This document was too large to scan as a single document. It has been divided into smaller sections.

Section 2 of 3

Document Information			
Document #	**SNF-6315**	**Revision**	**0**
Title	CSB MCH CGI DEDICATIONS		
Date	**05/17/2000**		
Originator	**CE SWENSON**	**Originator Co.**	**FH**
Recipient		**Recipient Co.**	
References	**EDT-629027, USQ-LIKE-CSB-0-0030**		
Keywords			
Projects	**W-379, SNF**		
Other Information			

Commercial Grade Item Upgrade Dedication Form

ECN No. N/A CGI No. CGI-SNF-D-MHM-047 Title Various P06, ~~07,~~ 21, and 26 Interlocks–Siemens Contactor #3TF4422-0AK6	Rev. No. 0 Page 1 of 8

Section 1 Part Information

Item No.: **N/A**	Manufacturer: **N/A**	Supplier: **N/A**
Mfg. Part/Model No.: **N/A**	Supplier's P/N: **N/A**	
Part Description: **N/A** ORIGINAL		
End Use Description: **N/A**		

Section 2a Component Information

Equipment No.: **TRLC**	Specification No.: **None**	Manufacturer: **Siemens**	Past P.O. No.: **N/A**
Manufacturer's Part/ Model No.: **3TF4422-0AK6**	Equipment Supplier (if different from manufacturer): ~~None~~ Siemens		Equip. Supplier's Part No.: **N/A**

Component Description: **3-Pole contactor with120 VAC coil with 2 NO and 2 NC auxiliary contacts. Located on the MHM. The 3-pole 480 VAC 3PH/60HZ main contacts are used to provide line power from the circuit breaker to the Turret Rotate motor variable frequency drive when the permissive control circuit requirements are met.**

Section 2b Commercial Availability of the Item

1. Is the Item available from a catalogue from a qualified NQA1 supplier or ISO 9000 supplier (coordinate with project CGI interface Engineer or BTR)?

   [ ] YES (go to #2 below) [X] NO (go to procedure step 6.3.2, proceed to dedicate Item)

   If not available from a qualified NQA1 supplier, is it available from an ISO 9000 supplier? (coordinate with project CGI Interface Engineer or BTR)

   [ ] YES (go to #2 below, procedure step 6.3.2, dedicate Item) [X] NO (procedure step 6.3.2, dedicate Item)

2. List of Candidate qualified NQA1 suppliers or ISO 9000 suppliers, if used: **N/A**

3. Recommended Procurement Strategy (coordinate with project CGI interface Engineer or BTR): **N/A**

Section 2c CGI Determination

CGI Determination Questions:

#1: Is the Item subject to design or specification requirements that are unique to nuclear facilities or activities?

[ ] YES (the Item is not commercial grade) [X] NO (continue)

#2: Is the Item used in applications other than nuclear facilities or activities?

[ ] NO (the item is not commercial grade) [X] YES (continue)

#3: Is the Item ordered from manufacturer/supplier on the basis of specifications set forth in the manufacturer's catalog?

[ ] NO (the item is not commercial grade) [X] YES (continue)

[X] All three criteria have been satisfied. The Item meets the definition of commercial grade.

Commercial Grade Item Upgrade Dedication Form

ECN No. **N/A** CGI No. **CGI-SNF-D-MHM-047**	Rev. No. 0
Title Various **P06, 07, 21, and 26 Interlocks–Siemens Contactor #3TF4422-0AK6**	Page 2 of 8

	Section 2d Reason for Dedication The above Commercial Grade (CG) described Item is being Dedicated for use in the application cited for the following reason(s):
	Item is being purchased from a non ESL manufacturer supplier as CG to be used in a Safety Class application.
	Item is being purchased from a non ESL manufacturer supplier as CG to be used in a Safety Significant application.
X	Item was purchased from a non ESL manufacturer supplier as CG to be used in a Safety Class application.
	Item was purchased from a non ESL manufacturer supplier as CG to be used in a Safety Significant application.
	Other ('like-for-like', similar, substitution, replacement evaluation)

Section 3 Failure Effects Evaluation

A. Part/Component Safety Function:

1. **Isolates line power from the Turret Rotate Drive motor when permissives are not met.**

1. Part/Component Functional Mode: Safety Function #1: [X] Active [ ] Passive Safety Function #2: [ ] Active [ ] Passive Safety Function #3: [ ] Active [ ] Passive	Active - Mechanical or Electrical change of state is required to occur for the component to perform its safety function Passive – Change of state is not required for the component to perform its safety function

C. Host Component Safety Function (if applicable):

1. **N/A**

D. Failure Mode(s) and the effects on component or system safety function (see Worksheet 1):

1. **Contact resistance out of spec results in overheating and welding of contacts**
2. **Hot short across contacts results in failure to open the circuit**
3. **Binding of contacts results in failure to open/close circuit**

Section 4 Environmental & Natural Phenomena Hazard Design

Environmental Qualification Required: Yes [ ] No [X]	If yes: Environmental Qualification Requirements Limiting Environmental Conditions: Required Safety Functions: Qualification Period:
Natural Phenomena Hazard (NPH) Design Required: Yes [ ] No [X]	If yes: NPH Design Requirements Performance Category: NPH Design Req'ts.: Required Safety Functions:

Section 5 Component Functional Classification

X	Safety Class (SC)		General Service (GS)		Safety Significant (SS)

If part/component classification is different from host component/system, document basis. **N/A**

Sections 6 and 7 (Reserved)

Section 8 References (for Functional Classification)

National Codes/Standards: **N/A**

Safety Analysis Report (SAR): **HNF-3672, Rev. 0**

Drawings: **Ederer, Inc. EB-33056, Sheets 25, 27**

Vendor Manual/Manufacturer/Supplier Information: **Siemens Industrial Control Products, World Series Contactors, 3TF4 3-Pole with AC coil**

Other: **ALSTOM ESL/R (96) 065 – Rev. D, 100% Design Submittal – June 1998**

Commercial Grade Item Upgrade Dedication Form	Rev. No. 0
ECN No. N/A CGI No. CGI-SNF-D-MHM-047 Title Various P06, 07, 21, and 26 Interlocks--Siemens Contactor #3TF4422-0AK6	Page 3 of 8

Section 9 Critical Characteristics

Critical Characteristics	Acceptance Criteria/Tolerances	Acceptance Method	ID	Function
1. Item Identification Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
Manufacturer	**Siemens**	**1, IN**	**X**	
Model Number	**3TF44**	**1, IN**	**X**	
Coil	**K6**	**1, IN**	**X**	
2. Physical Critical Characteristics (for reasonable assurance that the Item delivered is the Item specified)				
Contact configuration	**3 pole NO main contacts, 2 NO and 2 NC Aux Contacts**	**1, IN**	**X**	
3 Performance Critical Characteristics (for reasonable assurance that the Item will perform its intended safety function(s))				
Current carrying capability	**0.5V max. voltage drop across closed contacts at 25 amps resistive on main contacts and at 10 amps, resistive on auxiliary contacts**	**1, T**		**X**
Insulation resistance	**10 Megohm min across open contact terminals and terminals to ground (500 VDC meggar)**	**1, T**		**X**
Operation	**Contacts open/close at maximum pick-up (96 VAC) and minimum drop-out (36 VAC) voltages**	**1, T**		**X**

4. Notes and Legend: Notes and Legend: Siemens Number 3TF4422-0AK6 is a catalogue ordering number. 3TF44 is the model number of the contactor, the next two numbers are the style and number of auxiliary contacts, and the last two digits is the type of coil (e.g. K6 is a 120VAC, 60 hz coil). Typically the aux contacts do not have a designator on them so visual verification is used.

Acceptance Method (Acc Meth):
1. Special Test and Inspection:
   1, IN for Inspection
   1,T for Test
2. Commercial Grade Survey
3. Source Verification
1. Vendor/Item History

Section 10 Initial Review and Approval

Approvals:
Designated Engineer: [signature] 4/6/00
Design Authority: [signature] 4-6-00
Quality Assurance: [signature] 4-6-00

Commercial Grade Item Upgrade Dedication Form	Rev. No. 0
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WORKSHEET 1
DETERMINATION OF FAILURE MECHANISMS/MODES

Section 1			
Typical Failure Mechanisms	Definition	X = Applicable to Component under Evaluation	
		X?	Indicate Failure Mode
Fracture	Separation of a solid accompanied by little or no macroscopic plastic deformation.		
Corrosion	The gradual deterioration of a material due to chemical or electrochemical reactions, such as oxidation, between the material and its environment.		
Erosion	Destruction of materials by the abrasive action of moving fluids, usually accelerated by the presence of solid particles carried with the fluid.		
Open Circuit	An electrical circuit that is unintentionally broken so that there is no complete path for current flow.		
Short Circuit	An abnormal connection by which an electrical current is connected to ground, or to some conducting body, resulting in excessive current flow.	X	**Failure to open the circuit by contact welding or hot short across the contact base.**
Blockage	Clogging of a filtering medium resulting in the inability to perform its purification function or blockage of flow.		
Seizure	Binding of a normally moving item through excessive pressure, temperature, friction, jamming.	X	**Results in failure of contacts to open**
Unacceptable Vibration	Mechanical oscillations produced are beyond the defined permissible limits due to unbalancing, poor support, or rotation at critical speeds.		
Loss of Properties	A loss of mechanical and physical properties of a material due to exposure to high temperatures, radiation exposure.		
Excess Strain	Under the action of excessive external forces the material of the part has been deformed or distorted.		
Mechanical Creep	From prolonged exposure to high temperature and stress, the object will show a slow change in its physical (shape and dimension) and mechanical characteristics.		
Ductile Fracture	Fracture characterized by tearing of metal accompanied by appreciable gross plastic deformation.		
Section 2 Additional Failure Modes Applicable to the Component Under Evaluation			

Commercial Grade Item Upgrade Dedication Form

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ECN No. N/A CGI No. CGI-SNF-D-MHM-047	Page 5 of 8
Title Various P06, 07, 21, and 26 Interlocks–Siemens Contactor #3TF4422-0AK6	

Checklist 1 - Acceptance Method 1 - Special Test/Inspection Verification

SECTION 1

Item Description: **Siemens Contactor** System #: **Turret Rotate**	Equip #: TRLC Model #: **3TF4422-0AK6**
Manufacturer (Address/Phone): **Siemens Industrial Control Products** **1-800-964-4114**	Supplier (Address/Phone): **Ederer, Inc.**

SECTION 2 CRITICAL CHARACTERISTICS TO BE VERIFIED BY METHOD 1.

Insp	Test	PIT	
X			1. **Manufacturer**
X			2. **Contactor Model Number**
X			3. **Coil Model Number**
X			4. **Contact Configuration**
	X		5. **Contact Rating**
	X		6. **Insulation Resistance**
	X		7. **Operation**

SECTION 3 BY INSPECTION * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)

Characteristic: **Manufacturer** Sample Size*: **100%**

Acceptance Criteria: **Siemens**

Receipt Inspection Plan / Report #: CGI-SNF-D-MHM-047-TP-047

Characteristic: **Contactor Model Number** Sample Size*: **100%**

Acceptance Criteria: **3TF44**

Receipt Inspection Plan / Report #: TP-047*

Characteristic: **Coil Model Number** Sample Size*: **100%**

Acceptance Criteria: **K6**

Receipt Inspection Plan / Report #: TP-047*

Characteristic: **Contact Configuration** Sample Size*: **100%**

Acceptance Criteria: **3 Pole NO Main Contacts and 2 NO and 2 NC auxiliary contacts**

Receipt Inspection Plan / Report #: TP-047*

Commercial Grade Item Upgrade Dedication Form	Rev. No. 0
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SECTION 4 BY SPECIAL TEST * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)

Characteristic for Test: **Current carrying capability** Samp Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **0.5V max. voltage drop across closed contacts at 25 amps resistive on main contacts and at 10 amps, resistive on auxiliary contacts**

Actual Test Value: See Procedure Test Plan and Report #: TP-047*

Characteristic for Test: **Insulation Resistance** Samp Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **10 Megohms min across open contact terminals and terminals to ground, with 500 vdc megger.**

Actual Test Value: See Procedure Test Plan and Report #: TP-047*

Characteristic for Test: **Operation** Samp Size* [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **Contacts change state at max. pickup voltage of 96VAC and at min. drop-out voltage of 36VAC**

Actual Test Value: See Procedure Test Plan and Report #: TP-047*

*Full no. is: CGI-SNF-D-MHM-047-TP-047

SECTION 5 TEST / INSPECTION SUMMARY (Acceptance Method 1)

1. SUMMARY OF VERIFIED CRITICAL CHARACTERISTICS, THEIR VERIFICATION METHODS, AND RESULTS

ITEM DESCRIPTION: Contactor

Critical Characteristics				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/IN	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
Manufacturer	Siemens	X		1, IN	TP-047*	N/A	1	0	KWEST	LARRY PRICE	4/4/00
Contactor Model Number	3TF44	X		1, IN							
Coil Model Number	K6	X		1, IN							
Contact Configuration	3 Pole NO Main Contacts and 2 NO ands 2 NC auxiliary contacts	X		1, IN							
Current Carrying Capability	0.5V max voltage drop across closed terminals, 25 amps on main contacts and at 10 amps on aux. contacts, resistive		X	1, T							
Insulation Resistance	10 Megohms min across open contact terminals and terminals to ground (500VDC megger)		X	1, T							
Operation	Contacts change state at max pick-up voltage of 96VAC and at min drop-out voltage of 36VAC		X	1, T							

2. DISPOSITION OF UNVERIFIED OR FAILED CRITICAL CHARACTERISTICS

Critical Characteristic	Disposition

3. SIGNATURE INDICATES ALL CRITICAL CHARACTERISTICS VERIFIED SATISFACTORY OR ACCEPTABLY DISPOSITIONED AND COMMERCIAL GRADE DEDICATION IS SATISFACTORY AND COMPLETE.

See Test Plan TP-047 cited above. CES 4/11/00

Testing Agency Approval: NR CES 4/11/00 Date

Testing Agency QA Engineer: NR CES 4/11/00 Date

BUYER VERIFICATION

CES

Design Authority: Craig Severson Date 4-11-00

QA Engineer: Stephen Scott Moss Date 4-24-2000

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Title: Various P06, 07, 21, and 26 Interlocks--Siemens Contactor #3TF4422-0AK6

SECTION 6 CONTACTS / PHONE NUMBERS		
	Name	Phone
Design Authority	CRAIG SWENSON	( ) 376-0288
QA		( )
QC		( )
Cog - Engineer		( )
CGI Engineer		( )
Procurement Engineer		( )
Other		( )

SECTION 7 SUPPORTING DOCUMENTATION FOR THIS CHECKLIST		
Initial Procurement Documents		**For Critical Characteristics**
	Drawings:	
X	Manuals (specify type & number): **Siemens Industrial Control Products, Contractor, 3TF4 3-Pole**	**All**
	Design Calculations	
	Installation Instructions	
	Operation Instructions	
	Calibration Instructions	
	Manufacturer's Recommended Spare Parts List	
	Other:	
Procurement Documents:		**For Critical Characteristics**
	Certificate of Conformance/Compliance	
	Seismic Qualification Certificate	
	Environmental Qualification Certificate	
	Test Report (s):	
	Inspection Report (s):	
	CMTRs for ASME Pressure Retaining Materials	
	Valve Seat Leakage Report	
	Weld Records	
	Material Traceability Record	
	Other:	

Dedication Test Plan – IST
Test Plan No.: CGI-SNF-D-MHM-047-TP-047
Test Specimen: Siemens 3TF4422, Eqmt. No.: TRLC

ORIGINAL

Rev. No. 0

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI Eng	DA	QA Post Review*
						3/22/00 NO CHANGES

* QA Post Review of Individual Revisions is allowed

ORIGINAL

ORIGINAL

In-Situ Test Procedure

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) YMP Larry Thomas Date: 3/16/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Belhaven	Michael Cram	MRC
Electrician	JW EBERHART	PCE	JW Eberhart	JWE
Electrician Quality Control	Stephen R. Cooley	RE	Stephen R. Cooley	SRC
Design Authority Representative	LARRY W. PRICE	KWEST		YMP
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Current Source capable of 10 amps and 25 amps
Megger Instrument capable of 500 VDC Test Voltage
Adjustable Voltage Power supply capable of 0 to 120 VAC minimum
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: AVO B4180/2 I.D.: 6410-889 Calib. Due date: 02-09-01

Test Instrument type: HP 3457A I.D.: BAT 123 Calib. Due date: 07-29-00

Test Instrument type: HP 3457A I.D.: BAT 124 Calib. Due date: 07-30-00

Test Instrument type: PROTO 6106 I.D.: 029E/009 Calib. Due date: 01-13-01

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE:

For this In-Situ Test, certain leads must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of leads.

1.0 Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	TRLC	**TRLC**	Acc.
Manufacturer:	SIEMENS	**Siemens**	Acc.
Model:	3TF44	**3TF44**	Acc.
Contact Configuration:	YES	**3 pole Main Contacts and 2 NO & 2 NC auxiliary contacts**	Acc.
Serial No./Lot No./Date Code:	OK	**N/A**	Acc.
Coil:	K6	**K6**	Acc

2.0 Perform the following testing steps: 03-16-00 2:00 p.m

2.1 **Record:** Date /Time of Test Beginning: ~~03-17-00~~ MRC

2.2 **Operation** YUPPIES

2.2.1 Regulate voltage to the coil of the contactor and monitor the maximum pick-up voltage and minimum drop-out voltages.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Pick-up Voltage	98.853 VAC	**102 VAC maximum**	Acc.
Drop-out Voltage	45.173 VAC	**36 VAC minimum**	Acc

2.2.2 De-energize and remove test equipment.

2.3 Insulation Resistance Test

2.3.1 Setup the test equipment and contactor specimen for insulation resistance testing.

2.3.2 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the test specimen. Record data below.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
L1	T1	>100Gohm	> 10 Megohms	Acc
L2	T2	>100Gohm	> 10 Megohms	Acc
L3	T3	>100Gohm	> 10 Megohms	Acc
13	14	>100Gohm	> 10 Megohms	Acc
43	44	>100Gohm	> 10 Megohms	Acc
L1	Ground	>100Gohm	> 10 Megohms	Acc
L2	Ground	>100Gohm	> 10 Megohms	Acc
L3	Ground	>100Gohm	> 10 Megohms	Acc
T1	Ground	>100Gohm	> 10 Megohms	Acc
T2	Ground	>100Gohm	> 10 Megohms	Acc
T3	Ground	>100Gohm	> 10 Megohms	Acc
13	Ground	>100Gohm	> 10 Megohms	Acc
14	Ground	>100Gohm	> 10 Megohms	Acc
43	Ground	>100Gohm	> 10 Megohms	Acc
44	Ground	>100Gohm	> 10 Megohms	Acc
21 or 22	Ground	>100Gohm	> 10 Megohms	Acc
31 or 32	Ground	>100Gohm	> 10 Megohms	Acc
A1 or A2 (coil)	Ground	>100Gohm	> 10 Megohms	Acc

2.4 Contact Rating Test

2.4.1 Setup the test equipment and contactor specimen for contact rating testing.

2.4.2 Manually adjust the contactor or apply 120 VAC to the coil to close the normally open contacts

2.4.3 Apply a nominal 25 amps VAC, resistive, across closed main contacts of the test specimen

2.4.4 Apply a nominal 10 amps VAC, resistive, across the closed NO auxiliary contacts of the test specimen.

Caution: Do not change state of contacts while energized.

2.4.5 Record the following data.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Main Contacts L1 Closed	.0355 VAC	**< 0.5 ± 10% Volts AC drop**	Acc
Main Contacts L2 Closed	.0351 VAC	**< 0.5 ± 10% Volts AC drop**	Acc
Main Contacts L3 Closed	.0401 VAC	**< 0.5 ± 10% Volts AC drop**	Acc
Auxiliary NO Contact 13-14 (closed)	.0998 VAC	**< 0.5 ± 10% Volts AC drop**	Acc
Auxiliary NO Contact 43-44 (closed)	.1042 VAC	**< 0.5 ± 10% Volts AC drop**	Acc

2.4.6 De-energize and remove test equipment.

2.4.7 Apply a nominal 10 amps VAC, resistive, across the normally closed auxiliary contacts of the test specimen.

2.4.8 Record the following data.

Caution: Do not change state of contacts while energized.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Auxiliary NC 21-22 Contacts	.1270 VAC	**< 0.5 ± 10% Volts AC drop**	Acc
Auxiliary NC 31-32 Contacts	.1284 VAC	**< 0.5 ± 10% Volts AC drop**	Acc

2.4.9 De-energize and remove the test equipment.

2.5 Terminate the test.

2.5.1 Reland the lifted leads and verify reland in accordance with the Lifted Lead Log.

2.5.2 Retorque the terminals to 12 in-pounds.

2.5.3 Record: Date /Time of Test End: 03-17-00 9:00 a.m.

3.0 References

3.1 Elementary Wiring Drawings: EB-33056 Sheet 25A

3.2 Y-Channel Main Power Panel Wiring Diagram: ED-33069 Sheet 1

Dedication Test Plan – IST	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-047-TP-047	
Test Specimen: Siemens 3TF4422, Eqmt. No.: TRLC	Page 6 of 7

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Acceptance Criteria has been met

Michael Cram
03-17-00

Notes:

Certified InstrumentationTechnician (signature) Michael Cram Date: 03-17-00.

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

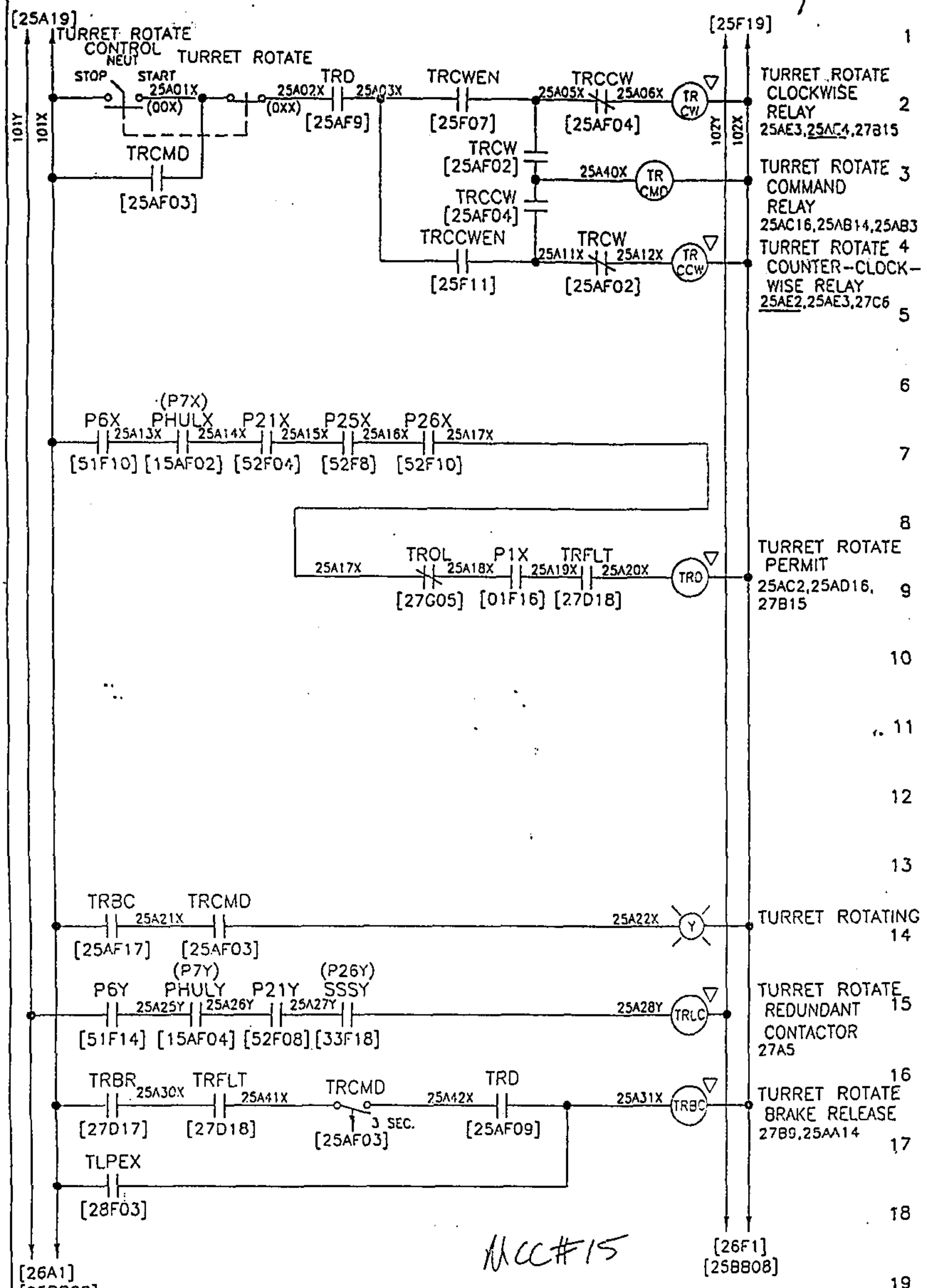
Design Authority (signature) Craig Swenson Date: 3/20/00.

QA/QC (signature) Stephen Scott Mock Date: 3-22-2000.

LIFTED LEAD LOG

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
E3-33056		25A26Y	TRLC	A-1	JWE	3/16/00	SRC	3-16-00	JWE	3/17/00	SRC	3-17-00
		Black	RCSA-6	A-1	JWE	3/16/00	SRC	3-16-00	JWE	3/17/00	SRC	3-17-00
		Grey		A-2	JWE	3/16/00	SRC	3-16-00	JWE	3/17/00	SRC	3-17-00
		2) 102Y		A-2	JWE	3/16/00	SRC	3-16-00	JWE	3/17/00	SRC	3-17-00
		TRx 1	TRLC	L-1	JWE	3/16/00	SRC	3-16-00	JWE	3/17/00	SRC	3-17-00
		TRx 2		L-2	JWE	3/16/00	SRC	3-16-00	JWE	3/17/00	SRC	3-17-00
		TRx 3		L-3	JWE	3/16/00	SRC	3-16-00	JWE	3/17/00	SRC	3-17-00
		TRM-1		T-1	JWE	3/16/00	SRC	3-16-00	JWE	3/17/00	SRC	3-17-00
		TRM-2		T-2	JWE	3/16/00	SRC	3-16-00	JWE	3/17/00	SRC	3-17-00
		TRM-3		T-3	JWE	3/16/00	SRC	3-16-00	JWE	3/17/00	SRC	3-17-00

Remarks:



MCC#15

HANFORD DWG # H-2-828710 SHT 41 OF 97

REVISIONS

LTR	DESCRIPTION	DATE	BY	CHK	ENG	APPD	APPD
D	GENERAL REVISION	7/25/97	JBR	JMH	TMM	JMH	
E	REMOVED ROTATE SWITCHES & P2X; ADDED TRMC2 & TRMC3	8/20/97	JBR	JMH	TMM	JMH	LLA
F	ADDED SHEET 25B; MADE TROL CONTACT NC	9/4/97	JBR	JMH	TMM	JMH	CM
G	DELETE TRCO & TRCCO	10/25/97	JRS	TMM	TMM	JMH	CM
H	DE-INERTING & SIMPLIFICATION	3/9/98	CSB	SEO	CSB		
J	REMOVE TRMC3 AND TRMC2 FROM TRCW & TRCCW	7/20/98	CSB	SEO	CSB		
K	REVISED PER INSTALLATION MARK-UPS	3/17/99	CSB	[illegible]	[illegible]		

DRWN	J B RUPP	7/25/97
CHCK	T M MEADOWS	7/25/97
ENG	T M MEADOWS	7/25/97
APPD	J M WARWICK	7/25/97
APPD	L L ANDERSON	8/1/97
APPD		

SCALE N/A
FIRST USED ON F-256U

EDERER INCORPORATED
EDERER CRANES · WASHINGTON CRANES · STAR CRANES

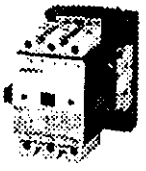
TURRET ROTATE CONTROL ELEMENTARY

DWG. NO. EB-33056 SHEET 25A OF 25B REV K

EB-33056 25A

3TF4 3-Pole with AC Coil

3TF43



3TF48

Ordering Information

- Select Contactor from table below.
- Complete Catalog Number from coil code table.
  Example: **3TF4010-0AK6**

Additional References

- Overload Relays see pages 361–363.
- Accessories see pages 357–360.
- Replacement Parts see pages 912–913.
- Technical Data see pages 378–379.
- Electrical Life Curves see page 381.
- Dimensions see page 394.
- Wiring Diagrams see page 302.

Coil Voltage Codes

AC Voltage 60Hz	50Hz	Code
24	24	C2
120	110	K6
208	208	M2
277	220	U1
240	220	P6
480	380–415	V0
600	500	S0

Ampere Rating Enclosed		1 Phase HP Ratings		3 Phase HP Ratings				Auxiliary Contacts Type			
IEC AC-3	UL	115V	230V	200V	230V	460V	575V	NO	NC	Catalog No	Price $
9	20	½	1½	2	3	5	7½	1	0	3TF4910-0A††	105.
12	20	1	2	3	3	7½	10	1	0	3TF4110-0A††	135.
16	30	1	3	5	5	10	15	1	0	3TF4210-0A††	150.
22	30	2	3	7½	7½	15	20	1	0	3TF4310-0A††	159.
32	55	3	5	10	10	25	30	1	1	3TF4411-0A††	180.
38	55	3	7½	10	15	25	30	1	1	3TF4511-0A††	206.
Auxiliary Contacts may be added to 3TF46–3TF56 for maximum 4 NO and 4 NC①											
45	80	5	10	15	20	40	50	1	1	3TF4611-0A††	276.
63	80	5	15	20	25	50	60	1	1	3TF4711-0A††	348.
75	100	7½	15	25	30	60	75	1	1	3TF4811-0A††	420.
85	105	—	—	30	40	75	100	1	1	3TF4911-0A††	520.

3TF Contactors— Auxiliary Contact

Replace 6th (NO Aux. Contact) and 7th (NC Aux. Contact) digit in Catalog Number per chart. Example: 3TF4411-0AK6.

Contactors	Auxiliary Contacts NO 6th Digit	NC 7th Digit	Price Adder $
3TF40–3TF43	1	0	STD
	0	1	No Adder
	1	1	12.
	2	2	24.
3TF44–3TF45	1	1	STD
	2	2	24.
3TF46–3TF49	1	1	STD
	2	2	24.
	4②	4②	48.

①See Auxiliary Contact table for standard and optional Auxiliary Contact Configurations.

②Field assembled kit.

3TF3, 3TF4, CRLOF3 and CRLOF4

Technical Data

	NEMA Size		00		0		1	
Contactor	**Type**	**Units of Measure**	**3TF30/40 CRLOF30/40**	**3TF31/41 CRLOF31/41**	**3TF32/42 CRLOF32/42**	**3TF33/43 CRLOF33/43**	**3TF34/44 CRLOF34/44**	**3TF35/45 CRLOF35/45**
Mechanical life	make/break operations	Mil	15		15		10	
Insulation rating		V	690					
Ambient temperature range		°C	−25 to +55 in operation, −55 to +80 when stored					
Coil ratings (cold coil 1.0 × U_s)		Hz	50	60			50	60
AC operation	Inrush	VA	68	75			87	115
	p.f.		0.82	0.76			0.82	0.75
	Sealed	VA	10	9.4			13	13
	p.f.		0.29	0.29			0.27	0.27
DC operation	Inrush = Sealed	W	6.5				11.7	
Coil voltage range:	AC		0.85 to 1.1 × U_s				0.85 to 1.1 U_s	
	at DC 24V		0.8 to 1.2 × U_s				0.8 to 1.1 U_s	
Operating times[1] (Valid for 20% undervoltage to 10% overvoltage cold or warm coil)			(Values are applicable up to and including 20% undervoltage, 10% overvoltage as well as with the coil in cold state and operating temperature)					
AC operation	closing delay	ms	8–35		10–35		13–57	
	opening delay	ms	4–18		5–20		5–10	
DC operation	closing delay	ms	20–170		35–180		54–182	
	opening delay	ms	10–25		10–25		13–17	
Operating times at 1.0 × U_s[1]								
AC operation	closing delay	ms	10–15		10–25		13–32	
	opening delay	ms	4–18		5–20		5–10	
DC operation	closing delay	ms	30–70		40–80		58–107	
	opening delay	ms	12–20		10–25		13–17	
Resistance to shock (rectangular pulse)	AC	g/ms	7.7/5, 4.4/10		5.8/5, 3.4/10		6.2/5, 3.6/10	
Conductor sizes For contactors without overload relay								
main conductor; solid or stranded	main	AWG	(2) 18–12	(2) 18–12	(2) 14–10	(2) 14–10	(1) 14–3 or (2) 16–6	
auxiliary conductor; solid or stranded	aux.	AWG	(2) 18–12	(2) 18–12	(2) 18–12	(2) 18–12	(2) 18–12	
Switching frequency in make/break operations per hour Contactors without overload relay								
	to AC-1	ops./h	1500		1500		1200	1200
	to AC-2	ops./h	1000		750		750	600
	to AC-3	ops./h	1000		750		750	600
	to AC-4	ops./h	250		250		250	200
Contactor with overload relay (avg. value)		1/h	15		15		15	15
Auxiliary contacts								
Ⓢ, Ⓡ and ratings for auxiliary contacts								

				24V	120V	240V	480V	600V
Auxiliary Contacts within 3TF30 and 3TF31 and 3TF40 through 3TF45	Rated voltage switching capacity continuous current 10 Amp (AC/DC)	AC 600V max NEMA A600						
		Make	A	60	60	30	15	12
		Break	A	6	6	3	1.5	1.2
		DC 600V max. NEMA P600		24V	125V	250V	300V	600V
		Make	A	1.1	1.1	0.55	0.20	0.20
		Break	A	1.1	1.1	0.55	0.20	0.20
Auxiliary contact blocks for 3TF30 to 3TF35. Cat. 3TX40		AC 600V max NEMA A600						
		DC 600V max. NEMA Q600		24V	125V	200V	300V	600V
		Make	A	0.55	0.55	0.27	0.10	0.10
		Break	A	0.55	0.55	0.27	0.10	0.10

Load/Life Curves shown with 3TF contactor technical data page XXX

[1] The opening time delay is increased when the contactor coil is protected against voltage peaks (diode 6 to 9 times; diode combination 2 to 6 times; varistor + 2 to 6 ms).

World Series Contactors

3TF4 and CRLOF4

NEMA Size			2		3	
Contactor	**Type**	**Unit of Measure**	**3TF46 CRLOF46**	**3TF47 CRLOF47**	**3TF48 CRLOF48**	**3TF49 CRLOF49**
Mechanical life	make/break operations	Mil	10	10	10	10
Insulation rating		V	1000	1000	1000	1000
Ambient temperature range		°C	−25 to +55 in operation, −50 to +80 when stored			
Coil ratings (cold coil, 1.0 × U_c)		Hz	50 60		50 60	
AC operation	Inrush	VA	183 185		345 360	
	p.f.		0.5 0.54		0.5 0.4	
	Sealed	VA	17 15		35 31	
	p.f.		0.29 0.29		0.23 0.24	
DC economy circuit	Inrush	W	400 —		420 —	
	Sealed	W	2.1 —		2.7 —	
DC solenoid system	Closing = Closed	W	15 —		— —	
Coil voltage range	AC		0.85 to 1.1 × U_s			
Operating times (valid for 20% undervoltage to 10% overvoltage, cold or warm coil) Total break time = opening delay + arcing time						
AC operation	closing delay	ms	15–40		20–50	
	opening delay①	ms	5–25		5–30	
	arcing time	ms	10–15		10–15	
Operating times at 1.0 × U_s						
AC operation	closing delay	ms	17–30		22–35	
	opening delay①	ms	5–25		5–30	
Resistance to shock (rectangular pulse)		g/ms	11.2/5	6.6/10	8.6/5	4.8/10
Conductor sizes For contactors without overload relay						
main conductor: solid or stranded		AWG	max. 1/0		max. 1/0	
auxiliary conductor: solid or stranded		AWG	2 × (18 to 12)		2 × (18 to 12)	
Switching frequency in make/break operations per hour (1/h)						
Contactors without overload relay						
	duty AC-1	1/h	1000	1000	900	900
	duty AC-2	1/h	600	400	400	350
	duty AC-3	1/h	1200	1000	1000	850
	duty AC-4	1/h	400	300	300	250
Contactors with overload relay (average value)		1/h	15	15	15	15

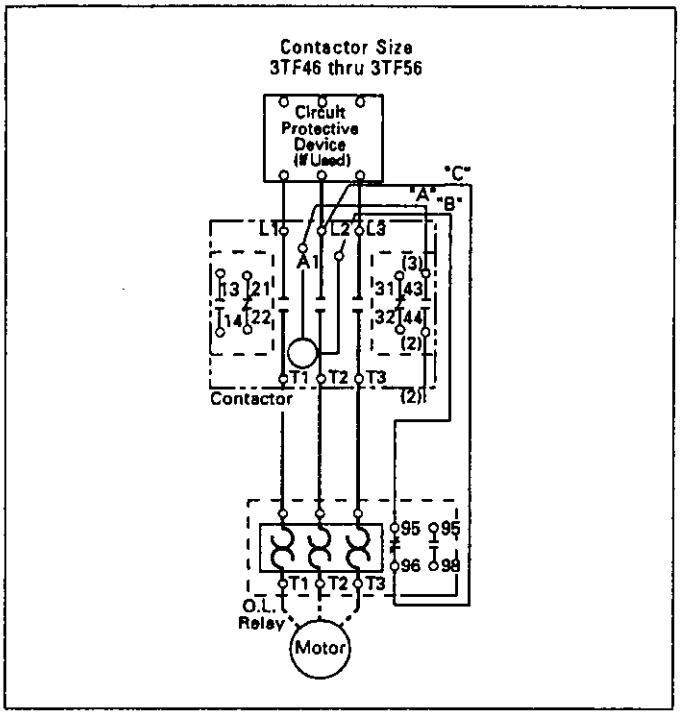
Auxiliary contacts

Ⓤ, UL and CSA ratings for auxiliary contacts

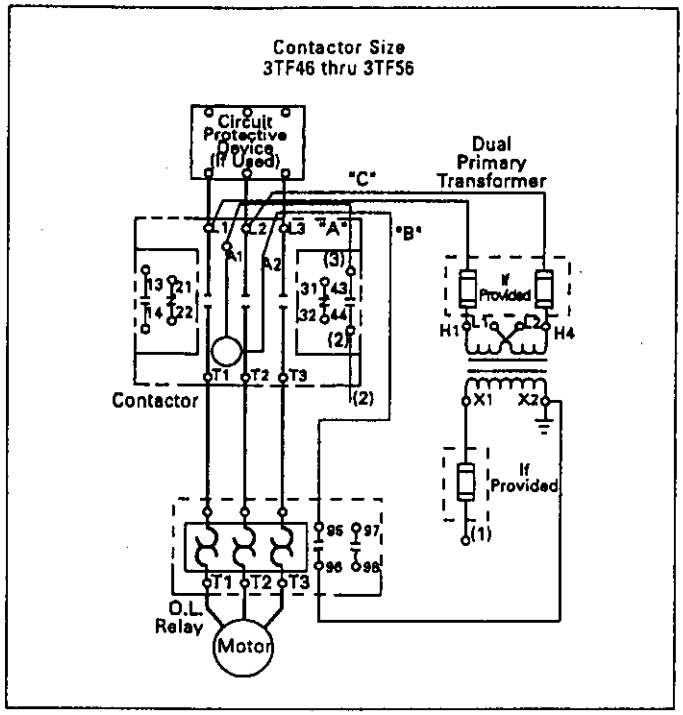
3TF40 thru 3TF57	Rated voltage switching capacity	AC 600V maximum NEMA A600		24V	120V	240V	480V	600V
		Make	A	60	60	30	15	12
		Break	A	6	6	3	1.5	1.2
	Continuous current 10A (AC/DC)	DC 600V maximum NEMA P600		24V	150V	250V	300V	600V
		Make	A	1.1	1.1	0.55	0.20	0.20
		Break	A	1.1	1.1	0.55	0.20	0.20

①The opening delay can increase if the coils have voltage spike protection. Diodes may only be attached to contactors up to **3TF44**.

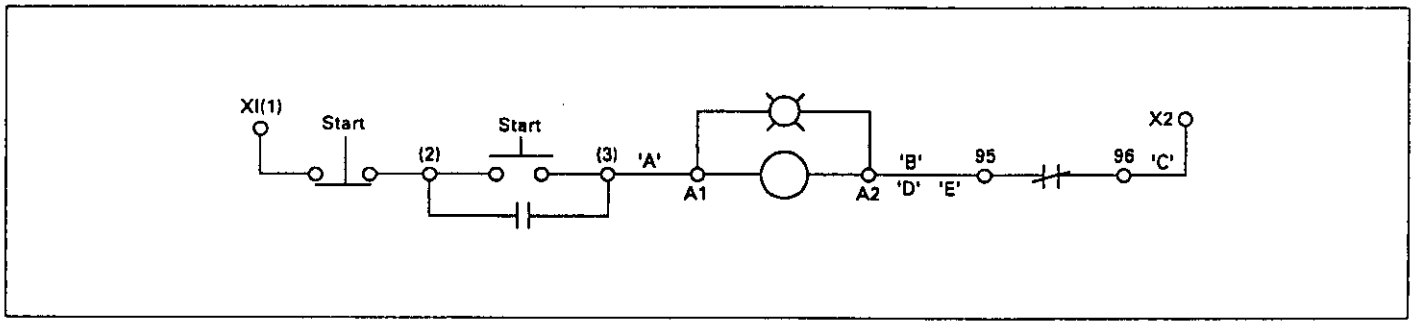
Without Control Power Transformer



With Control Power Transformer



Standard Pilot Control
Wire "C" omitted on starters with coils rated 120V or less.



Note: Starters with Contactor Sizes 3TF40 through 3TF44 are provided with the overload relays which mount directly to the contactor. These overload relays are provided with a contactor coil A2 repeat terminal. Wire "D" is integral with the overload relay. Jumper wire "E" is provided on the overload relay.

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Commercial Grade Item Upgrade Dedication Form

Rev. No. 1

ECN No. N/A CGI No. CGI-SNF-D-MHM-037

Page 1 of 8

Title: **Ashcroft Hydraulic Pressure Gauge #45-1009S-02L-2000**

Section 1 Part Information

Item No.: **N/A**	Manufacturer: **N/A**	Supplier: **N/A**
Mfg. Part/Model No.: **N/A**	Supplier's P/N: **N/A**	

Part Description: **N/A**

ORIGINAL

End Use Description: **N/A**

Section 2a Component Information

Equipment No.: **BSPGE, BSPGW**	Specification No.: **None**	Manufacturer: **Ashcroft**	Past P.O. No.: **N/A**
Manufacturer's Part/Model No.: **45-1009S-02L-2000**	Equipment Supplier (if different from manufacturer): None RICHLAND IND. YMP LES 4/11/00		Equip. Supplier's Part No.: **N/A**

Component Description:

4-1/2" dial and 0-2000 psig range hydraulic pressure 316 SS gauge has a 1/4" process connection and is mounted near the seismic restraints.

Section 2b Commercial Availability of the Item

1.. Is the Item available from a catalogue from a qualified NQA1 supplier or ISO 9000 supplier (coordinate with project CGI interface Engineer or BTR)? [ ] YES (go to #2 below) [X] NO (go to procedure step 6.3.2, proceed to dedicate Item)

If not available from a qualified NQA1 supplier, is it available from an ISO 9000 supplier? (coordinate w/ project CGI Interface Engineer or BTR) [ ] YES (go to #2 below, procedure step 6.3.2, dedicate Item) [X] NO (procedure step 6.3.2, dedicate Item)

2. List of Candidate qualified suppliers or ISO 9000 suppliers **N/A**

3. Recommended Procurement Strategy (coordinate with project CGI interface Engineer or BTR): **N/A**

Section 2c CGI Determination

CGI Determination Questions:

#1: Is the Item subject to design or specification requirements that are unique to nuclear facilities or activities?

[ ] YES (the Item is not commercial grade) [X] NO (continue)

#2: Is the Item used in applications other than nuclear facilities or activities?

[ ] NO (the item is not commercial grade) [X] YES (continue)

#3: Is the Item ordered from manufacturer/supplier on the basis of specifications set forth in the manufacturer's catalog?

[ ] NO (the item is not commercial grade) [X] YES (continue)

[X] All three criteria have been satisfied. The Item meets the definition of commercial grade.

Commercial Grade Item Upgrade Dedication Form	Rev. No. 1
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Section 2d Reason for Dedication The above described Item is being Dedicated for use in the application cited for the following reason(s):	
X	Item is being purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Class application.
	Item is being purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Significant application.
	Item was purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Class application.
	Item was purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Significant application.
	Other ('like-for-like', similar, substitution, replacement evaluation)

Section 3 Failure Effects Evaluation

A. Part/Component Safety Function:

1. **Provided visual indication of seismic restraints status.**

B. Part/Component Functional Mode:

Safety Function #1: [ ] Active [X] Passive

Safety Function #2: [ ] Active [ ] Passive

Safety Function #3: [ ] Active [ ] Passive

Active - Mechanical or Electrical change of state is required to occur for the component to perform its safety function

Passive – Change of state is not required for the component to perform its safety function

C. Host Component Safety Function (if applicable): **N/A**

1.

D. Failure Mode(s) and the effects on component or system safety function (see Worksheet 1):

1. **Failure of pressure gauge, i.e. rupture results in rapid pressure reduction.**

Section 4 Environmental & Natural Phenomena Hazard Design

Environmental Qualification Required:

Yes [ ]

No [X]

If yes: Environmental Qualification Requirements

Limiting Environmental Conditions:

Required Safety Functions:

Qualification Period:

Natural Phenomena Hazard (NPH) Design Required:

Yes [ ]

No [X]

If yes: NPH Design Requirements

Performance Category:

NPH Design Req'ts.:

Required Safety Functions:

Section 5 Component Functional Classification

X	Safety Class (SC)		General Service		Safety Significant (SS)

If part/component classification is different from host component/system, document basis. **N/A**

Sections 6 and 7 (Reserved)

Section 8 References (for Functional Classification)

National Codes/Standards: **N/A**

Safety Analysis Report (SAR): **HNF-3672 Rev. 0**

Drawings: **Hanford H-2-830016**

Vendor Manual/Manufacturer/Supplier Information: **Ashcroft Hydraulic Gauges Catalog Cut Sheet Reference Bulletin IG-1**

Other: **ALSTROM ESL/R (96) 065-Rev. D, 100% Design Submittal, June 1998.**

Commercial Grade Item Upgrade Dedication Form

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Title: **Ashcroft Hydraulic Pressure Gauge #45-1009S-02L-2000**	Page 3 of 8

Section 9 Critical Characteristics				
Critical Characteristics	Acceptance Criteria/Tolerances	Acceptance Method	ID	Function
1. Item Identification Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
Manufacturer	**Ashcroft**	**1, IN**	**X**	
Model Number	**45-1009S-02L-2000**	**1, IN**	**X**	
2. Physical Critical Characteristics (for reasonable assurance that the Item delivered is the Item specified)				
Dial Size	**4-1/2" Nominal**	**1, IN**	**X**	
Process Connection	**1/4" Nominal**	**1, IN**	**X**	
Indicator Range, Figure Interval, Minor Graduation	**0-2000 psi, 200, 20**	**1, IN**	**X**	
3 Performance Critical Characteristics (for reasonable assurance that the Item will perform its intended safety function(s))				
Pressure Boundary Integrity	**No leakage at test pressure of 1980 psig for minimum of 10 minutes. Note 1**	**1, T**		**X**
Operating Range Accuracy	**± 1% full scale at pressure range of 1300-1600 psig**	**1, T**		**X**

4. Notes and Legend:

Note 1: Pressure Boundary Integrity test at 110% of design pressure of 1800 psig.

Model Number Breakdown: 45-1009S-02L-2000, 45 = 4.5" Dial Size; 1009 = Gauge Type; S = 316 SS Tube & Socket Material; 02 = 1/4" Connection; L = Connection Location is Lower; 2000 = Standard Pressure Range is 0-2000 psi

Rev. 1: Pages 3,5,7: Deleted Physical CC of Material-Bourdon tube, Tip, Socket: 316SS; Pages 3,6,7: Changes Performance CC of Pressure Boundary Integrity of (No Bubbles) to "for minimum of 10 minutes"

Acceptance Method (Acc Meth):
1. Special Test and Inspection:
   1, IN for Inspection
   1, T for Test
2. Commercial Grade Survey
3. Source Verification
3. Vendor/Item History

Section 10 Initial Review and Approval

Approvals:

Designated Engineer: [signature]

Design Authority: Erwin Craig Swenson

QA Engineer: [signature] 2/1/00

T Z ANDERSON

Commercial Grade Item Upgrade Dedication Form	Rev. No. 1
ECN No. N/A CGI No. CGI-SNF-D-MHM-037	Page 4 of 8
Title: **Ashcroft Hydraulic Pressure Gauge #45-1009S-02L-2000**	

WORKSHEET 1
DETERMINATION OF FAILURE MECHANISMS/MODES

Section 1			
Typical Failure Mechanisms	Definition	X = Applicable to Component under Evaluation	
		X?	Indicate Failure Mode
Fracture	Separation of a solid accompanied by little or no macroscopic plastic deformation.		
Corrosion	The gradual deterioration of a material due to chemical or electrochemical reactions, such as oxidation, between the material and its environment.		
Erosion	Destruction of materials by the abrasive action of moving fluids, usually accelerated by the presence of solid particles carried with the fluid.		
Open Circuit	An electrical circuit that is unintentionally broken so that there is no complete path for current flow.		
Short Circuit	An abnormal connection by which an electrical current is connected to ground, or to some conducting body, resulting in excessive current flow.		
Blockage	Clogging of a filtering medium resulting in the inability to perform its purification function or blockage of flow.		
Seizure	Binding of a normally moving item through excessive pressure, temperature, friction, jamming.		
Unacceptable Vibration	Mechanical oscillations produced are beyond the defined permissible limits due to unbalancing, poor support, or rotation at critical speeds.		
Loss of Properties	A loss of mechanical and physical properties of a material due to exposure to high temperatures, radiation exposure.		
Excess Strain	Under the action of excessive external forces the material of the part has been deformed or distorted.	X	**Rupture of pressure gauge will cause rapid reduction of hydraulic pressure.**
Mechanical Creep	From prolonged exposure to high temperature and stress, the object will show a slow change in its physical (shape and dimension) and mechanical characteristics.		
Ductile Fracture	Fracture characterized by tearing of metal accompanied by appreciable gross plastic deformation.		
Section 2 Additional Failure Modes Applicable to the Component Under Evaluation			
1.			
2.			
3.			

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Checklist 1 - Acceptance Method 1 - Special Test/Inspection Verification

SECTION 1

Item Description: **Ashcroft Hydraulic Pressure Gauge** System #: **MHM**	Equip #: **BSPGE, BSPGW** Model #: **45-1009S-02L-2000**
Manufacturer (Address/Phone): **Ashcroft** **203-378-8281** **Fax: 203-385-0499**	Supplier (Address/Phone):

SECTION 2 CRITICAL CHARACTERISTICS TO BE VERIFIED BY METHOD 1.

Insp	Test	Post-Test		
X			1.	**Manufacturer**
X			2.	**Model**
X			3.	**Dial Size**
X			4.	**Process Connection**
X			5.	**Indicator Range, Figure Interval, Minor Graduation**
	X		6.	**Pressure Boundary Integrity**
	X		7.	**Operating Range Accuracy**

SECTION 3 BY INSPECTION * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)

Characteristic: **Manufacturer** Sample Size*: **100%**

Acceptance Criteria: **Ashcroft**

Receipt Inspection Plan / Report #: TP037*

Characteristic: **Model** Sample Size*: **100%**

Acceptance Criteria: **45-1009S-02L-2000**

Receipt Inspection Plan / Report #: TP037*

Characteristic: **Dial Size** Sample Size*: **100%**

Acceptance Criteria: **4-1/2" Nominal**

Receipt Inspection Plan / Report #: TP037*

Characteristic: **Process Connection** Sample Size*: **100%**

Acceptance Criteria: **¼" Nominal**

Receipt Inspection Plan / Report #: TP037*

Characteristic: **Indicator Range, Figure Interval, Minor Graduation** Sample Size*: **100%**

Acceptance Criteria: **0-2000 psi, 200, 20**

Receipt Inspection Plan / Report #: TP037*

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SECTION 4 BY SPECIAL TEST * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)

Characteristic for Test: **Pressure Boundary Integrity** Samp Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **No leakage at test pressure of 1980 psig for minimum of 10 minutes**

Actual Test Value: See TP037* Test Plan and Report #: TP037*

Characteristic for Test: **Operating Range Accuracy** Samp Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **± 1% full scale at pressure range of 1300-1600 psig**

Actual Test Value: See TP037* Test Plan and Report #: TP037*

*Full no. is: CGI-SNF-D-MHM-037-TP-037

Section 5 Test / Inspection Summary (Acceptance Method 1)

1. SUMMARY OF VERIFIED CRITICAL CHARACTERISTICS , THEIR VERIFICATION METHODS, AND RESULTS

ITEM DESCRIPTION: Hydraulic pressure gauge

Critical Characteristics				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/IN	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
Manufacturer	Ashcroft	X		1, IN	TP037*	NA	2	0	XWEST	[signature]	4/11/00
Model	45-1009S-02L-2000	X		1, IN							
Dial Size	4-1/2" Nominal	X		1, IN							
Process Connection	Nominal ¼"	X		1, IN							
Indicator Range, Figure Interval, Minor Graduation	0-2000 psi, 200, 20	X		1, T							
Pressure Boundary Integrity	No leakage at test pressure of 1980 psig for minimum of 10 minutes.		X	1, T							
Operating Range Accuracy	± 1% full scale at pressure range of 1300-1600 psig		X	1, T							

2. DISPOSITION OF UNVERIFIED OR FAILED CRITICAL CHARACTERISTICS

Critical Characteristic	Disposition

3. SIGNATURE INDICATES ALL CRITICAL CHARACTERISTICS VERIFIED SATISFACTORY OR ACCEPTABLY DISPOSITIONED AND COMMERCIAL GRADE DEDICATION IS SATISFACTORY AND COMPLETE.

See Test Plan TP-037 cited above, CES 4/11/00

Testing Agency Approval: NR CES 4/11/00 Date 4/11/00

Testing Agency QA Engineer: NR CES 4/11/00 Date

BUYER VERIFICATION

Design Authority: CES [signature] Date 4-13-00

QA Engineer: Stephen Scott Mosh Date 4-24-2000

SNF-6315, Rev. 0

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Section 6 Contacts/Phone Numbers		
	Name	Phone
Design Authority	CRAIG SWENSON	376-0288
QA		
QC		
Cog - Engineer		
CGI Engineer		
Procurement Engineer		
Other		

Section 7 Supporting Documentation for this Checklist		
Initial Procurement Documents		**For Critical Characteristics**
X	Drawings: **SBC100X2 Rail Clamp Dwg. A3826-02.0, 12.0, 22.0, P3.0**	**Those pertaining to operating and limiting pressures**
	Manuals (specify type & number):	
	Design Calculations	
	Installation Instructions	
	Operation Instructions	
	Calibration Instructions	
	Manufacturer's Recommended Spare Parts List	
X	**Other: Ashcroft Hydraulic Gauges Catalog Cut Sheet Reference Bulletin IG-1**	**All, except as noted above**
Procurement Documents		**For Critical Characteristics**
	Certificate of Conformance/Compliance	
	Seismic Qualification Certificate	
	Environmental Qualification Certificate	
	Test Report (s):	
	Inspection Report (s):	
	CMTRs for ASME Pressure Retaining Materials	
	Valve Seat Leakage Report	
	Weld Records	
	Material Traceability Record	

Dedication Test Plan – PG-1 **ORIGINAL** **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-037-TP-037
Test Specimen: Ashcroft Hydraulic Pressure Gauge #45-1009S-02L-2000 **Page 1 of 4**

Test Procedure Approval (Obtain prior to testing):
This test procedure adequately tests the critical characteristics of the test specimen upon acceptable completion of the testing.

Design Authority (signature) [signature] Date: 3/24/00

RECOMMENDED EQUIPMENT:
Helium supply
Pressure regulator – to hydrostatically test the specimen to 2000+ psig
Pressure regulator – helium supply to 2000+ psig
Peak Pressure indicator 0-2000+ psig
Test jig to mount Pressure Gauge vertically with port at bottom of switch
Personnel protection panel
Snoop or equivalent
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) serial numbers and calibration due
Test Instrument type: AMETEK DEADWEIGHT I.D.: BAT-035 Calib. Due date 11-6-02.
Test Instrument type: _____ I.D.: _____ Calib. Due date _____.
Test Instrument type: _____ I.D.: _____ Calib. Due date _____.
Test Instrument type: _____ I.D.: _____ Calib. Due date _____.

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE: (Note: use one set of sheets per test specimen)

Test Specimen Description: **Pressure Gauge**

Record the following identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Manufacturer:	ASHCROFT	**Ashcroft**	ACC.
Model:	45-1009S-02L-2K	**45-1009S-02L-2000**	ACC
Dial Size:	4.5" Ø	**4-1/2" Nominal**	ACC.
Pressure Connection:	1/4"	**¼" Nominal**	ACC
Indicator Range, figure Interval, Minor Graduation	YES	**0-2000, 200, 20**	ACC.

ORIGINAL

Dedication Test Plan – PG-1 **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-037-TP-037
Test Specimen: Ashcroft Hydraulic Pressure Gauge #45-1009S-02L-2000 **Page 2 of 4**

Description	Record Data	Acceptance Criteria	Comments/Deviations
Serial No.:	#1	**N/A**	MARKED #1

Perform the following tests:

Record: Date /Time of Test Beginning: 3-24-00, 2:41 pm

Record: Room Temperature: 68 °F. Room Barometric Pressure: .7528 mmHg.

Perform steps below:

1. **Pressure Boundary Integrity Test**

   Setup the Pressure Gauge specimen for pressure testing with water on the wetted surfaces of the gauge. Attach a sketch of test circuit with all test instrumentation used.

   Apply a water pressure to the test specimen, gradually building up the pressure to 110% of design pressure of 1800 psig = 1980 psig.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Pressure Boundary Integrity Test:	1999.729 psi	**No leakage at test pressure of 1980 psig +1 %, - zero for minimum of 10 minutes**	NO LEAK DOWN ACC.

2. **Calibration and Operating Range Accuracy Test**

   With water on the wetted surfaces of the pressure gauge specimen, apply hydrostatic pressure to the specimen and perform calibration and operating range accuracy testing. Attach a sketch of test circuit with all test instrumentation used.

   Calibrate the gauge on a five point calibration throughout the 0-1800 range and within the operating range (1300-1600 psig). Record the data below:

Pressure Point	As-Found Record Data	Acceptance Criteria	Comments/Deviations
5 Point Calibration			
0 psig	0 psig	**± 1% full scale**	ACC.
249.992 psig	250 psig	**± 1% full scale**	ACC.
599.551 psig	600 psig	**± 1% full scale**	ACC.
999.715 psig	1000 psig	**± 1% full scale**	ACC.
1349.732 psig	1350 psig	**± 1% full scale**	ACC
1599.552 psig	1600 psig	± 1% Full scale	ACC.
0 psig	0 psig	± 1% Full scale	ACC.

Dedication Test Plan – PG-1 **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-037-TP-037
Test Specimen: Ashcroft Hydraulic Pressure Gauge #45-1009S-02L-2000 **Page 3 of 4**

Pressure Point	As-Found Record Data	Acceptance Criteria	Comments/Deviations
Operating Range Calibration			
1249.987 PSIG	1250 PSIG	± 1% full scale	ACC.
1349.732 PSIG	1350 PSIG	± 1% full scale	ACC.
1499.771 PSIG	1500 PSIG	± 1% full scale	ACC.
1599.552 PSIG	1600 PSIG	± 1% full scale	ACC.

1. De-pressurize equipment.
2. End test.
3. Carefully disassemble pressure connection to pressure gauge and drain the water from the gauge.
4. Clean, label w/calibration sticker, box (in original packing & paperwork) and ready the test specimen for transfer to buyer.

Record: Date /Time of Test End: 3-24-00, 3:15 pm

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Pressure gauge meets all requirements of this Test Plan along with Mfg. accuracy.
A. Carlisle 3/24/00

Notes:

Test Engineer/Technician (Printed Name) Jeff Cadick

Test Engineer/Technician (signature) J. Cadick Date: 3/24/00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Craig Swenson Date: 3/28/00

QA/QC (signature) Stephen Scott Mott Date: 3-28-2000

Belhaven
Applied Technologies **Customer** FDH Contract # 2717-3

Certificate of Calibration

Tag BEL00-188 **Model** 45-1009S-02L-2000 **Manufacturer** Ashcroft

Instrument Pressure Gauge **Serial No** Marked "1"

Calibration traceable to the National Institute of Standards and Technology in accordance with ANSI- Z540.1 has been accomplished on the above-named instrument by comparison with standards maintained by Belhaven. The accuracy and stability of all standards maintained by Belhaven are traceable to national standards maintained by the National Institute of Standards and Technology in Washington, D.C. and Boulder, Colorado.

Temperature at Calibration:	68F	
Accuracy of Instrument	1%	
Calibrated Range:	2000	PSIG

Calibration Report No. **00-188**

Date Due: **3-24-2001**

Test Equipment

Ametek Deadweight Tester, S/N: 16132 (BAT-035)

Calibrated by: J. Cook 3-24-00

Certified by:
Quality Assurance Manager

ORIGINAL

Belhaven Calibration Data Sheet

Report Number
00-188

Tag No BEL00-188
Instrument Type Pressure Gauge
Manufacturer Ashcroft
Serial No Marked "1"
Model 45-1009S-02L-
Cal Due Date 3-24-2001
System
Special Instructions Procedure Used: NA17-20MP-41

Units:	PSIG	
F.S. Accuracy	1%	
F.S. Accuracy		
Full Scale	2000	
Permitted Variation	20.0000	PSIG
Cal Temp	68F	

Cal Point	As Found	As Left	% Full Scale Accuracy
249.992	250	250	0.0004
599.551	600	600	0.0225
999.715	1000	1000	0.0143
1349.732	1350	1350	0.0134
1599.552	1600	1600	0.0224

Test Equipment Ametek Deadweight Tester, S/N: 16132 (BAT-035)

Calibration Performed By L. Cardwell Date 3/24/00

ORIGINAL

Dedication Test Plan – PG-1 **ORIGINAL** **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-037-TP-037
Test Specimen: Ashcroft Hydraulic Pressure Gauge #45-1009S-02L-2000 **Page 1 of 4**

Test Procedure Approval (Obtain prior to testing):
This test procedure adequately tests the critical characteristics of the test specimen upon acceptable completion of the testing.

Design Authority (signature) Craig Swenson Date: 3/24/00

RECOMMENDED EQUIPMENT:
Helium supply
Pressure regulator – to hydrostatically test the specimen to 2000+ psig
Pressure regulator – helium supply to 2000+ psig
Peak Pressure indicator 0-2000+ psig
Test jig to mount Pressure Gauge vertically with port at bottom of switch
Personnel protection panel
Snoop or equivalent
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) serial numbers and calibration due
Test Instrument type: Ametek Dead Weight I.D.: BAT-035 Calib. Due date 11/6/02.
Test Instrument type: _____ I.D.: _____ Calib. Due date _____.
Test Instrument type: _____ I.D.: _____ Calib. Due date _____.
Test Instrument type: _____ I.D.: _____ Calib. Due date _____.

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE: (Note: use one set of sheets per test specimen)

Test Specimen Description: **Pressure Gauge**

Record the following identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Manufacturer:	Ashcroft	**Ashcroft**	Acc.
Model:	45-1009S-02L-2K	**45-1009S-02L-2000**	Acc.
Dial Size:	4.5 Ø	**4-1/2" Nominal**	Acc.
Pressure Connection:	1/4 NPT	**¼" Nominal**	Acc.
Indicator Range, figure interval, Minor Graduation	OK	**0-2000, 200, 20**	Acc.

Dedication Test Plan – PG-1	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-037-TP-037	
Test Specimen: Ashcroft Hydraulic Pressure Gauge #45-1009S-02L-2000	Page 2 of 4

Description	Record Data	Acceptance Criteria	Comments/Deviations
Serial No.:	#2	N/A	MARKED #2

Perform the following tests:

Record: Date /Time of Test Beginning: 3-24-00, 11:30 AM

Record: Room Temperature: 68 °F. Room Barometric Pressure: .7052 mmHg.

Perform steps below:

1. **Pressure Boundary Integrity Test**

   Setup the Pressure Gauge specimen for pressure testing with water on the wetted surfaces of the gauge. Attach a sketch of test circuit with all test instrumentation used.

   Apply a water pressure to the test specimen, gradually building up the pressure to 110% of design pressure of 1800 psig = 1980 psig.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Pressure Boundary Integrity Test:	1999.724 psig	**No leakage at test pressure of 1980 psig +1 %, - zero for minimum of 10 minutes**	NO LEAK DOWN ACC.

2. **Calibration and Operating Range Accuracy Test**

   With water on the wetted surfaces of the pressure gauge specimen, apply hydrostatic pressure to the specimen and perform calibration and operating range accuracy testing. Attach a sketch of test circuit with all test instrumentation used.

   Calibrate the gauge on a five point calibration throughout the 0-1800 range and within the operating range (1300-1600 psig). Record the data below:

Pressure Point	As-Found Record Data	Acceptance Criteria	Comments/Deviations
5 Point Calibration			
0 psig	0	± 1% full scale	ACC.
249.992 psig	260 psig	± 1% full scale	ACC
599.551 psig	580.5 psig	± 1% full scale	ACC. * CLOSE TO TOL.
999.715 psig	1000 psig	± 1% full scale	ACC.
1349.732 psig	1350 psig	± 1% full scale	ACC.
1599.552 psig	1600 psig	± 1% Full Scale	ACC.
0 psig	0 psig	± 1% Full Scale	ACC.

OK JMP

Dedication Test Plan – PG-1 **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-037-TP-037
Test Specimen: Ashcroft Hydraulic Pressure Gauge #45-1009S-02L-2000 **Page 3 of 4**

Pressure Point	As-Found Record Data	Acceptance Criteria	Comments/Deviations
Operating Range Calibration			
1249.937 psig	1250 psig	± 1% full scale	Acc.
1349.732 psig	1350 psig	± 1% full scale	Acc.
1499.771 psig	1500 psig	± 1% full scale	Acc.
1599.552 psig	1600 psig	± 1% full scale	Acc.

1. De-pressurize equipment.
2. End test.
3. Carefully disassemble pressure connection to pressure gauge and drain the water from the gauge.
4. Clean, label w/calibration sticker, box (in original packing & paperwork) and ready the test specimen for transfer to buyer.

Record: Date /Time of Test End: 3-24-00, 1:45 pm.

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Gauge meets the requirement of this Test Plan along with mfg. accuracies.

L. Cadieux

3/24/00

Dedication Test Plan – PG-1	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-037-TP-037	
Test Specimen: Ashcroft Hydraulic Pressure Gauge #45-1009S-02L-2000	Page 4 of 4

Notes:

Test Engineer/Technician (Printed Name) Jeff Cadick

Test Engineer/Technician (signature) J. Cadick Date: 3/24/00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Craig Swanson Date: 3/28/00

QA/QC (signature) Stephen Scott Moss Date: 3-29-2000

Belhaven
Applied Technologies **Customer** FDH Contract # 2717-3

Certificate of Calibration

Tag BEL00-187 **Model** 45-1009S-02L-2000 **Manufacturer** Ashcroft

Instrument Pressure Gauge **Serial No** Marked "2"

Calibration traceable to the National Institute of Standards and Technology in accordance with ANSI- Z540.1 has been accomplished on the above-named instrument by comparison with standards maintained by Belhaven. The accuracy and stability of all standards maintained by Belhaven are traceable to national standards maintained by the National Institute of Standards and Technology in Washington, D.C. and Boulder, Colorado.

Temperature at Calibration:	68F	
Accuracy of Instrument	1%	
Calibrated Range:	2000	PSIG

Calibration Report No. **00-187**

Date Due: **3-24-2001**

Test Equipment

Ametek Deadweight Tester, S/N: 16132 (BAT-035)

Calibrated by: 3-24-00

Certified by:

Quality Assurance Manager

ORIGINAL

Belhaven Calibration Data Sheet

Report Number
00-187

Tag No BEL00-187
Instrument Type Pressure Gauge
Manufacturer Ashcroft
Serial No Marked "2"
Model 45-1009S-02L-2000
Cal Due Date 3-24-2001
System
Special Instructions Procedure Used: NA17-20MP-41

Units:	PSIG	
F.S. Accuracy	1%	
F.S. Accuracy		
Full Scale	2000	
Permitted Variation	20.0000	PSIG
Cal Temp	68F	

Cal Point	As Found	As Left	% Full Scale Accuracy
249.992	260	260	0.5004
599.551	580.5	580.5	-0.9526
999.715	1000	1000	0.0143
1349.732	1350	1350	0.0134
1599.552	1600	1600	0.0224

Test Equipment Ametek Deadweight Tester, S/N: 16132 (BAT-035)

Calibration Performed By L. Cadena Date 3-24-00

ORIGINAL

Dedication Test Plan – PG-1 ORIGINAL Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-037-TP-037
Test Specimen: Ashcroft Hydraulic Pressure Gauge #45-1009S-02L-2000 Page 1 of 4

Test Procedure Approval (Obtain prior to testing):
This test procedure adequately tests the critical characteristics of the test specimen upon acceptable completion of the testing.

Design Authority (signature) Craig Swenson Date: 3/24/00

RECOMMENDED EQUIPMENT:
Helium supply
Pressure regulator – to hydrostatically test the specimen to 2000+ psig
Pressure regulator – helium supply to 2000+ psig
Peak Pressure Indicator 0-2000+ psig
Test jig to mount Pressure Gauge vertically with port at bottom of switch
Personnel protection panel
Snoop or equivalent
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) serial numbers and calibration due
Test Instrument type: Ametek Dead Weight I.D.: BAT-035 Calib. Due date 11/16/02.
Test Instrument type: _____ I.D.: _____ Calib. Due date _____.
Test Instrument type: _____ I.D.: _____ Calib. Due date _____.
Test Instrument type: _____ I.D.: _____ Calib. Due date _____.

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE: (Note: use one set of sheets per test specimen)

Test Specimen Description: Pressure Gauge

Record the following identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Manufacturer:	Ashcroft	Ashcroft	Acc.
Model:	45-1009S-02L-2K	45-1009S-02L-2000	Acc.
Dial Size:	4.5 Ø	4-1/2" Nominal	Acc.
Pressure Connection:	1/4 NPT	¼" Nominal	Acc.
Indicator Range, figure Interval, Minor Graduation	OK	0-2000, 200, 20	Acc.

Dedication Test Plan – PG-1	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-037-TP-037	
Test Specimen: Ashcroft Hydraulic Pressure Gauge #45-1009S-02L-2000	Page 2 of 4

Description	Record Data	Acceptance Criteria	Comments/Deviations
Serial No.:	#3	N/A	MARKED #3

Perform the following tests:

Record: Date /Time of Test Beginning: 4-17-00, 8:41 AM

Record: Room Temperature: 68 °F. Room Barometric Pressure: -14.7199 mmHg.

Perform steps below:

1. **Pressure Boundary Integrity Test**

   Setup the Pressure Gauge specimen for pressure testing with water on the wetted surfaces of the gauge. Attach a sketch of test circuit with all test instrumentation used.

   Apply a water pressure to the test specimen, gradually building up the pressure to 110% of design pressure of 1800 psig = 1980 psig.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Pressure Boundary Integrity Test:	1999.729 PSIG	No leakage at test pressure of 1980 psig +1 %, - zero for minimum of 10 minutes	NO LEAK DOWN ACC.

2. **Calibration and Operating Range Accuracy Test**

   With water on the wetted surfaces of the pressure gauge specimen, apply hydrostatic pressure to the specimen and perform calibration and operating range accuracy testing. Attach a sketch of test circuit with all test instrumentation used.

   Calibrate the gauge on a five point calibration throughout the 0-1800 range and within the operating range (1300-1600 psig). Record the data below:

Pressure Point	As-Found Record Data	Acceptance Criteria	Comments/Deviations
5 Point Calibration			
0 PSIG	0	± 1% full scale	ACC.
249.992 PSIG	245 PSIG	± 1% full scale	ACC
599.537 PSIG	600.5 PSIG	± 1% full scale	ACC.
999.715 PSIG	1,000 PSIG	± 1% full scale	ACC.
1349.732 PSIG	1360 PSIG	± 1% full scale	ACC.
1599.552 PSIG	1600 PSIG	± 1% Full Scale	ACC.
0 PSIG	0 PSIG	± 1% Full Scale	ACC.

ORIGINAL

Dedication Test Plan – PG-1	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-037-TP-037	
Test Specimen: Ashcroft Hydraulic Pressure Gauge #45-1009S-02L-2000	Page 3 of 4

Pressure Point	As-Found Record Data	Acceptance Criteria	Comments/Deviations
Operating Range Calibration			
1249.937 psig	1260 psig	± 1% full scale	Acc.
1349.732 psig	1360 psig	± 1% full scale	Acc.
1499.721 psig	1500 psig	± 1% full scale	Acc.
1599.552 psig	1600 psig	± 1% full scale	Acc.

1. De-pressurize equipment.
2. End test.
3. Carefully disassemble pressure connection to pressure gauge and drain the water from the gauge.
4. Clean, label w/calibration sticker, box (in original packing & paperwork) and ready the test specimen for transfer to buyer.

Record: Date /Time of Test End: 4-17-00, 9:01 AM

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Gauge meets the requirement of this Test Plan along with mfg. accuracies.

J. Cadwell

4/17/00

ORIGINAL

Dedication Test Plan – PG-1	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-037-TP-037	
Test Specimen: Ashcroft Hydraulic Pressure Gauge #45-1009S-02L-2000	Page 4 of 4

Notes:

This test plan was approved prior to testing on 3/24/00 for 2 devices (pressure gauges). A third identical pressure gauge needed to be tested based on same approved test plan but testing lab (Delhaven) did not have an approved blank (unexecuted) test plan to record data. So, an executed test plan was copied, data removed, and used to record new data. Lynn Swanson 4/27/00.

Test Engineer/Technician (Printed Name) Jeff Cusick

Test Engineer/Technician (signature) J. Cusick Date: 4/17/00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) for Lynn Swanson Date: 4/27/00

QA/QC (signature) Stephen Scott Most Date: 5-3-2000

ORIGINAL

Belhaven
Applied Technologies **Customer** Fluor Daniel PO# 2717-3

Certificate of Calibration

Tag BEL00-214 **Model** 45-1009S-02L-2 K **Manufacturer** Ashcroft

Instrument Pressure Gauge **Serial No** Marked #3

Calibration traceable to the National Institute of Standards and Technology in accordance with ANSI- Z540.1 has been accomplished on the above-named instrument by comparison with standards maintained by Belhaven. The accuracy and stability of all standards maintained by Belhaven are traceable to national standards maintained by the National Institute of Standards and Technology in Washington, D.C. and Boulder, Colorado.

Temperature at Calibration:	68F	
Accuracy of Instrument	1%	
Calibrated Range:	2000	PSIG

Calibration Report No. **00-214**

Date Due: ***4/17/2001***

Test Equipment

Ametek Deadweight Tester, S/N: 16132

Calibrated by: _____ 4-17-00

Certified by: _____
Quality Assurance Manager

ORIGINAL

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Commercial Grade Item Upgrade Dedication Form

Rev. No. 0
Page 1 of 7

ECN No. **N/A** CGI No. **CGI-SNF-D-MHM-032**

Title: **MHM Interlock P2 & P6 – MHM Mode Select Switch w/Solenoid Interlock**

Section 1 Part Information

Item No.: **N/A**	Manufacturer: **N/A**	Supplier: **N/A**
Mfg. Part/Model No.: **N/A**	Supplier's P/N: **N/A**	
Part Description: **N/A**		
End Use Description: **N/A**		

ORIGINAL

Section 2a Component Information

Equipment No.: **MHM Mode Select Switch**	Specification No.: **Ederer F-2566, Foster Wheeler MJX-SDX 452656**	Manufacturer: **Fortress Interlocks**	Past P.O. No.: **N/A**
Manufacturer's Part/Model No.: **H31SS**	Equipment Supplier (if different from manufacturer): **ALSTROM, Foster Wheeler**		Equip. Supplier's Part No.: **N/A**

Component Description: **Mode selector switch for interlock P2 & P6. This switch with its integral solenoid selects the operation of the MHM in one of three modes: MCO, Impact Absorber Exchange Mode (IAXM), or Tube Plug Exchange Mode (TPXM). Through this switch, the correct set of interlocks for each operating mode sequence is selected.**

Section 2b Commercial Availability of the Item

1. Is the Item available from a catalogue from a qualified NQA1 supplier or ISO 9000 supplier (coordinate with project CGI interface Engineer or BTR)?

   [ ] YES (go to #2 below) [X] NO (go to procedure step 6.3.2-dedicate Item)

   If not available from a qualified NQA1 supplier, is it available from an ISO 9000 supplier?

   [ ] YES (go to #2 below, procedure step 6.3.2, & dedicate Item) [X] NO (procedure step 6.3.2-dedicate Item)

2. List of Candidate qualified NQA1 suppliers or ISO 9000 suppliers, if used: **N/A**

1. Recommended Procurement Strategy (coordinate with project CGI interface Engineer or BTR): **N/A**

Section 2c CGI Determination

CGI Determination Questions:

#1: Is the Item subject to design or specification requirements that are unique to nuclear facilities or activities?

[ ] YES (the Item is not commercial grade) [X] NO (continue)

#2: Is the Item used in applications other than nuclear facilities or activities?

[ ] NO (the item is not commercial grade) [X] YES (continue)

#3: Is the Item ordered from manufacturer/supplier on the basis of specifications set forth in the manufacturer's catalog?

[ ] NO (the item is not commercial grade) [X] YES (continue)

[X] All three criteria have been satisfied. The Item meets the definition of commercial grade.

Commercial Grade Item Upgrade Dedication Form

ECN No. **N/A** CGI No. **CGI-SNF-D-MHM-032**	Rev. No. 0
Title **MHM Interlock P2 & P6 – MHM Mode Select Switch w/Solenoid Interlock**	Page 2 of 7

	Section 2d Reason for Dedication The above Commercial Grade (CG) described item is being Dedicated for use in the application cited for the following reason(s):
	Item is being purchased from a non ESL manufacturer supplier as CG to be used in a Safety Class application.
	Item is being purchased from a non ESL manufacturer supplier as CG to be used in a Safety Significant application.
X	Item was purchased from a non ESL manufacturer supplier as CG to be used in a Safety Class application.
	Item was purchased from a non ESL manufacturer supplier as CG to be used in a Safety Significant application.
	Item was purchased from a non ESL manufacturer supplier as CG to be used in a Safety Significant application.
	Other ('like-for-like', similar, substitution, replacement evaluation)

Section 3 Failure Effects Evaluation

A. Part/Component Safety Function:

1. **This selector switch's interlocking is provided to ensure that the operating mode may only be changed when the MHM is positioned at the Exchange Facility with its Plug Cask and MCO Cask both empty and the Shield Skirt seated.**

B. Part/Component Functional Mode:	Active - Mechanical or Electrical change of state is required to occur for the component to perform its safety function Passive – Change of state is not required for the component to perform its safety function
Safety Function #1: [X] Active [ ] Passive	
Safety Function #2: [ ] Active [ ] Passive	
Safety Function #3: [ ] Active [ ] Passive	

C. Host Component Safety Function (if applicable): **N/A**

1.

D. Failure Mode(s) and the effects on component or system safety function (see Worksheet 1):

1. **Failure of switch contacts to open upon demand results in potential override of interlock channel.**
2. **Selector switch inoperative results in failure to provide interlock function at correct demand position.**

Section 4 Environmental & Natural Phenomena Hazard Design

Environmental Qualification Required:	If yes: Environmental Qualification Requirements
Yes [ ]	Limiting Environmental Conditions:
No [X]	Required Safety Functions:
	Qualification Period:
Natural Phenomena Hazard (NPH) Design Required:	If yes: NPH Design Requirements
Yes [ ]	Performance Category:
No [X]	NPH Design Req'ts.:
	Required Safety Functions:

Section 5 Component Functional Classification

X	Safety Class (SC)		General Service (GS)		Safety Significant (SS)

If part/component classification is different from host component/system, document basis. **N/A**

Sections 6 and 7 (Reserved)

Section 8 References (for Functional Classification)

National Codes/Standards: **N/A**

Safety Analysis Report (SAR): **HNF-3672 Rev. 0**

Drawings: **Ederer, Inc. EB-33056, Sheet 4**

Vendor Manual/Manufacturer/Supplier Information: **Cut Sheet – Fortress Keygard H31SS Solenoid Controlled Interlock Unit**

Other: **ALSTOM ESL/R (96) 065 – Rev. D, 100% Design Submittal – June 1988**

98 JVP CE 5 4/11/00

Commercial Grade Item Upgrade Dedication Form

Rev. No. 0
Page 3 of 7

ECN No. **N/A** CGI No. **CGI-SNF-D-MHM-032**

Title: **MHM Interlock P2 & P6 – MHM Mode Select Switch w/Solenoid Interlock**

Section 9 Critical Characteristics

Critical Characteristics	Acceptance Criteria/Tolerances	Acc Meth	ID	Function
1. Item Identification Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
Manufacturer	**Fortress**	**1, IN**	**X**	
Model	**H31SS**	**1, IN**	**X**	
2. Physical Critical Characteristics (for reasonable assurance that the Item delivered is the Item specified)				
3 Performance Critical Characteristics (for reasonable assurance that the Item will perform its intended safety function(s))				
Contact Rating	**Nominal 16 amps VAC, resistive, less than 0.5 V drop across contacts**	**1, T**		**X**
Insulation Resistance (includes solenoid leads)	**≥10 megohm resistance, terminal to terminal and terminal to ground at 500 V for contacts and solenoid.**	**1, T**		**X**
Mechanical Operation	**Cycle switch – confirm contacts open and close with smooth operation**	**1, T**		**X**

4. Notes: 10 AMPS IS ADEQUATE FOR TESTING. TYPICAL FOR MOST COMPONENTS. CES 4/10/00

Acceptance Method (Acc Meth):
1. Special Test and Inspection:
   1, IN for Inspection
   1,T for Test
2. Commercial Grade Survey
3. Source Verification
2. Vendor/Item History

Section 10 Initial Review and Approval

Approvals:

Designated Engineer: 4/6/00

Design Authority: CES Craig Swenson 4-6-00

QA Engineer: Stephen Scott Mott 4-6-2000

Commercial Grade Item Upgrade Dedication Form	Rev. No. 0
ECN No. N/A CGI No. CGI-SNF-D-MHM-032 Title: MHM Interlock P2 & P6 – MHM Mode Select Switch w/Solenoid Interlock	Page 4 of 7

WORKSHEET 1
DETERMINATION OF FAILURE MECHANISMS/MODES

Section 1			
Typical Failure Mechanisms	Definition	X = Applicable to Component under Evaluation	
		X?	Indicate Failure Mode
Fracture	Separation of a solid accompanied by little or no macroscopic plastic deformation.		
Corrosion	The gradual deterioration of a material due to chemical or electrochemical reactions, such as oxidation, between the material and its environment.	X	**Switch contacts corrode closed and fail to open upon demand**
Erosion	Destruction of materials by the abrasive action of moving fluids, usually accelerated by the presence of solid particles carried with the fluid.		
Open Circuit	An electrical circuit that is unintentionally broken so that there is no complete path for current flow.		
Short Circuit	An abnormal connection by which an electrical current is connected to ground, or to some conducting body, resulting in excessive current flow.	X	**Switch contacts fuse closed and fail to open upon demand**
Blockage	Clogging of a filtering medium resulting in the inability to perform its purification function or blockage of flow.		
Seizure	Binding of a normally moving item through excessive pressure, temperature, friction, jamming.	X	**Switch mechanism jams and contacts fail to open upon demand.**
Unacceptable Vibration	Mechanical oscillations produced are beyond the defined permissible limits due to unbalancing, poor support, or rotation at critical speeds.		
Loss of Properties	A loss of mechanical and physical properties of a material due to exposure to high temperatures, radiation exposure.		
Excess Strain	Under the action of excessive external forces the material of the part has been deformed or distorted.		
Mechanical Creep	From prolonged exposure to high temperature and stress, the object will show a slow change in its physical (shape and dimension) and mechanical characteristics.		
Ductile Fracture	Fracture characterized by tearing of metal accompanied by appreciable gross plastic deformation.		
Section 2 Additional Failure Modes Applicable to the Component Under Evaluation			
3. Switch contacts are closed to permit equipment movement. Contacts open for the interlock function. Any failure, which prevents contacts to open, inhibits the particular switch interlock function.			
4. Selector switch seizure or break renders the contact opening inoperable.			
5. Short circuit could give false signal to energize interlock function.			

Commercial Grade Item Upgrade Dedication Form

ECN No. N/A CGI No. CGI-SNF-D-MHM-032

Title: **MHM Interlock P2 & P6 – MHM Mode Select Switch w/Solenoid Interlock**

Checklist 1 - Acceptance Method 1 - Special Test/Inspection Verification

SECTION 1

Item Description: **MHM Mode Select Switch**	Equip #:
System #: **MHM**	Model #: ~~KGRSG~~ H31SS JMP 4/10/00
Manufacturer (Address/Phone): **Fortress Interlocks Ltd.** **148 Birmingham New Road,** **Wolverhampton, WV4 6NT** P.O. #	Supplier (Address/Phone): **Castell Interlocks, Inc. (Laurie Wallace)** **P.O. Box 18485, 21 Kenton Lands Road** **Erlanger, Kentucky 41018 USA** **Ph: 606-341-3075; Fax: 606-341-2302**

SECTION 2 CRITICAL CHARACTERISTICS TO BE VERIFIED BY METHOD 1.

Insp	Test	Post-Test		
[X]	[ ]	[ ]	1.	**Manufacturer**
[X]	[ ]	[ ]	2.	**Model**
[ ]	[X]	[ ]	3.	**Contact Rating**
[ ]	[X]	[ ]	4.	**Insulation Resistance**
[ ]	[X]	[ ]	5.	**Mechanical Operation**

SECTION 3 BY INSPECTION * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)

Characteristic: **Manufacturer** * Sample Size*: **100%**

Acceptance Criteria: **Fortress**

Receipt Inspection Plan / Report #:

Characteristic: **Model Number** * Sample Size*: **100%**

Acceptance Criteria: **H31SS**

Receipt Inspection Plan / Report #:

SECTION 4 BY SPECIAL TEST * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)

Characteristic for Test: **Contact Rating** Samp Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **Nominal ~~16~~ 10 amps, resistive, @ 120 VAC, less than 0.5 V drop across contacts** JMP

Actual Test Value: See TP Test Plan and Report #: CGI-SNF-D-MHM-032-TP-032

Characteristic for Test: **Insulation Resistance (incls. Solenoid leads)** Samp Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **≥10 megohm resistance, terminal to terminal and terminal to ground at 500 V for contacts and solenoid.**

Actual Test Value: See TP Test Plan and Report #: TP-032

Characteristic for Test: **Mechanical Operation** Samp Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **Cycle switch – confirm contacts open and close with smooth operation.**

Actual Test Value: See TP Test Plan and Report #: TP-032

*SWITCH WAS TAKEN APART - THERE WERE NO MARKINGS EXCEPT ON THE CONTACT BLOCKS - MFG: CRAIG-DERRICOTT & DEERER'S AS-BUILT LIST SAYS THIS IS A FORTRESS, MODEL # H31SS. (See cutsheet attached to Test Plan TP-032) JMP 4/10/00

CES 4-11-00

Section 5 Test / Inspection Summary (Acceptance Method 1)

1. SUMMARY OF VERIFIED CRITICAL CHARACTERISTICS, THEIR VERIFICATION METHODS, AND RESULTS

ITEM DESCRIPTION: MHM Mode Select Switch w/Solenoid Interlock

Critical Characteristics				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/IN	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
Manufacturer	Fortress Interlocks	X		1, IN	See* on pg 5						
Model	H31SS	X		1, IN							
Contact Rating	Nominal ~~16~~ 10 amps, resistive, @ 120 VAC, less than 0.5 V drop across contacts		X	1, T	TP-032	NA	1	0	XWEST	Larry W. Price	4/10/00
Insulation Resistance (includes solenoid leads)	≥10 megohm resistance, terminal to terminal and terminal to ground at 500 V for contacts and solenoid.		X	1, T	↓	↓	↓	↓	↓	↓	↓
Mechanical Operation	Cycle switch – confirm contacts open and close with smooth operation.		X	1, T	↓	↓	↓	↓	↓	↓	↓

2. DISPOSITION OF UNVERIFIED OR FAILED CRITICAL CHARACTERISTICS

Critical Characteristic	Disposition

3. SIGNATURE INDICATES ALL CRITICAL CHARACTERISTICS VERIFIED SATISFACTORY OR ACCEPTABLY DISPOSITIONED AND COMMERCIAL GRADE DEDICATION IS SATISFACTORY AND COMPLETE.

See Test Plan TP-032 cited above. CES 4/11/00

Testing Agency Approval: NR CES 4/11/00 Date

Testing Agency QA Engineer: NR CES 4/11/00 Date

BUYER VERIFICATION

Design Authority: CES Nancy Dunkerson Date 4-11-00

QA Engineer: Stephen Scott Moe Date 4-20-2000

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Commercial Grade Item Upgrade Dedication Form

Rev. No. 0

ECN No. N/A CGI No. CGI-SNF-D-MHM-032

Page 7 of 7

Title **MHM Interlock P2 & P6 – MHM Mode Select Switch w/Solenoid Interlock**

Section 6 Contacts/Phone Numbers		
Name		Phone
Design Authority CRAIG SWENSON	( )	376-0288
QA	( )	
QC	( )	
Cog - Engineer	( )	
CGI Engineer	( )	
Procurement Engineer	( )	
Other	( )	

Section 7 Supporting Documentation for this Checklist	
Initial Procurement Documents	**For Critical Characteristics**
[ ] Drawings:	
[ ] Manuals (specify type & number):	
[ ] Design Calculations	
[ ] Installation Instructions	
[ ] Operation Instructions	
[ ] Calibration Instructions	
[ ] Manufacturer's Recommended Spare Parts List	
[X] **Other: Cut Sheet – Fortress Keygard KGRSS Solenoid Controlled Interlock Unit** H3155	**All**
Procurement Documents	
[ ] Certificate of Conformance/Compliance	
[ ] Seismic Qualification Certificate	
[ ] Environmental Qualification Certificate	
[ ] Test Report (s	
[ ] Inspection Report (s):	
[ ] CMTRs for ASME Pressure Retaining Materials	
[ ] Valve Seat Leakage Report	
[ ] Weld Records	
[ ] Material Traceability Record	
[X] **Other: Hanford MCO Handling Machine (MHM) Operations & Maintenance Manual, Section 3.1.7.1**	

ORIGINAL Page 358

Dedication Test Plan – IST-SelSw-2 Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-032-TP-032
Test Specimen: Fortress Selector Switch H31SS; Eqmt. No.: Mode Selector Switch Page 1 of 8

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI Eng	DA	QA Post Review*
						3/13/00 NO CHANGES

* QA Post Review of Individual Revisions is allowed

this will be the original test plan
J. Lasseter 3/2/00

ORIGINAL

In-Situ Test Procedure

ORIGINAL

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) Larry Swenson Date: 2/29/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician (CIT)	Michael Cram	Bellhaven	Michael Cram	MRC
Electrician	J W EBERHART	PCE	J W Eberhart	JWE
Electrician Quality Control (QC)	Stephen R Conley	PCE	Stephen R Conley	SRC
Design Authority Representative (DA	LARRY W. PRICE	KNEST		
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Power Supply capable of 10 amps @ 120 VAC
Megger Instrument capable of 500 VDC Test Voltage
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being verified unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: HP3457 I.D.: BAT-123 Calib. Due date: 7-27-00

Test Instrument type: HP3457 I.D.: BAT-124 Calib. Due date: 7-30-00

Test Instrument type: AVO BM 80-2 I.D.: 6410-889/000100/53145 Calib. Due date: 2-9-01

Test Instrument type: FLUKE 787 I.D.: BAT-107 Calib. Due date: 5-28-00

Test Instrument type: Proto 6106 Torque screw Driver I.D.: 029E/009 #2 Calib. Due date: 1-14-2001

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE:

For this In-Situ Test, certain leads must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of leads.

1.0 Lock and tagout Main Disconnect CRN-004, or Main Disconnect MD.

2.0 Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Manufacturer:	FORTRESS	**Fortress**	Acc
Model:	N/A	**N/A**	Acc
Type:	YES	**3 Position Selector, 2 NC, 4 NO**	Acc
Serial No.:	N/A	**N/A**	Acc

2.1 Perform the following testing steps:

2.2 Record: Date /Time of Test Beginning: 3-01-00 11:00 a.m.

Record: Room Temperature: 63 °F.

2.3 Mechanical Operation

Cycle the switch - confirm contacts open and close with smooth operation and spring return from right to center.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Describe Operation:	YES	**Contacts open and close with smooth operation.**	Acc

Note: 2.5 may be performed before 2.4

2.4 Contact Rating Test

2.4.1 Setup the Selector Switch specimen for contact rating testing. Attach a sketch of test circuit with all test instrumentation used. See drawing on page 6 for circuit nos.

2.4.2 Place selector switch in the "TPXM" Mode position. Apply a nominal 10 amps VAC, resistive, across the closed contacts of the test specimen. First apply the current to Contact Circuit #1and record the readings, then Contact Circuit #2 and record the readings.

Caution: Do not change state of contacts while energized.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Contact Circuit #1 (Terminals 101X-404X)	.1 VAC	**< 0.5 Volts AC drop**	Acc
Contact Circuit #2 (Terminals 101Y-407Y)	.07 VAC	**< 0.5 Volts AC drop**	Acc

2.4.3 Move the switch to the "IAXM" Mode position to close the NO contacts. Apply a nominal 10 amps VAC, resistive, across the now closed contacts of the test specimen. First apply the current to Contact Circuit #3 and record the readings, then Contact Circuit #4 and record the readings.

Caution: Do not change state of contacts while energized.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Contact Circuit #3 (Terminals 101X - 405X)	.12 VAC	**< 0.5 Volts AC drop**	Acc
Contact Circuit #4 (Terminals 101Y - 408Y)	.14 VAC	**< 0.5 Volts AC drop**	Acc

2.4.4 Move the switch to the "MCO" Mode position to close the NO contacts. Apply a nominal 10 amps VAC, resistive, across the now closed contacts of the test specimen. First apply the current to Contact Circuit #5 and record the readings, then Contact Circuit #6 and record the readings.

Caution: Do not change state of contacts while energized.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Contact Circuit #5 (Terminals 101X - 406X)	.07VAC	**< 0.5 Volts AC drop**	Acc
Contact Circuit #6 (Terminals 101Y - 409Y)	.1 CVAC	**< 0.5 Volts AC drop**	Acc

2.4.5 De-energize equipment and determinate test leads.

2.5 Insulation Resistance Test

2.5.1 Setup the Selector Switch specimen for insulation resistance testing. Attach Selector Switch in its normal mounting configuration to grounded fixture.

2.5.2 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the test specimen. Describe the terminals and their data below:

Terminal to Terminal / Ground

Selector Switch Position	Contact Circuit No.*	Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
TPXM	1	101X	Ground	> 100 Gohm	> 10 Megohms	Acc
TPXM	2	101Y	Ground	> 100 Gohm	> 10 Megohms	Acc
TPXM	3	101X	405X	> 100 Gohm	> 10 Megohms	Acc
TPXM	4	101Y	408Y	> 100 Gohm	> 10 Megohms	Acc
TPXM	5	101X	406X	> 100 Gohm	> 10 Megohms	Acc
TPXM	6	101Y	409Y	> 100 Gohm	> 10 Megohms	Acc
IAXM	1	101X	404X	> 100 Gohm	> 10 Megohms	Acc
IAXM	2	101Y	407Y	> 100 Gohm	> 10 Megohms	Acc
IAXM	3	101X	Ground	> 100 Gohm	> 10 Megohms	Acc
IAXM	4	101Y	Ground	> 100 Gohm	> 10 Megohms	Acc
MCO	5	101X	Ground	> 100 Gohm	> 10 Megohms	Acc
MCO	6	101Y	Ground	> 100 Gohm	> 10 Megohms	Acc

* Refer to drawing on page 6

MSSS Solenoid terminals 402X and LO(2):

N/A	N/A	402X or LO(2)	Ground	> 100 Gohm	> 10 Megohms	Acc

2.6 De-energize test equipment.

2.7 Terminate the test.

2.7.1 Reland the lifted leads and verify reland in accordance with the Lifted Lead Log.

2.7.2 Retorque the terminals to 7-9 in-pounds.

2.7.3 Remove lockout/tagout and restore system to normal.

2.7.4 Record: Date /Time of Test End: 2:00 PM 3-2-00

3.0 References

3.1 Elementary Wiring Drawings: EB-33056 Sheet 4

Dedication Test Plan – IST-SelSw-2 / **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-032-TP-032
Test Specimen: Fortress Selector Switch H31SS; Eqmt. No.: Mode Selector Switch **Page 6 of 8**

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Component meets all of this test plan requirements.

W. Cram 3/2/00

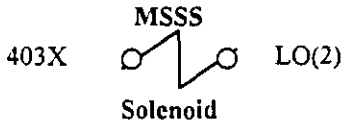
Notes:

Certified InstrumentationTechnician (signature) W. Cram Date: 3-2-00
Reviewed by. gbc 3/2/00

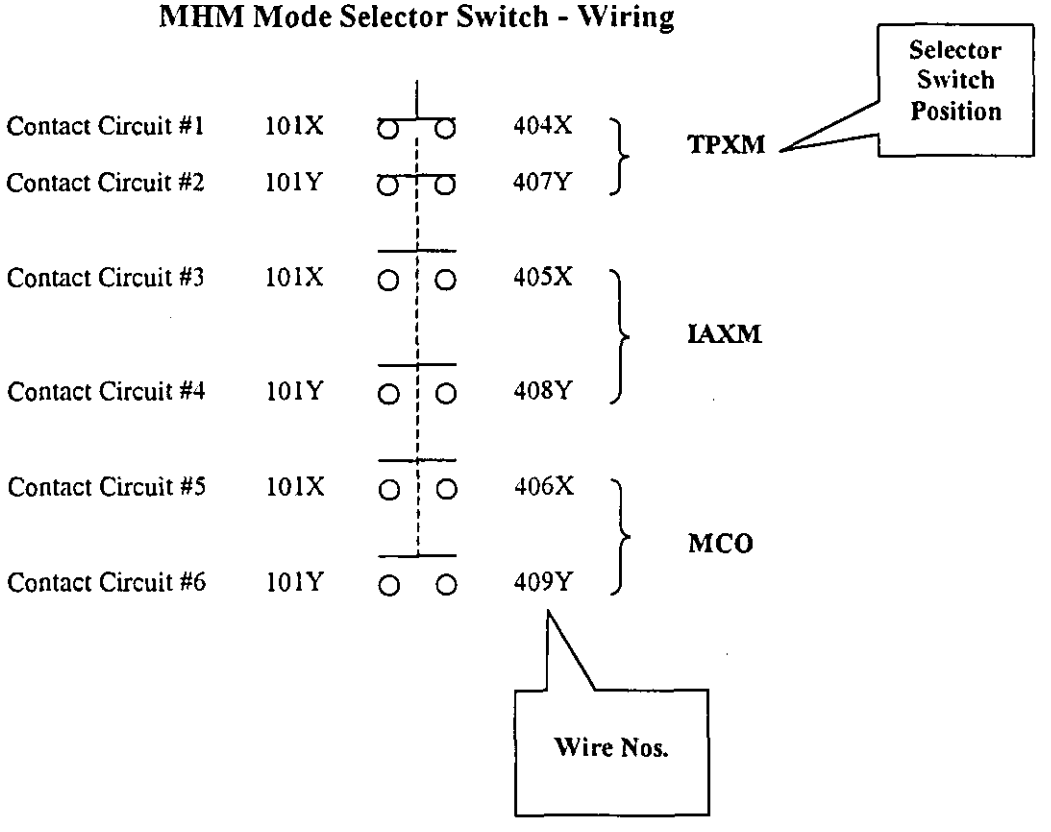
Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Craig Swenson 3/2/00 Date: 3/2/00

QA/QC (signature) T. B. Cahill Date: 3/13/00



MHM Mode Selector Switch - Wiring



LIFTED LEAD LOG

Junction Box: MHM Control Console - Left Side

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
EB-33056	4	101X	Mode Sel Sw	NC	JWE	3/2/00	SRC	3-2-00	JWE	3/2/00	SRC	3-2-00
EB-33056	4	404X	Mode Sel Sw	NC	JWE	3/2/00	SRC	3-2-00	JWE	3/2/00	SRC	3-2-00
EB-33056	4	101Y	Mode Sel Sw	NC	JWE	3/2/00	SRC	3-2-00	JWE	3/2/00	SRC	3-2-00
EB-33056	4	407Y	Mode Sel Sw	NC	JWE	3/2/00	SRC	3-2-00	JWE	3/2/00	SRC	3-2-00
EB-33056	4	101X	Mode Sel Sw	NO	JWE	3/2/00	SRC	3-2-00	JWE	3/2/00	SRC	3-2-00
EB-33056	4	405X	Mode Sel Sw	NO	JWE	3/2/00	SRC	3-2-00	JWE	3/2/00	SRC	3-2-00
EB-33056	4	101Y	Mode Sel Sw	NO	JWE	3/2/00	SRC	3-2-00	JWE	3/2/00	SRC	3-2-00
EB-33056	4	408Y	Mode Sel Sw	NO	JWE	3/2/00	SRC	3-2-00	JWE	3/2/00	SRC	3-2-00
EB-33056	4	101X	Mode Sel Sw	NO	JWE	3/2/00	SRC	3-2-00	JWE	3/2/00	SRC	3-2-00
EB-33056	4	406X	Mode Sel Sw	NO	JWE	3/2/00	SRC	3-2-00	JWE	3/2/00	SRC	3-2-00
EB-33056	4	101Y	Mode Sel Sw	NO	JWE	3/2/00	SRC	3-2-00	JWE	3/2/00	SRC	3-2-00
EB-33056	4	409Y	Mode Sel Sw	NO	JWE	3/2/00	SRC	3-2-00	JWE	3/2/00	SRC	3-2-00
EB-33056	4	403X	Solenoid	N/A	JWE	3/2/00	SRC	3-2-00	JWE	3/2/00	SRC	3-2-00
EB-33056	4	LO(2)	Solenoid	N/A	JWE	3/2/00	SRC	3-2-00	JWE	3/2/00	SRC	3-2-00

Remarks:

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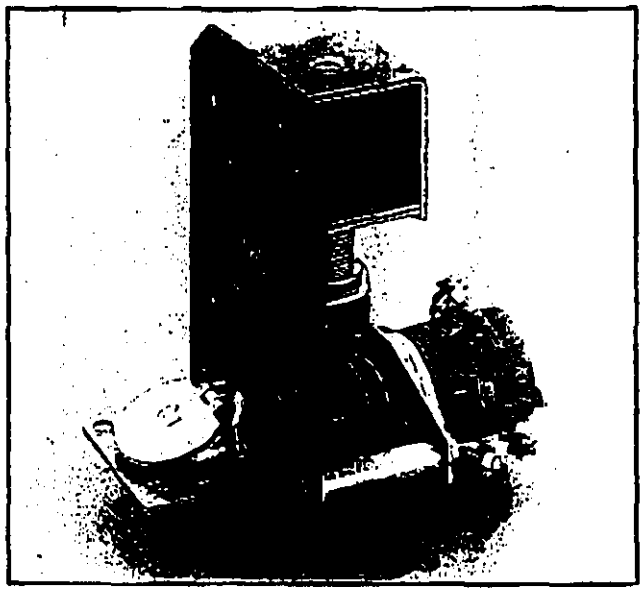
Data Sheet

Ref. B2

FORTRESS INTERLOCKS



H31SS
Solenoid Controlled Interlock Unit

Description
A range of key operated rotary switch units, with additional solenoid control. Variations including up to 7 locks are available, in both panel (BOB) and surface (FOB) mounting forms. Normally supplied for vertical mounting; horizontal mounting units available on request.

Application
As part of an interlock system, the units are used for control or isolation of control or power circuits operating plant or machinery, and the solenoid facility allows for integration with other electronic control processes within the system.
(e.g a machine may come to end of cycle, before the power can be isolated.)

Operation
The solenoid holds the primary key in the trapped position (normally power ON), and must be energised by receipt of a remote electrical signal, before the key can be operated and released. Removal of the key isolates the power or control circuits. In multiple lock units, the primary key is released first, followed by the others in sequence. All keys must be replaced in the correct order before the primary key can be returned and the equipment re-energised.

Construction
Lock mechanism - Brass, with nickel-chrome finish to lock casing and hinged dustcover. *Enclosure* - (FOB) or mounting plate (BOB) - Mild Steel with polyester/epoxy finish.
Solenoids - Standard 110V AC continuously rated
Consumption 20VA
Switches - Standard 16A 250V (Max.) DC
4 Pole N/O or 2 N/O, 2 N/C
Other ratings available on request

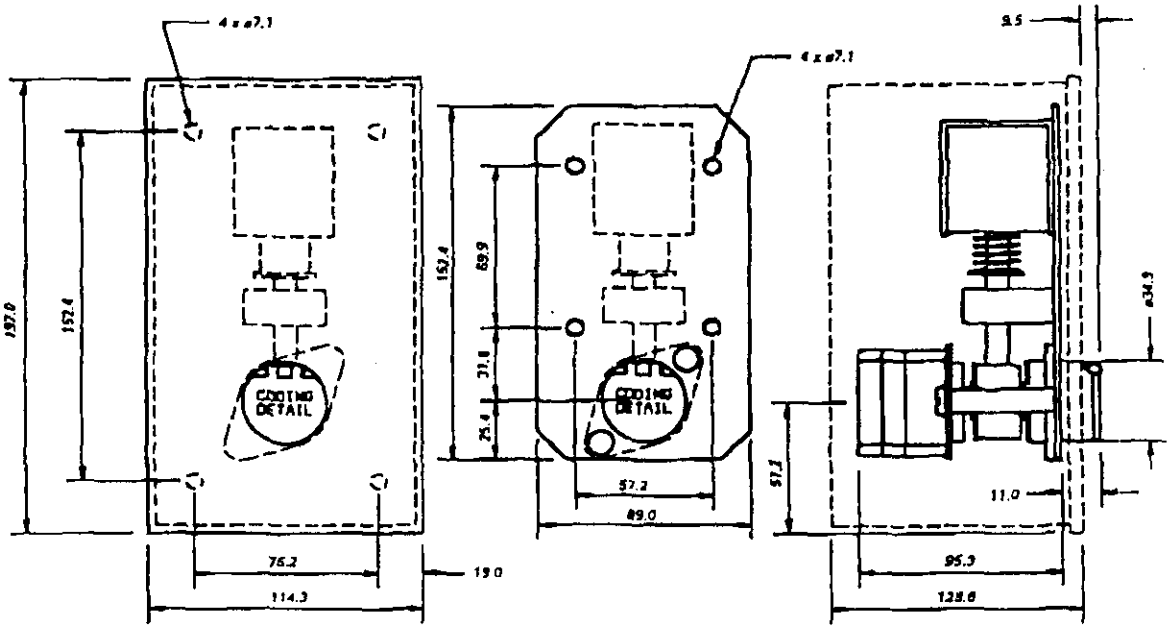
Options *(See Options Data Sheet)*
Part/All Stainless Steel Basic Locks
Stainless Steel dustcover
Screw-on dustcover
Additional locks (Max total 7)
Horizontal mounting
Optional solenoid ratings
Special switch contact configurations
Supplied without switch
'Special' units (details on application)

Keys
Keys are ordered separately.

See reverse for Technical Data and ordering details

Technical Data *(all dimensions in mm)*

FORTRESS INTERLOCKS



H31SS1/FOB
Front view

H31SS1/BOB
Front view

Side view

Ordering Information		
1. Type	H31SS/(1,2,3,4,5,6,7)	
2. Mounting	Panel (BOB)	Surface (FOB)
3. Solenoid	110V AC 24V DC	Other (Specify)
4. Switch	16A 4 N/O	16A 2 N/O,2N/C Other (Specify)
5. Construction	Standard	Part Stainless Steel (Basic Lock(s))
6. Dustcover	Standard	Stainless Steel Screw-on None
7. Coding Details	Specify Coding required- 1/4" Characters - Max 11 Characters 6 top row; 5 bottom row Longer codes using 1/8" Characters - on request	
8. Keys	Standard	Indicator Large 'T' (708) type
Finish	Brass	Stainless Steel

Order Example	
1. Type	*- H31SS2*
2. Mounting	*- FOB*
3. Solenoid	*- 24V DC*
4. Switch	*- 16A 4 N/O*
5. Construction	*- Standard*
6. Dustcover	*- Standard*
7. Coding	*- Top lock ACCESS - Bottom lock ISOL*
8. Keys	*- Standard Codes 1 - ISOL 1 - ACCESS*

FORTRESS

A Division of Fortress Interlocks Ltd
148 Birmingham New Road, Wolverhampton WV4 6NT
tel (01902) 403546 fax (01902) 353003 telex 339193

A HALMA GROUP COMPANY

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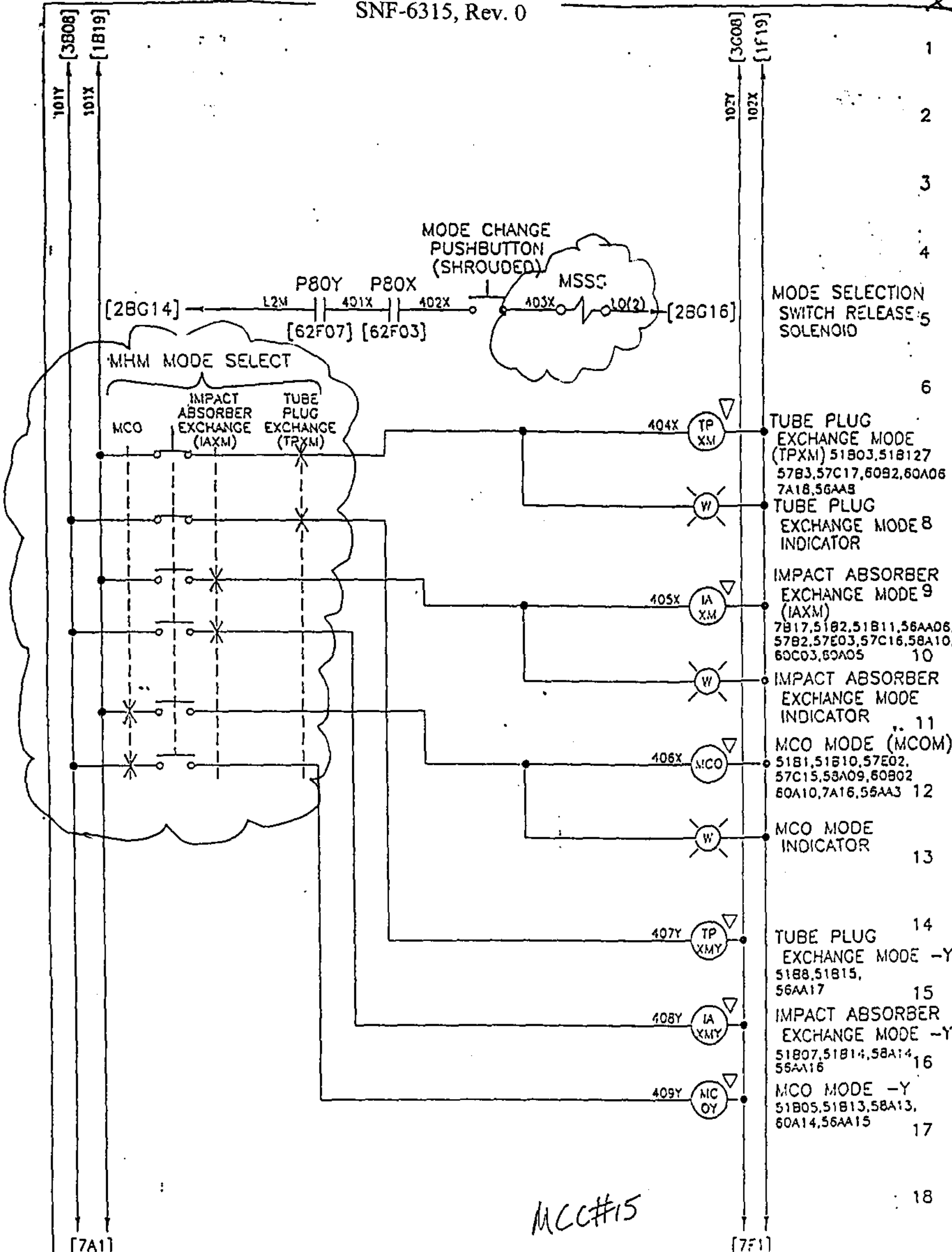

HANFORD DWG # H-2-828710 SHT 9 OF 97

A B C D E F G

REVISIONS

LTR	DESCRIPTION	DATE	BY	CHK	E/C	APPD	APPD
D	GENERAL REVISIONS	7/25/97	JBR	JMH	TWM	JMH	
E	MODIFY SELECTOR SWITCH	8/18/97	JRS	AH	TWM	JMH	LLA
F	MODIFY LOCATION ADDRESS; ADD PUSH-TO-TEST	9/4/97	JBR	AHH	TWM	JMH	EU
G	MODIFY LOCATORS	10/25/97	JRS	TWM	TWM	JMH	EU
H	RE-WIRING & SIMPLIFICATION	3/9/98	CSO	SEO	CSO		
J	GENERAL REVISION	7/20/98	CSO	SEO	CSO		
K	REVISED PER INSTALLATION MARK-UPS	3/5/99	CSO	[illegible]	CSO		

EB-33056

DUDERER INCORPORATED

MCCE SELECTOR SWITCH CONTROL ELEMENTARY

SCALE N/A

F-2566

DWG NO. EB-33056 SHEET 4 OF 5 REV K

Ederer Job No. F-2566
Bill of Material

A-242408LP	NEMA Type 12, 13 Enclosure, single door, 24"x24"x8"	Hoffman	TB-P-JBOX	8626	1	EL-35935
tbd-2566t	Motor, 15HP, 1200RPM, 460VAC, suitable for VFD operation to 2000RPM continuous duty, Class F insul., class B rise, NEMA	General Electric	TRMTR	10060	2	EL-35935
H31SS/LESS BASIC/	H31SS/less basic/replace with switch knob/16A/6 pole 3 position/ ul rated/110 VAC soleniod/bob/ solenoid is energised to allow switch to	Fortress	3POS	13008	1	EL-35936
66X12-4000-116	Alarm Display, 6 x 6 LEDs,, 120 VAC power, w/integral pushbuttons per drawing ED-35900 rev. - sht 1	Ronan	ALARM	13370	1	EL-35936
CR104PSK21A91L	2-Position Selector Switch, Maintained, Cylinder Lock, Remove Key from Left Only, 1N.O.-1N.C., N.C. Left Position	General Electric	ANTI-COLLISION	1875	1	EL-35936
CR104PSG34B91	3-Position Selector Switch, Maintained, Standard Knob, Black, 1 NO 1 NC	General Electric	BRIDGE SEISMIC CLAMPS	13721	1	EL-35936
CR104PSG21B91	2-Position Selector Switch, Maintained, Standard Knob, Black, 1N.O.-1N.C.	General Electric	BRIDGE SLOW	1855	1	EL-35936
CR104PSG94B91	3-Position Selector Switch, Spring Return Right To Center, Key Lever, Chrome, 2N.O.-2N.C.	General Electric	CAMERA FOCUS	13579	1	EL-35936
			CAMERA LIGHTING DIMMER		1	EL-35936
CR104PSG94B91	3-Position Selector Switch, Spring Return Right To Center, Key Lever, Chrome, 2N.O.-2N.C.	General Electric	CAMERA ZOOM	13579	1	EL-35936
EC-35937	Console Phenolic Labels	Ederer	CONSOLE LABELS	13599	1	EL-35936

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Commercial Grade Item Upgrade Dedication Form

Rev. No. 2	
Page 1 of 8	

ECN No. N/A 2/10/00 CGI No. CGI-SNF-D-MHM-023

Title: P02, 06, 61, 63 and ~~P65~~ Interlocks – Siemens Relay #3TH4310-0AK6

Section 1 Part Information

Item No.: **N/A**	Manufacturer: **N/A**	Supplier: **N/A**
Mfg. Part/Model No.: **N/A**	Supplier's P/N: **N/A**	
Part Description: **N/A** ORIGINAL		
End Use Description: **N/A**		

Section 2a Component Information

Equipment No.: **MCO, TPXM, IAXM**	Specification No.: **Ederer F-2566, Foster Wheeler MJX-SDX 452656**	Manufacturer: **Siemens**	Past P.O. No.: **N/A**
Manufacturer's Part/ Model No.: **3TH4310-0AK6**	Equipment Supplier (if different from manufacturer): **ALSTROM, Foster Wheeler**		Equip. Supplier's Part No.: **N/A**

Component Description: **120 VAC Fixed Contact Type Control Relay with 10 NO contacts. Located on the MHM. Used to prevent lifting an MCO when in the impact absorber or tube plug exchange mode.**

Section 2b Commercial Availability of the Item

1. Is the Item available from a catalogue from a qualified NQA1 supplier or ISO 9000 supplier (coordinate with project CGI interface Engineer or BTR)?

   [ ] YES (go to #2 below) [X] NO (go to procedure step 6.3.2, proceed to dedicate Item)

   If not available from a qualified NQA1 supplier, is it available from an ISO 9000 supplier? (coordinate with project CGI Interface Engineer or BTR)

   [ ] YES (go to #2 below, procedure step 6.3.2, dedicate Item) [X] NO (procedure step 6.3.2, dedicate Item)

2. List of Candidate qualified NQA1 suppliers or ISO 9000 suppliers, if used: **N/A**

3. Recommended Procurement Strategy (coordinate with project CGI interface Engineer or BTR): **N/A**

Section 2c CGI Determination

CGI Determination Questions:

#1: Is the Item subject to design or specification requirements that are unique to nuclear facilities or activities?

[ ] YES (the Item is not commercial grade) [X] NO (continue)

#2: Is the Item used in applications other than nuclear facilities or activities?

[ ] NO (the item is not commercial grade) [X] YES (continue)

#3: Is the Item ordered from manufacturer/supplier on the basis of specifications set forth in the manufacturer's catalog?

[ ] NO (the item is not commercial grade) [X] YES (continue)

[X] All three criteria have been satisfied. The Item meets the definition of commercial grade.

Commercial Grade Item Upgrade Dedication Form

ECN No. N/A CGI No. CGI-SNF-D-MHM-023

Title P02, 06, 61, 63 and P65 Interlocks – Siemens Relay #3TH4310-0AK6

Section 2d Reason for Dedication The above Commercial Grade (CG) described item is being Dedicated for use in the application cited for the following reason(s):	
	Item is being purchased from a non ESL manufacturer supplier as CG to be used in a Safety Class application.
	Item is being purchased from a non ESL manufacturer supplier as CG to be used in a Safety Significant application.
X	Item was purchased from a non ESL manufacturer supplier as CG to be used in a Safety Class application.
X	Item was purchased from a non ESL manufacturer supplier as CG to be used in a Safety Significant application.
	Other ('like-for-like', similar, substitution, replacement evaluation)

Section 3 Failure Effects Evaluation

A. Part/Component Safety Function:

1. **Relay contacts must remain open to prevent operation when NOT in the MCO Mode.**

1. Part/Component Functional Mode:
   - Safety Function #1: [X] Active [ ] Passive
   - Safety Function #2: [ ] Active [ ] Passive
   - Safety Function #3: [ ] Active [ ] Passive

Active - Mechanical or Electrical change of state is required to occur for the component to perform its safety function

Passive – Change of state is not required for the component to perform its safety function

C. Host Component Safety Function (if applicable):

1. **Relay is used in control circiuts providing interlocks that ensure proper MCO grapple and hoist operation for protection against events that could result in an MCO drop, P63 and P65.**

D. Failure Mode(s) and the effects on component or system safety function (see Worksheet 1):

1. **Contact resistance out of spec results in overheating and welding of contacts**
2. **Hot short across contacts results in failure to open the circuit**
3. **Binding of contacts results in failure to open circuit**

Section 4 Environmental & Natural Phenomena Hazard Design

Environmental Qualification Required:
- Yes [ ]
- No [X]

If yes: Environmental Qualification Requirements
- Limiting Environmental Conditions:
- Required Safety Functions:
- Qualification Period:

Natural Phenomena Hazard (NPH) Design Required:
- Yes [ ]
- No [X]

If yes: NPH Design Requirements
- Performance Category:
- NPH Design Req'ts.:
- Required Safety Functions:

Section 5 Component Functional Classification

	Safety Class (SC)		General Service (GS)	X	Safety Significant (SS)

If part/component classification is different from host component/system, document basis. **N/A**

Sections 6 and 7 (Reserved)

Section 8 References (for Functional Classification)

National Codes/Standards: **N/A**

Safety Analysis Report (SAR): **HNF-3672, Rev. 0**

Drawings: **Ederer, Inc. EB-33056, Sheet 4**

Vendor Manual/Manufacturer/Supplier Information: **Siemens Industrial Control Products, Control Relays, 3TH4 Fixed Contact Type**

Other: **ALSTOM ESL/R (96) 065 – Rev. D, 100% Design Submittal – June 1998**

Commercial Grade Item Upgrade Dedication Form

ECN No. N/A CGI No. CGI-SNF-D-MHM-023	Rev. No. 2
Title: P02, 06, 61, 63 and P65 Interlocks – Siemens Relay #3TH4310-0AK6	Page 3 of 8

Section 9 Critical Characteristics				
Critical Characteristics	Acceptance Criteria/Tolerances	Acceptance Method	ID	Function
1. Item Identification Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
Manufacturer	**Siemens**	**1, IN**	**X**	
Model Number	**3TH4310-0AK6**	**1, IN**	**X**	
2. Physical Critical Characteristics (for reasonable assurance that the Item delivered is the Item specified)				
Contact configuration	**10 Normally Open (NO) contacts**	**1, IN**	**X**	
3 Performance Critical Characteristics (for reasonable assurance that the Item will perform its intended safety function(s))				
Current carrying capability	**0.5V max. voltage drop across closed contacts at 10 amps VAC, resistive**	**1, T**		**X**
Insulation resistance	**10 Megohm min across open contact terminals and terminals to ground (500vdc)**	**1, T**		**X**
Operation	**Contacts open/close at maximum pick-up (102 VAC) and minimum drop-out (36 VAC) voltages**	**1, T**		**X**

4. Notes and Legend:

Rev 1: Page 1: Added Equipment Nos.; General New Forms

Rev. 2: Pages 3, 6, 7: revised Current carrying capability acceptance criteria to "0.5V max. voltage drop across closed contacts at 10 amps VAC, resistive "; Pages 3, 6, 7: revised Operation acceptance criteria to " Contacts open/close at maximum pick-up (102 VAC) and minimum drop-out (36 VAC) voltages"

Acceptance Method (Acc Meth):
1. Special Test and Inspection:
   - 1, IN for Inspection
   - 1,T for Test
2. Commercial Grade Survey
3. Source Verification
1. Vendor/Item History

Section 10 Initial Review and Approval

Approvals:

Designated Engineer: [signature]

Design Authority: DWR [signature] 2/10/00

QA Engineer: [signature] T Z ANDERSON 2/10/00

WORKSHEET 1
DETERMINATION OF FAILURE MECHANISMS/MODES

Section 1			
Typical Failure Mechanisms	Definition	X = Applicable to Component under Evaluation	
		X?	Indicate Failure Mode
Fracture	Separation of a solid accompanied by little or no macroscopic plastic deformation.		
Corrosion	The gradual deterioration of a material due to chemical or electrochemical reactions, such as oxidation, between the material and its environment.		
Erosion	Destruction of materials by the abrasive action of moving fluids, usually accelerated by the presence of solid particles carried with the fluid.		
Open Circuit	An electrical circuit that is unintentionally broken so that there is no complete path for current flow.		
Short Circuit	An abnormal connection by which an electrical current is connected to ground, or to some conducting body, resulting in excessive current flow.	X	**Failure to open the circuit by contact welding or hot short across the contact base.**
Blockage	Clogging of a filtering medium resulting in the inability to perform its purification function or blockage of flow.		
Seizure	Binding of a normally moving item through excessive pressure, temperature, friction, jamming.	X	**Results in failure of contacts to open**
Unacceptable Vibration	Mechanical oscillations produced are beyond the defined permissible limits due to unbalancing, poor support, or rotation at critical speeds.		
Loss of Properties	A loss of mechanical and physical properties of a material due to exposure to high temperatures, radiation exposure.		
Excess Strain	Under the action of excessive external forces the material of the part has been deformed or distorted.		
Mechanical Creep	From prolonged exposure to high temperature and stress, the object will show a slow change in its physical (shape and dimension) and mechanical characteristics.		
Ductile Fracture	Fracture characterized by tearing of metal accompanied by appreciable gross plastic deformation.		
Section 2 Additional Failure Modes Applicable to the Component Under Evaluation			

Commercial Grade Item Upgrade Dedication Form

ECN No. N/A CGI No. CGI-SNF-D-MHM-023

Title: **P02, 06, 61, 63 and P65 Interlocks – Siemens Relay #3TH4310-0AK6**

Checklist 1 - Acceptance Method 1 - Special Test/Inspection Verification

SECTION 1	
Item Description: **Siemens relay** System #: **MHM**	Equip #: **MCO, TPXM, IAXM** Model #: **3TH4310-0AK6**
Manufacturer (Address/Phone): **Siemens Industrial Control Products** **1-800-964-4114**	Supplier (Address/Phone): **Ederer**

SECTION 2 CRITICAL CHARACTERISTICS TO BE VERIFIED BY METHOD 1.

Insp	Test	PIT	
X			1. **Manufacturer**
X			2. **Model Number**
X			3. **Actuator**
	X		4. **Contact Rating**
	X		5. **Insulation Resistance**
	X		6. **Operation**

SECTION 3 BY INSPECTION * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)

Characteristic: **Manufacturer** Sample Size*: **100%**

Acceptance Criteria: **Siemens**

Receipt Inspection Plan / Report #: CGT-SNF-D-MHM-023 -TP-023 A,B,C

Characteristic: **Model Number** Sample Size*: **100%**

Acceptance Criteria: **3TH4310-0AK6**

Receipt Inspection Plan / Report #: TP-023 A,B,C

Characteristic: **Contact Configuration** Sample Size*: **100%**

Acceptance Criteria: **10 NO contacts**

Receipt Inspection Plan / Report #: TP-023 A,B,C

Commercial Grade Item Upgrade Dedication Form	Rev. No: 2
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SECTION 4 BY SPECIAL TEST * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)	
Characteristic for Test: **Current carrying capability**	Samp Size*: [X]Normal[ ]Reduced[ ]Tightened
Acceptance Criteria: **0.5V max. voltage drop across closed contacts at 10 amps VAC, resistive**	
Actual Test Value: See TP	Test Plan and Report #: TP023A,B
Characteristic for Test: **Insulation Resistance**	Samp Size*: [X]Normal[ ]Reduced[ ]Tightened
Acceptance Criteria: **10 Megohms min across open contact terminals and terminals to ground, with 500 vdc megger.**	
Actual Test Value: See TP	Test Plan and Report #: TP023A,B
Characteristic for Test: **Operation**	Samp Size*: [X]Normal[ ]Reduced[ ]Tightened
Acceptance Criteria: **Contacts open/close at maximum pick-up (102 VAC) and minimum drop-out (36 VAC) voltages**	
Actual Test Value: See TP	Test Plan and Report #: TP023A,B

SECTION 5 TEST / INSPECTION SUMMARY (Acceptance Method 1)

1. SUMMARY OF VERIFIED CRITICAL CHARACTERISTICS, THEIR VERIFICATION METHODS, AND RESULTS

ITEM DESCRIPTION: Contactor

Critical Characteristics				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/IN	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
Manufacturer	Siemens	X		1, IN	TP-023A,B,C	NA	2	0	XWEST	Larry Wilpers	4/10/00
Model Number	3TH4310-0AK6	X		1, IN	↓	↓	↓	↓	↓	↓	↓
Terminal Configuration	10 NO contacts	X		1, IN	↓	↓	↓	↓	↓	↓	↓
Current Carrying Capability	0.5V max. voltage drop across closed contacts at 10 amps VAC, resistive		X	1, T	TP-023A,B	↓	↓	↓	↓	↓	↓
Insulation Resistance	10 Megohms min across open contact terminals and terminals to ground (500VDC megger)		X	1, T	↓	↓	↓	↓	↓	↓	↓
Operation	Contacts open/close at maximum pick-up (102 VAC) and minimum drop-out (36 VAC) voltages		X	1, T	↓	↓	↓	↓	↓	↓	↓

2. DISPOSITION OF UNVERIFIED OR FAILED CRITICAL CHARACTERISTICS

Critical Characteristic	Disposition

3. SIGNATURE INDICATES ALL CRITICAL CHARACTERISTICS VERIFIED SATISFACTORY OR ACCEPTABLY DISPOSITIONED AND COMMERCIAL GRADE DEDICATION IS SATISFACTORY AND COMPLETE.

See Test Plan TP-023 A,B,C cited above CES 4/11/00

Testing Agency Approval: NA CES 4/11/00 Date

Testing Agency QA Engineer: NA CES 4/11/00 Date

BUYER VERIFICATION

Design Authority: CES Laura Sherman Date 4-11-00

QA Engineer: Stephen Scott Nash Date 4-20-2000

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SECTION 6 CONTACTS / PHONE NUMBERS		
	Name	Phone
Design Authority	CRAIG SWENSON	( ) 376-0288
QA		( )
QC		( )
Cog - Engineer		( )
CGI Engineer		( )
Procurement Engineer		( )
Other		( )

SECTION 7 SUPPORTING DOCUMENTATION FOR THIS CHECKLIST		
Initial Procurement Documents		**For Critical Characteristics**
	Drawings:	
X	Manuals (specify type & number): **Siemens Industrial Control Products, Control Relays, 3TH4 Fixed Contact Type**	**All**
	Design Calculations	
	Installation Instructions	
	Operation Instructions	
	Calibration Instructions	
	Manufacturer's Recommended Spare Parts List	
	Other:	
Procurement Documents:		**For Critical Characteristics**
	Certificate of Conformance/Compliance	
	Seismic Qualification Certificate	
	Environmental Qualification Certificate	
	Test Report (s):	
	Inspection Report (s):	
	CMTRs for ASME Pressure Retaining Materials	
	Valve Seat Leakage Report	
	Weld Records	
	Material Traceability Record	
	Other:	

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI. Eng	DA	QA Post Review*

* QA Post Review of Individual Revisions is allowed

ORIGINAL

In-Situ Test Procedure

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) [signature] Date: 3/16/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	MICHAEL CRAM	Belhaven	[signature]	MCC
Electrician	DAN K. YORK	P.C.E	[signature]	D.K.Y
Electrician Quality Control	Stephen R Cowley	PCE	[signature]	SRC
Design Authority Representative	LeRoy W. Price	XWST	[signature]	[signature]
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Current Source capable of 10 amps
Megger Instrument capable of 500 VDC Test Voltage
Adjustable Voltage Power supply capable of 0 to 120 VAC minimum
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: AVO BM80/2 I.D.: 6410-889 Calib. Due date: 02-09-01

Test Instrument type: HP 3457A I.D.: BAT 123 Calib. Due date: 07-29-00

Test Instrument type: HP 3457A I.D.: BAT 124 Calib. Due date: 07-30-00

Test Instrument type: FLUKE 787 I.D.: BAT 107 Calib. Due date: 05-28-00

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE:

For this In-Situ Test, certain leads must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of leads..

1.0 Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	IAXM	**IAXM**	Acc
Manufacturer:	SIEMENS	**Siemens**	Acc
Model:	3TH4310	**3TH4310 (on side of relay)**	Acc
Contact Configuration:	OK	**10 Normally Open Contacts**	Acc
Serial No./Lot No./Date Code:	OK	**N/A**	Acc
Coil	K6	**K6 (near terminal A1)**	Acc.

2.0 Perform the following testing steps: 11:20 a.m

2.1 Record: Date /Time of Test Beginning: 03-22-00 10:20 a.m 03-27-00 (illegible)

2.1.1 Complete the Lifted Lead Log prior to lifting leads.

2.1.2 Lift all leads

2.2 Operation

2.2.1 Regulate voltage to the coil of the relay and monitor the maximum pick-up voltage and minimum drop-out voltages.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Pick-up Voltage	84.376VAC	**96 VAC maximum**	Acc
Drop-out Voltage	43.867 VAC	**36 AC minimum**	Acc

2.2.2 De-energize and remove test equipment.

2.3 Insulation Resistance Test

1 Setup the test equipment and relay specimen for insulation resistance testing.

2.3.2 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the test specimen. Record data below.

Terminal to Terminal / Ground

Desc. Of Terminal	Desc. Of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
13	Ground	>100Gohm	> 10 Megohms	Acc
14	Ground	>100Gohm	> 10 Megohms	Acc
23	Ground	>100Gohm	> 10 Megohms	Acc
24	Ground	>100Gohm	> 10 Megohms	Acc
33	Ground	>100Gohm	> 10 Megohms	Acc
34	Ground	>100Gohm	> 10 Megohms	Acc
43	Ground	>100Gohm	> 10 Megohms	Acc
44	Ground	>100Gohm	> 10 Megohms	Acc
53	Ground	>100Gohm	> 10 Megohms	Acc
54	Ground	>100Gohm	> 10 Megohms	Acc
63	Ground	>100Gohm	> 10 Megohms	Acc
64	Ground	>100Gohm	> 10 Megohms	Acc
73	Ground	>100Gohm	> 10 Megohms	Acc
74	Ground	>100Gohm	> 10 Megohms	Acc
83	Ground	>100Gohm	> 10 Megohms	Acc
84	Ground	>100Gohm	> 10 Megohms	Acc
93	Ground	>100Gohm	> 10 Megohms	Acc
94	Ground	>100Gohm	> 10 Megohms	Acc
03	Ground	>100Gohm	> 10 Megohms	Acc
04	Ground	>100Gohm	> 10 Megohms	Acc
A1 or A2 (coil)	Ground	>100Gohm	> 10 Megohms	Acc
13	14	>100Gohm	> 10 Megohms	Acc
23	24	>100Gohm	> 10 Megohms	Acc
33	34	>100Gohm	> 10 Megohms	Acc
43	44	>100Gohm	> 10 Megohms	Acc
53	54	>100Gohm	> 10 Megohms	Acc
63	64	>100Gohm	> 10 Megohms	Acc
73	74	>100Gohm	> 10 Megohms	Acc
83	84	>100Gohm	> 10 Megohms	Acc
93	94	>100Gohm	> 10 Megohms	Acc
03	04	>100Gohm	> 10 Megohms	Acc

2.4 Contact Rating Test

2.4.1 Setup the test equipment and relay specimen for contact rating testing.

2.4.2 Manually adjust the relay or apply 120 VAC to the coil to close the normally open contacts

2.4.3 Apply a nominal 10 amps, resistive, across closed normally open contacts of the test specimen

Caution: Do not change state of contacts while energized.

2.4.5 Record the following data.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Contacts 13-14	.0683 VAC	< 0.5 ± 10% Volts AC drop	Acc
Contacts 23-24	.0621 VAC	< 0.5 ± 10% Volts AC drop	Acc
Contacts 33-34	.1227 VAC	< 0.5 ± 10% Volts AC drop	Acc
Contacts 43-44	.1073 VAC	< 0.5 ± 10% Volts AC drop	Acc
Contacts 53-54	.1176 VAC	< 0.5 ± 10% Volts AC drop	Acc
Contacts 63-64	.0910 VAC	< 0.5 ± 10% Volts AC drop	Acc
Contacts 73-74	.0707 VAC	< 0.5 ± 10% Volts AC drop	Acc
Contacts 83-84	.0732 VAC	< 0.5 ± 10% Volts AC drop	Acc
Contacts 93-94	.0881 VAC	< 0.5 ± 10% Volts AC drop	Acc
Contacts 03-04	.0891 VAC	< 0.5 ± 10% Volts AC drop	Acc.

2.4.6 De-energize and remove test equipment.

2.5 Terminate the test.

2.5.1 Reland the lifted leads and verify reland in accordance with the Lifted Lead Log.

2.5.2 Retorque the terminals to 12 in-pounds.

2.5.3 Record: Date /Time of Test End: 03-22-00 12:50 p.m.

3.0 References

3.1 Elementary Wiring Drawings: EB-33056 Sheet 4

3.2 Y-Channel Main Power Panel Wiring Diagram: ED-33069 Sheet 1

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Acceptance Criteria has been met.

Michael Cram

03-22-00

Notes:

Certified Instrumentation Technician (signature) Michael Cram Date: 03-22-00.

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Mary Swenson Date: 3/24/00

QA/QC (signature) Stephen Scott Mott Date: 3-27-00CO.

LIFTED LEAD LOG

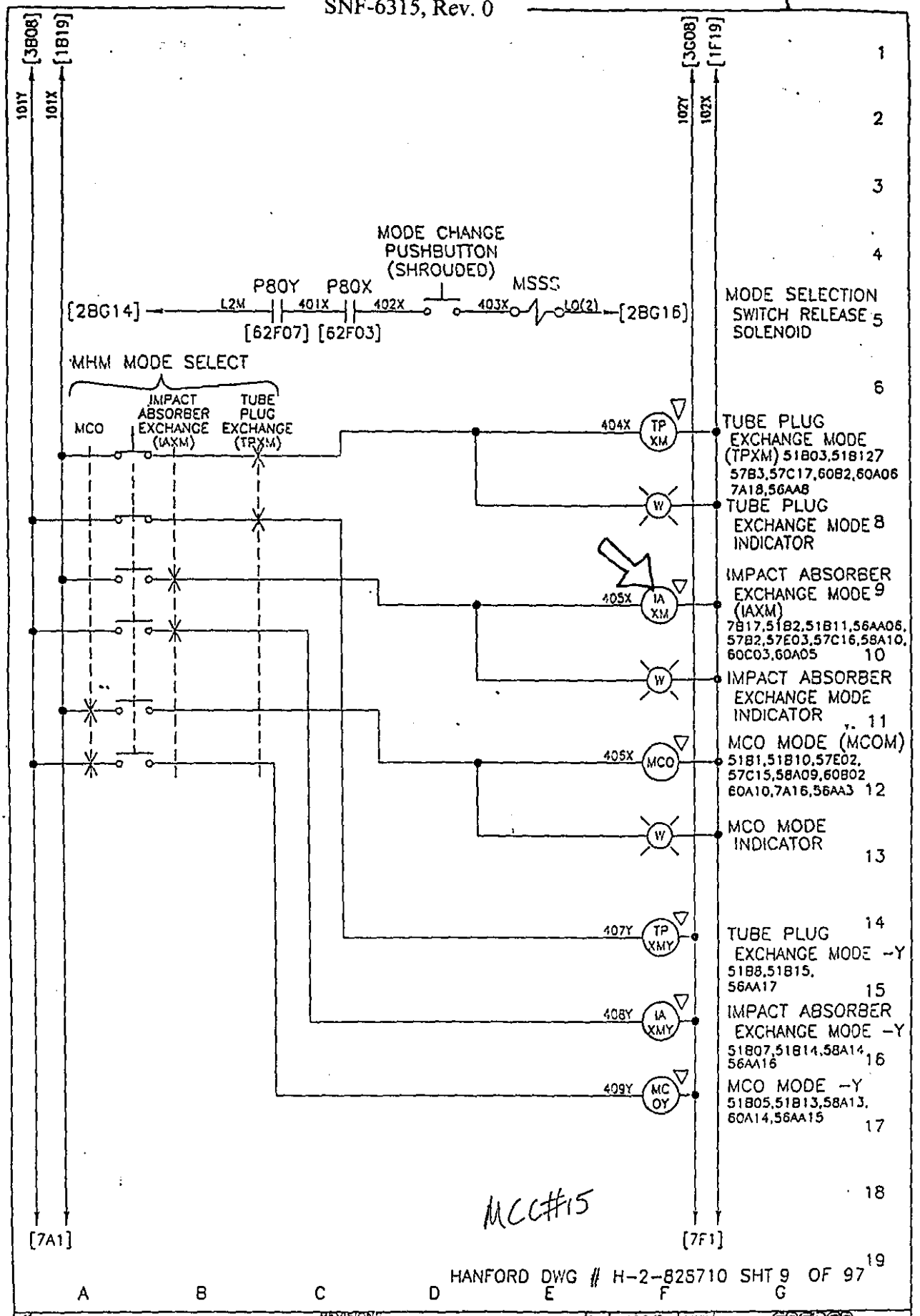
Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
		2) 5702X	IAXM	63	D.K.Y	3-22-00	SRC	3-22-00	D.K.Y	3-22-00	SRC	3-22-00
		5701X		64	D.K.Y	3-22-00	SRC	3-22-00	D.K.Y	3-22-00	SRC	3-22-00
		5705X		73	D.K.Y	3-22-00	SRC	3-22-00	D.K.Y	3-22-00	SRC	3-22-00
		5709X		74	D.K.Y	3-22-00	SRC	3-22-00	D.K.Y	3-22-00	SRC	3-22-00
		510CX		83	D.K.Y	3-22-00	SRC	3-22-00	D.K.Y	3-22-00	SRC	3-22-00
		5101X		84	D.K.Y	3-22-00	SRC	3-22-00	D.K.Y	3-22-00	SRC	3-22-00
		2) 6002X		93	D.K.Y	3-22-00	SRC	3-22-00	D.K.Y	3-22-00	SRC	3-22-00
		2) 6003X		94	D.K.Y	3-22-00	SRC	3-22-00	D.K.Y	3-22-00	SRC	3-22-00
		2) 101X		03	D.K.Y	3-22-00	SRC	3-22-00	D.K.Y	3-22-00	SRC	3-22-00
		56A05X		04	D.K.Y	3-22-00	SRC	3-22-00	D.K.Y	3-22-00	SRC	3-22-00
		2) 5702X		13	D.K.Y	3-22-00	SRC	3-22-00	D.K.Y	3-22-00	SRC	3-22-00
		2) 5704X		14	D.K.Y	3-22-00	SRC	3-22-00	D.K.Y	3-22-00	SRC	3-22-00
		2) 101X		23	D.K.Y	3-22-00	SRC	3-22-00	D.K.Y	3-22-00	SRC	3-22-00
		714X		24	D.K.Y	3-22-00	SRC	3-22-00	D.K.Y	3-22-00	SRC	3-22-00

Remarks:

LIFTED LEAD LOG

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
		2) 101X	IAXM	33	DKY	3-22-00	SRC	3-22-00	DKY	3-22-00	SRC	3-22-00
		5811 X		34	DKY	3-22-00	SRC	3-22-00	DKY	3-22-00	SRC	3-22-00
		2) 151X		43	DKY	3-22-00	SRC	3-22-00	DKY	3-22-00	SRC	3-22-00
		5140X		44	DKY	3-22-00	SRC	3-22-00	DKY	3-22-00	SRC	3-22-00
		2) 101X		53	DKY	3-22-00	SRC	3-22-00	DKY	3-22-00	SRC	3-22-00
		6004X		54	DKY	3-22-00	SRC	3-22-00	DKY	3-22-00	SRC	3-22-00
		2) 405X		A-1	DKY	3-22-00	SRC	3-22-00	DKY	3-22-00	SRC	3-22-00
		Black	PCS24-6	A-1	DKY	3-22-00	SRC	3-22-00	DKY	3-22-00	SRC	3-22-00
		Grey	"	A-2	DKY	3-22-00	SRC	3-22-00	DKY	3-22-00	SRC	3-22-00
		2) 102X	IAXM	A-2	DKY	3-22-00	SRC	3-22-00	DKY	3-22-00	SRC	3-22-00

Remarks:



LTR	DESCRIPTION	DATE	BY	CHK	ENG	APPD	APPD
D	GENERAL REVISIONS	7/25/97	JDR	JMH	TMM	JMH	
E	MODIFY SELECTOR SWITCH	8/15/97	JRS	AH	TMM	JMH	LLA
F	MODIFY LOCATION ADDRESS; ADD PUSH-TO-TEST	9/4/97	JDR	AHH	TMM	JMH	EM
G	MODIFY LOCATORS	10/23/97	JRS	TMM	TMM	JMH	EM
H	DE-INERTING & SIMPLIFICATION	3/3/98	CSD	SED	CSD		
J	GENERAL REVISION	7/20/98	CSD	SED	CSD		
K	REVISED PER INSTALLATION MARK-UPS	3/3/99	CSD				

DRAWN	J. D. RUPP	4/23/97
DSGN	T. M. MEADOWS	4/23/97
CHK	T. M. MEADOWS	4/23/97
APPD	J. M. HANNUM	4/29/97
APPD	L. L. ANDERSON	5/1/97
APPD		

EDGERER INCORPORATED

MODE SELECTOR SWITCH CONTROL ELEMENTARY

SCALE N/A

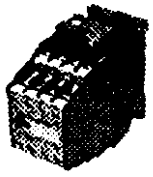
FROM WDD No. F-2566

DWG NO. EB-33056

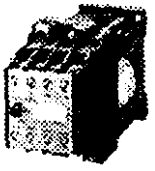
SHEET 4 OF 5

REV K

3TH4 Fixed Contacts Type



3TH4040-0AK6



3TH4022-0BB4

Ordering Instructions

- Determine the number of contacts, AC or DC, then select Catalog Number.
- Complete Catalog Number by adding Coil suffix from table below e.g.

3TH40	2	2	0	A	K6

Relay Type
2 NO
2 NC
Terminals
AC
Coil
Voltage 120V AC

Additional References

- Technical Data see page 614.
- Dimensions see page 617.
- Wiring Diagrams see page 616.
- Accessories, Varistors, RC Elements and Suppressors see page 613.
- Replacement Parts see page 923.

Relays With Screw Terminals for DIN Rail and Screw Mounting

AC Operation

No of Contacts	Code	Contact Type NO	Contact Type NC	Early Make NO	Late Break NC	Catalog No (Coil Suffix required from table below)	Price $
Relay With 4 Fixed Contacts							
4	40E	4	—	—	—	3TH4040-0Att	72.
	31E	3	1	—	—	3TH4031-0Att	72.
	22E	2	2	—	—	3TH4022-0Att	72.
	13E	1	3	—	—	3TH4013-0Att	72.
	04E	—	4	—	—	3TH4004-0Att	72.
	Relay with 4 Contacts, Early Make/Late Break						
	31E, U	2	—	1	1	3TH4095-0Att	89.
	22E, U	1	1	1	1	3TH4096-0Att	182.
	22E, 2U	—	—	2	2	3TH4092-0Att	132.
Relay With 8 Fixed Contacts							
8	80E	8	—	—	—	3TH4280-0Att	120.
	71E	7	1	—	—	3TH4271-0Att	120.
	62E	6	2	—	—	3TH4262-0Att	120.
	53E	5	3	—	—	3TH4253-0Att	120.
	44E	4	4	—	—	3TH4244-0Att	120.
	Relay With 8 Contacts, Early Make/Late Break						
	44E, U	3	3	1	1	3TH4293-0Att	150.
Relay With 10 Fixed Contacts							
10	100E	10	—	—	—	3TH4310-0Att	144.
	91E	9	1	—	—	3TH4391-0Att	144.
	82E	8	2	—	—	3TH4382-0Att	144.
	73E	7	3	—	—	3TH4373-0Att	144.
	64E	6	4	—	—	3TH4364-0Att	144.
	55E	5	5	—	—	3TH4355-0Att	144.
	Relay With 10 Contacts With Early Make/Late Break						
	55E, U	4	4	1	1	3TH4394-0Att	174.
Mechanically Latched Relay With 9 Contacts							
9	54	5	4	—	—	3TH4454-0Att	201.

DC Operation

No of Contacts	Code	Contact Type NO	Contact Type NC	Early Make NO	Late Break NC	Catalog No (Coil Suffix required from table below)	Price $
Relay With 4 Fixed Contacts							
4	40E	4	—	—	—	3TH4040-0Btt	117.
	31E	3	1	—	—	3TH4031-0Btt	117.
	22E	2	2	—	—	3TH4022-0Btt	117.
	13E	1	3	—	—	3TH4013-0Btt	117.
	04E	—	4	—	—	3TH4004-0Btt	117.
	Relay With 4 Contacts, Early Make/Late Break						
	31E, U	2	—	1	1	3TH4095-0Btt	147.
	22E, U	1	1	1	1	3TH4096-0Btt	147.
	22E, 2U	—	—	2	2	3TH4092-0Btt	177.
Relay With 8 Fixed Contacts							
8	80E	8	—	—	—	3TH4280-0Btt	162.
	71E	7	1	—	—	3TH4271-0Btt	162.
	62E	6	2	—	—	3TH4262-0Btt	162.
	53E	5	3	—	—	3TH4253-0Btt	162.
	44E	4	4	—	—	3TH4244-0Btt	162.
	Relay With 8 Contacts, Early Make/Late Break						
	44E, U	3	3	1	1	3TH4293-0Btt	192.
Relay With 10 Fixed Contacts							
10	100E	10	—	—	—	3TH4310-0Btt	186.
	91E	9	1	—	—	3TH4391-0Btt	186.
	82E	8	2	—	—	3TH4382-0Btt	186.
	73E	7	3	—	—	3TH4373-0Btt	186.
	64E	6	4	—	—	3TH4364-0Btt	186.
	55E	5	5	—	—	3TH4355-0Btt	186.
	Relay With 10 Contacts With Early Make/Late Break						
	55E, U	4	4	1	1	3TH4394-0Btt	216.
Mechanically Latched Relay With 9 Contacts							
9	54	5	4	—	—	3TH4454-0Btt	231.

Coil Suffix

AC Volts 50/60Hz							
24	110/120	173/208	220/277	208	220/240	380/460	500/600
C2	K6	M1	U1	M2	P6	Q0	S0

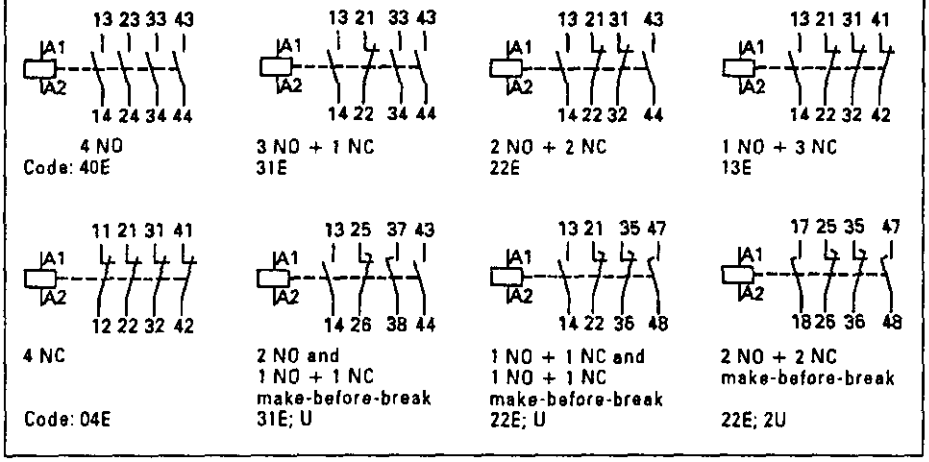
For other Coil Voltages see page 911.

Coil Suffix

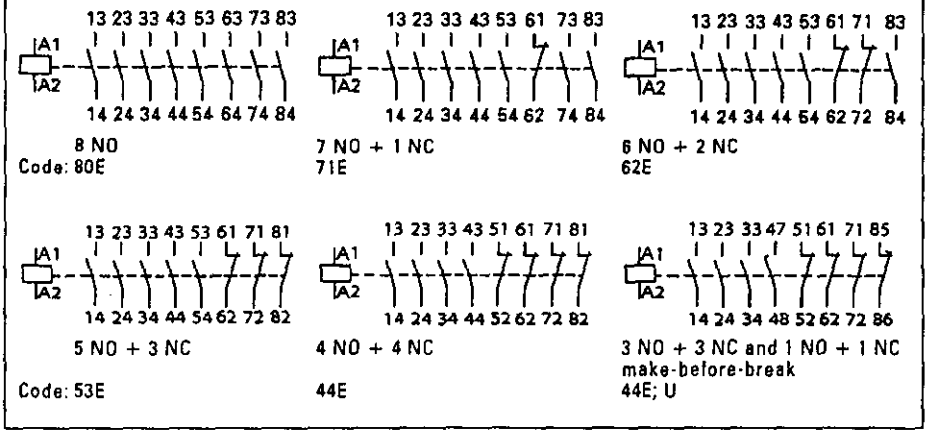
DC Volts				
12	24	48	125	240
A4	B4	W4	G4	Q4

Terminal Designations According to DIN EN 50011

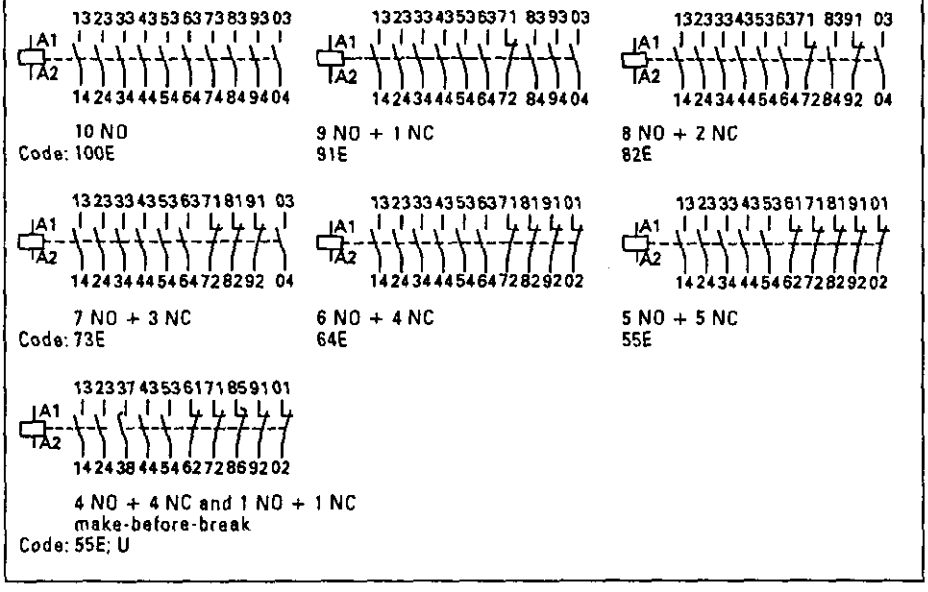
3TH40, AC and DC Operation



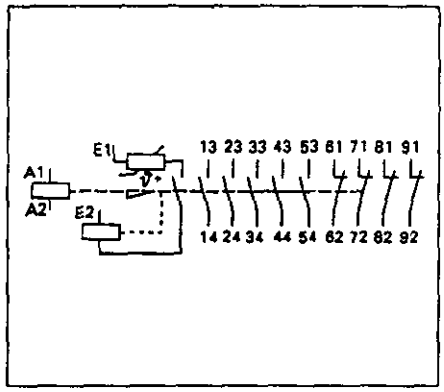
3TH42, AC and DC Operation



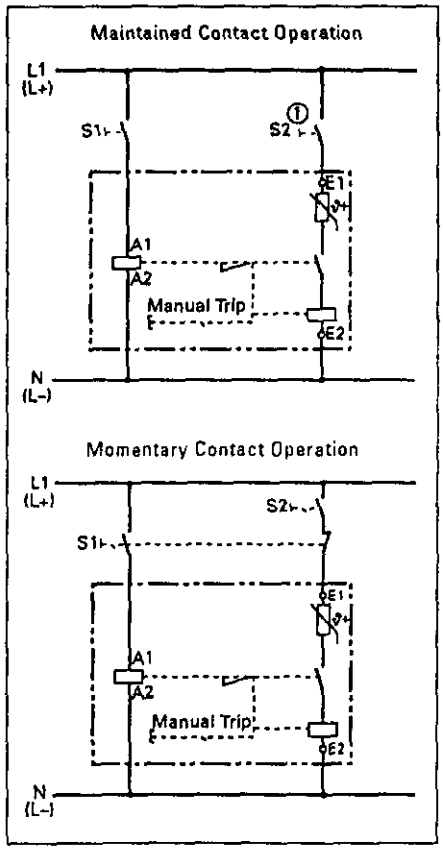
3TH43, AC and DC Operation



3TH44, Internal Connection Diagram, AC and DC Operation



3TH44, Schematic Diagrams, AC and DC Operation①



①Do not operate S2 while S1 is closed.

3TH4 Fixed Contacts Type

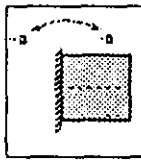
Type		3TH40, 3TH42, 3TH43	
Mechanical Life		30 Million Operations	
Permissible Ambient Temperature Range		−25 to +55°C	
Coil Ratings		(Cold Coil and 1.0 × U_s)	
AC Operation		60Hz	50Hz
	Inrush	75 VA	68 VA
	p.f.	0.76	0.82
	Sealed	9.4 VA	10 VA
	p.f.	0.29	0.29
DC Operation	Inrush = Sealed	6.2 W	
Coil Voltage Tolerances			
AC		0.8 to 1.1 × U_s	
DC (except 24V)		0.8 to 1.1 × U_s	
DC 24V		0.8 to 1.2 × U_s	
Operation Times		0.80 to	
Total Break Time = Opening Delay + Arcing Time		1.1 × U_s, 1.0 × U_s	
AC Operation Closing Delay	NO	8–35 ms	10–25 ms
	NC	6–20 ms	7–20 ms
Opening Delay	NO	4–18 ms	5–18 ms
	NC	5–30 ms	7–20 ms
Arcing Time		10 ms	

Type		3TH40, 3TH42, 3TH43	
Resistance to Shock (Rectangular Plus)	AC	7.7/5 and 4.4/10 g/ms	
	DC	9.3/5 and 5.4/10 g/ms	
Rated currents			
I_e/AC-12 (AC-1)		16A	
I_e/AC-15/AC-14 (AC-11) at U_e	120/230/220V	10A	
	400/380V	6A	
	500V	4A	
	690/660V	2A	
		Current Paths in Series	
I_e/DC-12 (DC-1) at U_e		1	3
	24V	10A	10A
	48V	10A	10A
	110V	2.1A	10A
	220V	0.8A	10A
	440V	0.6A	1.3A
	600V	0.6A	1A
I_e/DC-13 (DC-11) U_e			
	24V	10A	10A
	48V	5A	10A
	110V	0.9A	10A
	220V	0.45A	2A
	440V	0.25A	0.9A
	600V	0.2A	0.8A

Type	3TH40, 3TH42, 3TH43
Switching Frequency z in make/break operations per hour at rated operation for duty AC-12	1,000/h
AC-2	500/h
AC-3	1,000/h
AC-15/AC-14 resp DC-13	3,600/h
No-load switching frequency	10,000/h
Conductor Sizes Terminal Wire Size	AWG(2) #16–12
cULus, CSA ratings	
Rated Control Supply Voltage AC	Max. 600V
DC	Max. 230V
Rated Voltage	AC 600V, DC 600V
Making and Breaking Capacity	A600, P600
Continuous Current Rating	10A

Permitted Mounting Positions

The relation between the permitted inclination to the mounting surface to the vertical and the coil voltage tolerance is as follows:

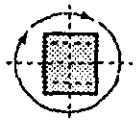


Permitted inclination (<) a) of the mounting surface to the vertical	Coil voltage tolerance min × U_s	max × U_s
−22.5 to +22.5°	0.8 to	1.1
−90 to +90°	0.85 to	1.1
any	0.9 to	1.1

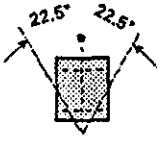
Mounting

For snap-on and screw mounting, snapping onto 35 mm standard mounting rail in accordance with DIN EN 50 022.

When 3TH AC-operated control relays are mounted in rows, the minimum gap between them must be 0.19 (5) when the voltage is likely to reach 1.1 × Us, the ambient temperature ≥45°C and the duty factor of all relays is 100%.

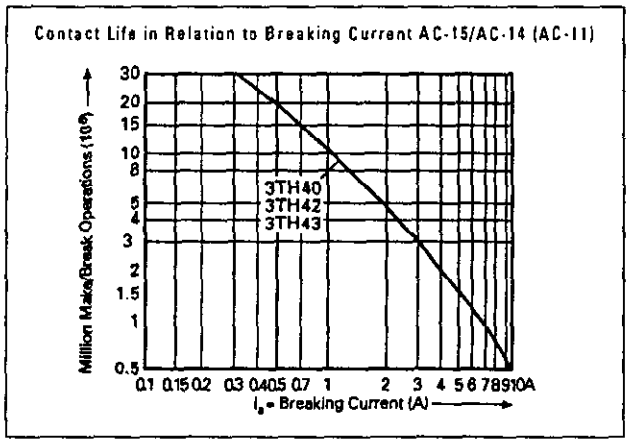


The AC operated relays preferably should be mounted on a vertical surface in any desired position.



The DC operated relays preferably should be mounted on a vertical surface in the position as shown in the drawing.

Contact Life Curve



3TH44 Mechanically Latched Type

Design and Mode of Operation

3TH44 mechanical latch relays latch upon closing. The contacts open either electrically by energizing the release coil or manually, by moving the release switch.

The release coil must not be energized continuously.

A PTC thermistor is connected in series with the tripping solenoid in order to prevent damage to the coil in the event of simultaneous maintained-contact signals being applied. The maximum delay before resetting after the thermistor has operated by double command is 5 minutes.

Specifications

3TH44 mechanical latch relays are suitable for use in industrial environments. They meet or exceed the requirements of NEMA, UL, CSA, IEC, VDE and other international standards.

Contacts

The contacts are not replaceable.

Coils

The main coil of the control relays, with mechanical latch, is replaceable. The release coil is not replaceable. The voltage of the tripping coil will be found under the marking tag.

①Any technical data not given here is identical to that of the 3TH43 relays.

Technical Data①②

Mechanical Life		10 Million Make/Break Operations	
Coil Ratings			
AC Operation up to 240V	Inrush Release coil	77VA, p.f. = 0.81 (Contactor Coil) 110VA, p.f. = 0.86 (Unlatching Coil)	
DC Operation up to 230V	Inrush Release coil	6.5W (Contactor Coil) 130W (Unlatching Coil)	
Control Signal Duration		Minimum	
AC Operation	Closing Opening	40 ms 30 ms	
DC Operation	Closing Opening	170 ms 30 ms	
Rated Operational Current at Rated Voltage		**Volts AC/DC**	**Amps**
AC-15/AC-14 (AC-11)		230/220V 380/400V 500V 660V/690V	10 A 6 A 4 A 2 A

Permitted Mounting Positions

The relays must be mounted on a vertical surface in the position shown in the dimension drawings.

②For Internal connection diagrams and schematic diagrams see page 616.

Dedication Test Plan – IST
Test Plan No.: CGI-SNF-D-MHM-023-TP-023B
Test Specimen: Siemens 3TH4310-0AK6, Eqmt. No.: TPXM

ORIGINAL

Rev. No. 0

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI. Eng	DA	QA Post Review*
						3/16/00 NO CHANGES

* QA Post Review of Individual Revisions is allowed

ORIGINAL

ORIGINAL

In-Situ Test Procedure

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) Larry Swenson Date: 3/16/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Belhaven	Michael Cram	MRC
Electrician	DAN K. YORK Dan K. York	PGE	Dan K. York	D.Y
Electrician Quality Control	Stephen R Conley	PGE	Stephen R Conley	SRC
Design Authority Representative	LARRY W. PRICE	XWEST		
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Current Source capable of 10 amps
Megger Instrument capable of 500 VDC Test Voltage
Adjustable Voltage Power supply capable of 0 to 120 VAC minimum
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: ~~BAT 123~~ HP 3457A MRC I.D.: BAT 123 Calib. Due date: 07-29-00

Test Instrument type: ~~BAT 124~~ HP 3457A MRC I.D.: BAT 124 Calib. Due date: 07-30-00

Test Instrument type: AVO BM 80/2 I.D.: 6410-889 Calib. Due date: 02-09-01

Test Instrument type: PROTO 6100 I.D.: 029E/059 Calib. Due date: 01-13-01

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE:

For this In-Situ Test, certain leads must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of leads..

1.0 Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	TPXM	**TPXM**	Acc
Manufacturer:	SIEMENS	**Siemens**	Acc
Model:	3TH4310	**3TH4310 (on side of relay)**	Acc
Contact Configuration:	OK	**10 Normally Open Contacts**	Acc
Serial No./Lot No./Date Code:	N/A OK	**N/A**	Acc
Coil	K6	**K6 (near terminal A1)**	Acc

2.0 Perform the following testing steps:

2.1 Record: Date /Time of Test Beginning: 03-17-00 12:45 p.m

2.1.1 Complete the Lifted Lead Log prior to lifting leads.

2.1.2 Lift all leads

2.2 Operation

2.2.1 Regulate voltage to the coil of the relay and monitor the maximum pick-up voltage and minimum drop-out voltages.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Pick-up Voltage	73.655 VAC	**96 VAC maximum**	Acc
Drop-out Voltage	43.862 VAC	**36 AC minimum**	Acc

2.2.2 De-energize and remove test equipment.

2.3 Insulation Resistance Test

1 Setup the test equipment and relay specimen for insulation resistance testing.

2.3.2 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the test specimen. Record data below.

Terminal to Terminal / Ground

Desc. Of Terminal	Desc. Of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
13	Ground	>100Gohm	> 10 Megohms	Acc
14	Ground	>100Gohm	> 10 Megohms	Acc
23	Ground	>100Gohm	> 10 Megohms	Acc
24	Ground	>100Gohm	> 10 Megohms	Acc
33	Ground	>100Gohm	> 10 Megohms	Acc
34	Ground	>100Gohm	> 10 Megohms	Acc
43	Ground	>100Gohm	> 10 Megohms	Acc
44	Ground	>100Gohm	> 10 Megohms	Acc
53	Ground	>100Gohm	> 10 Megohms	Acc
54	Ground	>100Gohm	> 10 Megohms	Acc
63	Ground	>100Gohm	> 10 Megohms	Acc
64	Ground	>100Gohm	> 10 Megohms	Acc
73	Ground	>100Gohm	> 10 Megohms	Acc
74	Ground	>100Gohm	> 10 Megohms	Acc
83	Ground	>100Gohm	> 10 Megohms	Acc
84	Ground	>100Gohm	> 10 Megohms	Acc
93	Ground	>100Gohm	> 10 Megohms	Acc
94	Ground	>100Gohm	> 10 Megohms	Acc
03	Ground	>100Gohm	> 10 Megohms	Acc
04	Ground	>100Gohm	> 10 Megohms	Acc
A1 or A2 (coil)	Ground	>100Gohm	> 10 Megohms	Acc
13	14	>100Gohm	> 10 Megohms	Acc
23	24	>100Gohm	> 10 Megohms	Acc
33	34	>100Gohm	> 10 Megohms	Acc
43	44	>100Gohm	> 10 Megohms	Acc
53	54	>100Gohm	> 10 Megohms	Acc
63	64	>100Gohm	> 10 Megohms	Acc
73	74	>100Gohm	> 10 Megohms	Acc
83	84	>100Gohm	> 10 Megohms	Acc
93	94	>100Gohm	> 10 Megohms	Acc
03	04	>100Gohm	> 10 Megohms	Acc

2.4 Contact Rating Test

2.4.1 Setup the test equipment and relay specimen for contact rating testing.

2.4.2 Manually adjust the relay or apply 120 VAC to the coil to close the normally open contacts

2.4.3 Apply a nominal 10 amps, resistive, across closed normally open contacts of the test specimen

Caution: Do not change state of contacts while energized.

2.4.5 Record the following data.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Contacts 13-14	.0710 VAC	< 0.5 ± 10% Volts AC drop	Acc
Contacts 23-24	.0899 VAC	< 0.5 ± 10% Volts AC drop	Acc
Contacts 33-34	.0953 VAC	< 0.5 ± 10% Volts AC drop	Acc
Contacts 43-44	.1114 VAC	< 0.5 ± 10% Volts AC drop	Acc
Contacts 53-54	.0617 VAC	< 0.5 ± 10% Volts AC drop	Acc
Contacts 63-64	.0641 VAC	< 0.5 ± 10% Volts AC drop	Acc
Contacts 73-74	.0687 VAC	< 0.5 ± 10% Volts AC drop	Acc
Contacts 83-84	.0731 VAC	< 0.5 ± 10% Volts AC drop	Acc
Contacts 93-94	.0743 VAC	< 0.5 ± 10% Volts AC drop	Acc
Contacts 03-04	.0849 VAC	< 0.5 ± 10% Volts AC drop	Acc

2.4.6 De-energize and remove test equipment.

2.5 Terminate the test.

2.5.1 Reland the lifted leads and verify reland in accordance with the Lifted Lead Log.

2.5.2 Retorque the terminals to 12 in-pounds.

2.5.3 Record: Date /Time of Test End: 03-17-00 1:00 P.M.

3.0 References

3.1 Elementary Wiring Drawings: EB-33056 Sheet 4

3.2 X Channel Main Power Panel Wiring Diagram: ED-33065 Sheet 1

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Acceptance Criteria has been met

Michael Cram

03-17-00

Notes:

Certified Instrumentation Technician (signature) Michael O Cram Date: 03-17-00.

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Craig Swenson Date: 3/20/00

QA/QC (signature) Stephen Scott Mott Date: 3-22-2000

LIFTED LEAD LOG

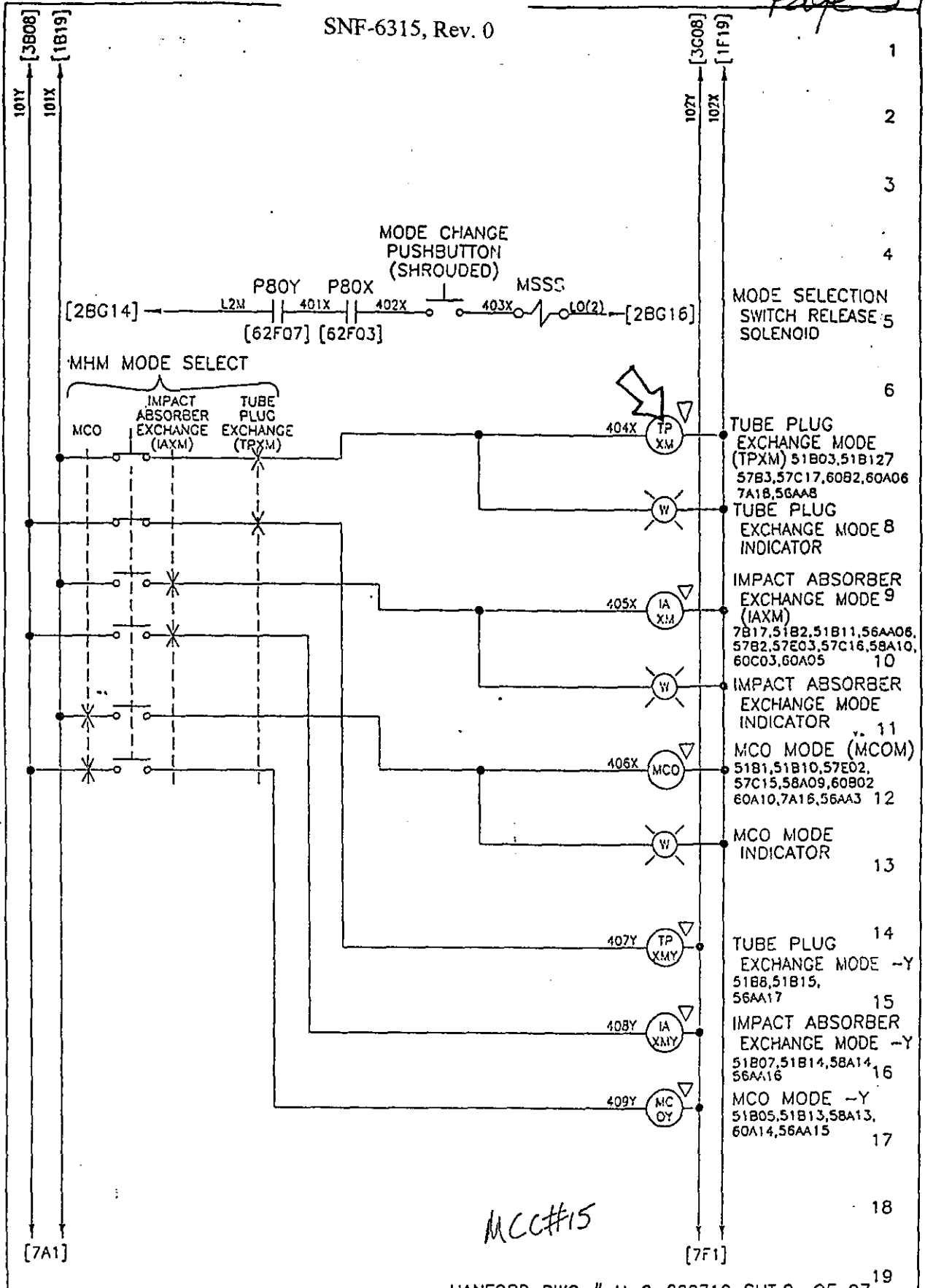
Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
		6002X	TPXM	63	D.Y	3-17-00	SRC	3-17-00	D.Y	3-17-00	SRC	3-17-00
		2) 6001X		64	D.Y	3-17-00	SRC	3-17-00	D.Y	3-17-00	SRC	3-17-00
		2) 5100 X		73	D.Y	3-17-00	SRC	3-17-00	D.Y	3-17-00	SRC	3-17-00
		5104X		74	D.Y	3-17-00	SRC	3-17-00	D.Y	3-17-00	SRC	3-17-00
		2) 5702X		83	D.Y	3-17-00	SRC	3-17-00	D.Y	3-17-00	SRC	3-17-00
		2) 5701X		84	D.Y	3-17-00	SRC	3-17-00	D.Y	3-17-00	SRC	3-17-00
		5713X		93	D.Y	3-17-00	SRC	3-17-00	D.Y	3-17-00	SRC	3-17-00
		2) 5710 X		94	D.Y	3-17-00	SRC	3-17-00	D.Y	3-17-00	SRC	3-17-00
		2) 101X		23	D.Y	3-17-00	SRC	3-17-00	D.Y	3-17-00	SRC	3-17-00
		2) 101 X		33	D.Y	3-17-00	SRC	3-17-00	D.Y	3-17-00	SRC	3-17-00
		2) 101 X		43	D.Y	3-17-00	SRC	3-17-00	D.Y	3-17-00	SRC	3-17-00
		2) 101 X		53	D.Y	3-17-00	SRC	3-17-00	D.Y	3-17-00	SRC	3-17-00
		404X		A-1	D.Y	3-17-00	SRC	3-17-00	D.Y	3-17-00	SRC	3-17-00
		Black	RSS2A-6	A-1	D.Y	3-17-00	SRC	3-17-00	D.Y	3-17-00	SRC	3-17-00

Remarks:

LIFTED LEAD LOG

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
		2) 6004X	TPXM	24	D.Y	3-17-00	SRC	3-17-00	D.Y	3-17-00	SRC	3-17-00
		5142X		34	D.Y	3/17-00	SRC	3-17-00	DY	3-17-00	SRC	3-17-00
		715X		44	D.Y	3-17-00	SRC	3-17-00	DY	3-17-00	SRC	3-17-00
		56A11X		54	D.Y	3-17-00	SRC	3-17-00	DY	3-17-00	SRC	3-17-00
		102X		A-2	D.Y	3-17-00	SRC	3-17-00	D.Y	3-17-00	SRC	3-17-00
		6 grey	RCS2A-6	A-2	D.Y	3-17-00	SRC	3-17-00	D.Y	3-17-00	SRC	3-17-00

Remarks:



HANFORD DWG # H-2-828710 SHT 9 OF 97

A B C D E F G

LTR	DESCRIPTION	DATE	BY	CHK	ENG	APPD	APPD
D	GENERAL REVISIONS	7/25/97	JBR	JMH	TMM	JMH	
E	MODIFY SELECTOR SWITCH	8/18/97	JRS	AH	TMM	JMH	LLA
F	MODIFY LOCATION ADDRESS; ADD PUSH-TO-TEST	9/4/97	JBR	JMH	TMM	JMH	EV
G	MODIFY LOCATORS	10/23/97	JRS	TMM	TMM	JMH	EV
H	DC-INVERTING & SIMPLIFICATION	3/9/98	CSD	SED	CSD		
J	GENERAL REVISION	7/20/98	CSD	SED	CSD		
K	REVISED PER INSTALLATION MARK-UPS	3/5/99	CSD				

DRAWN	J B RUPP	5/23/96	EDERER INCORPORATED
CHKD	S M MEADOWS	5/23/96	
ENG	J M MEADOWS	5/23/96	
APPD	J M MANNICK	5/23/96	
APPD	L L ANDERSON	5/23/96	
APPD			

SCALE N/A
FIRST USED ON F-2566

MODE SELECTOR SWITCH CONTROL ELEMENTARY

DWG NO. E8-33056 SHT 4 OF 5 REV K

3TH4 Fixed Contacts Type

3TH4040-0AK6

3TH4022-0BB4

Ordering Instructions

- Determine the number of contacts, AC or DC, then select Catalog Number.
- Complete Catalog Number by adding Coil suffix from table below e.g.

3TH40	2	2	0	A	K6

Relay Type
2 NO
2 NC
Terminals
AC
Coil
Voltage 120V AC

Additional References

- *Technical Data see page 614.*
- Dimensions see page 617.
- Wiring Diagrams see page 616.
- Accessories, Varistors, RC Elements and Suppressors see page 613.
- Replacement Parts see page 923.

Relays With Screw Terminals for DIN Rail and Screw Mounting

AC Operation

No of Contacts	Code	Contact Type NO	Contact Type NC	Early Make NO	Late Break NC	Catalog No (Coil Suffix required from table below)	Price $
Relay With 4 Fixed Contacts							
4	40E	4	—	—	—	3TH4040-0A††	72.
	31E	3	1	—	—	3TH4031-0A††	72.
	22E	2	2	—	—	3TH4022-0A††	72.
	13E	1	3	—	—	3TH4013-0A††	72.
	04E	—	4	—	—	3TH4004-0A††	72.
	Relay with 4 Contacts, Early Make/Late Break						
	31E, U	2	—	1	1	3TH4095-0A††	89.
	22E, U	1	1	1	1	3TH4096-0A††	102.
	22E, 2U	—	—	2	2	3TH4092-0A††	132.
Relay With 8 Fixed Contacts							
8	80E	8	—	—	—	3TH4280-0A††	120.
	71E	7	1	—	—	3TH4271-0A††	120.
	62E	6	2	—	—	3TH4262-0A††	120.
	53E	5	3	—	—	3TH4253-0A††	120.
	44E	4	4	—	—	3TH4244-0A††	120.
	Relay With 8 Contacts, Early Make/Late Break						
	44E, U	3	3	1	1	3TH4293-0A††	150.
Relay With 10 Fixed Contacts							
10	100E	10	—	—	—	3TH4310-0A††	144.
	91E	9	1	—	—	3TH4391-0A††	144.
	82E	8	2	—	—	3TH4382-0A††	144.
	73E	7	3	—	—	3TH4373-0A††	144.
	64E	6	4	—	—	3TH4364-0A††	144.
	55E	5	5	—	—	3TH4355-0A††	144.
	Relay With 10 Contacts With Early Make/Late Break						
	55E, U	4	4	1	1	3TH4394-0A††	174.
Mechanically Latched Relay With 9 Contacts							
9	54	5	4	—	—	3TH4454-0A††	201.

DC Operation

No of Contacts	Code	Contact Type NO	Contact Type NC	Early Make NO	Late Break NC	Catalog No (Coil Suffix required from table below)	Price $
Relay With 4 Fixed Contacts							
4	40E	4	—	—	—	3TH4040-0B††	117.
	31E	3	1	—	—	3TH4031-0B††	117.
	22E	2	2	—	—	3TH4022-0B††	117.
	13E	1	3	—	—	3TH4013-0B††	117.
	04E	—	4	—	—	3TH4004-0B††	117.
	Relay With 4 Contacts, Early Make/Late Break						
	31E, U	2	—	1	1	3TH4095-0B††	147.
	22E, U	1	1	1	1	3TH4096-0B††	147.
	22E, 2U	—	—	2	2	3TH4092-0B††	177.
Relay With 8 Fixed Contacts							
8	80E	8	—	—	—	3TH4280-0B††	162.
	71E	7	1	—	—	3TH4271-0B††	162.
	62E	6	2	—	—	3TH4262-0B††	162.
	53E	5	3	—	—	3TH4253-0B††	162.
	44E	4	4	—	—	3TH4244-0B††	162.
	Relay With 8 Contacts, Early Make/Late Break						
	44E, U	3	3	1	1	3TH4293-0B††	192.
Relay With 10 Fixed Contacts							
10	100E	10	—	—	—	3TH4310-0B††	186.
	91E	9	1	—	—	3TH4391-0B††	186.
	82E	8	2	—	—	3TH4382-0B††	186.
	73E	7	3	—	—	3TH4373-0B††	186.
	64E	6	4	—	—	3TH4364-0B††	186.
	55E	5	5	—	—	3TH4355-0B††	186.
	Relay With 10 Contacts With Early Make/Late Break						
	55E, U	4	4	1	1	3TH4394-0B††	216.
Mechanically Latched Relay With 9 Contacts							
9	54	5	4	—	—	3TH4454-0B††	231.

Coil Suffix

AC Volts 50/60Hz							
24	110/120	173/208	220/277	208	220/240	380/460	500/600
C2	K6	M1	U1	M2	P6	Q0	S0

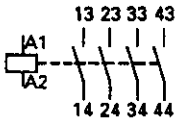
Coil Suffix

DC Volts				
12	24	48	125	240
A4	B4	W4	G4	04

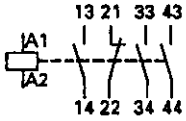
For other Coil Voltages see page 911.

Terminal Designations According to DIN EN 50011

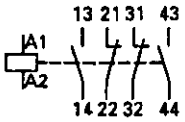
3TH40, AC and DC Operation



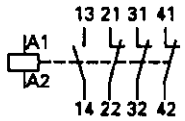
4 NO
Code: 40E



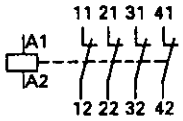
3 NO + 1 NC
31E



2 NO + 2 NC
22E

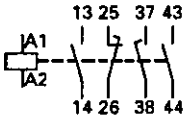


1 NO + 3 NC
13E

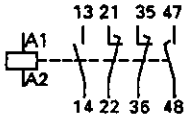


4 NC

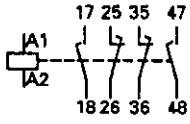
Code: 04E



2 NO and
1 NO + 1 NC
make-before-break
31E; U

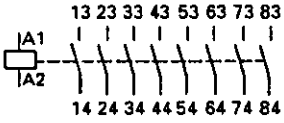


1 NO + 1 NC and
1 NO + 1 NC
make-before-break
22E; U



2 NO + 2 NC
make-before-break
22E; 2U

3TH42, AC and DC Operation



8 NO
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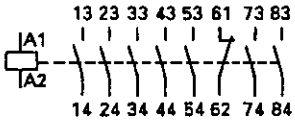
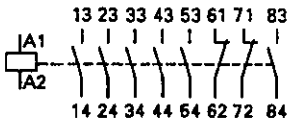
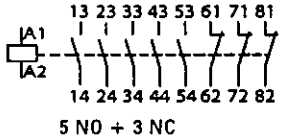


7 NO + 1 NC
71E

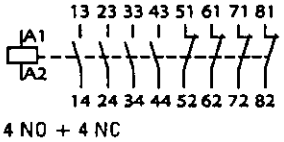


6 NO + 2 NC
62E



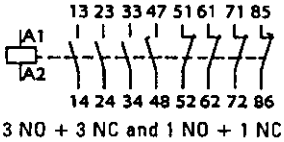
5 NO + 3 NC

Code: 53E



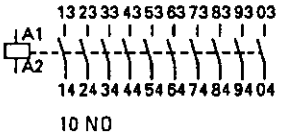
4 NO + 4 NC

44E

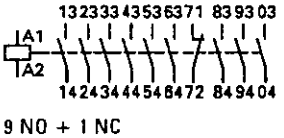


3 NO + 3 NC and 1 NO + 1 NC
make-before-break
44E; U

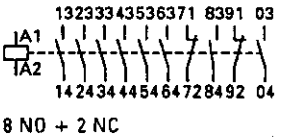
3TH43, AC and DC Operation



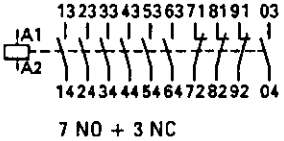
10 NO
Code: 100E



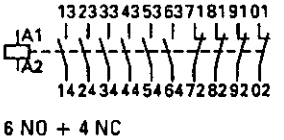
9 NO + 1 NC
91E



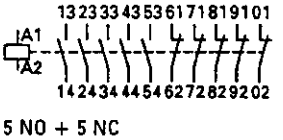
8 NO + 2 NC
82E



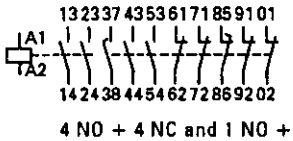
7 NO + 3 NC
Code: 73E



6 NO + 4 NC
64E

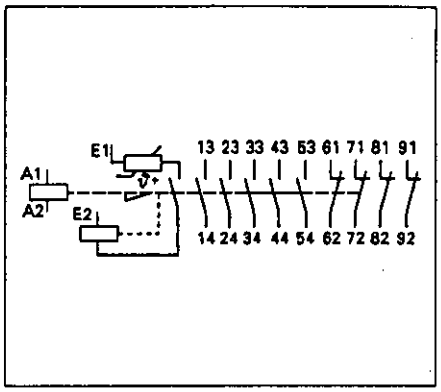


5 NO + 5 NC
55E

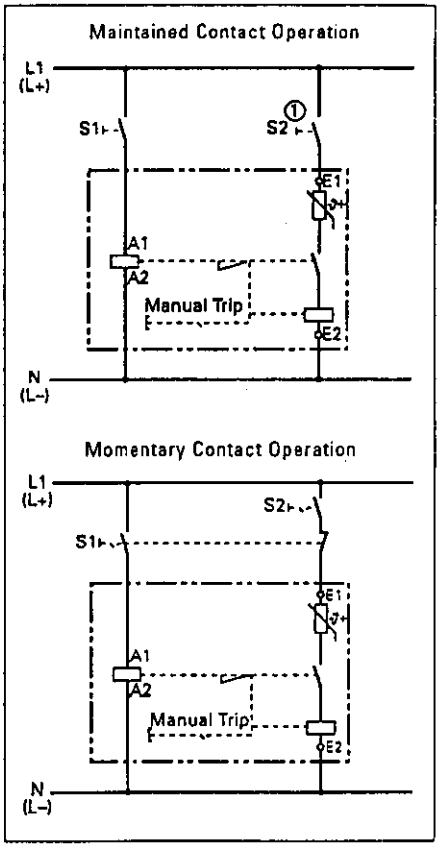


4 NO + 4 NC and 1 NO + 1 NC
make-before-break
Code: 55E; U

3TH44, Internal Connection Diagram, AC and DC Operation



3TH44, Schematic Diagrams, AC and DC Operation①



①Do not operate S2 while S1 is closed.

3TH4 Fixed Contacts Type

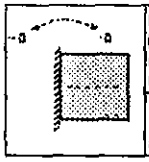
Type			3TH40, 3TH42, 3TH43
Mechanical Life			30 Million Operations
Permissible Ambient Temperature Range			−25 to +55°C
Coil Ratings			(Cold Coil and 1.0 × U_s)
AC Operation		60Hz	50Hz
	Inrush	75 VA	68 VA
	p f	0.76	0.82
	Sealed	9.4 VA	10 VA
	p f	0.29	0.29
DC Operation	Inrush = Sealed	6.2 W	
Coil Voltage Tolerances			
AC			0.8 to 1.1 × U_s
DC (except 24V)			0.8 to 1.1 × U_s
DC 24V			0.8 to 1.2 × U_s
Operation Times			0.80 to
Total Break Time = Opening Delay + Arcing Time			1.1 × U_s, 1.0 × U_s
AC Operation	Closing Delay NO		8–35 ms 10–25 ms
	Closing Delay NC		6–20 ms 7–20 ms
	Opening Delay NO		4–18 ms 5–18 ms
	Opening Delay NC		5–30 ms 7–20 ms
	Arcing Time		10 ms

Type		3TH40, 3TH42, 3TH43	
Resistance to Shock (Rectangular Plus)	AC	7.7/5 and 4.4/10 g/ms	
	DC	9.3/5 and 5.4/10 g/ms	
Rated currents			
I_e/AC-12 (AC-1)		16A	
I_e/AC-15/AC-14 (AC-11)			
at U_e	120/230/220V	10A	
	400/380V	6A	
	500V	4A	
	690/660V	2A	
		Current Paths in Series	
I_e/DC-12 (DC-1)		1	3
at U_e	24V	10A	10A
	48V	10A	10A
	110V	2.1A	10A
	220V	0.8A	10A
	440V	0.6A	1.3A
	600V	0.6A	1A
I_e/DC-13 (DC-11)			
U_e	24V	10A	10A
	48V	5A	10A
	110V	0.9A	10A
	220V	0.45A	2A
	440V	0.25A	0.9A
	600V	0.2A	0.8A

Type		3TH40, 3TH42, 3TH43
Switching Frequency z in make/break operations per hour at rated operation for duty	AC-12	1,000/h
	AC-2	500/h
	AC-3	1,000/h
	AC-15/AC-14 resp. DC-13	3,600/h
No-load switching frequency		10,000/h
Conductor Sizes Terminal Wire Size		AWG(2) #16–12
cULus ratings		
Rated Control Supply Voltage	AC	Max. 600V
	DC	Max. 230V
Rated Voltage		AC 600V, DC 600V
Making and Breaking Capacity		A600, P600
Continuous Current Rating		10A

Permitted Mounting Positions

The relation between the permitted inclination to the mounting surface to the vertical and the coil voltage tolerance is as follows:

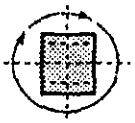


Permitted inclination (<) a) of the mounting surface to the vertical	Coil voltage tolerance min × U_s	max × U_s
−22.5 to +202.5°	0.8 to	1.1
−50 to +230°	0.85 to	1.1
any	0.9 to	1.1

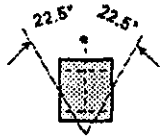
Mounting

For snap-on and screw mounting, snapping onto 35 mm standard mounting rail in accordance with DIN EN 50 022.

When 3TH AC-operated control relays are mounted in rows, the minimum gap between them must be 0.19 (5) when the voltage is likely to reach 1.1 × Us, the ambient temperature ≥45°C and the duty factor of all relays is 100%.

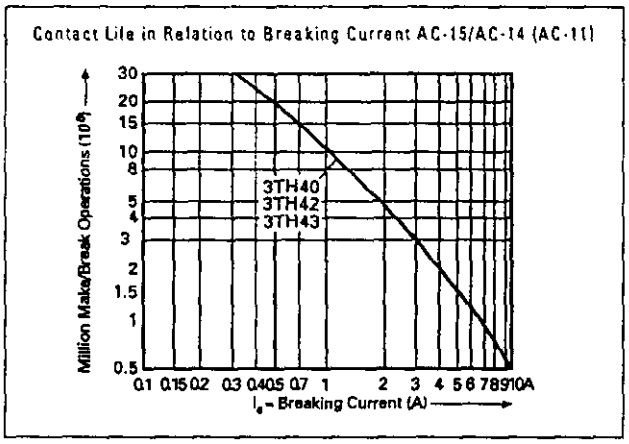


The AC operated relays preferably should be mounted on a vertical surface in any desired position.



The DC operated relays preferably should be mounted on a vertical surface in the position as shown in the drawing.

Contact Life Curve



Control Relays

3TH44 Mechanically Latched Type

Design and Mode of Operation

3TH44 mechanical latch relays latch upon closing. The contacts open either electrically by energizing the release coil or manually, by moving the release switch.

The release coil must not be energized continuously.

A PTC thermistor is connected in series with the tripping solenoid in order to prevent damage to the coil in the event of simultaneous maintained-contact signals being applied. The maximum delay before resetting after the thermistor has operated by double command is 5 minutes.

Specifications

3TH44 mechanical latch relays are suitable for use in industrial environments. They meet or exceed the requirements of NEMA, UL, CSA, IEC, VDE and other international standards.

Contacts

The contacts are not replaceable.

Coils

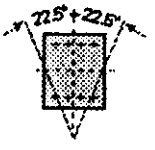
The main coil of the control relays, with mechanical latch, is replaceable. The release coil is not replaceable. The voltage of the tripping coil will be found under the marking tag.

①Any technical data not given here is identical to that of the 3TH43 relays.

Technical Data①②

Mechanical Life		10 Million Make/Break Operations	
Coil Ratings			
AC Operation up to 240V	Inrush Release coil	77VA, p.f. = 0.81 (Contactor Coil) 110VA, p.f. = 0.86 (Unlatching Coil)	
DC Operation up to 230V	Inrush Release coil	6.5W (Contactor Coil) 130W (Unlatching Coil)	
Control Signal Duration		Minimum	
AC Operation	Closing Opening	40 ms 30 ms	
DC Operation	Closing Opening	170 ms 30 ms	
Rated Operational Current at Rated Voltage AC-15/AC-14 (AC-11)		**Volts AC/DC** 230/220V 380/400V 500V 660V/690V	**Amps** 10 A 6 A 4 A 2 A

Permitted Mounting Positions



The relays must be mounted on a vertical surface in the position shown in the dimension drawings.

②For internal connection diagrams and schematic diagrams see page 616.

Dedication Test Plan – IST
Test Plan No.: CGI-SNF-D-MHM-023-TP-023C
Test Specimen: Siemens 3TF4310-0AK6, Eqmt. No.:MCO

ORIGINAL

In-Situ Inspection Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI. Eng	DA	QA Post Review*

*** QA Post Review of Individual Revisions is allowed**

Dedication Test Plan – IST **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-023-TP-023C
Test Specimen: Siemens 3TF4310-0AK6, Eqmt. No.:MCO **Page 2 of 4**

ORIGINAL

In-Situ Inspection Procedure

Inspection Procedure Approval (Obtain prior to inspection):

This procedure documents the visual verification of the identification critical characteristics of the remaining specimen which were in-situ tested on a sampling basis as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) Larry Swenson Date: 4-6-00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Electrician	N/A	N/A	N/A	N/A
Electrician Quality Control	N/A	N/A	N/A	N/A
Design Authority Representative	LARRY W. PRICE	XNWEST		

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment.

INSPECTION PROCEDURE:

1.0 Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	MCO	**MCO**	
Manufacturer:	SIEMENS	**Siemens**	
Model:	~~3TF43~~ 3TH43	**3TF43**	
Contact Configuration:	3P MC & 10NO	**3 pole Main Contacts and 10 NO auxiliary contacts**	100E
Serial No./Lot No./Date Code:	G/9722	**N/A**	
Coil:	K6	**K6**	

2.0 Record: Date /Time of Test Beginning: 4/7/00 8:14AM

Dedication Test Plan – IST **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-023-TP-023C
Test Specimen: Siemens 3TF4310-0AK6, Eqmt. No.:MCO **Page 3 of 4**

2.1 Record: Date /Time of Test End: 4/7/00 8:15AM

3.0 References

3.1 Elementary Wiring Drawings: EB-33056 Sheet 4

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

ACCEPTANCE CRITERIA MET

Notes:
NA

Design Authority Representative (signature) _____ Date: 4/7/00

Dedication Test Plan – IST	**Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-023-TP-023C	
Test Specimen: Siemens 3TF4310-0AK6, Eqmt. No.:MCO	**Page 4 of 4**

Completed Test Evaluation Approval:

Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Craig Swenson Date: 4-7-00

QA/QC (signature) Stephen Scott Mor Date: 4-7-2000

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Commercial Grade Item Upgrade Dedication Form

ECN No. **N/A** CGI No. **CGI-SNF-D-MHM-022**	Rev. No. 3
Title: **P2 & P61 – Honeywell Limit Switch LSYAC3K**	Page 1 of 8

Section 1 Part Information

Item No.: **N/A**	Manufacturer: **N/A**	Supplier: **N/A**
Mfg. Part/Model No.: **N/A**	Supplier's P/N: **N/A**	
Part Description: **N/A**	**ORIGINAL**	
End Use Description: **N/A**		

Section 2a Component Information

Equipment No.: **LFMJLY**	Specification No.: **Ederer F-2566, Foster Wheeler MJX-SDX 452656**	Manufacturer: **Honeywell**	Past P.O. No.: **N/A**
Manufacturer's Part/Model No.: **LSYAC3K**	Equipment Supplier (if different from manufacturer): **ALSTOM, Foster Wheeler**		Equip. Supplier's Part No.: **N/A**

Component Description: **Limit Switch for Interlock P2 & P61, LFMJLY limit switch is located on the MCO grapple assembly. When the MCO Grapple Jaws become locked, the limit switches senses position of the locking ring, is actuated and indicates MCO GRAPPLE JAWS LOCKED and prevents raising a load, when the jaws are not locked. It also indicates MCO GRAPPLE JAWS NOT LOCKED.**

Section 2b Commercial Availability of the Item

1. Is the Item available from a catalogue from a qualified NQA1 supplier or ISO 9000 supplier (coordinate with project CGI interface Engineer or BTR)?

   [ ] YES (go to #2 below) [X] NO (go to procedure step 6.3.2, proceed to dedicate Item)

   If not available from a qualified NQA1 supplier, is it available from an ISO 9000 supplier? (coordinate with project CGI Interface Engineer or BTR)

   [ ] YES (go to #2 below, procedure step 6.3.2, dedicate Item) [X] NO (procedure step 6.3.2, dedicate Item)

2. List of Candidate qualified NQA1 suppliers or ISO 9000 suppliers, if used: **N/A**

3. Recommended Procurement Strategy (coordinate with project CGI interface Engineer or BTR): **N/A**

Section 2c CGI Determination

CGI Determination Questions:

#1: Is the Item subject to design or specification requirements that are unique to nuclear facilities or activities?

[ ] YES (the Item is not commercial grade) [X] NO (continue)

#2: Is the Item used in applications other than nuclear facilities or activities?

[ ] NO (the item is not commercial grade) [X] YES (continue)

#3: Is the Item ordered from manufacturer/supplier on the basis of specifications set forth in the manufacturer's catalog?

[ ] NO (the item is not commercial grade) [X] YES (continue)

[X] All three criteria have been satisfied. The Item meets the definition of commercial grade.

Commercial Grade Item Upgrade Dedication Form

Rev. No. 3	
ECN No. **N/A** CGI No. **CGI-SNF-D-MHM-022**	Page 2 of 8
Title **P2 & P61 – Honeywell Limit Switch LSYAC3K**	

	Section 2d Reason for Dedication The above Commercial Grade (CG) described Item is being Dedicated for use in the application cited for the following reason(s):
	Item is being purchased from a non ESL manufacturer supplier as CG to be used in a Safety Class application.
	Item is being purchased from a non ESL manufacturer supplier as CG to be used in a Safety Significant application.
X	Item was purchased from a non ESL manufacturer supplier as CG to be used in a Safety Class application. (~~Controller~~) JP CLS 4/4/00
	Item was purchased from a non ESL manufacturer supplier as CG to be used in a Safety Significant application.
	Other ('like-for-like', similar, substitution, replacement evaluation)

Section 3 Failure Effects Evaluation

A. Part/Component Safety Function:

1. **These limit switches sense the position of the jaws locking ring and are actuated when the MCO Grapple Jaws are locked. Interlock P2 inhibits Bridge operation, Trolley operation, and shield skirt jack raising. Interlock P61 automatically stops the MCO hoist from raising when loaded when the Grapple Jaws are not locked.**

B. Part/Component Functional Mode:	
Safety Function #1: [X] Active [ ] Passive	Active - Mechanical or Electrical change of state is required to occur for the component to perform its safety function
Safety Function #2: [ ] Active [ ] Passive	Passive – Change of state is not required for the component to perform its safety function
Safety Function #3: [ ] Active [ ] Passive	

C. Host Component Safety Function (if applicable): **N/A**

1.

D. Failure Mode(s) and the effects on component or system safety function (see Worksheet 1):

1. **Failure of switch contacts to open upon demand results in potential override of interlock channel.**
2. **Plunger/arm inoperative results in failure to provide interlock function at correct demand position.**

Section 4 Environmental & Natural Phenomena Hazard Design

Environmental Qualification Required: Yes [ ] No [X]	If yes: Environmental Qualification Requirements Limiting Environmental Conditions: Required Safety Functions: Qualification Period:
Natural Phenomena Hazard (NPH) Design Required: Yes [ ] No [X]	If yes: NPH Design Requirements Performance Category: NPH Design Req'ts.: Required Safety Functions:

Section 5 Component Functional Classification

X	Safety Class (SC)		General Service (GS)		Safety Significant (SS)

If part/component classification is different from host component/system, document basis. **N/A**

Sections 6 and 7(Reserved)

Section 8 References (for Functional Classification)

National Codes/Standards: **N/A**

Safety Analysis Report (SAR): **HNF-3672, Rev. 0**

Drawings: **Ederer, Inc. EB-33056, Sheet 13B**

Vendor Manual/Manufacturer/Supplier Information: **Honeywell Series LS heavy duty rotary actuated limit switch**

Other: **ALSTOM ESL/R (96) 065 – Rev. D, 100% Design Submittal – June 1998**

Commercial Grade Item Upgrade Dedication Form

ECN No. N/A CGI No. CGI-SNF-D-MHM-022

Title P2 & P61 – Honeywell Limit Switch LSYAC3K

Section 9 Critical Characteristics

Critical Characteristics	Acceptance Criteria/Tolerances	Acceptance Method	ID	Function
1. Item Identification Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
Manufacturer	**Honeywell**	**1, IN**	**X**	
Model Number	**LSYAC3K**	**1, IN**	**X**	
2. Physical Critical Characteristics (for reasonable assurance that the Item delivered is the Item specified)				
Actuator (Note 1)	**Standard Side Rotary**	**1, IN**	**X**	
3 Performance Critical Characteristics (for reasonable assurance that the Item will perform its intended safety function(s))				
Contact Rating	**Nominal 5 amps VAC, resistive, less than 0.5V drop across contacts**	**1, T**		**X**
Insulation Resistance	**Greater than 10 megohm resistance, terminal to terminal and terminal to ground at 1000v.**	**1, T**		**X**
Mechanical Operation	**Cycle switch - confirm contacts open and close with smooth operation and free release of spring.**	**1, T**		**X**

4. Notes and Legend:

Rev. 1: Page 7: added data to "Method T/IN" Column; General: new forms

Rev. 2: Pages 3, 5, 7: added Note 1

Note 1: This actuator is installed with the limit switch - replacement limit switches will not include an actuator - the existing actuator will be placed on the replacement switch. Therefore, the physical CC specified for the actuator lever need not be performed on the replacement limit switch.

Rev. 3: Pages 3, 6 & 7: Rev'd Contact Rating Criteria to "Nominal 5 amps VAC, resistive, less than 0.5V drop across contacts" from 10 amps for prevention of equipment damage due to excessive current; Pages 1, 2 & 5: Rev'd equipment ID Nos., and the component description per SEL changes.

Acceptance Method (Acc Meth):
1. Special Test and Inspection
   1, IN for Inspection
   1,T for Test
2. Commercial Grade Survey
3. Source Verification
4. Vendor/Item History

Section 10 Initial Review and Approval

Approvals:

Designated Engineer: [signature]

Design Authority: [signature] 3/29/00

QA Engineer: [signature] 3-30-2000

WORKSHEET 1
DETERMINATION OF FAILURE MECHANISMS/MODES

Section 1			
Typical Failure Mechanisms	Definition	X = Applicable to Component under Evaluation	
		X?	Indicate Failure Mode
Fracture	Separation of a solid accompanied by little or no macroscopic plastic deformation.		
Corrosion	The gradual deterioration of a material due to chemical or electrochemical reactions, such as oxidation, between the material and its environment.	X	**Switch contacts corrode closed and fail to open upon demand.**
Erosion	Destruction of materials by the abrasive action of moving fluids, usually accelerated by the presence of solid particles carried with the fluid.		
Open Circuit	An electrical circuit that is unintentionally broken so that there is no complete path for current flow.		
Short Circuit	An abnormal connection by which an electrical current is connected to ground, or to some conducting body, resulting in excessive current flow.	X	**Switch contacts fuse closed and fail to open upon demand.**
Blockage	Clogging of a filtering medium resulting in the inability to perform its purification function or blockage of flow.		
Seizure	Binding of a normally moving item through excessive pressure, temperature, friction, jamming.	X	**Switch mechanism jams and contacts fail to open upon demand.**
Unacceptable Vibration	Mechanical oscillations produced are beyond the defined permissible limits due to unbalancing, poor support, or rotation at critical speeds.		
Loss of Properties	A loss of mechanical and physical properties of a material due to exposure to high temperatures, radiation exposure.		
Excess Strain	Under the action of excessive external forces the material of the part has been deformed or distorted.		
Mechanical Creep	From prolonged exposure to high temperature and stress, the object will show a slow change in its physical (shape and dimension) and mechanical characteristics.		
Ductile Fracture	Fracture characterized by tearing of metal accompanied by appreciable gross plastic deformation.		

Section 2 Additional Failure Modes Applicable to the Component Under Evaluation
1. **Switch contacts are closed to permit equipment movement. Contacts open for the interlock function. Any failure which prevents contacts to open inhibits the particular switch interlock function.**
2. **Actuator plunger/arm seizure or break renders the contact opening inoperable.**
3. **Short circuit could give false signal to energize interlock function.**
4.
5.

Commercial Grade Item Upgrade Dedication Form	Rev. No. 3
ECN No. N/A CGI No. CGI-SNF-D-MHM-022 Title: P2 & P61 – Honeywell Limit Switch LSYAC3K	Page 5 of 8

Checklist 1 - Acceptance Method 1 - Special Test/Inspection Verification

SECTION 1 P2 & P61 LSs 4/11/00 — P61 LSs 4/11/00

Item Description: P-61 interlock limit switch	Equip #: ~~LFMJLX~~; LFMJLY
System #: MHM	Model #: LSYAC3K
Manufacturer (Address/Phone): Honeywell 1-800-537-6945 P.O. #	Supplier (Address/Phone):

SECTION 2 CRITICAL CHARACTERISTICS TO BE VERIFIED BY METHOD 1.

Insp	Test	Post-Test		
X			1.	Manufacturer
X			2.	Model Number
X			3.	Actuator (Note 1)
	X		4.	Contact Rating
	X		5.	Insulation Resistance
	X		6.	Mechanical Operation

SECTION 3 BY INSPECTION * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)

Characteristic: **Manufacturer** Sample Size*: **100%**

Acceptance Criteria: **Honeywell**

Receipt Inspection Plan / Report #: CGI-SNF-D-MHM-022-TP-022B

Characteristic: **Model Number** Sample Size*: **100%**

Acceptance Criteria: **LSYAC3K**

Receipt Inspection Plan / Report #: TP-022B

Characteristic: **Actuator (Note 1)** Sample Size*: **100%**

Acceptance Criteria: **Standard Side Rotary**

Receipt Inspection Plan / Report #: TP-022B

Commercial Grade Item Upgrade Dedication Form	Rev. No. 3
ECN No. **N/A** CGI No. **CGI-SNF-D-MHM-022** Title: **P2 & P61 – Honeywell Limit Switch LSYAC3K**	Page 6 of 8

SECTION 4 BY SPECIAL TEST * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)	
Characteristic for Test: **Contact Rating**	Samp Size*: [X]Normal[ ]Reduced[ ]Tightened
Acceptance Criteria: **Nominal 5 amps VAC, resistive, less than 0.5V drop across contacts**	
Actual Test Value: See TP	Test Plan and Report #: TP-022B
Characteristic for Test: **Insulation Resistance**	Samp Size*: [X]Normal[ ]Reduced[ ]Tightened
Acceptance Criteria: **Greater than 10 megohm resistance, terminal to terminal and terminal to ground at 1000v.**	
Actual Test Value: See TP	Test Plan and Report #: TP-022B
Characteristic for Test: **Mechanical Operation**	Samp Size*: [X]Normal[ ]Reduced[ ]Tightened
Acceptance Criteria: **Cycle switch - confirm contacts open and close with smooth operation and free release of spring**	
Actual Test Value: See TP	Test Plan and Report #: TP-022B

Section 5 Test / Inspection Summary (Acceptance Method 1)

1. SUMMARY OF VERIFIED CRITICAL CHARACTERISTICS , THEIR VERIFICATION METHODS, AND RESULTS

ITEM DESCRIPTION: Limit Switch

Critical Characteristics				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/IN	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
Manufacturer	Honeywell	X		1, IN	TP-022B	NA	1	0	XWEST	Larry W. Peirce	4/10/00
Model Number	LSYAC3K	X		1, IN	↓	↓	↓	↓	↓	↓	↓
Actuator (Note 1)	Standard Side Rotary	X		1, IN	↓	↓	↓	↓	↓	↓	↓
Contact Rating	Nominal 5 amps VAC, resistive, less than 0.5V drop across contacts.		X	1, T	↓	↓	↓	↓	↓	↓	↓
Insulation Resistance	Greater than 10 megohm resistance, terminal to terminal and terminal to ground at 1000v.		X	1, T	↓	↓	↓	↓	↓	↓	↓
Mechanical Operation	Cycle switch - confirm contacts open and close with smooth operation and free release of spring		X	1, T	↓	↓	↓	↓	↓	↓	↓

2. DISPOSITION OF UNVERIFIED OR FAILED CRITICAL CHARACTERISTICS

Critical Characteristic	Disposition

3. SIGNATURE INDICATES ALL CRITICAL CHARACTERISTICS VERIFIED SATISFACTORY OR ACCEPTABLY DISPOSITIONED AND COMMERCIAL GRADE DEDICATION IS SATISFACTORY AND COMPLETE.

See Test Plan TP-022B cited above. CES 4/11/00

Testing Agency Approval: NR CES 4/11/00 Date

Testing Agency QA Engineer: NR CES 4/11/00 Date

BUYER VERIFICATION

Design Authority: CES [signature] Date 4-11-00

QA Engineer: Stephen Scott Moth Date 4-20-2000

Commercial Grade Item Upgrade Dedication Form

ECN No. **N/A** CGI No. **CGI-SNF-D-MHM-022**

Title **P2 & P61 – Honeywell Limit Switch LSYAC3K**

Section 6 Contacts/Phone Numbers		
	Name	Phone
Design Authority	CRAIG SWENSON	( ) 376-0288
QA		( )
QC		( )
Cog - Engineer		( )
CGI Engineer		( )
Procurement Engineer		( )
Other		( )

Section 7 Supporting Documentation for this Checklist		
Initial Procurement Documents		**For Critical Characteristics**
	Drawings:	
	Manuals (specify type & number):	
	Design Calculation	
	Installation Instructions	
	Operation Instructions	
	Calibration Instructions	
	Manufacturer's Recommended Spare Parts List	
X	**Other: Honeywell Series LS heavy duty rotary actuated limit switch**	**All**
Procurement Documents		**For Critical Characteristics**
	Certificate of Conformance/Compliance	
	Seismic Qualification Certificate	
	Environmental Qualification Certificate	
	Test Report (s):	
	Inspection Report (s):	
	CMTRs for ASME Pressure Retaining Materials	
	Valve Seat Leakage Report	
	Weld Records	
	Material Traceability Record	
X	**Other: Component Test Package CSB(W379)-015-11-1042**	

ORIGINAL

Dedication Test Plan – IST-LS-1 Rev. No. 1
Test Plan No.: CGI-SNF-D-MHM-022-TP-022B
Test Specimen: Honeywell LSYAC3K Limit Switch, Eqmt. No.: LFMJLY Page 1 of 7

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI Eng	DA	QA Post Review*
1	Avoid equipment damage	3.4.3 3.4.10	Lower current from 10 amps to 5 amps		CBS 3/29/00	SSM 4-3-2000

* QA Post Review of Individual Revisions is allowed

In-Situ Test Procedure

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) Craig Swenson Date: 3/28/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Belhaven	Michael Cram	MRC
Electrician	DAN K. YORK	PCE	Dan K. York	DKY
Electrician Quality Control	Stephen R. Cowley	PCE	Stephen R Cowley	SRC
Design Authority Representative	LARRY W PAKE	XNEST		
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A
Design Authority	Craig Swenson	FHI	Craig Swenson	CES

RECOMMENDED EQUIPMENT:

Power Supply capable of 10 amps @ 120 VAC
Megger Instrument capable of 1000 VDC Test Voltage
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: FLUKE 787 I.D.: 107 Calib. Due date: 05-25-00

Test Instrument type: H.C. BM30/2 I.D.: 6410-857 Calib. Due date: 02-09-01

Test Instrument type: HP 3457A I.D.: BAT123 Calib. Due date: 07-29-00

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE:

For this In-Situ Test, certain leads must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of leads.

1.0 Lock and tagout Main Disconnect CRN-004, or Main Disconnect MD.

2.0 Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	LFMJLY	**LFMJLY**	Acc
Manufacturer:	HONEYWELL	**Honeywell**	Acc
Model:	LSYAC3K	**LSYAC3K**	Acc
Actuator:	OK	**Standard Side Rotary**	Acc
Serial No./Lot No./Date Code:	N/A	**N/A**	Acc

3.0 Perform the following testing steps:

3.1 Record: Date /Time of Test Beginning: 05 29-00 9:30 a.m

3.2 Mechanical Operation

3.2.1 Cycle the switch actuator full stroke 5 or more times to confirm contacts open and close with smooth operation and free release of spring.

3.2.2 Record the following data.

Description	Record Data	Acceptance Criteria	Comments/Deviations
No of Cycles:	6	**> 5 times**	Acc
Describe Operation:	SMOOTH	**Contacts open and close with smooth operation.**	Acc
Describe release of Spring:	FREE	**Free release of spring.**	Acc

3.3 Insulation Resistance Test

3.3.1 Setup the test equipment and Limit Switch specimen for insulation resistance testing. Remove the amphenol connector at the grapple housing.

3.3.2 Apply a nominal 1000 VDC via Megger device between non-continuity terminals on the limit switch side of the amphenol connector nos. 18 and 27 (Common - Across NO Contact) and then between terminal 27 and ground. Record the resistances.

3.3.3 Remove the Megger device.

3.3.4 Manually adjust the limit switch actuator to open the normally closed (NC) contacts.

3.4.5 Apply a nominal 1000 VDC via Megger device between non-continuity terminals on the the limit switch side of the amphenol connector nos. 18 and 26 (Common - Across open NC Contact) and then between terminal 26 and ground. Record the resistances.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Resistance	Acceptance Criteria	Comments/Deviations
18 and 27	**Common to NO**	>9.96 Gohm	**> 10 Megohms**	Acc
27 and Ground	**NO to Ground**	> 7.26 Gohm	**> 10 Megohms**	Acc
18 and 26	**Common to open NC***	>8.1 Gohm	**> 10 Megohms**	Acc
26 and ground	**Open NC to Ground***	>32.5 Gohm	**> 10 Megohms**	Acc

* Normally closed contacts are open.

3.3.6 De-energize and remove the test equipment.

3.4 Contact Rating Test

3.4.1 Setup the test equipment and Limit Switch specimen for contact rating testing.

3.4.2 At grapple mounted amphenol connector, disconnect the connector and imput test leads onto the limit switch side of the connector terminal no. 18 (Common) and terminal 26 (LFMJLY Normally Closed Contact).

3.4.3 Apply a nominal ~~10~~ 5 3/29/00 LES amps, resistive, across the normally closed contacts of the test specimen.

Caution: Do not change state of contacts while energized.

3.4.4 Record the following data.

Description	Record Voltage Drop	Acceptance Criteria	Comments/Deviations
Contact Circuit 18 and 26 (Terminals COM-NC)	.463 VAC	**< 0.5 Volts AC drop**	Acc

3.4.6 Reduce the current source to zero amps.

3.4.7 Disconnect the power supply from terminals 18 and 26.

3.4.8 Manually adjust the limit switch actuator to close the normally open contacts.

3.4.9 Connect the power supply to terminals 18 and 27.

5 Amps 3/29/00 CEF

3.4.10 Apply a nominal ~~10~~ amps, resistive, across the closed normally open contacts of the test specimen.

3.4.11 Record the following data.

Description	Record Voltage Drop	Acceptance Criteria	Comments/Deviations
Contact Circuit 18 and 27 (Terminals COM- Closed NO Contact):	.474 VAC	**< 0.5 Volts AC drop**	Acc

3.4.12 Reduce the current source to zero amps and remove the power supply from terminals 18 and 27.

3.4.13 Manually adjust the limit switch actuator to close the normally closed contacts.

3.5 Terminate the test.

3.5.1 Reconnect the Amphenol connector and tighten hand tight.

3.5.2 Remove lockout/tagout and restore system to normal.

3.5.4 Record: Date /Time of Test End: 03-29-00 10:24 a.m.

Dedication Test Plan – IST-LS-1 **Rev. No. 1**
Test Plan No.: CGI-SNF-D-MHM-022-TP-022B
Test Specimen: Honeywell LSYAC3K Limit Switch, Eqmt. No.: LFMJLY **Page 6 of 7**

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Acceptance Criteria has been met.
Michael Cram
03-29-00

Notes:

Certified InstrumentationTechnician (signature) Michael Cram Date: 03-29-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Craig Swanson Date: 3/29/00

QA/QC (signature) Stephen Scott Mosh Date: 4-3-2000

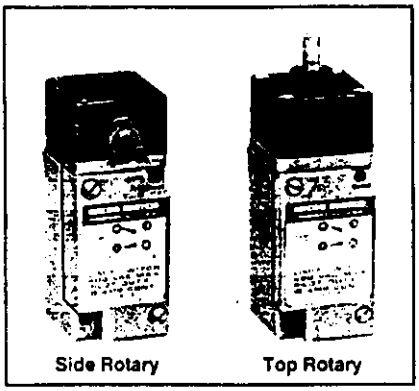
LIFTED LEAD LOG

Junction Box: Grapple Amphenol Connector

Drawing #	Sheet #	Wire #	Device #	Amphenol Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
363A0033	11	N/A	LFMJLY	Connector	DKY	3-29-00	SRL	3-29-00	DKY	3-29-00	SRL	3-29-00

Remarks:

Limit and Enclosed Switches
Rotary Actuated Switches



Side Rotary Top Rotary

Order guides below and on page A35 provide specification and pricing information for side and top rotary switches.

Plug-in body style catalog listings consist of the complete plug-in base receptacle.

Levers are ordered separately. See pages A37-A39 for lever selection.

For rapid response - off the shelf service, all **bold face** listings are normally stocked items.

For low temperature, high temperature or preleading see page A42.

ASSEMBLED CONDITIONS

Catalog listings in order guide below are factory assembled with:

- Shaft of side rotary heads facing front of switch (label side).
- Head adjusted for both clockwise and counterclockwise operation.
- Light on indicator versions wired to N.O. circuit.

Refer to facing page to specify modifications to these assembled conditions.

PRELEADED OR CONNECTORIZED VERSIONS

Refer to page A42.

Limit/Enclosed

ORDER GUIDE (Momentary action. UL listed, CSA certified, CE approved. Levers not included. Order separately pages A37-A39.)

Circuitry	Electrical Rating	Body** Style	Catalog Listings Side Rotary: Standard	Low Differential	5 Pretravel	Low Torque	Low Differential Low Torque	Top Rotary: High Overtravel
Silver contacts	A	Plug-in ½" Conduit	**LSA1A**	**LSP1A**	LSU1A	**LSR1A**	**LSH1A**	**LSB1A**
Gold cross point contacts	C	Plug-in ½" Conduit	**LSA1J**		LSU1J	—	—	LSB1J
Gold plated contacts	C		LSA1E	LSP1E	—	LSR1E	LSH1E	—
Silver contacts	A*	120 V Ind. lite Plug-In* ½" Conduit	**LSA5A**	**LSP5A**	**LSU5A**	LSR5A	**LSH5A**	**LSB5A**
	A*	240 V Ind. lite Plug-In ½" Conduit	LSA8A	LSP8A	LSU8A	LSR8A	LSH8A	LSB8A
MOMENTARY (4)(3)(1)(2) SPDT Double Break	A*	24 V LED lite 1.5mA max. Auto polarity Plug-in ½" Conduit	LSA9A	LSP9A	LSU9A	LSR9A	LSH9A	LSB9A
	A	Non plug-in ½" Conduit	**LSA3K**	**LSP3K**	LSU3K	**LSR3K**	**LSH3K**	**LSB3K**
Silver contacts	B	Plug-in ¾" Conduit	**LSA8B**	**LSP2B**	LSU2B	LSR2B	**LSH2B**	**LSB2B**
MOMENTARY (3)(4)(8)(7)(2)(1)(5)(6) DPDT Double Break	B	Plug-in ½" Conduit	LSA6B	LSP6B	LSU6B	LSR6B	LSH6B	LSB6B
	B	120 V Ind. lite Plug-In ¾" Conduit	LSA2R	LSP2R	LSU2R	LSR2R	LSH2R	LSB2R
	B	Non plug-in ¾" Conduit	**LSA4L**	**LSP4L**	LSU4L	LSR4L	LSH4L	LSB4L
	B	Non plug-in ½" Conduit	LSA7L	LSP7L	LSU7L	LSR7L	LSH7L	LSB7L
(C)(D) SPNC Direct Acting	D	Non plug-in ½" Conduit	LSA3N			LSR3N		LSB3N

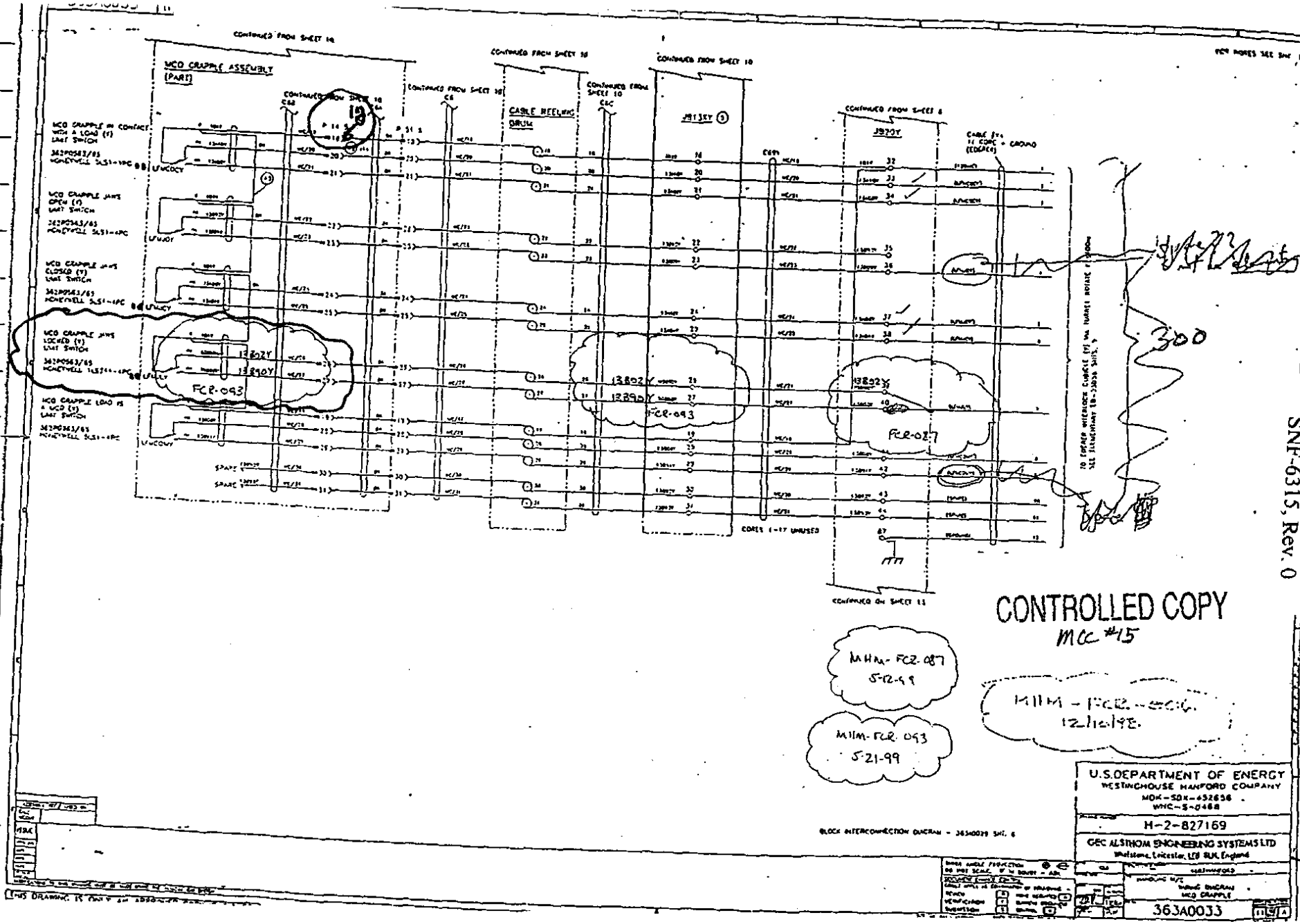
*Use at voltage indicated for light. Wired to N.O. circuit. Upper temperature limit for lighted units is 200°F (93°C). **Plug-in listings include base receptacle.

OPERATING CHARACTERISTICS

Pretravel (degrees max.)		15	9	5	15	9	25
Differential Travel (degrees max.)	SPDT	5	3	3	5	3	10
	DPDT	7	4	4	7	4	12
Overtravel (degrees min.)		60	66	70	60	66	110
Operating Torque (max.) NM = Newton meters		0,45 Nm 4 in. lbs.	0,45 Nm 4 in. lbs.	0,45 Nm 4 in. lbs.	0,19 Nm 1.7 in. lbs.	0,19 Nm 1.7 in. lbs.	0.28 Nm 2.5 in. lbs.
Operating Temperature Range***		10°F to 250°F -12° to 121°C			30°F to 250°F -1° to 121°C		

***Completely fluorocarbon-sealed switches are preferred for use in temperatures above 200°F (93°C). Refer to page A42.

LSYAC3K
↑
FLUORO-CARBON SEALED VERSION of LSA3K



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SNF-6315, Rev. 0

Commercial Grade Item Upgrade Dedication Form

ECN No. N/A CGI No. CGI-SNF-D-MHM-019 Title: Various P02,03,05,09,10,21,26,57,61,62,63&99 [& 85] Interlocks [JWP ZES 4/11/10] –Siemens Contactor #3TF4611-0AK6	Rev. No. 2

ORIGINAL

Section 1 Part Information

Item No.: **N/A**	Manufacturer: **N/A**	Supplier: **N/A**
Mfg. Part/Model No.: **N/A**	Supplier's P/N: **N/A**	
Part Description: **N/A**		
End Use Description: **N/A**		

Section 2a Component Information

Equipment No.: **MHLC** [4/11/00] ~~**MHLCX, TLCX, BLCX**~~ [ZES] [TLC, BLC ZES 4/11/10]	Specification No.: **Ederer F-2566, Foster Wheeler MJX-SDX 452656**	Manufacturer: **Siemens**	Past P.O. No.: **N/A**
Manufacturer's Part/ Model No.: **3TF4611-0AK6**	Equipment Supplier (if different from manufacturer): **ALSTROM, Foster Wheeler**		Equip. Supplier's Part No.: **N/A**

Component Description: **3-Pole contactor with120 VAC coil with 1 NO and 1 NC auxiliary contacts. Located on the MHM. The 3-pole 480 VAC 3PH/60HZ main contacts are used to provide line power from the circuit breaker to the MCO hoist line motor when the permissive control circuit requirements are met.**

Section 2b Commercial Availability of the Item

1. Is the Item available from a catalogue from a qualified NQA1 supplier or ISO 9000 supplier (coordinate with project CGI interface Engineer or BTR)?

   [ ] YES (go to #2 below) [X] NO (go to procedure step 6.3.2, proceed to dedicate Item)

   If not available from a qualified NQA1 supplier, is it available from an ISO 9000 supplier? (coordinate with project CGI Interface Engineer or BTR)

   [ ] YES (go to #2 below, procedure step 6.3.2, dedicate Item) [X] NO (procedure step 6.3.2, dedicate Item)

2. List of Candidate qualified NQA1 suppliers or ISO 9000 suppliers, if used: **N/A**

3. Recommended Procurement Strategy (coordinate with project CGI interface Engineer or BTR): **N/A**

Section 2c CGI Determination

CGI Determination Questions:

#1: Is the Item subject to design or specification requirements that are unique to nuclear facilities or activities?

[ ] YES (the Item is not commercial grade) [X] NO (continue)

#2: Is the Item used in applications other than nuclear facilities or activities?

[ ] NO (the item is not commercial grade) [X] YES (continue)

#3: Is the Item ordered from manufacturer/supplier on the basis of specifications set forth in the manufacturer's catalog?

[ ] NO (the item is not commercial grade) [X] YES (continue)

[X] All three criteria have been satisfied. The Item meets the definition of commercial grade.

Commercial Grade Item Upgrade Dedication Form

ECN No. N/A CGI No. CGI-SNF-D-MHM-019

Title: Various P02,03,05,09,10,21,26,57,61,62,63&99 Interlocks –Siemens Contactor #3TF4611-0AK6

Section 2d Reason for Dedication The above Commercial Grade (CG) described item is being Dedicated for use in the application cited for the following reason(s):	
	Item is being purchased from a non ESL manufacturer supplier as CG to be used in a Safety Class application.
	Item is being purchased from a non ESL manufacturer supplier as CG to be used in a Safety Significant application.
X	Item was purchased from a non ESL manufacturer supplier as CG to be used in a Safety Class application.
	Item was purchased from a non ESL manufacturer supplier as CG to be used in a Safety Significant application.
	Other ('like-for-like', similar, substitution, replacement evaluation)

Section 3 Failure Effects Evaluation

A. Part/Component Safety Function:

1. **Isolates line power from the MCO Hoist motor when any 1 of 15 permissives are not met.**

1. Part/Component Functional Mode: Safety Function #1: [X] Active [ ] Passive Safety Function #2: [ ] Active [ ] Passive Safety Function #3: [ ] Active [ ] Passive	Active - Mechanical or Electrical change of state is required to occur for the component to perform its safety function Passive – Change of state is not required for the component to perform its safety function

C. Host Component Safety Function (if applicable):

1. **N/A**

D. Failure Mode(s) and the effects on component or system safety function (see Worksheet 1):

1. **Contact resistance out of spec results in overheating and welding of contacts**
2. **Hot short across contacts results in failure to open the circuit**
3. **Binding of contacts results in failure to open/close circuit**

Section 4 Environmental & Natural Phenomena Hazard Design

Environmental Qualification Required: Yes [ ] No [X]	If yes: Environmental Qualification Requirements Limiting Environmental Conditions: Required Safety Functions: Qualification Period:
Natural Phenomena Hazard (NPH) Design Required: Yes [ ] No [X]	If yes: NPH Design Requirements Performance Category: NPH Design Req'ts.: Required Safety Functions:

Section 5 Component Functional Classification

X	Safety Class (SC)		General Service (GS)		Safety Significant (SS)

If part/component classification is different from host component/system, document basis. **N/A**

Sections 6 and 7 (Reserved)

Section 8 References (for Functional Classification)

National Codes/Standards: **N/A**

Safety Analysis Report (SAR): **HNF-3672, Rev. 0**

Drawings: **Ederer, Inc. EB-33056, Sheets 5, 8, 21, 24, 25A**

Vendor Manual/Manufacturer/Supplier Information: **Siemens Industrial Control Products, World Series Contactors, 3TF4 3-Pole with AC coil**

Other: **ALSTOM ESL/R (96) 065 – Rev. D, 100% Design Submittal – June 1998**

Commercial Grade Item Upgrade Dedication Form

Rev. No. 2

ECN No. N/A CGI No. CGI-SNF-D-MHM-019

Page 3 of 8

Title: Various P02,03,05,09,10,21,26,57,61,62,63&99 Interlocks –Siemens Contactor #3TF4611-0AK6

Section 9 Critical Characteristics

Critical Characteristics	Acceptance Criteria/Tolerances	Acceptance Method	ID	Function
1. Item Identification Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
Manufacturer	**Siemens**	**1, IN**	**X**	
Model Number	**3TF4611-0AK6**	**1, IN**	**X**	
2. Physical Critical Characteristics (for reasonable assurance that the Item delivered is the Item specified)				
Contact configuration	**3 pole NO main contacts, 1 NO & 1 NC Aux Contacts**	**1, IN**	**X**	
3 Performance Critical Characteristics (for reasonable assurance that the Item will perform its intended safety function(s))				
Current carrying capability	**0.5V max. voltage drop across closed contacts at 40 amps VAC resistive on main contacts and 10 amps VAC, resistive on auxiliary contacts**	**1, T**		**X**
Insulation resistance	**10 Megohm min across open contact terminals and terminals to ground (500 VDC megger)**	**1, T**		**X**
Operation	**Contacts open/close at maximum pick-up (102 VAC) and minimum drop-out (36 VAC) voltages**	**1, T**		**X**

4. Notes and Legend:

Rev. 1: Heading: revised interlocks; Page 1 & 3: revised equipment nos.; Page 2: revised drawing sheet nos.; General: new forms

Rev. 2: Pages 3, 6, 7: revised Current carrying capability acceptance criteria to "0.5V max. voltage drop across closed contacts at 40 amps VAC resistive on main contacts and 10 amps VAC, resistive on auxiliary contacts"; Pages 3, 6, 7: revised Operation acceptance criteria to " Contacts open/close at maximum pick-up (102 VAC) and minimum drop-out (36 VAC) voltages"

Acceptance Method (Acc Meth):
1. Special Test and Inspection:
   1, IN for Inspection
   1,T for Test
2. Commercial Grade Survey
3. Source Verification
1. Vendor/Item History

Section 10 Initial Review and Approval

Approvals:

Designated Engineer: [signature]

Design Authority: [signature] 2/10/00

Quality Assurance: [signature] J. T. ANDERSON 2/10/00

Commercial Grade Item Upgrade Dedication Form	Rev. No. 2
ECN No. N/A CGI No. CGI-SNF-D-MHM-019 Title: Various P02,03,05,09,10,21,26,57,61,62,63&99 Interlocks –Siemens Contactor #3TF4611-0AK6	Page 4 of 8

WORKSHEET 1
DETERMINATION OF FAILURE MECHANISMS/MODES

Section 1			
Typical Failure Mechanisms	Definition	X = Applicable to Component under Evaluation	
		X?	Indicate Failure Mode
Fracture	Separation of a solid accompanied by little or no macroscopic plastic deformation.		
Corrosion	The gradual deterioration of a material due to chemical or electrochemical reactions, such as oxidation, between the material and its environment.		
Erosion	Destruction of materials by the abrasive action of moving fluids, usually accelerated by the presence of solid particles carried with the fluid.		
Open Circuit	An electrical circuit that is unintentionally broken so that there is no complete path for current flow.		
Short Circuit	An abnormal connection by which an electrical current is connected to ground, or to some conducting body, resulting in excessive current flow.	X	**Failure to open the circuit by contact welding or hot short across the contact base.**
Blockage	Clogging of a filtering medium resulting in the inability to perform its purification function or blockage of flow.		
Seizure	Binding of a normally moving item through excessive pressure, temperature, friction, jamming.	X	**Results in failure of contacts to open**
Unacceptable Vibration	Mechanical oscillations produced are beyond the defined permissible limits due to unbalancing, poor support, or rotation at critical speeds.		
Loss of Properties	A loss of mechanical and physical properties of a material due to exposure to high temperatures, radiation exposure.		
Excess Strain	Under the action of excessive external forces the material of the part has been deformed or distorted.		
Mechanical Creep	From prolonged exposure to high temperature and stress, the object will show a slow change in its physical (shape and dimension) and mechanical characteristics.		
Ductile Fracture	Fracture characterized by tearing of metal accompanied by appreciable gross plastic deformation.		
Section 2: Additional Failure Modes Applicable to the Component Under Evaluation			

Commercial Grade Item Upgrade Dedication Form	Rev. No. 2
ECN No. N/A CGI No. CGI-SNF-D-MHM-019 Title: Various P02,03,05,09,10,21,26,57,61,62,63&99 Interlocks –Siemens Contactor #3TF4611-0AK6	Page 5 of 8

Checklist 1 - Acceptance Method 1 - Special Test/Inspection Verification

SECTION 1	
Item Description: **Siemens Contactor** System #: **MHM**	Equip #: **MHLC, ~~MHLCX, TLCX, BLCX~~** TLC, BLC Model #: **3TF4611-0AK6** 4/11/00
Manufacturer (Address/Phone): **Siemens Industrial Control Products** **1-800-964-4114**	Supplier (Address/Phone): **Ederer, Inc.**

SECTION 2 CRITICAL CHARACTERISTICS TO BE VERIFIED BY METHOD 1.

Insp	Test	PIT		
X			1.	**Manufacturer**
X			2.	**Model Number**
X			3.	**Actuator**
	X		4.	**Contact Rating**
	X		5.	**Insulation Resistance**
	X		6.	**Operation**

SECTION 3 BY INSPECTION * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)

Characteristic: **Manufacturer** Sample Size*: **100%**

Acceptance Criteria: **Siemens**

Receipt Inspection Plan / Report #: CGI-SNF-D-MHM-019-TP-019 A, B, C

Characteristic: **Model Number** Sample Size*: **100%**

Acceptance Criteria: **3TF4611-0AK6**

Receipt Inspection Plan / Report #: TP 019 A, B, C

Characteristic: **Contact Configuration** Sample Size*: **100%**

Acceptance Criteria: **3 Pole NO Main Contacts and 1 NO & 1 NC auxiliary contacts**

Receipt Inspection Plan / Report #: TP 019 A, B, C

Commercial Grade Item Upgrade Dedication Form	Rev. No. 2
ECN No. N/A CGI No. CGI-SNF-D-MHM-019 Title: Various P02,03,05,09,10,21,26,57,61,62,63&99 Interlocks –Siemens Contactor #3TF4611-0AK6	Page 6 of 8

SECTION 4 BY SPECIAL TEST * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)

Characteristic for Test: **Current carrying capability** Samp Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **0.5V max. voltage drop across closed contacts at 40 amps VAC resistive on main contacts and 10 amps VAC, resistive on auxiliary contacts**

Actual Test Value: TP019 A,B Test Plan and Report #:

Characteristic for Test: **Insulation Resistance** Samp Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **10 Megohms min across open contact terminals and terminals to ground, with 500 vdc megger.**

Actual Test Value: TP019 A,B Test Plan and Report #:

Characteristic for Test: **Operation** Samp Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **Contacts open/close at maximum pick-up (102 VAC) and minimum drop-out (36 VAC) voltages**

Actual Test Value: TP019 A,B Test Plan and Report #:

SECTION 5 TEST / INSPECTION SUMMARY (Acceptance Method 1)

1. SUMMARY OF VERIFIED CRITICAL CHARACTERISTICS, THEIR VERIFICATION METHODS, AND RESULTS

ITEM DESCRIPTION: Contactor

Critical Characteristics				Verification Results								
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/IN	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
Manufacturer	Siemens	X		1, IN	TP019ABC	NA	23 CES 4/24/00	0	XWEST	Larry W. Peace	4/10/00
Model Number	3TF4611-0AK6	X		1, IN							
Contact Configuration	3 Pole NO Main Contacts and 1 NO & 1 NC auxiliary contacts	X		1, IN							
Current Carrying Capability	0.5V max. voltage drop across closed contacts at 40 amps VAC resistive on main contacts and 10 amps VAC, resistive on auxiliary contacts		X	1, T	TP019AB		3 CES 4/24/00				
Insulation Resistance	10 Megohms min across open contact terminals and terminals to ground (500VDC megger)		X	1, T							
Operation	Contacts open/close at maximum pick-up (102 VAC) and minimum drop-out (36 VAC) voltages		X	1, T							

2. DISPOSITION OF UNVERIFIED OR FAILED CRITICAL CHARACTERISTICS

Critical Characteristic	Disposition

3. SIGNATURE INDICATES ALL CRITICAL CHARACTERISTICS VERIFIED SATISFACTORY OR ACCEPTABLY DISPOSITIONED AND COMMERCIAL GRADE DEDICATION IS SATISFACTORY AND COMPLETE.

See Test Plan TP-019A, B, C cited above CES 4/11/00

Testing Agency Approval: NA CES 4/11/00 Date

Testing Agency QA Engineer: NA CES 4/11/00 Date

BUYER VERIFICATION

Design Authority: CES Craig Swenson Date 4-11-00

QA Engineer: Stephen Scott Moss Date 4-24-2000

Commercial Grade Item Upgrade Dedication Form	Rev. No. 2
ECN No. N/A CGI No. CGI-SNF-D-MHM-019 Title: Various P02,03,05,09,10,21,26,57,61,62,63&99 Interlocks –Siemens Contactor #3TF4611-0AK6	Page 8 of 8

SECTION 6 CONTACTS / PHONE NUMBERS		
	Name	Phone
Design Authority	CRAIG EWENSON	( ) 376-0288
QA		( )
QC		( )
Cog - Engineer		( )
CGI Engineer		( )
Procurement Engineer		( )
Other		( )

SECTION 7 SUPPORTING DOCUMENTATION FOR THIS CHECKLIST		
Initial Procurement Documents		**For Critical Characteristics**
	Drawings:	
X	Manuals (specify type & number): **Siemens Industrial Control Products, Contractor, 3TF4 3-Pole**	**All**
	Design Calculations	
	Installation Instructions	
	Operation Instructions	
	Calibration Instructions	
	Manufacturer's Recommended Spare Parts List	
	Other:	
Procurement Documents:		**For Critical Characteristics**
	Certificate of Conformance/Compliance	
	Seismic Qualification Certificate	
	Environmental Qualification Certificate	
	Test Report (s):	
	Inspection Report (s):	
	CMTRs for ASME Pressure Retaining Materials	
	Valve Seat Leakage Report	
	Weld Records	
	Material Traceability Record	
	Other:	

Dedication Test Plan – IST
Test Plan No.: CGI-SNF-D-MHM-019-TP-019A
Test Specimen: Siemens 3TF4611-0AK6, Eqmt. No.: BLC

ORIGINAL

Rev. No. 0

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI Eng	DA	QA Post Review*
						3/22/00 NO CHANGES

* QA Post Review of Individual Revisions is allowed

ORIGINAL

Dedication Test Plan – IST	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-019-TP-019A	
Test Specimen: Siemens 3TF4611-0AK6, Eqmt. No.: BLC	Page 2 of 7

ORIGINAL

In-Situ Test Procedure

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) JWP Craig Swenson Date: 3/16/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Bahaven	Michael Cram	MRC
Electrician	J W EBERHART	PCE	J W Eberhart	JWE
Electrician Quality Control	Stephen R. Conley	PCE	Stephen R. Conley	SRC
Design Authority Representative	LARRY W PRICE	XWEST		JWP
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Current Source capable of 10 amps and 40 amps
Megger Instrument capable of 500 VDC Test Voltage
Adjustable Voltage Power supply capable of 0 to 120 VAC minimum
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: HP 3457A I.D.: BAT 123 Calib. Due date: 07-29-00

Test Instrument type: HP 3457A I.D.: BAT 124 Calib. Due date: 07-30-00

Test Instrument type: AVO BM8C/2 I.D.: 6410-889 Calib. Due date: 02-09-01

Test Instrument type: PROTO 6106 I.D.: 029E/009 Calib. Due date: 01-13-01

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE:

For this In-Situ Test, certain leads must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of leads.

1.0 Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	BLC	**BLC**	Acc
Manufacturer:	SIEMENS	**Siemens**	Acc
Model:	3TF46	**3TF46**	Acc
Contact Configuration:	YES	**3 pole Main Contacts and 1 NO & 1 NC auxiliary contacts**	Acc
Serial No./Lot No./Date Code:	OK	**N/A**	Acc
Coil:	K6	**K6**	Acc

2.0 Perform the following testing steps:

2.1 Record: Date /Time of Test Beginning: 03-16-00 2:20 P.M.

2.2 Operation

2.2.1 Regulate voltage to the coil of the contactor and monitor the maximum pick-up voltage and minimum drop-out voltages.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Pick-up Voltage	74.562 VAC	**102 VAC maximum**	Acc
Drop-out Voltage	49.829 VAC	**36 VAC minimum**	Acc

2.2.2 De-energize and remove test equipment.

2.3 Insulation Resistance Test

2.3.1 Setup the test equipment and contactor specimen for insulation resistance testing.

2.3.2 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the test specimen. Record data below.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
L1	T1	>100Gohm	> 10 Megohms	Acc
L2	T2	>100Gohm	> 10 Megohms	Acc
L3	T3	>100Gohm	> 10 Megohms	Acc
13	14	>100Gohm	> 10 Megohms	Acc
L1	Ground	>100Gohm	> 10 Megohms	Acc
L2	Ground	>100Gohm	> 10 Megohms	Acc
L3	Ground	>100Gohm	> 10 Megohms	Acc
T1	Ground	>100Gohm	> 10 Megohms	Acc
T2	Ground	>100Gohm	> 10 Megohms	Acc
T3	Ground	>100Gohm	> 10 Megohms	Acc
13	Ground	>100Gohm	> 10 Megohms	Acc
14	Ground	>100Gohm	> 10 Megohms	Acc
21 or 22	Ground	>100Gohm	> 10 Megohms	Acc
A1 or A2 (coil)	Ground	>100Gohm	> 10 Megohms	Acc

2.4 Contact Rating Test

2.4.1 Setup the test equipment and contactor specimen for contact rating testing.

2.4.2 Manually adjust the contactor or apply 120 VAC to the coil to close the normally open contacts

2.4.3 Apply a nominal 40 amps VAC, resistive, across closed main contacts of the test specimen

2.4.4 Apply a nominal 10 amps VAC, resistive, across the closed NO auxiliary contacts of the test specimen.

Caution: Do not change state of contacts while energized.

2.4.5 Record the following data.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Main Contacts L1 Closed	.0516 VAC	< 0.5 ± 10% Volts AC drop	Acc
Main Contacts L2 Closed	.0498 VAC	< 0.5 ± 10% Volts AC drop	Acc
Main Contacts L3 Closed	.0549 VAC	< 0.5 ± 10% Volts AC drop	Acc
Auxiliary NO Contact 13-14 (closed)	.1526 VAC	< 0.5 ± 10% Volts AC drop	Acc

2.4.6 De-energize and remove test equipment.

2.4.7 Apply a nominal 10 amps VAC, resistive, across the normally closed auxiliary contacts of the test specimen.

2.4.8 Record the following data.

Caution: Do not change state of contacts while energized.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Auxiliary NC 21-22 Contacts	.1442 VAC	**< 0.5 ± 10% Volts AC drop**	Ace

2.4.9 De-energize and remove the test equipment.

2.5 Terminate the test.

2.5.1 Reland the lifted leads and verify reland in accordance with the Lifted Lead Log.

2.5.2 Retorque the terminals to 12 in-pounds.

2.5.3 Record: Date /Time of Test End: 03-17-00 0:910 a.m.

3.0 References

3.1 Elementary Wiring Drawings: EB-33056 Sheet 24A

3.2 Y-Channel Main Power Panel Wiring Diagram: ED-33069 Sheet 1

Dedication Test Plan – IST	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-019-TP-019A	
Test Specimen: Siemens 3TF4611-0AK6, Eqmt. No.: BLC	Page 6 of 7

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Acceptance Criteria has been met
Michael D Crain
03-17-00

Notes:

Certified InstrumentationTechnician (signature) Michael D Crain Date: 03-17-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

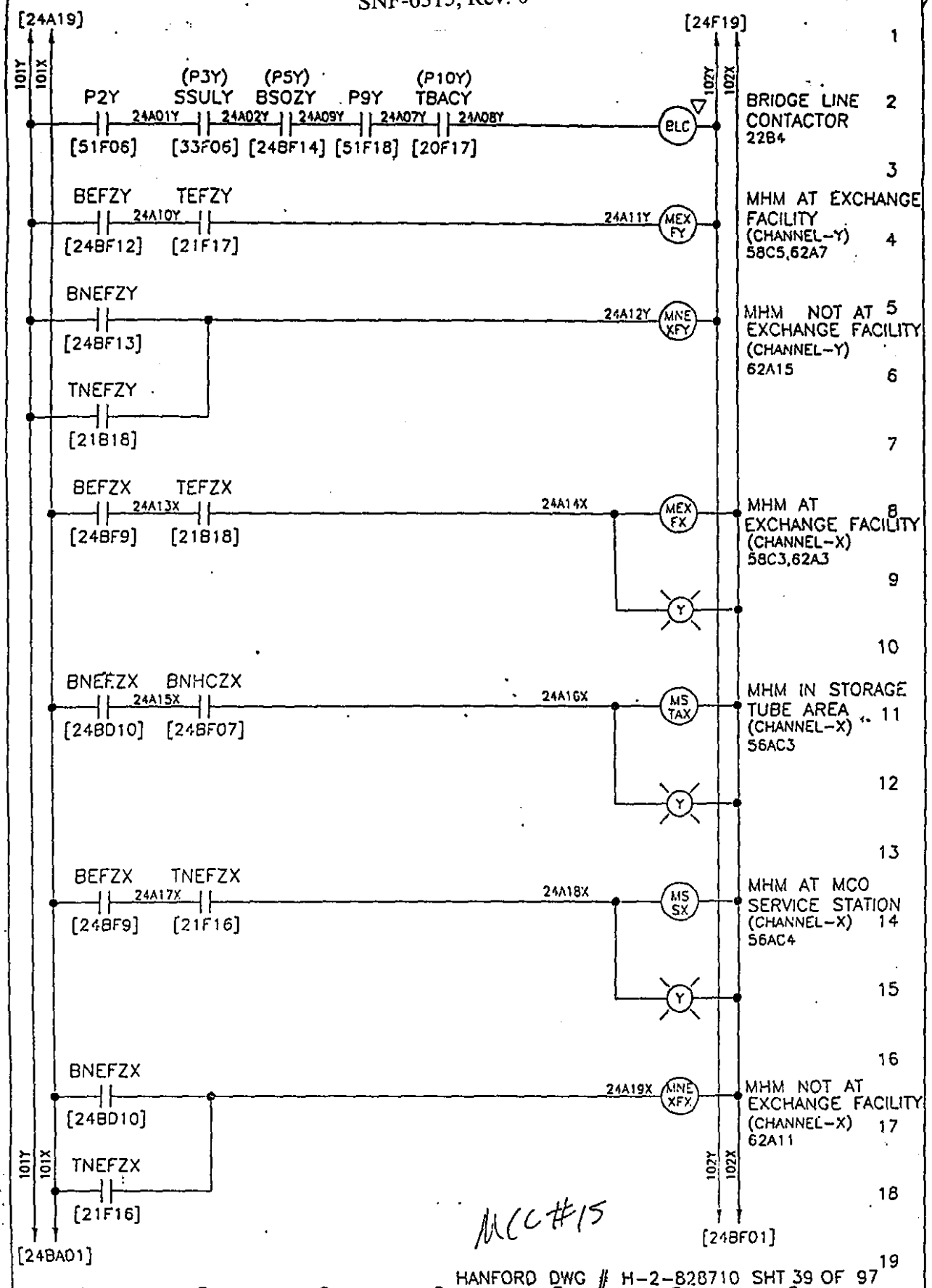
Design Authority (signature) Craig Swenson Date: 3/20/00

QA/QC (signature) Stephen Scott Mosh Date: 3-22-2000

LIFTED LEAD LOG

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
E3-33056		24ACRY	BLC	A-1	JWE	3/16/00	SRC	3-16-00	JWE	3/17/00	SRC	3-17-00
		Black	RCSA-6	A-1	JWE	3/16/00	SRC	3-16-00	JWE	3/17/00	SRC	3-17-00
		Grey		A-2	JWE	3/16/00	SRC	3-16-00	JWE	3/17/00	SRC	3-17-00
		21 102Y	BLC	A-2	JWE	3/16/00	SRC	3-16-00	JWE	3/17/00	SRC	3-17-00
		Bx-11		L-1	JWE	3/16/00	SRC	3-16-00	JWE	3/17/00	SRC	3-17-00
		Bx-12		L-2	JWE	3/16/00	SRC	3-16-00	JWE	3/17/00	SRC	3-17-00
		Bx-13		L-3	JWE	3/16/00	SRC	3-16-00	JWE	3/17/00	SRC	3-17-00
		BM-1		T1	JWE	3/16/00	SRC	3-16-00	JWE	3/17/00	SRC	3-17-00
		BM-2		T2	JWE	3/16/00	SRC	3-16-00	JWE	3/17/00	SRC	3-17-00
		BM-3		T3	JWE	3/16/00	SRC	3-16-00	JWE	3/17/00	SRC	3-17-00

Remarks:



LTR	DESCRIPTION	DATE	BY	CHK	ENG	APP'D	APP'D
A	MODIFY CONTROL CIRCUITRY	8/20/97	JBR	THM	THM	JMH	
B	GENERAL REVISIONS	9/25/97	JBR	JMH	THM	JMH	
C	ADD PLW, DELETE PBY	8/20/97	JBR	JMH	THM	JMH	LLA
D	CHANGED BOSZY TO SO	9/15/97	JRS	AHN	THM	JMH	EM
E	CORRECT SPELLING OF BSOZY	10/3/97	JRS	AHN	THM	JMH	LLA
F	RE-ENERING & SIMPLIFICATION	3/9/98	CSB	SED	CSB		
G	GENERAL REVISION	7/20/97	CSB	SED	CSB		

DRWN	J B RUPP	3/6/97
CHKD	T M MEADOWS	4/16/97
ENG	T M MEADOWS	5/6/97
APPD	J M HANNON	6/16/97
APPD	L L ANDERSON	6/16/97
APPD		

SCALE N/A
FIRST USED ON F-2500

EOERER INCORPORATED — EOERER CRANES — WASHINGTON CRANES — STAR CRANES

BRIDGE CONTROL ELEMENTARY

DWG NO. EB-33056 SHT 24A SHT 24B REV G

3TF4 3-Pole with AC Coil

3TF43

3TF48

Ordering Information

- Select Contactor from table below.
- Complete Catalog Number from coil code table.
  Example: **3TF4010-0AK6**

Additional References

- Overload Relays see pages 361–363.
- Accessories see pages 357–360.
- Replacement Parts see pages 912–913.
- Technical Data see pages 378–379.
- Electrical Life Curves see page 381.
- Dimensions see page 394.
- Wiring Diagrams see page 302.

Coil Voltage Codes

AC Voltage 60Hz	50Hz	Code
24	24	C2
120	110	K6
208	208	M2
277	220	U1
240	220	P6
480	380–415	V0
600	500	S0

Ampere Rating Enclosed		1 Phase HP Ratings		3 Phase HP Ratings				Auxiliary Contacts Type NO	Auxiliary Contacts Type NC	Catalog No	Price $
IEC AC-3	UL	115V	230V	200V	230V	460V	575V				
9	20	½	1½	2	3	5	7½	1	0	3TF4010-0AT†	105.
12	20	1	2	3	3	7½	10	1	0	3TF4110-0AT†	135.
16	30	1	3	5	5	10	15	1	0	3TF4210-0AT†	150.
22	30	2	3	7½	7½	15	20	1	0	3TF4310-0AT†	159.
32	55	3	5	10	10	25	30	1	1	3TF4411-0AT†	180.
38	55	3	7½	10	15	25	30	1	1	3TF4511-0AT†	206.
Auxiliary Contacts may be added to 3TF46–3TF56 for maximum 4 NO and 4 NC①											
45	80	5	10	15	20	40	50	1	1	3TF4611-0AT†	276.
63	80	5	15	20	25	50	60	1	1	3TF4711-0AT†	348.
75	100	7½	15	25	30	60	75	1	1	3TF4811-0AT†	420.
85	105	—	—	30	40	75	100	1	1	3TF4911-0AT†	520.

3TF Contactors—Auxiliary Contact
Replace 6th (NO Aux. Contact) and 7th (NC Aux. Contact) digit in Catalog Number per chart. Example: 3TF4411-0AK6.

Contactors	Auxiliary Contacts NO 6th Digit	NC 7th Digit	Price Adder $
3TF40–3TF43	1	0	STD
	0	1	No Adder
	1	1	12.
	2	2	24.
3TF44–3TF45	1	1	STD
	2	2	24.
3TF46–3TF49	1	1	STD
	2	2	24.
	4②	4②	48.

①See Auxiliary Contact table for standard and optional Auxiliary Contact Configurations.

②Field assembled kit.

3TF3, 3TF4, CRLOF3 and CRLOF4

Technical Data

Contactor	Type	Units of Measure	NEMA Size 00: 3TF30/40 CRLOF30/40	00: 3TF31/41 CRLOF31/41	0: 3TF32/42 CRLOF32/42	0: 3TF33/43 CRLOF33/43	1: 3TF34/44 CRLOF34/44	1: 3TF35/45 CRLOF35/45
Mechanical life	make/break operations	Mil	15		15		10	
Insulation rating		V	690					
Ambient temperature range		°C	−25 to +55 in operation, −55 to +80 when stored					
Coil ratings (cold coil 1.0 × U_s)		Hz	50	60			50	60
AC operation	Inrush	VA	68	75			87	115
	p.f.		0.82	0.76			0.82	0.75
	Sealed	VA	10	9.4			13	13
	p.f.		0.29	0.29			0.27	0.27
DC operation	Inrush = Sealed	W	6.5				11.7	
Coil voltage range:	AC		0.85 to 1.1 × U_s				0.85 to 1.1 U_s	
	at DC 24V		0.8 to 1.2 × U_s				0.8 to 1.1 U_s	
Operating times① (Valid for 20% undervoltage to 10% overvoltage cold or warm coil)			(Values are applicable up to and including 20% undervoltage, 10% overvoltage as well as with the coil in cold state and operating temperature)					
AC operation	closing delay	ms	8–35		10–35		13–57	
	opening delay	ms	4–18		5–20		5–10	
DC operation	closing delay	ms	20–170		35–180		54–182	
	opening delay	ms	10–25		10–25		13–17	
Operating times at 1.0 × U_s①								
AC operation	closing delay	ms	10–15		10–25		13–32	
	opening delay	ms	4–18		5–20		5–10	
DC operation	closing delay	ms	30–70		40–80		58–107	
	opening delay	ms	12–20		10–25		13–17	
Resistance to shock (rectangular pulse)	AC	g/ms	7.7/5, 4.4/10		5.8/5, 3.4/10		6.2/5, 3.6/10	
Conductor sizes For contactors without overload relay								
main conductor; solid or stranded	main	AWG	(2) 18–12	(2) 18–12	(2) 14–10	(2) 14–10	(1) 14–3 or (2) 16–6	
auxiliary conductor; solid or stranded	aux.	AWG	(2) 18–12	(2) 18–12	(2) 18–12	(2) 18–12	(2) 18–12	
Switching frequency in make/break operations per hour Contactors without overload relay								
	to AC-1	ops./h	1500		1500		1200	1200
	to AC-2	ops./h	1000		750		750	600
	to AC-3	ops./h	1000		750		750	600
	to AC-4	ops./h	250		250		250	200
Contactor with overload relay (avg. value)		1/h	15		15		15	15

Auxiliary contacts

UL, CSA and ratings CE for auxiliary contacts

Auxiliary Contacts within 3TF30 and 3TF31 and 3TF40 through 3TF45	Rated voltage switching capacity continuous current: 10 Amp (AC/DC)	AC 600V max. NEMA A600		24V	120V	240V	480V	600V
		Make	A	60	60	30	15	12
		Break	A	6	6	3	1.5	1.2
		DC 600V max. NEMA P600		24V	125V	250V	300V	600V
		Make	A	1.1	1.1	0.55	0.20	0.20
		Break	A	1.1	1.1	0.55	0.20	0.20
Auxiliary contact blocks for 3TF30 to 3TF35, Cat. 3TX40		AC 600V max. NEMA A600						
		DC 600V max. NEMA Q600		24V	125V	200V	300V	600V
		Make	A	0.55	0.55	0.27	0.10	0.10
		Break	A	0.55	0.55	0.27	0.10	0.10

Load/Life Curves shown with 3TF contactor technical data page XXX

①The opening time delay is increased when the contactor coil is protected against voltage peaks (diode 6 to 9 times; diode combination 2 to 6 times; varistor + 2 to 6 ms).

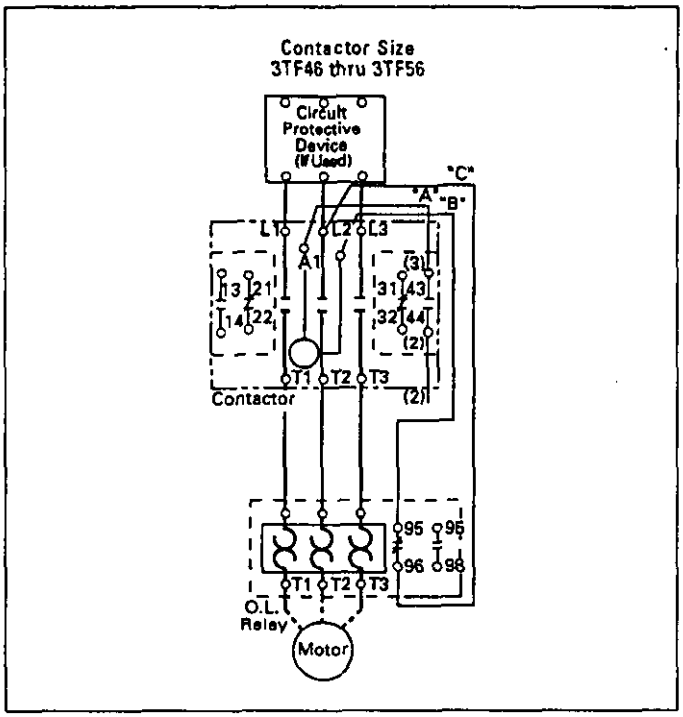
3TF4 and CRLOF4

NEMA Size			2		3	
Contactor	**Type**	**Unit of Measure**	**3TF46 CRLOF46**	**3TF47 CRLOF47**	**3TF48 CRLOF48**	**3TF49 CRLOF49**
Mechanical life	make/break operations	Mil	10	10	10	10
Insulation rating		V	1000	1000	1000	1000
Ambient temperature range		°C	−25 to +55 in operation, −50 to +80 when stored			
Coil ratings (cold coil, 1.0 × U_c)		Hz	50 60		50 60	
AC operation	Inrush	VA	183 185		345 360	
	p.f.		0.5 0.54		0.5 0.4	
	Sealed	VA	17 15		35 31	
	p.f.		0.29 0.29		0.23 0.24	
DC economy circuit	Inrush	W	400 —		420 —	
	Sealed	W	2.1 —		2.7 —	
DC solenoid system	Closing = Closed	W	15 —		— —	
Coil voltage range	AC		0.85 to 1.1 × U_s			
Operating times (valid for 20% undervoltage to 10% overvoltage, cold or warm coil) Total break time = opening delay + arcing time						
AC operation	closing delay	ms	15–40		20–50	
	opening delay①	ms	5–25		5–30	
	arcing time	ms	10–15		10–15	
Operating times at 1.0 × U_s						
AC operation	closing delay	ms	17–30		22–35	
	opening delay①	ms	5–25		5–30	
Resistance to shock (rectangular pulse)		g/ms	11.2/5	6.6/10	8.6/5	4.8/10
Conductor sizes *For contactors without overload relay*						
main conductor: solid or stranded		AWG	max. 1/0		max. 1/0	
auxiliary conductor: solid or stranded		AWG	2 × (18 to 12)		2 × (18 to 12)	
Switching frequency in make/break operations per hour (1/h)						
Contactors without overload relay						
	duty AC-1	1/h	1000	1000	900	900
	duty AC-2	1/h	600	400	400	350
	duty AC-3	1/h	1200	1000	1000	850
	duty AC-4	1/h	400	300	300	250
Contactors with overload relay (average value)		1/h	15	15	15	15

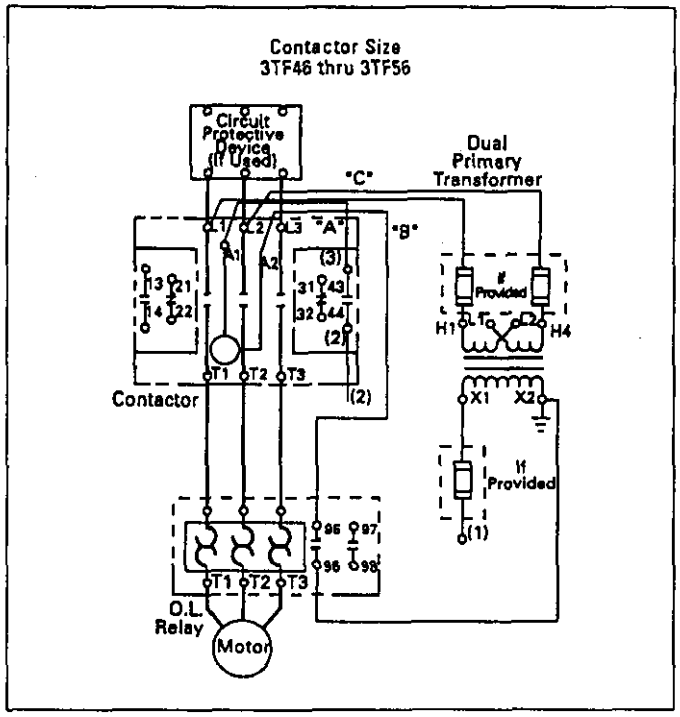
Auxiliary contacts								
ⓒ, ⓤ and ⓒ ratings for auxiliary contacts								
3TF40 thru 3TF57	Rated voltage · switching capacity	AC 600V maximum NEMA A600		24V	120V	240V	480V	600V
		Make	A	60	60	30	15	12
		Break	A	6	6	3	1.5	1.2
	Continuous current 10A (AC/DC)	DC 600V maximum NEMA P600		24V	150V	250V	300V	600V
		Make	A	1.1	1.1	0.55	0.20	0.20
		Break	A	1.1	1.1	0.55	0.20	0.20

①The opening delay can increase if the coils have voltage spike protection. Diodes may only be attached to contactors up to **3TF44**.

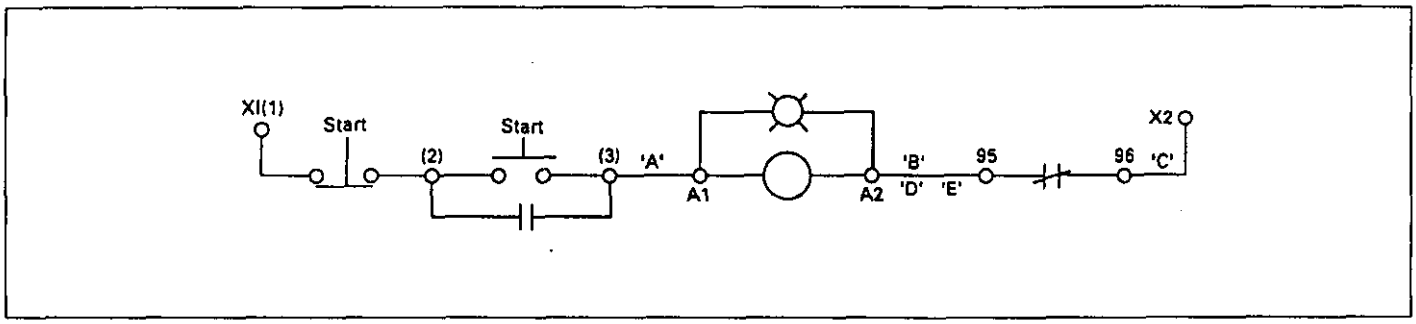
Without Control Power Transformer



With Control Power Transformer



Standard Pilot Control
Wire "C" omitted on starters with coils rated 120V or less.



Note: Starters with Contactor Sizes 3TF40 through 3TF44 are provided with the overload relays which mount directly to the contactor. These overload relays are provided with a contactor coil A2 repeat terminal. Wire "D" is integral with the overload relay. Jumper wire "E" is provided on the overload relay.

ORIGINAL

Dedication Test Plan – IST **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-019-TP-019B
Test Specimen: Siemens 3TF4611-0AK6, Eqmt. No.: TLC **Page 1 of 7**

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI Eng	DA	QA Post Review*

* QA Post Review of Individual Revisions is allowed

ORIGINAL

In-Situ Test Procedure

ORIGINAL

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature): [signature] Date: 3/16/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Bechtel	[signature]	MRC
Electrician	J W EBERHART	PGE	[signature]	JWE
Electrician Quality Control	Stephen R. Conley	PGE	[signature]	SRC
Design Authority Representative	LARRY W. PRICE	WMGT	[signature]	[signature]
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Current Source capable of 10 amps and 40 amps
Megger Instrument capable of 500 VDC Test Voltage
Adjustable Voltage Power supply capable of 0 to 120 VAC minimum
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: HP 3457A I.D.: BAT 123 Calib. Due date: 07-29-00

Test Instrument type: HP 3457A I.D.: BAT 124 Calib. Due date: 07-30-00

Test Instrument type: AVO BM850/2 I.D.: 6410-889 Calib. Due date: 02-09-01

Test Instrument type: FLUKE 6106 I.D.: ~~BZ4E~~ 029E/009 MRE 03-27-00 Calib. Due date: 01-13-01

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE:

For this In-Situ Test, certain leads must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of leads.

1.0 Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	TLC	**TLC**	Acc
Manufacturer:	SIEMENS	**Siemens**	Acc
Model:	3TF46	**3TF46**	Acc
Contact Configuration:	YES	**3 pole Main Contacts and 1 NO & 1 NC auxiliary contacts**	Acc
Serial No./Lot No./Date Code:	OK	**N/A**	Acc
Coil:	K6	**K6**	Acc

2.0 Perform the following testing steps:

2.1 Record: Date /Time of Test Beginning: 03-16-00 12:45 p.m.

2.2 Operation

2.2.1 Regulate voltage to the coil of the contactor and monitor the maximum pick-up voltage and minimum drop-out voltages.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Pick-up Voltage	79.556 VAC	**102 VAC maximum**	Acc
Drop-out Voltage	71.561 VAC	**36 VAC minimum**	Acc

2.2.2 De-energize and remove test equipment.

2.3 Insulation Resistance Test

2.3.1 Setup the test equipment and contactor specimen for insulation resistance testing.

2.3.2 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the test specimen. Record data below.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
L1	**T1**	>100Gohm	**> 10 Megohms**	Acc
L2	**T2**	>100Gohm	**> 10 Megohms**	Acc
L3	**T3**	>100Gohm	**> 10 Megohms**	Acc
13	**14**	>100Gohm	**> 10 Megohms**	Acc
L1	**Ground**	>100Gohm	**> 10 Megohms**	Acc
L2	**Ground**	>100Gohm	**> 10 Megohms**	Acc
L3	**Ground**	>100Gohm	**> 10 Megohms**	Acc
T1	**Ground**	>100Gohm	**> 10 Megohms**	Acc
T2	**Ground**	>100Gohm	**> 10 Megohms**	Acc
T3	**Ground**	>100Gohm	**> 10 Megohms**	Acc
13	**Ground**	>100Gohm	**> 10 Megohms**	Acc
14	**Ground**	>100Gohm	**> 10 Megohms**	Acc
21 or 22	**Ground**	>100Gohm	**> 10 Megohms**	Acc
A1 or A2 (coil)	**Ground**	>100Gohm	**> 10 Megohms**	Acc

2.4 Contact Rating Test

2.4.1 Setup the test equipment and contactor specimen for contact rating testing.

2.4.2 Manually adjust the contactor or apply 120 VAC to the coil to close the normally open contacts

2.4.3 Apply a nominal 40 amps VAC, resistive, across closed main contacts of the test specimen

2.4.4 Apply a nominal 10 amps VAC, resistive, across the closed NO auxiliary contacts of the test specimen.

Caution: Do not change state of contacts while energized.

2.4.5 Record the following data.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Main Contacts L1 Closed	.0582 VAC	**< 0.5 ± 10% Volts AC drop**	Acc
Main Contacts L2 Closed	.0676 VAC	**< 0.5 ± 10% Volts AC drop**	Acc
Main Contacts L3 Closed	.0635 VAC	**< 0.5 ± 10% Volts AC drop**	Acc
Auxiliary NO Contact 13-14 (closed)	.0989 VAC	**< 0.5 ± 10% Volts AC drop**	Acc

2.4.6 De-energize and remove test equipment.

2.4.7 Apply a nominal 10 amps VAC, resistive, across the normally closed auxiliary contacts of the test specimen.

2.4.8 Record the following data.

Caution: Do not change state of contacts while energized.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Auxiliary NC 21-22 Contacts	.0994 VAC	**< 0.5 ± 10% Volts AC drop**	Acc

2.4.9 De-energize and remove the test equipment.

2.5 Terminate the test.

2.5.1 Reland the lifted leads and verify reland in accordance with the Lifted Lead Log.

2.5.2 Retorque the terminals to 12 in-pounds.

2.5.3 Record: Date /Time of Test End: 03-16-00 1:54 p.m.

3.0 References

3.1 Elementary Wiring Drawings: EB-33056 Sheet 21

3.2 Y-Channel Main Power Panel Wiring Diagram: ED-33069 Sheet 1

Dedication Test Plan – IST	**Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-019-TP-019B	
Test Specimen: Siemens 3TF4611-0AK6, Eqmt. No.: TLC	**Page 6 of 7**

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Acceptance Criteria has been met.

Michael Cram
03-16-00

Notes:

Certified InstrumentationTechnician (signature) Michael Cram Date: 03-16-00
S. Cadwell 3/16/00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

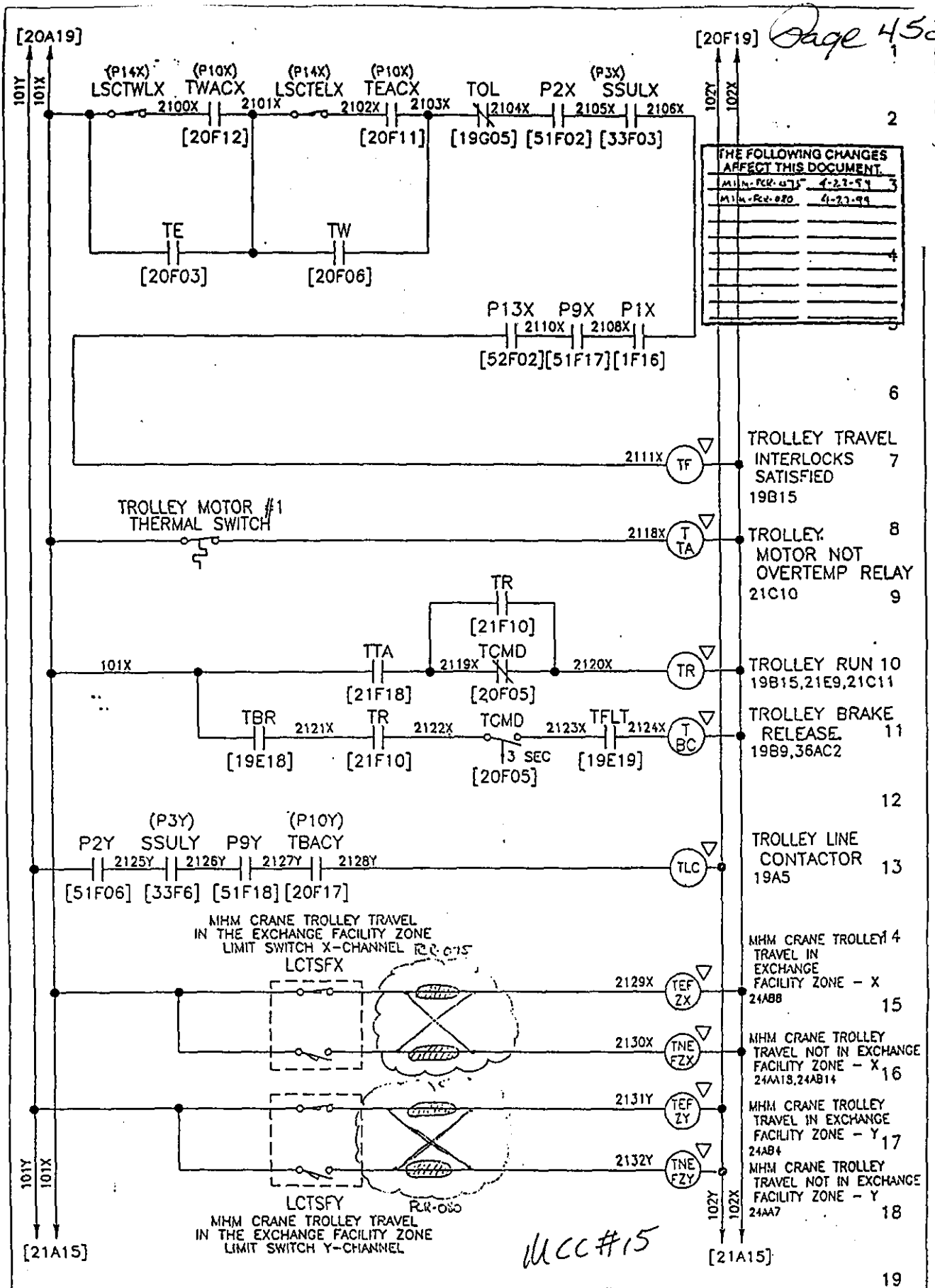
Design Authority (signature) Craig Swenson Date: 3/16/00

QA/QC (signature) Stephen Scott Mosh Date: 3-27-2000

LIFTED LEAD LOG

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
EB-33056		2128Y	TLC	A-1	JWE	3/16/00	SRC	3-16-00	JWE	3/16/00	SRC	3-16-00
		BLACK	RKS2A-6	A-1	JWE	3/16/00	SRC	3-16-00	JWE	3/16/00	SRC	3-16-00
		Gray	" "	A-2	JWE	3/16/00	SRC	3-16-00	JWE	3/16/00	SRC	3-16-00
		(2) 102Y	TLC	A-2	JWE	3/16/00	SRC	3-16-00	JWE	3/16/00	SRC	3-16-00
		TX-11		L-1	JWE	3/16/00	SRC	3-16-00	JWE	3/16/00	SRC	3-16-00
		TX-12		L-2	JWE	3/16/00	SRC	3-16-00	JWE	3/16/00	SRC	3-16-00
		TX-13		L-3	JWE	3/16/00	SRC	3-16-00	JWE	3/16/00	SRC	3-16-00
		TM-1 (R)		T-1	JWE	3/16/00	SRC	3-16-00	JWE	3/16/00	SRC	3-16-00
		TM-2 (Y)		T-2	JWE	3/16/00	SRC	3-16-00	JWE	3/16/00	SRC	3-16-00
		TM-3 (B)		T-3	JWE	3/16/00	SRC	3-16-00	JWE	3/16/00	SRC	3-16-00

Remarks:



LTR	DESCRIPTION	DATE	BY	CHK	ENG	APPD	APPD
E	MODIFY END-OF-TRAVEL DESIGNATIONS	8/20/97	JDR	JMH	TMH	JMH	LLA
F	MODIFIED LOCATION ADDRESSES	9/4/97	JDR	MH	TMH	JMH	EM
G	REMOVE FESTOON SYMBOLS	10/2/97	JRS	MH	TMH	JMH	LLA
H	CHANGE TOL TO N.C.	10/29/97	JRS	TMH	TMH	JMH	EM
J	DE-HEATING & SIMPLIFICATION	3/9/98	CSB	SEO	CSB		
K	GENERAL REVISION	7/20/98	CSB	SEO	CSB		
L	REVISED PER INSTALLATION MARK-UPS	3/6/99	CSB				

DRAWN	J B RUPP	4/29/96
DESIGN	T M MEADOWS	4/29/96
CHK	T M MEADOWS	4/29/96
APPD	J M HARRICK	4/29/96
APPD	L L ANDERSEN	5/1/97
APPD		
SCALE	N/A	

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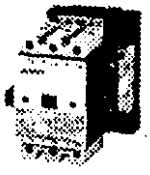
TROLLEY CONTROL ELEMENTARY

SHT NO. 21 REV 1

FB-331556

3TF4 3-Pole with AC Coil

3TF43



3TF48

Ordering Information

- Select Contactor from table below.
- Complete Catalog Number from coil code table.
  Example: **3TF4010-0AK6**

Additional References

- Overload Relays see pages 361–363.
- Accessories see pages 357–360.
- Replacement Parts see pages 912–913.
- Technical Data see pages 378–379.
- Electrical Life Curves see page 381.
- Dimensions see page 394.
- Wiring Diagrams see page 302.

Coil Voltage Codes

AC Voltage 60Hz	50Hz	Code
24	24	C2
120	110	K6
208	208	M2
277	220	U1
240	220	P6
480	380–415	V0
600	500	S0

Ampere Rating Enclosed		1 Phase HP Ratings		3 Phase HP Ratings				Auxiliary Contacts Type NO	NC	Catalog No	Price $
IEC AC-3	UL	115V	230V	200V	230V	460V	575V				
9	20	½	1½	2	3	5	7½	1	0	3TF4010-0A††	105.
12	20	1	2	3	3	7½	10	1	0	3TF4110-0A††	135.
16	30	1	3	5	5	10	15	1	0	3TF4210-0A††	150.
22	30	2	3	7½	7½	15	20	1	0	3TF4310-0A††	159.
32	55	3	5	10	10	25	30	1	1	3TF4411-0A††	186.
38	55	3	7½	10	15	25	30	1	1	3TF4511-0A††	206.
Auxiliary Contacts may be added to 3TF46–3TF56 for maximum 4 NO and 4 NC①											
45	80	5	10	15	20	40	50	1	1	3TF4611-0A††	276.
63	80	5	15	20	25	50	60	1	1	3TF4711-0A††	348.
75	100	7½	15	25	30	60	75	1	1	3TF4811-0A††	420.
85	105	—	—	30	40	75	100	1	1	3TF4911-0A††	520.

3TF Contactors—Auxiliary Contact
Replace 6th (NO Aux. Contact) and 7th (NC Aux. Contact) digit in Catalog Number per chart. Example: 3TF4411-0AK6.

Contactors	Auxiliary Contacts NO 6th Digit	NC 7th Digit	Price Adder $
3TF40–3TF43	1	0	STD
	0	1	No Adder
	1	1	12.
	2	2	24.
3TF44–3TF45	1	1	STD
	2	2	24.
3TF46–3TF49	1	1	STD
	2	2	24.
	4②	4②	48.

①See Auxiliary Contact table for standard and optional Auxiliary Contact Configurations.

②Field assembled kit.

Technical Data

	NEMA Size		00		0		1	
Contactor	**Type**	**Units of Measure**	**3TF30/40 CRLOF30/40**	**3TF31/41 CRLOF31/41**	**3TF32/42 CRLOF32/42**	**3TF33/43 CRLOF33/43**	**3TF34/44 CRLOF34/44**	**3TF35/45 CRLOF35/45**
Mechanical life	make/break operations	Mil	15		15		10	
Insulation rating		V	690					
Ambient temperature range		°C	−25 to +55 in operation, −55 to +80 when stored					
Coil ratings (cold coil 1.0 × U_s)		Hz	50	60			50	60
AC operation	Inrush	VA	68	75			87	115
	p.f.		0.82	0.76			0.82	0.75
	Sealed	VA	10	9.4			13	13
	p.f.		0.29	0.29			0.27	0..27
DC operation	Inrush = Sealed	W	6.5				11.7	
Coil voltage range:	AC		0.85 to 1.1 × U_s				0.85 to 1.1 U_s	
	at DC 24V		0.8 to 1.2 × U_s				0.8 to 1.1 U_s	
Operating times① (Valid for 20% undervoltage to 10% overvoltage cold or warm coil)			(Values are applicable up to and including 20% undervoltage, 10% overvoltage as well as with the coil in cold state and operating temperature)					
AC operation	closing delay	ms	8–35		10–35		13–57	
	opening delay	ms	4–18		5–20		5–10	
DC operation	closing delay	ms	20–170		35–180		54–182	
	opening delay	ms	10–25		10–25		13–17	
Operating times at 1.0 × U_s①								
AC operation	closing delay	ms	10–15		10–25		13–32	
	opening delay	ms	4–18		5–20		5–10	
DC operation	closing delay	ms	30–70		40–80		58–107	
	opening delay	ms	12–20		10–25		13–17	
Resistance to shock (rectangular pulse)	AC	g/ms	7.7/5; 4.4/10		5.8/5; 3.4/10		6.2/5; 3.6/10	
Conductor sizes For contactors without overload relay								
main conductor, solid or stranded	main	AWG	(2) 18–12	(2) 18–12	(2) 14–10	(2) 14–10	(1) 14–3 or (2) 16–6	
auxiliary conductor; solid or stranded	aux.	AWG	(2) 18–12	(2) 18–12	(2) 18–12	(2) 18–12	(2) 18–12	
Switching frequency in make/break operations per hour Contactors without overload relay								
	to AC-1	ops./h	1500		1500		1200	1200
	to AC-2	ops./h	1000		750		750	600
	to AC-3	ops./h	1000		750		750	600
	to AC-4	ops./h	250		250		250	200
Contactor with overload relay (avg. value)		1/h	15		15		15	15
Auxiliary contacts								
Ⓤ, UL and ratings CE for auxiliary contacts								
Auxiliary Contacts within 3TF30 and 3TF31 and 3TF40 through 3TF45	Rated voltage switching capacity continuous current. 10 Amp (AC/DC)	AC 600V max NEMA A600		24V	120V	240V	480V	600V
		Make	A	60	60	30	15	12
		Break	A	6	6	3	1.5	1.2
		DC 600V max NEMA P600		24V	125V	250V	300V	600V
		Make	A	1.1	1.1	0.55	0.20	0.20
		Break	A	1.1	1.1	0.55	0.20	0.20
Auxiliary contact blocks for 3TF30 to 3TF35, Cat. 3TX40		AC 600V max. NEMA A600						
		DC 600V max. NEMA Q600		24V	125V	200V	300V	600V
		Make	A	0.55	0.55	0.27	0.10	0.10
		Break	A	0.55	0.55	0.27	0.10	0.10
Load/Life Curves shown with 3TF contactor technical data page XXX								

①The opening time delay is increased when the contactor coil is protected against voltage peaks (diode 6 to 9 times; diode combination 2 to 6 times; varistor + 2 to 6 ms).

World Series Contactors

3TF4 and CRLOF4

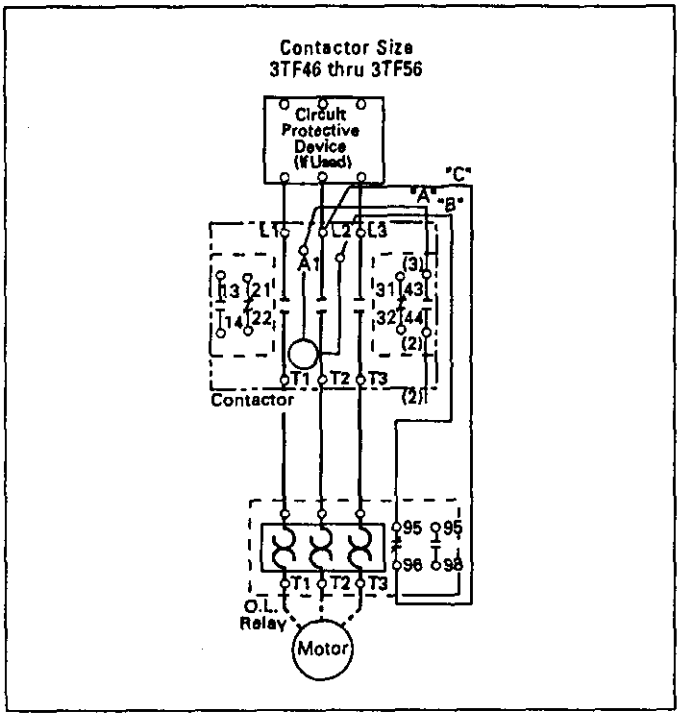
NEMA Size			2		3	
Contactor	Type	Unit of Measure	3TF46 CRLOF46	3TF47 CRLOF47	3TF48 CRLOF48	3TF49 CRLOF49
Mechanical life	make/break operations	Mil	10	10	10	10
Insulation rating		V	1000	1000	1000	1000
Ambient temperature range		°C	−25 to +55 in operation, −50 to +80 when stored			
Coil ratings (cold coil, 1.0 × U_c)		Hz	50 60		50 60	
AC operation	Inrush	VA	183 185		345 360	
	p.f.		0.5 0.54		0.5 0.4	
	Sealed	VA	17 15		35 31	
	p.f.		0.29 0.29		0.23 0.24	
DC economy circuit	Inrush	W	400 —		420 —	
	Sealed	W	2.1 —		2.7 —	
DC solenoid system	Closing = Closed	W	15 —		— —	
Coil voltage range	AC		0.85 to 1.1 × U_c			
Operating times (valid for 20% undervoltage to 10% overvoltage, cold or warm coil) Total break time = opening delay + arcing time						
AC operation	closing delay	ms	15–40		20–50	
	opening delay①	ms	5–25		5–30	
	arcing time	ms	10–15		10–15	
Operating times at 1.0 × U_s						
AC operation	closing delay	ms	17–30		22–35	
	opening delay①	ms	5–25		5–30	
Resistance to shock (rectangular pulse)		g/ms	11.2/5	6.6/10	8.6/5	4.8/10
Conductor sizes For contactors without overload relay						
main conductor: solid or stranded		AWG	max. 1/0		max. 1/0	
auxiliary conductor: solid or stranded		AWG	2 × (18 to 12)		2 × (18 to 12)	
Switching frequency in make/break operations per hour (1/h) Contactors without overload relay						
	duty AC-1	1/h	1000	1000	900	900
	duty AC-2	1/h	600	400	400	350
	duty AC-3	1/h	1200	1000	1000	850
	duty AC-4	1/h	400	300	300	250
Contactors with overload relay (average value)		1/h	15	15	15	15

Auxiliary contacts								
UL, CSA and ratings for auxiliary contacts								
3TF40 thru 3TF57	Rated voltage switching capacity	AC 600V maximum NEMA A600		24V	120V	240V	480V	600V
		Make	A	60	60	30	15	12
		Break	A	6	6	3	1.5	1.2
	Continuous current 10A (AC/DC)	DC 600V maximum NEMA P600		24V	150V	250V	300V	600V
		Make	A	1.1	1.1	0.55	0.20	0.20
		Break	A	1.1	1.1	0.55	0.20	0.20

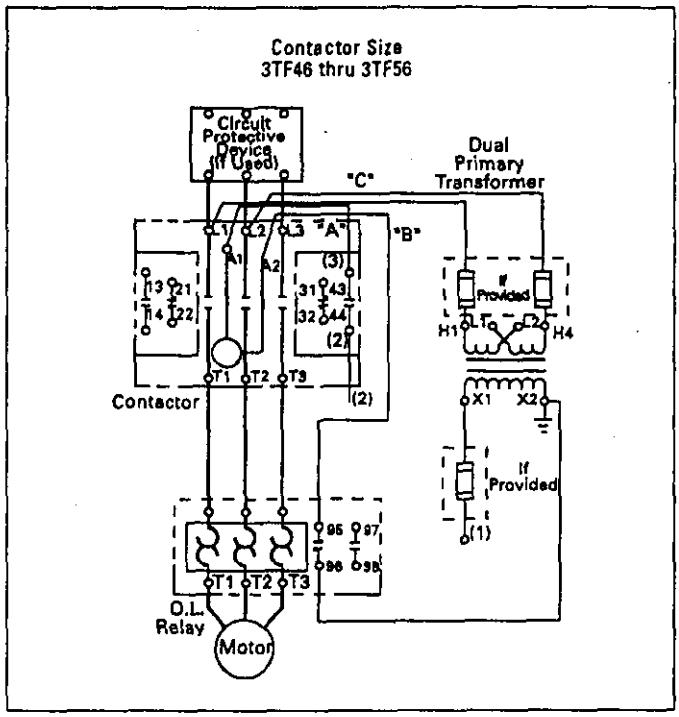
①The opening delay can increase if the coils have voltage spike protection. Diodes may only be attached to contactors up to 3TF44.

Non-Reversing Starters — Type 3TF

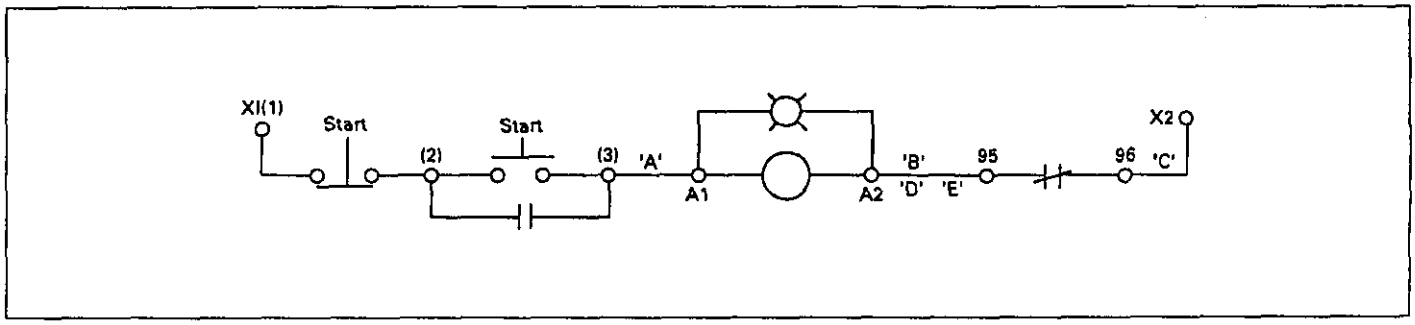
Without Control Power Transformer



With Control Power Transformer



Standard Pilot Control
Wire "C" omitted on starters with coils rated 120V or less.



Note: Starters with Contactor Sizes 3TF40 through 3TF44 are provided with the overload relays which mount directly to the contactor. These overload relays are provided with a contactor coil A2 repeat terminal. Wire "D" is integral with the overload relay. Jumper wire "E" is provided on the overload relay.

In-Situ Inspection Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI. Eng	DA	QA Post Review*

* QA Post Review of Individual Revisions is allowed

In-Situ Inspection Procedure

Inspection Procedure Approval (Obtain prior to inspection):

This procedure documents the visual verification of the identification critical characteristics of the remaining specimen which were in-situ tested on a sampling basis as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) for Larry Swanson Date: 4-6-00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Electrician	N/A	N/A	N/A	N/A
Electrician Quality Control	N/A	N/A	N/A	N/A
Design Authority Representative	Larry W. Price	KAPL		

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment.

INSPECTION PROCEDURE:

1.0 Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	MHLC	**MHLC**	
Manufacturer:	SIEMENS	**Siemens**	SIZE 2
Model:	3TF46	**3TF46**	
Contact Configuration:	3P MC 2 AUX CONT	**3 pole Main Contacts and 1 NO and 1 NC auxiliary contacts**	
Serial No./Lot No./Date Code:	N/A	**N/A**	
Coil:	K6	**K6**	

2.0 Record: Date /Time of Test Beginning: 4/7/00 8:18 AM

Dedication Test Plan – IST **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-019-TP-019C
Test Specimen: Siemens 3TF4611-0AK6, Eqmt. No.:MHLC **Page 3 of 4**

2.1 Record: Date /Time of Test End: 4/17/00 8:20AM

3.0 References

3.1 Elementary Wiring Drawings: EB-33056 Sheet 4

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

ACCEPTANCE CRITERIA MET.

Notes:

N/A

Design Authority Representative (signature) _____ Date: 4/7/00

Lucy Anderson 4/7/00 LEE 4/7/00

Dedication Test Plan – IST	**Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-019-TP-019C	
Test Specimen: Siemens 3TF4611-0AK6, Eqmt. No.:MHLC	**Page 4 of 4**

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Craig Swenson Date: 4/7/00.

QA/QC (signature) Stephen Scott Moss Date: 4-7-2000.

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Commercial Grade Item Upgrade Dedication Form

ECN No. N/A CGI No. CGI-SNF-D-MHM-016C Title: P2 & P63 Interlocks – Action Pak AP 1080-2000 Trip Point Relays & Sockets	Rev. No. 1 Page 1 of 11

Section 1 Part Information

Item No.: N/A	Manufacturer: N/A	Supplier: N/A
Mfg. Part/Model No.: N/A	Supplier's P/N: N/A	
Part Description: N/A		
End Use Description: N/A		

ORIGINAL

Section 2a Component Information

Equipment No.: **Trip Point Relays 5X, 6X, 7X, 8X**	Specification No.: **Ederer F-2566, Foster Wheeler MJX-SDX 452656**	Manufacturer: **Action Pak**	Past P.O. No.: **N/A**
Manufacturer's Part/Model No.: **Relay: AP1080-2000; Relay Sockets: M011 (Track/Surface Mount); MD11 (DIN Rail)**	Equipment Supplier (if different from manufacturer): **ALSTROM, Foster Wheeler**		Equip. Supplier's Part No.: **N/A**

Component Description: **120 VAC Relay with Single Trip, with adjustable deadband, 0-20 mA input, 5 Amp DPDT contacts, with 11-pin base. MD11 - Standard DIN Rail Mount and M011 - Track/Surface Mount plug-in Sockets for Action Pak Relays AP1080-2000**

Section 2b Commercial Availability of the Item

1. Is the Item available from a catalogue from a qualified NQA1 supplier or ISO 9000 supplier (coordinate w/ project CGI Engineer or BTR)? [ ] YES (go to #2 below) [X] NO (go to procedure step 6.3.2, proceed to dedicate Item)

   If not available from a qualified NQA1 supplier, is it available from an ISO 9000 supplier? (coordinate w/ project CGI Engineer or BTR)? [ ] YES (go to #2 below, procedure step 6.3.2, dedicate Item) [X] NO (procedure step 6.3.2, dedicate Item)

2. List of Candidate qualified suppliers or ISO 9000 suppliers **N/A**

3. Recommended Procurement Strategy (coordinate with project CGI interface Engineer or BTR): **N/A**

Section 2c CGI Determination

CGI Determination Questions:

#1: Is the Item subject to design or specification requirements that are unique to nuclear facilities or activities?

[ ] YES (the Item is not commercial grade) [X] NO (continue)

#2: Is the Item used in applications other than nuclear facilities or activities?

[ ] NO (the item is not commercial grade) [X] YES (continue)

#3: Is the Item ordered from manufacturer/supplier on the basis of specifications set forth in the manufacturer's catalog?

[ ] NO (the item is not commercial grade) [X] YES (continue)

[X] All three criteria have been satisfied. The Item meets the definition of commercial grade.

Commercial Grade Item Upgrade Dedication Form

ECN No. N/A CGI No. CGI-SNF-D-MHM-016C

Title: **P2 & P63 Interlocks – Action Pak AP 1080-2000 Trip Point Relays & Sockets**

Section 2d Reason for Dedication

The above Commercial Grade (CG) described item is being Dedicated for use in the application cited for the following reason(s):

	Item is being purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Class application.
	Item is being purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Significant application.
X	Item was purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Class application.
	Item was purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Significant application.
	Other ('like-for-like', similar, substitution, replacement evaluation)

Section 3 Failure Effects Evaluation

A. Part/Component Safety Function:

1. **The P2 interlock serves to prevent the MHM from leaving a storage tube without replacing the tube plug by determining when the MCO Hoist weight is greater than the minimum grapple and tube plug weight and when the MCO Hoist weight is less than the maximum grapple only weight. The P63 interlock insures that the MCO Hoist cannot be raised if the MCO weight is exceeded. These relays inhibit the action as stated in the interlocks for the X channel only.**

B. Part/Component Functional Mode:

Safety Function #1:	X	Active		Passive
Safety Function #2:		Active		Passive
Safety Function #3:		Active		Passive

Active - Mechanical or Electrical change of state is required to occur for the component to perform its safety function

Passive – Change of state is not required for the component to perform its safety function

C. Host Component Safety Function (if applicable): **N/A**

1.

D. Failure Mode(s) and the effects on component or system safety function (see Worksheet 1):

1. **Failure to actuate from the weight of the MCO Hoist weight and the weight it carries results in movement of the MHM or raising of the MCO hoist at improper times.**

Section 4 Environmental & Natural Phenomena Hazard Design

Environmental Qualification Required:

Yes [ ]

No [X]

If yes: Environmental Qualification Requirements

Limiting Environmental Conditions:

Required Safety Functions:

Qualification Period:

Natural Phenomena Hazard (NPH) Design Required:

Yes [ ]

No [X]

If yes: NPH Design Requirements

Performance Category:

NPH Design Req'ts.:

Required Safety Functions:

Section 5 Component Functional Classification

X	Safety Class (SC)		General Service (GS)		Safety Significant (SS)

If part/component classification is different from host component/system, document basis. **N/A**

Sections 6 and 7 (Reserved)

Section 8 References (for Functional Classification)

National Codes/Standards: **N/A**

Safety Analysis Report (SAR): **HNF-3672, Rev. 0**

Drawings: **Ederer, Inc. EB-33056, Sht 11; H-2-827174 Sht 10, 21, 22, 23**

Vendor Manual/Manufacturer/Supplier Information: **Action Pak, DC Input, Field Configurable Limit Alarms, Models AP1080, AP1090**

Other: **ALSTOM ESL/R (96) 065 – Rev. D, 100% Design Submittal – June 1998**

Commercial Grade Item Upgrade Dedication Form

ECN No. N/A CGI No. CGI-SNF-D-MHM-016C Title: **P2 & P63 Interlocks – Action Pak AP 1080-2000 Trip Point Relays & Sockets**	Rev. No. 1 Page 3 of 11

Section 9 Critical Characteristics				
Critical Characteristics	Acceptance Criteria/Tolerances	Acc Meth	ID	Function
1. Item Identification Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
Relay:				
Manufacturer - Relay	**Action Pak**	**1, IN**	**X**	
Model - Relay	**AP1080-2000**	**1, IN**	**X**	
2. Physical Critical Characteristics (for reasonable assurance that the Item delivered is the Item specified)				
3 Performance Critical Characteristics (for reasonable assurance that the Item will perform its intended safety function(s))				
Insulation Resistance	**Greater than 10 megohm across open contact terminals and terminals to ground at 500 VDC**	**1, T**		**X**
Contact Rating	**0.5 V max. voltage drop across closed contacts, 120 VAC at 5 Amps, resistive**	**1, T**		**X**
Operation	**Contacts open/close at trip and reset values in milliamps. See Table 1 on last page of this CGI.**	**1, T**		**X**
Relay Socket:				
1. Item Identification Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
Manufacturer – Relay Socket	**Action Pak**	**1, IN**	**X**	
Model – Relay Socket	**MD11 (11 pin for mounting on a DIN Rail)**	**1, IN**	**X**	
Model – Relay Socket	**M011 (11 pin for mounting on Track/Surface)**	**1, IN**	**X**	
2. Physical Critical Characteristics (for reasonable assurance that the Item delivered is the Item specified)				
3 Performance Critical Characteristics (for reasonable assurance that the Item will perform its intended safety function(s))				
Insulation Resistance	**Greater than 10 megohm between terminal to terminal and terminal to ground at 500 VDC**	**1, T**		**X**

4. Notes and Legend:

Rev. 1: All Pages: Added Relay socket M011.

Acceptance Method (Acc Meth):
1. Special Test and Inspection:
   1, IN for Inspection
   1,T for Test
2. Commercial Grade Survey
3. Source Verification
4. Vendor/Item History

Section 10 Initial Review and Approval

Approvals:

Designated Engineer: 2-23-00

Design Authority: 2/23/00

QA Engineer: 2/24/00

WORKSHEET 1
DETERMINATION OF FAILURE MECHANISMS/MODES

Section 1			
Typical Failure Mechanisms	Definition	X = Applicable to Component under Evaluation	
		X?	Indicate Failure Mode
Fracture	Separation of a solid accompanied by little or no macroscopic plastic deformation.		
Corrosion	The gradual deterioration of a material due to chemical or electrochemical reactions, such as oxidation, between the material and its environment.		
Erosion	Destruction of materials by the abrasive action of moving fluids, usually accelerated by the presence of solid particles carried with the fluid.		
Open Circuit	An electrical circuit that is unintentionally broken so that there is no complete path for current flow.		
Short Circuit	An abnormal connection by which an electrical current is connected to ground, or to some conducting body, resulting in excessive current flow.	X	**Failure to open the circuit by contact welding or hot short across the contact base.**
Blockage	Clogging of a filtering medium resulting in the inability to perform its purification function or blockage of flow.		
Seizure	Binding of a normally moving item through excessive pressure, temperature, friction, jamming.	X	**Binding results in failure of contacts to open**
Unacceptable Vibration	Mechanical oscillations produced are beyond the defined permissible limits due to unbalancing, poor support, or rotation at critical speeds.		
Loss of Properties	A loss of mechanical and physical properties of a material due to exposure to high temperatures, radiation exposure.		
Excess Strain	Under the action of excessive external forces the material of the part has been deformed or distorted.		
Mechanical Creep	From prolonged exposure to high temperature and stress, the object will show a slow change in its physical (shape and dimension) and mechanical characteristics.		
Ductile Fracture	Fracture characterized by tearing of metal accompanied by appreciable gross plastic deformation.		

Section 2 Additional Failure Modes Applicable to the Component Under Evaluation
1. **Controller contacts fail to open. Cause could be binding or contacts welded.**
2. .
3.
4.
5.

Commercial Grade Item Upgrade Dedication Form

ECN No. N/A CGI No. CGI-SNF-D-MHM-016C

Title: P2 & P63 Interlocks – Action Pak AP 1080-2000 Trip Point Relays & Sockets

Checklist 1 - Acceptance Method 1 - Special Test/Inspection Verification

SECTION 1	
Item Description: **Trip Point Relays** System #: **MHM**	Equip #: **5X, 6X, 7X, 8X** Model #: **AP1080-2000**
Manufacturer (Address/Phone): **800-767-5726** **Action Instruments, Inc.** **8601 Aero Drive** **San Diego, CA 92123** Phone. # **(619) 279-5726** Fax: **(619) 270-6290** http://www.actionio.com/	Supplier (Address/Phone): **Set-Point Control** **603 4th Avenue, Suite 200** **Kirkland, WA 98033** **Kevin Gaunce Tel : 800-255-5212 Fax : 425-822-5624** **Email : kevin@set-point.com**

SECTION 2 CRITICAL CHARACTERISTICS TO BE VERIFIED BY METHOD 1.

Insp	Test	Post-Test		
X			1.	**Manufacturer - Relay**
X			2.	**Model - Relay**
X			3.	**Manufacturer – Relay Socket**
X			4.	**Model – Relay Socket**
	X		5.	**Insulation resistance – Relay and Relay Socket**
	X		6.	**Contact Rating**
	X		7.	**Operation**

SECTION 3 BY INSPECTION * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)

Characteristic: **Manufacturer - Relay** Sample Size*: **100%**

Acceptance Criteria: **Action Pak**

Receipt Inspection Plan / Report #: CGI-SNF-D-MHM-016C-TP-016C

Characteristic: **Model – Relay** Sample Size*: **100%**

Acceptance Criteria: **AP1080-2000**

Receipt Inspection Plan / Report #: TP-016C

Characteristic: **Manufacturer - Relay Socket** Sample Size*: **100%**

Acceptance Criteria: **Action Pak**

Receipt Inspection Plan / Report #: TP-016CS

Characteristic: **Model – Relay Socket** Sample Size*: **100%**

Acceptance Criteria: **MD11 (11 pin for mounting on a DIN Rail)**

Receipt Inspection Plan / Report #: TP-016CS

Characteristic: **Model – Relay Socket** Sample Size*: **100%**

Acceptance Criteria: **M011 (11 pin for mounting on a Track/Surface)** THIS socket not used

Receipt Inspection Plan / Report #: ~~TP-016CS~~ JWP 4/10/00 LES JWP 4/10/00 4/10/00

SECTION 4 BY SPECIAL TEST * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)	
Characteristic for Test: **Insulation Resistance**	Samp Size*: [X]Normal[ ]Reduced[ ]Tightened
Acceptance Criteria: **Greater than 10 megohm across open contact terminals and terminals to ground at 500 VDC**	
Actual Test Value: See TP	Test Plan and Report #: TP-016C
Characteristic for Test: **Relay Contact Rating**	Samp Size*: [X]Normal[ ]Reduced[ ]Tightened
Acceptance Criteria: **0.5 V max. voltage drop across closed contacts, 120 VAC at 5 Amps, resistive**	
Actual Test Value: See TP	Test Plan and Report #: TP-016C
Characteristic for Test: **Relay Operation**	Samp Size*: [X]Normal[ ]Reduced[ ]Tightened
Acceptance Criteria: **Contacts open/close at trip and reset values in milliamps. See Table 1 on last page of this CGI.**	
Actual Test Value: See TP	Test Plan and Report #: TP-016C
Characteristic for Test: **Relay Socket Insulation Resistance**	Samp Size*: [X]Normal[ ]Reduced[ ]Tightened
Acceptance Criteria: **Greater than 10 megohm between terminal to terminal and terminal to ground at 500 VDC**	
Actual Test Value: See TP	Test Plan and Report #: TP-016CS

SECTION 5 TEST / INSPECTION SUMMARY (Acceptance Method 1)

1. Summary Of Verified Critical Characteristics, Their Verification Methods, And Results

ITEM DESCRIPTION: Relay Socket MD11

Critical Characteristics				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/IN	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
Manufacturer	Action Pak	X		1, IN	TP-016CS	NA	5	0	XWEST	LARRY W. PEACE	4/10/00
Model – Relay Socket	MD11 (11 pin for mounting on a DIN Rail)	X		1, IN	↓	↓	↓	↓	↓	↓	↓
Insulation Resistance – Relay Socket	Greater than 10 megohm between terminal to terminal and terminal to ground at 500 VDC		X	1, T	↓	↓	↓	↓	↓	↓	↓

2. Disposition Of Unverified Or Failed Critical Characteristics

Critical Characteristic	Disposition

3. Signature Indicates All Critical Characteristics Verified Satisfactory Or Acceptably Dispositioned And Commercial Grade Dedication Is Satisfactory And Complete.

See Test Plan TP-016CS cited above

Testing Agency Approval: NR CES 4/12/00 Date

Testing Agency QA Engineer: NR CES 4/12/00 Date

BUYER VERIFICATION

CES

Design Authority: Craig Swenson Date 4/12/00

QA Engineer: Date

SNF-6315, Rev. 0

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SECTION 5 TEST / INSPECTION SUMMARY (Acceptance Method 1)

1. Summary Of Verified Critical Characteristics , Their Verification Methods, And Results

ITEM DESCRIPTION: Relay

Critical Characteristics				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/IN	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
Manufacturer	Action Pak	X		1, IN	TP-016C	NA	2	0	XWEST	LARRY W. FORCE	4/11/00
Model – Relay	AP1080-2000	X		1, IN	↓	↓	↓	↓	↓	↓	↓
Insulation Resistance - Relay	Greater than 10 megohm across open contact terminals and terminals to ground at 500 VDC		X	1, T	↓	↓	↓	↓	↓	↓	↓
Contact Rating - Relay	0.5 V max. voltage drop across closed contacts, 120 VAC at 5 Amps, resistive		X	1, T	↓	↓	↓	↓	↓	↓	↓
Operation - Relay	Contacts open/close at trip and reset values in milliamps. See Table 1 on last page of this CGI.		X	1, T	↓	↓	↓	↓	↓	↓	↓

2. Disposition Of Unverified Or Failed Critical Characteristics

Critical Characteristic	Disposition

3. Signature Indicates All Critical Characteristics Verified Satisfactory Or Acceptably Dispositioned And Commercial Grade Dedication Is Satisfactory And Complete.

See Test Plan TP-016C cited above. CES 4/12/00

Testing Agency Approval: NR CES 4/12/00 Date 4/12/00

Testing Agency QA Engineer: NR CES 4/12/00 Date

BUYER VERIFICATION

Design Authority: CES Craig Swenson Date 4/12/00

QA Engineer: Date

SNF-6315, Rev. 0

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SECTION 5 TEST / INSPECTION SUMMARY (Acceptance Method 1)

1. Summary Of Verified Critical Characteristics, Their Verification Methods, And Results

ITEM DESCRIPTION: Relay Socket M011

Critical Characteristics				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/IN	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
Manufacturer	Action Pak	X		1, IN	THESE SOCKETS WERE NOT USED						4/10/00
Model – Relay Socket	M011 (11 pin for mounting on a Track/Surface)	X		1, IN							
Insulation Resistance – Relay Socket	Greater than 10 megohm between terminal to terminal and terminal to ground at 500 VDC		X	1, T							4/12/00

2. Disposition Of Unverified Or Failed Critical Characteristics

Critical Characteristic	Disposition

3. Signature Indicates All Critical Characteristics Verified Satisfactory Or Acceptably Dispositioned And Commercial Grade Dedication Is Satisfactory And Complete.

Testing Agency Approval:_____ Date_____

Testing Agency QA Engineer:_____ Date_____

BUYER VERIFICATION

Design Authority:_____ Date_____

QA Engineer:_____ Date_____

Commercial Grade Item Upgrade Dedication Form

ECN No. N/A CGI No. CGI-SNF-D-MHM-016C

Title: P2 & P63 Interlocks – Action Pak AP 1080-2000 Trip Point Relays & Sockets

SECTION 6 CONTACTS / PHONE NUMBERS		
	Name	Phone
Design Authority	CRAIG SWENSON	376-0288
QA		
QC		
Cog - Engineer		
CGI Engineer		
Procurement Engineer		
Other		

SECTION 7 SUPPORTING DOCUMENTATION FOR THIS CHECKLIST		
Initial Procurement Documents		**For Critical Characteristics**
	Drawings:	
	Manuals (specify type & number):	
	Design Calculations	
	Installation Instructions	
	Operation Instructions	
	Calibration Instructions	
	Manufacturer's Recommended Spare Parts List	
X	**Other: Action Pak, DC Input, Field Configurable Limit Alarms, Models AP1080, AP1090**	**All**
Procurement Documents		**For Critical Characteristics**
	Certificate of Conformance/Compliance	
	Seismic Qualification Certificate	
	Environmental Qualification Certificate	
	Test Report (s):	
	Inspection Report (s):	
	CMTRs for ASME Pressure Retaining Materials	
	Valve Seat Leakage Report	
	Weld Record	
	Material Traceability Record	
X	**Other: CSB (W379)-015-11-059 & 060**	**Relay Setpoints**

Table 1

Relay Actuation Points (Trip and Reset)

Relay ID	Trip	Reset	Tolerance
5X	6.34 mA Inc.	6.34 mA Dec.	±0.2% of full scale
6X	9.19 mA Inc.	9.19 mA Dec.	±0.2% of full scale
7X	6.76 mA Inc.	6.76 mA Dec.	±0.2% of full scale
8X	10.31 mA Inc.	10.31 mA Dec.	±0.2% of full scale

NR - Not on MHM SEL anymore CES 4/12/00

Note: To the "Testing authority" – the relay ID's above are those installed in the MHM system and when bench testing replacement relays, the new relays are tested, adjusted, and set per the trip and reset values listed above for a single relay, each must then be marked 5X, 6X, etc. for ID and placement purposes.

Dedication Test Plan – RLY-3 **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-016C-TP-016C
Test Specimen: Acton Pak AP1080-2000 Relay **Page 1 of 5**

Test Procedure Approval (Obtain prior to testing):
This test procedure adequately tests the critical characteristics of the test specimen upon acceptable completion of the testing.

Design Authority (signature) Craig Svenson Date: 1-31-00

ORIGINAL

RECOMMENDED EQUIPMENT:
Power Supply capable of 5 amps @ 120 VAC.
Megger Instrument capable of 500 VDC Test Voltage
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) serial numbers and calibration due
Test Instrument type: Prema MEM I.D.: SN:10012 Calib. Due dates 3-25-00
Test Instrument type: HP3457A I.D.: BAT-123 Calib. Due dates 7-29-00
Test Instrument type: HP3457A I.D.: BAT-124 Calib. Due dates 7-30-00
AVO BM80/2 MEGGER, 6440-889/000100/5345 2-9-01
FLUKE 787 DMM, BAT-107 5-28-00

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE: (Note: use one set of sheets per test specimen)

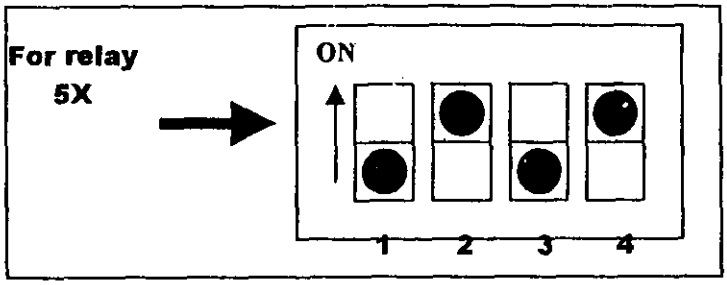
Test Specimen Description: Relay

Record the following identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Manufacturer:	ACTION PAK	Action Pak	ACCEPT
Model:	1080-2000	AP1080-2000	ACCEPT
Contact Configuration:	DPDT	DPDT	ACCEPT
Serial No.:	B8507	N/A	N/A

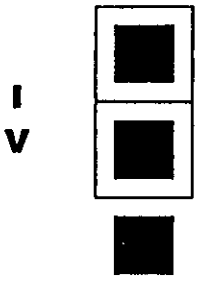
Setup the Relay(s) for testing configuration:

Input Range Selector, adjust selector for 10mA (5X) current ranges as follows:



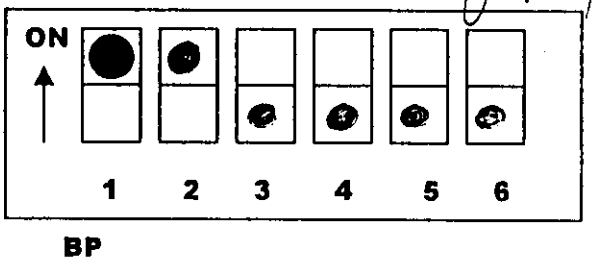
ORIGINAL
ORIGINAL

Input Jumper W2, position the input jumper for all relays' current inputs as follows:



Mode Selector Switch, adjust for Unipolar for all relays' as follows:

JWP 2/17/00 CES



Perform the following tests:

Record: Date /Time of Test Beginning: 2-16-00 8:00 AM

Record: Room Temperature: 68 °F.

Perform steps below:

1. **Operation**
   Check , the relay being testing, regulate and record current to the coil of the relay and monitor the trip and reset milliamp values.

* applicable Relay	Relay No.	Description	Record Data	Acceptance Criteria	Comments/Deviations
	5X	Trip Current	6.34004 ~~VAC~~ mA	6.34 ± 0.02 mA Inc.	ACCEPT
		Reset Current	6.33007 ~~VAC~~ mA	6.34 ± 0.02 mA Dec.	ACCEPT

2. **Contact Rating Test**

   Setup the Relay specimen for contact rating testing. Attach a sketch of test circuit with all test instrumentation used.

   Apply a nominal 5 amps, resistive, @ ~~120 VAC~~ VAC JWP 3/1/00 CES across the NC contacts of the test specimen.

   Caution: Do not change state of contacts while energized.

JWP 2/9/00

Description	Record Data	Acceptance Criteria	Comments/Deviations
7-8	.2297 VAC	~~0.5 ± 10%~~ Volts AC drop	ACCEPT
10-11	.2743 VAC	~~0.5 ± 10%~~ Volts AC drop	ACCEPT

Dedication Test Plan – RLY-3	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-016C-TP-016C	
Test Specimen: Acton Pak AP1080-2000 Relay	Page 4 of 5

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Relay has been calibrated per the requirements of this test plan. Relay is in compliance and found to be acceptable

L. Cadwell

2/16/00

Dedication Test Plan – RLY-3 Test Plan No.: CGI-SNF-D-MHM-016C-TP-016C Test Specimen: Acton Pak AP1080-2000 Relay	Rev. No. 0 Page 5 of 5

Notes:

Relay was reverified to be in calibration after megger test was completed. This reverification was performed to verify no electronic components were damaged during megger testing with high voltage.
J. Cadick
2/16/00

Test Engineer/Technician (Printed Name) JEFF CADICK.

Test Engineer/Technician (signature) J. Cadick Date: 2/16/00.

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) [signature] Date: 3/1/00.

QA/QC (signature) [signature] TZANDERSON Date: 3/2/00.

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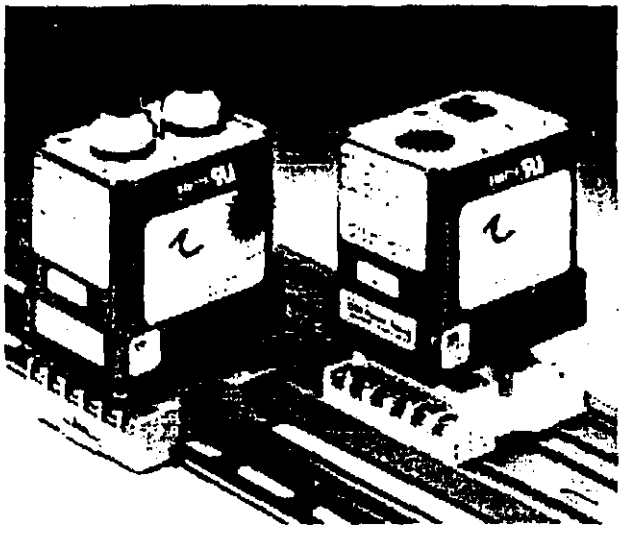
Action Pak®

DC Input, Field Configurable Limit Alarms

Models AP1080, AP1090



Provides Relay Contact Closure(s) at a Preset DC Input Level

- Field Configurable Input Ranges for DC Voltage and Current
- Setpoint(s) Programmable HI or LO
- Exclusive "Dynamic Deadband" Prevents False Trips
- Selectable Failsafe/Latching Operation
- LED Trip Indicators
- Selectable 120/240VAC Operation (9 to 30 VDC Available)
- Lifetime Warranty

DESCRIPTION

Action Pak models AP1080 single setpoint and AP1090 dual setpoint limit alarms offer flexible, wide-ranging DC input capability. Voltage spans from 10mV to 200 volts and current spans from 1mA to 100mA can be field configured. Bipolar inputs are also accepted. Both models offer configurable latching, failsafe and HI/LO operation. The AP1080 and AP1090 also include 0.25%-50% adjustable deadbands and selectable 120/240VAC operation.

DIAGNOSTIC LED

Models AP1080-2000 and AP1090-2000 are equipped with a dual function diagnostic LED. The green center LED indicates line power and input signal status. Active line power is indicated by an illuminated LED. If the center LED is off, check line power and the wiring connection. If the input signal is above 100% full scale, the LED will flash at approximately 8Hz. Below 0%, the flash rate is approximately 4Hz.

OUTPUT SELECTION

The single setpoint AP1080 and the dual setpoint AP1090 provide the following relay outputs:

AP1080	Single Trip (DPDT, 5A)
AP1090	Single/Dual Trip (2 SPDT, 5A)

Setpoint(s) are top accessed 15-turn potentiometer(s) or option "P" provides ten-turn dial(s).

OPERATION

The field configurable AP1080 and AP1090 limit alarm setpoint(s) can be configured for HI, LO, latching and/or failsafe trip operation. Non-latching HI and LO setpoints have respective HI and LO deadbands. In a tripped condition, the setpoint is exceeded and the appropriate red LED will illuminate. The trip will reset only when the process falls below the HI deadband or rises above the LO deadband (see figure 1). To reset a latched setpoint the signal must be in the safe region and the line power turned off for at least 5 seconds. For proper deadband operation, a HI setpoint must always be set above a LO setpoint.

In failsafe operation, the relay is energized when the process is below the HI setpoint or above the LO setpoint (opposite for non-failsafe). In the failsafe mode, the relays go to the tripped condition when the power fails.

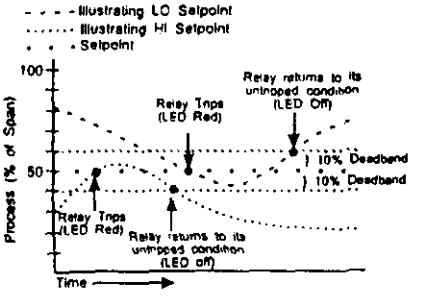


Figure 1: Limit alarm operation and effect of deadband(s).

ACTION INSTRUMENTS
the Industrial I/O Company

DYNAMIC DEADBAND

LSI circuitry prevents false trips by repeatedly sampling the input. The input must remain beyond the setpoint for 100 milliseconds, uninterrupted, to qualify as a valid trip condition. Likewise, the input must fall outside the deadband and remain there for 100 milliseconds to return the alarm to an untripped condition. This effectively results in a "dynamic deadband"--based on time--in addition to the normal deadband.

OPTIONS

U Urethane coating of internal circuitry for protection from corrosive atmospheres.

P Top Mounted, Ten-Turn Dial(s) for setpoint adjustment.

C620 Factory calibration to customer's specifications

CONFIGURATION

The factory presets models AP1080 and AP1090 as follows:

	AP1080	AP1090
Input	0-20mA	0-20mA
Output	Single, DPDT	Dual, SPDT
Trip	HI	A: HI, B: LO
Latching	No	No
Failsafe	Yes	No
Deadband	0.25%	A/B: 0.25%
Power	120VAC	120VAC

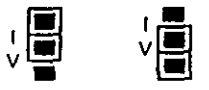
For other I/O ranges, remove the four base screws and case to access the configuration switches.

Replace the cover before applying power.

Refer to Figure 4 for configuration.

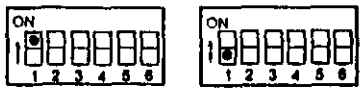
Input

1. Position input jumper "W2" for Current or Voltage inputs.



Current Voltage

2. Set position 1 of the Mode Selector for Unipolar or Bipolar operation. Unipolar is the default.



Unipolar Bipolar

Note: A bipolar span selection will double any span from Table 1 (e.g., 10V unipolar span = ±10V bipolar span)

3. Using Table 1, configure positions 1 through 4 of the Input Range Selector for the desired maximum setpoint input. Round desired maximum input values to the next highest range (e.g., 0-120V = 200V range).

Output

Configure the Mode Selector for the required function. See Figure 5.

Power

Configure the AC jumpers for either 120 or 240 VAC operation. See Figure 6.

CALIBRATION

Note: To maximize thermal stability, final calibration should be performed in the operating installation, allowing approximately 1-2 hours for warmup and thermal equilibrium of the system.

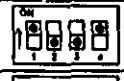
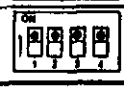
Setpoint. Set deadband at its minimum (20 turns Counter Clockwise) before adjusting the setpoint. With the specified trip voltage or current input applied, adjust setpoint until the relay trips. For HI trip calibration, start with the setpoint above the desired trip. For LO trip calibration, start below the desired trip.

Deadband. Set deadband to its minimum (fully Counter Clockwise). Set setpoint to desired trip. Adjust voltage/current input until relay trips. Readjust deadband to 50% (20 turns Clockwise). Set voltage/current input to desired deadband position. Slowly adjust deadband until relay untrips.

FACTORY ASSISTANCE

For additional information on calibration, operation and installation please contact Action's Technical Services Group. Call toll-free: **800 -767-5726**

Table 1: AP1080-2000 and 1090-2000 Input Ranges

*Voltage	*Current	Input Range Selector
10mV	1mA	
20mV	2mA	
50mV	5mA	
100mV	10mA	
200mV	20mA	
500mV	50mA	
1V	100mA	
2V		
5V		
10V		
20V		
50V		
100V		
200V		

**Note: Use Jumper (W2) to configure either voltage or current input. All unipolar input ranges are zero based.*

RELAY PROTECTION AND EMI SUPPRESSION

When switching inductive loads, maximum relay life and transient EMI suppression is achieved using external protection (see Figures 2 & 3). Place all protection devices directly across the load and minimize all lead lengths. For AC inductive loads, place a properly-rated MOV across the load in parallel with a series RC snubber. Use a 0.01 to 0.1µF pulse film capacitor (foil polypropylene recommended) of sufficient voltage, and a 47Ω, 1/2W carbon resistor. For DC inductive loads, place a diode across the load (PRV > DC supply, 1N4006 recommended) with (+) to cathode and (-) to anode (the RC snubber is an optional enhancement)

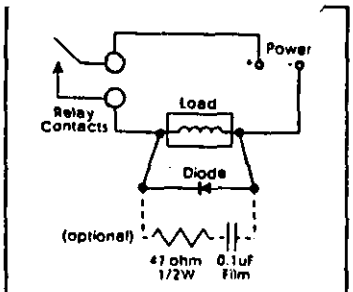


Figure 2: DC Inductive Loads

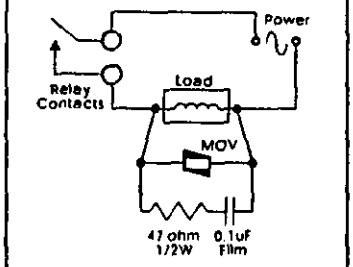


Figure 3: AC Inductive Loads

PIN CONNECTIONS*

AP1080, AP1090

1 AC Power (Hot)
2 Shield (Gnd)
3 AC Power (Neu)
4 Input (+)
5 Input (-)
6 N.O. ┐
7 C ├ A
8 N.C. ┘
9 N.O. ┐
10 C ├ B
11 N.C ┘

Key:
N.O. = Normally Open
C = Common
N.C. = Normally Closed
DC Power: Pin 1 = (+); Pin 3 = (-)

**Contacts are in the "normal" state when the relay is de-energized.*

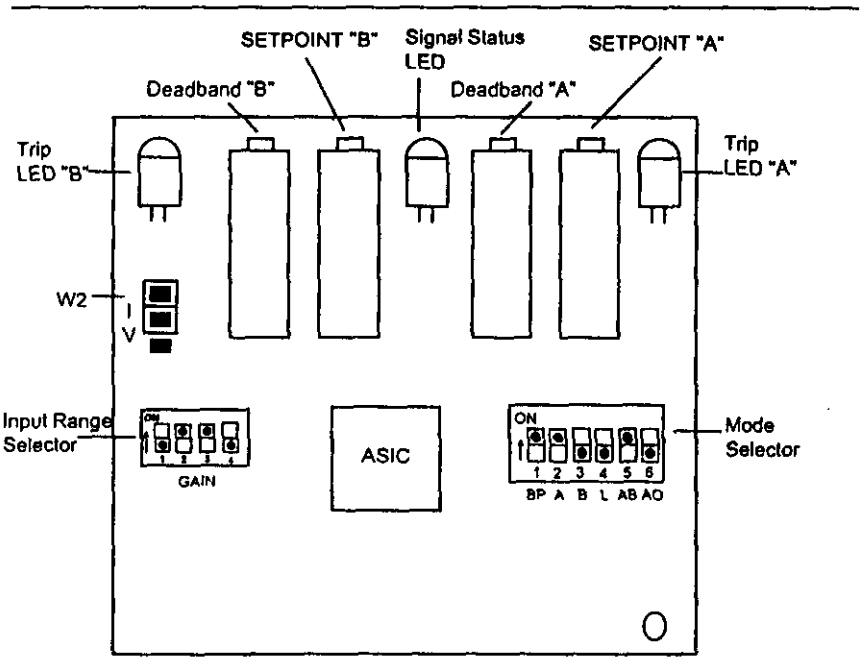


Figure 4: AP1090-2000 Factory Calibration 0-20mA, Dual HI/LO, Non-Latching, Non-Failsafe

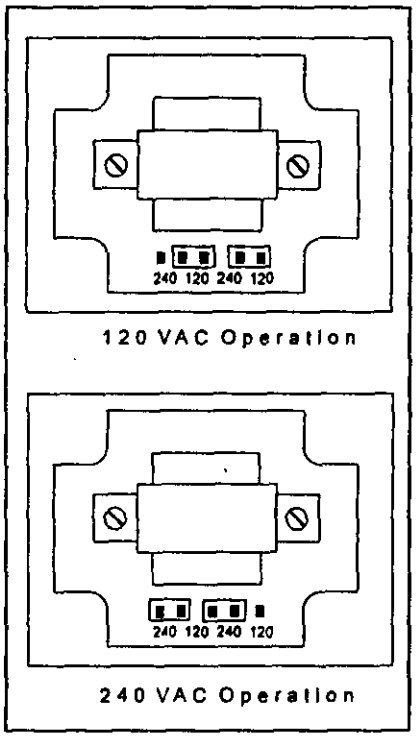


Figure 6: 120/240 VAC Selection

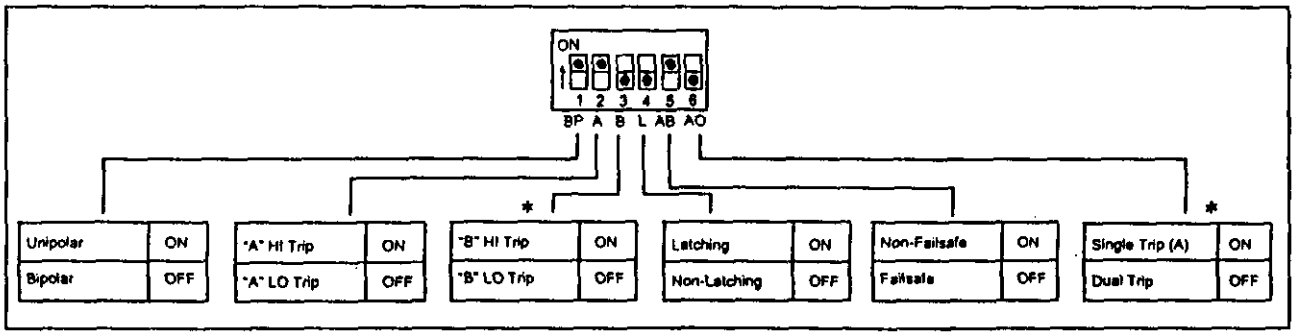


Figure 5: Mode Selection Dual Trip/A: HI, B: LO, Non-Latching, Non-Failsafe
**Applicable for AP1090-2000, only*

SPECIFICATIONS

Inputs
Voltage Input
Range: 10mV to 200V
Impedance: >100K ohm
Overvoltage: 400V, max.
Current Input
Range: 1mA to 100mA
Impedance: 20 ohms, typical
Overcurrent: 200mA, max.
Overvoltage: 60VDC
Common Mode (Input to Ground): 1000VDC, max.

LED Indications
Input Range (Green)
>100% input: 8Hz flash
<0% input: 4Hz flash
Setpoint (Red)
Tripped: Solid red
Safe: Off

Limit Differentials (Deadbands)
>50mV/5mA: 0.25% to 50% of span
<50mV/5mA: 1% to 50% of span

Response Time
Dynamic Deadband:
Relay status will change when proper setpoint/process condition exists uninterrupted for 100msec.
Normal Mode (analog filtering): <250msec, (10-90%)

Setpoint
Effectivity: Setpoint(s) are adjustable over 100% of the selected input span.
Repeatability (constant temp):
>50mV/5mA: 0.1% of full scale
<50mV/5mA: 0.2% of full scale

Stability
Line Voltage: ±0.01%/%, max.
Temperature: ±0.05% of full scale/°C, max.

Common Mode Rejection
DC to 60Hz: 120dB

Isolation
1000V DC between contacts, input and power

ESD Susceptibility
Meets IEC 801-2, Level 2 (4KV)

Humidity
Operating: 15 to 95% (@45°C)
Soak: 90% for 24 hours (@65°C)

Temperature Range
Operating: 0 to 60°C (32 to 140°F)
Storage: -15 to 70°C (5 to 158°F)

Power
Consumption: 2W typical, 5W max.
Standard: Selectable 120/240VAC (±10%, 50-60Hz)
Optional: 9 to 30VDC, Inverter-Isolated

Relay Contacts
AP1080: DPDT (2 Form C)
AP1090: 1 SPDT (1 Form C) per setpoint
Current Rating (resistive)
120VAC: 5A
240VAC: 2A
28VDC: 5A
Material: Silver-Cadmium Oxide
Electrical Life: 10^5 operations at rated load
Note: External relay contact protection is required for use with inductive loads. See relay protection section (Figure 1 & 2).
Mechanical Life: 10^7 operations

Latch Reset Time
5 seconds

Weight
AP1080 0.46lbs
AP1090 0.62lbs

Agency Approvals
CSA certified per standard C22.2, No. M1982 (File No. LR42272-8,9)
UL recognized per standard UL508, (File No. E99775)

MOUNTING

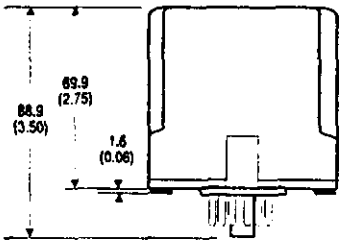
All Action Paks feature plug-in installation. Models AP1080 and AP1090 use an 11-pin base, either molded socket (M011) or DIN rail socket (MD11).

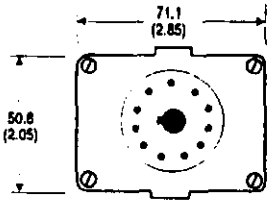
ORDERING INFORMATION

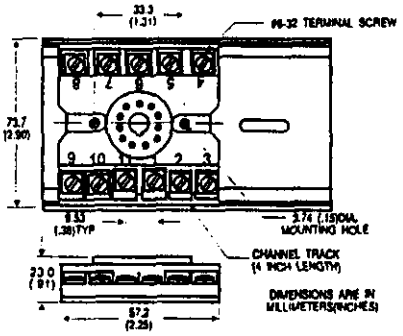
Specify:
1. Model: AP1080-2000, AP1090-2000
2. Options: U, P (see text)
3. Line Power (see specs.)
(All power supplies are transformer-isolated from the internal circuitry.)

DIMENSIONS

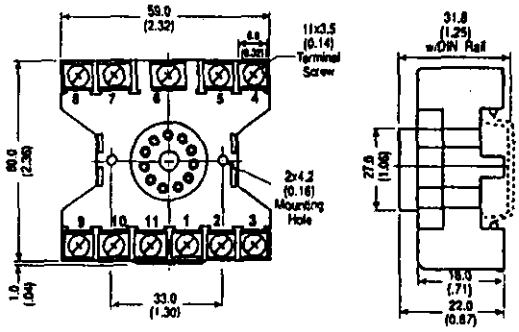
Dimensions are in millimeters (inches)







M011(Track/Surface)



MD11 (DIN Rail)

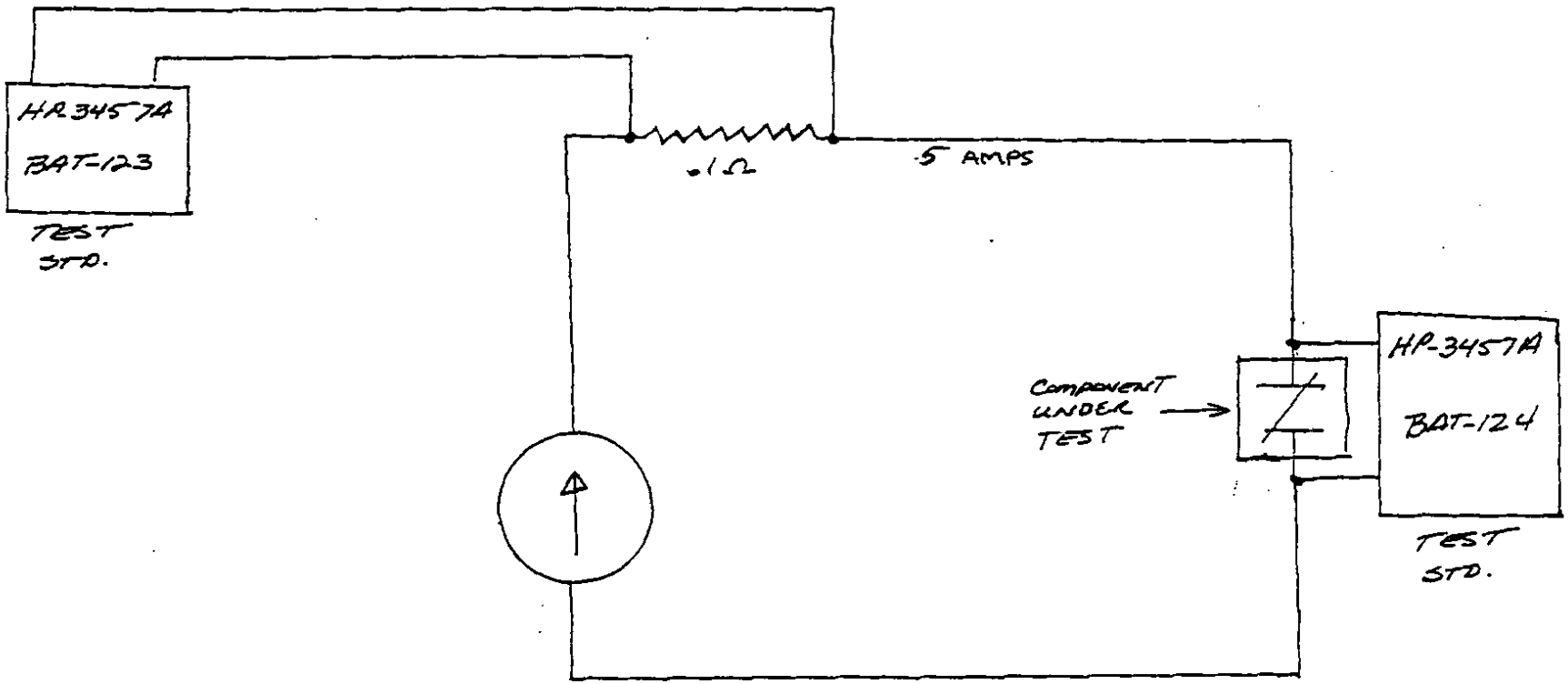
All Prices and Specifications subject to change without notice

For order entry, applications or customer service assistance, call toll-free 800-767-5726

■ **United States**
Action Instruments, Inc.
8601 Aero Drive
San Diego, CA 92123
Phone: 619-279-5726
FAX: 619-279-6290

721-0479-00-J 12/98

ACTION INSTRUMENTS
...the Industrial I/O Company



STANDARD TEST SET-UP FOR MEASURING
RESISTANCE ACCROSS CONTACTS.

Dedication Test Plan – RLY-3 **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-016C-TP-016C
Test Specimen: Acton Pak AP1080-2000 Relay **Page 1 of 5**

Test Procedure Approval (Obtain prior to testing):
This test procedure adequately tests the critical characteristics of the test specimen upon acceptable completion of the testing.

Design Authority (signature) Craig Swenson Date: 1-31-00

ORIGINAL

RECOMMENDED EQUIPMENT:
Power Supply capable of 5 amps @ 120 VAC.
Megger Instrument capable of 500 VDC Test Voltage
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) serial numbers and calibration due
Test Instrument type: DREMA MFM I.D.: S/N 10012 Calib. Due dates 2-25-00 .
Test Instrument type: HP3457A I.D.: BAT-123 Calib. Due dates 7-29-00 .
Test Instrument type: HP3457A I.D.: BAT-124 Calib. Due dates 7-30-00 .
AVO BM80/2 MEGGER , 6410-889/000100/5345 2-9-01
FLUKE 787 DMM , BAT- 107 5-28-00

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE: (Note: use one set of sheets per test specimen)

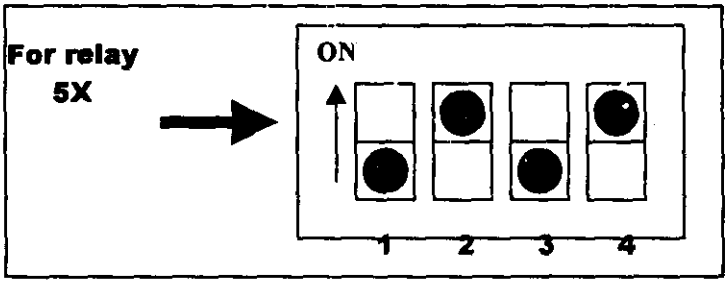
Test Specimen Description: Relay

Record the following identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Manufacturer:	ACTION PAK	**Action Pak**	ACCEPT
Model:	1080-2000	**AP1080-2000**	ACCEPT
Contact Configuration:	DPDT	**DPDT**	ACCEPT
Serial No.:	B8506	**N/A**	

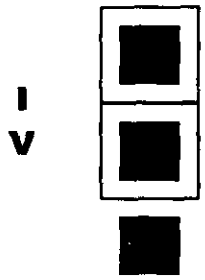
Setup the Relay(s) for testing configuration:

Input Range Selector, adjust selector for 10mA (5X) current ranges as follows:



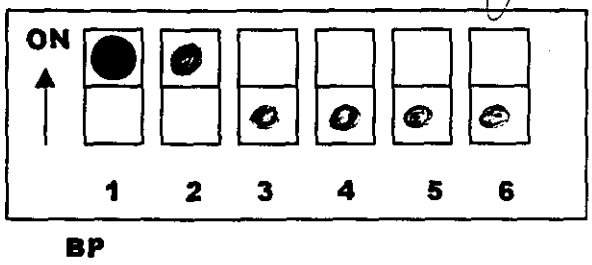
ORIGINAL

Input Jumper W2, position the input jumper for <u>all relays'</u> current inputs as follows:



Mode Selector Switch, adjust for Unipolar for <u>all relays'</u> as follows:

YWP 2/17/00 CES



Perform the following tests:

Record: Date /Time of Test Beginning: 2-14-00 1:00 pm

Record: Room Temperature: 68 °F.

Perform steps below:

1. **Operation**
   Check , the relay being testing, regulate and record current to the coil of the relay and monitor the trip and reset milliamp values.

,= applicable Relay	Relay No.	Description	Record Data	Acceptance Criteria	Comments/Deviations
	5X	Trip Current	6.34002 mA	6.34 ± 0.02 mA Inc.	CALIBRATED
		Reset Current	6.33004 mA	6.34 ± 0.02 mA Dec.	CALIBRATED

2. **Contact Rating Test**

   Setup the Relay specimen for contact rating testing. Attach a sketch of test circuit with all test instrumentation used. VAC YWP 3/1/00 CES

   Apply a nominal 5 amps, resistive, @ 120 VAC across the NC contacts of the test specimen.

   Caution: Do not change state of contacts while energized.

YWP 2/9/00 CES

Description	Record Data	Acceptance Criteria	Comments/Deviations
7-8	.2319 VAC	< 0.5 ~~± 10%~~ Volts AC drop	ACCEPT
10-11	.2354 VAC	< 0.5 ~~± 10%~~ Volts AC drop	ACCEPT

Reset the relay and allow the NO contacts to close. Apply a nominal 5 amps, resistive, @ ~~120 VAC~~ VAC across the closed normally open contacts of the test specimen. JWP 3/1/00 CES

Caution: Do not change state of contacts while energized.

JWP 2/9/00 CES

Description	Record Data	Acceptance Criteria	Comments/Deviations
6-7	.1933 VAC	≤ 0.5 ~~±10%~~ Volts AC drop	ACCEPT
9-10	.2228 VAC	≤ 0.5 ~~±10%~~ Volts AC drop	ACCEPT

3. **Insulation Resistance Test**

Setup the Relay specimen for insulation resistance testing. Attach Relay in its normal mounting configuration to grounded fixture.

Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the test specimen. Describe the terminals and their data below:

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
6	8	>100 Gohm	> 10 Megohms	ACCEPT
9	11	>100 G	> 10 Megohms	
COM	6	>100 G	> 10 Megohms	
COM	9	>100 G	> 10 Megohms	
1	2 (Ground)	>100 G	> 10 Megohms	
3	2 (Ground)	>100 G	> 10 Megohms	
6	2 (Ground)	>100 G	> 10 Megohms	
7	2 (Ground)	>100 G	> 10 Megohms	
8	2 (Ground)	>100 G	> 10 Megohms	
9	2 (Ground)	>100 G	> 10 Megohms	
10	2 (Ground)	>100 G	> 10 Megohms	
11	2 (Ground)	>100G	> 10 Megohms	

4. De-energize equipment.

5. End test.

6. Carefully disassemble test leads to Relay specimen. Label the test specimen as 5X, depending on the trip and reset values used during testing.

7. Clean, box (in original packing & paperwork) and ready the test specimen for transfer to buyer.

Record: Date /Time of Test End: 2-16-00 9:43 AM

Dedication Test Plan – RLY-3 **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-016C-TP-016C
Test Specimen: Acton Pak AP1080-2000 Relay **Page 4 of 5**

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Relay has been calibrated to this test plan criteria. Relay is in compliance and found to be acceptable.

J. Corbett

2-16-00

Dedication Test Plan – RLY-3 **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-016C-TP-016C
Test Specimen: Acton Pak AP1080-2000 Relay **Page 5 of 5**

Notes:

Relay was re-verified to be in calibration after Megger test was performed. This re-verification was performed to verify no electronic components were damaged during megger test with high voltage.
L. Cadwick

Test Engineer/Technician (Printed Name) JEFF CADICK

Test Engineer/Technician (signature) L. Cadwick Date: 2/16/00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Craig Swenson Date: 3/1/00

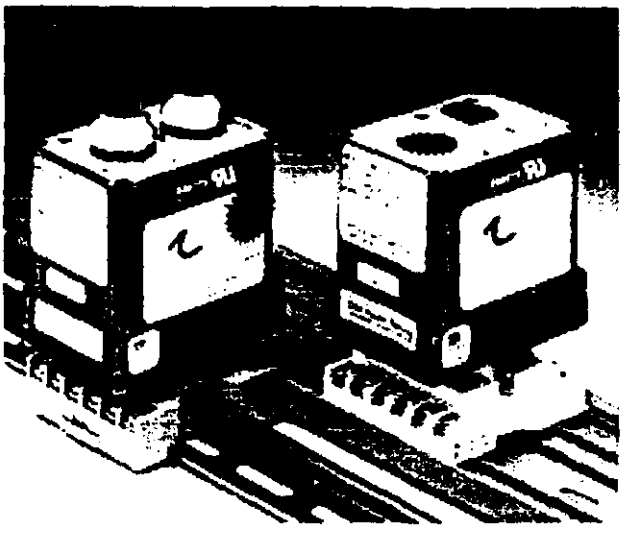
QA/QC (signature) T.R. Anderson Date: 3/2/00
T R ANDERSON

Page 486

Action Pak®

DC Input, Field Configurable Limit Alarms

Models AP1080, AP1090



Provides Relay Contact Closure(s) at a Preset DC Input Level

- Field Configurable Input Ranges for DC Voltage and Current
- Setpoint(s) Programmable HI or LO
- Exclusive "Dynamic Deadband" Prevents False Trips
- Selectable Failsafe/Latching Operation
- LED Trip Indicators
- Selectable 120/240VAC Operation (9 to 30 VDC Available)
- Lifetime Warranty

DESCRIPTION

Action Pak models AP1080 single setpoint and AP1090 dual setpoint limit alarms offer flexible, wide-ranging DC input capability. Voltage spans from 10mV to 200 volts and current spans from 1mA to 100mA can be field configured. Bipolar inputs are also accepted. Both models offer configurable latching, failsafe and HI/LO operation. The AP1080 and AP1090 also include 0.25%-50% adjustable deadbands and selectable 120/240VAC operation.

DIAGNOSTIC LED

Models AP1080-2000 and AP1090-2000 are equipped with a dual function diagnostic LED. The green center LED indicates line power and input signal status. Active line power is indicated by an illuminated LED. If the center LED is off, check line power and the wiring connection. If the input signal is above 100% full scale, the LED will flash at approximately 8Hz. Below 0%, the flash rate is approximately 4Hz.

OUTPUT SELECTION

The single setpoint AP1080 and the dual setpoint AP1090 provide the following relay outputs:

AP1080	Single Trip (DPDT, 5A)
AP1090	Single/Dual Trip (2 SPDT, 5A)

Setpoint(s) are top accessed 15-turn potentiometer(s) or option "P" provides ten-turn dial(s).

OPERATION

The field configurable AP1080 and AP1090 limit alarm setpoint(s) can be configured for HI, LO, latching and/or failsafe trip operation. Non-latching HI and LO setpoints have respective HI and LO deadbands. In a tripped condition, the setpoint is exceeded and the appropriate red LED will illuminate. The trip will reset only when the process falls below the HI deadband or rises above the LO deadband (see figure 1). To reset a latched setpoint the signal must be in the safe region and the line power turned off for at least 5 seconds. For proper deadband operation, a HI setpoint must always be set above a LO setpoint.

In failsafe operation, the relay is energized when the process is below the HI setpoint or above the LO setpoint (opposite for non-failsafe). In the failsafe mode, the relays go to the tripped condition when the power fails.

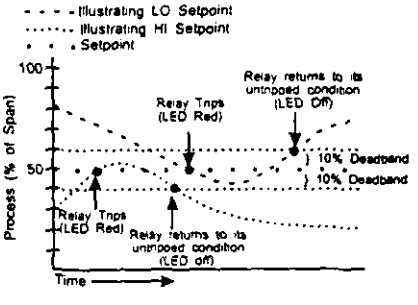


Figure 1: Limit alarm operation and effect of deadband(s).

ACTION INSTRUMENTS
the industrial I/Q company

DYNAMIC DEADBAND

LSI circuitry prevents false trips by repeatedly sampling the input. The input must remain beyond the setpoint for 100 milliseconds, uninterrupted, to qualify as a valid trip condition. Likewise, the input must fall outside the deadband and remain there for 100 milliseconds to return the alarm to an untripped condition. This effectively results in a "dynamic deadband"--based on time--in addition to the normal deadband.

OPTIONS

U Urethane coating of internal circuitry for protection from corrosive atmospheres.

P Top Mounted, Ten-Turn Dial(s) for setpoint adjustment.

C620 Factory calibration to customer's specifications

CONFIGURATION

The factory presets models AP1080 and AP1090 as follows:

	AP1080	AP1090
Input	0-20mA	0-20mA
Output	Single, DPDT	Dual, SPDT
Trip	HI	A: HI, B: LO
Latching	No	No
Failsafe	Yes	No
Deadband	0.25%	A/B: 0.25%
Power	120VAC	120VAC

For other I/O ranges, remove the four base screws and case to access the configuration switches.

Replace the cover before applying power.

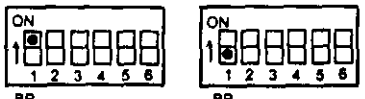
Refer to Figure 4 for configuration.

Input

1. Position input jumper "W2" for Current or Voltage inputs.

Current Voltage

2. Set position 1 of the Mode Selector for Unipolar or Bipolar operation. Unipolar is the default.



Unipolar Bipolar

Note: A bipolar span selection will double any span from Table 1 (e.g., 10V unipolar span = ±10V bipolar span)

3. Using Table 1, configure positions 1 through 4 of the Input Range Selector for the desired maximum setpoint input. Round desired maximum input values to the next highest range (e.g., 0-120V = 200V range).

Output

Configure the Mode Selector for the required function. See Figure 5.

Power

Configure the AC jumpers for either 120 or 240 VAC operation. See Figure 6.

CALIBRATION

Note: To maximize thermal stability, final calibration should be performed in the operating installation, allowing approximately 1-2 hours for warmup and thermal equilibrium of the system.

Setpoint. Set deadband at its minimum (20 turns Counter Clockwise) before adjusting the setpoint. With the specified trip voltage or current input applied, adjust setpoint until the relay trips. For HI trip calibration, start with the setpoint above the desired trip. For LO trip calibration, start below the desired trip.

Deadband. Set deadband to its minimum (fully Counter Clockwise). Set setpoint to desired trip. Adjust voltage/current input until relay trips. Readjust deadband to 50% (20 turns Clockwise). Set voltage/current input to desired deadband position. Slowly adjust deadband until relay untrips.

FACTORY ASSISTANCE

For additional information on calibration, operation and installation please contact Action's Technical Services Group. Call toll-free: **800 -767-5726**

Table 1: AP1080-2000 and 1090-2000 Input Ranges

*Voltage	*Current	Input Range Selector
10mV	1mA	
20mV	2mA	
50mV	5mA	
100mV	10mA	
200mV	20mA	
500mV	50mA	
1V	100mA	
2V		
5V		
10V		
20V		
50V		
100V		
200V		

**Note: Use Jumper (W2) to configure either voltage or current input. All unipolar input ranges are zero based.*

RELAY PROTECTION AND EMI SUPPRESSION

When switching inductive loads, maximum relay life and transient EMI suppression is achieved using external protection (see Figures 2 & 3). Place all protection devices directly across the load and minimize all lead lengths. For AC inductive loads, place a properly-rated MOV across the load in parallel with a series RC snubber. Use a 0.01 to 0.1µF pulse film capacitor (foil polypropylene recommended) of sufficient voltage, and a 47Ω, 1/2W carbon resistor. For DC inductive loads, place a diode across the load (PRV > DC supply, 1N4006 recommended) with (+) to cathode and (-) to anode (the RC snubber is an optional enhancement)

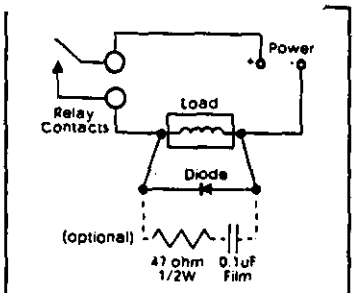


Figure 2: DC Inductive Loads

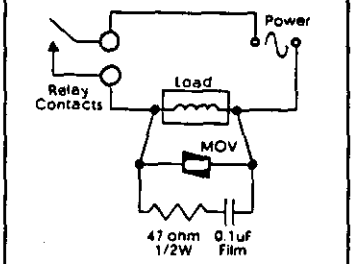


Figure 3: AC Inductive Loads

PIN CONNECTIONS*

AP1080, AP1090

1 AC Power (Hot)
2 Shield (Gnd)
3 AC Power (Neu)
4 Input (+)
5 Input (-)
6 N.O. ┐
7 C ├ A
8 N.C. ┘
9 N.O. ┐
10 C ├ B
11 N.C ┘

Key:
N.O. = Normally Open
C = Common
N.C. = Normally Closed
DC Power: Pin 1 = (+); Pin 3 = (-)

**Contacts are in the "normal" state when the relay is de-energized.*

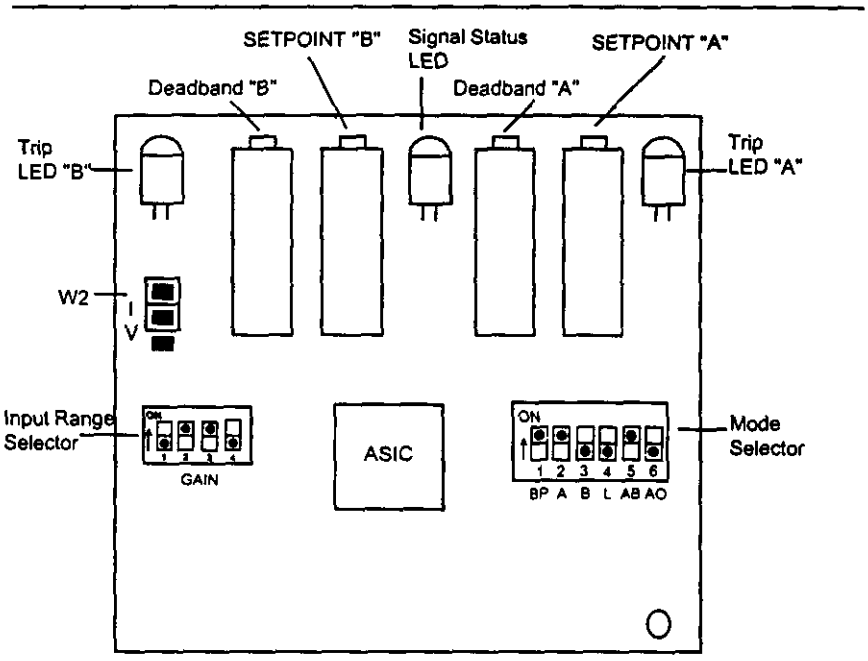


Figure 4: AP1090-2000 Factory Calibration 0-20mA, Dual HI/LO, Non-Latching, Non-Failsafe

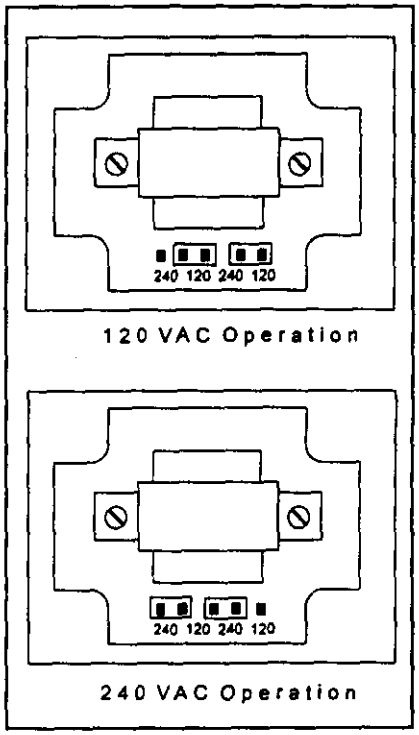


Figure 6: 120/240 VAC Selection

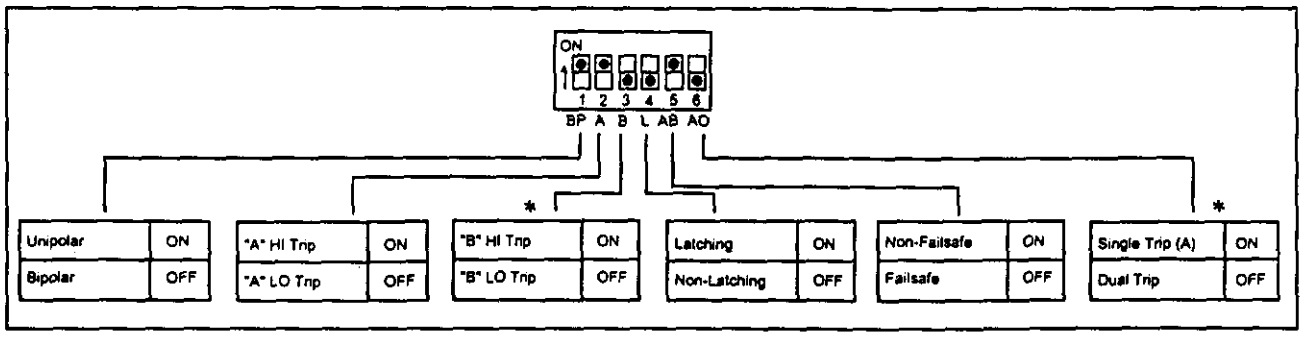


Figure 5: Mode Selection Dual Trip/A: HI, B: LO, Non-Latching, Non-Failsafe
**Applicable for AP1090-2000, only*

SPECIFICATIONS

Inputs
Voltage Input
Range: 10mV to 200V
Impedance: >100K ohm
Overvoltage: 400V, max.
Current Input
Range: 1mA to 100mA
Impedance: 20 ohms, typical
Overcurrent: 200mA, max.
Overvoltage: 60VDC
Common Mode (Input to Ground): 1000VDC, max.

LED Indications
Input Range (Green)
>100% input: 8Hz flash
<0% input: 4Hz flash
Setpoint (Red)
Tripped: Solid red
Safe: Off

Limit Differentials (Deadbands)
>50mV/5mA: 0.25% to 50% of span
<50mV/5mA: 1% to 50% of span

Response Time
Dynamic Deadband:
Relay status will change when proper setpoint/process condition exists uninterrupted for 100msec.
Normal Mode (analog filtering):
<250msec, (10-90%)

Setpoint
Effectivity: Setpoint(s) are adjustable over 100% of the selected input span.
Repeatability (constant temp):
>50mV/5mA: 0.1% of full scale
<50mV/5mA: 0.2% of full scale

Stability
Line Voltage: ±0.01%/%, max.
Temperature: ±0.05% of full scale/°C, max.

Common Mode Rejection
DC to 60Hz: 120dB

Isolation
1000V DC between contacts, input and power

ESD Susceptibility
Meets IEC 801-2, Level 2 (4KV)

Humidity
Operating: 15 to 95% (@45°C)
Soak: 90% for 24 hours (@65°C)

Temperature Range
Operating: 0 to 60°C (32 to 140°F)
Storage: -15 to 70°C (5 to 158°F)

Power
Consumption: 2W typical, 5W max.
Standard: Selectable 120/240VAC (±10%, 50-60Hz)
Optional: 9 to 30VDC, Inverter-Isolated

Relay Contacts
AP1080: DPDT (2 Form C)
AP1090: 1 SPDT (1 Form C) per setpoint
Current Rating (resistive)
120VAC: 5A
240VAC: 2A
28VDC: 5A
Material: Silver-Cadmium Oxide
Electrical Life: 10^5 operations at rated load
Note: External relay contact protection is required for use with inductive loads. See relay protection section (Figure 1 & 2).
Mechanical Life: 10^7 operations

Latch Reset Time
5 seconds

Weight
AP1080 0.46lbs
AP1090 0.62lbs

Agency Approvals
CSA certified per standard C22.2, No. M1982 (File No. LR42272-8,9)
UL recognized per standard UL508, (File No. E99775)

MOUNTING

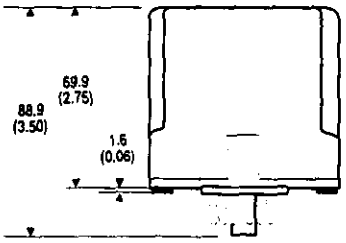
All Action Paks feature plug-in installation. Models AP1080 and AP1090 use an 11-pin base, either molded socket (M011) or DIN rail socket (MD11).

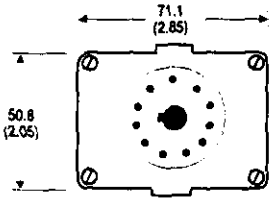
ORDERING INFORMATION

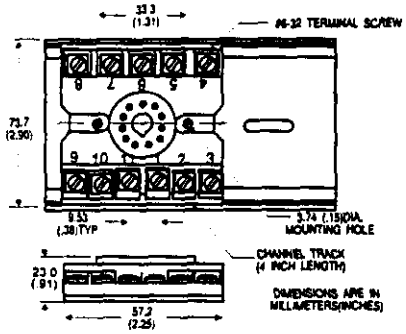
Specify:
1. Model: AP1080-2000, AP1090-2000
2. Options: U, P (see text)
3. Line Power (see specs.)
(All power supplies are transformer-isolated from the internal circuitry.)

DIMENSIONS

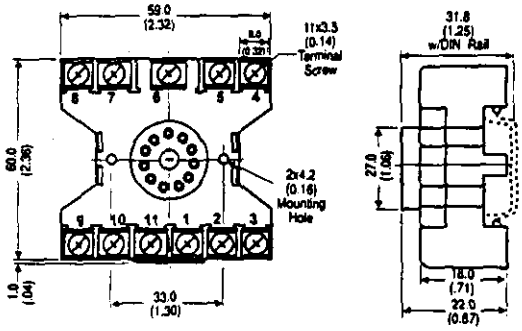
Dimensions are in millimeters (inches)







M011(Track/Surface)



MD11 (DIN Rail)

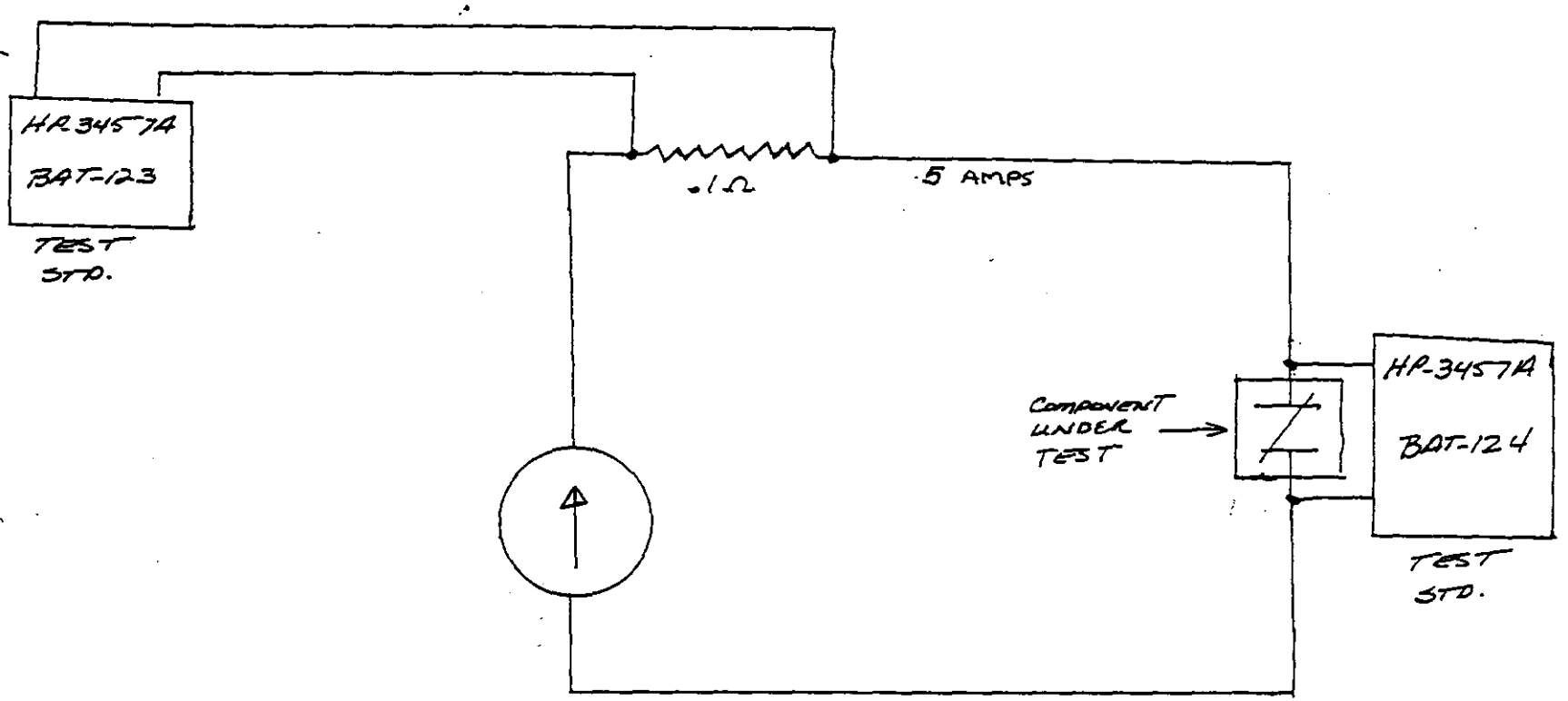
All Prices and Specifications subject to change without notice

For order entry, applications or customer service assistance, call toll-free 800-767-5726

■ **United States**
Action Instruments, Inc.
8601 Aero Drive
San Diego, CA 92123
Phone: 619-279-5726
FAX: 619-279-6290

721-0479-00-J 12/98

ACTION INSTRUMENTS
...the Industrial I/O Company



STANDARD TEST SET-UP FOR MEASURING
RESISTANCE ACCROSS CONTACTS.

Dedication Test Plan – RLYSKT-1	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-016C-TP-016CS	
Test Specimen: Acton Pak MD11 & M011 Relay Sockets	Page 1 of 4

Test Procedure Approval (Obtain prior to testing):
This test procedure adequately tests the critical characteristics of the test specimen upon acceptable completion of the testing.

Design Authority (signature) Jerry Swenson Date: 2/23/00.

ORIGINAL

RECOMMENDED EQUIPMENT:
Megger Instrument capable of 500 VDC Test Voltage
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) serial numbers and calibration due
Test Instrument type: AVO BM221 I.D.: BAT-137 Calib. Due dates 3-14-01.
Test Instrument type: _____ I.D.: _____ Calib. Due dates _____.
Test Instrument type: _____ I.D.: _____ Calib. Due dates _____.

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE: (Note: use one set of sheets per test specimen)

Test Specimen Description: Relay Socket

Record the following identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Manufacturer:	Action Pak	Action Pak	ACC
Model:	MD11	MD11 or M011	ACC
Serial No.: SN: 4	4	N/A	ACC

Setup the Relay Sockets for testing configuration:

Perform the following tests:

Record: Date /Time of Test Beginning: 9:00A 4-7-00.

Record: Room Temperature: 68 °F.

ORIGINAL

Perform steps below:

1. **Insulation Resistance Test**

Setup the Relay Socket specimen for insulation resistance testing. Attach Relay Socket in its normal mounting configuration to grounded fixture.

Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the test specimen. Describe the terminals and their data below:

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1	2	>999 mOhm	> 10 Megohms	ACC
1	3	>999 mOhm	> 10 Megohms	ACC
1	4	>999 mOhm	> 10 Megohms	ACC
1	5	>999 mOhm	> 10 Megohms	ACC
1	6	>999 mOhm	> 10 Megohms	ACC
1	7	>999 mOhm	> 10 Megohms	ACC
1	8	>999 mOhm	> 10 Megohms	ACC
1	9	>999 mOhm	> 10 Megohms	ACC
1	10	>999 mOhm	> 10 Megohms	ACC
1	11	>999 mOhm	> 10 Megohms	ACC
2	3	>999 mOhm	> 10 Megohms	ACC
2	4	>999 mOhm	> 10 Megohms	ACC
2	5	>999 mOhm	> 10 Megohms	ACC
2	6	>999 mOhm	> 10 Megohms	ACC
2	7	>999 mOhm	> 10 Megohms	ACC
2	8	>999 mOhm	> 10 Megohms	ACC
2	9	>999 mOhm	> 10 Megohms	ACC
2	10	>999 mOhm	> 10 Megohms	ACC
2	11	>999 mOhm	> 10 Megohms	ACC
3	4	>999 mOhm	> 10 Megohms	ACC
3	5	>999 mOhm	> 10 Megohms	ACC
3	6	>999 mOhm	> 10 Megohms	ACC
3	7	>999 mOhm	> 10 Megohms	ACC
3	8	>999 mOhm	> 10 Megohms	ACC
3	9	>999 mOhm	> 10 Megohms	ACC
3	10	>999 mOhm	> 10 Megohms	ACC
3	11	>999 mOhm	> 10 Megohms	ACC
4	5	>999 mOhm	> 10 Megohms	ACC
4	6	>999 mOhm	> 10 Megohms	ACC
4	7	>999 mOhm	> 10 Megohms	ACC
4	8	>999 mOhm	> 10 Megohms	ACC
4	9	>999 mOhm	> 10 Megohms	ACC
4	10	>999 mOhm	> 10 Megohms	ACC
4	11	>999 mOhm	> 10 Megohms	ACC
5	6	>999 mOhm	> 10 Megohms	ACC
5	7	>999 mOhm	> 10 Megohms	ACC
5	8	>999 mOhm	> 10 Megohms	ACC

Dedication Test Plan – RLYSKT-1 **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-016C-TP-016CS
Test Specimen: Acton Pak MD11 & M011 Relay Sockets **Page 3 of 4**

Terminal to Terminal / Ground

LES 4/11/00

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
5	~~8~~	>999 mOhm	> 10 Megohms	ACC
5	10	>999 mOhm	> 10 Megohms	ACC
5	11	>999 mOhm	> 10 Megohms	ACC
6	7	>999 mOhm	> 10 Megohms	ACC
6	8	>999 mOhm	> 10 Megohms	ACC
6	9	>999 mOhm	> 10 Megohms	ACC
6	10	>999 mOhm	> 10 Megohms	ACC
6	11	>999 mOhm	> 10 Megohms	ACC
7	8	>999 mOhm	> 10 Megohms	ACC
7	9	>999 mOhm	> 10 Megohms	ACC
7	10	>999 mOhm	> 10 Megohms	ACC
7	11	>999 mOhm	> 10 Megohms	ACC
8	9	>999 mOhm	> 10 Megohms	ACC
8	10	>999 mOhm	> 10 Megohms	ACC
8	11	>999 mOhm	> 10 Megohms	ACC
9	10	>999 mOhm	> 10 Megohms	ACC
9	11	>999 mOhm	> 10 Megohms	ACC
10	11	>999 mOhm	> 10 Megohms	ACC
1	Ground	>999 mOhm	> 10 Megohms	ACC
2	Ground	>999 mOhm	> 10 Megohms	ACC
3	Ground	>999 mOhm	> 10 Megohms	ACC
4	Ground	>999 mOhm	> 10 Megohms	ACC
5	Ground	>999 mOhm	> 10 Megohms	ACC
6	Ground	>999 mOhm	> 10 Megohms	ACC
7	Ground	>999 mOhm	> 10 Megohms	ACC
8	Ground	>999 mOhm	> 10 Megohms	ACC
9	Ground	>999 mOhm	> 10 Megohms	ACC
10	Ground	>999 mOhm	> 10 Megohms	ACC
11	Ground	>999 mOhm	> 10 Megohms	ACC

2. De-energize equipment.

3. End test.

4. Carefully disassemble test leads to Relay Socket specimen.

5. Clean, box (in original packing & paperwork) and ready the test specimen for transfer to buyer.

Record: Date /Time of Test End: 9:30A 4-7-00

Dedication Test Plan – RLYSKT-1	**Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-016C-TP-016CS	
Test Specimen: Acton Pak MD11 & M011 Relay Sockets	**Page 4 of 4**

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Item meets requirements for this test plan.

Notes:

Test Engineer/Technician (Printed Name) JEFF CHORT

Test Engineer/Technician (signature) J. Chort Date: 4-7-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Greg Swenson Date: 4-11-00

QA/QC (signature) Stephen Scott Mode Date: 4-12-2000

Dedication Test Plan – RLYSKT-1	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-016C-TP-016CS	
Test Specimen: Acton Pak MD11 & M011 Relay Sockets	Page 1 of 4

Test Procedure Approval (Obtain prior to testing):
This test procedure adequately tests the critical characteristics of the test specimen upon acceptable completion of the testing.

Design Authority (signature) [signature] Date: 2/23/00.

ORIGINAL

RECOMMENDED EQUIPMENT:
Megger Instrument capable of 500 VDC Test Voltage
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) serial numbers and calibration due
Test Instrument type: AVO BM221 I.D.: BAT-137 Calib. Due dates 3-14-01,
Test Instrument type: _____ I.D.: _____ Calib. Due dates _____,
Test Instrument type: _____ I.D.: _____ Calib. Due dates _____,

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE: (Note: use one set of sheets per test specimen)

Test Specimen Description: Relay Socket

Record the following identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Manufacturer:	Action Pak	Action Pak	ACC
Model:	MD11	MD11 or M011	ACC
Serial No.: S/N: 5	5	N/A	ACC

Setup the Relay Sockets for testing configuration:

Perform the following tests:

Record: Date /Time of Test Beginning: 9:40A 4-7-00.

Record: Room Temperature: 68 °F.

ORIGINAL

Perform steps below:

1. **Insulation Resistance Test**

Setup the Relay Socket specimen for insulation resistance testing. Attach Relay Socket in its normal mounting configuration to grounded fixture.

Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the test specimen. Describe the terminals and their data below:

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1	2	>999 mOhm	> 10 Megohms	ACC
1	3	>999 mOhm	> 10 Megohms	ACC
1	4	>999 mOhm	> 10 Megohms	ACC
1	5	>999 mOhm	> 10 Megohms	ACC
1	6	>999 mOhm	> 10 Megohms	ACC
1	7	>999 mOhm	> 10 Megohms	ACC
1	8	>999 mOhm	> 10 Megohms	ACC
1	9	>999 mOhm	> 10 Megohms	ACC
1	10	>999 mOhm	> 10 Megohms	ACC
1	11	>999 mOhm	> 10 Megohms	ACC
2	3	>999 mOhm	> 10 Megohms	ACC
2	4	>999 mOhm	> 10 Megohms	ACC
2	5	>999 mOhm	> 10 Megohms	ACC
2	6	>999 mOhm	> 10 Megohms	ACC
2	7	>999 mOhm	> 10 Megohms	ACC
2	8	>999 mOhm	> 10 Megohms	ACC
2	9	>999 mOhm	> 10 Megohms	ACC
2	10	>999 mOhm	> 10 Megohms	ACC
2	11	>999 mOhm	> 10 Megohms	ACC
3	4	>999 mOhm	> 10 Megohms	ACC
3	5	>999 mOhm	> 10 Megohms	ACC
3	6	>999 mOhm	> 10 Megohms	ACC
3	7	>999 mOhm	> 10 Megohms	ACC
3	8	>999 mOhm	> 10 Megohms	ACC
3	9	>999 mOhm	> 10 Megohms	ACC
3	10	>999 mOhm	> 10 Megohms	ACC
3	11	>999 mOhm	> 10 Megohms	ACC
4	5	>999 mOhm	> 10 Megohms	ACC
4	6	>999 mOhm	> 10 Megohms	ACC
4	7	>999 mOhm	> 10 Megohms	ACC
4	8	>999 mOhm	> 10 Megohms	ACC
4	9	>999 mOhm	> 10 Megohms	ACC
4	10	>999 mOhm	> 10 Megohms	ACC
4	11	>999 mOhm	> 10 Megohms	ACC
5	6	>999 mOhm	> 10 Megohms	ACC
5	7	>999 mOhm	> 10 Megohms	ACC
5	8	>999 mOhm	> 10 Megohms	ACC

Dedication Test Plan – RLYSKT-1 Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-016C-TP-016CS
Test Specimen: Acton Pak MD11 & M011 Relay Sockets

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
5	~~8~~	>999 mOhm	> 10 Megohms	ACC
5	10	>999 mOhm	> 10 Megohms	ACC
5	11	>999 mOhm	> 10 Megohms	ACC
6	7	>999 mOhm	> 10 Megohms	ACC
6	8	>999 mOhm	> 10 Megohms	ACC
6	9	>999 mOhm	> 10 Megohms	ACC
6	10	>999 mOhm	> 10 Megohms	ACC
6	11	>999 mOhm	> 10 Megohms	ACC
7	8	>999 mOhm	> 10 Megohms	ACC
7	9	>999 mOhm	> 10 Megohms	ACC
7	10	>999 mOhm	> 10 Megohms	ACC
7	11	>999 mOhm	> 10 Megohms	ACC
8	9	>999 mOhm	> 10 Megohms	ACC
8	10	>999 mOhm	> 10 Megohms	ACC
8	11	>999 mOhm	> 10 Megohms	ACC
9	10	>999 mOhm	> 10 Megohms	ACC
9	11	>999 mOhm	> 10 Megohms	ACC
10	11	>999 mOhm	> 10 Megohms	ACC
1	Ground	>999 mOhm	> 10 Megohms	ACC
2	Ground	>999 mOhm	> 10 Megohms	ACC
3	Ground	>999 mOhm	> 10 Megohms	ACC
4	Ground	>999 mOhm	> 10 Megohms	ACC
5	Ground	>999 mOhm	> 10 Megohms	ACC
6	Ground	>999 mOhm	> 10 Megohms	ACC
7	Ground	>999 mOhm	> 10 Megohms	ACC
8	Ground	>999 mOhm	> 10 Megohms	ACC
9	Ground	>999 mOhm	> 10 Megohms	ACC
10	Ground	>999 mOhm	> 10 Megohms	ACC
11	Ground	>999 mOhm	> 10 Megohms	ACC

4-11-00

2. De-energize equipment.

3. End test.

4. Carefully disassemble test leads to Relay Socket specimen.

5. Clean, box (in original packing & paperwork) and ready the test specimen for transfer to buyer.

Record: Date /Time of Test End: 1025A 4-7-00

Dedication Test Plan – RLYSKT-1	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-016C-TP-016CS	
Test Specimen: Acton Pak MD11 & M011 Relay Sockets	Page 4 of 4

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Item meets requirements for this test plan.

Notes:

Test Engineer/Technician (Printed Name) JEFF CHURCK

Test Engineer/Technician (signature) J. Church Date: 4-7-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) for Craig Swenson Date: 4-11-00

QA/QC (signature) Stephen Scott Mosa Date: 4-12-2000

Dedication Test Plan – RLYSKT-1	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-016C-TP-016CS	
Test Specimen: Acton Pak MD11 & M011 Relay Sockets	Page 1 of 4

Test Procedure Approval (Obtain prior to testing):
This test procedure adequately tests the critical characteristics of the test specimen upon acceptable completion of the testing.

Design Authority (signature) [signature] Date: 2/23/00.

ORIGINAL

RECOMMENDED EQUIPMENT:
Megger Instrument capable of 500 VDC Test Voltage
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) serial numbers and calibration due
Test Instrument type: AVO BM221 I.D.: BAT-137 Calib. Due dates 3-14-01.
Test Instrument type: _____ I.D.: _____ Calib. Due dates _____.
Test Instrument type: _____ I.D.: _____ Calib. Due dates _____.

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE: (Note: use one set of sheets per test specimen)

Test Specimen Description: Relay Socket

Record the following identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Manufacturer:	Acton Pak	Action Pak	ACC
Model:	MD11	MD11 or M011	ACC
Serial No.: S/N: 3	3	N/A	ACC

Setup the Relay Sockets for testing configuration:

Perform the following tests:

Record: Date /Time of Test Beginning: 4:20p 4-6-00.

Record: Room Temperature: 68 °F.

ORIGINAL

Perform steps below:

1. **Insulation Resistance Test**

Setup the Relay Socket specimen for insulation resistance testing. Attach Relay Socket in its normal mounting configuration to grounded fixture.

Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the test specimen. Describe the terminals and their data below:

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1	2	>999 mOhm	> 10 Megohms	ACC
1	3	>999 mOhm	> 10 Megohms	ACC
1	4	>999 mOhm	> 10 Megohms	ACC
1	5	>999 mOhm	> 10 Megohms	ACC
1	6	>999 mOhm	> 10 Megohms	ACC
1	7	>999 mOhm	> 10 Megohms	ACC
1	8	>999 mOhm	> 10 Megohms	ACC
1	9	>999 mOhm	> 10 Megohms	ACC
1	10	>999 mOhm	> 10 Megohms	ACC
1	11	>999 mOhm	> 10 Megohms	ACC
2	3	>999 mOhm	> 10 Megohms	ACC
2	4	>999 mOhm	> 10 Megohms	ACC
2	5	>999 mOhm	> 10 Megohms	ACC
2	6	>999 mOhm	> 10 Megohms	ACC
2	7	>999 mOhm	> 10 Megohms	ACC
2	8	>999 mOhm	> 10 Megohms	ACC
2	9	>999 mOhm	> 10 Megohms	ACC
2	10	>999 mOhm	> 10 Megohms	ACC
2	11	>999 mOhm	> 10 Megohms	ACC
3	4	>999 mOhm	> 10 Megohms	ACC
3	5	>999 mOhm	> 10 Megohms	ACC
3	6	>999 mOhm	> 10 Megohms	ACC
3	7	>999 mOhm	> 10 Megohms	ACC
3	8	>999 mOhm	> 10 Megohms	ACC
3	9	>999 mOhm	> 10 Megohms	ACC
3	10	>999 mOhm	> 10 Megohms	ACC
3	11	>999 mOhm	> 10 Megohms	ACC
4	5	>999 mOhm	> 10 Megohms	ACC
4	6	>999 mOhm	> 10 Megohms	ACC
4	7	>999 mOhm	> 10 Megohms	ACC
4	8	>999 mOhm	> 10 Megohms	ACC
4	9	>999 mOhm	> 10 Megohms	ACC
4	10	>999 mOhm	> 10 Megohms	ACC
4	11	>999 mOhm	> 10 Megohms	ACC
5	6	>999 mOhm	> 10 Megohms	ACC
5	7	>999 mOhm	> 10 Megohms	ACC
5	8	>999 mOhm	> 10 Megohms	ACC

Dedication Test Plan – RLYSKT-1	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-016C-TP-016CS	
Test Specimen: Acton Pak MD11 & M011 Relay Sockets	Page 3 of 4

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
5	~~8~~	>999 mOhm	> 10 Megohms	ACC
5	10	>999 mOhm	> 10 Megohms	ACC
5	11	>999 mOhm	> 10 Megohms	ACC
6	7	>999 mOhm	> 10 Megohms	ACC
6	8	>999 mOhm	> 10 Megohms	ACC
6	9	>999 mOhm	> 10 Megohms	ACC
6	10	>999 mOhm	> 10 Megohms	ACC
6	11	>999 mOhm	> 10 Megohms	ACC
7	8	>999 mOhm	> 10 Megohms	ACC
7	9	>999 mOhm	> 10 Megohms	ACC
7	10	>999 mOhm	> 10 Megohms	ACC
7	11	>999 mOhm	> 10 Megohms	ACC
8	9	>999 mOhm	> 10 Megohms	ACC
8	10	>999 mOhm	> 10 Megohms	ACC
8	11	>999 mOhm	> 10 Megohms	ACC
9	10	>999 mOhm	> 10 Megohms	ACC
9	11	>999 mOhm	> 10 Megohms	ACC
10	11	>999 mOhm	> 10 Megohms	ACC
1	Ground	>999 mOhm	> 10 Megohms	ACC
2	Ground	>999 mOhm	> 10 Megohms	ACC
3	Ground	>999 mOhm	> 10 Megohms	ACC
4	Ground	>999 mOhm	> 10 Megohms	ACC
5	Ground	>999 mOhm	> 10 Megohms	ACC
6	Ground	>999 mOhm	> 10 Megohms	ACC
7	Ground	>999 mOhm	> 10 Megohms	ACC
8	Ground	>999 mOhm	> 10 Megohms	ACC
9	Ground	>999 mOhm	> 10 Megohms	ACC
10	Ground	>999 mOhm	> 10 Megohms	ACC
11	Ground	>999 mOhm	> 10 Megohms	ACC

2. De-energize equipment.

3. End test.

4. Carefully disassemble test leads to Relay Socket specimen.

5. Clean, box (in original packing & paperwork) and ready the test specimen for transfer to buyer.

Record: Date /Time of Test End: 8:50A 4-7-00

Dedication Test Plan – RLYSKT-1	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-016C-TP-016CS	
Test Specimen: Acton Pak MD11 & M011 Relay Sockets	Page 4 of 4

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Item meets requirements for this test plan.

Notes:

Test Engineer/Technician (Printed Name) JEFF CHUICK

Test Engineer/Technician (signature) J. Chuick Date: 4.6.00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) J.P. Craig Swenson Date: 4-11-00

QA/QC (signature) Stephen Scott Moss Date: 4-12-2000

Dedication Test Plan – RLYSKT-1	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-016C-TP-016CS	
Test Specimen: Acton Pak MD11 & M011 Relay Sockets	Page 1 of 4

Test Procedure Approval (Obtain prior to testing):
This test procedure adequately tests the critical characteristics of the test specimen upon acceptable completion of the testing.

Design Authority (signature) [signature] Date: 2/23/00.

ORIGINAL

RECOMMENDED EQUIPMENT:
Megger Instrument capable of 500 VDC Test Voltage
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) serial numbers and calibration due
Test Instrument type: AVO BM221 I.D.: BAT-137 Calib. Due dates 3-14-01.
Test Instrument type: _____ I.D.: _____ Calib. Due dates _____.
Test Instrument type: _____ I.D.: _____ Calib. Due dates _____.

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE: (Note: use one set of sheets per test specimen)

Test Specimen Description: Relay Socket

Record the following identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Manufacturer:	Action Pak	**Action Pak**	ACC
Model:	MD11	**MD11 or M011**	ACC
Serial No.: S/N: 2	2	**N/A**	ACC

Setup the Relay Sockets for testing configuration:

Perform the following tests:

Record: Date /Time of Test Beginning: 3:40p 4-6-00

Record: Room Temperature: 68 °F.

ORIGINAL

Perform steps below:

1. **Insulation Resistance Test**

Setup the Relay Socket specimen for insulation resistance testing. Attach Relay Socket in its normal mounting configuration to grounded fixture.

Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the test specimen. Describe the terminals and their data below:

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1	2	>999 mOhm	> 10 Megohms	ACC
1	3	>999 mOhm	> 10 Megohms	ACC
1	4	>999 mOhm	> 10 Megohms	ACC
1	5	>999 mOhm	> 10 Megohms	ACC
1	6	>999 mOhm	> 10 Megohms	ACC
1	7	>999 mOhm	> 10 Megohms	ACC
1	8	>999 mOhm	> 10 Megohms	ACC
1	9	>999 mOhm	> 10 Megohms	ACC
1	10	>999 mOhm	> 10 Megohms	ACC
1	11	>999 mOhm	> 10 Megohms	ACC
2	3	>999 mOhm	> 10 Megohms	ACC
2	4	>999 mOhm	> 10 Megohms	ACC
2	5	>999 mOhm	> 10 Megohms	ACC
2	6	>999 mOhm	> 10 Megohms	ACC
2	7	>999 mOhm	> 10 Megohms	ACC
2	8	>999 mOhm	> 10 Megohms	ACC
2	9	>999 mOhm	> 10 Megohms	ACC
2	10	>999 mOhm	> 10 Megohms	ACC
2	11	>999 mOhm	> 10 Megohms	ACC
3	4	>999 mOhm	> 10 Megohms	ACC
3	5	>999 mOhm	> 10 Megohms	ACC
3	6	>999 mOhm	> 10 Megohms	ACC
3	7	>999 mOhm	> 10 Megohms	ACC
3	8	>999 mOhm	> 10 Megohms	ACC
3	9	>999 mOhm	> 10 Megohms	ACC
3	10	>999 mOhm	> 10 Megohms	ACC
3	11	>999 mOhm	> 10 Megohms	ACC
4	5	>999 mOhm	> 10 Megohms	ACC
4	6	>999 mOhm	> 10 Megohms	ACC
4	7	>999 mOhm	> 10 Megohms	ACC
4	8	>999 mOhm	> 10 Megohms	ACC
4	9	>999 mOhm	> 10 Megohms	ACC
4	10	>999 mOhm	> 10 Megohms	ACC
4	11	>999 mOhm	> 10 Megohms	ACC
5	6	>999 mOhm	> 10 Megohms	ACC
5	7	>999 mOhm	> 10 Megohms	ACC
5	8	>999 mOhm	> 10 Megohms	ACC

GES 4/11/00

Terminal to Terminal / Ground				
Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
5	8	>999 mOhm	> 10 Megohms	ACC
5	10	>999 mOhm	> 10 Megohms	ACC
5	11	>999 mOhm	> 10 Megohms	ACC
6	7	>999 mOhm	> 10 Megohms	ACC
6	8	>999 mOhm	> 10 Megohms	ACC
6	9	>999 mOhm	> 10 Megohms	ACC
6	10	>999 mOhm	> 10 Megohms	ACC
6	11	>999 mOhm	> 10 Megohms	ACC
7	8	>999 mOhm	> 10 Megohms	ACC
7	9	>999 mOhm	> 10 Megohms	ACC
7	10	>999 mOhm	> 10 Megohms	ACC
7	11	>999 mOhm	> 10 Megohms	ACC
8	9	>999 mOhm	> 10 Megohms	ACC
8	10	>999 mOhm	> 10 Megohms	ACC
8	11	>999 mOhm	> 10 Megohms	ACC
9	10	>999 mOhm	> 10 Megohms	ACC
9	11	>999 mOhm	> 10 Megohms	ACC
10	11	>999 mOhm	> 10 Megohms	ACC
1	Ground	>999 mOhm	> 10 Megohms	ACC
2	Ground	>999 mOhm	> 10 Megohms	ACC
3	Ground	>999 mOhm	> 10 Megohms	ACC
4	Ground	>999 mOhm	> 10 Megohms	ACC
5	Ground	>999 mOhm	> 10 Megohms	ACC
6	Ground	>999 mOhm	> 10 Megohms	ACC
7	Ground	>999 mOhm	> 10 Megohms	ACC
8	Ground	>999 mOhm	> 10 Megohms	ACC
9	Ground	>999 mOhm	> 10 Megohms	ACC
10	Ground	>999 mOhm	> 10 Megohms	ACC
11	Ground	>999 mOhm	> 10 Megohms	ACC

2. **De-energize equipment.**

3. **End test.**

4. **Carefully disassemble test leads to Relay Socket specimen.**

5. **Clean, box (in original packing & paperwork) and ready the test specimen for transfer to buyer.**

Record: Date /Time of Test End: 4:08P 4-6-00

Dedication Test Plan – RLYSKT-1	**Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-016C-TP-016CS	
Test Specimen: Acton Pak MD11 & M011 Relay Sockets	**Page 4 of 4**

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Item meets requirements for this test plan.

Notes:

Test Engineer/Technician (Printed Name) Jeff Cranck

Test Engineer/Technician (signature) J. Cranck Date: 4-6-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Craig Swenson Date: 4-11-00

QA/QC (signature) Stephen Scott Mosk Date: 4-12-2000

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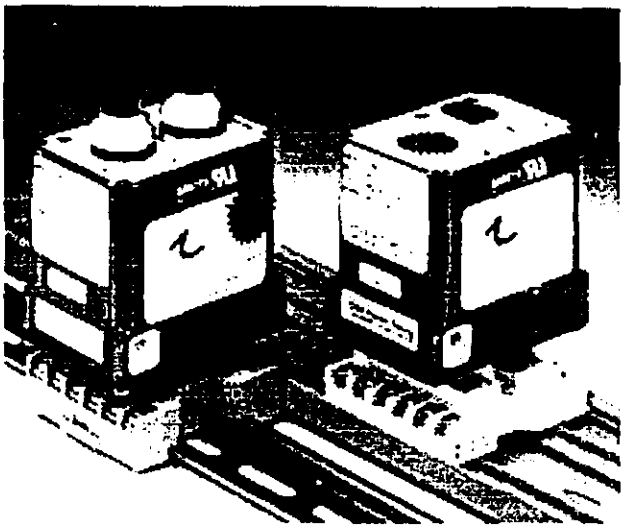
Action Pak®

DC Input, Field Configurable Limit Alarms

Models AP1080, AP1090



Provides Relay Contact Closure(s) at a Preset DC Input Level

- Field Configurable Input Ranges for DC Voltage and Current
- Setpoint(s) Programmable HI or LO
- Exclusive "Dynamic Deadband" Prevents False Trips
- Selectable Failsafe/Latching Operation
- LED Trip Indicators
- Selectable 120/240VAC Operation (9 to 30 VDC Available)
- Lifetime Warranty

DESCRIPTION

Action Pak models AP1080 single setpoint and AP1090 dual setpoint limit alarms offer flexible, wide-ranging DC input capability. Voltage spans from 10mV to 200 volts and current spans from 1mA to 100mA can be field configured. Bipolar inputs are also accepted. Both models offer configurable latching, failsafe and HI/LO operation. The AP1080 and AP1090 also include 0.25%-50% adjustable deadbands and selectable 120/240VAC operation.

DIAGNOSTIC LED

Models AP1080-2000 and AP1090-2000 are equipped with a dual function diagnostic LED. The green center LED indicates line power and input signal status. Active line power is indicated by an illuminated LED. If the center LED is off, check line power and the wiring connection. If the input signal is above 100% full scale, the LED will flash at approximately 8Hz. Below 0%, the flash rate is approximately 4Hz.

OUTPUT SELECTION

The single setpoint AP1080 and the dual setpoint AP1090 provide the following relay outputs:

AP1080	Single Trip (DPDT, 5A)
AP1090	Single/Dual Trip (2 SPDT, 5A)

Setpoint(s) are top accessed 15-turn potentiometer(s) or option "P" provides ten-turn dial(s).

OPERATION

The field configurable AP1080 and AP1090 limit alarm setpoint(s) can be configured for HI, LO, latching and/or failsafe trip operation. Non-latching HI and LO setpoints have respective HI and LO deadbands. In a tripped condition, the setpoint is exceeded and the appropriate red LED will illuminate. The trip will reset only when the process falls below the HI deadband or rises above the LO deadband (see figure 1). To reset a latched setpoint the signal must be in the safe region and the line power turned off for at least 5 seconds. For proper deadband operation, a HI setpoint must always be set above a LO setpoint.

In failsafe operation, the relay is energized when the process is below the HI setpoint or above the LO setpoint (opposite for non-failsafe). In the failsafe mode, the relays go to the tripped condition when the power fails.

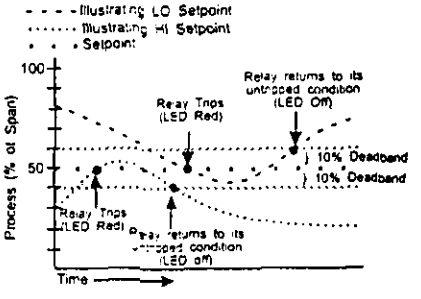


Figure 1: Limit alarm operation and effect of deadband(s).

ACTION INSTRUMENTS
the industrial I/O Company

DYNAMIC DEADBAND

LSI circuitry prevents false trips by repeatedly sampling the input. The input must remain beyond the setpoint for 100 milliseconds, uninterrupted, to qualify as a valid trip condition. Likewise, the input must fall outside the deadband and remain there for 100 milliseconds to return the alarm to an untripped condition. This effectively results in a "dynamic deadband"--based on time--in addition to the normal deadband.

OPTIONS

U Urethane coating of internal circuitry for protection from corrosive atmospheres.

P Top Mounted, Ten-Turn Dial(s) for setpoint adjustment.

C620 Factory calibration to customer's specifications

CONFIGURATION

The factory presets models AP1080 and AP1090 as follows:

	AP1080	AP1090
Input	0-20mA	0-20mA
Output	Single, DPDT	Dual, SPDT
Trip	HI	A: HI, B: LO
Latching	No	No
Failsafe	Yes	No
Deadband	0.25%	A/B: 0.25%
Power	120VAC	120VAC

For other I/O ranges, remove the four base screws and case to access the configuration switches.

Replace the cover before applying power.

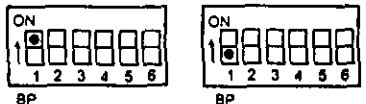
Refer to Figure 4 for configuration.

Input

1. Position input jumper "W2" for Current or Voltage inputs.

Current Voltage

2. Set position 1 of the Mode Selector for Unipolar or Bipolar operation. Unipolar is the default.



Unipolar Bipolar

Note: A bipolar span selection will double any span from Table 1 (e.g., 10V unipolar span = ±10V bipolar span)

3. Using Table 1, configure positions 1 through 4 of the Input Range Selector for the desired maximum setpoint input. Round desired maximum input values to the next highest range (e.g., 0-120V = 200V range).

Output

Configure the Mode Selector for the required function. See Figure 5.

Power

Configure the AC jumpers for either 120 or 240 VAC operation. See Figure 6.

CALIBRATION

Note: To maximize thermal stability, final calibration should be performed in the operating installation, allowing approximately 1-2 hours for warmup and thermal equilibrium of the system.

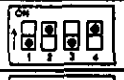
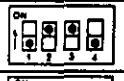
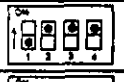
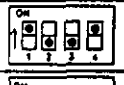
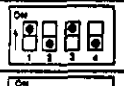
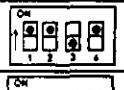
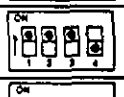
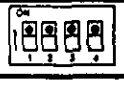
Setpoint. Set deadband at its minimum (20 turns Counter Clockwise) before adjusting the setpoint. With the specified trip voltage or current input applied, adjust setpoint until the relay trips. For HI trip calibration, start with the setpoint above the desired trip. For LO trip calibration, start below the desired trip.

Deadband. Set deadband to its minimum (fully Counter Clockwise). Set setpoint to desired trip. Adjust voltage/current input until relay trips. Readjust deadband to 50% (20 turns Clockwise). Set voltage/current input to desired deadband position. Slowly adjust deadband until relay untrips.

FACTORY ASSISTANCE

For additional information on calibration, operation and installation please contact Action's Technical Services Group. Call toll-free: **800 -767-5726**

Table 1: AP1080-2000 and 1090-2000 Input Ranges

*Voltage	*Current	Input Range Selector
10mV	1mA	
20mV	2mA	
50mV	5mA	
100mV	10mA	
200mV	20mA	
500mV	50mA	
1V	100mA	
2V		
5V		
10V		
20V		
50V		
100V		
200V		

**Note: Use Jumper (W2) to configure either voltage or current input. All unipolar input ranges are zero based.*

RELAY PROTECTION AND EMI SUPPRESSION

When switching inductive loads, maximum relay life and transient EMI suppression is achieved using external protection (see Figures 2 & 3). Place all protection devices directly across the load and minimize all lead lengths. For AC inductive loads, place a properly-rated MOV across the load in parallel with a series RC snubber. Use a 0.01 to 0.1μF pulse film capacitor (foil polypropylene recommended) of sufficient voltage, and a 47Ω, 1/2W carbon resistor. For DC inductive loads, place a diode across the load (PRV > DC supply, 1N4006 recommended) with (+) to cathode and (-) to anode (the RC snubber is an optional enhancement)

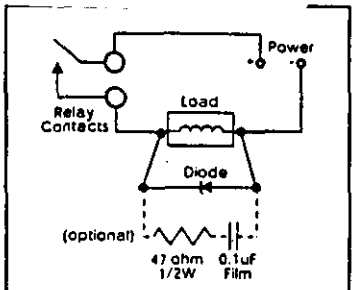


Figure 2: DC Inductive Loads

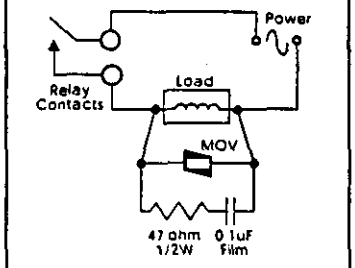


Figure 3: AC Inductive Loads

PIN CONNECTIONS*

AP1080, AP1090

1 AC Power (Hot)
2 Shield (Gnd)
3 AC Power (Neu)
4 Input (+)
5 Input (-)
6 N.O. ┐
7 C ├ A
8 N.C. ┘
9 N.O. ┐
10 C ├ B
11 N.C ┘

Key:
N.O. = Normally Open
C = Common
N.C. = Normally Closed
DC Power: Pin 1 = (+); Pin 3 = (-)

**Contacts are in the "normal" state when the relay is de-energized.*

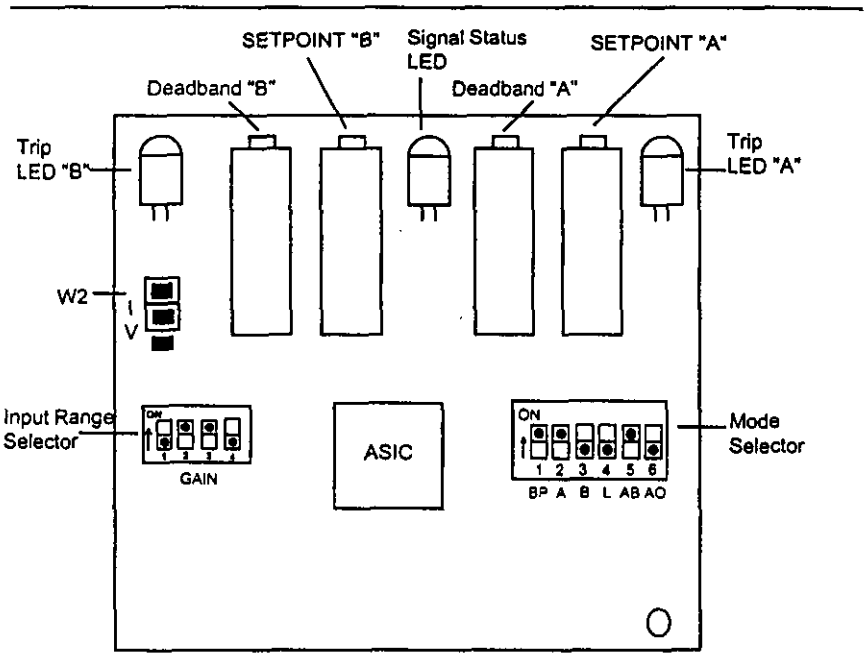


Figure 4: AP1090-2000 Factory Calibration 0-20mA, Dual HI/LO, Non-Latching, Non-Failsafe

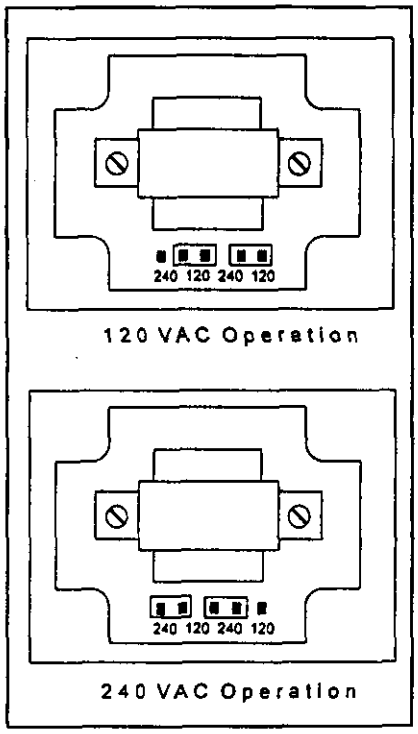


Figure 6: 120/240 VAC Selection

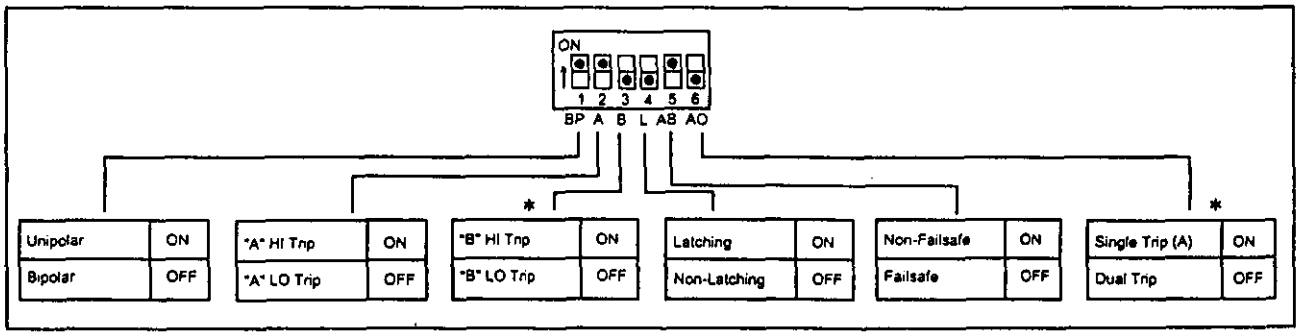


Figure 5: Mode Selection Dual Trip/A: HI, B: LO, Non-Latching, Non-Failsafe
**Applicable for AP1090-2000, only*

Page 510

SPECIFICATIONS

Inputs
Voltage Input
Range: 10mV to 200V
Impedance: >100K ohm
Overvoltage: 400V, max.
Current Input
Range: 1mA to 100mA
Impedance: 20 ohms, typical
Overcurrent: 200mA, max.
Overvoltage: 60VDC
Common Mode (Input to Ground): 1000VDC, max.

LED Indications
Input Range (Green)
>100% input: 8Hz flash
<0% input: 4Hz flash
Setpoint (Red)
Tripped: Solid red
Safe: Off

Limit Differentials (Deadbands)
>50mV/5mA: 0.25% to 50% of span
<50mV/5mA: 1% to 50% of span

Response Time
Dynamic Deadband:
Relay status will change when proper setpoint/process condition exists uninterrupted for 100msec.
Normal Mode (analog filtering): <250msec, (10-90%)

Setpoint
Effectivity: Setpoint(s) are adjustable over 100% of the selected input span.
Repeatability (constant temp):
>50mV/5mA: 0.1% of full scale
<50mV/5mA: 0.2% of full scale

Stability
Line Voltage: ±0.01%/%, max..
Temperature: ±0.05% of full scale/°C, max.

Common Mode Rejection
DC to 60Hz: 120dB

Isolation
1000V DC between contacts, input and power

ESD Susceptibility
Meets IEC 801-2, Level 2 (4KV)

Humidity
Operating: 15 to 95% (@45°C)
Soak: 90% for 24 hours (@65°C)

Temperature Range
Operating: 0 to 60°C (32 to 140°F)
Storage: -15 to 70°C (5 to 158°F)

Power
Consumption: 2W typical, 5W max.
Standard: Selectable 120/240VAC (±10%, 50-60Hz)
Optional: 9 to 30VDC, Inverter-Isolated

Relay Contacts
AP1080: DPDT (2 Form C)
AP1090: 1 SPDT (1 Form C) per setpoint
Current Rating (resistive)
120VAC: 5A
240VAC: 2A
28VDC: 5A
Material: Silver-Cadmium Oxide
Electrical Life: 10^5 operations at rated load
Note: External relay contact protection is required for use with inductive loads. See relay protection section (Figure 1 & 2).
Mechanical Life: 10^7 operations

Latch Reset Time
5 seconds

Weight
AP1080 0.46lbs
AP1090 0.62lbs

Agency Approvals
CSA certified per standard C22.2, No. M1982 (File No. LR42272-8,9)
UL recognized per standard UL508, (File No. E99775)

MOUNTING

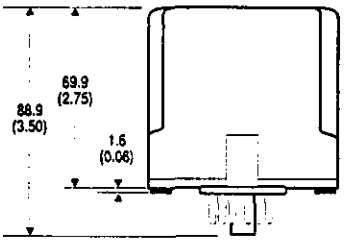
All Action Paks feature plug-in installation. Models AP1080 and AP1090 use an 11-pin base, either molded socket (M011) or DIN rail socket (MD11).

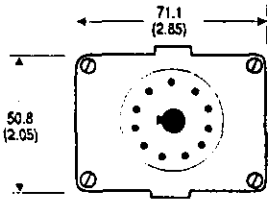
ORDERING INFORMATION

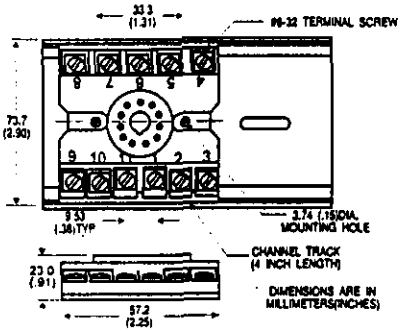
Specify:
1. Model: AP1080-2000, AP1090-2000
2. Options: U, P (see text)
3. Line Power (see specs.)
(All power supplies are transformer-isolated from the internal circuitry.)

DIMENSIONS

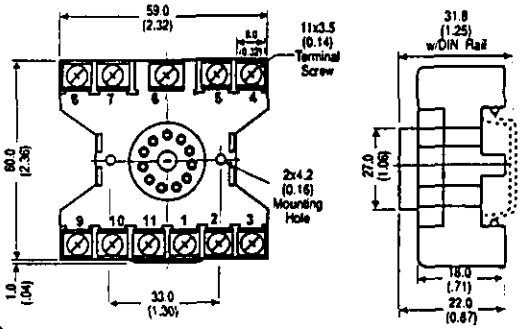
Dimensions are in milimeters (inches)







M011(Track/Surface)



MD11 (DIN Rail)

All Prices and Specifications subject to change without notice

For order entry, applications or customer service assistance, call toll-free 800-767-5726

■ **United States**
Action Instruments, Inc.
8601 Aero Drive
San Diego, CA 92123
Phone: 619-279-5726
FAX: 619-279-6290

721-0479-00-J 12/98

ACTION INSTRUMENTS
...the industrial I/O company

Dedication Test Plan – RLYSKT-1	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-016C-TP-016CS	
Test Specimen: Acton Pak MD11 & M011 Relay Sockets	Page 1 of 4

Test Procedure Approval (Obtain prior to testing):
This test procedure adequately tests the critical characteristics of the test specimen upon acceptable completion of the testing.

Design Authority (signature) Larry Anderson Date: 2/23/00.

ORIGINAL

RECOMMENDED EQUIPMENT:
Megger Instrument capable of 500 VDC Test Voltage
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) serial numbers and calibration due
Test Instrument type: Avo BM221 I.D.: BAT 137 Calib. Due dates 3-14-01.
Test Instrument type: _____ I.D.: _____ Calib. Due dates _____.
Test Instrument type: _____ I.D.: _____ Calib. Due dates _____.

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE: (Note: use one set of sheets per test specimen)

Test Specimen Description: **Relay Socket**

Record the following identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Manufacturer:	Acton Pak	Action Pak	Acc
Model:	MD 11	MD11 or M011	Acc
Serial No.: 1	1	N/A	Acc

Setup the Relay Sockets for testing configuration:

Perform the following tests:

Record: Date /Time of Test Beginning: 3:00 p.m. 4-6-00

Record: Room Temperature: 68 °F.

ORIGINAL

ORIGINAL

Perform steps below:

1. **Insulation Resistance Test**

Setup the Relay Socket specimen for insulation resistance testing. Attach Relay Socket in its normal mounting configuration to grounded fixture.

Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the test specimen. Describe the terminals and their data below:

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1	2	>999Mohm	> 10 Megohms	Acc
1	3	>999Mohm	> 10 Megohms	Acc
1	4	>999Mohm	> 10 Megohms	Acc
1	5	>999Mohm	> 10 Megohms	Acc
1	6	>999Mohm	> 10 Megohms	Acc
1	7	>999Mohm	> 10 Megohms	Acc
1	8	>999Mohm	> 10 Megohms	Acc
1	9	>999Mohm	> 10 Megohms	Acc
1	10	>999Mohm	> 10 Megohms	Acc
1	11	>999Mohm	> 10 Megohms	Acc
2	3	>999Mohm	> 10 Megohms	Acc
2	4	>999Mohm	> 10 Megohms	Acc
2	5	>999Mohm	> 10 Megohms	Acc
2	6	>999Mohm	> 10 Megohms	Acc
2	7	>999Mohm	> 10 Megohms	Acc
2	8	>999Mohm	> 10 Megohms	Acc
2	9	>999Mohm	> 10 Megohms	Acc
2	10	>999Mohm	> 10 Megohms	Acc
2	11	>999Mohm	> 10 Megohms	Acc
3	4	>999Mohm	> 10 Megohms	Acc
3	5	>999Mohm	> 10 Megohms	Acc
3	6	>999Mohm	> 10 Megohms	Acc
3	7	>999Mohm	> 10 Megohms	Acc
3	8	>999Mohm	> 10 Megohms	Acc
3	9	>999Mohm	> 10 Megohms	Acc
3	10	>999Mohm	> 10 Megohms	Acc
3	11	>999Mohm	> 10 Megohms	Acc
4	5	>999Mohm	> 10 Megohms	Acc
4	6	>999Mohm	> 10 Megohms	Acc
4	7	>999Mohm	> 10 Megohms	Acc
4	8	>999Mohm	> 10 Megohms	Acc
4	9	>999Mohm	> 10 Megohms	Acc
4	10	>999Mohm	> 10 Megohms	Acc
4	11	>999Mohm	> 10 Megohms	Acc
5	6	>999Mohm	> 10 Megohms	Acc
5	7	>999Mohm	> 10 Megohms	Acc
5	8	>999Mohm	> 10 Megohms	Acc

Dedication Test Plan – RLYSKT-1	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-016C-TP-016CS	
Test Specimen: Acton Pak MD11 & M011 Relay Sockets	Page 3 of 4

Terminal to Terminal / Ground				
Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
5	8	>999 Mohm	> 10 Megohms	Acc
5	10	>999 Mohm	> 10 Megohms	Acc
5	11	>999 Mohm	> 10 Megohms	Acc
6	7	>999 Mohm	> 10 Megohms	Acc
6	8	>999 Mohm	> 10 Megohms	Acc
6	9	>999 Mohm	> 10 Megohms	Acc
6	10	>999 Mohm	> 10 Megohms	Acc
6	11	>999 Mohm	> 10 Megohms	Acc
7	8	>999 Mohm	> 10 Megohms	Acc
7	9	>999 Mohm	> 10 Megohms	Acc
7	10	>999 Mohm	> 10 Megohms	Acc
7	11	>999 Mohm	> 10 Megohms	Acc
8	9	>999 Mohm	> 10 Megohms	Acc
8	10	>999 Mohm	> 10 Megohms	Acc
8	11	>999 Mohm	> 10 Megohms	Acc
9	10	>999 Mohm	> 10 Megohms	Acc
9	11	>999 Mohm	> 10 Megohms	Acc
10	11	>999 Mohm	> 10 Megohms	Acc
1	Ground	>999 Mohm	> 10 Megohms	Acc
2	Ground	>999 Mohm	> 10 Megohms	Acc
3	Ground	>999 Mohm	> 10 Megohms	Acc
4	Ground	>999 Mohm	> 10 Megohms	Acc
5	Ground	>999 Mohm	> 10 Megohms	Acc
6	Ground	>999 Mohm	> 10 Megohms	Acc
7	Ground	>999 Mohm	> 10 Megohms	Acc
8	Ground	>999 Mohm	> 10 Megohms	Acc
9	Ground	>999 Mohm	> 10 Megohms	Acc
10	Ground	>999 Mohm	> 10 Megohms	Acc
11	Ground	>999 Mohm	> 10 Megohms	Acc

2. De-energize equipment.

3. End test.

4. Carefully disassemble test leads to Relay Socket specimen.

5. Clean, box (in original packing & paperwork) and ready the test specimen for transfer to buyer.

Record: Date /Time of Test End: 04-06-00 4:30 p.m.

Dedication Test Plan – RLYSKT-1	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-016C-TP-016CS	
Test Specimen: Acton Pak MD11 & M011 Relay Sockets	Page 4 of 4

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Test was acceptable
Michael Cram
04-06-00

Notes:

Test Engineer/Technician (Printed Name) Michael Cram

Test Engineer/Technician (signature) Michael Cram Date: 04-06-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) for Craig Swenson Date: 4-11-00

QA/QC (signature) Stephen Scott Moss Date: 4-12-2000

CGI REMOVAL/REPLACEMENT LOG

Equipment ID No.	Equipment Description	Removd By*	Date	Removal Verified By*	Date	Replaced By*	Date	Replacement Verified By*	Date
5X	MLO Hoist Weight System Trip Relay (Action Pak AP1080-2000	B. W	4-13-00	SRC	4-13-00	B. W.	4-13-00	SRC	4-13-00

Personnel Identification Section

Title	Printed Name	Signature	Initials
GC Electrician	Stephen R Conley	Stephen R Conley	SRC
I.W	BRIAN W. WHITSETOR	Brian L Whitsetor	B.W.W

Remarks:

* Complete Title, Printed Name, Signature and Initials in Personnel Identification Section

Dedication Test Plan – RLY-3	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-016C-TP-016C	
Test Specimen: Acton Pak AP1080-2000 Relay	Page 1 of 5

Test Procedure Approval (Obtain prior to testing):
This test procedure adequately tests the critical characteristics of the test specimen upon acceptable completion of the testing.

Design Authority (signature) Craig Svenson Date: 1-31-00

ORIGINAL

RECOMMENDED EQUIPMENT:
Power Supply capable of 5 amps @ 120 VAC.
Megger Instrument capable of 500 VDC Test Voltage
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) serial numbers and calibration due
Test Instrument type: PREMA MFM I.D.: S/N 10012 Calib. Due dates 3-25-00
Test Instrument type: HP3457A I.D.: BAT-123 Calib. Due dates 7-29-00
Test Instrument type: HP3457A I.D.: BAT-124 Calib. Due dates 7-30-00
AVO BM80/2 MEGGER, 6410-889/1000100/5345 2-9-01
FLUKE 787 DMM, BAT-107 5-28-00

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE: (Note: use one set of sheets per test specimen)

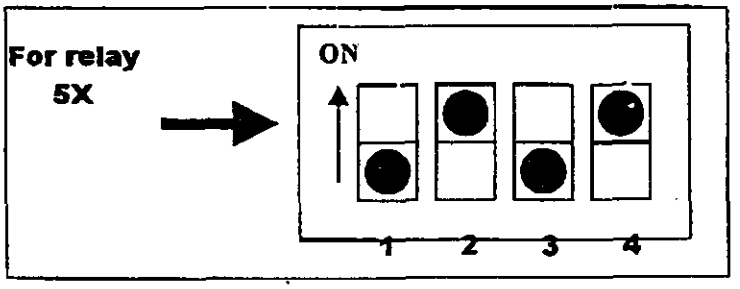
Test Specimen Description: Relay

Record the following identification information:

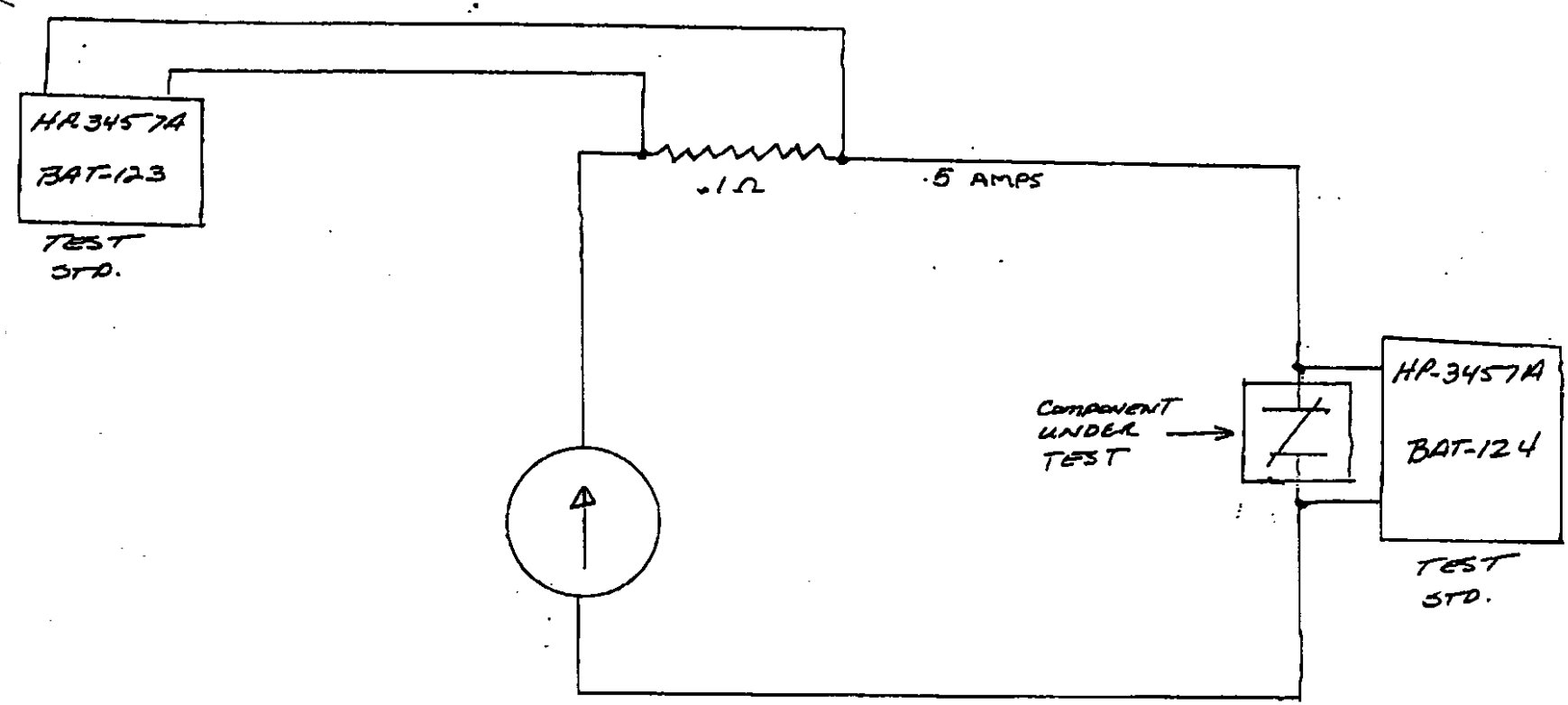
Description	Record Data	Acceptance Criteria	Comments/Deviations
Manufacturer:	Action PAK	Action Pak	ACCEPT
Model:	1080-2000	AP1080-2000	ACCEPT
Contact Configuration:	DPDT	DPDT	ACCEPT
Serial No.:	B8506	N/A	

Setup the Relay(s) for testing configuration:

Input Range Selector, adjust selector for: 10mA (5X) current ranges as follows:



ORIGINAL



STANDARD TEST SET-UP FOR MEASURING RESISTANCE ACROSS CONTACTS.

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Commercial Grade Item Upgrade Dedication Form

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ECN No. N/A CGI No. CGI-SNF-D-MHM-016A

Title: P2, ~~P53~~, P62, & P63 Interlocks – Sensotec Load Cell

ORIGINAL

Section 1 Part Information

Item No.: N/A	Manufacturer: N/A	Supplier: N/A
Mfg. Part/Model No.: N/A	Supplier's P/N: N/A	
Part Description: N/A		
End Use Description: N/A		

Section 2a Component Information

Equipment No.:	Specification No.:	Manufacturer:	Past P.O. No.:
LCMHR1X, LCMHR2X, LCMHR1Y, LCMHR2Y	Ederer F-2566, Foster Wheeler MJX-SDX 452656	Sensotec	N/A
Manufacturer's Part/Model No.: RM/C717-01	Equipment Supplier (if different from manufacturer): ALSTROM, Foster Wheeler		Equip. Supplier's Part No.: N/A

Component Description: **These load cells (LCMHR1X, LCMHR2X, LCMHR1Y, LCMHR2Y) measure the load (weight) on the ropes that support the MCO Hoist, they provide an output signal based upon that loading that is used for the P2, P53, P62 and P63 interlocks.**

Section 2b Commercial Availability of the Item

1. Is the Item available from a catalogue from a qualified NQA1 supplier or ISO 9000 supplier (coordinate w/ project CGI Engineer or BTR)? [ ] YES (go to #2 below) [X] NO (go to procedure step 6.3.2, proceed to dedicate Item)

If not available from a qualified NQA1 supplier, is it available from an ISO 9000 supplier? (coordinate w/ project CGI Engineer or BTR)? [ ] YES (go to #2 below, procedure step 6.3.2, dedicate Item) [X] NO (procedure step 6.3.2, dedicate Item)

2. List of Candidate qualified suppliers or ISO 9000 suppliers **N/A**

3.. Recommended Procurement Strategy (coordinate with project CGI interface Engineer or BTR): **N/A**

Section 2c CGI Determination

CGI Determination Questions:

#1: Is the Item subject to design or specification requirements that are unique to nuclear facilities or activities?

[ ] YES (the Item is not commercial grade) [X] NO (continue)

#2: Is the Item used in applications other than nuclear facilities or activities?

[ ] NO (the item is not commercial grade) [X] YES (continue)

#3: Is the Item ordered from manufacturer/supplier on the basis of specifications set forth in the manufacturer's catalog?

[ ] NO (the item is not commercial grade) [X] YES (continue)

[X] All three criteria have been satisfied. The Item meets the definition of commercial grade.

Commercial Grade Item Upgrade Dedication Form

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ECN No. N/A CGI No. CGI-SNF-D-MHM-016A

Title: **P2, P53, P62, & P63 Interlocks – Sensotec Load Cell**

	Section 2d Reason for Dedication The above Commercial Grade (CG) described item is being Dedicated for use in the application cited for the following reason(s):
	Item is being purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Class application.
	Item is being purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Significant application.
X	Item was purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Class application.
	Item was purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Significant application.
	Other ('like-for-like', similar, substitution, replacement evaluation)

Section 3 Failure Effects Evaluation

A. Part/Component Safety Function: **The P2 interlock serves to prevent the MHM from leaving a storage tube without replacing the tube plug by determining when the MCO Hoist weight is more than the min. grapple and tube plug weight and when the MCO Hoist weight is less than the max. grapple only weight. The P53 interlock ensures the MCO Hoist is not lowered unless the weight is above the min. grapple weight or above the min. grapple plus MCO weight w/grapple jaws closed unless the grapple is in the seating zone. The P62 interlock ensures that the MCO cannot be hoisted when MCO weight is detected and jaws are not closed. The P63 interlock ensures that the MCO Hoist cannot be raised if the MCO weight is exceeded. These load cells provide input to initiate the action as stated in the interlocks.**

B. Part/Component Functional Mode:

Safety Function #1:	X	Active		Passive
Safety Function #2:		Active		Passive
Safety Function #3:		Active		Passive

Active - Mechanical or Electrical change of state is required to occur for the component to perform its safety function

Passive – Change of state is not required for the component to perform its safety function

C. Host Component Safety Function (if applicable): **N/A**

D. Failure Mode(s) and the effects on component or system safety function (see Worksheet 1): **Failure to properly function and ultimately actuate output devices based on input from the weight of the MCO Hoist weight and the weight it carries results in movement of the MHM or raising of the MCO hoist at improper times.**

Section 4 Environmental & Natural Phenomena Hazard Design

Environmental Qualification Required:

Yes	
No	X

If yes: Environmental Qualification Requirements
Limiting Environmental Conditions:
Required Safety Functions:
Qualification Period:

Natural Phenomena Hazard (NPH) Design Required:

Yes	
No	X

If yes: NPH Design Requirements
Performance Category
NPH Design Req'ts.:
Required Safety Functions:

Section 5 Component Functional Classification

X	Safety Class (SC)		General Service (GS)		Safety Significant (SS)

If part/component classification is different from host component/system, document basis. **N/A**

Sections 6 and 7 (Reserved)

Section 8 References (for Functional Classification)

National Codes/Standards: **N/A**

Safety Analysis Report (SAR): **HNF-3672, Rev. 0**

Drawings: **Ederer, Inc. EB-33056, Sht 11, 12; H-2-827174 Sht 10, 21, 22, 23, 25**

Vendor Manual/Manufacturer/Supplier Information: **Sensotec Manual**

Other: **ALSTOM ESL/R (96) 065 – Rev. D, 100% Design Submittal – June 1998**

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ECN No. N/A CGI No. CGI-SNF-D-MHM-016A

Title: **P2, P53, P62, & P63 Interlocks – Sensotec Load Cell**

Section 9 Critical Characteristics				
Critical Characteristics	Acceptance Criteria/Tolerances	Acc Meth	ID	Function
1. Item Identification Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
Manufacturer	**Sensotec**	**1, IN**	**X**	
Model	**RM/C717-01**	**1, IN**	**X**	
2. Physical Critical Characteristics (for reasonable assurance that the Item delivered is the Item specified)				
N/A				
3 Performance Critical Characteristics (for reasonable assurance that the Item will perform its intended safety function(s))				
Load Cell Circuit Resistance (from lead to body of load cell)	**>100 Megohms -0% +5%** **<<Do not Meggar or Hi-Pot>>**	**1, T**		**X**
Load Cell Resistance (from - signal to + signal)	**350-700 Ohms ± 5%**	**1, T**		**X**
Load Cell Resistance (from - Excitation to + Excitation)	**350-700 Ohms ± 5%**	**1, T**		**X**
Operation	**During operation of the hoist, determine the output of the load cell and reading compared to the load placed upon it. Deviation allowed @ meter ± 5%**	**1, T**		**X**

4. Notes and Legend:
Rev. 1: Pages 3, 5, 6 - Rev'd performance CC/Acc Crit. to ">100 Megohms -0% +5%"; added performance CC/Acc Crit. for "Load Cell Resistance" 2 lines.

Acceptance Method (Acc Meth):
1.Special Test and Inspection
1, IN for Inspection
1,T for Test
2. Commercial Grade Survey
3. Source Verification
1. Vendor/Item History

Section 10 Initial Review and Approval

Approvals:

Designated Engineer: [signature]

Design Authority: [signature] 3/4/00

QA Engineer: [signature] 3/8/00 TZ ANDERSON

WORKSHEET 1
DETERMINATION OF FAILURE MECHANISMS/MODES

Section 1			
Typical Failure Mechanisms	Definition	X = Applicable to Component under Evaluation	
		X?	Indicate Failure Mode
Fracture	Separation of a solid accompanied by little or no macroscopic plastic deformation.		
Corrosion	The gradual deterioration of a material due to chemical or electrochemical reactions, such as oxidation, between the material and its environment.		
Erosion	Destruction of materials by the abrasive action of moving fluids, usually accelerated by the presence of solid particles carried with the fluid.		
Open Circuit	An electrical circuit that is unintentionally broken so that there is no complete path for current flow.	X	**Failure to provide output due to opening of sensor leads**
Short Circuit	An abnormal connection by which an electrical current is connected to ground, or to some conducting body, resulting in excessive current flow.		
Blockage	Clogging of a filtering medium resulting in the inability to perform its purification function or blockage of flow.		
Seizure	Binding of a normally moving item through excessive pressure, temperature, friction, jamming.	X	**Binding results in failure to transmit the correct signal**
Unacceptable Vibration	Mechanical oscillations produced are beyond the defined permissible limits due to unbalancing, poor support, or rotation at critical speeds.		
Loss of Properties	A loss of mechanical and physical properties of a material due to exposure to high temperatures, radiation exposure.		
Excess Strain	Under the action of excessive external forces the material of the part has been deformed or distorted.		
Mechanical Creep	From prolonged exposure to high temperature and stress, the object will show a slow change in its physical (shape and dimension) and mechanical characteristics.		
Ductile Fracture	Fracture characterized by tearing of metal accompanied by appreciable gross plastic deformation.		
Section 2 Additional Failure Modes Applicable to the Component Under Evaluation			
1.			
2.			
3.			
4.			
5.			

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Title: P2, P53, P62, & P63 Interlocks – Sensotec Load Cell	

Checklist 1 - Acceptance Method 1 - Special Test/Inspection Verification

SECTION 1

Item Description: **Load Cells**	Equip #: **LCMHR1X, LCMHR2X, LCMHR1Y, LCMHR2Y**
System #: **MHM**	Model #: **RM/C717-01**
Manufacturer (Address/Phone): **(888) 736 - 7683** **Sensotec** **2080 Arlingate Lane,** **Columbus,Ohio 43228** Phone. # **(614) 850-5000 Fax (614) 850-1111**	Supplier (Address/Phone): **email:** *sales@sensotec.com* **www.loadcell.com**

SECTION 2 CRITICAL CHARACTERISTICS TO BE VERIFIED BY METHOD 1.

Insp	Test	Post-Test	
X			1. **Manufacturer**
X			2. **Model**
	X		3. **Circuit resistance**
	X		4. **Load Cell Resistance (signal)**
	X		5. **Load Cell Resistance (excitation)**
	X		7. **Operation**

SECTION 3 BY INSPECTION * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)

Characteristic: **Manufacturer** Sample Size*: **100%**

Acceptance Criteria: **Sensotec**

Receipt Inspection Plan / Report #: CGI-SNF-D-MHM-016A-TP-016AX1, AX2, AY1, AY2

Characteristic: **Model** Sample Size*: **100%**

Acceptance Criteria: **RM/C717-01**

Receipt Inspection Plan / Report #: TP-016AX1, AX2, AY1, AY2

SECTION 4 BY SPECIAL TEST * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)

Characteristic for Test: **Circuit Resistance <<Do not Meggar or Hi-Pot>>** Samp Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **>100 Megohms -0% +5%**

Actual Test Value: See TP Test Plan and Report #: TP-016AX1, AX2, AY1, AY2

Characteristic for Test: **Load Cell Resistance (+signal to -signal)** Samp Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **350-700 Ohms ± 5%**

Actual Test Value: See TP Test Plan and Report #: TP-016AX1, AX2, AY1, AY2

Characteristic for Test: **Load Cell Resistance (+excitation to -excitation)** Samp Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **350-700 Ohms ± 5%**

Actual Test Value: See TP Test Plan and Report #: TP-016AX1, AX2, AY1, AY2

Characteristic for Test: **Operation** Samp Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **During operation of the hoist, determine the output of the load cell and reading compared to the load placed upon it. Deviation allowed @ meter ± 5%**

Actual Test Value: See CTP Test Plan and Report #: CSD(W379)-015-059 & 060

SECTION 5 TEST / INSPECTION SUMMARY (Acceptance Method 1)

1. SUMMARY OF VERIFIED CRITICAL CHARACTERISTICS, THEIR VERIFICATION METHODS, AND RESULTS

ITEM DESCRIPTION: Load Cells

Critical Characteristics				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/IN	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
Manufacturer	Sensotec	X		1, IN	TP-016 AX1,2, AY1,2	NA	4	0	XWEST	Larry W. Price	4/10/00
Model	RM/C717-01	X		1, IN							
Circuit Resistance <<Do not Meggar or Hi-Pot>>	>100 Megohms -0% +5%		X	1, T							
Load Cell Resistance (+signal to -signal)	350-700 Ohms ± 5%		X	1, T							
Load Cell Resistance (+excitation to -excitation)	350-700 Ohms ± 5%		X	1, T							
Operation	During operation of the hoist, determine the output of the load cell and reading compared to the load placed upon it. Deviation allowed @ meter ± 5%		X	1, T	CTP-* CSB(W379) -015-11-059 &060						

2. Disposition Of Unverified or Failed Critical Characteristics

Critical Characteristic	Disposition

3. Signature Indicates All Critical Characteristics Verified Satisfactory or Acceptably Dispositioned and Commercial Grade Dedication Is Satisfactory And Complete.

See Test Plans TP-016 AX1, AY1, AX2, AY2 cited above.

Testing Agency Approval: NR CES 4/12/00 Date CES 4/12/00

Testing Agency QA Engineer: NR CES 4/12/00 Date

BUYER VERIFICATION

Design Authority: CES Craig Shulman Date 4/12/00

QA Engineer: Stephen Scott Mohr Date 4-20-2000

* CTP CSB(W379)-015-11-059 & -060 available as Startup Test record. Excerpt attached. CES 4/12/00

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ECN No. **N/A** CGI No. **CGI-SNF-D-MHM-016A** Title: **P2, P53, P62, & P63 Interlocks – Sensotec Load Cell**	Page 7 of 7

SECTION 6 CONTACTS / PHONE NUMBERS		
	Name	Phone
Design Authority	CRAIG SWENSON	376-0288
QA		
QC		
Cog - Engineer		
CGI Engineer		
Procurement Engineer		
Other		

SECTION 7 SUPPORTING DOCUMENTATION FOR THIS CHECKLIST		
Initial Procurement Documents		**For Critical Characteristics**
	Drawings:	
X	Manuals (specify type & number): **Sensotec Manual**	**All**
	Design Calculations	
	Installation Instructions	
	Operation Instructions	
	Calibration Instructions	
	Manufacturer's Recommended Spare Parts List	
	Other:	
Procurement Documents		**For Critical Characteristics**
	Certificate of Conformance/Compliance	
	Seismic Qualification Certificate	
	Environmental Qualification Certificate	
	Test Report (s):	
	Inspection Report (s):	
	CMTRs for ASME Pressure Retaining Materials	
	Valve Seat Leakage Report	
	Weld Record	
	Material Traceability Record	
X	**Other: CSB (W379)-015-11-059 & 060**	**Operational CCs**

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Attachment A

MHM WEIGHT SYSTEM LOAD TEST FOR X AND Y CHANNELS

3964 Grappel + test block Total load

	Meter readings	Force applied	Total load	X ch	Y ch	X error	Y error	X-Y diff
	216	2160	6124	5911	5549	213	575	362
	421	4210	8174	7916	7514	258	660	402
	620	6200	10164	9896	9463	268	701	433
	821	8210	12174	11910	11480	264	694	430
Increasing	1020	10200	14164	13914	13449	250	715	465
weight	1215	12150	16114	15910	15450	204	664	460
	1410	14100	18064	17910	17425	154	639	485
	1605	16050	20014	19920	19420	94	594	500
	1800	18000	21964	21920	21400	44	564	520
	1992	19920	23884	23915	23350	-31	534	565
	2195	21950	25914	25920	25350	-6	564	570
	2385	23850	27814	27945	27320	-131	494	625
	2580	25800	29764	29930	29311	-166	453	619
	2765	27650	31614	31906	31250	-292	364	656
	2510	25100	29064	29890	29215	-826	-151	675
	2312	23120	27084	27896	27244	-812	-160	652
	2105	21050	25014	25699	25076	-685	-62	623
	1915	19150	23114	23780	23170	-666	-56	610
Decreasing	1728	17280	21244	21915	21270	-671	-26	645
weight	1524	15240	19204	19855	19242	-651	-38	613
	1335	13350	17314	17875	17310	-561	4	565
	1138	11380	15344	15791	15244	-447	100	547
	950	9500	13464	13899	13362	-435	102	537
	740	7400	11364	11800	11260	-436	104	540
	550	5500	9464	9875	9340	-411	124	535
	370	3700	7664	7850	7399	-186	265	451
	170	1700	5664	5895	5460	-231	204	435

ALL readings are in pounds

DLW 6/24/99

TP Status.xls Load Cell Load Cell Readings - per CSB(W379)-015-11-060 4/12/00 3:59 PM

Direction	Force	Total	X	X-Error	Y	Y-Error	Avg Error
Inc	2160	6124	5911	3.48%	5549	**9.39%**	**6.43%**
Inc	4210	8174	7916	3.16%	7514	**8.07%**	**5.62%**
Inc	6200	10164	9896	2.64%	9463	**6.90%**	4.77%
Inc	8210	12174	11910	2.17%	11480	**5.70%**	3.93%
Inc	10200	14164	13914	1.77%	13449	**5.05%**	3.41%
Inc	12150	16114	15910	1.27%	15450	4.12%	2.69%
Inc	14100	18064	17910	0.85%	17425	3.54%	2.19%
Inc	16050	20014	19920	0.47%	19420	2.97%	1.72%
Inc	18000	21964	21920	0.20%	21400	2.57%	1.38%
Inc	19920	23884	23915	-0.13%	23350	2.24%	1.05%
Inc	21950	25914	25920	-0.02%	25350	2.18%	1.08%
Inc	23850	27814	27945	-0.47%	27320	1.78%	0.65%
Inc	25800	29764	29930	-0.56%	29311	1.52%	0.48%
Inc	27650	31614	31906	-0.92%	31250	1.15%	0.11%
				Average Error over Span (Inc):			**2.54%**
Dec	25100	29064	29890	-2.84%	29215	-0.52%	-1.68%
Dec	23120	27084	27896	-3.00%	27244	-0.59%	-1.79%
Dec	21050	25014	25699	-2.74%	25076	-0.25%	-1.49%
Dec	19150	23114	23780	-2.88%	23170	-0.24%	-1.56%
Dec	17280	21244	21915	-3.16%	21270	-0.12%	-1.64%
Dec	15240	19204	19855	-3.39%	19242	-0.20%	-1.79%
Dec	13350	17314	17875	-3.24%	17310	0.02%	-1.61%
Dec	11380	15344	15791	-2.91%	15244	0.65%	-1.13%
Dec	9500	13464	13899	-3.23%	13362	0.76%	-1.24%
Dec	7400	11364	11800	-3.84%	11260	0.92%	-1.46%
Dec	5500	9464	9875	-4.34%	9340	1.31%	-1.52%
Dec	3700	7664	7850	-2.43%	7399	3.46%	0.52%
Dec	1700	5664	5895	-4.08%	5460	3.60%	-0.24%
				Average Error over Span (Dec):			**-1.28%**

Max. Deviation Allowed = 5% over span

X-Error = (Total-X)/Total
Y-Error = (Total-Y)/Total
Avg Error = (YError + XError)/2

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ORIGINAL

Dedication Test Plan – IST-LC-1 Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-016A-TP-016AX1
Test Specimen: Sensotec Load Cell FM/C717-01, Eqmt. No.: LCMHR1X Page 1 of 6

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				Cog. Eng	DA	QA Post Review*
						3/13/00 NO CHANGE

* QA Post Review of Individual Revisions is allowed

ORIGINAL

In-Situ Test Procedure

Test Procedure Approval (Obtain prior to testing): ORIGINAL

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) Craig Swenson Date: 3/6/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Belhaven	Michael Cram	MRC
Electrician	J WEBERHART	PCE	J W Eberhart	JWE
Electrician Quality Control	Stephen R. Cooley	PCE	Stephen R Cooley	SRC
Design Authority Representative	E.R. Kahler	XWest	E R Kahler	ERK
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Insulation Resistance Instrument capable of measuring >100 megohms
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: HP3457A I.D.: BAT 123 Calib. Due date: 7-29-00

Test Instrument type: Proto 6106 I.D.: 0296/009 Calib. Due date: 01-13-01

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE:

For this In-Situ Test, certain leads must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of leads.

1.0 Lock and tagout Main Disconnect CRN-004, or Main Disconnect MD.

2.0 Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	YES	**LCMHR1X**	Acc
Manufacturer:	YES	**Sensotec**	Acc
Model:	YES	**FM/C717-01**	Acc
Serial No./Lot No./Date Code:	OK	**N/A**	Acc

3.0 Perform the following testing steps:

3.1 Record: Date /Time of Test Beginning: 03-09-00 9:00 a.m

Record: Room Temperature: 70 °F.

3.2 Insulation Resistance Test

3.2.1 Setup the test equipment and Load Cell specimen for insulation resistance testing.

Warning: Do not use a high-voltage Hypot tester or Megger type tester! Test Equipment must apply no more than 20 VDC

3.2.2 Disconnect wires from terminals on TB2 on the System 1 J-Box, record and verify on the Lifted Lead Log.

3.2.3 Apply a maximum of 20 VDC via Ohmmeter between wire No. LC11X from the load cell at the System 1 J-box and the metal casing of the load cell, LCMHR1X. Record the resistance.

3.2.4 Then connect Ohmmeter between wire No. LC12X from the load cell at the System 1 J-box and the metal casing of the load cell, LCMHR1X. Record the resistances.

3.2.5 Then connect Ohmmeter between wire No. LC15X from the load cell at the System 1 J-box and the metal casing of the load cell, LCMHR1X. Record the resistances.

3.2.6 Then connect Ohmmeter between wire No. LC16X from the load cell at the System 1 J-box and the metal casing of the load cell, LCMHR1X. Record the resistances.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Resistance	Acceptance Criteria	Comments/Deviations
LC11X	**Load Cell Housing**	>100Gohm	**>100 Megohms -0% +5%**	Acc
LC12X	**Load Cell Housing**	>100Gohm	**>100 Megohms -0% +5%**	Acc
LC15X	**Load Cell Housing**	>100Gohm	**>100 Megohms -0% +5%**	Acc
LC16X	**Load Cell Housing**	>100Gohm	**>100 Megohms -0% +5%**	Acc

3.2.4 Connect Ohmmeter between wire nos. LC11X and LC12X. Record the resistance. Then connect Ohmmeter between wire nos. LC15X and LC16X. Record the resistance.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Resistance	Acceptance Criteria	Comments/Deviations
LC11X	**LC12X**	350.2 ohms	**350-700 Ohms ± 5%**	Acc
LC15X	**LC16X**	350.2 ohms	**350-700 Ohms ± 5%**	Acc

3.2.5 De-energize and remove the test equipment.

3.3 Terminate the test.

3.3.1 Reland the lifted leads and verify reland in accordance with the Lifted Lead Log.

3.3.2 Retorque the terminals to 12 in-pounds.

3.3.3 Remove lockout/tagout and restore system to normal.

3.3.3 Record: Date /Time of Test End: 03-09-00 10:30 a.m.

4.0 References

4.1 Elementary Wiring Drawings: EB-33056 Sheet 11

4.2 Wiring Diagram: 363A0033 Sheet 9

Dedication Test Plan – IST-LC-1	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-016A-TP-016AX1	
Test Specimen: Sensotec Load Cell FM/C717-01, Eqmt. No.: LCMHR1X	Page 5 of 6

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Devices under test have proved all parameters.

Michael Crane
03-09-00

Notes:

Certified Instrumentation Technician (signature) Michael Crane Date: 03-09-00
Reviewed By: L. Cannon 3-10-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) 3/9/00 Craig Anderson Date: 3-9-00

QA/QC (signature) T ZANDERSON Date: 3/13/00

LIFTED LEAD LOG

Junction Box: System 1 J-Box TB-2

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
EB-33056	11	LC11X	LCMHR1X	TB2-1	JWE	3/9/00	SRC	3-9-00	JWE	3/9/00	SRC	3-9-00
EB-33056	11	LC12X	LCMHR1X	TB2-5	JWE	3/9/00	SRC	3-9-00	JWE	3/9/00	SRC	3-9-00
EB-33056	11	LC16X	LCMHR1X	TB2-3	JWE	3/9/00	SRC	3-9-00	JWE	3/9/00	SRC	3-9-00
EB-33056	11	LC15X	LCMHR1X	TB2-4	JWE	3/9/00	SRC	3-9-00	JWE	3/9/00	SRC	3-9-00
EB-33056	11	Jumper	LCMHR1X	TB2-1 to TB-2-2	JWE	3/9/00	SRC	3-9-00	JWE	3/9/00	SRC	3-9-00
EB-33056	11	Jumper	LCMHR1X	TB2-5 to TB-2-6	JWE	3/9/00	SRC	3-9-00	JWE	3/9/00	SRC	3-9-00

Remarks:

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ORIGINAL

Dedication Test Plan – IST-LC-1 Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-016A-TP-016AX2
Test Specimen: Sensotec Load Cell FM/C717-01, Eqmt. No.: LCMHR2X Page 1 of 6

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				Cog. Eng	DA	QA Post Review*
						3/13/00 NO CHANGE

* QA Post Review of Individual Revisions is allowed

ORIGINAL

In-Situ Test Procedure

ORIGINAL

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) Craig Swenson Date: 3/6/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Belhaven	Michael Cram	MRC
Electrician	J W Eberhart	PCE	J W Eberhart	JWE
Electrician Quality Control	Stephen R. Conley	PCE	Stephen R. Conley	SRC
Design Authority Representative	E.R. Kahler	XWest	E R Kahler	ERK
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Insulation Resistance Instrument capable of measuring >100 megohms
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: HP 3457A I.D.: BAT 123 Calib. Due date: 7-29-00

Test Instrument type: PROTO 6106 I.D.: 029E/009 Calib. Due date: 01-13-01

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE:

For this In-Situ Test, certain leads must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of leads.

1.0 Lock and tagout Main Disconnect CRN-004, or Main Disconnect MD.

2.0 Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	YES	**LCMHR2X**	Acc
Manufacturer:	YES	**Sensotec**	Acc.
Model:	YES	**FM/C717-01**	Acc.
Serial No./Lot No./Date Code:	OK	**N/A**	Acc.

3.0 Perform the following testing steps:

3.1 Record: Date /Time of Test Beginning: 03-09-00 9:00 a.m.

Record: Room Temperature: 70 °F.

3.2 Insulation Resistance Test

3.2.1 Setup the test equipment and Load Cell specimen for insulation resistance testing.

Warning: Do not use a high-voltage Hypot tester or Megger type tester! Test Equipment must apply no more than 20 VDC

3.2.2 Disconnect wires from terminals on TB2 on the System 1 J-Box, record and verify on the Lifted Lead Log.

3.2.3 Apply a maximum of 20 VDC via Ohmmeter between wire No. LC21X from the load cell at the System 1 J-box and the metal casing of the load cell, LCMHR2X. Record the resistance.

3.2.4 Then connect Ohmmeter between wire No. LC22X from the load cell at the System 1 J-box and the metal casing of the load cell, LCMHR2X. Record the resistances.

3.2.5 Then connect Ohmmeter between wire No. LC25X from the load cell at the System 1 J-box and the metal casing of the load cell, LCMHR2X. Record the resistances.

3.2.6 Then connect Ohmmeter between wire No. LC26X from the load cell at the System 1 J-box and the metal casing of the load cell, LCMHR2X. Record the resistances.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Resistance	Acceptance Criteria	Comments/Deviations
LC21X	Load Cell Housing	> 100 Gohm	>100 Megohms -0% +5%	Acc
LC22X	Load Cell Housing	> 100 Gohm	>100 Megohms -0% +5%	Acc
LC25X	Load Cell Housing	> 100 Gohm	>100 Megohms -0% +5%	Acc
LC26X	Load Cell Housing	> 100 Gohm	>100 Megohms -0% +5%	Acc

3.2.4 Connect Ohmmeter between wire nos. LC21X and LC22X. Record the resistance. Then connect Ohmmeter between wire nos. LC25X and LC26X. Record the resistance.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Resistance	Acceptance Criteria	Comments/Deviations
LC21X	LC22X	350.2 ohms	350-700 Ohms ± 5%	Acc
LC25X	LC26X	350.2 ohms	350-700 Ohms ± 5%	Acc.

3.2.5 De-energize and remove the test equipment.

3.3 Terminate the test.

3.3.1 Reland the lifted leads and verify reland in accordance with the Lifted Lead Log.

3.3.2 Retorque the terminals to 12 in-pounds.

3.3.3 Remove lockout/tagout and restore system to normal.

3.3.3 Record: Date /Time of Test End: 03-09-00 10:35 a.m.

4.0 References

4.1 Elementary Wiring Drawings: EB-33056 Sheet 11

4.2 Wiring Diagram: 363A0033 Sheet 9

Dedication Test Plan – IST-LC-1	**Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-016A-TP-016AX2	
Test Specimen: Sensotec Load Cell FM/C717-01, Eqmt. No.: LCMHR2X	**Page 5 of 6**

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Devices under test have passed all parameters

Michael Crum
03-09-00

Notes:

Certified InstrumentationTechnician (signature) Michael Crum Date: 03-09-00
Reviewed By: J. Cadena 3-10-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) 3/9/00 Craig Anderson Date: 3-9-00

QA/QC (signature) T.Z. Anderson Date: 3/13/00.
T Z ANDERSON

LIFTED LEAD LOG

Junction Box: System 1 J-Box TB-2

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
EB-33056	11	LC21X	LCMHR2X	TB2-2	JWE	3/9/00	SRC	3-9-00	JWE	3/9/00	SRC	3-9-00
EB-33056	11	LC22X	LCMHR2X	TB2-6	JWE	3/9/00	SRC	3-9-00	JWE	3/9/00	SRC	3-9-00
EB-33056	11	LC26X	LCMHR2X	TB2-3	JWE	3/9/00	SRC	3-9-00	JWE	3/9/00	SRC	3-9-00
EB-33056	11	LC25X	LCMHR2X	TB2-4	JWE	3/9/00	SRC	3-9-00	JWE	3/9/00	SRC	3-9-00
EB-33056	11	Jumper	LCMHR2X	TB2-1 to TB-2-2	JWE	3/9/00	SRC	3-9-00	JWE	3/9/00	SRC	3-9-00
EB-33056	11	Jumper	LCMHR2X	TB2-5 to TB-2-6	JWE	3/9/00	SRC	3-9-00	JWE	3/9/00	SRC	3-9-00

Remarks:

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Dedication Test Plan – IST-LC-1 ORIGINAL Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-016A-TP-016AY1
Test Specimen: Sensotec Load Cell FM/C717-01, Eqmt. No.: LCMHR1Y Page 1 of 6

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				Cog. Eng	DA	QA Post Review*
						3/13/00 NO CHANGE

* QA Post Review of Individual Revisions is allowed

ORIGINAL

In-Situ Test Procedure

ORIGINAL

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) Craig Swenson Date: 3/6/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Bellhaven	Michael Cram	MRC
Electrician	J W EBERHART	PCE	J W Eberhart	JWE
Electrician Quality Control	Stephen R. Cowley	PCE	Stephen R Cowley	SRC
Design Authority Representative	E.R. Kahler	XWest	E R Kahler	ERK
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Insulation Resistance Instrument capable of measuring >100 megohms
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: HP3457A I.D.: BAT 123 Calib. Due date: 07-29-00

Test Instrument type: FLUKE 6106 I.D.: 029E10009 Calib. Due date: 01-13-01

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE:

For this In-Situ Test, certain leads must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of leads.

1.0 Lock and tagout Main Disconnect CRN-004, or Main Disconnect MD.

2.0 Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	YES	**LCMHR1Y**	Acc
Manufacturer:	YES	**Sensotec**	Acc
Model:	YES	**FM/C717-01**	Acc
Serial No./Lot No./Date Code:	OK	**N/A**	Acc

3.0 Perform the following testing steps:

3.1 Record: Date /Time of Test Beginning: 03-09-00 10:35 a.m.

Record: Room Temperature: 68 °F.

3.2 Insulation Resistance Test

3.2.1 Setup the test equipment and Load Cell specimen for insulation resistance testing.

Warning: Do not use a high-voltage Hypot tester or Megger type tester! Test Equipment must apply no more than 20 VDC

3.2.2 Disconnect wires from terminals on TB2 on the System 2 J-Box, record and verify on the Lifted Lead Log.

3.2.3 Apply a maximum of 20 VDC via Ohmmeter between wire No. LC11Y from the load cell at the System 2 J-box and the metal casing of the load cell, LCMHR1Y. Record the resistance.

3.2.4 Then connect Ohmmeter between wire No. LC12Y from the load cell at the System 2 J-box and the metal casing of the load cell, LCMHR1Y. Record the resistances.

3.2.5 Then connect Ohmmeter between wire No. LC15Y from the load cell at the System 2 J-box and the metal casing of the load cell, LCMHR1Y. Record the resistances.

3.2.6 Then connect Ohmmeter between wire No. LC16Y from the load cell at the System 2 J-box and the metal casing of the load cell, LCMHR1Y. Record the resistances.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Resistance	Acceptance Criteria	Comments/Deviations
LC11Y	Load Cell Housing	> 100Gohm	>100 Megohms -0% +5%	Acc
LC12Y	Load Cell Housing	>100Gohm	>100 Megohms -0% +5%	Acc
LC15Y	Load Cell Housing	>100Gohm	>100 Megohms -0% +5%	Acc
LC16Y	Load Cell Housing	> 100ohm	>100 Megohms -0% +5%	Acc

3.2.4 Connect Ohmmeter between wire nos. LC11Y and LC12Y. Record the resistance. Then connect Ohmmeter between wire nos. LC15Y and LC16Y. Record the resistance.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Resistance	Acceptance Criteria	Comments/Deviations
LC11Y	LC12Y	350.1ohm	350-700 Ohms ± 5%	Acc
LC15Y	LC16Y	349.9ohm	350-700 Ohms ± 5%	Acc

3.2.5 De-energize and remove the test equipment.

3.3 Terminate the test.

3.3.1 Reland the lifted leads and verify reland in accordance with the Lifted Lead Log.

3.3.2 Retorque the terminals to 12 in-pounds.

3.3.3 Remove lockout/tagout and restore system to normal.

3.3.3 Record: Date /Time of Test End: 03-09-00 11:10 a.m.

4.0 References

4.1 Elementary Wiring Drawings: EB-33056 Sheet 12

4.2 Wiring Diagram: 363A0033 Sheet 13

Dedication Test Plan – IST-LC-1	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-016A-TP-016AY1	
Test Specimen: Sensotec Load Cell FM/C717-01, Eqmt. No.: LCMHR1Y	Page 5 of 6

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Devices under test have passed all parameters

Michael Cram
03-09-00

Notes:

Certified InstrumentationTechnician (signature) Michael Cram Date: 03-09-00

Reviewed By: J. Cassick 3-10-00

Completed Test Evaluation Approval:

Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) 3/9/00 Craig Swenson Date: 3-9-00

QA/QC (signature) T.Z. Anderson Date: 3/9/00

T Z ANDERSON

LIFTED LEAD LOG

Junction Box: System 2 J-Box TB-2

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
EB-33056	12	LC11Y	LCMHR1Y	TB2-1	JWE	3/9/00	SRC	3-9-00	JWE	3/9/00	SRC	3-9-00
EB-33056	12	LC12Y	LCMHR1Y	TB2-5	JWE	3/9/00	SRC	3-9-00	JWE	3/9/00	SRC	3-9-00
EB-33056	12	LC16Y	LCMHR1Y	TB2-3	JWE	3/9/00	SRC	3-9-00	JWE	3/9/00	SRC	3-9-00
EB-33056	12	LC15Y	LCMHR1Y	TB2-4	JWE	3/9/00	SRC	3-9-00	JWE	3/9/00	SRC	3-9-00
EB-33056	12	Jumper	LCMHR1Y	TB2-1 to TB-2-2	JWE	3/9/00	SRC	3-9-00	JWE	3/9/00	SRC	3-9-00
EB-33056	12	Jumper	LCMHR1Y	TB2-5 to TB-2-6	JWE	3/9/00	SRC	3-9-00	JWE	3/9/00	SRC	3-9-00

Remarks:

Dedication Test Plan – IST-LC-1 ORIGINAL Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-016A-TP-016AY2
Test Specimen: Sensotec Load Cell FM/C717-01, Eqmt. No.: LCMHR2Y Page 1 of 6

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				Cog. Eng	DA	QA Post Review*
						3/13/00 NO CHANGE

* QA Post Review of Individual Revisions is allowed

ORIGINAL

In-Situ Test Procedure

ORIGINAL

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) Craig Swenson Date: 3/6/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Bellhaven	Michael Cram	MRC
Electrician	J WEBERHART	PCE	JW Eberhart	JWE
Electrician Quality Control	Stephen R. Conley	PCE	Stephen R. Conley	SRC
Design Authority Representative	E.R. Kahler	XWest	ERKahler	ERK
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Insulation Resistance Instrument capable of measuring >100 megohms
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: HP 34574 I.D.: BAT 123 Calib. Due date: 07-29-00

Test Instrument type: PROTO 6106 I.D.: 029E/C09 Calib. Due date: 01-13-01

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE:

For this In-Situ Test, certain leads must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of leads.

1.0 Lock and tagout Main Disconnect CRN-004, or Main Disconnect MD.

2.0 Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	YES	**LCMHR2Y**	Acc.
Manufacturer:	YES	**Sensotec**	Acc
Model:	YES	**FM/C717-01**	Acc
Serial No./Lot No./Date Code:	OK	**N/A**	Acc

3.0 Perform the following testing steps:

3.1 Record: Date /Time of Test Beginning: 03-09-00 10:36 a.m.

Record: Room Temperature: 68 °F.

3.2 Insulation Resistance Test

3.2.1 Setup the test equipment and Load Cell specimen for insulation resistance testing.

Warning: Do not use a high-voltage Hypot tester or Megger type tester! Test Equipment must apply no more than 20 VDC

3.2.2 Disconnect wires from terminals on TB2 on the System 2 J-Box, record and verify on the Lifted Lead Log.

3.2.3 Apply a maximum of 20 VDC via Ohmmeter between wire No. LC21Y from the load cell at the System 1 J-box and the metal casing of the load cell, LCMHR2Y. Record the resistance.

3.2.4 Then connect Ohmmeter between wire No. LC22Y from the load cell at the System 2 J-box and the metal casing of the load cell, LCMHR2Y. Record the resistances.

3.2.5 Then connect Ohmmeter between wire No. LC25Y from the load cell at the System 2 J-box and the metal casing of the load cell, LCMHR2Y. Record the resistances.

3.2.6 Then connect Ohmmeter between wire No. LC26Y from the load cell at the System 2 J-box and the metal casing of the load cell, LCMHR2Y. Record the resistances.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Resistance	Acceptance Criteria	Comments/Deviations
LC21Y	**Load Cell Housing**	> 100 Gohm	**>100 Megohms -0% +5%**	Acc.
LC22Y	**Load Cell Housing**	> 100Gohm	**>100 Megohms -0% +5%**	Acc
LC25Y	**Load Cell Housing**	> 100Gohm	**>100 Megohms -0% +5%**	Acc.
LC26Y	**Load Cell Housing**	> 100Gohm	**>100 Megohms -0% +5%**	Acc

3.2.4 Connect Ohmmeter between wire nos. LC21Y and LC22Y. Record the resistance. Then connect Ohmmeter between wire nos. LC25Y and LC26Y. Record the resistance.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Resistance	Acceptance Criteria	Comments/Deviations
LC21Y	**LC22Y**	350.1 ohm	**350-700 Ohms ± 5%**	Acc
LC25Y	**LC26Y**	349.9 ohm	**350-700 Ohms ± 5%**	Acc

3.2.5 De-energize and remove the test equipment.

3.3 Terminate the test.

3.3.1 Reland the lifted leads and verify reland in accordance with the Lifted Lead Log.

3.3.2 Retorque the terminals to 12 in-pounds.

3.3.3 Remove lockout/tagout and restore system to normal.

3.3.3 Record: Date /Time of Test End: 03-09-00 11.12 a.m

4.0 References

4.1 Elementary Wiring Drawings: EB-33056 Sheet 12

4.2 Wiring Diagram: 363A0033 Sheet 13

Dedication Test Plan – IST-LC-1	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-016A-TP-016AY2	
Test Specimen: Sensotec Load Cell FM/C717-01, Eqmt. No.: LCMHR2Y	Page 5 of 6

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Devices under test have passed all parameters.

Michael Crum
03-09-00

Notes:

Certified InstrumentationTechnician (signature) Michael Crum Date: 03-09-00
Reviewed By: J. Cusick 3-10-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) 3/9/00 Craig Swenson Date: 3-9-00

QA/QC (signature) T ZANDERSON Date: 3/13/00

LIFTED LEAD LOG

Junction Box: System 2 J-Box TB-2

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
EB-33056	12	LC21Y	LCMHR2Y	TB2-2	JWE	3/9/00	SRC	3-9-00	JWE	3/9/00	SRC	3-9-00
EB-33056	12	LC22Y	LCMHR2Y	TB2-6	JWE	3/9/00	SRC	3-9-00	JWE	3/9/00	SRC	3-9-00
EB-33056	12	LC26Y	LCMHR2Y	TB2-3	JWE	3/9/00	SRC	3-9-00	JWE	3/9/00	SRC	3-9-00
EB-33056	12	LC25Y	LCMHR2Y	TB2-4	JWE	3/9/00	SRC	3-9-00	JWE	3/9/00	SRC	3-9-00
EB-33056	12	Jumper	LCMHR2Y	TB2-1 to TB-2-2	JWE	3/9/00	SRC	3-9-00	JWE	3/9/00	SRC	3-9-00
EB-33056	12	Jumper	LCMHR2Y	TB2-5 to TB-2-6	JWE	3/9/00	SRC	3-9-00	JWE	3/9/00	SRC	3-9-00

Remarks:

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cal #2 Signal Cards

DATA SHEET 11.1
LOCAL INDICATOR INSPECTION AND TEST RECORD

System No.: 015	Project: W379	
Instrument No.: MCOWD-1		
Function: MCO Hoist Weight Display 1		
Manufacturer: M/D Totco	Model No.: LM2000	Location: MHM Console
Reference Documents (Vendor Information, Drawings): EB-33056, Sht. 11		
Instrument Input Range: 4	to 20	Units: mA
Instrument Indication Range: 0	to 30,000	Units: lbs
Allowable Instrument Error: ±0.15 % DCN 7/8/99		
Startup Contact: Jon Molnar		Phone: 372-8794

Special Instructions: Reference TDR CSB(W379)-015-11-060-2, replaced signal conditioning card with 1mv/v card. New scaling is 4 ~ 20 mA = 0 – 30,000lbs. Recalibrate with new scaling.

NOTE: SET ALL RELAYS TO UNLATCHED.

Verify alarm setpoint values and relays are set in programming as follows:
High High = 24,597 Rly 3

High = 20,000 (Alarm point to enable proper operation)

Low = 7,180 Rly 1

Low Low = 1,840 Rly 4

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DATA SHEET 11.1
LOCAL INDICATOR INSPECTION AND TEST RECORD (Continued)

TEST EQUIPMENT	M&TE NUMBER	CALIBRATION DUE DATE
Fluke 867B Multimeter	1056024	5/12/00
Transmation	1056010	3/15/00

Proc. Step No.	ACTION	INITIAL/DATE
3.0	PREREQUISITES COMPLETED	DLW 16/11/99
5.0	INITIAL CONDITIONS COMPLETED	DLW 16/11/99
7.0	INSPECTION AND TEST RESULTS	
7.1	Installation inspection satisfactory	DLW 16/11/99
7.2	Electrical inspection satisfactory	DLW 16/11/99
7.3	Liquid/Gas service piping inspection satisfactory	N/A 1
7.4	Head correction completed	N/A 1
7.5	Instrument removed or isolated	DLW 16/11/99
7.6	Instrument range 0 to 30,000 Units Lbs	DLW 16/11/99
	Allowable instrument error 0.15 Units % F.S.	DLW 16/11/99

6/11/99

7.10, 7.11, 7.12, 7.13, 7.14:

INPUT UNITS: mA

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DATA SHEET 11.1
LOCAL INDICATOR INSPECTION AND TEST RECORD (Continued)

% SPAN	DESIRED OUTPUT	AS FOUND OUTPUT	OUTPUT ERROR	FINAL OUTPUT	FINAL ERROR	INIT/ DATE
0% 4mA	0	0	0	0	0	DLW 6/11/99
25% 8mA	7500	7500	0	7500	0	DLW 6/11/99
50% 12mA	15,000	14995	-5	14995	-5	DLW 6/11/99
75% 16mA	22,500	22497	-3	22497	-3	DLW 6/11/99
100% 20mA	30,000	29998	-2	29998	-2	DLW 6/11/99
75% 16mA	22,500	22498	-2	22498	-2	DLW 6/11/99
50% 12mA	15,000	14997	-3	14997	-3	DLW 6/11/99
25% 8mA	7500	7498	-2	7498	-2	DLW 6/11/99
0% 4mA	0	-1	-1	-1	-1	DLW 6/11/99
Allowable error----------→			+/-0.15% DLW 7/14/99	---------→	±	1

Proc. Step No.	ACTION	INITIAL/DATE
7.13	Calculated error less than allowable error (10.1)	DLW 6/11/99
7.15	Calibration sticker attached	DLW 6/11/99
8.0	RESTORATION COMPLETE	DLW 6/11/99

Remarks: _____

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DATA SHEET 11.1
LOCAL INDICATOR INSPECTION AND TEST RECORD (Continued)

Performed By: [signature] Technician   Date: 6/11/99

Reviewed By: [signature] A.I. Witness   Date: 7-12-99

Reviewed By: [signature] Startup Test Engineer   Date: 6/14/99

Approved By: [signature] Test Director   Date: 6/14/99

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Reval. #1

DATA SHEET 11.1
LOCAL INDICATOR INSPECTION AND TEST RECORD

System No.: 015	Project: W379	
Instrument No.: MCOWD-1		
Function: MCO Hoist Weight Display 1		
Manufacturer: M/D Totco	Model No.: LM2000	Location: MHM Console
Reference Documents (Vendor Information, Drawings): EB-33056, Sht. 11		
Instrument Input Range: 4	to 11.63	Units: mA
Instrument Indication Range: 0	to 30,000	Units: lbs
Allowable Instrument Error: ±0.15 % (initialed 7/8/99)		
Startup Contact: Jon Molnar		Phone: 372-8794

Special Instructions: Reference TDR CSB(W379)-015-11-60-2. It was found that the load cell output does not match the Signal Conditioner full scale input. Load cell output is .83 m/v. The Signal Conditioner need 2 mv/v input for full span output of 4-20 mA. The output from the signal conditioner with full scale output from load cell applied will produce a max 11.63 mA. Set scaling at 4 - 11.63 mA equals 0 to 30,000 lbs.

NOTE: SET ALL RELAYS TO UNLATCHED.

Verify alarm setpoint values and relays are set in programming as follows:
High High = 24,597 Rly 3

High = 20,000 (Alarm point to enable proper operation)

Low = 7,180 Rly 1

Low Low = 1,840 Rly 4

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DATA SHEET 11.1
LOCAL INDICATOR INSPECTION AND TEST RECORD (Continued)

TEST EQUIPMENT	M&TE NUMBER	CALIBRATION DUE DATE
Fluke 743B Calibrator	105 6155	9/30/99
Transmation	105 6010	3/15/99

Proc. Step No.	ACTION	INITIAL/DATE
3.0	PREREQUISITES COMPLETED	DLW 1 5/19/99
5.0	INITIAL CONDITIONS COMPLETED	DLW 1 5/19/99
7.0	INSPECTION AND TEST RESULTS	
7.1	Installation inspection satisfactory	DLW 1 5/19/99
7.2	Electrical inspection satisfactory	DLW 1 5/19/99
7.3	Liquid/Gas service piping inspection satisfactory	N/A 1 5/19/99
7.4	Head correction completed	N/A 1
7.5	Instrument removed or isolated	DLW 1 5/19/99
7.6	Instrument range 0 to 30,000 Units Lbs	DLW 1 5/19/99
	Allowable instrument error 0.15 Units % F.S.	DLW 1 5/19/99

7.10, 7.11, 7.12, 7.13, 7.14:

INPUT UNITS: mA

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DATA SHEET 11.1
LOCAL INDICATOR INSPECTION AND TEST RECORD (Continued)

% SPAN	DESIRED OUTPUT	AS FOUND OUTPUT	OUTPUT ERROR	FINAL OUTPUT	FINAL ERROR	INIT/ DATE
0% 4 mA	0	0	Ø	0	Ø	DLW 15/19/99
25% 5.91 mA	7500	7518	+18	7518	+18	DLW 15/19/99
50% 7.81 mA	15,000	14983	-17	14983	-17	DLW 15/19/99
75% 9.72 mA	22,500	22494	-6	22494	-6	DLW 15/19/99
100% 11.63 mA	30,000	30005	+5	30005	+5	DLW 15/19/99
75% 9.72 mA	22,500	22487	-13	22487	-13	DLW 15/19/99
50% 7.81 mA	15,000	14986	-14	14986	-14	DLW 15/19/99
25% 5.91 mA	7500	7504	+4	7504	+4	DLW 15/19/99
0% 4 mA	0	6	+6	6	+6	DLW 15/19/99
Allowable error----------→			±0.15% DLW 7/7/99	---------→	±	/

Proc. Step No.	ACTION	INITIAL/DATE
7.13	Calculated error less than allowable error (10.1)	DLW 15/19/99
7.15	Calibration sticker attached	DLW 15/19/99
8.0	RESTORATION COMPLETE	DLW 15/19/99

Remarks: _____

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DATA SHEET 11.1
LOCAL INDICATOR INSPECTION AND TEST RECORD (Continued)

Performed By: Dawayne Welch (Technician) Date: 5/19/99

Reviewed By: [signature] (A.I. Witness) Date: 7-12-99

Reviewed By: Roberto V. Cruz (Startup Test Engineer) Date: 6/14/99

Approved By: [signature] (Test Director) Date: 6/14/99

SPENT NUCLEAR FUEL PROJECT	Procedure No.	SNF-CTP-IC-03
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DATA SHEET 11.1
LOCAL INDICATOR INSPECTION AND TEST RECORD

System No.: 015	Project: W379	
Instrument No.: MCOWD-1		
Function: MCO Hoist Weight Display 1		
Manufacturer: M/D Totco	Model No.: LM2000	Location: MHM Console
Reference Documents (Vendor Information, Drawings): EB-33056, Sht. 11		
Instrument Input Range: 4	to 20	Units: mA
Instrument Indication Range: 0	to 30,000	Units: Lbs
Allowable Instrument Error:	± 0.15 % DLW 7/8/99	
Startup Contact: Jon Molnar		Phone: 372-8794

Special Instructions: NOTE: SET ALL RELAYS TO UNLATCHED.

Verify alarm setpoint values are set in programming as follows:

Alarm 1 = 7180 RY3 HH = 24597
H = 29000 FAKE Alarm point

Alarm 3 = 11,840 RY1 L = 7180

Alarm 4 = 1840 RY4 LL = 1840

TEST EQUIPMENT	M&TE NUMBER	CALIBRATION DUE DATE
Fluke 867B multimeter	1050665	11/2/99
Fluke 743B calibrator	1056155	9/30/99

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DATA SHEET 11.1
LOCAL INDICATOR INSPECTION AND TEST RECORD (Continued)

Proc. Step No.	ACTION	INITIAL/DATE
3.0	PREREQUISITES COMPLETED	DLW 1 4/26/99
5.0	INITIAL CONDITIONS COMPLETED	DLW 1 4/26/99
7.0	INSPECTION AND TEST RESULTS	
7.1	Installation inspection satisfactory	DLW 1 4/26/99
7.2	Electrical inspection satisfactory	DLW 1 4/26/99
7.3	Liquid/Gas service piping inspection satisfactory	N/A 1
7.4	Head correction completed	N/A 1
7.5	Instrument removed or isolated	DLW 1 4/26/99
7.6	Instrument range 0 to 30,000 Units Lbs	DLW 1 4/26/99
	Allowable instrument error 0.15 Units % F.S.	DLW 1 4/26/99

Jan 4/26/99

7.10, 7.11, 7.12, 7.13, 7.14:

INPUT UNITS: mA

% SPAN	DESIRED OUTPUT	AS FOUND OUTPUT	OUTPUT ERROR	FINAL OUTPUT	FINAL ERROR	INIT/ DATE
4 0%	0	0	ø	0	ø	DLW 1 4/26/99
8 25%	7500	7500	ø	7500	ø	DLW 14/26/99
12 50%	15,000	14,999	-1	14,999	-1	DLW 14/26/99
16 75%	22,500	22,500	ø	22,500	ø	DLW 14/26/99

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DATA SHEET 11.1
LOCAL INDICATOR INSPECTION AND TEST RECORD (Continued)

100% 20	30,000	30,001	+1	30,001	+1	1
75% 16	22,500	22,500	Ø	22,500	Ø	1
50% 12	15,000	14,999	-1	14,999	-1	1
25% 8	7500	7499	-1	7499	-1	1
0% 40	0	1	+1	1	+1	1
Allowable error----------→			±0.15% Dw 7/7/99	---------→	±	1

Proc. Step No.	ACTION	INITIAL/DATE
7.13	Calculated error less than allowable error (10.1)	DLW 14/26/99
7.15	Calibration sticker attached	DLW 14/26/99
8.0	RESTORATION COMPLETE	DLW 14/26/99

Remarks: High High set point set to 24,597. In order for the unit to function a High set point had to be entered, 20,000 was used for this value. Low set point set to 7,180, and a Low Low set point 1840. Relay 1 programed to the L setpoint, Relay 3 programed to High High and Relay 4 to the Low Low setpoint.
NOTE: Password is factory set to 01919

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DATA SHEET 11.1
LOCAL INDICATOR INSPECTION AND TEST RECORD (Continued)

Performed By: _____ Date: 4/26/99
Technician

Reviewed By: _____ Date: _____
A.I. Witness

Reviewed By: Roberto V. Cruz Date: 6/14/99
Startup Test Engineer

Approved By: _____ Date: 6/14/99
Test Director

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Local #2 w Signal Cards

DATA SHEET 11.1
LOCAL INDICATOR INSPECTION AND TEST RECORD

System No.: 015	Project: W379	
Instrument No.: MCOWD-2		
Function:MCO Hoist Weight Display 2		
Manufacturer: M/D Totco	Model No.: LM2000	Location: MHM Console
Reference Documents (Vendor Information, Drawings): EB-33056, Sht. 12		
Instrument Input Range: 4	to 20	Units: mA
Instrument Indication Range: 0	to 30,000	Units: Lbs
Allowable Instrument Error:	± 0.15 %	
Startup Contact: Jon Molnar		Phone: 372-8794

Special Instructions: Reference TDR CSB(W379)-015-11-060-2, replaced signal conditioning card with 1mv/v card. New scaling is 4 ~ 20 mA = 0 – 30,000lbs. Recalibrate with new scaling.

NOTE: SET ALL RELAYS TO UNLATCHED

Verify alarm setpoint values and relays are set in programming as follows:
High High = 25,986 Rly 3

High = 4,386 Rly 2

Low = 1,840 Rly 1

Low Low = (No Alarm point)

DATA SHEET 11.1
LOCAL INDICATOR INSPECTION AND TEST RECORD (Continued)

TEST EQUIPMENT	M&TE NUMBER	CALIBRATION DUE DATE
Fluke 867B Multimeter	105 6024	5/12/00
Transmation	105 6010	3/15/00

Proc. Step No.	ACTION	INITIAL/DATE
3.0	PREREQUISITES COMPLETED	DLW 16/11/99
5.0	INITIAL CONDITIONS COMPLETED	DLW 16/11/99
7.0	INSPECTION AND TEST RESULTS	
7.1	Installation inspection satisfactory	DLW 16/11/99
7.2	Electrical inspection satisfactory	DLW 16/11/99
7.3	Liquid/Gas service piping inspection satisfactory	N/A 1
7.4	Head correction completed	N/A 1
7.5	Instrument removed or isolated	DLW 16/11/99
7.6	Instrument range 0 to 30.000 Units Lbs	DLW 16/11/99
	Allowable instrument error 0.15 Units % F.S.	DLW 16/11/99

6/14/99

7.10, 7.11, 7.12, 7.13, 7.14:

INPUT UNITS: mA

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DATA SHEET 11.1
LOCAL INDICATOR INSPECTION AND TEST RECORD (Continued)

% SPAN	DESIRED OUTPUT	AS FOUND OUTPUT	OUTPUT ERROR	FINAL OUTPUT	FINAL ERROR	INIT/ DATE
0%	0	1	+1	1	+1	DLW 16/11/99
25%	7500	7500	0	7500	0	DLW 16/11/99
50%	15,000	15001	+1	15001	+1	DLW 16/11/99
75%	22,500	22498	-2	22498	-2	DLW 16/11/99
100%	30,000	29999	-1	29999	-1	DLW 16/11/99
75%	22,500	22499	-1	22499	-1	DLW 16/11/99
50%	15,000	14997	-3	14997	-3	DLW 16/11/99
25%	7500	7502	+2	7502	+2	DLW 16/11/99
0%	0	1	+1	1	+1	DLW 16/11/99
Allowable error----------→			+/0.15% DLW 3/4/99	---------→	±	1

Proc. Step No.	ACTION	INITIAL/DATE
7.13	Calculated error less than allowable error (10.1)	DLW 16/11/99
7.15	Calibration sticker attached	DLW 16/11/99
8.0	RESTORATION COMPLETE	DLW 16/11/99

Remarks: _____

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DATA SHEET 11.1
LOCAL INDICATOR INSPECTION AND TEST RECORD (Continued)

Performed By: Dwayne Welch (Technician) Date: 6/11/99

Reviewed By: [signature] (A.I. Witness) Date: 7-12-99

Reviewed By: Robert V. Gray (Startup Test Engineer) Date: 6/14/99

Approved By: [signature] (Test Director) Date: 6/14/99

SPENT NUCLEAR FUEL PROJECT	Procedure No.	SNF-CTP-IC-03
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Recal #1

DATA SHEET 11.1
LOCAL INDICATOR INSPECTION AND TEST RECORD

System No.: 015	Project: W379	
Instrument No.: MCOWD-2		
Function:MCO Hoist Weight Display 2		
Manufacturer: M/D Totco	Model No.: LM2000	Location: MHM Console
Reference Documents (Vendor Information, Drawings): EB-33056, Sht. 12		
Instrument Input Range: 4	to 11.63	Units: mA
Instrument Indication Range: 0	to 30.000	Units: Lbs
Allowable Instrument Error: +/- 0.15 % Dw 7/8/11		
Startup Contact: Jon Molnar		Phone: 372-8794

Special Instructions: Reference TDR CSB(W379)-015-11-60-2. It was found that the load cell output does not match the Signal Conditioner full scale input. Load cell output is .83 m/v. The Signal Conditioner need 2 mv/v input for full span output of 4-20 mA. The output from the Signal Conditioner with full scale output from load cell applied will produce a max 11.63 mA. Set scaling at 4 - 11.63 mA equals 0 to 30,000 lbs.

NOTE: SET ALL RELAYS TO UNLATCHED

Verify alarm setpoint values and relays are set in programming as follows:
High High = 25,986 Rly 3

High = 4,386 Rly 2

Low = 1,840 Rly 1

Low Low = (No Alarm point)

DATA SHEET 11.1
LOCAL INDICATOR INSPECTION AND TEST RECORD (Continued)

TEST EQUIPMENT	M&TE NUMBER	CALIBRATION DUE DATE
Transmation	1056010	3/15/00
Fluke 743 B Calibrator	1056155	9/30/99

Proc. Step No.	ACTION	INITIAL/DATE
3.0	PREREQUISITES COMPLETED	DLW 1 5/19/99
5.0	INITIAL CONDITIONS COMPLETED	DLW 1 5/19/99
7.0	INSPECTION AND TEST RESULTS	
7.1	Installation inspection satisfactory	DLW 1 5/19/99
7.2	Electrical inspection satisfactory	DLW 1 5/19/99
7.3	Liquid/Gas service piping inspection satisfactory	N/A 1
7.4	Head correction completed	N/A 1
7.5	Instrument removed or isolated	N/A 1
7.6	Instrument range 0 to 30,000 Units Lbs	DLW 1 5/19/99
	Allowable instrument error 0.15 Units % F.S.	DLW 1 5/19/99

5/19/99

7.10, 7.11, 7.12, 7.13, 7.14:

INPUT UNITS: mA

SPENT NUCLEAR FUEL PROJECT	Procedure No.	SNF-CTP-IC-03
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DATA SHEET 11.1
LOCAL INDICATOR INSPECTION AND TEST RECORD (Continued)

% SPAN	DESIRED OUTPUT	AS FOUND OUTPUT	OUTPUT ERROR	FINAL OUTPUT	FINAL ERROR	INIT/ DATE
0% 4mA	0	0	ø	0	ø	DLW 15/19/99
25% 5.91mA	7500	7501	+1	7501	+1	DLW 15/19/99
50% 7.81mA	15,000	14982	-18	14982	-18	DLW 15/19/99
75% 9.72mA	22,500	22482	-18	22482	-18	DLW 15/19/99
100% 11.63mA	30,000	29996	-4	29996	-4	DLW 15/19/99
75% 9.72mA	22,500	22488	-12	22488	-12	DLW 15/19/99
50% 7.81mA	15,000	14985	-15	14985	-15	DLW 15/19/99
25% 5.91mA	7500	7507	+7	7507	+7	DLW 15/19/99
0% 4mA	0	-4	-4	-4	-4	DLW 15/19/99
Allowable error----------→			±0.15% DLW 7/8/99	---------→	±	/

Proc. Step No.	ACTION	INITIAL/DATE
7.13	Calculated error less than allowable error (10.1)	DLW 15/19/99
7.15	Calibration sticker attached	DLW 15/19/99
8.0	RESTORATION COMPLETE	DLW 15/19/99

Remarks: _____

SPENT NUCLEAR FUEL PROJECT	Procedure No.	SNF-CTP-IC-03
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DATA SHEET 11.1
LOCAL INDICATOR INSPECTION AND TEST RECORD (Continued)

Performed By: Dawayne Welch (Technician) Date: 5/19/99

Reviewed By: [signature] (A.I. Witness) Date: 7-12-99

Reviewed By: Robert V. Cuny (Startup Test Engineer) Date: 6/14/99

Approved By: [signature] (Test Director) Date: 6/14/99

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SPENT NUCLEAR FUEL PROJECT	Procedure No.	SNF-CTP-IC-03
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Original

DATA SHEET 11.1
LOCAL INDICATOR INSPECTION AND TEST RECORD

System No.: 015	Project: W379	
Instrument No.: MCOWD-2		
Function: MCO Hoist Weight Display 2		
Manufacturer: M/D Totco	Model No.: LM2000	Location: MHM Console
Reference Documents (Vendor Information, Drawings): EB-33056, Sht. 12		
Instrument Input Range: 4	to 20	Units: mA
Instrument Indication Range: 0	to 30,000	Units: Lbs
Allowable Instrument Error: +/- 0.15 % Due 7/8/99		
Startup Contact: Jon Molnar		Phone: 372-8794

Special Instructions: NOTE: SET ALL RELAYS TO UNLATCHED

Verify alarm setpoint values are set in programming as follows:

Alarm 1 = 1840 L set point

Alarm 2 = 4386 H set point

Alarm 3 = 25,986 HH setpoint

TEST EQUIPMENT	M&TE NUMBER	CALIBRATION DUE DATE
Fluke 743B Calibrator	1056155	9/30/99
Transmation	1056010	3/15/00

SPENT NUCLEAR FUEL PROJECT	Procedure No.	SNF-CTP-IC
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DATA SHEET 11.1
LOCAL INDICATOR INSPECTION AND TEST RECORD (Continued)

Proc. Step No.	ACTION	INITIAL/DATE
3.0	PREREQUISITES COMPLETED	DLW 4/29/99
5.0	INITIAL CONDITIONS COMPLETED	DLW 4/29/99
7.0	INSPECTION AND TEST RESULTS	
7.1	Installation inspection satisfactory	DLW 4/29/99
7.2	Electrical inspection satisfactory	DLW 4/29/99
7.3	Liquid/Gas service piping inspection satisfactory	N/A /
7.4	Head correction completed	N/A /
7.5	Instrument removed or isolated	N/A /
7.6	Instrument range 0 to 30,000 Units Lbs	DLW 4/29/99
	Allowable instrument error 0.15 Units % F.S.	DLW 4/29/99

4/29/99

7.10, 7.11, 7.12, 7.13, 7.14:

INPUT UNITS:mA

% SPAN	DESIRED OUTPUT	AS FOUND OUTPUT	OUTPUT ERROR	FINAL OUTPUT	FINAL ERROR	INIT/ DATE
0%	0	1	+1	1	+1	DLW 4/29/99
25%	7500	7500	Ø	7500	Ø	DLW 4/29/99
50%	15,000	14,999	-1	14,999	-1	DLW 4/29/99
75%	22,500	22,500	Ø	22,500	Ø	DLW 4/29/99

SPENT NUCLEAR FUEL PROJECT	Procedure No.	SNF-CTP-IC-03
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DATA SHEET 11.1
LOCAL INDICATOR INSPECTION AND TEST RECORD (Continued)

100%	30,000	29,999	-1	29,999	-1	DLW 1/29/99
75%	22,500	22,498	-2	22,498	-2	DLW 1/29/99
50%	15,000	14,999	-1	14,999	-1	DLW 1/29/99
25%	7500	7500	0	7500	0	DLW 1/29/99
0%	0	0	0	0	0	DLW 1/29/99
Allowable error----------→			±0.15% DLW 1/29/99	---------→	±	1

Proc. Step No.	ACTION	INITIAL/DATE
7.13	Calculated error less than allowable error (10.1)	DLW 1/29/99
7.15	Calibration sticker attached	DLW 1/29/99
8.0	RESTORATION COMPLETE	DLW 1/29/99

Remarks: Set points set as follows. ## High High set point 25,986. High set point 4386. Low setpoint 1840. There is no low low set point. Relay 1 set to low setpoint. Relay 2 set to High set Point and Relay 3 set to High High set point.

SPENT NUCLEAR FUEL PROJECT	Procedure No.	SNF-CTP-IC-03
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DATA SHEET 11.1
LOCAL INDICATOR INSPECTION AND TEST RECORD (Continued)

Performed By: _____ Date: 4/29/99
Technician

Reviewed By: _____ Date: 7-12-99
A.I. Witness

Reviewed By: _____ Date: 6/14/99
Startup Test Engineer

Approved By: _____ Date: 6/14/99
Test Director

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Title: P2, ~~P53~~, P62, & P63 Interlocks – Motherboard & Signal Conditioner

ORIGINAL

Section 1 Part Information

Item No.: N/A	Manufacturer: N/A	Supplier: N/A
Mfg. Part/Model No.: N/A	Supplier's P/N: N/A	
Part Description: N/A		
End Use Description: N/A		

Section 2a Component Information

Equipment No.:	Specification No.:	Manufacturer:	Past P.O. No.:
Motherboard, Signal Conditioner/Amplifier	**Ederer F-2566, Foster Wheeler MJX-SDX 452656**	**M/D TOTCO**	**N/A**
Manufacturer's Part/Model No.: **2077-034, 2078-101**	Equipment Supplier (if different from manufacturer): **ALSTROM, Foster Wheeler**		Equip. Supplier's Part No.: **N/A**

Component Description: **Signal Conditioner/Amplifier Mother Board with a current output mounted in a NEMA Type 4 enclosure. Four relays are integral to this printed circuit board and two (1) are used for shunt calibration, one (1) for zero check of the instrumentation and one (1) for gain check. The motherboard is P/N 2077-034 and the Signal Conditioner is P/N 2078-101.**

Section 2b Commercial Availability of the Item

1. Is the Item available from a catalogue from a qualified NQA1 supplier or ISO 9000 supplier (coordinate w/ project CGI Engineer or BTR)? [ ] YES (go to #2 below) [X] NO (go to procedure step 6.3.2, proceed to dedicate Item)

If not available from a qualified NQA1 supplier, is it available from an ISO 9000 supplier? (coordinate w/ project CGI Engineer or BTR)? [ ] YES (go to #2 below, procedure step 6.3.2, dedicate Item) [X] NO (procedure step 6.3.2, dedicate Item)

2. List of Candidate qualified suppliers or ISO 9000 suppliers: **N/A**

3.. Recommended Procurement Strategy (coordinate with project CGI interface Engineer or BTR): **N/A**

Section 2c CGI Determination

CGI Determination Questions:

#1: Is the Item subject to design or specification requirements that are unique to nuclear facilities or activities?

[ ] YES (the Item is not commercial grade) [X] NO (continue)

#2: Is the Item used in applications other than nuclear facilities or activities?

[ ] NO (the item is not commercial grade) [X] YES (continue)

#3: Is the Item ordered from manufacturer/supplier on the basis of specifications set forth in the manufacturer's catalog?

[ ] NO (the item is not commercial grade) [X] YES (continue)

[X] All three criteria have been satisfied. The Item meets the definition of commercial grade.

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Title: **P2, P53, P62, & P63 Interlocks – Motherboard & Signal Conditioner**

Section 2d Reason for Dedication

The above Commercial Grade (CG) described item is being Dedicated for use in the application cited for the following reason(s):

	Item is being purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Class application.
	Item is being purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Significant application.
X	Item was purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Class application.
	Item was purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Significant application.
	Other ('like-for-like', similar, substitution, replacement evaluation)

Section 3 Failure Effects Evaluation

A. Part/Component Safety Function: **The P2 interlock serves to prevent the MHM from leaving a storage tube without replacing the tube plug by determining when the MCO Hoist weight is more than the min. grapple and tube plug weight and when the MCO Hoist weight is less than the max. grapple only weight. The P53 interlock ensures the MCO Hoist is not lowered unless the weight is above the min. grapple weight or above the min. grapple plus MCO weight w/grapple jaws closed unless the grapple is in the seating zone. The P62 interlock ensures that the MCO cannot be hoisted when MCO weight is detected and jaws are not closed. The P63 interlock ensures that the MCO Hoist cannot be raised if the MCO weight is exceeded. This signal conditioner/mother board initiate the action as stated in the interlocks.**

B. Part/Component Functional Mode:

Safety Function #1:	X	Active		Passive
Safety Function #2:		Active		Passive
Safety Function #3:		Active		Passive

Active - Mechanical or Electrical change of state is required to occur for the component to perform its safety function

Passive – Change of state is not required for the component to perform its safety function

C. Host Component Safety Function (if applicable): **N/A**

D. Failure Mode(s) and the effects on component or system safety function (see Worksheet 1): **Failure to properly function and actuate output devices based on input from the weight of the MCO Hoist weight and the weight it carries results in movement of the MHM or raising of the MCO hoist at improper times.**

Section 4 Environmental & Natural Phenomena Hazard Design

Environmental Qualification Required:

Yes [ ]

No [X]

If yes: Environmental Qualification Requirements

Limiting Environmental Conditions:

Required Safety Functions:

Qualification Period:

Natural Phenomena Hazard (NPH) Design Required:

Yes [ ]

No [X]

If yes: NPH Design Requirements

Performance Category:

NPH Design Req'ts.:

Required Safety Functions:

Section 5 Component Functional Classification

[X] Safety Class (SC) [ ] General Service (GS) [ ] Safety Significant (SS)

If part/component classification is different from host component/system, document basis. **N/A**

Sections 6 and 7 (Reserved)

Section 8 References (for Functional Classification)

National Codes/Standards:

Safety Analysis Report (SAR): **HNF-3672, Rev. 0**

Drawings: **Ederer, Inc. EB-33056, Sht 11; H-2-827174 Sht 10, 21, 22, 23, 25**

Vendor Manual/Manufacturer/Supplier Information: **M/D TOTCO Instrumentation Installation, Calibration, and Operation Manual Series 2000 Instruments**

Other: **ALSTOM ESL/R (96) 065 – Rev. D, 100% Design Submittal – June 1998**

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Section 9 Critical Characteristics				
Critical Characteristics	Acceptance Criteria/Tolerances	Acc Meth	ID	Function
1. Item Identification Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
Motherboard:				
Manufacturer	**M/D TOTCO**	**1, IN**	**X**	
Model - Motherboard	**2077-034**	**1, IN**	**X**	
Model – Signal Conditioner	**2078-101**	**1, IN**	**X**	
2. Physical Critical Characteristics (for reasonable assurance that the Item delivered is the Item specified)				
3 Performance Critical Characteristics (for reasonable assurance that the Item will perform its intended safety function(s))				
Circuit Loop Performance	**With known force(s) applied, determine that the system responds and provides accurate meter readings within a deviation of 5%**	**1, T**		**X**

4. Notes and Legend:

Acceptance Method (Acc Meth):
1.Special Test and Inspection:
1, IN for Inspection
1,T for Test
2. Commercial Grade Survey
3. Source Verification
4. Vendor/Item History

Section 10 Initial Review and Approval

Approvals:

Designated Engineer: [signature]

Design Authority: [signature] 4-11-00

QA Engineer: Stephen Scott Mosi 4-12-2000

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WORKSHEET 1
DETERMINATION OF FAILURE MECHANISMS/MODES

Section 1			
Typical Failure Mechanisms	Definition	X = Applicable to Component under Evaluation X?	Indicate Failure Mode
Fracture	Separation of a solid accompanied by little or no macroscopic plastic deformation.		
Corrosion	The gradual deterioration of a material due to chemical or electrochemical reactions, such as oxidation, between the material and its environment.		
Erosion	Destruction of materials by the abrasive action of moving fluids, usually accelerated by the presence of solid particles carried with the fluid.		
Open Circuit	An electrical circuit that is unintentionally broken so that there is no complete path for current flow.	X	**Inadvertant circuit break on printed circuit boards**
Short Circuit	An abnormal connection by which an electrical current is connected to ground, or to some conducting body, resulting in excessive current flow.		
Blockage	Clogging of a filtering medium resulting in the inability to perform its purification function or blockage of flow.		
Seizure	Binding of a normally moving item through excessive pressure, temperature, friction, jamming.		
Unacceptable Vibration	Mechanical oscillations produced are beyond the defined permissible limits due to unbalancing, poor support, or rotation at critical speeds.		
Loss of Properties	A loss of mechanical and physical properties of a material due to exposure to high temperatures, radiation exposure.		
Excess Strain	Under the action of excessive external forces the material of the part has been deformed or distorted.		
Mechanical Creep	From prolonged exposure to high temperature and stress, the object will show a slow change in its physical (shape and dimension) and mechanical characteristics.		
Ductile Fracture	Fracture characterized by tearing of metal accompanied by appreciable gross plastic deformation.		
Section 2 Additional Failure Modes Applicable to the Component Under Evaluation			
1.			
2.			
3.			
4.			
5.			

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Checklist 1 - Acceptance Method 1 - Special Test/Inspection Verification

SECTION 1	
Item Description: **Motherboard and Signal Conditioner** System #: **MHM**	Equip #: **Motherboard, Signal Conditioner** Model #: **2077-034, 2078-101**
Manufacturer (Address/Phone): **M/D TOTCO** **1200 Cypress Creek Road** **Cedar Park, Texas 78613-3614** Phone. **# (512) 331-0411**	Supplier (Address/Phone):

SECTION 2 CRITICAL CHARACTERISTICS TO BE VERIFIED BY METHOD 1.

Insp	Test	Post-Test	
X			1. **Manufacturer - Motherboard & Signal Conditioner**
X			2. **Model - Motherboard**
X			3. **Model – Motherboard**
	X		4. **Circuit resistance – Internal mounted relays**
	X		6. **Contact Rating – Internal mounted relays**
	X		7. **Operation – Internal mounted relays**

SECTION 3 BY INSPECTION * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)

Characteristic: **Manufacturer - Motherboard** Sample Size*: **100%**

Acceptance Criteria: **M/D TOTCO**

Receipt Inspection Plan / Report #: **CSB(W379)-015-11-059 & 060**

Characteristic: **Model - Motherboard** Sample Size*: **100%**

Acceptance Criteria: **2077-034**

Receipt Inspection Plan / Report #: **CSB(W379)-015-11-059 & 060**

Characteristic: **Manufacturer – Signal Conditioner** Sample Size*: **100%**

Acceptance Criteria: **M/D TOTCO**

Receipt Inspection Plan / Report #: **CSB(W379)-015-11-059 & 060**

Characteristic: **Model – Signal Conditioner** Sample Size*: **100%**

Acceptance Criteria: **2078-101**

Receipt Inspection Plan / Report #: **CSB(W379)-015-11-059 & 060**

SECTION 4 BY SPECIAL TEST * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)

Characteristic for Test: **Circuit Loop Performance** Samp Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **With known force(s) applied, determine that the system responds and provides accurate meter readings within a deviation of 5%**

Actual Test Value: **Summary Table (Att. A of Loop Calib.) of shows output readings are within the 5% deviation**

Test Plan and Report #: **CSB(W379)-015-11-059 & 060**

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SECTION 5 TEST / INSPECTION SUMMARY (Acceptance Method 1)

1. SUMMARY OF VERIFIED CRITICAL CHARACTERISTICS, THEIR VERIFICATION METHODS, AND RESULTS

ITEM DESCRIPTION: Signal Conditioner/Amplifier Mother Board

Critical Characteristics				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/IN	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
Manufacturer	M/D TOTCO	X		1, IN	CSB(W374)-15-11 (059 & 60)	N/A	2	0	XWEST	Larry W. Pierce [signature]	4/12/00
Model - Motherboard	2077-034	X		1, IN	* ↓	↓	↓	↓	↓	↓	↓
Model – Signal Conditioner	2078-101	X		1, IN	↓	↓	↓	↓	↓	↓	↓
Circuit Loop Performance	With known force(s) applied, determine that the system responds and provides meter readings within a deviation of 5%		X	1, T	↓	↓	↓	↓	↓	↓	↓

2. DISPOSITION OF UNVERIFIED OR FAILED CRITICAL CHARACTERISTICS

Critical Characteristic	Disposition

3. SIGNATURE INDICATES ALL CRITICAL CHARACTERISTICS VERIFIED SATISFACTORY OR ACCEPTABLY DISPOSITIONED AND COMMERCIAL GRADE DEDICATION IS SATISFACTORY AND COMPLETE.

Testing Agency Approval: NA CES 4/12/00 Date______	BUYER VERIFICATION Design Authority: CES [signature] Date 4/12/00
Testing Agency QA Engineer: NA CES 4/12/00 Date______	QA Engineer:______ Date______

* CTP CSB(W374)-015-13-059 & -060 available as Startup Test record & attached. CES 4/12/00

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SECTION 6 CONTACTS / PHONE NUMBERS		
Name		Phone
Design Authority	CRAIG SWENSON	( ) 376-0288
QA		( )
QC		( )
Cog - Engineer		( )
CGI Engineer		( )
Procurement Engineer		( )
Other		( )

SECTION 7 SUPPORTING DOCUMENTATION FOR THIS CHECKLIST	
Initial Procurement Documents	**For Critical Characteristics**
[ ] Drawings:	
[ ] Manuals (specify type & number):	
[ ] Design Calculations	
[ ] Installation Instructions	
[ ] Operation Instructions	
[ ] Calibration Instructions	
[ ] Manufacturer's Recommended Spare Parts List	
[X] **M/D TOTCO Instrumentation Installation, Calibration, and Operation Manual Series 2000 Instruments**	**All**
Procurement Documents	
[ ] Certificate of Conformance/Compliance	
[ ] Seismic Qualification Certificate	
[ ] Environmental Qualification Certificate	
[ ] Test Report (s):	
[ ] Inspection Report (s):	
[ ] CMTRs for ASME Pressure Retaining Materials	
[ ] Valve Seat Leakage Report	
[ ] Weld Records	
[ ] Material Traceability Record	
[X] **Other: CSB (W379)-015-11-059 & 060**	

Price, Larry W

From: Molnar, Jon C
Sent: Wednesday, April 12, 2000 8:17 AM
To: Kelmel, Gary J; Price, Larry W
Cc: Swenson, Craig E
Subject: RE: MD Totco Serial No.'s

Larry / Gary

I went back and looked at the old cards. They are being kept in the static-free bags that the new cards came in. On the outside of the static-free bags the new model numbers are hand written with a Sharpie which is 2078-101. So I would say this corroborates your note about the model number being changed.

To explain why one card in the field is marked 2078-102, I recall that we had a problem with one of the new cards. Of the two cards that I have in hand, one of the cards is marked with the 2078-102 model number on top of the heat sink while the other card has no marking. The card with no marking has a loose resistor, R13. This was the new card that had the problem. Dawayne did a part-by-part and circuit comparison between the two cards. We determined that the R13 resistor was the only difference between the new and old cards. We swapped resistors between the new and old cards in attempt to get the same performance as the other new card. It worked. Thus, one of the old cards was updated to the new card configuration.

Based on the hand-written marking on the outside of the static-free bags the model number for both cards should be 2078-101. Note, however, that this information is not identified on the new cards as it was on the old cards. I will pursue getting this memo into our test packages CSB(W379)-015-11-059 and -060. I guess we should also at least remove (or black out) the old model number on the Y Channel signal conditioner.

Gary - We should look at least removing or blacking out the model number on the Y Channel Signal Conditioner. If possible, it would even be better if we could at the new model number to both X and Y Channel Signal Conditioners.

Any questions, let me know

Thanks,

Jon

Larry, Jon.....

Steve Connley and myself looked for the Serial No.'s Larry gave me:

Motherboard 2077-034
Signal Conditioner 2078-101

We could NOT find these no.'s.

What we could find was:

MD Totco MCO Weight Display No. 1 (X channel), Top of control Console
SN 97EE0804972
BC 2000
PC# 7861, Series 2000

MD Totco MCO Weight Display No. 2 (Y channel), Inside of Control Console
SN 97EE0884971
BC 2000
PC# 7861, Series 2000

Signal Conditioner Y Channel, on side of Hoist Compartment
CLI 610-2001
2078-102

Signal Conditioner X Channel, on side of Hoist Compartment
CLI 610-2001
No Label

That's all we could find without disassembling the machine.

GJK

Price, Larry W

From: Kelmel, Gary J
Sent: Tuesday, April 11, 2000 5:25 PM
To: Price, Larry W; Molnar, Jon C
Cc: Swenson, Craig E; Kelmel, Gary J
Subject: MD Totco Serial No.'s

Larry, Jon.....

Steve Connley and myself looked for the Serial No.'s Larry gave me:

Motherboard 2077-034
Signal Conditioner 2078-101

We could NOT find these no.'s.

What we could find was:

MD Totco MCO Weight Display No. 1 (X channel), Top of control Console
SN 97EE0804972
BC 2000
PC# 7861, Series 2000

MD Totco MCO Weight Display No. 2 (Y channel), Inside of Control Console
SN 97EE0884971
BC 2000
PC# 7861, Series 2000

Signal Conditioner Y Channel, on side of Hoist Compartment
CLI 610-2001
2078-102

Signal Conditioner X Channel, on side of Hoist Compartment
CLI 610-2001
No Label

That's all we could find without disassembling the machine.

GJK

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CTP PACKAGE NO./ CSB(W379)-015-11-060

COMPONENT ID NO. MCOWD-2

SPENT NUCLEAR FUELS PROJECT

COMPONENT TEST PROCEDURE (CTP)

TEST DEFICIENCY REPORT (TDR)

CTP TDR No.: CSB(W379)-015-11-060-2	CTP/Rev. No: CSB(W379)-015-11-060/0	Date: 5/12/99

Description of Discrepancy/Deficiency: **Total weight seen on both the X and Y MCO WEIGHT displays is less than half of what is expected to be seen. Further investigation found that there is a mismatch between the output of the load cells and the input of the signal conditioner cards. Load cell output is calibrated at .83mv/v, signal card need 2mv/v to produce a full range output of 4-20 ma.**

NOTE: (This TDR impacts both –59 and –60 CTP packages)

Signature Dawayne Welch Date 5/12/99
Initiator

Disposition of TDR: (NOTE: If disposition involves a design change, an SFR is to be initiated,)

Replace signal conditioning cards with a 1mv/v card. Calibrate cards to match load cells to produce a full scale output of 4-20 ma. NEW P/N: 2078-101 / D.WELCH JWP

PLUS SEE J.MOLNAR E-MAIL DTD. 4/12/00 JWP 4/12/00

Disposition By:

Signature Roberto V. Cruz Date 6/14/99
Startup Engineer

1. Disposition Concurrence:

Signature [signature] Date 6/14/99
Test Director

2. Retest Required: YES _x_ NO___ N/A___

Results: Satisfactory

3. Retest Completed:

Signature Dawayne Welch Date 6/14/99
Startup Technician/Startup Engineer

M/D TOTCO™
INSTRUMENTATION
INDUSTRIAL SYSTEMS

1200 Cypress Creek Road
Cedar Park, Texas 78613-3614
Phone: (512) 331-0411

Ederer Corp.

System Certification

System 1, Consisting of:

BC2-1A-5555-ZZZZ	Crane Display	S.N. = 97EE0804972
XJA (2077-034 / 2078-102)	Boom Tip J-Box	S.N. = 11173

CALIBRATION:

0mV/V input to signal conditioner = 4mA Output = 0 TON Displayed
2mV/V input to signal conditioner = 20mA Output = 15.1 TONS Displayed

System 2, Consisting of:

BC2-1A-5555-ZZZZ	Crane Display	S.N. = 97EE0804971
XJA (2077-034 / 2078-102)	Boom Tip J-Box	S.N. = 9694

CALIBRATION:

0mV/V input to signal conditioner = 4mA Output = 0 TON Displayed
2mV/V input to signal conditioner = 20mA Output = 15.1 TONS Displayed

SPENT NUCLEAR FUEL PROJECT	Procedure No.	SNF-CTP-IC-04
FACILITY SYSTEM START-UP	Revision No.	0
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INSTRUMENT LOOP CALIBRATION	Page	1 of 7

DATA SHEET 11.1
INSTRUMENT LOOP CALIBRATION

System No: 15			Project: W379		
Reference Documents (Vendor Information, Drawings): EB-33056, Sht.11, 363A0033, Sht.9					
Loop: 1 (X)					
Setpoint: Multiple	Sensing Element: LCMHR1X, LCMHR2X		Final Element #1: MCO Hoist Wt. Meter		
Final Element #2: Trip Pt. Relay 5X-8X			Final Element #3: ____		
Failure Mode (air and electric, as applicable):					
Test Loop Diagram: EB-33056, Sht.11					
Annunciator/MMI/HMI, Engraving/Designation: See Reference Drawings					
Required Annunciator Alarm point	See SI 1	±	____	Inc./Dec.	____
Required Annunciator Reset point	See SI 1	±	____	Inc./Dec.	____
Startup Contact: Jon Molnar			Phone: 372-8794		

Special Instructions:

1. Alarm setpoints are validated in Procedure IC-03 for MCO Hoist Weight Meter #1.

2. Trip point relay setpoints are validated in Procedure IC-07 for Relays 5X, 6X, 7X, 8X.

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DATA SHEET 11.1
INSTRUMENT LOOP CALIBRATION (Continued)

Loop Components	Loop/Component Name	Input Units	Instrument Range	Output Units	Accuracy
LCMHR1X	LOAD CELL	LBS	0 TO 7500		
			0 TO 0.75	MV/V	0.15%
LCMHR2X	LOAD CELL	LBS	0 TO 7500		
			0 TO 0.75	MV/V	0.15%
MWS1	Signal Conditioner	MV/V	0 TO 2		
			4 TO 20	MA	0.1%
MCOWD-1	Display Meter	MA	4 TO 20		
			0 TO 30,000	LBS	0.01%
5X	Trip Point Relay	MA	1 TO 100		0.2%
6X	Trip Point Relay	MA	1 TO 100		0.2%
7X	Trip Point Relay	MA	1 TO 100		0.2%
8X	Trip Point Relay	MA	1 TO 100		0.2%

Proc Step No.	ACTION	INITIALS / DATE
3.0	PREREQUISITES COMPLETE.	DLW 1 6/24/99

TEST EQUIPMENT	M&TE NUMBER	CALIBRATION DUE DATE
N/A		

SPENT NUCLEAR FUEL PROJECT	Procedure No.	SNF-CTP-IC-04
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DATA SHEET 11.1
INSTRUMENT LOOP CALIBRATION (Continued)

Proc. Step No.	ACTION	INITIALS / DATE
5.0	INITIAL CONDITIONS COMPLETE.	DLW 1 6/24/99
7.1.1.1	Failure modes correct for sudden/bleed down air tests.	N/A
	Record failure mode _____ FO/FC	
7.1.1.2	Failure modes correct for gradual bleed down air test.	N/A
	Record failure mode _____ FO/FC	
7.1.2.1	Failure modes correct for gradual electrical test.	N/A
	Record failure mode _____ FO/FC	

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MHM WEIGHT SYSTEM LOAD TEST FOR X AND Y CHANNELS

Attachment A

3964 Grappel + test block Total load

	Meter readings	Force applied	Total load	X ch	Y ch	X error	Y error	X-Y diff
	216	2160	6124	5911	5549	213	575	362
	421	4210	8174	7916	7514	258	660	402
	620	6200	10164	9896	9463	268	701	433
	821	8210	12174	11910	11480	264	694	430
Increasing	1020	10200	14164	13914	13449	250	715	465
weight	1215	12150	16114	15910	15450	204	664	460
	1410	14100	18064	17910	17425	154	639	485
	1605	16050	20014	19920	19420	94	594	500
	1800	18000	21964	21920	21400	44	564	520
	1992	19920	23884	23915	23350	-31	534	565
	2195	21950	25914	25920	25350	-6	564	570
	2385	23850	27814	27945	27320	-131	494	625
	2580	25800	29764	29930	29311	-166	453	619
	2765	27650	31614	31906	31250	-292	364	656
	2510	25100	29064	29890	29215	-826	-151	675
	2312	23120	27084	27896	27244	-812	-160	652
	2105	21050	25014	25699	25076	-685	-62	623
	1915	19150	23114	23780	23170	-666	-56	610
Decreasing	1728	17280	21244	21915	21270	-671	-26	645
weight	1524	15240	19204	19855	19242	-651	-38	613
	1335	13350	17314	17875	17310	-561	4	565
	1138	11380	15344	15791	15244	-447	100	547
	950	9500	13464	13899	13362	-435	102	537
	740	7400	11364	11800	11260	-436	104	540
	550	5500	9464	9875	9340	-411	124	535
	370	3700	7664	7850	7399	-186	265	451
	170	1700	5664	5895	5460	-231	204	435

ALL readings are in pounds

DCW 6/24/99

DATA SHEET 11.1
INSTRUMENT LOOP CALIBRATION (Continued)

7.2, 7.3, 7.4.1, 7.4.3 (10.0)

LOOP ACCURACY +/- 5.0 % DLW 7/7/99		DEVICE OUTPUTS											
		DESIRED			AS-FOUND			ERROR			ALLOWED ERROR		
INPUT COMPONENT NO.		COMPONENT ID NO.			COMPONENT ID NO.			COMPONENT ID. NO.			COMPONENT ID NO.		
% SPAN	INPUT UNITS LBS	MCOWD-1 LBS			MCO WD-1			MCO WD-1			MCO WD-1		
0%	0	0									5.0%		
25%	7,500	7,500									5.0%		
50%	15,000	15,000									5.0%		
75%	22,500	22,500									5.0%		
100%	30,000	30,000									5.0%		
75%	22,500	22,500									5.0%		
50%	15,000	15,000									5.0%		
25%	7,500	7,500									5.0%		
0%	0	0									5.0%		

See Attachment A

Proc. Step No.	ACTION	INITIALS / DATE

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DATA SHEET 11.1
INSTRUMENT LOOP CALIBRATION (Continued)

Proc. Step No.	ACTION	INITIALS/DATE
7.4.3	Verify the above data is acceptable and within the allowable error (10/2)	DLW 1 6/24/99
7.5.1	Verify annunciator window engraving or MMI/HMI alarm/status designations are correct, as listed below. Annunciator Engraving See ref.drawings MMI/HMI Designation See ref.drawings	DLW 1 6/24/99
7.5.4	Verify annunciator alarms and resets, at values specified below. (10.2) Required annunciator alarm point _____ Inc./Dec._____ Required annunciator alarm reset point _____ Inc./Dec._____ Actual annunciator alarm point _____ Inc./Dec._____ Actual annunciator alarm reset point _____ Inc./Dec._____	DLW 1 6/24/99 see S.I.
7.5.5	Verify that loop diagram has been highlighted for that portion of the loop that has been functionally tested.	DLW 1 6/24/99
7.6.1	Verify that the controller responds to changes in manual mode, as indicated below. Record results in space provided. Manually set controller output to 0% _____, 50% _____, 100% _____ Final control element position output to 0% _____, 50% _____, 100% _____	N/A
7.6.2	Verify limit switches and indicating lights operate properly	DLW 1 6/24/99
7.6.3	Record controller as-found PID settings. Re-adjust controller PID settings to a narrow proportional band (P) and minimum integral (I) and derivative (D). As-Found PID settings P_____, I _____, D	N/A

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DATA SHEET 11.1
INSTRUMENT LOOP CALIBRATION (Continued)

Proc. Step No.	ACTION	INITIALS/DATE
7.6.4	Verify the final control elements response to varying controller inputs in automatic mode. The final control element will move to within 10 % of full closed or full open position, depending on controller action (i.e., – direct or reverse action).	N/A
	Record controller action _____ Dir./Rev.	
7.6.5	Verify the final controllers PID settings have been returned to its as-found settings or to new settings, as directed by the Construction Field Engineer. Record as-left settings below.	N/A
	As-Left PID Settings P_____, I _____, D _____	
7.7	Verify re-alignment of valves, switches and circuit breakers. Reinstallation of fuses and removal of jumpers, as configured for testing.	DLW 1 6/24/99
7.8	Verify acceptance criteria have been satisfied.	DLW 1 6/24/99
	Acceptance criteria satisfied YES Yes/No	
	Additional calibration and testing required NO Yes/No	
8.0	RESTORATION COMPLETE	DLW 1 6/24/99
10.0	ACCEPTANCE CRITERIA Loop accuracy is within allowable error limits.	DLW 1 6/24/99

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DATA SHEET 11.1
INSTRUMENT LOOP CALIBRATION (Continued)

Remarks: Data was collected during PAT 1 steps 9.11.1529 - 9.11.1533 of Procedure SNF-W379-PAT-015-1 using the Load Cell verification System

Performed By: Dawayne Welch (Technician) Date: 6/25/99

Reviewed By: [signature] (AI Witness) Date: 7-12-99

Reviewed By: Roberto V. Cruz (Startup Test Engineer) Date: 6/25/99

Approved By: [signature] (Test Director) Date: 6/25/99

TP Status.xls Load Cell Load Cell Readings - per CSB(W379)-015-11-060 4/12/00 3:59 PM

Direction	Force	Total	X	X-Error	Y	Y-Error	Avg Error
Inc	2160	6124	5911	3.48%	5549	**9.39%**	**6.43%**
Inc	4210	8174	7916	3.16%	7514	**8.07%**	**5.62%**
Inc	6200	10164	9896	2.64%	9463	**6.90%**	4.77%
Inc	8210	12174	11910	2.17%	11480	**5.70%**	3.93%
Inc	10200	14164	13914	1.77%	13449	**5.05%**	3.41%
Inc	12150	16114	15910	1.27%	15450	4.12%	2.69%
Inc	14100	18064	17910	0.85%	17425	3.54%	2.19%
Inc	16050	20014	19920	0.47%	19420	2.97%	1.72%
Inc	18000	21964	21920	0.20%	21400	2.57%	1.38%
Inc	19920	23884	23915	-0.13%	23350	2.24%	1.05%
Inc	21950	25914	25920	-0.02%	25350	2.18%	1.08%
Inc	23850	27814	27945	-0.47%	27320	1.78%	0.65%
Inc	25800	29764	29930	-0.56%	29311	1.52%	0.48%
Inc	27650	31614	31906	-0.92%	31250	1.15%	0.11%
				Average Error over Span (Inc):			**2.54%**
Dec	25100	29064	29890	-2.84%	29215	-0.52%	-1.68%
Dec	23120	27084	27896	-3.00%	27244	-0.59%	-1.79%
Dec	21050	25014	25699	-2.74%	25076	-0.25%	-1.49%
Dec	19150	23114	23780	-2.88%	23170	-0.24%	-1.56%
Dec	17280	21244	21915	-3.16%	21270	-0.12%	-1.64%
Dec	15240	19204	19855	-3.39%	19242	-0.20%	-1.79%
Dec	13350	17314	17875	-3.24%	17310	0.02%	-1.61%
Dec	11380	15344	15791	-2.91%	15244	0.65%	-1.13%
Dec	9500	13464	13899	-3.23%	13362	0.76%	-1.24%
Dec	7400	11364	11800	-3.84%	11260	0.92%	-1.46%
Dec	5500	9464	9875	-4.34%	9340	1.31%	-1.52%
Dec	3700	7664	7850	-2.43%	7399	3.46%	0.52%
Dec	1700	5664	5895	-4.08%	5460	3.60%	-0.24%
				Average Error over Span (Dec):			**-1.28%**

Max. Deviation Allowed = 5% over span

X-Error = (Total-X)/Total
Y-Error = (Total-Y)/Total
Avg Error = (YError + XError)/2

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Commercial Grade Item Upgrade Dedication Form

Rev. No. 3

ECN No. **N/A** CGI No. **CGI-SNF-D-MHM-013**

Page 1 of 8

Title: **P2, P62, P65 and P80 – Honeywell Limit Switch LSYDC3K**

ORIGINAL

Section 1 Part Information

Item No.: **N/A**	Manufacturer: **N/A**	Supplier: **N/A**
Mfg. Part/Model No.: **N/A**	Supplier's P/N: **N/A**	
Part Description: **N/A**		
End Use Description: **N/A**		

Section 2a Component Information

Equipment No.:	Specification No.:	Manufacturer:	Past P.O. No.:
LFMJCY, LFMCOCX, LFMCOCY	**Ederer F-2566, Foster Wheeler MJX-SDX 452656**	**Honeywell**	**N/A**
Manufacturer's Part/Model No.: **LSYDC3K**	Equipment Supplier (if different from manufacturer): **ALSTOM, Foster Wheeler**		Equip. Supplier's Part No.: **N/A**

Component Description: **Limit Switches for Interlocks P02 and P80, LFMCOCX, LFM COCY and LFMJCY are located on the MCO grapple assembly, show when MCO grapple is in contact with a load (LFMCOCX & LFM COCY) and measure MCO grapple jaws fully closed (LFMJCY), to inhibit operating mode changes. LFMJCY is also used in Interlocks P62 & P65.**

Section 2b Commercial Availability of the Item

1. Is the Item available from a catalogue from a qualified NQA1 supplier or ISO 9000 supplier (coordinate with project CGI interface Engineer or BTR)?

   [ ] YES (go to #2 below) [X] NO (go to procedure step 6.3.2, proceed to dedicate Item)

   If not available from a qualified NQA1 supplier, is it available from an ISO 9000 supplier? (coordinate with project CGI Interface Engineer or BTR)

   [ ] YES (go to #2 below, procedure step 6.3.2, dedicate Item) [X] NO (procedure step 6.3.2, dedicate Item)

2. List of Candidate qualified NQA1 suppliers or ISO 9000 suppliers, if used: **N/A**

3. Recommended Procurement Strategy (coordinate with project CGI interface Engineer or BTR): **N/A**

Section 2c CGI Determination

CGI Determination Questions:

#1: Is the Item subject to design or specification requirements that are unique to nuclear facilities or activities?

[ ] YES (the Item is not commercial grade) [X] NO (continue)

#2: Is the Item used in applications other than nuclear facilities or activities?

[ ] NO (the item is not commercial grade) [X] YES (continue)

#3: Is the Item ordered from manufacturer/supplier on the basis of specifications set forth in the manufacturer's catalog?

[ ] NO (the item is not commercial grade) [X] YES (continue)

[X] All three criteria have been satisfied. The Item meets the definition of commercial grade.

Commercial Grade Item Upgrade Dedication Form	Rev. No. 3
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Section 2d Reason for Dedication

The above Commercial Grade (CG) described item is being Dedicated for use in the application cited for the following reason(s):

	Item is being purchased from a non ESL manufacturer supplier as CG to be used in a Safety Class application.
	Item is being purchased from a non ESL manufacturer supplier as CG to be used in a Safety Significant application.
X	Item was purchased from a non ESL manufacturer supplier as CG to be used in a Safety Class application.
	Item was purchased from a non ESL manufacturer supplier as CG to be used in a Safety Significant application.
	Other ('like-for-like', similar, substitution, replacement evaluation)

Section 3 Failure Effects Evaluation

A. Part/Component Safety Function:

1. **These interlocks inhibit operating mode changes, lowering of the shield skirt, and lowering of the MCO hoist if the grapple jaws are not closed, are in contact with a load, or the load is an MCO. Prevents MCO shear due to lateral movement of the MHM, MCO drop due to shear of the hoist cable, and MCO drop to the maintenance pit.**

B. Part/Component Functional Mode:

Safety Function #1: [X] Active [ ] Passive

Safety Function #2: [ ] Active [ ] Passive

Safety Function #3: [ ] Active [ ] Passive

Active - Mechanical or Electrical change of state is required to occur for the component to perform its safety function

Passive – Change of state is not required for the component to perform its safety function

C. Host Component Safety Function (if applicable): **N/A**

1.

D. Failure Mode(s) and the effects on component or system safety function (see Worksheet 1):

1. **Failure of switch contacts to open upon demand results in potential override of interlock channel.**

2. **Plunger/arm inoperative results in failure to provide interlock function at correct demand position.**

Section 4 Environmental & Natural Phenomena Hazard Design

Environmental Qualification Required: Yes [ ] No [X]	If yes: Environmental Qualification Requirements Limiting Environmental Conditions: Required Safety Functions: Qualification Period:
Natural Phenomena Hazard (NPH) Design Required: Yes [ ] No [X]	If yes: NPH Design Requirements Performance Category: NPH Design Req'ts.: Required Safety Functions:

Section 5 Component Functional Classification

X	Safety Class (SC)		General Service (GS)		Safety Significant (SS)

If part/component classification is different from host component/system, document basis. **N/A**

Sections 6 and 7 (Reserved)

Section 8 References (for Functional Classification)

National Codes/Standards: **N/A**

Safety Analysis Report (SAR): **HNF-3672 Rev. 0**

Drawings: **Ederer, Inc. EB-33056, Sht 13A & 13B, Hanford H-2-827174, Shts. 9, 23 & 27** (Enclosed yw 4/11/00)

Vendor Manual/Manufacturer/Supplier Information: **Honeywell ~~Series LS compact~~ limit switches**

Other: **ALSTOM ESL/R (96) 065 - Rev. D, 100% Design Submittal - June 1998.**

Commercial Grade Item Upgrade Dedication Form	Rev. No. 3
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Section 9 Critical Characteristics

Critical Characteristics	Acceptance Criteria/Tolerances	Acceptance Method	ID	Function
1. Item Identification Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
Manufacturer	**Honeywell**	**1, IN**	**X**	
Model Number	**LSYDC3K**	**1, IN**	**X**	
2. Physical Critical Characteristics (for reasonable assurance that the Item delivered is the Item specified)				
Actuator (Note 1)	**RollerTop Plunger**	**1, IN**	**X**	
3 Performance Critical Characteristics (for reasonable assurance that the Item will perform its intended safety function(s))				
Contact rating	**Nominal 5 amps VAC, resistive, less than 0.5V drop across contacts**	**1, T**		**X**
Insulation Resistance	**Greater than 10 megohm resistance, terminal to terminal and terminal to ground at 1000v.**	**1, T**		**X**
Mechanical Operation	**Cycle switch - confirm contacts open and close with smooth operation and free release of spring.**	**1, T**		**X**

4. Notes and Legend:

Rev. 2: All Pages: New Forms; Pages 3, 5, 7: added Note 1

Note 1: This actuator is installed with the limit switch - replacement limit switches will not include an actuator - the existing actuator will be placed on the replacement switch. Therefore, the physical CC specified for the actuator lever need not be performed on the replacement limit switch.

Rev. 3: Pages 3, 6 & 7: Rev'd Contact Rating Criteria to "Nominal 5 amps VAC, resistive, less than 0.5V drop across contacts" from 10 amps for prevention of equipment damage due to excessive current; Pages 1, 2 & 5: Rev'd equipment ID Nos., and the component description per SEL changes.

Acceptance Method (Acc Meth):

1. Special Test and Inspection
   - 1, IN for Inspection
   - 1,T for Test
2. Commercial Grade Survey
3. Source Verification
4. Vendor/Item History

Section 10 Initial Review and Approval

Approvals:

Designated Engineer: [signature]

Design Authority: Craig Swenson 3/29/00

QA Engineer: Stephen Scott Mosr 3-30-2000

Commercial Grade Item Upgrade Dedication Form	Rev. No. 3
ECN No. **N/A** CGI No. **CGI-SNF-D-MHM-013** Title: **P2, P62, P65 and P80 – Honeywell Limit Switch LSYDC3K**	Page 4 of 8

WORKSHEET 1
DETERMINATION OF FAILURE MECHANISMS/MODES

Section 1			
Typical Failure Mechanisms	Definition	X = Applicable to Component under Evaluation	
		X?	Indicate Failure Mode
Fracture	Separation of a solid accompanied by little or no macroscopic plastic deformation.		
Corrosion	The gradual deterioration of a material due to chemical or electrochemical reactions, such as oxidation, between the material and its environment.	X	**Switch contacts corrode closed and fail to open upon demand.**
Erosion	Destruction of materials by the abrasive action of moving fluids, usually accelerated by the presence of solid particles carried with the fluid.		
Open Circuit	An electrical circuit that is unintentionally broken so that there is no complete path for current flow.		
Short Circuit	An abnormal connection by which an electrical current is connected to ground, or to some conducting body, resulting in excessive current flow.	X	**Switch contacts fuse closed and fail to open upon demand.**
Blockage	Clogging of a filtering medium resulting in the inability to perform its purification function or blockage of flow.		
Seizure	Binding of a normally moving item through excessive pressure, temperature, friction, jamming.	X	**Switch mechanism jams and contacts fail to open upon demand.**
Unacceptable Vibration	Mechanical oscillations produced are beyond the defined permissible limits due to unbalancing, poor support, or rotation at critical speeds.		
Loss of Properties	A loss of mechanical and physical properties of a material due to exposure to high temperatures, radiation exposure.		
Excess Strain	Under the action of excessive external forces the material of the part has been deformed or distorted.		
Mechanical Creep	From prolonged exposure to high temperature and stress, the object will show a slow change in its physical (shape and dimension) and mechanical characteristics.		
Ductile Fracture	Fracture characterized by tearing of metal accompanied by appreciable gross plastic deformation.		

Section 2 Additional Failure Modes Applicable to the Component Under Evaluation
1. **Switch contacts are closed to permit equipment movement. Contacts open for the interlock function to prevent lateral movement of the MHM. Any failure which prevents contacts opening inhibits the particular switch interlock function.**
2. **Actuator plunger/arm seizure or break renders the contact opening inoperable.**
3. **Short circuit could give false signal to energize interlock function.**

Commercial Grade Item Upgrade Dedication Form	Rev. No. 3
ECN No. N/A CGI No. CGI-SNF-D-MHM-013 Title: P2, P62, P65 and P80 – Honeywell Limit Switch LSYDC3K	Page 5 of 8

Checklist 1 - Acceptance Method 1 - Special Test/Inspection Verification

SECTION 1

Item Description: **P2, P62, P65 and P-80 Interlock limit switches** System #: **MHM**	Equip #: **LFMJCY, LFMCOCX, LFMCOCY** Model #: **LSYDC3K**
Manufacturer (Address/Phone): **Honeywell** **1-800-537-6945**	Supplier (Address/Phone):

SECTION 2 CRITICAL CHARACTERISTICS TO BE VERIFIED BY METHOD 1.

Insp	Test	Post-Test	
X			**1. Manufacturer**
X			**2. Model Number**
X			**3. Actuator (Note 1)**
	X		**4. Contact Rating**
	X		**5. Insulation Resistance**
	X		**6. Mechanical Operation**

SECTION 3 BY INSPECTION * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)

Characteristic: **Manufacturer** Sample Size*: **100%**

Acceptance Criteria: **Honeywell**

Receipt Inspection Plan / Report #: CGI- SNF-D-MHM-013-TP-013B,C,D

Characteristic: **Model Number** Sample Size*: **100%**

Acceptance Criteria: **LSYDC3K**

Receipt Inspection Plan / Report #: TP-013 B, C, D

Characteristic: **Actuator (Note 1)** Sample Size*: **100%**

Acceptance Criteria: **RollerTop Plunger**

Receipt Inspection Plan / Report #: TP-013B, C, D

Commercial Grade Item Upgrade Dedication Form	Rev. No. 3
ECN No. N/A CGI No. CGI-SNF-D-MHM-013 Title: P2, P62, P65 and P80 – Honeywell Limit Switch LSYDC3K	Page 6 of 8

SECTION 4 BY SPECIAL TEST * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)

Characteristic for Test: **Contact Rating** Samp Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **Nominal 5 amps VAC, resistive, less than 0.5V drop across contacts**

Actual Test Value: See TP Test Plan and Report #: TP-013B,C,D

Characteristic for Test: ***Insulation Resistance*** Samp Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **Greater than 10 megohm resistance, terminal to terminal and terminal to ground at 1000 vdc.**

Actual Test Value: See TP Test Plan and Report #: TP-013B,C,D

Characteristic for Test: **Mechanical Operation** Samp Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **Cycle switch - confirm contacts open and close with smooth operation and free release of spring**

Actual Test Value: See TP Test Plan and Report #: TP-013B,C,D

Section 5 Test / Inspection Summary (Acceptance Method 1)

1. SUMMARY OF VERIFIED CRITICAL CHARACTERISTICS, THEIR VERIFICATION METHODS, AND RESULTS

ITEM DESCRIPTION: Honeywell Limit Switch

Critical Characteristics				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/IN	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
Manufacturer	Honeywell	X		1, IN	TP-013 B,C,D	NA	3	0	XWEST	[signature]	4/10/00
Model Number	LSYDC3K	X		1, IN							
Actuator (Note 1)	RollerTop Plunger	X		1, IN							
Contact Rating	Nominal 5 amps VAC, resistive, less than 0.5V drop across contacts		X	1, T							
Insulation Resistance	Greater than 10 megohm resistance, terminal to terminal and terminal to ground at 1000v.		X	1, T							
Mechanical Operation	Cycle switch - confirm contacts open and close with smooth operation and free release of spring		X	1, T							

2. DISPOSITION OF UNVERIFIED OR FAILED CRITICAL CHARACTERISTICS

Critical Characteristic	Disposition

3. SIGNATURE INDICATES ALL CRITICAL CHARACTERISTICS VERIFIED SATISFACTORY OR ACCEPTABLY DISPOSITIONED AND COMMERCIAL GRADE DEDICATION IS SATISFACTORY AND COMPLETE.

See Test Plan TP-013C,D,B cited above. CES 4/11/00

Testing Agency Approval: NR CES 4/11/00 Date

Testing Agency QA Engineer: NR CES 4/11/00 Date

BUYER VERIFICATION

Design Authority: [signature] Date 4-11-00

QA Engineer: Stephen Scott Moss Date 4-20-2000

Commercial Grade Item Upgrade Dedication Form	Rev. No. 3
ECN No. **N/A** CGI No. **CGI-SNF-D-MHM-013** Title: **P2, P62, P65 and P80 – Honeywell Limit Switch LSYDC3K**	Page 8 of 8

Section 6 Contacts/Phone Numbers		
	Name	Phone
Design Authority	CRAIG SWENSON	( ) 376-0288
QA		( )
QC		( )
Cog - Engineer		( )
CGI Engineer		( )
Procurement Engineer		( )
Other		( )

Section 7 Supporting Documentation for this Checklist		
Initial Procurement Documents		**For Critical Characteristics**
	Drawings:	
	Manuals (specify type & number):	
	Design Calculations	
	Installation Instructions	
	Operation Instructions	
	Calibration Instructions	
	Manufacturer's Recommended Spare Parts List	# ENCLOSED LES 4/11/00
X	**Other: Honeywell Series ~~LS Compact~~ Limit Switches**	**All**
Procurement Documents		**For Critical Characteristics**
	Certificate of Conformance/Compliance	
	Seismic Qualification Certificate	
	Environmental Qualification Certificate	
X	Test Report (s): **CSB(W379)-015-11-1042**	
	Inspection Report (s):	
	CMTRs for ASME Pressure Retaining Materials	
	Valve Seat Leakage Report	
	Weld Records	
	Material Traceability Record	
	Other:	

ORIGINAL

Dedication Test Plan – IST-LS-1 Rev. No. 1
Test Plan No.: CGI-SNF-D-MHM-013-TP-013B
Test Specimen: Honeywell LSYDC3K Limit Switch, Eqmt. No.: LFMJCY Page 1 of 7

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI Eng	DA	QA Post Review*
1	Avoid equipment damage	3.4.3 3.4.10	Lower current from 16 amps to 5 amps		CES 3/29/00	SSM 4-3-2000

* QA Post Review of Individual Revisions is allowed

ORIGINAL

Dedication Test Plan – IST-LS-1	**Rev. No. 1**
Test Plan No.: CGI-SNF-D-MHM-013-TP-013B	
Test Specimen: Honeywell LSYDC3K Limit Switch, Eqmt. No.: LFMJCY	**Page 2 of 7**

In-Situ Test Procedure

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) YMP Craig Swenson Date: 3/28/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Bellhaven	Michael Cram	MCC
Electrician	DAN K. YORK	PCE	Dan K. York	DKY
Electrician Quality Control	Stephen R. Cowley	PCE	Stephen R. Cowley	SRC
Design Authority Representative	Larry W. Peace	XWBST		YMP
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A
Design Authority	Craig Swenson	PHI	Craig Swenson	CES

RECOMMENDED EQUIPMENT:

Power Supply capable of 10 amps @ 120 VAC
Megger Instrument capable of 1000 VDC Test Voltage
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: FLUKE 787 I.D.: BAT 167 Calib. Due date: 05-28-00

Test Instrument type: Avo BM80/2 I.D.: 6410-589 Calib. Due date: 02-09-01

Test Instrument type: HP 3457A I.D.: BAT 123 Calib. Due date: 07-29-00

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Dedication Test Plan – IST-LS-1	Rev. No. 1
Test Plan No.: CGI-SNF-D-MHM-013-TP-013B	
Test Specimen: Honeywell LSYDC3K Limit Switch, Eqmt. No.: LFMJCY	Page 3 of 7

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE:

For this In-Situ Test, certain leads must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of leads.

1.0 Lock and tagout Main Disconnect CRN-004, or Main Disconnect MD.

2.0 Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	LFMJCY	**LFMJCY**	Acc
Manufacturer:	HONEYWELL	**Honeywell**	Acc
Model:	LSYDC3K	**LSYDC3K**	Acc
Actuator:	OK	**Roller Top Plunger**	Acc
Serial No./Lot No./Date Code:	N/A	**N/A**	Acc

3.0 Perform the following testing steps:

3.1 Record: Date /Time of Test Beginning: 03-29-00 9:30 am

3.2 Mechanical Operation

3.2.1 Cycle the switch actuator full stroke 5 or more times to confirm contacts open and close with smooth operation and free release of spring.

3.2.2 Record the following data.

Description	Record Data	Acceptance Criteria	Comments/Deviations
No of Cycles:	6	**> 5 times**	Acc
Describe Operation:	OK	**Contacts open and close with smooth operation.**	Acc
Describe release of Spring:	OK	**Free release of spring.**	Acc

3.3 Insulation Resistance Test

3.3.1 Setup the test equipment and Limit Switch specimen for insulation resistance testing. Remove the amphenol connector at the grapple housing.

3.3.2 Apply a nominal 1000 VDC via Megger device between non-continuity terminals on the limit switch side of the amphenol connector nos. 18 and 25 (Common - Across NO Contact) and then between terminal 25 and ground. Record the resistances.

3.3.3 Remove the Megger device.

3.3.4 Manually adjust the limit switch actuator to open the normally closed (NC) contacts.

3.4.5 Apply a nominal 1000 VDC via Megger device between non-continuity terminals on the the limit switch side of the amphenol connector nos. 18 and 24 (Common - Across open NC Contact) and then between terminal 24 and ground. Record the resistances.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Resistance	Acceptance Criteria	Comments/Deviations
18 and 25	**Common to NO**	> 7.8 Gohm	**> 10 Megohms**	acc
25 and Ground	**NO to Ground**	> 6.3 Gohm	**> 10 Megohms**	acc
18 and 24	**Common to open NC***	> 7.7 Gohm	**> 10 Megohms**	acc
24 and ground	**Open NC to Ground***	> 7.6 Gohm	**> 10 Megohms**	acc

* Normally closed contacts are open.

3.3.6 De-energize and remove the test equipment.

3.4 Contact Rating Test

3.4.1 Setup the test equipment and Limit Switch specimen for contact rating testing.

3.4.2 At grapple mounted amphenol connector, disconnect the connector and imput test leads onto the limit switch side of the connector terminal no. 18 (Common) and terminal 24 (LFMJCY Normally Closed Contact).

5 Amp 3/24/00 LEF

3.4.3 Apply a nominal ~~10~~ amps, resistive, across the normally closed contacts of the test specimen.

Caution: Do not change state of contacts while energized.

3.4.4 Record the following data.

Description	Record Voltage Drop	Acceptance Criteria	Comments/Deviations
Contact Circuit 18 and 24 (Terminals COM-NC)	.449 VAC	**< 0.5 Volts AC drop**	Acc

3.4.6 Reduce the current source to zero amps.

3.4.7 Disconnect the power supply from terminals 18 and 24.

3.4.8 Manually adjust the limit switch actuator to close the normally open contacts.

3.4.9 Connect the power supply to terminals 18 and 25.

3.4.10 Apply a nominal ~~10~~ 5 amps, resistive, across the closed normally open contacts of the test specimen.

3.4.11 Record the following data.

Description	Record Voltage Drop	Acceptance Criteria	Comments/Deviations
Contact Circuit 18 and 25 (Terminals COM- Closed NO Contact):	.488 VAC	**< 0.5 Volts AC drop**	Acc

3.4.12 Reduce the current source to zero amps and remove the power supply from terminals 18 and 25.

3.4.13 Manually adjust the limit switch actuator to close the normally closed contacts.

3.5 Terminate the test.

3.5.1 Reconnect the Amphenol connector and tighten hand tight.

3.5.2 Remove lockout/tagout and restore system to normal.

3.5.4 Record: Date /Time of Test End: 03-29-00 10:22 a.m.

Dedication Test Plan – IST-LS-1	Rev. No. 1
Test Plan No.: CGI-SNF-D-MHM-013-TP-013B	
Test Specimen: Honeywell LSYDC3K Limit Switch, Eqmt. No.: LFMJCY	Page 6 of 7

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Acceptance Criteria has been met

Michael D Cram
03-29-00

Notes:

Certified Instrumentation Technician (signature) Michael D Cram Date: 03-29-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Craig Swenson Date: 3/29/00

QA/QC (signature) Stephen Scott Mosh Date: 4-3-2000

LIFTED LEAD LOG

Junction Box: Grapple Amphenol Connector

Drawing #	Sheet #	Wire #	Device #	Amphenol Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
363A0033	11	N/A	LFMJCY	Connector	DKY	3-29-00	SRL	3-29-00	DKY	3-29-00	SRL	3-29-00

Remarks:

Page 6 of 10

Limit and Enclosed Switches

HDLS Series

Plunger Actuated Switches

ASSEMBLED CONDITIONS

Catalog listings in order guide below are factory assembled with:

- Side plungers facing front (label side) of switch. Rollers on side plungers are in horizontal position.
- Roller on top plungers are parallel to mounting surface.
- Lights on indicator versions are wired to N.O. circuit.

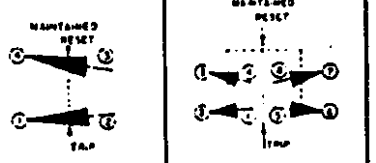
Refer to facing page to specify modifications to these assembled conditions.

For low temperature, high temperature or preleaded versions see page A42.

ORDER GUIDE

Momentary action, except for maintained contact LSG version. UL listed, CSA certified.

Circuitry For Maintained Plunger



SPDT Double Break (Electrical rating A) | DPDT Double Break (Electrical rating B)

Circuits on any one pole must be the same polarity.

Catalog listings in this chart are complete switches.

Circuitry	Elec. Rating Page A34	Body** Style	Catalog Listings: Top Plungers — Plain	Top Plungers — Roller	Top Plungers — Adjustable	Side Plungers — Plain	Side Plungers — Roller	Side Plungers — Adjustable	Maintained (Circuitry Shown Above)
Silver contacts	A	Plug-in ½" Conduit	LSC1A	LSD1A	LSV1A	LSE1A	LSF1A	LSW1A	LSG1A
Gold cross pt.	C	Plug-in ½" Conduit	LSC1J	LSD1J	LSV1J	LSE1J	LSF1J	LSW1J	—
Gold plated	C	Plug-in ½" Conduit	—	LSD1E	—	—	LSF1E	LSW1E	—
Silver contacts MOMENTARY	A*	120 V. Ind. Lite Plug-in ½" Conduit*	LSC5A	LSD5A	LSV5A	LSE5A	LSF5A	LSW5A	LSG5A
	A*	240 V. Ind. Lite Plug-in ½" Conduit*	LSC8A	LSD8A	LSV8A	LSE8A	LSF8A	LSW8A	LSG8A
SPDT Double Break	A	Non plug-in ½" Conduit	LSC3K	LSD3K	LSV3K	LSE3K	LSF3K	LSW3K	LSG3K
Silver contacts	B	Plug-in ¾" Conduit	LSC2B	LSD2B	LSV2B	LSE2B	LSF2B	LSW2B	LSG2B
	B	120 V Ind. Lite Plug-in ¾" Conduit	LSC2R	LSD2R	LSV2R	LSE2R	LSF2R	LSW2R	LSG2R
MOMENTARY	B	Plug-in ½" Conduit	LSC6B	LSD6B	LSV6B	LSE6B	LSF6B	LSW6B	LSG6B
	B	Non plug-in ¾" Conduit	LSC4L	LSD4L	LSV4L	LSE4L	LSF4L	LSW4L	LSG4L
DPDT Double Break	B	Non plug-in ½" Conduit	LSC7L	LSD7L	LSV7L	LSE7L	LSF7L	LSW7L	LSG7L
SPNC Direct Acting	D	Non plug-in ½" Conduit	—	—	—	LSE3N	LSF3N	LSW3N	LSG3N

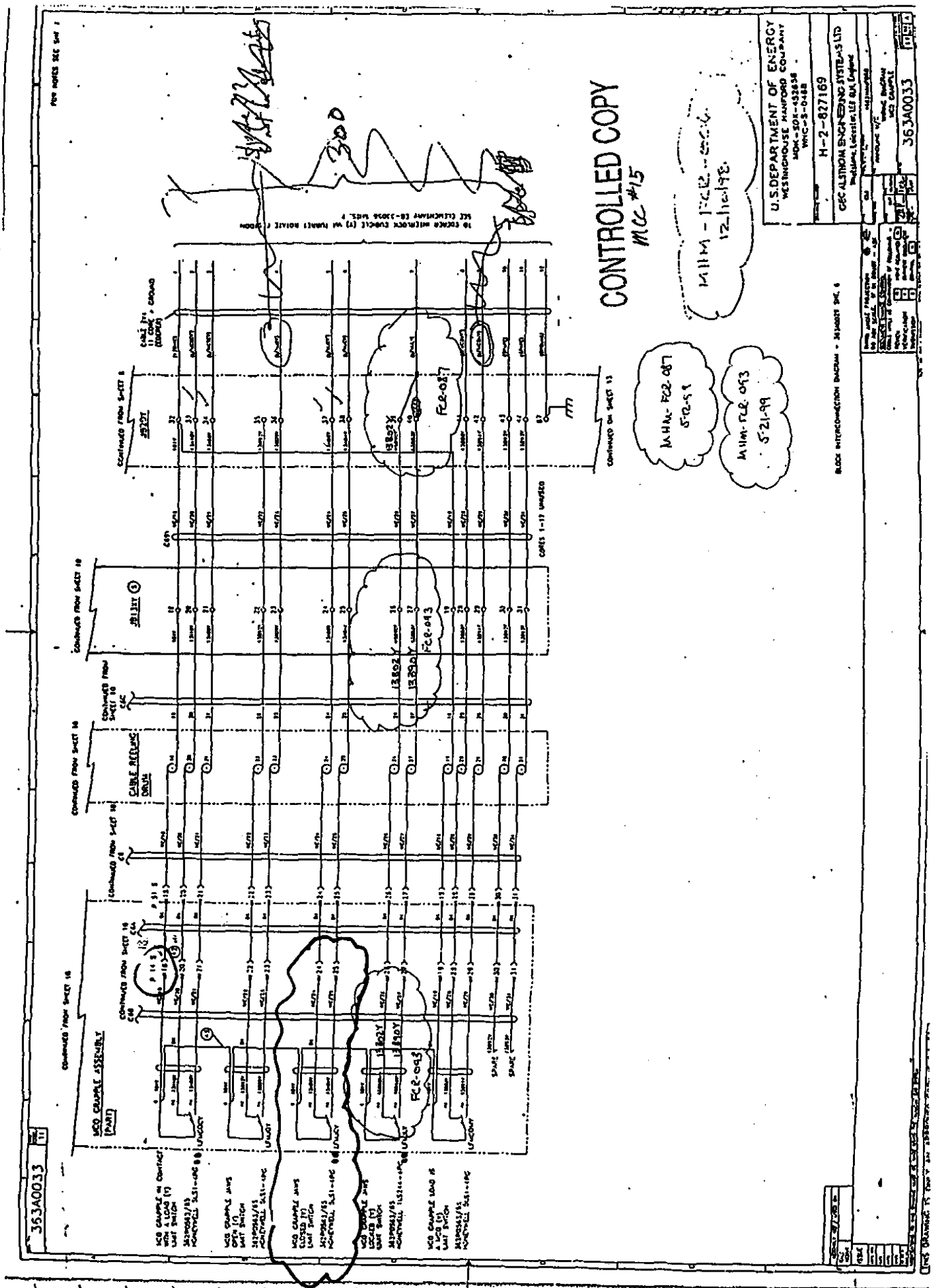
*Use at voltage indicated for light. Upper operating temperature limit for lighted units is 200°F. Wired to N.O. circuit. **Plug-in listings include base receptacle.

OPERATING CHARACTERISTICS

Pretravel (in. max.)	mm	1,78 .070	1,78 .070	1,78 .070	2,54 .100	2,54 .100	2,54 .100	4,32 .170
Differential Travel (in. max.)	SPDT	0,38 .015	0,38 .015	0,38 .015	0,64 .025	0,64 .025	0,64 .025	2,29 .090
	DPDT	0,51 .020	0,51 .020	0,51 .020	0,89 .035	0,89 .035	0,89 .035	2,29 .090
Overtravel (in. min.)	mm	4,83 .190	4,83 .190	4,83 .190	4,83 .190	4,83 .190	4,83 .190	2,0 .080
Operating Force (lb. max.)	Newton	17,8 4	17,8 4	17,8 4	26,7 6	26,7 6	26,7 6	44,5 10
Operating Point (in.)	mm	45,8 ±0,76 1.805 ±.030	55,9 ±1,02 2.200 ±.040	53,0 to 59,3 2.085 to 2.335	33,0 ±0,76 1.300 ±.030	44,1 ±1,02 1.735 ±.040	41,0 to 47,4 1.615 to 1.865	37,6 ±0,76 1.480 ±.030
Operating Temperature Range		10°F to 200°F −12 to 93°C		10°F to 200°F −12 to 93°C		10°F to 200°F −12 to 93°C		30°F to 200°F −1 to 93°C

LSYDC3K

FLUORO-CARBON SEALED VERSION of LSD3K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MC #15
U.S. DEPARTMENT OF ENERGY
WESTINGHOUSE HANFORD COMPANY
H-2-827169
363A0033
363A0033

ORIGINAL

Dedication Test Plan – IST-LS-1 Rev. No. 1
Test Plan No.: CGI-SNF-D-MHM-013-TP-013C
Test Specimen: Honeywell LSYDC3K Limit Switch, Eqmt. No.: LFMCOCX Page 1 of 7

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI Eng	DA	QA Post Review*
1	Avoid equipment damage	3.9.3 3.9.16	Lower current from 10 amps to 5 amps		CES 3/29/00	SGM 4-3-200

* QA Post Review of Individual Revisions is allowed

Dedication Test Plan – IST-LS-1	Rev. No. 1
Test Plan No.: CGI-SNF-D-MHM-013-TP-013C	
Test Specimen: Honeywell LSYDC3K Limit Switch, Eqmt. No.: LFMCOCX	Page 2 of 7

ORIGINAL

In-Situ Test Procedure

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) Craig Swenson Date: 3/28/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Balhaven	Michael Cram	MRC
Electrician	DAN K. YORK	PCE	Dan K. York	D K.Y
Electrician Quality Control	Stephen P. Cawley	PCE	Stephen R. Cawley	SRC
Design Authority Representative	LARRY W. PIKE	WEST		
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A
Design Authority	Craig Swenson	FHI	Craig Swenson	CES

RECOMMENDED EQUIPMENT:

Power Supply capable of 10 amps @ 120 VAC
Megger Instrument capable of 1000 VDC Test Voltage
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: FLUKE 787 I.D.: BAT 107 Calib. Due date: 05-28-00

Test Instrument type: HP 3457A I.D.: BAT 123 Calib. Due date: 07-29-00

Test Instrument type: AVO BM80/2 I.D.: 6410-889 Calib. Due date: 02-09-01

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE:

For this In-Situ Test, certain leads must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of leads.

1.0 Lock and tagout Main Disconnect CRN-004, or Main Disconnect MD.

2.0 Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	LFMCOCX	**LFMCOCX**	Acc
Manufacturer:	HONEYWELL	**Honeywell**	Acc
Model:	LSYDC3K	**LSYDC3K**	Acc
Actuator:	OK	**Roller Top Plunger**	Acc
Serial No./Lot No./Date Code:	N/A	**N/A**	Acc

3.0 Perform the following testing steps:

3.1 Record: Date /Time of Test Beginning: 03-29-00 9:40 a.m.

3.2 Mechanical Operation

3.2.1 Cycle the switch actuator full stroke 5 or more times to confirm contacts open and close with smooth operation and free release of spring.

3.2.2 Record the following data.

Description	Record Data	Acceptance Criteria	Comments/Deviations
No of Cycles:	6	**> 5 times**	Acc
Describe Operation:	OK	**Contacts open and close with smooth operation.**	Acc
Describe release of Spring:	OK	**Free release of spring.**	Acc

3.3 Insulation Resistance Test

3.3.1 Setup the test equipment and Limit Switch specimen for insulation resistance testing. Remove the amphenol connector at the grapple housing.

3.3.2 Apply a nominal 1000 VDC via Megger device between non-continuity terminals on the limit switch side of the amphenol connector nos. 1 and 4 (Common - Across NO Contact) and then between terminal 4 and ground. Record the resistances.

3.3.3 Remove the Megger device.

3.3.4 Manually adjust the limit switch actuator to open the normally closed (NC) contacts.

3.4.5 Apply a nominal 1000 VDC via Megger device between non-continuity terminals on the the limit switch side of the amphenol connector nos. 1 and 3 (Common - Across open NC Contact) and then between terminal 3 and ground. Record the resistances.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Resistance	Acceptance Criteria	Comments/Deviations
1 and 4	Common to NO	> 6 Gohm	> 10 Megohms	Acc
4 and Ground	NO to Ground	> 5 Gohm	> 10 Megohms	Acc
1 and 3	Common to open NC*	> 5.6 Gohm	> 10 Megohms	Acc
3 and ground	Open NC to Ground*	> 4.4 Gohm	> 10 Megohms	Acc

* Normally closed contacts are open.

3.3.6 De-energize and remove the test equipment.

3.4 Contact Rating Test

3.4.1 Setup the test equipment and Limit Switch specimen for contact rating testing.

3.4.2 At grapple mounted amphenol connector, disconnect the connector and imput test leads onto the limit switch side of the connector terminal no. 1 (Common) and terminal 3 (LFMCOCX Normally Closed Contact).

5 Amps 3/27/00 CLS

3.4.3 Apply a nominal ~~10~~ amps, resistive, across the normally closed contacts of the test specimen.

Caution: Do not change state of contacts while energized.

3.4.4 Record the following data.

Description	Record Voltage Drop	Acceptance Criteria	Comments/Deviations
Contact Circuit 1 and 3 (Terminals COM-NC)	.283 VAC	**< 0.5 Volts AC drop**	Acc

3.4.6 Reduce the current source to zero amps.

3.4.7 Disconnect the power supply from terminals 1 and 3.

3.4.8 Manually adjust the limit switch actuator to close the normally open contacts.

3.4.9 Connect the power supply to terminals 1 and 4.

3.4.10 Apply a nominal ~~10~~ 5 amps, resistive, across the closed normally open contacts of the test specimen. JMP 03/29/00 CBS

3.4.11 Record the following data.

Description	Record Voltage Drop	Acceptance Criteria	Comments/Deviations
Contact Circuit 1 and 4 (Terminals COM- Closed NO Contact):	.294 VAC	**< 0.5 Volts AC drop**	Acc

3.4.12 Reduce the current source to zero amps and remove the power supply from terminals 1 and 4.

3.4.13 Manually adjust the limit switch actuator to close the normally closed contacts.

3.5 Terminate the test.

3.5.1 Reconnect the Amphenol connector and tighten hand tight.

3.5.2 Remove lockout/tagout and restore system to normal.

3.5.4 Record: Date /Time of Test End: 03-29-00 10:30 a.m.

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Dedication Test Plan – IST-LS-1	Rev. No. 1
Test Plan No.: CGI-SNF-D-MHM-013-TP-013C	
Test Specimen: Honeywell LSYDC3K Limit Switch, Eqmt. No.: LFMCOCX	Page 6 of 7

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Acceptance Criteria has been met.

Michael Cr
03-29-00

Notes:

Certified InstrumentationTechnician (signature) Michael Cr Date: 03-29-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Craig Swenson Date: 3/29/00

QA/QC (signature) Stephen Scott Mosi Date: 4-3-2000

LIFTED LEAD LOG

Junction Box: Grapple Amphenol Connector

Drawing #	Sheet #	Wire #	Device #	Amphenol Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
363A0033	10	N/A	LFMCOCX	Connector	DKY	3-29-00	SRC	3-29-00	DKY	3-29-00	SRC	3-29-00

Remarks:

Limit and Enclosed Switches

Plunger Actuated Switches

ASSEMBLED CONDITIONS

Catalog listings in order guide below are factory assembled with:

- Side plungers facing front (label side) of switch. Rollers on side plungers are in horizontal position.
- Roller on top plungers are parallel to *mounting surface*.
- Lights on indicator versions are wired to N.O. circuit.

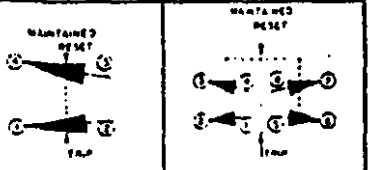
Refer to facing page to specify modifications to these assembled conditions.

For low temperature, high temperature or preleaded versions see page A42.

ORDER GUIDE

Momentary action, except for maintained contact LSG version. UL listed, CSA certified.

Circuitry For Maintained Plunger



SPDT Double Break (Electrical rating A) | DPDT Double Break (Electrical rating B)

Circuits on any one pole must be the same polarity.

Catalog listings in this chart are complete switches.

Circuitry	Elec. Rating Page A34	Body** Style	Catalog Listings: Top Plungers — Plain	Top Plungers — Roller	Top Plungers — Adjustable	Side Plungers — Plain	Side Plungers — Roller	Side Plungers — Adjustable	Maintained (Circuitry Shown Above)
Silver contacts	A	Plug-in ½" Conduit	LSC1A	LSD1A	LSV1A	LSE1A	LSF1A	LSW1A	LSG1A
Gold cross pt.	C	Plug-in ½" Conduit	LSC1J	LSD1J	LSV1J	LSE1J	LSF1J	LSW1J	—
Gold plated	C		—	LSD1E	—	—	LSF1E	LSW1E	—
Silver contacts MOMENTARY	A*	120 V. Ind. Lite Plug-in ½" Conduit*	LSC5A	LSD5A	LSV5A	LSE5A	LSF5A	LSW5A	LSG5A
	A*	240 V. Ind. Lite Plug-in ½" Conduit*	LSC8A	LSD8A	LSV8A	LSE8A	LSF8A	LSW8A	LSG8A
SPDT Double Break	A	Non plug-in ½" Conduit	LSC3K	LSD3K	LSV3K	LSE3K	LSF3K	LSW3K	LSG3K
Silver contacts	B	Plug-in ¾" Conduit	LSC2B	LSD2B	LSV2B	LSE2B	LSF2B	LSW2B	LSG2B
	B	120 V Ind. Lite Plug-in ¾" Conduit	LSC2R	LSD2R	LSV2R	LSE2R	LSF2R	LSW2R	LSG2R
MOMENTARY	B	Plug-in ½" Conduit	LSC6B	LSD6B	LSV6B	LSE6B	LSF6B	LSW6B	LSG6B
	B	Non plug-in ¾" Conduit	LSC4L	LSD4L	LSV4L	LSE4L	LSF4L	LSW4L	LSG4L
DPDT Double Break	B	Non plug-in ½" Conduit	LSC7L	LSD7L	LSV7L	LSE7L	LSF7L	LSW7L	LSG7L
SPNC Direct Acting	D	Non plug-in ½" Conduit	—	—	—	LSE3N	LSF3N	LSW3N	LSG3N

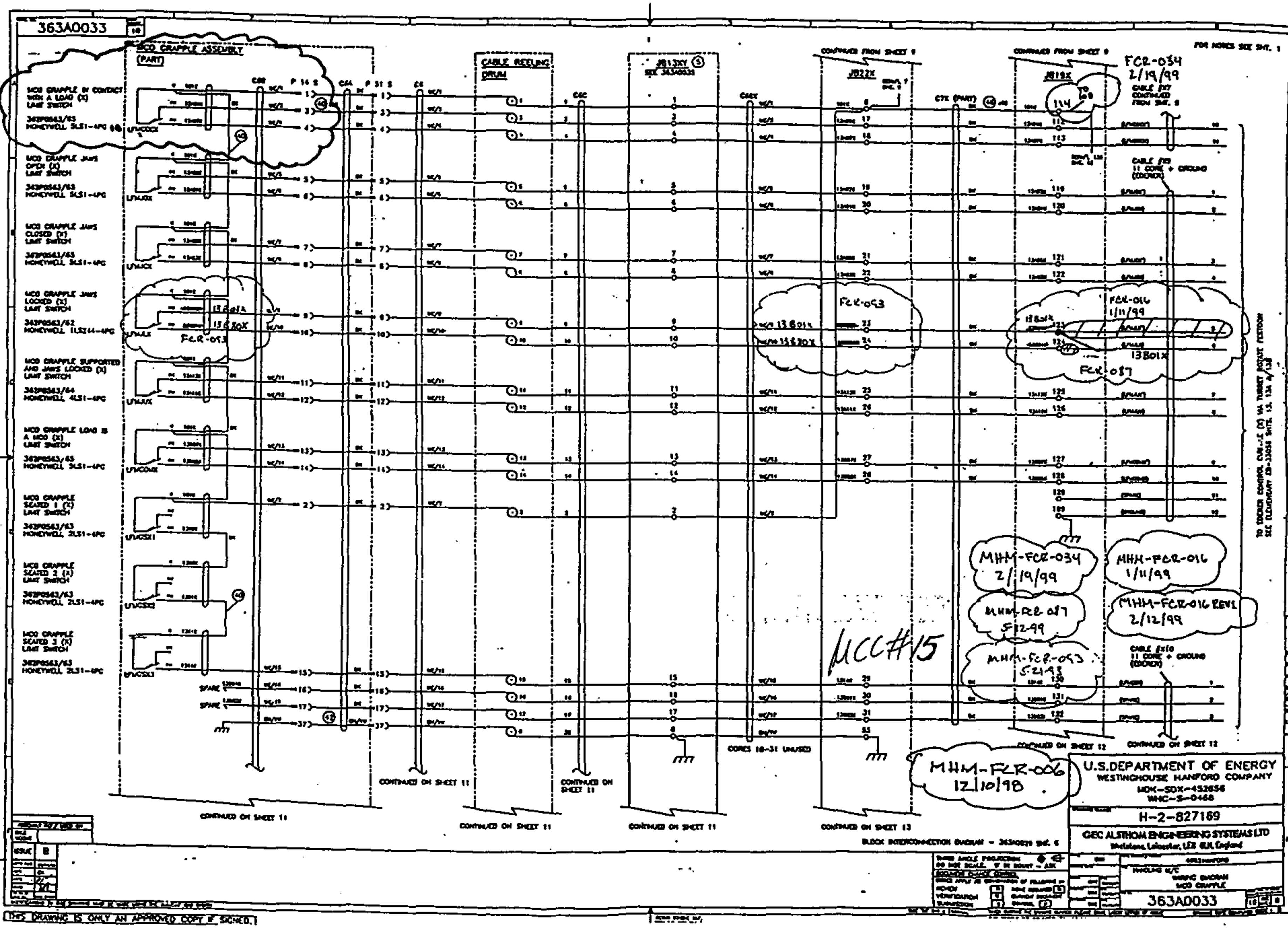
*Use at voltage indicated for light. Upper operating temperature limit for lighted units is 200°F. Wired to N.O. circuit. **Plug-in listings include base receptacle.

OPERATING CHARACTERISTICS

		Top Plungers — Plain	Top Plungers — Roller	Top Plungers — Adjustable	Side Plungers — Plain	Side Plungers — Roller	Side Plungers — Adjustable	Maintained
Pretravel (in. max.)	mm	1,78	1,78	1,78	2,54	2,54	2,54	4,32
	(in.)	.070	.070	.070	.100	.100	.100	.170
Differential Travel (in. max.)	SPDT mm	0,38	0,38	0,38	0,64	0,64	0,64	2,29
	SPDT (in.)	.015	.015	.015	.025	.025	.025	.090
	DPDT mm	0,51	0,51	0,51	0,89	0,89	0,89	2,29
	DPDT (in.)	.020	.020	.020	.035	.035	.035	.090
Overtravel (in. min.)	mm	4,83	4,83	4,83	4,83	4,83	4,83	2,0
	(in.)	.190	.190	.190	.190	.190	.190	.080
Operating Force (lb. max.)	Newton	17,8	17,8	17,8	26,7	26,7	26,7	44,5
	(lb.)	4	4	4	6	6	6	10
Operating Point	mm	45,6 ±0,76	55,9 ±1,02	53,0 to 59,3	33,0 ±0,76	44,1 ±1,02	41,0 to 47,4	37,6 ±0,76
	(in.)	1.805 ±.030	2.200 ±.040	2.085 to 2.335	1.300 ±.030	1.735 ±.040	1.615 to 1.865	1.480 ±.030
Operating Temperature Range		10°F to 200°F −12 to 93°C		10°F to 200°F −12 to 93°C		10°F to 200°F −12 to 93°C		30°F to 200°F −1 to 93°C

LSYDC3K

FLUORO-CARBON SEALED VERSION OF LSD3K


363A0033
MCO GRAPPLE ASSEMBLY (PART)
CABLE REELING DRUM
J813XY
J822X
J819X
FOR NOTES SEE SHT. 1
CONTINUED FROM SHEET 9
CONTINUED ON SHEET 11
CONTINUED ON SHEET 12
CONTINUED ON SHEET 13
CORES 18-31 UNUSED
FCR-034 2/19/99
FCR-053
FCR-016 1/11/99
FCR-087
MHM-FCR-034 2/19/99
MHM-FCR-016 1/11/99
MHM-RE-087 5-12-99
MHM-FCR-016 REV1 2/12/99
MHM-FCR-053 5-21-99
MCC#15
MHM-FCR-006 12/10/98
U.S.DEPARTMENT OF ENERGY
WESTINGHOUSE HANFORD COMPANY
H-2-827169
GEC ALSTHOM ENGINEERING SYSTEMS LTD
363A0033
THIS DRAWING IS ONLY AN APPROVED COPY IF SIGNED.

SNF-6315, Rev. 0

Page 621

Page 622

ORIGINAL

Dedication Test Plan – IST-LS-1 Rev. No. 1
Test Plan No.: CGI-SNF-D-MHM-013-TP-013D
Test Specimen: Honeywell LSYDC3K Limit Switch, Eqmt. No.: LFMCOCY Page 1 of 7

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI Eng	DA	QA Post Review*
1	Avoid equipment damage	3.4.7 3.4.10	lower current from 10 amps to 5 amps		LES 3/29/00	SSM 4-3-2000

* QA Post Review of Individual Revisions is allowed

ORIGINAL

Dedication Test Plan – IST-LS-1	**Rev. No. 1**
Test Plan No.: CGI-SNF-D-MHM-013-TP-013D	
Test Specimen: Honeywell LSYDC3K Limit Switch, Eqmt. No.: LFMCOCY	**Page 2 of 7**

In-Situ Test Procedure

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) Craig Swenson Date: 3/28/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Belhaven	Michael Cram	MRC
Electrician	DAN K. YORK	PCE	Dan K. York	DKY
Electrician Quality Control	Stephen R Cowley	PCE	Stephen R Cowley	SRC
Design Authority Representative	see below SSR	4-3-200		
~~Start-Up Representative~~ (As Required) DA Rep.	LARRY W. PRICE	XWEST		
Construction Management (As Required)	N/A	N/A	N/A	N/A
Design Authority	Craig Swenson	FHI	Craig Swenson	CES

RECOMMENDED EQUIPMENT:

Power Supply capable of 10 amps @ 120 VAC
Megger Instrument capable of 1000 VDC Test Voltage
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: Avo BM80/2 I.D.: G410-889 Calib. Due date: 02-09-01

Test Instrument type: HP 3457A I.D.: BAT 123 Calib. Due date: 07-29-00

Test Instrument type: FLUKE 787 I.D.: BAT 107 Calib. Due date: 05-28-00

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Dedication Test Plan – IST-LS-1	Rev. No. 1
Test Plan No.: CGI-SNF-D-MHM-013-TP-013D	
Test Specimen: Honeywell LSYDC3K Limit Switch, Eqmt. No.: LFMCOCY	Page 3 of 7

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE:

For this In-Situ Test, certain leads must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of leads.

1.0 Lock and tagout Main Disconnect CRN-004, or Main Disconnect MD.

2.0 Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	LFMCOCY	LFMCOCY	Acc
Manufacturer:	HONEYWELL	Honeywell	Acc
Model:	LSYDC3K	LSYDC3K	Acc
Actuator:	OK	Roller Top Plunger	Acc
Serial No./Lot No./Date Code:	OK	N/A	Acc

3.0 Perform the following testing steps:

3.1 Record: Date /Time of Test Beginning: 3-28-00 8:00 a.m.

3.2 Mechanical Operation

3.2.1 Cycle the switch actuator full stroke 5 or more times to confirm contacts open and close with smooth operation and free release of spring.

3.2.2 Record the following data.

Description	Record Data	Acceptance Criteria	Comments/Deviations
No of Cycles:	6	**> 5 times**	Acc
Describe Operation:	OK	**Contacts open and close with smooth operation.**	Acc
Describe release of Spring:	OK	**Free release of spring.**	Acc

3.3 Insulation Resistance Test

3.3.1 Setup the test equipment and Limit Switch specimen for insulation resistance testing. Remove the amphenol connector at the grapple housing.

3.3.2 Apply a nominal 1000 VDC via Megger device between non-continuity terminals on the limit switch side of the amphenol connector nos. 18 and 20 (Common - Across NO Contact) and then between terminal 20 and ground. Record the resistances.

3.3.3 Remove the Megger device.

3.3.4 Manually adjust the limit switch actuator to open the normally closed (NC) contacts.

3.4.5 Apply a nominal 1000 VDC via Megger device between non-continuity terminals on the the limit switch side of the amphenol connector nos. 18 and 21 (Common - Across open NC Contact) and then between terminal 21 and ground. Record the resistances.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Resistance	Acceptance Criteria	Comments/Deviations
18 and 20	Common to NO	>10.5Gohm	> 10 Megohms	Acc
20 and Ground	NO to Ground	>4.5Gohm	> 10 Megohms	Acc
18 and 21	Common to open NC*	>8.7Gohm	> 10 Megohms	Acc
21 and ground	Open NC to Ground*	>8.4Gohm	> 10 Megohms	Acc

* Normally closed contacts are open.

3.3.6 De-energize and remove the test equipment.

3.4 Contact Rating Test

3.4.1 Setup the test equipment and Limit Switch specimen for contact rating testing.

3.4.2 At grapple mounted amphenol connector, disconnect the connector and imput test leads onto the limit switch side of the connector terminal no. 18 (Common) and terminal 20 (LFMCOCY Normally Closed Contact).

5 yrs 3/29/00 CES

3.4.3 Apply a nominal ~~10~~ amps, resistive, across the normally closed contacts of the test specimen.

Caution: Do not change state of contacts while energized.

3.4.4 Record the following data.

Description	Record Voltage Drop	Acceptance Criteria	Comments/Deviations
Contact Circuit 18 and 20 (Terminals COM-NC)	.311 VAC	**< 0.5 Volts AC drop**	Acc

3.4.6 Reduce the current source to zero amps.

3.4.7 Disconnect the power supply from terminals 18 and 20.

3.4.8 Manually adjust the limit switch actuator to close the normally open contacts.

3.4.9 Connect the power supply to terminals 18 and 21.

3.4.10 Apply a nominal ~~10~~ 5 JMP 3/28/00 LES amps, resistive, across the closed normally open contacts of the test specimen.

3.4.11 Record the following data.

Description	Record Voltage Drop	Acceptance Criteria	Comments/Deviations
Contact Circuit 18 and 21 (Terminals COM- Closed NO Contact):	.313 VAC	**< 0.5 Volts AC drop**	Acc

3.4.12 Reduce the current source to zero amps and remove the power supply from terminals 18 and 21.

3.4.13 Manually adjust the limit switch actuator to close the normally closed contacts.

3.5 Terminate the test.

3.5.1 Reconnect the Amphenol connector and tighten hand tight.

3.5.2 Remove lockout/tagout and restore system to normal.

3.5.4 Record: Date /Time of Test End: 03-28-00 9:30 a.m.

Dedication Test Plan – IST-LS-1	**Rev. No. 1**
Test Plan No.: CGI-SNF-D-MHM-013-TP-013D	
Test Specimen: Honeywell LSYDC3K Limit Switch, Eqmt. No.: LFMCOCY	**Page 6 of 7**

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Acceptance Criteria has been met.

Michael Cram
03-29-00

Notes:

Certified InstrumentationTechnician (signature) Michael Cram Date: 03-29-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Greg Swenson Date: 3/29/00

QA/QC (signature) Stephen Scott Mosa Date: 4-6-2000

LIFTED LEAD LOG

Junction Box: Grapple Amphenol Connector

Drawing #	Sheet #	Wire #	Device #	Amphenol Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
363A0033	11	N/A	LFMCOCY	Connector	DKY	3-29-00	SRL	3-29-00	DKY	3-29-00	SRL	3-29-00

Remarks:

Limit and Enclosed Switches

HDLS Series

Plunger Actuated Switches

ASSEMBLED CONDITIONS

Catalog listings in order guide below are factory assembled with:

- Side plungers facing front (label side) of switch. Rollers on side plungers are in horizontal position.
- Roller on top plungers are parallel to mounting surface.
- Lights on indicator versions are wired to N.O. circuit.

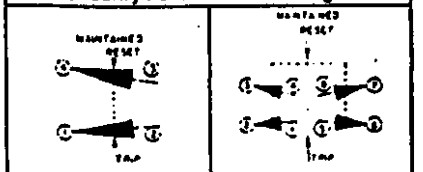
Refer to facing page to specify modifications to these assembled conditions.

For low temperature, high temperature or preleaded versions see page A42.

ORDER GUIDE

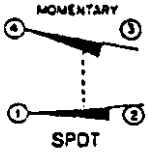
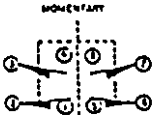
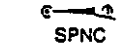
Momentary action, except for maintained contact LSG version. UL listed, CSA certified.

Circuitry For Maintained Plunger



SPDT Double Break (Electrical rating A) | DPDT Double Break (Electrical rating B)

Circuits on any one pole must be the same polarity.

Catalog listings in this chart are complete switches.			Catalog Listings — Top Plungers			Side Plungers			
									
Circuitry	Elec. Rating Page A34	Body** Style	Plain	Roller	Adjustable	Plain	Roller	Adjustable	Maintained (Circuitry Shown Above)
Silver contacts	A	Plug-in ½" Conduit	LSC1A	LSD1A	LSV1A	LSE1A	LSF1A	LSW1A	LSG1A
Gold cross pt.	C	Plug-in ½" Conduit	LSC1J	LSD1J	LSV1J	LSE1J	LSF1J	LSW1J	—
Gold plated	C		—	LSD1E	—	—	LSF1E	LSW1E	—
Silver contacts MOMENTARY  SPDT Double Break	A*	120 V. Ind. Lite Plug-in ½" Conduit*	LSC5A	LSD5A	LSV5A	LSE5A	LSF5A	LSW5A	LSG5A
	A*	240 V. Ind. Lite Plug-in ½" Conduit*	LSC8A	LSD8A	LSV8A	LSE8A	LSF8A	LSW8A	LSG8A
	A	Non plug-in ½" Conduit	LSC3K	LSD3K	LSV3K	LSE3K	LSF3K	LSW3K	LSG3K
Silver contacts  DPDT Double Break	B	Plug-in ¾" Conduit	LSC2B	LSD2B	LSV2B	LSE2B	LSF2B	LSW2B	LSG2B
	B	120 V Ind. Lite Plug-in ¾" Conduit	LSC2R	LSD2R	LSV2R	LSE2R	LSF2R	LSW2R	LSG2R
	B	Plug-in ½" Conduit	LSC6B	LSD6B	LSV6B	LSE6B	LSF6B	LSW6B	LSG6B
	B	Non plug-in ¾" Conduit	LSC4L	LSD4L	LSV4L	LSE4L	LSF4L	LSW4L	LSG4L
	B	Non plug-in ½" Conduit	LSC7L	LSD7L	LSV7L	LSE7L	LSF7L	LSW7L	LSG7L
 SPNC Direct Acting	D	Non plug-in ½" Conduit	—	—	—	LSE3N	LSF3N	LSW3N	LSG3N

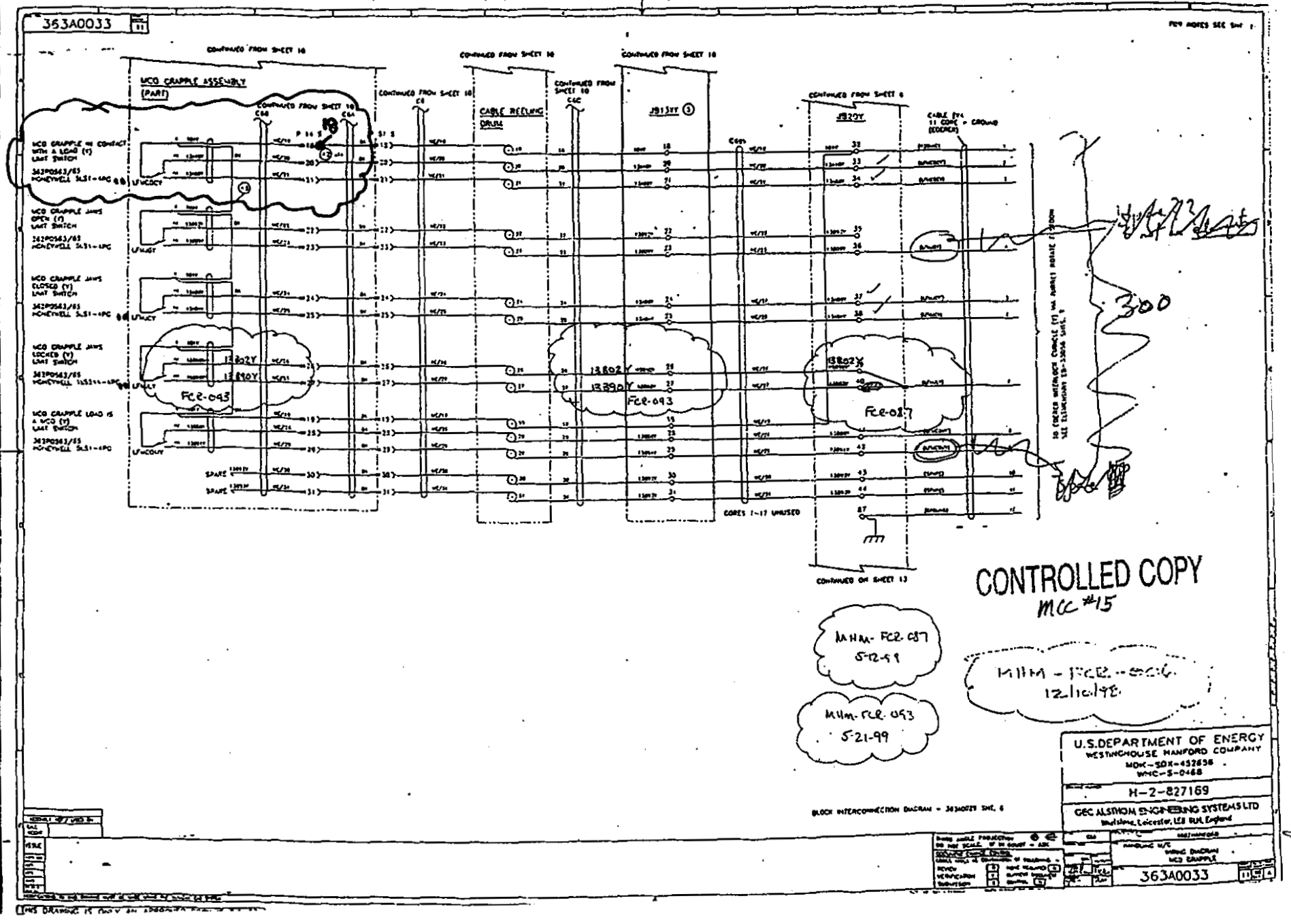
*Use at voltage indicated for light. Upper operating temperature limit for lighted units is 200°F. Wired to N.O. circuit. **Plug-in listings include base receptacle.

OPERATING CHARACTERISTICS

Pretravel (in. max.)	mm	1,78 .070	1,78 .070	1,78 .070	2,54 .100	2,54 .100	2,54 .100	4,32 .170
Differential Travel (in. max.)	SPDT	0,38 .015	0,38 .015	0,38 .015	0,64 .025	0,64 .025	0,64 .025	2,29 .090
	DPDT	0,51 .020	0,51 .020	0,51 .020	0,89 .035	0,89 .035	0,89 .035	2,29 .090
Overtravel (in. min.)	mm	4,83 .190	4,83 .190	4,83 .190	4,83 .190	4,83 .190	4,83 .190	2,0 .080
Operating Force (lb. max.)	Newton	17,8 4	17,8 4	17,8 4	26,7 6	26,7 6	26,7 6	44,5 10
Operating Point (In.)	mm	45,8 ±0,76 1.805 ±.030	55,9 ±1,02 2.200 ±.040	53,0 to 59,3 2.085 to 2.335	33,0 ±0,76 1.300 ±.030	44,1 ±1,02 1.735 ±.040	41,0 to 47,4 1.615 to 1.865	37,6 ±0,76 1.480 ±.030
Operating Temperature Range		10°F to 200°F −12 to 93°C		10°F to 200°F −12 to 93°C		10°F to 200°F −12 to 93°C		30°F to 200°F −1 to 93°C

LSYDC3K

FLUORO-CARBON SEALED VERSION OF LSD3K



SNF-6315, Rev. 0

Page 630

This document was too large to scan as a single document. It has been divided into smaller sections.

Section 3 of 3

Document Information			
Document #	**SNF-6315**	**Revision**	**0**
Title	CSB MCH CGI DEDICATIONS		
Date	**05/17/2000**		
Originator	**CE SWENSON**	**Originator Co.**	**FH**
Recipient		**Recipient Co.**	
References	**EDT-629027, USQ-LIKE-CSB-0-0030**		
Keywords			
Projects	**W-379, SNF**		
Other Information			

Commercial Grade Item Upgrade Dedication Form

Rev. No. 3

ECN No. **N/A** CGI No. **CGI-SNF-D-MHM-012**

Title: **P02 and-80 – OMRON Photoelectric Switch E3V-R2C43S and sensor controller S3D2-CK-US**

Section 1 Part Information

Item No.: **N/A**	Manufacturer: **N/A**	Supplier: **N/A**
Mfg. Part/Model No.: **N/A**	Supplier's P/N: **N/A**	
Part Description: **N/A**	**ORIGINAL**	
End Use Description: **N/A**		

Section 2a Component Information

Equipment No.: **PESSPX, PESSPY**	Specification No.: **Ederer F-2566, Foster Wheeler MJX-SDX 452656**	Manufacturer: **OMRON**	Past P.O. No.: **N/A**
Manufacturer's Part/Model No.: ~~3EV-R2C43S and S3D2-CK-US~~ E3V	Equipment Supplier (if different from manufacturer): **ALSTROM, Foster Wheeler**		Equip. Supplier's Part No.: **N/A**

Component Description: **Photoelectric switch and controller provide part of the P02 and-80 interlock. The controller provides power to the photoelectric switch and hard contacts that are wired into the control circuits. The photoelectric switches are located on the side wall of the tube plug cask. The controller is mounted in the panels on the operator platform.**

Section 2b Commercial Availability of the Item

1. Is the Item available from a catalogue from a qualified NQA1 supplier or ISO 9000 supplier (coordinate with project CGI interface Engineer or BTR)?

   [ ] YES (go to #2 below) [X] NO (go to procedure step 6.3.2, proceed to dedicate Item)

   If not available from a qualified NQA1 supplier, is it available from an ISO 9000 supplier? (coordinate with project CGI Interface Engineer or BTR)

   [ ] YES (go to #2 below, procedure step 6.3.2, dedicate Item) [X] NO (procedure step 6.3.2, dedicate Item)

2. List of Candidate qualified suppliers or ISO 9000 suppliers **N/A**

3. Recommended Procurement Strategy (coordinate with project CGI interface Engineer or BTR): **N/A**

Section 2c CGI Determination

CGI Determination Questions:

#1: Is the Item subject to design or specification requirements that are unique to nuclear facilities or activities?

[ ] YES (the Item is not commercial grade) [X] NO (continue)

#2: Is the Item used in applications other than nuclear facilities or activities?

[ ] NO (the item is not commercial grade) [X] YES (continue)

#3: Is the Item ordered from manufacturer/supplier on the basis of specifications set forth in the manufacturer's catalog?

[ ] NO (the item is not commercial grade) [X] YES (continue)

[X] All three criteria have been satisfied. The Item meets the definition of commercial grade.

Commercial Grade Item Upgrade Dedication Form

Rev. No. 3

ECN No. N/A CGI No. CGI-SNF-D-MHM-012

Page 2 of 8

Title: **P02 and-80 – OMRON Photoelectric Switch E3V-R2C43S and sensor controller S3D2-CK-US**

Section 2d Reason for Dedication

The above Commercial Grade (CG) described Item is being Dedicated for use in the application cited for the following reason(s):

[ ] Item is being purchased from a non ESL manufacturer supplier as CG to be used in a Safety Class application.

[ ] Item is being purchased from a non ESL manufacturer supplier as CG to be used in a Safety Significant application.

[X] Item was purchased from a non ESL manufacturer supplier as CG to be used in a Safety Class application.

[ ] Item was purchased from a non ESL manufacturer supplier as CG to be used in a Safety Significant application.

[ ] Other ('like-for-like', similar, substitution, replacement evaluation)

Section 3 Failure Effects Evaluation

A. Part/Component Safety Function:

1. **The photoelectric switch and controller provide part of the P-80 inhibit to the change of MHM operating mode unless the tube plug cask is empty.**

B. Part/Component Functional Mode:

Safety Function #1: [X] Active [ ] Passive

Safety Function #2: [ ] Active [ ] Passive

Safety Function #3: [ ] Active [ ] Passive

Active - Mechanical or Electrical change of state is required to occur for the component to perform its safety function

Passive – Change of state is not required for the component to perform its safety function

C. Host Component Safety Function (if applicable): **N/A**

1.

D. Failure Mode(s) and the effects on component or system safety function (see Worksheet 1):

1. **Failure to detect the presence of a tube plug in the tube plug cavity.**

Section 4 Environmental & Natural Phenomena Hazard Design

Environmental Qualification Required:

Yes [ ]

No [X]

If yes: Environmental Qualification Requirements

Limiting Environmental Conditions:

Required Safety Functions:

Qualification Period:

Natural Phenomena Hazard (NPH) Design Required:

Yes [ ]

No [X]

If yes: NPH Design Requirements

Performance Category:

NPH Design Req'ts.:

Required Safety Functions:

Section 5 Component Functional Classification

X	Safety Class (SC)		General Service (GS)		Safety Significant (SS)

If part/component classification is different from host component/system, document basis. **N/A**

Sections 6 and 7 (Reserved)

Section 8 References (for Functional Classification)

National Codes/Standards: **N/A**

Safety Analysis Report (SAR): **HNF-3672, Rev. 0**

Drawings: **Ederer, Inc. EB-33056, Sht 17A**

Vendor Manual/Manufacturer/Supplier Information: **OMRON data sheets; Photoelectric Switch E3V and Controller S3D2**

Other: **ALSTOM ESL/R (96) 065 – Rev. D, 100% Design Submittal – June 1998**

Commercial Grade Item Upgrade Dedication Form

ECN No. N/A CGI No. CGI-SNF-D-MHM-012 Title: **P02 and-80 – OMRON Photoelectric Switch E3V-R2C43S and sensor controller S3D2-CK-US**	Rev. No. 3 Page 3 of 8

Section 9 Critical Characteristics				
Critical Characteristics	Acceptance Criteria/Tolerances	Acc Meth	ID	Function
1. Item Identification Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
Manufacturer	**OMRON**	**1, IN**	**X**	
Model – Photoelectric Switch	**E3V-R2C43S with attached cable**	**1, IN**	**X**	
Model - Controller	**S3D2-CK-US**	**1, IN**	**X**	
2. Physical Critical Characteristics (for reasonable assurance that the Item delivered is the Item specified)				
N/A				
3 Performance Critical Characteristics (for reasonable assurance that the Item will perform its intended safety function(s))				
Current carrying capability	**3 amps at 120 VAC resistive, nominal**	**1,T**		**X**
Insulation Resistance	**Minimum 10 Megohms at 500 VDC**	**1,T**		**X**
Power supply voltage	**12 VDC + or – 10%**	**1,T**		**X**

4. Notes and Legend: This revision issued to add P02. This is the originally supplied equipment. It was determined to in-situ dedicate this equipment.

Acceptance Method (Acc Meth):
1.Special Test and Inspection:
1, IN for Inspection
1,T for Test
2. Commercial Grade Survey
3. Source Verification
4. Vendor/Item History

Section 10 Initial Review and Approval

Approvals:

Designated Engineer: _____

Design Authority: _____ 4/12/00

QA Engineer: _____ 4-20-2000

Commercial Grade Item Upgrade Dedication Form	Rev. No. 3
ECN No. N/A CGI No. CGI-SNF-D-MHM-012 Title: **P02 and-80 – OMRON Photoelectric Switch E3V-R2C43S and sensor controller S3D2-CK-US**	Page 4 of 8

WORKSHEET 1
DETERMINATION OF FAILURE MECHANISMS/MODES

Section 1			
Typical Failure Mechanisms	Definition	X = Applicable to Component under Evaluation	
		X?	Indicate Failure Mode
Fracture	Separation of a solid accompanied by little or no macroscopic plastic deformation.		
Corrosion	The gradual deterioration of a material due to chemical or electrochemical reactions, such as oxidation, between the material and its environment.		
Erosion	Destruction of materials by the abrasive action of moving fluids, usually accelerated by the presence of solid particles carried with the fluid.		
Open Circuit	An electrical circuit that is unintentionally broken so that there is no complete path for current flow.		
Short Circuit	An abnormal connection by which an electrical current is connected to ground, or to some conducting body, resulting in excessive current flow.		
Blockage	Clogging of a filtering medium resulting in the inability to perform its purification function or blockage of flow.		
Seizure	Binding of a normally moving item through excessive pressure, temperature, friction, jamming.		
Unacceptable Vibration	Mechanical oscillations produced are beyond the defined permissible limits due to unbalancing, poor support, or rotation at critical speeds.		
Loss of Properties	A loss of mechanical and physical properties of a material due to exposure to high temperatures, radiation exposure.		
Excess Strain	Under the action of excessive external forces the material of the part has been deformed or distorted.		
Mechanical Creep	From prolonged exposure to high temperature and stress, the object will show a slow change in its physical (shape and dimension) and mechanical characteristics.		
Ductile Fracture	Fracture characterized by tearing of metal accompanied by appreciable gross plastic deformation.		

Section 2 Additional Failure Modes Applicable to the Component Under Evaluation
1. Controller contacts fail to open. Cause could be binding or contacts welded.
2. Photoelectric switch fails in a way that provides false indication to the controller.
3.
4.
5.

Commercial Grade Item Upgrade Dedication Form

ECN No. N/A CGI No. CGI-SNF-D-MHM-012

Title: **P02 and-80 – OMRON Photoelectric Switch E3V-R2C43S and sensor controller S3D2-CK-US**

Checklist 1 - Acceptance Method 1 - Special Test/Inspection Verification

SECTION 1	
Item Description: **Photoelectric switch and Controller** System #: **MHM**	Equip #: **PESSPX, PESSPY** Model #: **3EV-R2C43S and S3D2-CK-US**
Manufacturer (Address/Phone): **OMRON Electronics, Inc.** **750 The City Drive South, Suite 120** **Orange, CA 92868** Phone. # **(714) 621-3455**	Supplier (Address/Phone): **ALSTROM**

SECTION 2 CRITICAL CHARACTERISTICS TO BE VERIFIED BY METHOD 1.

Insp	Test	Post-Test	
X			1. **Manufacturer**
X			2. **Photoelectric switch model number**
X			3. **Controller model number**
	X		6. **Current carrying capability**
	X		7. **Insulation resistance**
	X		8. **Power supply voltage**

SECTION 3 BY INSPECTION * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)

Characteristic: **Manufacturer** Sample Size*: **100%**

Acceptance Criteria: **OMRON (photoelectric switch and controller)**

Receipt Inspection Plan / Report #: TP-012X, Y*

Characteristic: **Photoelectric switch model number** Sample Size*: **100%**

Acceptance Criteria: **3EV-R2C43S with attached cable**

Receipt Inspection Plan / Report #: PAT-015-1 TP**

Characteristic: **Controller model number** Sample Size*: **100%**

Acceptance Criteria: **S3D2-CK-US**

Receipt Inspection Plan / Report #: TP-012X, Y*

** THIS PAT DOES NOT CONFIRM THE MODEL NO. OF THIS SWITCH. IT SHOWS ONLY THAT THE SWITCH, CABLE, CONTROLLER AND ASSOCIATED CIRCUITRY WORKS AND ACTUATES THE STATUS LIGHTS WHEN THE TUBE PLUG IS RAISED INTO THE CASK & WHEN IT IS REMOVED. THE MODEL NO. CANNOT BE SEEN AND VERIFIED.

YMP 4/12/00

Commercial Grade Item Upgrade Dedication Form	Rev. No. 3
ECN No. N/A CGI No. CGI-SNF-D-MHM-012 Title: **P02 and-80 – OMRON Photoelectric Switch E3V-R2C43S and sensor controller S3D2-CK-US**	Page 6 of 8

SECTION 4 BY SPECIAL TEST * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)

Characteristic for Test: **Controller output contacts, SPDT, current carrying capability** Samp Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **Nominal 3 amps at 120 VAC, resistive**

Actual Test Value: See TP-012X, Y Test Plan and Report #: TP-012X, Y*

Characteristic for Test: **Controller output contacts, SPDT, insulation resistance** Samp Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **10 megohms minimum, contact to contact and contact to ground**

Actual Test Value: See TP Test Plan and Report #: TP-012X, Y*

Characteristic for Test: **Controller supply voltage to photoelectric switch** Samp Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **12 VDC, + or – 10%**

Actual Test Value: See TP Test Plan and Report #: TP-012X, Y*

*Full Nos is: CGI-SNF-D-MHM-012-TP-012X
" " " -012Y
YMP 4/12/00

SECTION 5 TEST / INSPECTION SUMMARY (Acceptance Method 1)

1. SUMMARY OF VERIFIED CRITICAL CHARACTERISTICS, THEIR VERIFICATION METHODS, AND RESULTS

ITEM DESCRIPTION: Photoelectric Switch and Controller

Critical Characteristics				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/A/N	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
Manufacturer	OMRON	X		1, IN	TP-012x,y *	N/A	2	0	XWEST	LARRY W. PRICE	4/10/00
Model – Photoelectric Switch	E3V-R2C43S with attached cable	X		1, IN	PAT-015-ITP **	NA	2	0	XWEST	↓	4/10/00
Model - Controller	S3D2-CK-US	X		1, IN	TP-012x,y *	N/A	2	0	XWEST	LARRY W. PRICE	4/10/00
Controller output contacts, SPDT, current carrying capability	3 amps at 120 VAC resistive, nominal		X	1, T	↓	↓	↓	↓	↓	↓	↓
Controller output contacts, SPDT, insulation Resistance	Minimum 10 Megohms at 500 VDC		X	1, T							
Controller power supply voltage to photoelectric switch	12 VDC + or – 10%		X	1, T	↓	↓	↓	↓	↓	↓	↓

2. DISPOSITION OF UNVERIFIED OR FAILED CRITICAL CHARACTERISTICS

Critical Characteristic	Disposition

3. SIGNATURE INDICATES ALL CRITICAL CHARACTERISTICS VERIFIED SATISFACTORY OR ACCEPTABLY DISPOSITIONED AND COMMERCIAL GRADE DEDICATION IS SATISFACTORY AND COMPLETE.

See Test Plan TP-

Testing Agency Approval: NR CES 4/12/00 Date

Testing Agency QA Engineer: NR CES 4/12/00 Date

BUYER VERIFICATION

Design Authority: CES Larry Swenson Date 9-12-00

QA Engineer: Stephen Scott Mote Date 4-20-2000

* SEE NOTE ON PAGE 6

** SEE NOTE ON PAGE 5

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Commercial Grade Item Upgrade Dedication Form

ECN No. N/A CGI No. CGI-SNF-D-MHM-012

Title: **P02 and-80 – OMRON Photoelectric Switch E3V-R2C43S and sensor controller S3D2-CK-US**

SECTION 6 CONTACTS / PHONE NUMBERS		
	Name	Phone
Design Authority	CRAIG SWENSON	( ) 376-0288
QA		( )
QC		( )
Cog - Engineer		( )
CGI Engineer		( )
Procurement Engineer		( )
Other		( )

SECTION 7 SUPPORTING DOCUMENTATION FOR THIS CHECKLIST		
Initial Procurement Documents		**For Critical Characteristics**
	Drawings:	
	Manuals (specify type & number):	
	Design Calculations	
	Installation Instructions	
	Operation Instructions	
	Calibration Instructions	
	Manufacturer's Recommended Spare Parts List	
X	**Other: OMRON data sheets; Photoelectric Switch E3V and Controller S3D2**	**All**
Procurement Documents:		**For Critical Characteristics**
	Certificate of Conformance/Compliance	
	Seismic Qualification Certificate	
	Environmental Qualification Certificate	
	Test Report (s):	
	Inspection Report (s):	
	CMTRs for ASME Pressure Retaining Materials	
	Valve Seat Leakage Report	
	Weld Records	
	Material Traceability Record	
	Other:	

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Date: 3/20/00

TO: Ed Kahler
FAX: 415-453-8836

FROM: Larry Price - XWest
Ph: 509-372-8770 FAX: 509-373-9621

Re: Info received from Jon Molnar

Jon gave me the attached two pages of PAT-015-1 TP. He said you were *expecting them.*

Thanks,

Larry

Cover plus 2 pages

Ed, Jon highlighted Steps 9.10.11.5 and 9.10.11.6

Larry

SPENT NUCLEAR FUEL PROJECT	Procedure No. SNF-W379-PAT-015-1
FACILITY/SYSTEM START-UP	Revision 0
PREOPERATIONAL ACCEPTANCE TEST	Effective Date 4/29/99
MHM: Control Logic Test	Page 262 of 666

			INITIAL/DATE
	9.10.8	Place the TUBE PLUG GRAPPLE JAWS handswitch to the CLOSE position.	PDS / 6/11/99
	9.10.9	Verify the TUBE PLUG GRAPPLE JAWS CLOSED status indicator illuminates.	PDS / 6/11/99
	9.10.10	Verify the TUBE PLUG GRAPPLE JAWS OPEN status indicator is not illuminated.	PDS / 6/11/99
	9.10.11	Momentarily depress the TUBE PLUG HOIST RAISE pushbutton and perform the following:	PDS / 6/11/99
	9.10.11.1	Verify the Tube Plug Hoist drive starts in the raising direction.	PDS / 6/11/99
AC☛	9.10.11.2	Verify the TUBE PLUG HOIST RAISING status indicator is illuminated.	PDS / 6/11/99
	9.10.11.3	Verify as the Tube Plug Hoist Grapple unseats, the TUBE PLUG GRAPPLE JAWS LOCKED status indicator illuminates.	PDS / 6/11/99
	9.10.11.4	Verify the TUBE PLUG GRAPPLE SEATED & JAWS UNLOCKED status indicator is not illuminated.	PDS / 6/11/99
AC☛	9.10.11.5	As the Tube Plug Hoist raises, verify the TUBE PLUG CASK OCCUPIED status indicator illuminates.	PDS / 6/11/99
	9.10.11.6	Verify the TUBE PLUG CASK EMPTY status indicator is not illuminated.	PDS / 6/11/99
AC☛	9.10.11.7	Verify the Tube Plug Hoist drive stops when it reaches the fully raised position.	PDS / 6/11/99

[redacted]

			INITIAL/DATE
	9.10.11.8	Verify the TUBE PLUG HOIST RAISING status indicator is not illuminated.	ADZ 6/11/99
	9.10.11.9	Verify the TUBE PLUG GRAPPLE FULLY RAISED status indicator is illuminated.	ADZ 6/11/99
AC	9.10.11.10	Verify that no binding or unusual noises were observed at the Tube Plug Hoist drive during the raising operation.	ADZ 6/11/99

NOTE

Personnel performing local monitoring of the Tube Plug Hoist Drive may be released for other activities.

	9.10.12	Momentarily depress the TUBE PLUG HOIST LOWER pushbutton and perform the following:	ADZ 6/11/99
	9.10.12.1	Verify the TUBE PLUG HOIST LOWERING status indicator is illuminated.	ADZ 6/11/99
	9.10.12.2	Verify the TUBE PLUG GRAPPLE FULLY RAISED status indicator is not illuminated.	ADZ 6/11/99
PCN 027 (1)	~~9.10.12.3~~	~~Verify as the Tube Plug Hoist lowers, the TUBE PLUG CASK EMPTY status indicator illuminates.~~	/
	9.10.12.4	Verify the TUBE PLUG CASK OCCUPIED status indicator is not illuminated.	ADZ 6/11/99
	9.10.12.5	As the Tube Plug Hoist approaches the fully lowered position, verify the TUBE PLUG GRAPPLE IN SEATING ZONE status indicator illuminates.	ADZ 6/11/99

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ORIGINAL

Dedication Test Plan – IST	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-012-TP-012X	
Test Specimen: Omron Photoelectric Switch Controller Eqmt. No.: for PESSPX	Page 1 of 9

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				~~Cog.~~ Eng	DA	QA Post Review*
1	TESTING	24.4/4 25.8/5 25.13/5	ADD 120 VAC TO Tests 1 & 2 MODIFIED PARAGRAPH ADD 120 VAC TO Tests 1 & 2		CES 3/16/00	SSM 3-22-2000

* QA Post Review of Individual Revisions is allowed

ORIGINAL

Dedication Test Plan – IST	**Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-012-TP-012X	
Test Specimen: Omron Photoelectric Switch Controller Eqmt. No.: for PESSPX	**Page 2 of 9**

In-Situ Test Procedure

ORIGINAL

Test Procedure Approval (Obtain prior to testing):
This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) LWP Craig Swenson Date: 3/15/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Belhaven	Michael Cram	MPC
Electrician	J W EBERHART	PCE	J W Eberhart	JWE
Electrician Quality Control	Stephen R. Conley	PCE	Stephen R Conley	SRC
Design Authority Representative	Larry W. Price	WMNSD	[signature]	LWP
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:
Current source capable of 3 amps
Megger Instrument capable of 500 VDC Test Voltage
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
DC voltage source capable of +12VDC
AC voltage source capable of 120 VAC
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: HP 3457A I.D.: BAT 123 Calib. Due date: 7-29-00

Test Instrument type: HP 3457A I.D.: BAT 124 Calib. Due date: 7-30-00

Test Instrument type: AVO BM 80/2 I.D.: 6410-889 Calib. Due date: 02-09-01

Test Instrument type: FLUKE 787 I.D.: BAT 107 Calib. Due date: 05-28-00

Test Instrument type: PROTO 6106 I.D.: 029E/009 Calib. Due date: 01-13-01

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE:

For this In-Situ Test, certain leads must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of leads..

1.0 Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Manufacturer:	YES	**Omron**	Acc
Model:	YES	**S3D2-CK-US**	Acc
Serial No./Lot No./Date Code:	OK	**N/A**	Acc

2.0 Perform the following testing steps:

2.1 Record: Date /Time of Test Beginning: 03-15-00 12:30 p.m.

2.2 Open main disconnect switch MD, lock and tag out.

2.3 Mechanical Operation

2.3.1 At the Controller, record wire color for each terminal listed on the Lifted Lead Log.

2.3.2 At the Controller, disconnect all wiring as shown on the Lifted Lead Log.

2.3.3 Cycle the output relay 5 or more times by applying and removing 10 VDC to the controller terminals 8 and 9 to confirm contacts open and close, using a multi-meter, with smooth operation and free release when voltage is removed.

2.3.4 Record the following data.

Description	Record Data	Acceptance Criteria	Comments/Deviations
No of Cycles:	6	**>5 times**	Acc
Describe Operation:	YES	**Contacts open and close with smooth operation.**	Acc

2.4 Insulation Resistance Test

2.4.1 Setup the test equipment and Controller for insulation resistance testing.

2.4.2 Apply a nominal 500 VDC via Megger device between non-continuity terminals 4 and 5 (Common - Across NO Contact) and then between terminal 5 and ground. Record the resistances.

2.4.3 Remove the Megger device. and 120 VAC to Terminals 1 and 2 Jmp 3/15/00 LES

2.4.4 Apply 10 VDC to terminals 8 and 9 to open the normally closed (NC) contacts.

2.4.5 Apply a nominal 500 VDC via Megger device between non-continuity terminals 4 and 6 (Common - Across open NC Contact) and then between terminal 6 and ground. Record the resistances.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Resistance	Acceptance Criteria	Comments/Deviations
4 and 5	**Common to NO**	>100Gohm	**> 10 Megohms**	Acc
5 and Ground	**NO to Ground**	>100Gohm	**> 10 Megohms**	Acc
4 and 6	**Common to open NC***	>100Gohm	**> 10 Megohms**	Acc
6 and ground	**Open NC to Ground***	>100Gohm	**> 10 Megohms**	Acc

* Normally closed contacts are open.

2.4.6 Remove the 10 VDC from terminals 8 and 9

2.5 Contact Rating Test

2.5.1 Setup the test equipment and Controller for contact rating testing.

2.5.3 Connect the current source to terminals 4 and 6.

2.5.4 Apply a nominal 3 amps, resistive, across the normally closed contacts of the test specimen.

Caution: Do not change state of contacts while energized.

2.5.5 Record the following data.

Description	Record Voltage Drop	Acceptance Criteria	Comments/Deviations
Contact Circuit (Terminals COM-NC)	.0813 VAC	**< 0.5 Volts AC drop**	Acc

2.5.6 Reduce the current source to zero amps.

Dedication Test Plan – IST	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-012-TP-012X	
Test Specimen: Omron Photoelectric Switch Controller Eqmt. No.: for PESSPX	Page 5 of 9

2.5.7 Disconnect the power supply from terminals 4 and 6. JMP 3/15/00 CES

2.5.8 Apply ~~10 VDC to terminals 8 and 9 to close the normally open contacts.~~ ~~and 120VAC to terminals 1 and 2~~ JMP 3/15/00 CES
JMP 3/15/00
CLOSE THE NO CONTACTS AND APPLY 120VAC TO TERMINALS 1 AND 2 JMP 3/16/00

2.5.9 Connect the current source to terminals 4 and 5.

2.5.10 Apply a nominal 3 amps, resistive, across the closed normally open contacts of the test specimen.

2.5.11 Record the following data.

Description	Record Voltage Drop	Acceptance Criteria	Comments/Deviations
Contact Circuit (Terminals COM-Closed NO Contact):	.0513 VAC	**< 0.5 Volts AC drop**	Acc

2.5.12 Reduce the current source to zero amps and remove from terminals 4 and 5.

2.5.13 Remove the ~~10 VDC from terminals 8 and 9~~ and Remove 120VAC from terminals 1 and 2 to close the normally closed contacts. JMP 3/15/00 CES JMP CES 3/15/00

2.5.14 De-energize and remove the test equipment.

2.6 Controller supply voltage to photoelectric switch

2.6.1 Connect 120 VAC to Controller terminals 1 and 2. Measure photoelectric supply voltage at terminals 7 and 9

Description	Record Voltage	Acceptance Criteria	Comments/Deviations
At Controller terminals 7 and 9	12.48 VDC	**12 VDC ±10% (10.8 – 13.2)**	Acc

2.6.2 Disconnect 120 VAC supply

2.7 Terminate the test.

2.7.1 Reland the lifted leads and verify reland in accordance with the Lifted Lead Log.

2.7.2 Record: Date /Time of Test End: 03-16-00 11:15 a.m.

Dedication Test Plan – IST	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-012-TP-012X	
Test Specimen: Omron Photoelectric Switch Controller Eqmt. No.: for PESSPX	Page 6 of 9

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Acceptance Criteria has been met.

Michael Cram
03-16-00

Notes:

Certified InstrumentationTechnician (signature) Michael Cram Date: 03-16-00.
Independent Reviewer 3/16/00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Craig Swenson Date: 3/16/00

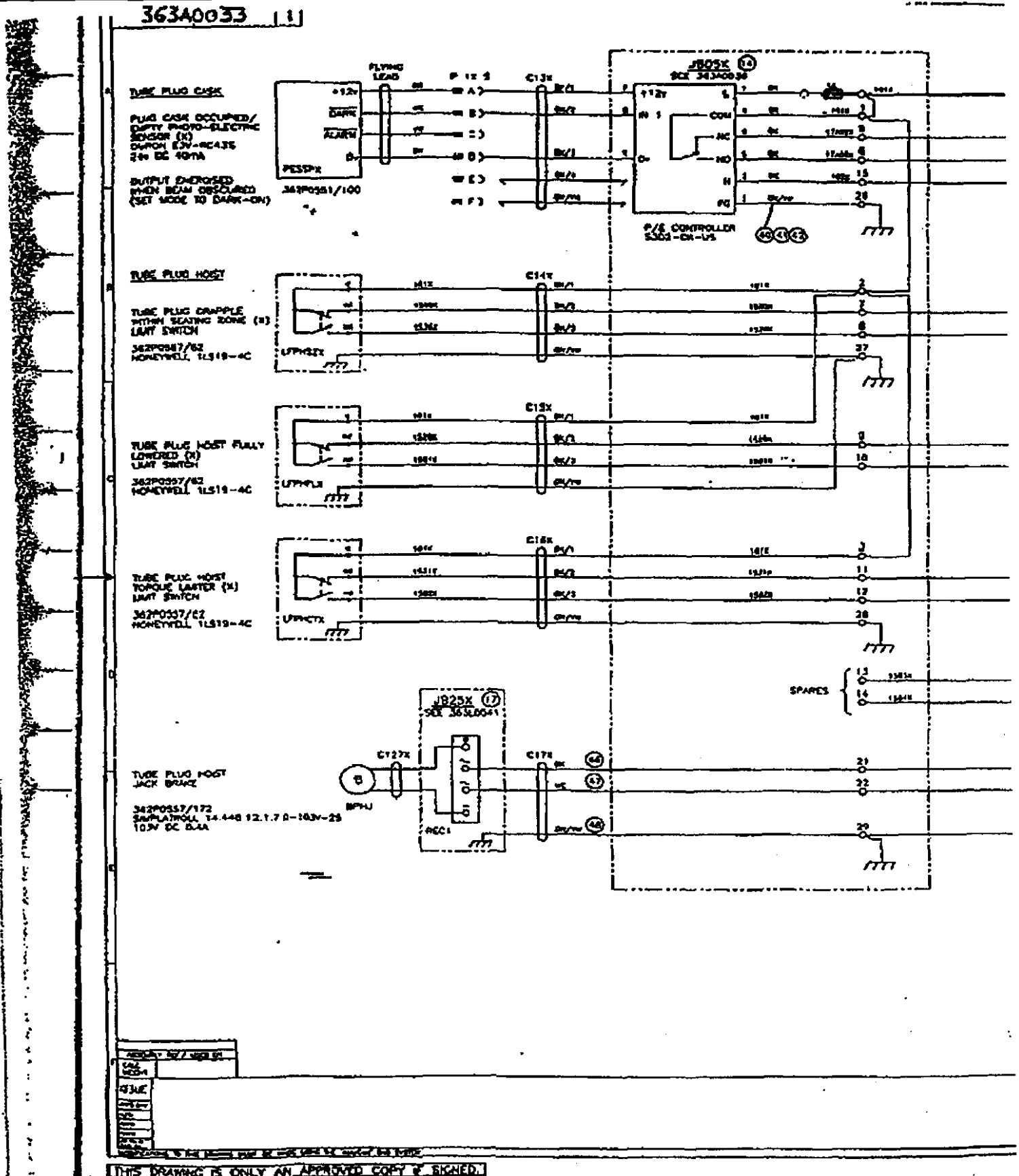
QA/QC (signature) Stephen Scott Mosl Date: 3-22-2000.

LIFTED LEAD LOG

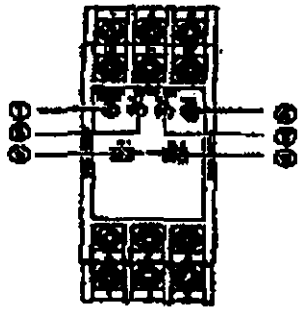
At Junction Box: JB05X

Drawing #	Sheet #	Record wire color#	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
363A0033	1	101X	Controller	1	JWE	3/16/00	SRC	3-16-00	JWE	3/16/00	SRC	3-16-00
363A0033	1	102X	Controller	2	JWE	3/16/00	SRC	3-16-00	JWE	3/16/00	SRC	3-16-00
363A0033	1	101X	Controller	4	JWE	3/16/00	SRC	3-16-00	JWE	3/16/00	SRC	3-16-00
363A0033	1	17A06X	Controller	5	JWE	3/16/00	SRC	3-16-00	JWE	3/16/00	SRC	3-16-00
363A0033	1	17A02X	Controller	6	JWE	3/16/00	SRC	3-16-00	JWE	3/16/00	SRC	3-16-00
363A0033	1	#7	Controller	7	JWE	3/16/00	SRC	3-16-00	JWE	3/16/00	SRC	3-16-00
363A0033	1	#8	Controller	8	JWE	3/16/00	SRC	3-16-00	JWE	3/16/00	SRC	3-16-00
363A0033	1	#9	Controller	9	JWE	3/16/00	SRC	3-16-00	JWE	3/16/00	SRC	3-16-00
"	"	GRD	"	3	JWE	3/16/00	SRC	3-16-00	JWE	3/16/00	SRC	3-16-00

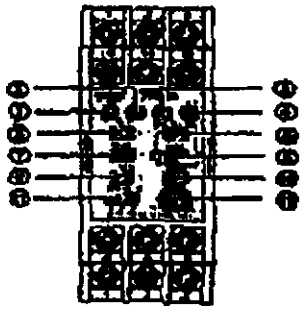
Remarks:


363A0033
TUBE PLUG CASK
PLUG CASK OCCUPIED/ EMPTY PHOTO-ELECTRIC SENSOR (X)
OMRON E3V-RC435 24V DC 40mA
OUTPUT ENERGISED WHEN BEAM OBSCURED (SET MODE TO DARK-ON)
PESSPX
363P0581/100
FLYING LEAD
C13X
J805X
SEE 363A0038
P/S CONTROLLER S3G2-DN-US
TUBE PLUG HOIST
TUBE PLUG GRAPPLE WITHIN SEATING ZONE (X) LIMIT SWITCH
363P0587/62
HONEYWELL 1LS19-4C
UPHSIX
C14X
TUBE PLUG HOIST FULLY LOWERED (X) LIMIT SWITCH
363P0587/62
HONEYWELL 1LS19-4C
UPHPLX
C15X
TUBE PLUG HOIST TORQUE LIMITER (X) LIMIT SWITCH
363P0587/62
HONEYWELL 1LS19-4C
UPHCTX
C16X
SPARES
J825X
SEE 363A0041
C127X
C17X
TUBE PLUG HOIST JACK BRAKE
363P0557/172
SAMPLA/MOLL 14.448 12.1.7 0-10.3V-25 10.3V DC 0.4A
BPHJ
RCC1
THIS DRAWING IS ONLY AN APPROVED COPY IF SIGNED.

S3D2-AK-US



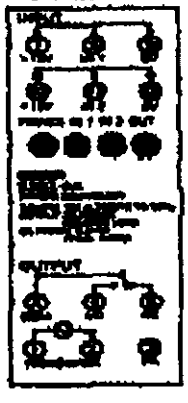
S3D2-CK-US/-CC-US



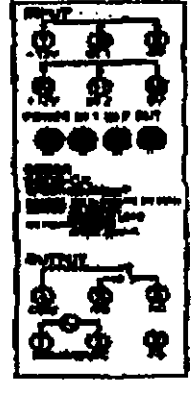
No.	Name	Functions
1	Power supply indicator	This illuminates when the operating power is turned on and at the same time, the output is turned from the power supply for sensors. It does not illuminate when power supply output for sensors is short-circuited (between +12 V terminal and 0 V terminal).
2	IN1 indicator	This illuminates when it receives the output of the sensor which is connected with IN1 as an input.
3	IN2 indicator	This illuminates when it receives the output of the sensor which is connected with IN2 as an input.
4	OUT indicator	This illuminates when the output is turned on.
5	IN1 input signal selector switch	NORM: When the transistor (or output contact) is turned on, the switch receives it as a signal. INV: When the transistor (or output contact) is turned off, the switch receives it as a signal.
6	IN2 indicator	
7	AND/OR operation selector switch	AND: The output is turned on when input signals of both IN1 and IN2 are turned on. OR: The output is turned on when input signal of either IN1 or IN2 is turned ON.
8	Synchronous mode selector switch (This switch can operate only when AND is selected on the AND/OR operation selector switch.)	The output is turned on during input signals when both IN1 and IN2 are turned on. If the input signal of IN2 is turned on before (the rising time), when that of IN1 turns to the ON state, the output is turned on. IN1 is the "gate sensor."
9	Timer switch	When ON: the timer function operates. When OFF: the timer function does not operate.
10	Timer timing selector switch	With this switch, ranges of timer setting are changed. (Model S3D2-CK) 1 s: Setting time lies in the range of 0.1 s to 1 s. 10 s: Setting time lies in the range of 1 s to 10 s. (Model S3D2-CC) 0.1 s: Setting time lies in the range of 0.01 s to 0.1 s. 1 s: Setting time lies in the range of 0.1 s to 1 s.
11	Timer operation selector switch	O.S: One-shot delay timer ON.D: On-delay timer Off.D: Off-delay timer
12	Time setting trimmer	Setting time can be adjusted with the accessory screwdriver. It rotates 180°.

How to connect

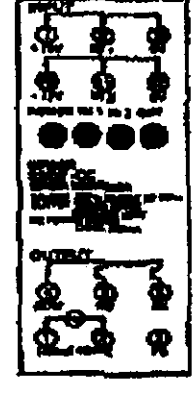
S3D2-AK-US



S3D2-CK-US



S3D2-CC-US



No.	Name/Function
1, 2	Power terminal supplies a voltage of 100 to 240 VAC.
3	FG terminal; in a location where much noise is expected, ground this terminal at a ground resistance of 100 Ω max.
4 to 6	Output terminals
7, 10	Power terminal for the sensor (+ 12 V)
9, 12	Power terminal for the sensor (0 V)
8, 11	Output terminals for the sensor (input of the sensor, synchronous input). Connect the output wiring of the sensor.

FCE-034 2/19/99

TUBE PLUG CASK

PLUG CASK OCCUPIED/ EMPTY PHOTO-ELECTRIC SENSOR (X) OMRON E3F-DC43S 24v DC 40mA

OUTPUT ENERGISED WHEN BEAM OBSCURED (SET MODE TO DARK-ON)

363P0551/100

TUBE PLUG HOIST

TUBE PLUG GRAPPLE WITHIN SEATING ZONE (X) LIMIT SWITCH

362P0557/62 HONEYWELL 1LS19-4C

TUBE PLUG HOIST FULLY LOWERED (X) LIMIT SWITCH

362P0557/62 HONEYWELL 1LS19-4C

TUBE PLUG HOIST TORQUE LIMITER (X) LIMIT SWITCH

362P0557/62 HONEYWELL 1LS19-4C

TUBE PLUG HOIST JACK BRAKE

362P0557/172 SAMPLATROLL 14.448 12.1.70-103V-25 103V DC 0.4A

P/E CONTROLLER 3302-CX-US

SPARES

CONTINUED ON SHEET 3

CABLE 201 11 CORE + GROUND (EDERER)

TO EDERER CONTROL CUBICLE (X) VIA TURRET ROTATE FESTOON SEE ELEMENTARY CD-33056 SHTS. 15, 16 & 17A

FCE-006 12/10/98

MHM-FCE-006 12/10/98

MHM-FCE-034 2/19/99

NOTES:-

1. MANUFACTURING & ASSEMBLY TO BE IN ACCORDANCE WHERE APPLICABLE TO THE FOLLOWING SPECIFICATIONS AND SPECIFICATIONS REFERRED TO THEREIN.
   - 343F
   - 363F
2. TYPES OF CABLES USED
   CABLE TYPES ARE DERIVED FROM ITEM No's (SHOWN IN CIRCLE) ON PARTS LIST - 363P0032.
3. WIRE MARKERS
   ALL MARKERS SHALL BE WHITE WITH PERMANENT INSCRIPTIONS. HEAT SHRINKABLE ONLY WILL BE USED. THEY SHALL NOT SLIP ALONG THE WIRE, NEITHER SHALL THEY BE REMOVABLE WITHOUT RE-TERMINATING.
   ALL WIRE No.s & LETTERS SHALL BE READ FROM THE TERMINAL OUTWARD ALONG THE WIRE.
4. SPARE CORES
   WHERE SPARE CORES ARE TURNED BACK IN CUBICLES/PANELS ETC. AND TIED BACK.
   SUFFICIENT LENGTH MUST BE LEFT FOR ANY SPARE CORE TO REACH THE FURTHERMOST TERMINAL IN THE CUBICLE/PANEL ETC.
5. CABLE MARKERS
   ALL MARKERS SHALL BE WHITE WITH BLACK INSCRIPTIONS. THE CABLE No. MUST BE SHOWN AT EACH END OF THE CABLE. IF DUE TO SPACE RESTRICTIONS, ADDITIONAL CABLE No.s ARE REQUIRED, THEN THEY SHOULD BE FITTED.
6. SYSTEM EARTHING
   TO BE IN ACCORDANCE WITH DRG. 363A0043.
7. SEGREGATION
   ALL INFORMATION REGARDING CABLE SEGREGATION EXTERNAL TO CUBICLES IS SHOWN ON THE RELEVANT DRAWINGS.
8. CABLE TESTING
   TO BE IN ACCORDANCE WITH TEST CONFORMANCE DOCUMENT.
9. ASSOCIATED DRAWINGS
   BUILD LIST - 362A0549
   PLANT PARTS LIST - 363P0032
   B.I.D. - 363A0029
10. SHEET ALLOCATION
    - 1 & 2: TUBE PLUG HOIST
    - 3: BASE LOCKING PIN
    - 4 & 5: TUBE PLUG GRAPPLE
    - 6: TURRET - CCTV
    - 7 & 8: MCO HOIST
    - 9: MCO CASK CONTAINMENT
    - 10 & 11: MCO GRAPPLE
    - 12: CASK EXTRACT FANS
    - 13: MCO HOIST CONTAINMENT
    - 14 & 15: SHIELD SKIRT
    - 16 & 17: TROLLEY
11. EARTHING
    EARTH CONNECTION OF GLANDS ASSOCIATED WITH POWER CABLES TO BE CONNECTED TO EARTH STUD ON GLAND PLATE INDIVIDUALLY.
12. LIMIT SWITCHES
    LINK ONE TERM.OF N.O.CONTACT AND ONE TERM. OF N.C.CONTACT TO FORM COMMON USING BLACK INSULATED WIRE (30/0.25) WHERE NECESSARY
13. NUMBERS SHOWN THUS:- (46) ††1
    INDICATE PLANT PARTS LIST ITEM No. AND QUANTITY.

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MCC#15

U.S.DEPARTMENT OF ENERGY
WESTINGHOUSE HANFORD COMPANY
MDK-SOX-452656
WHC-S-0468

H-2-827169

GEC ALSTHOM ENGINEERING SYSTEMS LTD
Whetstone, Leicester, LE8 6LH, England

4683 HANFORD

HANDLING M/C
WIRING DIAGRAM
TUBE PLUG HOIST

363A0033 | 1 | 17 | A

THIRD ANGLE PROJECTION
DO NOT SCALE. IF IN DOUBT - ASK

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Page 652

Dedication Test Plan – IST	ORIGINAL	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-012-TP-012Y		
Test Specimen: Omron Photoelectric Switch Controller Eqmt. No.: for PESSPY		Page 1 of 9

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				~~QG~~ T ~~Dog~~ Eng	DA	QA Post Review*
1	TESTABILITY	2.4.4/4 25.8/5 25.13.15	ADD 120VAC to Term. 1&2 MODIFIED PARAGRAPH ADD 120VAC to Term. 1&2	3/15/00	CES 3/14/00	SSM 3-22-2000

*QA Post Review of Individual Revisions is allowed

ORIGINAL

Dedication Test Plan – IST	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-012-TP-012Y	
Test Specimen: Omron Photoelectric Switch Controller Eqmt. No.: for PESSPY	Page 2 of 9

In-Situ Test Procedure

ORIGINAL

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) Larry Swanson Date: 3/15/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Belhaven	Michael Cram	MRC
Electrician	J WEBERHART	PCE	J W Eberhart	JWE
Electrician Quality Control	Stephen R Conley	PCE	Stephen R Conley	SRC
Design Authority Representative	LARRY W. PRICE	XWEST		
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Current source capable of 3 amps
Megger Instrument capable of 500 VDC Test Voltage
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
DC voltage source capable of +12VDC
AC voltage source capable of 120 VAC
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: HP 3457A I.D.: BAT 123 Calib. Due date: 7-29-00

Test Instrument type: HP 3457A I.D.: BAT 124 Calib. Due date: 7-30-00

Test Instrument type: AVO BM86/2 I.D.: 6A10-889 Calib. Due date: 02-09-01

Test Instrument type: FLUKE 787 I.D.: BAT 107 Calib. Due date: 05-28-00

Test Instrument type: PROTO 6106 I.D.: 029E/009 Calib. Due date: 01-13-01

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE:

For this In-Situ Test, certain leads must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of leads..

1.0 Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Manufacturer:	YES	**Omron**	Acc
Model:	YES	**S3D2-CK-US**	Acc
Serial No./Lot No./Date Code:	OK	**N/A**	Acc

2.0 Perform the following testing steps:

2.1 Record: Date /Time of Test Beginning: 03-15-00 12:45 pm

2.2 Open main disconnect switch MD, lock and tag out.

2.3 Mechanical Operation

2.3.1 At the Controller, record wire color for each terminal listed on the Lifted Lead Log.

2.3.2 At the Controller, disconnect all wiring as shown on the Lifted Lead Log.

2.3.3 Cycle the output relay 5 or more times by applying and removing 10 VDC to the controller terminals 8 and 9 to confirm contacts open and close, using a multi-meter, with smooth operation and free release when voltage is removed.

2.3.4 Record the following data.

Description	Record Data	Acceptance Criteria	Comments/Deviations
No of Cycles:	6	**>5 times**	Acc
Describe Operation:	OK	**Contacts open and close with smooth operation.**	Acc

Dedication Test Plan – IST	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-012-TP-012Y	
Test Specimen: Omron Photoelectric Switch Controller Eqmt. No.: for PESSPY	Page 4 of 9

2.4 Insulation Resistance Test

2.4.1 Setup the test equipment and Controller for insulation resistance testing.

2.4.2 Apply a nominal 500 VDC via Megger device between non-continuity terminals 4 and 5 (Common - Across NO Contact) and then between terminal 5 and ground. Record the resistances.

2.4.3 Remove the Megger device.

2.4.4 Apply ~~10 VDC~~ 10 VDC to terminals 8 and 9 to open the normally closed (NC) contacts. [handwritten insertion: 120VAC to terminals 1 and 2 JLP 3/15/00]

2.4.5 Apply a nominal 500 VDC via Megger device between non-continuity terminals 4 and 6 (Common - Across open NC Contact) and then between terminal 6 and ground. Record the resistances.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Resistance	Acceptance Criteria	Comments/Deviations
4 and 5	Common to NO	>100Gohm	> 10 Megohms	Acc
5 and Ground	NO to Ground	>100Gohm	> 10 Megohms	Acc
4 and 6	Common to open NC*	>100 Gohm	> 10 Megohms	Acc
6 and ground	Open NC to Ground*	>100 Gohm	> 10 Megohms	Acc

* Normally closed contacts are open.

2.4.6 Remove the 10 VDC from terminals 8 and 9

2.5 Contact Rating Test

2.5.1 Setup the test equipment and Controller for contact rating testing.

2.5.3 Connect the current source to terminals 4 and 6.

2.5.4 Apply a nominal 3 amps, resistive, across the normally closed contacts of the test specimen.

Caution: Do not change state of contacts while energized.

2.5.5 Record the following data.

Description	Record Voltage Drop	Acceptance Criteria	Comments/Deviations
Contact Circuit (Terminals COM-NC)	.0798 VAC	< 0.5 Volts AC drop	~~VAC~~ ACC

2.5.6 Reduce the current source to zero amps.

2.5.7 Disconnect the power supply from terminals 4 and 6. JWP 3/15/00 CES ~~and 120VAC to terminals 1 and 2~~ JWP 3/15/00 CES

2.5.8 ~~Apply 10 VDC to terminals 8 and 9 to close the normally open contacts.~~ CLOSE THE NO CONTACTS AND APPLY 120VAC TO TERMINALS 1 and 2 JWP 3/15/00

2.5.9 Connect the current source to terminals 4 and 5.

2.5.10 Apply a nominal 3 amps, resistive, across the closed normally open contacts of the test specimen.

2.5.11 Record the following data.

Description	Record Voltage Drop	Acceptance Criteria	Comments/Deviations
Contact Circuit (Terminals COM-Closed NO Contact):	.0743 VAC	**< 0.5 Volts AC drop**	Acc

CES JWP 3/15/00 ~~and remove 120VAC to terminals 1 and 2~~

2.5.12 Reduce the current source to zero amps and remove from terminals 4 and 5.

JWP 3/15/00 CES ~~and 120 VAC to terminals 1 and 2~~ JWP 3/15/00 CES

2.5.13 Remove the ~~10 VDC from terminals 8 and 9~~ to close the normally closed contacts.

2.5.14 De-energize and remove the test equipment.

2.6 Controller supply voltage to photoelectric switch

2.6.1 Connect 120 VAC to Controller terminals 1 and 2. Measure photoelectric supply voltage at terminals 7 and 9

Description	Record Voltage	Acceptance Criteria	Comments/Deviations
At Controller terminals 7 and 9	12.62 VDC	**12 VDC ±10% (10.8 – 13.2)**	Acc

2.6.2 Disconnect 120 VAC supply

2.7 Terminate the test.

2.7.1 Reland the lifted leads and verify reland in accordance with the Lifted Lead Log.

2.7.2 Record: Date /Time of Test End: 03-16-00 11:15 am

Dedication Test Plan – IST	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-012-TP-012Y	
Test Specimen: Omron Photoelectric Switch Controller Eqmt. No.: for PESSPY	Page 6 of 9

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Acceptance Criteria has been met.

Michael Cram
03-15-00

Notes:

Certified InstrumentationTechnician (signature) Michael Cram Date: 03-15-00
J. Cadwell 3-16-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Craig Swenson Date: 3/16/00

QA/QC (signature) Stephen Scott Mosh Date: 3-22-2000

LIFTED LEAD LOG

At Junction Box: JB05X

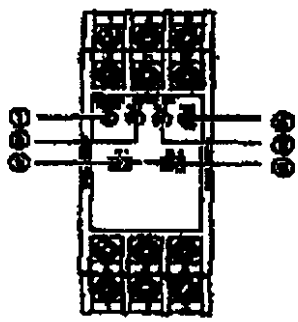
Drawing #	Sheet #	Record wire color#	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
363A0033	2	101Y	Controller	1	JWE	3/15/00	SRC	3-15-00	JWE	3/16/00	SRC	3-16-00
363A0033	2	102Y	Controller	2	JWE	3/15/00	SRC	3-15-00	JWE	3/16/00	SRC	3-16-00
363A0033	2	101Y	Controller	4	JWE	3/15/00	SRC	3-15-00	JWE	3/16/00	SRC	3-16-00
363A0033	2	17A07Y	Controller	5	JWE	3/15/00	SRC	3-15-00	JWE	3/16/00	SRC	3-16-00
363A0033	2	17A03Y	Controller	6	JWE	3/15/00	SRC	3-15-00	JWE	3/16/00	SRC	3-16-00
363A0033	2	#7	Controller	7	JWE	3/15/00	SRC	3-15-00	JWE	3/16/00	SRC	3-16-00
363A0033	2	#8	Controller	8	JWE	3/15/00	SRC	3-15-00	JWE	3/16/00	SRC	3-16-00
363A0033	2	#9	Controller	9	JWE	3/15/00	SRC	3-15-00	JWE	3/16/00	SRC	3-16-00
" "	"	GROUND	" "	3	JWE	3/15/00	SRC	3-15-00	JWE	3/16/00	SRC	3-16-00

Remarks:

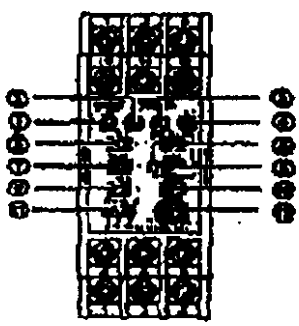
Page 658

S3D2 OMRON S3D2

S3D2-AK-US



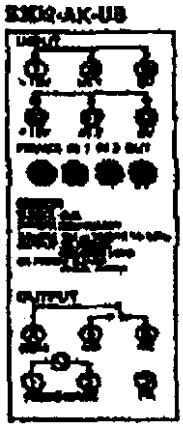
S3D2-CK-US/-CC-US



No.	Name	Functions
1	Power supply indicator	This illuminates when the operating power is turned on and at the same time, the output is issued from the power supply for sensors. It does not illuminate when power supply output for sensors is short-circuited (between +12 V terminal and 0 V terminal).
3	IN1 indicator	This illuminates when it receives the output of the sensor which is connected with IN1 as an input.
9	IN2 indicator	This illuminates when it receives the output of the sensor which is connected with IN2 as an input.
4	OUT indicator	This illuminates when the output is turned on.
6	IN1 input signal selector switch	NORM: When the transistor (or output contact) is turned on, the switch receives it as a signal. INV: When the transistor (or output contact) is turned off, the switch receives it as a signal.
5	IN2 indicator	
7	AND/OR operation selector switch	AND: The output is turned on when input signals of both IN1 and IN2 are turned on. OR: The output is turned on when input signal of either IN1 or IN2 is turned ON.
8	Synchronous mode selector switch (This switch can operate only when AND is selected on the AND/OR operation selector switch.)	The output is turned on during input signals when both IN1 and IN2 are turned on. If the input signal of IN2 is turned on before (the rising time), when that of IN1 turns to the ON state, the output is turned on. IN1 is the "gate sensor."
9	Timer switch	When ON: the timer function operates. When OFF: the timer function does not operate.
10	Timer timing selector switch	With this switch, ranges of timer setting are changed. (Model S3D2-CK) 1s: Setting time lies in the range of 0.1 s to 1 s. 10 s: Setting time lies in the range of 1 s to 10 s. (Model S3D2-CC) 0.1 s: Setting time lies in the range of 0.01 s to 0.1s. 1 s: Setting time lies in the range of 0.1 s to 1 s.
11	Timer operation selector switch	O.S: One-shot delay timer ON.D: On-delay timer Off.D: Off-delay timer
12	Time setting trimmer	Setting time can be adjusted with the accessory screwdriver. It rotates 180°.

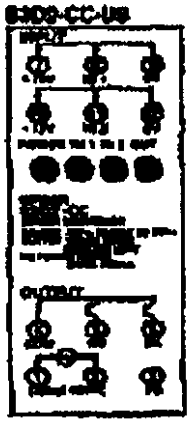
How to connect

S3D2-AK-US



S3D2-CK-US

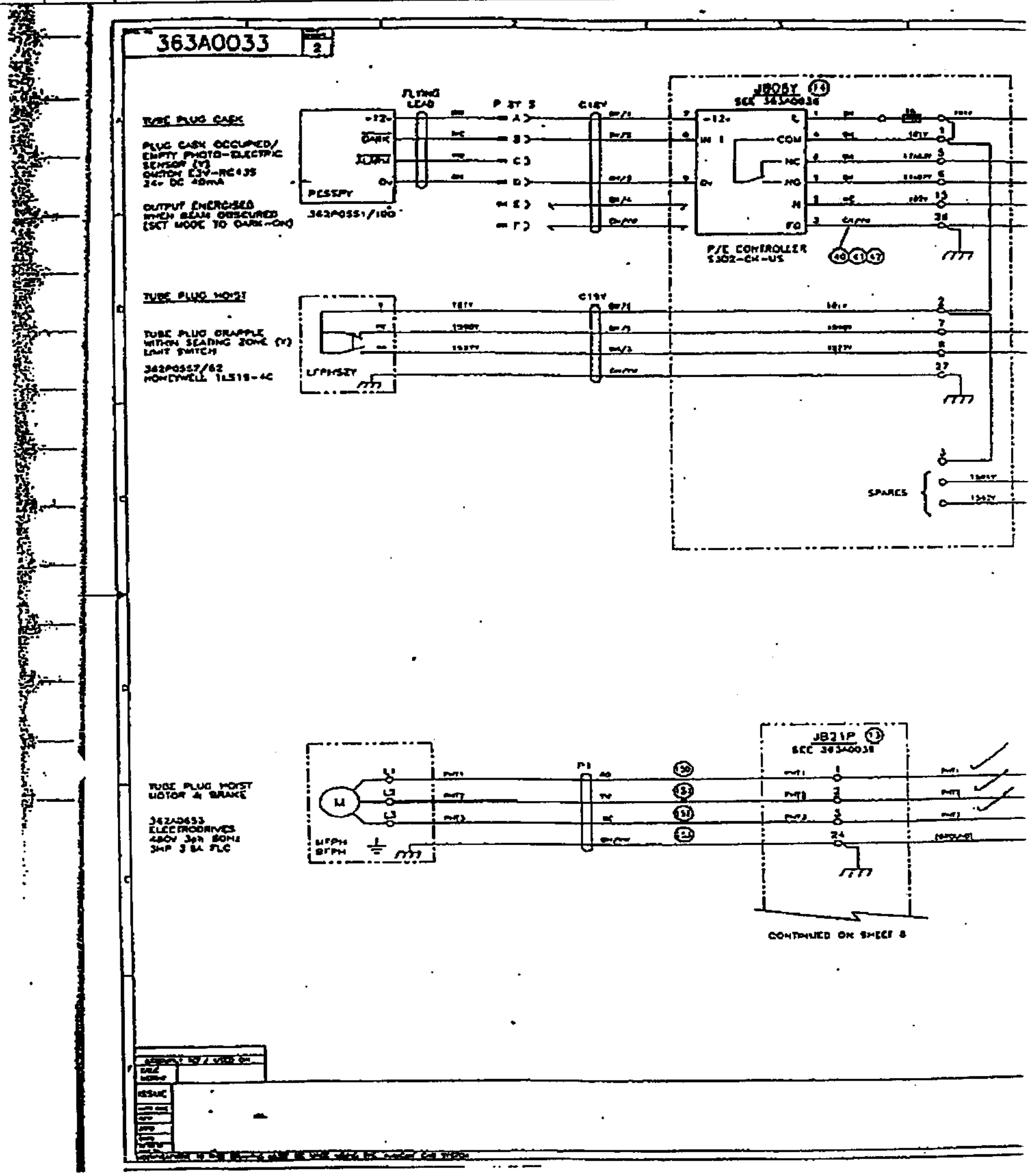
S3D2-CC-US

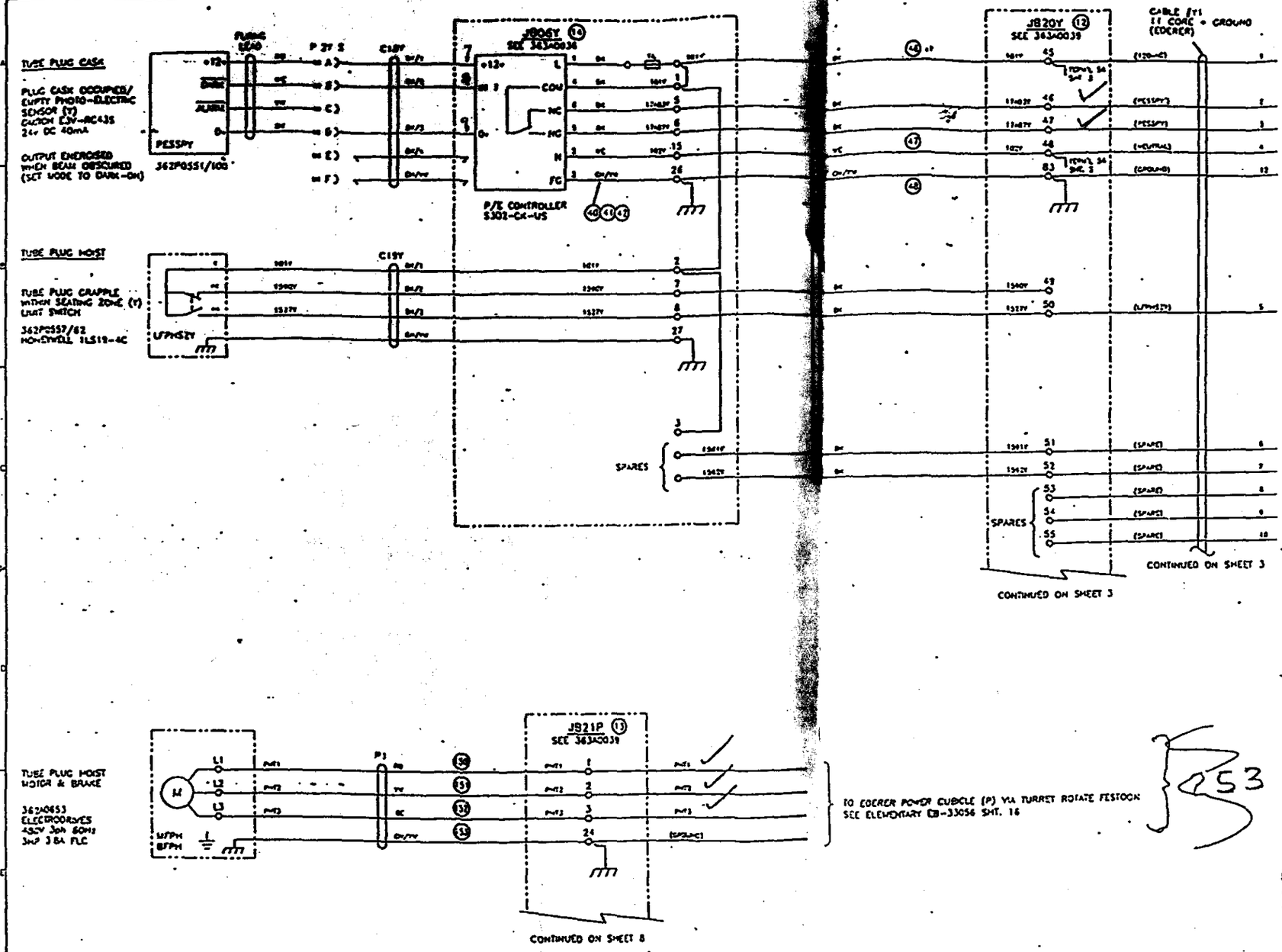


No.	Name/Function
1, 2	Power terminal supplies a voltage of 100 to 240 VAC.
3	FG terminal: In a location where much noise is expected, ground this terminal at a ground resistance of 100 Ω max.
4 to 6	Output terminals
7, 10	Power terminal for the sensor (+ 12 V)
8, 12	Power terminal for the sensor (0 V)
9, 11	Output terminals for the sensor (input of the sensor, synchronous input). Connect the output wiring of the sensor.

Page 659

Dedication Test Plan – IST **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-012-TP-012Y
Test Specimen: Omron Photoelectric Switch Controller Eqmt. No.: for PESSPY **Page 9 of 9**





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MCC #15

MHM-FCR-006
12/10/98

U.S. DEPARTMENT OF ENERGY
WESTINGHOUSE HANFORD COMPANY
MDK-SOX-452656
WHC-S-0468

H-2-827169

GEC ALSTHOM ENGINEERING SYSTEMS LTD
Whetstone, Leicester, LE8 6LH, England

HANDLING M/C
WIRING DIAGRAM
TUBE PLUG HOIST

363A0033

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Commercial Grade Item Upgrade Dedication Form

Rev. No. 2	
ECN No. **N/A** CGI No. **CGI-SNF-D-MHM-011**	Page 1 of 8
Title: **P- 80 – Honeywell Limit Switch 1LS19-4C**	

f2 & yup

Section 1 Part Information

Item No.: **N/A**	Manufacturer: **N/A**	Supplier: **N/A**
Mfg. Part/Model No.: **N/A**	Supplier's P/N: **N/A**	
Part Description: **N/A**		
End Use Description: **N/A**		

ORIGINAL

Section 2a Component Information

Equipment No.: **LFPHFRX, LFPHFRY**	Specification No.: **Ederer F-2566, Foster Wheeler MJX-SDX 452656**	Manufacturer: **Honeywell**	Past P.O. No.: **N/A**
Manufacturer's Part/Model No.: **1LS19-4C**	Equipment Supplier (if different from manufacturer): **ALSTOM, Foster Wheeler**		Equip. Supplier's Part No.: **N/A**

Component Description: **Limit switches for interlock P-80, located inside the top of the tube plug hoist screw jack bellows assembly, measures tube plug hoist not fully raised, inhibits operating mode changes between MCO mode, impact absorber exchange mode, and tube plug exchange mode with the mode selector switch.** f2 yup

Section 2b Commercial Availability of the Item

1. Is the Item available from a catalogue from a qualified NQA1 supplier or ISO 9000 supplier (coordinate with project CGI interface Engineer or BTR)?

   [ ] YES (go to #2 below) [X] NO (go to procedure step 6.3.2, proceed to dedicate Item)

   If not available from a qualified NQA1 supplier, is it available from an ISO 9000 supplier? (coordinate with project CGI Interface Engineer or BTR)

   [ ] YES (go to #2 below, procedure step 6.3.2, dedicate Item) [X] NO (procedure step 6.3.2, dedicate Item)

2. List of Candidate qualified NQA1 suppliers or ISO 9000 suppliers, if used: **N/A**

3. Recommended Procurement Strategy (coordinate with project CGI interface Engineer or BTR): **N/A**

Section 2c CGI Determination

CGI Determination Questions:

#1: Is the Item subject to design or specification requirements that are unique to nuclear facilities or activities?

[ ] YES (the Item is not commercial grade) [X] NO (continue)

#2: Is the Item used in applications other than nuclear facilities or activities?

[ ] NO (the item is not commercial grade) [X] YES (continue)

#3: Is the Item ordered from manufacturer/supplier on the basis of specifications set forth in the manufacturer's catalog?

[ ] NO (the item is not commercial grade) [X] YES (continue)

[X] All three criteria have been satisfied. The Item meets the definition of commercial grade.

Commercial Grade Item Upgrade Dedication Form

Rev. No. 2
Page 2 of 8

ECN No. **N/A** CGI No. **CGI-SNF-D-MHM-011**

Title: **P- 80 – Honeywell Limit Switch 1LS19-4C**

Section 2d Reason for Dedication

The above Commercial Grade (CG) described Item is being Dedicated for use in the application cited for the following reason(s):

	Item is being purchased from a non ESL manufacturer supplier as CG to be used in a Safety Class application.
	Item is being purchased from a non ESL manufacturer supplier as CG to be used in a Safety Significant application.
X	Item was purchased from a non ESL manufacturer supplier as CG to be used in a Safety Class application.
	Item was purchased from a non ESL manufacturer supplier as CG to be used in a Safety Significant application.
	Other ('like-for-like', similar, substitution, replacement evaluation)

Section 3 Failure Effects Evaluation

A. Part/Component Safety Function:

1. **Interlock P-80 Inhibits operating mode changes with the mode selector switch. Prevents MCO shear due to lateral movement of the MHM, MCO drop due to shear of hoist cable, and MCO drop to the maintenance pit.** ADD P2 JHP CES 4/11/00

B. Part/Component Functional Mode:

Safety Function #1: [X] Active [ ] Passive

Safety Function #2: [ ] Active [ ] Passive

Safety Function #3: [ ] Active [ ] Passive

Active - Mechanical or Electrical change of state is required to occur for the component to perform its safety function

Passive – Change of state is not required for the component to perform its safety function

C. Host Component Safety Function (if applicable): **N/A**

1.

D. Failure Mode(s) and the effects on component or system safety function (see Worksheet 1):

1. **Failure of switch contacts to open upon demand results in potential override of interlock channel.**

2. **Plunger/arm inoperative results in failure to provide interlock function at correct demand position.**

Section 4 Environmental & Natural Phenomena Hazard Design

Environmental Qualification Required:

Yes [ ]

No [X]

If yes: Environmental Qualification Requirements

Limiting Environmental Conditions:

Required Safety Functions:

Qualification Period:

Natural Phenomena Hazard (NPH) Design Required:

Yes [ ]

No [X]

If yes: NPH Design Requirements

Performance Category:

NPH Design Req'ts.:

Required Safety Functions:

Section 5 Component Functional Classification

X	Safety Class (SC)		General Service (GS)		Safety Significant (SS)

If part/component classification is different from host component/system, document basis. **N/A**

Sections 6 and 7(Reserved)

Section 8 References (for Functional Classification)

National Codes/Standards:

Safety Analysis Report (SAR): **HNF-3672 Rev. 0**

Drawings: **Ederer, Inc. EB-33056, Sht 15A, Hanford H-2-827174, Sht. 27**

Vendor Manual/Manufacturer/Supplier Information: **Honeywell Series LS compact limit switches**

Other: **ALSTOM ESL/R (96) 065 - Rev. D, 100% Design Submittal - June 1998.**

Commercial Grade Item Upgrade Dedication Form

ECN No. N/A CGI No. CGI-SNF-D-MHM-011	Rev. No. 2
Title: P- 80 – Honeywell Limit Switch 1LS19-4C	Page 3 of 8

Section 9 Critical Characteristics

Critical Characteristics	Acceptance Criteria/Tolerances	Acceptance Method	ID	Function
1. Item Identification Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
Manufacturer	**Honeywell**	**1, IN**	**X**	
Model Number	**1LS19-4C**	**1, IN**	**X**	
2. Physical Critical Characteristics (for reasonable assurance that the Item delivered is the Item specified)				
Actuator (Note 1)	**Side mounted, rotary with nominal 1.5 inch radius, metallic arm with roller.**	**1, IN**	**X**	
3 Performance Critical Characteristics (for reasonable assurance that the Item will perform its intended safety function(s))				
Contact Rating	**Nominal 10 amps, resistive, @ 120vac, less than 0.5V drop across contacts.**	**1, T**		**X**
Insulation Resistance	**Greater than 10 megohm resistance, terminal to terminal and terminal to ground at 1000v.**	**1, T**		**X**
Mechanical Operation	**Cycle switch - confirm contacts open and close with smooth operation and free release of spring.**	**1, T**		**X**

4. Notes and Legend:

Rev. 2: All Pages: New Forms; Pages 3, 5, 7: added Note 1

Note 1: This actuator is installed with the limit switch - replacement limit switches will not include an actuator - the existing actuator will be placed on the replacement switch. Therefore, the physical CC specified for the actuator lever need not be performed on the replacement limit switch.

ADDED P2 PER SEL REVISION

Acceptance Method (Acc Meth)
1. Special Test and Inspection
   1, IN for Inspection
   1,T for Test
2. Commercial Grade Survey
3. Source Verification
4. Vendor/Item History

Section 10 Initial Review and Approval

Approvals:

Designated Engineer: _____

Design Authority: DWM _____

QA Engineer: _____ 2/1/00

TZ ANDERSON

WORKSHEET 1
DETERMINATION OF FAILURE MECHANISMS/MODES

Section 1			
Typical Failure Mechanisms	Definition	X = Applicable to Component under Evaluation	
		X?	Indicate Failure Mode
Fracture	Separation of a solid accompanied by little or no macroscopic plastic deformation.		
Corrosion	The gradual deterioration of a material due to chemical or electrochemical reactions, such as oxidation, between the material and its environment.	X	**Switch contacts corrode closed and fail to open upon demand.**
Erosion	Destruction of materials by the abrasive action of moving fluids, usually accelerated by the presence of solid particles carried with the fluid.		
Open Circuit	An electrical circuit that is unintentionally broken so that there is no complete path for current flow.		
Short Circuit	An abnormal connection by which an electrical current is connected to ground, or to some conducting body, resulting in excessive current flow.	X	**Switch contacts fuse closed and fail to open upon demand.**
Blockage	Clogging of a filtering medium resulting in the inability to perform its purification function or blockage of flow.		
Seizure	Binding of a normally moving item through excessive pressure, temperature, friction, jamming.	X	**Switch mechanism jams and contacts fail to open upon demand.**
Unacceptable Vibration	Mechanical oscillations produced are beyond the defined permissible limits due to unbalancing, poor support, or rotation at critical speeds.		
Loss of Properties	A loss of mechanical and physical properties of a material due to exposure to high temperatures, radiation exposure.		
Excess Strain	Under the action of excessive external forces the material of the part has been deformed or distorted.		
Mechanical Creep	From prolonged exposure to high temperature and stress, the object will show a slow change in its physical (shape and dimension) and mechanical characteristics.		
Ductile Fracture	Fracture characterized by tearing of metal accompanied by appreciable gross plastic deformation.		

Section 2 Additional Failure Modes Applicable to the Component Under Evaluation
1. **Switch contacts are closed to permit equipment movement. Contacts open for the interlock function to prevent lateral movement of the MHM. Any failure which prevents contacts opening inhibits the particular switch interlock function.**
2. **Actuator plunger/arm seizure or break renders the contact opening inoperable.**
3. **Short circuit could give false signal to energize interlock function.**

Commercial Grade Item Upgrade Dedication Form	Rev. No. 2
ECN No. N/A CGI No. CGI-SNF-D-MHM-011 Title: P- 80 – Honeywell Limit Switch 1LS19-4C	Page 5 of 8

Checklist 1 - Acceptance Method 1 - Special Test/Inspection Verification

SECTION 1	
Item Description: **P-80 interlock limit switches** System #: **MHM**	Equip #: **LFPHFRX, LFPHFRY** Model #: **1LS19-4C**
Manufacturer (Address/Phone): **Honeywell** **1-800-537-6945** P.O. #	Supplier (Address/Phone):

SECTION 2 CRITICAL CHARACTERISTICS TO BE VERIFIED BY METHOD 1.

Insp	Test	Post-Test		
X			1.	**Manufacturer**
X			2.	**Model Number**
X			3.	**Actuator (Note 1)**
	X		4.	**Contact Rating**
	X		5.	**Insulation Resistance**
	X		6.	**Mechanical Operation**

SECTION 3 BY INSPECTION * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)

Characteristic: **Manufacturer** Sample Size*: **100%**

Acceptance Criteria: **Honeywell**

Receipt Inspection Plan / Report #: TP011A, B*

Characteristic: **Model Number** Sample Size*: **100%**

Acceptance Criteria: **1LS19-4C**

Receipt Inspection Plan / Report #: TP011A, B*

Characteristic: **Actuator (Note 1)** Sample Size*: **100%**

Acceptance Criteria: **Side mounted, rotary with nominal 1.5 inch radius, metallic arm with roller.**

Receipt Inspection Plan / Report #: TP011A, B*

Commercial Grade Item Upgrade Dedication Form	Rev. No. 2
ECN No. N/A CGI No. CGI-SNF-D-MHM-011 Title: P- 80 – Honeywell Limit Switch 1LS19-4C	Page 6 of 8

SECTION 4 BY SPECIAL TEST * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)	
Characteristic for Test: **Contact Rating**	Samp Size*: [X]Normal[ ]Reduced[ ]Tightened
Acceptance Criteria: **Nominal 10 amps, resistive @ 120 vac, less than 0.5V drop across contacts**	
Actual Test Value: See TP	Test Plan and Report #: TP011A, B*
Characteristic for Test: **Insulation Resistance**	Samp Size*: [X]Normal[ ]Reduced[ ]Tightened
Acceptance Criteria: **Greater than 10 megohm resistance, terminal to terminal and terminal to ground at 500 vdc.** 1000 JMP	
Actual Test Value: See TP	Test Plan and Report #: TP011A, B*
Characteristic for Test: **Mechanical Operation**	Samp Size*: [X]Normal[ ]Reduced[ ]Tightened
Acceptance Criteria: **Cycle switch - confirm contacts open and close with smooth operation and free release of spring**	
Actual Test Value: See TP 011A, B*	Test Plan and Report #: TP011A, B*

*Full nos is: CGI-SNF-D-MHM-011-TP-011A
" " " -011B

Section 5 Test / Inspection Summary (Acceptance Method 1)

1. SUMMARY OF VERIFIED CRITICAL CHARACTERISTICS , THEIR VERIFICATION METHODS, AND RESULTS

ITEM DESCRIPTION: Honeywell Limit Switch

Critical Characteristics				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/N	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
Manufacturer	Honeywell	X		1, IN	TP-011A,B*	N/A	2	0	X WEST	Larry W. Pence	4/10/00
Model	1LS19-4C	X		1, IN							
Actuator (Note 1)	Side mounted, rotary with nominal 1.5 inch radius, metallic arm with roller.	X		1, IN							
Contact Rating	Nominal 10 amps, resistive, @ 120 vac, less than 0.5V drop across contacts		X	1, T							
Insulation Resistance	Greater than 10 megohm resistance, terminal to terminal and terminal to ground at 1000v.		X	1, T							
Mechanical Operation	Cycle switch - confirm contacts open and close with smooth operation and free release of spring		X	1, T							

2. DISPOSITION OF UNVERIFIED OR FAILED CRITICAL CHARACTERISTICS

Critical Characteristic	Disposition

3. SIGNATURE INDICATES ALL CRITICAL CHARACTERISTICS VERIFIED SATISFACTORY OR ACCEPTABLY DISPOSITIONED AND COMMERCIAL GRADE DEDICATION IS SATISFACTORY AND COMPLETE.

See Test Plan TP-011A,B cited above. CES 4/11/00

Testing Agency Approval: NR CES 4/11/00 Date

Testing Agency QA Engineer: NR CES 4/11/00 Date

BUYER VERIFICATION

CES

Design Authority: Larry Swenson Date 4-11-00

QA Engineer: Stephen Scott Marsh Date 4-20-2000

Commercial Grade Item Upgrade Dedication Form

ECN No. **N/A** CGI No. **CGI-SNF-D-MHM-011**	Rev. No. 2
Title: **P- 80 – Honeywell Limit Switch 1LS19-4C**	Page 8 of 8

Section 6 Contacts/Phone Numbers		
Name		Phone
Design Authority		( )
QA		( )
QC		( )
Cog - Engineer		( )
CGI Engineer		( )
Procurement Engineer		( )
Other		( )

Section 7 Supporting Documentation for this Checklist		
Initial Procurement Documents		**For Critical Characteristics**
	Drawings:	
	Manuals (specify type & number):	
	Design Calculations	
	Installation Instructions	
	Operation Instructions	
	Calibration Instructions	
	Manufacturer's Recommended Spare Parts List	
X	**Other: Honeywell Series LS Compact Limit Switches**	**All**
Procurement Documents		**For Critical Characteristics**
	Certificate of Conformance/Compliance	
	Seismic Qualification Certificate	
	Environmental Qualification Certificate	
X	Test Report (s): **CSB(W379)-015-1-074**	
	Inspection Report (s):	
	CMTRs for ASME Pressure Retaining Materials	
	Valve Seat Leakage Report	
	Weld Records	
	Material Traceability Record	
X	**Other: SU Test SNF-CTP-IC-07**	

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ORIGINAL

Dedication Test Plan – IST-LS-1 Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-011-TP-011A
Test Specimen: Honeywell 1LS19-4C Limit Switch, Eqmt. No.: LFPHFRX Page 1 of 7

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI Eng	DA	QA Post Review*
						3/13/00 NO CHANGES

* QA Post Review of Individual Revisions is allowed

ORIGINAL

In-Situ Test Procedure

Test Procedure Approval (Obtain prior to testing): ORIGINAL

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) Craig Swenson Date: 2/29/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	MICHAEL CRAM	BELLHAVEN	Michael Cram	MPC
Electrician	JW EBERHART	PCE	JW Eberhart	JWE
Electrician Quality Control	Stephen R Cauley	PCE	Stephen R. Cauley	SRC
Design Authority Representative	Larry W Peace	XWEST		
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Power Supply capable of 10 amps @ 120 VAC
Megger Instrument capable of 1000 VDC Test Voltage
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type:	HP3457A	I.D.:	BAT 123	Calib. Due date:	7-29-00
Test Instrument type:	HP3457A	I.D.:	BAT 124	Calib. Due date:	7-30-00
Test Instrument type:	AVO BM89/2	I.D.:	6410-889	Calib. Due date:	2-9-01
Test Instrument type:	PROTO 6106	I.D.:	0295/009	Calib. Due date:	1-13-01
Test Instrument type:		I.D.:		Calib. Due date:	

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE:

For this In-Situ Test, certain leads must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of leads.

1.0 Lock and tagout Main Disconnect CRN-004, or Main Disconnect MD.

2.0 Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	YES	**LFPHFRX**	Acc
Manufacturer:	YES	**Honeywell**	Acc.
Model:	YES	**1LS19-4C**	Acc.
Actuator:	YES	**Side mounted, rotary w/ nominal 1.5 inch radius, metallic arm w/roller**	Acc
Serial No./Lot No./Date Code:	OK	**N/A**	Acc

3.0 Perform the following testing steps:

3.1 Record: Date /Time of Test Beginning: 3-07-00 8:45 a.m.

Record: Room Temperature: 68 °F. Room Barometric Pressure: N/A mmHg.

3.2 Mechanical Operation

3.2.1 Cycle the switch actuator full stroke 5 or more times to confirm contacts open and close with smooth operation and free release of spring.

3.2.2 Record the following data.

Description	Record Data	Acceptance Criteria	Comments/Deviations
No of Cycles:	6 times	**> 5 times**	Acc.
Describe Operation:	YES	**Contacts open and close with smooth operation.**	Acc
Describe release of Spring:	YES	**Free release of spring.**	Acc

Note: 3.4 may be performed before 3.3

3.3 Contact Rating Test

3.3.1 De-energize equipment or panel and lockout/tagout prior to lifting leads.

3.3.2 Setup the test equipment and Limit Switch specimen for contact rating testing. Attach a sketch of test circuit with all test instrumentation used.

3.3.3 At limit switch LFPHFRX, lift leads on Common terminal, Normally Closed terminal and Normally Open terminal. Record on the lifted lead log.

3.3.4 Connect the power supply to terminals Common and Normally Closed.

3.3.5 Apply a nominal 10 amps, resistive, across the normally closed contacts of the test specimen.

Caution: Do not change state of contacts while energized.

3.3.6 Record the following data.

Description	Record Voltage Drop	Acceptance Criteria	Comments/Deviations
Contact Circuit (Terminals COM-NC)	.021 VAC	**< 0.5 Volts AC drop**	Acc

3.3.7 Reduce the current source to zero amps.

3.3.8 Disconnect the power supply from terminals Common and Normally Closed.

3.3.9 Manually adjust the limit switch actuator to close the normally open contacts.

3.3.10 Connect the power supply to terminals Common and Normally Open.

3.3.11 Apply a nominal 10 amps, resistive, across the closed normally open contacts of the test specimen.

3.3.12 Record the following data:

Description	Record Voltage Drop	Acceptance Criteria	Comments/Deviations
Contact Circuit (Terminals COM-Closed NO Contact):	.035 VAC	**< 0.5 Volts AC drop**	Acc

3.3.13 Reduce the current source to zero amps and remove the power supply from terminals Common and Normally Open.

3.3.14 Manually adjust the limit switch actuator to close the normally closed contacts.

3.4 Insulation Resistance Test

3.4.1 Setup the test equipment and Limit Switch specimen for insulation resistance testing.

3.4.2 Apply a nominal 1000 VDC via Megger device between non-continuity terminals Common and Normally Open and then between terminal Normally Open and ground. Record the resistances.

3.4.3 Remove the Megger device.

3.4.4 Manually adjust the limit switch actuator to open the normally closed (NC) contacts.

3.4.5 Apply a nominal 1000 VDC via Megger device between non-continuity terminals Common and open Normally Closed and then between terminal Normally Closed and ground. Record the resistances.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Resistance	Acceptance Criteria	Comments/Deviations
Common	**NO**	>13.3Gohm	**> 10 Megohms**	Acc
NO	**Ground**	> 70 Gohm	**> 10 Megohms**	Acc
Common	**open NC***	> 124 Gohm	**> 10 Megohms**	Acc
Open NC	**Ground***	> 50 Gohm	**> 10 Megohms**	Acc

* Normally closed contacts are open.

3.4.6 De-energize and remove the test equipment.

3.5 Terminate the test.

3.5.1 Reland the lifted leads and verify reland in accordance with the Lifted Lead Log.

3.5.2 Retorque the terminals to 7-9 in-pounds.

3.5.3 Remove lockout/tagout and restore system to normal.

3.5.3 Record: Date /Time of Test End: 03-07-00 9:15 a.m.

Dedication Test Plan – IST-LS-1	**Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-011-TP-011A	
Test Specimen: Honeywell 1LS19-4C Limit Switch, Eqmt. No.: LFPHFRX	**Page 6 of 7**

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

device under test has passed all parameters

Michael Cram
03-07-00

Notes:

Certified InstrumentationTechnician (signature) Michael Cram Date: 03-07-00
Reviewed By: J. Caslick 3-10-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Larry Swenson Date: 3/7/00

QA/QC (signature) T Z ANDERSON Date: 3/13/00

LIFTED LEAD LOG

Junction Box: N/A

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
363A0033	4	101X	LFPHFRX	C	[signature]	3/7/00	SRL	3-7-00	[signature]	3/7/00	SRL	3-7-00
363A0033	4	1525X	LFPHFRX	NC	[signature]	3/7/00	SRL	3-7-00	[signature]	3/7/00	SRL	3-7-00
363A0033	4	1520X	LFPHFRX	NO	[signature]	3/7/00	SRL	3-7-00	[signature]	3/7/00	SRL	3-7-00

15A25X per FCR-006
18A20X 12/10/98

Remarks:

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SNF-6315, Rev. 0

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Compact Limit Switches

FEATURES
- Mode of operation is field adjustable.
- NEMA 1, 3, 4, 6 and 13.
- Wide choice of heads and actuators.
- Variety of operating characteristics.
- Optional indicator light.
- Captive screws.
- UL Recognized, file #E12252
- CSA Certified, file #LR57325

FIELD ADJUSTABLE

Rotary motion roller lever and rod actuators are adjustable through 360°. They may be set for operation clockwise, counter-clockwise, or in both directions.

Operating heads may be positioned in any of four 90° positions.

UL/CSA LS SWITCHES

Several UL recognized and CSA certified LS compact limit switches are in the order guides.

Other listings can be furnished in the UL version. Contact the 800 number for information.

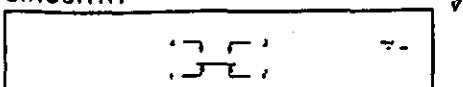
For rapid response – off the shelf service, all bold face listings are normally stocked items.

Compact LS and plug-in 200LS limit switches have a long record of successful performance in industrial applications.

The LS fits in many places too small for any other fully adjustable limit switch.

The 200LS switches are the original plug-in concept for reducing downtime by making changeover simple and fast.

CIRCUITRY



Two-circuit Double-break

ELECTRICAL RATINGS

A	10 amps, 120, 240 or 480 VAC; ½ hp, 120 VAC; ¾ hp, 240 VAC; 0.8 amp, 115 VDC**; 0.4 amp, 230 VDC;** 0.1 amp, 550 VDC;** Pilot Duty, 600 VAC max.	APPLICATION NOTE: Silver Cadmium Oxide Contacts – Designed for use with inductive loads such as relays, contactors, motors and solenoids. Honeywell MICRO SWITCH does *not* recommend the use of silver cadmium oxide switch contacts in non-arcing loads. Non-arcing loads are generally loads less than 12 volts and/or 0.5 amp.
B	10 amps, 120, 240 or 480 VAC; ¼ hp, 120 VAC; ½ hp, 240 VAC. Pilot Duty, 600 VAC max.	
C	10 amps, 120 VAC; ½ hp, 120 VAC.	
D	10 amps, 120, 240, 480 VAC; ¼ hp, 120 VAC; ½ hp, 240 VAC; 0.8 amp, 115 VDC**; 0.4 amp, 230 VDC**; 0.1 amp, 550 VDC**; Pilot Duty, 600 VAC max.	
E	10 amps, 120, 240 or 480 VAC; ½ hp, 120 VAC; ¾ hp, 240 VAC. Pilot Duty, 600 VAC max.	
F	UL Rating: 10 amps, 125, 250, or 480 VAC; ½ hp, 125 VAC; ¾ hp, 250 VAC; 0.8 amp, 125 VDC**; 0.4 amp, 250 VDC**	Fine Silver Contacts
G	UL Rating: 10 amps, 125, 250 or 480 VAC; ¼ hp, 125 VAC; ½ hp, 250 VAC; 0.8 amp, 125 VDC**; 0.4 amp, 250 VDC**	

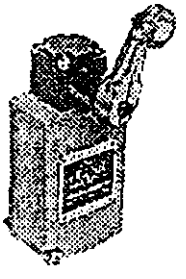
** Resistive Rating

NOTE: The terminals of two-circuit double-break switches must be wired to equal voltage sources and the same polarity. The loads should be on the same side of the line.

ROLLER LEVER ROTARY ACTUATED SWITCHES

(To order switches and levers separately, refer to pages A73 and A74 or A37 and A38.)

Compact



Plug-In*

ORDER GUIDE

Momentary action. Steel rollers.

Description	Rating	Catalog Listing Compact	Catalog Listing Plug-in	O.F. max.	P.T. max.	O.T. min.	D.T. max.
Standard	A	1LS1	201LS1*	13,3 N 3 lb.	20°	30°	12°
20° Pretravel UL/CSA	F	1LS1-L	—	13,3 N 3 lb.	20°	30°	12°
Low Pretravel 5°	B	1LS19	201LS19*	13,3 N 3 lb.	5°	30°	4°
Low Operating Force 5° Pretravel	B	1LS131	—	5,0 N 18 oz.	5°	30°	4°
Standard with indicator light 120 VAC only	C	1LS501	201LS501*	13,3 N 3 lb.	20°	30°	12°
Low Operating Force	A	1LS6	201LS6*	5,0 N 18 oz.	20°	30°	12°
Cavity Mount version of 1LS1	A	7LS1	—	13,3 N 3 lb.	20°	30°	12°

*Require Terminal Block (18PA1 for 200LS switches) which must be ordered separately. Unless damaged, it is not necessary to replace terminal block when replacing switch.

Characteristics: O.F. — Operating Force; P.T. — Pretravel; O.T. — Overtravel; D.T. — Differential Travel.

Compact Limit Switches

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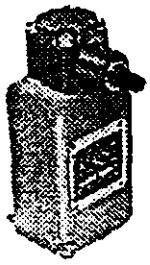
ROTARY ACTUATED SWITCHES — WITHOUT LEVERS

The following compact LS and plug-in LS limit switches are sold without actuating levers. Levers are ordered separately from the order guide below and on the facing page.

Plug-in*



Compact

ORDER GUIDE

Momentary action, except where noted.

Description	Electrical Rating Page A70	Catalog Listing Compact	Catalog Listing Plug-in	O.Tq. max.	P.T. max.	O.T. min.	D.T. max.
Standard 20° pretravel	A	1LS2	201LS2*	0,51 Nm 4.5 in. lb.	20°	30°	12°
UL/CSA	F	1LS2-L	—	0,51 Nm 4.5 in. lb.	20°	30°	12°
Low pretravel 5°	B	1LS9	201LS9*	0,51 Nm 4.5 in. lb.	5°	30°	4°
Standard pretravel 20° Low operating force	A	1LS23	201LS23*	0,21 Nm 30 in. oz.	20°	30°	12°
Low pretravel 5° Low operating force	B	1LS56	201LS56*	0,11 Nm 15 in. oz.	5°	30°	4°
Maintained Contact	A	6LS2	206LS2*	0,34 Nm 3 in. lb.	55°	35°	20°
UL/CSA	F	6LS2-L	—	0,34 Nm 3 in. lb.	55°	35°	20°

*Require Terminal Block (18PA1 for 200LS Switches).

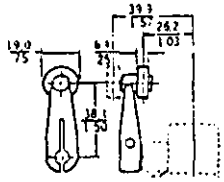
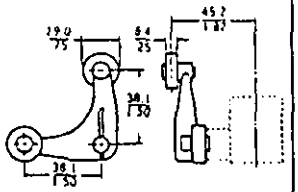
Note 1 — Yoke lever actuators normally used

Characteristics
O.Tq. — Operating Torque; P.T. — Pretravel; O.T. — Overtravel; D.T. — Differential Travel

Limit/Enclosed

AUXILIARY ROTARY LEVERS

ORDER GUIDE

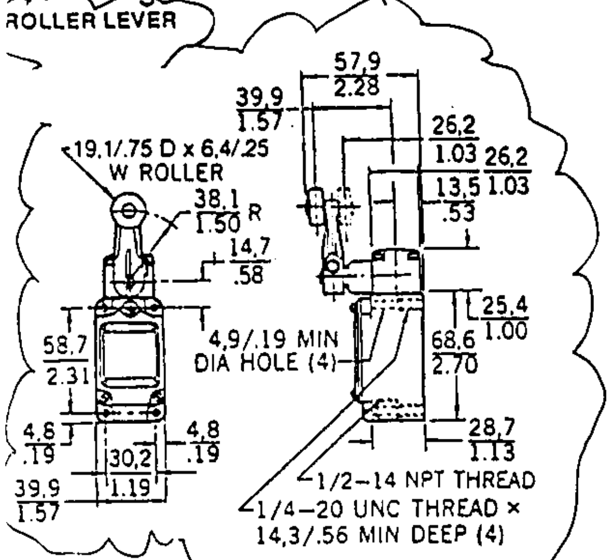
	Type	Catalog Listing	
	Roller arm, with nylon, steel, or ball bearing roller.	Nylon	6PA71
		Steel	6PA121
		Ball bearing	6PA144
	Yoke roller lever with nylon or steel rollers.	Steel	6PA30
	Rollers on same side.	Steel	6PA32
		Nylon	6PA102

60mm radius levers Part # PA-J11

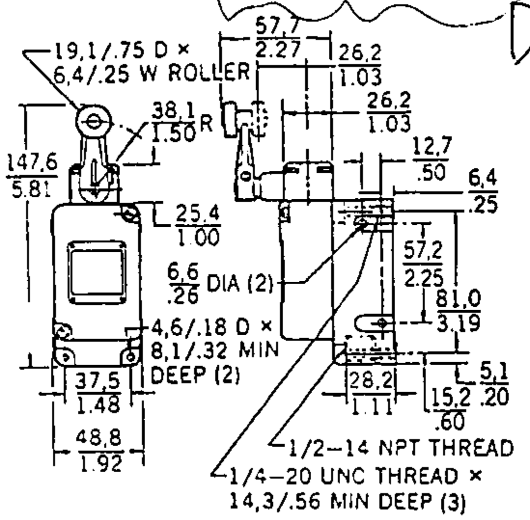
Page 668

Mounting Dimensions (For reference only)

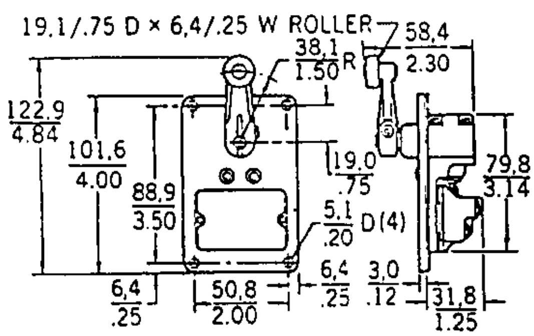
ROLLER LEVER



Compact

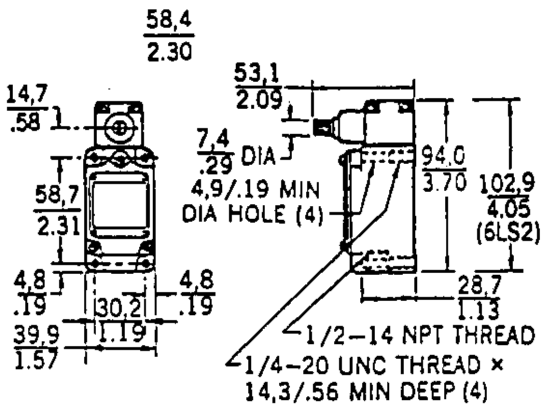


Plug-in

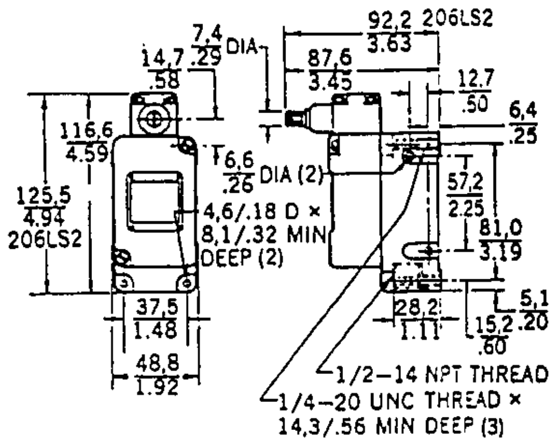


Cavity mount

SWITCH WITHOUT LEVER



Compact



Plug-in

362PO826 ITEM 126
Page 669

Basic switches

LS-series listings have 2-circuit, double break precision basic switches as standard. These are fitted with keyed washers to facilitate wiring and obviate wrap-round. Step design and use of barriers provides ample over-surface dielectric spacing. Basic switches can be replaced easily without special tools.

4-circuit double break basic switch versions are available in LS switches with roller-lever, plunger and roller-plunger. This basic has solder terminals.

Basic switch listings for respective compact LS types are listed below.

Compact LS	Basic Switch	Operating Head	Actuator Only
1LS1-4 (C or PG)	2MN1-M	9PA15-4	6PA78-4
1LS2-4 (C or PG)	2MN1-M	9PA16-4	*
1LS-4 (C or PG)	2MN1-M	9PA16-4	6PA44-4
1LS10-4 (C or PG)	2MN1-M	9PA40-4	6PA43-4
1LS19-4 (C or PG)	2MN8-M	9PA15-4	6PA78-4
1LS23-4 (C or PG)	2MN1-M	–	–
1LS47-4 (C or PG)	2MN8-M	9PA40-4	6PA43-4
1LS56-4 (C or PG)	2MN8-M	9PA74-4	**
1LS243-4 (C or PG)	2MN24	914PA15	6PA78-4
1LS244-4 (C or PG)	2MN24	914PA15	6PA78-4
2LS1-4 (C or PG)	2MN1-M	9PA32-4	NA
3LS1-4 (C or PG)	2MN11-M	9PA45-4	NA
4LS1-4 (C or PG)	2MN11-M	9PA44-4	NA
5LS1-4 (C or PG)	2MN1-M	9PA33-4	NA
6LS1-4 (C or PG)	2MN1-M	9PA46-4	6PA80-4
6LS2-4 (C or PG)	2MN1-M	9PA47-4	***
6LS3-4 (C or PG)	2MN1-M	9PA47-4	6PA102-4
8LS1-4 (C or PG)	2MN1-M	9PA58-4	NA
8LS3-4 (C or PG)	2MN1-M	9PA49-4	NA
8LS125-4 (C or PG)	2MN11-M	9PA54-4	NA
8LS152-4 (C or PG)	2MN1-M	9PA42-4	NA
11LS1-4 (C or PG)	8AS42-2B	9PA15-4	6PA78-4
11LS2-4 (C or PG)	8AS42-2B	9PA16-4	*
12LS1-4 (C or PG)	8AS42-2B	9PA32-4	NA
15LS1-4 (C or PG)	8AS42-2B	9PA33-4	NA

Note : Operating head includes lever where appropriate and internal plunger.

* Actuators shown on page 45 may be used.

** Because of low operating force 6PA43-4; 6PA71-4 or 6PA78-4 auxiliary actuators only are recommended for these listings.

*** Yoke lever actuators only.

Conduit Thread

"PG" specifies PG 13.5 thread e.g. 1LS1-4PG
"C" specifies 20 mm thread e.g 1LS1-4C

Replacement Parts

REPLACEMENT PARTS

Except where noted, all operating heads are furnished with actuators.

Catalog Listing	Contact Block Compact	Contact Block Plug-In	Operating Head	Actuator Only
1LS1-L	2MN1-L	2MN6	9PA15	6PA121
1LS1 201LS1	2MN1			
1LS2-L	2MN1-L	2MN6	9PA16†	Note 1
1LS2 201LS2	2MN1			
1LS3-L	2MN1-L	2MN6	9PA16†	LSZ52C
1LS3 201LS3	2MN1			
1LS6 201LS6	2MN1	2MN6	9PA50	6PA121
1LS9 201LS9	2MN8	2MN13	9PA16†	Note 1
1LS10-L	2MN1-L	2MN6	9PA40	6PA43
1LS10 201LS10	2MN1			
1LS19 201LS19	2MN8	2MN13	9PA15	6PA121
1LS23 201LS23	2MN1	2MN6	9PA68†	Note 2
1LS47 201LS47	2MN8	2MN13	9PA40	6PA43
1LS53 201LS51	2MN8	2MN13	9PA48	6PA43
201LS56	2MN8	2MN13	9PA74†	Note 2
1LS53	2MN8	—	9PA16†	LSZ52C
1LS131	2MN8	—	9PA50	6PA121
1LS501 201LS501	2MN1	2MN14	9PA15	6PA121

Catalog Listing	Contact Block Compact	Contact Block Plug-In	Operating Head	Actuator Only
2LS1-L	2MN1-L	2MN6	9PA32	None
2LS1 202LS1	2MN1			
2LS111 202LS111	2MN3	2MN7	9PA71	None
3LS1 203LS1	2MN11	2MN9	9PA45	None
4LS1 204LS1	2MN11	2MN9	9PA44	None
5LS1-L	2MN1-L	2MN6	9PA33	None
5LS1 205LS1	2MN1			
6LS1 206LS1	2MN1	2MN6	9PA46	6PA80
6LS2-L	2MN1-L	2MN6	9PA47†	Note 3
6LS2 206LS2	2MN1			
6LS3	2MN1	—	9PA47†	6PA102
7LS1	2MN1	—	9PA15	6PA121
8LS1-L	2MN11-L	2MN9	9PA58	None
8LS1 208LS1	2MN11			
8LS3 208LS3	2MN1	2MN6	9PA49	None
8LS125 208LS125	2MN11	2MN9	9PA54	None
8LS152 208LS152	2MN1	2MN6	9PA42	None

†Furnished without actuator
Note 1—Any auxiliary actuator shown can be used with these listings.
Note 2—6PA43 6PA53 6PA71 or 6PA121 auxiliary actuators only are recommended for these listings.
Note 3—Yoke lever actuators normally used

CONDUIT SEALING PACKETS

Packet	Cable O.D. Inches
2PA6	.400"-.435"
2PA16	.435"-.470"
2PA1	.530"-.570"

(See page A49 for description)

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363A0033

TUBE PLUG GRAPPLE

TUBE PLUG GRAPPLE JAWS FULLY OPEN (X) LIMIT SWITCH
362P0557/171 HONEYWELL SL1-E

TUBE PLUG GRAPPLE JAWS FULLY CLOSED (X) LIMIT SWITCH
362P0557/171 HONEYWELL SL1-E

TUBE PLUG GRAPPLE JAWS LOCKED (X) LIMIT SWITCH
362P0557/171 HONEYWELL SL1-H

TUBE PLUG GRAPPLE SUPPORTED (X) LIMIT SWITCH
362P0557/170 HONEYWELL SL1-H

TUBE PLUG GRAPPLE ACTUATOR MOTOR WITH END OF TRAVEL LIMIT SWITCHES
363P0557/52 RAWL,40,110V,60Hz 110v 1ph 60Hz 4VA

TUBE PLUG GRAPPLE ACTUATOR ASSEMBLY (PART)

TUBE PLUG HOIST

TUBE PLUG HOIST FULLY RAISED (X) LIMIT SWITCH
362P0557/62 HONEYWELL 1LS19-4C

CONTINUED FROM SHEET 3

CONTINUED ON SHEET 6

CONTINUED ON SHEET 7

TO EDERER INTERLOCK CUBICLE (X) VIA TURRET ROTATE FESTOON SEE ELEMENTARY ED-33056 SHTS. 15A, 17 & 17A

FCR-039 2/19/99

MHM-FCR-006 12/10/98

MHM-FCR-034 2/19/99

FCR-006 12/10/98

MCC#15

BLOCK INTERCONNECTION DIAGRAM - 363A0029 SHT. 4

THIS DRAWING IS ONLY AN APPROVED COPY IF SIGNED.

U.S.DEPARTMENT OF ENERGY
WESTINGHOUSE HANFORD COMPANY
MDK-SDX-452656
WHC-S-0468

H-2-827169

GEC ALSTHOM ENGINEERING SYSTEMS LTD
Whetstone, Leicester, LE8 6LH, England

HANDLING M/C
WIRING DIAGRAM
TUBE PLUG HOIST

363A0033

Dedication Test Plan – IST-LS-1 Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-011-TP-011B
Test Specimen: Honeywell 1LS19-4C Limit Switch, Eqmt. No.: LFPHFRY Page 1 of 7

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI Eng	DA	QA Post Review*
						3/13/00 NO CHANGES

* QA Post Review of Individual Revisions is allowed

ORIGINAL

In-Situ Test Procedure

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) Craig Swenson Date: 3/1/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Bellhaven	Michael Cram	MRC
Electrician	J W EBERHART	PCE	J W Eberhart	JWE
Electrician Quality Control	Stephen R. Conley	PCE	Stephen R Conley	SRC
Design Authority Representative	LARRY W. FRKE	KWEST		JWP
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Power Supply capable of 10 amps @ 120 VAC
Megger Instrument capable of 1000 VDC Test Voltage
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type:	HP3457	I.D.:	BAT123	Calib. Due date:	7-29-00
Test Instrument type:	HP3457	I.D.:	BAT124	Calib. Due date:	7-30-00
Test Instrument type:	AVO BM 869/2	I.D.:	6410-889 000100/5345	Calib. Due date:	2-9-01
Test Instrument type:	FLUKE 787	I.D.:	BAT 107	Calib. Due date:	5-25-00
Test Instrument type:	PROTO TORQUE SCREWDRIVER	I.D.:	0295/009/2	Calib. Due date:	1-14-2001

ORIGINAL

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE:

For this In-Situ Test, certain leads must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of leads..

1.0 Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	LFPHFRY	**LFPHFRY**	Acc.
Manufacturer:	HONEYWELL	**Honeywell**	Acc.
Model:	1LS19-4C	**1LS19-4C**	Acc.
Actuator:	YES	**Side mounted, rotary w/ nominal 1.5 inch radius, metallic arm w/roller**	Acc.
Serial No./Lot No./Date Code:	N/A	**N/A**	

2.0 Perform the following testing steps:

2.1 Record: Date /Time of Test Beginning: 2:10 p.m 3-2-00

Record: Room Temperature: 68 °F. Room Barometric Pressure: N/A mmHg.

2.2 Mechanical Operation

2.2.1 Cycle the switch actuator full stroke 5 or more times to confirm contacts open and close with smooth operation and free release of spring.

2.2.2 Record the following data.

Description	Record Voltage Drop	Acceptance Criteria	Comments/Deviations
No of Cycles:	6	**> 5 times**	Acc.
Describe Operation:	YES	**Contacts open and close with smooth operation.**	Acc
Describe release of Spring:	YES	**Free release of spring.**	Acc

2.3 Contact Rating Test

2.3.1 Setup the test equipment and Limit Switch specimen for contact rating testing. Attach a sketch of test circuit with all test instrumentation used.

2.3.2 At limit switch LFPHFRY, lift leads on Common terminal, Normally Closed terminal and Normally Open terminal. Record on the lifted lead log.

2.3.3 Connect the power supply to terminals Common and Normally Closed.

2.3.4 Apply a nominal 10 amps, resistive, across the normally closed contacts of the test specimen.

Caution: Do not change state of contacts while energized.

2.3.5 Record the following data.

Description	Record Voltage Drop	Acceptance Criteria	Comments/Deviations
Contact Circuit (Terminals COM-NC)	.02 vAC	**< 0.5 Volts AC drop**	Acc
	.02 vAC		

2.3.6 Reduce the current source to zero amps.

2.3.7 Disconnect the power supply from terminals Common and Normally Closed.

2.3.8 Manually adjust the limit switch actuator to close the normally open contacts.

2.3.9 Connect the power supply to terminals Common and Normally Open.

2.3.10 Apply a nominal 10 amps, resistive, across the closed normally open contacts of the test specimen.

2.3.11 Record the following data.

Description	Record Voltage Drop	Acceptance Criteria	Comments/Deviations
Contact Circuit (Terminals COM-Closed NO Contact):	.02 vAC	**< 0.5 Volts AC drop**	Acc

2.3.12 Reduce the current source to zero amps and remove the power supply from terminals Common and Normally Open.

2.3.13 Manually adjust the limit switch actuator to close the normally closed contacts.

2.4 Insulation Resistance Test

2.4.1 Setup the test equipment and Limit Switch specimen for insulation resistance testing.

2.4.2 Apply a nominal 1000 VDC via Megger device between non-continuity terminals Common and Normally Open and then between terminal Normally Open and ground. Record the resistances.

2.4.3 Remove the Megger device.

2.4.4 Manually adjust the limit switch actuator to open the normally closed (NC) contacts.

2.4.5 Apply a nominal 1000 VDC via Megger device between non-continuity terminals Common and open Normally Closed and then between terminal Normally Closed and ground. Record the resistances.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Resistance	Acceptance Criteria	Comments/Deviations
Common	**NO**	5.6Gohm	**> 10 Megohms**	Acc.
NO	**Ground**	6.5Gohm	**> 10 Megohms**	Acc.
Common	**open NC***	5.3Gohm	**> 10 Megohms**	Acc.
Open NC	**Ground***	5.5Gohm	**> 10 Megohms**	Acc.

* Normally closed contacts are open.

2.4.6 De-energize and remove the test equipment.

2.5 Terminate the test.

2.5.1 Reland the lifted leads and verify reland in accordance with the Lifted Lead Log.

2.5.2 Retorque the terminals to 7-9 in-pounds.

2.5.3 Record: Date /Time of Test End: 3:00 PM 3-2-00

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Dedication Test Plan – IST-LS-1	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-011-TP-011B	
Test Specimen: Honeywell 1LS19-4C Limit Switch, Eqmt. No.: LFPHFRY	Page 67 of 67

Summary of Results (Continued):

Component meets all of this test plan requirements.

M. Cram 3-02-00

Notes:

Certified Instrumentation Technician (signature) Michael Cram Date: 3-02-00

Reviewed by. gfe 3/2/00

Completed Test Evaluation Approval:

Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) [signature] Date: 3/2/00

QA/QC (signature) [signature] Date: 3/13/00

T Z ANDERSON

LIFTED LEAD LOG

Junction Box: JB19X

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
363A0033	5	101Y	LFPHFRY	C	JWE	3/2/00	SRL	3-2-00	JWE	3/2/00	SRL	3-2-00
363A0033	5	1591Y	LFPHFRY	NC	JWE	3/2/00	SRL	3-2-00	JWE	3/2/00	SRL	3-2-00
363A0033	5	1521Y	LFPHFRY	NO	JWE	3/2/00	SRL	3-2-00	JWE	3/2/00	SRL	3-2-00

Remarks:

Compact Limit Switches

FEATURES

- Mode of operation is field adjustable.
- NEMA 1, 3, 4, 6 and 13.
- [illegible]de choice of heads and actuators.
- [illegible]iety of operating characteristics.
- Optional indicator light.
- Captive screws.
- UL Recognized, file #E12252
- CSA Certified, file #LR57325

FIELD ADJUSTABLE

Rotary motion roller lever and rod actuators are adjustable through 360°. They may be set for operation clockwise, counter-clockwise, or in both directions.

Operating heads may be positioned in any of four 90° positions.

UL/CSA LS SWITCHES

Several UL recognized and CSA certified LS compact limit switches are in the order guides.

Other listings can be furnished in the UL version. Contact the 800 number for information.

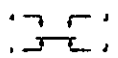
For rapid response – off the shelf service, all bold face listings are normally stocked items.

Compact LS and plug-in 200LS limit switches have a long record of successful performance in industrial applications.

The LS fits in many places too small for any other fully adjustable limit switch.

The 200LS switches are the original plug-in concept for reducing downtime by making changeover simple and fast.

CIRCUITRY



Two-circuit
Double-break

ELECTRICAL RATINGS

A	10 amps, 120, 240 or 480 VAC; ½ hp, 120 VAC; ¾ hp, 240 VAC; 0.8 amp, 115 VDC**; 0.4 amp, 230 VDC;** 0.1 amp, 550 VDC;** Pilot Duty, 600 VAC max.	**APPLICATION NOTE:** Silver Cadmium Oxide Contacts – Designed for use with inductive loads such as relays, contactors, motors and solenoids. Honeywell MICRO SWITCH does *not* recommend the use of silver cadmium oxide switch contacts in non-arcing loads. Non-arcing loads are generally loads less than 12 volts and/or 0.5 amp.
B	10 amps, 120, 240 or 480 VAC; ¼ hp, 120 VAC; ½ hp, 240 VAC. Pilot Duty, 600 VAC max.	
C	10 amps, 120 VAC; ½ hp, 120 VAC.	
D	10 amps, 120, 240, 480 VAC; ¼ hp, 120 VAC; ½ hp, 240 VAC; 0.8 amp, 115 VDC**; 0.4 amp, 230 VDC**; 0.1 amp, 550 VDC**; Pilot Duty, 600 VAC max.	
E	10 amps, 120, 240 or 480 VAC; ½ hp, 120 VAC; ¾ hp, 240 VAC. Pilot Duty, 600 VAC max.	
F	UL Rating: 10 amps, 125, 250, or 480 VAC; ½ hp, 125 VAC; ¾ hp, 250 VAC; 0.8 amp, 125 VDC**; 0.4 amp, 250 VDC**	Fine Silver Contacts
G	UL Rating: 10 amps, 125, 250 or 480 VAC; ¼ hp, 125 VAC; ½ hp, 250 VAC; 0.8 amp, 125 VDC**; 0.4 amp, 250 VDC**	

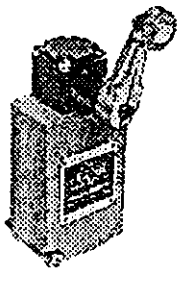
** Resistive Rating

NOTE: The terminals of two-circuit double-break switches must be wired to equal voltage sources and the same polarity. The loads should be on the same side of the line.

ROLLER LEVER ROTARY ACTUATED SWITCHES

(To order switches and levers separately, refer to pages A73 and A74 or A37 and A38.)

Compact



Plug-in*

ORDER GUIDE

Momentary action. Steel rollers.

Description	Rating	Catalog Listing Compact	Catalog Listing Plug-in	O.F. max.	P.T. max.	O.T. min.	D.T. max.
Standard	A	1LS1	201LS1*	13,3 N 3 lb.	20°	30°	12°
20° Pretravel UL/CSA	F	1LS1-L	—	13,3 N 3 lb.	20°	30°	12°
Low Pretravel 5°	B	1LS19	201LS19*	13,3 N 3 lb.	5°	30°	4°
Low Operating Force 5° Pretravel	B	1LS131	—	5,0 N 18 oz.	5°	30°	4°
Standard with indicator light 120 VAC only	C	1LS501	201LS501*	13,3 N 3 lb.	20°	30°	12°
Low Operating Force	A	1LS6	201LS6*	5,0 N 18 oz.	20°	30°	12°
Cavity Mount version of 1LS1	A	7LS1	—	13,3 N 3 lb.	20°	30°	12°

*Require Terminal Block (18PA1 for 200LS switches) which must be ordered separately. Unless damaged, it is not necessary to replace terminal block when replacing switch.

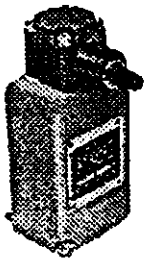
Characteristics: O.F. — Operating Force; P.T. — Pretravel; O.T. — Overtravel; D.T. — Differential Travel.

Compact Limit Switches

ROTARY ACTUATED SWITCHES — WITHOUT LEVERS

The following compact LS and plug-in 200LS limit switches are sold without actuators. Levers are ordered separately [illegible] the order guide below and on the facing page.

Plug-In*



Compact

ORDER GUIDE

Momentary action, except where noted.

Description	Electrical Rating Page A70	Catalog Listing Compact	Catalog Listing Plug-in	O.Tq. max.	P.T. max.	O.T. min.	D.T. max.
Standard 20° pretravel	A	1LS2	201LS2*	0,51 Nm 4.5 in. lb.	20°	30°	12°
UL/CSA	F	1LS2-L	—	0,51 Nm 4.5 in. lb.	20°	30°	12°
Low pretravel 5°	B	1LS9	201LS9*	0,51 Nm 4.5 in. lb	5°	30°	4°
Standard pretravel 20° Low operating force	A	1LS23	201LS23*	0,21 Nm 30 in. oz.	20°	30°	12°
Low pretravel 5° Low operating force	B	1LS56	201LS56*	0,11 Nm 15 in. oz.	5°	30°	4°
Maintained Contact	A	6LS2	206LS2*	0,34 Nm 3 in. lb.	55°	35°	20°
UL/CSA	F	6LS2-L	—	0,34 Nm 3 in. lb.	55°	35°	20°

* Require Terminal Block (18PA1 for 200LS Switches).

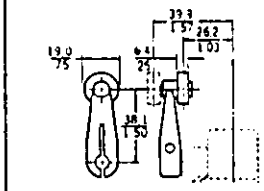
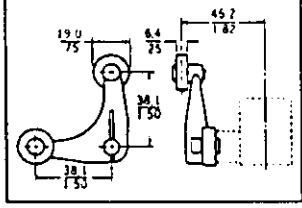
Note 1 — Yoke lever actuators normally used

Characteristics:
O.Tq. — Operating Torque; P.T. — Pretravel; O.T. — Overtravel; D.T. — Differential Travel

Limit/Enclosed

AUXILIARY ROTARY LEVERS

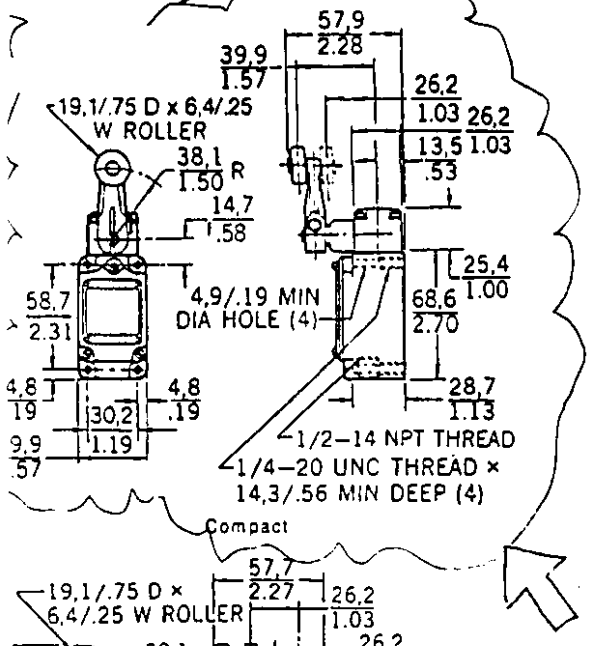
ORDER GUIDE

	Type	Catalog Listing	
	Roller arm, with nylon, steel, or ball bearing roller.	Nylon	6PA71
		Steel	6PA121
		Ball bearing	6PA144
	Yoke roller lever with nylon or steel rollers.	Steel	6PA80
	Rollers on same side.	Steel	6PA82
		Nylon	6PA102

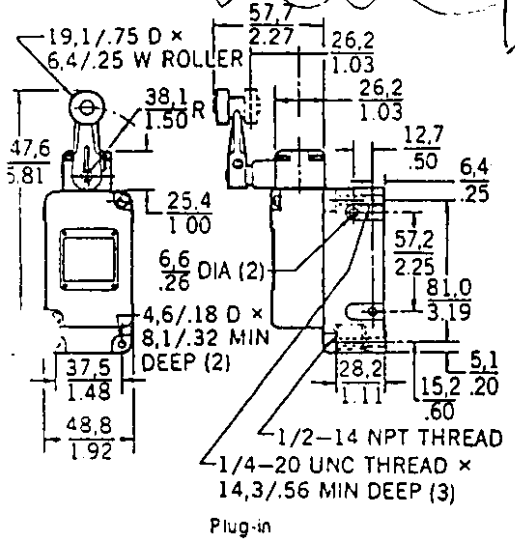
60mm radius levers Part # PA-J11

Mounting Dimensions (For reference only)

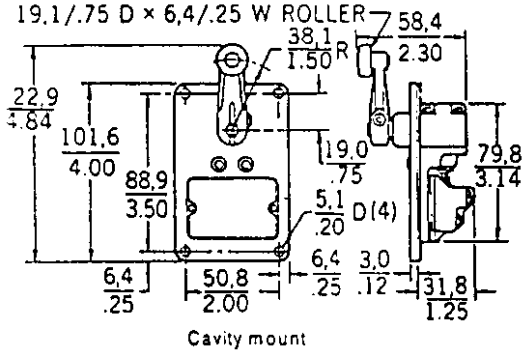
ROLLER LEVER



Compact

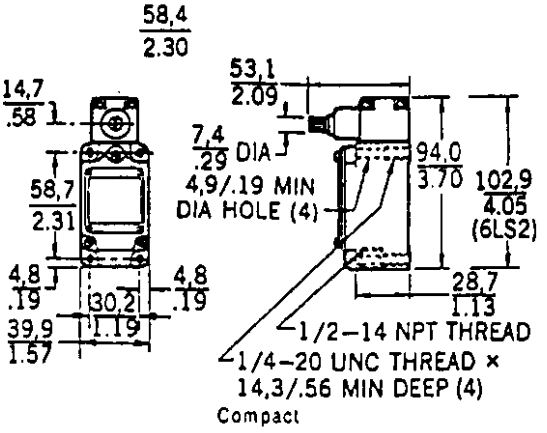


Plug-in

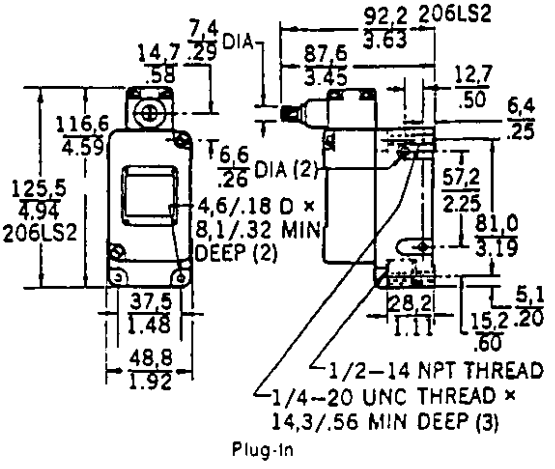


Cavity mount

SWITCH WITHOUT LEVER



Compact



Plug-in

362P0826 ITEM 126
Page 6-82

Basic switches

LS-series listings have 2-circuit, double break precision basic switches as standard. These are fitted with keyed washers to facilitate wiring and obviate wrap-round. Step design and use of barriers provides ample over-surface dielectric spacing. Basic switches can be replaced easily without special tools.

4-circuit double break basic switch versions are available in LS switches with roller-lever, plunger and roller-plunger. This basic has solder terminals.

Basic switch listings for respective compact LS types are listed below.

Compact LS	Basic Switch	Operating Head	Actuator Only
1LS1-4 (C or PG)	2MN1-M	9PA15-4	6PA78-4
1LS2-4 (C or PG)	2MN1-M	9PA16-4	*
1LS-4 (C or PG)	2MN1-M	9PA16-4	6PA44-4
1LS10-4 (C or PG)	2MN1-M	9PA40-4	6PA43-4
1LS19-4 (C or PG)	2MN8-M	9PA15-4	6PA78-4
1LS23-4 (C or PG)	2MN1-M	–	–
1LS47-4 (C or PG)	2MN8-M	9PA40-4	6PA43-4
1LS56-4 (C or PG)	2MN8-M	9PA74-4	**
1LS243-4 (C or PG)	2MN24	914PA15	6PA78-4
1LS244-4 (C or PG)	2MN24	914PA15	6PA78-4
2LS1-4 (C or PG)	2MN1-M	9PA32-4	NA
3LS1-4 (C or PG)	2MN11-M	9PA45-4	NA
4LS1-4 (C or PG)	2MN11-M	9PA44-4	NA
5LS1-4 (C or PG)	2MN1-M	9PA33-4	NA
6LS1-4 (C or PG)	2MN1-M	9PA46-4	6PA80-4
6LS2-4 (C or PG)	2MN1-M	9PA47-4	***
6LS3-4 (C or PG)	2MN1-M	9PA47-4	6PA102-4
8LS1-4 (C or PG)	2MN1-M	9PA58-4	NA
8LS3-4 (C or PG)	2MN1-M	9PA49-4	NA
8LS125-4 (C or PG)	2MN11-M	9PA54-4	NA
8LS152-4 (C or PG)	2MN1-M	9PA42-4	NA
11LS1-4 (C or PG)	8AS42-2B	9PA15-4	6PA78-4
11LS2-4 (C or PG)	8AS42-2B	9PA16-4	*
12LS1-4 (C or PG)	8AS42-2B	9PA32-4	NA
15LS1-4 (C or PG)	8AS42-2B	9PA33-4	NA

Note : Operating head includes lever where appropriate and internal plunger.

* Actuators shown on page 45 may be used.

** Because of low operating force 6PA43-4; 6PA71-4 or 6PA78-4 auxiliary actuators only are recommended for these listings.

*** Yoke lever actuators only.

Conduit Thread

"PG" specifies PG 13.5 thread e.g. 1LS1-4PG
"C" specifies 20 mm thread e.g. 1LS1-4C

...eplacement Parts

EPLACEMENT PARTS

xcept where noted, all operating heads are furnished with actuators.

...log ...sting	Contact Block Compact	Contact Block Plug-In	Operating Head	Actuator Only
LS1-L	2MN1-L	2MN6	9PA15	6PA121
LS1 01LS1	2MN1			
LS2-L	2MN1-L	2MN6	9PA16†	Note 1
LS2 01LS2	2MN1			
LS3-L	2MN1-L	2MN6	9PA16†	LSZ52C
LS3 01LS3	2MN1			
LS6 01LS6	2MN1	2MN6	9PA50	6PA121
LS9 01LS9	2MN8	2MN13	9PA16†	Note 1
LS10-L	2MN1-L	2MN6	9PA40	6PA43
LS10 01LS10	2MN1			
LS19 01LS19	2MN8	2MN13	9PA15	6PA121
LS23 01LS23	2MN1	2MN6	9PA68†	Note 2
LS47 01LS47	2MN8	2MN13	9PA40	6PA43
LS53 951	2MN8	2MN13	9PA48	6PA43
6 01LS56	2MN8	2MN13	9PA74†	Note 2
LS58	2MN8	—	9PA16†	LSZ52C
LS131	2MN8	—	9PA50	6PA121
LS501 01LS501	2MN1	2MN14	9PA15	6PA121

Catalog Listing	Contact Block Compact	Contact Block Plug-In	Operating Head	Actuator Only
2LS1-L	2MN1-L	2MN6	9PA32	None
2LS1 202LS1	2MN1			
2LS111 202LS111	2MN3	2MN7	9PA71	None
3LS1 203LS1	2MN11	2MN9	9PA45	None
4LS1 204LS1	2MN11	2MN9	9PA44	None
5LS1-L	2MN1-L	2MN6	9PA33	None
5LS1 205LS1	2MN1			
6LS1 206LS1	2MN1	2MN6	9PA46	6PA80
6LS2-L	2MN1-L	2MN6	9PA47†	Note 3
6LS2 206LS2	2MN1			
6LS3	2MN1	—	9PA47†	6PA102
7LS1	2MN1	—	9PA15	6PA121
8LS1-L	2MN11-L	2MN9	9PA58	None
8LS1 208LS1	2MN11			
8LS3 208LS3	2MN1	2MN6	9PA49	None
8LS125 208LS125	2MN11	2MN9	9PA54	None
8LS152 208LS152	2MN1	2MN6	9PA42	None

'urnished without actuator.
ote 1—Any auxiliary actuator shown can be used with these listings.
ote 2—6PA43, 6PA53, 6PA71 or 6PA121 auxiliary actuators only are commended for these listings.
ote 3—Yoke lever actuators normally used.

ONDUIT SEALING PACKETS

'acket	Cable O.D. Inches
PA6	.400"-.435"
PA16	.435"-.470"
PA1	.530"-.570"

ee page A49 for description)

Limit/Enclosed

363A0033 Sheet 5

FOR NOTES SEE SHT 1

TUBE PLUG GRAPPLE

TUBE PLUG GRAPPLE JAWS FULLY OPEN (Y) LIMIT SWITCH
362P0557/171 HONEYWELL SL1-E

TUBE PLUG GRAPPLE JAWS FULLY CLOSED (Y) LIMIT SWITCH
362P0557/171 HONEYWELL SL1-E

TUBE PLUG GRAPPLE JAWS LOCKED (Y) LIMIT SWITCH
362P0557/171 HONEYWELL SL1-H

TUBE PLUG GRAPPLE SUPPORTED (Y) LIMIT SWITCH
362P0557/170 HONEYWELL SL1-H

362P0557/138

C130Y P 9Y S

LFPGOY LFPGCY LFPGLY LFPGSY SPARE

C27Y

JB10Y (2) SEE 363A0034

TUBE PLUG GRAPPLE ACTUATOR ASSEMBLY (PART)

TUBE PLUG HOIST

TUBE PLUG HOIST FULLY RAISED (Y) LIMIT SWITCH
362P0557/62 HONEYWELL 1LS19-4C

LFPHFRY

C28Y

CONTINUED FROM SHEET 3

C10Y

JB20Y

CABLE 8Y2 11 CORE + GROUND (EDERER)

TO EDERER INTERLOCK CUBICLE (Y) VIA TURRET ROTATE FESTOON SEE ELEMENTARY ED-33056 SHTS. 15A, 17 & 17A

CONTINUED ON SHEET 8

CONTINUED ON SHEET 6

U.S.DEPARTMENT OF ENERGY
WESTINGHOUSE HANFORD COMPANY
MDK-SDX-452856
WHC-S-0468

H-2-827169

GEC ALSTHOM ENGINEERING SYSTEMS LTD
Whetstone, Leicester. LE8 6LH. England

4683 HANFORD

HANDLING M/C
WIRING DIAGRAM
TUBE PLUG GRAPPLE

363A0033 Sheet 5 A

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Commercial Grade Item Upgrade Dedication Form

Rev. No. 1

ECN No. N/A CGI No. CGI-SNF-D-MHM-009

Title: **P-21 – CCS Industrial Pressure Switch 604G3**

Section 1 Part Information

Item No.: **N/A**	Manufacturer: **N/A**	Supplier: **N/A**
Mfg. Part/Model No.: **N/A**	Supplier's P/N: **N/A**	

ORIGINAL

Part Description: **N/A**

End Use Description: **N/A**

Section 2a Component Information

Equipment No.: **PLSTSC1AX, PSLTSC2AY, PSLTSC2AX, PSLTSC2AY**	Specification No.: **Ederer F-2566, Foster Wheeler MJX-SDX 452656**	Manufacturer: **CCS Industrial**	Past P.O. No.: **N/A**
Manufacturer's Part/Model No.: **604G3**	Equipment Supplier (if different from manufacturer): **ALSTOM, Foster Wheeler/Johnson Industries Ltd.**		Equip. Supplier's Part No.: **N/A**

Component Description:

SPDT pressure switches for Interlock P-21, located inside the seismic clamps, to measure bridge seismic clamps not fully applied, inhibits turret rotation, base and turret locking pins disengaging, lowering of shield skirt, and MCO and tube plug hoist operation.

Section 2b Commercial Availability of the Item

1.. Is the Item available from a catalogue from a qualified NQA1 supplier or ISO 9000 supplier (coordinate with project CGI interface Engineer or BTR)? [ ] YES (go to #2 below) [X] NO (go to procedure step 6.3.2, proceed to dedicate Item)

If not available from a qualified NQA1 supplier, is it available from an ISO 9000 supplier? (coordinate w/ project CGI Interface Engineer or BTR) [ ] YES (go to #2 below, procedure step 6.3.2, dedicate Item) [X] NO (procedure step 6.3.2, dedicate Item)

2. List of Candidate qualified suppliers or ISO 9000 suppliers **N/A**

3. Recommended Procurement Strategy (coordinate with project CGI interface Engineer or BTR): **N/A**

Section 2c CGI Determination

CGI Determination Questions:

#1: Is the Item subject to design or specification requirements that are unique to nuclear facilities or activities?

[ ] YES (the Item is not commercial grade) [X] NO (continue)

#2: Is the Item used in applications other than nuclear facilities or activities?

[ ] NO (the item is not commercial grade) [X] YES (continue)

#3: Is the Item ordered from manufacturer/supplier on the basis of specifications set forth in the manufacturer's catalog?

[ ] NO (the item is not commercial grade) [X] YES (continue)

[X] All three criteria have been satisfied. The Item meets the definition of commercial grade.

Commercial Grade Item Upgrade Dedication Form

ECN No. N/A CGI No. CGI-SNF-D-MHM-009	Rev. No. 1
Title: **P-21 – CCS Industrial Pressure Switch 604G3**	Page 2 of 8

Section 2d Reason for Dedication The above described Item is being Dedicated for use in the application cited for the following reason(s):	
	Item is being purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Class application.
	Item is being purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Significant application.
(X)	Item was purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Class application.
X	Item was purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Significant application.
	Other ('like-for-like', similar, substitution, replacement evaluation)

Section 3 Failure Effects Evaluation

A. Part/Component Safety Function:

1. **Interlock P-21 inhibits turret rotation, base and turret locking pins disengagement, shield skirt lowering, and hoists operation if the bridge seismic clamps are not fully applied. Prevent MCO shear from lateral movement of the MHM.**

2.

B. Part/Component Functional Mode:

Safety Function #1: [X] Active [ ] Passive

Safety Function #2: [ ] Active [ ] Passive

Safety Function #3: [ ] Active [ ] Passive

Active - Mechanical or Electrical change of state is required to occur for the component to perform its safety function

Passive – Change of state is not required for the component to perform its safety function

C. Host Component Safety Function (if applicable): **N/A**

1.

D. Failure Mode(s) and the effects on component or system safety function (see Worksheet 1):

1. **Failure of pressure switch contacts to open upon demand results in potential override of interlock channel.**

Section 4 Environmental & Natural Phenomena Hazard Design

Environmental Qualification Required:

Yes [ ]

No [X]

If yes: Environmental Qualification Requirements

Limiting Environmental Conditions:

Required Safety Functions:

Qualification Period:

Natural Phenomena Hazard (NPH) Design Required:

Yes [ ]

No [X]

If yes: NPH Design Requirements

Performance Category:

NPH Design Req'ts.:

Required Safety Functions:

Section 5 Component Functional Classification

Safety Class (SC)		General Service	X	Safety Significant (SS)

If part/component classification is different from host component/system, document basis. **N/A**

Sections 6 and 7 (Reserved)

Section 8 References (for Functional Classification)

National Codes/Standards: **N/A**

Safety Analysis Report (SAR): **HNF-3672 Rev. 0**

Drawings: **Ederer, Inc. EB-33056, Sheet 35, Hanford H-2-827174, Sheets 4, 9, 14, 15, 19, 23.**

Vendor Manual/Manufacturer/Supplier Information: **CCS Industrial series 604G, 604P, 604V Vendor Sheet.**

Other: **ALSTROM ESL/R (96) 065-Rev. D, 100% Design Submittal, June 1998.**

Commercial Grade Item Upgrade Dedication Form

Rev. No. 1

ECN No. N/A CGI No. CGI-SNF-D-MHM-009

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Title. P-21 – CCS Industrial Pressure Switch 604G3

Section 9 Critical Characteristics				
Critical Characteristics	Acceptance Criteria/Tolerances	Acceptance Method	ID	Function
1. Item Identification Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
Manufacturer	**CCS Industrial**	**1, IN**	**X**	
Model	**604G3**	**1, IN**	**X**	
2. Physical Critical Characteristics (for reasonable assurance that the Item delivered is the Item specified)				
Pressure Port	**Nominal ¼"**	**1, IN**	**X**	
3 Performance Critical Characteristics (for reasonable assurance that the Item will perform its intended safety function(s))				
Contact rating	**Nominal 15 amps, resistive, @ 120 VAC less than 0.5 V drop across contacts.**	**1, T**		**X**
Insulation Resistance	**Greater than 10 megohms resistance, terminal to terminal and terminal to ground at 1000V.**	**1, T**		**X**
Mechanical Operation	**Cycle pressure – confirm switch contacts open and close at set points with a nominal deadband of 20 psi and with smooth operation and free release of spring.**	**1, T**		**X**
Pressure Test	**No leakage at ~~400~~ 1800 psi (e.g. no bubbles if tested with a gas)** 1800 CGS 1/12/00	**1, T**		**X**

4. Notes and Legend:

The non-metallic polymide Buna N, viton, and ethylene propylene parts are not susceptible to degradation or aging at the CSB environmental conditions.

Rev. 1: Page 3, 5, 6 & 7: Revised to "Contact Rating" only; General: new forms

Acceptance Method (Acc Meth):
1.Special Test and Inspection:
1, IN for Inspection
1,T for Test
2. Commercial Grade Survey
3. Source Verification
3. Vendor/Item History

Section 10 Initial Review and Approval

Approvals:

Designated Engineer: [signature]

Design Authority: DW [signature]

QA Engineer: [signature] 1/18/00 T K ANDERSON

WORKSHEET 1
DETERMINATION OF FAILURE MECHANISMS/MODES

Section 1

Typical Failure Mechanisms	Definition	X = Applicable to Component under Evaluation	
		X?	Indicate Failure Mode
Fracture	Separation of a solid accompanied by little or no macroscopic plastic deformation.		
Corrosion	The gradual deterioration of a material due to chemical or electrochemical reactions, such as oxidation, between the material and its environment.	X	**Switch contacts corrode closed and fail to open upon demand.**
Erosion	Destruction of materials by the abrasive action of moving fluids, usually accelerated by the presence of solid particles carried with the fluid.		
Open Circuit	An electrical circuit that is unintentionally broken so that there is no complete path for current flow.		
Short Circuit	An abnormal connection by which an electrical current is connected to ground, or to some conducting body, resulting in excessive current flow.	X	**Switch contacts fuse closed and fail to open upon demand.**
Blockage	Clogging of a filtering medium resulting in the inability to perform its purification function or blockage of flow.		
Seizure	Binding of a normally moving item through excessive pressure, temperature, friction, jamming.	X	**Switch mechanism jams and contacts fail to open upon demand.**
Unacceptable Vibration	Mechanical oscillations produced are beyond the defined permissible limits due to unbalancing, poor support, or rotation at critical speeds.		
Loss of Properties	A loss of mechanical and physical properties of a material due to exposure to high temperatures, radiation exposure.		
Excess Strain	Under the action of excessive external forces the material of the part has been deformed or distorted.		
Mechanical Creep	From prolonged exposure to high temperature and stress, the object will show a slow change in its physical (shape and dimension) and mechanical characteristics.		
Ductile Fracture	Fracture characterized by tearing of metal accompanied by appreciable gross plastic deformation.		

Section 2 Additional Failure Modes Applicable to the Component Under Evaluation

1. **Pressure switch contacts are closed to enable equipment movement. Contacts open for the interlock function to prevent lateral movement of the MHM. Any failure which prevents contacts to open inhibits the particular pressure switch interlock function.**
2. **Short circuit could give false signal to energize interlock function.**
3.

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ECN No. N/A CGI No. CGI-SNF-D-MHM-009	Page 5 of 8
Title: P-21 – CCS Industrial Pressure Switch 604G3	

CHECKLIST 1 - ACCEPTANCE METHOD 1 - SPECIAL TEST/INSPECTION VERIFICATION

SECTION 1

Item Description: **CCS Industrial Pressure Switches** System #: **MHM**	Equip #: **PSLTSC1AX, PSLTSC2AY, PSLTSC2AX, PSLTSC2AY** Model #: **604G3**
Manufacturer (Address/Phone): **CCS Industrial** **477 S.O.M. Center Rd.** **Mayfield Village, OH 44143** **(216)979-7378**	Supplier (Address/Phone): **Johnson Industries, Ltd.** **8500 River Road** **Richmond BC, Canada** **(604) 273-3737 V6X1Y4**

SECTION 2 CRITICAL CHARACTERISTICS TO BE VERIFIED BY METHOD 1.

Insp	Test	Post-Test		
X			1.	**Manufacturer**
X			2.	**Model**
X			3.	**Pressure Port**
	X		4.	**Contact Rating**
	X		5.	**Insulation Resistance**
	X		6.	**Mechanical Operation**
	X		7.	**Pressure Retention**

SECTION 3 BY INSPECTION * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)

Characteristic: **Manufacturer** Sample Size*: **100%**

Acceptance Criteria: **CCS Industrial**

Receipt Inspection Plan / Report #: TP009*

Characteristic: **Model** Sample Size*: **100%**

Acceptance Criteria: **604G3**

Receipt Inspection Plan / Report #: TP009*

Characteristic: **Pressure Port** Sample Size*: **100%**

Acceptance Criteria: **¼" Nominal**

Receipt Inspection Plan / Report #: TP009*

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Title. P-21 – CCS Industrial Pressure Switch 604G3	

SECTION 4 BY SPECIAL TEST * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)

Characteristic for Test: **Contact Rating** Samp Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **Nominal 15 amps, resistive, @ 120 VAC less than 0.5 V drop across contacts.**

Actual Test Value: SEE TP Test Plan and Report #: TP009*

Characteristic for Test: **Insulation Resistance** Samp Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **Greater than 10 megohms resistance, terminal to terminal and terminal to ground at 1000V.**

Actual Test Value: SEE TP Test Plan and Report #: TP009*

Characteristic for Test: **Mechanical Operation** Samp Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **Cycle pressure – confirm switch contacts open and close at set points with a nominal deadband of 20 psi and with smooth operation and free release of spring.**

Actual Test Value: SEE TP Test Plan and Report #: TP009*

Characteristic for Test: **Pressure Retention** Samp Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **No leakage at ~~400~~ 1800 psi (e.g. no bubbles if tested with a gas)**

Actual Test Value: SEE TP Test Plan and Report #: TP009*

*Full no. is: CGI-SNF-D-MHM-009-TP-009

Section 5 Test / Inspection Summary (Acceptance Method 1)

1. SUMMARY OF VERIFIED CRITICAL CHARACTERISTICS, THEIR VERIFICATION METHODS, AND RESULTS

ITEM DESCRIPTION:

Critical Characteristics				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/N	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
Manufacturer	CCS Industrial	X		1, IN	TP-009*	N/A	2	0	XWEST	Larry W. Peice	4/10/00
Model	604G3	X		1, IN							
Pressure Port	Nominal ¼"	X		1, IN							
Contact Rating	Nominal 15 amps, resistive, @ 120 VAC less than 0.5 V drop across contacts.		X	1, T							
Insulation Resistance	Greater than 10 megohms resistance, terminal to terminal and terminal to ground at 1000V.		X	1, T							
Mechanical Operation	Cycle pressure – confirm switch contacts open and close at set points with a nominal deadband of 20 psi and with smooth operation and free release of spring.		X	1, T							
Pressure Retention	No leakage at ~~400~~ 1000 psi (e.g. no bubbles if tested with a gas)		X	1, T							

2. DISPOSITION OF UNVERIFIED OR FAILED CRITICAL CHARACTERISTICS

Critical Characteristic	Disposition

3. SIGNATURE INDICATES ALL CRITICAL CHARACTERISTICS VERIFIED SATISFACTORY OR ACCEPTABLY DISPOSITIONED AND COMMERCIAL GRADE DEDICATION IS SATISFACTORY AND COMPLETE.

See Test Plan TP-009 cited above. CES

Testing Agency Approval: NR-CES 4/12/00 Date 4/12/00

Testing Agency QA Engineer: NR - CES 4/12/00 Date

BUYER VERIFICATION

CES

Design Authority: Larry Pierce Date 4/12/00

QA Engineer: Date

Commercial Grade Item Upgrade Dedication Form

ECN No. **N/A** CGI No. **CGI-SNF-D-MHM-009**	Rev. No. 1
Title **P-21 – CCS Industrial Pressure Switch 604G3**	Page 8 of 8

Section 6 Contacts/Phone Numbers		
	Name	Phone
Design Authority		
QA		
QC		
Cog - Engineer		
CGI Engineer		
Procurement Engineer		
Other		

Section 7 Supporting Documentation for this Checklist		
Initial Procurement Documents		**For Critical Characteristics**
	Drawings:	
	Manuals (specify type & number):	
	Design Calculations	
	Installation Instructions	
	Operation Instructions	
	Calibration Instructions	
	Manufacturer's Recommended Spare Parts List	
X	**Other: CCS Industrial Series 604G, 604P, 604V Vendor Sheet**	**All**
Procurement Documents		**For Critical Characteristics**
	Certificate of Conformance/Compliance	
	Seismic Qualification Certificate	
	Environmental Qualification Certificate	
	Test Report (s):	
	Inspection Report (s):	
	CMTRs for ASME Pressure Retaining Materials	
	Valve Seat Leakage Report	
	Weld Records	
	Material Traceability Record	
X	**Other: SU Test SNF-CTP-IC-07**	

Dedication Test Plan – PS-1 Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-009-TP-009
Test Specimen: CCS Industrial Pressure Switch Page 1 of 4

Test Procedure Approval (Obtain prior to testing):
This test procedure adequately tests the critical characteristics of the test specimen upon acceptable completion of the testing.

Design Authority (signature) YMP Craig Swenson Date: 1/31/00

ORIGINAL

RECOMMENDED EQUIPMENT:
Power Supply capable of 15 amps @ 125 VAC
Megger Instrument capable of 1000 VDC Test Voltage
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Helium supply
Pressure regulator – helium supply to 1800+ psig
Peak Pressure indicator 0-2000+ psig
Set Point Pressure indicator 0-50 psig
Test jig to mount Pressure Switch vertically with port at bottom of switch
Personnel protection panel
Snoop or equivalent
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) serial numbers and calibration due
Test Instrument type: HP 3457A I.D.: BAT-123 Calib. Due date 7-29-00.
Test Instrument type: HP 3457A I.D.: BAT-124 Calib. Due date 7-30-00.
Test Instrument type: AVO BM250/2 I.D.: 6410-889/ 00010015245 Calib. Due date 2-9-01.
Test Instrument type: Amprobe 93CA I.D.: BAT-042 Calib. Due date 1-13-02.
TRANSCAT DG-3 BAT-046 2-14-00

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE: (Note: use one set of sheets per test specimen)

Test Specimen Description: **Pressure Switch**

Record the following identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Manufacturer:	CCS	**CCS Industrial**	ACCEPT
Model:	604G3	**604G3**	ACCEPT
Pressure Port:	1/4 NPT	**¼" Nominal**	ACCEPT
Serial No.:	MARKED "A"	**N/A**	✓

ORIGINAL

Perform the following tests:

Record: Date /Time of Test Beginning: 2-14-00, 3:25 P

Record: Room Temperature: 68 °F. Room Barometric Pressure: ~6.1489 mmHg.

Perform steps below:

1. **Contact Rating Test**

Setup the Limit Switch specimen for contact rating testing. Attach a sketch of test circuit with all test instrumentation used.

VAC JMP 3/1/00 CES

Apply a nominal 15 amps, resistive, @ 125 VAC across the normally closed contacts of the test specimen.

Caution: Do not change state of contacts while energized.

JMP 2/9/00 CES

Description	Record Data	Acceptance Criteria	Comments/Deviations
Contact Circuit #1 (Terminals COM-NC):	JMP 2/22/00 [redacted] VAC .107	**<0.5 ~~±10%~~ Volts AC drop**	ACCEPT

VAC JMP 3/1/00

Apply a nominal 15 amps, resistive, @ 125 VAC across the closed normally open contacts of the test specimen. Move the actuator and close the NO contacts.

Caution: Do not change state of contacts while energized.

JMP 2/9/00 CES

Description	Record Data	Acceptance Criteria	Comments/Deviations
Contact Circuit #1 (Terminals COM-NC these are closed NO Contacts):	JMP 2/22/00 [redacted] VAC .112	**< 0.5 ~~±10%~~ Volts AC drop**	ACCEPT

2. **Insulation Resistance Test**

Setup the Pressure Switch specimen for insulation resistance testing:

Apply a nominal 1000 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the test specimen. Describe the terminals and their data below:

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
COM	**NO**	17.0 G ohms	**> 10 Megohms**	ACCEPT
COM	**NC (Open Contact)**	11.5 G ohms	**> 10 Megohms**	ACCEPT
COM or NC	**Ground**	>200 G	**> 10 Megohms**	ACCEPT
NO	**Ground**	40.0 G	**> 10 Megohms**	ACCEPT

3. Mechanical Operation – Set Point Pressure Test

Mount Pressure Switch to test jig vertically with port at bottom of switch. Attach sketch of pressure switch mounting, test setup, show test instruments and source of pressure.

Cycle pressure – confirm switch contacts open and close at set points with a nominal deadband of 20 psi and with smooth operation and free release of spring. Note: use set point pressure range indicator (0-50 psig).

Description	Record Data	Acceptance Criteria	Comments/Deviations
Set Point Adjustment:	Increasing-Set @: 29.7 psig Decreasing-Set@: 9.9 psig	**Increasing pressure, set switch to actuate @ 30 psig ±3 psig.** **Decreasing pressure, set switch to actuate @ 10 psig ± 3 psig.**	(ACCEPTED) NOTE: MFG SCALE HAS MINIMUM SET POINT INDICATOR @ 50 PSIG.
Take Set Point Readings:	1: 29.1 / 10.4 psig 2: 29.0 / 10.3 psig 3: 29.3 / 9.9 psig 4: 29.5 / 10.8 psig	**Cycle ≥ 3 times at set points tolerance;** **30 psig ±3 psig** **10 psig ± 3 psig**	ACCEPTED
Describe Operation:	OPERATES SMOOTH	**Contacts open and close with smooth operation.**	ACCEPTED
Describe release of Spring:	FREE RELEASE	**Free release of spring (No Binding)**	ACCEPTED

4. Peak Pressure Test

PERSONNEL SAFETY – While performing the remainder of this test, personnel shall be behind protective panel when pressure exceeds 100 psig.

Mounting of the Pressure Switch to test jig vertically with port at bottom of switch is the same as in 3 above except that the peak pressure range indicator is used, not the set point indicator.

Increase pressure to 1800 + 5% - 0 % – confirm no leakage (no bubbles) with Snoop or equivalent solution. Note: use peak pressure range indicator (0-2000+ psig).

Description	Record Data	Acceptance Criteria	Comments/Deviations
Pressure Test:	1810 PSIG NO VISIBLE LEAKS	**No leakage @ 1800 + 5% - 0%psig (No Bubbles)**	ACCEPTED

5. De-energize equipment.
6. De-pressurize equipment.
7. End test.
8. Carefully disassemble test leads and pressure connection to pressure switch, replace gasket(s), re-torque any permanent connections and cover screws.

Dedication Test Plan – PS-1	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-009-TP-009	
Test Specimen: CCS Industrial Pressure Switch	Page 4 of 4

9. Clean, label w/calibration sticker, box (in original packing & paperwork) and ready the test specimen for transfer to buyer.

Record: Date /Time of Test End: 2/23/00 2:52 pm.

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Switch has met all testing & acceptance criteria of this plan. Switch has been calibrated to requirements of para. 3 of this plan.

T. Cadwell

2/29/00

Notes:

Test Engineer/Technician (Printed Name) Jeff Cadwell.

Test Engineer/Technician (signature) T. Cadwell Date: 2/23/00.

Completed Test Evaluation Approval:

Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Craig Swenson Date: 3/1/00.

QA/QC (signature) T. Z. Anderson Date: 3/2/00.

T Z ANDERSON

Belhaven
Applied Technologies **Customer** Fluor Daniel Hanford PO# 2717

Certificate of Calibration

Tag BEL00-143 **Model** 604G3 **Manufacturer** CCS

Instrument Pressure Switch **Serial No** Marked "A"

Calibration traceable to the National Institute of Standards and Technology in accordance with ANSI- Z540.1 has been accomplished on the above-named instrument by comparison with standards maintained by Belhaven. The accuracy and stability of all standards maintained by Belhaven are traceable to national standards maintained by the National Institute of Standards and Technology in Washington, D.C. and Boulder, Colorado.

Temperature at Calibration:	68F	
Accuracy of Instrument	+/- 3psi	
Calibrated Range:	30	PSIG

Calibration Report No. **00-143**

Date Due: **2-23-2001**

Test Equipment

Ametek Pressure Indicator S/N: BAT-042
Fluke 787 S/N: BAT-107

Calibrated by: L. Caswell

Certified by: L. Caswell 2/23/00
Quality Assurance Manager

ORIGINAL

Belhaven Calibration Data Sheet

Report Number
00-143

Tag No BEL00-143
Instrument Type Pressure Switch
Manufacturer CCS
Serial No Marked "A"
Model 604G3
Cal Due Date 2-23-2001
System
Special Instructions Calibrated to the requirements of CGI-SNF-D-MHM-009-TP-009

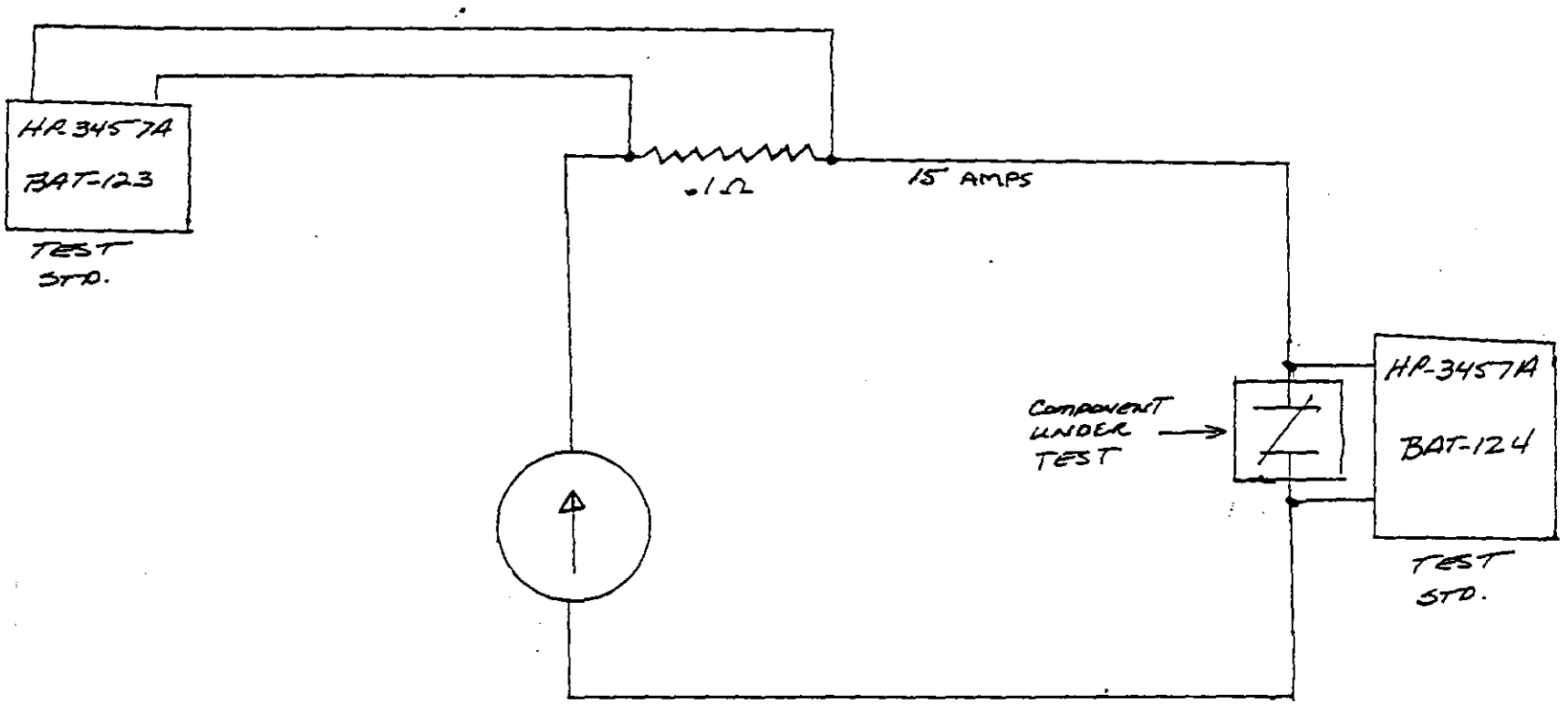
Units: PSIG
F.S. Accuracy +/- 3psi
F.S. Accuracy
Full Scale 30
Permitted Variation -0.9000 PSIG
Cal Temp 68F

Cal Point	As Found	As Left	% Full Scale Accuracy
30psi	29.7	29.7	-1.0000
10psi	9.9	9.9	-0.3333

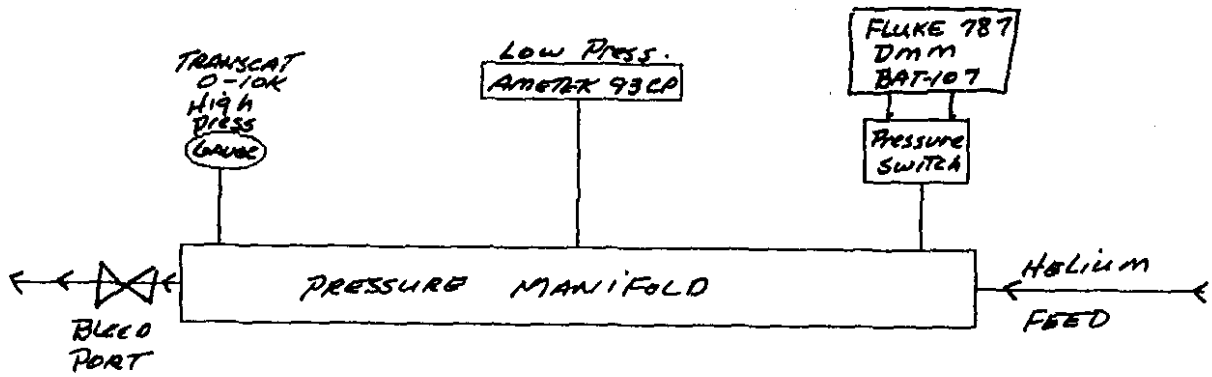
Test Equipment Ametek Pressure Indicator S/N: BAT-042
Fluke 787 S/N: BAT-107

Calibration Performed By L. Cornett Date 2/22/00

ORIGINAL



STANDARD TEST SET-UP FOR MEASURING RESISTANCE ACROSS CONTACTS.



STANDARD PRESSURE MANIFOLD SET-UP

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ISO 9002 Certified Company

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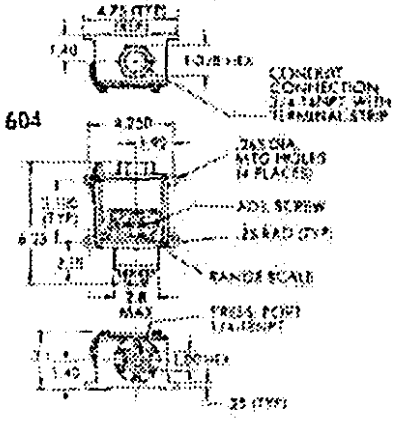
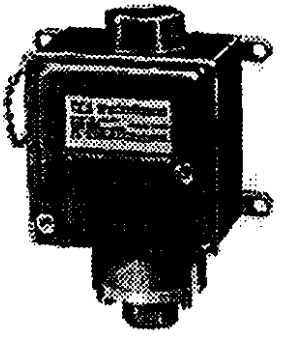
EXTERNAL ADJUSTMENT | WIDE RANGE DIAPHRAGM PISTON | PRESSURE VACUUM

INSTALLATION DRAWING





Press. .3 to 4700 psi
Vac. 1.0 to 28.5" Hg

SERIES:
604G
604P
604V

Standard Features:
- U.L. Listed — See Note
- NEMA: 4, 13
- Weatherproof
- Internal Case Ground

AMBIENT TEMP. RANGE
−30° to 160° F
−34° to 71° C

OPERATING AND ORDERING DATA:

PRESSURE SWITCHES MODEL 604G • 1/4" ALUMINUM PRESSURE PORT AND POLYIMIDE DIAPHRAGM

Max. Sys. Press. psi	Proof (Test) Press. psi	Adj. Set-Point Range: On Incr. Press. psi	Adj. Set-Point Range: On Decr. Press. psi	Approx. Dead-band psi	Model No. and Wetted Parts: MODEL SPDT-Std.	MODEL DPDT "A"	MODEL Dbl. Brk. "X"	Wetted Parts
500	750	.9-18	.3-17.5	.6	604G1	604GM1	604GX1	Aluminum Polyimide Buna N
2000	4500	6-75	2-71	.8	604G2	604GM2	604GX2	
3000	4500	12-150	4-142	.8	604G11	604GM11	604GX11	
3000	4500	30-375	10-355	.20	604G3	604GM3	604GX3	
3000	4500	300-1500	240-945	.55	604G5	604GM5	604GX5	

PRESSURE SWITCHES MODEL 604P • PISTON PRESSURE SWITCH WITH 1/4" ALUMINUM PRESSURE PORT • FOR HIGH CYCLING—LONG LIFE—HYDRAULIC APPLICATIONS

Hyd. psi	Hyd. psi	Piston switch dead bands shown are narrowest at bottom and widest at top of adjustable range						
2000	3000	15-200	4-189	9-11	604P12	604PM12	604PX12	Aluminum 400 SS Buna N Teflon
3000	5000	150-1500	75-1350	75-150	604P15	604PM15	604PX15	
5000	7500	200-3000	100-2800	100-200	604P21	604PM21	604PX21	
7500	10,000	2000-4700	1750-4250	250-450	604P31	604PM31	604PX31	

VACUUM SWITCHES MODEL 604V • 1/4" ALUMINUM PRESSURE PORT AND POLYIMIDE DIAPHRAGM

Max. Sys. Press psi	Proof (Test) Press. psi	Adj. Set-Point Range: On Incr. Vacuum In. Hg	Adj. Set-Point Range: On Decr. Vacuum In. Hg	Approx. Dead-band In. Hg	Model No. and Wetted Parts: MODEL SPDT-Std.	MODEL DPDT "A"	Wetted Parts
150	250	2.5-28.5	1.0-26.0	2.5	604V1	604VM1	Aluminum Polyimide Buna N

ELECTRICAL CHARACTERISTICS:

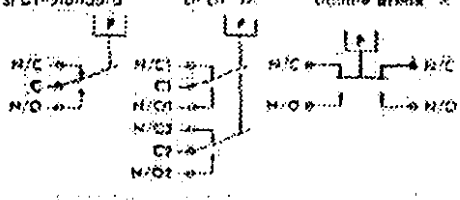
Rating of Switch Element

VOLTS	AMPERES: SPDT Res.	DPDT "A" Res.	Dbl. Brk. "X" Res.
125 AC-50/60 Hz	15	5	15
250 AC-50/60 Hz	15	5	15
480 AC-50/60 Hz	15	—	—
28 DC	6	5	6
125 DC	.4	.5	1

HOW TO ORDER:

1. Specify model number.
2. Specify optional feature by inserting the letter

SCHEMATIC AND WIRING CODE



NOTE:
All models shown are Underwriters' Laboratories, Inc. listed in the Recognized Components Index, Guide NKPZ "Motor Controllers, Float and Pressure Operated" File No. E72038.

NOTE:
Models 604GA11 & 604GX1 have an approximate dead band of .9 psi.

OPTIONAL FEATURES:
"A" = Viton O-ring

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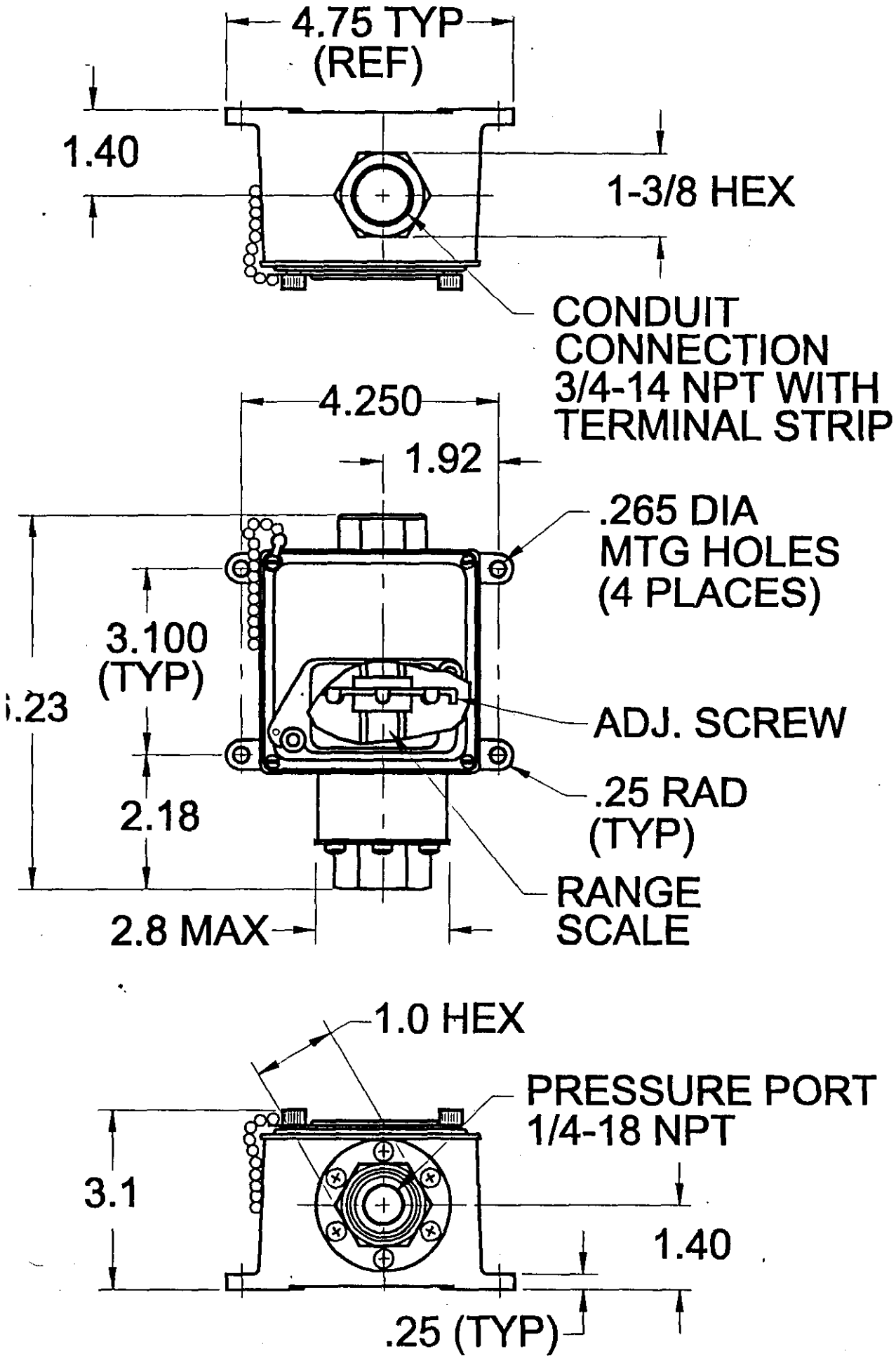
designation of the application letters after the last letter in the model number. Example: 60HCF1 "F" = Ethylene Propylene O-ring

Home Up

Custom Control Sensors, Inc.
21111 Plummer Street, Chatsworth CA 91311 Ph: (818) 341-4610; Fax: (818) 709-0426
E-mail webmaster

604C
604P
604V



Dedication Test Plan – PS-1	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-009-TP-009	
Test Specimen: CCS Industrial Pressure Switch	Page 1 of 4

Test Procedure Approval (Obtain prior to testing):
This test procedure adequately tests the critical characteristics of the test specimen upon acceptable completion of the testing.

Design Authority (signature) *[signature]* Date: *1/31/00*

ORIGINAL

RECOMMENDED EQUIPMENT:
Power Supply capable of 15 amps @ 125 VAC
Megger Instrument capable of 1000 VDC Test Voltage
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Helium supply
Pressure regulator – helium supply to 1800+ psig
Peak Pressure indicator 0-2000+ psig
Set Point Pressure indicator 0-50 psig
Test jig to mount Pressure Switch vertically with port at bottom of switch
Personnel protection panel
Snoop or equivalent
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) serial numbers and calibration due
Test Instrument type: *HP3457A* I.D.: *BAT-123* Calib. Due date *7-29-2000*
Test Instrument type: *HP3457A* I.D.: *BAT-124* Calib. Due date *7-30-00*.
Test Instrument type: *AVO BM80/2* I.D.: *6410-889/000000 5845* Calib. Due date *2-9-01*.
Test Instrument type: *AMETEK 93CP* I.D.: *BAT-042* Calib. Due date *1-13-02*.
TRANSCAT DG6 *BAT-046* *2-14-01*

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE: (Note: use one set of sheets per test specimen)

Test Specimen Description: Pressure Switch

Record the following identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Manufacturer:	*CCS*	**CCS Industrial**	*ACCEPT*
Model:	*604G3*	**604G3**	*ACCEPT*
Pressure Port:	*1/4 NPT*	**¼" Nominal**	*ACCEPT*
Serial No.:	*"B" MARKED*	**N/A**	

ORIGINAL **ORIGINAL**

Perform the following tests:

Record: Date /Time of Test Beginning: 2-14-00, 4:00 P

Record: Room Temperature: 68 °F. Room Barometric Pressure: 30.1533 mmHg.

Perform steps below:

1. **Contact Rating Test**

Setup the Limit Switch specimen for contact rating testing. Attach a sketch of test circuit with all test instrumentation used.

VAC JWP 2/1/00 CBS

Apply a nominal 15 amps, resistive, @ 125 VAC across the normally closed contacts of the test specimen.

Caution: Do not change state of contacts while energized.

JWP 2/9/00 CBS

Description	Record Data	Acceptance Criteria	Comments/Deviations
Contact Circuit #1 (Terminals COM-NC):	.108 VAC	<0.5 ~~±10%~~ Volts AC drop	ACCEPT

VAC JWP 2/1/00 CBS

Apply a nominal 15 amps, resistive, @ 125 VAC across the closed normally open contacts of the test specimen. Move the actuator and close the NO contacts.

Caution: Do not change state of contacts while energized.

JWP 2/9/00 CBS

Description	Record Data	Acceptance Criteria	Comments/Deviations
Contact Circuit #1 (Terminals COM-NC these are closed NO Contacts):	.104 VAC	<0.5 ~~±10%~~ Volts AC drop	ACCEPT

2. **Insulation Resistance Test**

Setup the Pressure Switch specimen for insulation resistance testing:

Apply a nominal 1000 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the test specimen. Describe the terminals and their data below:

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
COM	NO	45 G ohms	> 10 Megohms	ACCEPT
COM	NC (Open Contact)	35 G ohms	> 10 Megohms	↓
COM or NC	Ground	28 G ohms	> 10 Megohms	↓
NO	Ground	30 G ohms	> 10 Megohms	↓

3. Mechanical Operation – Set Point Pressure Test

Mount Pressure Switch to test jig vertically with port at bottom of switch. Attach sketch of pressure switch mounting, test setup, show test instruments and source of pressure.

Cycle pressure – confirm switch contacts open and close at set points with a nominal deadband of 20 psi and with smooth operation and free release of spring. Note: use set point pressure range indicator (0-50 psig).

Description	Record Data	Acceptance Criteria	Comments/Deviations
Set Point Adjustment:	Increasing-Set @: 30.6 psi Decreasing-Set@: 10.5 psi	**Increasing pressure, set switch to actuate @ 30 psig ±3 psig.** **Decreasing pressure, set switch to actuate @ 10 psig ± 3 psig.**	NOTE: MFG SCALE HAS MINIMUM SET POINT INDICATOR @ 50 PSI. ACCEPTABLE
Take Set Point Readings:	1: 28.3 & 9.7 psi 2: 30.2 & 12.1 psi 3: 30.2 & 11.6 psi 4: 29.9 & 11.7 psi	**Cycle ≥ 3 times at set points tolerance;** **30 psig ±3 psig** **10 psig ± 3 psig**	ACC.
Describe Operation:	ACCEPTABLE	**Contacts open and close with smooth operation.**	ACC.
Describe release of Spring:	ACCEPTABLE	**Free release of spring (No Binding)**	ACC.

4. Peak Pressure Test

PERSONNEL SAFETY – While performing the remainder of this test, personnel shall be behind protective panel when pressure exceeds 100 psig.

Mounting of the Pressure Switch to test jig vertically with port at bottom of switch is the same as in 3 above except that the peak pressure range indicator is used, not the set point indicator.

Increase pressure to 1800 + 5% - 0 % – confirm no leakage (no bubbles) with Snoop or equivalent solution. Note: use peak pressure range indicator (0-2000+ psig).

Description	Record Data	Acceptance Criteria	Comments/Deviations
Pressure Test:	1820 PSI NO visible LEAKS	**No leakage @ 1800 + 5% - 0%psig (No Bubbles)**	ACC.

5. De-energize equipment.
6. De-pressurize equipment.
7. End test.
8. Carefully disassemble test leads and pressure connection to pressure switch, replace gasket(s), re-torque any permanent connections and cover screws.

Dedication Test Plan – PS-1	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-009-TP-009	
Test Specimen: CCS Industrial Pressure Switch	Page 4 of 4

9. Clean, label w/calibration sticker, box (in original packing & paperwork) and ready the test specimen for transfer to buyer.

Record: Date /Time of Test End: 2/23/00 1:37pm.

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Switch is found to be acceptable to the requirements of this test plan.
Switch has been calibrated to the requirement of paragraph 3. See attached Cert of Cal.
J. Cadick

Notes:

Test Engineer/Technician (Printed Name) JEFF CADICK.

Test Engineer/Technician (signature) J. Cadick Date: 2/23/00.

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Craig Swenson Date: 3/1/00.

QA/QC (signature) T.R. Anderson Date: 3/2/00.
T R ANDERSON

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Belhaven
Applied Technologies **Customer** Fluor Daniel Hanford PO# 2717

Certificate of Calibration

Tag BEL00-144 **Model** 604G3 **Manufacturer** CCS

Instrument Pressure Switch **Serial No** Marked "B"

Calibration traceable to the National Institute of Standards and Technology in accordance with ANSI- Z540.1 has been accomplished on the above-named instrument by comparison with standards maintained by Belhaven. The accuracy and stability of all standards maintained by Belhaven are traceable to national standards maintained by the National Institute of Standards and Technology in Washington, D.C. and Boulder, Colorado.

Temperature at Calibration:	68F	
Accuracy of Instrument	+/- 3psi	
Calibrated Range:	30	PSIG

Calibration Report No. **00-144**

Date Due: **2-23-2001**

Test Equipment

Ametek Pressure Indicator S/N: BAT-042
Fluke 787 S/N: BAT-107

Calibrated by: L. Cardenas

Certified by: L. Cardenas 2/23/00
Quality Assurance Manager

ORIGINAL

Belhaven Calibration Data Sheet

Report Number
00-144

Tag No	BEL00-144
Instrument Type	Pressure Switch
Manufacturer	CCS
Serial No	Marked "B"
Model	604G3
Cal Due Date	2-23-2001
System	
Special Instructions	Calibrated to the requirements of CGI-SNF-D-MHM-009-TP-009

Units:	PSIG	
F.S. Accuracy	+/- 3psi	
F.S. Accuracy		
Full Scale	30	
Permitted Variation	-0.9000	PSIG
Cal Temp	68F	

Cal Point	As Found	As Left	% Full Scale Accuracy
30psi	30.6	30.6	2.0000
10psi	10.5	10.5	1.6667

Test Equipment: Ametek Pressure Indicator S/N: BAT-042
Fluke 787 S/N: BAT-107

Calibration Performed By: L. Cantrell Date: 2/23/00

ORIGINAL

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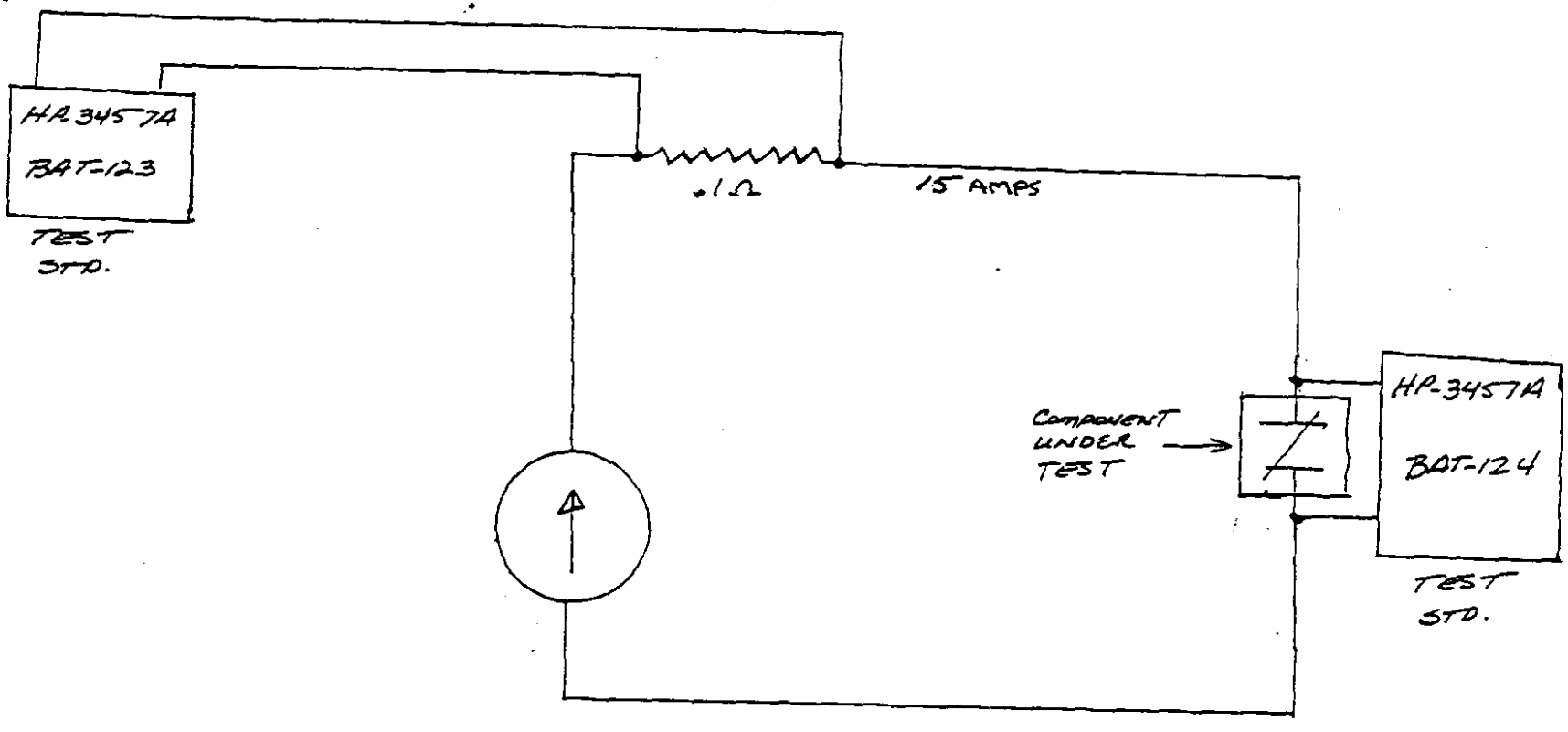
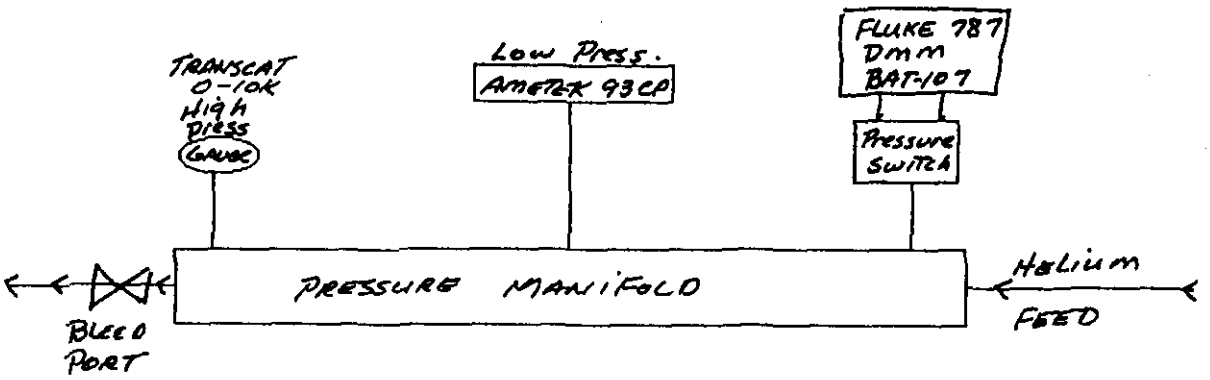


STANDARD TEST SET-UP FOR MEASURING
RESISTANCE ACROSS CONTACTS.



STANDARD PRESSURE MANIFOLD SET-UP

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ISO 9002 Certified Company

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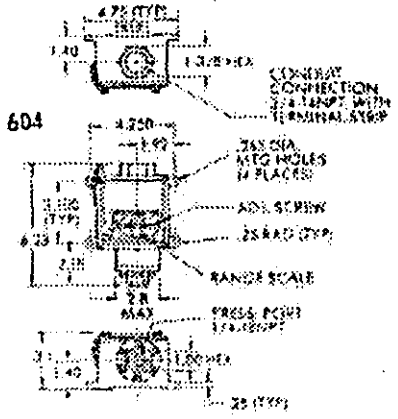
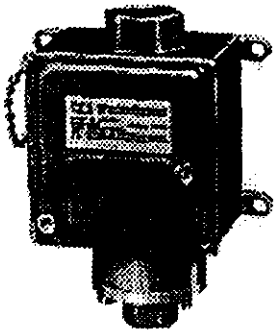
EXTERNAL ADJUSTMENT | WIDE RANGE DIAPHRAGM PISTON | PRESSURE VACUUM

INSTALLATION DRAWING





Press. .3 to 4700 psi
Vac. 1.0 to 28.5" Hg

SERIES:
604G
604P
604V

Standard Features:
- U.L. Listed — See Note
- NEMA: 4, 13
- Weatherproof
- Internal Case Ground

AMBIENT TEMP. RANGE
−30° to 160° F
−34° to 71° C

OPERATING AND ORDERING DATA:

PRESSURE SWITCHES MODEL 604G • 1/4" ALUMINUM PRESSURE PORT AND POLYIMIDE DIAPHRAGM

Max. Sys. Press. psi	Proof (Test) Press. psi	Adj. Set-Point Range: On Incr. Press. psi	Adj. Set-Point Range: On Decr. Press. psi	Approx. Deadband psi	Model No. and Wetted Parts: MODEL SPDT-Std.	MODEL DPDT "M"	MODEL Dbl. Brk. "X"	Wetted Parts
500	750	.9-18	.9-17.5	.6	604G1	604GM1	604GX1	Aluminum Polyimide Buna N
2000	4500	6-75	2-71	.4	604G2	604GM2	604GX2	
3000	4500	12-150	4-142	.6	604G11	604GM11	604GX11	
5000	4500	30-375	10-355	.20	604G3	604GM3	604GX3	
3000	4500	300-1500	245-945	.55	604G5	604GM5	604GX5	

PRESSURE SWITCHES MODEL 604P • PISTON PRESSURE SWITCH WITH 1/4" ALUMINUM PRESSURE PORT • FOR HIGH CYCLING—LONG LIFE—HYDRAULIC APPLICATIONS

Hyd. psi	Hyd. psi	Piston switch dead bands shown are narrowest at bottom and widest at top of adjustable range						
2000	3000	15-200	6-186	9-11	604P12	604PM12	604PX12	Aluminum 400 SS, Buna N Teflon
3000	5000	150-1500	75-1350	75-150	604P15	674PM15	604PX15	
5000	2500	200-3000	100-2900	300-300	604P21	604PM21	604PX21	
7500	10,000	2000-4700	1750-4250	250-450	604P31	604PM31	604PX31	

VACUUM SWITCHES MODEL 604V • 1/4" ALUMINUM PRESSURE PORT AND POLYIMIDE DIAPHRAGM

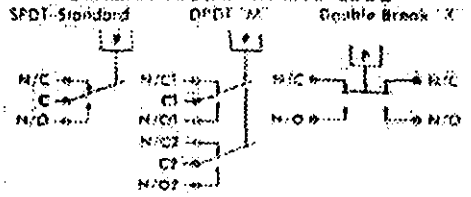
Max. Sys. Press. psi	Proof (Test) Press. psi	Adj. Set-Point Range: On Incr. Vacuum In. Hg	Adj. Set-Point Range: On Decr. Vacuum In. Hg	Approx. Deadband In. Hg	Model No. and Wetted Parts: MODEL SPDT-Std.	MODEL DPDT "M"	Wetted Parts
150	250	3.5-28.5	1.0-26.0	2.5	604V1	604VM1	Aluminum Polyimide Buna N

ELECTRICAL CHARACTERISTICS:

Rating of Switch Element

VOLTS	AMPERES: SPDT Res.	DPDT "M" Res.	Dbl Brk "X" Res.
125 AC-50/60 Hz	15	5	15
250 AC-50/60 Hz	15	5	15
480 AC-50/60 Hz	15	—	—
28 DC	6	5	6
125 DC	.4	.5	1

SCHEMATIC AND WIRING CODE



NOTE:
All models shown are Underwriters' Laboratories, Inc. listed in the Recognized Components Index, Guide NKPZ "Motor Controllers, Pilot and Pressure Operated" File No. E72030.

NOTE:
Models 604GX11 & 604GX1 have an approximate dead band of .9 psi.

HOW TO ORDER:

1. Specify model number.
2. Specify optional feature by inserting the letter

OPTIONAL FEATURES:

"A" = Viton O-ring

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letter in the model number. Example: 604CF) "F" = Ethylene Propylene O-ring

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Home Up

Custom Control Sensors, Inc.
21111 Plummer Street, Chatsworth CA 91311 Ph: (818) 341-4610; Fax: (818) 709-0426
E-mail webmaster

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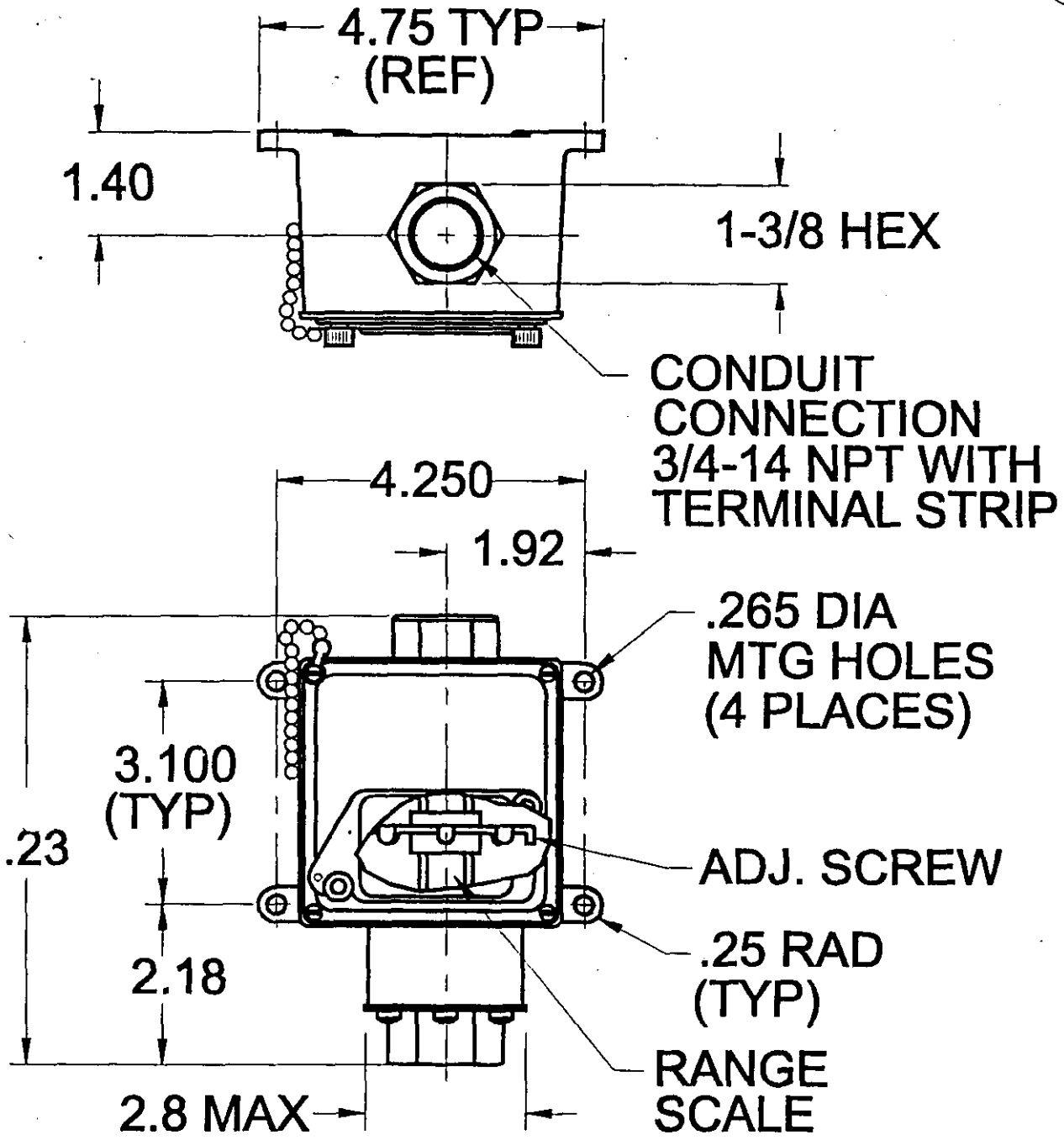
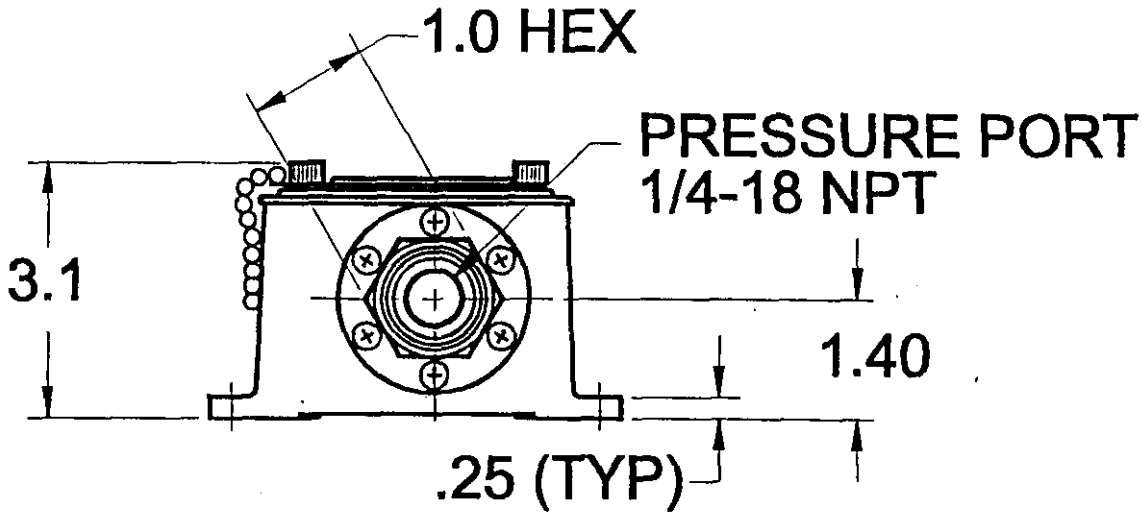
604C
604P
604V





Test Procedure Approval (Obtain prior to testing):
This test procedure adequately tests the critical characteristics of the test specimen upon acceptable completion of the testing.

Design Authority (signature) Craig Swenson Date: 1/31/00

ORIGINAL

RECOMMENDED EQUIPMENT:
Power Supply capable of 15 amps @ 125 VAC
Megger Instrument capable of 1000 VDC Test Voltage
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Helium supply
Pressure regulator – helium supply to 1800+ psig
Peak Pressure indicator 0-2000+ psig
Set Point Pressure indicator 0-50 psig
Test jig to mount Pressure Switch vertically with port at bottom of switch
Personnel protection panel
Snoop or equivalent
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) serial numbers and calibration due
Test Instrument type: 3457A I.D.: BAT-124 Calib. Due date 7-30-00
Test Instrument type: TEK-916 I.D.: BAT-052 Calib. Due date 12-18-00
Test Instrument type: MINTEK 9XLP I.D.: BAT-042 Calib. Due date 1-13-02
Test Instrument type: TRANSCAT I.D.: BAT-046 Calib. Due date 2-14-01
PRESS. STA, PARO SCIENTIFIC, BAT-071, 11-12-00

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE: (Note: use one set of sheets per test specimen)

Test Specimen Description: **Pressure Switch**

Record the following identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Manufacturer:	CCS	**CCS Industrial**	ACC.
Model:	604G3	**604G3**	ACC.
Pressure Port:	OK	**¼" Nominal**	ACC.
Serial No.:	P6C8CMMX	**N/A**	ACC.

ORIGINAL

Perform the following tests:

Record: Date /Time of Test Beginning: 4-12-00 11:15A

Record: Room Temperature: 68 °F. Room Barometric Pressure: ~~-~~8.45 mmHg.

Perform steps below:

1. **Contact Rating Test**

Setup the Limit Switch specimen for contact rating testing. Attach a sketch of test circuit with all test instrumentation used.

YMP CES 5.3.00

Apply a nominal 15 amps, resistive, ~~@ 125~~ VAC across the normally closed contacts of the test specimen.

Caution: Do not change state of contacts while energized.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Contact Circuit #1 (Terminals COM-NC):	0.1457VAC	**< 0.5 Volts AC drop**	ACC.

YMP CES 5.3.00

Apply a nominal 15 amps, resistive, ~~@ 125~~ VAC across the closed normally open contacts of the test specimen. Move the actuator and close the NO contacts.

Caution: Do not change state of contacts while energized.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Contact Circuit #1 (Terminals COM-NC these are closed NO Contacts):	.1763 VAC	**< 0.5 Volts AC drop**	ACC.

2. **Insulation Resistance Test**

Setup the Pressure Switch specimen for insulation resistance testing:

Apply a nominal 1000 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the test specimen. Describe the terminals and their data below:

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
COM	NO	70 GOHM	> 10 Megohms	ACC.
COM	NC (Open Contact)	70 GOHM	> 10 Megohms	ACC.
COM or NC	Ground	70 GOHM	> 10 Megohms	ACC.
NO	Ground	70 GOHM	> 10 Megohms	ACC.

ORIGINAL

3. Mechanical Operation – Set Point Pressure Test

Mount Pressure Switch to test jig vertically with port at bottom of switch. Attach sketch of pressure switch mounting, test setup, show test instruments and source of pressure.

Cycle pressure – confirm switch contacts open and close at set points with a nominal deadband of 20 psi and with smooth operation and free release of spring. Note: use set point pressure range indicator (0-50 psig).

Description	Record Data	Acceptance Criteria	Comments/Deviations
Set Point Adjustment:	Increasing-Set @: 32.7652 PSI NEW SET: 31.2652 Decreasing-Set@: 10.6059 PSI NEW SET: 8.0440	**Increasing pressure, set switch to actuate @ 30 psig ±3 psig.** **Decreasing pressure, set switch to actuate @ 10 psig ± 3 psig.**	NS FOUND SET: 33.365 BOOK @ 15.585
Take Set Point Readings:	1: 32.7695 / 10.9863 2: 32.8755 / 9.7655 3: 32.6887 / 8.6865 ④ 32.9141 / 6.3858 SEE COMMENTS / NOTES	**Cycle ≥ 3 times at set points tolerance;** **30 psig ±3 psig** **10 psig ± 3 psig**	#4 OUT OF TOL. 2ND TEST 1. 31.2652 / 8.0440 2. 31.0795 / 7.3218 3. 31.1544 / 8.3160 4. 30.6771 / 7.9491
Describe Operation:	YES	**Contacts open and close with smooth operation.**	ACC.
Describe release of Spring:	YES	**Free release of spring (No Binding)**	ACC.

4. Peak Pressure Test

PERSONNEL SAFETY – While performing the remainder of this test, personnel shall be behind protective panel when pressure exceeds 100 psig.

Mounting of the Pressure Switch to test jig vertically with port at bottom of switch is the same as in 3 above except that the peak pressure range indicator is used, not the set point indicator.

Increase pressure to 1800 + 5% - 0 % – confirm no leakage (no bubbles) with Snoop or equivalent solution. Note: use peak pressure range indicator (0-2000+ psig).

Description	Record Data	Acceptance Criteria	Comments/Deviations
Pressure Test:	1840 PSI	**No leakage @ 1800 + 5% - 0%psig (No Bubbles)**	NO VISIBLE LEAKS

5. De-energize equipment.
6. De-pressurize equipment.
7. End test.
8. Carefully disassemble test leads and pressure connection to pressure switch, replace gasket(s), re-torque any permanent connections and cover screws.

ORIGINAL

9. Clean, label w/calibration sticker, box (in original packing & paperwork) and ready the test specimen for transfer to buyer.

Record: Date /Time of Test End: 4/11/00, 3:54 P.

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):
COMPONENT MEETS REQUIREMENTS OF THIS TEST PLAN AND IS SET TO THE REQUIRED VALUES.

Notes:
SECT #3: DURING FINAL RUN AFTER FIRST SETTING, THE FINAL TEST (#4) WAS FOUND OUT OF TOLERANCE. A NEW SETPOINT WAS SET AND A SECOND RUN OF 4 TEST WAS CONDUCTED AND FOUND TO BE ACCEPTABLE.

Test Engineer/Technician (Printed Name) JEFF CADICK.

Test Engineer/Technician (signature) J. Cadick Date: 4-12-00.

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) for Craig Swenson Date: 5-3-00.

QA/QC (signature) Stephen Scott Most Date: 5-3-2000.

ORIGINAL

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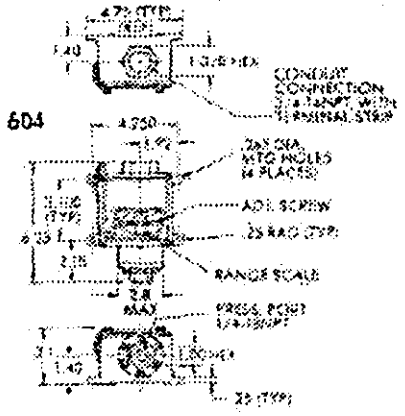
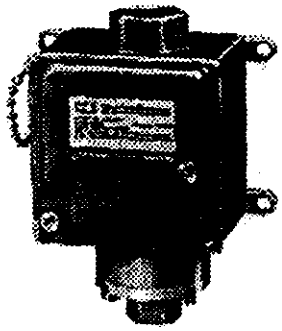
ISO 9002 Certified Company

[Home] [Up]

EXTERNAL ADJUSTMENT | WIDE RANGE DIAPHRAGM PISTON | PRESSURE VACUUM

INSTALLATION DRAWING





Press. .3 to 4700 psi
Vac. 1.0 to 28.5" Hg

SERIES: 604G 604P 604V

Standard Features:

- U.L. Listed — See Note
- NEMA: 4, 13
- Weatherproof
- Internal Case Ground

AMBIENT TEMP. RANGE
−30° to 160° F
−34° to 71° C

OPERATING AND ORDERING DATA:

PRESSURE SWITCHES MODEL 604G • 1/4" ALUMINUM PRESSURE PORT AND POLYIMIDE DIAPHRAGM

Max. Sys. Press. psi	Proof (Test) Press. psi	Adj. Set-Point Range: On Incr. Press. psi	Adj. Set-Point Range: On Decr. Press. psi	Approx. Dead-band psi	Model No. and Wetted Parts: MODEL SPDT-Std.	MODEL DPDT "M"	MODEL Dbl. Brk. "X"	Wetted Parts
500	750	.9-15	.3-12.5	.6	604G1	604GM1	604GX1	Aluminum Polyimide Buna N
2000	4500	6-75	2-71	4	604G2	604GM2	604GX2	
3000	4500	12-150	4-142	8	604G11	604GM11	604GX11	
3000	4500	30-375	10-335	20	604G3	604GM3	604GX3	
3000	4500	300-1000	245-945	55	604G5	604GM5	604GX5	

PRESSURE SWITCHES MODEL 604P • PISTON PRESSURE SWITCH WITH 1/4" ALUMINUM PRESSURE PORT • FOR HIGH CYCLING—LONG LIFE—HYDRAULIC APPLICATIONS

Hyd. psi	Hyd. psi	Piston switch dead bands shown are narrowest at bottom and widest at top of adjustable range						
2000	3000	15-200	6-189	9-11	604P12	604PM12	604PX12	Aluminum 400 SS Buna N Teflon
3000	5000	150-1500	75-1350	75-150	604P15	604PM15	604PX15	
5000	7500	200-3000	100-2900	100-200	604P21	604PM21	604PX21	
7500	10,000	2000-4700	1750-4250	350-450	604P31	604PM31	604PX31	

VACUUM SWITCHES MODEL 604V • 1/4" ALUMINUM PRESSURE PORT AND POLYIMIDE DIAPHRAGM

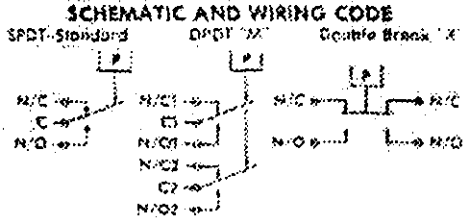
Max. Sys. Press psi	Proof (Test) Press. psi	Adj. Set-Point Range: On Incr. Vacuum In. Hg	Adj. Set-Point Range: On Decr. Vacuum In. Hg	Approx. Dead-band In. Hg	Model No. and Wetted Parts: MODEL SPDT-Std	MODEL DPDT "M"	Wetted Parts
150	250	2.5-28.5	1.0-26.0	2.5	604V1	604VM1	Aluminum Polyimide Buna N

ELECTRICAL CHARACTERISTICS:

Rating of Switch Element

VOLTS	AMPERES: SPDT Res.	DPDT "M" Res.	Dbl Brk "X" Res.
125 AC-50/60 Hz	15	5	15
250 AC-50/60 Hz	15	5	15
480 AC-50/60 Hz	15	—	—
28 DC	6	5	6
125 DC	.4	.5	1

SCHEMATIC AND WIRING CODE



NOTE:
All models shown are Underwriters' Laboratories, Inc. listed in the Recognized Components Index, Guide NKPZ "Motor Controllers, Float and Pressure Operated", File No. E72038.

NOTE:
Models 604GM1 & 604GX1 have an approximate dead band of .9 psi.

HOW TO ORDER:

1. Specify model number.
2. Specify optional features by inserting the letter

OPTIONAL FEATURES:

"A" = Viton O-ring

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letter in the model number. Example: 604CF)

"F" = Ethylene Propylene O-ring

Custom Control Sensors, Inc.
21111 Plummer Street, Chatsworth CA 91311 Ph: (818) 341-4610; Fax: (818) 709-0426
E-mail webmaster

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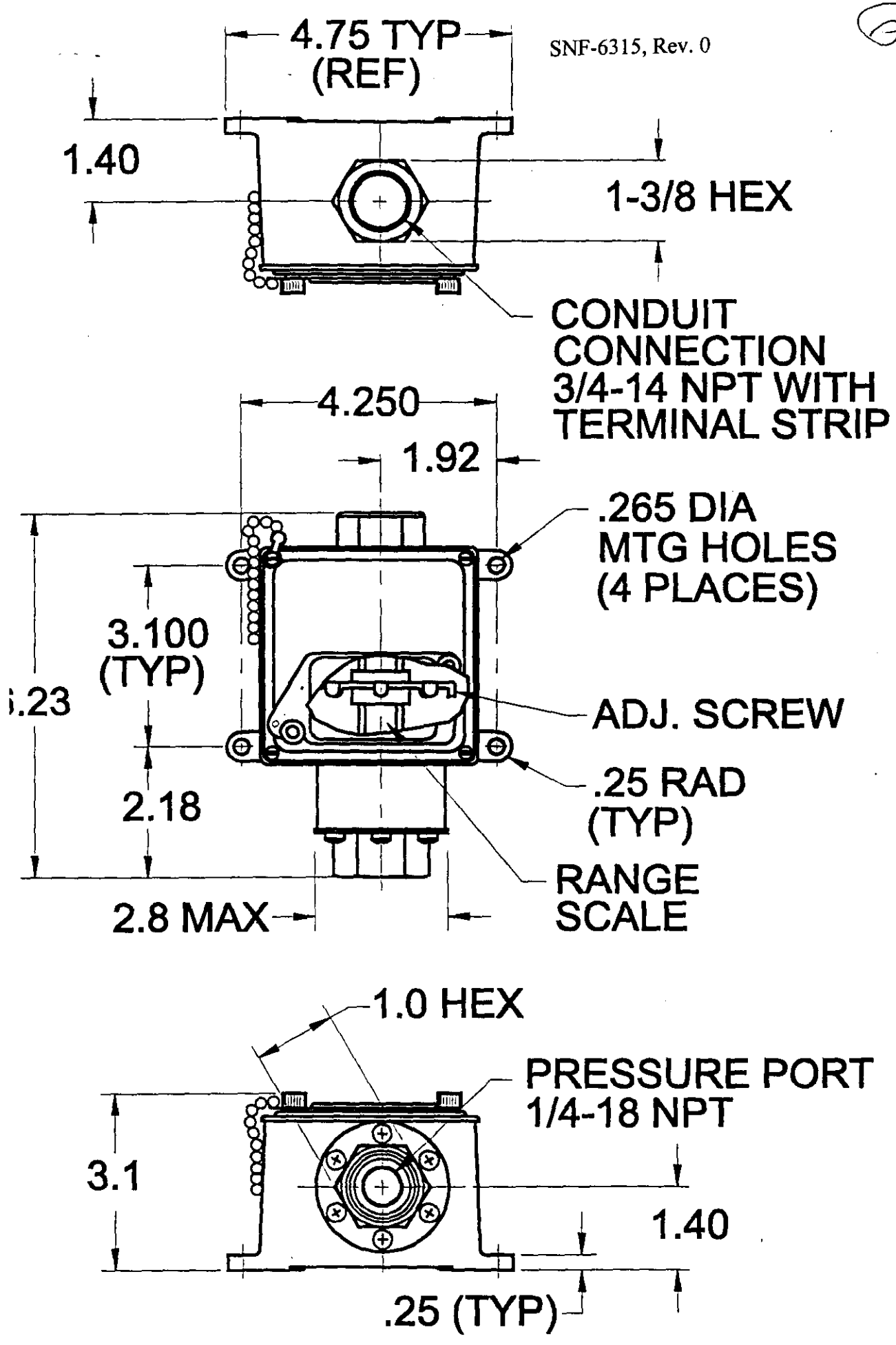
604C
604P
604V



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Belhaven
Applied Technologies **Customer** Fluor Daniel PO# 2717-3

Certificate of Calibration

Tag PSLTSC1AX **Model** 6043G **Manufacturer** CCS

Instrument Pressure Switch **Serial No** PSLTSC1AX

Calibration traceable to the National Institute of Standards and Technology in accordance with ANSI- Z540.1 has been accomplished on the above-named instrument by comparison with standards maintained by Belhaven. The accuracy and stability of all standards maintained by Belhaven are traceable to national standards maintained by the National Institute of Standards and Technology in Washington, D.C. and Boulder, Colorado.

Temperature at Calibration:	68F	
Accuracy of Instrument	+/- 3 psi	
Calibrated Range:	31.2654	PSI

Calibration Report No. **00-209**

Date Due: **4-12-2001**

Test Equipment

Paroscientific Pressure Standard S/N 224

Calibrated by: _____ 4-12-00

Certified by: _____
Quality Assurance Manager

ORIGINAL

Belhaven Calibration Data Sheet

Report Number
00-209

Tag No PSLTSC1AX
Instrument Type Pressure Switch
Manufacturer CCS
Serial No PSLTSC1AX
Model 6043G
Cal Due Date 4-12-2001
System
Special Instructions Set to the requirements of Test Plan CGI-SNF-D-MHM-009
As Found set point was set at 33.3957 psi and decrease psi @ 15.585. Reset at below values.

Units: PSI
F.S. Accuracy +/- 3 psi
F.S. Accuracy
Full Scale 31.2654
ermitted Variation -0.9380 PSI
Cal Temp 68F

Cal Point	As Found	As Left	% Full Scale Accuracy
30	31.2654	31.2654	4.0473
10	8.0440	8.0440	-6.2561

Test Equipment Paroscientific Pressure Standard S/N 224

Calibration Performed By L. Cook Date 4-12-00

ORIGINAL

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Dedication Test Plan – PS-1	**Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-009-TP-009	
Test Specimen: CCS Industrial Pressure Switch	**Page 1 of 4**

Test Procedure Approval (Obtain prior to testing):
This test procedure adequately tests the critical characteristics of the test specimen upon acceptable completion of the testing.

Design Authority (signature) Craig Swenson Date: 4-11-00.

RECOMMENDED EQUIPMENT:
Power Supply capable of 15 amps @ 125 VAC
Megger Instrument capable of 1000 VDC Test Voltage
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Helium supply
Pressure regulator – helium supply to 1800+ psig
Peak Pressure indicator 0-2000+ psig
Set Point Pressure indicator 0-50 psig
Test jig to mount Pressure Switch vertically with port at bottom of switch
Personnel protection panel
Snoop or equivalent
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) serial numbers and calibration due
Test Instrument type: 3457A HP I.D.: BAT-124 Calib. Due date 7-30-00.
Test Instrument type: TEK 916 I.D.: BAT-052 Calib. Due date 12-18-00.
Test Instrument type: BAT. TRANSCAT I.D.: BAT-046 Calib. Due date 2-14-01.
Test Instrument type: PARO SCIENTIFIC PRESS STD. I.D.: BAT-071 Calib. Due date 11-12-00.

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE: (Note: use one set of sheets per test specimen)

Test Specimen Description: **Pressure Switch**

Record the following identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Manufacturer:	CCS	**CCS Industrial**	ACC.
Model:	60463	**604G3**	ACC
Pressure Port:	1/4	**¼" Nominal**	ACC
Serial No.:	PSLTSC2AX	**N/A**	ACC.

ORIGINAL

Perform the following tests:

Record: Date /Time of Test Beginning: 4-13-00, 11:40 A

Record: Room Temperature: 68 °F. Room Barometric Pressure: ~~-~~ 8.3738 mmHg.

Perform steps below:

1. **Contact Rating Test**

Setup the Limit Switch specimen for contact rating testing. Attach a sketch of test circuit with all test instrumentation used.

Apply a nominal 15 amps, resistive, ~~@ 125 VAC~~ CCS 4/27/00 across the normally closed contacts of the test specimen.

Caution: Do not change state of contacts while energized.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Contact Circuit #1 (Terminals COM-NC):	.1017 VAC	**< 0.5 Volts AC drop**	ACC

Apply a nominal 15 amps, resistive, ~~@ 125 VAC~~ CCS 4/27/00 across the closed normally open contacts of the test specimen. Move the actuator and close the NO contacts.

Caution: Do not change state of contacts while energized.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Contact Circuit #1 (Terminals COM-NC these are closed NO Contacts):	.1098 VAC	**< 0.5 Volts AC drop**	ACC.

2. **Insulation Resistance Test**

Setup the Pressure Switch specimen for insulation resistance testing:

Apply a nominal 1000 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the test specimen. Describe the terminals and their data below:

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
COM	**NO**	30 Gohm	**> 10 Megohms**	ACC.
COM	**NC (Open Contact)**	35 Gohm	**> 10 Megohms**	ACC.
COM or NC	**Ground**	40 Gohm	**> 10 Megohms**	ACC.
NO	**Ground**	50 Gohm	**> 10 Megohms**	ACC.

3. Mechanical Operation – Set Point Pressure Test

Mount Pressure Switch to test jig vertically with port at bottom of switch. Attach sketch of pressure switch mounting, test setup, show test instruments and source of pressure.

Cycle pressure – confirm switch contacts open and close at set points with a nominal deadband of 20 psi and with smooth operation and free release of spring. Note: use set point pressure range indicator (0-50 psig).

Description	Record Data	Acceptance Criteria	Comments/Deviations
Set Point Adjustment:	Increasing-Set @: 29.7255 PSI Decreasing-Set@: 8.0425 PSI	**Increasing pressure, set switch to actuate @ 30 psig ±3 psig.** **Decreasing pressure, set switch to actuate @ 10 psig ± 3 psig.**	AS-FOUND: 32.6775 11.4672
Take Set Point Readings:	1: 29.6349 / 8.0425 2: 29.7223 / 7.8603 3: 29.6970 / 7.5763 4: 29.2977 / 8.3758 29.5415 / 7.8867	**Cycle≥3 times at set points tolerance;** **30 psig ±3 psig** **10 psig ± 3 psig**	ACC. SEE NOTE:
Describe Operation:	YES	**Contacts open and close with smooth operation.**	ACC.
Describe release of Spring:	YES	**Free release of spring (No Binding)**	ACC

4. Peak Pressure Test

PERSONNEL SAFETY – While performing the remainder of this test, personnel shall be behind protective panel when pressure exceeds 100 psig.

Mounting of the Pressure Switch to test jig vertically with port at bottom of switch is the same as in 3 above except that the peak pressure range indicator is used, not the set point indicator.

Increase pressure to 1800 + 5% - 0 % – confirm no leakage (no bubbles) with Snoop or equivalent solution. Note: use peak pressure range indicator (0-2000+ psig).

Description	Record Data	Acceptance Criteria	Comments/Deviations
Pressure Test:	1865 PSI	**No leakage @ 1800 + 5% - 0%psig (No Bubbles)**	NO USABLE LEAKS

5. De-energize equipment.
6. De-pressurize equipment.
7. End test.
8. Carefully disassemble test leads and pressure connection to pressure switch, replace gasket(s), re-torque any permanent connections and cover screws.

Dedication Test Plan – PS-1	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-009-TP-009	
Test Specimen: CCS Industrial Pressure Switch	Page 4 of 4

9. Clean, label w/calibration sticker, box (in original packing & paperwork) and ready the test specimen for transfer to buyer.

Record: Date /Time of Test End: 4-13-01, 9:05A.

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

pressure Switch meets requirement of this test plan after Several readjustment.

J. Carlock

Notes:

Linearity of Switch 10 PSI to 30 PSI is not consistant. Switch setting is below mfg. scale setting of 50 PSIG.

Test Engineer/Technician (Printed Name) JEFF Carlock.

Test Engineer/Technician (signature) J. Carlock Date: 4-13-01.

Completed Test Evaluation Approval:

Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Craig Swenson Date: 4-27-00.

QA/QC (signature) Stephen Scott Mosh Date: 4-27-2000.

Belhaven
Applied Technologies **Customer** Fluor Daniel PO# 2717-3

Certificate of Calibration

Tag PSLTSC2AX **Model** 6043G **Manufacturer** CCS

Instrument Pressure Switch **Serial No** PSLTSC2AX

Calibration traceable to the National Institute of Standards and Technology in accordance with ANSI- Z540.1 has been accomplished on the above-named instrument by comparison with standards maintained by Belhaven. The accuracy and stability of all standards maintained by Belhaven are traceable to national standards maintained by the National Institute of Standards and Technology in Washington, D.C. and Boulder, Colorado.

Temperature at Calibration:	68F	
Accuracy of Instrument	+/- 3 psi	
Calibrated Range:	30.00	PSI

Calibration Report No. **00-213**

Date Due: **4-12-2001**

Test Equipment

Paroscientific Pressure Standard S/N 224

Calibrated by: _____ 4-13-00

Certified by: _____ 4-13-00
Quality Assurance Manager

ORIGINAL

Belhaven Calibration Data Sheet

Report Number
00-213

Tag No	PSLTSC2AX
Instrument Type	Pressure Switch
Manufacturer	CCS
Serial No	PSLTSC2AX
Model	6043G
Cal Due Date	4-12-2001
System	
Special Instructions	Set to the requirements of Test Plan CGI-SNF-D-MHM-009 As Found set point was set at 32.8775 psi and decrease psi @ 11.4672. Reset at below values.

Units:	PSI	
F.S. Accuracy	+/- 3 psi	
F.S. Accuracy		
Full Scale	30.00	
Permitted Variation	-0.9000	PSI
Cal Temp	68F	

Cal Point	As Found	As Left	% Full Scale Accuracy
30	29.7255	29.7255	-0.9150
			0.0000
10	8.0245	8.0245	-6.5850

Test Equipment Paroscientific Pressure Standard S/N 224

Calibration Performed By L Cadwell Date 4-13-00

ORIGINAL

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Commercial Grade Item Upgrade Dedication Form

ECN No. **N/A** CGI No. **CGI-SNF-D-MHM-007**

Title: **P2, P21, P80 – Microswitch / Honeywell Yamatake Limit Switch SL1**

Section 1 Part Information

Item No.: **N/A**	Manufacturer: **N/A**	Supplier: **N/A**
Mfg. Part/Model No.: **N/A**	Supplier's P/N: **N/A**	
Part Description: **N/A**	**ORIGINAL**	
End Use Description: **N/A**		

Section 2a Component Information

Equipment No.:	Specification No.:	Manufacturer:	Past P.O. No.:
LFPGCX, LFPGCY, LFPGOX, LFPGOY, LFPGLX, LFPGLY, LFTSLP1AX, LFTSLP1AY, LFTSLP2AX, LFTSLP2AY	**Ederer F-2566, Foster Wheeler MJX-SDX 452656**	**MicroSwitch Honeywell-Yamatake**	**N/A**
Manufacturer's Part/Model No.: **SL 1**	Equipment Supplier (if different from manufacturer): **ALSTOM, Foster Wheeler**		Equip. Supplier's Part No.: **N/A**

Component Description: **Limit switches LFPGCX and LFPGCY for interlock P-2 measure grapple jaws not fully closed and Limit switches; LFPGOX & LFP GOY for interlock P-2 & 80 measure grapple jaws fully open. LFPGLX and LFPGLY for interlock P-2 measure grapple jaws not locked, inhibits shield skirt motor operation and bridge and trolley travel. LFTSLP1AX, LFTSLP1AY, LFTSLP2AX & LFTSLP2AY for interlock P21 measure trolley restraint pins North and South fully inserted.**

Section 2b Commercial Availability of the Item

1. Is the Item available from a catalogue from a qualified NQA1 supplier or ISO 9000 supplier (coordinate with project CGI interface Engineer or BTR)?

   [ ] YES (go to #2 below) [X] NO (go to procedure step 6.3.2, proceed to dedicate Item)

   If not available from a qualified NQA1 supplier, is it available from an ISO 9000 supplier? (coordinate with project CGI Interface Engineer or BTR)

   [ ] YES (go to #2 below, procedure step 6.3.2, dedicate Item) [X] NO (procedure step 6.3.2, dedicate Item)

2. List of Candidate qualified NQA1 suppliers or ISO 9000 suppliers, if used: **N/A**

3. Recommended Procurement Strategy (coordinate with project CGI interface Engineer or BTR): **N/A**

Section 2c CGI Determination

CGI Determination Questions:

#1: Is the Item subject to design or specification requirements that are unique to nuclear facilities or activities?

[ ] YES (the Item is not commercial grade) [X] NO (continue)

#2: Is the Item used in applications other than nuclear facilities or activities?

[ ] NO (the item is not commercial grade) [X] YES (continue)

#3: Is the Item ordered from manufacturer/supplier on the basis of specifications set forth in the manufacturer's catalog?

[ ] NO (the item is not commercial grade) [X] YES (continue)

[X] All three criteria have been satisfied. The Item meets the definition of commercial grade.

Commercial Grade Item Upgrade Dedication Form

Rev. No. 3

ECN No. **N/A** CGI No. **CGI-SNF-D-MHM-007**

Page 2 of 8

Title: **P2, P21, P80 – Microswitch / Honeywell Yamatake Limit Switch SL1**

Section 2d Reason for Dedication

The above Commercial Grade (CG) described item is being Dedicated for use in the application cited for the following reason(s):

	Item is being purchased from a non ESL manufacturer supplier as CG to be used in a Safety Class application.
	Item is being purchased from a non ESL manufacturer supplier as CG to be used in a Safety Significant application.
X	Item was purchased from a non ESL manufacturer supplier as CG to be used in a Safety Class application.
	Item was purchased from a non ESL manufacturer supplier as CG to be used in a Safety Significant application.
	Other ('like-for-like', similar, substitution, replacement evaluation)

Section 3 Failure Effects Evaluation

A. Part/Component Safety Function:

1. **Interlock P-2 prevents the MHM from leaving a storage tube without replacing the tube plug, to provide radiation protection and shielding for facility workers. P21 inhibits the Shield Jack lowering and Turret rotating and the Turret Locking Pin disengaging and the Base Locking Pin disengaging and Tube Plug Hoist operating and MCO Hoist operating unless the Crane Bridge Seismic clamps are fully applied AND the Trolley Restraint Pins are fully inserted.**

B. Part/Component Functional Mode:

Safety Function #1: [X] Active [ ] Passive

Safety Function #2: [ ] Active [ ] Passive

Safety Function #3: [ ] Active [ ] Passive

Active - Mechanical or Electrical change of state is required to occur for the component to perform its safety function

Passive – Change of state is not required for the component to perform its safety function

C. Host Component Safety Function (if applicable): **N/A**

1.

D. Failure Mode(s) and the effects on component or system safety function (see Worksheet 1):

1. **Failure of switch contacts to open upon demand results in potential override of interlock channel.**

2. **Actuator plunger/arm inoperative results in failure to provide interlock function at correct demand position.**

Section 4 Environmental & Natural Phenomena Hazard Design

Environmental Qualification Required:

Yes [ ]

No [X]

If yes: Environmental Qualification Requirements

Limiting Environmental Conditions:

Required Safety Functions:

Qualification Period:

Natural Phenomena Hazard (NPH) Design Required:

Yes [ ]

No [X]

If yes: NPH Design Requirements

Performance Category:

NPH Design Req'ts.:

Required Safety Functions:

Section 5 Component Functional Classification

X	Safety Class (SC)		General Service (GS)		Safety Significant (SS)

If part/component classification is different from host component/system, document basis. **N/A**

Sections 6 and 7 (Reserved)

Section 8 References (for Functional Classification)

National Codes/Standards: **N/A**

Safety Analysis Report (SAR): **HNF-3672, Rev. 0**

Drawings: **Ederer, Inc. EB-33056, Sht 17/17A, 37; Hanford H-2-827174, Sheets 2, 4, 9, 10, 14, 15, 19 & 23**

Vendor Manual/Manufacturer/Supplier Information: **Honeywell Series ~~LS compact~~ limit switches** 1 ENCLOSED

Other: **ALSTOM ESL/R (96) 065 – Rev. D, 100% Design Submittal – June 1998**

YJP LES 4/14/00

Commercial Grade Item Upgrade Dedication Form

Rev. No. 3

ECN No. N/A CGI No. CGI-SNF-D-MHM-007

Title: **P2, P21, P80 – Microswitch / Honeywell Yamatake Limit Switch SL1**

Section 9 Critical Characteristics

Critical Characteristics	Acceptance Criteria/Tolerances	Acceptance Method	ID	Function
1. Item Identification Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
Manufacturer	**MicroSwitch / Honeywell-Yamatake**	**1, IN**	**X**	
Model Number	**SL1**	**1, IN**	**X**	
2. Physical Critical Characteristics (for reasonable assurance that the Item delivered is the Item specified)				
Actuator (Note 1)	**Plunger**	**1, IN**	**X**	
3 Performance Critical Characteristics (for reasonable assurance that the Item will perform its intended safety function(s))				
Contact rating	**Nominal 5 amps VAC,resistive, less than 0.5V drop across contacts.**	**1, T**		**X**
Insulation Resistance	**Greater than 10 megohm resistance, terminal to terminal and terminal to ground at 500vdc.**	**1, T**		**X**
Mechanical Operation	**Cycle switch - confirm contacts open and close with smooth operation and free release of spring.**	**1, T**		**X**

4. Notes and Legend:

Rev. 1: Page 2: Revised Sheet No.; Page 7: Added date to "Method R/IN" header; General: new forms.

Rev. 2: Pages 3, 5, 7: added Note 1

Note 1: This actuator is installed with the limit switch - replacement limit switches will not include an actuator - the existing actuator will be placed on the replacement switch. Therefore, the physical CC specified for the actuator lever need not be performed on the replacement limit switch.

Rev. 3: All Pages: Rev'd to include Interlocks P2, P21 & P80 and include all SL1 Limit Switches into this CGI (CGI-008 now included in CGI-007). Rev'd Equipment ID Nos. to include CGI-008 ID's. Added Note 2. Pages 3, 5, 7, Rev'd Contact rating to " Nominal 5 amps VAC,resistive, less than 0.5V drop across contacts." Test voltage varies with the load.

Note 2: The differences between the SL1-E & SL1-H are actuator only and vary the length of the plunger. All other physical and electrical characteristics are the same. Model(s) SL1-E was In-Situ Tested and SL1-E & -H were bench tested satisfactorily.

Acceptance Method (Acc Meth):
1. Special Test and Inspection:
   1, IN for Inspection
   1,T for Test
2. Commercial Grade Survey
3. Source Verification
4. Vendor/Item History

Approvals:

Designated Engineer: [signature] 4/6/00

Design Authority: Craig Swenson 4/6/00

QA Engineer: Stephen Scott Moss 4-6-2000

Commercial Grade Item Upgrade Dedication Form	Rev. No. 3
ECN No. N/A CGI No. CGI-SNF-D-MHM-007	Page 4 of 8
Title: P2, P21, P80 – Microswitch / Honeywell Yamatake Limit Switch SL1	

WORKSHEET 1
DETERMINATION OF FAILURE MECHANISMS/MODES

Section 1			
Typical Failure Mechanisms	Definition	X = Applicable to Component under Evaluation	
		X?	Indicate Failure Mode
Fracture	Separation of a solid accompanied by little or no macroscopic plastic deformation.		
Corrosion	The gradual deterioration of a material due to chemical or electrochemical reactions, such as oxidation, between the material and its environment.	X	**Switch contacts corrode closed and fail to open upon demand.**
Erosion	Destruction of materials by the abrasive action of moving fluids, usually accelerated by the presence of solid particles carried with the fluid.		
Open Circuit	An electrical circuit that is unintentionally broken so that there is no complete path for current flow.		
Short Circuit	An abnormal connection by which an electrical current is connected to ground, or to some conducting body, resulting in excessive current flow.	X	**Switch contacts fuse closed and fail to open upon demand.**
Blockage	Clogging of a filtering medium resulting in the inability to perform its purification function or blockage of flow.		
Seizure	Binding of a normally moving item through excessive pressure, temperature, friction, jamming.	X	**Switch mechanism jams and contacts fail to open upon demand.**
Unacceptable Vibration	Mechanical oscillations produced are beyond the defined permissible limits due to unbalancing, poor support, or rotation at critical speeds.		
Loss of Properties	A loss of mechanical and physical properties of a material due to exposure to high temperatures, radiation exposure.		
Excess Strain	Under the action of excessive external forces the material of the part has been deformed or distorted.		
Mechanical Creep	From prolonged exposure to high temperature and stress, the object will show a slow change in its physical (shape and dimension) and mechanical characteristics.		
Ductile Fracture	Fracture characterized by tearing of metal accompanied by appreciable gross plastic deformation.		

Section 2 Additional Failure Modes Applicable to the Component Under Evaluation
1. **Switch contacts are closed to permit equipment movement. Contacts open for the interlock function. Any failure to open inhibits the particular switch interlock function.**
2. **Actuator plunger/arm seizure or break renders the contact opening inoperable.**
3. **Short circuit could give false signal to energize interlock funtion.**

Commercial Grade Item Upgrade Dedication Form

Checklist 1 - Acceptance Method 1 - Special Test/Inspection Verification

SECTION 1	
Item Description: **P2, P21 & P80 interlock limit switches** System #: **MHM**	Equip #: **LFPGCX, LFPGCY, LFPGOX, LFPGOY, LFPGLX, LFPGLY, LFTSLP1AX, LFTSLP1AY, LFTSLP2AX, LFTSLP2AY** Model #: **SL1**
Manufacturer (Address/Phone): **MicroSwitch/Honeywell-Yamatake** **Honeywell Sensing and Control** **Freeport, Ill** **1-800-537-6945**	Supplier (Address/Phone): **N/A**

SECTION 2 CRITICAL CHARACTERISTICS TO BE VERIFIED BY METHOD 1.

Insp	Test	Post-Test	
X			1. **Manufacturer**
X			2. **Model Number**
X			3. **Actuator (Note 1)**
	X		4. **Contact Rating**
	X		5. **Insulation Resistance**
	X		6. **Mechanical Operation**

SECTION 3 BY INSPECTION * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)

Characteristic: **Manufacturer** Sample Size*: **100%**

Acceptance Criteria: **MicroSwitch / Honeywell-Yamatake**

Receipt Inspection Plan / Report #: CGI-SNF-D-MHM-007-TP-007C,D,E,F,J

Characteristic: **Model Number** Sample Size*: **100%**

Acceptance Criteria: **SL1**

Receipt Inspection Plan / Report #: TP-007C,D,E,F,J

Characteristic: **Actuator (Note 1)** Sample Size*: **100%**

Acceptance Criteria: **Plunger**

Receipt Inspection Plan / Report #: TP-007C,D,E,F,J

Commercial Grade Item Upgrade Dedication Form	Rev. No. 3
ECN No. **N/A** CGI No. **CGI-SNF-D-MHM-007** Title: **P2, P21, P80 – Microswitch / Honeywell Yamatake Limit Switch SL1**	Page 6 of 8

SECTION 4 BY SPECIAL TEST * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)

Characteristic for Test: **Contact Rating** Samp Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **Nominal 5 amps VAC,resistive, less than 0.5V drop across contacts.**

Actual Test Value: See TP Test Plan and Report #: TP-007C,D,E,F

Characteristic for Test: **Insulation Resistance** Samp Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **Greater than 10 megohm resistance, terminal to terminal and terminal to ground at 500 vdc.**

Actual Test Value: See TP Test Plan and Report #: TP-007C,D,E,F

Characteristic for Test: **Mechanical Operation** Samp Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **Cycle switch - confirm contacts open and close with smooth operation and free release of spring**

Actual Test Value: See TP Test Plan and Report #: TP-007C,D,E,F

Section 5 Test / Inspection Summary (Acceptance Method 1)

1. SUMMARY OF VERIFIED CRITICAL CHARACTERISTICS , THEIR VERIFICATION METHODS, AND RESULTS

ITEM DESCRIPTION: Limit Switch

Critical Characteristics				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/N	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
Manufacturer	MicroSwitch / Honeywell-Yamatake	X		1, IN	TP007 C,D,E,F,J	NA	7	0	XWEST	Larry W. Peace	4/10/00
Model Number	SL1	X		1, IN	↓	↓	↓	↓	↓	↓	↓
Actuator (Note 1)	Plunger	X		1, IN	↓	↓	↓	↓	↓	↓	↓
Contact Rating	Nominal 5 amps VAC,resistive, less than 0.5V drop across contacts.		X	1, T	TP007 C,D,E,F	NA	4	0	↓	↓	↓
Insulation Resistance	Greater than 10 megohm resistance, terminal to terminal and terminal to ground at 500 vdc.		X	1, T	↓	↓	↓	↓	↓	↓	↓
Mechanical Operation	Cycle switch - confirm contacts open and close with smooth operation and free release of spring		X	1, T	↓	↓	↓	↓	↓	↓	↓

2. DISPOSITION OF UNVERIFIED OR FAILED CRITICAL CHARACTERISTICS

Critical Characteristic	Disposition

3. SIGNATURE INDICATES ALL CRITICAL CHARACTERISTICS VERIFIED SATISFACTORY OR ACCEPTABLY DISPOSITIONED AND COMMERCIAL GRADE DEDICATION IS SATISFACTORY AND COMPLETE.

See Test Plan TP-007C,D,E,F,J cited above. CES 4/11/00

Testing Agency Approval: NR CES 4/11/00 Date

Testing Agency QA Engineer: NR CES 4/11/00 Date

BUYER VERIFICATION

Design Authority: CES Larry Swenson Date 4-11-00

QA Engineer: Stephen Scott Mott Date 4-20-2000

SNF-6315, Rev. 0

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Commercial Grade Item Upgrade Dedication Form

ECN No. N/A CGI No. CGI-SNF-D-MHM-007

Title: P2, P21, P80 – Microswitch / Honeywell Yamatake Limit Switch SL1

Section 6 Contacts/Phone Numbers		
Name		Phone
Design Authority	( )	
QA	( )	
QC	( )	
Cog - Engineer	( )	
CGI Engineer	( )	
Procurement Engineer	( )	
Other	( )	

Section 7 Supporting Documentation for this Checklist		
Initial Procurement Documents		**For Critical Characteristics**
	Drawings:	
	Manuals (specify type & number):	
	Design Calculations	
	Installation Instructions	
	Operation Instructions	
	Calibration Instructions	
	Manufacturer's Recommended Spare Parts List ENCLOSED yuf 4/10/00	
X	**Other: Honeywell Series ~~LS Compact~~ Limit Switches**	**All**
Procurement Documents		**For Critical Characteristics**
	Certificate of Conformance/Compliance	
	Seismic Qualification Certificate	
	Environmental Qualification Certificate	
X	Test Report (s): **CSB(W379)-015-1-074**	
	Inspection Report (s):	
	CMTRs for ASME Pressure Retaining Materials	
	Valve Seat Leakage Report	
	Weld Records	
	Material Traceability Record	
X	**Other: SU Test SNF-CTP-IC-07**	

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Dedication Test Plan – IST-LS-2	ORIGINAL	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-007-TP-007C		
Test Specimen: Honeywell SL1 Limit Switch, Eqmt. No.: LFTSLP1AX		Page 1 of 7

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI Eng	DA	QA Post Review*
						3/12/00 NO CHANGES

* QA Post Review of Individual Revisions is allowed

ORIGINAL

Dedication Test Plan – IST-LS-2	**Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-007-TP-007C	
Test Specimen: Honeywell SL1 Limit Switch, Eqmt. No.: LFTSLP1AX	**Page 2 of 7**

ORIGINAL

In-Situ Test Procedure

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) for Craig Stevenson Date: 3/8/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Belhaven	Michael Cram	MRC
Electrician	JIM EBERHART	PCE	JW Eberhart	JWE
Electrician Quality Control	Stephen R Cowley	PCE	Stephen R Cowley	SRC
Design Authority Representative	E.R. Keller	XWest	ERKeller	ERK
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Power Supply capable of 5 amps @ 120 VAC
Megger Instrument capable of 500 VDC Test Voltage
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: HP 3457A I.D.: BAT 123 Calib. Due date: 07-29-00

Test Instrument type: HP 3457A I.D.: BAT 123 Calib. Due date: 07-30-00

Test Instrument type: AVO BM80/2 I.D.: 6410-889 Calib. Due date: 02-09-01

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE:

For this In-Situ Test, certain leads must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of leads..

1.0 Lock and tagout Main Disconnect CRN-004, or Main Disconnect MD.

2.0 Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	YES	**LFTSLP1AX**	ACC
Manufacturer:	YES	**Honeywell**	ACC
Model:	YES	**SL1**	ACC
Serial No./Lot No./Date Code:	OK	**N/A**	ACC

3.0 Perform the following testing steps:

3.1 Record: Date /Time of Test Beginning: 03-10-00 8:30 a.m.

Record: Room Temperature: 68 °F.

3.2 Mechanical Operation

Note: If switch cannot be stroked/cycled due to operational or physical restraints - make note in the note section of this procedure and proceed to the next step.

3.2.1 Cycle the switch actuator full stroke 5 or more times to confirm contacts open and close with smooth operation and free release of spring.

3.2.2 Record the following data.

Description	Record Data	Acceptance Criteria	Comments/Deviations
No of Cycles:	6	**> 5 times**	ACC
Describe Operation:	YES	**Contacts open and close with smooth operation.**	ACC
Describe release of Spring:	YES	**Free release of spring.**	ACC

3.3 Insulation Resistance Test

3.3.1 Setup the test equipment and Limit Switch specimen for insulation resistance testing.

3.3.2 Apply a nominal 500 VDC via Megger device between non-continuity terminals Common and Normally Open and then between terminal Normally Open and ground. Record the resistances.

3.3.3 Remove the Megger device.

3.3.4 Manually adjust the limit switch actuator to open the normally closed (NC) contacts.

3.3.5 Apply a nominal 500 VDC via Megger device between non-continuity terminals Common and open-Normally Closed and then between terminal Normally Closed and ground. Record the resistances.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Resistance	Acceptance Criteria	Comments/Deviations
Common	**NO**	> 6.1 Gohm	**> 10 Megohms**	Acc
NO	**Ground**	> 15 Gohm	**> 10 Megohms**	Acc
Common	**open NC***	>6.3Gohm	**> 10 Megohms**	Acc
Open NC	**Ground***	>16 Gohm	**> 10 Megohms**	Acc

* Normally closed contacts are open.

3.3.6 De-energize and remove the test equipment.

3.4 Contact Rating Test

3.4.1 Setup the test equipment and Limit Switch specimen for contact rating testing. Attach a sketch of test circuit with all test instrumentation used.

3.4.2 At limit switch, lift leads on Common terminal, Normally Closed terminal and Normally Open terminal. Record on the lifted lead log.

3.4.3 Connect the power supply to terminals Common and Normally Closed.

3.4.4 Apply a nominal 5 amps VAC, resistive, across the normally closed contacts of the test specimen.

Caution: Do not change state of contacts while energized.

3.4.5 Record the following data.

Description	Record Voltage Drop	Acceptance Criteria	Comments/Deviations
Contact Circuit (Terminals COM-NC)	.366 VAC	**< 0.5 Volts AC drop**	Acc

3.4.6 Reduce the current source to zero amps.

3.4.7 Disconnect the power supply from terminals Common and Normally Closed.

3.4.8 Manually adjust the limit switch actuator to close the normally open contacts.

Note: If switch cannot be adjusted to close the NO contacts due to operational or physical restraints - make note in the note section of this procedure and proceed to step 3.5.

3.4.9 Connect the power supply to terminals Common and Normally Open.

3.4.10 Apply a nominal 5 amps, resistive, across the closed normally open contacts of the test specimen.

3.4.11 Record the following data.

Description	Record Voltage Drop	Acceptance Criteria	Comments/Deviations
Contact Circuit (Terminals COM-Closed NO Contact):	.351 VAC	**< 0.5 Volts AC drop**	Acc

3.4.12 Reduce the current source to zero amps and remove the power supply from terminals Common and Normally Open.

3.4.13 Manually adjust the limit switch actuator to close the normally closed contacts.

3.5 Terminate the test.

3.5.1 Reland the lifted leads and verify reland in accordance with the Lifted Lead Log.

3.5.2 Retorque the terminals to 12 in-pounds.

3.5.3 Remove lockout/tagout and restore system to normal.

3.5.4 Record: Date /Time of Test End: 03-10-00 8:58 am

4.0 References

4.1 Elementary Wiring Drawings: EB-33056 Sheet 37

4.2 Wiring Diagram: 363A0033 Sheet 16

Dedication Test Plan – IST-LS-2	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-007-TP-007C	
Test Specimen: Honeywell SL1 Limit Switch, Eqmt. No.: LFTSLP1AX	Page 6 of 7

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

test was acceptable

Michael Cram
03-10-00

Notes:

Certified InstrumentationTechnician (signature) Michael Cram Date: 03-10-00
Reviewed By: L. Cadwell 3-10-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) 3/10/00 Date: 3/10/00

QA/QC (signature) T.J. Anderson Date: 3/13/00
T.J. ANDERSON

LIFTED LEAD LOG

Junction Box: Local

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
363A0033	16	101X	LFTSLP1AX	C	JWE	3/10/00	SRC	3-10-00	JWE	3/10/00	SRC	3-10-00
363A0033	16	3711X	LFTSLP1AX	NC	JWE	3/10/00	SRC	3-10-00	JWE	3/10/00	SRC	3-10-00
363A0033	16	3707X	LFTSLP1AX	NO	JWE	3/10/00	SRC	3-10-00	JWE	3/10/00	SRC	3-10-00

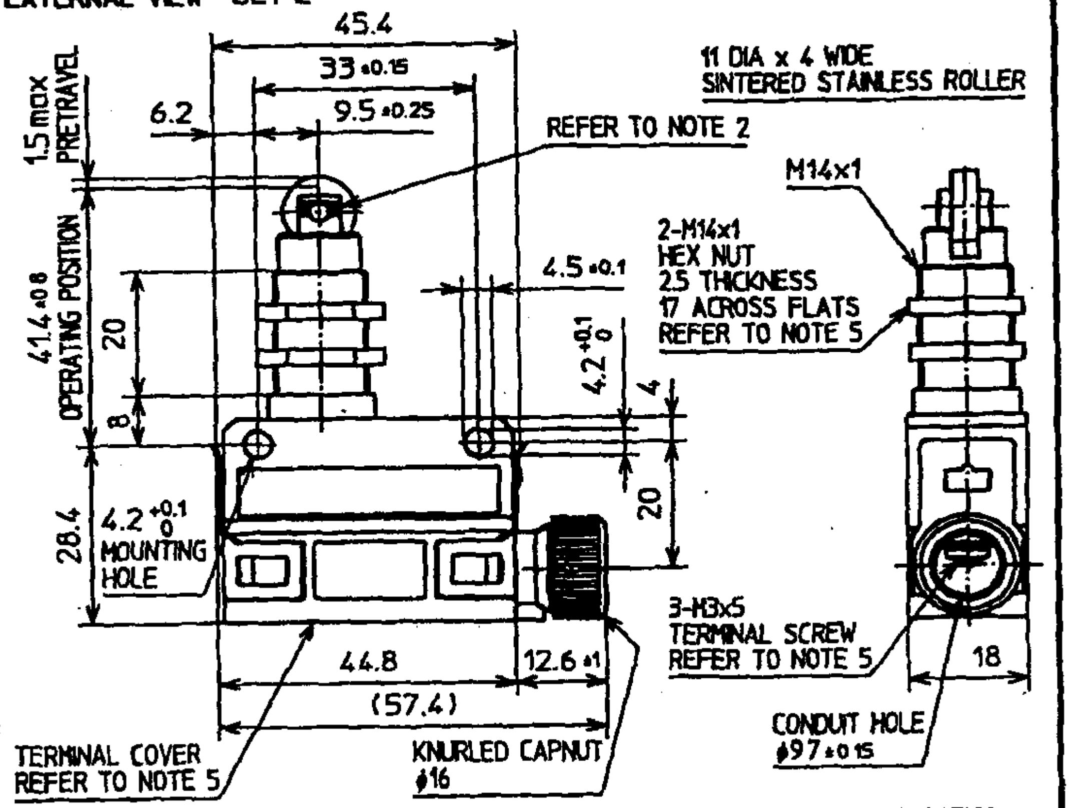
Remarks:

SP. No.

Micro Switch
Phone #1-800-537-6945
Fax #1-815-235-6545

SPECIFICATIONS

EXTERNAL VIEW SL1-E



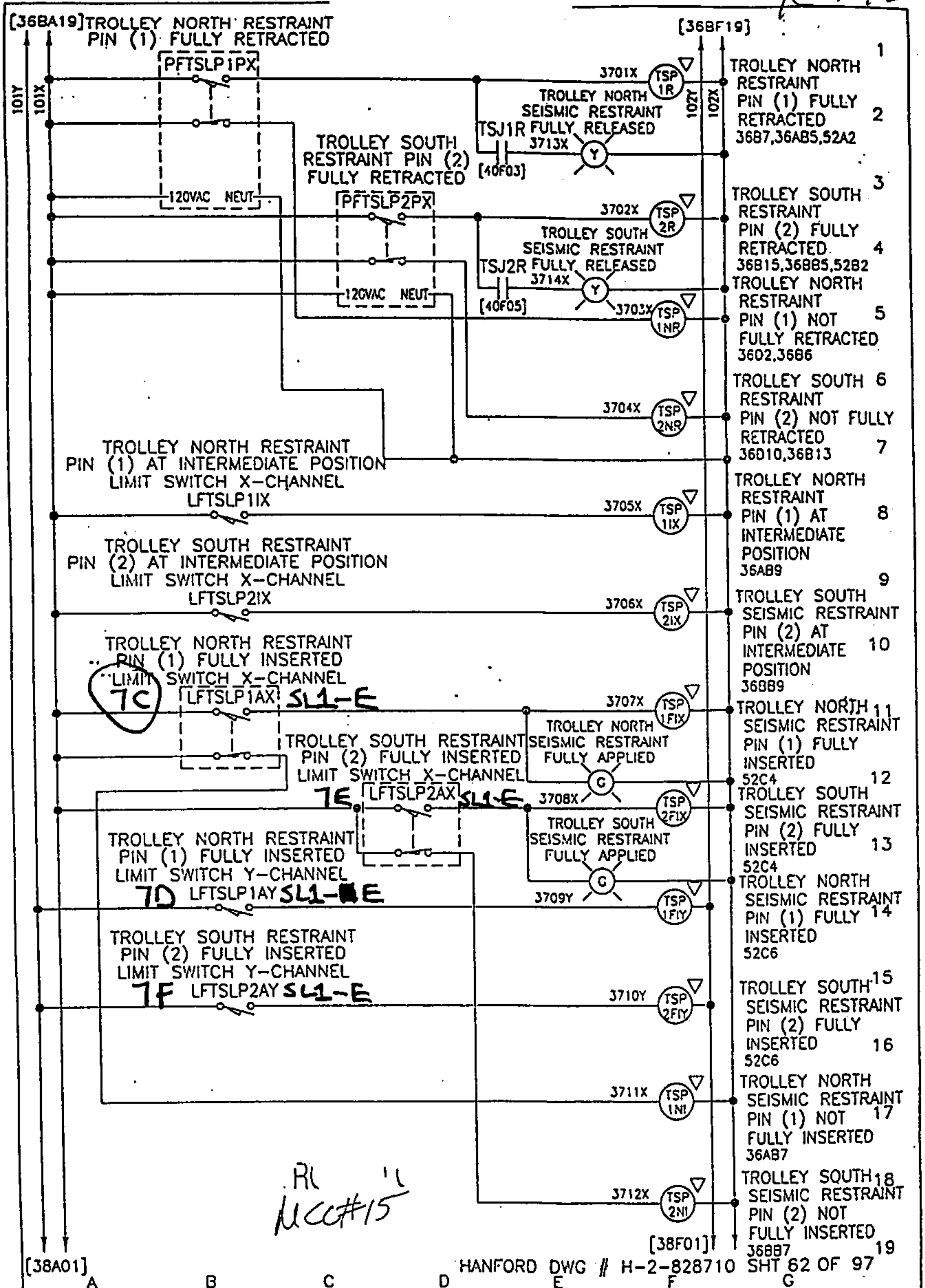
NOTES
1. SWITCH ENCLOSURE IS OF ZINC ALLOY COATED WITH BLACK FLUOROPLASTICS
TERMINAL COVER IS PLASTIC.
2. SET FULL OVERTRAVEL POSITION SO THAT TOP OF BUSHING BE WITHIN RANGE OF ROLLER PLUNGER GROOVES SHOWN WITH CROSS HATCHING.
3. SEAL IS ALREADY ASSEMBLED FOR A CABLE OF 5.8 TO 7.8 DIA.
SEAL IS ATTACHED FOR A CABLE OF 7.9 TO 9.6 DIA.
4. MOUNT COMPLETELY THE TERMINAL COVER AFTER WIRING, TO KEEP THE SEALING OF TERMINAL HOUSING. TIGHTEN FULLY THE KNURLED CAPNUT BY HAND WITHOUT USING A TOOL.
5. TERMINAL COVER, TERMINAL SCREWS AND HEX NUTS ARE FURNISHED UNASSEMBLED.

CHARACTERISTICS		
OPERATING FORCE	11.8N	MAX △
RELEASE FORCE	4.9N	MIN △
MOVEMENT DIFFERENTIAL	0.1	MAX
OVERTRAVEL	3	MIN

改番 REV	來歴 RECORD	日付 DATE	担当 BY	検閲 APPD
06	SI(MKS)-SI	8.30.'99	TATSUHARA	TOMITA

作成 DR. TATSUHARA 12.22.'93		尺度 SCALE 1:1	記入のない公差 TOL. UNLESS NOTED ±0.4
検査 CHK. ISHII 12.22.'93	形番 MODEL	SL1-*******	
承認 APPD TSUKAKOSHI 12.22.'93	名称 NAME	MINIATURE LIMIT SWITCH	
日付 DATE 12.24.'93	図番 NO.	AD51236E	改番 REV. 06 8/17

頁 改番



HANFORD DWG # H-2-828710 SHT 62 OF 97

LTR	DESCRIPTION	DATE	BY	CHK	ENG	APPD	APPD
A	GENERAL REVISIONS	7/29/97	JBR	JMH	TMM	JMH	
B	DELETE UN-NEEDED L.S.	8/20/97	JRS	JMH	TMM	JMH	LLA
C	DESIGN MODIFICATION	9/15/97	JRS	JMH	TMM	JMH	EM
D	ADD WIRE I'S	10/3/97	JRS	JMH	TMM	JMH	LLA
E	DE-INERTING & SIMPLIFICATION	3/9/98	CSB	SEO	CSN		
F	ADD NORTH AND SOUTH REFERENCES	7/20/98	CSB	SEO	CSN		

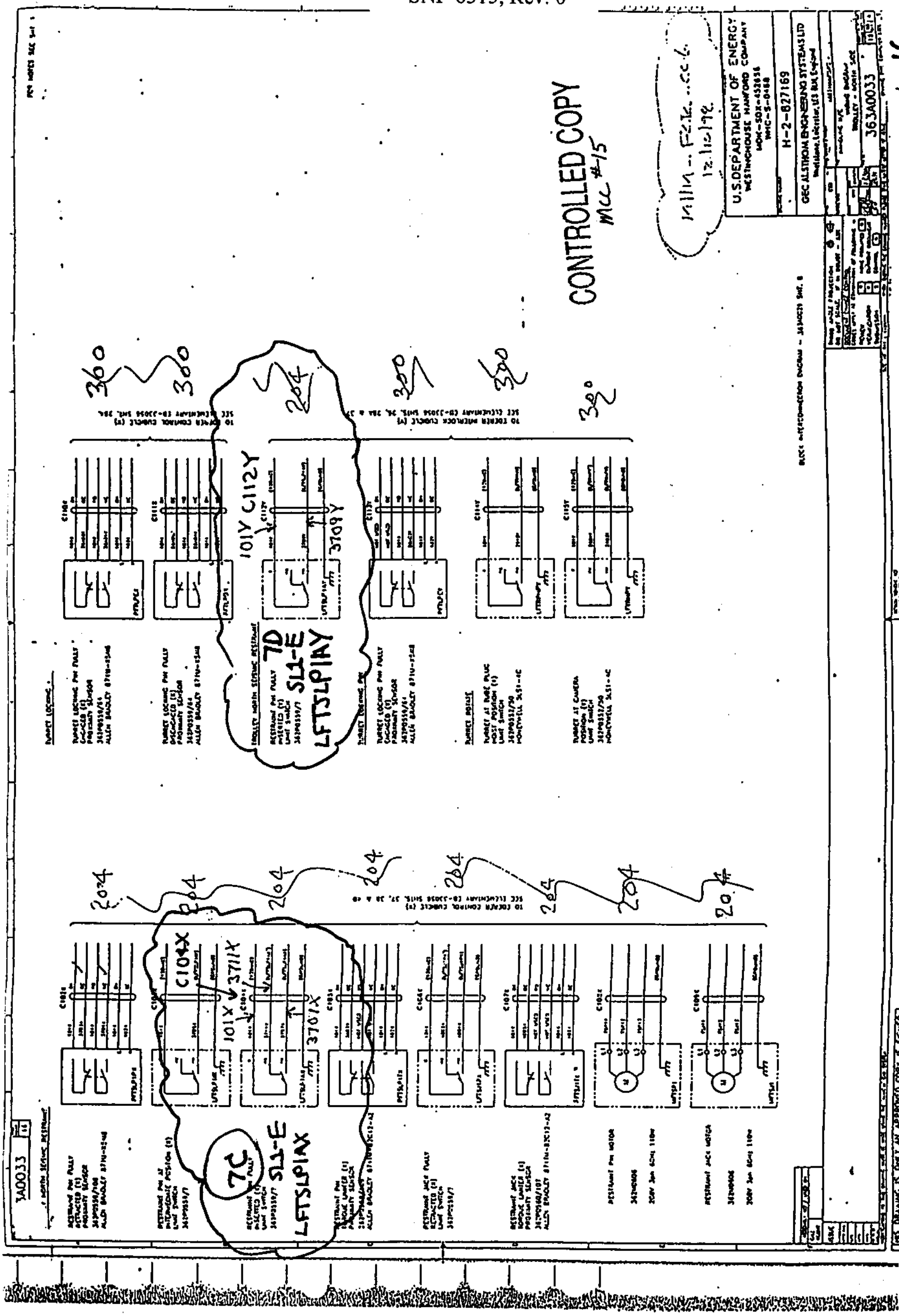
EDERER INCORPORATED

TROLLEY SEISMIC RESTRAINT PINS CONTROL ELEMENTARY

E8-33056 SHEET 37 OF 38 REV F

F-2566

Page 747


CONTROLLED COPY
MCC #15
U.S. DEPARTMENT OF ENERGY
WESTINGHOUSE HANFORD COMPANY
H-2-827169
GEC ALSTHOM ENGINEERING SYSTEMS LTD
363A0033
16
7D
SL1-E
LFTSLP1AY
101Y C112Y
3709Y
7C
SL1-E
LFTSLP1AX
C104X
101X
3711X
3707X
3A0033

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Dedication Test Plan – IST-LS-2 ORIGINAL Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-007-TP-007D
Test Specimen: Honeywell SL1 Limit Switch, Eqmt. No.: LFTSLP1AY Page 1 of 6

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI Eng	DA	QA Post Review*
						3/17/00 NO CHANGES

* QA Post Review of Individual Revisions is allowed

ORIGINAL

Dedication Test Plan – IST-LS-2 **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-007-TP-007D
Test Specimen: Honeywell SL1 Limit Switch, Eqmt. No.: LFTSLP1AY **Page 2 of 6**

ORIGINAL

In-Situ Test Procedure

Test Procedure Approval (Obtain prior to testing):
This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) Craig Swenson Date: 3/8/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	MRE	Michael Cram	MRE
Electrician	J W EBERHART	PCE	J W Eberhart	JWE
Electrician Quality Control	Stephen R. Conley	PCE	Stephen R. Conley	SRC
Design Authority Representative	E.R. Keller	Kaiser	E R Keller	ERK
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:
Power Supply capable of 5 amps @ 120 VAC
Megger Instrument capable of 500 VDC Test Voltage
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: HP3457A I.D.: BAT 123 Calib. Due date: 07-29-00

Test Instrument type: HP3457A I.D.: BAT 124 Calib. Due date: 07-30-00

Test Instrument type: AVO BM80/2 I.D.: 6410-889 Calib. Due date: 02-09-01

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE:

For this In-Situ Test, certain leads must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of leads..

1.0 Lock and tagout Main Disconnect CRN-004, or Main Disconnect MD.

2.0 Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	YES	**LFTSLP1AY**	Acc
Manufacturer:	YES	**Honeywell**	Acc
Model:	YES	**SL1**	Acc
Serial No./Lot No./Date Code:	OK	**N/A**	Acc

3.0 Perform the following testing steps:

3.1 Record: Date /Time of Test Beginning: 03-10-00 8:50 a.m.

Record: Room Temperature: 68 °F.

3.2 Mechanical Operation

Note: If switch cannot be stroked/cycled due to operational or physical restraints - make note in the note section of this procedure and proceed to the next step.

3.2.1 Cycle the switch actuator full stroke 5 or more times to confirm contacts open and close with smooth operation and free release of spring.

3.2.2 Record the following data.

Description	Record Data	Acceptance Criteria	Comments/Deviations
No of Cycles:	YES	**> 5 times**	Acc
Describe Operation:	YES	**Contacts open and close with smooth operation.**	Acc
Describe release of Spring:	YES	**Free release of spring.**	Acc

3.3 Insulation Resistance Test

3.3.1 Setup the test equipment and Limit Switch specimen for insulation resistance testing.

3.3.2 Apply a nominal 500 VDC via Megger device between non-continuity terminals Common and Normally Open and then between terminal Normally Open and ground. Record the resistances.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Resistance	Acceptance Criteria	Comments/Deviations
Common	**NO**	>10Gohm	**> 10 Megohms**	Acc
NO	**Ground**	> 14 Gohm	**> 10 Megohms**	Acc

* Normally closed contacts are open.

3.3.3 De-energize and remove the test equipment.

3.4 Contact Rating Test

3.4.1 Manually adjust the limit switch actuator to close the normally open contacts.

Note: If switch cannot be adjusted to close the NO contacts due to operational or physical restraints - make note in the note section of this procedure and proceed to step 3.5.

3.4.2 Connect the power supply to terminals Common and Normally Open.

3.4.3 Apply a nominal 5 amps, resistive, across the **closed normally open** contacts of the test specimen.

3.4.4 Record the following data:

Description	Record Voltage Drop	Acceptance Criteria	Comments/Deviations
Contact Circuit (Terminals COM-Closed NO Contact):	.492 VAC	**< 0.5 Volts AC drop**	Acc

3.4.5 Reduce the current source to zero amps and remove the power supply from terminals Common and Normally Open.

3.4.6 Manually adjust the limit switch actuator to close the normally closed contacts (If necessary).

3.5 Terminate the test.

3.5.1 Reland the lifted leads and verify reland in accordance with the Lifted Lead Log.

3.5.2 Retorque the terminals to 12 in-pounds.

3.5.3 Remove lockout/tagout and restore system to normal.

3.5.4 Record: Date /Time of Test End: 03-10-00 9:10a.m.

4.0 References

4.1 Elementary Wiring Drawings: EB-33056 Sheet 37

4.2 Wiring Diagram: 363A0033 Sheet 16

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Test was acceptable

Michael Cram

03-10-00

Notes:

Certified InstrumentationTechnician (signature) Michael Cram Date: 03-10-00

Reviewed By: J. Castro 3/10/00

Completed Test Evaluation Approval:

Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) 3/10/00 Date: 3/10/00

QA/QC (signature) T.R. Anderson Date: 3/13/00

T ZANDERSON

LIFTED LEAD LOG

Junction Box: Local

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
363A0033	16	101Y	LFTSLP1AY	C	JWE	3/10/00	SRL	3-10-00	JWE	3/10/00	SRL	3-10-00
363A0033	16	3709Y	LFTSLP1AY	NO	JWE	3/10/00	SRL	3-10-00	JWE	3/10/00	SRL	3-10-00

Remarks:

Page 753

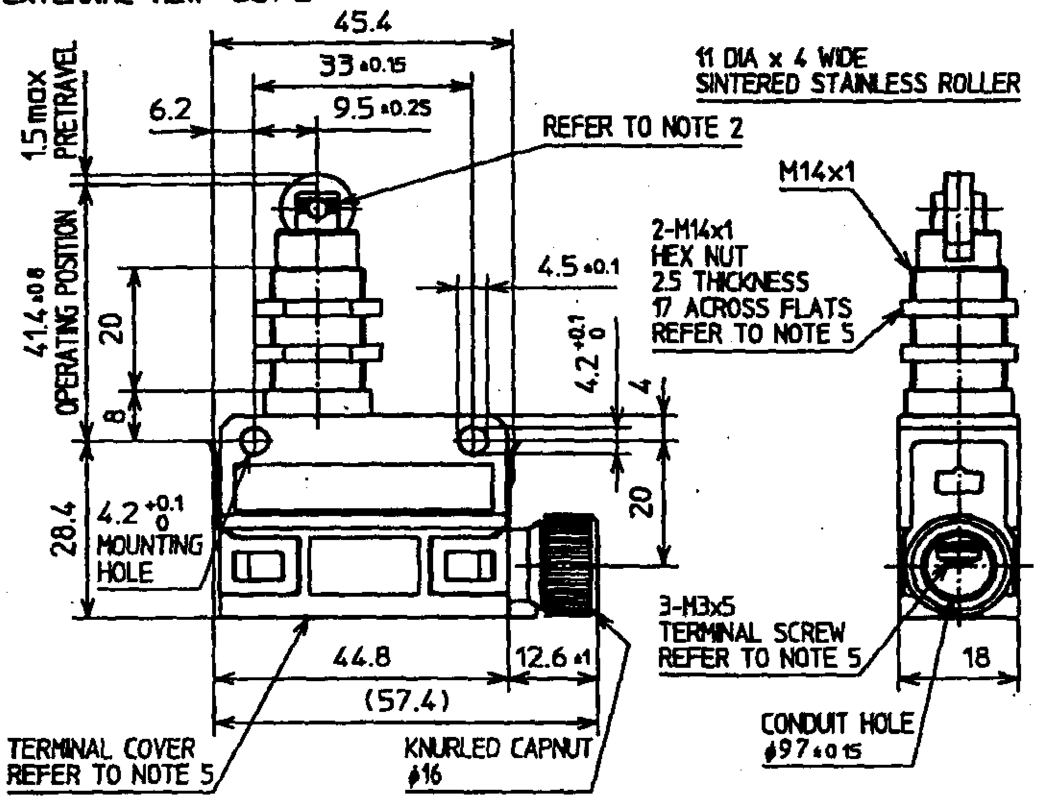
Page 154

Micro Switch
Phone #1-800-537-6945
Fax #1-815-235-6545

SP. No.

SPECIFICATIONS

EXTERNAL VIEW SL1-E

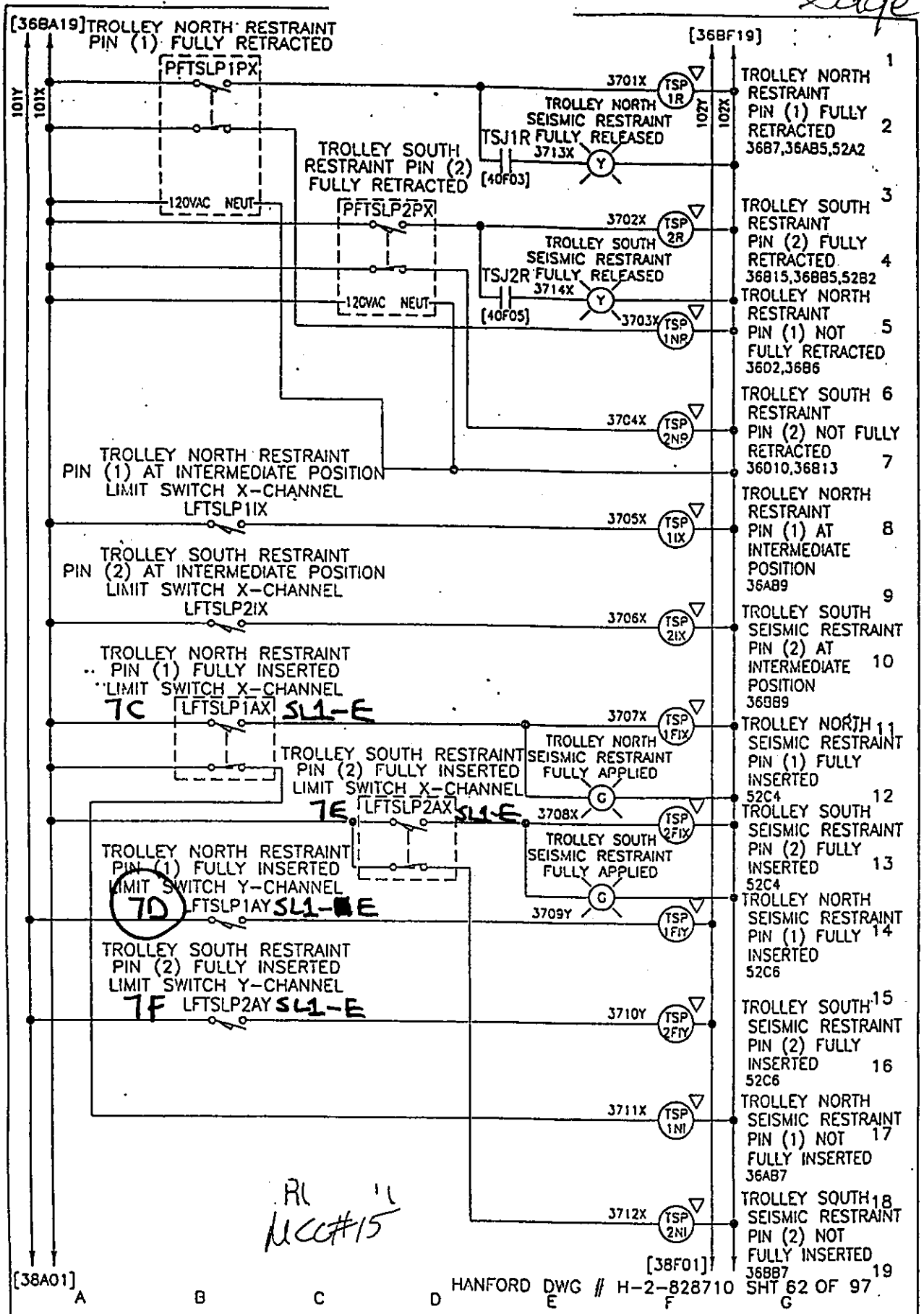


NOTES
1. SWITCH ENCLOSURE IS OF ZINC ALLOY COATED WITH BLACK FLUOROPLASTICS TERMINAL COVER IS PLASTIC.
2. SET FULL OVERTRAVEL POSITION SO THAT TOP OF BUSHING BE WITHIN RANGE OF ROLLER PLUNGER GROOVES SHOWN WITH CROSS HATCHING.
3. SEAL IS ALREADY ASSEMBLED FOR A CABLE OF 5.8 TO 7.8 DIA. SEAL IS ATTACHED FOR A CABLE OF 7.9 TO 9.6 DIA.
4. MOUNT COMPLETELY THE TERMINAL COVER AFTER WIRING, TO KEEP THE SEALING OF TERMINAL HOUSING. TIGHTEN FULLY THE KNURLED CAPNUT BY HAND WITHOUT USING A TOOL.
5. TERMINAL COVER, TERMINAL SCREWS AND HEX NUTS ARE FURNISHED UNASSEMBLED.

CHARACTERISTICS			
OPERATING FORCE	11.8N	MAX	△
RELEASE FORCE	4.9N	MIN	△
MOVEMENT DIFFERENTIAL	0.1	MAX	
OVERTRAVEL	3	MIN	

改番 REV	来歴 RECORD	日付 DATE	担当 BY	検印 APPD
06	SI (MKS) → SI	8.30.'99	TATSUHARA	TOMITA

作成 DR. TATSUHARA 12.28.'93		尺度 SCALE 1:1	記入なき公差 TOL. UNLESS NOTED ±0.4
検図 CHK. KISAITO 12.28.'93	形番 MODEL	SL1-*******	
承認 APPD TSUKAKOSHI 12.28.'93	名称 NAME	MINIATURE LIMIT SWITCH	
日付 DATE 12.28.'93	図番 NO.	AD51236E	改番 REV. 06 8/17



LTR	DESCRIPTION	DATE	BY	CHK	ENG	APPD	APPD
A	GENERAL REVISIONS	7/29/97	JBR	JMH	TMM	JMH	
B	DELETE UN-NEEDED L.S.	8/20/97	JRS	JMH	TMM	JMH	LLA
C	DESIGN MODIFICATION	9/15/97	JRS	AMH	TMM	JMH	EM
D	ADD WIRE #'S	10/3/97	JRS	AMH	TMM	JMH	LLA
E	RE-NUMBERING & SIMPLIFICATION	3/3/98	CSB	SED	CSB		
F	ADD NORTH AND SOUTH REFERENCES	7/20/98	CSB	SED	CSB		

DRAWN	J B RUPP	5/5/97
CHKD	T M MEADOWS	7/7/97
ENG	T M MEADOWS	9/22/97
APPD	J M MARCHUK	7/7/97
APPD	L L ANDERSON	9/5/97
APPD		

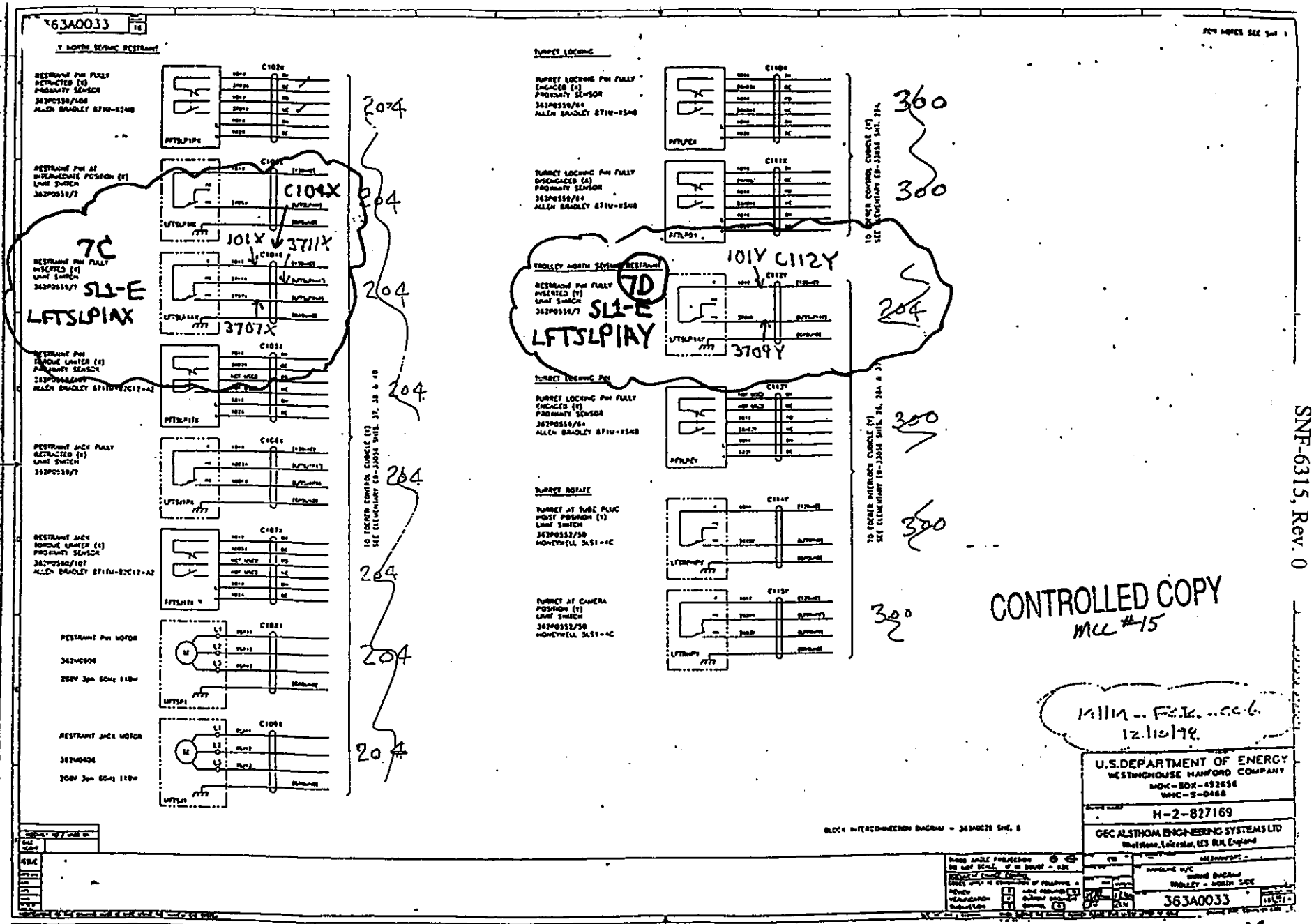
EDERER INCORPORATED — Eastern Washington Counties — Star Counties

TROLLEY SEISMIC RESTRAINT PINS CONTROL ELEMENTARY

SCALE N/A — F-25066

ENG. NO. E8-33056 — SHEET 37 OF 38 — REV F

E8-33056 SH 37



SNF-6315, Rev. 0

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ORIGINAL

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Dedication Test Plan – IST-LS-2 Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-007-TP-007E
Test Specimen: Honeywell SL1 Limit Switch, Eqmt. No.: LFTSLP2AX Page 1 of 7

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI Eng	DA	QA Post Review*
						3/13/00 NO CHANGE

* QA Post Review of Individual Revisions is allowed

ORIGINAL

Dedication Test Plan – IST-LS-2 **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-007-TP-007E
Test Specimen: Honeywell SL1 Limit Switch, Eqmt. No.: LFTSLP2AX **Page 2 of 7**

In-Situ Test Procedure

ORIGINAL

Test Procedure Approval (Obtain prior to testing):
This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) Craig Swenson Date: 3/8/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Belhaven	Michael Cram	MRC
Electrician	J W EBERHART	PCE	JW Eberhart	JWE
Electrician Quality Control	Stephen P. Cowley	PCE	Stephen P. Cowley	SPC
Design Authority Representative	E.R. Kahler	XWest	ERKahler	ERK
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:
Power Supply capable of 5 amps @ 120 VAC
Megger Instrument capable of 500 VDC Test Voltage
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: AVO BM80/2 I.D.: GA10-889 Calib. Due date: 02-09-01

Test Instrument type: HP 3457A I.D.: BAT123 Calib. Due date: 07-29-00

Test Instrument type: HP-3457A I.D.: BAT124 Calib. Due date: 07-30-00

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE:

For this In-Situ Test, certain leads must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of leads..

1.0 Lock and tagout Main Disconnect CRN-004, or Main Disconnect MD.

2.0 Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	YES	**LFTSLP2AX**	Acc
Manufacturer:	YES	**Honeywell**	Acc
Model:	YES	**SL1**	Acc
Serial No./Lot No./Date Code:	OK	**N/A**	Acc

3.0 Perform the following testing steps:

3.1 Record: Date /Time of Test Beginning: 03-09-00 70 MEA 1:07 P.M.

Record: Room Temperature: 70 °F.

3.2 Mechanical Operation

Note: If switch cannot be stroked/cycled due to operational or physical restraints - make note in the note section of this procedure and proceed to the next step.

3.2.1 Cycle the switch actuator full stroke 5 or more times to confirm contacts open and close with smooth operation and free release of spring.

3.2.2 Record the following data.

Description	Record Data	Acceptance Criteria	Comments/Deviations
No of Cycles:	YES	**> 5 times**	Acc
Describe Operation:	YES	**Contacts open and close with smooth operation.**	Acc
Describe release of Spring:	YES	**Free release of spring.**	Acc

3.3 Insulation Resistance Test

3.3.1 Setup the test equipment and Limit Switch specimen for insulation resistance testing.

3.3.2 Apply a nominal 500 VDC via Megger device between non-continuity terminals Common and Normally Open and then between terminal Normally Open and ground. Record the resistances.

3.3.3 Remove the Megger device.

3.3.4 Manually adjust the limit switch actuator to open the normally closed (NC) contacts.

3.3.5 Apply a nominal 500 VDC via Megger device between non-continuity terminals Common and open Normally Closed and then between terminal Normally Closed and ground. Record the resistances.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Resistance	Acceptance Criteria	Comments/Deviations
Common	**NO**	> 6.1 Gohms	**> 10 Megohms**	Acc
NO	**Ground**	> 12.5 Gohms	**> 10 Megohms**	Acc
Common	**open NC***	> 40 Gohms	**> 10 Megohms**	Acc
Open NC	**Ground***	> 12 Gohms	**> 10 Megohms**	Acc

*Normally closed contacts are open.

3.3.6 De-energize and remove the test equipment.

3.4 Contact Rating Test

3.4.1 Setup the test equipment and Limit Switch specimen for contact rating testing. Attach a sketch of test circuit with all test instrumentation used.

3.4.2 At limit switch, lift leads on Common terminal, Normally Closed terminal and Normally Open terminal. Record on the lifted lead log.

3.4.3 Connect the power supply to terminals Common and Normally Closed.

3.4.4 Apply a nominal 5 amps VAC, resistive, across the normally closed contacts of the test specimen.

Caution: Do not change state of contacts while energized.

3.4.5 Record the following data.

Description	Record Voltage Drop	Acceptance Criteria	Comments/Deviations
Contact Circuit (Terminals COM-NC)	.493 VAC	**< 0.5 Volts AC drop**	Acc

3.4.6 Reduce the current source to zero amps.

3.4.7 Disconnect the power supply from terminals Common and Normally Closed.

3.4.8 Manually adjust the limit switch actuator to close the normally open contacts.

Note: If switch cannot be adjusted to close the NO contacts due to operational or physical restraints - make note in the note section of this procedure and proceed to step 3.5.

3.4.9 Connect the power supply to terminals Common and Normally Open.

3.4.10 Apply a nominal 5 amps, resistive, across the closed normally open contacts of the test specimen.

3.4.11 Record the following data.

Description	Record Voltage Drop	Acceptance Criteria	Comments/Deviations
Contact Circuit (Terminals COM-Closed NO Contact):	.361 VAC	**< 0.5 Volts AC drop**	Acc

3.4.12 Reduce the current source to zero amps and remove the power supply from terminals Common and Normally Open.

3.4.13 Manually adjust the limit switch actuator to close the normally closed contacts.

3.5 Terminate the test.

3.5.1 Reland the lifted leads and verify reland in accordance with the Lifted Lead Log.

3.5.2 Retorque the terminals to 12 in-pounds.

3.5.3 Remove lockout/tagout and restore system to normal.

3.5.4 Record: Date /Time of Test End: 03-09-00 1:42

4.0 References

4.1 Elementary Wiring Drawings: EB-33056 Sheet 37

4.2 Wiring Diagram: 363A0033 Sheet 17

Dedication Test Plan – IST-LS-2	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-007-TP-007E	
Test Specimen: Honeywell SL1 Limit Switch, Eqmt. No.: LFTSLP2AX	Page 6 of 7

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Devices under test passed all parameters.

Michael Cram
03-09-00

Notes:

Certified InstrumentationTechnician (signature) Michael Cram Date: 03-09-00
Reviewed By: T. Cadwell 3-10-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) 3/9/00 Craig Swenson Date: 3-9-00

QA/QC (signature) T.Z. Anderson Date: 3/13/00.
T Z ANDERSON

LIFTED LEAD LOG

Junction Box: Local

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
363A0033	17	101X	LFTSLP2AX	C	JWE	3/9/00	SRC	3-9-00	JWE	3/9/00	SRC	3-9-00
363A0033	17	3712X	LFTSLP2AX	NC	JWE	3/9/00	SRC	3-9-00	JWE	3/9/00	SRC	3-9-00
363A0033	17	3708X	LFTSLP2AX	NO	JWE	3/9/00	SRC	3-9-00	JWE	3/9/00	SRC	3-9-00

Remarks:

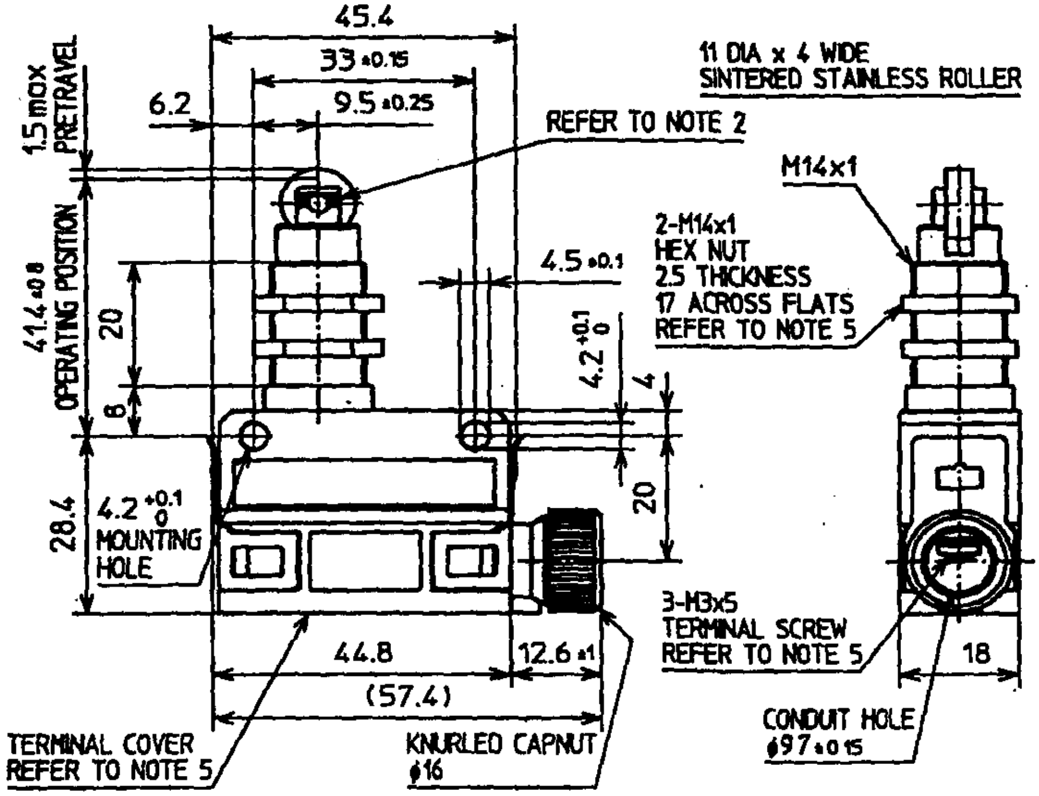
Page 764

SP. No.

Micro Switch
Phone #1-800-537-6945
Fax #1-815-235-6545

SPECIFICATIONS

EXTERNAL VIEW SL1-E



NOTES
1. SWITCH ENCLOSURE IS OF ZINC ALLOY COATED WITH BLACK FLUOROPLASTICS
   TERMINAL COVER IS PLASTIC
2. SET FULL OVERTRAVEL POSITION SO THAT TOP OF BUSHING BE WITHIN RANGE OF ROLLER PLUNGER GROOVES SHOWN WITH CROSS HATCHING.
3. SEAL IS ALREADY ASSEMBLED FOR A CABLE OF 5.8 TO 7.8 DIA.
   SEAL IS ATTACHED FOR A CABLE OF 7.9 TO 9.6 DIA.
4. MOUNT COMPLETELY THE TERMINAL COVER AFTER WIRING, TO KEEP THE SEALING OF TERMINAL HOUSING. TIGHTEN FULLY THE KNURLED CAPNUT BY HAND WITHOUT USING A TOOL.
5. TERMINAL COVER, TERMINAL SCREWS AND HEX NUTS ARE FURNISHED UNASSEMBLED.

CHARACTERISTICS		
OPERATING FORCE	11.8N	MAX ⚠
RELEASE FORCE	4.9N	MIN ⚠
MOVEMENT DIFFERENTIAL	0.1	MAX
OVERTRAVEL	3	MIN

改番 REV	記事 RECORD	日付 DATE	担当 BY	検認 APPD
06	SI (MKS) → SI	8.30.'99	TATSUHARA	TOMITA

作成 DR.	TATSUHARA 12.22.'93
検図 CHK	H.SATO 12.22.'93
承認 APPD	TSUKAKOSHI 12.22.'93
日付 DATE	12.24.'93
尺度 SCALE	1:1
記入のない公差 TOL. UNLESS NOTED	±0.4
形番 MODEL	SL1-*******
名称 NAME	MINIATURE LIMIT SWITCH
図番 NO.	AD51236E
改番 REV.	06
	8/17

頁 改番

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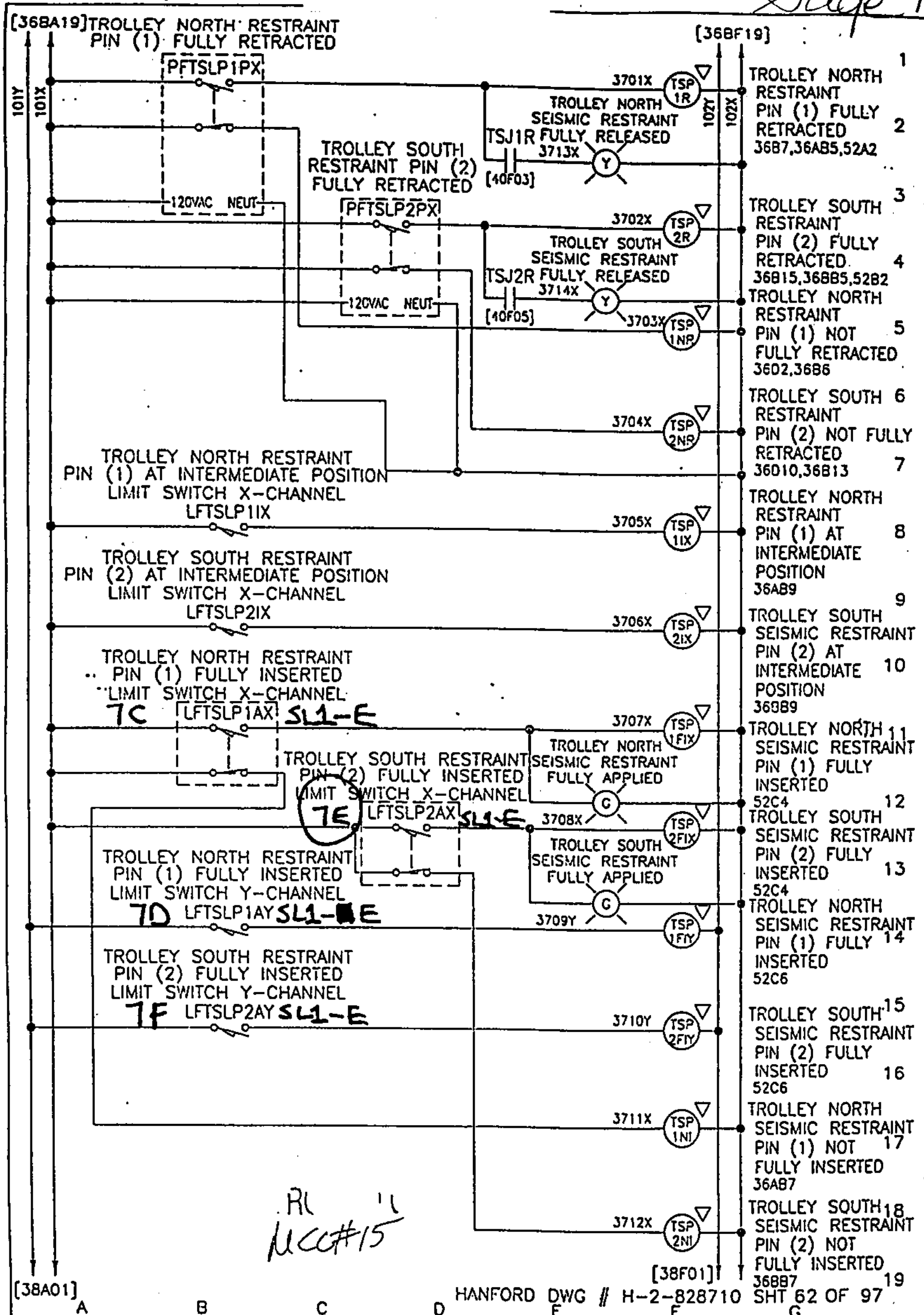


HANFORD DWG # H-2-828710 SHT 62 OF 97

REVISIONS

LTR	DESCRIPTION	DATE	BY	CHK	ENG	APPD	APPD
A	GENERAL REVISIONS	7/29/97	JBR	JMH	TMM	JMH	
B	DELETE UN-NEEDED L.S.	8/20/97	JRS	JMH	TMM	JMH	LLA
C	DESIGN MODIFICATION	9/15/97	JRS	AHH	TMM	JMH	EM
D	ADD WIRE #'S	10/3/97	JRS	AHH	TVV	JMH	LLA
E	DE-WIERING & SIMPLIFICATION	3/9/98	CSB	SED	CSB		
F	ADD NORTH AND SOUTH REFERENCES	7/20/98	CSO	SED	CSB		

DRAWN	J B RUPP	5/5/97
DESIGN	T M MEADOWS	7/7/97
CHK	T M MEADOWS	5/30/97
APPD	J M HAMMECK	7/7/97
APPD	L L ANDERSON	8/7/97
APPD		

SCALE N/A

FIRST USED ON F-2566

EDERER INCORPORATED

EDERER CRANES · WASHINGTON CRANES · STAR CRANES

TROLLEY SEISMIC RESTRAINT PINS CONTROL ELEMENTARY

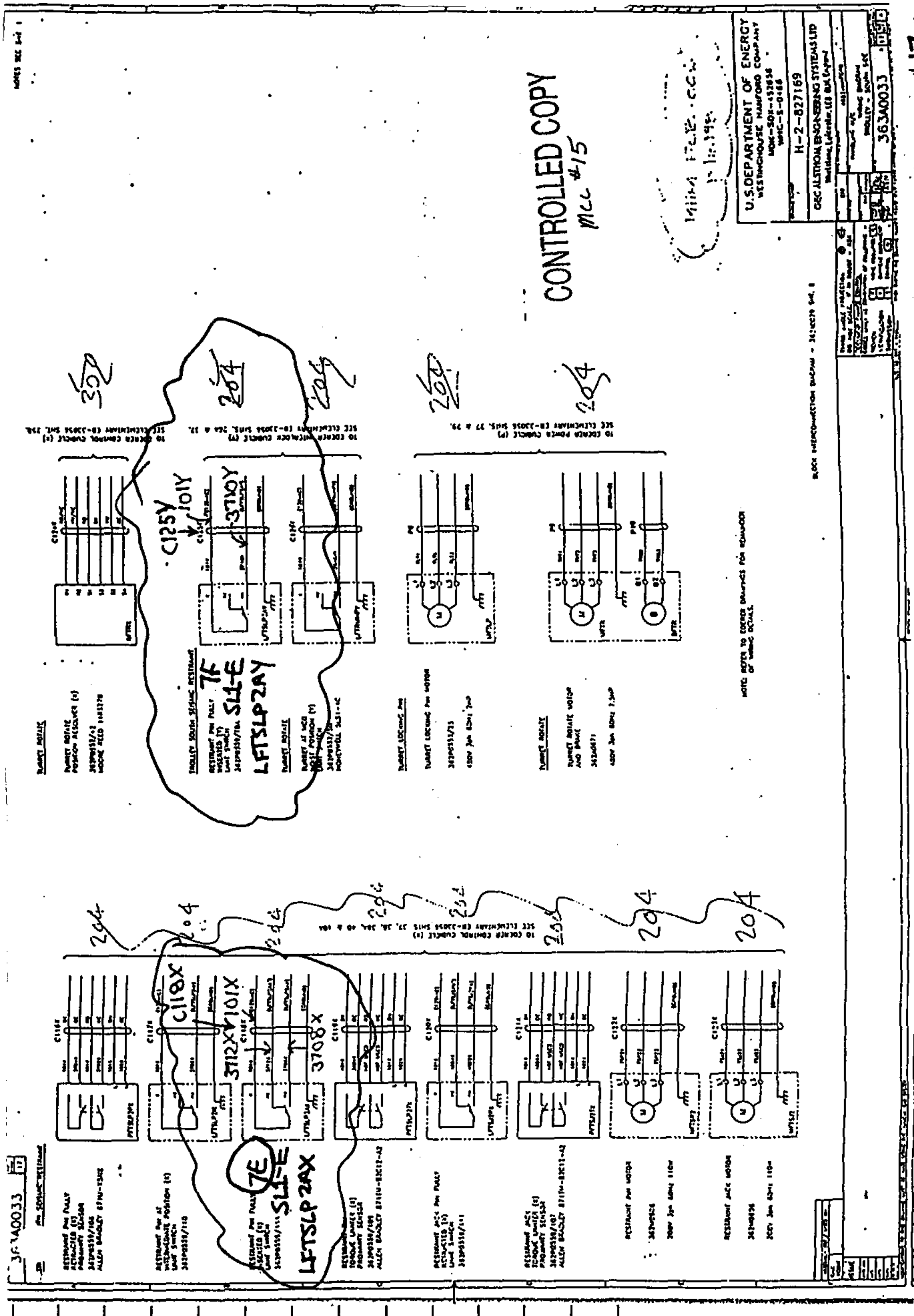
DWG NO. E3-33056

SHEET 37 OF 38

REV F

E3-33056 SH 37

Page 76b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U.S. DEPARTMENT OF ENERGY
WESTINGHOUSE HANFORD COMPANY
H-2-827169
GEC ALSTHOM ENGINEERING SYSTEMS LTD
36340033
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101X
3712X
3708X

ORIGINAL

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Dedication Test Plan – IST-LS-2 Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-007-TP-007F
Test Specimen: Honeywell SL1 Limit Switch, Eqmt. No.: LFTSLP2AY Page 1 of 6

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI Eng	DA	QA Post Review*
						3/13/00 NO CHANGE

* QA Post Review of Individual Revisions is allowed

ORIGINAL

Dedication Test Plan – IST-LS-2	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-007-TP-007F	
Test Specimen: Honeywell SL1 Limit Switch, Eqmt. No.: LFTSLP2AY	Page 2 of 6

ORIGINAL

In-Situ Test Procedure

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) Craig Swenson Date: 3/8/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Belhaven	Michael Cram	MRC
Electrician	JW EBERHART	PCE	JW Eberhart	JWE
Electrician Quality Control	Stephen R. Conley	PCE	Stephen R. Conley	SRC
Design Authority Representative	E.R. Kahler	XWest	ERKahler	ERK
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Power Supply capable of 5 amps @ 120 VAC
Megger Instrument capable of 500 VDC Test Voltage
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: Avo BM80/2 I.D.: 6410-889 Calib. Due date: 02-09-01

Test Instrument type: HP 3457A I.D.: BAT 123 Calib. Due date: 07-29-00

Test Instrument type: HP 3457A I.D.: BAT 124 Calib. Due date: 07-30-00

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE:

For this In-Situ Test, certain leads must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of leads..

1.0 Lock and tagout Main Disconnect CRN-004, or Main Disconnect MD.

2.0 Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	YES	**LFTSLP2AY**	Acc
Manufacturer:	YES	**Honeywell**	Acc
Model:	YES	**SL1**	Acc
Serial No./Lot No./Date Code:	OK	**N/A**	Acc

3.0 Perform the following testing steps:

3.1 Record: Date /Time of Test Beginning: 03-09-00 1:17 p.m.

Record: Room Temperature: 70 °F.

3.2 Mechanical Operation

Note: If switch cannot be stroked/cycled due to operational or physical restraints - make note in the note section of this procedure and proceed to the next step.

3.2.1 Cycle the switch actuator full stroke 5 or more times to confirm contacts open and close with smooth operation and free release of spring.

3.2.2 Record the following data.

Description	Record Data	Acceptance Criteria	Comments/Deviations
No of Cycles:	YES	**> 5 times**	Acc
Describe Operation:	YES	**Contacts open and close with smooth operation.**	Acc
Describe release of Spring:	YES	**Free release of spring.**	Acc

3.3 Insulation Resistance Test

3.3.1 Setup the test equipment and Limit Switch specimen for insulation resistance testing.

3.3.2 Apply a nominal 500 VDC via Megger device between non-continuity terminals Common and Normally Open and then between terminal Normally Open and ground. Record the resistances.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Resistance	Acceptance Criteria	Comments/Deviations
Common	**NO**	> 8.4Gohm	**> 10 Megohms**	Acc
NO	**Ground**	>13.5Gohm	**> 10 Megohms**	Acc

* Normally closed contacts are open.

3.3.3 De-energize and remove the test equipment.

3.4 Contact Rating Test

3.4.1 Manually adjust the limit switch actuator to close the normally open contacts.

Note: If switch cannot be adjusted to close the NO contacts due to operational or physical restraints - make note in the note section of this procedure and proceed to step 3.5.

3.4.2 Connect the power supply to terminals Common and Normally Open.

3.4.3 Apply a nominal 5 amps, resistive, across the **closed normally open** contacts of the test specimen.

3.4.4 Record the following data:

Description	Record Voltage Drop	Acceptance Criteria	Comments/Deviations
Contact Circuit (Terminals COM-Closed NO Contact):	.424 VAC	**< 0.5 Volts AC drop**	Acc

3.4.5 Reduce the current source to zero amps and remove the power supply from terminals Common and Normally Open.

3.4.6 Manually adjust the limit switch actuator to close the normally closed contacts (If necessary).

3.5 Terminate the test.

3.5.1 Reland the lifted leads and verify reland in accordance with the Lifted Lead Log.

3.5.2 Retorque the terminals to 12 in-pounds.

Dedication Test Plan – IST-LS-2	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-007-TP-007F	
Test Specimen: Honeywell SL1 Limit Switch, Eqmt. No.: LFTSLP2AY	Page 5 of 6

3.5.3 Remove lockout/tagout and restore system to normal.

3.5.4 Record: Date /Time of Test End: 03-09-00 1:46 p.m.

4.0 References

4.1 Elementary Wiring Drawings: EB-33056 Sheet 37

4.2 Wiring Diagram: 363A0033 Sheet 17

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Device under test passed all parameters. Michael Cram

Notes:

Certified InstrumentationTechnician (signature) Michael Cram Date: 03-09-00

Reviewed By: J. Carlisle 3-10-00

Completed Test Evaluation Approval:

Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) 3/9/00 [signature] Date: 3-9-00

QA/QC (signature) [signature] Date: 3/13/00

LIFTED LEAD LOG

Junction Box: Local

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
363A0033	17	101Y	LFTSLP2AY	C	JWE	3/9/00	SRL	3-9-00	JWE	3/9/00	SRL	3-9-00
363A0033	17	3710Y	LFTSLP2AY	NO	JWE	3/9/00	SRL	3-9-00	JWE	3/9/00	SRL	3-9-00

Remarks:

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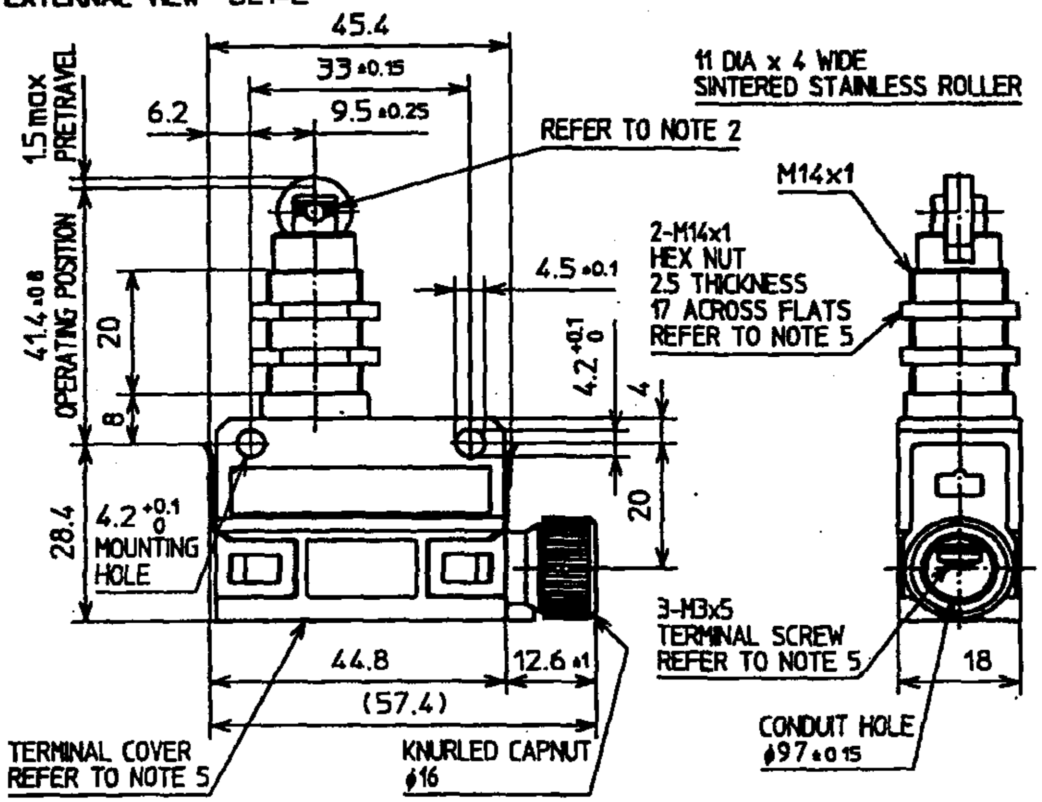
Micro Switch
Phone #1-800-537-6945
Fax #1-815-235-6545

SPECIFICATIONS

EXTERNAL VIEW SL1-E

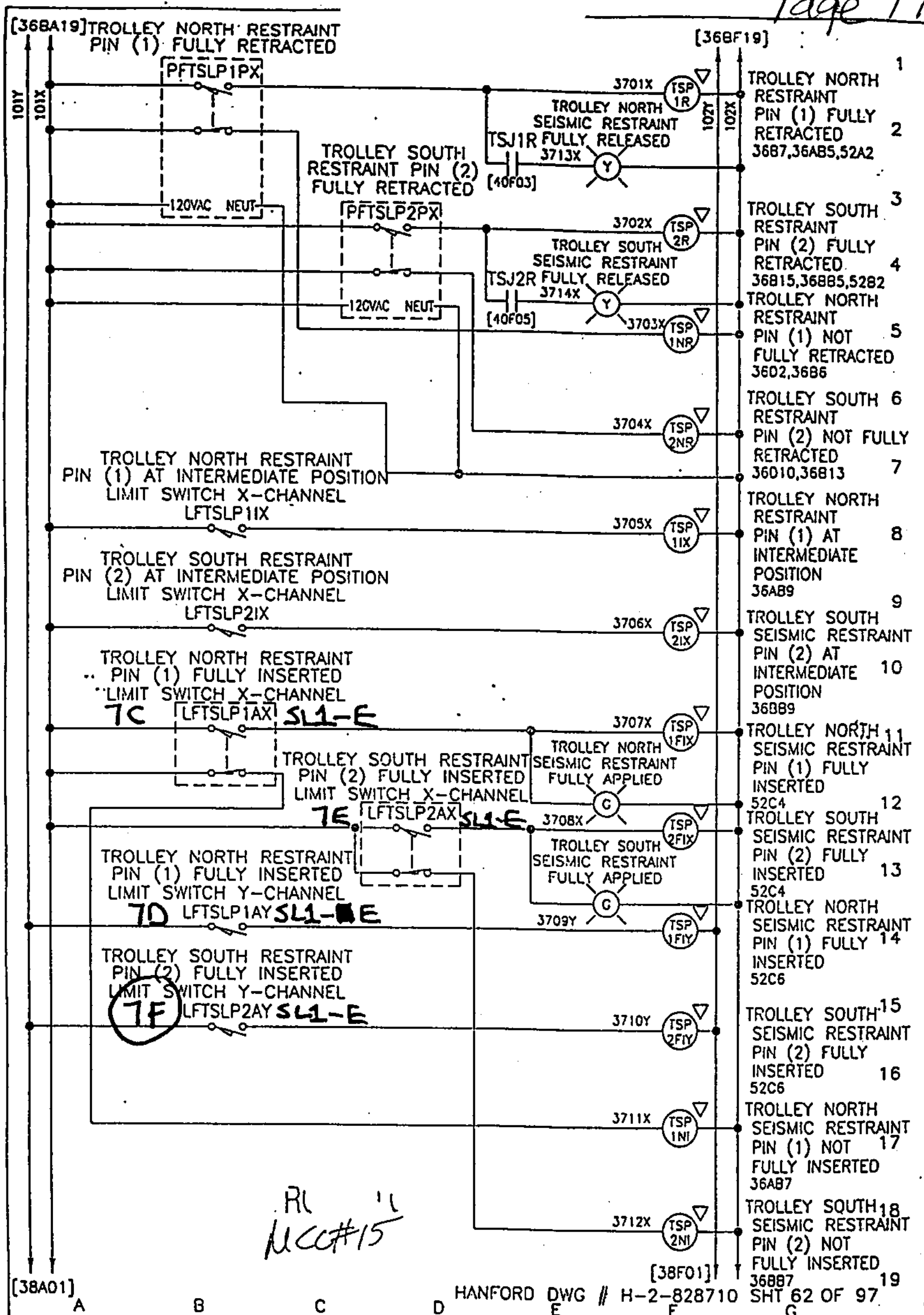


NOTES
1. SWITCH ENCLOSURE IS OF ZINC ALLOY COATED WITH BLACK FLUOROPLASTICS
TERMINAL COVER IS PLASTIC.
2. SET FULL OVERTRAVEL POSITION SO THAT TOP OF BUSHING BE WITHIN RANGE OF ROLLER PLUNGER GROOVES SHOWN WITH CROSS HATCHING.
3. SEAL IS ALREADY ASSEMBLED FOR A CABLE OF 5.8 TO 7.8 DIA.
SEAL IS ATTACHED FOR A CABLE OF 7.9 TO 9.6 DIA.
4. MOUNT COMPLETELY THE TERMINAL COVER AFTER WIRING, TO KEEP THE SEALING OF TERMINAL HOUSING. TIGHTEN FULLY THE KNURLED CAPNUT BY HAND WITHOUT USING A TOOL.
5. TERMINAL COVER, TERMINAL SCREWS AND HEX NUTS ARE FURNISHED UNASSEMBLED.

CHARACTERISTICS		
OPERATING FORCE	11.8N	MAX ⚠
RELEASE FORCE	4.9N	MIN ⚠
MOVEMENT DIFFERENTIAL	0.1	MAX
OVERTRAVEL	3	MIN

改番 REV	来歴 RECORD	日付 DATE	担当 BY	検閲 APPD
06	SI (MKS) → SI	8.30.'99	TATSUHARA	TOMITA

作成 DR. TATSUHARA 12.28.'93	尺度 SCALE 1:1	記入のない公差 TOL. UNLESS NOTED ±0.4
検図 CHK. H.SAITO 12.24.'93	形番 MODEL	SL1-*******
審査 APPD TSUKAKOSHI 12.22.'93	名称 NAME	MINIATURE LIMIT SWITCH
日付 DATE 12.24.'93	図番 NO. AD51236E	改番 REV. 06 8/17



HANFORD DWG # H-2-828710 SHT 62 OF 97

REVISIONS

LTR	DESCRIPTION	DATE	BY	CHK	ENG	APPD	APPD
A	GENERAL REVISIONS	7/29/97	JBR	JMH	TMM	JMH	
B	DELETE UN-NEEDED L.S.	8/29/97	JRS	JMH	TMM	JMH	LLA
C	DESIGN MODIFICATION	9/15/97	JRS	AHN	TMM	JMH	EM
D	ADD WIRE #'S	10/3/97	JRS	AHN	TMM	JMH	LLA
E	DE-INERTING & SIMPLIFICATION	3/3/98	CSO	SEO	CSO		
F	ADD NORTH AND SOUTH REFERENCES	7/20/98	CSO	SEO	CSO		

DRWN	J D RUPP	3/4/97
DSGN	I M MEADOWS	7/7/97
CHK	I M MEADOWS	4/30/97
APPD	J M HANNICK	7/7/97
APPD	L L ANDERSON	3/7/97
APPD		

EDERER INCORPORATED — CASCADE CRANES, WASHINGTON CRANES, STAR CRANES

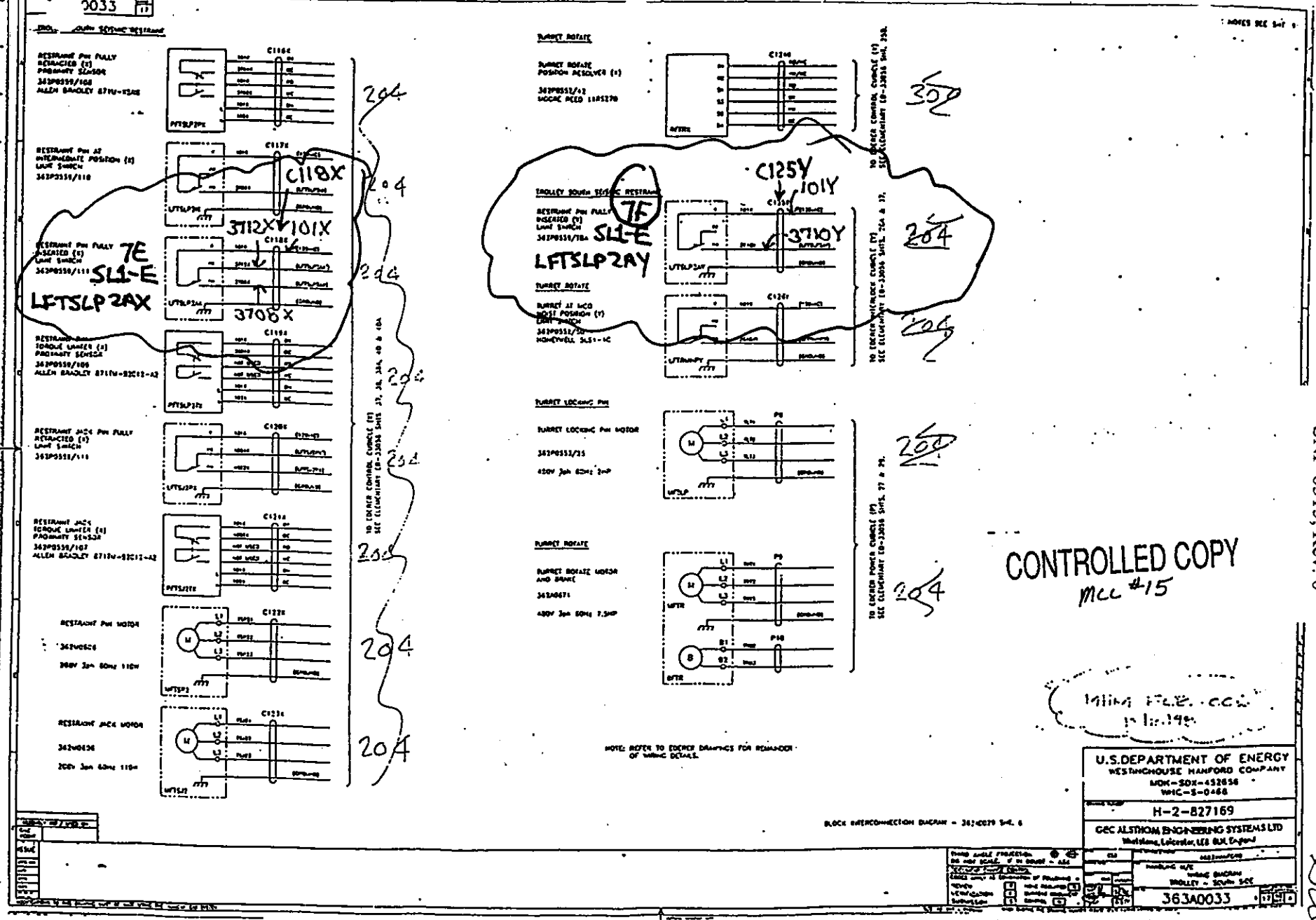
TROLLEY SEISMIC RESTRAINT PINS CONTROL ELEMENTARY

SCALE N/A

F-2566

DWG NO. E8-33056 SHEET 37 OF 38 REV F

E8-33056 37



SNF-6315, Rev. 0

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Dedication Test Plan – IST ORIGINAL Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-007-TP-007J
Test Specimen: Honeywell Limit Switch Eqmt. No.: LFPGOX,Y; LFPGCX, Y; LFPGLX,Y Page 1 of 4

In-Situ Inspection Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI. Eng	DA	QA Post Review*

* QA Post Review of Individual Revisions is allowed

In-Situ Inspection Procedure

ORIGINAL

Inspection Procedure Approval (Obtain prior to inspection):

This procedure documents the visual verification of the identification critical characteristics of the remaining specimen which were in-situ tested on a sampling basis as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) JMP Larry Swenson Date: 4-6-00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Electrician	N/A	N/A	N/A	N/A
Electrician Quality Control	N/A	N/A	N/A	N/A
Design Authority Representative	LARRY W. PRICE	XWEST		JMP

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment.

INSPECTION PROCEDURE:

1.0 Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	LFPGOX	**LFPGOX**	
Manufacturer:	Honeywell	**Honeywell**	
Model:	SL1-E	**SL1-E**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	LFPGOY	**LFPGOY**	
Manufacturer:	HONEYWELL	**Honeywell**	
Model:	SL1-E	**SL1-E**	

Dedication Test Plan – IST **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-007-TP-007J
Test Specimen: Honeywell Limit Switch Eqmt. No.: LFPGOX,Y; LFPGCX, Y; LFPGLX,Y **Page 3 of 4**

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	LFPGCX	**LFPGCX**	
Manufacturer:	Honeywell	**Honeywell**	
Model:	SL1-H	**SL1-H**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	LFPGCX	**LFPGCX**	
Manufacturer:	Honeywell	**Honeywell**	
Model:	SL1-H	**SL1-H**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	LFPGLX	**LFPGLX**	
Manufacturer:	Honeywell	**Honeywell**	
Model:	SL1-H	**SL1-H**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	LFPGLY	**LFPGLY**	
Manufacturer:	Honeywell	**Honeywell**	
Model:	SL1-H	**SL1-H**	

2.0 Record: Date /Time of Test Beginning: 4/7/00

2.1 Record: Date /Time of Test End: 4/7/00

3.0 References

3.1 Elementary Wiring Drawings: EB-33056 Sheet 17, 17A

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Dedication Test Plan – IST **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-007-TP-007J
Test Specimen: Honeywell Limit Switch Eqmt. No.: LFPGOX,Y; LFPGCX, Y; LFPGLX,Y **Page 4 of 4**

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):
TEST (INSPECTION) WAS DONE ≈ 3/10/00 WHEN GRAPPLE WAS IN SAMPLE PIT. THIS FORM WAS COMPLETED 4/7/00

ALL ITEMS MEET ACCEPTANCE CRITERIA.

Notes:
N/A

Design Authority Representative (signature) _____ Date: 4-7-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Craig Swenson Date: 4/7/00

QA/QC (signature) Stephen Scott Mosh Date: 4-7-2000

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Commercial Grade Item Upgrade Dedication Form

Rev. No. 1

ECN No. N/A 4/11/2000 CGI No. CGI-SNF-D-MHM-003C

Page 1 of 10

Title: **MHM Interlock P6, ~~P52, P53~~, P57 and P61 - Gemco Programmable Limit Switch (PLS) and Output Relay Module (OM)**

Section 1 Part Information

Item No.: **N/A**	Manufacturer:	Supplier:
Mfg. Part/Model No.:	Supplier's P/N: ORIGINAL	
Part Description:		
End Use Description:		

Section 2a Component Information

Equipment No.:	Specification No.:	Manufacturer:	Past P.O. No.:
PLS1, PLS1-OM, PLS2, PLS2-OM	**Ederer F-2566, Foster Wheeler MJX-SDX**	**GEMCO**	**N/A**
Manufacturer's Part/Model No.: **1989-A-16-R-14-64-E-R, 1989-O-115-M-S**	Equipment Supplier (if different from manufacturer): **Foster Wheeler**		Equip. Supplier's Part No.: **N/A**

Component Description: **Programmable Limit Switch (PLS) for interlocks to measure height of MCO grapple, raise and lower commands, MCO seating zones and locking pins disengagement, located on MCO control station.**

Section 2b Commercial Availability of the Item

1. **Is the item available from a catalogue from a qualified NQA1 supplier or ISO 9000 supplier?**

   [ ] YES (go to #2 below) [X] NO (go to procedure step 6.3.2-dedicate Item)

   If not available from a qualified NQA-1 supplier, is it available from an ISO 9000 supplier?

   [ ] YES (go to #2 below, procedure step 6.3.2, & dedicate Item) [X] NO (procedure step 6.3.2-dedicate Item).

2. List of Candidate qualified NQA1 suppliers or ISO 9000 suppliers, if used

company name & type	contact name	phone
N/A		

3. Recommended Procurement Strategy (coordinate with project CGI interface Engineer or BTR): **N/A**

Section 2c CGI Determination

CGI Determination Questions:

#1: Is the Item subject to design or specification requirements that are unique to nuclear facilities or activities?

[ ] YES (the Item is not commercial grade) [X] NO (continue)

#2: Is the Item used in applications other than nuclear facilities or activities?

[ ] NO (the item is not commercial grade) [X] YES (continue)

#3: Is the Item ordered from manufacturer/supplier on the basis of specifications set forth in the manufacturer's catalog?

[ ] NO (the item is not commercial grade) [X] YES (continue)

[X] All three criteria have been satisfied. The Item meets the definition of commercial grade.

Section 2d Reason for Dedication

The above Commercial Grade (CG) described Item is being Dedicated for use in the application cited for the following reason(s):

[ ] Item is being purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Class application.

[ ] Item is being purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Significant application.

[X] Item was purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Class application.

[ ] Item was purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Significant application.

[ ] Other ('like-for-like', similar, substitution, replacement evaluation)

Commercial Grade Item Upgrade Dedication Form

Rev. No. 1

ECN No. **N/A** CGI No. **CGI-SNF-D-MHM-003C**

Title: **MHM Interlock P6, P52, P53, P57 and P61 - Gemco Programmable Limit Switch (PLS) and Output Relay Module (OM)**

Section 3 Failure Effects Evaluation

A. Part/Component Safety Function:

1. **P6 revents shear of MCO partially lowered with MHM. This MCO grapple limit switch prevents locking pins disengaging when the MCO hoist is not at the upper limit or at the tube plug exchange limit.**

2. **For interlocks ~~P52, P53~~, P57 and P61, PLS provides safety significant functions to position the MHM and to prevent drop of the MCO from the MHM.**

3. [handwritten initials and date 4/12/00]

1. Part/Component Functional Mode:

Safety Function #1: [X] Active [ ] Passive

Safety Function #2: [ ] Active [ ] Passive

Safety Function #3: [ ] Active [ ] Passive

Active - Mechanical or Electrical change of state is required to occur for the component to perform its safety function

Passive – Change of state is not required for the component to perform its safety function

C. Host Component Safety Function (if applicable): **N/A**

D. Failure Mode(s) and the effects on component or system safety function (see Worksheet 1):

1. **Failure of the PLS or OM could cause the output relay contacts to open/close resulting in potential override of interlock channel.**

2.

Section 4 Environmental & Natural Phenomena Hazard Design

Environmental Qualification Required:

Yes [ ]

No [X]

If yes: Environmental Qualification Requirements

Limiting Environmental Conditions:

Required Safety Functions:

Qualification Period:

Natural Phenomena Hazard (NPH) Design Required:

Yes [ ]

No [X]

If yes: NPH Design Requirements

Performance Category:

NPH Design Req'ts.:

Required Safety Functions:

Section 5 Component Functional Classification

[X] Safety Class (SC) [ ] General Service (GS) [ ] Safety Significant (SS)

If part/component classification is different from host component/system, document basis. **N/A**

Sections 6 and 7 (Reserved)

Section 8 References (for Functional Classification)

National Codes/Standards: **N/A**

Safety Analysis Report (SAR): **HNF-3672, Rev. 0**

Drawings: **N/A**

Vendor Manual/Manufacturer/Supplier Information: **GEMCO Series 1989: Quik-Set III High Resolution Single Turn and Multi-turn PLS**

Other: **ALSTOM ESL/R (96) 065 – Rev. D, 100% Design Submittal – June 1998**

Commercial Grade Item Upgrade Dedication Form

Rev. No. 1

ECN No. N/A CGI No. CGI-SNF-D-MHM-003C

Page 3 of 10

Title: MHM Interlock P6, P52, P53, P57 and P61 - Gemco Programmable Limit Switch (PLS) and Output Relay Module (OM)

Section 9 Critical Characteristics

Critical Characteristics	Acceptance Criteria/Tolerances	Acc Meth	ID	Function
1. Item Identification Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
PLS1 and 2				
Manufacturer	**GEMCO**	**1, IN**	**X**	
Model	**1989-A-16-R-14-64-E-R**	**1, IN**	**X**	
2. Physical Critical Characteristics (for reasonable assurance that the Item delivered is the Item specified)				
3 Performance Critical Characteristics (for reasonable assurance that the Item will perform its intended safety function(s))				
Run/Prog selector lockout	**Program cannot be changed in the Run mode**	**1, T**		**X**
Transducer operating voltage	**14.3 to 15.3 VDC between terminals 29 and 30 on terminal strip S2 in the CPU module**	**1, T**		**X**
Microprocessor operating voltage	**4.8 to 5.2 VDC between terminals 1 and 2 on terminal strip S2 in the CPU module**	**1, T**		**X**
PLS1-OM, PLS2-OM				
1. Item Identification Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
Manufacturer	**GEMCO**	**1, IN**	**X**	
Model	**1989-O-115-M-S**	**1, IN**	**X**	
2. Physical Critical Characteristics (for reasonable assurance that the Item delivered is the Item specified)				
3 Performance Critical Characteristics (for reasonable assurance that the Item will perform its intended safety function(s))				
Insulation Resistance	**>10 Megohms across open contacts and contact terminals to ground at 500 VDC**	**1, T**		**X**
Contact current carrying capability	**<0.5 volt drop contacts at 115 VAC, 10 amps, resistive**	**1, T**		**X**
PLS1 and PL1-OM, PLS2 and PL2-OM				
3 Performance Critical Characteristics (for reasonable assurance that the Item will perform its intended safety function(s))				
Output relay operation	**Contacts close at programmed limit**	**1, T**		**X**
PLS system operability	**PLS system operates as programmed**	**1, T**		**X**

4. Notes and Legend:

PLS1, PLS2 Model: 1989-A-16-R-64-E-R

1989 – Model number
A – Complete system CPU and Keypad
16 – 16 Output circuits
R – Resolver input
64 – 64 turn resolver
E – Current sinking programmer output
R – Remote serial display

PLS1-OM, PLS2-OM Model: 1989-O-115-M-S

1989 – Model Number
O – Output Module
115 – 115 VAC
M – Mechanical Relay, SPDT, 10 amp
S - Standard Panel Mount

Acceptance Method (Acc Meth):
1.Special Test and Inspection:
1, IN for Inspection
1,T for Test
2. Commercial Grade Survey
3. Source Verification
5. Vendor/Item History

Section 10 Initial Review and Approval

Approvals:
Designated Engineer: ERKAMER
Design Authority: DWM Ingrid Swenson 10/12/99
QA Engineer: T Z ANDERSON 10/13/99

Commercial Grade Item Upgrade Dedication Form

ECN No. N/A CGI No. CGI-SNF-D-MHM-003C

Title: **MHM Interlock P6, P52, P53, P57 and P61 - Gemco Programmable Limit Switch (PLS) and Output Relay Module (OM)**

WORKSHEET 1
DETERMINATION OF FAILURE MECHANISMS/MODES

Section 1

Typical Failure Mechanisms	Definition	Applicable to Component under Evaluation
Fracture	Separation of a solid accompanied by little or no macroscopic plastic deformation.	Yes [ ] No [X]; If Yes, indicate failure Mode _____
Corrosion	The gradual deterioration of a material due to chemical or electrochemical reactions, such as oxidation, between the material and its environment.	Yes [ ] No [X]; If Yes, indicate failure Mode _____
Erosion	Destruction of materials by the abrasive action of moving fluids, usually accelerated by the presence of solid particles carried with the fluid.	Yes [ ] No [X]; If Yes, indicate failure Mode _____
Open Circuit	An electrical circuit that is unintentionally broken so that there is no complete path for current flow.	Yes [ ] No [X]; If Yes, indicate failure Mode _____
Short Circuit	An abnormal connection by which an electrical current is connected to ground, or to some conducting body, resulting in excessive current flow.	Yes [X] No [ ]; If Yes, indicate failure Mode **PLS system provides incorrect position to CPU to energize permissive circuit.**
Blockage	Clogging of a filtering medium resulting in the inability to perform its purification function or blockage of flow.	Yes [ ] No [X]; If Yes, indicate failure Mode _____
Seizure	Binding of a normally moving item through excessive pressure, temperature, friction, jamming.	Yes [ ] No [X]; If Yes, indicate failure Mode _____
Unacceptable Vibration	Mechanical oscillations produced are beyond the defined permissible limits due to unbalancing, poor support, or rotation at critical speeds.	Yes [ ] No [X]; If Yes, indicate failure Mode _____
Loss of Properties	A loss of mechanical and physical properties of a material due to exposure to high temperatures, radiation exposure.	Yes [ ] No [X]; If Yes, indicate failure Mode _____
Excess Strain	Under the action of excessive external forces the material of the part has been deformed or distorted.	Yes [ ] No [X]; If Yes, indicate failure Mode _____
Mechanical Creep	From prolonged exposure to high temperature and stress, the object will show a slow change in its physical (shape and dimension) and mechanical characteristics.	Yes [ ] No [X]; If Yes, indicate failure Mode _____
Ductile Fracture	Fracture characterized by tearing of metal accompanied by appreciable gross plastic deformation.	Yes [ ] No [X]; If Yes, indicate failure Mode _____

Section 2 Additional Failure Modes Applicable to the Component Under Evaluation

1. Programmable Limit Switch (PLS) switch contacts are closed to permit equipment movement. Contacts open for the interlock function. Any failure, which prevents contacts to open, inhibits the particular resolver interlock function.
2.
3.
4.
5.

Commercial Grade Item Upgrade Dedication Form

Rev. No. 1

ECN No. N/A CGI No. CGI-SNF-D-MHM-003C

Page 5 of 10

Title: MHM Interlock P6, P52, P53, P57 and P61 - Gemco Programmable Limit Switch (PLS) and Output Relay Module (OM)

Checklist 1 - Acceptance Method 1 - Special Test/Inspection Verification

SECTION 1

Item Description: **GEMCO Quik-Set III Programmable Limit Switch** System #: **MHM**	Equip #: **PLS1, PLS1-OM, PLS2, PLS2-OM** Model #: **1989-A-16-R-14-64-E-R, 1989-O-115-M-S**
Manufacturer (Address/Phone): **GEMCO/PATRIOT** **1080 N. Crooks Rd** **Clawson, MI 48017-1097** **(810) 435-0700**	Supplier (Address/Phone):

SECTION 2 CRITICAL CHARACTERISTICS TO BE VERIFIED BY METHOD 1.

Insp	Test	Post-Test		
X			1.	**Manufacturer**
X			2.	**Model**
	X		3.	**Run/Prog selector lockout**
	X		4.	**Transducer operating voltage**
	X		5.	**Microprocessor operating voltage**
	X		6.	**Insulation Resistance**
	X		7.	**Contact current carrying capability**
	X		8.	**Output relay operation**
	X		9.	**PLS system operability**

SECTION 3 BY INSPECTION * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)

PLS1, PLS2

Characteristic: **Manufacturer** Sample Size*: **100%**

Acceptance Criteria: **GEMCO**

Receipt Inspection Plan / Report #: CGI-SNF-D-MHM-003C-TP-003CX, 3CY

Characteristic: **Model – PLS3** Sample Size*: **100%**

Acceptance Criteria: **1989-A-16-R-14-64-E-R**

Receipt Inspection Plan / Report #: TP-003CX, 3CY

PLS1-OM, PLS2-OM

Characteristic: **Manufacturer** Sample Size*: **100%**

Acceptance Criteria: **GEMCO**

Receipt Inspection Plan / Report #: TP-003CX, 3CY

Characteristic: **Model – PLS3 -OM** Sample Size*: **100%**

Acceptance Criteria: **1989-O-115-M-S**

Receipt Inspection Plan / Report #: TP-003CX, 3CY

Commercial Grade Item Upgrade Dedication Form

ECN No. N/A CGI No. CGI-SNF-D-MHM-003C

Title: MHM Interlock P6, P52, P53, P57 and P61 - Gemco Programmable Limit Switch (PLS) and Output Relay Module (OM)

SECTION 4 BY SPECIAL TEST * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)

PLS1, PLS2

Characteristic for Test: **Run/Prog selector lockout** Sampling Size*: [X] Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **Program cannot be changed in the Run mode**

Actual Test Value: See TP Test Plan and Report #: TP-003CX, 3CY

Characteristic for Test: **Transducer operating voltage** Sampling Size*: [X] Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **14.3 to 15.3 VDC between terminals 29 and 30 on terminal strip S2 in the CPU module**

Actual Test Value: See TP Test Plan and Report #: TP-003X, 3CY

Characteristic for Test: **Microprocessor operating voltage** Sampling Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **4.8 to 5.2 VDC between terminals 1 and 2 on terminal strip S2 in the CPU module**

Actual Test Value: See TP Test Plan and Report #: TP-003CX, 3CY

PLS1-OM, PLS2-OM

Characteristic for Test: **Insulation Resistance** Sampling Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **>10 megohms across open contacts and contact terminals at 500 VDC** Relays were

Actual Test Value: See TP 003DX Test Plan and Report #: tested in TP003DX

Characteristic for Test: **Contact current carrying capability** Sampling Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **<0.5 volt across contacts at 115 VAC, 10 amps, resistive** Relays were Tested

Actual Test Value: See TP 003DX Test Plan and Report #: in TP-003DX

PLS and PLS-OM tested as a unit with resolver

Characteristic for Test: **Output relay operation** Sampling Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **Contacts open and close at programmed limits**

Actual Test Value: **CSB (W379) –015-11-058** → Test Plan and Report #: See TP

Characteristic for Test: **PLS system operability** Sampling Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **PLS system operates as programmed**

Actual Test Value **CSB (W379) –015-11-058** → Test Plan and Report #: See TP

ECN No. N/A CGI No. CGI-SNF-D-MHM-005C

Title: MHM Interlock P8 - Gemco Programmable Limit Switch (PLS) and Output Relay Module (OM)

Section 5 Test / Inspection Summary (Acceptance Method 1)

1. SUMMARY OF VERIFIED CRITICAL CHARACTERISTICS , THEIR VERIFICATION METHODS, AND RESULTS

ITEM DESCRIPTION: PLS1, PLS2

Critical Characteristics				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/N	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
Manufacturer	GEMCO	X		1, IN	TP003 CX, CY	NA	2	0	XWEST	Larry W. Price	4/12/00
Model	1989-A-16-R-14-64-E-R	X		1, IN							
Run/Prog selector lockout	Program cannot be changed in the Run mode		X	1, T							
Transducer operating voltage	14.3 to 15.3 VDC between terminals 29 and 30 on terminal strip S2 in the CPU module		X	1, T							
Microprocessor operating voltage	4.8 to 5.2 VDC between terminals 1 and 2 on terminal strip S2 in the CPU module		X	1, T							

2. DISPOSITION OF UNVERIFIED OR FAILED CRITICAL CHARACTERISTICS

Critical Characteristic	Disposition

3. SIGNATURE INDICATES ALL CRITICAL CHARACTERISTICS VERIFIED SATISFACTORY OR ACCEPTABLY DISPOSITIONED AND COMMERCIAL GRADE DEDICATION IS SATISFACTORY AND COMPLETE.

See Test Plan TP-003CX, -003CY, cited above.

Testing Agency Approval: NR CES 4/12/00 Date 4/12/00

Testing Agency QA Engineer: NR CES 4/12/00 Date 4/12/00

BUYER VERIFICATION

Design Authority: CES Craig Stevenson Date 4/12/00

QA Engineer: Stephen Scott Mott Date 4-20-2000

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Section 5 Test / Inspection Summary (Acceptance Method 1)

1. SUMMARY OF VERIFIED CRITICAL CHARACTERISTICS , THEIR VERIFICATION METHODS, AND RESULTS

ITEM DESCRIPTION: PLS1-OM, PLS2-OM

Critical Characteristics				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/IN	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
Manufacturer	GEMCO	X		1, IN	TP-003CX,Y,DX	NA	3	0	XWEST	LARRY W PRICE	4/10/00
Model	1989-O-115-M-S	X		1, IN	↓	↓	↓	↓	↓	↓	↓
Insulation resistance	>10 megohms across open contacts and contact terminals at 500 VDC		X	1, T	TP-003DX	NA	3	0	XWEST	LARRY W PRICE	4/10/00
Contact current carrying capability	<0.5 volt across contacts at 115 VAC, 10 amps, resistive		X	1, T	↓	↓	↓	↓	↓	↓	↓

2. DISPOSITION OF UNVERIFIED OR FAILED CRITICAL CHARACTERISTICS

Critical Characteristic	Disposition

3. SIGNATURE INDICATES ALL CRITICAL CHARACTERISTICS VERIFIED SATISFACTORY OR ACCEPTABLY DISPOSITIONED AND COMMERCIAL GRADE DEDICATION IS SATISFACTORY AND COMPLETE.

See Test Plan TP-003CX,Y, DX cited above.

Testing Agency Approval: NR CES 4/12/00 Date CES 4/11/00

Testing Agency QA Engineer: NR CES 4/12/00 Date

BUYER VERIFICATION

Design Authority: CES Date 4-12-00

QA Engineer: Stephen Scott Moe Date 4-20-2000

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Section 5 Test / Inspection Summary (Acceptance Method 1)

1. SUMMARY OF VERIFIED CRITICAL CHARACTERISTICS, THEIR VERIFICATION METHODS, AND RESULTS

ITEM DESCRIPTION: PLS and PLS-OM tested as a unit with resolver

Critical Characteristics				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/A/N	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
Output relay operation	Contacts open and close at programmed limits		X	1, T	TP003 CX, CY	NA	2	0	XWEST	LARRY W. PRICE	4/12/00
PLS system operability	PLS system operates as programmed		X	1, T	↓	↓	↓	↓	↓	↓	↓

2. DISPOSITION OF UNVERIFIED OR FAILED CRITICAL CHARACTERISTICS

Critical Characteristic	Disposition

3. SIGNATURE INDICATES ALL CRITICAL CHARACTERISTICS VERIFIED SATISFACTORY OR ACCEPTABLY DISPOSITIONED AND COMMERCIAL GRADE DEDICATION IS SATISFACTORY AND COMPLETE.

See Test Plan TP-003CX, CY cited above.

Testing Agency Approval: NR CES 4/12/00 Date CES 4/12/00

Testing Agency QA Engineer: NR CES 4/12/00 Date 4/12/00

BUYER VERIFICATION

Design Authority: CES Craig Swenson Date 4/12/00

QA Engineer: Stephen Scott Mark Date 4-20-2000

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Commercial Grade Item Upgrade Dedication Form

ECN No. **N/A** CGI No. **CGI-SNF-D-MHM-005C**

Title: **MHM Interlock P8 - Gemco Programmable Limit Switch (PLS) and Output Relay Module (OM)**

Section 6 Contacts/Phone Numbers		
Name		Phone
Design Authority	CRAIG SWENSON	( ) 376-0288
QA		( )
QC		( )
Cog - Engineer		( )
CGI Engineer		( )
Procurement Engineer		( )
Other		( )

Section 7 Supporting Documentation for this Checklist	
Initial Procurement Documents	**For Critical Characteristics**
[ ] Drawings:	
[ ] Manuals (specify type & number):	
[ ] Design Calculations	
[ ] Installation Instructions	
[ ] Operation Instructions	
[ ] Calibration Instructions	
[ ] Manufacturer's Recommended Spare Parts List	
[X] Other: GEMCO Series 1989: Quik-Set III High Resolution Single Turn and Multi-turn PLS	**All**
Procurement Documents	
[ ] Certificate of Conformance/Compliance	
[ ] Seismic Qualification Certificate	
[ ] Environmental Qualification Certificate	
[ ] Test Report (s):	
[ ] Inspection Report (s):	
[ ] CMTRs for ASME Pressure Retaining Materials	
[ ] Valve Seat Leakage Report	
[ ] Weld Records	
[ ] Material Traceability Record	
[ ] **Other:**	

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ORIGINAL

Dedication Test Plan – IST. Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-003C-TP-003CY
Test Specimen: Gemco PLS and Output Relay Module; Eqmt. No.: PLS2, PLS2 OM Page 1 of 7

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI Eng	DA	QA Post Review*
1	Perform as a Bench Test	Section 2.5 deleted	Contact Rating Test to be performed as a Bench Test No. CGI-SNF-D-MHM-003C-TP-003CY	ERK 3/7/00	LES 3/8/00	3/13/00
2	Power not available use temporary 120 VAC Power	2.3 A) 2.4.2	Use temporary power	ERK 3/8/00	LES 3/8/00	3/13/00
3	Terminal not wired to ground	2.4.1 Table	either Terminal 3 or 4 needs to be grounded. Terminal 3 was not grounded	ERK 3/8/00	LES 3/8/00	3/13/00

*QA Post Review of Individual Revisions is allowed

ORIGINAL

In-Situ Test Procedure

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) YWP Craig Swenson Date: 3/6/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Belhaven	Michael Cram	MRC
Electrician	JW EBERHART	PCE	JW Eberhart	JWE
Electrician Quality Control	Stephen R. Cooley	PCE	Stephen R Cooley	SRC
Design Authority Representative	ERK = E.R. Kahler Craig Swenson	XWest		
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A
Design Authority	C.E. Swenson	KHI	Craig Swenson	CES

RECOMMENDED EQUIPMENT:

Power Supply capable of 10 amps @ 115 VAC
Megger Instrument capable of 500 VDC Test Voltage
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being verified unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: AVO BM80/2 I.D.: 640-889 Calib. Due date: 02-09-01

Test Instrument type: FLUKE 787 I.D.: BAT 107 Calib. Due date: 05-28-00

Test Instrument type: PROTO 6106 I.D.: 029E/009 Calib. Due date: 01/13/01

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE:

For this In-Situ Test, certain leads must be removed before testing in Section 2.5 and 2.6 begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of leads.

1.0 Record the following Test Specimen identification information for PLS1:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Manufacturer:	YES	**Gemco**	Acc
Model:	YES	**1989-A-16-R-14-64-E-R**	Acc
Serial No.:	OK	**N/A**	Acc

2.0 Record the following Test Specimen identification information for PLS1 OM:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Manufacturer:	YES	**Gemco**	Acc
Model:	YES	**1989-O-115-M-S**	Acc
Serial No.:	OK	**N/A**	Acc

2.1 Perform the following testing steps:

2.2 Record: Date /Time of Test Beginning: 03-08-00 1:25 p.m.

Record: Room Temperature: 68 °F.

IBH 3/8/00 LES

2.3 Program Lockout

2.3A At PLS OM2 terminals "Power" (101Y) and "AC" (102Y), lift leads per Lifted Lead Log and apply 120 VAC temporary power.

2.3.1 Attach, if not already attached, a Gemco Quik-Set III Programmer (keypad/display module) to PLS2.

2.3.2 With the Run/Prog selector lockout switch in the Run mode, verify that the program cannot be changed.

Description	Record Data	Acceptance Criteria	Comments/Deviations
With Selector Switch in Run, try to change program:	OK	**Program does not change**	Acc

2.4 Operating Voltage

2.4.1 At PLS2, terminal strip S2, record the following DC voltages:

Description	Terminal	Terminal	Record Data	Acceptance Criteria	Comments/Deviations
Transducer operating voltage	29	30 (ground)	14.96VDC	14.3 to 15.3 VDC	Acc
Microprocessor operating voltage	1	4 (ground)	5.17VDC	4.8 to 5.2 VDC	Acc
Microprocessor operating voltage	2	4 (ground)	5.17VDC	4.8 to 5.2 VDC	Acc

CES ERL 3/8/00

2.4.2 Remove temporary power and reland lifted leads per Lifted Lead Log and verify.

3/8/00 CES

2.5 Contact Rating Test

2.5.1 Open main disconnect switch MD, lock and tag out.

2.5.2 With a Multi-meter, verify that 120 VAC is not present at LS2 COM terminal 101Y, disconnect wire from LS2 terminals COM and NO, circuits 101Y and 1004Y, disconnect wire from LS4 terminals COM and NO, circuits 101Y and 1008Y.

2.5.3 Setup the PLS2 OM for contact rating testing. Attach a sketch of test circuit with all test instrumentation used.

2.5.4 Apply a nominal 10 amps VAC, resistive, across the closed contacts (COM and NO) of LS2 and LS4.

Caution: Do not change state of contacts while energized.

Delete RRK 5/2/00 CES

Description	Record Data	Acceptance Criteria	Comments/Deviations
LS2 (Terminals COM and NO)		< 0.5 Volts AC drop	
LS4 (Terminals COM and NO		< 0.5 Volts AC drop	

2.5.5 De-energize equipment and determinate test leads.

2.6 Insulation Resistance Test

THIS TEST INCLUDED IN TP-003DX JMP 4/14/00

2.6.1 Lift all leads on PLS2 OM relay outputs per Lifted Lead Log.

2.6.2 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the test specimen. Describe the terminals and their data below:

Terminal to Terminal / Ground

PLS2 OM output relay	Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
LS2	COM	Ground	> 100Gohm	> 10 Megohms	Acc
LS2	NO	Ground	>100Gohm	> 10 Megohms	Acc
LS2	COM	NO	> 1.19Gohm	> 10 Megohms	Acc
LS3	COM	Ground	>100Gohm	> 10 Megohms	Acc
LS3	NO	Ground	>100Gohm	> 10 Megohms	Acc
LS3	COM	NO	> 1.24 Gohm	> 10 Megohms	Acc
LS4	COM	Ground	> 100Gohm	> 10 Megohms	Acc
LS4	NO	Ground	>100Gohm	> 10 Megohms	Acc
LS4	COM	NO	> 1.21Gohm	> 10 Megohms	Acc
LS5	COM	Ground	>100Gohm	> 10 Megohms	Acc
LS5	NO	Ground	>100Gohm	> 10 Megohms	Acc
LS5	COM	NO	> 1.24Gohm	> 10 Megohms	Acc
LS7	COM	Ground	>100Gohm	> 10 Megohms	Acc
LS7	NO	Ground	>100Gohm	> 10 Megohms	Acc
LS7	COM	NO	> 1.27Gohm	> 10 Megohms	Acc
LS8	COM	Ground	>100 Gohm	> 10 Megohms	Acc
LS8	NO	Ground	>100Gohm	> 10 Megohms	Acc
LS8	COM	NO	> 1.17Gohm	> 10 Megohms	Acc

2.6 De-energize test equipment.

2.7 Terminate the test.

2.7.1 Reland the lifted leads and verify reland in accordance with the Lifted Lead Log.

2.7.2 Retorque the terminals to 12 in-pounds.

2.7.3 Remove lockout/tagout and restore system to normal.

2.7.4 Record: Date /Time of Test End: 03-08-00 2:00 p.m.

3.0 References

3.1 Elementary Wiring Drawings: EB-33056 Sheet 9

Dedication Test Plan – IST.	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-003C-TP-003CY	
Test Specimen: Gemco PLS and Output Relay Module; Eqmt. No.: PLS2, PLS2 OM	Page 6 of 7

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Device passed all test parameters.

Michael Ray Cram
03-08-00

Notes:

Certified InstrumentationTechnician (signature) Michael Cram Date: 03-08-00
Reviewed By: J. Cook 3-10-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Craig Swenson Date: 3/8/00

QA/QC (signature) TZ ANDERSON Date: 3/13/00

LIFTED LEAD LOG

MHM Control Console

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
EB-33056	9	101Y	LS2	COM	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
EB-33056	9	1004Y	LS2	NO	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
EB-33056	9	101Y	LS3	COM	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
EB-33056	9	1006Y	LS3	NO	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
EB-33056	9	101Y	LS4	COM	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
EB-33056	9	1008Y	LS4	NO	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
EB-33056	9	101Y	LS5	COM	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
EB-33056	9	1010Y	LS5	NO	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
EB-33056	9	101Y	LS7	COM	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
EB-33056	9	10A29Y	LS7	NO	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
EB-33056	9	101Y	LS8	COM	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
EB-33056	9	10A30Y	LS8	NO	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
Remarks: EB-33052 9		101Y	PLSOM2 Power				SRC	3-8-00			SRC	3-8-00
EB-33056 9		102Y	PLSOM2 AC				SRC	3-8-00			SRC	3-8-00

TRH 3/8/00

Dedication Test Plan – IST Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-003C-TP-003CX
Test Specimen: Gemco PLS and Output Relay Module; Eqmt. No.: PLS1, PLS1 OM Page 1 of 9

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI Eng	DA	QA Post Review*
1	Perform as a Bench Test	Section 2.5 deleted	Contact rating Test to be performed as a Bench test No. CGI-SNF-D-MHM-003B-TP-003DX	~~SKK~~ 3/3/00	LES 3/8/00	3/13/00
2	Power not available, use Temporary 120VAC power	2.3A, 2.4.2	Use Temporary Power to run test	~~SRK~~ 3/8/00	LES 3/8/00	3/13/00
3	Duplicate relay number deleted	Table 2.6.2	Deleted duplicate relay numbers from table	~~SRK~~ 3/8/00	LES 3/8/00	3/13/00

* QA Post Review of Individual Revisions is allowed

ORIGINAL

In-Situ Test Procedure

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) Craig Swenson Date: 3/6/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Belhaven	Michael Cram	MC
Electrician	J WEBERHART	PCE	J W Eberhart	JWE
Electrician Quality Control	Stephen R. Cowley	PCE	Stephen R. Cowley	SRC
Design Authority Representative	E. R. Kahler	KWest	E R Kahler	ERK
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Power Supply capable of 10 amps @ 115 VAC
Megger Instrument capable of 500 VDC Test Voltage
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being verified unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: AVO BM8012 I.D.: GA10-889 Calib. Due date: 02-09-01

Test Instrument type: HP 3457A I.D.: BAT 123 Calib. Due date: 07-29-00

Test Instrument type: FLUKE 787 I.D.: BAT 107 Calib. Due date: 05-28-00

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE:

For this In-Situ Test, certain leads must be removed before certain testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of leads.

1.0 Record the following Test Specimen identification information for PLS1:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Manufacturer:	YES	**Gemco**	Acc
Model:	YES	**1989-A-16-R-14-64-E-R**	Acc
Serial No.:	OK	**N/A**	Acc

2.0 Record the following Test Specimen identification information for PLS1 OM:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Manufacturer:	YES	**Gemco**	Acc
Model:	YES	**1989-O-115-M-S**	Acc
Serial No.:	OK	**N/A**	Acc

2.1 Perform the following testing steps:

2.2 Record: Date /Time of Test Beginning: 03-08-00 8:40 a.m

Record: Room Temperature: 68 °F.

2.3 Program Lockout

TRK 5/8/00 2.3A At PLS DM1 "Power" (101K) and AC (102X) lift leads per Lifted Lead Log and apply 120 VAC Temporary Power

2.3.1 Attach, if not already attached, a Gemco Quik-Set III Programmer (keypad/display module) to PLS1.

2.3.2 With the Run/Prog selector lockout switch in the Run mode, verify that the program cannot be changed.

Description	Record Data	Acceptance Criteria	Comments/Deviations
With Selector Switch in Run, try to change program:	OK	**Program does not change**	Acc

2.4 Operating Voltage

2.4.1 At PLS1, terminal strip S2, record the following DC voltages:

Description	Terminal	Terminal	Record Data	Acceptance Criteria	Comments/Deviations
Transducer operating voltage	**29**	**30 (ground)**	15.03	**14.3 to 15.3 VDC**	Acc
Microprocessor operating voltage	**1**	**3 (ground)**	5.13	**4.8 to 5.2 VDC**	Acc
Microprocessor operating voltage	**2**	**4 (ground)**	5.12	**4.8 to 5.2 VDC**	Acc

3/8/00 2.4.2 Disconnect temporary power and related leads at "Power" (101X) and ACC102X per Lifted Lead Log and Verify.

2.5 Contact Rating Test

2.5.1 Open main disconnect switch MD, lock and tag out.

2.5.2 With a Multi-meter, verify that 120 VAC is not present at LS2 COM terminal 101X, disconnect wire from LS2 terminals COM and NO, circuits 101X and 1003X

2.5.3 Setup the PLS1 OM for contact rating testing. Attach a sketch of test circuit with all test instrumentation used.

Per Letter Rec'd 4/7/00

2.5.4 Apply a nominal 10 amps VAC, resistive, across the closed contacts (COM and NO) of LS2.

Caution: Do not change state of contacts while energized.

Description	Record Data	Acceptance Criteria	Comments/Deviations
LS2 (Terminals COM and NO)		**< 0.5 Volts AC drop**	

2.5.5 De-energize equipment and determinate test leads.

2.6 Insulation Resistance Test

THIS TEST INCLUDED IN TP-003DX 4/10/00

2.6.1 Lift all leads on PLS1 OM relay outputs per Lifted Lead Log.

2.6.2 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the test specimen. Describe the terminals and their data below:

Terminal to Terminal / Ground

PLS1 OM output relay	Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
LS1	COM	Ground	> 100 Gohm	**> 10 Megohms**	Acc
LS1	NO	Ground	> 100 Gohm	**> 10 Megohms**	Acc
LS1	COM	NO	> 2.4 Gohm	**> 10 Megohms**	Acc

Dedication Test Plan – IST **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-003C-TP-003CX
Test Specimen: Gemco PLS and Output Relay Module; Eqmt. No.: PLS1, PLS1 OM **Page 5 of 9**

PLS1 OM output relay	Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
LS2	COM	Ground	>100Gohm	> 10 Megohms	Acc
LS2	NO	Ground	>100Gohm	> 10 Megohms	Acc
LS2	COM	NO	>1.16Gohm	> 10 Megohms	Acc
LS3	COM	Ground	>100Gohm	> 10 Megohms	Acc
LS3	NO	Ground	>100Gohm	> 10 Megohms	Acc
LS3	COM	NO	>1.17Gohm	> 10 Megohms	Acc
LS4	COM	Ground	>100Gohm	> 10 Megohms	Acc
LS4	NO	Ground	>100Gohm	> 10 Megohms	Acc
LS4	COM	NO	>1.27Gohm	> 10 Megohms	Acc
LS4	COM	Ground		> 10 Megohms	
LS4	NO	Ground		> 10 Megohms	
LS4	COM	NO		> 10 Megohms	
LS1	COM	Ground		> 10 Megohms	
LS1	NO	Ground		> 10 Megohms	
LS1	COM	NO		> 10 Megohms	
LS2	COM	Ground		> 10 Megohms	
LS2	NO	Ground		> 10 Megohms	
LS2	COM	NO		> 10 Megohms	
LS3	COM	Ground		> 10 Megohms	
LS3	NO	Ground		> 10 Megohms	
LS3	COM	NO		> 10 Megohms	
LS4	COM	Ground		> 10 Megohms	
LS4	NO	Ground		> 10 Megohms	
LS4	COM	NO		> 10 Megohms	
LS5	COM	Ground	>100Gohm	> 10 Megohms	Acc
LS5	NO	Ground	>100Gohm	> 10 Megohms	Acc
LS5	COM	NO	>1.21Gohm	> 10 Megohms	Acc
LS6	COM	Ground	>100Gohm	> 10 Megohms	Acc
LS6	NO	Ground	>100Gohm	> 10 Megohms	Acc
LS6	COM	NO	>1.28Gohm	> 10 Megohms	Acc
LS7	COM	Ground	>100Gohm	> 10 Megohms	Acc
LS7	NO	Ground	>100Gohm	> 10 Megohms	Acc
LS7	COM	NO	>1.24Gohm	> 10 Megohms	Acc

Relay

2/8/00

PLS1 OM output relay	Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
LS8	COM	Ground	>100Gohm	> 10 Megohms	Acc
LS8	NO	Ground	>100Gohm	> 10 Megohms	Acc
LS8	COM	NO	>1.20Gohm	> 10 Megohms	Acc
LS9	COM	Ground	>100Gohm	> 10 Megohms	Acc
LS9	NO	Ground	>100Gohm	> 10 Megohms	Acc
LS9	COM	NO	>1.22Gohm	> 10 Megohms	Acc
LS10	COM	Ground	>100Gohm	> 10 Megohms	Acc
LS10	NO	Ground	>100Gohm	> 10 Megohms	Acc
LS10	COM	NO	>1.19Gohm	> 10 Megohms	Acc
LS11	COM	Ground	>100Gohm	> 10 Megohms	Acc
LS11	NO	Ground	>100Gohm	> 10 Megohms	Acc
LS11	COM	NO	>1.20Gohm	> 10 Megohms	Acc
LS12	COM	Ground	>100Gohm	> 10 Megohms	Acc
LS12	NO	Ground	>100Gohm	> 10 Megohms	Acc
LS12	COM	NO	>1.17Gohm	> 10 Megohms	Acc
LS13	COM	Ground	>100Gohm	> 10 Megohms	Acc
LS13	NO	Ground	>100Gohm	> 10 Megohms	Acc
LS13	COM	NO	>1.25Gohm	> 10 Megohms	Acc
LS14	COM	Ground	>100Gohm	> 10 Megohms	Acc
LS14	NO	Ground	>100Gohm	> 10 Megohms	Acc
LS14	COM	NO	>1.20Gohm	> 10 Megohms	Acc
LS15	COM	Ground	>100Gohm	> 10 Megohms	Acc
LS15	NO	Ground	>100Gohm	> 10 Megohms	Acc
LS15	COM	NO	>1.22Gohm	> 10 Megohms	Acc
LS16	COM	Ground	>100Gohm	> 10 Megohms	Acc
LS16	NO	Ground	>100Gohm	> 10 Megohms	Acc
LS16	COM	NO	>1.20Gohm	> 10 Megohms	Acc

2.6 De-energize test equipment.

2.7 Terminate the test.

2.7.1 Reland the lifted leads and verify reland in accordance with the Lifted Lead Log.

2.7.2 Retorque the terminals to 12 in-pounds.

2.7.3 Remove lockout/tagout and restore system to normal.

2.7.4 Record: Date /Time of Test End: 03-08-00

3.0 References

3.1 Elementary Wiring Drawings: EB-33056 Sheet 9

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Devices under test passed all parameters.

Michael Ray Cram
03-08-00

Notes:

Certified InstrumentationTechnician (signature) Michael Cram Date: 03-08-00
Reviewed By: J. Cassels 3-10-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) 3/8/00 Craig Swenson Date: 3/8/00

QA/QC (signature) T.J. Anderson Date: 3/13/00
T ZANDERSON

LIFTED LEAD LOG

MHM Control Console

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
EB-33056	9	101X	LS1	COM	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
EB-33056	9	1001X	LS1	NO	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
EB-33056	9	101X	LS2	COM	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
EB-33056	9	1003X	LS2	NO	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
EB-33056	9	101X	LS3	COM	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
EB-33056	9	1005X	LS3	NO	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
EB-33056	9	101X	LS4	COM	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
EB-33056	9	1007X	LS4	NO	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
EB-33056	9	101X	LS5	COM	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
EB-33056	9	1009X	LS5	NO	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
EB-33056	9	101X	LS6	COM	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
EB-33056	9	1011X	LS6	NO	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
EB-33056	9	101X	LS7	COM	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
EB-33056	9	1013X	LS7	NO	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
EB-33056	9	101X	LS8	COM	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
EB-33056	9	10A20X	LS8	NO	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
EB-33056	9	101X	LS9	COM	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00

Remarks:

Page 804

LIFTED LEAD LOG

MHM Control Console

					LIFTED BY	DATE	LIFT VERIFY	DATE	LAND BY	DATE	LAND VERIFY	DATE
EB-33056	9	10A21X	LS9	NO	JWE	3-8-00	SRC	3-8-00	JWE	3-8-00	SRC	3-8-00
EB-33056	9	101X	LS10	COM	JWE	3-8-00	SRC	3-8-00	JWE	3-8-00	SRC	3-8-00
EB-33056	9	10A22X	LS10	NO	JWE	3-8-00	SRC	3-8-00	JWE	3-8-00	SRC	3-8-00
EB-33056	9	101X	LS11	COM	JWE	3-8-00	SRC	3-8-00	JWE	3-8-00	SRC	3-8-00
EB-33056	9	10A23X	LS11	NO	JWE	3-8-00	SRC	3-8-00	JWE	3-8-00	SRC	3-8-00
EB-33056	9	101X	LS12	COM	JWE	3-8-00	SRC	3-8-00	JWE	3-8-00	SRC	3-8-00
EB-33056	9	10A24X	LS12	NO	JWE	3-8-00	SRC	3-8-00	JWE	3-8-00	SRC	3-8-00
EB-33056	9	101X	LS14	COM	JWE	3-8-00	SRC	3-8-00	JWE	3-8-00	SRC	3-8-00
EB-33056	9	10A26X	LS14	NO	JWE	3-8-00	SRC	3-8-00	JWE	3-8-00	SRC	3-8-00
EB-33056	9	101X	LS15	COM	JWE	3-8-00	SRC	3-8-00	JWE	3-8-00	SRC	3-8-00
EB-33056	9	10A27X	LS15	NO	JWE	3-8-00	SRC	3-8-00	JWE	3-8-00	SRC	3-8-00
EB-33056	9	101X	LS16	COM	JWE	3-8-00	SRC	3-8-00	JWE	3-8-00	SRC	3-8-00
EB-33056	9	10A28X	LS16	NO	JWE	3-8-00	SRC	3-8-00	JWE	3-8-00	SRC	3-8-00
EB-33056	9	101X	PLS OM1	Power	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
EB-33056	9	102X	PLS OM1	Acc	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00

3/8/00

Remarks:

Dedication Test	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-003D-TP-003DX	
Test Specimen: Idec RH1B-U-DC24V Relay	Page 1 of 3

Test Procedure Approval (Obtain prior to testing):
This test procedure adequately tests the critical characteristics of the test specimen upon acceptable completion of the testing.

Design Authority (signature) Larry Swenson Date: 4/4/00

RECOMMENDED EQUIPMENT:
Power Supply capable of 10 amps @ 120 VAC.
Power Supply capable of 1 watt @ 24 VDC.
Megger Instrument capable of 500 VDC Test Voltage
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) serial numbers and calibration due
Test Instrument type: AVO BM221 I.D.: BAT 137 Calib. Due dates 3-14-01.
Test Instrument type: HP3457A I.D.: BAT 124 Calib. Due dates 7-30-00.
Test Instrument type: FLUKE 787 I.D.: BAT 107 Calib. Due dates 5-28-00.

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE: (Note: use one set of sheets per test specimen)

Test Specimen Description: **Relay**

Record the following identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Manufacturer:	OK	**Idec**	Acc
Model:	OK	**RH1B-U-DC24V**	Acc
Terminal Configuration:	OK	**Blade terminals**	Acc
Serial No.:	OK LS13X	**N/A**	Acc

Perform the following tests:

Record: Date /Time of Test Beginning: 04-05-00 8:15 a.m.

Record: Room Temperature: 68 °F.

Perform steps below:

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Dedication Test	Rev. No: 0
Test Plan No.: CGI-SNF-D-MHM-003D-TP-003DX	
Test Specimen: Idec RH1B-U-DC24V Relay	Page 2 of 3

1. Operation

Regulate voltage to the coil of the relay and monitor the max. pick-up voltage and min. drop-out voltages.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Pick-up Voltage	15.906 VDC	**19.2 VDC Maximum**	Acc
Drop-out Voltage	5.697 VDC	**2.4 VDC minimum**	Acc

2. Contact Rating Test

Setup the Relay specimen for contact rating testing. Attach a sketch of test circuit with all test Instrumentation used.

Apply a nominal 10 amps VAC, resistive, across the NC contacts of the test specimen.

Caution: Do not change state of contacts while energized.

Description	Record Data	Acceptance Criteria	Comments/Deviations
1-9	.1443 VAC	**< 0.5 Volts AC drop**	Acc

Apply a nominal 10 amps, resistive VAC, @ across the **closed** NO contacts of the test specimen.

Caution: Do not change state of contacts while energized.

Description	Record Data	Acceptance Criteria	Comments/Deviations
5-9	.1521 VAC	**< 0.5 Volts AC drop**	Acc

3. Insulation Resistance Test

Setup the Relay specimen for insulation resistance testing. Attach Relay in its normal mounting configuration to grounded fixture.

Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the test specimen. *Describe the terminals and their data below:*

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1	**5**	>999Mohm	**> 10 Megohms**	Acc
5	**9**	>999Mohm	**> 10 Megohms**	Acc
1	**Ground**	>999Mohm	**> 10 Megohms**	Acc
5	**Ground**	>999Mohm	**> 10 Megohms**	Acc
9	**Ground**	>999Mohm	**> 10 Megohms**	Acc
13	**Ground**	>999Mohm	**> 10 Megohms**	Acc
14	**Ground**	>999Mohm	**> 10 Megohms**	Acc

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Dedication Test	Rev. No/ 0
Test Plan No.: CGI-SNF-D-MHM-003D-TP-003DX	
Test Specimen: Idec RH1B-U-DC24V Relay	Page 3 of 3

4. **De-energize equipment.**
5. **End test.**
6. **Carefully disassemble test leads to Relay specimen.**
7. **Clean, box (in original packing & paperwork) and ready the test specimen for transfer to buyer.**

Record: Date /Time of Test End: 04-05-00 9:12 a.m.

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Testing was acceptable.
Michael Cram
04-05-00

Notes:

Test Engineer/Technician (Printed Name) Michael Cram

Test Engineer/Technician (signature) Michael Cram Date: 04-05-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

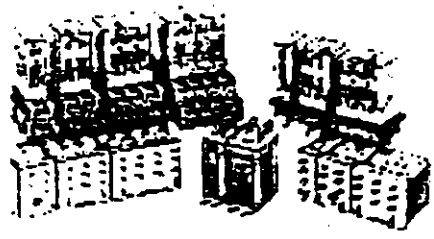
Design Authority (signature) Craig Swenson Date: 4-6-00

QA/QC (signature) Stephen Scott Moss Date: 4-6-2000

RH Series — General Purpose Midget Relays

Key features of the RH series include:

- Compact midget size saves space
- High switching capacity (10A)
- Choice of blade or PCB style terminals
- Relay options include indicator light, check button, and top mounting bracket
- DIN rail, surface, panel, and PCB type sockets available for a wide range of mounting applications



UL Recognized
Files No. E67770
E59804
E64245

CSA Certified
File No.LR35144

TÜV File No. BL9511113332319

CE

D

Specifications

Contact Material	Silver cadmium oxide
Contact Resistance	50mΩ maximum (initial value)
Minimum Applicable Load	24V DC/30mA, 5V DC/100mA (reference value)
Operating Time	SPDT (RH1), DPDT (RH2): 20ms maximum 3PDT (RH3), 4PDT (RH4): 25ms maximum
Release Time	SPDT (RH1), DPDT (RH2): 20ms maximum 3PDT (RH3), 4PDT (RH4): 25ms maximum
Power Consumption	**SPDT** (RH1): DC: 0.8W AC: 1.1VA (50Hz), 1VA (60Hz) **DPDT** (RH2): DC: 0.9W AC: 1.4VA (50Hz), 1.2VA (60Hz) **3PDT** (RH3): DC: 1.5W AC: 2VA (50Hz), 1.7VA (60Hz) **4PDT** (RH4): DC: 1.5W AC: 2.5VA (50Hz), 2VA (60Hz)
Insulation Resistance	100MΩ min (measured with a 500V DC megger)
Dielectric Strength	**SPDT** (RH1) Between live and dead parts: 2,000V AC, 1 minute; Between contact circuit and operating coil: 2,000V AC, 1 minute; Between contacts of the same pole: 1,000V AC, 1 minute
	DPDT (RH2), **3PDT** (RH3), **4PDT** (RH4) Between live and dead parts: 2,000V AC, 1 minute; Between contact circuit and operating coil: 2,000V AC, 1 minute; Between contact circuits: 2,000V AC, 1 minute; Between contacts of the same pole: 1,000V AC, 1 minute
Frequency Response	1,800 operations/hour
Temperature Rise	Coil: 85°C maximum Contact: 65°C maximum
Vibration Resistance	0 to 6G (55Hz maximum)
Shock Resistance	SPDT/DPDT: 200N (approximately 20G) 3PDT/4PDT: 100N (approximately 10G)
Life Expectancy	Electrical: over 500,000 operations at 120V AC, 10A; (over 200,000 operations at 120V AC, 10A for SPDT [RH1], 3PDT [RH3], 4PDT [RH4]) Mechanical: 50,000,000 operations
Operating Temperature	–30 to +70°C
Weight	SPDT: 24g, DPDT: 37g (approximately) 3PDT: 50g, 4PDT: 74g (approximately)

See page D-29 for dimensions.

Operational Characteristics

Maximum Continuous Applied Voltage (AC/DC) at 20°C	110% of the rated voltage
Minimum Operating Voltage (AC/DC) at 20°C	80% of the rated voltage
Drop-Out Voltage (AC)	30% or more of the rated voltage
Drop-Out Voltage (DC)	10% or more of the rated voltage

Ordering Information

Order standard voltages for fastest delivery. Allow extra delivery time for non-standard voltages.

Basic Part No.	*Coil Voltage:*
RH2B-U	AC110-120V

Part Numbers

Part Numbers: RH Series with Options

Termination	Contact Configuration	Basic Part No.	Indicator Light	Check Button	Indicator Light and Check Button	Top Bracket
B (blade)	SPDT	RH1B-U	RH1B-L*	—	—	RH1B-UT
	DPDT	RH2B-U	RH2B-UL	RH2B-UC	RH2B-ULC	RH2B-UT
	3PDT	RH3B-U	RH3B-UL	RH3B-UC	RH3B-ULC	RH3B-UT
	4PDT	RH4B-U	RH4B-UL	RH4B-UC	RH4B-ULC	RH4B-UT
V2 (PCB 0.078" [2mm] wide)	SPDT	RH1V2-U	RH1V2-L*	—	—	—
	DPDT	RH2V2-U	RH2V2-UL	RH2V2-UC	RH2V2-ULC	—
	3PDT	RH3V2-U	RH3V2-UL	RH3V2-UC	RH3V2-ULC	—
	4PDT	RH4V2-U	RH4V2-UL	RH4V2-UC	RH4V2-ULC	—

*1. * RH1B(V2)-L is not UL recognized.*
2. For Coil and Contact Ratings, see the next page.

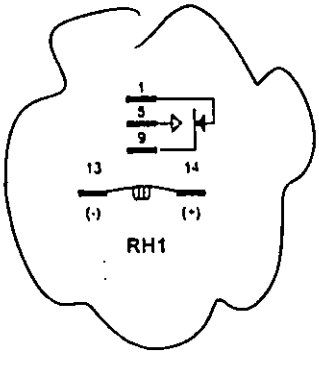
D

Part Numbers: Sockets

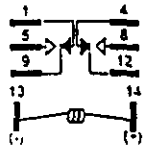
Relay	Standard DIN Rail Mount	Finger-Safe DIN Rail Mount	Surface Mount	Panel Mount	PCB Mount	Spring (optional)
RH1B	SH1B-05	SH1B-05C	—	SH1B-51	SH1B-62	SY2S-02F1 SFA-101 SFA-202 SY4S-51F1 SFA-301 SFA-302
RH2B	SH2B-05	SH2B-05C	SH2B-02	SH2B-51	SH2B-62	SY4S-02F1 SFA-101 SFA-202 SY4S-51F1
RH3B	SH3B-05	SH3B-05C	—	SH3B-51	SH3B-62	SH3B-05F1 SFA-101, -202 SY4S-51F1
RH4B	SH4B-05	SH4B-05C		SH4B-51	SH4B-62	SH4S-02F1 SFA-101, -202 SY4S-51F1

3. See Section F for details on sockets. All DIN rail mount sockets shown above can be mounted using DIN rail BNDN1000.

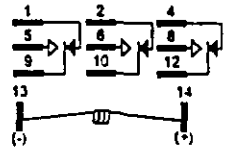
Internal Circuit



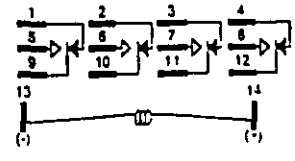
RH1



RH2



RH3



RH4

Ratings

Coil Ratings

Rated Voltage		Rated Current ±15% at 20°C								Coil Resistance ±15% at 20°C			
		60Hz				50Hz							
		SPDT		DPDT		3PDT		4PDT		SPDT	DPDT	3PDT	4PDT
AC	6V	150mA	200mA	280mA	330mA	170mA	238mA	330mA	387mA	18.8Ω	9.4Ω	6.0Ω	5.4Ω
	12V	75mA	100mA	140mA	165mA	86mA	118mA	165mA	196mA	76.8Ω	39.3Ω	25.3Ω	21.2Ω
	24V	37mA	50mA	70mA	83mA	42mA	59.7mA	81mA	98mA	300Ω	153Ω	103Ω	84.5Ω
	120V*	7.5mA	11mA	14.2mA	16.5mA	8.6mA	12.9mA	16.4mA	19.5mA	7,680Ω	4,170Ω	27,70Ω	22.20Ω
	240V†	3.2mA	5.5mA	7.1mA	8.3mA	3.7mA	6.5mA	8.2mA	9.8mA	3,1200Ω	15,210Ω	12,100Ω	91,20Ω
		SPDT		DPDT		3PDT		4PDT		SPDT	DPDT	3PDT	4PDT
DC	6V	128mA		150mA		240mA		250mA		47Ω	40Ω	25Ω	24Ω
	12V	64mA		75mA		120mA		125mA		188Ω	160Ω	100Ω	96Ω
	24V	32mA		36.9mA		60mA		62mA		750Ω	650Ω	400Ω	388Ω
	48V	18mA		18.5mA		30mA		31mA		2,660Ω	2,600Ω	1,600Ω	15.50Ω
	110V‡	8mA		9.1mA		12.8mA		15mA		13,800Ω	12,100Ω	8,600Ω	7,340Ω

D

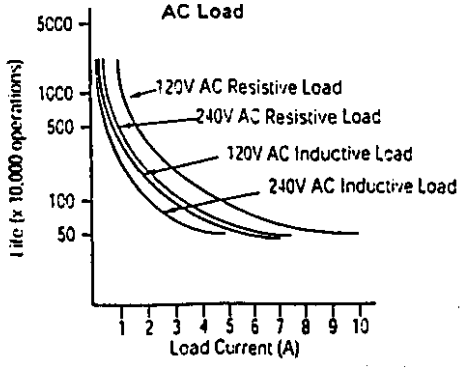
** For RH2 relays = 110 120V AC.*
† For RH2 relays = 220 240V AC.
‡ For RH2 relays = 100 110V DC.

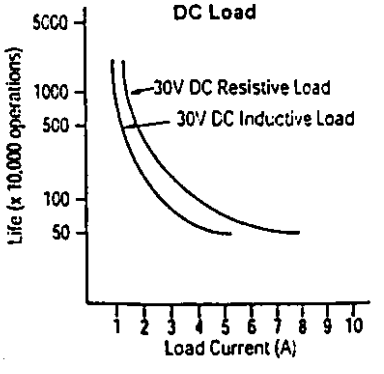
Contact Ratings

Voltage	Rating	Resistive				Inductive				Motor Load	
		SPDT	DPDT	3PDT	4PDT	SPDT	DPDT	3PDT	4PDT	SPDT	DPDT
28V DC	UL	10A	10A	10A	10A	7.5A	—	—	7.5A	—	—
30V DC	UL	10A	10A	10A	—	7A	7A	—	—	—	—
	CSA				10A		7.5A			—	—
	Nominal							7.5A	7.5A	—	—
110V DC	Nominal	0.5A	0.5A	0.5A	0.5A	0.3A	0.3A	0.3A	0.3A	—	—
120V AC	UL	10A	10A	10A	10A	7.5A	—	—	7.5A	1/6	1/6
	CSA						7.5A			—	—
	Nominal					7A		7.5A			
240V AC	UL	10A	10A	—	7.5A	7A	7A	—	5A	1/3	1/3
	CSA							7A		—	—
	Nominal	7A	7.5A	7.5A	4.5A	5A	5A	5A			

*1. * 6.5A 1 pole, 20A total.*
2. Inductive load cos φ = 0.3, L/R = 7ms

Electrical Life Curves





Dedication Test	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-003D-TP-003DX	
Test Specimen: Idec RH1B-U-DC24V Relay	Page 1 of 3

Test Procedure Approval (Obtain prior to testing):
This test procedure adequately tests the critical characteristics of the test specimen upon acceptable completion of the testing.

Design Authority (signature) Craig Swenson Date: 4/4/00

RECOMMENDED EQUIPMENT:
Power Supply capable of 10 amps @ 120VAC.
Power Supply capable of 1 watt @ 24 VDC.
Megger Instrument capable of 500 VDC Test Voltage
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) serial numbers and calibration due
Test Instrument type: Avo BM 221 I.D.: BAT 137 Calib. Due dates 3-A-01.
Test Instrument type: HP 3457A I.D.: BAT 124 Calib. Due dates 7-30-00.
Test Instrument type: FLUKE 787 I.D.: BAT 107 Calib. Due dates 5-28-00.

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE: (Note: use one set of sheets per test specimen)

Test Specimen Description: **Relay**

Record the following identification Information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Manufacturer:	OK	**Idec**	Acc
Model:	OK	**RH1B-U-DC24V**	Acc
Terminal Configuration:	OK	**Blade terminals**	Acc
Serial No.:	LS9	**N/A**	Acc

Perform the following tests:

Record: Date /Time of Test Beginning: 04-05-00 10:00 a.m.

Record: Room Temperature: 68 °F.

Perform steps below:

Dedication Test	Rev. No: 0
Test Plan No.: CGI-SNF-D-MHM-003D-TP-003DX	
Test Specimen: Idec RH1B-U-DC24V Relay	Page 2 of 3

1. Operation

Regulate voltage to the coil of the relay and monitor the max. pick-up voltage and min. drop-out voltages.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Pick-up Voltage	16.71 VDC	19.2 VDC Maximum	Acc
Drop-out Voltage	6.05 VDC	2.4 VDC minimum	Acc

2. Contact Rating Test

Setup the Relay specimen for contact rating testing. Attach a sketch of test circuit with all test instrumentation used.

Apply a nominal 10 amps VAC, resistive, across the NC contacts of the test specimen.

Caution: Do not change state of contacts while energized.

Description	Record Data	Acceptance Criteria	Comments/Deviations
1-9	.1231 VAC	< 0.5 Volts AC drop	Acc

Apply a nominal 10 amps, resistive VAC, @ across the **closed** NO contacts of the test specimen.

Caution: Do not change state of contacts while energized.

Description	Record Data	Acceptance Criteria	Comments/Deviations
5-9	.1524 VAC	< 0.5 Volts AC drop	Acc

3. Insulation Resistance Test

Setup the Relay specimen for insulation resistance testing. Attach Relay in its normal mounting configuration to grounded fixture.

Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the test specimen. Describe the terminals and their data below:

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1	5	>999 Mohm	> 10 Megohms	Acc
5	9	>999 Mohm	> 10 Megohms	Acc
1	Ground	>999 Mohm	> 10 Megohms	Acc
5	Ground	>999 Mohm	> 10 Megohms	Acc
9	Ground	>999 Mohm	> 10 Megohms	Acc
13	Ground	>999 Mohm	> 10 Megohms	Acc
14	Ground	>999 Mohm	> 10 Megohms	Acc

Dedication Test	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-003D-TP-003DX	
Test Specimen: Idec RH1B-U-DC24V Relay	Page 3 of 3

4. **De-energize equipment.**
5. **End test.**
6. **Carefully disassemble test leads to Relay specimen.**
7. **Clean, box (in original packing & paperwork) and ready the test specimen for transfer to buyer.**

Record: Date /Time of Test End: 04-05-00 10:20 a.m.

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Testing was Acceptable.
Michael Cram
04-05-00

Notes:

Test Engineer/Technician (Printed Name) Michael Cram

Test Engineer/Technician (signature) Michael Cram Date: 04-05-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

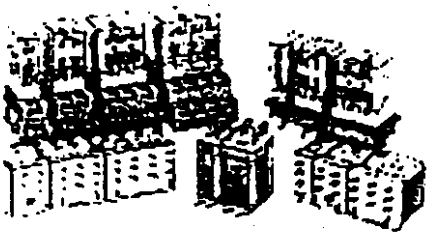
Design Authority (signature) Craig Swenson Date: 4-6-00

QA/QC (signature) Stephen Scott Mosi Date: 4-6-2000

RH Series — General Purpose Midget Relays

Key features of the RH series include:

- Compact midget size saves space
- High switching capacity (10A)
- Choice of blade or PCB style terminals
- Relay options include indicator light, check button, and top mounting bracket
- DIN rail, surface, panel, and PCB type sockets available for a wide range of mounting applications



UL Recognized
Files No. E67770
E59804
E64245

CSA Certified
File No.LR35144

TÜV File No. BL951113332319

CE

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Specifications

Contact Material	Silver cadmium oxide
Contact Resistance	50mΩ maximum (initial value)
Minimum Applicable Load	24V DC/30mA, 5V DC/100mA (reference value)
Operating Time	SPDT (RH1), DPDT (RH2): 20ms maximum 3PDT (RH3), 4PDT (RH4): 25ms maximum
Release Time	SPDT (RH1), DPDT (RH2): 20ms maximum 3PDT (RH3), 4PDT (RH4): 25ms maximum
Power Consumption	SPDT (RH1): DC: 0.8W AC: 1.1VA (50Hz), 1VA (60Hz) DPDT (RH2): DC: 0.9W AC: 1.4VA (50Hz), 1.2VA (60Hz) 3PDT (RH3): DC: 1.5W AC: 2VA (50Hz), 1.7VA (60Hz) 4PDT (RH4): DC: 1.5W AC: 2.5VA (50Hz), 2VA (60Hz)
Insulation Resistance	100MΩ min (measured with a 500V DC megger)
Dielectric Strength	SPDT (RH1) Between live and dead parts: 2,000V AC, 1 minute; Between contact circuit and operating coil: 2,000V AC, 1 minute; Between contacts of the same pole: 1,000V AC, 1 minute
	DPDT (RH2), 3PDT (RH3), 4PDT (RH4) Between live and dead parts: 2,000V AC, 1 minute; Between contact circuit and operating coil: 2,000V AC, 1 minute; Between contact circuits: 2,000V AC, 1 minute; Between contacts of the same pole: 1,000V AC, 1 minute
Frequency Response	1,800 operations/hour
Temperature Rise	Coil: 85°C maximum Contact: 65°C maximum
Vibration Resistance	0 to 6G (55Hz maximum)
Shock Resistance	SPDT/DPDT: 200N (approximately 20G) 3PDT/4PDT: 100N (approximately 10G)
Life Expectancy	Electrical: over 500,000 operations at 120V AC, 10A; (over 200,000 operations at 120V AC, 10A for SPDT (RH1), 3PDT (RH3), 4PDT (RH4)) Mechanical: 50,000,000 operations
Operating Temperature	–30 to +70°C
Weight	SPDT: 24g, DPDT: 37g (approximately) 3PDT: 50g, 4PDT: 74g (approximately)

Operational Characteristics

Maximum Continuous Applied Voltage (AC/DC) at 20°C	110% of the rated voltage
Minimum Operating Voltage (AC/DC) at 20°C	80% of the rated voltage
Drop-Out Voltage (AC)	30% or more of the rated voltage
Drop-Out Voltage (DC)	10% or more of the rated voltage

Ordering Information

Order standard voltages for fastest delivery. Allow extra delivery time for non-standard voltages.

Basic Part No.	Coil Voltage:
RH2B-U	AC110-120V

See page D-29 for dimensions.

Part Numbers

Part Numbers: RH Series with Options

Termination	Contact Configuration	Basic Part No.	Indicator Light	Check Button	Indicator Light and Check Button	Top Bracket
B (blade)	SPDT	RH1B-U	RH1B-L*	—	—	RH1B-UT
	DPDT	RH2B-U	RH2B-UL	RH2B-UC	RH2B-ULC	RH2B-UT
	3PDT	RH3B-U	RH3B-UL	RH3B-UC	RH3B-ULC	RH3B-UT
	4PDT	RH4B-U	RH4B-UL	RH4B-UC	RH4B-ULC	RH4B-UT
V2 (PCB 0.078" [2mm] wide)	SPDT	RH1V2-U	RH1V2-L*	—	—	—
	DPDT	RH2V2-U	RH2V2-UL	RH2V2-UC	RH2V2-ULC	—
	3PDT	RH3V2-U	RH3V2-UL	RH3V2-UC	RH3V2-ULC	—
	4PDT	RH4V2-U	RH4V2-UL	RH4V2-UC	RH4V2-ULC	—

*1. * RH1B(V2)-L is not UL recognized.*
2. For Coil and Contact Ratings, see the next page.

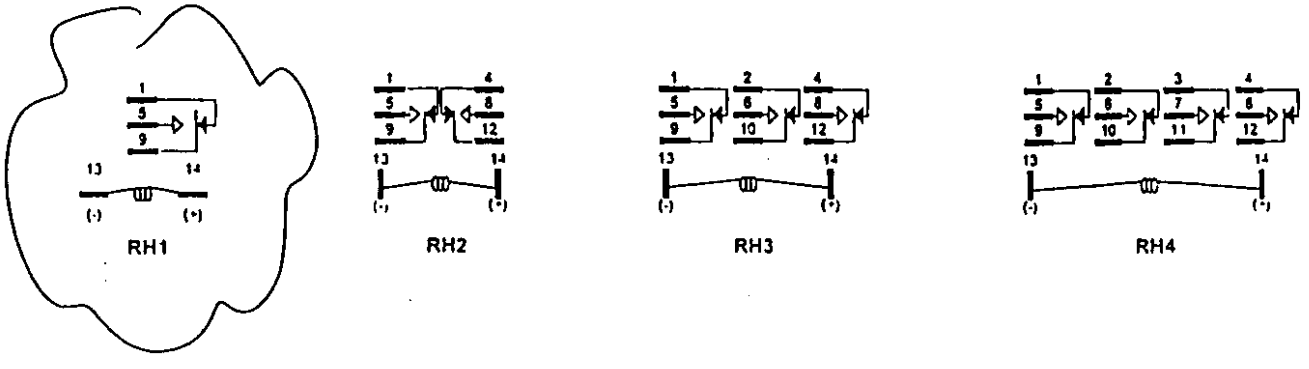
D

Part Numbers: Sockets

Relay	Standard DIN Rail Mount	Finger-Safe DIN Rail Mount	Surface Mount	Panel Mount	PCB Mount	Spring (optional)
RH1B	SH1B-05	SH1B-05C	—	SH1B-51	SH1B-62	SY2S-02F1 SFA-101 SFA-202 SY4S-51F1 SFA-301 SFA-302
RH2B	SH2B-05	SH2B-05C	SH2B-02	SH2B-51	SH2B-62	SY4S-02F1 SFA-101 SFA-202 SY4S-51F1
RH3B	SH3B-05	SH3B-05C	—	SH3B-51	SH3B-62	SH3B-05F1 SFA-101, -202 SY4S-51F1
RH4B	SH4B-05	SH4B-05C		SH4B-51	SH4B-62	SH4B-02F1 SFA-101, -202 SY4S-51F1

3. See Section F for details on sockets. All DIN rail mount sockets shown above can be mounted using DIN rail BNDN1000.

Internal Circuit



Ratings

Coil Ratings

Rated Voltage		Rated Current ±15% at 20°C								Coil Resistance ±15% at 20°C			
		60Hz				50Hz							
		SPDT	DPDT			3PDT		4PDT		SPDT	DPDT	3PDT	4PDT
AC	6V	150mA	200mA	280mA	330mA	170mA	238mA	330mA	387mA	18.8Ω	9.4Ω	6.0Ω	5.4Ω
	12V	75mA	100mA	140mA	165mA	86mA	118mA	165mA	196mA	76.8Ω	39.3Ω	25.3Ω	21.2Ω
	24V	37mA	50mA	70mA	83mA	42mA	59.7mA	81mA	98mA	300Ω	153Ω	103Ω	84.5Ω
	120V*	7.5mA	11mA	14.2mA	16.5mA	8.6mA	12.9mA	16.4mA	19.5mA	7,680Ω	4,170Ω	27,700Ω	22,200Ω
	240V†	3.2mA	5.5mA	7.1mA	8.3mA	3.7mA	6.5mA	8.2mA	9.8mA	31,200Ω	15,210Ω	12,100Ω	91,200Ω
		SPDT	DPDT	3PDT	4PDT	SPDT	DPDT	3PDT	4PDT				
DC	6V	128mA	150mA	240mA	250mA	47Ω	40Ω	25Ω	24Ω				
	12V	64mA	75mA	120mA	125mA	188Ω	160Ω	100Ω	96Ω				
	24V	32mA	36.9mA	60mA	62mA	750Ω	650Ω	400Ω	388Ω				
	48V	18mA	18.5mA	30mA	31mA	2,660Ω	2,600Ω	1,600Ω	15,50Ω				
	110V‡	8mA	9.1mA	12.8mA	15mA	13,800Ω	12,100Ω	8,600Ω	7,340Ω				

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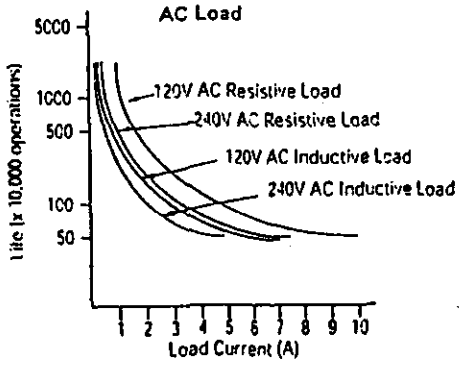
* *For RH2 relays = 110-120V AC.*
† *For RH2 relays = 220-240V AC.*
‡ *For RH2 relays = 100-110V DC.*

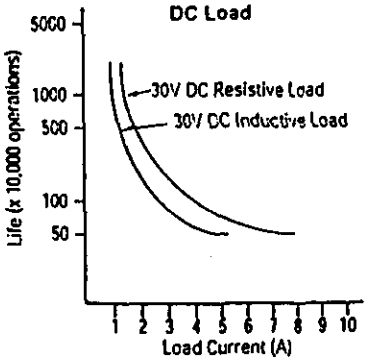
Contact Ratings

		Resistive				Inductive				Motor Load	
Voltage	Rating	SPDT	DPDT	3PDT	4PDT	SPDT	DPDT	3PDT	4PDT	SPDT	DPDT
28V DC	UL	10A	10A	10A	10A	7.5A	—	—	7.5A	—	—
30V DC	UL	10A	10A	10A	—	7A	7A	—	—	—	—
	CSA				10A					—	—
	Nominal						7.5A	7.5A	7.5A	—	—
110V DC	Nominal	0.5A	0.5A	0.5A	0.5A	0.3A	0.3A	0.3A	0.3A	—	—
120V AC	UL	10A	10A	10A	10A	7.5A	—	—	7.5A	1/6	1/6
	CSA						7.5A	7.5A		—	—
	Nominal					7A					
240V AC	UL	10A	10A	—	7.5A	7A	7A	—	5A	1/3	1/3
	CSA							7A		—	—
	Nominal	7A	7.5A	7.5A	4.5A	5A	5A	5A			

1. ** 6.3A per pole, 20A total.*
2. *Inductive load cos φ = 0.3, L/R = 7ms.*

Electrical Life Curves





Dedication Test	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-003D-TP-003DX	
Test Specimen: Idec RH1B-U-DC24V Relay	Page 1 of 3

Test Procedure Approval (Obtain prior to testing):
This test procedure adequately tests the critical characteristics of the test specimen upon acceptable completion of the testing.

Design Authority (signature) Craig Swenson Date: 4/4/00

RECOMMENDED EQUIPMENT:
Power Supply capable of 10 amps @ 120VAC.
Power Supply capable of 1 watt @ 24 VDC.
Megger Instrument capable of 500 VDC Test Voltage
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) serial numbers and calibration due
Test Instrument type: AVO BM221 I.D.: BAT 137 Calib. Due dates 3-14-01,
Test Instrument type: HP3457A I.D.: BAT 124 Calib. Due dates 7-30-00,
Test Instrument type: FLUKE 787 I.D.: BAT 107 Calib. Due dates 5-25-00.

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE: (Note: use one set of sheets per test specimen)

Test Specimen Description: **Relay**

Record the following identification Information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Manufacturer:	OK	**Idec**	Acc
Model:	OK	**RH1B-U-DC24V**	Acc
Terminal Configuration:	OK	**Blade terminals**	Acc
Serial No.:	LS1Y	**N/A**	Acc

Perform the following tests:

Record: Date /Time of Test Beginning: 04-05-00 10:20 a.m.

Record: Room Temperature: 68 °F.

Perform steps below:

Dedication Test	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-003D-TP-003DX	
Test Specimen: Idec RH1B-U-DC24V Relay	Page 2 of 3

1. Operation

Regulate voltage to the coil of the relay and monitor the max. pick-up voltage and min. drop-out voltages.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Pick-up Voltage	15.67 VDC	19.2 VDC Maximum	Acc
Drop-out Voltage	6.11 VDC	2.4 VDC minimum	Acc

2. Contact Rating Test

Setup the Relay specimen for contact rating testing. Attach a sketch of test circuit with all test instrumentation used.

Apply a nominal 10 amps VAC, resistive, across the NC contacts of the test specimen.

Caution: Do not change state of contacts while energized.

Description	Record Data	Acceptance Criteria	Comments/Deviations
1-9	.0995 VAC	< 0.5 Volts AC drop	Acc

Apply a nominal 10 amps, resistive VAC, @ across the **closed** NO contacts of the test specimen.

Caution: Do not change state of contacts while energized.

Description	Record Data	Acceptance Criteria	Comments/Deviations
5-9	.1468 VAC	< 0.5 Volts AC drop	Acc

3. Insulation Resistance Test

Setup the Relay specimen for insulation resistance testing. Attach Relay in its normal mounting configuration to grounded fixture.

Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the test specimen. Describe the terminals and their data below:

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1	5	>999 Mohm	> 10 Megohms	Acc
5	9	>999 Mohm	> 10 Megohms	Acc
1	Ground	>999 Mohm	> 10 Megohms	Acc
5	Ground	>999 Mohm	> 10 Megohms	Acc
9	Ground	>999 Mohm	> 10 Megohms	Acc
13	Ground	>999 Mohm	> 10 Megohms	Acc
14	Ground	>999 Mohm	> 10 Megohms	Acc

Dedication Test	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-003D-TP-003DX	
Test Specimen: Idec RH1B-U-DC24V Relay	Page 3 of 3

4. **De-energize equipment.**
5. **End test.**
6. **Carefully disassemble test leads to Relay specimen.**
7. **Clean, box (in original packing & paperwork) and ready the test specimen for transfer to buyer.**

Record: Date /Time of Test End: 04-05-00 10:30 a.m.

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Testing was acceptable.
Michael Cram
04-05-00

Notes:

Test Engineer/Technician (Printed Name) Michael Cram

Test Engineer/Technician (signature) Michael Cram Date: 04-05-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

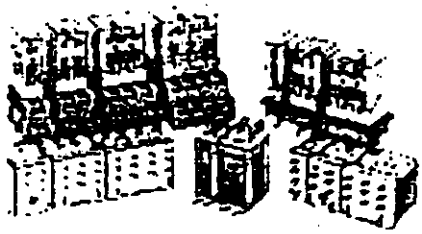
Design Authority (signature) Craig Swenson Date: 4-6-00

QA/QC (signature) Stephen Scott Mosi Date: 4-6-2000

RH Series — General Purpose Midget Relays

Key features of the RH series include:

- Compact midget size saves space
- High switching capacity (10A)
- Choice of blade or PCB style terminals
- Relay options include indicator light, check button, and top mounting bracket
- DIN rail, surface, panel, and PCB type sockets available for a wide range of mounting applications



UL Recognized
Files No. E67770
E59804
E64245

CSA Certified
File No.LR35144

TÜV File No. BL951113332319

CE

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Specifications

Contact Material	Silver cadmium oxide
Contact Resistance	50mΩ maximum (initial value)
Minimum Applicable Load	24V DC/30mA, 5V DC/100mA (reference value)
Operating Time	SPDT (RH1), DPDT (RH2): 20ms maximum 3PDT (RH3), 4PDT (RH4): 25ms maximum
Release Time	SPDT (RH1), DPDT (RH2): 20ms maximum 3PDT (RH3), 4PDT (RH4): 25ms maximum
Power Consumption	SPDT (RH1): DC: 0.8W AC: 1.1VA (50Hz), 1VA (60Hz) DPDT (RH2): DC: 0.9W AC: 1.4VA (50Hz), 1.2VA (60Hz) 3PDT (RH3): DC: 1.5W AC: 2VA (50Hz), 1.7VA (60Hz) 4PDT (RH4): DC: 1.5W AC: 2.5VA (50Hz), 2VA (60Hz)
Insulation Resistance	100MΩ min (measured with a 500V DC megger)
Dielectric Strength	SPDT (RH1) Between live and dead parts: 2,000V AC, 1 minute; Between contact circuit and operating coil: 2,000V AC, 1 minute; Between contacts of the same pole: 1,000V AC, 1 minute
	DPDT (RH2), 3PDT (RH3), 4PDT (RH4) Between live and dead parts: 2,000V AC, 1 minute; Between contact circuit and operating coil: 2,000V AC, 1 minute; Between contact circuits: 2,000V AC, 1 minute; Between contacts of the same pole: 1,000V AC, 1 minute
Frequency Response	1,800 operations/hour
Temperature Rise	Coil: 85°C maximum Contact: 65°C maximum
Vibration Resistance	0 to 6G (55Hz maximum)
Shock Resistance	SPDT/DPDT: 200N (approximately 20G) 3PDT/4PDT: 100N (approximately 10G)
Life Expectancy	Electrical: over 500,000 operations at 120V AC, 10A; (over 200,000 operations at 120V AC, 10A for SPDT [RH1], 3PDT [RH3], 4PDT [RH4]) Mechanical: 50,000,000 operations
Operating Temperature	-30 to +70°C
Weight	SPDT: 24g, DPDT: 37g (approximately) 3PDT: 50g, 4PDT: 74g (approximately)

See page D-29 for dimensions.

Operational Characteristics

Maximum Continuous Applied Voltage (AC/DC) at 20°C	110% of the rated voltage
Minimum Operating Voltage (AC/DC) at 20°C	80% of the rated voltage
Drop-Out Voltage (AC)	30% or more of the rated voltage
Drop-Out Voltage (DC)	10% or more of the rated voltage

Ordering Information

Order standard voltages for fastest delivery. Allow extra delivery time for non-standard voltages.

Basic Part No.	Coil Voltage:
RH2B-U	AC110-120V

Part Numbers

Part Numbers: RH Series with Options

Termination	Contact Configuration	Basic Part No.	Indicator Light	Check Button	Indicator Light and Check Button	Top Bracket
B (blade)	SPDT	RH1B-U	RH1B-L*	—	—	RH1B-UT
	DPDT	RH2B-U	RH2B-UL	RH2B-UC	RH2B-ULC	RH2B-UT
	3PDT	RH3B-U	RH3B-UL	RH3B-UC	RH3B-ULC	RH3B-UT
	4PDT	RH4B-U	RH4B-UL	RH4B-UC	RH4B-ULC	RH4B-UT
V2 (PCB 0.078" [2mm] wide)	SPDT	RH1V2-U	RH1V2-L*	—	—	—
	DPDT	RH2V2-U	RH2V2-UL	RH2V2-UC	RH2V2-ULC	—
	3PDT	RH3V2-U	RH3V2-UL	RH3V2-UC	RH3V2-ULC	—
	4PDT	RH4V2-U	RH4V2-UL	RH4V2-UC	RH4V2-ULC	—

*1. * RH1B(V2)-L is not UL recognized.*
2. For Coil and Contact Ratings, see the next page.

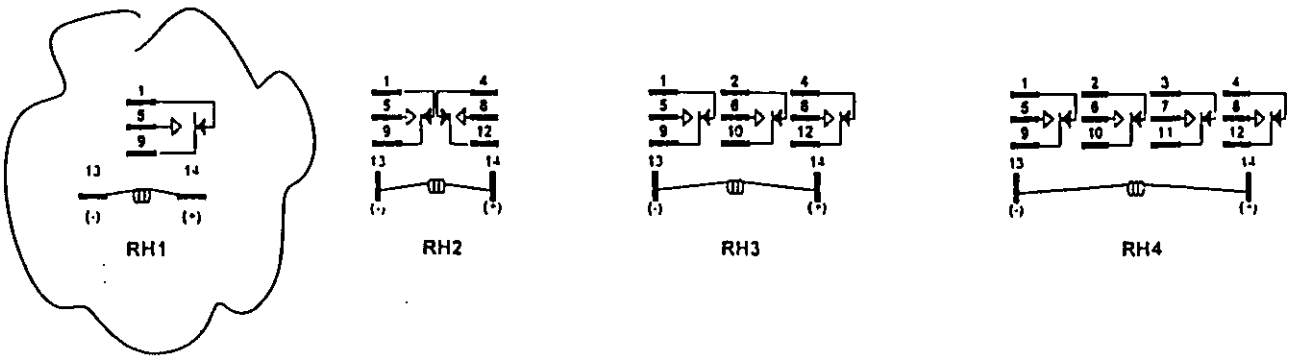
D

Part Numbers: Sockets

Relay	Standard DIN Rail Mount	Finger-Safe DIN Rail Mount	Surface Mount	Panel Mount	PCB Mount	Spring (optional)
RH1B	SH1B-05	SH1B-05C	—	SH1B-51	SH1B-62	SY2S-02F1 SFA-101 SFA-202 SY4S-51F1 SFA-301 SFA-302
RH2B	SH2B-05	SH2B-05C	SH2B-02	SH2B-51	SH2B-62	SY4S-02F1 SFA-101 SFA-202 SY4S-51F1
RH3B	SH3B-05	SH3B-05C	—	SH3B-51	SH3B-62	SH3B-05F1 SFA-101, -202 SY4S-51F1
RH4B	SH4B-05	SH4B-05C		SH4B-51	SH4B-62	SH4B-02F1 SFA-101, -202 SY4S-51F1

3. See Section F for details on sockets. All DIN rail mount sockets shown above can be mounted using DIN rail BNDN1000.

Internal Circuit



Ratings

Coil Ratings

	Rated Voltage	Rated Current ±15% at 20°C								Coil Resistance ±15% at 20°C			
		60Hz				50Hz							
		SPDT		DPDT		3PDT		4PDT		SPDT	DPDT	3PDT	4PDT
AC	6V	150mA	200mA	280mA	330mA	170mA	238mA	330mA	387mA	18.8Ω	9.4Ω	6.0Ω	5.4Ω
	12V	75mA	100mA	140mA	165mA	86mA	118mA	165mA	196mA	76.8Ω	39.3Ω	25.3Ω	21.2Ω
	24V	37mA	50mA	70mA	83mA	42mA	59.7mA	81mA	98mA	300Ω	153Ω	103Ω	84.5Ω
	120V*	7.5mA	11mA	14.2mA	16.5mA	8.6mA	12.9mA	16.4mA	19.5mA	7,680Ω	4,170Ω	27,70Ω	22.20Ω
	240V†	3.2mA	5.5mA	7.1mA	8.3mA	3.7mA	6.5mA	8.2mA	9.8mA	3,1200Ω	15,210Ω	12,100Ω	91.20Ω
		SPDT		DPDT		3PDT		4PDT		SPDT	DPDT	3PDT	4PDT
DC	6V	128mA		150mA		240mA		250mA		47Ω	40Ω	25Ω	24Ω
	12V	64mA		75mA		120mA		125mA		188Ω	160Ω	100Ω	96Ω
	24V	32mA		36.9mA		60mA		62mA		750Ω	650Ω	400Ω	388Ω
	48V	18mA		18.5mA		30mA		31mA		2,660Ω	2,600Ω	1,600Ω	15.50Ω
	110V‡	8mA		9.1mA		12.8mA		15mA		13,800Ω	12,100Ω	8,600Ω	7,340Ω

D

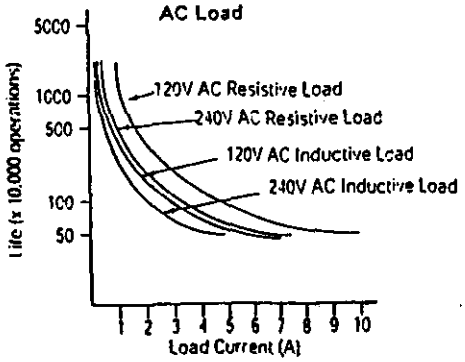
** For RH2 relays = 110-120V AC.*
† For RH2 relays = 220-240V AC.
‡ For RH2 relays = 100-110V DC.

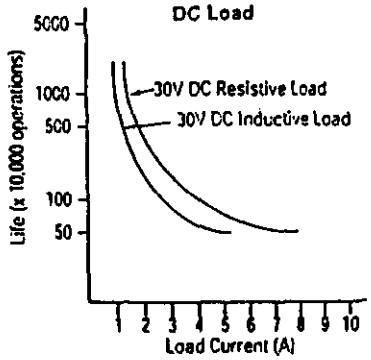
Contact Ratings

Voltage	Rating	Resistive				Inductive				Motor Load	
		SPDT	DPDT	3PDT	4PDT	SPDT	DPDT	3PDT	4PDT	SPDT	DPDT
28V DC	UL	10A	10A	10A	10A	7.5A	—	—	7.5A	—	—
30V DC	UL	10A	10A	10A	—	7A	7A	—	—	—	—
	CSA				10A					—	—
	Nominal						7.5A	7.5A	7.5A	—	—
110V DC	Nominal	0.5A	0.5A	0.5A	0.5A	0.3A	0.3A	0.3A	0.3A	—	—
120V AC	UL	10A	10A	10A	10A	7.5A	—	—	7.5A	1/6	1/6
	CSA						7.5A	7.5A		—	—
	Nominal					7A					
240V AC	UL	10A	10A	—	7.5A	7A	7A	—	5A	1/3	1/3
	CSA							7A		—	—
	Nominal	7A	7.5A	7.5A	4.5A	5A	5A	5A			

*1. * 6.5A per pole, 20A total.*
2. Inductive load cos φ = 0.3, L/R = 7ms.

Electrical Life Curves





CGI REMOVAL/REPLACEMENT LOG

ORIGINAL

Equipment ID No.	Equipment Description	Removd By*	Date	Removal Verified By*	Date	Replaced By*	Date	Replacement Verified By*	Date
PLS1/LS13	Relay	SRC	3-29-00	SRC	3-29-00	SRC	4-12-00	SRC/CES	4-12-00
PLS2/LS1	Relay	SRC	3-29-00	SRC	3-29-00	SRC	4-12-00	SRC/CES	4-12-00
PLS2/LS9	Relay	SRC	3-29-00	SRC	3-29-00	SRC	4-12-00	SRC/CES	4-12-00

Personnel Identification Section

Title	Printed Name	Signature	Initials
Electrician	Steve Conneley		SRC
Design Authority	Craig Swenson	Craig Swenson	CES

Remarks:

* Complete Title, Printed Name, Signature and Initials in Personnel Identification Section

Swenson, Craig E

From: Swenson, Craig E
Sent: Tuesday, April 11, 2000 3:19 PM
To: Kelmel, Gary J
Cc: Swenson, Craig E; Price, Larry W; Molnar, Jon C
Subject: MHM PLS Idec Relay Replacement

Pls replace the 3 PLS 3 small Idec relays (RH1B-U DC24V, serial #27610) and complete the removal/replacement form. Return the completed replacement form to me.

Thx,
Craig E. Swenson, P.E.
MHM BTR & Design Authority
509-376-0288

PCE Mark —

Please Have Steve
do this today.
charge to In Situ CO#53
Thx
GJK

Complete
4/12/00 GJK

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Commercial Grade Item Upgrade Dedication Form

Rev. No. 2

Page 1 of 8

ECN No. **N/A** CGI No. **CGI-SNF-D-MHM-003B**

Title: **MHM Interlocks P6, ~~P52, P53,~~ P57 and P61 – Gemco Cables**

ORIGINAL

Section 1 Part Information

Item No.: **N/A**	Manufacturer: **N/A**	Supplier: **N/A**
Mfg. Part/Model No.: **N/A**	Supplier's P/N: **N/A**	
Part Description: **N/A**		
End Use Description: **N/A**		

Section 2a Component Information

Equipment No.: **RSVMGHX, RSVMGHY**	Specification No.: **Ederer F-2566, Foster Wheeler MJX-SDX 452656**	Manufacturer: **GEMCO**	Past P.O. No.: **N/A**
Manufacturer's Part/Model No.: **SD0334900 and SD0336100**	Equipment Supplier (if different from manufacturer): **ALSTOM, Foster Wheeler**		Equip. Supplier's Part No.: **N/A**

Component Description: **SD0334900 is the connector cable between the Resolver and the PLS. SD0336100 is the connector cable between the PLS and the Output Module.**

Section 2b Commercial Availability of the Item

1. Is the Item available from a catalogue from a qualified NQA1 supplier or ISO 9000 supplier (coordinate with project CGI interface Engineer or BTR)?

   [ ] YES (go to #2 below) [X] NO (go to procedure step 6.3.2-dedicate Item)

   If not available from a qualified NQA1 supplier, is it available from an ISO 9000 supplier?

   [ ] YES (go to #2 below, procedure step 6.3.2, & dedicate Item) [X] NO (procedure step 6.3.2-dedicate Item).

2. List of Candidate qualified NQA1 suppliers or of ISO 9000 suppliers, if used. **N/A**

1. Recommended Procurement Strategy (coordinate with project CGI interface Engineer or BTR): **N/A**

Section 2c CGI Determination

CGI Determination Questions:

#1: Is the Item subject to design or specification requirements that are unique to nuclear facilities or activities?

[ ] YES (the Item is not commercial grade) [X] NO (continue)

#2: Is the Item used in applications other than nuclear facilities or activities?

[ ] NO (the item is not commercial grade) [X] YES (continue)

#3: Is the Item ordered from manufacturer/supplier on the basis of specifications set forth in the manufacturer's catalog?

[ ] NO (the item is not commercial grade) [X] YES (continue)

[X] All three criteria have been satisfied. The Item meets the definition of commercial grade.

Section 2d Reason for Dedication

The above Commercial Grade (CG) described Item is being Dedicated for use in the application cited for the following reason(s):

[ ] Item is being purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Class application.

[ ] Item is being purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Significant application.

[X] Item was purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Class application.

[ ] Item was purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Significant application.

[ ] Other ('like-for-like', similar, substitution, replacement evaluation)

Commercial Grade Item Upgrade Dedication Form

ECN No. **N/A** CGI No. **CGI-SNF-D-MHM-003B**	Rev. No. **2**
Title: **MHM Interlocks P6, P52, P53, P57 and P61 – Gemco Cables**	Page 2 of 8

Section 3 Failure Effects Evaluation

A. Part/Component Safety Function:
1. SD0334900 transmits the rotational position of the turret form the resolver to the PLS. SD0336100 transmits the PLS logic to the Output Module to activate the output relays.

B. Part/Component Functional Mode:

Safety Function #1: [ ] Active [X] Passive

Safety Function #2: [ ] Active [ ] Passive

Safety Function #3: [ ] Active [ ] Passive

Active - Mechanical or Electrical change of state is required to occur for the component to perform its safety function

Passive – Change of state is not required for the component to perform its safety function

C. Host Component Safety Function (if applicable): **N/A**
1.

D. Failure Mode(s) and the effects on component or system safety function (see Worksheet 1):
1. Failure of the cables to transmit signals by either short circuit or open circuit could provide incorrect information to the PLS or the Output Module and defeat the safety function of the P-6 interlock.

CSection 4 Environmental & Natural Phenomena Hazard Design

Environmental Qualification Required:
Yes [ ]
No [X]

If yes: Environmental Qualification Requirements
Limiting Environmental Conditions:
Required Safety Functions:
Qualification Period:

Natural Phenomena Hazard (NPH) Design Required:
Yes [ ]
No [X]

If yes: NPH Design Requirements
Performance Category:
NPH Design Req'ts.:
Required Safety Functions:

Section 5 Component Functional Classification

X	Safety Class (SC)		General Service (GS)		Safety Significant (SS)

If part/component classification is different from host component/system, document basis. **N/A**

Sections 6 and 7 (Reserved)

Section 8 References (for Functional Classification)

National Codes/Standards: **N/A**

Safety Analysis Report (SAR): **HNF-3672, Rev. 0**

Drawings: **Ederer, Inc. EB-33056, Sht 9**

Vendor Manual/Manufacturer/Supplier Information: **GEMCO Series 1989: Quik-Set III High Resolution Single Turn and Multi-turn PLS**

Other: **ALSTOM ESL/R (96) 065 – Rev. D, 100% Design Submittal – June 1998**

Commercial Grade Item Upgrade Dedication Form

ECN No. N/A CGI No. CGI-SNF-D-MHM-003B

Title: **MHM Interlocks P6, P52, P53, P57 and P61 – Gemco Cables**

Section 9 Critical Characteristics

Critical Characteristics	Acceptance Criteria/Tolerances	Acc Meth	ID	Function
Gemco Cable SD0334900				
1. Item Identification Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
N/A				
2. Physical Critical Characteristics (for reasonable assurance that the Item delivered is the Item specified)				
N/A				
3 Performance Critical Characteristics (for reasonable assurance that the Item will perform its intended safety function(s))				
Insulation resistance	**> 10 megohm resistance each wire to shield ground and wire to wire at 500 VDC**	**1, T**		**X**
Wire Continuity	**No open circuits**	**1, T**		**X**
Gemco Cable SD0336100				
1. Item Identification Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
None				
2. Physical Critical Characteristics (for reasonable assurance that the Item delivered is the Item specified)				
3 Performance Critical Characteristics (for reasonable assurance that the Item will perform its intended safety function(s))				
Insulation resistance	**> 10 megohm resistance each wire to shield ground and wire to wire at 500 VDC**	**1, T**		**X**
Wire Continuity	**No open circuits**	**1, T**		**X**

4. Notes and Legend:

Rev 2 was issued due to supplier, Gemco, using a variety of cable manufacturers. Therefore, only performance characteristics will be verified.

Acceptance Method (Acc Meth):
1. Special Test and Inspection:
   1, IN for Inspection
   1,T for Test
2. Commercial Grade Survey
3. Source Verification
   2. Vendor/Item History

Section 10 Initial Review and Approval

Approvals:

Designated Engineer: [signature]

Design Authority: [signature] 3/6/00

QA Engineer: [signature] 3/8/00 TZ ANDERSON

WORKSHEET 1
DETERMINATION OF FAILURE MECHANISMS/MODES

Section 1			
Typical Failure Mechanisms	Definition	X = Applicable to Component under Evaluation	
		X?	Indicate Failure Mode
Fracture	Separation of a solid accompanied by little or no macroscopic plastic deformation.		
Corrosion	The gradual deterioration of a material due to chemical or electrochemical reactions, such as oxidation, between the material and its environment.		
Erosion	Destruction of materials by the abrasive action of moving fluids, usually accelerated by the presence of solid particles carried with the fluid.		
Open Circuit	An electrical circuit that is unintentionally broken so that there is no complete path for current flow.	X	**Open circuit would not allow transmission of information to perform safety function.**
Short Circuit	An abnormal connection by which an electrical current is connected to ground, or to some conducting body, resulting in excessive current flow.	X	**Cables provides incorrect position to CPU to energize permissive circuit.**
Blockage	Clogging of a filtering medium resulting in the inability to perform its purification function or blockage of flow.		
Seizure	Binding of a normally moving item through excessive pressure, temperature, friction, jamming.		
Unacceptable Vibration	Mechanical oscillations produced are beyond the defined permissible limits due to unbalancing, poor support, or rotation at critical speeds.		
Loss of Properties	A loss of mechanical and physical properties of a material due to exposure to high temperatures, radiation exposure.		
Excess Strain	Under the action of excessive external forces the material of the part has been deformed or distorted.		
Mechanical Creep	From prolonged exposure to high temperature and stress, the object will show a slow change in its physical (shape and dimension) and mechanical characteristics.		
Ductile Fracture	Fracture characterized by tearing of metal accompanied by appreciable gross plastic deformation.		
Section 2 Additional Failure Modes Applicable to the Component Under Evaluation			
1.			
2.			
3.			

Commercial Grade Item Upgrade Dedication Form

ECN No. N/A CGI No. CGI-SNF-D-MHM-003B

Title: **MHM Interlocks P6, P52, P53, P57 and P61 – Gemco Cables**

Checklist 1 - Acceptance Method 1 - Special Test/Inspection Verification

SECTION 1

Item Description: **Resolver Cable and PLS to relay module cable** System #: **MHM**	Equip #: **None** Model #: **SD0334900, SD0336100**
Manufacturer (Address/Phone): **GEMCO/PATRIOT** **1080 N. Crooks Rd** **Clawson, MI 48017-1097** **(810) 435-0700**	Supplier (Address/Phone): **N/A**

SECTION 2 CRITICAL CHARACTERISTICS TO BE VERIFIED BY METHOD 1.

Insp	Test	Post-Test	
	X		1. **Insulation resistance**
	X		2. **Wire continuity**
			3.

SECTION 3 BY INSPECTION * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)

N/A

SECTION 4 BY SPECIAL TEST * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)

GEMCO Cable SD0334900

Characteristic for Test: **Insulation resistance** Sampling Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **> 10 megohm resistance each wire to shield ground and wire to wire at 500 VDC**

Actual Test Value: See TP Test Plan and Report #: CGI-SNF-D-MHM-003B - TP-003B1X, B1Y

Characteristic for Test: **Wire continuity** Sampling Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **No open circuits**

Actual Test Value: See TP Test Plan and Report #: TP-003B1X, B1Y

GEMCO Cable SD0336100 *

Characteristic for Test: **Insulation resistance** * Sampling Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **> 10 megohm resistance each wire to shield ground and wire to wire at 500 VDC**

Actual Test Value: Test Plan and Report #:

Characteristic for Test: **Wire continuity** * Sampling Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **No open circuits**

Actual Test Value: Test Plan and Report #:

* THIS CABLE AND THESE TESTS WERE DELETED BECAUSE THE TELEPHONE TYPE WIRE AND TERMINALS WERE SO SMALL THAT REMOVAL TO TEST AND RETERMINATION COULD DO MORE DAMAGE THAN GOOD. SYSTEM WORKS SATISFACTORILY. JMP 4/10/00

Section 5 Test / Inspection Summary (Acceptance Method 1)

1. SUMMARY OF VERIFIED CRITICAL CHARACTERISTICS, THEIR VERIFICATION METHODS, AND RESULTS

ITEM DESCRIPTION: Gemco Cable SD0334900

Critical Characteristics				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/N	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
Insulation resistance	> 10 megohm resistance each wire to shield ground and wire to wire at 500 VDC		X	1, T	TP003 B1X, B1Y	NA	2	0	XWEST	LARRY W. PRICE	4/10/00
Circuit Continuity	No open circuits		X	1, T	↓	↓	↓	↓	↓	↓	↓

2. DISPOSITION OF UNVERIFIED OR FAILED CRITICAL CHARACTERISTICS

Critical Characteristic	Disposition

3. SIGNATURE INDICATES ALL CRITICAL CHARACTERISTICS VERIFIED SATISFACTORY OR ACCEPTABLY DISPOSITIONED AND COMMERCIAL GRADE DEDICATION IS SATISFACTORY AND COMPLETE.

See Test Plan TP-003B1X, -003B1Y

Testing Agency Approval: NR CES 4/12/00 Date _____

Testing Agency QA Engineer: NR CES 4/12/00 Date _____

BUYER VERIFICATION

Design Authority: CES Craig Swenson Date 4-12-00

QA Engineer: Stephen Scott Mosi Date 4-20-2000

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Section 5 Test / Inspection Summary (Acceptance Method 1)

1. SUMMARY OF VERIFIED CRITICAL CHARACTERISTICS, THEIR VERIFICATION METHODS, AND RESULTS

ITEM DESCRIPTION: Gemco Cable SD0336100

Critical Characteristics				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/IN	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
Insulation resistance	> 10 megohm resistance each wire to shield ground and wire to wire at 500 VDC		X	1, T	} SEE ASTERISK NOTE ON PAGE 5					YVP	4/10/00
Circuit Continuity	No open circuits		X	1, T							

2. DISPOSITION OF UNVERIFIED OR FAILED CRITICAL CHARACTERISTICS

Critical Characteristic	Disposition

3. SIGNATURE INDICATES ALL CRITICAL CHARACTERISTICS VERIFIED SATISFACTORY OR ACCEPTABLY DISPOSITIONED AND COMMERCIAL GRADE DEDICATION IS SATISFACTORY AND COMPLETE.

Testing Agency Approval:_____ Date_____

Testing Agency QA Engineer:_____ Date_____

BUYER VERIFICATION

Design Authority:_____ Date_____

QA Engineer:_____ Date_____

Commercial Grade Item Upgrade Dedication Form	Rev. No. 2
ECN No. N/A CGI No. CGI-SNF-D-MHM-003B Title: **MHM Interlocks P6, P52, P53, P57 and P61 – Gemco Cables**	Page 8 of 8

SECTION 6 CONTACTS / PHONE NUMBERS		
	Name	Phone
Design Authority		
QA		
QC		
Cog - Engineer		
CGI Engineer		
Procurement Engineer		
Other		

SECTION 7 SUPPORTING DOCUMENTATION FOR THIS CHECKLIST		
Initial Procurement Documents		**For Critical Characteristics**
	Drawings:	
	Manuals (specify type & number):	
	Design Calculations	
	Installation Instructions	
	Operation Instructions	
	Calibration Instructions	
	Manufacturer's Recommended Spare Parts List	
X	**Other: GEMCO Series 1989: Quik-Set III High Resolution Single Turn and Multi-turn PLS**	**All**
Procurement Documents		**For Critical Characteristics**
	Certificate of Conformance/Compliance	
	Seismic Qualification Certificate	
	Environmental Qualification Certificate	
	Test Report (s):	
	Inspection Report (s):	
	CMTRs for ASME Pressure Retaining Materials	
	Valve Seat Leakage Report	
	Weld Record	
	Material Traceability Record	
	Other:	

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Dedication Test Plan – IST Test Plan No.: CGI-SNF-D-MHM-003B-TP-003B1X Test Specimen: Gemco Cable SD0334900, Eqmt. No: None	ORIGINAL	Rev. No. 0 Page 1 of 6

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				Cog. Eng	DA	QA Post Review*
1	As found condition	2.3.1 Table	Resolver cable pin J is wire 51H, pin G is 41H. See FCR-1006	ERK 3/10/00	CES 3/10/00	3/13/00

* QA Post Review of Individual Revisions is allowed

ORIGINAL

In-Situ Test Procedure

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) ~~FBK~~ Craig Swenson Date: 3-7-00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Bethaven	Michael Cram	MRC
Electrician	J W EBERHART	PCE	J W Eberhart	JWE
Electrician Quality Control	Stephen R. Cooley	PCE	Stephen R. Cooley	SRC
Design Authority Representative	E.R. Kahler	KWest	ERKahler	ERK
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Megger Instrument capable of 500 VDC Test Voltage
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being verified unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: AVO BM8012 I.D.: 0410-889 Calib. Due date: 2/9/01

Test Instrument type: FLUKE 787 I.D.: 6910042 Calib. Due date: 5/28/00

Test Instrument type: PROTO6106 I.D.: 029E/009 Calib. Due date: 01/13/01

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE:

For this In-Situ Test, certain leads must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of leads..

1.0 Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	OK	**None**	Acc
Manufacturer:	OK	**N/A**	Acc
Configuration	OK	**N/A**	Acc
Serial No./Lot No./Date Code:	OK	**N/A**	Acc

2.0 Perform the following testing steps:

2.1 Record: Date /Time of Test Beginning: 03-07-00 1:10 p.m.

Record: Room Temperature: 68 °F.

2.2 Insulation Resistance Test

2.2.1 Open main disconnect switch MD and tag out.

2.2.2 Disconnect cable from resolver, RSVMGHX and tag cable as energized.

2.2.3 At PLS 1, terminal strip S1, lift incoming wire per the Lifted Lead Log.

2.2.4 Setup the test equipment for insulation resistance testing.

2.2.5 Apply a nominal 500 VDC via Megger device wire to shield ground. Record the resistances.

Resolver Pin / Ground

Desc. of Wire No.	Desc. of Wire No./Ground	Record Resistance	Acceptance Criteria	Comments/Deviations
11H	Ground	> 6.1 Gohm	> 10 Megohms	
21H	Ground	> 6.1 Gohm	> 10 Megohms	
31H	Ground	> 6.1 Gohm	> 10 Megohms	
41H	Ground	> 6.1 Gohm	>10 Megohms	
51H	Ground	> 5.8 Gohm	>10 Megohms	
61H	Ground	> 5.8 Gohm	>10 Megohms	
71H	Ground	> 5.9 Gohm	>10 Megohms	

2.2.6 Short all wires together except the one being tested. Check with Ohm-meter

2.2.7 Apply a nominal 500 VDC via Megger device wire to wire. Record the resistances

Desc. of Wire No.	Desc. of Wire No	Record Resistance	Acceptance Criteria	Comments/Deviations
11H	Other wires	0 Ohms	None	Verify shorted
Megger 11H	Other wires	>7.5 Gohms	>10 Megohms	Acc
21H	Other wires	0 Ohms	None	Verify shorted
Megger 21H	Other wires	>7.3 Gohms	>10 Megohms	Acc
31H	Other wires	0 Ohms	None	Verify shorted
Megger 31H	Other wires	> 7.3 Gohms	>10 Megohms	Acc
41H	Other wires	0 Ohms	None	Verify shorted
Megger 41H	Other wires	>7.1 Gohms	>10 Megohms	Acc
51H	Other wires	0 Ohms	None	Verify shorted
Megger 51H	Other wires	>7.2 Gohms	>10 Megohms	Acc
61H	Other wires	0 Ohms	None	Verify shorted
Megger 61H	Other wires	>7.1 Gohms	>10 Megohms	Acc
71H	Other wires	Shorted 0 Ohms	None	Verify shorted
Megger 71H	Other wires	> 7.5 Gohms	>10 Megohms	Acc

2.2.6 Remove the Megger device.

2.3 Wire Continuity test

2.3.1 Attach Ohmmeter between resolver cable connector pins and lifted wire at PLS1 to verify wire continuity. Record below:

Desc. of Pin No.	Desc. of Wire No	Record Resistance	Acceptance Criteria	Comments/Deviations
A	11H	0 Ohms	No open circuit	Acc
B	21H	0 Ohms	No open circuit	Acc
H	31H	0 Ohms	No open circuit	Acc
J	51H ~~41H~~	0 Ohms	No open circuit	Acc
G	41H ~~51H~~	0 Ohms	No open circuit	Acc
K	61h	0 Ohms	No open circuit	Acc
N	71H	0 Ohms	No open circuit	Acc

3/8/00

2.3.2 Remove Ohmmeter.

2.4 Terminate the test.

2.4.1 Reland the lifted leads and verify reland in accordance with the Lifted Lead Log.

2.4.2 Retorque the terminals to 12 in-pounds

2.4.3 Re-attach cable to resolver, hand tight.

2.5.2 Record: Date /Time of Test End: 03-08-00 10:12 a.m.

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Devices under test passed all parameters

Michael Ray Cram
03-08-00

Notes:

Certified InstrumentationTechnician (signature) Michael Cram Date: 03-08-00.
Reviewed: J. Cadick 3-10-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) 3/10/00 Craig Swenson Date: 3/10/00.

QA/QC (signature) T.Z. Anderson Date: 3/13/00.
T Z ANDERSON

LIFTED LEAD LOG

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
363A0033	7	P 8X S C50X	RSVMGHX	Cable connector	JWE	3/7/00			JWE			
EB-33056	9	11H	PLS 1	9	JWE	3/7/00	SRC	3-7-00	JWE	3/7/00	SRC	3-7-00
EB-33056	9	21H	PLS 1	10	JWE	3/7/00	SRC	3-7-00	JWE	3/7/00	SRC	3-7-00
EB-33056	9	31H	PLS 1	12	JWE	3/7/00	SRC	3-7-00	JWE	3/7/00	SRC	3-7-00
EB-33056	9	41H	PLS 1	14	JWE	3/7/00	SRC	3-7-00	JWE	3/7/00	SRC	3-7-00
EB-33056	9	51H	PLS 1	13	JWE	3/7/00	SRC	3-7-00	JWE	3/7/00	SRC	3-7-00
EB-33056	9	61H	PLS 1	15	JWE	3/7/00	SRC	3-7-00	JWE	3/7/00	SRC	3-7-00
EB-33056	9	71H	PLS 1	21	JWE	3/7/00	SRC	3-7-00	JWE	3/7/00	SRC	3-7-00

Remarks:

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Dedication Test Plan – IST	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-003B-TP-003B1Y	
Test Specimen: Gemco Cable SD0334900, Eqmt. No: None	Page 1 of 6

ORIGINAL

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				Cog. Eng	DA	QA Post Review*
1	As found condition	2.3.1 Table	Resdue cable pin J is wire number 52H, G is 42H. See FCR-1006.	~~ERK~~ 3/10/00	LES 3/10/00	3/13/00

* QA Post Review of Individual Revisions is allowed

ORIGINAL

Dedication Test Plan – IST Test Plan No.: CGI-SNF-D-MHM-003B-TP-003B1Y Test Specimen: Gemco Cable SD0334900, Eqmt. No: None	ORIGINAL	Rev. No. 0 Page 2 of 6

In-Situ Test Procedure

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) ERK Craig Swenson Date: 3-7-00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Belhaven	MichaDCram	MRC
Electrician	J W EBERHART	PCE	JWEberhart	JWE
Electrician Quality Control	Stephen R. Conley	PCE	Stephen R Conley	SRC
Design Authority Representative	E.R. Kahler	XWest	ERKahler	ERK
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Megger Instrument capable of 500 VDC Test Voltage
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being verified unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: AVO BM852 I.D.: 6410-889 Calib. Due date: 02/09/01

Test Instrument type: FLUKE 787 I.D.: BAT107 Calib. Due date: 05/28/00

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE:

For this In-Situ Test, certain leads must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of leads..

1.0 Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	OK	**None**	Acc
Manufacturer:	OK	**N/A**	Acc
Configuration	OK	**N/A**	Acc
Serial No./Lot No./Date Code:	OK	**N/A**	Acc

2.0 Perform the following testing steps:

2.1 Record: Date /Time of Test Beginning: 03-08-00 11:00AM

Record: Room Temperature: 68 °F.

2.2 Insulation Resistance Test

2.2.1 Open main disconnect switch MD and tag out.

2.2.2 Disconnect cable from resolver, RSVMGHY and tag cable as energized.

2.2.3 At PLS2, terminal strip S1, lift incoming wire per the Lifted Lead Log.

2.2.4 Setup the test equipment for insulation resistance testing.

2.2.5 Apply a nominal 500 VDC via Megger device wire to shield ground. Record the resistances.

Resolver Pin / Ground

Desc. of Wire No.	Desc. of Wire No./Ground	Record Resistance	Acceptance Criteria	Comments/Deviations
12H	Ground	>1.23Gohm	> 10 Megohms	Acc
22H	Ground	>1.36Gohm	> 10 Megohms	Acc
32H	Ground	>2.40 Gohm	> 10 Megohms	Acc
42H	Ground	>1.35Gohm	>10 Megohms	Acc
52H	Ground	>1.35Gohm	>10 Megohms	Acc
62H	Ground	>2.35Gohm	>10 Megohms	Acc
72H	Ground	>2.33Gohm	>10 Megohms	Acc

2.2.6 Short all wires together except the one being tested. Check with Ohm-meter

2.2.7 Apply a nominal 500 VDC via Megger device wire to wire. Record the resistances

Desc. of Wire No.	Desc. of Wire No	Record Resistance	Acceptance Criteria	Comments/Deviations
12H	Other wires	0 Ohm	None	Verify shorted
Megger 12H	Other wires	>1.57Gohm	>10 Megohms	Acc
22H	Other wires	0 Ohm	None	Verify shorted
Megger 22H	Other wires	>1.59Gohm	>10 Megohms	Acc
32H	Other wires	0 Ohm	None	Verify shorted
Megger 32H	Other wires	>1.57Gohm	>10 Megohms	Acc
42H	Other wires	0 Ohm	None	Verify shorted
Megger 42H	Other wires	>1.55Gohm	>10 Megohms	Acc
52H	Other wires	0 Ohm	None	Verify shorted
Megger 52H	Other wires	>1.62Gohm	>10 Megohms	Acc
62H	Other wires	0 Ohm	None	Verify shorted
Megger 62H	Other wires	>1.52Gohm	>10 Megohms	Acc.
72H	Other wires	0 Ohm	None	Verify shorted
Megger 72H	Other wires	>1.62Gohm	>10 Megohms	Acc

2.2.6 Remove the Megger device.

2.3 Wire Continuity test

2.3.1 Attach Ohmmeter between resolver cable connector pins and lifted wire at PLS2 to verify wire continuity. Record below:

Desc. of Pin No.	Desc. of Wire No	Record Resistance	Acceptance Criteria	Comments/Deviations
A	12H	0 Ohm	No open circuit	Acc
B	22H	1.1 Ohm	No open circuit	Acc
H	32H	2.1 Ohm	No open circuit	Acc
J	52H ~~42H~~	3.1 Ohm	No open circuit	Acc
G	42H ~~52H~~	2.4 Ohm	No open circuit	Acc
K	62h	2.2 Ohm	No open circuit	Acc
N	72H	2.9 Ohm	No open circuit	Acc

EAK 2/8/00

Dedication Test Plan – IST	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-003B-TP-003B1Y	
Test Specimen: Gemco Cable SD0334900, Eqmt. No: None	Page 5 of 6

2.3.2 Remove Ohmmeter.

2.4 Terminate the test.

2.4.1 Reland the lifted leads and verify reland in accordance with the Lifted Lead Log.

2.4.2 Retorque the terminals to 12 in-pounds

2.4.3 Re-attach cable to resolver, hand tight.

2.5.2 Record: Date /Time of Test End: 03-08-00 11:42 a.m.

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):
Devices under test have passed all parameters.
Michael Ray Cram
03-08-00

Notes:

Certified InstrumentationTechnician (signature) Michael Cram Date: 03-08-00
Reviewed By: J. Cadick 3-10-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) 3/10/00 Craig Swenson Date: 3/10/00

QA/QC (signature) T.R. Anderson Date: 3/13/00
T ZANDERSON

LIFTED LEAD LOG

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
363A0033	8	P 9Y S C51Y	RSVMGHX	Cable connector								
EB-33056	9	12H	PLS 2	9	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
EB-33056	9	22H	PLS 2	10	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
EB-33056	9	32H	PLS 2	12	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
EB-33056	9	42H	PLS 2	14	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
EB-33056	9	52H	PLS 2	13	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
EB-33056	9	62H	PLS 2	15	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
EB-33056	9	72H	PLS 2	21	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00

Remarks:

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Commercial Grade Item Upgrade Dedication Form

Rev. No. 2

ECN No. N/A CGI No. CGI-SNF-D-MHM-003A

Page 1 of 7

Title: **MHM Interlock P6 - Gemco Resolver**

Section 1 Part Information

Item No.: **N/A**	Manufacturer: **N/A**	Supplier: **N/A**
Mfg. Part/Model No.: **N/A**	Supplier's P/N: **N/A**	
Part Description: **N/A**	**ORIGINAL**	
End Use Description: **N/A**		

Section 2a Component Information

Equipment No.: **RSVMGHX, RSVMGHY**	Specification No.: **Ederer F-2566, Foster Wheeler MJX-SDX 452656**	Manufacturer: **GEMCO**	Past P.O. No.: **N/A**
Manufacturer's Part/Model No.: **SD0410901**	Equipment Supplier (if different from manufacturer): **ALSTOM, Foster Wheeler**		Equip. Supplier's Part No.: **N/A**

Component Description: **Resolver for interlocks to measure height of MCO grapple for raise and lower commands, inhibits turret rotation, MCO seating zones and locking pins disengagement, located on MCO hoist drive unit**

Section 2b Commercial Availability of the Item

1. Is the Item available from a catalogue from a qualified NQA1 supplier or ISO 9000 supplier (coordinate with project CGI interface Engineer or BTR)?

   [ ] YES (go to #2 below) [X] NO (go to procedure step 6.3.2-dedicate Item)

   If not available from a qualified NQA1 supplier, is it available from an ISO 9000 supplier?

   [ ] YES (go to #2 below, procedure step 6.3.2, & dedicate Item) [X] NO (procedure step 6.3.2-dedicate Item).

2. List of Candidate qualified NQA1 suppliers or of ISO 9000 suppliers, if used. **N/A**

3. Recommended Procurement Strategy (coordinate with project CGI interface Engineer or BTR): **N/A**

Section 2c CGI Determination

CGI Determination Questions:

#1: Is the Item subject to design or specification requirements that are unique to nuclear facilities or activities?

[ ] YES (the Item is not commercial grade) [X] NO (continue)

#2: Is the Item used in applications other than nuclear facilities or activities?

[ ] NO (the item is not commercial grade) [X] YES (continue)

#3: Is the Item ordered from manufacturer/supplier on the basis of specifications set forth in the manufacturer's catalog?

[ ] NO (the item is not commercial grade) [X] YES (continue)

[X] All three criteria have been satisfied. The Item meets the definition of commercial grade.

Section 2d Reason for Dedication

The above Commercial Grade (CG) described Item is being Dedicated for use in the application cited for the following reason(s):

	Item is being purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Class application.
	Item is being purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Significant application.
X	Item was purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Class application.
	Item was purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Significant application.
	Other ('like-for-like', similar, substitution, replacement evaluation)

Commercial Grade Item Upgrade Dedication Form

ECN No. **N/A** CGI No. **CGI-SNF-D-MHM-003A**	Rev. No. 2
Title: **MHM Interlock P6 - Gemco Resolver**	Page 2 of 7

Section 3 Failure Effects Evaluation

A. Part/Component Safety Function:
1. P6 prevents shear of MCO partially lowered with MHM. This MCO grapple limit switch prevents turret rotation and turret and base locking pins disengaging when the MCO hoist is not at the upper limit or at the tube plug exchange limit.

B. Part/Component Functional Mode:

Safety Function #1: [X] Active [ ] Passive

Safety Function #2: [ ] Active [ ] Passive

Safety Function #3: [ ] Active [ ] Passive

Active - Mechanical or Electrical change of state is required to occur for the component to perform its safety function

Passive – Change of state is not required for the component to perform its safety function

C. Host Component Safety Function (if applicable): **N/A**
1.

D. Failure Mode(s) and the effects on component or system safety function (see Worksheet 1):
1. Failure of resolver position indication to PLS switch contacts to open upon demand results in potential override of interlock channel.

CSection 4 Environmental & Natural Phenomena Hazard Design

Environmental Qualification Required:
Yes [ ]
No [X]

If yes: Environmental Qualification Requirements
Limiting Environmental Conditions:
Required Safety Functions:
Qualification Period:

Natural Phenomena Hazard (NPH) Design Required:
Yes [ ]
No [X]

If yes: NPH Design Requirements
Performance Category:
NPH Design Req'ts.:
Required Safety Functions:

Section 5 Component Functional Classification

X	Safety Class (SC)		General Service (GS)		Safety Significant (SS)

If part/component classification is different from host component/system, document basis. **N/A**

Sections 6 and 7 (Reserved)

Section 8 References (for Functional Classification)

National Codes/Standards: **N/A**

Safety Analysis Report (SAR): **HNF-3672, Rev. 0**

Drawings: **Ederer, Inc. EB-33056, Sht 9**

Vendor Manual/Manufacturer/Supplier Information: **GEMCO Series 1989: Quik-Set III High Resolution Single Turn and Multi-turn PLS**

Other: **ALSTOM ESL/R (96) 065 – Rev. D, 100% Design Submittal – June 1998**

Commercial Grade Item Upgrade Dedication Form

ECN No. N/A CGI No. CGI-SNF-D-MHM-003A Title: MHM Interlock P6 - Gemco Resolver	Rev. No. 2 Page 3 of 7

Section 9 Critical Characteristics

Critical Characteristics	Acceptance Criteria/Tolerances	Acc Meth	ID	Function
1. Item Identification Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
Manufacturer	**GEMCO**	**1, IIN**	**X**	
Model	**SD0410901**	**1, IIN**	**X**	
2. Physical Critical Characteristics (for reasonable assurance that the Item delivered is the Item specified)				
3 Performance Critical Characteristics (for reasonable assurance that the Item will perform its intended safety function(s))				
Insulation resistance	**> 10 megohm resistance to ground, rotor and stator windings at 500 VDC**	**1, T**		**X**
Resolver rotor excitation voltage	**With resolver connected to CPU, verify 7.0 to 7.9V RMS at CPU terminal strip S1, terminals 9 and 10 and at 9 and 21**	**1, T**		**X**

4. Notes and Legend:

Rev 2 was issued due to wiring changes per MHM-FCR-079, 081, 086, and 102. Deleted references to interlocks P52. P53, P57 and P61. Deleted Performance CC for Mechanical/Electrical Operation.

Acceptance Method (Acc Meth):
1. Special Test and Inspection:
   1, IN for Inspection
   1,T for Test
2. Commercial Grade Survey
3. Source Verification
4. Vendor/Item History

Section 10 Initial Review and Approval

Approvals:

Designated Engineer: [signature]

Design Authority: [signature] 3/6/00

QA Engineer: [signature] 3/8/00 T.E. ANDERSON

WORKSHEET 1
DETERMINATION OF FAILURE MECHANISMS/MODES

Section 1			
Typical Failure Mechanisms	Definition	X = Applicable to Component under Evaluation	
		X?	Indicate Failure Mode
Fracture	Separation of a solid accompanied by little or no macroscopic plastic deformation.		
Corrosion	The gradual deterioration of a material due to chemical or electrochemical reactions, such as oxidation, between the material and its environment.		
Erosion	Destruction of materials by the abrasive action of moving fluids, usually accelerated by the presence of solid particles carried with the fluid.		
Open Circuit	An electrical circuit that is unintentionally broken so that there is no complete path for current flow.		
Short Circuit	An abnormal connection by which an electrical current is connected to ground, or to some conducting body, resulting in excessive current flow.	X	**Resolver provides incorrect position to CPU to energize passive circuit.**
Blockage	Clogging of a filtering medium resulting in the inability to perform its purification function or blockage of flow.		
Seizure	Binding of a normally moving item through excessive pressure, temperature, friction, jamming.	X	**Resolver mechanism jams and CPU contacts fail to open upon demand.**
Unacceptable Vibration	Mechanical oscillations produced are beyond the defined permissible limits due to unbalancing, poor support, or rotation at critical speeds.		
Loss of Properties	A loss of mechanical and physical properties of a material due to exposure to high temperatures, radiation exposure.		
Excess Strain	Under the action of excessive external forces the material of the part has been deformed or distorted.		
Mechanical Creep	From prolonged exposure to high temperature and stress, the object will show a slow change in its physical (shape and dimension) and mechanical characteristics.		
Ductile Fracture	Fracture characterized by tearing of metal accompanied by appreciable gross plastic deformation.		

Section 2 Additional Failure Modes Applicable to the Component Under Evaluation
1. Resolver position indication to Programmable Limit Switch (PLS) switch contacts are closed to permit equipment movement. Contacts open for the interlock function. Any failure which prevents contacts to open inhibits the particular resolver interlock function.

Commercial Grade Item Upgrade Dedication Form

ECN No. N/A CGI No. CGI-SNF-D-MHM-003A
Title: **MHM Interlock P6 - Gemco Resolver**

Checklist 1 - Acceptance Method 1 - Special Test/Inspection Verification

SECTION 1

Item Description: **Dual Resolver Transducer, 128 turn** System #: **MHM**	Equip #: **RSVMGHX, RSVMGHY** Model #: **SD0410901**
Manufacturer (Address/Phone): **GEMCO/PATRIOT** **1080 N. Crooks Rd** **Clawson, MI 48017-1097** **(810) 435-0700**	Supplier (Address/Phone): **N/A**

SECTION 2 CRITICAL CHARACTERISTICS TO BE VERIFIED BY METHOD 1.

Insp	Test	Post-Test		
X			1.	**Manufacturer**
X			2.	**Model**
	X		3.	**Insulation resistance**
	X		4.	**Resolver rotor excitation voltage**

SECTION 3 BY INSPECTION * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)

Characteristic: **Manufacturer** Sample Size*: **100%**

Acceptance Criteria: **GEMCO**

Receipt Inspection Plan / Report #: CGI-SNF-D-MHM-003A-TP-003 AX, ~~BX~~ AY yup 4/10/00

Characteristic: **Model** Sample Size*: **100%**

Acceptance Criteria: **SD0410901**

Receipt Inspection Plan / Report #: TP-003 AX, BX

SECTION 4 BY SPECIAL TEST * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)

Characteristic for Test: **Insulation resistance** Sampling Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **> 10 megohm resistance to ground, rotor and stator windings at 500 VDC**

Actual Test Value: See TP Test Plan and Report #: TP 003 AX, ~~BX~~ AY yup 4/10/00

Characteristic for Test: **Resolver rotor excitation voltage** Sampling Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **With resolver connected to CPU, verify 7.0 to 7.9V RMS at CPU terminal strip S1, terminals 9 and 10, and at 9 and 21**

Actual Test Value: See TP Test Plan and Report #: TP 003 AX, ~~BX~~ AY yup 4/10/00

Section 5 Test / Inspection Summary (Acceptance Method 1)

1. SUMMARY OF VERIFIED CRITICAL CHARACTERISTICS, THEIR VERIFICATION METHODS, AND RESULTS

ITEM DESCRIPTION: GEMCO Resolver

Critical Characteristics				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/IN	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
Manufacturer	GEMCO	X		1, IN	[illegible]	NA	2	0	XWEST	Larry W. Price	4/10/00
Model	SD0410901	X		1, IN	↓	↓	↓	↓	↓	↓	↓
Insulation resistance	> 10 megohm resistance to ground, rotor and stator windings at 500 VDC		X	1, T	↓	↓	↓	↓	↓	↓	↓
Resolver rotor excitation voltage	With resolver connected to CPU, verify 7.0 to 7.9V RMS at CPU terminal strip S1, terminals 9 and 10 and at 9 and 21				↓	↓	↓	↓	↓	↓	↓

2. DISPOSITION OF UNVERIFIED OR FAILED CRITICAL CHARACTERISTICS

Critical Characteristic	Disposition

3. SIGNATURE INDICATES ALL CRITICAL CHARACTERISTICS VERIFIED SATISFACTORY OR ACCEPTABLY DISPOSITIONED AND COMMERCIAL GRADE DEDICATION IS SATISFACTORY AND COMPLETE.

See Test Plan TP-003AX, ~~AX~~

Testing Agency Approval: NR CES 4/12/00 Date

Testing Agency QA Engineer: NR CES 4/12/00 Date

BUYER VERIFICATION

Design Authority: CES Craig Swenson Date 4-12-00

QA Engineer: Stephen Scott Moss Date 4-20-2000

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Commercial Grade Item Upgrade Dedication Form

ECN No. N/A CGI No. CGI-SNF-D-MHM-003A

Title: **MHM Interlock P6 - Gemco Resolver**

SECTION 6 CONTACTS / PHONE NUMBERS		
	Name	Phone
Design Authority	CRAIG SWENSON	376-0288
QA		
QC		
Cog - Engineer		
CGI Engineer		
Procurement Engineer		
Other		

SECTION 7 SUPPORTING DOCUMENTATION FOR THIS CHECKLIST		
Initial Procurement Documents		**For Critical Characteristics**
	Drawings:	
X	Manuals (specify type & number): **Gemco Technical Documentation**	**All**
	Design Calculations	
	Installation Instructions	
	Operation Instructions	
	Calibration Instructions	
	Manufacturer's Recommended Spare Parts List	
	Other:	
Procurement Documents		**For Critical Characteristics**
	Certificate of Conformance/Compliance	
	Seismic Qualification Certificate	
	Environmental Qualification Certificate	
	Test Report (s):	
	Inspection Report (s):	
	CMTRs for ASME Pressure Retaining Materials	
	Valve Seat Leakage Report	
	Weld Record	
	Material Traceability Record	
	Other:	

ORIGINAL

Dedication Test Plan – IST **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-003A-TP-003AX
Test Specimen: Gemco Resolver SD0410901, Eqmt. No: RSVMGHX **Page 1 of 6**

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI Eng	DA	QA Post Review*
1	Physical inaccessability of resolver	Revise 2.2.3, 2.2.8, Table 2.2.5, 2.2.8, 2.2.9 and Lifted lead Log	(change) Meyser Resolver rotor and Stator through cable at PLS1	3/2/00	3/7/00	3/13/00
2	Main power to MD not available	2.3A	Use temporary 120 VAC power to energize PLS1	3/2/00	3/7/00	3/13/00
3	Vendor manual incorrect	2.3.2 2.3.3	Vendor manual "Series 1989" Technical Documentation part A2a page 30 is incorrect. Schematic page 20 is correct.	3/2/00	3/7/00	3/13/00

*QA Post Review of Individual Revisions is allowed

ORIGINAL

Dedication Test Plan – IST	Rev No. 0
Test Plan No.: CGI-SNF-D-MHM-003A-TP-003AX	
Test Specimen: Gemco Resolver SD0410901, Eqmt. No: RSVMGHX	Page 2 of 6

ORIGINAL

In-Situ Test Procedure

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) Craig Swenson Date: 3/6/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Bellhaven	Michael Cram	MRC
Electrician	JW EBERHART	PCE	J.W Eberhart	JCSE
Electrician Quality Control	Stephen R Conley	PCE	Stephen R Conley	SRC
Design Authority Representative	E.R. Kahler	YWest	E.R. Kahler	ERK
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Megger Instrument capable of 500 VDC Test Voltage

MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance

Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being verified unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: HP3457A I.D.: BAT123 Calib. Due date: 7-29-00

Test Instrument type: AVO BM 80/2 I.D.: 6410-889 Calib. Due date: 2-9-01

Test Instrument type: PROTO 6106 I.D.: 029E/009 Calib. Due date: 1-13-01

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Dedication Test Plan – IST	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-003A-TP-003AX	
Test Specimen: Gemco Resolver SD0410901, Eqmt. No: RSVMGHX	Page 3 of 6

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE:

For this In-Situ Test, certain leads must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of leads..

1.0 Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	YES	**RSVMGHX**	Acc
Manufacturer:	YES	**Gemco**	Acc
Model:	YES	**SD0410901**	Acc
Serial No./Lot No./Date Code:	OK	**N/A**	Acc

2.0 Perform the following testing steps:

2.1 Record: Date /Time of Test Beginning: 3-07-00 10:33 a.m.

Record: Room Temperature: 68 °F.

2.2 Resolver Insulation Resistance Test

2.2.1 Open main disconnect switch MD, lock and tag out.

2.2.2 At the Control Console, PLS1 OM "Power"(101X) to "AC"(102X) terminals ~~verify no~~ determ and attach temporary 120 VAC power. stet

ERK 3/7/00 ~~2.2.3 At the resolver, disconnect cable from resolver, RSVMGHX.~~ at PLS-1 Lift leads per lifted Lead Log

2.2.4 Setup the test equipment for insulation resistance testing.

ERK 3/7/00 2.2.5 Apply a nominal 500 VDC via Megger device between resolver cable connection pin ~~A~~ 1H or ~~B~~ 2H and ground, ~~G~~ 3H or ~~H~~ 5H and ground, and ~~J~~ 4H or ~~K~~ 6H and ground. Record the resistances.

Resolver Pin / Ground

Desc. of Pins	Desc. of Terminal/Ground	Record Resistance	Acceptance Criteria	Comments/Deviations
A or B (rotor) 1H or 2H	Ground	> 1.56 Gohm	> 10 Megohms	Acc
G or H(stator 1) 3H or 5H	Ground	> 2.32 Gohm	> 10 Megohms	Acc
J or K(stator 2) 4H or 6H	Ground	> 3.21 Gohm	> 10 Megohms	Acc

ERK 3/7/00

2.2.6 Remove the Megger device.

2.2.7 De-energize and remove the test equipment.

ERR 3/2/00 2.2.8 Reattach ~~cable to Resolver, hand tight~~. leads per Lifted Lead Log

~~2.2.9 Remove tags from main disconnect switch MD and close.~~ delete ERR 3/2/00

2.3 Resolver Rotor Excitation Voltage

ERR 3/2/00 2.3A at PLS1 On "Power" (101K) to AC (102X) terminals, determ wire and attach temporary 120VAC power

2.3.1 Attach Multi-meter to PLS1 CPU terminal strip S1, terminals 9 and 10.

ERR 3/2/00 2.3.2 Attach Multi-meter to PLS1 CPU terminal strip S1, terminals ~~9~~ 10 and 21.

2.3.3 Record the following data;

Description	Record Voltage	Acceptance Criteria	Comments/Deviations
Terminals 9 and 10	7.762 VAC	7.0 to 7.9 V RMS	Acc
Terminals ~~9~~ 10 and 21	7.678 VAC	7.0 to 7.9 V RMS	Acc

ERR 3/2/00 ~~2.3.4~~

2.4 Terminate the test.

2.4.1 Reland the lifted leads and verify reland in accordance with the Lifted Lead Log.

2.4.2 Record: Date /Time of Test End: 03-07-00 12:56 p.m.

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Device under test was found to be within parameters

Michael Ray Cram
03-07-00

Dedication Test Plan – IST	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-003A-TP-003AX	
Test Specimen: Gemco Resolver SD0410901, Eqmt. No: RSVMGHX	Page 5 of 6

Notes:

Certified InstrumentationTechnician (signature) Michael D Cram Date: 03-07-00
Reviewed By: L. Cadena 3-10-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) 3/7/00 Craig Anderson Date: 3/7/00

QA/QC (signature) T Z Anderson Date: 3/13/00

LIFTED LEAD LOG

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
~~363A0033~~	~~7~~	~~P-8X-S C50X~~	~~RSVMGHX~~	~~Cable connector~~	Delete							
EB 33002	9	11H	PLS1	9	JWE	3/7/00	SRC	3-7-00	JWE	3/7/00	SRC	3-7-00
		21H		10	JWE	3/7/00	SRC	3-7-00	JWE	3/7/00	SRC	3-7-00
		31H		12	JWE	3/7/00	SRC	3-7-00	JWE	3/7/00	SRC	3-7-00
		41H		14	JWE	3/7/00	SRC	3-7-00	JWE	3/7/00	SRC	3-7-00
		51H		13	JWE	3/7/00	SRC	3-7-00	JWE	3/7/00	SRC	3-7-00
		61H		15	JWE	3/7/00	SRC	3-7-00	JWE	3/7/00	SRC	3-7-00
		71H		21	JWE	3/7/00	SRC	3-7-00	JWE	3/7/00	SRC	3-7-00
		101X		Power	JWE	3/7/00	SRC	3-7-00	JWE	3/7/00	SRC	3-7-00
		102X		AC	JWE	3/7/00	SRC	3-7-00	JWE	3/7/00	SRC	3-7-00

Remarks:

SRC 3/2/00

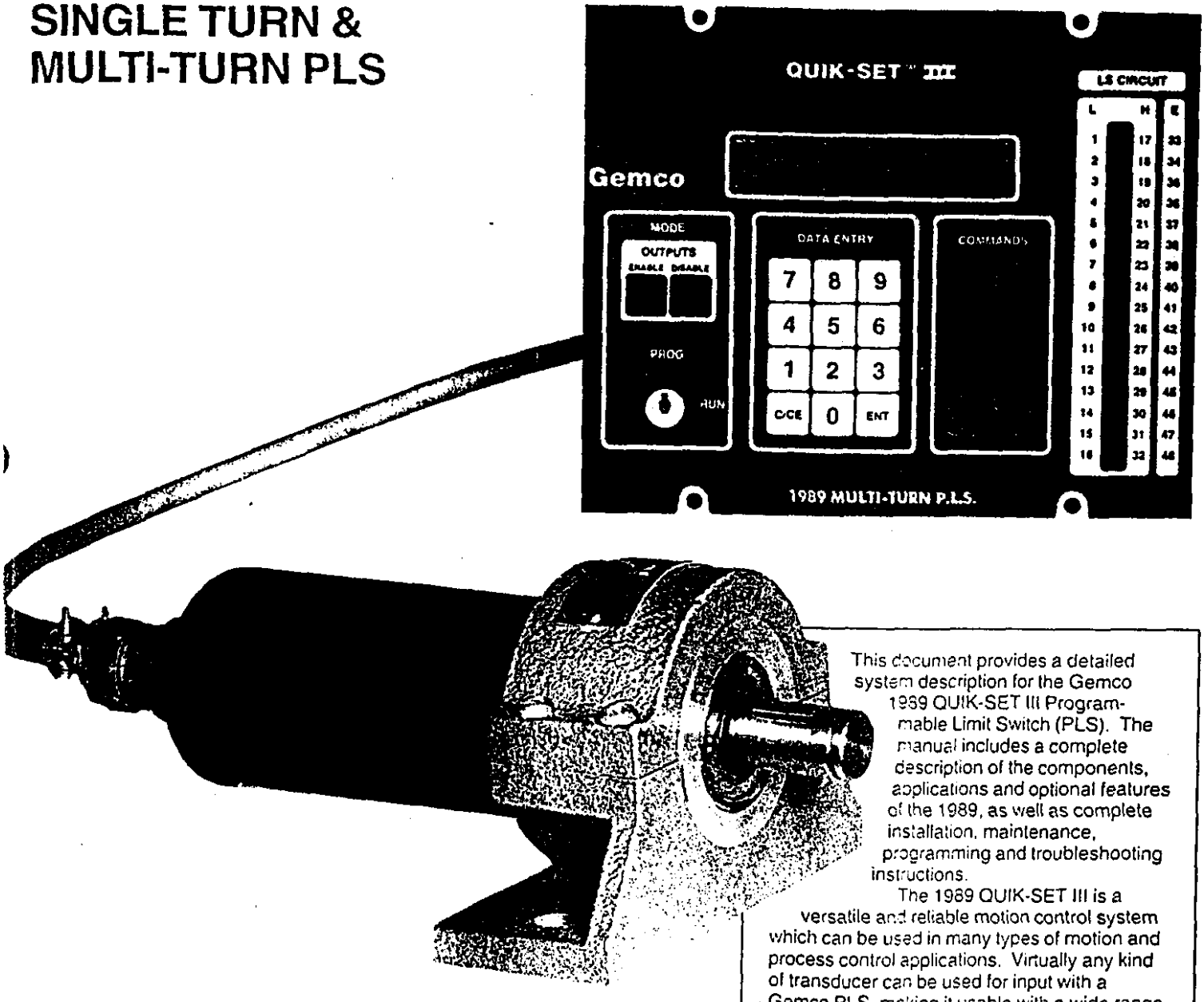
3/8/00
ERK

Page 859

007AX

SERIES 1989:

QUIK-SET III HIGH RESOLUTION SINGLE TURN & MULTI-TURN PLS



This document provides a detailed system description for the Gemco 1989 QUIK-SET III Programmable Limit Switch (PLS). The manual includes a complete description of the components, applications and optional features of the 1989, as well as complete installation, maintenance, programming and troubleshooting instructions.

The 1989 QUIK-SET III is a versatile and reliable motion control system which can be used in many types of motion and process control applications. Virtually any kind of transducer can be used for input with a Gemco PLS, making it usable with a wide range of applications. The PLS system's position information, programs and set point memory are non-volatile, making it as reliable as fixed limit or proximity switches, but far more flexible.

The remainder of this manual will describe in detail all the advanced features of the 1989, which include: up to 48 output channels; 8 separate programs which are keypad selectable; compatibility with single- or multi-turn resolvers and two-axis systems; and virtually limitless combinations of options and features.

GEMCO

TECHNICAL DOCUMENTATION

INSTALLATION

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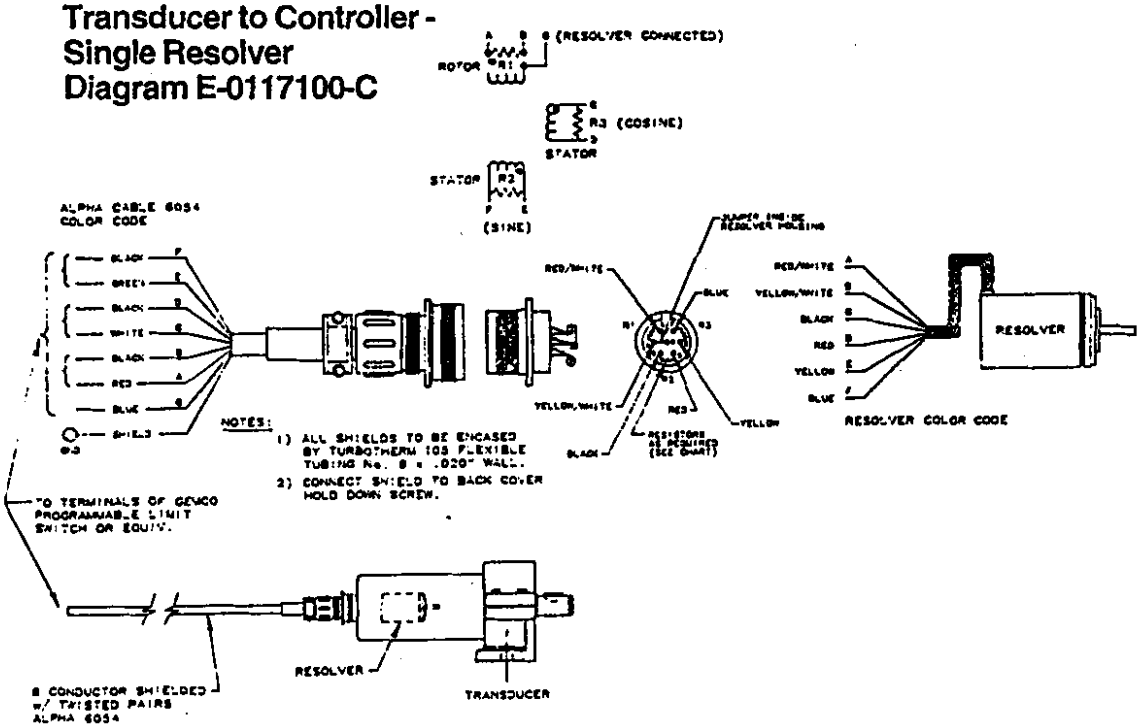
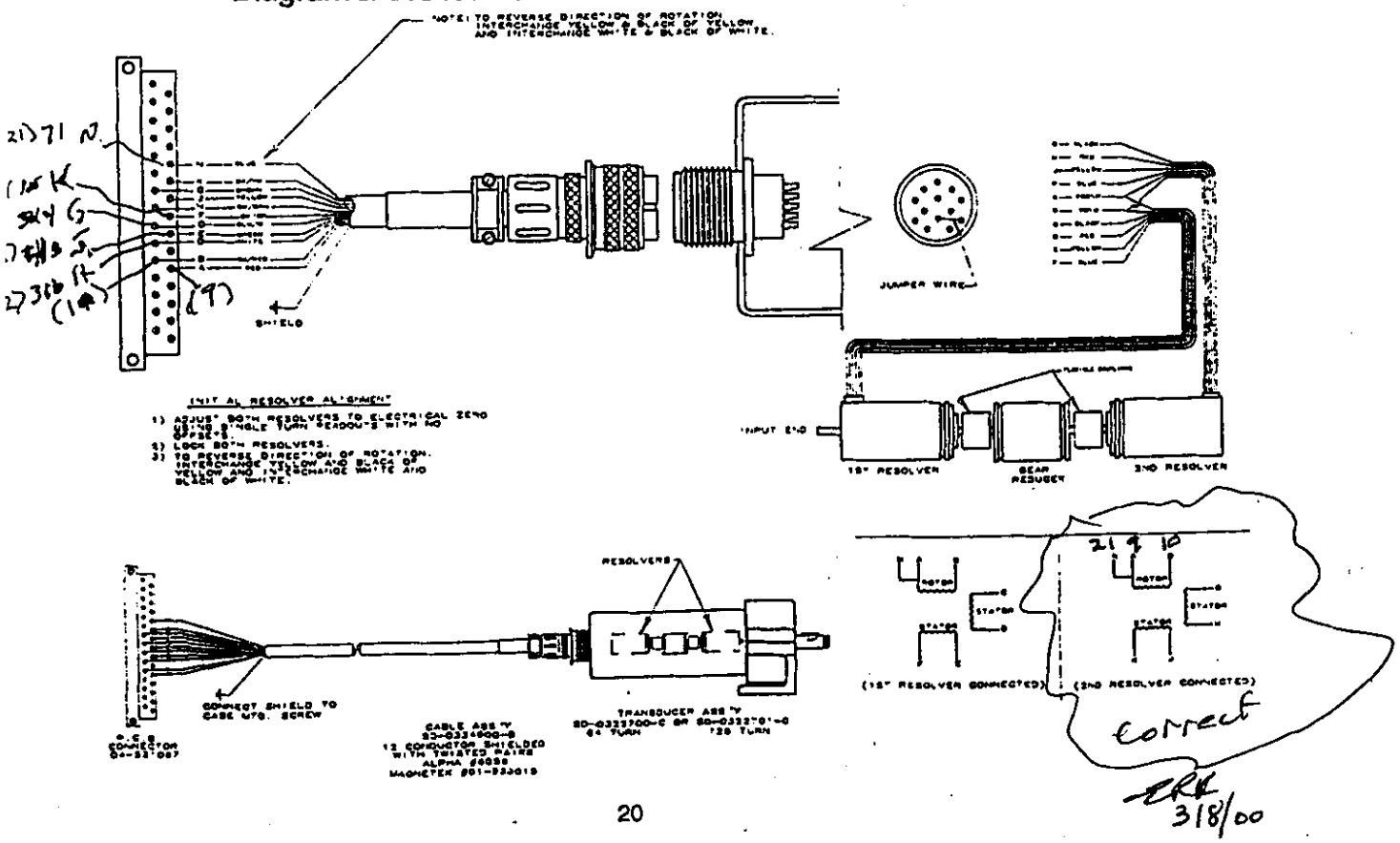
Transducer to Controller - Single Resolver Diagram E-0117100-C



Transducer to Controller - Dual Resolver Diagram E-0184600-C



1. TROUBLESHOOTING

?ODUCTION

The following procedures are intended to aid in isolating system malfunctions to field replaceable modules. These modules include the display/keypad module, CPU module, output/power supply module, auxiliary output boards, transducer and all interconnecting cables. Once isolated, the defective module should be replaced and returned for factory repair.

Field repair beyond this level is not recommended.

Note: The screw terminals of the CPU module terminal strip do not make electrical contact when not tightened down. Insure that these screw terminals are fully tightened when taking voltage readings.

LIMINARY CKS

Check all system wiring connections at the transducer, CPU module and output module. Amphenol-type connectors on the transducer and its cabling should be checked for tightness. A slight tug on all wire terminations will verify a good connection. Push-on cable connectors at the keypad, CPU and output modules should be checked for proper connections.

Verify that all wiring at the CPU module is in agreement with its legend plate. The terminal designations of your CPU module may not be identical to the enclosed general wiring diagrams due to the wide range of available options.

Note: Verify that the keypad cable is connected to a multipin connector located through a cutout in the lower left corner of the CPU module's sheetmetal base. Other similar looking connectors may have been used by mistake.

A. Input Operation

A1. Check the operating voltage of the 5 VDC and 15 VDC inputs at the CPU module. Voltage between the terminals labeled 5 VDC (terminals 1 and 2 of terminal strip S2) and ground (terminals 3 and 4 of terminal strip S2) should be 4.8 to 5.2 VDC . This voltage range is critical for proper operation of the microprocessor. Voltage between the terminal labeled 15 VDC (terminal 29 of terminal strip S2) and ground (terminal 30 of terminal strip S2) should be 14.3 to 15.3 VDC . This input powers the transducer excitation circuitry.

If either of these voltages are not present at the CPU module terminals, the input wires should be disconnected and the voltage level checked across the wires. If the correct voltage is seen across the input wires, a short condition probably exists within the CPU module and it should be replaced.

If the correct voltage levels are not seen across these wires, the power supply has failed. This power supply can be an integral part of a Gemco output/power supply module, a Gemco power supply without outputs or a standard power supply not provided by Gemco. All Gemco power supply modules have a circuit board-mounted line fuse that should be checked. AC input voltages to these modules should be 105 to 125 VAC or 210 to 250 VAC depending on the version specified.

After verifying the AC input voltages and line fuse, the 5 VDC and 15 VDC output should be verified at the power supply with all wiring disconnected at its output terminals. See diagram E-0190100-C, (pages 11-12), for the location of these output pins on a Gemco output/power supply module. On a Gemco power supply without outputs, these are screw terminals that are clearly labeled on its circuit board.

If the 5 VDC and 15 VDC voltages are now correct at the power supply terminals, an open or short condition of the power supply to CPU module wiring should be suspected. Incorrect voltages at the power supply indicate a defective power supply and the complete power supply module should be replaced.

A2. Transducer excitation voltage should be checked at the CPU module terminal strip S1. Use the following procedures based on the type of transducer that your system was designed for:

A2a. Single-turn resolver: AC voltage across terminals 9 and 10 of terminal strip S1 (labeled Red and Bk/R) should be 7.0 to 7.9V RMS. This is the output voltage being supplied to the resolver rotor. If this voltage is not present, disconnect the resolver wires at the CPU module and recheck the voltage. If this voltage is still not present, the resolver excitation circuitry in the CPU module has failed and it should be replaced. If this voltage reappears, a short condition in the resolver or its cable should be looked for.

The return signals from the resolver stator windings wire to the CPU module on terminal strip S1 terminals 12 and 14 (labeled White and Bk/W) and terminals 13 and 15 (labeled Green and Bk/G). To verify the presence of these AC return signals, put a voltmeter across terminals 12 and 14 and rotate the resolver. A voltage reading that rises and falls between these terminals as the resolver is rotated indicates a good resolver return signal. Repeat this same procedure with your meter across terminals 13 and 15. No voltage or a voltage that does not vary as the resolver rotates indicates an open or short condition in the resolver windings or the resolver cable.

The blue resolver wire that connects to the CPU module at terminal strip S1 terminal 21 (labeled BL) is a feedback wire used to verify that the resolver excitation voltage has reached the resolver rotor. A loss of this feedback voltage is intended to indicate a disconnected or severed resolver cable or other resolver excitation fault. If this feedback voltage is not present, the display on the keypad will show all E's. A voltmeter across terminal strip S1 terminal 9 (labeled Red) and terminal 21 (labeled BL) should read 7.0 to 7.9V RMS. If this voltage is not present, but was present across terminals 9 and 10 when checked earlier, an open or short condition exists in the resolver or its cable. If it is present, and all E's still appear on the display, a fault in the CPU module has been detected and it should be replaced.

10 Corrected EHH 3/8/00

Note: The reason for an all "E" fault display can be quickly isolated without the use of a voltmeter. Remove the resolver cable wires from terminals 9, 10 and 21

Dedication Test Plan – IST	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-003A-TP-003AY	
Test Specimen: Gemco Resolver SD0410901, Eqmt. No: RSVMGHY	Page 1 of 6

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI Eng	DA	QA Post Review*
1	Inaccessibility of resolver	2.2.3, 2.2.5, 2.2.8, 2.2.9 Table 2.2.5 and Lifted Leads Log	Megger resolver rotors and stator through cable from PLS 2	ERK 3/7/00	CES 3/8/00	3/13/00
2.	Power not available at MD	2.3A	Use temporary power to test PLS2 excitation voltage	ERK 3/7/00	CES 3/8/00	3/13/00
3	Vendor manual incorrect	2.3.2 2.3.3	Vendor manual "Series 1989" Technical Documentation page 30, para A2a is incorrect. Schematic page 20 is correct. Vendor sheets attached	ERK 3/2/00	CES 3/8/00	3/13/00

* QA Post Review of Individual Revisions is allowed

ORIGINAL

Dedication Test Plan – IST **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-003A-TP-003AY
Test Specimen: Gemco Resolver SD0410901, Eqmt. No: RSVMGHY **Page 2 of 6**

In-Situ Test Procedure

ORIGINAL

Test Procedure Approval (Obtain prior to testing):
This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) Craig Swenson Date: 3/6/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Belhaven	Michael Cram	MRC
Electrician	J W EBERHART	PCE	JW Eberhart	JWE
Electrician Quality Control	Stephen R. Cowley	PCE	Stephen R. Cowley	SRC
Design Authority Representative	E.R. Kahler	XWest	ERKahler	ERK
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:
Megger Instrument capable of 500 VDC Test Voltage
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being verified unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: Avo BM80/2 I.D.: 6410-889 Calib. Due date: 02-09-01

Test Instrument type: HP3457A I.D.: BAT 123 Calib. Due date: 07-29-00

Test Instrument type: FLUKE 787 I.D.: BAT 107 Calib. Due date: 05-28-00

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Dedication Test Plan – IST	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-003A-TP-003AY	
Test Specimen: Gemco Resolver SD0410901, Eqmt. No: RSVMGHY	Page 3 of 6

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE:

For this In-Situ Test, certain leads must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of leads..

1.0 Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	YES	RSVMGHY	Acc
Manufacturer:	YES	Gemco	Acc
Model:	YES	SD0410901	Acc
Serial No./Lot No./Date Code:	OK	N/A	Acc

2.0 Perform the following testing steps:

2.1 Record: Date /Time of Test Beginning: 03-08-00 10:45 a.m

Record: Room Temperature: 68 °F.

2.2 Insulation Resistance Test

2.2.1 Open main disconnect switch MD, lock and tag out.

2.2.2 At the Control Console, PLS2 OM "Power"(101Y) to "AC"(102Y) terminals verify no 120 VAC power.

ERK 3/7/00 2.2.3 ~~At the resolver, disconnect cable from resolver, RSVMGHY.~~ at PLS2, determ per Lifted Lead log

2.2.4 Setup the test equipment for insulation resistance testing.

ERK 3/7/00 2.2.5 Apply a nominal 500 VDC via Megger device between resolver pin ~~A~~ 12H or ~~B~~ 22H and ground, ~~G~~ 32H or ~~H~~ 52H and ground, and ~~J~~ 42H or ~~K~~ 62H and ground. Record the resistances..

Resolver Pin / Ground

Desc. of Pins	Desc. of Terminal/Ground	Record Resistance	Acceptance Criteria	Comments/Deviations
A or B (rotor) ~~12H~~	or 22H Ground	> 1.43 Gohm	> 10 Megohms	Acc
G or H(stator 1) 32H	or 52H Ground	> 1.10 Gohm	> 10 Megohms	Acc
J or K(stator 2) 42H	or 62H Ground	> 1.10 Gohm	> 10 Megohms	Acc

ERK 3/7/00

2.2.6 Remove the Megger device.

2.2.7 De-energize and remove the test equipment.

ERK 3/7/00 2.2.8 ~~Reattach cable to Resolver, hand tight~~ Lift leads per Lifted Lead Log and verify

ERK 3/7/00 2.2.9 ~~Remove tags from main disconnect switch MD and close~~. delete

2.3 Resolver Rotor Excitation Voltage

ERK 3/7/00 2.3 A at PLS omit "Power" (101Y) and AC (102Y), Lift Leads per Lifted Lead Log and apply temporary 120 VAC power.

2.3.1 Attach Multi-meter to PLS2 CPU terminal strip S1, terminals 9 and 10.

ERK 3/7/00 2.3.2 Attach Multi-meter to PLS2 CPU terminal strip S1, terminals 9 and 21. 10

2.3.3 Record the following data;

Description	Record Voltage	Acceptance Criteria	Comments/Deviations
Terminals 9 and 10	7.66 VAC	7.0 to 7.9 V RMS	Acc
ERK 3/7/00 Terminals 9 and 21 10	7.55 VAC	7.0 to 7.9 V RMS	Acc

2.4 Terminate the test.

2.4.1 Reland the lifted leads and verify reland in accordance with the Lifted Lead Log.

2.4.2 Record: Date /Time of Test End: 03-08-00 1:25 pm

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Devices under test were found to be acceptable.

Michael Cram 03-08-00

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Dedication Test Plan – IST	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-003A-TP-003AY	
Test Specimen: Gemco Resolver SD0410901, Eqmt. No: RSVMGHY	Page 5 of 6

Notes:

Certified InstrumentationTechnician (signature) Michael Crem Date: 03-08-00
Received By: L. Cadena 3-10-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) 3/8/00 Craig Swenson Date: 3/8/00

QA/QC (signature) T. B. Date: 3/13/00

LIFTED LEAD LOG

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
363A0033	8	P9YS C51Y	RSVMGHY	Cable connector	Delete							
EB-33056	9	12H	PLS2	9	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
		22H		10	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
		32H		12	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
		42H		14	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
		52H		13	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
		62H		15	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
		72H		21	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
		101Y		Power	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00
		102Y		AC	JWE	3/8/00	SRC	3-8-00	JWE	3/8/00	SRC	3-8-00

Remarks:

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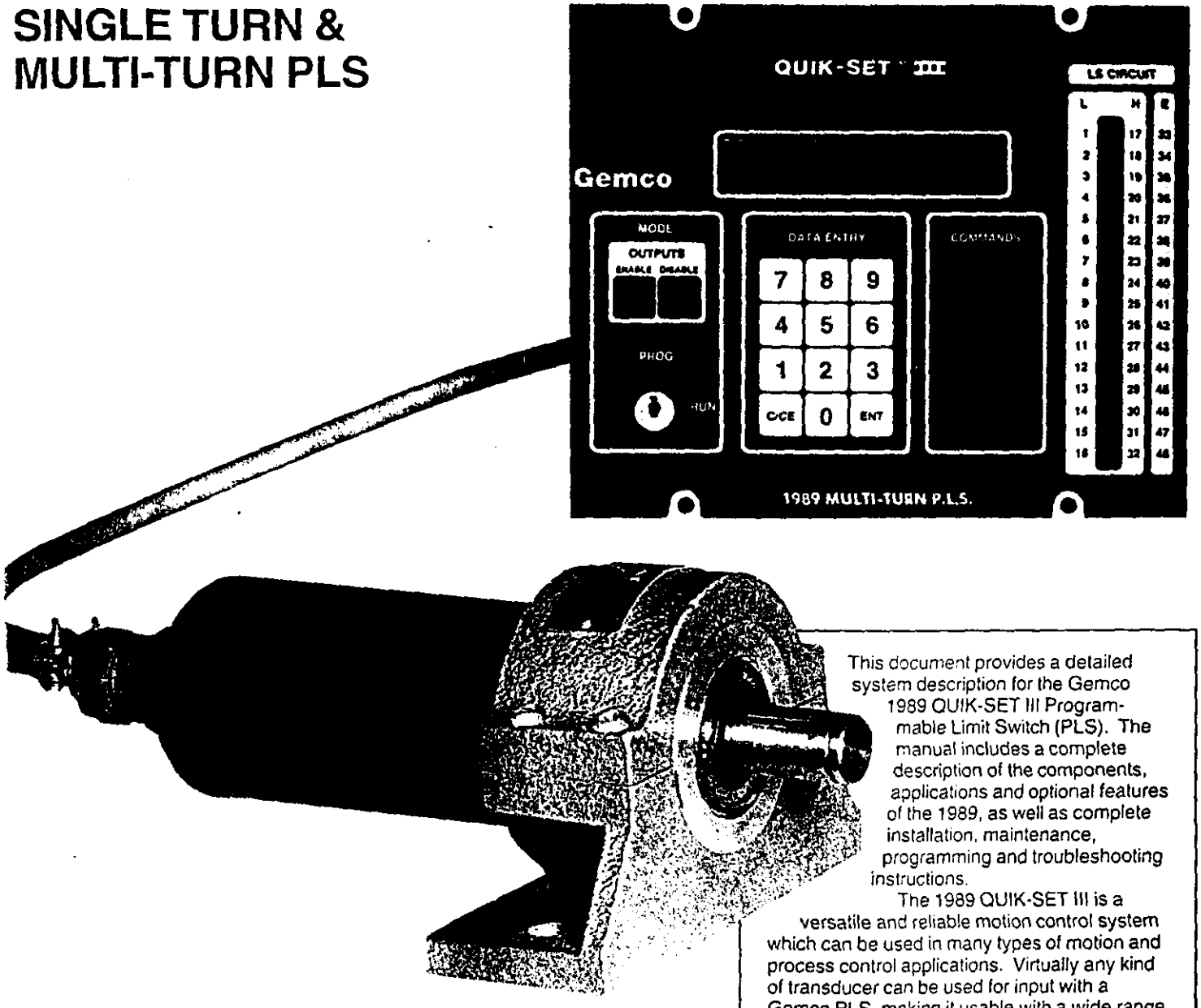
3/8/00
ZRK

003AY

SERIES 1989:

QUIK-SET III HIGH RESOLUTION SINGLE TURN & MULTI-TURN PLS



This document provides a detailed system description for the Gemco 1989 QUIK-SET III Programmable Limit Switch (PLS). The manual includes a complete description of the components, applications and optional features of the 1989, as well as complete installation, maintenance, programming and troubleshooting instructions.

The 1989 QUIK-SET III is a versatile and reliable motion control system which can be used in many types of motion and process control applications. Virtually any kind of transducer can be used for input with a Gemco PLS, making it usable with a wide range of applications. The PLS system's position information, programs and set point memory are non-volatile, making it as reliable as fixed limit or proximity switches, but far more flexible.

The remainder of this manual will describe in detail all the advanced features of the 1989, which include: up to 48 output channels; 8 separate programs which are keypad selectable; compatibility with single- or multi-turn resolvers and two-axis systems; and virtually limitless combinations of options and features.

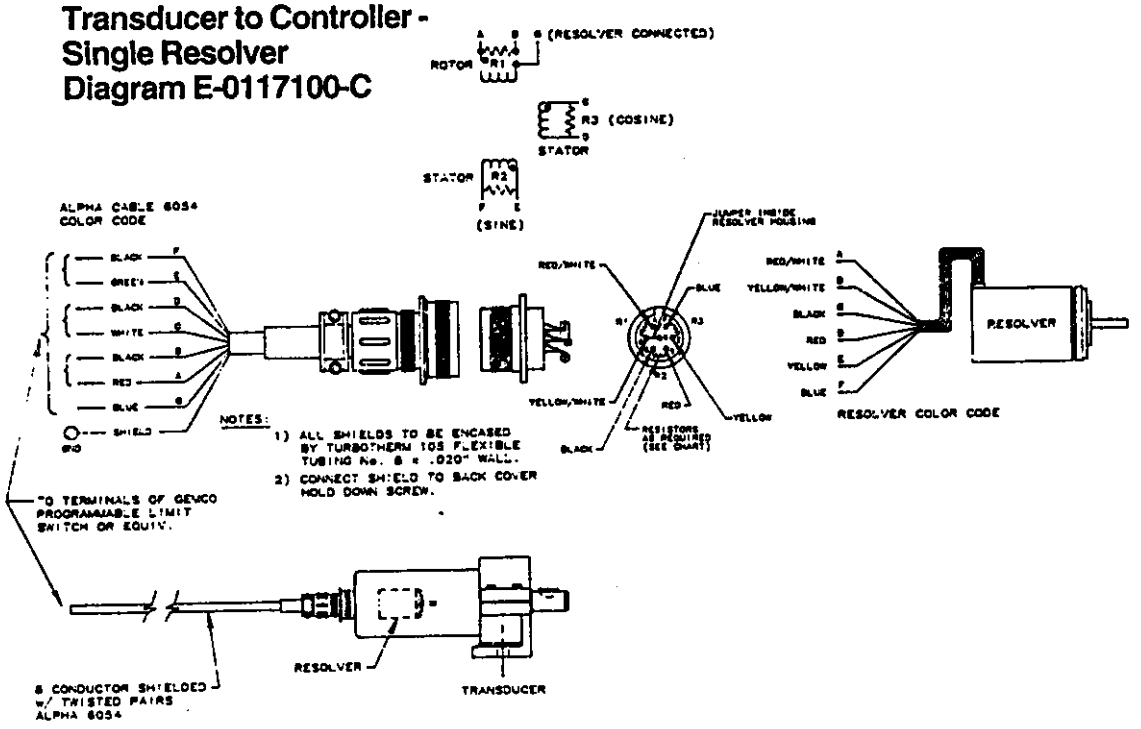
GEMCO

TECHNICAL DOCUMENTATION

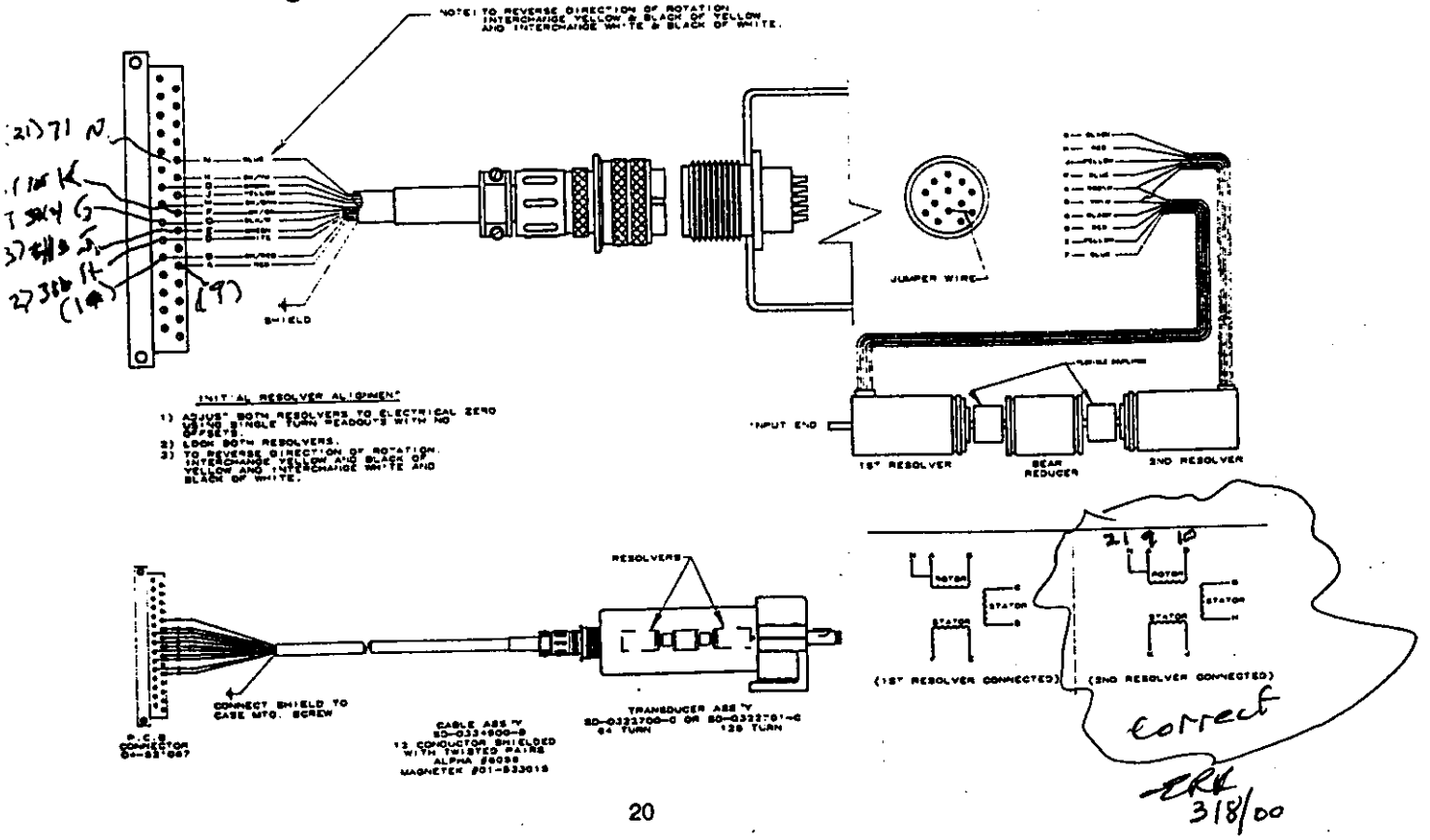
INSTALLATION

Page 869

Transducer to Controller - Single Resolver Diagram E-0117100-C



Transducer to Controller - Dual Resolver Diagram E-0184600-C



1. TROUBLESHOOTING

)UCTION

The following procedures are intended to aid in isolating system malfunctions to field replaceable modules. These modules include the display/keypad module, CPU module, output/power supply module, auxiliary output boards, transducer and all interconnecting cables. Once isolated, the defective module should be replaced and returned for factory repair.

Field repair beyond this level is not recommended.

Note: The screw terminals of the CPU module terminal strip do not make electrical contact when not tightened down. Insure that these screw terminals are fully tightened when taking voltage readings.

LIMINARY CKS

Check all system wiring connections at the transducer, CPU module and output module. Amphenol-type connectors on the transducer and its cabling should be checked for tightness. A slight tug on all wire terminations will verify a good connection. Push-on cable connectors at the keypad, CPU and output modules should be checked for proper connections.

Verify that all wiring at the CPU module is in agreement with its legend plate. The terminal designations of your CPU module may not be identical to the enclosed general wiring diagrams due to the wide range of available options.

Note: Verify that the keypad cable is connected to a multipin connector located through a cutout in the lower left corner of the CPU module's sheetmetal base. Other similar looking connectors may have been used by mistake.

A. Input Operation

A1. Check the operating voltage of the 5 VDC and 15 VDC inputs at the CPU module. Voltage between the terminals labeled 5 VDC (terminals 1 and 2 of terminal strip S2) and ground (terminals 3 and 4 of terminal strip S2) should be 4.8 to 5.2 VDC . This voltage range is critical for proper operation of the microprocessor. Voltage between the terminal labeled 15 VDC (terminal 29 of terminal strip S2) and ground (terminal 30 of terminal strip S2) should be 14.3 to 15.3 VDC . This input powers the transducer excitation circuitry.

If either of these voltages are not present at the CPU module terminals, the input wires should be disconnected and the voltage level checked across the wires. If the correct voltage is seen across the input wires, a short condition probably exists within the CPU module and it should be replaced.

If the correct voltage levels are not seen across these wires, the power supply has failed. This power supply can be an integral part of a Gemco output/power supply module, a Gemco power supply without outputs or a standard power supply not provided by Gemco. All Gemco power supply modules have a circuit board-mounted line fuse that should be checked. AC input voltages to these modules should be 105 to 125 VAC or 210 to 250 VAC depending on the version specified.

After verifying the AC input voltages and line fuse, the 5 VDC and 15 VDC output should be verified at the power supply with all wiring disconnected at its output terminals. See diagram E-0190100-C, (pages 11-12), for the location of these output pins on a Gemco output/power supply module. On a Gemco power supply without outputs, these are screw terminals that are clearly labeled on its circuit board.

If the 5 VDC and 15 VDC voltages are now correct at the power supply terminals, an open or short condition of the power supply to CPU module wiring should be suspected. Incorrect voltages at the power supply indicate a defective power supply and the complete power supply module should be replaced.

A2. Transducer excitation voltage should be checked at the CPU module terminal strip S1. Use the following procedures based on the type of transducer that your system was designed for:

A2a. Single-turn resolver: AC voltage across terminals 9 and 10 of terminal strip S1 (labeled Red and Bk/R) should be 7.0 to 7.9V RMS. This is the output voltage being supplied to the resolver rotor. If this voltage is not present, disconnect the resolver wires at the CPU module and recheck the voltage. If this voltage is still not present, the resolver excitation circuitry in the CPU module has failed and it should be replaced. If this voltage reappears, a short condition in the resolver or its cable should be looked for.

The return signals from the resolver stator windings wire to the CPU module on terminal strip S1 terminals 12 and 14 (labeled White and Bk/W) and terminals 13 and 15 (labeled Green and Bk/G). To verify the presence of these AC return signals, put a voltmeter across terminals 12 and 14 and rotate the resolver. A voltage reading that rises and falls between these terminals as the resolver is rotated indicates a good resolver return signal. Repeat this same procedure with your meter across terminals 13 and 15. No voltage or a voltage that does not vary as the resolver rotates indicates an open or short condition in the resolver windings or the resolver cable.

The blue resolver wire that connects to the CPU module at terminal strip S1 terminal 21 (labeled BL) is a feedback wire used to verify that the resolver excitation voltage has reached the resolver rotor. A loss of this feedback voltage is intended to indicate a disconnected or severed resolver cable or other resolver excitation fault. If this feedback voltage is not present, the display on the keypad will show all E's. A voltmeter across terminal strip S1 terminal 9 (labeled Red) and terminal 21 (labeled BL) should read 7.0 to 7.9V RMS. If this voltage is not present, but was present across terminals 9 and 10 when checked earlier, an open or short condition exists in the resolver or its cable. If it is present, and all E's still appear on the display, a fault in the CPU module has been detected and it should be replaced.

10

Corrected EHH 3/8/00

Note: The reason for an all "E" fault display can be quickly isolated without the use of a voltmeter. Remove the resolver cable wires from terminals 9, 10 and 21

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Price, Larry W

From: Swenson, Craig E
Sent: Wednesday, May 03, 2000 12:28 PM
To: Price, Larry W
Cc: Swenson, Craig E; Bazinet, Gerald D (Jerry); Salazar, Pamela K (Pam)
Subject: MHM CGI Records Submittal

The CGI items that will be included under an EDT will be packaged as a "SNF-XXXX" document.

SNF-6315: "Canister Storage Building - MCO Handling Machine - Commercial Grade Item Dedication Program"

Table of Contents:
Introduction and Purpose
Tab 1. Memorandum 00-SNF/CES-003, dated 3/22/00.
Tab 2. CGI Personnel Qualifications
Tab 3. QA Surveillances of Test Laboratory (Belhaven)
Tab 4. Test Laboratory Equipment Qualification
Tab 5. Safety Equipment & CGI Dedication Working List
Tab 6. CGI Dedication Forms and Test Reports
(Summary List: CGI & Test Plan No.and Mfr/Model for each test plan)

I will have the TOC, Intro/Purpose, and section dividers made up.

Craig Swenson
SNF/CSB/MHM 376-0288

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Manufacturer or Vendor	Model No.	CGI	Test Procedure No.
Honeywell	5LS1-4PG	CGI-SNF-D-MHM-02	ITP002A
Gemco	SD0410901	CGI-SNF-D-MHM-03A	ITP003AX
Gemco	SD0410901	CGI-SNF-D-MHM-03A	ITP003AY
Gemco	SD0334900	CGI-SNF-D-MHM-03B	ITP003B1X
Gemco	SD0334900	CGI-SNF-D-MHM-03B	ITP003B1Y
Gemco	SD0336100	CGI-SNF-D-MHM-03B	ITP003B2X
Gemco	SD0336100	CGI-SNF-D-MHM-03B	ITP003B2Y
Gemco	1989-A-16-R-14-64-E-R	CGI-SNF-D-MHM-03C	ITP003CX
Gemco	1989-A-16-R-14-64-E-R	CGI-SNF-D-MHM-03C	ITP003CY
Gemco	1989-O-114-M-S	CGI-SNF-D-MHM-03C	ITP003CX
Gemco	1989-O-114-M-S	CGI-SNF-D-MHM-03C	ITP003CY
Honeywell	SL1-E	CGI-SNF-D-MHM-08	ITP007C
Honeywell	SL1-E	CGI-SNF-D-MHM-08	ITP007D
Honeywell	SL1-E	CGI-SNF-D-MHM-08	ITP007E
Honeywell	SL1-E	CGI-SNF-D-MHM-08	ITP007F
CCS Industrial	604G3	CGI-SNF-D-MHM-09	BTP009
CCS Industrial	604G3	CGI-SNF-D-MHM-09	BTP009
CCS Industrial	604G3	CGI-SNF-D-MHM-09	BTP009
CCS Industrial	604G3	CGI-SNF-D-MHM-09	BTP009
Honeywell	1LS19-4C	CGI-SNF-D-MHM-11	ITP011A
Honeywell	1LS19-4C	CGI-SNF-D-MHM-11	ITP011B
Omron	E3V-R2C43S	CGI-SNF-D-MHM-12	ITP012X
Omron	E3V-R2C43S	CGI-SNF-D-MHM-12	ITP012Y
Omron	S3D2-CK-US	CGI-SNF-D-MHM-12	ITP012X
Omron	S3D2-CK-US	CGI-SNF-D-MHM-12	ITP012Y
Honeywell	LSYDC3K	CGI-SNF-D-MHM-13	ITP013C
Honeywell	LSYDC3K	CGI-SNF-D-MHM-13	ITP013D
Honeywell	LSYDC3K	CGI-SNF-D-MHM-13	ITP013B
Sensotec	RM/C717-01	CGI-SNF-D-MHM-16A	ITP016AX2
Sensotec	RM/C717-01	CGI-SNF-D-MHM-16A	ITP015AY2
M/D TOTCO	2077-034	CGI-SNF-D-MHM-16B	CTP59,60
M/D TOTCO	2077-034	CGI-SNF-D-MHM-16B	CTP59,60
M/D TOTCO	2078-101	CGI-SNF-D-MHM-16B	CTP59,60
M/D TOTCO	2078-101	CGI-SNF-D-MHM-16B	CTP59,60
Action Pak	AP1080-2000	CGI-SNF-D-MHM-16C	BTP016C
Siemens	3TF4611-0AK6	CGI-SNF-D-MHM-19	BTP019A
Siemens	3TF4611-0AK6	CGI-SNF-D-MHM-19	BTP019C
Siemens	3TF4611-0AK6	CGI-SNF-D-MHM-19	BTP019B
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020C
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020C
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020C
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D

Manufacturer or Vendor	Model No.	CGI	Test Procedure No.
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020C
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020C
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020C
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020C
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020C
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020C
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020C
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Honeywell	LSYAC3K	CGI-SNF-D-MHM-22	ITP022B
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-23	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-23	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-23	ITP020C
Siemens	3TH4310-0AK6	CGI-SNF-D-MHM-23	ITP023A
Siemens	3TH4310-0AK6	CGI-SNF-D-MHM-23	ITP023C
Siemens	3TH4310-0AK6	CGI-SNF-D-MHM-23	ITP023B
Fortress Solenoid Interlock Assy w/Craig Derricott switch & contacts	H31SS w/120 VAC Solenoid, 3PDT Selector Switch	CGI-SNF-D-MHM-32	ITP032
Ashcroft	45 1009 S 02L 2000	CGI-SNF-D-MHM-37	BTP037
Ashcroft	45 1009 S 02L 2000	CGI-SNF-D-MHM-37	BTP037
Siemens	3TF4422-0AK6	CGI-SNF-D-MHM-47	ITP047
Siemens	3TF4222-0AK6	CGI-SNF-D-MHM-48	ITP048D
Siemens	3TF4222-0AK6	CGI-SNF-D-MHM-48	ITP048A
Siemens	3TF4222-0AK6	CGI-SNF-D-MHM-48	ITP048B
Siemens	3TF4222-0AK6	CGI-SNF-D-MHM-48	ITP048C
Siemens	3TF4222-0AK6	CGI-SNF-D-MHM-48	ITP048D
Siemens	3TF4222-0AK6	CGI-SNF-D-MHM-48	ITP048D
Honeywell	SL1-H	CGI-SNF-D-MHM-7	ITP007G
Honeywell	SL1-H	CGI-SNF-D-MHM-7	ITP007H
Honeywell	SL1-H	CGI-SNF-D-MHM-7	ITP007
Honeywell	SL1-H	CGI-SNF-D-MHM-7	ITP007
Honeywell	SL1-E	CGI-SNF-D-MHM-8	ITP007A
Honeywell	SL1-E	CGI-SNF-D-MHM-8	ITP007B

Commercial Grade Item Upgrade Dedication Form

ECN No. **N/A** CGI No. **CGI-SNF-D-MHM-002**	Rev. No. 1
Title: **P-6 – Honeywell Limit Switch 5LS1-4PG**	Page 1 of 8

Section 1 Part Information

Item No.: **N/A**	Manufacturer: **N/A**	Supplier: **N/A**
Mfg. Part/Model No.: **N/A**	Supplier's P/N: **N/A**	
Part Description: **N/A**		
End Use Description: **N/A**		

ORIGINAL

Section 2a Component Information

Equipment No.: **LFMGUDX**	Specification No.: **Ederer F-2566, Foster Wheeler MJX-SDX 452656**	Manufacturer: **Honeywell**	Past P.O. No.: **N/A**
Manufacturer's Part/ Model No.: **5LS1-4PG**	Equipment Supplier (if different from manufacturer): **ALSTOM, Foster Wheeler**		Equip. Supplier's Part No.: **N/A**

Component Description: **MCO grapple not at upper datum limit switch for interlock P-6, located in the MCO hoist compartment, inhibits turret rotation and turret and base locking pins disengagement, when in MCO mode or impact absorber mode.**

Section 2b Commercial Availability of the Item

1. Is the Item available from a catalogue from a qualified NQA1 supplier or ISO 9000 supplier (coordinate with project CGI interface Engineer or BTR)?

   [ ] YES (go to #2 below) [X] NO (go to procedure step 6.3.2, proceed to dedicate Item)

   If not available from a qualified NQA1 supplier, is it available from an ISO 9000 supplier? (coordinate with project CGI Interface Engineer or BTR)

   [ ] YES (go to #2 below, procedure step 6.3.2, dedicate Item) [X] NO (procedure step 6.3.2, dedicate Item)

2. List of Candidate qualified NQA1 suppliers or ISO 9000 suppliers, if used: **N/A**

3. Recommended Procurement Strategy (coordinate with project CGI interface Engineer or BTR): **N/A**

Section 2c CGI Determination

CGI Determination Questions:

#1: Is the Item subject to design or specification requirements that are unique to nuclear facilities or activities?

[ ] YES (the Item is not commercial grade) [X] NO (continue)

#2: Is the Item used in applications other than nuclear facilities or activities?

[ ] NO (the item is not commercial grade) [X] YES (continue)

#3: Is the Item ordered from manufacturer/supplier on the basis of specifications set forth in the manufacturer's catalog?

[ ] NO (the item is not commercial grade) [X] YES (continue)

[X] All three criteria have been satisfied. The Item meets the definition of commercial grade.

Commercial Grade Item Upgrade Dedication Form

ECN No. **N/A** CGI No. **CGI-SNF-D-MHM-002**

Title: **P-6 – Honeywell Limit Switch 5LS1-4PG**

Section 2d Reason for Dedication

The above Commercial Grade (CG) described item is being Dedicated for use in the application cited for the following reason(s).

	Item is being purchased from a non ESL manufacturer supplier as CG to be used in a Safety Class application.
	Item is being purchased from a non ESL manufacturer supplier as CG to be used in a Safety Significant application.
X	Item was purchased from a non ESL manufacturer supplier as CG to be used in a Safety Class application.
	Item was purchased from a non ESL manufacturer supplier as CG to be used in a Safety Significant application.
	Other ('like-for-like', similar, substitution, replacement evaluation)

Section 3 Failure Effects Evaluation

A. Part/Component Safety Function:

1. **MCO grapple limit switch (P-6) prevents turret rotation and turret and base locking pins disengaging when the MCO hoist is not at the upper limit. Prevents shear of hoist cable and MCO drop. P-6 prevents partially lowered MCO shear due to laterial movement of the MHM.**

B. Part/Component Functional Mode:

Safety Function #1: [X] Active [ ] Passive

Safety Function #2: [ ] Active [ ] Passive

Safety Function #3: [ ] Active [ ] Passive

Active - Mechanical or Electrical change of state is required to occur for the component to perform its safety function

Passive – Change of state is not required for the component to perform its safety function

C. Host Component Safety Function (if applicable): **N/A**

1.

D. Failure Mode(s) and the effects on component or system safety function (see Worksheet 1):

1. **Failure of switch contacts to open upon demand results in potential override of interlock channel.**
2. **Actuator plunger/arm inoperative results in failure to provide interlock function at correct demand position.**

Section 4 Environmental & Natural Phenomena Hazard Design

Environmental Qualification Required: Yes [ ] No [X]	If yes: Environmental Qualification Requirements Limiting Environmental Conditions: Required Safety Functions: Qualification Period:
Natural Phenomena Hazard (NPH) Design Required: Yes [ ] No [X]	If yes: NPH Design Requirements Performance Category: NPH Design Req'ts.: Required Safety Functions:

Section 5 Component Functional Classification

X	Safety Class (SC)		General Service (GS)		Safety Significant (SS)

If part/component classification is different from host component/system, document basis. **N/A**

Sections 6 and 7 (Reserved)

Section 8 References (for Functional Classification)

National Codes/Standards: **N/A**

Safety Analysis Report (SAR): **HNF-3672, Rev. 0**

Drawings: **Ederer, Inc. EB-33056, Sheets 10A**

Vendor Manual/Manufacturer/Supplier Information: **Honeywell Series LS compact limit switches**

Other: **ALSTOM ESL/R (96) 065 – Rev. D, 100% Design Submittal – June 1998**

Commercial Grade Item Upgrade Dedication Form

ECN No. N/A CGI No. CGI-SNF-D-MHM-002	Rev. No. 1
Title: P-6 – Honeywell Limit Switch 5LS1-4PG	Page 3 of 8

Section 9 Critical Characteristics

Critical Characteristics	Acceptance Criteria/Tolerances	Acceptance Method	ID	Function
1. Item Identification Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
Manufacturer	**Honeywell**	**1,IN**	**X**	
Model Number	**5LS1-4PG**	**1,IN**	**X**	
2. Physical Critical Characteristics (for reasonable assurance that the Item delivered is the Item specified)				
Actuator arm	**~~4 position adjustable head~~, plunger with top roller**	**1,IN**	**X**	
3 Performance Critical Characteristics (for reasonable assurance that the Item will perform its intended safety function(s))				
Contact rating	**Nominal 10 amps, resistive, @ 120 vac, less than 0.5V drop across contacts**	**1,T**		**X**
Insulation resistance	**Greater than 10 megohm resistance, terminal to terminal and terminal to ground at 1000v.**	**1,T**		**X**
Mechanical operation	**Cycle switch – confirm contacts open and close with smooth operation and free release of spring**	**1,T**		**X**

4. Notes and Legend:

Rev. 1: Page 5: Revised Section 3 header; Page 6: Revised Section 4 header; General: new forms.

Acceptance Method (Acc Meth):
1. Special Test and Inspection:
   1, IN for Inspection
   1,T for Test
2. Commercial Grade Survey
3. Source Verification
4. Vendor/Item History

Section 10 Initial Review and Approval

Approvals:
Designated Engineer:
Design Authority:
QA Engineer: 1/18/00 T2 ANDERSON

Commercial Grade Item Upgrade Dedication Form	Rev. No. 1
ECN No. N/A CGI No. CGI-SNF-D-MHM-002 Title: P-6 – Honeywell Limit Switch 5LS1-4PG	Page 4 of 8

WORKSHEET 1
DETERMINATION OF FAILURE MECHANISMS/MODES

Section 1			
Typical Failure Mechanisms	Definition	X = Applicable to Component under Evaluation	
		X?	Indicate Failure Mode
Fracture	Separation of a solid accompanied by little or no macroscopic plastic deformation.		
Corrosion	The gradual deterioration of a material due to chemical or electrochemical reactions, such as oxidation, between the material and its environment.	X	**Switch contacts corrode closed and fail to open upon demand.**
Erosion	Destruction of materials by the abrasive action of moving fluids, usually accelerated by the presence of solid particles carried with the fluid.		
Open Circuit	An electrical circuit that is unintentionally broken so that there is no complete path for current flow.		
Short Circuit	An abnormal connection by which an electrical current is connected to ground, or to some conducting body, resulting in excessive current flow.	X	**Switch contacts fuse closed and fail to open upon demand.**
Blockage	Clogging of a filtering medium resulting in the inability to perform its purification function or blockage of flow.		
Seizure	Binding of a normally moving item through excessive pressure, temperature, friction, jamming.	X	**Switch mechanism jams and contacts fail to open upon demand**
Unacceptable Vibration	Mechanical oscillations produced are beyond the defined permissible limits due to unbalancing, poor support, or rotation at critical speeds.		
Loss of Properties	A loss of mechanical and physical properties of a material due to exposure to high temperatures, radiation exposure.		
Excess Strain	Under the action of excessive external forces the material of the part has been deformed or distorted.		
Mechanical Creep	From prolonged exposure to high temperature and stress, the object will show a slow change in its physical (shape and dimension) and mechanical characteristics.		
Ductile Fracture	Fracture characterized by tearing of metal accompanied by appreciable gross plastic deformation.		

Section 2 Additional Failure Modes Applicable to the Component Under Evaluation
1. **Switch contacts are closed to permit equipment movement. Contacts open for the interlock function. Any failure which prevents contacts to open inhibits the particular switch interlock function.**
2. **Actuator plunger/arm seizure or break renders the contact opening inoperable.**
3. **Short circuit could give false signal to energize interlock function.**

Commercial Grade Item Upgrade Dedication Form

ECN No. N/A CGI No. CGI-SNF-D-MHM-002	Rev. No. 1
Title: P-6 – Honeywell Limit Switch 5LS1-4PG	Page 5 of 8

Checklist 1 - Acceptance Method 1 - Special Test/Inspection Verification

SECTION 1

Item Description: **P-6 interlock limit switch**	Equip #: **LFMGUDX**
System #: **MHM**	Model #: **5LS1-4PG**
Manufacturer (Address/Phone): **Honeywell** **1-800-537-6945** P.O. #	Supplier (Address/Phone):

SECTION 2 CRITICAL CHARACTERISTICS TO BE VERIFIED BY METHOD 1.

Insp	Test	Post-Test		
X			1.	**Manufacturer**
X			2.	**Model Number**
X			3.	**Actuator**
	X		4.	**Contact Rating**
	X		5.	**Insulation Resistance**
	X		6.	**Mechanical Operation**

SECTION 3 BY INSPECTION * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)

Characteristic: **Manufacturer** Sample Size*: **100%**

Acceptance Criteria: **Honeywell**

Receipt Inspection Plan / Report #: CGI-SNF-D-MHM-002-TP-002A

Characteristic: **Model Number** Sample Size*: **100%**

Acceptance Criteria: **5LS1-4PG**

Receipt Inspection Plan / Report #: TP-002A

Characteristic: **Actuator** Sample Size*: **100%**

Acceptance Criteria: **Plunger with top roller**

Receipt Inspection Plan / Report #: TP-002A

Commercial Grade Item Upgrade Dedication Form

ECN No. N/A CGI No. CGI-SNF-D-MHM-002 Title: P-6 – Honeywell Limit Switch 5LS1-4PG	Rev. No. 1 Page 6 of 8

SECTION 4 BY SPECIAL TEST * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)

Characteristic for Test: **Contact Rating** Samp Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **Nominal 10 amps, resistive, @ 120 vac, less than 0.5V drop across contacts**

Actual Test Value: See TP Test Plan and Report #: TP-002A

Characteristic for Test: **Insulation Resistance** Samp Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **Greater than 10 megohm resistance, terminal to terminal and terminal to ground at 1000v.**

Actual Test Value: See TP Test Plan and Report #: TP-002A

Characteristic for Test: **Mechanical Operation** Samp Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **Cycle switch - confirm contacts open and close with smooth operation and free release of spring**

Actual Test Value: See TP Test Plan and Report #: TP-002A

ECN No. N/A CGI No. CGI-SNF-D-MHM-002

Title: MHM INTERLOCK P-6 – HONEYWELL LIMIT SWITCH

Section 5 Test / Inspection Summary (Acceptance Method 1)

1. SUMMARY OF VERIFIED CRITICAL CHARACTERISTICS, THEIR VERIFICATION METHODS, AND RESULTS

ITEM DESCRIPTION: Limit Switch

Critical Characteristics				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/IN	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
Manufacturer	Honeywell	X		1, IN	TP-002A	NA	1	0	XWEST	Larry W. Pence	4/10/00
Model Number	5LS1-4PG	X		1, IN							
Actuator	Plunger with top roller	X		1, IN							
Contact Rating	Nominal 10 amps, resistive, @ 120 vac, less than 0.5V drop across contacts		X	1, T							
Insulation Resistance	Greater than 10 megohm resistance, terminal to terminal and terminal to ground at 1000v.		X	1, T							
Mechanical Operation	Cycle switch - confirm contacts open and close with smooth operation and free release of spring		X	1, T							

2. DISPOSITION OF UNVERIFIED OR FAILED CRITICAL CHARACTERISTICS

Critical Characteristic	Disposition

3. SIGNATURE INDICATES ALL CRITICAL CHARACTERISTICS VERIFIED SATISFACTORY OR ACCEPTABLY DISPOSITIONED AND COMMERCIAL GRADE DEDICATION IS SATISFACTORY AND COMPLETE.

See Test Plan TP-002A cited above. CES 4/11/00

Testing Agency Approval: NR CES 4/10/00 Date

Testing Agency QA Engineer: NR CES 4/10/00 Date

BUYER VERIFICATION

Design Authority: CES Larry Sherman Date 4-11-00

QA Engineer: Stephen Scott Moss Date 4-24-2000

SNF-6315, Rev. 0

Page 8 of 8

Commercial Grade Item Upgrade Dedication Form

ECN No. N/A CGI No. CGI-SNF-D-MHM-002 Title: MHM INTERLOCK P-6 – HONEYWELL LIMIT SWITCH	Rev. No. 0 Page 8 of 8

Section 7 Supporting Documentation for this Checklist		
Initial Procurement Documents		**For Critical Characteristics**
	Drawings:	
	Manuals (specify type & number):	
	Design Calculations	
	Installation Instructions	
	Operation Instructions	
	Calibration Instructions	
	Manufacturer's Recommended Spare Parts List	
X	**Other: Honeywell Series LS Compact Limit Switches**	**All**
Procurement Documents		**For Critical Characteristics**
Certificate of Conformance/Compliance		
Seismic Qualification Certificate		
Environmental Qualification Certificate		
X	Test Report (s): **CSB (W379)-015-1-062**	
	Inspection Report (s):	
	CMTRs for ASME Pressure Retaining Materials	
	Valve Seat Leakage Report	
	Weld Records	
	Material Traceability Record	
X	**Other: SU Test SNF-CTP-IC-07**	

Dedication Test Plan – IST-LS-1 Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-002-TP-002A
Test Specimen: Honeywell 5LS1-4PG Limit Switch, Eqmt. No.: LFMGUDX Page 1 of 8

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI Eng	DA	QA Post Review*
1	Test device directly	3.4.2	Input signal at limit switch not JB22X	JWP	CES 3/29/00	SSM 4-3-2000
2	Clarification	3.3.2 3.4.9 3.3.5 3.4.9 3.4.2 3.4.12	Terminals are "terminals for wires..."	JWP	CES 3/29/00	SSM 4-3-200

* QA Post Review of Individual Revisions is allowed

Dedication Test Plan – IST-LS-1 **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-002-TP-002A
Test Specimen: Honeywell 5LS1-4PG Limit Switch, Eqmt. No.: LFMGUDX **Page 2 of 8**

ORIGINAL

In-Situ Test Procedure

Test Procedure Approval (Obtain prior to testing):
This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) YMP Craig Swenson Date: 3/17/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Beltraven	Michael Cram	MRC
Electrician	DAN K. YORK	PCE	Dan K. York	DKY
Electrician Quality Control	Stephen R Conley	PCE	Stephen R. Conley	SRC
Design Authority Representative	LARRY W. PRICE	XNWST		YMP
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A
Design Authority	Craig Swenson	FHI	Craig Swenson	CES

RECOMMENDED EQUIPMENT:
Power Supply capable of 10 amps @ 120 VAC
Megger Instrument capable of 1000 VDC Test Voltage
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: FLUKE 787 I.D.: BAT 107 Calib. Due date: ~~03-~~ MRC 3-29-00 05-28-00

Test Instrument type: HP 3457A I.D.: BAT 123 Calib. Due date: 07-29-00

Test Instrument type: AVO BM80/2 I.D.: 6410-889 Calib. Due date: 02-09-01

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE:

For this In-Situ Test, certain leads must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of leads..

1.0 Lock and tagout Main Disconnect CRN-004, or Main Disconnect MD.

2.0 Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	LFMGUDX	**LFMGUDX**	Acc
Manufacturer:	HONEYWELL	**Honeywell**	Acc
Model:	5LS1-4PG	**5LS1-4PG**	Acc
Actuator:	OK	**Standard Top roller Plunger**	Acc
Serial No./Lot No./Date Code:	N/A	**N/A**	Acc

3.0 Perform the following testing steps:

3.1 Record: Date /Time of Test Beginning: 03-29-00 11:20 a.m.

Record: Room Temperature: 68 °F.

3.2 Mechanical Operation

3.2.1 Cycle the switch actuator full stroke 5 or more times to confirm contacts open and close with smooth operation and free release of spring.

3.2.2 Record the following data.

Description	Record Data	Acceptance Criteria	Comments/Deviations
No of Cycles:	6	**> 5 times**	Acc
Describe Operation:	OK	**Contacts open and close with smooth operation.**	Acc
Describe release of Spring:	OK	**Free release of spring.**	Acc

3.3 *Insulation Resistance Test*

3.3.1 Setup the test equipment and Limit Switch specimen for insulation resistance testing.

3.3.2 Apply a nominal 1000 VDC via Megger device between non-continuity terminals 101X and 10A31X (Common - Across NO Contact) and then between terminal 10A31X and ground. Record the resistances.

for wires CES 3/29/00

for wires CES 3/29/00

3.3.3 Remove the Megger device.

3.3.4 Manually adjust the limit switch actuator to open the normally closed (NC) contacts.

for wires CES 3/29/00

3.3.5 Apply a nominal 1000 VDC via Megger device between non-continuity terminals 101X and 10A32X (Common - Across open NC Contact) and then between terminal 10A32X and ground. Record the resistances.

for wires CES 3/29/00

Terminal to Terminal / Ground

Desc. of Terminal	*Desc. of Terminal/Ground*	*Record Resistance*	*Acceptance Criteria*	*Comments/Deviations*
101X and 10A31X	**Common to NO**	>13.5Gohm	**> 10 Megohms**	Acc
10A31X and Ground	**NO to Ground**	>29 Gohm	**> 10 Megohms**	Acc
101X and 10A32X	**Common to open NC***	> 8.5Gohm	**> 10 Megohms**	Acc
10A32X and ground	**Open NC to Ground***	> 22 Gohm	**> 10 Megohms**	Acc

* Normally closed contacts are open.

3.3.6 De-energize and remove the test equipment.

3.4 Contact Rating Test

3.4.1 Setup the test equipment and Limit Switch specimen for contact rating testing. Attach a sketch of test circuit with all test instrumentation used.

CES 3/29/00

for wires CES 3/29/00

3.4.2 ~~At junction box JB22X~~, lift leads on terminal 101X (Common), terminal 10A32X (LFMGUDX Normally Closed Contact) and terminal 10A31X (LFMGUDX Normally Open Contact). Record on the lifted lead log.

3.4.3 Connect the power supply to terminals 101X and 10A32X.

3.4.4 Apply a nominal 10 amps VAC, resistive, across the normally closed contacts of the test specimen.

Caution: Do not change state of contacts while energized.

3.4.5 Record the following data.

Description	Record Voltage Drop	Acceptance Criteria	Comments/Deviations
Contact Circuit (Terminals COM-NC)	.056 V	**< 0.5 Volts AC drop**	Acc

3.4.6 Reduce the current source to zero amps. for wires LE's 3/29/00

3.4.7 Disconnect the power supply from terminals 101X and 10A32X.

3.4.8 Manually adjust the limit switch actuator to close the normally open contacts.

3.4.9 Connect the power supply to terminals 101X and 10A31X.

3.4.10 Apply a nominal 10 amps VAC, resistive, across the closed normally open contacts of the test specimen.

3.4.11 Record the following data.

Description	Record Voltage Drop	Acceptance Criteria	Comments/Deviations
Contact Circuit (Terminals COM-Closed NO Contact):	.120V	**< 0.5 Volts AC drop**	Acc

3.4.12 Reduce the current source to zero amps and remove the power supply from terminals 101X and 10A31X.

3.4.13 Manually adjust the limit switch actuator to close the normally closed contacts. for wires LE's 3/29/00

3.5 Terminate the test.

3.5.1 Reland the lifted leads and verify reland in accordance with the Lifted Lead Log.

3.5.2 Retorque the terminals to 12 in-pounds.

3.5.3 Remove lockout/tagout and restore system to normal.

3.5.4 Record: Date /Time of Test End: 03-29-00 2:30 p.m.

Dedication Test Plan – IST-LS-1 **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-002-TP-002A
Test Specimen: Honeywell 5LS1-4PG Limit Switch, Eqmt. No.: LFMGUDX **Page 6 of 7**

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Acceptance Criteria has been met

Michael D Cram
03-29-00

Notes:

Step 3.4.10 - 10 amp signal applied at limit switch terminals directly in lieu of junction box due to electrical voltage drop.

Craig Swenson 3/29/00

Certified InstrumentationTechnician (signature) Michael D Cram Date: 03-29-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Craig Swenson Date: 3/29/00

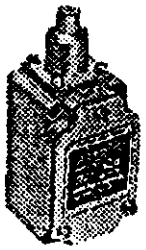
QA/QC (signature) Stephen Scott Moss Date: 4-3-2000

Page 888

ompact Limit Switches

OP PLUNGER ACTUATED SWITCHES

Compact



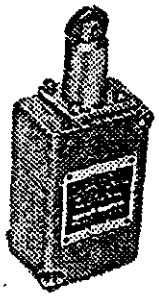
ORDER GUIDE

Momentary action.

Description	Electrical Rating Page A70	Catalog Listing Compact	Catalog Listing Plug-in	O.F. max. N lb.	P.T. max. mm in.	O.T. min. mm in.	D.T. max. mm in.
Standard top plunger	A	2LS1	202LS1*	31,1 7	1,65 .065	6,35 .250	0,51 .020
UL/CSA	F	2LS1-L	—	31,1 7	1,65 .065	6,35 .250	0,51 .020
Low operating force top plunger	E	2LS111	202LS111*	10 36 oz.	1,65 .065	5,56 .219	0,23 .009

OP ROLLER PLUNGER ACTUATED SWITCHES

Plug-in*



ORDER GUIDE

Momentary action.

Description	Electrical Rating Page A70	Catalog Listing Compact	Catalog Listing Plug-in	O.F. max. N lb.	P.T. max. mm in.	O.T. min. mm in.	D.T. max. mm in.
Standard top roller Plunger	A	5LS1	205LS1*	31,1 7	1,65 .065	5,56 .219	0,51 .020
Steel roller UL/CSA	F	5LS1-L	—	31,1 7	1,65 .065	5,56 .219	0,51 .020

SIDE PLUNGER ACTUATED SWITCHES

Compact

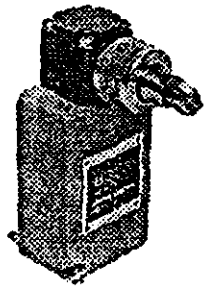
ORDER GUIDE

Momentary action. Assembled with plunger facing front (label side).

Description	Electrical Rating Page A70	Catalog Listing Compact	Catalog Listing Plug-in	O.F. max. N lb.	P.T. max. mm in.	O.T. min. mm in.	D.T. max. mm in.
Standard side roller	A	4LS1	204LS1*	40 9	2,77 .109	6,35 .250	1,02 .040

SIDE ROLLER PLUNGER ACTUATED SWITCHES

Plug-in*



ORDER GUIDE

Momentary action. Assembled with plunger facing front (label side).

Description	Electrical Rating Page A70	Catalog Listing Compact	Catalog Listing Plug-in	O.F. max. N lb.	P.T. max. mm in.	O.T. min. mm in.	D.T. max. mm in.
Standard side roller plunger *Steel Roller*	A	3LS1	203LS1*	40 9	2,77 .109	5,56 .219	1,02 .040

Roller may be turned in any position through 360°.

* Require Terminal Block (18PA1 for 203LS Switches) which must be ordered separately. Unless damaged it is not necessary to replace terminal block when replacing switch.

N = Newton

Characteristics: O.F. — Operating Force; P.T. — Pretravel; O.T. — Overtravel; D.T. — Differential Travel.

Compact Limit Switches

Page 889

FEATURES

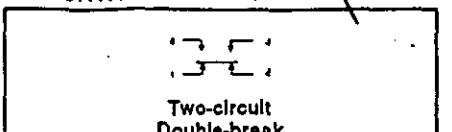
Mode of operation is field adjustable.
NEMA 1, 3, 4, 6 and 13.
Wide choice of heads and actuators.
Variety of operating characteristics.
Optional indicator light.
Captive screws.
UL Recognized, file #E12252
CSA Certified, file #LR57325

Compact LS and plug-in 200LS limit switches have a long record of successful performance in industrial applications.

The LS fits in many places too small for any other fully adjustable limit switch.

The 200LS switches are the original plug-in concept for reducing downtime by making changeover simple and fast.

CIRCUITRY



Two-circuit
Double-break

FIELD ADJUSTABLE

Rotary motion roller lever and rod actuators are adjustable through 360°. They may be set for operation clockwise, counter-clockwise, or in both directions.

Operating heads may be positioned in any of four 90° positions.

UL/CSA LS SWITCHES

Several UL recognized and CSA certified LS compact limit switches are in the order guides.

Other listings can be furnished in the UL version. Contact the 800 number for information.

For rapid response – off the shelf service, all bold face listings are normally stocked items.

ELECTRICAL RATINGS

A	10 amps, 120, 240 or 480 VAC; ½ hp, 120 VAC; ¾ hp, 240 VAC; 0.8 amp, 115 VDC**; 0.4 amp, 230 VDC;** 0.1 amp, 550 VDC;** Pilot Duty, 600 VAC max.	APPLICATION NOTE: Silver Cadmium Oxide Contacts – Designed for use with inductive loads such as relays, contactors, motors and solenoids. Honeywell MICRO SWITCH does not recommend the use of silver cadmium oxide switch contacts in non-arcing loads. Non-arcing loads are generally loads less than 12 volts and/or 0.5 amp.
B	10 amps, 120, 240 or 480 VAC; ¼ hp, 120 VAC; ½ hp, 240 VAC. Pilot Duty, 600 VAC max.	
C	10 amps, 120 VAC; ½ hp, 120 VAC.	
D	10 amps, 120, 240, 480 VAC; ¼ hp, 120 VAC; ½ hp, 240 VAC; 0.8 amp, 115 VDC**; 0.4 amp, 230 VDC**; 0.1 amp, 550 VDC**; Pilot Duty, 600 VAC max.	
E	10 amps, 120, 240 or 480 VAC; ½ hp, 120 VAC; ¾ hp, 240 VAC. Pilot Duty, 600 VAC max.	
F	UL Rating: 10 amps, 125, 250, or 480 VAC; ½ hp, 125 VAC; ¾ hp, 250 VAC; 0.8 amp, 125 VDC**; 0.4 amp, 250 VDC**	Fine Silver Contacts
G	UL Rating: 10 amps, 125, 250 or 480 VAC; ¼ hp, 125 VAC; ½ hp, 250 VAC; 0.8 amp, 125 VDC**; 0.4 amp, 250 VDC**	

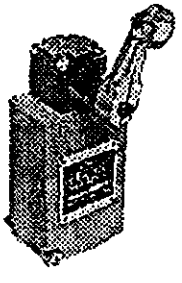
** Resistive Rating

NOTE: The terminals of two-circuit double-break switches must be wired to equal voltage sources and the same polarity. The loads should be on the same side of the line.

ROLLER LEVER ROTARY ACTUATED SWITCHES

(To order switches and levers separately, refer to pages A73 and A74 or A37 and A38.)

Compact



Plug-In*

ORDER GUIDE

Momentary action. Steel rollers.

Description	Rating	Catalog Listing Compact	Catalog Listing Plug-in	O.F. max.	P.T. max.	O.T. min.	D.T. max.
Standard	A	1LS1	201LS1*	13,3 N 3 lb.	20°	30°	12°
20° Pretravel UL/CSA	F	1LS1-L	—	13,3 N 3 lb.	20°	30°	12°
Low Pretravel 5°	B	1LS19	201LS19*	13,3 N 3 lb.	5°	30°	4°
Low Operating Force 5° Pretravel	B	1LS131	—	5,0 N 18 oz.	5°	30°	4°
Standard with indicator light 120 VAC only	C	1LS501	201LS501*	13,3 N 3 lb.	20°	30°	12°
Low Operating Force	A	1LS6	201LS6*	5,0 N 18 oz.	20°	30°	12°
Cavity Mount version of 1LS1	A	7LS1	—	13,3 N 3 lb.	20°	30°	12°

*Require Terminal Block (18PA1 for 200LS switches) which must be ordered separately. Unless damaged, it is not necessary to replace terminal block when replacing switch.

Characteristics: O.F. — Operating Force; P.T. — Pretravel; O.T. — Overtravel; D.T. — Differential Travel.

363A0033 SHT 9

MCO CASK CONTAINMENT

MCO HOIST EQUIPMENT

CABLE REELING DRUM ROTATION SENSOR (X)
NJB-18CK-N-150
(2 WIRE NAMUR)

HOSE REELING DRUM ROTATION SENSOR (X)
NJB-18CK-N-150
(2 WIRE NAMUR)

MCO HOIST BALANCE BEAM ROPE 1 SLACK (X) LIMIT SWITCH
362P0578/113
HONEYWELL 1LS244-4PC

MCO HOIST BALANCE BEAM ROPE 2 SLACK (X) LIMIT SWITCH
362P0578/113
HONEYWELL 1LS244-4PC

MCO CRADLE UPPER DATUM (X) LIMIT SWITCH
362P0578/132
HONEYWELL 1LS1-4PC

MCO HOIST ROPE 1 LOAD CELL (X)
362PC578/115
SENSOTEC F/T/1749
(CONNECTION DETAIL [2])

MCO HOIST ROPE 2 LOAD CELL (X)
362PC578/115
SENSOTEC F/T/1749
(CONNECTION DETAIL [2])

J822X (9)
SEE 363A0040 FOR PANEL INTERNAL WIRING DETAIL

MWS1 (18)
SUPPLIED AND WIRED BY EDERER. REFER TO EDERER FOR CONNECTION DETAILS.

CONTINUED FROM SHEET 7

JB19X

CABLE [X7 11 CORE + GROUND (EDERER)

CABLE [X8 2 TWISTED PAIRS (EDERER)

FCR-034 2/19/99

FCR-031 2/8/99

FCR-006 12/10/98

10A32X
10A31X

CONTINUED ON SHEET 10

FOR NOTES SEE SHT. 1

TO EDERER C.W."KOL CUBICLE (X) VIA TURRET ROTATE FESTOON SEE ELEMENTARY. EB-33036 SHTS. 7A, 10A & 11

MHM-FCR-006 12/10/98

MHM-FCR-031 2/8/99

MHM-FCR-034 2/19/99

MCC#15

BLOCK INTERCONNECTION DIAGRAM - 363A0029 SHT. 6

U.S.DEPARTMENT OF ENERGY
WESTINGHOUSE HANFORD COMPANY
MDK-SDX-452656
WHC-S-0468

H-2-827169

GEC ALSTHOM ENGINEERING SYSTEMS LTD
Whetstone, Leicester, LE8 6LH, England

HANDLING M/C
WIRING DIAGRAM
MCO CASK CONTAINMENT
363A0033

ISSUE B

This document was too large to scan as a single document. It has been divided into smaller sections.

Section 1 of 3

Document Information			
Document #	**SNF-6315**	**Revision**	**0**
Title	CSB MCH CGI DEDICATIONS		
Date	**05/17/2000**		
Originator	**CE SWENSON**	**Originator Co.**	**FH**
Recipient		**Recipient Co.**	
References	**EDT-629027, USQ-LIKE-CSB-0-0030**		
Keywords			
Projects	**W-379, SNF**		
Other Information			

#14 (16)
MAY 17 2000

ENGINEERING DATA TRANSMITTAL

Page 1 of 1

1. EDT 629027

2. To: (Receiving Organization)	3. From: (Originating Organization)	4. Related EDT No.:
SNF -Canister Storage Building	CSB Project/MCO Handling Machine	NA
5. Proj./Prog./Dept./Div.:	**6. Design Authority/Design Agent/Cog. Engr.:**	**7. Purchase Order No.:**
SNF/CSB(W379)/Engineering	CE Swenson 376-0288	
8. Originator Remarks:		**9. Equip./Component No.:**
The program and test results for the MHM commercial grade dedication is included in document SNF-6315 attached. (*) For distribution - SNF-6315, sections 1 thru 5 only. USQ LIKE SCREENING CSB-00-030 DWM 5-16-00		MHM-001
		10. System/Bldg./Facility: 212H
		12. Major Assm. Dwg. No.: H-2-827086
11. Receiver Remarks:	**11A. Design Baseline Document?** ○ Yes ◉ No	**13. Permit/Permit Application No.:**
		14. Required Response Date:

15. DATA TRANSMITTED

(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Approval Desig-nator	(G) Reason for Trans-mittal	(H) Origi-nator Dispo-sition	(I) Receiv-er Dispo-sition
1	SNF-6315		0	CSB-MHM-CGI Dedications	SnQ	1	1	

16. KEY

Approval Designator (F)	Reason for Transmittal (G)	Disposition (H) & (I)
E, S, Q, D OR N/A (See WHC-CM-3-5, Sec. 12.7)	1. Approval 2. Release 3. Information 4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION
(See Approval Designator for required signatures)

(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN
1	1	Design Authority CE Swenson	Craig Swenson	5/16/00	S8-07 (*)	1	1	LW Price	Lyle W	5-5-00	R3-26 (*)
		Design Agent NA				3		GD Bazinet, S*-06 (*)			
		Cog. Eng. NA				3		TW Libs, R3-86 (*)			
1	1	Cog. Mgr. AS Daughtridge	AS Daughtridge	5/15/00	R3-86 (*)	3		CSB Project Files, S8-06 (Originals)			
1	1	QA SS Moss	Stephen Scott Moss	5.8.2000	R3-11 (*)			Central Files (2)			
1	1	Safety YJ Liu		5/9/00	R3-26 (*)						
		Env.									

18.	19.	20.	21. DOE APPROVAL (if required)
Craig Swenson 5/16/00 Signature of EDT Originator — Date	Authorized Representative for Receiving Organization — Date	Dean W. Medford 5/16/00 DW Medford X401 Design Authority/ Cognizant Manager — Date	Ctrl No. _____ ○ Approved ○ Approved w/comments ○ Disapproved w/comments

S

SNF-6315
Revision 0
EDT 627029 9027 5/17/00 ps

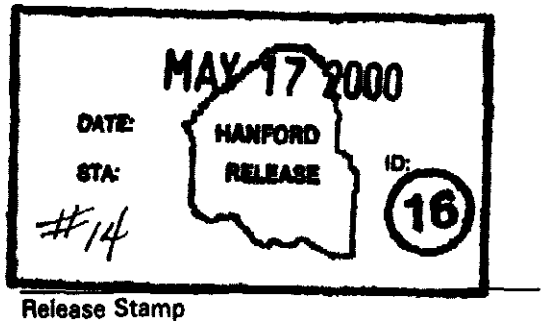
Canister Storage Building - MCO Handling Machine – Commercial Grade Item Dedications

C.E. Swenson
Fluor Hanford Inc

Date Published
May 2000

Prepared for the U.S. Department of Energy
Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL1320099RL14047

Fluor Hanford
P.O. Box 1000
Richland, Washington 99352



Release Approval

5/16/00
Date

Release Stamp

SNF-6315
Revision 0

CANISTER STORAGE BUILDING - MCO HANDLING MACHINE – COMMERCIAL GRADE ITEM DEDICATIONS

Prepared for the U.S. Department of Energy

Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL13200096RL14047

Fluor Hanford
P.O. Box 1000
Richland, Washington 99352

Table of Contents

Introduction

The Multi-Canister Overpack (MCO) Handling Machine (MHM) will transport MCOs inside the Canister Storage Building (CSB) and provide radiation shielding for personnel protection. The MHM has dual-girders with a trolley that supports a three-part rotating cask which is fixed to the trolley frame. The cask rotates on large turret bearings and the MCO hoisting system is the largest part of the cask assembly. The girders are supported on end tie beams which are supported by two bridge trucks with two wheels each that bear on the north-south CSB rails that are 126'6" apart. The 480 volt power is supplied via festoon cable system along the east side of the CSB. The power supply continues thru the trolley festoon system along the south side of the south girder. Power is then distributed to five control panel enclosures (6'x 7') and an operator console mounted on the trolley deck. The control panels contain relays, contactors, disconnects, fuses, and motor controllers that provide the controls and protection for the MHM functions. The 480 VAC power is stepped down to 120 VAC for the control system. Additionally, there are sensors that provide signals to relays and circuit logic devices. Although there are redundant circuits and control devices in the control system for prevention of nuclear safety accidents defined in the MHM specification, HNF-S-0468 revision 5, the procurement of the devices by the MHM supplier/manufacturer did not include evidence of the traceability according to the contract quality assurance requirements nor did the supplier/manufacturer perform dedications of commercial grade items (CGI). The reason for the latter is that the supplier did not have responsibility for the accident basis in the nuclear safety analysis to assign accident prevention credit to specific devices within a control circuit. Therefore, the devices that had to be dedicated to perform a safety function was performed by the CSB Project organization at the Hanford site.

Purpose

This document serves to explain and to document the test results and qualifications for personnel and test equipment for the MHM CGI program. Which components are CGI dedicated are based on the Safety Equipment List (SEL), SNF-5591, and the procedures for the Spent Nuclear Fuel Project.

UNREVIEWED SAFETY QUESTION-LIKE SCREENING FORM		
Document Number: EDT 629027	USQ-Like Tracking # (Facility & Unique Identifying #) CSB-00-030	Page 1 of 3
Title: Canister Storage Building – MCO Handling Machine – Commercial Grade Item Dedications		

Description: The program and test results for the MHM commercial grade dedication is included in document SNF-6315. This document serves to explain and to document the test results and qualifications for personnel and test equipment for the MHM CGI program. Selection of component for CGI dedication was based on the Safety Equipment List (SEL), SNF-5591, and the procedures for the Spent Nuclear Fuel Project. The USQ-Like was performed per the pending CSB SAR Rev.0.

USQ-Like Screening Questions

Note: Respond to each question and provide basis/justification for each response. An adequate justification provides sufficient explanation such that an independent reviewer could reach the same conclusion.

1. Does the Proposed Activity Result in a Permanent or Temporary Change in the Facility as Described in the Pending Authorization Basis (ABs not fully implemented – not included in Appendix B to NS-4-001)?

[ ] N/A **[X] NO** **[ ] YES/MAYBE**

Basis: This document serves to explain and to document the test results and qualifications for personnel and test equipment for the MHM CGI program. The test results demonstrate that the components tested meet their functional requirements, which is consistent with the facility design as described in the pending AB. Selection of component for CGI dedication was based on the Safety Equipment List (SEL), SNF-5591, and the procedures for the Spent Nuclear Fuel Project. The SEL and procedures are the same as those in the pending AB. Therefore, the proposed activity does not result in a permanent or temporary change in the facility as described in the pending AB.

1a. Does the proposed activity result in a change or need for a change to any other SNF Project facility, including those not yet included in Appendix B to NS-4-001?

[ ] N/A **[X] NO** **[ ] YES/MAYBE**

If Yes or Yes/Maybe indicate

[ ] CVDF **[ ] CSB** **[ ] MCO Topical** **[ ] K Basins**

UNREVIEWED SAFETY QUESTION-LIKE SCREENING FORM		
Document Number: EDT 629027	USQ-Like Tracking # (Facility & Unique Identifying #) CSB-00-030	Page 2 of 3
Title: Canister Storage Building – MCO Handling Machine – Commercial Grade Item Dedications		

2. Does the Proposed Activity Result in a Temporary or Permanent Change in the Procedure(s) as Described, Outline or Summarized in the Pending Authorization Basis (ABs not fully *implemented – not included in Appendix B to NS-4-001)*?

[ ] N/A **[X] NO** **[ ] YES/MAYBE**

Basis: This document serves to explain and to document the test results and qualifications for personnel and test equipment for the MHM CGI program. The test results demonstrate that the components tested meet their functional requirements, which is consistent with the facility design as described in the pending AB. Selection of component for CGI dedication was based on the Safety Equipment List (SEL), SNF-5591, and the procedures for the Spent Nuclear Fuel Project. The SEL and procedures are the same as those in the pending AB. Therefore, the proposed activity does not result in a permanent or temporary change in the procedures as described, outlined, or summarized in the pending AB.

2a. Does the proposed activity result in a change or need for a change to any other SNF Project facility, including those not yet included in Appendix B to NS-4-001?

[ ] N/A **[X] NO** **[ ] YES/MAYBE**

If Yes or Yes/Maybe indicate

[ ] CVDF **[ ] CSB** **[ ] MCO Topical** **[ ] K Basins**

3. Does the Proposed Activity Result in a Test or Experiment Not Described in the Pending Authorization Basis (ABs not fully implemented – not included in Appendix B to NS-4-001)?

[ ] N/A **[X] NO** **[ ] YES/MAYBE**

Basis: This document serves to explain and to document the test results and qualifications for personnel and test equipment for the MHM CGI program. The test results demonstrate that the components tested meet their functional requirements, which is consistent with the facility design as described in the pending AB. Selection of component for CGI dedication was based on the Safety Equipment List (SEL), SNF-5591, and the procedures for the Spent Nuclear Fuel Project. The SEL and procedures are the same as those in the pending AB. Therefore, the proposed activity does not result in a test or experiment not described in the pending AB.

4. Does the Proposed Activity, Reportable Occurrence, or Issue Require Changes to Pending Technical Safety Requirements (TSRs not fully implemented – not included in Appendix B to NS-4-001)?

[ ] N/A **[X] NO** **[ ] YES/MAYBE**

Basis: This document serves to explain and to document the test results and qualifications for personnel and test equipment for the MHM CGI program. The test results demonstrate that the components tested meet their functional requirements, which is consistent with the facility design as described in the pending AB. Selection of component for CGI dedication was based on the Safety Equipment List (SEL), SNF-5591, and the procedures for the Spent Nuclear Fuel Project. The SEL and procedures are the same as those in the pending AB. Therefore, the proposed activity does not result require changes to TSRs.

UNREVIEWED SAFETY QUESTION-LIKE SCREENING FORM		
Document Number: EDT 629027	USQ-Like Tracking # (Facility & Unique Identifying #) CSB-00-030	Page 3 of 3
Title: Canister Storage Building – MCO Handling Machine – Commercial Grade Item Dedications		

5. Does the Reportable Occurrence or Issue Have Any Potential for Impacting the pending Authorization Basis (ABs not fully implemented – not included in Appendix B to NS-4-001)?

[X] N/A **[ ] NO** **[ ] YES/MAYBE**

Basis: This is an EDT, not a reportable occurrence or issue.

[X] Agree
[ ] Disagree (Requires explanation; attach additional pages as necessary)

USQ-Like Evaluator No. 1

Signature Date 5/10/00

Yih Justin Liu
(Print Name)

USQ-Like Evaluator No. 2

Signature Date 5/10/00

L. J. GARVIN
(Print Name)

IF ANY RESPONSE IS "YES/MAYBE" OR THERE IS A DISAGREEMENT WITH ALL "NOs" COMPLETE THE USQ-LIKE EVALUATION FORM USING THE SAME USQ NUMBER AND ATTACH THIS FORM TO THE USQ-LIKE EVALUATION FORM.

SNF Project Nuclear Safety Manager Decision _____

Basis for Decision _____

_____

_____

Signature Date

Section 1
Internal Memorandum
00-SNF/CES-003,
dated 3/22/00

Page 5

INTEROFFICE CORRESPONDENCE

00-SNF/CES-003

To:	G. D. Bazinet	S8-06	Date:	March 22, 2000
	V. D. Zarasua	S2-44		
	S. S. Moss	R3-11		
From:	C. E. Swenson		Telephone:	376-0288

cc:	A. S. Daughtridge	R3-86	L. W. Price	R3-26
	T. Z. Anderson	B4-68	J. C. Molnar	S1-53
	T. W. Libs	R3-86	CES File/LB	R3-86
	R. C. Garrison	S8-07	CSB Project Files	S8-06
	D. W. Medford	R3-86		

Subject: PROJECT NUMBER W-379 – MULTI-CANISTER OVERPACK HANDLING MACHINE – COMMERCIAL GRADE ITEM DEDICATION

The purpose for this memorandum is to document and explain the commercial grade item (CGI) dedication process for the Multi-Canister Overpack Handling Machine (MHM). Components selected for CGI dedication in a safety related application were those that had been specified, procured, and installed on subassemblies by the MHM manufacturers, Alstom Automation (Leicester, U.K.) and Ederer Cranes (Seattle, WA.). Other engineered subassemblies that perform a safety function, such as trolley and bridge seismic restraints, and the Multi-Canister Overpack (MCO) hoisting system, were fabricated, inspected, and tested at the manufacturer's facilities according to the quality assurance program requirements of the contract which is American Society of Mechanical Engineers (ASME) Nuclear Quality Assurance (NQA-1). This is an acceptable method to meet the requirements of 10 CFR 830.120. There is documentation of these results with the supplier's submittals. However, the detailed acceptance testing of the electrical devices for its critical attributes is not available in the MHM supplier's documentation or the site component test packages. So, the special CGI testing of devices selected for safety-related dedication are control panel relays, control contactors, and sensors. These devices are consistent with the Safety Equipment List (SEL), SNF-5591, Part B, for the MHM. The MHM CGI process is based on AP EN-035-00, *"Dedication of Commercial Grade Items,"* section 6.2.3.1, Acceptance Method 1 – special tests and inspections. The original strategy for the MHM CGI program in 1999 was that several items would need to be dedication tested and that this could occur during Pre-Operational Acceptance Testing and completion activities. Therefore, separate items would be ordered for bench testing at a laboratory with a Quality Assurance program that met the requirements for qualified equipment and certified personnel. Initially, the orders were placed by material requisition and purchase order process. The material requisition orders in August 1999 thru October 1999 became an obstacle, so we ordered the devices by contract requisition which invoked a contract for the procurement resulting in more control and responsiveness.

In November 1999, it became obvious due to engineering evaluations of the application of requirements for "Class 1E" items as defined by Institute of Electrical and Electronics Engineers, Inc. (IEEE) 603 and required for Safety Class items, that the MHM SEL was incomplete. So, the

basis for which descrete devices were performing a safety function in the control system was incomplete. The MHM SEL was upgraded in December 1999 and has served as the basis for CGI dedication. As devices were delivered in January thru March of 2000 in a piecemeal manner, there was considerable special interaction required with Spent Nuclear Fuel (SNF) Procurement to support the schedule. When enough components were received at Hanford, a contract for laboratory testing services was awarded to Belhaven Applied Technologies (Belhavel) of Kennewick. Also, in January 2000, a review of the Canister Storage Building (CSB) Final Safety Analysis Report had resulted in a reassessment of the nuclear consequences for various accidents. This resulted in fewer devices that served a safety-related function. In fact, The SEL designates the MHM seismic restraints as the ONLY components preventing a Safety Class accident. All other devices are classified Safety Significant.

Since the nuclear safety review of the detailed design for mitigating features of the MHM in Fall 1999, there were a number of modifications required to upgrade the MHM engineering features to ensure prevention of accidents in consequence analysis. Since then, some modification were reassessed and deleted because of the change of the nuclear safety accident consequences in January 2000. Also, since the MHM pre-operational testing phase was essentially complete, CGI testing of devices on the MHM would not interfere with physical testing. In addition, there would be less disruption to the MHM configuration if the installed devices were "in-situ" CGI tested instead of replaced with bench tested devices. Also, it was noted in some cases that bench tested Idec AC relays that plug into a relay socket base does not disrupt the configuration because wires do not need to be de-terminated and re-terminated with strict control to ensure the configuration of the pre-operational test is restored. Since the relay base socket needs to be CGI tested anyway, de-termination of the wires is necessary to perform its CGI test also. CGI testing of Siemens Power Corporation contactors and relays requires de-termination of wires whether tested in-situ or replaced. So, in-situ CGI testing seemed to be the easiest to avoid material transfers through SNF Procurement to Belhaven. Several Honeywell SL1 microswitches were CGI tested in-situ to avoid resetting the microswitch and affecting both the Component Test Procedure (CTP) and the Pre-Operational Test for that device.

The quantity of devices that require CGI testing as a sample of a "Lot" is specified in the sampling basis in the Desk Instruction, DI-003, *"Commercial Grade Item Upgrade Dedication Process Requirements and Implementation Instructions,"* Table H-1. These quantities are based upon accepted practice in the commercial nuclear industry in which Electric Power Research Institute (EPRI), EPRI 7218 (NCIG-19) serves as a guideline. A summary is attached. The devices procured and installed on the MHM components by the supplier and its manufacturers are considered from the same "Lot" because they are nearly identical devices (i.e. – same manufacturer and model) and ordered specially for their MHM contract in the same time period in 1997 and 1998. The turret assembly and control panels were built in 1997 and the MCO hoist assembly was completed in 1998.

The CGI testing of operational spare parts needs to be addressed. There are several devices that were procured as explained above, but there will be no CGI dedication qualification for it. Most, if not all of the parts can be CGI dedication bench tested at Belhaven if necessary to have

"qualified" spare parts available for a safety-related application. Otherwise, the spare parts can be left "Conditionally Accepted" and an emergency CGI dedication bench test can be performed by Belhaven, if still under contract, or by a yet-to-be-identified Hanford instrument test laboratory.

I am available to discuss recommendations for spare parts at your convenience.

rit

00-SNF/CES-003

Attachment
Lot Sampling Quantities

2 pages, including cover

Info from ENG-DI-003 Att H, Table H-1

Sampling Plans

3/8/00 10:54 AM

Reduced Sampling Plan		Normal Sampling Plan		Tightened Sampling Plan	
Lot Size	Sample Size	Lot Size	Sample Size	Lot Size	Sample Size
1-5	1	1	1	1	1
6-13	2	2-4	2	2	2
14-24	3	5-6	3	3-4	3
25-41	4	7-11	4	5-6	4
42-50	5	12-20	5	7-8	5
51--63	6	21-24	6	9-10	6
64-76	7	25-28	7	11	7
77-90	8	29-32	8	12-13	8
91-102	9	33-41	9	14-15	9
103-114	10	42-50	10	16-20	10
115-126	11	51-56	11	21-25	11
127-138	12	57-62	12	26-31	12
139-150	13	63-69	13	32-38	13
151-175	14	70-76	14	39-46	14
176-200	15	77-83	15	47-50	15
201-225	16	84-90	16	51-54	16
>225	16	91-96	17	55-58	17
		97-102	18	59-62	18
		103-108	19	63-66	19
		109-114	20	67-70	20
		115-120	21	71-74	21
		121-126	22	75-78	22
		127-132	23	79-82	23
		133-138	24	83-86	24
		139-144	25	87-90	25
		145-150	26	91-94	26
		151-162	27	95-98	27
		163-174	28	99-102	28
		175-186	29	103-106	29
		187-198	30	107-110	30
		199-210	31	111-114	31
		211-225	32	115-118	32
		225	32	119-122	33
				123-126	34
				127-130	35
				131-135	36
				136-140	37
				141-145	38
				146-150	39
				151-158	40
				159-166	41
				167-174	42
				175-182	43
				183-190	44
				191-198	45
				199-207	46
				208-216	47
				217-225	48
				>225	48

Section 2
CGI Personnel Qualifications

SNF CGI Dedication Qualification Form

In accordance with SNF Project requirements as specified in AP-EN-035-00, SNF Project Dedication of Commercial Grade Items (CGIs), and SNF-DI-003, Commercial Grade Item Upgrade Dedication Process Requirements & Implementation Instructions, the completion of this form designates an individual to be qualified to perform CGI dedication activities.

Individual:

Name: Larry W. Price
SSN: [redacted]
Location: 2750/D146
Phone: 372-8770

ORIGINAL

Qualification Summary: (Attach Resume)

Experience: 2 yrs @ Rocky Flats - Dedication Engineering
2 yrs @ Test Laboratory - Dedication Engineering & Testing
1 yr @ Gasser Assoc. - Instructor & developer of Dedication Engineering Training

Education: B.S. Chemical Engineering/Nuclear Engineering
EPRI Seminar - Commercial Grade

AP-EN-035 Training (required): [X] Yes [ ] No Completion Date: 7/28/99

Other: 3-4 months at Hanford - performing CGI dedications
Over 25 years of Commercial Nuclear Power Experience plus 6 years of Navy Nuclear Submarine Duty

Evaluation:

Based upon the qualification summary above, review of the individual's resume and the comments below, this individual has the appropriate background and expertise to perform dedication activities.

Comments:

Responsible Manager(s):

By: Dean W. Mafford (Printed Name) Title: Manager technical Integration (Printed Title) Signature: Dean W. Mafford Date: 8-12-99

By: _____ (Printed Name) Title: _____ (Printed Title) Signature: _____ / Date: _____

By: _____ (Printed Name) Title: _____ (Printed Title) Signature: _____ / Date: _____

Required Attachment: Resume Optional Attachment: Training Sign-In Form for AP-EN-6-035

Résumé - Larry W. Price

Personal Data:

Health: excellent
Married-two children
Interests: Scuba diving, private plane piloting, working out and reading

Address:

P.O. Box 26
Humboldt, AZ 86329
Ph: (520)632-5700
Fax: (520) 632-5701

Education:

Arizona State University-Tempe, Arizona-B.S. Chemical Engineering/Nuclear Engineering (1968-71)
Glendale Community College - Glendale, Arizona (1967-1968)
Academic Honor Society

Special Training:

Basic Nuclear Power School and Nuclear Power Prototype (U.S. Navy)
Management Academy (Arizona Public Service)
Seminars: Nuclear Engineering/Procurement/Receipt/QA/Commercial Grade/Maintenance (by EPRI), Computer Inter-relational Data Bases, Maintenance Programs, Dale Carnegie Sales Course, etc.

Skills:

Familiar with IBM & MacIntosh word processing, spreadsheet, graphics, presentation and database programs. These include Microsoft Word, Excel, PowerPoint, Project, and File. Others include: WordPerfect, MacWrite, WriteNow, MacFlow, MacDraw, SuperPaint, Filemaker-Pro, and HyperCard.

Experience:

Mr. Price presently provides consulting services to nuclear industry.

Mr. Price provided Senior Project Management services for Johnson Controls Sunbelt Area Office located in Tempe, Arizona. He and his team of engineers, technicians, installers and sub-contractors designed, constructed, and started-up HVAC controls , fire, lighting and security installations for both new construction and renovations. Installations include small, medium and large projects around the metropolitan Phoenix area and the state.

Mr. Price provided engineering services at the DOE facilities at Rocky Flats, Colorado. He was responsible for the development, installation, and training of personnel for the Oracle-based relational database for site-wide use. This program reduces time spent to prepare bills of material for design & work packages to support the Operations Department. Mr. Price also wrote procurement specifications for material, equipment and parts ensuring they met appropriate codes and standards.

Larry W. Price Résumé - Experience (Continued) **Page 2**

Mr. Price provided training services at the DOE facilities at Hanford, Wash. He developed lesson plans for personnel training on applications of DOE Order 5480.19 Conduct of Operations. Note: this activity was in conjunction with that in Rocky Flats described above.

Mr. Price provided engineering, operations and quality assurance services to the nuclear industry. He organized and developed the environmental qualification (EQ) program for safety-related equipment at the Nine Mile Point Unit 1 BWR. Mr. Price was responsible for the EQ program meeting NRC code requirements. He aided in NRC presentations and audit activities. Later, he functioned in a leading role on the NMP-2 program.

Mr. Price developed and presented a training program for Commercial Grade Procurement of parts and equipment for Commonwealth Edison nuclear power plants.

Mr. Price served as the Director of the GA Engineering Test Laboratory in Prescott Valley, Arizona. He was responsible for start-up of the facility, marketing, testing and inspection activities for the EQ and Dedication of parts for the Nuclear Industry. All operational and testing procedures and start-up of equipment and systems were his responsibilities.

Mr. Price developed an inter-relational data base computer code. It is used for EQ, nameplate data, equipment lists and locations, spare parts, zone info, etc. The code calculates the qualified life of operating nuclear plant equipment based on actual ambient conditions measurement. It is practical for tracking plant life extension (PLEX) data.

Mr. Price prepared performance goals for the Rancho Seco Nuclear Plant. These goals met NRC, ANI and INPO requirements in the areas of engineering, operations, training, maintenance, and surveillances. Mr. Price prepared design changes, licensing and compliance submittals; also, field walkdowns and overview of the EQ program for Wisconsin Public Service's Kewaunee PWR.

He was Management Analysis Company's (MAC) project leader for work control process improvement for Southern California Edison at San Onofre Nuclear Generating Station, working in the control room for both units. He co-authored the Methods Manual for Work and Equipment Control, essentially a handbook to provide detailed direction and guidance to increase the efficiency of the work process for the start-up and operation of SONGS.

At APS, Mr. Price was the Site Construction Manager for the Palo Verde Nuclear Power Plant project representing five utilities for the construction of three units. Earlier, he was the field engineering manager of Civil, Electrical, Mechanical and Instrumentation & Control engineering disciplines.

Larry W. Price Résumé - Experience (Continued)

At Exxon Nuclear, he was a planner/scheduler, system coordinator, and contracts administrator. As a construction supervisor and later as a start-up engineer, he completed the turnover of the St. Lucie Unit 1 plant to the Florida Power and Light's Operations Department. He also performed nuclear fuel max power flux profile calculations prior to movement of control rods at Oyster Creek plant. He also was a member of the Exxon nuclear fuel inspection team. Before this, he developed maintenance training programs and taught nuclear plant training courses for Westinghouse to prepare reactor operators for their NRC exams as well as plant nuclear engineer's training, and many others. At Powers Regulator, he provided sales and engineering of environmental control systems, many were computer-based.

Employment:

Dates	Company/Location	Position/Responsibility
11/97 - Present	Centurion Engineering Humboldt, Arizona	President - Engineering Contractor in Nuclear Power
6/95 - 11/97	Johnson Controls Tempe, AZ	Senior Project Manager
6/93 - 6/95	VIP/Barri/EG & G Rocky Flats, Colo.	Engineer - Procurement Engineering & Software Development Project Leader
4/94 - 7/94	Gasser Associates/ Kaiser Engineering Hanford, Washington	Trainer for DOE Conduct of Operations
4/88 - 6/93	Centurion Engineering Prescott, Arizona	President - Engineering Contractor in Nuclear Power
8/83 - 1/93	Gasser Associates	Principal Engineer and Lab Director U.S. Nuclear Power Plants and Test Lab in Prescott, AZ
4/80 - 8/83	Centurion Engineering Prescott, Arizona	President and Project Leader for Management Analysis Company
4/76 - 4/80	Arizona Public Service Phoenix, Arizona	Site Construction Manager
4/74 - 4/76	Exxon Nuclear Co. Bellevue, Wash.	Field Engineer
4/73 - 4/74	Westinghouse Corp. Pittsburgh, PA	Lead Training Engineer
5/71 - 4/73	Powers Regulator Co. Denver, Colorado	Sales Engineer

Training Record of Attendence

Administrative Procedure No.: EN-6-035-00

Title: SNF Project Dedication of Commercial Grade Items (CGIs)

Date of Training: 7/28/99

Location: 2150 / 200E

Attendees:

Print Name	SSN	Signature
LARRY W. PRICE	[redacted]	
DAVID C MARBURGER	[redacted]	
THOMAS LIBS	[redacted]	

SNF CGI Dedication Qualification Form

In accordance with SNF Project requirements as specified in AP-EN-035-00, SNF Project Dedication of Commercial Grade Items (CGIs), and SNF-DI-003, Commercial Grade Item Upgrade Dedication Process Requirements & Implementation Instructions, the completion of this form designates an individual to be qualified to perform CGI dedication activities.

ORIGINAL

Individual:

Name: Edwin R. Kahler
SSN: [redacted]
Location: 8 Elm Court San Anselmo, CA 94960
Phone: (415) 453-8836

Qualification Summary: (Attach Resume)

Experience: Supervisor – Spare Parts Dedication Group, PG&E., max staff 35 1988-1994
EPRI Joint Utility Task Group – developed generic dedication packages for utilities
Pacific Gas & Electric Co. 1973-1999, 20+ years commercial nuclear power experience

Education: Registered Professional Engineer, Electrical, California #E10110
Washington State University

AP-EN-035 Training (required): [X] Yes [ ] No Completion Date: 7/28/99
Co-author and trainer for AP-EN-035 and ENG-DI-002

Other: Member of various EPRI Task Groups developing utility CGI standards, e.g. NP-5652, TR-102260, etc.
Former member ASME NQA-1 QA Committee, Design and Procurement Work Group 1985-1995, also Task Group member on Supplement for CGI.

Evaluation:

Based upon the qualification summary above, review of the individual's resume and the comments below, this individual has the appropriate background and expertise to perform dedication activities.

Comments:

Responsible Manager(s):

By: Dean W. Medford (Printed Name) Title: Manager Tech Integration (Printed Title) Signature: Dean W. Medford 8-12-99 (Date)

By: _____ (Printed Name) Title: _____ (Printed Title) Signature: _____ / _____ (Date)

By: _____ (Printed Name) Title: _____ (Printed Title) Signature: _____ / _____ (Date)

RESUME

Edwin R. Kahler, P.E.

1994 - Present

Management oversight of the Diablo Canyon Nuclear Power Plant Commercial Grade Dedication Program including reviews of program and procedure revisions for conformance to NRC requirements and expectations, technical reviews of dedication packages, maintaining cognizance of industry activities and interfacing with the NRC on CGI issues.

1988 - 1994

Supervisor, Spare and Replacement Parts Program - Supervised 22 engineers in developing technical evaluations, dedication requirements and acceptance criteria for commercial grade items, providing technical evaluations of commercial and Appendix B supplier programs. Major projects included:

CGI dedication of an emergency diesel generator

CGI dedication of replacement SF6 4kV circuit breakers

Fastener consolidation program.

Also supervised the Environmental Qualification Program from 1988 to 1991.

1981 - 1988

Supervisor, Engineering Quality Control Program - Supervised 12 engineers and auditors in developing, maintaining and implementing programs and procedures for engineering activities.

1975 - 1980

Electrical Engineer - Major design projects included; system and seismic upgrades for Humboldt Bay Power Plant Nuclear Unit 3, generator replacement Antioc Power Plant, Los Medanos Natural Gas Storage Field, H2S abatement systems for Geysers Power Plants.

1973 - 1975

Start-up Engineer - Geysers Power Plants Units 9, 10 and 11; Morro Bay Power Plant Tank Farm, Diablo Canyon Nuclear Power Plant.

Industry Associations

ASME NQA-1 Quality Assurance Committee - Member of the Design and Procurement Work Group 1984 to 1996. This work group was responsible for Sections 3 and 7 and supplements for design and procurement. Member of subcommittee that developed the supplement on commercial grade dedication.

EPRI Joint Utility Task Group (JUTG) 19988 to 1994 responsible for developing the EPRI standards for commercial grade dedication. Committee chairman for several of the industry generic dedication packages

Qualifications

Registered Professional Electrical Engineer - California

Washington State University - Electrical Engineering

Training Record of Attendence

Administrative Procedure No.: EN-6-035-00

Title: SNF Project Dedication of Commercial Grade Items (CGIs)

Date of Training: 7/28/99

Location: 2750 / 200E

Attendees:

Print Name	SSN	Signature
LARRY W. PRICE	[redacted]	
DAVID C MARBURGER	[redacted]	
THOMAS LIBS	[redacted]	
Edwin R. Keller	[redacted]	

SNF CGI Dedication Qualification Form

In accordance with SNF Project requirements as specified in AP-EN-035-00, SNF Project Dedication of Commercial Grade Items (CGIs), and SNF-DI-003, Commercial Grade Item Upgrade Dedication Process Requirements & Implementation Instructions, the completion of this form designates an individual to be qualified to perform CGI dedication activities.

Individual:

Name: THOMAS W. LIBS

SSN: [redacted]

Location: 2750E/D279

Phone: 376-1850

ORIGINAL

Qualification Summary: (Attach Resume)

Experience: 35 YEARS IN NUCLEAR FIELD - TEST & OPS EXPERIENCE INTEGRATED EQUIP QUAL WITH GE & QUADREX, CGI DEDICATION WITH DUKE AT HANFORD

Education: MS PHYSICAL SCIENCE
MBA
NUMEROUS TRAINING COURSES/OTHER COLLEGE COURSES

AP-EN-035 Training (required): ☑ Yes ☐ No Completion Date: MAY 99

Other:

Evaluation:

Based upon the qualification summary above, review of the individual's resume and the comments below, this individual has the appropriate background and expertise to perform dedication activities.

Comments:

Responsible Manager(s):

By: Dean W. Medford (Printed Name) Title: Manager Technical Integration (Printed Title) Signature: Dean W. Medford 8-12-99 (Date)

By: _____ (Printed Name) Title: _____ (Printed Title) Signature: _____ / _____ (Date)

By: _____ (Printed Name) Title: _____ (Printed Title) Signature: _____ / _____ (Date)

Required Attachment: Resume Optional Attachment: Training Sign-In Form for AP-EN-6-035

THOMAS W. LIBS

Operations Engineering and Testing, Regulatory Analysis and Licensing, and Safety Evaluation

Mr Libs has over 30 years of experience in the nuclear industry (government facilities, commercial power plants and commercial industry institutes), providing assistance to approximately twenty (20) nuclear BWR, PWR and government production and test facilities. These include Diablo Canyon, Trojan, Humboldt Bay BWR, Grand Gulf, Fermi, Nine Mile Point 1 & 2, Hope Creek, Kauwanee, Prairie Island 1 & 2, Duane Arnold, Beaver Valley 1 & 2 and DC Cook 1 & 2, Westinghouse, GE, EPRI, INPO, Hanford N-Reactor, LOFT and at naval reactors. He has broad and diversified 'hands-on' experience in operations, testing, maintenance and engineering of nuclear power plant systems. He has defined and developed engineering, operations and maintenance programs and procedures for essentially categories of plant operation, testing and maintenance, consistent with utility, USNRC and other governmental requirements. Further, Mr Libs has extensive experience in the preparation of nuclear facility SARs, Technical Specifications and regulatory analysis and licensing.

In particular, Mr Libs' experience includes the following:

- Developed procedures for surveillance and testing at seven (7) commercial PWRs and four (4) BWRs
- Prepared Plant Technical Specifications for four (4) PWRs and three (3) BWRs
- Prepared plant operating, test and maintenance procedures for four (4) PWRs and two (2) BWRs
- Prepared procedures for rad-waste management at Beaver Valley Nuclear Power Station
- Participated in the preparation of initial Technical Specifications and surveillance test procedures for the Loss of Flow Test Facility (LOFT) in Idaho
- Performed engineering and operational design review of selected safety related systems at two (2) commercial PWRs
- Startup Test Engineer for the safety related I&C systems at three (3) commercial PWRs
- Developed I&C systems test equipment in use at commercial nuclear facilities, including transducer time response test equipment, planning and test procedures for equipment qualification and monitoring requirements for equipment operability and performance

Recently Mr Libs completed ten years as senior engineer and supervising engineer in PG&E's Nuclear Regulatory Affairs Department for licensing of Diablo Canyon Power Plant. His prior experience includes three years as project manager with the Electric Power Research Institute (EPRI) responsible for formulation and technical management of component reliability and plant availability improvement projects and seven years as an engineering, licensing, and operations consultant. Other experience includes two years as test engineer on overhaul, construction. and startup of naval nuclear plants, three years as a licensed naval reactor operator and plant operations engineer, and four years as project engineer for testing with the Lawrence Livermore Laboratory at the Nevada Test Site.

PG&E: Mr Libs was a Supervising Engineer in the Nuclear Regulatory Affairs Department responsible for operational licensing activities to ensure compliance with USNRC requirements and practices. He prepared and organized the operations and engineering information in response to NRC requirements. As such, he was responsible for assuring the accuracy and completeness of the owner's responses to the regulatory agency. Prior to the receipt of the commercial operating license at Diablo Canyon, he was directly involved with operations, maintenance and engineering activities on behalf of the Nuclear Regulatory Affairs Department for preparation of regulatory correspondence for NRC Letters, I&E Bulletins, Regional NRC Inspection Reports and License Amendment requests. Specific duties and accomplishments included preparation of responses to construction, engineering and operations licensing issues, responses to allegations and preparation of the rate adjustment application to the CPUC. Mr Libs recommended and implemented direction and strategy necessary to maintain and comply with the DCPP operating licenses, including development of technical positions for response to NRC information requests; license amendment requests including changes to the Technical Specifications; and

coordination of activities between the Nuclear Regulatory Affairs Department and Operating Plant Staff.

ENG and PTA: Prior to working on Diablo Canyon and Humboldt Bay, he was a Senior Nuclear Engineering Consultant for plant licensing, plant availability and component reliability improvements, procedures preparation and review, plant site engineering, operations and design review. He also prepared FSAR sections and responses to NRC questions for GE for WPPSS 2, Grand Gulf and Hope Creek.
He contributed to Fermi Project for identification of Class IE equipment (NSSS & BOP) for qualification per IEEE 323 and NUREG-0588. The effort included instrument and electrical systems review, plant records search, identification of harsh environment zones, and preparation of equipment qualification summaries and test plans. Also prepared input for a computerized equipment qualification data base system for GE. Completed assignment as project engineer on a General Electric contract to develop Qualification Sample Material Evaluation (QSME) aging analysis reports for Grand Gulf Nuclear Plant IE devices. Mr Libs completed six (6) month assignment at Susquehanna plant, where he prepared operations and I&C test and surveillance procedures prior to issuance of the operating license. As a consultant to the General Electric Company, he evaluated the Nine Mile Point 2 and Hope Creek FSARs against the NRC Standard Review Plan criteria for engineering and operational requirements.

EPRI: At the EPRI's Nuclear Safety Analysis Center, Mr Libs helped establish the Significant Event and Licensee Evaluation Report assessment project prior to turning it over to INPO. He assisted EPRI in the analysis of residual heat removal system operating and design experience for both BWR and PWR plants and analysis for generic qualification of Class IE equipment.

As a Project manager in EPRI's Engineering and Operations Department, Systems and Component Performance Program, he was responsible for formulation and management of projects for research and development to improve power plant components and systems. His project responsibilities included system controls; primary coolant pumps and seals; piping support reliability improvements; improved cable tray and conduit supports; refueling water clarity and refueling equipment improvements; containment leak rate testing; feedwater heater tube erosion and flow effects; evaluation of on-line leak sealing methods; valve stem leakage improvements; MSR and feedwater heater performance monitoring; and other plant availability and component reliability improvement projects.

NSC (Quadrex): Mr Libs was responsible for test group assistance and preparation of pre-op, surveillance, maintenance, and operations procedures for five (5) commercial nuclear plants (Kewaunee, Prairie Island, Duane Arnold, Beaver Valley, Trojan and DC Cook). He also performed design review of selected plant safety systems PWR facilities and assisted with SAR revisions and preparation, training, review of programs for operations, piping and system analysis for pipe whip and jet impingement effects at other nuclear plants.

As Manager of the Plant Operational Support Group, he managed over 40 engineers on such tasks as planning programs and preparing manuals and procedures for initial construction test, plant startup, operations, maintenance, and surveillance for eight (8) PWR and five (5) BWR plants. He also prepared QA Plans, Plant Procedures Plan, manpower requirements, and definition of system boundaries for the preoperational testing phase for six (6) nuclear plants in the PWR Standard Nuclear Unit Power Plant Systems ('SNUPPs'). He also implemented Standardized Technical Specifications at DC Cook and the Beaver Valley Nuclear Stations. As a consultant to GE, he prepared answers to NRC questions on two BWRs facilities. Other group responsibilities included I&C and electrical construction testing at Trojan Nuclear Plant; transducer time response equipment design and testing at Beaver Valley and Trojan; chemistry, health physics, and instrumentation procedures and systems operation and maintenance training at FitzPatrick; plant productivity studies for the FEA; radwaste management program for Beaver Valley; redwaste management risk analysis for ERDA; plant safety systems studies for EPRI; and engineering and test support for plant systems and piping design review, and A/E and NSSS bid evaluations.

Mr Libs also has diversified government facilities experience working with Westinghouse. At Hanford's N-Reactor, Mr Libs assisted in the preparation of a computerized preventive maintenance program ('PM') and at LOFT, he prepared the initial Technical Specifications for LOFT to be consistent with commercial nuclear power 22requirements and comply with consistency with AEC-NRC requirements. At LOFT, he also worked in the operational engineering group to prepare LOFT's operations and surveillance testing procedures. Later, as a consultant to Kaiser, he performed safety assessment and feasibility studies for processing, containerization and transportation to DOT requirements for low-level waste from Hanford's storage tanks to Nevada. This included assessment of other alternatives, such glass bead vitrification, clay calcification and other options considered by ERDA.

EDUCATION: BS, Engineering Physics, Humboldt State University, 1961
MS, Physical Science, Oregon State University, 1967
MBA, San Jose State University, 1975
Course work in MS Taxation at San Jose State University

PROFESSIONAL:
Graduate Westinghouse - Idaho Nuclear Power School, 1968
Qualified Plant Operator, Dual Reactor AIW Naval Prototype, 1970
Registered Professional Nuclear Engineer, California, 1975

Employment History

1995 - Present	Self Employed Consultant and businessman
1986 - 1995:	PG&E, San Francisco and Diablo Canyon
1980 - 1986:	ENG Services Corporation and Power Technical Associates Inc. Campbell, CA
1977 - 1980:	Electric Power Research Institute, Palo Alto, CA
1972 - 1977:	Nuclear Services Corporation (Quadrex), Campbell, CA
1967 - 1972:	Westinghouse Idaho and Mare Island, CA
1964 - 1967:	University of California, Lawrence Radiation Laboratory

Publications:
Residual Heat Removal Experience Review and Safety Analysis (PWRs), NSAC-52 (1983), Co-author with G. Vine, W. Layman, S. Farrington

Feedwater Heater Workshop Proceedings, EPRI 78-123 (1979)

Design, Stress Analysis and Operating Experience in Feedwater Heaters, Proceeding of the Conference on Industrial Energy Conservation Technology (1980)

Training Record of Attendence

Administrative Procedure No.: EN-6-035-00

Title: SNF Project Dedication of Commercial Grade Items (CGIs)

Date of Training: 7/28/99

Location: 2150 / 200E

Attendees:

Print Name	SSN	Signature
LARRY W. PRICE	[redacted]	
DAVID C MARBURGER	[redacted]	
THOMAS LIBS	[redacted]	

SNF CGI Dedication Qualification Form

In accordance with SNF Project requirements as specified in AP-EN-035-00, SNF Project Dedication of Commercial Grade Items (CGIs), and SNF-DI-003, Commercial Grade Item Upgrade Dedication Process Requirements & Implementation Instructions, the completion of this form designates an individual to be qualified to perform CGI dedication activities.

Individual:

Name: DAVID MARBURGER

SSN: [redacted]

Location: 2750 - D146 200E

Phone: 509 372 8669

ORIGINAL

Qualification Summary: (Attach Resume)

Experience: NUCLEAR COMMERCIAL PLANTS - SAFETY-REGULATORY

Education: BS M E

AP-EN-035 Training (required): [X] Yes [ ] No Completion Date: 7/28/99

Other:

Evaluation:

Based upon the qualification summary above, review of the individual's resume and the comments below, this individual has the appropriate background and expertise to perform dedication activities.

Comments:

Responsible Manager(s):

By: Dean V. Medford (Printed Name) Title: Manager Technical Integration (Printed Title) Signature: Dean V. Medford Date: 8-12-99

By: _____ (Printed Name) Title: _____ (Printed Title) Signature: _____ Date: _____

By: _____ (Printed Name) Title: _____ (Printed Title) Signature: _____ Date: _____

Required Attachment: Resume Optional Attachment: Training Sign-In Form for AP-EN-6-035

DAVID C. MARBURGER
PO Box 3062
Richland, WA 99352

Residence - None

SUMMARY

This overview describes my experience gained through positions with Westinghouse Electric Corporation since 1966. This experience has been mainly in commercial nuclear power, although it includes three recent assignments at Hanford, DOE site. I am knowledgeable with the Nuclear Steam Supply System and the Balance of Plant system designs. Positions held include Regulatory, Project, Systems Design Engineering, interfacing with Architect Engineers and with Regulatory Agencies and utility customer technical/regulatory support. Much of my experience has been in the regulatory/licensing field, specializing in resolution of non-conformances, definition of root cause, determination of corrective action and the associated documentation to the NRC such as Licensing Event Reports, Justification for Continued Operation and Operability Evaluations. I am experienced with performance of 10 CFR 50.59 evaluations and safety evaluations. I have also prepared numerous Licensing Amendment Requests.

Since 1985, I have successfully completed field assigments with six different customers. In these assignments, I worked as a member of the customer's organization on tasks defined by them. I typically operated in a mode where the task/problem was outlined and then I worked as an independent contributor with mininun direction fron the customer or from Westinghouse headquarters. My field assignments were with:

- Westinghouse Hanford Corporation, Richland, WA
- Pacific Gas and Electric, Diablo Canyon Power Station
- Tennessee Valley Authority, Sequoyah Nuclear Plant
- Florida Power and Light, Turkey Point Nuclear Generation Plant
- Omaha Public Power District, Fort Calhoun
- Iowa Electric Light and Power Company, Duane Arnold Nuclear Plant

My last assignment, at Hanford, ended in October, 94. The Pittsburgh Westinghouse Corporate reduction in force effective at that time eliminated this position, I would like to continue my career with work on assignments of interest where my skills and experience would be effectively utilized.

My most recent positions are:
(No longer with Westinghouse)

Oct./98 to present Hanford, Washington SNF/VDF
Update VDF commercial dedication packages to capture later revisions of the Procurement Packages and of the Safety Equipment List and other changes.

June/98 to Sept/98 Hanford, Washington SNF/VDF
Prepare SNF VDF commercial dedication packages for Safety Category hardware components.

Oct/96 to April/ 98 Diablo Canyon Power Plant
Prepare second submittal of the Improved Standard Technical Specification.

Oct/95 to June/96 Diablo Canyon Power Plant
Prepare assigned chapters of the Improved Diablo Canyon Technical Specification to the NUREG-1441 Merits Specification.

March/95 to Aug/95 New Jersey Power and Light
Administer the NRC Resident Open Item List for Unit 1.

1) Experience Summary at Hanford WHC.

July 1994 to
November 1994

Westinghouse Electric Corporation
Nuclear Technology Division
Nuclear Safety and Regulatory Initiatives

On-site support to Westinghouse Hanford Corporation at Richland, Wa. Prepare K-Basins Seismic Leak USQ Summary Report. Conduct reviews leading to signature and issuance as a WHC controlled document. Conduct independent design review and resolve comments. Assist Task Team Leader, J. C. Wiborg, in other tasks as requested.

September 1993 to July 1994

Westinghouse Electric Corporation
Nuclear Technology Division
Nuclear Safety and Regulatory Initiatives

On-site support to Westinghouse Hanford Corporation at Richland, Wa. Prepare management level procedures for Regulatory Standards under the direction of K. D. Daschke. These include a policy procedure for 10 CFR 820 compliance, a procedure for guidelines for preparation of Technical Safety Requirements, and a revised procedure on processing Unreviewed Safety Questions.

June 1993 to
September 1993

Westinghouse Electric Corporation
Advanced Nuclear Technology Division
Nuclear Safety

Provide on-site assistance in the preparation of portions of the Deactivation Plan for the Westinghouse Hanford Company PUREX facility in Richland WA under the direction of D. J. Washenfelter. This plutonium processing facility is being deactivated. The Plan documents the actions to be taken and the acceptance guidelines for the deactivation completion. The Plan is submitted to the Regulatory agencies for their review and approval.

2) Experience Summary at PG&E Diablo Canyon Power Plant

September 1988 to June 1993.

Westinghouse Electric Corporation
Nuclear Technology Systems Division
Nuclear Safety

This assignment was with Pacific Gas and Electric Diablo Canyon Power Plant in Avila Beach. CA. I worked directly with the Regulatory Compliance section under the direction of T. L. Grebel. I provided a background of knowledge of Westinghouse design and a communication channel to Westinghouse technical groups in Pittsburgh to obtain their assistance to resolve plant problems. as appropriate. My work involves participation

in Technical Review Groups which are a procedural approach utilized by DCPP to investigate problems determine root cause. and define corrective actions. One major activity is the preparation of Operability Evaluations. These OEs are used to document/justify continued operation of the plant in the presence of some non-conforming condition. The OE documents that the plant can operate safely and within the License and Design basis until the condition is corrected. I also have prepared License Amendment Requests. License Event Reports. and Non-conformance Reports. I provided preparation guidance. technical review and comment on similar documents prepared by others in the group. I served as Westinghouse senior site representative for the performance of the Diablo Canyon Power Plant Surveillance Test Procedure Basis program in 1992.

AFFILIATIONS

Professional Engineer registration in the states of Ohio and Pennsylvania.

EDUCATION

Bachelor of Mechanical Engineering. 1959 Ohio State University Columbus. Ohio (5 year curriculum)

Specialized Training

Management Techniques
Management by Objectives
Management by Problem Solving
Performance Review
Stress Management
Games People Play
Managerial Grid
Negotiation Training
Communication Workshop
Quality is Free

Psychology of Human Behavior University of Pittsburgh
Nuclear Power Reactor Safety. Massachusetts Institute of Technology
Personnel Management. University of Pittsburgh
Personnel Administration. University of Pittsburgh

Training Record of Attendence

Administrative Procedure No.: EN-6-035-00

Title: SNF Project Dedication of Commercial Grade Items (CGIs)

Date of Training: 7/28/99

Location: 2150 / 200E

Attendees:

Print Name	SSN	Signature
LARRY W. PRICE	[redacted]	
DAVID C MARBURGER	[redacted]	
THOMAS LIBS	[redacted]	

Section 3
Quality Assurance Surveillances

SPENT NUCLEAR FUEL PROJECT QUALITY ASSURANCE SURVEILLANCE REPORT

DATE: February 10, 2000	SR# 1K-FY00-059	Page 1 of 1

Copies To:

D. L. Anderson	S7-41	K. Napora	S2-48	SNF Project Files	R3-11
T. Z. Anderson	B4-68	R. P. Ruth	R3-11	Surveillance File	S2-48
A. S. Daughtridge	R3-86	C.E. Swenson	S8-07	W-379 (CSB) Project File	S8-06
M. F. Nicol	S2-48	FHAVS	G1-50		

Subject: MHM Commercial Grade Item Dedication Testing – Bellhaven Labs

System: CSB MCO Handling Machine (MHM)	**Equipment No.:** CR-2
Location: Bellhaven Labs, Kennewick WA	**Survey Item:** N/A
Reference: Contract 2717 Release 3	
Person Contacted: Jeff Cadick, Bellhaven QA	

Report:

On February 10, 2000, a supplier performance monitoring surveillance was performed at Bellhaven Laboratories, Kennewick, Washington. This surveillance was performed at the request of the MHM Design Authority (DA) to assess the supplier's conformance to the requirements of Statement of Work (SOW) for Contract 2717 Release 3, "CGI Bench Testing of Electrical Components." Sixteen (16) attributes were developed from the SOW and reviewed at the vendor's facility; eight (8) of the items were found to be satisfactory. Testing of items has just begun (in progress, none completed) so the remaining eight (8) were considered to be not applicable (N/A) at the time of the review. These attributes will be reviewed when testing of some items is completed. (No deficiencies identified)

The attributes reviewed during this surveillance included use of current approved revision of test procedures, maintenance of test procedures, control of changes to the test procedures (approved redlines), documentation of test information and results on the test procedure, verification of test instrument calibration, and verification of appropriate training records.

The vendor's test facility was neat and well organized. No other work was being performed in the same testing location, thus segregation and special control of the Buyer's material was not required. The Buyer's status indicators (Conditional Accept envelops) were with the parts and contained copies of the receiving inspection plans used for each item. (The vendor will provide a separate status indicator to document their activity for each completed item after testing.)

The vendor's representatives were helpful and provided all required information upon request. Results of the surveillance were discussed with the vendor's Quality Assurance Manager upon completion of the surveillance (exit briefing).

Performed By: T.Z. Anderson		Concurred By: K. Napora	
T. Z. Anderson	2/11/00	Karen Napora	2/14/00
Signature	Date	Signature	Date

ORIGINAL

SURVEILLANCE CHECKLIST

SURVEILLANCE NUMBER 1K-FY00-059 TITLE MHM COMMERCIAL GRADE ITEM (CGI) TESTING - BELLHAVEN

Page 1 of 4 DATE 02/09/00 PREPARED BY T.Z. Anderson Rev. 0 PERFORMED BY T.Z. Anderson 2/9/00

SUBJECT/ACTIVITY REQUIREMENT REFERENCE	EVIDENCE EXAMINED/ PERSONNEL CONTACTED	OBSERVATIONS/COMMENTS	COMPLY		
			YES	NO	N/A
This surveillance is intended to review Bellhaven's performance of testing in accordance with Contract 2717 Release 3 SOW (Rev 1, 1/20/00) and various Buyer provided CGI testing procedures.	Bellhaven contact: Jeff Cadick, QA				
WORK SCOPE (Section 3)					
1. Items failing inspection/testing shall be documented on the testing facility's deficiency form and forwarded to the Buyer's representative for disposition. (3.c)		No items have failed inspection or testing			X
2. Test anomalies shall be documented. (3.d)		No test anomalies have occurred			X
3. Inspections or tests beyond the capability of the testing facility may be subcontracted to qualified sub-vendors that are approved for the work activity. (3.e)		No testing has been performed by a subcontractor			X
4. Test procedures will be provided by the Buyer. (3.f) Note: Changes to procedures must be approved by the Buyer's representative.	Procedure RLY-1 for items MHM-023 & -026	Copy of original being used for testing. Original copy at test location. Changes to procedure are signed by Buyer's representative. Copy being used has contains these changes.	X		
DELIVERABLES (Section 4)					
5. The Contractor will provide a complete, certified test report for each component or family of components.		No items completed, three items in progress. Awaiting megger tester to complete testing of in process items.			X

SURVEILLANCE CHECKLIST

SURVEILLANCE NUMBER IK-FY00-059 TITLE MHM COMMERCIAL GRADE ITEM (CGI) TESTING - BELLHAVEN

Page 2 of 4 DATE 02/09/00 PREPARED BY T.Z. Anderson Rev. 0 PERFORMED BY T.Z. Anderson

SUBJECT/ACTIVITY REQUIREMENT REFERENCE	EVIDENCE EXAMINED/ PERSONNEL CONTACTED	OBSERVATIONS/COMMENTS	COMPLY		
			YES	NO	N/A
6. Packaging of returned items shall prevent dirt, moisture, or other foreign matter from contaminating or damaging the components, thus maintaining the validity of the calibration/testing.		No items completed, three items in progress.			X
CONFIGURATION MANAGEMENT (Section 11)					
7. Parts may not be substituted without Buyer's approval. All components and accompanying documentation delivered to the Contractor shall be maintained together and returned to the Buyer.		No substitutions have been made. All items have been supplied by Buyer.	X		
TRAINING (Section 12)					
8. Contractor's personnel are required to have documented qualifications, experience, and training to perform bench testing of electrical components of this type.	Jim Johnson, Jeff Cadick training folders reviewed.	Cadick folder has certification for calibration expiration date of 9/21/99. Noted to Contractor. No calibrations have been performed to date.	X		
STANDARDS (Section 15)					
9. Instruments used for testing shall be calibrated in accordance with calibratin standards and have traceability of primary/secondary standards to NIST. (Also 3.j)	BAT-123 (HP3457A), 7/29/00 BAT-124 (HP3457A), 7/30/00 BAT-052 (TEK DMM916), 2/18/00	All items being used are under current calibration	X		

SURVEILLANCE CHECKLIST

SURVEILLANCE NUMBER 1K-FY00-059 TITLE MHM COMMERCIAL GRADE ITEM (CGI) TESTING - BELLHAVEN

Page 3 of 4 DATE 02/09/00 PREPARED BY T.Z. Anderson Rev. 0 PERFORMED BY T.Z. Anderson

SUBJECT/ACTIVITY REQUIREMENT REFERENCE	EVIDENCE EXAMINED/ PERSONNEL CONTACTED	OBSERVATIONS/COMMENTS	COMPLY		
			YES	NO	N/A
TEST PROCEDURES					
10. Test procedure approved by DA.	See attached table		X		
11. Test instrument information recorded.	See attached table		X		
12. CGI item identification information recorded.	See attached table		X		
13. Test performance recorded.	See attached table	Items in process, no items completed at the time of this review. Testing to date has been properly recorded on test procedure sheet copies.	X		
14. Summary of Results recorded.		Items in process, no items completed at the time of this review			X
15. Notes completed (when applicable).		Items in process, no items completed at the time of this review			X
16. Test Engineer/Technician signature.		Items in process, no items completed at the time of this review			X

SURVEILLANCE CHECKLIST

SURVEILLANCE NUMBER 1K-FY00-059 TITLE MHM COMMERCIAL GRADE ITEM (CGI) TESTING - BELLHAVEN

Page 4 of 4 DATE 02/09/00 PREPARED BY T.Z. Anderson Rev. 0 PERFORMED BY T.Z. Anderson

TEST PROCEDURE NO.	RLY-1	RLY-1							
CGI Dedication Package #	MHM-023	MHM-026							
TEST PROCEDURE ATTRIBUTES									
Test procedure approved by DA	X	X							
Test instrument information recorded	X	X							
CGI item identification information recorded	X	X							
Test performance recorded	X *	X *							
Summary of results recorded									
Notes (when applicable)									
Test Engineer/ Technician signature									

* - Testing in progress, tests not completed at time of review. Awaiting megger.

SPENT NUCLEAR FUEL PROJECT QUALITY ASSURANCE SURVEILLANCE REPORT

DATE: February 15, 2000	SR# 1K-FY00-067	Page 1 of 1

Copies To:

D. L. Anderson	S7-41	K. Napora	S2-48	SNF Project Files	R3-11
T. Z. Anderson	B4-68	R. P. Ruth	R3-11	Surveillance File	S2-48
A. S. Daughtridge	R3-86	C.E. Swenson	S8-07	W-379 (CSB) Project File	S8-06
M. F. Nicol	S2-48	FHAVS	G1-50		

Subject: MHM Commercial Grade Item Dedication Testing – Belhaven Labs

System: CSB MCO Handling Machine (MHM)
Location: Belhaven Labs, Kennewick WA
Reference: Contract 2717 Release 3
Person Contacted: Jeff Cadick, Belhaven Quality Assurance

Equipment No.: CR-2
Survey Item: N/A

Report:

On February 15, 2000, a supplier performance monitoring surveillance was performed at Belhaven Laboratories, Kennewick, Washington. This surveillance was performed to review testing documentation for first five (5) items completed under Contract 2717 Release 3, "CGI Bench Testing of Electrical Components." Eighteen (18) attributes were reviewed at the vendor's facility; thirteen (13) of the items were found to be satisfactory while the remaining five (5) were considered to be not applicable (N/A). (No deficiencies identified)

The attributes reviewed during this surveillance included use of current approved revision of test procedures, control of changes to the test procedures (approved redlines), documentation of test information and results on the test procedure, verification of test instrument calibration and use of status indicators.

All testing documentation for the five (5) test specimens had been completed with all information recorded and sign-offs completed. Tested items were wrapped and sealed in plastic along with the vendor's status indicators. The Buyer's status indicators (Conditional Accept envelops) were with the parts and contained copies of the receiving inspection plans used for each item. The vendor included a Certificate of Conformance for the tested items.

The vendor's test facility was neat and well organized. No other work was being performed in the same testing location, thus segregation and special control of the Buyer's material was not required.

The vendor's representative was helpful and provided all required information upon request. Results of the surveillance were discussed with the vendor's QA Manager upon completion of the surveillance (exit briefing).

[Note: This is the second surveillance performed on Contract 2717 Release 3. Previous surveillance: 1K-FY00-059.]

Performed By: T.Z. Anderson

Signature 2/17/00 Date

Concurred By: K. Napora

Signature 2/23/00 Date

ORIGINAL

SURVEILLANCE CHECKLIST

SURVEILLANCE NUMBER 1K-FY00-067 TITLE MHM COMMERCIAL GRADE ITEM (CGI) TESTING - BELHAVEN

Page 1 of 4 DATE 02/15/00 PREPARED BY T.Z. Anderson Rev. 0 PERFORMED BY T.Z. Anderson 2/16/00

SUBJECT/ACTIVITY REQUIREMENT REFERENCE	EVIDENCE EXAMINED/ PERSONNEL CONTACTED	OBSERVATIONS/COMMENTS	COMPLY		
			YES	NO	N/A
This surveillance is intended to review Belhaven's performance of testing in accordance with Contract 2717 Release 3 SOW (Rev 1, 1/20/00) and various Buyer provided CGI testing procedures.	Belhaven contact: Jeff Cadick, QA				
WORK SCOPE (Section 3)					
1. Items failing inspection/testing shall be documented on the testing facility's deficiency form and forwarded to the Buyer's representative for disposition. (3.c)		None			X
2. Test anomalies shall be documented. (3.d)		None			X
3. Inspections or tests beyond the capability of the testing facility may be subcontracted to qualified sub-vendors that are approved for the work activity. (3.e)		None			X
4. Test procedures will be provided by the Buyer. (3.f) Note: Changes to procedures must be approved by the Buyer's representative.	CON-1 (MHM-019), RLY-1 (MHM-023, -026), LS-2 (MHM-007)	Redline changes initialed and dated by Buyer's representative	X		
DELIVERABLES (Section 4)					
5. The Contractor will provide a complete, certified test report for each component or family of components.	Certificate of Conformance signed 2/15/00	Testing is not complete. CofC for first 5 items tested.	X		
6. Packaging of returned items shall prevent dirt, moisture, or other foreign matter from contaminating or damaging the components, thus maintaining the validity of the calibration/testing.	Items for test procedures noted in #4 above	Each item protected by sealed plastic wrap. Tags inside package. Awaiting completion of packaging.	X		
CONFIGURATION MANAGEMENT (Section 11)					

SURVEILLANCE CHECKLIST

SURVEILLANCE NUMBER 1K-FY00-067 TITLE MHM COMMERCIAL GRADE ITEM (CGI) TESTING - BELHAVEN

Page 2 of 4 DATE 02/15/00 PREPARED BY T.Z. Anderson Rev. 0 PERFORMED BY T.Z. Anderson

SUBJECT/ACTIVITY REQUIREMENT REFERENCE	EVIDENCE EXAMINED/ PERSONNEL CONTACTED	OBSERVATIONS/COMMENTS	COMPLY		
			YES	NO	N/A
7. Parts may not be substituted without Buyer's approval. All components and accompanying documentation delivered to the Contractor shall be maintained together and returned to the Buyer.		None			X
TRAINING (Section 12)					
8. Contractor's personnel are required to have documented qualifications, experience, and training to perform bench testing of electrical components of this type.		Reviewed previously, see Surveillance Report 1K-FY00-59			X
STANDARDS (Section 15)					
9. Instruments used for testing shall be calibrated in accordance with calibratin standards and have traceability of primary/secondary standards to NIST. (Also 3.j)	AVO Megger BM80/2, #6410-889/0000100/5345, expiration 2/9/00	Other items reviewed previously, see Surveillance Report 1K-FY00-059	X		

SURVEILLANCE CHECKLIST

SURVEILLANCE NUMBER 1K-FY00-067 TITLE MHM COMMERCIAL GRADE ITEM (CGI) TESTING - BELHAVEN

Page 3 of 4 DATE 02/15/00 PREPARED BY T.Z. Anderson Rev. 0 PERFORMED BY T.Z. Anderson

SUBJECT/ACTIVITY REQUIREMENT REFERENCE	EVIDENCE EXAMINED/ PERSONNEL CONTACTED	OBSERVATIONS/COMMENTS	COMPLY		
			YES	NO	N/A
TEST PROCEDURES					
10. Test procedure approved by DA.	See attached table		X		
11. Test instrument information recorded.	See attached table		X		
12. CGI item identification information recorded.	See attached table		X		
13. Test performance recorded.	See attached table		X		
14. Summary of Results recorded.	See attached table		X		
15. Notes completed (when applicable).	See attached table		X		
16. Test Engineer/Technician signature.	See attached table		X		
STATUS INDICATORS					
17. Buyer's Conditional Acceptance Envelop	See attached table		X		
18. Belhaven Green Acceptance Tag	See attached table		X		

SURVEILLANCE CHECKLIST

SURVEILLANCE NUMBER 1K-FY00-067 TITLE MHM COMMERCIAL GRADE ITEM (CGI) TESTING - BELHAVEN

Page 4 of 4 DATE 02/15/00 PREPARED BY T.Z. Anderson Rev. 0 PERFORMED BY T.Z. Anderson

TEST PROCEDURE NO.	CON-1	RLY-1	RLY-1	LS-2	LS-2				
CGI Dedication Package #	MHM-019	MHM-023	MHM-026	MHM-007 Bag #1	MHM-007 Bag #2				
TEST PROCEDURE ATTRIBUTES									
Test procedure approved by DA	X	X	X	X	X				
Test instrument information recorded	X	X	X	X	X				
CGI item identification information recorded	X	X	X	X	X				
Test performance recorded	X	X	X	X	X				
Summary of results recorded	X	X	X	X	X				
Notes (when applicable)	X	X	X	X	X				
Test Engineer/ Technician signature	X	X	X	X	X				
STATUS INDICATORS									
Conditional Acceptance Envelop	X	X	X	X	X				
Belhaven Green Acceptance Tag	X	X	X	X	X				

SPENT NUCLEAR FUEL PROJECT QUALITY ASSURANCE SURVEILLANCE REPORT

DATE: March 2, 2000	SR# 1K-FY00-085	Page 1 of 1

Copies To:					
D. L. Anderson	S7-41	K. Napora	S2-48	SNF Project Files	R3-11
T. Z. Anderson	B4-68	R. P. Ruth	R3-11	Surveillance File	S2-48
A. S. Daughtridge	R3-86	C.E. Swenson	S8-07	W-379 (CSB) Project File	S8-06
M. F. Nicol	S2-48	FHAVS	G1-50		

Subject: MHM Commercial Grade Item Dedication Testing – Belhaven Labs

System: CSB MCO Handling Machine (MHM)	Equipment No.: CR-2
Location: Belhaven Labs, Kennewick WA	Survey Item: N/A
Reference: Contract 2717 Release 3	
Person Contacted: Jeff Cadick, Belhaven Quality Assurance	

Report:

On March 2, 2000, a supplier performance monitoring surveillance was performed at Belhaven Laboratories, Kennewick, Washington. This surveillance was performed to review testing documentation for items completed under Contract 2717 Release 3, "CGI Bench Testing of Electrical Components." Nineteen (19) attributes were reviewed at the vendor's facility; fourteen (14) of the items were found to be satisfactory while the remaining five (5) were considered to be not applicable (N/A). (No deficiencies identified)

The attributes reviewed during this surveillance included use of current approved revision of test procedures, control of changes to the test procedures (approved redlines), documentation of test information and results on the test procedure, verification of test instrument calibration, use of status indicators, sign-off by the test performer, the Buyer's test engineer and Design Authority, and preliminary packaging prior to shipment

All testing documentation for the twenty-six (26) test specimens had been completed with all information recorded and sign-offs completed. Some of the tested items were wrapped and sealed in plastic along with the vendor's status indicator, while the remainder were staged for wrapping. The Buyer's status indicators (Conditional Accept envelopes) were with the parts and contained copies of the receiving inspection plans used for each item. The vendor is including a Certificate of Conformance signed by the Company President for the tested items.

The vendor's test facility was neat and well organized. The Buyer's material was identified and segregation from other material in the laboratory facility. There are a number of items which remain to be tested. Field testing (in-situ) has been initiated so that some test equipment has been moved to the field to support this testing. Some of the bench testing will not be able to proceed until the test equipment is returned to the lab.

The vendor's representative was helpful and provided all required information upon request. Results of the surveillance were discussed with the vendor's QA Manager upon completion of the surveillance (exit briefing).

[Note: This is the third surveillance performed on Contract 2717 Release 3. Previous surveillances: 1K-FY00-059, -067.]

Performed By: T.Z. Anderson		Concurred By: K. Napora	
Signature	3/6/00 Date	Signature	3/7/00 Date

SURVEILLANCE CHECKLIST

SURVEILLANCE NUMBER 1K-FY00-085 TITLE MHM COMMERCIAL GRADE ITEM (CGI) TESTING - BELHAVEN

Page 1 of 4 DATE 03/02/00 PREPARED BY T.Z. Anderson Rev. 0 PERFORMED BY T.Z. Anderson 3/9/00

SUBJECT/ACTIVITY REQUIREMENT REFERENCE	EVIDENCE EXAMINED/ PERSONNEL CONTACTED	OBSERVATIONS/COMMENTS	COMPLY		
			YES	NO	N/A
This surveillance is intended to review Belhaven's performance of testing in accordance with Contract 2717 Release 3 SOW (Rev 1, 1/20/00) and various Buyer provided CGI testing procedures.	Belhaven contact: Jeff Cadick, QA	3/2/00			
WORK SCOPE (Section 3)					
1. Items failing inspection/testing shall be documented on the testing facility's deficiency form and forwarded to the Buyer's representative for disposition. (3.c)		None			X
2. Test anomalies shall be documented. (3.d)		None			X
3. Inspections or tests beyond the capability of the testing facility may be subcontracted to qualified sub-vendors that are approved for the work activity. (3.e)		None			X
4. Test procedures will be provided by the Buyer. (3.f) Note: Changes to procedures must be approved by the Buyer's representative.	All completed bench test plans. See table listing.	Acceptance signature by Buyer's test engineer and DA. Copy of original used to start multiple testing using same test plan.	X		
DELIVERABLES (Section 4)					
5. The Contractor will provide a complete, certified test report for each component or family of components.	Certificate of Compliance. Completed test plans.	CoC signed by Company President Test plans signed by tester.	X		
6. Packaging of returned items shall prevent dirt, moisture, or other foreign matter from contaminating or damaging the components, thus maintaining the validity of the calibration/testing.	All completed bench test items. See table listing.	Being prepared for shipment to Buyer.	X		
CONFIGURATION MANAGEMENT (Section 11)					

SURVEILLANCE CHECKLIST

SURVEILLANCE NUMBER 1K-FY00-085 TITLE MHM COMMERCIAL GRADE ITEM (CGI) TESTING - BELHAVEN

Page 2 of 4 DATE 03/02/00 PREPARED BY T.Z. Anderson Rev. 0 PERFORMED BY T.Z. Anderson

SUBJECT/ACTIVITY REQUIREMENT REFERENCE	EVIDENCE EXAMINED/ PERSONNEL CONTACTED	OBSERVATIONS/COMMENTS	COMPLY		
			YES	NO	N/A
7. Parts may not be substituted without Buyer's approval. All components and accompanying documentation delivered to the Contractor shall be maintained together and returned to the Buyer.		No part substituted.			X
TRAINING (Section 12)					
8. Contractor's personnel are required to have documented qualifications, experience, and training to perform bench testing of electrical components of this type.	Michael Cram qualification and training file - new employee.	Certified for electrical & instrumentation only as of 2/29/00. Required reading in progress; 6 of 11 completed with due date of 3/15/00. Work to be reviewed by supervision and checked by QA.	X		
STANDARDS (Section 15)					
9. Instruments used for testing shall be calibrated in accordance with calibratin standards and have traceability of primary/secondary standards to NIST. (Also 3.j)		Instruments reviewed during previous surveillances (1K-FY00-0059 & 0067)			X

SURVEILLANCE CHECKLIST

SURVEILLANCE NUMBER 1K-FY00-085 TITLE MHM COMMERCIAL GRADE ITEM (CGI) TESTING - BELHAVEN

Page 3 of 4 DATE 03/02/00 PREPARED BY T.Z. Anderson Rev. 0 PERFORMED BY T.Z. Anderson

SUBJECT/ACTIVITY REQUIREMENT REFERENCE	EVIDENCE EXAMINED/ PERSONNEL CONTACTED	OBSERVATIONS/COMMENTS	COMPLY		
			YES	NO	N/A
TEST PROCEDURES					
10. Test procedure approved by DA.	See attached table		X		
11. Test instrument information recorded.	See attached table		X		
12. CGI item identification information recorded.	See attached table		X		
13. Test performance recorded.	See attached table		X		
14. Summary of Results recorded.	See attached table		X		
15. Notes completed (when applicable).	See attached table		X		
16. Test Engineer/Technician signature.	See attached table		X		
17. Buyer's representatives.	See attached table	LS-1 (9951) just completed, awaiting signature	X		
STATUS INDICATORS					
18. Buyer's Conditional Acceptance Envelope	See attached table		X		
19. Belhaven Green Acceptance Tag	See attached table		X		

SURVEILLANCE CHECKLIST

SURVEILLANCE NUMBER 1K-FY00-085 TITLE MHM COMMERCIAL GRADE ITEM (CGI) TESTING - BELHAVEN

Page 4 of 4 DATE 03/02/00 PREPARED BY T.Z. Anderson Rev. 0 PERFORMED BY T.Z. Anderson

TEST PROCEDURE NO.	CON-1	RLY-1	LS-2	SELSW-1	RLY-3	LS-1	PS-1	LS-1	
CGI Dedication Package #	019	026 023		027	016C	013	009	022	
Item Identification	1 - 10		#1, #2		B8506 B8507	A - F	A, B	9951 9951	
TEST PROCEDURE ATTRIBUTES									
Test procedure approved by DA	X	X	X	X	X	X	X	X	
Test instrument information recorded	X	X	X	X	X	X	X	X	
CGI item identification information recorded	X	X	X	X	X	X	X	X	
Test performance recorded	X	X	X	X	X	X	X	X	
Summary of results recorded	X	X	X	X	X	X	X	X	
Notes (when applicable)	N/A	N/A	N/A	N/A	X	N/A	N/A	N/A	
Test Engineer/ Technician signature	X	X	X	X	X	X	X	X	
Buyer's representatives	X	X	X	X	X	X	X	*	
STATUS INDICATORS									
Conditional Acceptance Envelop	X	X	X	X	X	X	X	X	
Belhaven Green Acceptance Tag	X	X	X	X	X	X	X	X	

* - Testing just completed, awaiting Buyer's representative review and signature (scheduled 3/3/00).

SPENT NUCLEAR FUEL PROJECT QUALITY ASSURANCE SURVEILLANCE REPORT

DATE: March 14, 2000	SR# 1K-FY00-091	Page 1 of 1

Copies To:					
D. L. Anderson	S7-41	K. Napora	S2-48	SNF Project Files	R3-11
T. Z. Anderson	B4-68	R. P. Ruth	R3-11	Surveillance File	S2-48
A. S. Daughtridge	R3-86	C.E. Swenson	S8-07	W-379 (CSB) Project File	S8-06
M. F. Nicol	S2-48	FHAVS	G1-50		

Subject: MHM Commercial Grade Item Dedication Testing – Belhaven Labs

System: CSB MCO Handling Machine (MHM)	Equipment No.: CR-2
Location: Belhaven Labs, Kennewick WA	Survey Item: N/A
Reference: Contract 2717 Release 3 and 4	
Person Contacted: Jeff Cadick, Belhaven Quality Assurance	

Report:

On March 13, 2000, a supplier performance monitoring surveillance was performed at Belhaven Laboratories, Kennewick, Washington. This surveillance was performed to review bench and in-situ testing documentation for items completed under Contract 2717 Release 3, "CGI Bench Testing of Electrical Components," and Release 4, "In-Situ Testing." Nineteen (19) attributes were reviewed at the vendor's facility; fifteen (15) of the items were found to be satisfactory while the remaining four (4) were considered to be not applicable (N/A). (No deficiencies identified)

The attributes reviewed during this surveillance included use of current approved revision of test procedures, control of changes to the test procedures (approved redlines and revision log), documentation of test information and results on the test procedure, use of status indicators, sign-off by the test performer, the Buyer's test engineer and Design Authority.

Testing documentation for the six (6) bench test specimens had been completed with all information recorded and sign-offs completed. The Buyer's status indicators (Conditional Accept envelopes) were with the parts and contained copies of the receiving inspection plans used for each item. The vendor had provided a green acceptance tag to cover all six items. After a review of the test paperwork and a check of the items, a Buyer's green acceptance tag was written for each item. The Buyer's tag will be included with the item when packaged and shipped to the CSB.

Seventeen completed in-situ test plans were reviewed. All vendor attributes were properly completed. Buyer representative initials were missing from several plans (does not invalidate the test results). These missing items were marked using Post-It Notes. The Design Authority will be notified to provide the missing initials prior to final acceptance of the respective in-situ dedication packages.

The vendor's test facility was neat and well organized. The Buyer's material was identified and segregation from other material in the laboratory facility. The vendor's representative was helpful and provided all required information upon request. Results of the surveillance were discussed with the vendor's QA Manager upon completion of the surveillance (exit briefing).

[Note: This is the fourth surveillance performed on Contract 2717 Release 3 and 4. Previous surveillances: 1K-FY00-059, -067, -085.]

Performed By: T.Z. Anderson	Concurred By: K. Napora
Signature: T. Z. Anderson 3/14/00	Signature: Karen Napora 3/15/00
Date	Date

SURVEILLANCE CHECKLIST

SURVEILLANCE NUMBER 1K-FY00-091 TITLE MHM COMMERCIAL GRADE ITEM (CGI) TESTING - BELHAVEN

Page 1 of 5 DATE 03/13/00 PREPARED BY T.Z. Anderson Rev. 0 PERFORMED BY T.Z. Anderson 3/14/00

SUBJECT/ACTIVITY REQUIREMENT REFERENCE	EVIDENCE EXAMINED/ PERSONNEL CONTACTED	OBSERVATIONS/COMMENTS	COMPLY		
			YES	NO	N/A
This surveillance is intended to review Belhaven's performance of testing in accordance with Contract 2717 Release 3 SOW (Rev 1, 1/20/00) and various Buyer provided CGI testing procedures.	Belhaven contact: Jeff Cadick, QA	3/13/00			
WORK SCOPE (Section 3)					
1. Items failing inspection/testing shall be documented on the testing facility's deficiency form and forwarded to the Buyer's representative for disposition. (3.c)	NCR BEL 00-01 Contactor 044-4, Model # 3TF4411-0AK6	NCR issued 3/6/00 and transmitted to Buyer representative	X		
2. Test anomalies shall be documented. (3.d)	NCR BEL 00-01	NCR issued 3/6/00	X		
3. Inspections or tests beyond the capability of the testing facility may be subcontracted to qualified sub-vendors that are approved for the work activity. (3.e)		None			X
4. Test procedures will be provided by the Buyer. (3.f) Note: Changes to procedures must be approved by the Buyer's representative.	See table for test plans reviewed	All changes to bench and in-situ tests have been properly approved	X		
DELIVERABLES (Section 4)					
5. The Contractor will provide a complete, certified test report for each component or family of components.	See table for test plans reviewed		X		
6. Packaging of returned items shall prevent dirt, moisture, or other foreign matter from contaminating or damaging the components, thus maintaining the validity of the calibration/testing.		Items reviewed not ready for shipment			X

SURVEILLANCE CHECKLIST

SURVEILLANCE NUMBER 1K-FY00-091 TITLE MHM COMMERCIAL GRADE ITEM (CGI) TESTING - BELHAVEN

Page 2 of 5 DATE 03/13/00 PREPARED BY T.Z. Anderson Rev. 0 PERFORMED BY T.Z. Anderson

SUBJECT/ACTIVITY REQUIREMENT REFERENCE	EVIDENCE EXAMINED/ PERSONNEL CONTACTED	OBSERVATIONS/COMMENTS	COMPLY		
			YES	NO	N/A
CONFIGURATION MANAGEMENT (Section 11)					
7. Parts may not be substituted without Buyer's approval. All components and accompanying documentation delivered to the Contractor shall be maintained together and returned to the Buyer.		None			X
TRAINING (Section 12)					
8. Contractor's personnel are required to have documented qualifications, experience, and training to perform bench testing of electrical components of this type.	Michael Cram	Required reading in progress. Required to be completed by 3/15/00.	X		
STANDARDS (Section 15)					
9. Instruments used for testing shall be calibrated in accordance with calibratin standards and have traceability of primary/secondary standards to NIST. (Also 3.j)	See test plans	Test instruments identified on test plans. Test instruments reviewed previously.	X		

SURVEILLANCE CHECKLIST

SURVEILLANCE NUMBER 1K-FY00-091 TITLE MHM COMMERCIAL GRADE ITEM (CGI) TESTING - BELHAVEN

Page 3 of 5 DATE 03/13/00 PREPARED BY T.Z. Anderson Rev. 0 PERFORMED BY T.Z. Anderson

SUBJECT/ACTIVITY REQUIREMENT REFERENCE	EVIDENCE EXAMINED/ PERSONNEL CONTACTED	OBSERVATIONS/COMMENTS	COMPLY		
			YES	NO	N/A
TEST PROCEDURES					
10. Test procedure approved by DA.	See attached table		X		
11. Test instrument information recorded.	See attached table		X		
12. CGI item identification information recorded.	See attached table		X		
13. Test performance recorded.	See attached table		X		
14. Summary of Results recorded.	See attached table		X		
15. Notes completed (when applicable).	See attached table		X		
16. Test Engineer/Technician signature.	See attached table		X		
17. Buyer's representatives.	See attached table	A few initials random missing. Marked. Does not invalidate testing.	X		
STATUS INDICATORS					
18. Buyer's Conditional Acceptance Envelope	See attached table	Bench tested items only	X		
19. Belhaven Green Acceptance Tag	See attached table	Bench tested items only	X		

SURVEILLANCE CHECKLIST

SURVEILLANCE NUMBER 1K-FY00-091 TITLE MHM COMMERCIAL GRADE ITEM (CGI) TESTING - BELHAVEN

Page 4 of 5 DATE 03/13/00 PREPARED BY T.Z. Anderson Rev. 0 PERFORMED BY T.Z. Anderson

TEST PROCEDURE NO.	CON-1	IST-LS-2	IST	IST-LC-1	IST	IST	IST-LS-1	IST-SelSw-2
CGI Dedication Package #	044	007	003B	016A	003C	003A	011	032
Item Identification	1,2,3,5 ,6,7 [4**]	LFTSLP1AY LFTSLP1AX LFTSLP2AY LFTSLP2AX	1X 1Y	LCMHR1X LCMHR1Y LCMHR2X LCMHR2Y	PLS2, OM PLS1, OM	RSVMGHX RSVMGHY	LFPHFRX FLPHFRY	Mode Selector Switch
TEST PROCEDURE ATTRIBUTES								
In-situ test revision log	N/A	X	*	X	*	*	X	X
Test procedure approved by DA	X	X	X	X	X	X	X	X
Test instrument information recorded	X	X	X	X	X	X	X	X
CGI item identification information recorded	X	X	X	X	X	X	X	X
Test performance recorded	X	X	X	X	X	X	X	X
Summary of results recorded	X	X	X	X	X	X	X	X
Notes (when applicable)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Test Engineer/ Technician signature	X	X	X	X	X	X	X	X
Buyer's representatives	X	X	X	X	X	X	X	X

SURVEILLANCE CHECKLIST

SURVEILLANCE NUMBER 1K-FY00-091 TITLE MHM COMMERCIAL GRADE ITEM (CGI) TESTING - BELHAVEN

Page 5 of 5 DATE 03/13/00 PREPARED BY T.Z. Anderson Rev. 0 PERFORMED BY T.Z. Anderson

STATUS INDICATORS								
Conditional Acceptance Envelope	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Belhaven Green Acceptance Tag	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Buyer's Green Acceptance Tag	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A

* - Buyer's representative initials missing.
** - 044-4 failed one test attribute. NCR BEL 00-01 issued to Buyer.

SPENT NUCLEAR FUEL PROJECT QUALITY ASSURANCE SURVEILLANCE REPORT

DATE: March 22, 2000	SR# 1K-FY00-101	Page 1 of 1

Copies To:

D. L. Anderson	S7-41	K. Napora	S2-48	SNF Project Files	R3-11
T. Z. Anderson	B4-68	R. P. Ruth	R3-11	Surveillance File	S2-48
A. S. Daughtridge	R3-86	C.E. Swenson	S8-07	W-379 (CSB) Project File	S8-06
M. F. Nicol	S2-48	FHAVS	G1-50		

Subject: MHM Commercial Grade Item Dedication Testing – Belhaven Labs

System: CSB MCO Handling Machine (MHM)	**Equipment No.:** CR-2
Location: *Belhaven Labs, Kennewick WA*	***Survey Item:*** *N/A*
Reference: Contract 2717 Release 3 and 4	
Person Contacted: Jeff Cadick, Belhaven Quality Assurance	

Report:

On March 22, 2000, a supplier performance monitoring surveillance was performed at Belhaven Laboratories, Kennewick, Washington. This surveillance was performed to review bench and in-situ testing documentation for items completed under Contract 2717 Release 3, "CGI Bench Testing of Electrical Components," and Release 4, "In-Situ Testing." Nineteen (19) attributes were reviewed at the vendor's facility; sixteen (16) of the items were found to be satisfactory while the remaining three (3) were considered to be not applicable (N/A). (No deficiencies identified)

The attributes reviewed during this surveillance included: use of current approved revision of test procedures, control of changes to the test procedures (approved redlines and revision log), documentation of test information and results on the test procedure, use of status indicators, sign-off by the test performer, the Buyer's test engineer and Design Authority.

Testing documentation for the twenty-four (24) bench test specimens had been completed with all information recorded and sign-offs completed. The Buyer's status indicators (Conditional Accept envelopes) were with the parts and contained copies of the receiving inspection plans used for each item. The vendor had provided green acceptance stickers for each of the items. After a review of the test paperwork and a check of the items, a Buyer's green acceptance tag was written for each item or group of items. The Buyer's tag will be included with the items when packaged and shipped to the CSB.

Seventeen (17) completed in-situ test plans were reviewed. All vendor attributes were properly completed. Several plans were awaiting the Buyer representative's signature. These signatures will be required prior to test plan acceptance.

The vendor's test facility was neat and well organized. The Buyer's material was segregated from other material in the laboratory facility. The vendor's representative was helpful and provided all required information upon request. Results of the surveillance were discussed with the vendor's QA Manager upon completion of the surveillance (exit briefing).

[Note: This is the fifth surveillance performed on Contract 2717 Release 3 and 4. Previous surveillances: 1K-FY00-059, -067, -085, -091.]

Performed By: T.Z. Anderson	**Concurred By:** K. Napora
Signature: [signature] Date: 3/22/00	Signature: Karen Napora Date: 3/27/00

SURVEILLANCE CHECKLIST

SURVEILLANCE NUMBER 1K-FY00-101 TITLE MHM COMMERCIAL GRADE ITEM (CGI) TESTING - BELHAVEN

Page 1 of 5 DATE 03/22/00 PREPARED BY T.Z. Anderson Rev. 0 PERFORMED BY T.Z. Anderson 3/22/00

SUBJECT/ACTIVITY REQUIREMENT REFERENCE	EVIDENCE EXAMINED/ PERSONNEL CONTACTED	OBSERVATIONS/COMMENTS	COMPLY		
			YES	NO	N/A
This surveillance is intended to review Belhaven's performance of testing in accordance with Contract 2717 Release 3 SOW (Rev 1, 1/20/00), Release 4, and various Buyer provided CGI testing procedures.	Belhaven contact: Jeff Cadick, QA	3/22/00			
WORK SCOPE (Section 3)					
1. Items failing inspection/testing shall be documented on the testing facility's deficiency form and forwarded to the Buyer's representative for disposition. (3.c)	NCR BEL-00-01	Reviewed previously. Awaiting Buyer disposition and return to Belhaven.	X		
2. Test anomalies shall be documented. (3.d)	NCR BEL-00-01	Reviewed previously	X		
3. Inspections or tests beyond the capability of the testing facility may be subcontracted to qualified sub-vendors that are approved for the work activity. (3.e)		None			X
4. Test procedures will be provided by the Buyer. (3.f) Note: Changes to procedures must be approved by the Buyer's representative.	Bench and in-situ test plans	See table	X		
DELIVERABLES (Section 4)					
5. The Contractor will provide a complete, certified test report for each component or family of components.	Bench and in-situ test plans	See table	X		
6. Packaging of returned items shall prevent dirt, moisture, or other foreign matter from contaminating or damaging the components, thus maintaining the validity of the calibration/testing.		Not ready for shipment			X

SURVEILLANCE CHECKLIST

SURVEILLANCE NUMBER 1K-FY00-101 TITLE MHM COMMERCIAL GRADE ITEM (CGI) TESTING - BELHAVEN

Page 2 of 5 DATE 03/22/00 PREPARED BY T.Z. Anderson Rev. 0 PERFORMED BY T.Z. Anderson

SUBJECT/ACTIVITY REQUIREMENT REFERENCE	EVIDENCE EXAMINED/ PERSONNEL CONTACTED	OBSERVATIONS/COMMENTS	COMPLY		
			YES	NO	N/A
CONFIGURATION MANAGEMENT (Section 11)					
7. Parts may not be substituted without Buyer's approval. All components and accompanying documentation delivered to the Contractor shall be maintained together and returned to the Buyer.		None			X
TRAINING (Section 12)					
8. Contractor's personnel are required to have documented qualifications, experience, and training to perform bench testing of electrical components of this type.	Michael Cram	Required reading completed and checked off by J Cadick	X		
STANDARDS (Section 15)					
9. Instruments used for testing shall be calibrated in accordance with calibratin standards and have traceability of primary/secondary standards to NIST. (Also 3.j)	Instruments noted on test plans with tag ID and calibration due date	Instruments reviewed previously	X		

SURVEILLANCE CHECKLIST

SURVEILLANCE NUMBER 1K-FY00-101 TITLE MHM COMMERCIAL GRADE ITEM (CGI) TESTING - BELHAVEN

Page 3 of 5 DATE 03/22/00 PREPARED BY T.Z. Anderson Rev. 0 PERFORMED BY T.Z. Anderson

SUBJECT/ACTIVITY REQUIREMENT REFERENCE	EVIDENCE EXAMINED/ PERSONNEL CONTACTED	OBSERVATIONS/COMMENTS	COMPLY		
			YES	NO	N/A
TEST PROCEDURES					
10. Test procedure approved by DA.	See attached table		X		
11. Test instrument information recorded.	See attached table		X		
12. CGI item identification information recorded.	See attached table		X		
13. Test performance recorded.	See attached table		X		
14. Summary of Results recorded.	See attached table		X		
15. Notes completed (when applicable).	See attached table		X		
16. Test Engineer/Technician signature.	See attached table		X		
17. Buyer's representatives.	See attached table		X		
STATUS INDICATORS					
18. Buyer's Conditional Acceptance Envelope	See attached table		X		
19. Belhaven Green Acceptance Tag	See attached table		X		

SURVEILLANCE CHECKLIST

SURVEILLANCE NUMBER 1K-FY00-101 TITLE MHM COMMERCIAL GRADE ITEM (CGI) TESTING - BELHAVEN

Page 4 of 5 DATE 03/22/00 PREPARED BY T.Z. Anderson Rev. 0 PERFORMED BY T.Z. Anderson

TEST PROCEDURE NO.	020A	LS-1	LS-1	IST	IST	IST	IST	LST-1; LS-1
CGI Dedication Package #	020A	014	004	012; 019A	019B; 048A	048B; 048C	023B; 047	002; 004
Item Identification	1-19, 1-3, 1-6	1,2	1	PESSPX, PESSPY; BLC	TLC; PHHY	PHLY; SSLY	TPXM; TRLC	1; 1
TEST PROCEDURE ATTRIBUTES								
In-situ test revision log	N/A	N/A	N/A	X	X	X	X	X
Test procedure approved by DA	X	X	X	X	X	X	X	X
Test instrument information recorded	X	X	X	X	X	X	X	X
CGI item identification information recorded	X	X	X	X	X	X	X	X
Test performance recorded	X	X	X	X	X	X	X	X
Summary of results recorded	X	X	X	X	X	X	X	X
Notes (when applicable)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Test Engineer/ Technician signature	X	X	X	X	X	X	X	X
Buyer's representatives	X	Missing *	X	X	Missing ;X	X; Missing	X	X

SURVEILLANCE CHECKLIST

SURVEILLANCE NUMBER 1K-FY00-101 TITLE MHM COMMERCIAL GRADE ITEM (CGI) TESTING - BELHAVEN

Page 5 of 5 DATE 03/22/00 PREPARED BY T.Z. Anderson Rev. 0 PERFORMED BY T.Z. Anderson

STATUS INDICATORS								
Conditional Acceptance Envelope	X 3453	X 3449	X 3454	N/A	N/A	N/A	N/A	X 3467; X 70634
Belhaven Green Acceptance Tag	X	X	X	N/A	N/A	N/A	N/A	X
Buyer's Green Acceptance Tag	X	X	X	N/A	N/A	N/A	N/A	X

* - Buyer's representative signature missing, DA notified

SPENT NUCLEAR FUEL PROJECT QUALITY ASSURANCE SURVEILLANCE REPORT

DATE: March 22, 2000	SR# 1K-FY00-101	Page 1 of 1

Copies To:					
D. L. Anderson	S7-41	K. Napora	S2-48	SNF Project Files	R3-11
T. Z. Anderson	B4-68	R. P. Ruth	R3-11	Surveillance File	S2-48
A. S. Daughtridge	R3-86	[redacted]	[redacted]	W-379 (CSB) Project File	S8-06
M. F. Nicol	S2-48	FHAVS	G1-50		

Subject: MHM Commercial Grade Item Dedication Testing – Belhaven Labs

System: CSB MCO Handling Machine (MHM)	**Equipment No.:** CR-2
Location: Belhaven Labs, Kennewick WA	**Survey Item:** N/A
Reference: Contract 2717 Release 3 and 4	
Person Contacted: Jeff Cadick, Belhaven Quality Assurance	

Report:

On March 22, 2000, a supplier performance monitoring surveillance was performed at Belhaven Laboratories, Kennewick, Washington. This surveillance was performed to review bench and in-situ testing documentation for items completed under Contract 2717 Release 3, "CGI Bench Testing of Electrical Components," and Release 4, "In-Situ Testing." Nineteen (19) attributes were reviewed at the vendor's facility; sixteen (16) of the items were found to be satisfactory while the remaining three (3) were considered to be not applicable (N/A). (No deficiencies identified)

The attributes reviewed during this surveillance included: use of current approved revision of test procedures, control of changes to the test procedures (approved redlines and revision log), documentation of test information and results on the test procedure, use of status indicators, sign-off by the test performer, the Buyer's test engineer and Design Authority.

Testing documentation for the twenty-four (24) bench test specimens had been completed with all information recorded and sign-offs completed. The Buyer's status indicators (Conditional Accept envelopes) were with the parts and contained copies of the receiving inspection plans used for each item. The vendor had provided green acceptance stickers for each of the items. After a review of the test paperwork and a check of the items, a Buyer's green acceptance tag was written for each item or group of items. The Buyer's tag will be included with the items when packaged and shipped to the CSB.

Seventeen (17) completed in-situ test plans were reviewed. All vendor attributes were properly completed. Several plans were awaiting the Buyer representative's signature. These signatures will be required prior to test plan acceptance.

The vendor's test facility was neat and well organized. The Buyer's material was segregated from other material in the laboratory facility. The vendor's representative was helpful and provided all required information upon request. Results of the surveillance were discussed with the vendor's QA Manager upon completion of the surveillance (exit briefing).

[Note: This is the fifth surveillance performed on Contract 2717 Release 3 and 4. Previous surveillances: 1K-FY00-059, -067, -085, -091.]

Performed By: T.Z. Anderson		Concurred By: K. Napora	
Signature	Date 3/22/00	Signature Karen Napora	Date 3/27/00

SNF PROJECT QUALITY ASSURANCE SURVEILLANCE REPORT

DATE: 3-28-2000	SR# 1K-FY00-104	Page 1 of 1

Copies To:					
D. L. Anderson	S7-41	A. S. Daughtridge	R3-86	C. E. Swenson	S8-07
K. Napora	S2-48	M. F. Nicol	S2-48	Surveillance File	S2-48
S. S. Moss	R3-11	R. P. Ruth	R3-11	SNF-CAM(deficient only)	S2-48
SNF Project File	R3-11	CSB Project File	S8-06		

Subject: MHM CGI SUVEILLANCE BELHAVEN LABS (W-379)

System: N/A	Equipment No.: N/A
Location: Canister Storage Building	Survey Item: N/A
Reference: N/A	
Person Contacted: Jeff Cadick (Belhaven)	

Report:

This unscheduled surveillance report documents SNF Project QA review and approval of reports of Commercial Grade Item (CGI) testing of Safety Class components for the MCO Handling Machine (MHM). These reports were reviewed at Belhaven Labs on 3-27-2000. Reports of both bench and in-situ testing were reviewed. In general, the reports were complete and acceptable with the following exceptions.

1) On a few reports, textual changes and corrections were initialed, but not dated. Some these were corrected by the individual who made the change or correction. The others were flagged and left for correction.

2) On one test report the instrument ID number and calibration due date was not filled in for one item of M&TE. This was on the second test report of a set of two identical components test one after the other. The missing information was recorded on the first test report. The second test report was completed by the individual who performed the test, and was approved.

Note, some of the textual changes and corrections, and signatures on the test reports were made in colored inks. However, the colors used produce legible photocopies.

Performed By: S. Scott Moss		Concurred By: K. Napora	
Stephen Scott Moss	4-3-2000	Karen Napora	4-6-00
Signature	Date	Signature	Date

Section 4
Test Equipment Calibration Records

Belhaven
Applied Technologies **Customer** Seeco Electric

Certificate of Calibration

Tag 029E/009 **Model** 6106 **Manufacturer** PROTO

Instrument Torque Wrench **Serial No** 5239875

Calibration traceable to the National Institute of Standards and Technology in accordance with ANSI- Z540.1 has been accomplished on the above-named instrument by comparison with standards maintained by Belhaven. The accuracy and stability of all standards maintained by Belhaven are traceable to national standards maintained by the National Institute of Standards and Technology in Washington, D.C. and Boulder, Colorado.

Temperature at Calibration:	70F	
Accuracy of Instrument	4% CW	FS
Calibrated Range:	0-36	in lbs

Calibration Report No. **00-068**

Date Due: **1/13/2001**

Test Equipment

BAT-072

Calibrated by: [signature] 1/13/00

Certified by: [signature]
Quality Assurance Manager

QA RECO[illegible]

Belhaven
Applied Technologies **Customer** BAT

Certificate of Calibration

Tag BAT-092 **Model** L1010 **Manufacturer** Staco Energy Products

Instrument Power Source **Serial No** 8232

Calibration traceable to the National Institute of Standards and Technology in accordance with ANSI- Z540.1 has been accomplished on the above-named instrument by comparison with standards maintained by Belhaven. The accuracy and stability of all standards maintained by Belhaven are traceable to national standards maintained by the National Institute of Standards and Technology in Washington, D.C. and Boulder, Colorado.

Temperature at Calibration:	68 F	
Accuracy of Instrument	See report	
Calibrated Range:	140	V

Calibration Report No. **BEL99-100**

Date Due: **4/6/2000**

Test Equipment

Prema Multi-Function Meter S/N10012

Calibrated by: _____ 4-6-99

Certified by: _____ 4-9-99
Quality Assurance Manager

ORIGINAL COPY

Belhaven Calibration Data Sheet

Report Number BEL99-100

Tag No	BAT-092
Instrument Type	Power Source
Manufacturer	Staco Energy Products
Serial No	8232
Model	L1010
Cal Due Date	4/6/2000
System	
Special Instructions	

Units:	V
F.S. Accuracy	See report
F.S. Accuracy	
Full Scale	140
Permitted Variation	0.0000
Cal Temp	68 F

Cal Point	As Found	As Left	% Full Scale Accuracy
0	0.01557	0.01557	0.0111
10	9.963	9.963	-0.0264
20	19.923	19.923	-0.0550
30	31.115	31.115	0.7964
40	41.722	41.722	1.2300
50	51.04	51.04	0.7429
60	61.82	61.82	1.3000
70	71.50	71.50	1.0714
80	81.59	81.59	1.1357
90	91.69	91.69	1.2071
100	100.92	100.92	0.6571
110	110.49	110.49	0.3500
120	120.18	120.18	0.1286
130	129.81	129.81	-0.1357
140	140.42	140.42	0.3000

Test Equipment: Prema Multi-Function Meter S/N10012

Calibration Performed By: _____ Date: 4-6-99

ORIGINAL

Belhaven
Applied Technologies **Customer** Belhaven

Certificate of Calibration

Tag BAT-105 **Model** 4363 **Manufacturer** Leeds & Northrup

Instrument Resistor / Shunt **Serial No** 1656470

Calibration traceable to the National Institute of Standards and Technology in accordance with ANSI- Z540.1 has been accomplished on the above-named instrument by comparison with standards maintained by Belhaven. The accuracy and stability of all standards maintained by Belhaven are traceable to national standards maintained by the National Institute of Standards and Technology in Washington, D.C. and Boulder, Colorado.

Temperature at Calibration:	68 F	
Accuracy of Instrument	0.0350%	
Calibrated Range:	0.001	ohms

Calibration Report No. **BEL99-378**

Date Due: **5/25/2000**

Test Equipment

Prema Multi-Function Meter S/N10012
Isotek CS-10 Current Shunt, S/N: H121776 (BAT-104)

Calibrated by: Sean S. for GPS 5-25-99

Certified by: [signature] 5-25-99
Quality Assurance Manager

ORIGINAL COPY

Belhaven Calibration Data Sheet

Report Number
BEL99-378

Tag No	BAT-105
Instrument Type	Resistor / Shunt
Manufacturer	Leeds & Northrup
Serial No	1656470
Model	4363
Cal Due Date	5/25/2000
System	
Special Instructions	

Units:	ohms	
F.S. Accuracy	0.0350%	
F.S. Accuracy		
Full Scale	0.001	
Permitted Variation	0.0000	ohms
Cal Temp	68 F	

Cal Point	As Found	As Left	% Full Scale Accuracy
0.001	0.00099965	0.00099965	-0.0350

Test Equipment: Prema Multi-Function Meter S/N10012
Isotek CS-10 Current Shunt, S/N: H121776 (BAT-104)

Calibration Performed By: [signature] for GPS Date: May 25, 1999

ORIGINAL

Belhaven
Applied Technologies **Customer** Belhaven Applied Tech.

Certificate of Calibration

Tag BAT-124 **Model** 3457A **Manufacturer** Hew lett Packard

Instrument Multimeter **Serial No** 3114A14701

Calibration traceable to the National Institute of Standards and Technology in accordance with ANSI- Z540.1 has been accomplished on the above-named instrument by comparison with standards maintained by Belhaven. The accuracy and stability of all standards maintained by Belhaven are traceable to national standards maintained by the National Institute of Standards and Technology in Washington, D.C. and Boulder, Colorado.

Temperature at Calibration:	69F
Accuracy of Instrument	See data sht.
Calibrated Range:	Full

Calibration Report No. **BEL99-647**

Date Due: **7/30/2000**

Test Equipment

Prema Multi-Function Meter S/N10012

Calibrated by: _____ 7-30-99

Certified by: _____ 7-30-99
Quality Assurance Manager

COPY

ORIGINAL

PERFORMANCE TEST CARD
90 DAY LIMITS

Hewlett-Packard Model 3457A
Digital Multimeter
Serial Number 3144A14701

Test Performed by CAPS
Date 2-27-99
Reference Temperature 69

DC VOLTAGE TEST

Step#	Input to 3457A	Set-Up and Configuration	High Limit	Reading	Low Limit	Test Pass	Test Fail
	OFFSET TEST						
1	Short	300 V Range	+ 000.0007 V	000.0002	- 000.0007 V	✓	
2	Short	30 V Range	+ 00.00020 V	00.00002	- 00.00020 V	✓	
3	Short	3 V Range	+ 0.000007 V	0.000001	- 0.000007 V	✓	
4	Short	300 mV Range	+ 000.0040 mV	000.0015	- 000.0040 mV	✓	
5	Short	30 mV Range	+ 00.00385 mV	00.00049	- 00.00385 mV	✓	
	GAIN TEST						
6	30 mV	30 mV Range	+ 30.00505 mV	30.0024	+ 29.99495 mV	✓	
7	300 mV	300 mV Range	+ 300.0115 mV	299.9992	+ 299.9885 mV	✓	
8	3 V	3 V Range	+ 3.000058 V	3.000020	+ 2.999942 V	✓	
9	30 V	30 V Range	+ 30.00125 V	30.0009	+ 29.99875 V	✓	
10	300 V	300 V Range	+ 300.0157 V	300.0020	+ 299.9843 V	✓	
	LINEARITY TEST						
11	3 V	3 V Range	+ 3.000058 V	2.999992	+ 2.999942 V	✓	
12	2 V	3 V Range	+ 2.000041 V	1.999992	+ 1.999959 V	✓	
13	1 V	3 V Range	+ 1.000024 V	1.000002	- 0.999976 V	✓	
14	- 1 V	3 V Range	- 0.999976 V	-1.000000	- 1.000024 V	✓	
15	- 2 V	3 V Range	- 1.999959 V	-1.999978	- 2.000041 V	✓	
16	- 3 V	3 V Range	- 2.999942 V	-2.999973	- 3.000058 V	✓	

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PERFORMANCE TEST CARD
90 DAY LIMITS

Hewlett-Packard Model 3457A
Digital Multimeter
Serial Number 3114A14701

Test Performed by GPS
Date 7-27-99
Reference Temperature 64

AC VOLTAGE TEST

Step#	Input to 3457A	Set-Up and Configuration	High Limit	Reading	Low Limit	Test Pass	Test Fail
1	Set the 3457A to the AC Voltage Function and run the AUTO-CAL 2 routine.						
	GAIN TEST						
2	30mV, 1KHz	30 mVAC Range	30.05020 mV	30.00047	29.94980 mV	V	
3	300mV, 1KHz	300 mVAC Range	300.5020 mV	299.9950	299.4980 mV	V	
4	1V, 1KHz	3 VAC Range	1.002420 V	.99933	0.997580 V	V	
5	2V, 1KHz	3 VAC Range	2.003720 V	2.000666	1.996280 V	V	
6	3V, 1KHz	3 VAC Range	3.005100 V	3.000553	2.994900 V	V	
7	30V, 1KHz	30 VAC Range	30.05020 V	30.00153	29.94980 V	V	
8	300V, 1KHz	300 VAC Range	300.6820 V	299.9850	299.3180 V	V	
9	30V, 1KHz	300 VAC Range	030.1690 V	030.0011	029.8310 V	V	
10	3V, 1KHz	30 VAC Range	03.01510 V	03.00008	02.98490 V	V	
11	300mV, 1KHz	3 VAC Range	0.301510 V	0.300159	0.298490 V	V	
12	30mV, 1KHz	300 mVAC Range	030.1510 mV	030.0237	029.8490 mV	V	
13	Set the 3457A to AC Fast Response (ACBAND > 400)						
	FREQUENCY RESPONSE TEST						
14	30mV, 1MHz	300 mVAC Range	039.6880 mV	*028.9272	020.3120 mV	V	
15	30mV, 300KHz	300 mVAC Range	031.9180 mV	029.5891	028.0820 mV	V	
16	30mV, 100KHz	300 mVAC Range	030.4080 mV	*029.9054	029.5920 mV	V	
17	30mV, 20KHz	300 mVAC Range	030.1510 mV	029.9098	029.8490 mV	V	
18	30mV, 6.5KHz	300 mVAC Range	030.1510 mV	029.9516	029.8490 mV	V	
19	30mV, 400Hz	300 mVAC Range	030.1510 mV	029.9022	029.8490 mV	V	

Page 69

PERFORMANCE TEST CARD
90 DAY LIMITS

Hewlett-Packard Model 3457A
Digital Multimeter
Serial Number 3114A14701

Test Performed by 685
Date 7-27-94
Reference Temperature 69

AC VOLTAGE TEST (Cont'd)

Step#	Input to 3457A	Set-Up and Configuration	High Limit	Reading	Low Limit	Test Pass	Test Fail
	FREQUENCY RESPONSE TEST (Cont'd)						
20	300mV,1MHz	300 mVAC Range	337.1200 mV	306.3303	262.8800 mV	V	
21	300mV,300KHz	300 mVAC Range	310.4500 mV	297.9299	289.5500 mV	V	
22	300mV,100KHz	300 mVAC Range	302.1900 mV	299.4006	297.8100 mV	V	
23	300mV,20KHz	300 mVAC Range	300.5320 mV	299.9363	299.4680 mV	V	
24	300mV,6.5KHz	300 mVAC Range	300.5320 mV	299.7964	299.4680 mV	V	
25	300mV,400Hz	300 mVAC Range	300.5320 mV	299.8031	299.4680 mV	V	
26	300mV,1MHz	3 VAC Range	0.396880 V	0.278654	0.203120 V	V	
27	300mV,300KHz	3 VAC Range	0.319180 V	0.294486	0.280820 V	V	
28	300mV,100KHz	3 VAC Range	0.304080 V	0.296728	0.295920 V	V	
29	300mV,20KHz	3 VAC Range	0.301510 V	0.299894	0.298490 V	V	
30	300mV,6.5KHz	3 VAC Range	0.301510 V	0.299956	0.298490 V	V	
31	300mV,400Hz	3 VAC Range	0.301510 V	0.299943	0.298490 V	V	
32	3V,1MHz	3 VAC Range	3.371200 V	2.977694	2.628800 V	V	
33	3V,300KHz	3 VAC Range	3.104500 V	2.986486	2.895500 V	V	
34	3V,100KHz	3 VAC Range	3.021900 V	3.002223	2.978100 V	V	
35	3V,20KHz	3 VAC Range	3.005320 V	3.003210	2.994680 V	V	
36	3V,6.5KHz	3 VAC Range	3.005320 V	3.001577	2.994680 V	V	
37	3V,400Hz	3 VAC Range	3.005320 V	3.000979	2.994680 V	V	

PERFORMANCE TEST CARD
90 DAY LIMITS

Hewlett-Packard Model 3457A
Digital Mutimeter
Serial Number 3146A14701

Test Performed by GPS
Date 2-27-99
Reference Temperature 69

2-WIRE OHMS TEST

Step#	Input to 3457A	Set-Up and Configuration	High Limit	Reading	Low Limit	Test Pass	Test Fail
	OFFSET TEST						
1	Short	30 Ohm Range	+ 00.20335 ohm	00.01407	- 00.20335 ohm	✓	
2	Short	300 Ohm Range	+ 000.2035 ohm	000.0137	- 000.2035 ohm	✓	
3	Short	3 KOhm Range	+ 0.000207 Kohm	0.00001	- 0.000207 Kohm	✓	
4	Short	30 KOhm Range	+ 00.00027 Kohm	00.00003	- 00.00027 Kohm	✓	
5	Short	300 KOhm Range	+ 000.0010 Kohm	00.00001 0.000001	- 000.0010 Kohm	✓	
6	Short	3 MOhm Range	+ 0.000014 Mohm	000.0001	- 0.000014 Mohm	✓	
7	Short	30 MOhm Range	+ 00.00083 Mohm	00.00001	- 00.00083 Mohm	✓	
	GAIN TEST						
8	30 Ohm	30 Ohm Range	30.20530 ohm	30.00174	29.79470 ohm	✓	
9	300 Ohm	300 Ohm Range	300.2170 ohm	300.0125	299.7830 ohm	✓	
10	3 KOhm	3 KOhm Range	3.000312 Kohm	87.999952	2.999688 Kohm	✓	
11	30 KOhm	30 KOhm Range	30.00132 Kohm	29.99998	29.99868 Kohm	✓	
12	300 KOhm	300 KOhm Range	300.0130 Kohm	300.0080	299.9870 Kohm	✓	
13	3 MOhm	3 MOhm Range	3.000179 Mohm	3.00055	2.999821 Mohm	✓	
14	30 MOhm	30 MOhm Range	30.00833 Mohm	30.00028	29.99167 Mohm	✓	

PERFORMANCE TEST CARD
90 DAY LIMITS

Hewlett-Packard Model 3457A
Digital Multimeter
Serial Number 3114A14701

Test Performed by GAS
Date 7-22-94
Reference Temperature 69

4-WIRE OHMS TEST

Step#	Input to 3457A	Set-Up and Configuration	High Limit	Reading	Low Limit	Test Pass	Test Fail
	OFFSET TEST						
1	Short	30 Ohm Range	+ 00.00335 ohm	00,00022	00.00335 ohm	✓	
2	Short	300 Ohm Range	+ 000.0035 ohm	000,0003	- 000.0035 ohm	✓	
3	Short	3 KOhm Range	+ 0.000007 Kohm	0.000001	- 0.000007 Kohm	✓	
4	Short	30 KOhm Range	+ 00.00007 Kohm	00.00001	- 00.00007 Kohm	✓	
5	Short	300 KOhm Range	+ 000.0008 Kohm	000.0001	- 000.0008 Kohm	✓	
6	Short	3 MOhm Range	+ 0.000014 Mohm	0.000001	- 0.000014 Mohm	✓	
7	Short	30 MOhm Range	+ 00.00083 Mohm	00.00001	- 00.00083 Mohm	✓	
	GAIN TEST						
8	30 Ohm	30 Ohm Range	30.00530 ohm	29.99967	29.99470 ohm	✓	
9	300 Ohm	300 Ohm Range	300.0170 ohm	299.9999	299.9830 ohm	✓	
10	3 KOhm	3 KOhm Range	3.000112 Kohm	3.000051	2.999888 Kohm	✓	
11	30 KOhm	30 KOhm Range	30.00112 Kohm	30.00091	29.99888 Kohm	✓	
12	300 KOhm	300 KOhm Range	300.0128 Kohm	300.0067	299.9872 Kohm	✓	
13	3 MOhm	3 MOhm Range	3.000179 Mohm	3.000136	2.999821 Mohm	✓	
14	30 MOhm	30 MOhm Range	30.00833 Mohm	30.00409	29.99167 Mohm	✓	

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PERFORMANCE TEST CARD
90 DAY LIMITS

Hewlett-Packard Model 3457A
Digital Mutimeter
Serial Number 3114A14701

Test Performed by 605
Date 7-27-91
Reference Temperature 69

REAR INPUT TESTS (STANDARD INSTRUMENT)

Step#	Input to 3457A	Set-Up and Configuration	High Limit	Reading	Low Limit	Test Pass	Test Fail
	DC VOLTAGE OFFSET TEST (Rear Terminals)						
1	Short	300 V Range	+ 000.0007 V	000.0001	- 000.0007 V	V	
2	Short	30 V Range	+ 00.00020 V	00.00001	- 00.00020 V	V	
3	Short	3 V Range	+ 0.000007 V	0.000001	- 0.000007 V	V	
4	Short	300 mV Range	+ 000.0040 mV	000.0006	- 000.0040 mV	V	
5	Short	30 mV Range	+ 00.00385 mV	00.00110	- 00.00385 mV	V	
	DC CURRENT OFFSET TEST (Rear Terminals)						
6	Open	300 uADCI Range	+ 000.0104 uA	000.0003	- 000.0104 uA	V	
7	Open	3 mADCI Range	+ 0.000104 mA	0.000005	- 0.000104 mA	V	
8	Open	30 mADCI Range	+ 00.00104 mA	00.00003	- 00.00104 mA	V	
9	Open	300 mADCI Range	+ 000.0204 mA	000.0007	- 000.0204 mA	V	
10	Open	3 ADCI Range	+ 0.000604 A	0.000006	0.000604 A	V	
	2-WIRE OHMS OFFSET TEST (Rear Terminals)						
11	Short	30 Ohm Range	+ 00.20335 ohm	00.02341	- 00.20335 ohm	V	
12	Short	300 Ohm Range	+ 000.2035 ohm	000.0227	- 000.2035 ohm	V	
13	Short	3 KOhm Range	+ 0.000207 Kohm	0.000022	0.000207 Kohm	V	
14	Short	30 KOhm Range	+ 00.00027 Kohm	00.00003	- 00.00027 Kohm	V	
15	Short	300 KOhm Range	+ 000.0010 Kohm	000.0001	- 000.0010 Kohm	V	
16	Short	3 MOhm Range	+ 0.000014 Mohm	0.000001	- 0.000014 Mohm	V	
17	Short	30 MOhm Range	+ 00.00083 Mohm	00.00002	00.00083 Mohm	V	

PERFORMANCE TEST CARD
90 DAY LIMITS

Hewlett-Packard Model 3457A
Digital Mutimeter
Serial Number 3114A14701

Test Performed by GPS
Date 7-27-91
Reference Temperature 69

REAR INPUT TESTS (STANDARD INSTRUMENT)

Step#	Input to 3457A	Set-Up and Configuration	High Limit	Reading	Low Limit	Test Pass	Test Fail
	4-WIRE OHMS OFFSET TEST (Rear Terminals)						
18	Short	30 Ohm Range	+ 00.00335 ohm	00.00029	- 00.00335 ohm	V	
19	Short	300 Ohm Range	+ 000.0035 ohm	000.0004	- 000.0035 ohm	V	
20	Short	3 KOhm Range	+ 0.000007 Kohm	0.000001	- 0.000007 Kohm	V	
21	Short	30 KOhm Range	+ 00.00007 Kohm	00.00001	- 00.00007 Kohm	V	
22	Short	300 KOhm Range	+ 000.0008 Kohm	000.0001	- 000.0008 Kohm	V	
23	Short	3 MOhm Range	+ 0.000014 Mohm	0.000001	- 0.000014 Mohm	V	
24	Short	30 MOhm Range	+ 00.00083 Mohm	00.00001	- 00.00083 Mohm	V	

Belhaven
Applied Technologies **Customer** Belhaven Applied Tech

Certificate of Calibration

Tag	BAT-123	**Model**	3457A	**Manufacturer**	Hewlett Packard
Instrument	Voltmeter			**Serial No**	3114A14460

Calibration traceable to the National Institute of Standards and Technology in accordance with ANSI- Z540.1 has been accomplished on the above-named instrument by comparison with standards maintained by Belhaven. The accuracy and stability of all standards maintained by Belhaven are traceable to national standards maintained by the National Institute of Standards and Technology in Washington, D.C. and Boulder, Colorado.

Temperature at Calibration:	69F
Accuracy of Instrument	See Data Sheet
Calibrated Range:	Full

Calibration Report No. **BEL99-646**

Date Due: **7/29/2000**

Test Equipment

Prema Multi-Function Meter S/N10012

Calibrated by: _____

Certified by: L. Caudill 7-29-99
Quality Assurance Manager

ORIGINAL **COPY**

PERFORMANCE TEST CARD
90 DAY LIMITS

Hewlett-Packard Model 3457A
Digital Multimeter
Serial Number 3114A14466

Test Performed by GPS
Date 7-27-99
Reference Temperature 69

DC VOLTAGE TEST

Step#	Input to 3457A	Set-Up and Configuration	High Limit	Reading	Low Limit	Test Pass	Test Fail
	OFFSET TEST						
1	Short	300 V Range	• 000.0007 V	000.0000	· 000.0007 V	✓	
2	Short	30 V Range	+ 00.00020 V	000.00002	00.00020 V	✓	
3	Short	3 V Range	+ 0.000007 V	0.000001	· 0.000007 V	✓	
4	Short	300 mV Range	+ 000.0040 mV	000.0004	· 000.0040 mV	✓	
5	Short	30 mV Range	+ 00.00385 mV	00.00055	· 00.00385 mV	✓	
	GAIN TEST						
6	30 mV	30 mV Range	+ 30.00505 mV	~~30.~~ 29.99547	+ 29.99495 mV	✓	
7	300 mV	300 mV Range	+ 300.0115 mV	~~300.~~ 299.9886	+ 299.9885 mV	✓	
8	3 V	3 V Range	+ 3.000058 V	3.000004	+ 2.999942 V	✓	
9	30 V	30 V Range	+ 30.00125 V	29.99975	+ 29.99875 V	✓	
10	300 V	300 V Range	+ 300.0157 V	299.9987	+ 299.9843 V	✓	
	LINEARITY TEST						
11	3 V	3 V Range	+ 3.000058 V	2.999999	+ 2.999942 V	✓	
12	2 V	3 V Range	+ 2.000041 V	1.999994	+ 1.999959 V	✓	
13	1 V	3 V Range	+ 1.000024 V	1.000000	+ 0.999976 V	✓	
14	· 1 V	3 V Range	· 0.999976 V	-.999997	· 1.000024 V	✓	
15	· 2 V	3 V Range	· 1.999959 V	-1.999998	· 2.000041 V	✓	
16	· 3 V	3 V Range	· 2.999942 V	-2.999992	3.000058 V	✓	

PERFORMANCE TEST CARD
90 DAY LIMITS

Hewlett-Packard Model 3457A
Digital Mutimeter
Serial Number 3114A14460

Test Performed by GPS
Date 7-27-99
Reference Temperature 69

AC VOLTAGE TEST

Step#	Input to 3457A	Set-Up and Configuration	High Limit	Reading	Low Limit	Test Pass	Test Fail
1	Set the 3457A to the AC Voltage Function and run the AUTO-CAL 2 routine.						
	GAIN TEST						
2	30mV,1KHz	30 mVAC Range	30.05020 mV	29.9846	29.94980 mV	V	
3	300mV,1KHz	300 mVAC Range	300.5020 mV	300.0657	299.4980 mV	V	
4	1V,1KHz	3 VAC Range	1.002420 V	.999035	0.997580 V	V	
5	2V,1KHz	3 VAC Range	2.003720 V	1.999245	1.996280 V	V	
6	3V,1KHz	3 VAC Range	3.005100 V	2.998966	2.994900 V	V	
7	30V,1KHz	30 VAC Range	30.05020 V	30.00854	29.94980 V	V	
8	300V,1KHz	300 VAC Range	300.6820 V	300.1317	299.3180 V	V	
9	30V,1KHz	300 VAC Range	030.1690 V	~~30.00903~~ 30.0054 GPS	029.8310 V	V	
10	3V,1KHz	30 VAC Range	03.01510 V	~~2.99955~~ 2.99983 GPS	02.98490 V	V	
11	300mV,1KHz	3 VAC Range	0.301510 V	300.0512 .0299876 GPS	0.298490 V	V	
12	30mV,1KHz	300 mVAC Range	030.1510 mV	~~030.002~~ .0299876 GPS	029.8490 mV	V	
13	Set the 3457A to AC Fast Response (ACBAND > 400)						
	FREQUENCY RESPONSE TEST			maintain Next Higher Range GPS			
14	30mV,1MHz	300 mVAC Range	039.6880 mV	028.9365 ~~30.0551~~ GPS	020.3120 mV	V	
15	30mV,300KHz	300 mVAC Range	031.9180 mV	029.5448 ~~29.6037~~	028.0820 mV	V	
16	30mV,100KHz	300 mVAC Range	030.4080 mV	029.8923 ~~29.9146~~	029.5920 mV	V	
17	30mV,20KHz	300 mVAC Range	030.1510 mV	029.9905 ~~29.9970~~	029.8490 mV	V	
18	30mV,6.5KHz	300 mVAC Range	030.1510 mV	029.9857 ~~29.9867~~	029.8490 mV	V	
19	30mV,400Hz	300 mVAC Range	030.1510 mV	029.9844 ~~29.9843~~	029.8490 mV	V	

PERFORMANCE TEST CARD
90 DAY LIMITS

Hewlett-Packard Model 3457A
Digital Multimeter
Serial Number 3114A14460

Test Performed by GPS
Date 2-27-99
Reference Temperature 69

AC VOLTAGE TEST (Cont'd)

Step#	Input to 3457A	Set-Up and Configuration	High Limit	Reading	Low Limit	Test Pass	Test Fail
	FREQUENCY RESPONSE TEST (Cont'd)						
20	300mV, 1MHz	300 mVAC Range	337.1200 mV	305.6887	262.8800 mV	✓	
21	300mV, 300KHz	300 mVAC Range	310.4500 mV	297.1653	289.5500 mV	✓	
22	300mV, 100KHz	300 mVAC Range	302.1900 mV	299.4375	297.8100 mV	✓	
23	300mV, 20KHz	300 mVAC Range	300.5320 mV	299.9620	299.4680 mV	✓	
24	300mV, 6.5KHz	300 mVAC Range	300.5320 mV	299.8723	299.4680 mV	✓	
25	300mV, 400Hz	300 mVAC Range	300.5320 mV	300.0926	299.4680 mV	✓	
26	300mV, 1MHz	3 VAC Range	0.396880 V	.280261	0.203120 V	✓	
27	300mV, 300KHz	3 VAC Range	0.319180 V	.294341	0.280820 V	✓	
28	300mV, 100KHz	3 VAC Range	0.304080 V	.298527	0.295920 V	✓	
29	300mV, 20KHz	3 VAC Range	0.301510 V	.299921	0.298490 V	✓	
30	300mV, 6.5KHz	3 VAC Range	0.301510 V	.299991	0.298490 V	✓	
31	300mV, 400Hz	3 VAC Range	0.301510 V	.299991	0.298490 V	✓	
32	3V, 1MHz	3 VAC Range	3.371200 V	2.984821	2.628800 V	✓	
33	3V, 300KHz	3 VAC Range	3.104500 V	2.987990	2.895500 V	✓	
34	3V, 100KHz	3 VAC Range	3.021900 V	GPS 3.011627 ~~2.9~~	2.978100 V	✓	
35	3V, 20KHz	3 VAC Range	3.005320 V	3.001270	2.994680 V	✓	
36	3V, 6.5KHz	3 VAC Range	3.005320 V	3.000207	2.994680 V	✓	
37	3V, 400Hz	3 VAC Range	3.005320 V	3.000093	2.994680 V	✓	

PERFORMANCE TEST CARD
90 DAY LIMITS

Hewlett-Packard Model 3457A
Digital Multimeter
Serial Number 3114A14460

Test Performed by CAS
Date 7-27-99
Reference Temperature 69

AC VOLTAGE TEST (Cont'd)

Step#	Input to 3457A	Set-Up and Configuration	High Limit	Reading	Low Limit	Test Pass	Test Fail
	FREQUENCY RESPONSE TEST (Cont'd)						
37	Set the 3457A to AC Slow Response (ACBAND < 400)						
38	3V,100Hz	3 VAC Range	3.008800 V	2.999524	2.991200 V	✓	
39	3V,45Hz	3 VAC Range	3.026800 V	2.999664	2.973200 V	✓	
40	3V,20Hz	3 VAC Range	3.026800 V	2.998490	2.973200 V	✓	
41	300mV,100Hz	300 mVAC Range	300.8800 mV	300.0774	299.1200 mV	✓	
42	300mV,45Hz	300 mVAC Range	302.6800 mV	300.0069	297.3200 mV	✓	
43	300mV,20Hz	300 mVAC Range	302.6800 mV	299.9959	297.3200 mV	✓	

FREQUENCY TEST

Step#	Input to 3457A	Set-Up and Configuration	High Limit	Reading	Low Limit	Test Pass	Test Fail
1	1V,20Hz	3 VAC Range	20.01000 Hz	20.00052	19.99000 Hz	✓	
2	1V,1MHz	3 VAC Range	1.000100 MHz	.9999185	0.999900 MHz	✓	

PERFORMANCE TEST CARD
90 DAY LIMITS

Hewlett-Packard Model 3457A
Digital Mutimeter
Serial Number 3114A14460

Test Performed by BG
Date 1-27-99
Reference Temperature 64

DC CURRENT TEST

Step#	Input to 3457A	Set-Up and Configuration	High Limit	Reading	Low Limit	Test Pass	Test Fail
	OFFSET TEST						
1	Open	300 uADCI Range	+ 000.0104 uA	000.0007	- 000.0104 uA	V	
2	Open	3 mADCI Range	+ 0.000104 mA	0.00012	- 0.000104 mA	V	
3	Open	30 mADCI Range	+ 00.00104 mA	00.00012	- 00.00104 mA	V	
4	Open	300 mADCI Range	+ 000.0204 mA	000.0012	- 000.0204 mA	V	
5	Open	1 ADCI Range	+ 0.000604 A	0.00014	- 0.000604 A	V	
	GAIN TEST						
6	300 uA	300 uADCI Range	300.0704 uA	300.0226	299.9296 uA	V	
7	3 mA	3 mADCI Range	3.000704 mA	3.000131	2.999296 mA	V	
8	30 mA	30 mADCI Range	30.00704 ma	30.00245	29.99296 mA	V	
9	300 mA	300 mADCI Range	300.2304 mA	299.8364	299.7696 mA	V	
10	1 A	1 ADCI Range	1.001304 A	.999422	0.998696 A	F	

AC CURRENT TEST

Step#	Input to 3457A	Set-Up and Configuration	High Limit	Reading	Low Limit	Test Pass	Test Fail
		@ 1 KHz					
	GAIN TEST						
1	30 mA	30 mAACI Range	30.10300 mA	30.00959	29.89700 mA	V	
2	300 mA	300 mAACI Range	301.0300 mA	299.9429	298.9700 mA	V	
3	1 A	1 AACI Range	1.005300 A	.999239	0.994700 A	V	

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PERFORMANCE TEST CARD
90 DAY LIMITS

Hewlett-Packard Model 3457A
Digital Mutimeter
Serial Number 3114A14460

Test Performed by GD
Date 7-27-99
Reference Temperature 69

2-WIRE OHMS TEST

Step#	Input to 3457A	Set-Up and Configuration	High Limit	Reading	Low Limit	Test Pass	Test Fail
	OFFSET TEST						
1	Short	30 Ohm Range	+ 00.20335 ohm	00.00714	00.20335 ohm	V	
2	Short	300 Ohm Range	+ 000.2035 ohm	000.0079	000.2035 ohm	V	
3	Short	3 KOhm Range	+ 0.000207 Kohm	0.000009	0.000207 Kohm	V	
4	Short	30 KOhm Range	+ 00.00027 Kohm	00.00001	00.00027 Kohm	V	
5	Short	300 KOhm Range	+ 000.0010 Kohm	000.0000	000.0010 Kohm	V	
6	Short	3 MOhm Range	+ 0.000014 Mohm	0.000000	0.000014 Mohm	V	
7	Short	30 MOhm Range	+ 00.00083 Mohm	00.00000	00.00083 Mohm	V	
	GAIN TEST						
8	30 Ohm	30 Ohm Range	30.20530 ohm	30.04960	29.79470 ohm	V	
9	300 Ohm	300 Ohm Range	300.2170 ohm	300.0456	299.7830 ohm	V	
10	3 KOhm	3 KOhm Range	3.000312 Kohm	3000.007 ~~300.0134~~	2.999688 Kohm	V	
11	30 KOhm	30 KOhm Range	30.00132 Kohm	29.99978 30.684	29.99868 Kohm	V	
12	300 KOhm	300 KOhm Range	300.0130 Kohm	289.9876	299.9870 Kohm	V	
13	3 MOhm	3 MOhm Range	3.000179 Mohm	2.999921	2.999821 Mohm	V	
14	30 MOhm	30 MOhm Range	30.00833 Mohm	2998862	29.99167 Mohm	V	

PERFORMANCE TEST CARD
90 DAY LIMITS

Hewlett-Packard Model 3457A
Digital Multimeter
Serial Number 3114A14460

Test Performed by GDS
Date 7-22-99
Reference Temperature 69

4-WIRE OHMS TEST

Step#	Input to 3457A	Set-Up and Configuration	High Limit	Reading	Low Limit	Test Pass	Test Fail
	OFFSET TEST						
1	Short	30 Ohm Range	+ 00.00335 ohm	00.00035	- 00.00335 ohm	V	
2	Short	300 Ohm Range	+ 000.0035 ohm	000.0006	- 000.0035 ohm	V	
3	Short	3 KOhm Range	+ 0.000007 Kohm	0.000003	- 0.000007 Kohm	V	
4	Short	30 KOhm Range	+ 00.00007 Kohm	00.00001	- 00.00007 Kohm	V	
5	Short	300 KOhm Range	+ 000.0008 Kohm	000.0000	- 000.0008 Kohm	V	
6	Short	3 MOhm Range	+ 0.000014 Mohm	0.000001	- 0.000014 Mohm	V	
7	Short	30 MOhm Range	+ 00.00083 Mohm	00.00001	- 00.00083 Mohm	V	
	GAIN TEST						
8	30 Ohm	30 Ohm Range	30.00530 ohm	29.99903	29.99470 ohm	V	
9	300 Ohm	300 Ohm Range	300.0170 ohm	300.0081	299.9830 ohm	V	
10	3 KOhm	3 KOhm Range	3.000112 Kohm	2.999949	2.999888 Kohm	V	
11	30 KOhm	30 KOhm Range	30.00112 Kohm	29.99973	29.99888 Kohm	V	
12	300 KOhm	300 KOhm Range	300.0128 Kohm	~~300~~ 299.9999 .1004	299.9872 Kohm	V	
13	3 MOhm	3 MOhm Range	3.000179 Mohm	2.999967	2.999821 Mohm	V	
14	30 MOhm	30 MOhm Range	30.00833 Mohm	29.99839	29.99167 Mohm	V	

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PERFORMANCE TEST CARD
90 DAY LIMITS

Hewlett-Packard Model 3457A
Digital Mutimeter
Serial Number 3114A14460

Test Performed by GRS
Date 7-27-99
Reference Temperature 69

REAR INPUT TESTS (STANDARD INSTRUMENT)

Step#	Input to 3457A	Set-Up and Configuration	High Limit	Reading	Low Limit	Test Pass	Test Fail
	DC VOLTAGE OFFSET TEST (Rear Terminals)						
1	Short	300 V Range	+ 000.0007 V	000.0001	- 000.0007 V	✓	
2	Short	30 V Range	+ 00.00020 V	00.00002	- 00.00020 V	✓	
3	Short	3 V Range	+ 0.000007 V	0.000000	- 0.000007 V	✓	
4	Short	300 mV Range	+ 000.0040 mV	000.0002	- 000.0040 mV	✓	
5	Short	30 mV Range	+ 00.00385 mV	00.00017	- 00.00385 mV	✓	
	DC CURRENT OFFSET TEST (Rear Terminals)						
6	Open	300 uADCI Range	+ 000.0104 uA	-000.0022	- 000.0104 uA	✓	
7	Open	3 mADCI Range	+ 0.000104 mA	-0.000023	- 0.000104 mA	✓	
8	Open	30 mADCI Range	+ 00.00104 mA	-00.00023	- 00.00104 mA	✓	
9	Open	300 mADCI Range	+ 000.0204 mA	-000.0024	- 000.0204 mA	✓	
10	Open	3 ADCI Range	+ 0.000604 A	-0.000022	- 0.000604 A	✓	
	2-WIRE OHMS OFFSET TEST (Rear Terminals)						
11	Short	30 Ohm Range	+ 00.20335 ohm	-00.00054	- 00.20335 ohm	✓	
12	Short	300 Ohm Range	+ 000.2035 ohm	-000.0005	- 000.2035 ohm	✓	
13	Short	3 KOhm Range	+ 0.000207 Kohm	-0.000001	- 0.000207 Kohm	✓	
14	Short	30 KOhm Range	+ 00.00027 Kohm	-00.00001	- 00.00027 Kohm	✓	
15	Short	300 KOhm Range	+ 000.0010 Kohm	000.0001	- 000.0010 Kohm	✓	
16	Short	3 MOhm Range	+ 0.000014 Mohm	0.000001	- 0.000014 Mohm	✓	
17	Short	30 MOhm Range	+ 00.00083 Mohm	00.00000	- 00.00083 Mohm	✓	

PERFORMANCE TEST CARD
90 DAY LIMITS

Hewlett-Packard Model 3457A
Digital Multimeter
Serial Number 3114A16460

Test Performed by CDS
Date 2-22-99
Reference Temperature 64

REAR INPUT TESTS (STANDARD INSTRUMENT)

Step#	Input to 3457A	Set-Up and Configuration	High Limit	Reading	Low Limit	Test Pass	Test Fail
	4-WIRE OHMS OFFSET TEST (Rear Terminals)						
18	Short	30 Ohm Range	+ 00.00335 ohm	00.00015	00.00335 ohm	✓	
19	Short	300 Ohm Range	+ 000.0035 ohm	000.0002	000.0035 ohm	✓	
20	Short	3 KOhm Range	+ 0.000007 Kohm	0.000001	0.000007 Kohm	✓	
21	Short	30 KOhm Range	+ 00.00007 Kohm	00.00000	00.00007 Kohm	✓	
22	Short	300 KOhm Range	+ 000.0008 Kohm	000.0001	000.0008 Kohm	✓	
23	Short	3 MOhm Range	+ 0.000014 Mohm	0.000001	0.000014 Mohm	✓	
24	Short	30 MOhm Range	+ 00.00083 Mohm	00.00002	00.00083 Mohm	✓	

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Belhaven
Applied Technologies

Customer Belhaven

Certificate of Calibration

Tag BAT-107 **Model** 787 **Manufacturer** Fluke

Instrument Process Meter **Serial No** 6910042

Calibration traceable to the National Institute of Standards and Technology in accordance with ANSI- Z540.1 has been accomplished on the above-named instrument by comparison with standards maintained by Belhaven. The accuracy and stability of all standards maintained by Belhaven are traceable to national standards maintained by the National Institute of Standards and Technology in Washington, D.C. and Boulder, Colorado.

Temperature at Calibration: 68 F

Accuracy of Instrument See report

Calibrated Range: See report

Calibration Report No. **BEL99-420**

Date Due: 5/28/2000

Test Equipment

Prema Multi-Function Meter S/N10012

Calibrated by: Sean S— for GPS May 28, 1999

Certified by: [signature] 6-1-99
Quality Assurance Manager

COPY

ORIGINAL

Belhaven Calibration Data Sheet

Report Number
BEL99-420

Tag No	BAT-107
Instrument Type	Process Meter
Manufacturer	Fluke
Serial No	6910042
Model	787
Cal Due Date	5/28/2000
System	
Special Instructions	DC VOLTAGE

Units:	V	
F.S. Accuracy	0.05%	
F.S. Accuracy		
Full Scale	1000.0	
Permitted Variation	0.5000	V
Cal Temp	68 F	

Cal Point	As Found	As Left	% Full Scale Accuracy
999.247	999	999	-0.0247
799.409	799	799	-0.0409
599.709	600	600	0.0291
399.999	400	400	0.0001
200.513	200.5	200.5	-0.0013
100.664	100.7	100.7	0.0036
49.784	49.8	49.8	0.0016
25.034	25.03	25.03	-0.0004
3.000068	3.000	3.000	-0.0000
1.500024	1.500	1.500	-0.0000
0.750002	0.750	0.750	-0.0000
0.324984	0.325	0.325	0.0000
0.1000016	0.100	0.100	-0.0000
0.0500074	0.0500	0.0500	-0.0000
0.0250031	0.0250	0.0250	-0.0000

Test Equipment Prema Multi-Function Meter S/N10012

Calibration Performed By [signature] for GPS Date May 28, 1999

ORIGINAL

Belhaven Calibration Data Sheet

Report Number
BEL99-420

Tag No	BAT-107
Instrument Type	Process Meter
Manufacturer	Fluke
Serial No	6910042
Model	787
Cal Due Date	5/28/2000
System	
Special Instructions	Resistance

Units:	ohms	
F.S. Accuracy	0.003%	
F.S. Accuracy		
Full Scale	100000	
Permitted Variation	3.0000	ohms
Cal Temp	68 F	

Cal Point	As Found	As Left	% Full Scale Accuracy
100000.13	100000	100000	-0.0001
50002.41	50000	50000	-0.0024
25001.30	25000	25000	-0.0013
10000.228	10000	10000	-0.0002
5000.193	5000	5000	-0.0002
2500.0942	2500	2500	-0.0001
1000.0520	1000	1000	-0.0001
500.0470	500	500	-0.0000
250.02579	250.0	250.0	-0.0000
100.01811	100.0	100.0	-0.0000
50.01369	50.0	50.0	-0.0000
25.01324	25.0	25.0	-0.0000
10.01381	10.0	10.0	-0.0000
5.01173	5.0	5.0	-0.0000
1.01160	1.0	1.0	-0.0000

Test Equipment Prema Multi-Function Meter S/N10012

Calibration Performed By Sean S for GPS Date May 28, 1999

ORIGINAL

Belhaven Calibration Data Sheet

Report Number BEL99-420 Page 87

Tag No	BAT-107
Instrument Type	Process Meter
Manufacturer	Fluke
Serial No	6910042
Model	787
Cal Due Date	5/28/2000
System	
Special Instructions	DC mA Source

Units:	mA	
F.S. Accuracy		
F.S. Accuracy		
Full Scale	24.00	
Permitted Variation	0.0000	mA
Cal Temp	68 F	

Cal Point	As Found	As Left	% Full Scale Accuracy
4.000	4.00061	4.00061	0.0025
8.000	8.00017	8.00017	0.0007
12.000	11.99988	11.99988	-0.0005
16.000	15.99963	15.99963	-0.0015
20.000	19.99983	19.99983	-0.0007
24.000	24.0002	24.0002	0.0008

Test Equipment Prema Multi-Function Meter S/N10012

Calibration Performed By Sean S. for GPS Date May 28, 1999

ORIGINAL

Belhaven Calibration Data Sheet

Report Number BEL99-420

Tag No BAT-107
Instrument Type Process Meter
Manufacturer Fluke
Serial No 6910042
Model 787
Cal Due Date 5/28/2000
System
Special Instructions DC Current (mA)

Units: mA
F.S. Accuracy
F.S. Accuracy
Full Scale 400
ermitted Variation 0.0000 mA
Cal Temp 68 F

Cal Point	As Found	As Left	% Full Scale Accuracy
4.000	4.000	4.000	0.0000
8.000	8.000	8.000	0.0000
12.000	12.000	12.000	0.0000
16.000	16.000	16.000	0.0000
20.000	20.001	20.001	0.0003
50.000	50	50	0.0000
200.000	200	200	0.0000
400.00	400	400	0.0000

Test Equipment Prema Multi-Function Meter S/N10012

Calibration Performed By [signature] for GPS Date May 28, 1999

ORIGINAL

Belhaven Calibration Data Sheet

Report Number
BEL99-420

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Tag No	BAT-107
Instrument Type	Process Meter
Manufacturer	Fluke
Serial No	6910042
Model	787
Cal Due Date	5/28/2000
System	
Special Instructions	AC Voltage @ 60 Hz

Units:	V	
F.S. Accuracy	0.20%	
F.S. Accuracy		
Full Scale	600	
Permitted Variation	1.2000	V
Cal Temp	68 F	

Cal Point	As Found	As Left	% Full Scale Accuracy
0.01000	0.01003	0.01003	0.0000
1.000	1.002	1.002	0.0003
10.000	10.02	10.02	0.0033
599.822	601	601	0.1963

Test Equipment Prema Multi-Function Meter S/N10012

Calibration Performed By [signature] for GIS Date May 26, 1999

ORIGINAL

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TRANSCAT

CERTIFICATE OF CALIBRATION

Customer: BELHAVEN
415 N QUAY ST
KENNEWICK, WA 99336

Cert/RA Nbr:	1-OS264-2-1	**Date Received:**	02/08/00
ID Nbr:	NONE	**Date Calibrated:**	2/9/00
Manufacturer:	AVO INTERNATIONAL	**Next Calibration**	2/9/01
Description:	MEGOHMMETER	**Calibration Proc:**	33K1-4-2462-1
Model Nbr:	BM80/2	**Data Sheet Nbr:**	24-00684-2
Serial Nbr:	6410-889/000100/5345	**Item Received:**	In Tolerance
PO Nbr:	22844	***Item Returned:***	In Tolerance

Temperature: 70°F **Relative Humidity: 44%**

TRANSCAT will maintain and document the traceability of all its standards to the National Institute of Standards and Technology, NIST(formerly NBS), or the National Research Council, NRC, of Canada, or to other recognized national or international standard bodies, or to measurable conditions created in our laboratory, or accepted fundamental and/or natural physical constants, ratio type of calibration, or by comparison to consensus standards. The TRANSCAT calibration system, when applicable, conforms to the requirements of MIL-STD-45662A, ANSI/NCSL Z540-1-1994, ISO10012-1-1992, and ISO/IEC Guide 25. 10CFR21 and/or IEEE-A98-1985 applies if specified contractually.

Complete records of work performed are maintained by TRANSCAT and are available for inspection. Laboratory assets used in the performance of this calibration are shown below.

The results in this report relate only to the item calibrated or tested.

All calibrations have been performed using the standards having a test accuracy ratio of four or more times greater than the unit calibrated, unless otherwise noted. Uncertainties have been estimated at a 95 percent confidence level(k=2). Limitations on the uses of this instrument are detailed in the manufacturer's operating instructions.

Customer Notes:

Assets	Manufacturer	Model Nbr	Description	Date Cal'd	Date Due	Traceability Numbers
000233	WAVETEK	9100	Calibration System	12/2/99	12/2/00	14-NH928-1-1
2503	BIDDLE INSTRUMENTS	72-6340	Megadek	2/6/99	2/29/00	1-&2503-2-9
2559	GENERAL RESISTANCE	RDS-63A	Decade Box	5/3/99	5/3/00	1-&2559-5-9

COPY

Calibrated at:
10 Vantage Point Dr
Rochester, NY 14624
By Tom Honig

Facility Responsible:
10 Vantage Point Dr
Rochester, NY 14624
716-352-9720

for Tom Honig
Lab Manager

Date 2-9-2000

F0013R11 10/22/99

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SUPPLEMENTAL REPORT FOR CALIBRATION LAB DATA

TRANSCAT Calibration Services UL REGISTERED FIRM ISO 9002 A1959

RA Nbr:	1-OS264-2-1	Mfg:	AVO INTERNATIONAL
Description:	MEGOHMMETER	Model:	BM80/2
Customer:	BELHAVEN	Serial:	6410-889/000100/5345
Calibrated:	2/9/00	PO Nbr:	22844
Date due:	2/9/01	ID Nbr:	NONE
Service Type:	S6	Verification Procedure:	24-00684-2

1 KV MOHMS

Input		I/O	Accuracy	Low	High	Limits	As Rec'd	As Shipped
Range: 1 KV MOHMS								
1.000	MOHMS	I	±2% of Rdg ± 2Dgt	0.98	1.02	MOHMS	0.99	0.99
Range: 1 KV MOHMS								
10.00	MOHMS	I	±2% of Rdg ± 2Dgt	9.8	10.2	MOHMS	10.0	10.0
Range: 1 KV MOHMS								
100.0	MOHMS	I	±2% of Rdg ± 2Dgt	98.0	102	MOHMS	100	100

1 KV GOHMS

Input		I/O	Accuracy	Low	High	Limits	As Rec'd	As Shipped
Range: 1 KV GOHMS								
10	GOHMS	I	±.4% per G±2%±2Dg	9.2	10.8	GOHMS	9.6	9.6

500V MOHMS

Input		I/O	Accuracy	Low	High	Limits	As Rec'd	As Shipped
Range: 500V MOHMS								
1.000	MOHMS	I	±2% of Rdg ±2Dgt	0.98	1.02	MOHMS	0.99	0.99
Range: 500V MOHMS								
10.00	MOHMS	I	±2% of Rdg ±2Dgt	9.80	10.2	MOHMS	10.0	10.0
Range: 500V MOHMS								
100.0	MOHMS	I	±2% of Rdg ±2Dgt	98.0	102	MOHMS	99.0	99.0

500V GOHMS

Input		I/O	Accuracy	Low	High	Limits	As Rec'd	As Shipped
Range: 500V GOHMS								
10.00	GOHMS	I	±.4% per G±2%±2Dg	9.2	10.8	GOHMS	9.4	9.4

250V MOHMS

Input		I/O	Accuracy	Low	High	Limits	As Rec'd	As Shipped
Range: 250V MOHMS								
1.000	MOHMS	I	±2% of Rdg ±2Dgt	0.98	1.02	MOHMS	0.99	0.99
Range: 250V MOHMS								
10.00	MOHMS	I	±2% of Rdg ±2Dgt	9.8	10.2	MOHMS	10.0	10.0
Range: 250V MOHMS								
100.0	MOHMS	I	±2% of Rdg ±2Dgt	98.0	102	MOHMS	99.0	99.0

250V GOHMS

Input		I/O	Accuracy	Low	High	Limits	As Rec'd	As Shipped
Range: 250V GOHMS								
10.00	GOHMS	I	±.8%perG±2%±2Dg	7.0	13.0	GOHMS	8.9	8.9

100V MOHMS

Input		I/O	Accuracy	Low	High	Limits	As Rec'd	As Shipped
Range: 100V MOHMS								
1.000	MOHMS	I	±2% of Rdg ±2Dgt	0.98	1.02	MOHMS	0.99	0.99

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SUPPLEMENTAL REPORT FOR CALIBRATION LAB DATA

RA Nbr:	1-OS264-2-1	Mfg:	AVO INTERNATIONAL
Description:	MEGOHMMETER	Model:	BM80/2
Customer:	BELHAVEN	Serial:	6410-889/000100/5345
Calibrated:	2/9/00	PO Nbr:	22844
Date due:	2/9/01	ID Nbr:	NONE
Service Type:	S6	Verification Procedure:	24-00684-2

Input		I/O	Accuracy	Low	High	Limits	As Rec'd	As Shipped
Range: 100V MOHMS								
10.00	MOHMS	I	±2% of Rdg ±2Dgt	9.8	10.2	MOHMS	9.9	9.9
Range: 100V MOHMS								
100.0	MOHMS	I	±2% of Rdg ±2Dgt	98.0	102	MOHMS	99	99

100V GOHMS

Input		I/O	Accuracy	Low	High	Limits	As Rec'd	As Shipped
Range: 100V GOHMS								
10.00	GOHMS	I	±2%perG±2%±2Dg	7.6	12.4	GOHMS	9.0	9.0

50V MOHMS

Input		I/O	Accuracy	Low	High	Limits	As Rec'd	As Shipped
Range: 50V MOHMS								
1.000	MOHMS	I	±2% of Rdg ±2Dgt	0.98	1.02	MOHMS	0.99	0.99
Range: 50V MOHMS								
10.00	MOHMS	I	±2% of Rdg ±2Dgt	9.8	10.2	MOHMS	9.9	9.9
Range: 50V MOHMS								
100.0	MOHMS	I	±2% of Rdg ±2Dgt	98.0	102	MOHMS	99.0	99.0

50V GOHMS

Input		I/O	Accuracy	Low	High	Limits	As Rec'd	As Shipped
Range: 50V GOHMS								
10.00	GOHMS	I	±4% per G±2%±2	6.0	14.0	GOHMS	9.3	9.3

KOHMS

Input		I/O	Accuracy	Low	High	Limits	As Rec'd	As Shipped
Range: KOHMS KOHMS								
1.00	KOHMS	I	±3% of Rdg ±2Dgt	0.7	1.3	KOHMS	1.0	1.0
Range: KOHMS KOHMS								
10.00	KOHMS	I	±3% of Rdg ±2Dgt	9.7	10.3	KOHMS	10.1	10.1
Range: KOHMS KOHMS								
100.0	KOHMS	I	±3% of Rdg ±2Dgt	97.0	103	KOHMS	100	100

OHMS

Input		I/O	Accuracy	Low	High	Limits	As Rec'd	As Shipped
Range: OHMS OHMS								
25.00	OHMS	I	±2% of Rdg ±2Dgt	24.3	25.7	OHMS	25.4	25.4
Range: OHMS OHMS								
50.00	OHMS	I	±2% of Rdg ±2Dgt	47.0	53.0	OHMS	50.4	50.4
Range: OHMS OHMS								
100.0	OHMS	I	±2% of Rdg ±2Dgt	96.0	104	OHMS	99.9	99.9

DC VOLTS

Input		I/O	Accuracy	Low	High	Limits	As Rec'd	As Shipped
Range: DC VOLTS VOLTS								
25.0	VOLTS	I	±1% of Rdg ±2Dgt	23	27	VOLTS	25	25

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SUPPLEMENTAL REPORT FOR CALIBRATION LAB DATA

RA Nbr:	1-OS264-2-1	Mfg:	AVO INTERNATIONAL
Description:	MEGOHMMETER	Model:	BM80/2
Customer:	BELHAVEN	Serial:	6410-889/000100/5345
Calibrated:	2/9/00	PO Nbr:	22844
Date due:	2/9/01	ID Nbr:	NONE
Service Type:	S6	Verification Procedure:	24-00684-2

Input		I/O	Accuracy	Low	High	Limits	As Rec'd	As Shipped
Range:	**DC VOLTS VOLTS**							
100.0	VOLTS	I	±1% of Rdg ±2Dgt	97	103	VOLTS	100	100
Range:	**DC VOLTS VOLTS**							
250.0	VOLTS	I	±1% of Rdg ±2Dgt	246	254	VOLTS	249	249
Range:	**DC VOLTS VOLTS**							
500.0	VOLTS	I	±1% of Rdg ±2Dgt	493	507	VOLTS	498	498

ACV@60Hz

Range:	**ACV@60Hz VOLTS**							
25.0	VOLTS	I	±1% of Rdg ±2Dgt	23	27	VOLTS	26	26
Range:	**ACV@60Hz VOLTS**							
100.0	VOLTS	I	±1% of Rdg ±2Dgt	97	103	VOLTS	101	101
Range:	**ACV@60Hz VOLTS**							
250.0	VOLTS	I	±1% of Rdg ±2Dgt	246	254	VOLTS	251	251
Range:	**ACV@60Hz VOLTS**							
500.0	VOLTS	I	±2% of Rdg ±2Dgt	488	512	VOLTS	501	501

ACV@400Hz

Range:	**ACV@400Hz VOLTS**							
100	VOLTS	I	±5% of Rdg ±2Dgt	93	107	VOLTS	97	97
Range:	**ACV@400Hz VOLTS**							
250	VOLTS	I	±5% of Rdg ±2Dgt	235	265	VOLTS	244	244
Range:	**ACV@400Hz VOLTS**							
400	VOLTS	I	±5% of Rdg ±2Dgt	378	422	VOLTS	388	388

Remarks:

Section 5
Safety Equipment and
CGI Dedication Working List

Sys.	Component No.	Description	Safety Class.	Safety Function	Design and Operational Attributes	Reference Drawing(s) (No. Sheet, Rev.)	Manufacturer or Vendor	Model No. or Engineered Equipment	Test Procedure No.	Test Status	Part No.	CGI	Interlock (Bold = Safety Related)	Notes
15	5X	Trip Point Relay	SS	MCO Hoist Weigh System 1 Cutout	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 11 Rev L:	Action Pak	AP1080-2000	BTP016C	Complete	N/A	CGI-SNF-D-MHM-16C	P62, 62	Actuates MW15 relay for MCO Hoist Weigh System 1 Cutout
15	BSPGE	Gauge	SC	Visual Indication of Seismic Restraints	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	H-2-830016, Sht 1 Rev 0	Ashcroft	45 1009 S 02L 2000	BTP037	Complete	N/A	CGI-SNF-D-MHM-37	N/A	
15	BSPGW	Gauge	SC	Visual Indication of Seismic Restraints	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	H-2-830016, Sht 1 Rev 0	Ashcroft	45 1009 S 02L 2000	BTP037	Complete	N/A	CGI-SNF-D-MHM-37	N/A	
15	PSLTSC1AX	Pressure Switch	SS	Bridge Seismic Clamp East Fully Applied Pressure Switch	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 35 Rev K	CCS Industrial	604G3	BTP009	Complete	N/A	CGI-SNF-D-MHM-09	P21	
15	PSLTSC1AY	Pressure Switch	SS	Bridge Seismic Clamp East Fully Applied Pressure Switch	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 35 Rev K	CCS Industrial	604G3	BTP009	Complete	N/A	CGI-SNF-D-MHM-09	P21	
15	PSLTSC2AX	Pressure Switch	SS	Bridge Seismic Clamp West Fully Applied Pressure Switch	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 35 Rev K	CCS Industrial	604G3	BTP009	Complete	N/A	CGI-SNF-D-MHM-09	P21	
15	PSLTSC2AY	Pressure Switch	SS	Bridge Seismic Clamp West Fully Applied Pressure Switch	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 35 Rev K	CCS Industrial	604G3	BTP009	Complete	N/A	CGI-SNF-D-MHM-09	P21	
15	C-34650	Bridge 'Z' Restraint	SC	Provide restraint during seismic event	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	C-34650 Sht 1 Rev C	Ederer	Engineered Equipment	N/A	N/A	N/A	N/A	N/A	
15	C-34657	Bridge 'X' Restraint, Idler Wheel	SC	Provide restraint during seismic event	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	C-34657 Sht 1 Rev A	Ederer	Engineered Equipment	N/A	N/A	N/A	N/A	N/A	
15	C-34658	Bridge 'X' Restraint, Driver Wheel	SC	Provide restraint during seismic event	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	C-34658 Sht 1 Rev A	Ederer	Engineered Equipment	N/A	N/A	N/A	N/A	N/A	
15	C-34660	Trolley Wheel 'Y' Restraint	SC	Provide restraint during seismic event	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	C-3460 Sht 1 Rev A C-3460 Sht 1 Rev A	Ederer	Engineered Equipment	N/A	N/A	N/A	N/A	N/A	
15	C-34666	Trolley Shim 'Z' Restraint	SC	Provide restraint during seismic event	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	C-34666 Sht 1 Rev D	Ederer	Engineered Equipment	N/A	N/A	N/A	N/A	N/A	
15	D-34662-1	Trolley Shim 'Y' Restraint	SC	Provide restraint during seismic event	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	D-34662 Sht 1 Rev A	Ederer	Engineered Equipment	N/A	N/A	N/A	N/A	N/A	
15	362P0559	Trolley 'X' Restraint Pin, except MFTSP1/2	SC	Provide restraint during seismic event	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	362P0559 Sht 1 Rev H	Ederer	N/A	N/A	N/A	N/A	N/A	N/A	
15	362P0560	Trolley 'X' Restraint Jack, except MFTSJ1/2	SC	Provide restraint during seismic event	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	362P0560 Sht 1 Rev E	Ederer	N/A	N/A	N/A	N/A	N/A	N/A	
15		Switch, Selector	SS	Mode Selection	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 4 Rev K	Fortress Solenoid Interlock Assy w/Craig Derricott switch & contacts	H31SS w/120 VAC Solenoid, 3POT Selector Switch	ITP032	Complete	N/A	CGI-SNF-D-MHM-32	P62, 66, 61, 63, 65	MHM Mode Select Switch w/solenoid
15	362P0553	Turret Locking Pin, except PFTLPEX	SC	Provide restraint during seismic event	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	362P0553 Sht 1 Rev D	GEC	N/A	N/A	N/A	N/A	N/A	N/A	
15	362P0554	Base Locking Pin, except MFBLP	SC	Provide restraint during seismic event	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	362P0554 Sht 1 Rev E	GEC	N/A	N/A	N/A	N/A	N/A	N/A	
15	PLS1	Programmable Limit Switch	SS	MCO Grapple Depth Programmable Limit Switch	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 9 Rev K	Gemco	1966-A-16-R-14-64-E-R	ITP003CX	Complete	N/A	CGI-SNF-D-MHM-03C	P66, 57, 61	
15	PLS2	Programmable Limit Switch	SS	MCO Grapple Depth Programmable Limit Switch	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 9 Rev K	Gemco	1966-A-16-R-14-64-E-R	ITP003CY	Complete	N/A	CGI-SNF-D-MHM-03C	P66, 61	
15	PLS1-OM	Output Module	SS	MCO Grapple Depth Output Module	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 9 Rev K	Gemco	1966-O-114-M-S	ITP003CX	Complete	N/A	CGI-SNF-D-MHM-03C	P66, 57, 61	
15	PLS2-OM	Output Module	SS	MCO Grapple Depth Output Module	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 9 Rev K	Gemco	1966-O-114-M-S	ITP003CY	Complete	N/A	CGI-SNF-D-MHM-03C	P66, 61	
15	RSVMGHX	Cable, Resolver to PLS	SS	MCO Grapple Depth Resolver - connector cable between the Resolver and the PLS	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 9 Rev K	Gemco	SD0334800	ITP003B1X	Complete	N/A	CGI-SNF-D-MHM-03B	P66, 57, 61	
15	RSVMGHY	Cable, Resolver to PLS	SS	MCO Grapple Depth Resolver - connector cable between the Resolver and the PLS	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 9 Rev K	Gemco	SD0334800	ITP003B1Y	Complete	N/A	CGI-SNF-D-MHM-03B	P66, 61	
15	RSVMGHX	Cable, PLS to Output Module	SS	MCO Grapple Depth Resolver - connector cable between the PLS and the Output Module.	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 9 Rev K	Gemco	SD0336100	ITP003B2X	Complete	N/A	CGI-SNF-D-MHM-03B	P66, 57, 61	
15	RSVMGHY	Cable, PLS to Output Module	SS	MCO Grapple Depth Resolver - connector cable between the PLS and the Output Module.	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 9 Rev K	Gemco	SD0336100	ITP003B2Y	Complete	N/A	CGI-SNF-D-MHM-03B	P66, 61	
15	RSVMGHX	Resolver	SS	MCO Grapple Depth Resolver	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 9 Rev K	Gemco	SD0410801	ITP003AX	Complete	N/A	CGI-SNF-D-MHM-03A	P66, 57, 61	
15	RSVMGHY	Resolver	SS	MCO Grapple Depth Resolver	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 9 Rev K	Gemco	SD0410801	ITP003AY	Complete	N/A	CGI-SNF-D-MHM-03A	P66, 61	
15	LFPHFRX	Limit Switch	SS	Tube Plug Hoist Fully Raised Limit Switch	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 15A Rev H	Honeywell	1LS19-4C	ITP011A	Complete	N/A	CGI-SNF-D-MHM-11	P62, 60	
15	LFPHFRY	Limit Switch	SS	Tube Plug Hoist Fully Raised Limit Switch	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 15A Rev H	Honeywell	1LS19-4C	ITP011B	Complete	N/A	CGI-SNF-D-MHM-11	P62, 60	
15	LFMGUDX	Limit Switch	SS	MCO Grapple at Upper Deturn Limit Switch	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 10A Rev E	Honeywell	5LS1-4PG	ITP002A	Complete	N/A	CGI-SNF-D-MHM-02	P66, 57	
15	LFMJLY	Limit Switch	SS	MCO Grapple Jaws locked	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 13B Rev H	Honeywell	LSYAC3K	ITP022B	Complete	N/A	CGI-SNF-D-MHM-22	P62, 61	
15	LFMCOCX	Limit Switch	SS	MCO Grapple in contact with a load	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 13A Rev G	Honeywell	LSYDC3K	ITP013C	Complete	N/A	CGI-SNF-D-MHM-13	P62, 60	
15	LFMCOCY	Limit Switch	SS	MCO Grapple in contact with a load	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 13A Rev G	Honeywell	LSYDC3K	ITP013D	Complete	N/A	CGI-SNF-D-MHM-13	P62, 60	
15	LFMJCY	Limit Switch	SS	MCO Hoist Grapple Jaws Closed	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 13A Rev G	Honeywell	LSYDC3K	ITP013B	Complete	N/A	CGI-SNF-D-MHM-13	P62, 62, 65, 60	
15	LFPGOX	Limit Switch	SS	Tube Plug Grapple Jaws Fully Open Limit Switch (X)	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 17 Rev L	Honeywell	SL1-E	ITP007A	4/10 SS Cmpl	N/A	CGI-SNF-D-MHM-8	P62, 60	
15	LFPGOY	Limit Switch	SS	Tube Plug Grapple Jaws Fully Open Limit Switch (Y)	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 17 Rev L	Honeywell	SL1-E	ITP007B	4/10 SS Cmpl	N/A	CGI-SNF-D-MHM-8	P62, 60	
15	LFTSLP1AX	Limit Switch	SS	Trolley North Restraint Pin (1) Fully Inserted Limit Switch	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 37 Rev F	Honeywell	SL1-E	ITP007C	Complete	N/A	CGI-SNF-D-MHM-08	P21	
15	LFTSLP1AY	Limit Switch	SS	Trolley North Restraint Pin (1) Fully Inserted Limit Switch	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 37 Rev F	Honeywell	SL1-E	ITP007D	Complete	N/A	CGI-SNF-D-MHM-08	P21	
15	LFTSLP2AX	Limit Switch	SS	Trolley South Restraint Pin (2) Fully Inserted Limit Switch	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 37 Rev F	Honeywell	SL1-E	ITP007E	Complete	N/A	CGI-SNF-D-MHM-08	P21	
15	LFTSLP2AY	Limit Switch	SS	Trolley South Restraint Pin (2) Fully Inserted Limit Switch	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 37 Rev F	Honeywell	SL1-E	ITP007F	Complete	N/A	CGI-SNF-D-MHM-08	P21	

Sys.	Component No.	Description	Safety Class.	Safety Function	Design and Operational Attributes	Reference Drawing(s) (No. Sheet, Rev.)	Manufacturer or Vendor	Model No. or Engineered Equipment	Test Procedure No.	Test Status	Part No.	CGI	Interlock (Bold = Safety Related)	Notes
15	LFPGCX	Limit Switch	SS	Tube Plug Grapple Jaws Fully Closed Limit Switch (X)	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 17 Rev L	Honeywell	SL1-H	ITP007G	4/10 SS Qual	N/A	CGI-SNF-D-MHM-7	P62	
15	LFPGCY	Limit Switch	SS	Tube Plug Grapple Jaws Fully Closed Limit Switch (Y)	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 17 Rev L	Honeywell	SL1-H	ITP007H	4/10 SS Qual	N/A	CGI-SNF-D-MHM-7	P62	
15	LFPGLX	Limit Switch	SS	Plug Hoist Grapple Jaws Locked (X)	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 17A Rev H	Honeywell	SL1-H	ITP007	4/10 SS Qual	N/A	CGI-SNF-D-MHM-7	P62	
15	LFPGLY	Limit Switch	SS	Plug Hoist Grapple Jaws Locked (Y)	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 17A Rev H	Honeywell	SL1-H	ITP007	4/10 SS Qual	N/A	CGI-SNF-D-MHM-7	P62	
15	BF	Relay	SS	Bridge Travel Interlocks Satisfied Relay	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 24 Rev J	Idec	RH4B-UL-AC120V	ITP020C	Complete	N/A	CGI-SNF-D-MHM-20A	P62, 03, 05, 09, 10	
15	BSC1AX	Relay	SS	Bridge Seismic Clamp East Fully Applied	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 35 Rev K	Idec	RH4B-UL-AC120V	ITP020C	Complete	N/A	CGI-SNF-D-MHM-20A	P21	
15	BSC1AY	Relay	SS	Bridge Seismic Clamp East Fully Applied	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 35 Rev K	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P21	
15	BSC2AX	Relay	SS	Bridge Seismic Clamp West Fully Applied	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 35 Rev K	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P21	
15	BSC2AY	Relay	SS	Bridge Seismic Clamp West Fully Applied	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 35 Rev K	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P21	
15	IAXMY	Relay	SS	Impact Absorber Exchange Mode	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 4 Rev K	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-23	P62, 66, 61	
15	LS2X	Relay	SS	MCO Hoist at tube plug raise limit	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 10 Rev K	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P66	
15	LS2Y	Relay	SS	MCO Hoist at tube plug raise limit	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 10 Rev K	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P66	
15	LS4Y	Relay	SS	MCO Hoist at tube plug raise limit	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 10 Rev K	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P66	
15	MCOY	Relay	SS	MCO Mode	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 4 Rev K	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P62, 66, 61, 65	Labeled MCOY(1) w/MCOY(2) in parallel
15	MGCLY	Relay	SS	MCO Hoist Grapple Jaws Closed	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 13A Rev G	Idec	RH4B-UL-AC120V	ITP020C	Complete	N/A	CGI-SNF-D-MHM-20A	P62, 62	MCO Hoist Grapple Jaws Closed
15	MGCX	Relay	SS	MCO Grapple in contact with a load	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 13A Rev G	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P62	
15	MGCY	Relay	SS	MCO Grapple in contact with a load	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 13A Rev G	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P62	
15	MGNCLX	Relay	SS	MCO Hoist Grapple Jaws not closed	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 13A Rev G	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P62, 65, 66, 80	Labeled MGNCLX(1)
15	MGNCLY	Relay	SS	MCO Hoist Grapple Jaws not closed	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 13A Rev G	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P62, 65, 80	
15	MGNCY	Relay	SS	MCO Grapple not in contact with a load	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 13A Rev G	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P62, 80	
15	MGUD	Relay	SS	MCO Grapple upper datum	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 10A Rev E	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P66	
15	MHDX	Relay	SS	MCO Hoist Hoisting permit	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 8 Rev L	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P09, 21, 26, 57, 61, 62, 63	
15	MHF	Relay	SS	MCO Hoist Permissive Relay	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 8 Rev L	Idec	RH4B-UL-AC120V	ITP020C	Complete	N/A	CGI-SNF-D-MHM-20A	P09, 21, 26	Turret Rotate Permit
15	MW11	Relay	SS	MCO Hoist Weigh System 1 Cutout	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 11 Rev L:	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P62	Actuates MW11 relay for MCO Hoist Weigh System 1 Cutout
15	MW15	Relay	SS	MCO Hoist Weigh System 1 Cutout	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 11 Rev L:	Idec	RH4B-UL-AC120V	ITP020C	Complete	N/A	CGI-SNF-D-MHM-20A	P62, 62	MCO Hoist Weight System 1 Cutout
15	P21X	Relay	SS	Seismic Restraints Applied	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 52 Rev G	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P21	Labeled P21X(1) w/ P21X(2) in parallel
15	P21Y	Relay	SS	Seismic Restraints Applied	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 52 Rev G	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P21	Labeled P21Y(1) w/ P21Y(2) in parallel
15	P26X	Relay	SS	Shield Skirt Lowered & Seated	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 52 Rev G	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P21, 80	Labeled P26X(1) w/ P26X(2) in parallel
15	P2X	Relay	SS	Travel Permit Interlock	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 51 Rev F	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P62	Labeled P2X(1) w/ P2X(2) in parallel
15	P2Y	Relay	SS	Travel Permit Interlock	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 51 Rev F	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P62	
15	P6X	Relay	SS	Travel Permit Interlock	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 51 Rev F	Idec	RH4B-UL-AC120V	ITP020C	Complete	N/A	CGI-SNF-D-MHM-20A	P66	Labeled P6X(1) w/ P6X(2) in parallel
15	P6Y	Relay	SS	Travel Permit Interlock	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 51 Rev F	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P66	Labeled P6Y(1) w/ P6Y(2) in parallel
15	PGCLX	Relay	SS	Tube Plug Grapple Jaws Fully Closed	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 17 Rev L	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P62	Labeled PGCLX(1) w/ PGCLX(2) in parallel
15	PGCLY	Relay	SS	Tube Plug Grapple Jaws Fully Closed	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 17 Rev L	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P62	Labeled PGCLY(1) w/ PGCLY(2) in parallel
15	PGEX	Relay	SS	Plug Cask Empty	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 17A Rev H	Idec	RH4B-UL-AC120V	ITP020C	Complete	N/A	CGI-SNF-D-MHM-20A	P62, 80	
15	PGEY	Relay	SS	Plug Cask Empty	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 17A Rev H	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P62, 80	
15	PGLX	Relay	SS	Plug Hoist Grapple Jaws Locked	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 17A Rev H	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P62	
15	PGLY	Relay	SS	Plug Hoist Grapple Jaws Locked	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 17A Rev H	Idec	RH4B-UL-AC120V	ITP020C	Complete	N/A	CGI-SNF-D-MHM-20A	P62	
15	PGNEX	Relay	SS	Plug Cask Occupied	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 17A Rev H	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P62	
15	PGNEY	Relay	SS	Plug Cask Occupied	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 17A Rev H	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P62	
15	PGOPX	Relay	SS	Tube Plug Grapple Jaws Fully Open Limit (X)	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 17 Rev L	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P62, 80	Labeled PGOPX(1) w/ PGOPX(2) in parallel
15	PGOPY	Relay	SS	Tube Plug Grapple Jaws Fully Open Limit (y)	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 17 Rev L	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P62, 80	Labeled PGOPY(1) w/ PGOPY(2) in parallel
15	PHR	Relay	SS	Plug hoist common interlocks satisfied	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 15 Rev J	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P09, 21, 26	
15	PHULX	Relay	SS	Tube Plug Hoist Fully Raised	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 15A Rev H	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P62, 80	Labeled PHULX(1) w/PHULX(2), (3) & (4) in parallel

Sys.	Component No.	Description	Safety Class.	Safety Function	Design and Operational Attributes	Reference Drawing(s) (No. Sheet, Rev.)	Manufacturer or Vendor	Model No. or Engineered Equipment	Test Procedure No.	Test Status	Part No.	CGI	Interlock Bold = Safety Related	Notes
15	PHULY	Relay	SS	Tube Plug Hoist Fully Raised	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 15A Rev H	Idec	RH4B-UL-AC120V	ITP020C	Complete	N/A	CGI-SNF-D-MHM-20A	P62, 80	Labeled PHULY(1) w/PHULY(2) & (3) in parallel
15	SSRD	Relay	SS	Shield Skirt Raise Permit	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 32 Rev K	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P62, 88, 89	Turret Rotate Permit
15	TF	Relay	SS	Trolley Travel Interlocks Satisfied Relay	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 21 Rev L	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P62, 83, 88, 10	
15	TPXMY	Relay	SS	Tube Plug Exchange Mode	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 4 Rev K	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-23	P62, 86, 61	
15	TRD	Relay	SS	Turret Rotate Permissive	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 25A Rev K	Idec	RH4B-UL-AC120V	ITP020C	Complete	N/A	CGI-SNF-D-MHM-23	P66	
15	TSP1FIX	Relay	SS	Trolley North Restraint Pin (1) Fully Inserted	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 37 Rev F	Idec	RH4B-UL-AC120V	ITP020C	Complete	N/A	CGI-SNF-D-MHM-20A	P21	
15	TSP1FIY	Relay	SS	Trolley North Restraint Pin (1) Fully Inserted	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 37 Rev F	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P21	
15	TSP2FIX	Relay	SS	Trolley South Restraint Pin (2) Fully Inserted	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 37 Rev F	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P21	
15	TSP2FIY	Relay	SS	Trolley South Restraint Pin (2) Fully Inserted	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 37 Rev F	Idec	RH4B-UL-AC120V	ITP020D	>10/49 SS Qual	N/A	CGI-SNF-D-MHM-20A	P21	
15	C-35640	Bridge 'Y' Restraint, Rail Clamp	SC	Provide restraint during seismic event	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	C-35640 Sht 1 Rev B	Johnson Industries	Engineered Equipment	N/A	N/A	N/A	N/A	N/A	
15	LCMHR1X	Motherboard	SS	MCO Hoist Rope 1 Load Cell	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 11 Rev L:	M/D TOTCO	2077-034	CTP56,60	Complete	N/A	CGI-SNF-D-MHM-16B	P62, 62, 63	
15	LCMHR2X	Motherboard	SS	MCO Hoist Rope 2 Load Cell	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 11 Rev L:	M/D TOTCO	2077-034	CTP56,60	Complete	N/A	CGI-SNF-D-MHM-16B	P62, 62, 63	
15	LCMHR1X	Signal Conditioner	SS	MCO Hoist Rope 1 Load Cell	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 11 Rev L:	M/D TOTCO	2078-101	CTP56,60	Complete	N/A	CGI-SNF-D-MHM-16B	P62, 62, 63	
15	LCMHR2X	Signal Conditioner	SS	MCO Hoist Rope 2 Load Cell	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 11 Rev L:	M/D TOTCO	2078-101	CTP56,60	Complete	N/A	CGI-SNF-D-MHM-16B	P62, 62, 63	
15	H-3-828995	MCO centering guide	SS	Provide restraint during seismic event	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	H-2-828995 Sht 1 Rev 0	N/A	Engineered Equipment	N/A	N/A	N/A	N/A	N/A	
15	PESSPX	Switch, Photoelectric	SS	Plug Cask Empty	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 17A Rev H	Omron	E3V-R2C43S	ITP012X	Complete	N/A	CGI-SNF-D-MHM-12	P62, P80	Replacement is E3V3-061
15	PESSPY	Switch, Photoelectric	SS	Plug Cask Empty	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 17A Rev H	Omron	E3V-R2C43S	ITP012Y	Complete	N/A	CGI-SNF-D-MHM-12	P62, P80	Replacement is E3V3-061
15	PESSPX	Controller, Sensor	SS	Plug Cask Empty	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 17A Rev H	Omron	S302-CK-US	ITP012X	Complete	N/A	CGI-SNF-D-MHM-12	P62, P80	
15	PESSPY	Controller, Sensor	SS	Plug Cask Empty	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 17A Rev H	Omron	S302-CK-US	ITP012Y	Complete	N/A	CGI-SNF-D-MHM-12	P62, P80	
15	LCMHR1X	Load Cell	SS	MCO Hoist Rope 1 Load Cell	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 11 Rev L:	Sensotec	RM/C717-01	ITP016AX2	Complete	N/A	CGI-SNF-D-MHM-16A	P62, 62, 63	
15	LCMHR2X	Load Cell	SS	MCO Hoist Rope 2 Load Cell	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 11 Rev L:	Sensotec	RM/C717-01	ITP015AY2	Complete	N/A	CGI-SNF-D-MHM-16A	P62, 62, 63	
15	BLPDY	Contactor	SS	Base Locking Pin Disengage Redundant Contactor	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 30 Rev J	Siemens	3TF4222-0AK6	ITP048D	3/6 SS Qual	N/A	CGI-SNF-D-MHM-48	P66, 67, 21, 26	
15	PHHY	Contactor	SS	Plug hoist raise redundant contactor	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 15 Rev J	Siemens	3TF4222-0AK6	ITP048A	Complete	N/A	CGI-SNF-D-MHM-48	P09, 21, 26, 44, 45	
15	PHLY	Contactor	SS	Plug hoist lower redundant contactor	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 15 Rev J	Siemens	3TF4222-0AK6	ITP048B	Complete	N/A	CGI-SNF-D-MHM-48	P09, 21, 26	
15	SSLY	Contactor	SS	Shield Skirt Lowering Redundant Contactor	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 32 Rev K	Siemens	3TF4222-0AK6	ITP048C	Complete	N/A	CGI-SNF-D-MHM-48	P21, 85	
15	SSRY	Contactor	SS	Shield Skirt Raise Redundant Contactor	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 32A Rev J	Siemens	3TF4222-0AK6	ITP048D	3/6 SS Qual	N/A	CGI-SNF-D-MHM-48	P62, 88, 89	
15	TLPDY	Contactor	SS	Turret Locking Pin Disengage Redundant Contactor	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 28 Rev J	Siemens	3TF4222-0AK6	ITP048D	3/6 SS Qual	N/A	CGI-SNF-D-MHM-48	P66, 67, 21, 26	
15	TRLC	Contactor	SS	Turret Rotate Contactor	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 25A Rev K	Siemens	3TF4422-0AK6	ITP047	Complete	N/A	CGI-SNF-D-MHM-47	P66, 21, 26	
15	BLC	Contactor	SS	Bridge Line Contactor	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 24A Rev G	Siemens	3TF4611-0AK6	BTP019A	Complete	N/A	CGI-SNF-D-MHM-19	P62, 03, 05, 09, 10	
15	MHLC	Contactor	SS	MCO Hoist Line Contactor	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 8 Rev L	Siemens	3TF4611-0AK6	BTP019C	Complete	N/A	CGI-SNF-D-MHM-19	P09, 21, 26, 57, 61, 62, 63, 65, 85	
15	TLC	Contactor	SS	Trolley Line Contactor	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 21 Rev L	Siemens	3TF4611-0AK6	BTP019B	Complete	N/A	CGI-SNF-D-MHM-19	P62, 03, 09, 10	
15	IAXM	Relay	SS	Impact Absorber Exchange Mode	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 4 Rev K	Siemens	3TH4310-0AK6	ITP023A	Complete	N/A	CGI-SNF-D-MHM-23	P62, 86, 61, 63	IAXM(1) - Idec relay in parallel
15	MCO	Relay	SS	MCO Mode	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 4 Rev K	Siemens	3TH4310-0AK6	ITP023C	Complete	N/A	CGI-SNF-D-MHM-23	P62, 86, 61, 63, 85	MCO(1) - Idec relay in parallel
15	TPXM	Relay	SS	Tube Plug Exchange Mode	FR(s): Inhibit(s) is/are operable. PC(s): Operability of device and interlock circuit.	EB-33056 Sht 4 Rev K	Siemens	3TH4310-0AK6	ITP023B	Complete	N/A	CGI-SNF-D-MHM-23	P62, 86, 61, 63	

Legend:
ALARA = as low as reasonably achievable
CGI = CGI Dedication Package No.
CSB = Canister Storage Building
DBA = Design Basis Accident
DBE = Design Basis Earthquake
FR(s) = Functional Requirement(s)
HEPA = High-Efficiency Particulate Air (filter)
IAXM = Impact Absorber Exchange Mode
MCO = Multi-Canister Overpak
MCO = MCO Mode
MHM = MCO Handling Machine
NPH = Natural Phenomena Hazard
PC(s) = Performance Criteria(s)
SC = Safety Class
SS = Safety Significant
SSC = Structure, System, and Component
SYS = CSB System No.
TPXM = Tube Plug Exchange Mode

References:
1 100% Design Report, ESL/R(96)085, Rev D, Dated August 1999
2 Interlock Requirements Schedule ESL/R(97)9, Issue F, dated 8/3/99
3 FSAR, Table 2-1, "Multi-Canister Overpack Process Steps and Possible Drop, Shear, or Impact Scenarios." Dated 11/4/99
4 FSAR, Table 4-1, "Summary of Safety-Class Systems, Structures, and Components". Dtd 11/2/99
5 FSAR, Table 4-11, "Summary of Safety-Significant Systems, Structures, and Components". Dtd 11/2/99
6 E-Mail from Mahaffey, Michael K., "Impact of current safety position on MHM CGI Program", dated 11/4/99, annotated by Ralph Crewe
7 Updated SNF CSB Equipment List, dated 3/11/99
8 Electrical Elementary Drawings; EB-33056, Multiple sheets
9 CSB System Nos. Memo from Douglas M. Black dated 11/11/99

Section 6
CGI Dedication and Test Plan Records

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Manufacturer or Vendor	Model No.	CGI	Test Procedure No.
Honeywell	5LS1-4PG	CGI-SNF-D-MHM-02	ITP002A
Gemco	SD0410901	CGI-SNF-D-MHM-03A	ITP003AX
Gemco	SD0410901	CGI-SNF-D-MHM-03A	ITP003AY
Gemco	SD0334900	CGI-SNF-D-MHM-03B	ITP003B1X
Gemco	SD0334900	CGI-SNF-D-MHM-03B	ITP003B1Y
Gemco	SD0336100	CGI-SNF-D-MHM-03B	ITP003B2X
Gemco	SD0336100	CGI-SNF-D-MHM-03B	ITP003B2Y
Gemco	1989-A-16-R-14-64-E-R	CGI-SNF-D-MHM-03C	ITP003CX
Gemco	1989-A-16-R-14-64-E-R	CGI-SNF-D-MHM-03C	ITP003CY
Gemco	1989-O-114-M-S	CGI-SNF-D-MHM-03C	ITP003CX
Gemco	1989-O-114-M-S	CGI-SNF-D-MHM-03C	ITP003CY
Honeywell	SL1-E	CGI-SNF-D-MHM-08	ITP007C
Honeywell	SL1-E	CGI-SNF-D-MHM-08	ITP007D
Honeywell	SL1-E	CGI-SNF-D-MHM-08	ITP007E
Honeywell	SL1-E	CGI-SNF-D-MHM-08	ITP007F
CCS Industrial	604G3	CGI-SNF-D-MHM-09	BTP009
CCS Industrial	604G3	CGI-SNF-D-MHM-09	BTP009
CCS Industrial	604G3	CGI-SNF-D-MHM-09	BTP009
CCS Industrial	604G3	CGI-SNF-D-MHM-09	BTP009
Honeywell	1LS19-4C	CGI-SNF-D-MHM-11	ITP011A
Honeywell	1LS19-4C	CGI-SNF-D-MHM-11	ITP011B
Omron	E3V-R2C43S	CGI-SNF-D-MHM-12	ITP012X
Omron	E3V-R2C43S	CGI-SNF-D-MHM-12	ITP012Y
Omron	S3D2-CK-US	CGI-SNF-D-MHM-12	ITP012X
Omron	S3D2-CK-US	CGI-SNF-D-MHM-12	ITP012Y
Honeywell	LSYDC3K	CGI-SNF-D-MHM-13	ITP013C
Honeywell	LSYDC3K	CGI-SNF-D-MHM-13	ITP013D
Honeywell	LSYDC3K	CGI-SNF-D-MHM-13	ITP013B
Sensotec	RM/C717-01	CGI-SNF-D-MHM-16A	ITP016AX2
Sensotec	RM/C717-01	CGI-SNF-D-MHM-16A	ITP015AY2
M/D TOTCO	2077-034	CGI-SNF-D-MHM-16B	CTP59,60
M/D TOTCO	2077-034	CGI-SNF-D-MHM-16B	CTP59,60
M/D TOTCO	2078-101	CGI-SNF-D-MHM-16B	CTP59,60
M/D TOTCO	2078-101	CGI-SNF-D-MHM-16B	CTP59,60
Action Pak	AP1080-2000	CGI-SNF-D-MHM-16C	BTP016C
Siemens	3TF4611-0AK6	CGI-SNF-D-MHM-19	BTP019A
Siemens	3TF4611-0AK6	CGI-SNF-D-MHM-19	BTP019C
Siemens	3TF4611-0AK6	CGI-SNF-D-MHM-19	BTP019B
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020C
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020C
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020C
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D

Manufacturer or Vendor	Model No.	CGI	Test Procedure No.
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020C
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020C
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020C
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020C
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020C
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020C
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020C
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-20A	ITP020D
Honeywell	LSYAC3K	CGI-SNF-D-MHM-22	ITP022B
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-23	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-23	ITP020D
Idec	RH4B-UL-AC120V	CGI-SNF-D-MHM-23	ITP020C
Siemens	3TH4310-0AK6	CGI-SNF-D-MHM-23	ITP023A
Siemens	3TH4310-0AK6	CGI-SNF-D-MHM-23	ITP023C
Siemens	3TH4310-0AK6	CGI-SNF-D-MHM-23	ITP023B
Fortress Solenoid Interlock Assy w/Craig Derricott switch & contacts	H31SS w/120 VAC Solenoid, 3PDT Selector Switch	CGI-SNF-D-MHM-32	ITP032
Ashcroft	45 1009 S 02L 2000	CGI-SNF-D-MHM-37	BTP037
Ashcroft	45 1009 S 02L 2000	CGI-SNF-D-MHM-37	BTP037
Siemens	3TF4422-0AK6	CGI-SNF-D-MHM-47	ITP047
Siemens	3TF4222-0AK6	CGI-SNF-D-MHM-48	ITP048D
Siemens	3TF4222-0AK6	CGI-SNF-D-MHM-48	ITP048A
Siemens	3TF4222-0AK6	CGI-SNF-D-MHM-48	ITP048B
Siemens	3TF4222-0AK6	CGI-SNF-D-MHM-48	ITP048C
Siemens	3TF4222-0AK6	CGI-SNF-D-MHM-48	ITP048D
Siemens	3TF4222-0AK6	CGI-SNF-D-MHM-48	ITP048D
Honeywell	SL1-H	CGI-SNF-D-MHM-7	ITP007G
Honeywell	SL1-H	CGI-SNF-D-MHM-7	ITP007H
Honeywell	SL1-H	CGI-SNF-D-MHM-7	ITP007
Honeywell	SL1-H	CGI-SNF-D-MHM-7	ITP007
Honeywell	SL1-E	CGI-SNF-D-MHM-8	ITP007A
Honeywell	SL1-E	CGI-SNF-D-MHM-8	ITP007B

CGI-SNF-O-MHM-020A

Commercial Grade Item Upgrade Dedication Form

Rev. No. 3

ECN No. N/A CGI No. CGI-SNF-D-MHM-020A

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Title: **Various MHM P Interlocks – Idec Relay #RH4B-UL-AC120V**

Section 1 Part Information

Item No.: **N/A**	Manufacturer: **N/A**	Supplier: **N/A**
Mfg. Part/Model No.: **N/A**	Supplier's P/N: **N/A**	
Part Description: **N/A**		
End Use Description: **N/A**		

ORIGINAL

Section 2a Component Information

Equipment No.: **See Attachment 1**	Specification No.: **Ederer F-2566, Foster Wheeler MJX-SDX 452656**	Manufacturer: **Idec**	Past P.O. No.: **N/A**
Manufacturer's Part/ Model No.: **RH4B-UL-AC120V**	Equipment Supplier (if different from manufacturer): **Alstrom, Foster Wheeler**		Equip. Supplier's Part No.: **N/A**

Component Description: **120 VAC General Purpose Midget Relay with indicator light, 4PDT, blade terminals, DIN rail mount. Located in various panels on the MHM. Used to control the MCO hoist raising, lowering permits and hoist line contactor.**

Section 2b Commercial Availability of the Item

1. *Is the Item available from a catalogue from a qualified NQA1 supplier or ISO 9000 supplier (coordinate with project CGI interface Engineer or BTR)?*

   [ ] YES (go to #2 below) [X] NO (go to procedure step 6.3.2, proceed to dedicate Item)

   If not available from a qualified NQA1 supplier, is it available from an ISO 9000 supplier? (coordinate with project CGI Interface Engineer or BTR)

   [ ] YES (go to #2 below, procedure step 6.3.2, dedicate Item) [X] NO (procedure step 6.3.2, dedicate Item)

2. List of Candidate qualified suppliers or ISO 9000 suppliers: **N/A**

3. Recommended Procurement Strategy (coordinate with project DA or BTR): **N/A**

Section 2c CGI Determination

CGI Determination Questions:

#1: Is the Item subject to design or specification requirements that are unique to nuclear facilities or activities?

[ ] YES (the Item is not commercial grade) [X] NO (continue)

#2: Is the Item used in applications other than nuclear facilities or activities?

[ ] NO (the item is not commercial grade) [X] YES (continue)

#3: Is the Item ordered from manufacturer/supplier on the basis of specifications set forth in the manufacturer's catalog?

[ ] NO (the item is not commercial grade) [X] YES (continue)

[X] All three criteria have been satisfied. The Item meets the definition of commercial grade.

Commercial Grade Item Upgrade Dedication Form

ECN No. **N/A** CGI No. **CGI-SNF-D-MHM-020A**

Title: **Various MHM P Interlocks – Idec Relay #RH4B-UL-AC120V**

Section 2d Reason for Dedication

The above Commercial Grade (CG) described item is being Dedicated for use in the application cited for the following reason(s):

	Item is being purchased from a non ESL manufacturer supplier as CG to be used in a Safety Class application.
	Item is being purchased from a non ESL manufacturer supplier as CG to be used in a Safety Significant application.
(X)	Item was purchased from a non ESL manufacturer supplier as CG to be used in a Safety Class application.
X	Item was purchased from a non ESL manufacturer supplier as CG to be used in a Safety Significant application.
	Other ('like-for-like', similar, substitution, replacement evaluation)

LES 4/24/00

Section 3 Failure Effects Evaluation

A. Part/Component Safety Function:

1. **Relay contacts must open the circuit to disable the MCO hoist lowering permit, the MCO hoist hoisting permit or the MCO hoist line contactor.**

B. Part/Component Functional Mode:

Safety Function #1: [X] Active [ ] Passive

Safety Function #2: [ ] Active [ ] Passive

Safety Function #3: [ ] Active [ ] Passive

Active - Mechanical or Electrical change of state is required to occur for the component to perform its safety function

Passive – Change of state is not required for the component to perform its safety function

C. Host Component Safety Function (if applicable):

1. **Relays are used in control circuits providing interlocks that ensure proper MCO grapple and hoist operation for protection against events that could result in an MCO drop, including P57, P61, P62, P63, P65, and P66**

D. Failure Mode(s) and the effects on component or system safety function (see Worksheet 1):

1. **Contact resistance out of spec results in overheating and welding of contacts**
2. **Hot short across contacts results in failure to open the circuit**
3. **Binding of contacts results in failure to open circuit**

Section 4 Environmental & Natural Phenomena Hazard Design

Environmental Qualification Required: Yes [ ] No [X]	If yes: Environmental Qualification Requirements Limiting Environmental Conditions: Required Safety Functions: Qualification Period:
Natural Phenomena Hazard (NPH) Design Required: Yes [ ] No [X]	If yes: NPH Design Requirements Performance Category: NPH Design Req'ts.: Required Safety Functions:

Section 5 Component Functional Classification

	Safety Class (SC)		General Service (GS)	X	Safety Significant (SS)

If part/component classification is different from host component/system, document basis. **N/A**

Sections 6 and 7 (Reserved)

Section 8 References (for Functional Classification)

National Codes/Standards: **N/A**

Safety Analysis Report (SAR): **HNF-3672, Rev. 0**

Drawings: **Ederer, Inc. EB-33056, Sht 8 (primary with various others)**

Vendor Manual/Manufacturer/Supplier Information: **Idec General Purpose Relays, section D2**

Other: **ALSTOM ESL/R (96) 065 – Rev. D, 100% Design Submittal – June 1998**

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Section 9 Critical Characteristics

Critical Characteristics:	Acceptance Criteria/Tolerances	Acceptance Method	ID	Function
1. Item Identification Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
Manufacturer	**Idec**	**1, IN**	**X**	
Model Number	**RH4B-UL-AC120V**	**1, IN**	**X**	
2. Physical Critical Characteristics (for reasonable assurance that the Item delivered is the Item specified)				
Terminal Configuration	~~**Blade Terminals**~~ and 4DPT CGI 4-11-00	**1, IN**	**X**	
3 Performance Critical Characteristics (for reasonable assurance that the Item will perform its intended safety function(s))				
Current carrying capability	**0.5V max. voltage drop across closed contacts at 10 amps VAC, resistive**	**1, T**		**X**
Insulation resistance	**10 Megohm min across open contact terminals and terminals to ground at 500 VDC**	**1, T**		**X**
Mechanical Operation	**Contacts change state at max pickup voltage of 96VAC and at min drop-out voltage of 36VAC**	**1, T**		**X**

4. Notes and Legend:

Rev. 1: Page 3: corrected function column; Page 7: added data to "Method T/IN" Column; Page 9: Revised Attachment; General: new forms

Rev. 2: Pages 3, 6, 7: revised Current carrying capability acceptance criteria to "0.5V max. voltage drop across closed contacts at 10 amps VAC, resistive"; Pages 3, 6, 7: revised Mechanical Operation acceptance criteria to " Contacts change state at max pickup voltage of 96VAC and at min drop-out voltage of 36VAC "

Rev 3 issued to conform equipment number list attachment to the SEL and add slave relays.

Acceptance Method (Acc Meth):
1. Special Test and Inspection:
   - 1, IN for Inspection
   - 1,T for Test
2. Commercial Grade Survey
3. Source Verification
1. Vendor/Item History

Section 10 Initial Review and Approval

Approvals:

Designated Engineer: ERG Cox 4/6/00

Design Authority: Irving Swenson 4/6/00

QA Engineer: Stephen Scott Mosh 4-6-2000

Commercial Grade Item Upgrade Dedication Form	Rev. No. 3
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WORKSHEET 1
DETERMINATION OF FAILURE MECHANISMS/MODES

Section 1			
Typical Failure Mechanisms	Definition	X = Applicable to Component under Evaluation	
		X?	Indicate Failure Mode
Fracture	Separation of a solid accompanied by little or no macroscopic plastic deformation.		
Corrosion	The gradual deterioration of a material due to chemical or electrochemical reactions, such as oxidation, between the material and its environment.		
Erosion	Destruction of materials by the abrasive action of moving fluids, usually accelerated by the presence of solid particles carried with the fluid.		
Open Circuit	An electrical circuit that is unintentionally broken so that there is no complete path for current flow.		
Short Circuit	An abnormal connection by which an electrical current is connected to ground, or to some conducting body, resulting in excessive current flow.	X	**Failure to open the circuit by contact welding or hot short across the contact base.**
Blockage	Clogging of a filtering medium resulting in the inability to perform its purification function or blockage of flow.		
Seizure	Binding of a normally moving item through excessive pressure, temperature, friction, jamming.	X	**Results in failure of contacts to open.**
Unacceptable Vibration	Mechanical oscillations produced are beyond the defined permissible limits due to unbalancing, poor support, or rotation at critical speeds.		
Loss of Properties	A loss of mechanical and physical properties of a material due to exposure to high temperatures, radiation exposure.		
Excess Strain	Under the action of excessive external forces the material of the part has been deformed or distorted.		
Mechanical Creep	From prolonged exposure to high temperature and stress, the object will show a slow change in its physical (shape and dimension) and mechanical characteristics.		
Ductile Fracture	Fracture characterized by tearing of metal accompanied by appreciable gross plastic deformation.		
Section 2 Additional Failure Modes Applicable to the Component Under Evaluation			
1.			
2.			
3.			

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Checklist 1 - Acceptance Method 1 - Special Test/Inspection Verification

SECTION 1	
Item Description: **Idec Relay** System #: **MHM**	Equip #: **See Attachment 1** Model #: **RH4B-UL-AC120V**
Manufacturer (Address/Phone): **Idec** **(800) 262-4332** P.O. #	Supplier (Address/Phone): ~~ALSTROM~~, FOSTER WHEELER Alstom CES 4-11-00

SECTION 2 CRITICAL CHARACTERISTICS TO BE VERIFIED BY METHOD 1.

Insp	Test	PIT	
X			1. **Manufacturer**
X			2. **Model Number**
X			3. **Terminal Configuration**
	X		4. **Current Carrying Capability**
	X		5. **Insulation Resistance**
	X		6. **Mechanical Operation**

SECTION 3 BY INSPECTION ** See Attachment H, Table H-1 of Desk Instruction for Sampling Size, References (See Section 7)*

Characteristic: **Manufacturer** Sample Size*: 100%
Acceptance Criteria: **Idec**
Receipt Inspection Plan / Report #: TP-020C, D*

Characteristic: **Model Number** Sample Size*: 100%
Acceptance Criteria: **RH4B-UL-AC120V**
Receipt Inspection Plan / Report #: TP-020C, D*

Characteristic: **Terminal Configuration** Sample Size*: 100%
Acceptance Criteria: **Blade Terminals**
Receipt Inspection Plan / Report #: TP-020C, D*

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SECTION 4 BY SPECIAL TEST • See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)	
Characteristic for Test: **Current carrying Capability**	Samp Size*: [X]Normal[ ]Reduced[ ]Tightened
Acceptance Criteria: ***0.5V max. voltage drop across closed contacts at 10 amps VAC, resistive***	
Actual Test Value: See TP020C*	Test Plan and Report #: TP020C
Characteristic for Test: **Insulation Resistance**	Samp Size*: [X]Normal[ ]Reduced[ ]Tightened
Acceptance Criteria: **10 Megohms min across open contact terminals and terminals to ground (500VDC megger)**	
Actual Test Value: See TP020C*	Test Plan and Report #: TP020C
Characteristic for Test: **Mechanical Operation**	Samp Size*: [X]Normal[ ]Reduced[ ]Tightened
Acceptance Criteria: **Contacts change state at max pickup voltage of 96VAC and at min drop-out voltage of 36VAC**	
Actual Test Value: See TP	Test Plan and Report #: TP020C

*Full hos is: CGI-SNF-D-MHM-020C
" " " -020D

SECTION 5 TEST / INSPECTION SUMMARY (Acceptance Method 1)

1. SUMMARY OF VERIFIED CRITICAL CHARACTERISTICS, THEIR VERIFICATION METHODS, AND RESULTS

ITEM DESCRIPTION: Relay

Critical Characteristics				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/IN	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
Manufacturer	Idec	X		1, IN	TP020C, D	NA	15	0	XWEST	Larry W. Price	4/10/00
Model Number	RH4B-UL-AC120V	X		1, IN	↓	↓	↓	↓	↓	↓	↓
Terminal Configuration	Blade Terminals	X		1, IN	↓	↓	↓	↓	↓	↓	↓
Current Carrying Capability	0.5V max. voltage drop across closed contacts at 10 amps VAC, resistive		X	1, T	TP020C	NA	15	0	XWEST	Larry W. Price	4/10/00
Insulation Resistance	10 Megohms min across open contact terminals and terminals to ground (500VDC megger)		X	1, T	↓	↓	↓	↓	↓	↓	↓
Mechanical Operation	Contacts change state at max pickup voltage of 96VAC and at min drop-out voltage of 36VAC		X	1, T	↓	↓	↓	↓	↓	↓	↓

2. DISPOSITION OF UNVERIFIED OR FAILED CRITICAL CHARACTERISTICS

Critical Characteristic	Disposition

3. SIGNATURE INDICATES ALL CRITICAL CHARACTERISTICS VERIFIED SATISFACTORY OR ACCEPTABLY DISPOSITIONED AND COMMERCIAL GRADE DEDICATION IS SATISFACTORY AND COMPLETE.

See Test Plans TP-020C, D cited above. CES 4-11-00

Testing Agency Approval: NR CES 4/11/00 Date

Testing Agency QA Engineer: NR CES 4-11-00 Date

BUYER VERIFICATION

Design Authority: Craig Swenson Date 4/24/00

QA Engineer: Stephen Scott Moss Date 4-24-2000

Commercial Grade Item Upgrade Dedication Form	Rev. No. 3
ECN No. N/A CGI No. CGI-SNF-D-MHM-020A Title: Various MHM P Interlocks – Idec Relay #RH4B-UL-AC120V	Page 8 of 9

SECTION 6 CONTACTS / PHONE NUMBERS		
	Name	Phone
Design Authority	CRAIG SWENSON	376-0288
QA		
QC		
Cog - Engineer		
CGI Engineer		
Procurement Engineer		
Other		

SECTION 7 SUPPORTING DOCUMENTATION FOR THIS CHECKLIST		
Initial Procurement Documents		**For Critical Characteristics**
	Drawings:	
X	Manuals (specify type & number): **Idec General Purpose Relays, RH Series, Section D2**	**All**
	Design Calculations	
	Installation Instructions	
	Operation Instructions	
	Calibration Instructions	
	Manufacturer's Recommended Spare Parts List	
	Other:	
Procurement Documents		**For Critical Characteristics**
	Certificate of Conformance/Compliance	
	Seismic Qualification Certificate	
	Environmental Qualification Certificate	
	Test Report (s):	
	Inspection Report (s):	
	CMTRs for ASME Pressure Retaining Materials	
	Valve Seat Leakage Report	
	Weld Record	
	Material Traceability Record	
	Other:	

Commercial Grade Item Upgrade Dedication Form	Rev. No. 3
ECN No. N/A CGI No. CGI-SNF-D-MHM-020A Title: Various MHM P Interlocks – Idec Relay #RH4B-UL-AC120V	Page 9 of 9

Attachment 1
Section 2a Equipment Numbers

BF
BSC1AX
BSC1AY
BSC2AX
BSC2AY
IAXM(1)
IAXMY
LS2X
LS2Y
LS4Y
MCO(1)
MCOY(1)
MCOY(2)
MGCLX(1)
MGCLX(2)
MGCLY
MGCX
MGCY
MGNCLX(1)
MGNCLY
MGNCY
MGUD
MHDX
MHF
MW11
MW15
P21X(1)
P21X(2)
P21Y(1)
P21Y(2)
P26X(1)
P26X(2)
P2X(1)
P2X(2)
P2Y
P6X(1)
P6X(2)
P6Y(1)
P6Y(2)
PGCLX(1)
PGCLX(2)
PGCLY(1)
PGCLY(2)
PGEX
PGEY
PGLX
PGLY
PGNEX
PGNEY
PGOPX(1)
PGOPX(2)
PGOPY(1)
PGOPY(2)
PHIR
PHULX(1)
PHULX(2)
PHULX(3)
PHULX(4)
PHULY(1)
PHULY(2)
PHULY(3)
SSRD
TF
TPXMY
TRD
TSP1FIX
TSP1FIY
TSP2FIX
TSP2FIY

Total = 69

Note: Equipment ID Nos. with 1, 2, 3, 4 in parenthesis after the ID nos. are relays in parallel with others of the same ID. e.g. PHULX(1), PHULX(2), PHULX(3) & PHULX(4) are 4 relays whose coils are wired in parallel with each other, the SEL listing for this component is PHULX.

In-Situ Inspection Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI. Eng	DA	QA Post Review*

* QA Post Review of Individual Revisions is allowed

ORIGINAL

In-Situ Inspection Procedure

Inspection Procedure Approval (Obtain prior to inspection):

This procedure documents the visual verification of the identification critical characteristics of the remaining specimen which were in-situ tested on a sampling basis as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) Craig Swenson Date: 4-6-00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Electrician	N/A	N/A	N/A	N/A
Electrician Quality Control	N/A	N/A	N/A	N/A
Design Authority Representative	LARRY W. PRICE	XNEST		JWP

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment.

INSPECTION PROCEDURE:

1.0 Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	BSC1AY	**BSC1AY**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	BSC2AX	**BSC2AX**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	BSC2AY	**BSC2AY**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	IAXMY	**IAXMY**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	LS2X	**LS2X**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4BUL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	LS2Y	**LS2Y**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	LS4Y	**LS4Y**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations

Dedication Test Plan – IST Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-020-TP-020D
Test Specimen: Idec RH4B-UL-AC120V, Eqmt. No.:Various Page 4 of 14

Equipment ID No.:	MCOY (1	**MCOY(1)**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	MGCLX(1)	**MGCLX(1)**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	MGCLX(2)	**MGCLX(2)**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	MGCX	**MGCX**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	MGCY	**MGCY**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	MGNCLX(1)	**MGNCLX(1)**	

Dedication Test Plan – IST **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-020-TP-020D
Test Specimen: Idec RH4B-UL-AC120V, Eqmt. No.:Various **Page 5 of 14**

Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	MGNCLY	**MGNCLY**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	MGNCY	**MGNCY**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	MGUD	**MGUD**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	MHDX	**MHDX**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	MW11	**MW11**	
Manufacturer:	IDEC	**Idec**	

Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	P21X1	**P21X(1)**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	P21X2	**P21X(2)**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	P21Y1	**P21Y(1)**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	P21Y2	**P21Y(2)**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	P26X1	**P26X(1)**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	

Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	P26X2	**P26X(2)**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	P2X(2)	**P2X(2)**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	P2Y	**P2Y**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	P6X(2)	**P6X(2)**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	P6Y1	**P6Y(1)**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Dedication Test Plan – IST **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-020-TP-020D
Test Specimen: Idec RH4B-UL-AC120V, Eqmt. No.:Various

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	P6Y2	**P6Y(2)**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	PGCLX(1)	**PGCLX(1)**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	PGCLX(2)	**PGCLX(2)**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	PGCLY1	**PGCLY(1)**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	PGCLY2	**PGCLY(2)**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	PGEY	**PGEY**	

Dedication Test Plan – IST Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-020-TP-020D
Test Specimen: Idec RH4B-UL-AC120V, Eqmt. No.:Various Page 9 of 14

Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	PGLX	**PGLX**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	PGNEX	**PGNEX**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	PGNEY	**PGNEY**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	PGOPX(1)	**PGOPX(1)**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	PGOPX(2)	**PGOPX(2)**	
Manufacturer:	IDEC	**Idec**	

Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	PGOPY1	**PGOPY(1)**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	PGOPY 2	**PGOPY(2)**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	~~PHIR~~ PHIR	**PHIR**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	PHULX(1)	**PHULX(1)**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	PHULX(2)	**PHULX(2)**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	

Dedication Test Plan – IST **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-020-TP-020D
Test Specimen: Idec RH4B-UL-AC120V, Eqmt. No.:Various **Page 11 of 14**

Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	PHULX(3)	**PHULX(3)**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	PHULX(4)	**PHULX(4)**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	PHULY1	**PHULY(1)**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	PHULY2	**PHULY(2)**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	SSRD	**SSRD**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Dedication Test Plan – IST **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-020-TP-020D
Test Specimen: Idec RH4B-UL-AC120V, Eqmt. No.:Various

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	TF	**TF**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	TPXMY	**TPXMY**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	TSP1FIY	**TSP1FIY**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	TSP2F1X	**TSP2FIX**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	TSP2FIY	**TSP2FIY**	
Manufacturer:	IDEC	**Idec**	
Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	
Contact Configuration:	4PDT	**4PDT Contacts**	

Dedication Test Plan – IST **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-020-TP-020D
Test Specimen: Idec RH4B-UL-AC120V, Eqmt. No.:Various **Page 13 of 14**

2.0 Record: Date /Time of Test Beginning: 830AM 4/7/00

2.1 Record: Date /Time of Test End: 4/7/00 9:22 AM

3.0 References

3.1 Elementary Wiring Drawings: EB-33056

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

ACCEPTANCE CRITERIA MET.

Notes:

N/A

Design Authority Representative (signature) ______ Date: 4/7/00

~~Craig Swenson 4/7/00~~ CES 4/7/00

Dedication Test Plan – IST **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-020-TP-020D
Test Specimen: Idec RH4B-UL-AC120V, Eqmt. No.:Various **Page 14 of 14**

Completed Test Evaluation Approval:

Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Craig Swenson Date: 4/7/00

QA/QC (signature) Stephen Scott Mosi Date: 4-7-2000.

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI Eng	DA	QA Post Review*

* QA Post Review of Individual Revisions is allowed

In-Situ Test Procedure

ORIGINAL

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) YMP Craig Swenson Date: 3/22/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Bechaven	Michael Cram	MRC
Electrician	DANIEL K. York	P.G.E	Daniel K. York	D.K.Y
Electrician Quality Control	Stephen R. Cawley	PGE	Stephen R Cawley	SRC
Design Authority Representative	Larry W. Price	NWEST		YMP
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Power Supply capable of 10 amps @ 120 VAC.
Megger Instrument capable of 500 VDC Test Voltage
Adjustable Voltage Power supply capable of 0 to 120 VAC minimum
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: Avo BM89/2 I.D.: 6410-889 Calib. Due date: 02-09-01

Test Instrument type: FLUKE 787 I.D.: BAT 107 Calib. Due date: 05-28-00

Test Instrument type: HP3457A I.D.: BAT 123 Calib. Due date: 07-29-00

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

Relay Selection List

No.	Eqmt ID No.	Panel No.	Dwg. Reference
→ 1	P2X(1)	201	ED-33065 Sht. 1
2	P6X(1)	201	ED-33065 Sht. 1
3	IAXM(1)	201	ED-33065 Sht. 1
4	MCO(1)	201	ED-33065 Sht. 1
5	MHF	202	ED-33066 Sht. 1
6	PGEX	202	ED-33066 Sht. 1
7	MW15	202	ED-33066 Sht. 1
8	BF	203	ED-33067 Sht. 1
9	BSC1AX	203	ED-33067 Sht. 1
10	TSP1FIX	204	ED-33068 Sht. 1
11	TRD	204	ED-33068 Sht. 1
12	MCOY(2)	205	ED-33069 Sht. 1
13	MGCLY	205	ED-33069 Sht. 1
14	PHULY(3)	205	ED-33069 Sht. 1
15	PGLY	205	ED-33069 Sht. 1

TEST PROCEDURE:

For this In-Situ Test, the relay and its socket must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of the relay and its socket.

1.0 Select a relay from the list above. Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	P2X(1)	Select from List provided above	Acc
Manufacturer:	Idec	Idec	Acc
Relay Model:	OK	RH4B-UL-AC120V	Acc
Contact Configuration:	OK	4PDT Contacts	Acc
Socket Model:	OK	SH4B-05	Acc

2.0 Perform the following testing steps:

2.1 Record: Date /Time of Test Beginning: 03-28-00 1:50 pm

2.1.1 Complete the Lifted Lead Log prior to removing the plug-in relay and its associated socket.

2.2 Insulation Resistance Test

2.2.1 Setup the **Relay Socket** specimen for insulation resistance testing. Attach Relay Socket in its normal mounting configuration to grounded fixture.

2.2.2 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the relay socket test specimen. Record the socket data.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1	2	>100Gohm	> 10 Megohms	Acc
1	3	>100Gohm	> 10 Megohms	Acc
1	4	>100Gohm	> 10 Megohms	Acc
1	5	>100Gohm	> 10 Megohms	Acc
1	6	>100Gohm	> 10 Megohms	Acc
1	7	>100Gohm	> 10 Megohms	Acc
1	8	>100Gohm	> 10 Megohms	Acc
1	9	>100Gohm	> 10 Megohms	Acc
1	10	>100Gohm	> 10 Megohms	Acc
1	11	>100Gohm	> 10 Megohms	Acc
1	12	>100Gohm	> 10 Megohms	Acc
1	13	>100Gohm	> 10 Megohms	Acc
1	14	>100Gohm	> 10 Megohms	Acc
2	3	>100Gohm	> 10 Megohms	Acc
2	4	>100Gohm	> 10 Megohms	Acc
2	5	>100Gohm	> 10 Megohms	Acc
2	6	>100Gohm	> 10 Megohms	Acc
2	7	>100Gohm	> 10 Megohms	Acc
2	8	>100Gohm	> 10 Megohms	Acc
2	9	>100Gohm	> 10 Megohms	Acc
2	10	>100Gohm	> 10 Megohms	Acc
2	11	>100Gohm	> 10 Megohms	Acc
2	12	>100Gohm	> 10 Megohms	Acc
2	13	>100Gohm	> 10 Megohms	Acc
2	14	>100Gohm	> 10 Megohms	Acc
3	4	>100Gohm	> 10 Megohms	Acc
3	5	>100Gohm	> 10 Megohms	Acc
3	6	>100Gohm	> 10 Megohms	Acc
3	7	>100Gohm	> 10 Megohms	Acc
3	8	>100Gohm	> 10 Megohms	Acc
3	9	>100Gohm	> 10 Megohms	Acc
3	10	>100Gohm	> 10 Megohms	Acc
3	11	>100Gohm	> 10 Megohms	Acc
3	12	>100Gohm	> 10 Megohms	Acc
3	13	>100Gohm	> 10 Megohms	Acc
3	14	>100Gohm	> 10 Megohms	Acc
4	5	>100Gohm	> 10 Megohms	Acc

Dedication Test Plan – IST **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-020-TP-020C
Test Specimen: Idec RH4B-UL-AC120V & SH4B-05, Eqmt. No.: Generic **Page 5 of 9**

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
4	6	> 100Gohm	> 10 Megohms	Acc
4	7	> 100Gohm	> 10 Megohms	Acc
4	8	> 100Gohm	> 10 Megohms	Acc
4	9	> 100Gohm	> 10 Megohms	Acc
4	10	> 100Gohm	> 10 Megohms	Acc
4	11	> 100Gohm	> 10 Megohms	Acc
4	12	> 100Gohm	> 10 Megohms	Acc
4	13	> 100Gohm	> 10 Megohms	Acc
4	14	> 100Gohm	> 10 Megohms	Acc
5	6	> 100Gohm	> 10 Megohms	Acc
5	7	> 100Gohm	> 10 Megohms	Acc
5	8	> 100Gohm	> 10 Megohms	Acc
5	8	> 100Gohm	> 10 Megohms	Acc
5	10	> 100Gohm	> 10 Megohms	Acc
5	11	> 100Gohm	> 10 Megohms	Acc
5	12	> 100Gohm	> 10 Megohms	Acc
5	13	> 100Gohm	> 10 Megohms	Acc
5	14	> 100Gohm	> 10 Megohms	Acc
6	7	> 100Gohm	> 10 Megohms	Acc
6	8	> 100Gohm	> 10 Megohms	Acc
6	9	> 100Gohm	> 10 Megohms	Acc
6	10	> 100Gohm	> 10 Megohms	Acc
6	11	> 100Gohm	> 10 Megohms	Acc
6	12	> 100Gohm	> 10 Megohms	Acc
6	12	> 100Gohm	> 10 Megohms	Acc
6	14	> 100Gohm	> 10 Megohms	Acc
7	8	> 100Gohm	> 10 Megohms	Acc
7	9	> 100Gohm	> 10 Megohms	Acc
7	10	> 100Gohm	> 10 Megohms	Acc
7	11	> 100Gohm	> 10 Megohms	Acc
7	12	> 100Gohm	> 10 Megohms	Acc
7	13	> 100Gohm	> 10 Megohms	Acc
7	14	> 100Gohm	> 10 Megohms	Acc
8	9	> 100Gohm	> 10 Megohms	Acc
8	10	> 100Gohm	> 10 Megohms	Acc
8	11	> 100Gohm	> 10 Megohms	Acc
8	12	> 100Gohm	> 10 Megohms	Acc
8	13	> 100Gohm	> 10 Megohms	Acc
8	14	> 100Gohm	> 10 Megohms	Acc
9	10	> 100Gohm	> 10 Megohms	Acc
9	11	> 100Gohm	> 10 Megohms	Acc
9	12	> 100Gohm	> 10 Megohms	Acc
9	13	> 100Gohm	> 10 Megohms	Acc
9	14	> 100Gohm	> 10 Megohms	Acc
10	11	> 100Gohm	> 10 Megohms	Acc
10	12	> 100Gohm	> 10 Megohms	Acc
10	13	> 100Gohm	> 10 Megohms	Acc
10	14	> 100Gohm	> 10 Megohms	Acc
11	12	> 100Gohm	> 10 Megohms	Acc
11	13	> 100Gohm	> 10 Megohms	Acc
11	14	> 100Gohm	> 10 Megohms	Acc

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
12	13	>100Gohm	> 10 Megohms	Acc
12	14	>100Gohm	> 10 Megohms	Acc
13	14	>100Gohm	> 10 Megohms	Acc
1	Ground	>100Gohm	> 10 Megohms	Acc
2	Ground	>100Gohm	> 10 Megohms	Acc
3	Ground	>100Gohm	> 10 Megohms	Acc
4	Ground	>100Gohm	> 10 Megohms	Acc
5	Ground	>100Gohm	> 10 Megohms	Acc
6	Ground	>100Gohm	> 10 Megohms	Acc
7	Ground	>100Gohm	> 10 Megohms	Acc
8	Ground	>100Gohm	> 10 Megohms	Acc
9	Ground	>100Gohm	> 10 Megohms	Acc
10	Ground	>100Gohm	> 10 Megohms	Acc
11	Ground	>100Gohm	> 10 Megohms	Acc
12	Ground	>100Gohm	> 10 Megohms	Acc
13	Ground	>100Gohm	> 10 Megohms	Acc
14	Ground	>100Gohm	> 10 Megohms	Acc

2.2.3 De-energize and remove test equipment.

2.2.4 Setup the test equipment and **relay** specimen for insulation resistance testing.

2.2.5 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the relay test specimen. Record the relay data below.

Terminal to Terminal / Ground

Desc. Of Terminal	Desc. Of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1-9	2-10	>100Gohm	> 10 Megohms	Acc
1-9	3-11	>100Gohm	> 10 Megohms	Acc
1-9	4-12	>100Gohm	> 10 Megohms	Acc
2-10	3-11	>100Gohm	> 10 Megohms	Acc
2-10	4-12	>100Gohm	> 10 Megohms	Acc
3-11	4-12	>100Gohm	> 10 Megohms	Acc
5	6	>100Gohm	> 10 Megohms	Acc
6	7	>100Gohm	> 10 Megohms	Acc
7	8	>100Gohm	> 10 Megohms	Acc
1-9	Ground	>100Gohm	> 10 Megohms	Acc
2-10	Ground	>100Gohm	> 10 Megohms	Acc
3-11	Ground	>100Gohm	> 10 Megohms	Acc
4-12	Ground	>100Gohm	> 10 Megohms	Acc
5	Ground	>100Gohm	> 10 Megohms	Acc
6	Ground	>100Gohm	> 10 Megohms	Acc
7	Ground	>100Gohm	> 10 Megohms	Acc
8	Ground	>100Gohm	> 10 Megohms	Acc
13	Ground	>100Gohm	> 10 Megohms	Acc
14	Ground	>100Gohm	> 10 Megohms	Acc

2.2.6 De-energize and remove test equipment.

2.3 Operation

2.3.1 Assemble the relay onto its socket. Regulate voltage to the coil of the relay and monitor the maximum pick-up voltage and minimum drop-out voltages.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Pick-up Voltage	68.70 VAC	**96 VAC maximum**	Acc
Drop-out Voltage	65.86 VAC	**36 AC minimum**	Acc

2.3.2 De-energize and remove test equipment.

2.4 Contact Rating Test

2.4.1 Setup the Relay specimen for contact rating testing.

2.4.2 Apply a nominal 10 amps VAC, resistive, across the NC contacts of the test specimen. Record the data in the table below.

Caution: Do not change state of contacts while energized.

Description	Record Data	Acceptance Criteria	Comments/Deviations
1-9	.1168 VAC	**< 0.5 Volts AC drop**	Acc
2-10	.1022 VAC	**< 0.5 Volts AC drop**	Acc
3-11	.0989 VAC	**< 0.5 Volts AC drop**	Acc
4-12	.0963 VAC	**< 0.5 Volts AC drop**	Acc

2.4.3 Energize the relay coil with 120VAC to change the contacts' position of the test specimen.

2.4.4 Apply a nominal 10 amps VAC, resistive, across the **closed** NO contacts of the test specimen. . Record the data in the table below.

Description	Record Data	Acceptance Criteria	Comments/Deviations
5-9	.1150 VAC	**< 0.5 Volts AC drop**	Acc
6-10	.0929 VAC	**< 0.5 Volts AC drop**	Acc
7-11	.0946 VAC	**< 0.5 Volts AC drop**	Acc
8-12	.1319 VAC	**< 0.5 Volts AC drop**	Acc

2.4.5 De-energize and remove test equipment.

2.5 Terminate the test.

2.5.1 Reland the relay and verify reland in accordance with the Lifted Lead Log.

2.5.2 Record: Date /Time of Test End: 03/28/00 2:20 p.m.

3.0 References

3.1 *Panel Wiring Drawings: See list provided with relay selection list (page 3).*

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Acceptance Criteria has been met
Michael Cram 03-28-00

Notes:

Certified Instrumentation Technician (signature) Michael Cram Date: 03-28-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) [signature] Date: 3/28/00

QA/QC (signature) Stephen Scott Mose Date: 4-6-2000

LIFTED LEAD LOG

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
		2405 X	P2X1	6	DKY	3-22-00	SRC	3-22-00	DKY	3-22-00	SRC	3-22-00
		2104 X		5	DKY	3-22-00	SRC	3-22-00	DKY	3-22-00	SRC	3-22-00
		2) 102 X		14	DKY	3-22-00	SRC	3-22-00	DKY	3-22-00	SRC	3-22-00
		2) 5103 X		13	DKY	3-22-00	SRC	3-22-00	DKY	3-22-00	SRC	3-22-00
		Black	RCS2A-6	13	DKY	3-22-00	SRC	3-22-00	DKY	3-22-00	SRC	3-22-00
		Grey	" "	14	DKY	3-22-00	SRC	3-22-00	DKY	3-22-00	SRC	3-22-00
		2105 X		9	DKY	3-22-00	SRC	3-22-00	DKY	3-22-00	SRC	3-22-00
		2406 X		10	DKY	3-22-00	SRC	3-22-00	DKY	3-22-00	SRC	3-22-00

Remarks:

Dedication Test Plan – IST
Test Plan No.: CGI-SNF-D-MHM-020-TP-020C
ORIGINAL
Rev. No. 0
Test Specimen: Idec RH4B-UL-AC120V & SH4B-05, Eqmt. No.: Generic
Page 1 of 9

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI Eng	DA	QA Post Review*

* QA Post Review of Individual Revisions is allowed

In-Situ Test Procedure

ORIGINAL

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) JMP Craig Swenson Date: 3/22/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Belhaven	Michael Cram	MRC
Electrician	DANIEL K. York	P.G.E	Daniel K. York	D.K.Y
Electrician Quality Control	Stephen R. Conley	RE	Stephen R. Conley	SRC
Design Authority Representative	Leroy W. Pierce	XNWSI	JMP	JMP
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Power Supply capable of 10 amps @ 120 VAC.
Megger Instrument capable of 500 VDC Test Voltage
Adjustable Voltage Power supply capable of 0 to 120 VAC minimum
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: AVO MEGGER BM892 I.D.: 6410-889 Calib. Due date: 02-09-01

Test Instrument type: HP 3457A I.D.: BAT 123 Calib. Due date: 7-29-00

Test Instrument type: HP 3457A I.D.: BAT 124 Calib. Due date: 7-30-00

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

Relay Selection List

No.	Eqmt ID No.	Panel No.	Dwg. Reference
1	P2X(1)	201	ED-33065 Sht. 1
→ 2	P6X(1)	201	ED-33065 Sht. 1
3	IAXM(1)	201	ED-33065 Sht. 1
4	MCO(1)	201	ED-33065 Sht. 1
5	MHF	202	ED-33066 Sht. 1
6	PGEX	202	ED-33066 Sht. 1
7	MW15	202	ED-33066 Sht. 1
8	BF	203	ED-33067 Sht. 1
9	BSC1AX	203	ED-33067 Sht. 1
10	TSP1FIX	204	ED-33068 Sht. 1
11	TRD	204	ED-33068 Sht. 1
12	MCOY(2)	205	ED-33069 Sht. 1
13	MGCLY	205	ED-33069 Sht. 1
14	PHULY(3)	205	ED-33069 Sht. 1
15	PGLY	205	ED-33069 Sht. 1

TEST PROCEDURE:

For this In-Situ Test, the relay and its socket must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of the relay and its socket.

1.0 Select a relay from the list above. Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	P6X(1)	Select from List provided above	Acc
Manufacturer:	Idec	Idec	Acc
Relay Model:	OK	RH4B-UL-AC120V	Acc
Contact Configuration:	YES	4PDT Contacts	Acc
Socket Model:	YES	SH4B-05	Acc

2.0 Perform the following testing steps:

2.1 Record: Date /Time of Test Beginning: 03-28-00 1:00p.m

2.1.1 Complete the Lifted Lead Log prior to removing the plug-in relay and its associated socket.

2.2 Insulation Resistance Test

2.2.1 Setup the **Relay Socket** specimen for insulation resistance testing. Attach Relay Socket in its normal mounting configuration to grounded fixture.

2.2.2 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the relay socket test specimen. Record the socket data.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1	2	>100Gohm	> 10 Megohms	Acc
1	3	>100Gohm	> 10 Megohms	Acc
1	4	>100Gohm	> 10 Megohms	Acc
1	5	>100Gohm	> 10 Megohms	Acc
1	6	>100Gohm	> 10 Megohms	Acc
1	7	>100Gohm	> 10 Megohms	Acc
1	8	>100Gohm	> 10 Megohms	Acc
1	9	>100Gohm	> 10 Megohms	Acc
1	10	>100Gohm	> 10 Megohms	Acc
1	11	>100Gohm	> 10 Megohms	Acc
1	12	>100Gohm	> 10 Megohms	Acc
1	13	>100Gohm	> 10 Megohms	Acc
1	14	>100Gohm	> 10 Megohms	Acc
2	3	>100Gohm	> 10 Megohms	Acc
2	4	>100Gohm	> 10 Megohms	Acc
2	5	>100Gohm	> 10 Megohms	Acc
2	6	>100Gohm	> 10 Megohms	Acc
2	7	>100Gohm	> 10 Megohms	Acc
2	8	>100Gohm	> 10 Megohms	Acc
2	9	>100Gohm	> 10 Megohms	Acc
2	10	>100Gohm	> 10 Megohms	Acc
2	11	>100Gohm	> 10 Megohms	Acc
2	12	>100Gohm	> 10 Megohms	Acc
2	13	>100Gohm	> 10 Megohms	Acc
2	14	>100Gohm	> 10 Megohms	Acc
3	4	>100Gohm	> 10 Megohms	Acc
3	5	>100Gohm	> 10 Megohms	Acc
3	6	>100Gohm	> 10 Megohms	Acc
3	7	>100Gohm	> 10 Megohms	Acc
3	8	>100Gohm	> 10 Megohms	Acc
3	9	>100Gohm	> 10 Megohms	Acc
3	10	>100Gohm	> 10 Megohms	Acc
3	11	>100Gohm	> 10 Megohms	Acc
3	12	>100Gohm	> 10 Megohms	Acc
3	13	>100Gohm	> 10 Megohms	Acc
3	14	>100Gohm	> 10 Megohms	Acc
4	5	>100Gohm	> 10 Megohms	Acc

Dedication Test Plan – IST **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-020-TP-020C
Test Specimen: Idec RH4B-UL-AC120V & SH4B-05, Eqmt. No.: Generic **Page 5 of 9**

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
4	6	>100Gohm	> 10 Megohms	Acc
4	7	>100Gohm	> 10 Megohms	Acc
4	8	>100Gohm	> 10 Megohms	Acc
4	9	>100Gohm	> 10 Megohms	Acc
4	10	>100Gohm	> 10 Megohms	Acc
4	11	>100Gohm	> 10 Megohms	Acc
4	12	>100Gohm	> 10 Megohms	Acc
4	13	>100Gohm	> 10 Megohms	Acc
4	14	>100Gohm	> 10 Megohms	Acc
5	6	>100Gohm	> 10 Megohms	Acc
5	7	>100Gohm	> 10 Megohms	Acc
5	8	>100Gohm	> 10 Megohms	Acc
5	8	>100Gohm	> 10 Megohms	Acc
5	10	>100Gohm	> 10 Megohms	Acc
5	11	>100Gohm	> 10 Megohms	Acc
5	12	>100Gohm	> 10 Megohms	Acc
5	13	>100Gohm	> 10 Megohms	Acc
5	14	>100Gohm	> 10 Megohms	Acc
6	7	>100Gohm	> 10 Megohms	Acc
6	8	>100Gohm	> 10 Megohms	Acc
6	9	>100Gohm	> 10 Megohms	Acc
6	10	>100Gohm	> 10 Megohms	Acc
6	11	>100Gohm	> 10 Megohms	Acc
6	12	>100Gohm	> 10 Megohms	Acc
6	12	>100Gohm	> 10 Megohms	Acc
6	14	>100Gohm	> 10 Megohms	Acc
7	8	>100Gohm	> 10 Megohms	Acc
7	9	>100Gohm	> 10 Megohms	Acc
7	10	>100Gohm	> 10 Megohms	Acc
7	11	>100Gohm	> 10 Megohms	Acc
7	12	>100Gohm	> 10 Megohms	Acc
7	13	>100Gohm	> 10 Megohms	Acc
7	14	>100Gohm	> 10 Megohms	Acc
8	9	>100Gohm	> 10 Megohms	Acc
8	10	>100Gohm	> 10 Megohms	Acc
8	11	>100Gohm	> 10 Megohms	Acc
8	12	>100Gohm	> 10 Megohms	Acc
8	13	>100Gohm	> 10 Megohms	Acc
8	14	>100Gohm	> 10 Megohms	Acc
9	10	>100Gohm	> 10 Megohms	Acc
9	11	>100Gohm	> 10 Megohms	Acc
9	12	>100Gohm	> 10 Megohms	Acc
9	13	>100Gohm	> 10 Megohms	Acc
9	14	>100Gohm	> 10 Megohms	Acc
10	11	>100Gohm	> 10 Megohms	Acc
10	12	>100Gohm	> 10 Megohms	Acc
10	13	>100Gohm	> 10 Megohms	Acc
10	14	>100Gohm	> 10 Megohms	Acc
11	12	>100Gohm	> 10 Megohms	Acc
11	13	>100Gohm	> 10 Megohms	Acc
11	14	>100Gohm	> 10 Megohms	Acc

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
12	13	>100Gohm	> 10 Megohms	Acc
12	14	>100Gohm	> 10 Megohms	Acc
13	14	>100Gohm	> 10 Megohms	Acc
1	Ground	>100Gohm	> 10 Megohms	Acc
2	Ground	>100Gohm	> 10 Megohms	Acc
3	Ground	>100Gohm	> 10 Megohms	Acc
4	Ground	>100Gohm	> 10 Megohms	Acc
5	Ground	>100Gohm	> 10 Megohms	Acc
6	Ground	>100Gohm	> 10 Megohms	Acc
7	Ground	>100Gohm	> 10 Megohms	Acc
8	Ground	>100Gohm	> 10 Megohms	Acc
9	Ground	>100Gohm	> 10 Megohms	Acc
10	Ground	>100Gohm	> 10 Megohms	Acc
11	Ground	>100Gohm	> 10 Megohms	Acc
12	Ground	>100Gohm	> 10 Megohms	Acc
13	Ground	>100Gohm	> 10 Megohms	Acc
14	Ground	>100Gohm	> 10 Megohms	Acc

2.2.3 De-energize and remove test equipment.

2.2.4 Setup the test equipment and **relay** specimen for insulation resistance testing.

2.2.5 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the relay test specimen. Record the relay data below.

Terminal to Terminal / Ground

Desc. Of Terminal	Desc. Of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1-9	2-10	>100Gohm	> 10 Megohms	Acc
1-9	3-11	>100Gohm	> 10 Megohms	Acc
1-9	4-12	>100Gohm	> 10 Megohms	Acc
2-10	3-11	>100Gohm	> 10 Megohms	Acc
2-10	4-12	>100Gohm	> 10 Megohms	Acc
3-11	4-12	>100Gohm	> 10 Megohms	Acc
5	6	>100Gohm	> 10 Megohms	Acc
6	7	>100Gohm	> 10 Megohms	Acc
7	8	>100Gohm	> 10 Megohms	Acc
1-9	Ground	>100Gohm	> 10 Megohms	Acc
2-10	Ground	>100Gohm	> 10 Megohms	Acc
3-11	Ground	>100Gohm	> 10 Megohms	Acc
4-12	Ground	>100Gohm	> 10 Megohms	Acc
5	Ground	>100Gohm	> 10 Megohms	Acc
6	Ground	>100Gohm	> 10 Megohms	Acc
7	Ground	>100Gohm	> 10 Megohms	Acc
8	Ground	>100Gohm	> 10 Megohms	Acc
13	Ground	>100Gohm	> 10 Megohms	Acc
14	Ground	>100Gohm	> 10 Megohms	Acc

2.2.6 De-energize and remove test equipment.

2.3 Operation

2.3.1 Assemble the relay onto its socket. Regulate voltage to the coil of the relay and monitor the maximum pick-up voltage and minimum drop-out voltages.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Pick-up Voltage	81.1 VAC	**96 VAC maximum**	Acc
Drop-out Voltage	64.5 VAC	**36 AC minimum**	Acc

2.3.2 De-energize and remove test equipment.

2.4 Contact Rating Test

2.4.1 Setup the Relay specimen for contact rating testing.

2.4.2 Apply a nominal 10 amps VAC, resistive, across the NC contacts of the test specimen. Record the data in the table below.

Caution: Do not change state of contacts while energized.

Description	Record Data	Acceptance Criteria	Comments/Deviations
1-9	.1086 VAC	**< 0.5 Volts AC drop**	Acc
2-10	.0803 VAC	**< 0.5 Volts AC drop**	Acc
3-11	.0855 VAC	**< 0.5 Volts AC drop**	Acc
4-12	.1059 VAC	**< 0.5 Volts AC drop**	Acc

2.4.3 Energize the relay coil with 120VAC to change the contacts' position of the test specimen.

2.4.4 Apply a nominal 10 amps VAC, resistive, across the **closed** NO contacts of the test specimen. . Record the data in the table below.

Description	Record Data	Acceptance Criteria	Comments/Deviations
5-9	.1137 VAC	**< 0.5 Volts AC drop**	
6-10	.1318 VAC	**< 0.5 Volts AC drop**	
7-11	.1562 VAC	**< 0.5 Volts AC drop**	
8-12	.1140 VAC	**< 0.5 Volts AC drop**	

2.4.5 De-energize and remove test equipment.

2.5 Terminate the test.

2.5.1 Reland the relay and verify reland in accordance with the Lifted Lead Log.

2.5.2 Record: Date /Time of Test End: 03-28-00 2:55 p.m

3.0 References

3.1 Panel Wiring Drawings: See list provided with relay selection list (page 3).

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Acceptance Criteria has been met.
Michael Cram
03-28-00

Notes:

Certified Instrumentation Technician (signature) Michael Cram Date: 03-28-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) 3/28/00 Craig Swenson Date: 3/28/00

QA/QC (signature) Stephen Scott Moss Date: 4-3-2000.

LIFTED LEAD LOG

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
ED-33065	1	5141X	P6X(1)	13			SRC	3-28-00			SRC	3-28-00
		Black	RC52A-6	13			SRC	3-28-00			SRC	3-28-00
		Grey	" "	14			SRC	3-28-00			SRC	3-28-00
		2) 102X		14			SRC	3-28-00			SRC	3-28-00
		25A13X		12			SRC	3-28-00			SRC	3-28-00
		2) 101X		8			SRC	3-28-00			SRC	3-28-00

Remarks:

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Dedication Test Plan – IST
Test Plan No.: CGI-SNF-D-MHM-020-TP-020C
ORIGINAL
Rev. No. 0
Test Specimen: Idec RH4B-UL-AC120V & SH4B-05, Eqmt. No.: Generic
Page 1 of 9

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI Eng	DA	QA Post Review*

* QA Post Review of Individual Revisions is allowed

In-Situ Test Procedure

ORIGINAL

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) Craig Swenson Date: 3/22/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Belhaven	Michael Cram	MRC
Electrician	DAN K. YORK	P.G.E	Dan K. York	DKY
Electrician Quality Control	Stephen R. Cowley	RE	Stephen R Cowley	SRC
Design Authority Representative	N/A	N/A	N/A	N/A
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Power Supply capable of 10 amps @ 120 VAC.
Megger Instrument capable of 500 VDC Test Voltage
Adjustable Voltage Power supply capable of 0 to 120 VAC minimum
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: Avo BM80/2 I.D.: 6410-889 Calib. Due date: 02-09-01

Test Instrument type: FLUKE 787 I.D.: BAT 107 Calib. Due date: 05-28-00

Test Instrument type: HP 3457A I.D.: BAT123 Calib. Due date: 07-29-00

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

Relay Selection List

No.	Eqmt ID No.	Panel No.	Dwg. Reference
1	P2X(1)	201	ED-33065 Sht. 1
2	P6X(1)	201	ED-33065 Sht. 1
3	IAXM(1)	201	ED-33065 Sht. 1
4	MCO(1)	201	ED-33065 Sht. 1
5	MHF	202	ED-33066 Sht. 1
6	PGEX	202	ED-33066 Sht. 1
7	MW15	202	ED-33066 Sht. 1
8	BF	203	ED-33067 Sht. 1
9	BSC1AX	203	ED-33067 Sht. 1
10	TSP1FIX	204	ED-33068 Sht. 1
11	TRD	204	ED-33068 Sht. 1
12	MCOY(2)	205	ED-33069 Sht. 1
13	MGCLY	205	ED-33069 Sht. 1
14	PHULY(3)	205	ED-33069 Sht. 1
15	PGLY	205	ED-33069 Sht. 1

TEST PROCEDURE:

For this In-Situ Test, the relay and its socket must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of the relay and its socket.

1.0 Select a relay from the list above. Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	IAXM(1)	Select from List provided above	Acc
Manufacturer:	Idec	Idec	Acc
Relay Model:	RH4B-UL-AC120V	RH4B-UL-AC120V	Acc
Contact Configuration:	OK	4PDT Contacts	Acc
Socket Model:	OK	SH4B-05	Acc

2.0 Perform the following testing steps:

2.1 Record: Date /Time of Test Beginning: 03-28-00 2:30 p.m.

2.1.1 Complete the Lifted Lead Log prior to removing the plug-in relay and its associated socket.

2.2 Insulation Resistance Test

2.2.1 Setup the **Relay Socket** specimen for insulation resistance testing. Attach Relay Socket in its normal mounting configuration to grounded fixture.

2.2.2 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the relay socket test specimen. Record the socket data.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1	2	>100Gohm	> 10 Megohms	Acc
1	3	>100Gohm	> 10 Megohms	Acc
1	4	>100Gohm	> 10 Megohms	Acc
1	5	>100Gohm	> 10 Megohms	Acc
1	6	>100Gohm	> 10 Megohms	Acc
1	7	>100Gohm	> 10 Megohms	Acc
1	8	>100Gohm	> 10 Megohms	Acc
1	9	>100Gohm	> 10 Megohms	Acc
1	10	>100Gohm	> 10 Megohms	Acc
1	11	>100Gohm	> 10 Megohms	Acc
1	12	>100Gohm	> 10 Megohms	Acc
1	13	>100Gohm	> 10 Megohms	Acc
1	14	>100Gohm	> 10 Megohms	Acc
2	3	>100Gohm	> 10 Megohms	Acc
2	4	>100Gohm	> 10 Megohms	Acc
2	5	>100Gohm	> 10 Megohms	Acc
2	6	>100Gohm	> 10 Megohms	Acc
2	7	>100Gohm	> 10 Megohms	Acc
2	8	>100Gohm	> 10 Megohms	Acc
2	9	>100Gohm	> 10 Megohms	Acc
2	10	>100Gohm	> 10 Megohms	Acc
2	11	>100Gohm	> 10 Megohms	Acc
2	12	>100Gohm	> 10 Megohms	Acc
2	13	>100Gohm	> 10 Megohms	Acc
2	14	>100Gohm	> 10 Megohms	Acc
3	4	>100Gohm	> 10 Megohms	Acc
3	5	>100Gohm	> 10 Megohms	Acc
3	6	>100Gohm	> 10 Megohms	Acc
3	7	>100Gohm	> 10 Megohms	Acc
3	8	>100Gohm	> 10 Megohms	Acc
3	9	>100Gohm	> 10 Megohms	Acc
3	10	>100Gohm	> 10 Megohms	Acc
3	11	>100Gohm	> 10 Megohms	Acc
3	12	>100Gohm	> 10 Megohms	Acc
3	13	>100Gohm	> 10 Megohms	Acc
3	14	>100Gohm	> 10 Megohms	Acc
4	5	>100Gohm	> 10 Megohms	Acc

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
4	6	>100Gohm	> 10 Megohms	Acc
4	7	>100Gohm	> 10 Megohms	Acc
4	8	>100Gohm	> 10 Megohms	Acc
4	9	>100Gohm	> 10 Megohms	Acc
4	10	>100Gohm	> 10 Megohms	Acc
4	11	>100Gohm	> 10 Megohms	Acc
4	12	>100Gohm	> 10 Megohms	Acc
4	13	>100Gohm	> 10 Megohms	Acc
4	14	>100Gohm	> 10 Megohms	Acc
5	6	>100Gohm	> 10 Megohms	Acc
5	7	>100Gohm	> 10 Megohms	Acc
5	8	>100Gohm	> 10 Megohms	Acc
5	8	>100Gohm	> 10 Megohms	Acc
5	10	>100Gohm	> 10 Megohms	Acc
5	11	>100Gohm	> 10 Megohms	Acc
5	12	>100Gohm	> 10 Megohms	Acc
5	13	>100Gohm	> 10 Megohms	Acc
5	14	>100Gohm	> 10 Megohms	Acc
6	7	>100Gohm	> 10 Megohms	Acc
6	8	>100Gohm	> 10 Megohms	Acc
6	9	>100Gohm	> 10 Megohms	Acc
6	10	>100Gohm	> 10 Megohms	Acc
6	11	>100Gohm	> 10 Megohms	Acc
6	12	>100Gohm	> 10 Megohms	Acc
6	12	>100Gohm	> 10 Megohms	Acc
6	14	>100Gohm	> 10 Megohms	Acc
7	8	>100Gohm	> 10 Megohms	Acc
7	9	>100Gohm	> 10 Megohms	Acc
7	10	>100Gohm	> 10 Megohms	Acc
7	11	>100Gohm	> 10 Megohms	Acc
7	12	>100Gohm	> 10 Megohms	Acc
7	13	>100Gohm	> 10 Megohms	Acc
7	14	>100Gohm	> 10 Megohms	Acc
8	9	>100Gohm	> 10 Megohms	Acc
8	10	>100Gohm	> 10 Megohms	Acc
8	11	>100Gohm	> 10 Megohms	Acc
8	12	>100Gohm	> 10 Megohms	Acc
8	13	>100Gohm	> 10 Megohms	Acc
8	14	>100Gohm	> 10 Megohms	Acc
9	10	>100Gohm	> 10 Megohms	Acc
9	11	>100Gohm	> 10 Megohms	Acc
9	12	>100Gohm	> 10 Megohms	Acc
9	13	>100Gohm	> 10 Megohms	Acc
9	14	>100Gohm	> 10 Megohms	Acc
10	11	>100Gohm	> 10 Megohms	Acc
10	12	>100Gohm	> 10 Megohms	Acc
10	13	>100Gohm	> 10 Megohms	Acc
10	14	>100Gohm	> 10 Megohms	Acc
11	12	>100Gohm	> 10 Megohms	Acc
11	13	>100Gohm	> 10 Megohms	Acc
11	14	>100Gohm	> 10 Megohms	Acc

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
12	13	>100Gohm	> 10 Megohms	Acc
12	14	>100Gohm	> 10 Megohms	Acc
13	14	>100Gohm	> 10 Megohms	Acc
1	Ground	>100Gohm	> 10 Megohms	Acc
2	Ground	>100Gohm	> 10 Megohms	Acc
3	Ground	>100Gohm	> 10 Megohms	Acc
4	Ground	>100Gohm	> 10 Megohms	Acc
5	Ground	>100Gohm	> 10 Megohms	Acc
6	Ground	>100Gohm	> 10 Megohms	Acc
7	Ground	>100Gohm	> 10 Megohms	Acc
8	Ground	>100Gohm	> 10 Megohms	Acc
9	Ground	>100Gohm	> 10 Megohms	Acc
10	Ground	>100Gohm	> 10 Megohms	Acc
11	Ground	>100Gohm	> 10 Megohms	Acc
12	Ground	>100Gohm	> 10 Megohms	Acc
13	Ground	>100Gohm	> 10 Megohms	Acc
14	Ground	>100Gohm	> 10 Megohms	Acc

2.2.3 De-energize and remove test equipment.

2.2.4 Setup the test equipment and **relay** specimen for insulation resistance testing.

2.2.5 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the relay test specimen. Record the relay data below.

Terminal to Terminal / Ground

Desc. Of Terminal	Desc. Of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1-9	2-10	>100Gohm	> 10 Megohms	Acc
1-9	3-11	>100Gohm	> 10 Megohms	Acc
1-9	4-12	>100Gohm	> 10 Megohms	Acc
2-10	3-11	>100Gohm	> 10 Megohms	Acc
2-10	4-12	>100Gohm	> 10 Megohms	Acc
3-11	4-12	>100Gohm	> 10 Megohms	Acc
5	6	>100Gohm	> 10 Megohms	Acc
6	7	>100Gohm	> 10 Megohms	Acc
7	8	>100Gohm	> 10 Megohms	Acc
1-9	Ground	>100Gohm	> 10 Megohms	Acc
2-10	Ground	>100Gohm	> 10 Megohms	Acc
3-11	Ground	>100Gohm	> 10 Megohms	Acc
4-12	Ground	>100Gohm	> 10 Megohms	Acc
5	Ground	>100Gohm	> 10 Megohms	Acc
6	Ground	>100Gohm	> 10 Megohms	Acc
7	Ground	>100Gohm	> 10 Megohms	Acc
8	Ground	>100Gohm	> 10 Megohms	Acc
13	Ground	>100Gohm	> 10 Megohms	Acc
14	Ground	>100Gohm	> 10 Megohms	Acc

2.2.6 De-energize and remove test equipment.

2.3 Operation

2.3.1 Assemble the relay onto its socket. Regulate voltage to the coil of the relay and monitor the maximum pick-up voltage and minimum drop-out voltages.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Pick-up Voltage	71.047 VAC	**96 VAC maximum**	Acc
Drop-out Voltage	57.562 VAC	**36 AC minimum**	Acc

2.3.2 De-energize and remove test equipment.

2.4 Contact Rating Test

2.4.1 *Setup the Relay specimen for contact rating testing.*

2.4.2 Apply a nominal 10 amps VAC, resistive, across the NC contacts of the test specimen. Record the data in the table below.

Caution: Do not change state of contacts while energized.

Description	Record Data	Acceptance Criteria	Comments/Deviations
1-9	.08156 VAC	**< 0.5 Volts AC drop**	Acc
2-10	.08773 VAC	**< 0.5 Volts AC drop**	Acc
3-11	.08246 VAC	**< 0.5 Volts AC drop**	Acc
4-12	.07505 VAC	**< 0.5 Volts AC drop**	Acc

2.4.3 Energize the relay coil with 120VAC to change the contacts' position of the test specimen.

2.4.4 *Apply a nominal 10 amps VAC, resistive, across the* **closed** NO contacts of the test specimen. . Record the data in the table below.

Description	Record Data	Acceptance Criteria	Comments/Deviations
5-9	.09112 VAC	**< 0.5 Volts AC drop**	Acc
6-10	.12499 VAC	**< 0.5 Volts AC drop**	Acc
7-11	.10300 VAC	**< 0.5 Volts AC drop**	Acc
8-12	.10025 VAC	**< 0.5 Volts AC drop**	Acc

2.4.5 De-energize and remove test equipment.

2.5 Terminate the test.

2.5.1 Reland the relay and verify reland in accordance with the Lifted Lead Log.

2.5.2 Record: Date /Time of Test End: 03-30-00 11:20 a.m.

3.0 References

3.1 Panel Wiring Drawings: See list provided with relay selection list (page 3).

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Test was acceptable
Michael D Cram
03-30-00

Notes:

Certified Instrumentation Technician (signature) Michael D Cram Date: 03-30-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Craig Swenson Date: 3/30/00

QA/QC (signature) Stephen Scott Mosh Date: 4-6-2000

LIFTED LEAD LOG

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
		2102X	JAXM(1)	14	DKY	3-28-00	SRC	3-28-00	DKY	3-30-00	SRC	3-30-00
		Grey	RCS2A-6	14	DKY	3-28-00	SRC	3-28-00	DKY	3-30-00	SRC	3-30-00
		Black	RCS2A-6	13	DKY	3-28-00	SRC	3-28-00	DKY	3-30-00	SRC	3-30-00
		105X	JAXM(1)	13	DKY	3-28-00	SRC	3-28-00	DKY	3-30-00	SRC	3-30-00
		5701X	"	9	DKY	3-28-00	SRC	3-28-00	DKY	3-30-00	SRC	3-30-00
		5712X	"	5	DKY	3-28-00	SRC	3-28-00	DKY	3-30-00	SRC	3-30-00

Remarks:

ORIGINAL

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI Eng	DA	QA Post Review*

* QA Post Review of Individual Revisions is allowed

In-Situ Test Procedure

ORIGINAL

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) Craig Swenson Date: 3/22/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Belhaven	Michael Cram	MRC
Electrician	DAN K. YORK	PCE	Dan K. York	DKY
Electrician Quality Control	Stephen R. Cowley	PCE	Stephen R. Cowley	SRC
Design Authority Representative	N/A	N/A	N/A	N/A
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Power Supply capable of 10 amps @ 120 VAC.
Megger Instrument capable of 500 VDC Test Voltage
Adjustable Voltage Power supply capable of 0 to 120 VAC minimum
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: Avo BM 80/2 I.D.: 6410-889 Calib. Due date: 02-09-01

Test Instrument type: HP 3457A I.D.: BAT 124 Calib. Due date: 07-30-00

Test Instrument type: FLUKE 787 I.D.: BAT 107 Calib. Due date: 05-28-00

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

Relay Selection List

No.	Eqmt ID No.	Panel No.	Dwg. Reference
1	P2X(1)	201	ED-33065 Sht. 1
2	P6X(1)	201	ED-33065 Sht. 1
3	IAXM(1)	201	ED-33065 Sht. 1
4	MCO(1)	201	ED-33065 Sht. 1 ←
5	MHF	202	ED-33066 Sht. 1
6	PGEX	202	ED-33066 Sht. 1
7	MW15	202	ED-33066 Sht. 1
8	BF	203	ED-33067 Sht. 1
9	BSC1AX	203	ED-33067 Sht. 1
10	TSP1FIX	204	ED-33068 Sht. 1
11	TRD	204	ED-33068 Sht. 1
12	MCOY(2)	205	ED-33069 Sht. 1
13	MGCLY	205	ED-33069 Sht. 1
14	PHULY(3)	205	ED-33069 Sht. 1
15	PGLY	205	ED-33069 Sht. 1

TEST PROCEDURE:

For this In-Situ Test, the relay and its socket must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of the relay and its socket.

1.0 Select a relay from the list above. Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	MCO(1)	**Select from List provided above**	Acc
Manufacturer:	Idec	**Idec**	Acc
Relay Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	Acc
Contact Configuration:	OK	**4PDT Contacts**	Acc
Socket Model:	OK	**SH4B-05**	Acc

2.0 Perform the following testing steps:

2.1 Record: Date /Time of Test Beginning: 03-30-00 11:30 a.m.

2.1.1 Complete the Lifted Lead Log prior to removing the plug-in relay and its associated socket.

2.2 Insulation Resistance Test

2.2.1 Setup the **Relay Socket** specimen for insulation resistance testing. Attach Relay Socket in its normal mounting configuration to grounded fixture.

2.2.2 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the relay socket test specimen. Record the socket data.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1	2	>100Gohm	> 10 Megohms	Acc
1	3	>100Gohm	> 10 Megohms	Acc
1	4	>100Gohm	> 10 Megohms	Acc
1	5	>100Gohm	> 10 Megohms	Acc
1	6	>100Gohm	> 10 Megohms	Acc
1	7	>100Gohm	> 10 Megohms	Acc
1	8	>100Gohm	> 10 Megohms	Acc
1	9	>100Gohm	> 10 Megohms	Acc
1	10	>100Gohm	> 10 Megohms	Acc
1	11	>100Gohm	> 10 Megohms	Acc
1	12	>100Gohm	> 10 Megohms	Acc
1	13	>100Gohm	> 10 Megohms	Acc
1	14	>100Gohm	> 10 Megohms	Acc
2	3	>100Gohm	> 10 Megohms	Acc
2	4	>100Gohm	> 10 Megohms	Acc
2	5	>100Gohm	> 10 Megohms	Acc
2	6	>100Gohm	> 10 Megohms	Acc
2	7	>100Gohm	> 10 Megohms	Acc
2	8	>100Gohm	> 10 Megohms	Acc
2	9	>100Gohm	> 10 Megohms	Acc
2	10	>100Gohm	> 10 Megohms	Acc
2	11	>100Gohm	> 10 Megohms	Acc
2	12	>100Gohm	> 10 Megohms	Acc
2	13	>100Gohm	> 10 Megohms	Acc
2	14	>100Gohm	> 10 Megohms	Acc
3	4	>100Gohm	> 10 Megohms	Acc
3	5	>100Gohm	> 10 Megohms	Acc
3	6	>100Gohm	> 10 Megohms	Acc
3	7	>100Gohm	> 10 Megohms	Acc
3	8	>100Gohm	> 10 Megohms	Acc
3	9	>100Gohm	> 10 Megohms	Acc
3	10	>100Gohm	> 10 Megohms	Acc
3	11	>100Gohm	> 10 Megohms	Acc
3	12	>100Gohm	> 10 Megohms	Acc
3	13	>100Gohm	> 10 Megohms	Acc
3	14	>100Gohm	> 10 Megohms	Acc
4	5	>100Gohm	> 10 Megohms	Acc

Dedication Test Plan – IST **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-020-TP-020C
Test Specimen: Idec RH4B-UL-AC120V & SH4B-05, Eqmt. No.: Generic **Page 5 of 9**

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
4	6	>100Gohm	> 10 Megohms	Acc
4	7	>100Gohm	> 10 Megohms	Acc
4	8	>100Gohm	> 10 Megohms	Acc
4	9	>100Gohm	> 10 Megohms	Acc
4	10	>100Gohm	> 10 Megohms	Acc
4	11	>100Gohm	> 10 Megohms	Acc
4	12	>100Gohm	> 10 Megohms	Acc
4	13	>100Gohm	> 10 Megohms	Acc
4	14	>100Gohm	> 10 Megohms	Acc
5	6	>100Gohm	> 10 Megohms	Acc
5	7	>100Gohm	> 10 Megohms	Acc
5	8	>100Gohm	> 10 Megohms	Acc
5	8	>100Gohm	> 10 Megohms	Acc
5	10	>100Gohm	> 10 Megohms	Acc
5	11	>100Gohm	> 10 Megohms	Acc
5	12	>100Gohm	> 10 Megohms	Acc
5	13	>100Gohm	> 10 Megohms	Acc
5	14	>100Gohm	> 10 Megohms	Acc
6	7	>100Gohm	> 10 Megohms	Acc
6	8	>100Gohm	> 10 Megohms	Acc
6	9	>100Gohm	> 10 Megohms	Acc
6	10	>100Gohm	> 10 Megohms	Acc
6	11	>100Gohm	> 10 Megohms	Acc
6	12	>100Gohm	> 10 Megohms	Acc
6	12	>100Gohm	> 10 Megohms	Acc
6	14	>100Gohm	> 10 Megohms	Acc
7	8	>100Gohm	> 10 Megohms	Acc
7	9	>100Gohm	> 10 Megohms	Acc
7	10	>100Gohm	> 10 Megohms	Acc
7	11	>100Gohm	> 10 Megohms	Acc
7	12	>100Gohm	> 10 Megohms	Acc
7	13	>100Gohm	> 10 Megohms	Acc
7	14	>100Gohm	> 10 Megohms	Acc
8	9	>100Gohm	> 10 Megohms	Acc
8	10	>100Gohm	> 10 Megohms	Acc
8	11	>100Gohm	> 10 Megohms	Acc
8	12	>100Gohm	> 10 Megohms	Acc
8	13	>100Gohm	> 10 Megohms	Acc
8	14	>100Gohm	> 10 Megohms	Acc
9	10	>100Gohm	> 10 Megohms	Acc
9	11	>100Gohm	> 10 Megohms	Acc
9	12	>100Gohm	> 10 Megohms	Acc
9	13	>100Gohm	> 10 Megohms	Acc
9	14	>100Gohm	> 10 Megohms	Acc
10	11	>100Gohm	> 10 Megohms	Acc
10	12	>100Gohm	> 10 Megohms	Acc
10	13	>100Gohm	> 10 Megohms	Acc
10	14	>100Gohm	> 10 Megohms	Acc
11	12	>100Gohm	> 10 Megohms	Acc
11	13	>100Gohm	> 10 Megohms	Acc
11	14	>100Gohm	> 10 Megohms	Acc

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
12	13	>100Gohm	> 10 Megohms	Acc
12	14	>100Gohm	> 10 Megohms	Acc
13	14	>100Gohm	> 10 Megohms	Acc
1	Ground	>100Gohm	> 10 Megohms	Acc
2	Ground	>100Gohm	> 10 Megohms	Acc
3	Ground	>100Gohm	> 10 Megohms	Acc
4	Ground	>100Gohm	> 10 Megohms	Acc
5	Ground	>100Gohm	> 10 Megohms	Acc
6	Ground	>100Gohm	> 10 Megohms	Acc
7	Ground	>100Gohm	> 10 Megohms	Acc
8	Ground	>100Gohm	> 10 Megohms	Acc
9	Ground	>100Gohm	> 10 Megohms	Acc
10	Ground	>100Gohm	> 10 Megohms	Acc
11	Ground	>100Gohm	> 10 Megohms	Acc
12	Ground	>100Gohm	> 10 Megohms	Acc
13	Ground	>100Gohm	> 10 Megohms	Acc
14	Ground	>100Gohm	> 10 Megohms	Acc

2.2.3 De-energize and remove test equipment.

2.2.4 Setup the test equipment and **relay** specimen for insulation resistance testing.

2.2.5 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the relay test specimen. Record the relay data below.

Terminal to Terminal / Ground

Desc. Of Terminal	Desc. Of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1-9	2-10	>100Gohm	> 10 Megohms	Acc
1-9	3-11	>100Gohm	> 10 Megohms	Acc
1-9	4-12	>100Gohm	> 10 Megohms	Acc
2-10	3-11	>100Gohm	> 10 Megohms	Acc
2-10	4-12	>100Gohm	> 10 Megohms	Acc
3-11	4-12	>100Gohm	> 10 Megohms	Acc
5	6	>100Gohm	> 10 Megohms	Acc
6	7	>100Gohm	> 10 Megohms	Acc
7	8	>100Gohm	> 10 Megohms	Acc
1-9	Ground	>100Gohm	> 10 Megohms	Acc
2-10	Ground	>100Gohm	> 10 Megohms	Acc
3-11	Ground	>100Gohm	> 10 Megohms	Acc
4-12	Ground	>100Gohm	> 10 Megohms	Acc
5	Ground	>100Gohm	> 10 Megohms	Acc
6	Ground	>100Gohm	> 10 Megohms	Acc
7	Ground	>100Gohm	> 10 Megohms	Acc
8	Ground	>100Gohm	> 10 Megohms	Acc
13	Ground	>100Gohm	> 10 Megohms	Acc
14	Ground	>100Gohm	> 10 Megohms	Acc

2.2.6 De-energize and remove test equipment.

2.3 Operation

2.3.1 Assemble the relay onto its socket. Regulate voltage to the coil of the relay and monitor the maximum pick-up voltage and minimum drop-out voltages.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Pick-up Voltage	74.695 VAC	**96 VAC maximum**	Acc
Drop-out Voltage	55.945 VAC	**36 AC minimum**	Acc

2.3.2 De-energize and remove test equipment.

2.4 Contact Rating Test

2.4.1 Setup the Relay specimen for contact rating testing.

2.4.2 Apply a nominal 10 amps VAC, resistive, across the NC contacts of the test specimen. Record the data in the table below.

Caution: Do not change state of contacts while energized.

Description	Record Data	Acceptance Criteria	Comments/Deviations
1-9	.1143 VAC	**< 0.5 Volts AC drop**	Acc
2-10	.1112 VAC	**< 0.5 Volts AC drop**	Acc
3-11	.1134 VAC	**< 0.5 Volts AC drop**	Acc
4-12	.1232 VAC	**< 0.5 Volts AC drop**	Acc

2.4.3 Energize the relay coil with 120VAC to change the contacts' position of the test specimen.

2.4.4 Apply a nominal 10 amps VAC, resistive, across the **closed** NO contacts of the test specimen. . Record the data in the table below.

Description	Record Data	Acceptance Criteria	Comments/Deviations
5-9	.1218 VAC	**< 0.5 Volts AC drop**	Acc
6-10	.1224 VAC	**< 0.5 Volts AC drop**	Acc
7-11	.1587 VAC	**< 0.5 Volts AC drop**	Acc.
8-12	.1177 VAC	**< 0.5 Volts AC drop**	Acc

2.4.5 De-energize and remove test equipment.

2.5 Terminate the test.

2.5.1 Reland the relay and verify reland in accordance with the Lifted Lead Log.

2.5.2 Record: Date /Time of Test End: 03-30-00 12:45 p.m.

3.0 References

3.1 Panel Wiring Drawings: See list provided with relay selection list (page 3).

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Test was acceptable
Michael D Chan
03-30-00

Notes:

Certified Instrumentation Technician (signature) Michael D Chan Date: 03-30-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Craig Swenson Date: 3/30/00

QA/QC (signature) Stephen Scott Mosh Date: 4-6-2000

LIFTED LEAD LOG

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
13-33265	1	5708X	MCR(1)	5	DKY	3-30-00	SRC	3-30-00	DKY	3-30-00	SRC	3-30-00
		5711X		6	DKY	3-30-00	SRC	3-30-00	DKY	3-30-00	SRC	3-30-00
		2) 5705X		9	DKY	3-30-00	SRC	3-30-00	DKY	3-30-00	SRC	3-30-00
		2) 5710X		10	DKY	3-30-00	SRC	3-30-00	DKY	3-30-00	SRC	3-30-00
		2)102X		14	DKY	3-30-00	SRC	3-30-00	DKY	3-30-00	SRC	3-30-00
		406X		19	DKY	3-30-00	SRC	3-30-00	DKY	3-30-00	SRC	3-30-00

Remarks:

Dedication Test Plan – IST ORIGINAL Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-020-TP-020C
Test Specimen: Idec RH4B-UL-AC120V & SH4B-05, Eqmt. No.: Generic Page 1 of 9

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI Eng	DA	QA Post Review*

* QA Post Review of Individual Revisions is allowed

In-Situ Test Procedure

ORIGINAL

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature): YWP Craig Swenson Date: 3/22/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Belhaven	Michael D Cram	MDC
Electrician	DAN K. YORK	PCE	Dan K. York	DKY
Electrician Quality Control	Stephen R. Cowley	PCE	Stephen R. Cowley	SRC
Design Authority Representative	N/A	N/A	N/A	N/A
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Power Supply capable of 10 amps @ 120 VAC.
Megger Instrument capable of 500 VDC Test Voltage
Adjustable Voltage Power supply capable of 0 to 120 VAC minimum
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: AVO BM 302 I.D.: 6410-889 Calib. Due date: 02-09-01

Test Instrument type: HP 3457A I.D.: BAT 124 Calib. Due date: 07-30-00

Test Instrument type: FLUKE 787 I.D.: BAT 107 Calib. Due date: 05-28-00

Test Instrument type: ______ I.D.: ______ Calib. Due date: ______

Test Instrument type: ______ I.D.: ______ Calib. Due date: ______

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

Relay Selection List

No.	Eqmt ID No.	Panel No.	Dwg. Reference
1	P2X(1)	201	ED-33065 Sht. 1
2	P6X(1)	201	ED-33065 Sht. 1
3	IAXM(1)	201	ED-33065 Sht. 1
4	MCO(1)	201	ED-33065 Sht. 1
→ 5	MHF	202	ED-33066 Sht. 1
6	PGEX	202	ED-33066 Sht. 1
7	MW15	202	ED-33066 Sht. 1
8	BF	203	ED-33067 Sht. 1
9	BSC1AX	203	ED-33067 Sht. 1
10	TSP1FIX	204	ED-33068 Sht. 1
11	TRD	204	ED-33068 Sht. 1
12	MCOY(2)	205	ED-33069 Sht. 1
13	MGCLY	205	ED-33069 Sht. 1
14	PHULY(3)	205	ED-33069 Sht. 1
15	PGLY	205	ED-33069 Sht. 1

TEST PROCEDURE:

For this In-Situ Test, the relay and its socket must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of the relay and its socket.

1.0 Select a relay from the list above. Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	MHF	**Select from List provided above**	Acc
Manufacturer:	Idec	**Idec**	Acc
Relay Model:	RH4B-UL-AC120V	**RH4B-UL-AC120V**	Acc
Contact Configuration:	4PDT Contacts	**4PDT Contacts**	Acc
Socket Model:	SH4B-05	**SH4B-05**	Acc

2.0 Perform the following testing steps:

2.1 Record: Date /Time of Test Beginning: 03-30-00

2.1.1 Complete the Lifted Lead Log prior to removing the plug-in relay and its associated socket.

2.2 Insulation Resistance Test

2.2.1 Setup the **Relay Socket** specimen for insulation resistance testing. Attach Relay Socket in its normal mounting configuration to grounded fixture.

2.2.2 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the relay socket test specimen. Record the socket data.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1	2	>100Gohm	> 10 Megohms	Acc
1	3	>100Gohm	> 10 Megohms	Acc
1	4	>100Gohm	> 10 Megohms	Acc
1	5	>100Gohm	> 10 Megohms	Acc
1	6	>100Gohm	> 10 Megohms	Acc
1	7	>100Gohm	> 10 Megohms	Acc
1	8	>100Gohm	> 10 Megohms	Acc
1	9	>100Gohm	> 10 Megohms	Acc
1	10	>100Gohm	> 10 Megohms	Acc
1	11	>100Gohm	> 10 Megohms	Acc
1	12	>100Gohm	> 10 Megohms	Acc
1	13	>100Gohm	> 10 Megohms	Acc
1	14	>100Gohm	> 10 Megohms	Acc
2	3	>100Gohm	> 10 Megohms	Acc
2	4	>100Gohm	> 10 Megohms	Acc
2	5	>100Gohm	> 10 Megohms	Acc
2	6	>100Gohm	> 10 Megohms	Acc
2	7	>100Gohm	> 10 Megohms	Acc
2	8	>100Gohm	> 10 Megohms	Acc
2	9	>100Gohm	> 10 Megohms	Acc
2	10	>100Gohm	> 10 Megohms	Acc
2	11	>100Gohm	> 10 Megohms	Acc
2	12	>100Gohm	> 10 Megohms	Acc
2	13	>100Gohm	> 10 Megohms	Acc
2	14	>100Gohm	> 10 Megohms	Acc
3	4	>100Gohm	> 10 Megohms	Acc
3	5	>100Gohm	> 10 Megohms	Acc
3	6	>100Gohm	> 10 Megohms	Acc
3	7	>100Gohm	> 10 Megohms	Acc
3	8	>100Gohm	> 10 Megohms	Acc
3	9	>100Gohm	> 10 Megohms	Acc
3	10	>100Gohm	> 10 Megohms	Acc
3	11	>100Gohm	> 10 Megohms	Acc
3	12	>100Gohm	> 10 Megohms	Acc
3	13	>100Gohm	> 10 Megohms	Acc
3	14	>100Gohm	> 10 Megohms	Acc
4	5	>100Gohm	> 10 Megohms	Acc

Dedication Test Plan – IST **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-020-TP-020C
Test Specimen: Idec RH4B-UL-AC120V & SH4B-05, Eqmt. No.: Generic **Page 5 of 9**

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
4	6	>100Gohm	> 10 Megohms	Acc
4	7	>100Gohm	> 10 Megohms	Acc
4	8	>100Gohm	> 10 Megohms	Acc
4	9	>100Gohm	> 10 Megohms	Acc
4	10	>100Gohm	> 10 Megohms	Acc
4	11	>100Gohm	> 10 Megohms	Acc
4	12	>100Gohm	> 10 Megohms	Acc
4	13	>100Gohm	> 10 Megohms	Acc
4	14	>100Gohm	> 10 Megohms	Acc
5	6	>100Gohm	> 10 Megohms	Acc
5	7	>100Gohm	> 10 Megohms	Acc
5	8	>100Gohm	> 10 Megohms	Acc
5	8	>100Gohm	> 10 Megohms	Acc
5	10	>100Gohm	> 10 Megohms	Acc
5	11	>100Gohm	> 10 Megohms	Acc
5	12	>100Gohm	> 10 Megohms	Acc
5	13	>100Gohm	> 10 Megohms	Acc
5	14	>100Gohm	> 10 Megohms	Acc
6	7	>100Gohm	> 10 Megohms	Acc
6	8	>100Gohm	> 10 Megohms	Acc
6	9	>100Gohm	> 10 Megohms	Acc
6	10	>100Gohm	> 10 Megohms	Acc
6	11	>100Gohm	> 10 Megohms	Acc
6	12	>100Gohm	> 10 Megohms	Acc
6	12	>100Gohm	> 10 Megohms	Acc
6	14	>100Gohm	> 10 Megohms	Acc
7	8	>100Gohm	> 10 Megohms	Acc
7	9	>100Gohm	> 10 Megohms	Acc
7	10	>100Gohm	> 10 Megohms	Acc
7	11	>100Gohm	> 10 Megohms	Acc
7	12	>100Gohm	> 10 Megohms	Acc
7	13	>100Gohm	> 10 Megohms	Acc
7	14	>100Gohm	> 10 Megohms	Acc
8	9	>100Gohm	> 10 Megohms	Acc
8	10	>100Gohm	> 10 Megohms	Acc
8	11	>100Gohm	> 10 Megohms	Acc
8	12	>100Gohm	> 10 Megohms	Acc
8	13	>100Gohm	> 10 Megohms	Acc
8	14	>100Gohm	> 10 Megohms	Acc
9	10	>100Gohm	> 10 Megohms	Acc
9	11	>100Gohm	> 10 Megohms	Acc
9	12	>100Gohm	> 10 Megohms	Acc
9	13	>100Gohm	> 10 Megohms	Acc
9	14	>100Gohm	> 10 Megohms	Acc
10	11	>100Gohm	> 10 Megohms	Acc
10	12	>100Gohm	> 10 Megohms	Acc
10	13	>100Gohm	> 10 Megohms	Acc
10	14	>100Gohm	> 10 Megohms	Acc
11	12	>100Gohm	> 10 Megohms	Acc
11	13	>100Gohm	> 10 Megohms	Acc
11	14	>100Gohm	> 10 Megohms	Acc

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
12	13	>100Gohm	> 10 Megohms	Acc.
12	14	>100Gohm	> 10 Megohms	Acc.
13	14	>100Gohm	> 10 Megohms	Acc.
1	Ground	>100Gohm	> 10 Megohms	Acc.
2	Ground	>100Gohm	> 10 Megohms	Acc.
3	Ground	>100Gohm	> 10 Megohms	Acc.
4	Ground	>100Gohm	> 10 Megohms	Acc.
5	Ground	>100Gohm	> 10 Megohms	Acc.
6	Ground	>100Gohm	> 10 Megohms	Acc.
7	Ground	>100Gohm	> 10 Megohms	Acc.
8	Ground	>100Gohm	> 10 Megohms	Acc.
9	Ground	>100Gohm	> 10 Megohms	Acc.
10	Ground	>100Gohm	> 10 Megohms	Acc.
11	Ground	>100Gohm	> 10 Megohms	Acc.
12	Ground	>100Gohm	> 10 Megohms	Acc.
13	Ground	>100Gohm	> 10 Megohms	Acc.
14	Ground	>100Gohm	> 10 Megohms	Acc.

2.2.3 De-energize and remove test equipment.

2.2.4 Setup the test equipment and **relay** specimen for insulation resistance testing.

2.2.5 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the relay test specimen. Record the relay data below.

Terminal to Terminal / Ground

Desc. Of Terminal	Desc. Of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1-9	2-10	>100Gohm	> 10 Megohms	Acc.
1-9	3-11	>100Gohm	> 10 Megohms	Acc.
1-9	4-12	>100Gohm	> 10 Megohms	Acc.
2-10	3-11	>100Gohm	> 10 Megohms	Acc.
2-10	4-12	>100Gohm	> 10 Megohms	Acc.
3-11	4-12	>100Gohm	> 10 Megohms	Acc.
5	6	>100Gohm	> 10 Megohms	Acc.
6	7	>100Gohm	> 10 Megohms	Acc.
7	8	>100Gohm	> 10 Megohms	Acc.
1-9	Ground	>100Gohm	> 10 Megohms	Acc.
2-10	Ground	>100Gohm	> 10 Megohms	Acc.
3-11	Ground	>100Gohm	> 10 Megohms	Acc.
4-12	Ground	>100Gohm	> 10 Megohms	Acc.
5	Ground	>100Gohm	> 10 Megohms	Acc.
6	Ground	>100Gohm	> 10 Megohms	Acc.
7	Ground	>100Gohm	> 10 Megohms	Acc.
8	Ground	>100Gohm	> 10 Megohms	Acc.
13	Ground	>100Gohm	> 10 Megohms	Acc.
14	Ground	>100Gohm	> 10 Megohms	Acc.

2.2.6 De-energize and remove test equipment.

2.3 Operation

2.3.1 Assemble the relay onto its socket. Regulate voltage to the coil of the relay and monitor the *maximum pick-up voltage and minimum drop-out voltages.*

Description	Record Data	Acceptance Criteria	Comments/Deviations
Pick-up Voltage	74.018 VAC	**96 VAC maximum**	Acc
Drop-out Voltage	57.953 VAC	**36 AC minimum**	Acc

2.3.2 De-energize and remove test equipment.

2.4 Contact Rating Test

2.4.1 Setup the Relay specimen for contact rating testing.

2.4.2 Apply a nominal 10 amps VAC, resistive, across the NC contacts of the test specimen. Record the data in the table below.

Caution: Do not change state of contacts while energized.

Description	Record Data	Acceptance Criteria	Comments/Deviations
1-9	.1198 VAC	**< 0.5 Volts AC drop**	Acc
2-10	.1420 VAC	**< 0.5 Volts AC drop**	Acc
3-11	.1323 VAC	**< 0.5 Volts AC drop**	Acc
4-12	.1229 VAC	**< 0.5 Volts AC drop**	Acc

2.4.3 Energize the relay coil with 120VAC to change the contacts' position of the test specimen.

2.4.4 Apply a nominal 10 amps VAC, resistive, across the **closed** NO contacts of the test specimen. . Record the data in the table below.

Description	Record Data	Acceptance Criteria	Comments/Deviations
5-9	.1239 VAC	**< 0.5 Volts AC drop**	Acc
6-10	.1395 VAC	**< 0.5 Volts AC drop**	Acc
7-11	.1354 VAC	**< 0.5 Volts AC drop**	Acc
8-12	.1176 VAC	**< 0.5 Volts AC drop**	Acc

2.4.5 De-energize and remove test equipment.

2.5 Terminate the test.

2.5.1 Reland the relay and verify reland in accordance with the Lifted Lead Log.

2.5.2 Record: Date /Time of Test End: 03-30-00 1:40 p.m.

3.0 References

3.1 Panel Wiring Drawings: See list provided with relay selection list (page 3).

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Test was acceptable

Michael D Cram
03-30-00

Notes:

Certified Instrumentation Technician (signature) Michael D Cram Date: 03-30-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Craig Swenson Date: 3/30/00

QA/QC (signature) Stephen Scott Mosh Date: 4-6-2000

LIFTED LEAD LOG

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
FB-330-66	1	2) 101X	MHF	5	DKY	3-30-00	SRC	3-30-00	DKY	3-30-00	SRC	3-30-00
		812X		6	DKY	3-30-00	SRC	3-30-00	DKY	3-30-00	SRC	3-30-00
		2) 101X		7	DKY	3-30-00	SRC	3-30-00	DKY	3-30-00	SRC	3-30-00
		616X		9	DKY	3-30-00	SRC	3-30-00	DKY	3-30-00	SRC	3-30-00
		814X		10	DKY	3-30-00	SRC	3-30-00	DKY	3-30-00	SRC	3-30-00
		815X		11	DKY	3-30-00	SRC	3-30-00	DKY	3-30-00	SRC	3-30-00
		806X		13	DKY	3-30-00	SRC	3-30-00	DKY	3-30-00	SRC	3-30-00
		Grey	RBS27A-6	13	DKY	3-30-00	SRC	3-30-00	DKY	3-30-00	SRC	3-30-00
		Black		14	DKY	3-30-00	SRC	3-30-00	DKY	3-30-00	SRC	3-30-00
		2) 102X		14	DKY	3-30-00	SRC	3-30-00	DKY	3-30-00	SRC	3-30-00

Remarks:

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI Eng	DA	QA Post Review*

* QA Post Review of Individual Revisions is allowed

In-Situ Test Procedure

ORIGINAL

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) YMP Craig Swenson Date: 3/22/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Bellhaven	Michael Cram	MRC
Electrician	DAN K. YORK	PCE	Dan K. York	DKY
Electrician Quality Control	Stephen R Cowley	PCE	Stephen R Cowley	SRC
Design Authority Representative	N/A	N/A	N/A	N/A
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Power Supply capable of 10 amps @ 120 VAC.
Megger Instrument capable of 500 VDC Test Voltage
Adjustable Voltage Power supply capable of 0 to 120 VAC minimum
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: Ind Bulb 1/2 I.D.: 6410-889 Calib. Due date: 02-09-01

Test Instrument type: HP34574 I.D.: BAT124 Calib. Due date: 07-30-00

Test Instrument type: Fluke 787 I.D.: BAT107 Calib. Due date: 05-28-00

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

Relay Selection List

No.	Eqmt ID No.	Panel No.	Dwg. Reference
1	P2X(1)	201	ED-33065 Sht. 1
2	P6X(1)	201	ED-33065 Sht. 1
3	IAXM(1)	201	ED-33065 Sht. 1
4	MCO(1)	201	ED-33065 Sht. 1
5	MHF	202	ED-33066 Sht. 1
→ 6	PGEX	202	ED-33066 Sht. 1
7	MW15	202	ED-33066 Sht. 1
8	BF	203	ED-33067 Sht. 1
9	BSC1AX	203	ED-33067 Sht. 1
10	TSP1FIX	204	ED-33068 Sht. 1
11	TRD	204	ED-33068 Sht. 1
12	MCOY(2)	205	ED-33069 Sht. 1
13	MGCLY	205	ED-33069 Sht. 1
14	PHULY(3)	205	ED-33069 Sht. 1
15	PGLY	205	ED-33069 Sht. 1

TEST PROCEDURE:

For this In-Situ Test, the relay and its socket must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of the relay and its socket.

1.0 Select a relay from the list above. Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	PGEX	Select from List provided above	Acc
Manufacturer:	Idec	Idec	Acc
Relay Model:	OK	RH4B-UL-AC120V	Acc
Contact Configuration:	OK	4PDT Contacts	Acc
Socket Model:	OK	SH4B-05	Acc

2.0 Perform the following testing steps:

2.1 Record: Date /Time of Test Beginning: 03-30-00 1:20 p.m.

2.1.1 Complete the Lifted Lead Log prior to removing the plug-in relay and its associated socket.

2.2 Insulation Resistance Test

2.2.1 Setup the **Relay Socket** specimen for insulation resistance testing. Attach Relay Socket in its normal mounting configuration to grounded fixture.

2.2.2 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the relay socket test specimen. Record the socket data.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1	2	>100Gohm	> 10 Megohms	Acc
1	3	>100Gohm	> 10 Megohms	Acc
1	4	>100Gohm	> 10 Megohms	Acc
1	5	>100Gohm	> 10 Megohms	Acc
1	6	>100Gohm	> 10 Megohms	Acc
1	7	>100Gohm	> 10 Megohms	Acc
1	8	>100Gohm	> 10 Megohms	Acc
1	9	>100Gohm	> 10 Megohms	Acc
1	10	>100Gohm	> 10 Megohms	Acc
1	11	>100Gohm	> 10 Megohms	Acc
1	12	>100Gohm	> 10 Megohms	Acc
1	13	>100Gohm	> 10 Megohms	Acc
1	14	>100Gohm	> 10 Megohms	Acc
2	3	>100Gohm	> 10 Megohms	Acc
2	4	>100Gohm	> 10 Megohms	Acc
2	5	>100Gohm	> 10 Megohms	Acc
2	6	>100Gohm	> 10 Megohms	Acc
2	7	>100Gohm	> 10 Megohms	Acc
2	8	>100Gohm	> 10 Megohms	Acc
2	9	>100Gohm	> 10 Megohms	Acc
2	10	>100Gohm	> 10 Megohms	Acc
2	11	>100Gohm	> 10 Megohms	Acc
2	12	>100Gohm	> 10 Megohms	Acc
2	13	>100Gohm	> 10 Megohms	Acc
2	14	>100Gohm	> 10 Megohms	Acc
3	4	>100Gohm	> 10 Megohms	Acc
3	5	>100Gohm	> 10 Megohms	Acc
3	6	>100Gohm	> 10 Megohms	Acc
3	7	>100Gohm	> 10 Megohms	Acc
3	8	>100Gohm	> 10 Megohms	Acc
3	9	>100Gohm	> 10 Megohms	Acc
3	10	>100Gohm	> 10 Megohms	Acc
3	11	>100Gohm	> 10 Megohms	Acc
3	12	>100Gohm	> 10 Megohms	Acc
3	13	>100Gohm	> 10 Megohms	Acc
3	14	>100Gohm	> 10 Megohms	Acc
4	5	>100Gohm	> 10 Megohms	Acc

Dedication Test Plan – IST **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-020-TP-020C
Test Specimen: Idec RH4B-UL-AC120V & SH4B-05, Eqmt. No.: Generic **Page 5 of 9**

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
4	6	>100Gohm	> 10 Megohms	Acc
4	7	>100Gohm	> 10 Megohms	Acc
4	8	>100Gohm	> 10 Megohms	Acc
4	9	>100Gohm	> 10 Megohms	Acc
4	10	>100Gohm	> 10 Megohms	Acc
4	11	>100Gohm	> 10 Megohms	Acc
4	12	>100Gohm	> 10 Megohms	Acc
4	13	>100Gohm	> 10 Megohms	Acc
4	14	>100Gohm	> 10 Megohms	Acc
5	6	>100Gohm	> 10 Megohms	Acc
5	7	>100Gohm	> 10 Megohms	Acc
5	8	>100Gohm	> 10 Megohms	Acc
5	8	>100Gohm	> 10 Megohms	Acc
5	10	>100Gohm	> 10 Megohms	Acc
5	11	>100Gohm	> 10 Megohms	Acc
5	12	>100Gohm	> 10 Megohms	Acc
5	13	>100Gohm	> 10 Megohms	Acc
5	14	>100Gohm	> 10 Megohms	Acc
6	7	>100Gohm	> 10 Megohms	Acc
6	8	>100Gohm	> 10 Megohms	Acc
6	9	>100Gohm	> 10 Megohms	Acc
6	10	>100Gohm	> 10 Megohms	Acc
6	11	>100Gohm	> 10 Megohms	Acc
6	12	>100Gohm	> 10 Megohms	Acc
6	12	>100Gohm	> 10 Megohms	Acc
6	14	>100Gohm	> 10 Megohms	Acc
7	8	>100Gohm	> 10 Megohms	Acc
7	9	>100Gohm	> 10 Megohms	Acc
7	10	>100Gohm	> 10 Megohms	Acc
7	11	>100Gohm	> 10 Megohms	Acc
7	12	>100Gohm	> 10 Megohms	Acc
7	13	>100Gohm	> 10 Megohms	Acc
7	14	>100Gohm	> 10 Megohms	Acc
8	9	>100Gohm	> 10 Megohms	Acc
8	10	>100Gohm	> 10 Megohms	Acc
8	11	>100Gohm	> 10 Megohms	Acc
8	12	>100Gohm	> 10 Megohms	Acc
8	13	>100Gohm	> 10 Megohms	Acc
8	14	>100Gohm	> 10 Megohms	Acc
9	10	>100Gohm	> 10 Megohms	Acc
9	11	>100Gohm	> 10 Megohms	Acc
9	12	>100Gohm	> 10 Megohms	Acc
9	13	>100Gohm	> 10 Megohms	Acc
9	14	>100Gohm	> 10 Megohms	Acc
10	11	>100Gohm	> 10 Megohms	Acc
10	12	>100Gohm	> 10 Megohms	Acc
10	13	>100Gohm	> 10 Megohms	Acc
10	14	>100Gohm	> 10 Megohms	Acc
11	12	>100Gohm	> 10 Megohms	Acc
11	13	>100Gohm	> 10 Megohms	Acc
11	14	>100Gohm	> 10 Megohms	Acc

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
12	13	>100 Gohm	> 10 Megohms	Acc
12	14	>100 Gohm	> 10 Megohms	Acc
13	14	>100 Gohm	> 10 Megohms	Acc
1	Ground	>100 Gohm	> 10 Megohms	Acc
2	Ground	>100 Gohm	> 10 Megohms	Acc
3	Ground	>100 Gohm	> 10 Megohms	Acc
4	Ground	>100 Gohm	> 10 Megohms	Acc
5	Ground	>100 Gohm	> 10 Megohms	Acc
6	Ground	>100 Gohm	> 10 Megohms	Acc
7	Ground	>100 Gohm	> 10 Megohms	Acc
8	Ground	>100 Gohm	> 10 Megohms	Acc
9	Ground	>100 Gohm	> 10 Megohms	Acc
10	Ground	>100 Gohm	> 10 Megohms	Acc
11	Ground	>100 Gohm	> 10 Megohms	Acc
12	Ground	>100 Gohm	> 10 Megohms	Acc
13	Ground	>100 Gohm	> 10 Megohms	Acc
14	Ground	>100 Gohm	> 10 Megohms	Acc

2.2.3 De-energize and remove test equipment.

2.2.4 Setup the test equipment and **relay** specimen for insulation resistance testing.

2.2.5 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the relay test specimen. Record the relay data below.

Terminal to Terminal / Ground

Desc. Of Terminal	Desc. Of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1-9	2-10	>100 Gohm	> 10 Megohms	Acc
1-9	3-11	>100 Gohm	> 10 Megohms	Acc
1-9	4-12	>100 Gohm	> 10 Megohms	Acc
2-10	3-11	>100 Gohm	> 10 Megohms	Acc
2-10	4-12	>100 Gohm	> 10 Megohms	Acc
3-11	4-12	>100 Gohm	> 10 Megohms	Acc
5	6	>100 Gohm	> 10 Megohms	Acc
6	7	>100 Gohm	> 10 Megohms	Acc
7	8	>100 Gohm	> 10 Megohms	Acc
1-9	Ground	>100 Gohm	> 10 Megohms	Acc
2-10	Ground	>100 Gohm	> 10 Megohms	Acc
3-11	Ground	>100 Gohm	> 10 Megohms	Acc
4-12	Ground	>100 Gohm	> 10 Megohms	Acc
5	Ground	>100 Gohm	> 10 Megohms	Acc
6	Ground	>100 Gohm	> 10 Megohms	Acc
7	Ground	>100 Gohm	> 10 Megohms	Acc
8	Ground	>100 Gohm	> 10 Megohms	Acc
13	Ground	>100 Gohm	> 10 Megohms	Acc
14	Ground	>100 Gohm	> 10 Megohms	Acc

2.2.6 De-energize and remove test equipment.

2.3 Operation

2.3.1 Assemble the relay onto its socket. Regulate voltage to the coil of the relay and monitor the maximum pick-up voltage and minimum drop-out voltages.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Pick-up Voltage	71.319 VAC	**96 VAC maximum**	Acc
Drop-out Voltage	57.334 VAC	**36 AC minimum**	Acc

2.3.2 De-energize and remove test equipment.

2.4 Contact Rating Test

2.4.1 Setup the Relay specimen for contact rating testing.

2.4.2 Apply a nominal 10 amps VAC, resistive, across the NC contacts of the test specimen. Record the data in the table below.

Caution: Do not change state of contacts while energized.

Description	Record Data	Acceptance Criteria	Comments/Deviations
1-9	.1163 VAC	**< 0.5 Volts AC drop**	Acc
2-10	.1325 VAC	**< 0.5 Volts AC drop**	Acc
3-11	.1205 VAC	**< 0.5 Volts AC drop**	Acc
4-12	.1278 VAC	**< 0.5 Volts AC drop**	Acc

2.4.3 Energize the relay coil with 120VAC to change the contacts' position of the test specimen.

2.4.4 Apply a nominal 10 amps VAC, resistive, across the **closed** NO contacts of the test specimen. . Record the data in the table below.

Description	Record Data	Acceptance Criteria	Comments/Deviations
5-9	.1154 VAC	**< 0.5 Volts AC drop**	Acc
6-10	.1538 VAC	**< 0.5 Volts AC drop**	Acc
7-11	.1273 VAC	**< 0.5 Volts AC drop**	Acc
8-12	.1478 VAC	**< 0.5 Volts AC drop**	Acc

2.4.5 De-energize and remove test equipment.

2.5 Terminate the test.

2.5.1 Reland the relay and verify reland in accordance with the Lifted Lead Log.

2.5.2 Record: Date /Time of Test End: 03-30-00 2:42 p.m.

3.0 References

3.1 Panel Wiring Drawings: See list provided with relay selection list (page 3).

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Testing was acceptable

Michael Cram
03-30-00

Notes:

Certified Instrumentation Technician (signature) Michael Cram Date: 03-30-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Craig Swenson Date: 3/30/00

QA/QC (signature) Stephen Scott Moss Date: 4-6-2000

LIFTED LEAD LOG

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
FB-33066	1	2) 5103x	PGEX	5	DKY	3-30-00	SRC	3-30-00	DKY	3-30-00	SRC	3-30-00
		5106x		6	DKY	3-30-00	SRC	3-30-00	DKY	3-30-00	SRC	3-30-00
		6208x		7	DKY	3-30-00	SRC	3-30-00	DKY	3-30-00	SRC	3-30-00
		5102x		9	DKY	3-30-00	SRC	3-30-00	DKY	3-30-00	SRC	3-30-00
		5105x		10	DKY	3-30-00	SRC	3-30-00	DKY	3-30-00	SRC	3-30-00
		6207x		11	DKY	3-30-00	SRC	3-30-00	DKY	3-30-00	SRC	3-30-00
		17A02x		13	DKY	3-30-00	SRC	3-30-00	DKY	3-30-00	SRC	3-30-00
		Grey	RCS2A-6	13	DKY	3-30-00	SRC	3-30-00	DKY	3-30-00	SRC	3-30-00
		Black	" "	14	DKY	3-30-00	SRC	3-30-00	DKY	3-30-00	SRC	3-30-00
		2) 102x		14	DKY	3-30-00	SRC	3-30-00	DKY	3-30-00	SRC	3-30-00

Remarks:

Dedication Test Plan – IST
Test Plan No.: CGI-SNF-D-MHM-020-TP-020C
Test Specimen: Idec RH4B-UL-AC120V & SH4B-05, Eqmt. No.: Generic

ORIGINAL

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI Eng	DA	QA Post Review*

* QA Post Review of Individual Revisions is allowed

In-Situ Test Procedure

ORIGINAL

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) Craig Swenson Date: 3/22/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Belhaven	Michael Cram	MKC
Electrician	DAN K YORK	PCE	Dan K York	DKY
Electrician Quality Control	Stephen R. Conley	PCE	Stephen R Conley	SRC
Design Authority Representative	N/A	N/A	N/A	N/A
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Power Supply capable of 10 amps @ 120 VAC.
Megger Instrument capable of 500 VDC Test Voltage
Adjustable Voltage Power supply capable of 0 to 120 VAC minimum
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: Avo Bm80/2 I.D.: 6410-889 Calib. Due date: 02-09-01

Test Instrument type: HP3457A I.D.: BAT 124 Calib. Due date: 07-30-00

Test Instrument type: FLUKE 787 I.D.: BAT 107 Calib. Due date: 05-28-00

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

Relay Selection List

No.	Eqmt ID No.	Panel No.	Dwg. Reference
1	P2X(1)	201	ED-33065 Sht. 1
2	P6X(1)	201	ED-33065 Sht. 1
3	IAXM(1)	201	ED-33065 Sht. 1
4	MCO(1)	201	ED-33065 Sht. 1
5	MHF	202	ED-33066 Sht. 1
6	PGEX	202	ED-33066 Sht. 1
→ 7	MW15	202	ED-33066 Sht. 1
8	BF	203	ED-33067 Sht. 1
9	BSC1AX	203	ED-33067 Sht. 1
10	TSP1FIX	204	ED-33068 Sht. 1
11	TRD	204	ED-33068 Sht. 1
12	MCOY(2)	205	ED-33069 Sht. 1
13	MGCLY	205	ED-33069 Sht. 1
14	PHULY(3)	205	ED-33069 Sht. 1
15	PGLY	205	ED-33069 Sht. 1

TEST PROCEDURE:

For this In-Situ Test, the relay and its socket must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of the relay and its socket.

1.0 Select a relay from the list above. Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	MW15	Select from List provided above	Acc
Manufacturer:	Idec	Idec	Acc
Relay Model:	OK	RH4B-UL-AC120V	Acc
Contact Configuration:	OK	4PDT Contacts	Acc
Socket Model:	OK	SH4B-05	Acc

2.0 *Perform the following testing steps:*

2.1 Record: Date /Time of Test Beginning: 03-31-00 8:15am

2.1.1 Complete the Lifted Lead Log prior to removing the plug-in relay and its associated socket.

2.2 Insulation Resistance Test

2.2.1 Setup the **Relay Socket** specimen for insulation resistance testing. Attach Relay Socket in its normal mounting configuration to grounded fixture.

2.2.2 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the relay socket test specimen. Record the socket data.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1	2	>100Gohm	> 10 Megohms	Acc
1	3	>100Gohm	> 10 Megohms	Acc
1	4	>100Gohm	> 10 Megohms	Acc
1	5	>100Gohm	> 10 Megohms	Acc
1	6	>100Gohm	> 10 Megohms	Acc
1	7	>100Gohm	> 10 Megohms	Acc
1	8	>100Gohm	> 10 Megohms	Acc
1	9	>100Gohm	> 10 Megohms	Acc
1	10	>100Gohm	> 10 Megohms	Acc
1	11	>100Gohm	> 10 Megohms	Acc
1	12	>100Gohm	> 10 Megohms	Acc
1	13	>100Gohm	> 10 Megohms	Acc
1	14	>100Gohm	> 10 Megohms	Acc
2	3	>100Gohm	> 10 Megohms	Acc
2	4	>100Gohm	> 10 Megohms	Acc
2	5	>100Gohm	> 10 Megohms	Acc
2	6	>100Gohm	> 10 Megohms	Acc
2	7	>100Gohm	> 10 Megohms	Acc
2	8	>100Gohm	> 10 Megohms	Acc
2	9	>100Gohm	> 10 Megohms	Acc
2	10	>100Gohm	> 10 Megohms	Acc
2	11	>100Gohm	> 10 Megohms	Acc
2	12	>100Gohm	> 10 Megohms	Acc
2	13	>100Gohm	> 10 Megohms	Acc
2	14	>100Gohm	> 10 Megohms	Acc
3	4	>100Gohm	> 10 Megohms	Acc
3	5	>100Gohm	> 10 Megohms	Acc
3	6	>100Gohm	> 10 Megohms	Acc
3	7	>100Gohm	> 10 Megohms	Acc
3	8	>100Gohm	> 10 Megohms	Acc
3	9	>100Gohm	> 10 Megohms	Acc
3	10	>100Gohm	> 10 Megohms	Acc
3	11	>100Gohm	> 10 Megohms	Acc
3	12	>100Gohm	> 10 Megohms	Acc
3	13	>100Gohm	> 10 Megohms	Acc
3	14	>100Gohm	> 10 Megohms	Acc
4	5	>100Gohm	> 10 Megohms	Acc

Dedication Test Plan – IST **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-020-TP-020C
Test Specimen: Idec RH4B-UL-AC120V & SH4B-05, Eqmt. No.: Generic **Page 5 of 9**

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
4	6	>100Gohm	> 10 Megohms	Acc
4	7	>100Gohm	> 10 Megohms	Acc
4	8	>100Gohm	> 10 Megohms	Acc
4	9	>100Gohm	> 10 Megohms	Acc
4	10	>100Gohm	> 10 Megohms	Acc
4	11	>100Gohm	> 10 Megohms	Acc
4	12	>100Gohm	> 10 Megohms	Acc
4	13	>100Gohm	> 10 Megohms	Acc
4	14	>100Gohm	> 10 Megohms	Acc
5	6	>100Gohm	> 10 Megohms	Acc
5	7	>100Gohm	> 10 Megohms	Acc
5	8	>100Gohm	> 10 Megohms	Acc
5	8	>100Gohm	> 10 Megohms	Acc
5	10	>100Gohm	> 10 Megohms	Acc
5	11	>100Gohm	> 10 Megohms	Acc
5	12	>100Gohm	> 10 Megohms	Acc
5	13	>100Gohm	> 10 Megohms	Acc
5	14	>100Gohm	> 10 Megohms	Acc
6	7	>100Gohm	> 10 Megohms	Acc
6	8	>100Gohm	> 10 Megohms	Acc
6	9	>100Gohm	> 10 Megohms	Acc
6	10	>100Gohm	> 10 Megohms	Acc
6	11	>100Gohm	> 10 Megohms	Acc
6	12	>100Gohm	> 10 Megohms	Acc
6	12	>100Gohm	> 10 Megohms	Acc
6	14	>100Gohm	> 10 Megohms	Acc
7	8	>100Gohm	> 10 Megohms	Acc
7	9	>100Gohm	> 10 Megohms	Acc
7	10	>100Gohm	> 10 Megohms	Acc
7	11	>100Gohm	> 10 Megohms	Acc
7	12	>100Gohm	> 10 Megohms	Acc
7	13	>100Gohm	> 10 Megohms	Acc
7	14	>100Gohm	> 10 Megohms	Acc
8	9	>100Gohm	> 10 Megohms	Acc
8	10	>100Gohm	> 10 Megohms	Acc
8	11	>100Gohm	> 10 Megohms	Acc
8	12	>100Gohm	> 10 Megohms	Acc
8	13	>100Gohm	> 10 Megohms	Acc
8	14	>100Gohm	> 10 Megohms	Acc
9	10	>100Gohm	> 10 Megohms	Acc
9	11	>100Gohm	> 10 Megohms	Acc
9	12	>100Gohm	> 10 Megohms	Acc
9	13	>100Gohm	> 10 Megohms	Acc
9	14	>100Gohm	> 10 Megohms	Acc
10	11	>100Gohm	> 10 Megohms	Acc
10	12	>100Gohm	> 10 Megohms	Acc
10	13	>100Gohm	> 10 Megohms	Acc
10	14	>100Gohm	> 10 Megohms	Acc
11	12	>100Gohm	> 10 Megohms	Acc
11	13	>100Gohm	> 10 Megohms	Acc
11	14	>100Gohm	> 10 Megohms	Acc

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
12	13	>100Gohm	> 10 Megohms	Acc
12	14	>100Gohm	> 10 Megohms	Acc
13	14	>100Gohm	> 10 Megohms	Acc
1	Ground	>100Gohm	> 10 Megohms	Acc
2	Ground	>100Gohm	> 10 Megohms	Acc
3	Ground	>100Gohm	> 10 Megohms	Acc
4	Ground	>100Gohm	> 10 Megohms	Acc
5	Ground	>100Gohm	> 10 Megohms	Acc
6	Ground	>100Gohm	> 10 Megohms	Acc
7	Ground	>100Gohm	> 10 Megohms	Acc
8	Ground	>100Gohm	> 10 Megohms	Acc
9	Ground	>100Gohm	> 10 Megohms	Acc
10	Ground	>100Gohm	> 10 Megohms	Acc
11	Ground	>100Gohm	> 10 Megohms	Acc
12	Ground	>100Gohm	> 10 Megohms	Acc
13	Ground	>100Gohm	> 10 Megohms	Acc
14	Ground	>100Gohm	> 10 Megohms	Acc

2.2.3 *De-energize and remove test equipment.*

2.2.4 Setup the test equipment and **relay** specimen for insulation resistance testing.

2.2.5 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the relay test specimen. Record the relay data below.

Terminal to Terminal / Ground

Desc. Of Terminal	Desc. Of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1-9	2-10	>100Gohm	> 10 Megohms	Acc
1-9	3-11	>100Gohm	> 10 Megohms	Acc
1-9	4-12	>100Gohm	> 10 Megohms	Acc
2-10	3-11	>100Gohm	> 10 Megohms	Acc
2-10	4-12	>100Gohm	> 10 Megohms	Acc
3-11	4-12	>100Gohm	> 10 Megohms	Acc
5	6	>100Gohm	> 10 Megohms	Acc
6	7	>100Gohm	> 10 Megohms	Acc
7	8	>100Gohm	> 10 Megohms	Acc
1-9	Ground	>100Gohm	> 10 Megohms	Acc
2-10	Ground	>100Gohm	> 10 Megohms	Acc
3-11	Ground	>100Gohm	> 10 Megohms	Acc
4-12	Ground	>100Gohm	> 10 Megohms	Acc
5	Ground	>100Gohm	> 10 Megohms	Acc
6	Ground	>100Gohm	> 10 Megohms	Acc
7	Ground	>100Gohm	> 10 Megohms	Acc
8	Ground	>100Gohm	> 10 Megohms	Acc
13	Ground	>100Gohm	> 10 Megohms	Acc
14	Ground	>100Gohm	> 10 Megohms	Acc

2.2.6 De-energize and remove test equipment.

2.3 Operation

2.3.1 Assemble the relay onto its socket. Regulate voltage to the coil of the relay and monitor the maximum pick-up voltage and minimum drop-out voltages.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Pick-up Voltage	76.036 VAC	**96 VAC maximum**	Acc
Drop-out Voltage	58.585 VAC	**36 AC minimum**	Acc

2.3.2 De-energize and remove test equipment.

2.4 Contact Rating Test

2.4.1 Setup the Relay specimen for contact rating testing.

2.4.2 Apply a nominal 10 amps VAC, resistive, across the NC contacts of the test specimen. Record the data in the table below.

Caution: Do not change state of contacts while energized.

Description	Record Data	Acceptance Criteria	Comments/Deviations
1-9	.1302 VAC	**< 0.5 Volts AC drop**	Acc
2-10	.1177 VAC	**< 0.5 Volts AC drop**	Acc
3-11	.1307 VAC	**< 0.5 Volts AC drop**	Acc
4-12	.1224 VAC	**< 0.5 Volts AC drop**	Acc

2.4.3 Energize the relay coil with 120VAC to change the contacts' position of the test specimen.

2.4.4 Apply a nominal 10 amps VAC, resistive, across the **closed** NO contacts of the test specimen. . Record the data in the table below.

Description	Record Data	Acceptance Criteria	Comments/Deviations
5-9	.1456 VAC	**< 0.5 Volts AC drop**	Acc
6-10	.1422 VAC	**< 0.5 Volts AC drop**	Acc
7-11	.1402 VAC	**< 0.5 Volts AC drop**	Acc
8-12	.1279 VAC	**< 0.5 Volts AC drop**	Acc

2.4.5 De-energize and remove test equipment.

2.5 Terminate the test.

2.5.1 Reland the relay and verify reland in accordance with the Lifted Lead Log.

2.5.2 Record: Date /Time of Test End: 03-31-00 8:50 a.m.

3.0 References

3.1 Panel Wiring Drawings: See list provided with relay selection list (page 3).

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Testing was acceptable
Michael Cram
03-31-00

Notes:

Certified Instrumentation Technician (signature) Michael Cram Date: 03-31-00.

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Craig Swenson Date: 4/3/00.

QA/QC (signature) Stephen Scott Mort Date: 4-6-2000.

LIFTED LEAD LOG

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
EB-33066	1	2) 101X	MW-15	5	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00
		5111X		6	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00
		5907X		9	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00
		5103X		10	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00
		1105X		13	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00
		Grey	RCS2A-6	13	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00
		Black	" "	14	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00
		2) 102X		14	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00

Remarks:

Dedication Test Plan – IST
Test Plan No.: CGI-SNF-D-MHM-020-TP-020C
ORIGINAL
Rev. No. 0
Test Specimen: Idec RH4B-UL-AC120V & SH4B-05, Eqmt. No.: Generic
Page 1 of 9

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI Eng	DA	QA Post Review*

* QA Post Review of Individual Revisions is allowed

In-Situ Test Procedure

ORIGINAL

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) Craig Swenson Date: 3/22/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Belhaven	Michael Cram	MRC
Electrician	DAN K YORK	PCE	Dan K. York	DKY
Electrician Quality Control	Stephen R. Cowley	PCE	Stephen R. Cowley	SRC
Design Authority Representative	N/A	N/A	N/A	N/A
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Power Supply capable of 10 amps @ 120 VAC.
Megger Instrument capable of 500 VDC Test Voltage
Adjustable Voltage Power supply capable of 0 to 120 VAC minimum
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: Avo BM 80/2 I.D.: 6410-889 Calib. Due date: 02-09-01

Test Instrument type: HP 3457A I.D.: BAT 124 Calib. Due date: 07-30-00

Test Instrument type: FLUKE 787 I.D.: BAT 107 Calib. Due date: 05-28-00

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

Relay Selection List

No.	Eqmt ID No.	Panel No.	Dwg. Reference
1	P2X(1)	201	ED-33065 Sht. 1
2	P6X(1)	201	ED-33065 Sht. 1
3	IAXM(1)	201	ED-33065 Sht. 1
4	MCO(1)	201	ED-33065 Sht. 1
5	MHF	202	ED-33066 Sht. 1
6	PGEX	202	ED-33066 Sht. 1
7	MW15	202	ED-33066 Sht. 1
→ 8	BF	203	ED-33067 Sht. 1
9	BSC1AX	203	ED-33067 Sht. 1
10	TSP1FIX	204	ED-33068 Sht. 1
11	TRD	204	ED-33068 Sht. 1
12	MCOY(2)	205	ED-33069 Sht. 1
13	MGCLY	205	ED-33069 Sht. 1
14	PHULY(3)	205	ED-33069 Sht. 1
15	PGLY	205	ED-33069 Sht. 1

TEST PROCEDURE:

For this In-Situ Test, the relay and its socket must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of the relay and its socket.

1.0 Select a relay from the list above. Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	BF	Select from List provided above	Acc
Manufacturer:	Idec	Idec	Acc
Relay Model:	OK	RH4B-UL-AC120V	Acc
Contact Configuration:	OK	4PDT Contacts	Acc
Socket Model:	OK	SH4B-05	Acc

2.0 Perform the following testing steps:

2.1 Record: Date /Time of Test Beginning: 03-31-00 9:00 a.m.

2.1.1 Complete the Lifted Lead Log prior to removing the plug-in relay and its associated socket.

2.2 *Insulation Resistance Test*

2.2.1 Setup the **Relay Socket** specimen for insulation resistance testing. Attach Relay Socket in its normal mounting configuration to grounded fixture.

2.2.2 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the relay socket test specimen. Record the socket data.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1	2	>100Gohm	> 10 Megohms	Acc
1	3	>100Gohm	> 10 Megohms	Acc
1	4	>100Gohm	> 10 Megohms	Acc
1	5	>100Gohm	> 10 Megohms	Acc
1	6	>100Gohm	> 10 Megohms	Acc
1	7	>100Gohm	> 10 Megohms	Acc
1	8	>100Gohm	> 10 Megohms	Acc
1	9	>100Gohm	> 10 Megohms	Acc
1	10	>100Gohm	> 10 Megohms	Acc
1	11	>100Gohm	> 10 Megohms	Acc
1	12	>100Gohm	> 10 Megohms	Acc
1	13	>100Gohm	> 10 Megohms	Acc
1	14	>100Gohm	> 10 Megohms	Acc
2	3	>100Gohm	> 10 Megohms	Acc
2	4	>100Gohm	> 10 Megohms	Acc
2	5	>100Gohm	> 10 Megohms	Acc
2	6	>100Gohm	> 10 Megohms	Acc
2	7	>100Gohm	> 10 Megohms	Acc
2	8	>100Gohm	> 10 Megohms	Acc
2	9	>100Gohm	> 10 Megohms	Acc
2	10	>100Gohm	> 10 Megohms	Acc
2	11	>100Gohm	> 10 Megohms	Acc
2	12	>100Gohm	> 10 Megohms	Acc
2	13	>100Gohm	> 10 Megohms	Acc
2	14	>100Gohm	> 10 Megohms	Acc
3	4	>100Gohm	> 10 Megohms	Acc
3	5	>100Gohm	> 10 Megohms	Acc
3	6	>100Gohm	> 10 Megohms	Acc
3	7	>100Gohm	> 10 Megohms	Acc
3	8	>100Gohm	> 10 Megohms	Acc
3	9	>100Gohm	> 10 Megohms	Acc
3	10	>100Gohm	> 10 Megohms	Acc
3	11	>100Gohm	> 10 Megohms	Acc
3	12	>100Gohm	> 10 Megohms	Acc
3	13	>100Gohm	> 10 Megohms	Acc
3	14	>100Gohm	> 10 Megohms	Acc
4	5	>100Gohm	> 10 Megohms	Acc

Dedication Test Plan – IST **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-020-TP-020C
Test Specimen: Idec RH4B-UL-AC120V & SH4B-05, Eqmt. No.: Generic **Page 5 of 9**

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
4	6	>100Gohm	> 10 Megohms	Acc
4	7	>100Gohm	> 10 Megohms	Acc
4	8	>100Gohm	> 10 Megohms	Acc
4	9	>100Gohm	> 10 Megohms	Acc AIRC 03-3100
4	10	>100Gohm	> 10 Megohms	Acc
4	11	>100Gohm	> 10 Megohms	Acc
4	12	>100Gohm	> 10 Megohms	Acc
4	13	>100Gohm	> 10 Megohms	Acc
4	14	>100Gohm	> 10 Megohms	Acc
5	6	>100Gohm	> 10 Megohms	Acc
5	7	>100Gohm	> 10 Megohms	Acc
5	8	>100Gohm	> 10 Megohms	Acc
5	8	>100Gohm	> 10 Megohms	Acc
5	10	>100Gohm	> 10 Megohms	Acc
5	11	>100Gohm	> 10 Megohms	Acc
5	12	>100Gohm	> 10 Megohms	Acc
5	13	>100Gohm	> 10 Megohms	Acc
5	14	>100Gohm	> 10 Megohms	Acc
6	7	>100Gohm	> 10 Megohms	Acc
6	8	>100Gohm	> 10 Megohms	Acc
6	9	>100Gohm	> 10 Megohms	Acc
6	10	>100Gohm	> 10 Megohms	Acc
6	11	>100Gohm	> 10 Megohms	Acc
6	12	>100Gohm	> 10 Megohms	Acc
6	12	>100Gohm	> 10 Megohms	Acc
6	14	>100Gohm	> 10 Megohms	Acc
7	8	>100Gohm	> 10 Megohms	Acc
7	9	>100Gohm	> 10 Megohms	Acc
7	10	>100Gohm	> 10 Megohms	Acc
7	11	>100Gohm	> 10 Megohms	Acc
7	12	>100Gohm	> 10 Megohms	Acc
7	13	>100Gohm	> 10 Megohms	Acc
7	14	>100Gohm	> 10 Megohms	Acc
8	9	>100Gohm	> 10 Megohms	Acc
8	10	>100Gohm	> 10 Megohms	Acc
8	11	>100Gohm	> 10 Megohms	Acc
8	12	>100Gohm	> 10 Megohms	Acc
8	13	>100Gohm	> 10 Megohms	Acc
8	14	>100Gohm	> 10 Megohms	Acc
9	10	>100Gohm	> 10 Megohms	Acc
9	11	>100Gohm	> 10 Megohms	Acc
9	12	>100Gohm	> 10 Megohms	Acc
9	13	>100Gohm	> 10 Megohms	Acc
9	14	>100Gohm	> 10 Megohms	Acc
10	11	>100Gohm	> 10 Megohms	Acc
10	12	>100Gohm	> 10 Megohms	Acc
10	13	>100Gohm	> 10 Megohms	Acc
10	14	>100Gohm	> 10 Megohms	Acc
11	12	>100Gohm	> 10 Megohms	Acc
11	13	>100Gohm	> 10 Megohms	Acc
11	14	>100Gohm	> 10 Megohms	Acc

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
12	13	>100Gohm	> 10 Megohms	Acc
12	14	>100Gohm	> 10 Megohms	Acc
13	14	>100Gohm	> 10 Megohms	Acc
1	Ground	>100Gohm	> 10 Megohms	Acc
2	Ground	>100Gohm	> 10 Megohms	Acc
3	Ground	>100Gohm	> 10 Megohms	Acc
4	Ground	>100Gohm	> 10 Megohms	Acc
5	Ground	>100Gohm	> 10 Megohms	Acc
6	Ground	>100Gohm	> 10 Megohms	Acc
7	Ground	>100Gohm	> 10 Megohms	Acc
8	Ground	>100Gohm	> 10 Megohms	Acc
9	Ground	>100Gohm	> 10 Megohms	Acc
10	Ground	>100Gohm	> 10 Megohms	Acc
11	Ground	>100Gohm	> 10 Megohms	Acc
12	Ground	>100Gohm	> 10 Megohms	Acc
13	Ground	>100Gohm	> 10 Megohms	Acc
14	Ground	>100Gohm	> 10 Megohms	Acc

2.2.3 De-energize and remove test equipment.

2.2.4 Setup the test equipment and **relay** specimen for insulation resistance testing.

2.2.5 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the relay test specimen. Record the relay data below.

Terminal to Terminal / Ground

Desc. Of Terminal	Desc. Of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1-9	2-10	>100Gohm	> 10 Megohms	Acc
1-9	3-11	>100Gohm	> 10 Megohms	Acc
1-9	4-12	>100Gohm	> 10 Megohms	Acc
2-10	3-11	>100Gohm	> 10 Megohms	Acc
2-10	4-12	>100Gohm	> 10 Megohms	Acc
3-11	4-12	>100Gohm	> 10 Megohms	Acc
5	6	>100Gohm	> 10 Megohms	Acc
6	7	>100Gohm	> 10 Megohms	Acc
7	8	>100Gohm	> 10 Megohms	Acc
1-9	Ground	>100Gohm	> 10 Megohms	Acc
2-10	Ground	>100Gohm	> 10 Megohms	Acc
3-11	Ground	>100Gohm	> 10 Megohms	Acc
4-12	Ground	>100Gohm	> 10 Megohms	Acc
5	Ground	>100Gohm	> 10 Megohms	Acc
6	Ground	>100Gohm	> 10 Megohms	Acc
7	Ground	>100Gohm	> 10 Megohms	Acc
8	Ground	>100Gohm	> 10 Megohms	Acc
13	Ground	>100Gohm	> 10 Megohms	Acc
14	Ground	>100Gohm	> 10 Megohms	Acc

2.2.6 De-energize and remove test equipment.

2.3 Operation

2.3.1 Assemble the relay onto its socket. Regulate voltage to the coil of the relay and monitor the *maximum pick-up voltage and minimum drop-out voltages.*

Description	Record Data	Acceptance Criteria	Comments/Deviations
Pick-up Voltage	77.757 VAC	**96 VAC maximum**	Acc
Drop-out Voltage	62.502 VAC	**36 AC minimum**	Acc

2.3.2 De-energize and remove test equipment.

2.4 Contact Rating Test

2.4.1 Setup the Relay specimen for contact rating testing.

2.4.2 Apply a nominal 10 amps VAC, resistive, across the NC contacts of the test specimen. Record the data in the table below.

Caution: Do not change state of contacts while energized.

Description	Record Data	Acceptance Criteria	Comments/Deviations
1-9	.1236 VAC	**< 0.5 Volts AC drop**	Acc
2-10	.1152 VAC	**< 0.5 Volts AC drop**	Acc
3-11	.1260 VAC	**< 0.5 Volts AC drop**	Acc
4-12	.1121 VAC	**< 0.5 Volts AC drop**	Acc

2.4.3 Energize the relay coil with 120VAC to change the contacts' position of the test specimen.

2.4.4 Apply a nominal 10 amps VAC, resistive, across the **closed** NO contacts of the test specimen. . Record the data in the table below.

Description	Record Data	Acceptance Criteria	Comments/Deviations
5-9	.1301 VAC	**< 0.5 Volts AC drop**	Acc
6-10	.1170 VAC	**< 0.5 Volts AC drop**	Acc
7-11	.1362 VAC	**< 0.5 Volts AC drop**	Acc
8-12	.1774 VAC	**< 0.5 Volts AC drop**	Acc

2.4.5 De-energize and remove test equipment.

2.5 Terminate the test.

2.5.1 Reland the relay and verify reland in accordance with the Lifted Lead Log.

2.5.2 Record: Date /Time of Test End: 03-31-00 9:35a.m.

3.0 References

3.1 Panel Wiring Drawings: See list provided with relay selection list (page 3).

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Testing was acceptable.
Michael Cram
03-31-00

Notes:

Certified Instrumentation Technician (signature) Michael Cram Date: 03-31-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Craig Swenson Date: 4/3/00

QA/QC (signature) Stephen Scott Marr Date: 4-6-2000

LIFTED LEAD LOG

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
E8-33067	1	2203X	BF	5	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00
		2206X		9	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00
		2413X		13	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00
		Grey	RGS2A-6	13	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00
		Black	" "	14	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00
		2)102X		14	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00

Remarks:

Dedication Test Plan – IST
Test Plan No.: CGI-SNF-D-MHM-020-TP-020C
Test Specimen: Idec RH4B-UL-AC120V & SH4B-05, Eqmt. No.: Generic

ORIGINAL

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI Eng	DA	QA Post Review*

* QA Post Review of Individual Revisions is allowed

In-Situ Test Procedure

ORIGINAL

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) Craig Swenson Date: 3/22/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Belhaven	Michael Cram	MEC
Electrician	Dan K York	PCE	Dan K. York	DKY
Electrician Quality Control	Stephen R. Conley	PCE	Stephen R Conley	SRC
Design Authority Representative	N/A	N/A	N/A	N/A
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Power Supply capable of 10 amps @ 120 VAC.
Megger Instrument capable of 500 VDC Test Voltage
Adjustable Voltage Power supply capable of 0 to 120 VAC minimum
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: Avo BM80/2 I.D.: 6410-889 Calib. Due date: 02-09-01

Test Instrument type: HP3457A I.D.: BAT 124 Calib. Due date: 07-30-00

Test Instrument type: FLUKE 787 I.D.: BAT 107 Calib. Due date: 05-28-00

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

Relay Selection List

No.	Eqmt ID No.	Panel No.	Dwg. Reference
1	P2X(1)	201	ED-33065 Sht. 1
2	P6X(1)	201	ED-33065 Sht. 1
3	IAXM(1)	201	ED-33065 Sht. 1
4	MCO(1)	201	ED-33065 Sht. 1
5	MHF	202	ED-33066 Sht. 1
6	PGEX	202	ED-33066 Sht. 1
7	MW15	202	ED-33066 Sht. 1
8	BF	203	ED-33067 Sht. 1
→ 9	BSC1AX	203	ED-33067 Sht. 1
10	TSP1FIX	204	ED-33068 Sht. 1
11	TRD	204	ED-33068 Sht. 1
12	MCOY(2)	205	ED-33069 Sht. 1
13	MGCLY	205	ED-33069 Sht. 1
14	PHULY(3)	205	ED-33069 Sht. 1
15	PGLY	205	ED-33069 Sht. 1

TEST PROCEDURE:

For this In-Situ Test, the relay and its socket must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of the relay and its socket.

1.0 Select a relay from the list above. Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	BSC1AX	Select from List provided above	Acc
Manufacturer:	OK	Idec	Acc
Relay Model:	OK	RH4B-UL-AC120V	Acc
Contact Configuration:	OK	4PDT Contacts	Acc
Socket Model:	OK	SH4B-05	Acc

2.0 Perform the following testing steps:

2.1 Record: Date /Time of Test Beginning: 03-31-00 9:52 a.m.

2.1.1 Complete the Lifted Lead Log prior to removing the plug-in relay and its associated socket.

2.2 Insulation Resistance Test

2.2.1 Setup the **Relay Socket** specimen for insulation resistance testing. Attach Relay Socket in its normal mounting configuration to grounded fixture.

2.2.2 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the relay socket test specimen. Record the socket data.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1	2	>100Gohm	> 10 Megohms	Acc
1	3	>100Gohm	> 10 Megohms	Acc
1	4	>100Gohm	> 10 Megohms	Acc
1	5	>100Gohm	> 10 Megohms	Acc
1	6	>100 Gohm	> 10 Megohms	Acc
1	7	>100Gohm	> 10 Megohms	Acc
1	8	>100Gohm	> 10 Megohms	Acc
1	9	>100 Gohm	> 10 Megohms	Acc
1	10	>100Gohm	> 10 Megohms	Acc
1	11	>100 Gohm	> 10 Megohms	Acc
1	12	>100 Gohm	> 10 Megohms	Acc
1	13	>100Gohm	> 10 Megohms	Acc
1	14	>100 Gohm	> 10 Megohms	Acc
2	3	>100 Gohm	> 10 Megohms	Acc
2	4	>100Gohm	> 10 Megohms	Acc
2	5	>100 Gohm	> 10 Megohms	Acc
2	6	>100Gohm	> 10 Megohms	Acc
2	7	>100 Gohm	> 10 Megohms	Acc
2	8	>100 Gohm	> 10 Megohms	Acc
2	9	>100Gohm	> 10 Megohms	Acc
2	10	>100Gohm	> 10 Megohms	Acc
2	11	>100 Gohm	> 10 Megohms	Acc
2	12	>100 Gohm	> 10 Megohms	Acc
2	13	>100Gohm	> 10 Megohms	Acc
2	14	>100 Gohm	> 10 Megohms	Acc
3	4	>100Gohm	> 10 Megohms	Acc
3	5	>100 Gohm	> 10 Megohms	Acc
3	6	>100Gohm	> 10 Megohms	Acc
3	7	>100Gohm	> 10 Megohms	Acc
3	8	>100Gohm	> 10 Megohms	Acc
3	9	>100Gohm	> 10 Megohms	Acc
3	10	>100Gohm	> 10 Megohms	Acc
3	11	>100Gohm	> 10 Megohms	Acc
3	12	>100Gohm	> 10 Megohms	Acc
3	13	>100Gohm	> 10 Megohms	Acc
3	14	>100Gohm	> 10 Megohms	Acc
4	5	>100Gohm	> 10 Megohms	Acc

Dedication Test Plan – IST **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-020-TP-020C
Test Specimen: Idec RH4B-UL-AC120V & SH4B-05, Eqmt. No.: Generic **Page 5 of 9**

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
4	6	>100Gohms	> 10 Megohms	Acc
4	7	>100Gohms	> 10 Megohms	Acc
4	8	>100Gohms	> 10 Megohms	Acc
4	9	>100Gohms	> 10 Megohms	Acc
4	10	>100Gohms	> 10 Megohms	Acc
4	11	>100Gohm	> 10 Megohms	Acc
4	12	>100Gohm	> 10 Megohms	Acc
4	13	>100Gohm	> 10 Megohms	Acc
4	14	>100Gohm	> 10 Megohms	Acc
5	6	>100Gohm	> 10 Megohms	Acc
5	7	>100Gohm	> 10 Megohms	Acc
5	8	>100Gohm	> 10 Megohms	Acc
5	8	>100Gohm	> 10 Megohms	Acc
5	10	>100Gohm	> 10 Megohms	Acc
5	11	>100Gohm	> 10 Megohms	Acc
5	12	>100Gohm	> 10 Megohms	Acc
5	13	>100Gohm	> 10 Megohms	Acc
5	14	>100Gohm	> 10 Megohms	Acc
6	7	>100Gohm	> 10 Megohms	Acc
6	8	>100Gohm	> 10 Megohms	Acc
6	9	>100Gohm	> 10 Megohms	Acc
6	10	>100Gohm	> 10 Megohms	Acc
6	11	>100Gohm	> 10 Megohms	Acc
6	12	>100Gohm	> 10 Megohms	Acc
6	12	>100Gohm	> 10 Megohms	Acc
6	14	>100Gohm	> 10 Megohms	Acc
7	8	>100Gohm	> 10 Megohms	Acc
7	9	>100Gohm	> 10 Megohms	Acc
7	10	>100Gohm	> 10 Megohms	Acc
7	11	>100Gohm	> 10 Megohms	Acc
7	12	>100Gohm	> 10 Megohms	Acc
7	13	>100Gohm	> 10 Megohms	Acc
7	14	>100Gohm	> 10 Megohms	Acc
8	9	>100Gohm	> 10 Megohms	Acc
8	10	>100Gohm	> 10 Megohms	Acc
8	11	>100Gohm	> 10 Megohms	Acc
8	12	>100Gohm	> 10 Megohms	Acc
8	13	>100Gohm	> 10 Megohms	Acc
8	14	>100Gohm	> 10 Megohms	Acc
9	10	>100Gohm	> 10 Megohms	Acc
9	11	>100Gohm	> 10 Megohms	Acc
9	12	>100Gohm	> 10 Megohms	Acc
9	13	>100Gohm	> 10 Megohms	Acc
9	14	>100Gohm	> 10 Megohms	Acc
10	11	>100Gohm	> 10 Megohms	Acc
10	12	>100Gohm	> 10 Megohms	Acc
10	13	>100Gohm	> 10 Megohms	Acc
10	14	>100Gohm	> 10 Megohms	Acc
11	12	>100Gohm	> 10 Megohms	Acc
11	13	>100Gohm	> 10 Megohms	Acc
11	14	>100Gohm	> 10 Megohms	Acc

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
12	13	>100Gohm	> 10 Megohms	Acc
12	14	>100Gohm	> 10 Megohms	Acc
13	14	>100Gohm	> 10 Megohms	Acc
1	Ground	>100Gohm	> 10 Megohms	Acc
2	Ground	>100Gohm	> 10 Megohms	Acc
3	Ground	>100Gohm	> 10 Megohms	Acc
4	Ground	>100Gohm	> 10 Megohms	Acc
5	Ground	>100Gohm	> 10 Megohms	Acc
6	Ground	>100Gohm	> 10 Megohms	Acc
7	Ground	>100Gohm	> 10 Megohms	Acc
8	Ground	>100Gohm	> 10 Megohms	Acc
9	Ground	>100Gohm	> 10 Megohms	Acc
10	Ground	>100Gohm	> 10 Megohms	Acc
11	Ground	>100Gohm	> 10 Megohms	Acc
12	Ground	>100Gohm	> 10 Megohms	Acc
13	Ground	>100Gohm	> 10 Megohms	Acc
14	Ground	>100Gohm	> 10 Megohms	Acc

2.2.3 De-energize and remove test equipment.

2.2.4 Setup the test equipment and **relay** specimen for insulation resistance testing.

2.2.5 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the relay test specimen. Record the relay data below.

Terminal to Terminal / Ground

Desc. Of Terminal	Desc. Of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1-9	2-10	>100Gohm	> 10 Megohms	Acc
1-9	3-11	>100Gohm	> 10 Megohms	Acc
1-9	4-12	>100Gohm	> 10 Megohms	Acc
2-10	3-11	>100Gohm	> 10 Megohms	Acc
2-10	4-12	>100Gohm	> 10 Megohms	Acc
3-11	4-12	>100 Gohm	> 10 Megohms	Acc
5	6	>100Gohm	> 10 Megohms	Acc
6	7	>100Gohm	> 10 Megohms	Acc
7	8	>100Gohm	> 10 Megohms	Acc
1-9	Ground	>100Gohm	> 10 Megohms	Acc
2-10	Ground	>100Gohm	> 10 Megohms	Acc
3-11	Ground	>100Gohm	> 10 Megohms	Acc
4-12	Ground	>100Gohm	> 10 Megohms	Acc
5	Ground	>100Gohm	> 10 Megohms	Acc
6	Ground	>100Gohm	> 10 Megohms	Acc
7	Ground	>100Gohm	> 10 Megohms	Acc
8	Ground	> 100Gohm	> 10 Megohms	Acc
13	Ground	>100Gohm	> 10 Megohms	Acc
14	Ground	> 100Gohm	> 10 Megohms	Acc

2.2.6 De-energize and remove test equipment.

2.3 Operation

2.3.1 Assemble the relay onto its socket. Regulate voltage to the coil of the relay and monitor the maximum pick-up voltage and minimum drop-out voltages.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Pick-up Voltage	67.152 VAC	**96 VAC maximum**	Acc
Drop-out Voltage	43.416 VAC	**36 AC minimum**	Acc

2.3.2 De-energize and remove test equipment.

2.4 Contact Rating Test

2.4.1 Setup the Relay specimen for contact rating testing.

2.4.2 Apply a nominal 10 amps VAC, resistive, across the NC contacts of the test specimen. Record the data in the table below.

Caution: Do not change state of contacts while energized.

Description	Record Data	Acceptance Criteria	Comments/Deviations
1-9	.1163 VAC	**< 0.5 Volts AC drop**	Acc
2-10	.1189 VAC	**< 0.5 Volts AC drop**	Acc
3-11	.1298 VAC	**< 0.5 Volts AC drop**	Acc
4-12	.1025 VAC	**< 0.5 Volts AC drop**	Acc

2.4.3 Energize the relay coil with 120VAC to change the contacts' position of the test specimen.

2.4.4 Apply a nominal 10 amps VAC, resistive, across the **closed** NO contacts of the test specimen. . Record the data in the table below.

Description	Record Data	Acceptance Criteria	Comments/Deviations
5-9	.1153 VAC	**< 0.5 Volts AC drop**	Acc
6-10	.1185 VAC	**< 0.5 Volts AC drop**	Acc
7-11	.1270 VAC	**< 0.5 Volts AC drop**	Acc
8-12	.1804 VAC	**< 0.5 Volts AC drop**	Acc

2.4.5 De-energize and remove test equipment.

2.5 Terminate the test.

2.5.1 Reland the relay and verify reland in accordance with the Lifted Lead Log.

2.5.2 Record: Date /Time of Test End: 03-31-00 11:00 a.m.

3.0 References

3.1 Panel Wiring Drawings: See list provided with relay selection list (page 3).

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Testing was acceptable
Michael Cram
03-31-00

Notes:

Certified Instrumentation Technician (signature) Michael Cram Date: 03-31-00.

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Craig Swenson Date: 4/3/00

QA/QC (signature) Stephen Scott Moss Date: 4-6-2000

LIFTED LEAD LOG

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
EB-3306 1	1	2) 101X	BSC1AX	5	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00
		5210X		9	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00
		3503X		13	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00
		Grey	RCS2A-6	13	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00
		Black		14	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00
		2) 102X	BSC1AX	14	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00

Remarks:

SNF-6315, Rev. 0

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Dedication Test Plan – IST ORIGINAL Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-020-TP-020C
Test Specimen: Idec RH4B-UL-AC120V & SH4B-05, Eqmt. No.: Generic Page 1 of 9

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI Eng	DA	QA Post Review*

* QA Post Review of Individual Revisions is allowed

In-Situ Test Procedure

ORIGINAL

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) Craig Swenson Date: 3/22/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Belhaven	Michael Cram	MCC
Electrician	DAN K YORK	PCE	Dan K York	DKY
Electrician Quality Control	Stephen R. Conley	PCE	Stephen R Conley	SRC
Design Authority Representative	N/A	N/A	N/A	N/A
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Power Supply capable of 10 amps @ 120 VAC.
Megger Instrument capable of 500 VDC Test Voltage
Adjustable Voltage Power supply capable of 0 to 120 VAC minimum
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: AVO BM80/2 I.D.: 6410-889 Calib. Due date: 02-09-01

Test Instrument type: FLUKE 787 I.D.: BAT 107 Calib. Due date: 05-28-00

Test Instrument type: HP 3457A I.D.: BAT 124 Calib. Due date: 07-30-00

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

Relay Selection List

No.	Eqmt ID No.	Panel No.	Dwg. Reference
1	P2X(1)	201	ED-33065 Sht. 1
2	P6X(1)	201	ED-33065 Sht. 1
3	IAXM(1)	201	ED-33065 Sht. 1
4	MCO(1)	201	ED-33065 Sht. 1
5	MHF	202	ED-33066 Sht. 1
6	PGEX	202	ED-33066 Sht. 1
7	MW15	202	ED-33066 Sht. 1
8	BF	203	ED-33067 Sht. 1
9	BSC1AX	203	ED-33067 Sht. 1
10	TSP1FIX	204	ED-33068 Sht. 1
11	TRD	204	ED-33068 Sht. 1
12	MCOY(2)	205	ED-33069 Sht. 1
13	MGCLY	205	ED-33069 Sht. 1
14	PHULY(3)	205	ED-33069 Sht. 1
15	PGLY	205	ED-33069 Sht. 1

TEST PROCEDURE:

For this In-Situ Test, the relay and its socket must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of the relay and its socket.

1.0 Select a relay from the list above. Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	TSP1FIX	Select from List provided above	Acc
Manufacturer:	OK	Idec	Acc
Relay Model:	OK	RH4B-UL-AC120V	Acc
Contact Configuration:	OK	4PDT Contacts	Acc
Socket Model:	OK	SH4B-05	Acc

2.0 Perform the following testing steps:

2.1 Record: Date /Time of Test Beginning: 04-03-00 11:45 a.m.

2.1.1 Complete the Lifted Lead Log prior to removing the plug-in relay and its associated socket.

2.2 Insulation Resistance Test

2.2.1 Setup the **Relay Socket** specimen for insulation resistance testing. Attach Relay Socket in its normal mounting configuration to grounded fixture.

2.2.2 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the relay socket test specimen. Record the socket data.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1	2	>100Gohm	> 10 Megohms	Acc
1	3	>100Gohm	> 10 Megohms	Acc
1	4	>100Gohm	> 10 Megohms	Acc
1	5	>100Gohm	> 10 Megohms	Acc
1	6	>100Gohm	> 10 Megohms	Acc
1	7	>100Gohm	> 10 Megohms	Acc
1	8	>100Gohm	> 10 Megohms	Acc
1	9	>100Gohm	> 10 Megohms	Acc
1	10	>100Gohm	> 10 Megohms	Acc
1	11	>100Gohm	> 10 Megohms	Acc
1	12	>100Gohm	> 10 Megohms	Acc
1	13	>100Gohm	> 10 Megohms	Acc
1	14	>100Gohm	> 10 Megohms	Acc
2	3	>100Gohm	> 10 Megohms	Acc
2	4	>100Gohm	> 10 Megohms	Acc
2	5	>100Gohm	> 10 Megohms	Acc
2	6	>100Gohm	> 10 Megohms	Acc
2	7	>100Gohm	> 10 Megohms	Acc
2	8	>100Gohm	> 10 Megohms	Acc
2	9	>100Gohm	> 10 Megohms	Acc
2	10	>100Gohm	> 10 Megohms	Acc
2	11	>100Gohm	> 10 Megohms	Acc
2	12	>100Gohm	> 10 Megohms	Acc
2	13	>100Gohm	> 10 Megohms	Acc
2	14	>100Gohm	> 10 Megohms	Acc
3	4	>100Gohm	> 10 Megohms	Acc
3	5	>100Gohm	> 10 Megohms	Acc
3	6	>100Gohm	> 10 Megohms	Acc
3	7	>100Gohm	> 10 Megohms	Acc
3	8	>100Gohm	> 10 Megohms	Acc
3	9	>100Gohm	> 10 Megohms	Acc
3	10	>100Gohm	> 10 Megohms	Acc
3	11	>100Gohm	> 10 Megohms	Acc
3	12	>100Gohm	> 10 Megohms	Acc
3	13	>100Gohm	> 10 Megohms	Acc
3	14	>100Gohm	> 10 Megohms	Acc
4	5	>100Gohm	> 10 Megohms	Acc

Dedication Test Plan – IST Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-020-TP-020C
Test Specimen: Idec RH4B-UL-AC120V & SH4B-05, Eqmt. No.: Generic Page 5 of 9

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
4	6	>100Gohm	> 10 Megohms	Acc
4	7	>100Gohm	> 10 Megohms	Acc
4	8	>100Gohm	> 10 Megohms	Acc
4	9	>100Gohm	> 10 Megohms	Acc
4	10	>100Gohm	> 10 Megohms	Acc
4	11	>100Gohm	> 10 Megohms	Acc
4	12	>100Gohm	> 10 Megohms	Acc
4	13	>100Gohm	> 10 Megohms	Acc
4	14	>100Gohm	> 10 Megohms	Acc
5	6	>100Gohm	> 10 Megohms	Acc
5	7	>100Gohm	> 10 Megohms	Acc
5	8	>100Gohm	> 10 Megohms	Acc
5	8	>100Gohm	> 10 Megohms	Acc
5	10	>100Gohm	> 10 Megohms	Acc
5	11	>100Gohm	> 10 Megohms	Acc
5	12	>100Gohm	> 10 Megohms	Acc
5	13	>100Gohm	> 10 Megohms	Acc
5	14	>100Gohm	> 10 Megohms	Acc
6	7	>100Gohm	> 10 Megohms	Acc
6	8	>100Gohm	> 10 Megohms	Acc
6	9	>100Gohm	> 10 Megohms	Acc
6	10	>100Gohm	> 10 Megohms	Acc
6	11	>100Gohm	> 10 Megohms	Acc
6	12	>100Gohm	> 10 Megohms	Acc
6	12	>100Gohm	> 10 Megohms	Acc
6	14	>100Gohm	> 10 Megohms	Acc
7	8	>100Gohm	> 10 Megohms	Acc
7	9	>100Gohm	> 10 Megohms	Acc
7	10	>100Gohm	> 10 Megohms	Acc
7	11	>100Gohm	> 10 Megohms	Acc
7	12	>100Gohm	> 10 Megohms	Acc
7	13	>100Gohm	> 10 Megohms	Acc
7	14	>100Gohm	> 10 Megohms	Acc
8	9	>100Gohm	> 10 Megohms	Acc
8	10	>100Gohm	> 10 Megohms	Acc
8	11	>100Gohm	> 10 Megohms	Acc
8	12	>100Gohm	> 10 Megohms	Acc
8	13	>100Gohm	> 10 Megohms	Acc
8	14	>100Gohm	> 10 Megohms	Acc
9	10	>100Gohm	> 10 Megohms	Acc
9	11	>100Gohm	> 10 Megohms	Acc
9	12	>100Gohm	> 10 Megohms	Acc
9	13	>100Gohm	> 10 Megohms	Acc
9	14	>100Gohm	> 10 Megohms	Acc
10	11	>100Gohm	> 10 Megohms	Acc
10	12	>100Gohm	> 10 Megohms	Acc
10	13	>100Gohm	> 10 Megohms	Acc
10	14	>100Gohm	> 10 Megohms	Acc
11	12	>100Gohm	> 10 Megohms	Acc
11	13	>100Gohm	> 10 Megohms	Acc
11	14	>100Gohm	> 10 Megohms	Acc

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
12	13	>100Gohm	> 10 Megohms	Acc
12	14	>100Gohm	> 10 Megohms	Acc
13	14	>100Gohm	> 10 Megohms	Acc
1	Ground	>100Gohm	> 10 Megohms	Acc
2	Ground	>100Gohm	> 10 Megohms	Acc
3	Ground	>100Gohm	> 10 Megohms	Acc
4	Ground	>100Gohm	> 10 Megohms	Acc
5	Ground	>100Gohm	> 10 Megohms	Acc
6	Ground	>100Gohm	> 10 Megohms	Acc
7	Ground	>100Gohm	> 10 Megohms	Acc
8	Ground	>100Gohm	> 10 Megohms	Acc
9	Ground	>100Gohm	> 10 Megohms	Acc
10	Ground	>100Gohm	> 10 Megohms	Acc
11	Ground	>100Gohm	> 10 Megohms	Acc
12	Ground	>100Gohm	> 10 Megohms	Acc
13	Ground	>100Gohm	> 10 Megohms	Acc
14	Ground	>100Gohm	> 10 Megohms	Acc

2.2.3 De-energize and remove test equipment.

2.2.4 Setup the test equipment and **relay** specimen for insulation resistance testing.

2.2.5 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the relay test specimen. Record the relay data below.

Terminal to Terminal / Ground

Desc. Of Terminal	Desc. Of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1-9	2-10	>100Gohm	> 10 Megohms	Acc
1-9	3-11	>100Gohm	> 10 Megohms	Acc
1-9	4-12	>100Gohm	> 10 Megohms	Acc
2-10	3-11	>100Gohm	> 10 Megohms	Acc
2-10	4-12	>100Gohm	> 10 Megohms	Acc
3-11	4-12	>100Gohm	> 10 Megohms	Acc
5	6	>100Gohm	> 10 Megohms	Acc
6	7	>100Gohm	> 10 Megohms	Acc
7	8	>100Gohm	> 10 Megohms	Acc
1-9	Ground	>100Gohm	> 10 Megohms	Acc
2-10	Ground	>100Gohm	> 10 Megohms	Acc
3-11	Ground	>100Gohm	> 10 Megohms	Acc
4-12	Ground	>100Gohm	> 10 Megohms	Acc
5	Ground	>100Gohm	> 10 Megohms	Acc
6	Ground	>100Gohm	> 10 Megohms	Acc
7	Ground	>100Gohm	> 10 Megohms	Acc
8	Ground	>100Gohm	> 10 Megohms	Acc
13	Ground	>100Gohm	> 10 Megohms	Acc
14	Ground	>100Gohm	> 10 Megohms	Acc

2.2.6 De-energize and remove test equipment.

2.3 Operation

2.3.1 Assemble the relay onto its socket. Regulate voltage to the coil of the relay and monitor the maximum pick-up voltage and minimum drop-out voltages.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Pick-up Voltage	73.283 VAC	**96 VAC maximum**	Acc
Drop-out Voltage	50.783	**36 AC minimum**	Acc

2.3.2 De-energize and remove test equipment.

2.4 Contact Rating Test

2.4.1 Setup the Relay specimen for contact rating testing.

2.4.2 Apply a nominal 10 amps VAC, resistive, across the NC contacts of the test specimen. Record the data in the table below.

Caution: Do not change state of contacts while energized.

Description	Record Data	Acceptance Criteria	Comments/Deviations
1-9	.1237 VAC	**< 0.5 Volts AC drop**	Acc
2-10	.1362 VAC	**< 0.5 Volts AC drop**	Acc
3-11	.1187 VAC	**< 0.5 Volts AC drop**	Acc
4-12	.1045 VAC	**< 0.5 Volts AC drop**	Acc

2.4.3 Energize the relay coil with 120VAC to change the contacts' position of the test specimen.

2.4.4 Apply a nominal 10 amps VAC, resistive, across the **closed** NO contacts of the test specimen.. Record the data in the table below.

Description	Record Data	Acceptance Criteria	Comments/Deviations
5-9	.1214 VAC	**< 0.5 Volts AC drop**	Acc
6-10	.1136 VAC	**< 0.5 Volts AC drop**	Acc
7-11	.1253 VAC	**< 0.5 Volts AC drop**	Acc
8-12	.1455 VAC	**< 0.5 Volts AC drop**	Acc

2.4.5 De-energize and remove test equipment.

2.5 Terminate the test.

2.5.1 Reland the relay and verify reland in accordance with the Lifted Lead Log.

2.5.2 Record: Date /Time of Test End: 04-03-00 1 p.m.

3.0 References

3.1 Panel Wiring Drawings: See list provided with relay selection list (page 3).

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Test was acceptable
Michael Cram
04-03-00

Notes:

Certified Instrumentation Technician (signature) Michael Cram Date: 04-03-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Craig Swenson Date: 4/3/00

QA/QC (signature) Stephen Scott Mosh Date: 4-6-2000

LIFTED LEAD LOG

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
53-B3068	1	521X	TSP1FIX	5	DKY	4-3-00	SRC	4-3-00	DKY	4-3-00	SRC	4-3-00
		521ZX		9	DKY	4-3-00	SRC	4-3-00	DKY	4-3-00	SRC	4-3-00
		3707X		13	DKY	4-3-00	SRC	4-3-00	DKY	4-3-00	SRC	4-3-00
		Black	RSSA-6	13	DKY	4-3-00	SRC	4-3-00	DKY	4-3-00	SRC	4-3-00
		Grey		14	DKY	4-3-00	SRC	4-3-00	DKY	4-3-00	SRC	4-3-00
		2) 102X		14	DKY	4-3-00	SRC	4-3-00	DKY	4-3-00	SRC	4-3-00

Remarks:

Dedication Test Plan – IST
Test Plan No.: CGI-SNF-D-MHM-020-TP-020C
Test Specimen: Idec RH4B-UL-AC120V & SH4B-05, Eqmt. No.: Generic

ORIGINAL

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI Eng	DA	QA Post Review*

* QA Post Review of Individual Revisions is allowed

In-Situ Test Procedure

ORIGINAL

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) YMP Craig Swenson Date: 3/22/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Belhaven	Michael Cram	MRC
Electrician	DAN K YORK	PCE	Dan K York	DKY
Electrician Quality Control	Stephen R. Cowley	RE	Stephen R Cowley	SRC
Design Authority Representative	N/A	N/A	N/A	N/A
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Power Supply capable of 10 amps @ 120 VAC.
Megger Instrument capable of 500 VDC Test Voltage
Adjustable Voltage Power supply capable of 0 to 120 VAC minimum
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: AVO BM812 I.D.: 6410-889 Calib. Due date: 02-09-01

Test Instrument type: FLUKE 787 I.D.: BAT 107 Calib. Due date: 05-28-00

Test Instrument type: HP3457A I.D.: BAT 124 Calib. Due date: 07-30-00

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

Relay Selection List

No.	Eqmt ID No.	Panel No.	Dwg. Reference
1	P2X(1)	201	ED-33065 Sht. 1
2	P6X(1)	201	ED-33065 Sht. 1
3	IAXM(1)	201	ED-33065 Sht. 1
4	MCO(1)	201	ED-33065 Sht. 1
5	MHF	202	ED-33066 Sht. 1
6	PGEX	202	ED-33066 Sht. 1
7	MW15	202	ED-33066 Sht. 1
8	BF	203	ED-33067 Sht. 1
9	BSC1AX	203	ED-33067 Sht. 1
10	TSP1FIX	204	ED-33068 Sht. 1
→ 11	TRD	204	ED-33068 Sht. 1
12	MCOY(2)	205	ED-33069 Sht. 1
13	MGCLY	205	ED-33069 Sht. 1
14	PHULY(3)	205	ED-33069 Sht. 1
15	PGLY	205	ED-33069 Sht. 1

TEST PROCEDURE:

For this In-Situ Test, the relay and its socket must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of the relay and its socket.

1.0 Select a relay from the list above. Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	TRD	Select from List provided above	Acc
Manufacturer:	OK	Idec	Acc
Relay Model:	OK	RH4B-UL-AC120V	Acc
Contact Configuration:	OK	4PDT Contacts	Acc
Socket Model:	OK	SH4B-05	Acc

2.0 Perform the following testing steps:

2.1 Record: Date /Time of Test Beginning: 04-03-00 1:10 p.m.

2.1.1 Complete the Lifted Lead Log prior to removing the plug-in relay and its associated socket.

2.2 Insulation Resistance Test

2.2.1 Setup the **Relay Socket** specimen for insulation resistance testing. Attach Relay Socket in its normal mounting configuration to grounded fixture.

2.2.2 *Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to* terminal and terminal to ground of the relay socket test specimen. Record the socket data.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1	2	>100Gohm	> 10 Megohms	Acc
1	3	>100Gohm	> 10 Megohms	Acc
1	4	>100Gohm	> 10 Megohms	Acc
1	5	>100Gohm	> 10 Megohms	Acc
1	6	>100Gohm	> 10 Megohms	Acc
1	7	>100Gohm	> 10 Megohms	Acc
1	8	>100Gohm	> 10 Megohms	Acc
1	9	>100Gohm	> 10 Megohms	Acc
1	10	>100Gohm	> 10 Megohms	Acc
1	11	>100Gohm	> 10 Megohms	Acc
1	12	>100Gohm	> 10 Megohms	Acc
1	13	>100Gohm	> 10 Megohms	Acc
1	14	>100Gohm	> 10 Megohms	Acc
2	3	>100Gohm	> 10 Megohms	Acc
2	4	>100Gohm	> 10 Megohms	Acc
2	5	>100Gohm	> 10 Megohms	Acc
2	6	>100Gohm	> 10 Megohms	Acc
2	7	>100Gohm	> 10 Megohms	Acc
2	8	>100Gohm	> 10 Megohms	Acc
2	9	>100Gohm	> 10 Megohms	Acc
2	10	>100Gohm	> 10 Megohms	Acc
2	11	>100Gohm	> 10 Megohms	Acc
2	12	>100Gohm	> 10 Megohms	Acc
2	13	>100Gohm	> 10 Megohms	Acc
2	14	>100Gohm	> 10 Megohms	Acc
3	4	>100Gohm	> 10 Megohms	Acc
3	5	>100Gohm	> 10 Megohms	Acc
3	6	>100Gohm	> 10 Megohms	Acc
3	7	>100Gohm	> 10 Megohms	Acc
3	8	>100Gohm	> 10 Megohms	Acc
3	9	>100Gohm	> 10 Megohms	Acc
3	10	>100Gohm	> 10 Megohms	Acc
3	11	>100Gohm	> 10 Megohms	Acc
3	12	>100Gohm	> 10 Megohms	Acc
3	13	>100Gohm	> 10 Megohms	Acc
3	14	>100Gohm	> 10 Megohms	Acc
4	5	>100Gohm	> 10 Megohms	Acc

Dedication Test Plan – IST **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-020-TP-020C
Test Specimen: Idec RH4B-UL-AC120V & SH4B-05, Eqmt. No.: Generic **Page 5 of 9**

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
4	6	>100Gohm	> 10 Megohms	Acc
4	7	>100Gohm	> 10 Megohms	Acc
4	8	>100Gohm	> 10 Megohms	Acc
4	9	>100Gohm	> 10 Megohms	Acc
4	10	>100Gohm	> 10 Megohms	Acc
4	11	>100Gohm	> 10 Megohms	Acc
4	12	>100Gohm	> 10 Megohms	Acc
4	13	>100Gohm	> 10 Megohms	Acc
4	14	>100Gohm	> 10 Megohms	Acc
5	6	>100Gohm	> 10 Megohms	Acc
5	7	>100Gohm	> 10 Megohms	Acc
5	8	>100Gohm	> 10 Megohms	Acc
5	8	>100Gohm	> 10 Megohms	Acc
5	10	>100Gohm	> 10 Megohms	Acc
5	11	>100Gohm	> 10 Megohms	Acc
5	12	>100Gohm	> 10 Megohms	Acc
5	13	>100Gohm	> 10 Megohms	Acc
5	14	>100Gohm	> 10 Megohms	Acc
6	7	>100Gohm	> 10 Megohms	Acc
6	8	>100Gohm	> 10 Megohms	Acc
6	9	>100Gohm	> 10 Megohms	Acc
6	10	>100Gohm	> 10 Megohms	Acc
6	11	>100Gohm	> 10 Megohms	Acc
6	12	>100Gohm	> 10 Megohms	Acc
6	12	>100Gohm	> 10 Megohms	Acc
6	14	>100Gohm	> 10 Megohms	Acc
7	8	>100Gohm	> 10 Megohms	Acc
7	9	>100Gohm	> 10 Megohms	Acc
7	10	>100Gohm	> 10 Megohms	Acc
7	11	>100Gohm	> 10 Megohms	Acc
7	12	>100Gohm	> 10 Megohms	Acc
7	13	>100Gohm	> 10 Megohms	Acc
7	14	>100Gohm	> 10 Megohms	Acc
8	9	>100Gohm	> 10 Megohms	Acc
8	10	>100Gohm	> 10 Megohms	Acc
8	11	>100Gohm	> 10 Megohms	Acc
8	12	>100Gohm	> 10 Megohms	Acc
8	13	>100Gohm	> 10 Megohms	Acc
8	14	>100Gohm	> 10 Megohms	Acc
9	10	>100Gohm	> 10 Megohms	Acc
9	11	>100Gohm	> 10 Megohms	Acc
9	12	>100Gohm	> 10 Megohms	Acc
9	13	>100Gohm	> 10 Megohms	Acc
9	14	>100Gohm	> 10 Megohms	Acc
10	11	>100Gohm	> 10 Megohms	Acc
10	12	>100Gohm	> 10 Megohms	Acc
10	13	>100Gohm	> 10 Megohms	Acc
10	14	>100Gohm	> 10 Megohms	Acc
11	12	>100Gohm	> 10 Megohms	Acc
11	13	>100Gohm	> 10 Megohms	Acc
11	14	>100Gohm	> 10 Megohms	Acc

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
12	13	>100Gohm	> 10 Megohms	Acc
12	14	>100Gohm	> 10 Megohms	Acc
13	14	>100Gohm	> 10 Megohms	Acc
1	Ground	>100Gohm	> 10 Megohms	Acc
2	Ground	>100Gohm	> 10 Megohms	Acc
3	Ground	>100Gohm	> 10 Megohms	Acc
4	Ground	>100Gohm	> 10 Megohms	Acc
5	Ground	>100Gohm	> 10 Megohms	Acc
6	Ground	>100Gohm	> 10 Megohms	Acc
7	Ground	>100Gohm	> 10 Megohms	Acc
8	Ground	>100Gohm	> 10 Megohms	Acc
9	Ground	>100Gohm	> 10 Megohms	Acc
10	Ground	>100Gohm	> 10 Megohms	Acc
11	Ground	>100Gohm	> 10 Megohms	Acc
12	Ground	>100Gohm	> 10 Megohms	Acc
13	Ground	>100Gohm	> 10 Megohms	Acc
14	Ground	>100Gohm	> 10 Megohms	Acc

2.2.3 De-energize and remove test equipment.

2.2.4 Setup the test equipment and **relay** specimen for insulation resistance testing.

2.2.5 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the relay test specimen. Record the relay data below.

Terminal to Terminal / Ground

Desc. Of Terminal	Desc. Of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1-9	2-10	>100Gohm	> 10 Megohms	Acc
1-9	3-11	>100Gohm	> 10 Megohms	Acc
1-9	4-12	>100Gohm	> 10 Megohms	Acc
2-10	3-11	>100Gohm	> 10 Megohms	Acc
2-10	4-12	>100Gohm	> 10 Megohms	Acc
3-11	4-12	>100Gohm	> 10 Megohms	Acc
5	6	>100Gohm	> 10 Megohms	Acc
6	7	>100Gohm	> 10 Megohms	Acc
7	8	>100Gohm	> 10 Megohms	Acc
1-9	Ground	>100Gohm	> 10 Megohms	Acc
2-10	Ground	>100Gohm	> 10 Megohms	Acc
3-11	Ground	>100Gohm	> 10 Megohms	Acc
4-12	Ground	>100Gohm	> 10 Megohms	Acc
5	Ground	>100Gohm	> 10 Megohms	Acc
6	Ground	>100Gohm	> 10 Megohms	Acc
7	Ground	>100Gohm	> 10 Megohms	Acc
8	Ground	>100Gohm	> 10 Megohms	Acc
13	Ground	>100Gohm	> 10 Megohms	Acc
14	Ground	>100Gohm	> 10 Megohms	Acc

2.2.6 De-energize and remove test equipment.

2.3 Operation

2.3.1 Assemble the relay onto its socket. Regulate voltage to the coil of the relay and monitor the maximum pick-up voltage and minimum drop-out voltages.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Pick-up Voltage	75.521 VAC	**96 VAC maximum**	Acc
Drop-out Voltage	55.823	**36 AC minimum**	Acc

2.3.2 De-energize and remove test equipment.

2.4 Contact Rating Test

2.4.1 Setup the Relay specimen for contact rating testing.

2.4.2 Apply a nominal 10 amps VAC, resistive, across the NC contacts of the test specimen. Record the data in the table below.

Caution: Do not change state of contacts while energized.

Description	Record Data	Acceptance Criteria	Comments/Deviations
1-9	.1056 VAC	**< 0.5 Volts AC drop**	Acc
2-10	.1088 VAC	**< 0.5 Volts AC drop**	Acc
3-11	.1089 VAC	**< 0.5 Volts AC drop**	Acc
4-12	.1237 VAC	**< 0.5 Volts AC drop**	Acc

2.4.3 Energize the relay coil with 120VAC to change the contacts' position of the test specimen.

2.4.4 Apply a nominal 10 amps VAC, resistive, across the **closed** NO contacts of the test specimen. . Record the data in the table below.

Description	Record Data	Acceptance Criteria	Comments/Deviations
5-9	.1262 VAC	**< 0.5 Volts AC drop**	Acc
6-10	.1188 VAC	**< 0.5 Volts AC drop**	Acc
7-11	.1301 VAC	**< 0.5 Volts AC drop**	Acc
8-12	.1281 VAC	**< 0.5 Volts AC drop**	Acc

2.4.5 De-energize and remove test equipment.

2.5 Terminate the test.

2.5.1 Reland the relay and verify reland in accordance with the Lifted Lead Log.

2.5.2 Record: Date /Time of Test End: 04-03-00 1:30 p.m.

3.0 References

3.1 Panel Wiring Drawings: See list provided with relay selection list (page 3).

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Testing was acceptable
Michael Cram
04-03-00

Notes:

Certified Instrumentation Technician (signature) Michael Cram Date: 04-03-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Craig Swenson Date: 4/3/00

QA/QC (signature) Stephen Scott Moss Date: 4-6-2000

LIFTED LEAD LOG

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
SB 33068	1	25A02X	TRD	5	DKY	4-3-00	SRC	4-3-00	DKY	4-3-00	SRC	4-3-00
		25A42X		7	DKY	4-3-00	SRC	4-3-00	DKY	4-3-00	SRC	4-3-00
		2703X		8	DKY	4-3-00	SRC	4-3-00	DKY	4-3-00	SRC	4-3-00
		25A03X		9	DKY	4-3-00	SRC	4-3-00	DKY	4-3-00	SRC	4-3-00
		25A3X		11	DKY	4-3-00	SRC	4-3-00	DKY	4-3-00	SRC	4-3-00
		101X		12	DKY	4-3-00	SRC	4-3-00	DKY	4-3-00	SRC	4-3-00
		25A20X		13	DKY	4-3-00	SRC	4-3-00	DKY	4-3-00	SRC	4-3-00
		Black	RCS2A-6	13	DKY	4-3-00	SRC	4-3-00	DKY	4-3-00	SRC	4-3-00
		Grey	RCS2A-6	14	DKY	4-3-00	SRC	4-3-00	DKY	4-3-00	SRC	4-3-00
		102X	TPD	14	DKY	4-3-00	SRC	4-3-00	DKY	4-3-00	SRC	4-3-00

Remarks:

Dedication Test Plan – IST
Test Plan No.: CGI-SNF-D-MHM-020-TP-020C
Test Specimen: Idec RH4B-UL-AC120V & SH4B-05, Eqmt. No.: Generic

ORIGINAL

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI Eng	DA	QA Post Review*

* QA Post Review of Individual Revisions is allowed

In-Situ Test Procedure

ORIGINAL

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) YMP Craig Swenson Date: 3/22/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Belhuven	Michael Cram	MRC
Electrician	DAN K YORK	PCE	Dan K. York	DKY
Electrician Quality Control	Stephen R. Conley	PCE	Stephen R. Conley	SRC
Design Authority Representative	N/A	N/A	N/A	N/A
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Power Supply capable of 10 amps @ 120 VAC.
Megger Instrument capable of 500 VDC Test Voltage
Adjustable Voltage Power supply capable of 0 to 120 VAC minimum
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: Avo BM80/2 I.D.: 6410-889 Calib. Due date: 02-09-01

Test Instrument type: HP 3457A I.D.: BAT 124 Calib. Due date: 07-30-00

Test Instrument type: FLUKE 787 I.D.: BAT 107 Calib. Due date: 05-28-00

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

Relay Selection List

No.	Eqmt ID No.	Panel No.	Dwg. Reference
1	P2X(1)	201	ED-33065 Sht. 1
2	P6X(1)	201	ED-33065 Sht. 1
3	IAXM(1)	201	ED-33065 Sht. 1
4	MCO(1)	201	ED-33065 Sht. 1
5	MHF	202	ED-33066 Sht. 1
6	PGEX	202	ED-33066 Sht. 1
7	MW15	202	ED-33066 Sht. 1
8	BF	203	ED-33067 Sht. 1
9	BSC1AX	203	ED-33067 Sht. 1
10	TSP1FIX	204	ED-33068 Sht. 1
11	TRD	204	ED-33068 Sht. 1
→ 12	MCOY(2)	205	ED-33069 Sht. 1
13	MGCLY	205	ED-33069 Sht. 1
14	PHULY(3)	205	ED-33069 Sht. 1
15	PGLY	205	ED-33069 Sht. 1

TEST PROCEDURE:

For this In-Situ Test, the relay and its socket must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of the relay and its socket.

1.0 Select a relay from the list above. Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	MCOY(2)	**Select from List provided above**	Acc
Manufacturer:	OK	**Idec**	Acc
Relay Model:	OK	**RH4B-UL-AC120V**	Acc
Contact Configuration:	OK	**4PDT Contacts**	Acc
Socket Model:	OK	**SH4B-05**	Acc

2.0 Perform the following testing steps:

2.1 Record: Date /Time of Test Beginning: 03-31-00 11:05 a.m.

2.1.1 Complete the Lifted Lead Log prior to removing the plug-in relay and its associated socket.

2.2 Insulation Resistance Test

2.2.1 Setup the **Relay Socket** specimen for insulation resistance testing. Attach Relay Socket in its normal mounting configuration to grounded fixture.

2.2.2 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the relay socket test specimen. Record the socket data.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1	2	>100 Gohm	> 10 Megohms	Acc
1	3	>100Gohm	> 10 Megohms	Acc
1	4	>100 Gohm	> 10 Megohms	Acc
1	5	>100 Gohm	> 10 Megohms	Acc
1	6	>100Gohm	> 10 Megohms	Acc
1	7	>100Gohm	> 10 Megohms	Acc
1	8	>100Gohm	> 10 Megohms	Acc
1	9	>100Gohm	> 10 Megohms	Acc
1	10	>100Gohm	> 10 Megohms	Acc
1	11	>100Gohm	> 10 Megohms	Acc
1	12	>100Gohm	> 10 Megohms	Acc
1	13	>100Gohm	> 10 Megohms	Acc
1	14	>100Gohm	> 10 Megohms	Acc
2	3	>100Gohm	> 10 Megohms	Acc
2	4	>100Gohm	> 10 Megohms	Acc
2	5	>100Gohm	> 10 Megohms	Acc
2	6	>100Gohm	> 10 Megohms	Acc
2	7	>100Gohm	> 10 Megohms	Acc
2	8	>100Gohm	> 10 Megohms	Acc
2	9	>100Gohm	> 10 Megohms	Acc
2	10	>100Gohm	> 10 Megohms	Acc
2	11	>100Gohm	> 10 Megohms	Acc
2	12	>100Gohm	> 10 Megohms	Acc
2	13	>100Gohm	> 10 Megohms	Acc
2	14	>100Gohm	> 10 Megohms	Acc
3	4	>100Gohm	> 10 Megohms	Acc
3	5	>100Gohm	> 10 Megohms	Acc
3	6	>100Gohm	> 10 Megohms	Acc
3	7	>100Gohm	> 10 Megohms	Acc
3	8	>100Gohm	> 10 Megohms	Acc
3	9	>100Gohm	> 10 Megohms	Acc
3	10	>100Gohm	> 10 Megohms	Acc
3	11	>100Gohm	> 10 Megohms	Acc
3	12	>100Gohm	> 10 Megohms	Acc
3	13	>100Gohm	> 10 Megohms	Acc
3	14	>100Gohm	> 10 Megohms	Acc
4	5	>100Gohm	> 10 Megohms	Acc

Dedication Test Plan – IST **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-020-TP-020C
Test Specimen: Idec RH4B-UL-AC120V & SH4B-05, Eqmt. No.: Generic **Page 5 of 9**

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
4	6	>100Gohm	> 10 Megohms	Acc
4	7	>100Gohm	> 10 Megohms	Acc
4	8	>100Gohm	> 10 Megohms	Acc
4	9	>100Gohm	> 10 Megohms	Acc
4	10	>100Gohm	> 10 Megohms	Acc
4	11	>100Gohm	> 10 Megohms	Acc
4	12	>100Gohm	> 10 Megohms	Acc
4	13	>100Gohm	> 10 Megohms	Acc
4	14	>100Gohm	> 10 Megohms	Acc
5	6	>100Gohm	> 10 Megohms	Acc
5	7	>100Gohm	> 10 Megohms	Acc
5	8	>100Gohm	> 10 Megohms	Acc
5	8	>100Gohm	> 10 Megohms	Acc
5	10	>100Gohm	> 10 Megohms	Acc
5	11	>100Gohm	> 10 Megohms	Acc
5	12	>100Gohm	> 10 Megohms	Acc
5	13	>100Gohm	> 10 Megohms	Acc
5	14	>100Gohm	> 10 Megohms	Acc
6	7	>100Gohm	> 10 Megohms	Acc
6	8	>100Gohm	> 10 Megohms	Acc
6	9	>100Gohm	> 10 Megohms	Acc
6	10	>100Gohm	> 10 Megohms	Acc
6	11	>100Gohm	> 10 Megohms	Acc
6	12	>100Gohm	> 10 Megohms	Acc
6	12	>100Gohm	> 10 Megohms	Acc
6	14	>100Gohm	> 10 Megohms	Acc
7	8	>100Gohm	> 10 Megohms	Acc
7	9	>100Gohm	> 10 Megohms	Acc
7	10	>100Gohm	> 10 Megohms	Acc
7	11	>100Gohm	> 10 Megohms	Acc
7	12	>100Gohm	> 10 Megohms	Acc
7	13	>100Gohm	> 10 Megohms	Acc
7	14	>100Gohm	> 10 Megohms	Acc
8	9	>100Gohm	> 10 Megohms	Acc
8	10	>100Gohm	> 10 Megohms	Acc
8	11	>100Gohm	> 10 Megohms	Acc
8	12	>100Gohm	> 10 Megohms	Acc
8	13	>100Gohm	> 10 Megohms	Acc
8	14	>100Gohm	> 10 Megohms	Acc
9	10	>100Gohm	> 10 Megohms	Acc
9	11	>100Gohm	> 10 Megohms	Acc
9	12	>100Gohm	> 10 Megohms	Acc
9	13	>100Gohm	> 10 Megohms	Acc
9	14	>100Gohm	> 10 Megohms	Acc
10	11	>100Gohm	> 10 Megohms	Acc
10	12	>100Gohm	> 10 Megohms	Acc
10	13	>100Gohm	> 10 Megohms	Acc
10	14	>100Gohm	> 10 Megohms	Acc
11	12	>100Gohm	> 10 Megohms	Acc
11	13	>100Gohm	> 10 Megohms	Acc
11	14	>100Gohm	> 10 Megohms	Acc

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
12	13	>100Gohm	> 10 Megohms	Acc
12	14	>100 Gohm	> 10 Megohms	Acc
13	14	>100Gohm	> 10 Megohms	Acc
1	Ground	>100Gohm	> 10 Megohms	Acc
2	Ground	>100Gohm	> 10 Megohms	Acc
3	Ground	>100Gohm	> 10 Megohms	Acc
4	Ground	>100Gohm	> 10 Megohms	Acc
5	Ground	>100Gohm	> 10 Megohms	Acc
6	Ground	>100Gohm	> 10 Megohms	Acc
7	Ground	>100Gohm	> 10 Megohms	Acc
8	Ground	>100Gohm	> 10 Megohms	Acc
9	Ground	>100Gohm	> 10 Megohms	Acc
10	Ground	>100Gohm	> 10 Megohms	Acc
11	Ground	>100Gohm	> 10 Megohms	Acc
12	Ground	>100Gohm	> 10 Megohms	Acc
13	Ground	>100Gohm	> 10 Megohms	Acc
14	Ground	>100 Gohm	> 10 Megohms	Acc

2.2.3 De-energize and remove test equipment.

2.2.4 Setup the test equipment and **relay** specimen for insulation resistance testing.

2.2.5 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the relay test specimen. Record the relay data below.

Terminal to Terminal / Ground

Desc. Of Terminal	Desc. Of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1-9	2-10	>100Gohm	> 10 Megohms	Acc
1-9	3-11	>100Gohm	> 10 Megohms	Acc
1-9	4-12	>100Gohm	> 10 Megohms	Acc
2-10	3-11	>100Gohm	> 10 Megohms	Acc
2-10	4-12	>100Gohm	> 10 Megohms	Acc
3-11	4-12	>100Gohm	> 10 Megohms	Acc
5	6	>100Gohm	> 10 Megohms	Acc
6	7	>100Gohm	> 10 Megohms	Acc
7	8	>100Gohm	> 10 Megohms	Acc
1-9	Ground	>100Gohm	> 10 Megohms	Acc
2-10	Ground	>100Gohm	> 10 Megohms	Acc
3-11	Ground	>100Gohm	> 10 Megohms	Acc
4-12	Ground	>100Gohm	> 10 Megohms	Acc
5	Ground	>100Gohm	> 10 Megohms	Acc
6	Ground	>100Gohm	> 10 Megohms	Acc
7	Ground	>100Gohm	> 10 Megohms	Acc
8	Ground	>100Gohm	> 10 Megohms	Acc
13	Ground	>100Gohm	> 10 Megohms	Acc
14	Ground	>100Gohm	> 10 Megohms	Acc

2.2.6 De-energize and remove test equipment.

2.3 Operation

2.3.1 Assemble the relay onto its socket. Regulate voltage to the coil of the relay and monitor the maximum pick-up voltage and minimum drop-out voltages.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Pick-up Voltage	72.951 VAC	**96 VAC maximum**	Acc
Drop-out Voltage	55.802 VAC	**36 AC minimum**	Acc

2.3.2 De-energize and remove test equipment.

2.4 Contact Rating Test

2.4.1 Setup the Relay specimen for contact rating testing.

2.4.2 Apply a nominal 10 amps VAC, resistive, across the NC contacts of the test specimen. Record the data in the table below.

Caution: Do not change state of contacts while energized.

Description	Record Data	Acceptance Criteria	Comments/Deviations
1-9	.1099 VAC	**< 0.5 Volts AC drop**	Acc
2-10	.1227 VAC	**< 0.5 Volts AC drop**	Acc
3-11	.1132 VAC	**< 0.5 Volts AC drop**	Acc
4-12	.1284 VAC	**< 0.5 Volts AC drop**	Acc

2.4.3 Energize the relay coil with 120VAC to change the contacts' position of the test specimen.

2.4.4 Apply a nominal 10 amps VAC, resistive, across the **closed** NO contacts of the test specimen. . Record the data in the table below.

Description	Record Data	Acceptance Criteria	Comments/Deviations
5-9	.1335 VAC	**< 0.5 Volts AC drop**	Acc
6-10	.1195 VAC	**< 0.5 Volts AC drop**	Acc
7-11	.1293 VAC	**< 0.5 Volts AC drop**	Acc
8-12	.1078 VAC	**< 0.5 Volts AC drop**	Acc

2.4.5 De-energize and remove test equipment.

2.5 Terminate the test.

2.5.1 Reland the relay and verify reland in accordance with the Lifted Lead Log.

2.5.2 Record: Date /Time of Test End: 03-31-00 11:30 a.m.

3.0 References

3.1 Panel Wiring Drawings: See list provided with relay selection list (page 3).

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Testing was acceptable

Michael Cram
03-31-00

Notes:

Certified Instrumentation Technician (signature) Michael Cram Date: 03-31-00.

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Craig Swenson Date: 4/3/00.

QA/QC (signature) Stephen Scott Mott Date: 4-6-2000.

LIFTED LEAD LOG

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
EB-33269	1	2) 101 Y	MCOY(2)	5	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00
		56A15Y	MCOY (2)	9	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00
		2) 409 Y	MCOY (2)	13	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00
		Grey	RSSA-6	13	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00
		Black	"	14	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00
		2) 102 Y	MCOY(2)	14	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00

Remarks:

Dedication Test Plan – IST
Test Plan No.: CGI-SNF-D-MHM-020-TP-020C
Test Specimen: Idec RH4B-UL-AC120V & SH4B-05, Eqmt. No.: Generic

ORIGINAL

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI Eng	DA	QA Post Review*

* QA Post Review of Individual Revisions is allowed

In-Situ Test Procedure

ORIGINAL

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) Craig Swenson Date: 3/22/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Belhaven	Michael Cram	MRC
Electrician	Dan K York	PCE	Dan K. York	DKY
Electrician Quality Control	Stephen R Cowley	PCE	Stephen R Cowley	SRC
Design Authority Representative	N/A	N/A	N/A	N/A
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Power Supply capable of 10 amps @ 120 VAC.
Megger Instrument capable of 500 VDC Test Voltage
Adjustable Voltage Power supply capable of 0 to 120 VAC minimum
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: Avo BM80/2 I.D.: 6410-889 Calib. Due date: 02-09-01

Test Instrument type: HP3457A I.D.: BAT 124 Calib. Due date: 07-30-00

Test Instrument type: FLUKE 787 I.D.: BAT 107 Calib. Due date: 05-28-00

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

Relay Selection List

No.	Eqmt ID No.	Panel No.	Dwg. Reference
1	P2X(1)	201	ED-33065 Sht. 1
2	P6X(1)	201	ED-33065 Sht. 1
3	IAXM(1)	201	ED-33065 Sht. 1
4	MCO(1)	201	ED-33065 Sht. 1
5	MHF	202	ED-33066 Sht. 1
6	PGEX	202	ED-33066 Sht. 1
7	MW15	202	ED-33066 Sht. 1
8	BF	203	ED-33067 Sht. 1
9	BSC1AX	203	ED-33067 Sht. 1
10	TSP1FIX	204	ED-33068 Sht. 1
11	TRD	204	ED-33068 Sht. 1
12	MCOY(2)	205	ED-33069 Sht. 1
13	MGCLY	205	ED-33069 Sht. 1
14	PHULY(3)	205	ED-33069 Sht. 1
15	PGLY	205	ED-33069 Sht. 1

TEST PROCEDURE:

For this In-Situ Test, the relay and its socket must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of the relay and its socket.

1.0 Select a relay from the list above. Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	MGCLY	Select from List provided above	Acc
Manufacturer:	OK	Idec	Acc
Relay Model:	OK	RH4B-UL-AC120V	Acc
Contact Configuration:	OK	4PDT Contacts	Acc
Socket Model:	OK	SH4B-05	Acc

2.0 Perform the following testing steps:

2.1 Record: Date /Time of Test Beginning: 03-31-00 11:50 a.m.

2.1.1 Complete the Lifted Lead Log prior to removing the plug-in relay and its associated socket.

2.2 Insulation Resistance Test

2.2.1 Setup the **Relay Socket** specimen for insulation resistance testing. Attach Relay Socket in its normal mounting configuration to grounded fixture.

2.2.2 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the relay socket test specimen. Record the socket data.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1	2	> 100 Gohm	> 10 Megohms	Acc
1	3	> 100 Gohm	> 10 Megohms	Acc
1	4	> 100 Gohm	> 10 Megohms	Acc
1	5	> 100 Gohm	> 10 Megohms	Acc
1	6	> 100 Gohm	> 10 Megohms	Acc
1	7	> 100 Gohm	> 10 Megohms	Acc
1	8	> 100 Gohm	> 10 Megohms	Acc
1	9	> 100 Gohm	> 10 Megohms	Acc
1	10	> 100 Gohm	> 10 Megohms	Acc
1	11	> 100 Gohm	> 10 Megohms	Acc
1	12	> 100 Gohm	> 10 Megohms	Acc
1	13	> 100 Gohm	> 10 Megohms	Acc
1	14	> 100 Gohm	> 10 Megohms	Acc
2	3	> 100 Gohm	> 10 Megohms	Acc
2	4	> 100 Gohm	> 10 Megohms	Acc
2	5	> 100 Gohm	> 10 Megohms	Acc
2	6	> 100 Gohm	> 10 Megohms	Acc
2	7	> 100 Gohm	> 10 Megohms	Acc
2	8	> 100 Gohm	> 10 Megohms	Acc
2	9	> 100 Gohm	> 10 Megohms	Acc
2	10	> 100 Gohm	> 10 Megohms	Acc
2	11	> 100 Gohm	> 10 Megohms	Acc
2	12	> 100 Gohm	> 10 Megohms	Acc
2	13	> 100 Gohm	> 10 Megohms	Acc
2	14	> 100 Gohm	> 10 Megohms	Acc
3	4	> 100 Gohm	> 10 Megohms	Acc
3	5	> 100 Gohm	> 10 Megohms	Acc
3	6	> 100 Gohm	> 10 Megohms	Acc
3	7	> 100 Gohm	> 10 Megohms	Acc
3	8	> 100 Gohm	> 10 Megohms	Acc
3	9	> 100 Gohm	> 10 Megohms	Acc
3	10	> 100 Gohm	> 10 Megohms	Acc
3	11	> 100 Gohm	> 10 Megohms	Acc
3	12	> 100 Gohm	> 10 Megohms	Acc
3	13	> 100 Gohm	> 10 Megohms	Acc
3	14	> 100 Gohm	> 10 Megohms	Acc
4	5	> 100 Gohm	> 10 Megohms	Acc

Dedication Test Plan – IST **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-020-TP-020C
Test Specimen: Idec RH4B-UL-AC120V & SH4B-05, Eqmt. No.: Generic **Page 5 of 9**

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
4	6	>100Gohm	> 10 Megohms	Acc
4	7	>100Gohm	> 10 Megohms	Acc
4	8	>100 Gohm	> 10 Megohms	Acc
4	9	>100Gohm	> 10 Megohms	Acc
4	10	>100Gohm	> 10 Megohms	Acc
4	11	>100Gohm	> 10 Megohms	Acc
4	12	>100Gohm	> 10 Megohms	Acc
4	13	>100Gohm	> 10 Megohms	Acc
4	14	>100 Gohm	> 10 Megohms	Acc
5	6	>100 Gohm	> 10 Megohms	Acc
5	7	>100 Gohm	> 10 Megohms	Acc
5	8	>100 Gohm	> 10 Megohms	Acc
5	8	>100Gohm	> 10 Megohms	Acc
5	10	>100 Gohm	> 10 Megohms	Acc
5	11	>100Gohm	> 10 Megohms	Acc
5	12	>100Gohm	> 10 Megohms	Acc
5	13	>100Gohm	> 10 Megohms	Acc
5	14	>100Gohm	> 10 Megohms	Acc
6	7	>100Gohm	> 10 Megohms	Acc
6	8	>100Gohm	> 10 Megohms	Acc
6	9	>100Gohm	> 10 Megohms	Acc
6	10	>100Gohm	> 10 Megohms	Acc
6	11	>100Gohm	> 10 Megohms	Acc
6	12	>100Gohm	> 10 Megohms	Acc
6	12	>100Gohm	> 10 Megohms	Acc
6	14	>100Gohm	> 10 Megohms	Acc
7	8	>100 Gohm	> 10 Megohms	Acc
7	9	>100Gohm	> 10 Megohms	Acc
7	10	>100Gohm	> 10 Megohms	Acc
7	11	>100Gohm	> 10 Megohms	Acc
7	12	>100 Gohm	> 10 Megohms	Acc
7	13	>100Gohm	> 10 Megohms	Acc
7	14	>100Gohm	> 10 Megohms	Acc
8	9	>100Gohm	> 10 Megohms	Acc
8	10	>100Gohm	> 10 Megohms	Acc
8	11	>100Gohm	> 10 Megohms	Acc
8	12	>100Gohm	> 10 Megohms	Acc
8	13	>100Gohm	> 10 Megohms	Acc
8	14	>100Gohm	> 10 Megohms	Acc
9	10	>100 Gohm	> 10 Megohms	Acc
9	11	>100 Gohm	> 10 Megohms	Acc
9	12	>100 Gohm	> 10 Megohms	Acc
9	13	>100 Gohm	> 10 Megohms	Acc
9	14	>100 Gohm	> 10 Megohms	Acc
10	11	>100 Gohm	> 10 Megohms	Acc
10	12	>100Gohm	> 10 Megohms	Acc
10	13	>100Gohm	> 10 Megohms	Acc
10	14	>100Gohm	> 10 Megohms	Acc
11	12	>100Gohm	> 10 Megohms	Acc
11	13	>100Gohm	> 10 Megohms	Acc
11	14	>100 Gohm	> 10 Megohms	Acc

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
12	13	>100Gohm	> 10 Megohms	Acc
12	14	>100Gohm	> 10 Megohms	Acc
13	14	>100Gohm	> 10 Megohms	Acc
1	Ground	>100Gohm	> 10 Megohms	Acc
2	Ground	>100Gohm	> 10 Megohms	Acc
3	Ground	>100Gohm	> 10 Megohms	Acc
4	Ground	>100Gohm	> 10 Megohms	Acc
5	Ground	>100Gohm	> 10 Megohms	Acc
6	Ground	>100Gohm	> 10 Megohms	Acc
7	Ground	>100Gohm	> 10 Megohms	Acc
8	Ground	>100Gohm	> 10 Megohms	Acc
9	Ground	>100Gohm	> 10 Megohms	Acc
10	Ground	>100Gohm	> 10 Megohms	Acc
11	Ground	>100Gohm	> 10 Megohms	Acc
12	Ground	>100Gohm	> 10 Megohms	Acc
13	Ground	>100Gohm	> 10 Megohms	Acc
14	Ground	>100Gohm	> 10 Megohms	Acc

2.2.3 De-energize and remove test equipment.

2.2.4 Setup the test equipment and **relay** specimen for insulation resistance testing.

2.2.5 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the relay test specimen. Record the relay data below.

Terminal to Terminal / Ground

Desc. Of Terminal	Desc. Of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1-9	2-10	>100Gohm	> 10 Megohms	Acc
1-9	3-11	>100Gohm	> 10 Megohms	Acc
1-9	4-12	>100Gohm	> 10 Megohms	Acc
2-10	3-11	>100Gohm	> 10 Megohms	Acc
2-10	4-12	>100Gohm	> 10 Megohms	Acc
3-11	4-12	>100Gohm	> 10 Megohms	Acc
5	6	>100Gohm	> 10 Megohms	Acc
6	7	>100Gohm	> 10 Megohms	Acc
7	8	>100Gohm	> 10 Megohms	Acc
1-9	Ground	>100Gohm	> 10 Megohms	Acc
2-10	Ground	>100Gohm	> 10 Megohms	Acc
3-11	Ground	>100Gohm	> 10 Megohms	Acc
4-12	Ground	>100Gohm	> 10 Megohms	Acc
5	Ground	>100Gohm	> 10 Megohms	Acc
6	Ground	>100Gohm	> 10 Megohms	Acc
7	Ground	>100Gohm	> 10 Megohms	Acc
8	Ground	>100Gohm	> 10 Megohms	Acc
13	Ground	>100Gohm	> 10 Megohms	Acc
14	Ground	>100Gohm	> 10 Megohms	Acc

2.2.6 De-energize and remove test equipment.

2.3 Operation

2.3.1 Assemble the relay onto its socket. Regulate voltage to the coil of the relay and monitor the maximum pick-up voltage and minimum drop-out voltages.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Pick-up Voltage	72.702 VAC	**96 VAC maximum**	Acc
Drop-out Voltage	51.160 VAC	**36 AC minimum**	Acc

2.3.2 De-energize and remove test equipment.

2.4 Contact Rating Test

2.4.1 Setup the Relay specimen for contact rating testing.

2.4.2 Apply a nominal 10 amps VAC, resistive, across the NC contacts of the test specimen. Record the data in the table below.

Caution: Do not change state of contacts while energized.

Description	Record Data	Acceptance Criteria	Comments/Deviations
1-9	.1387 VAC	**< 0.5 Volts AC drop**	Acc
2-10	.1081 VAC	**< 0.5 Volts AC drop**	Acc
3-11	.1181 VAC	**< 0.5 Volts AC drop**	Acc
4-12	.1046 VAC	**< 0.5 Volts AC drop**	Acc

2.4.3 Energize the relay coil with 120VAC to change the contacts' position of the test specimen.

2.4.4 Apply a nominal 10 amps VAC, resistive, across the **closed** NO contacts of the test specimen. . Record the data in the table below.

Description	Record Data	Acceptance Criteria	Comments/Deviations
5-9	.1393 VAC	**< 0.5 Volts AC drop**	Acc
6-10	.1251 VAC	**< 0.5 Volts AC drop**	Acc
7-11	.1258 VAC	**< 0.5 Volts AC drop**	Acc
8-12	.1074 VAC	**< 0.5 Volts AC drop**	Acc

2.4.5 De-energize and remove test equipment.

2.5 Terminate the test.

2.5.1 Reland the relay and verify reland in accordance with the Lifted Lead Log.

2.5.2 Record: Date /Time of Test End: 03-31-00 1:30 p.m.

3.0 References

3.1 Panel Wiring Drawings: See list provided with relay selection list (page 3).

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Testing was acceptable.
Michael Cram
03-31-00

Notes:

Certified Instrumentation Technician (signature) Michael Cram Date: 03-31-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Craig Swenson Date: 4/3/00

QA/QC (signature) Stephen Scott Moss Date: 4-6-2000

LIFTED LEAD LOG

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
E8-33069	1	5128Y	MGCLY	5	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00
		2)101Y	MGCLY	6	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00
		5127Y	MGCLY	9	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00
		2) 5908Y	MGCLY	10	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00
		13A04Y	MGCLY	13	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00
		Grey	RCS2A-6	13	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00
		Black	"	14	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00
		2)102Y	MGCLY	14	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00

Remarks:

Dedication Test Plan – IST
Test Plan No.: CGI-SNF-D-MHM-020-TP-020C
Test Specimen: Idec RH4B-UL-AC120V & SH4B-05, Eqmt. No.: Generic

ORIGINAL

Rev. No. 0

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI Eng	DA	QA Post Review*

* QA Post Review of Individual Revisions is allowed

In-Situ Test Procedure

ORIGINAL

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) Craig Swenson Date: 3/22/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Belhaven	Michael Cram	MRC
Electrician	DAN K YORK	PCE	Dan K York	DKY
Electrician Quality Control	Stephen R Conley	RE	Stephen R Conley	SRC
Design Authority Representative	N/A	N/A	N/A	N/A
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Power Supply capable of 10 amps @ 120 VAC.
Megger Instrument capable of 500 VDC Test Voltage
Adjustable Voltage Power supply capable of 0 to 120 VAC minimum
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: FLUKE 787 I.D.: BAT 107 Calib. Due date: 05-28-00

Test Instrument type: AVO BM80/2 I.D.: 6410-889 Calib. Due date: 02-09-01

Test Instrument type: HP 3457A I.D.: BAT 124 Calib. Due date: 07-30-00

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

Relay Selection List

No.	Eqmt ID No.	Panel No.	Dwg. Reference
1	P2X(1)	201	ED-33065 Sht. 1
2	P6X(1)	201	ED-33065 Sht. 1
3	IAXM(1)	201	ED-33065 Sht. 1
4	MCO(1)	201	ED-33065 Sht. 1
5	MHF	202	ED-33066 Sht. 1
6	PGEX	202	ED-33066 Sht. 1
7	MW15	202	ED-33066 Sht. 1
8	BF	203	ED-33067 Sht. 1
9	BSC1AX	203	ED-33067 Sht. 1
10	TSP1FIX	204	ED-33068 Sht. 1
11	TRD	204	ED-33068 Sht. 1
12	MCOY(2)	205	ED-33069 Sht. 1
13	MGCLY	205	ED-33069 Sht. 1
→ 14	PHULY(3)	205	ED-33069 Sht. 1
15	PGLY	205	ED-33069 Sht. 1

TEST PROCEDURE:

For this In-Situ Test, the relay and its socket must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of the relay and its socket.

1.0 Select a relay from the list above. Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	PHULY (3)	Select from List provided above	Acc
Manufacturer:	OK	Idec	Acc
Relay Model:	OK	RH4B-UL-AC120V	Acc
Contact Configuration:	OK	4PDT Contacts	Acc
Socket Model:	OK	SH4B-05	Acc

2.0 Perform the following testing steps:

2.1 Record: Date /Time of Test Beginning: 03-31-00 1:40 p.m

2.1.1 Complete the Lifted Lead Log prior to removing the plug-in relay and its associated socket.

2.2 Insulation Resistance Test

2.2.1 Setup the **Relay Socket** specimen for insulation resistance testing. Attach Relay Socket in its normal mounting configuration to grounded fixture.

2.2.2 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the relay socket test specimen. Record the socket data.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1	2	>100 Gohm	> 10 Megohms	Acc
1	3	>100 Gohm	> 10 Megohms	Acc
1	4	>100 Gohm	> 10 Megohms	Acc
1	5	>100 Gohm	> 10 Megohms	Acc
1	6	>100 Gohm	> 10 Megohms	Acc
1	7	>100 Gohm	> 10 Megohms	Acc
1	8	>100 Gohm	> 10 Megohms	Acc
1	9	>100 Gohm	> 10 Megohms	Acc
1	10	>100 Gohm	> 10 Megohms	Acc
1	11	>100 Gohm	> 10 Megohms	Acc
1	12	>100 Gohm	> 10 Megohms	Acc
1	13	>100 Gohm	> 10 Megohms	Acc
1	14	>100 Gohm	> 10 Megohms	Acc
2	3	>100 Gohm	> 10 Megohms	Acc
2	4	>100 Gohm	> 10 Megohms	Acc
2	5	>100 Gohm	> 10 Megohms	Acc
2	6	>100 Gohm	> 10 Megohms	Acc
2	7	>100 Gohm	> 10 Megohms	Acc
2	8	>100 Gohm	> 10 Megohms	Acc
2	9	>100 Gohm	> 10 Megohms	Acc
2	10	>100 Gohm	> 10 Megohms	Acc
2	11	>100 Gohm	> 10 Megohms	Acc
2	12	>100 Gohm	> 10 Megohms	Acc
2	13	>100 Gohm	> 10 Megohms	Acc
2	14	>100 Gohm	> 10 Megohms	Acc
3	4	>100 Gohm	> 10 Megohms	Acc
3	5	>100 Gohm	> 10 Megohms	Acc
3	6	>100 Gohm	> 10 Megohms	Acc
3	7	>100 Gohm	> 10 Megohms	Acc
3	8	>100 Gohm	> 10 Megohms	Acc
3	9	>100 Gohm	> 10 Megohms	Acc
3	10	>100 Gohm	> 10 Megohms	Acc
3	11	>100 Gohm	> 10 Megohms	Acc
3	12	>100 Gohm	> 10 Megohms	Acc
3	13	>100 Gohm	> 10 Megohms	Acc
3	14	>100 Gohm	> 10 Megohms	Acc
4	5	>100 Gohm	> 10 Megohms	Acc

Dedication Test Plan – IST **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-020-TP-020C
Test Specimen: Idec RH4B-UL-AC120V & SH4B-05, Eqmt. No.: Generic **Page 5 of 9**

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
4	6	>100Gohm	> 10 Megohms	Acc
4	7	>100Gohm	> 10 Megohms	Acc
4	8	>100Gohm	> 10 Megohms	Acc
4	9	>100Gohm	> 10 Megohms	Acc
4	10	>100Gohm	> 10 Megohms	Acc
4	11	>100Gohm	> 10 Megohms	Acc
4	12	>100Gohm	> 10 Megohms	Acc
4	13	>100Gohm	> 10 Megohms	Acc
4	14	>100Gohm	> 10 Megohms	Acc
5	6	>100Gohm	> 10 Megohms	Acc
5	7	>100Gohm	> 10 Megohms	Acc
5	8	>100Gohm	> 10 Megohms	Acc
5	8	>100Gohm	> 10 Megohms	Acc
5	10	>100Gohm	> 10 Megohms	Acc
5	11	>100Gohm	> 10 Megohms	Acc
5	12	>100Gohm	> 10 Megohms	Acc
5	13	>100Gohm	> 10 Megohms	Acc
5	14	>100Gohm	> 10 Megohms	Acc
6	7	>100Gohm	> 10 Megohms	Acc
6	8	>100Gohm	> 10 Megohms	Acc
6	9	>100Gohm	> 10 Megohms	Acc
6	10	>100Gohm	> 10 Megohms	Acc
6	11	>100Gohm	> 10 Megohms	Acc
6	12	>100Gohm	> 10 Megohms	Acc
6	12	>100Gohm	> 10 Megohms	Acc
6	14	>100Gohm	> 10 Megohms	Acc
7	8	>100Gohm	> 10 Megohms	Acc
7	9	>100Gohm	> 10 Megohms	Acc
7	10	>100Gohm	> 10 Megohms	Acc
7	11	>100Gohm	> 10 Megohms	Acc
7	12	>100Gohm	> 10 Megohms	Acc
7	13	>100Gohm	> 10 Megohms	Acc
7	14	>100Gohm	> 10 Megohms	Acc
8	9	>100Gohm	> 10 Megohms	Acc
8	10	>100Gohm	> 10 Megohms	Acc
8	11	>100Gohm	> 10 Megohms	Acc
8	12	>100Gohm	> 10 Megohms	Acc
8	13	>100Gohm	> 10 Megohms	Acc
8	14	>100Gohm	> 10 Megohms	Acc
9	10	>100Gohm	> 10 Megohms	Acc
9	11	>100Gohm	> 10 Megohms	Acc
9	12	>100Gohm	> 10 Megohms	Acc
9	13	>100Gohm	> 10 Megohms	Acc
9	14	>100Gohm	> 10 Megohms	Acc
10	11	>100Gohm	> 10 Megohms	Acc
10	12	>100Gohm	> 10 Megohms	Acc
10	13	>100Gohm	> 10 Megohms	Acc
10	14	>100Gohm	> 10 Megohms	Acc
11	12	>100Gohm	> 10 Megohms	Acc
11	13	>100Gohm	> 10 Megohms	Acc
11	14	>100Gohm	> 10 Megohms	Acc

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
12	13	>100Gohm	> 10 Megohms	Acc
12	14	>100Gohm	> 10 Megohms	Acc
13	14	>100Gohm	> 10 Megohms	Acc
1	Ground	>100Gohm	> 10 Megohms	Acc
2	Ground	>100Gohm	> 10 Megohms	Acc
3	Ground	>100Gohm	> 10 Megohms	Acc
4	Ground	>100Gohm	> 10 Megohms	Acc
5	Ground	>100Gohm	> 10 Megohms	Acc
6	Ground	>100Gohm	> 10 Megohms	Acc
7	Ground	>100Gohm	> 10 Megohms	Acc
8	Ground	>100Gohm	> 10 Megohms	Acc
9	Ground	>100Gohm	> 10 Megohms	Acc
10	Ground	>100Gohm	> 10 Megohms	Acc
11	Ground	>100Gohm	> 10 Megohms	Acc
12	Ground	>100Gohm	> 10 Megohms	Acc
13	Ground	>100Gohm	> 10 Megohms	Acc
14	Ground	>100Gohm	> 10 Megohms	Acc

2.2.3 De-energize and remove test equipment.

2.2.4 Setup the test equipment and **relay** specimen for insulation resistance testing.

2.2.5 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the relay test specimen. Record the relay data below.

Terminal to Terminal / Ground

Desc. Of Terminal	Desc. Of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1-9	2-10	>100Gohm	> 10 Megohms	Acc
1-9	3-11	>100Gohm	> 10 Megohms	Acc
1-9	4-12	>100Gohm	> 10 Megohms	Acc
2-10	3-11	>100Gohm	> 10 Megohms	Acc
2-10	4-12	>100Gohm	> 10 Megohms	Acc
3-11	4-12	>100Gohm	> 10 Megohms	Acc
5	6	>100Gohm	> 10 Megohms	Acc
6	7	>100Gohm	> 10 Megohms	Acc
7	8	>100Gohm	> 10 Megohms	Acc
1-9	Ground	>100Gohm	> 10 Megohms	Acc
2-10	Ground	>100Gohm	> 10 Megohms	Acc
3-11	Ground	>100Gohm	> 10 Megohms	Acc
4-12	Ground	>100Gohm	> 10 Megohms	Acc
5	Ground	>100Gohm	> 10 Megohms	Acc
6	Ground	>100Gohm	> 10 Megohms	Acc
7	Ground	>100Gohm	> 10 Megohms	Acc
8	Ground	>100Gohm	> 10 Megohms	Acc
13	Ground	>100Gohm	> 10 Megohms	Acc
14	Ground	>100Gohm	> 10 Megohms	Acc

2.2.6 De-energize and remove test equipment.

2.3 Operation

2.3.1 Assemble the relay onto its socket. Regulate voltage to the coil of the relay and monitor the maximum pick-up voltage and minimum drop-out voltages.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Pick-up Voltage	72.588 VAC	**96 VAC maximum**	Acc
Drop-out Voltage	55.346 VAC	**36 AC minimum**	Acc

2.3.2 De-energize and remove test equipment.

2.4 Contact Rating Test

2.4.1 Setup the Relay specimen for contact rating testing.

2.4.2 Apply a nominal 10 amps VAC, resistive, across the NC contacts of the test specimen. Record the data in the table below.

Caution: Do not change state of contacts while energized.

Description	Record Data	Acceptance Criteria	Comments/Deviations
1-9	.1212 VAC	**< 0.5 Volts AC drop**	Acc
2-10	.1245 VAC	**< 0.5 Volts AC drop**	Acc
3-11	.1468 VAC	**< 0.5 Volts AC drop**	Acc
4-12	.1061 VAC	**< 0.5 Volts AC drop**	Acc

2.4.3 Energize the relay coil with 120VAC to change the contacts' position of the test specimen.

2.4.4 Apply a nominal 10 amps VAC, resistive, across the **closed** NO contacts of the test specimen. . Record the data in the table below.

Description	Record Data	Acceptance Criteria	Comments/Deviations
5-9	.1170 VAC	**< 0.5 Volts AC drop**	Acc
6-10	.1239 VAC	**< 0.5 Volts AC drop**	Acc
7-11	.1421 VAC	**< 0.5 Volts AC drop**	Acc
8-12	.1085	**< 0.5 Volts AC drop**	Acc

2.4.5 De-energize and remove test equipment.

2.5 Terminate the test.

2.5.1 Reland the relay and verify reland in accordance with the Lifted Lead Log.

2.5.2 Record: Date /Time of Test End: 03-31-00 2:30 p.m.

3.0 References

3.1 Panel Wiring Drawings: See list provided with relay selection list (page 3).

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Testing was acceptable

Michael Cram
03-31-00

Notes:

Certified Instrumentation Technician (signature) Michael Cram Date: 03-31-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Craig Swenson Date: 4/3/00

QA/QC (signature) Stephen Scott Mott Date: 4-6-2000

LIFTED LEAD LOG

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
EB-33069	1	6213Y	PHLCY(3)	5	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00
		6214Y		9	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00
		2) 1521Y		13	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00
		Grey	RCS2A-6	13	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00
		Black		14	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00
		102Y		14	DKY	3-31-00	SRC	3-31-00	DKY	3-31-00	SRC	3-31-00

Remarks:

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI Eng	DA	QA Post Review*

* QA Post Review of Individual Revisions is allowed

In-Situ Test Procedure

ORIGINAL

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) YMP Craig Swenson Date: 3/22/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Belhaven	Michael Cram	Mke
Electrician	DAN K YORK	PCE	Dan K. York	DKY
Electrician Quality Control	Stephen R. Conley	PCE	Stephen R Conley	SRC
Design Authority Representative	Larry W. Price	XNWST		YMP
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Power Supply capable of 10 amps @ 120 VAC.
Megger Instrument capable of 500 VDC Test Voltage
Adjustable Voltage Power supply capable of 0 to 120 VAC minimum
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: Avo BM80/2 I.D.: 6410-889 Calib. Due date: 02-09-01

Test Instrument type: FLUKE 787 I.D.: BAT107 Calib. Due date: 05-28-00

Test Instrument type: HP 3450A I.D.: BAT124 Calib. Due date: 07-30-00

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

Relay Selection List

No.	Eqmt ID No.	Panel No.	Dwg. Reference
1	P2X(1)	201	ED-33065 Sht. 1
2	P6X(1)	201	ED-33065 Sht. 1
3	IAXM(1)	201	ED-33065 Sht. 1
4	MCO(1)	201	ED-33065 Sht. 1
5	MHF	202	ED-33066 Sht. 1
6	PGEX	202	ED-33066 Sht. 1
7	MW15	202	ED-33066 Sht. 1
8	BF	203	ED-33067 Sht. 1
9	BSC1AX	203	ED-33067 Sht. 1
10	TSP1FIX	204	ED-33068 Sht. 1
11	TRD	204	ED-33068 Sht. 1
12	MCOY(2)	205	ED-33069 Sht. 1
13	MGCLY	205	ED-33069 Sht. 1
14	PHULY(3)	205	ED-33069 Sht. 1
15	PGLY	205	ED-33069 Sht. 1

TEST PROCEDURE:

For this In-Situ Test, the relay and its socket must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of the relay and its socket.

1.0 Select a relay from the list above. Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	PGLY	Select from List provided above	Acc
Manufacturer:	OK	Idec	Acc
Relay Model:	OK	RH4B-UL-AC120V	Acc
Contact Configuration:	OK	4PDT Contacts	Acc
Socket Model:	OK	SH4B-05	Acc

2.0 Perform the following testing steps:

2.1 Record: Date /Time of Test Beginning: 4-3-00 10:40 a.m

2.1.1 Complete the Lifted Lead Log prior to removing the plug-in relay and its associated socket.

2.2 Insulation Resistance Test

2.2.1 *Setup the* **Relay Socket** *specimen for insulation resistance testing.* Attach Relay Socket in its normal mounting configuration to grounded fixture.

2.2.2 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the relay socket test specimen. Record the socket data.

Terminal to Terminal / Ground

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1	2	>100Gohm	> 10 Megohms	Acc
1	3	>100Gohm	> 10 Megohms	Acc
1	4	>100Gohm	> 10 Megohms	Acc
1	5	>100Gohm	> 10 Megohms	Acc
1	6	>100Gohm	> 10 Megohms	Acc
1	7	>100 Gohm	> 10 Megohms	Acc
1	8	>100 Gohm	> 10 Megohms	Acc
1	9	>100Gohm	> 10 Megohms	Acc
1	10	>100Gohm	> 10 Megohms	Acc
1	11	>100 Gohm	> 10 Megohms	Acc
1	12	>100Gohm	> 10 Megohms	Acc
1	13	>100Gohm	> 10 Megohms	Acc
1	14	>100Gohm	> 10 Megohms	Acc
2	3	>100Gohm	> 10 Megohms	Acc
2	4	>100Gohm	> 10 Megohms	Acc
2	5	>100Gohm	> 10 Megohms	Acc
2	6	>100Gohm	> 10 Megohms	Acc
2	7	>100Gohm	> 10 Megohms	Acc
2	8	>100 Gohm	> 10 Megohms	Acc
2	9	>100 Gohm	> 10 Megohms	Acc
2	10	>100Gohm	> 10 Megohms	Acc
2	11	>100Gohm	> 10 Megohms	Acc
2	12	>100Gohm	> 10 Megohms	Acc
2	13	>100Gohm	> 10 Megohms	Acc
2	14	>100Gohm	> 10 Megohms	Acc
3	4	>100Gohm	> 10 Megohms	Acc
3	5	>100Gohm	> 10 Megohms	Acc
3	6	>100Gohm	> 10 Megohms	Acc
3	7	>100Gohm	> 10 Megohms	Acc
3	8	>100Gohm	> 10 Megohms	Acc
3	9	>100Gohm	> 10 Megohms	Acc
3	10	>100Gohm	> 10 Megohms	Acc
3	11	>100Gohm	> 10 Megohms	Acc
3	12	>100Gohm	> 10 Megohms	Acc
3	13	>100Gohm	> 10 Megohms	Acc
3	14	>100Gohm	> 10 Megohms	Acc
4	5	>100Gohm	> 10 Megohms	Acc

Dedication Test Plan – IST **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-020-TP-020C
Test Specimen: Idec RH4B-UL-AC120V & SH4B-05, Eqmt. No.: Generic **Page 5 of 9**

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
4	6	>100Gohm	> 10 Megohms	Acc
4	7	>100Gohm	> 10 Megohms	Acc
4	8	>100Gohm	> 10 Megohms	Acc
4	9	>100Gohm	> 10 Megohms	Acc
4	10	>100Gohm	> 10 Megohms	Acc
4	11	>100Gohm	> 10 Megohms	Acc
4	12	>100Gohm	> 10 Megohms	Acc
4	13	>100Gohm	> 10 Megohms	Acc
4	14	>100Gohm	> 10 Megohms	Acc
5	6	>100Gohm	> 10 Megohms	Acc
5	7	>100Gohm	> 10 Megohms	Acc
5	8	>100Gohm	> 10 Megohms	Acc
5	8	>100Gohm	> 10 Megohms	Acc
5	10	>100Gohm	> 10 Megohms	Acc
5	11	>100Gohm	> 10 Megohms	Acc
5	12	>100Gohm	> 10 Megohms	Acc
5	13	>100Gohm	> 10 Megohms	Acc
5	14	>100Gohm	> 10 Megohms	Acc
6	7	>100Gohm	> 10 Megohms	Acc
6	8	>100Gohm	> 10 Megohms	Acc
6	9	>100Gohm	> 10 Megohms	Acc
6	10	>100Gohm	> 10 Megohms	Acc
6	11	>100Gohm	> 10 Megohms	Acc
6	12	>100Gohm	> 10 Megohms	Acc
6	12	>100Gohm	> 10 Megohms	Acc
6	14	>100Gohm	> 10 Megohms	Acc
7	8	>100Gohm	> 10 Megohms	Acc
7	9	>100Gohm	> 10 Megohms	Acc
7	10	>100Gohm	> 10 Megohms	Acc
7	11	>100Gohm	> 10 Megohms	Acc
7	12	>100Gohm	> 10 Megohms	Acc
7	13	>100Gohm	> 10 Megohms	Acc
7	14	>100Gohm	> 10 Megohms	Acc
8	9	>100Gohm	> 10 Megohms	Acc
8	10	>100Gohm	> 10 Megohms	Acc
8	11	>100Gohm	> 10 Megohms	Acc
8	12	>100Gohm	> 10 Megohms	Acc
8	13	>100Gohm	> 10 Megohms	Acc
8	14	>100Gohm	> 10 Megohms	Acc
9	10	>100Gohm	> 10 Megohms	Acc
9	11	>100Gohm	> 10 Megohms	Acc
9	12	>100Gohm	> 10 Megohms	Acc
9	13	>100Gohm	> 10 Megohms	Acc
9	14	>100Gohm	> 10 Megohms	Acc
10	11	>100Gohm	> 10 Megohms	Acc
10	12	>100Gohm	> 10 Megohms	Acc
10	13	>100Gohm	> 10 Megohms	Acc
10	14	>100Gohm	> 10 Megohms	Acc
11	12	>100Gohm	> 10 Megohms	Acc
11	13	>100Gohm	> 10 Megohms	Acc
11	14	>100Gohm	> 10 Megohms	Acc

Desc. of Terminal	Desc. of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
12	13	>100Gohm	> 10 Megohms	Acc
12	14	>100Gohm	> 10 Megohms	Acc
13	14	>100Gohm	> 10 Megohms	Acc
1	Ground	>100Gohm	> 10 Megohms	Acc
2	Ground	>100Gohm	> 10 Megohms	Acc
3	Ground	>100Gohm	> 10 Megohms	Acc
4	Ground	>100Gohm	> 10 Megohms	Acc
5	Ground	>100Gohm	> 10 Megohms	Acc
6	Ground	>100Gohm	> 10 Megohms	Acc
7	Ground	>100Gohm	> 10 Megohms	Acc
8	Ground	>100Gohm	> 10 Megohms	Acc
9	Ground	>100Gohm	> 10 Megohms	Acc
10	Ground	>100Gohm	> 10 Megohms	Acc
11	Ground	>100Gohm	> 10 Megohms	Acc
12	Ground	>100Gohm	> 10 Megohms	Acc
13	Ground	>100Gohm	> 10 Megohms	Acc
14	Ground	>100Gohm	> 10 Megohms	Acc

2.2.3 De-energize and remove test equipment.

2.2.4 Setup the test equipment and **relay** specimen for insulation resistance testing.

2.2.5 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the relay test specimen. Record the relay data below.

Terminal to Terminal / Ground

Desc. Of Terminal	Desc. Of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
1-9	2-10	>100Gohm	> 10 Megohms	Acc
1-9	3-11	>100Gohm	> 10 Megohms	Acc
1-9	4-12	>100Gohm	> 10 Megohms	Acc
2-10	3-11	>100Gohm	> 10 Megohms	Acc
2-10	4-12	>100Gohm	> 10 Megohms	Acc
3-11	4-12	>100Gohm	> 10 Megohms	Acc
5	6	>100Gohm	> 10 Megohms	Acc
6	7	>100Gohm	> 10 Megohms	Acc
7	8	>100Gohm	> 10 Megohms	Acc
1-9	Ground	>100Gohm	> 10 Megohms	Acc
2-10	Ground	>100Gohm	> 10 Megohms	Acc
3-11	Ground	>100Gohm	> 10 Megohms	Acc
4-12	Ground	>100Gohm	> 10 Megohms	Acc
5	Ground	>100Gohm	> 10 Megohms	Acc
6	Ground	>100Gohm	> 10 Megohms	Acc
7	Ground	>100Gohm	> 10 Megohms	Acc
8	Ground	>100Gohm	> 10 Megohms	Acc
13	Ground	>100Gohm	> 10 Megohms	Acc
14	Ground	>100Gohm	> 10 Megohms	Acc

2.2.6 De-energize and remove test equipment.

2.3 Operation

2.3.1 Assemble the relay onto its socket. Regulate voltage to the coil of the relay and monitor the maximum pick-up voltage and minimum drop-out voltages.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Pick-up Voltage	75.136 VAC	**96 VAC maximum**	Acc
Drop-out Voltage	52.819 VAC	**36 AC minimum**	Acc

2.3.2 De-energize and remove test equipment.

2.4 Contact Rating Test

2.4.1 *Setup the Relay specimen for contact rating testing.*

2.4.2 Apply a nominal 10 amps VAC, resistive, across the NC contacts of the test specimen. Record the data in the table below.

Caution: Do not change state of contacts while energized.

Description	Record Data	Acceptance Criteria	Comments/Deviations
1-9	.1089 VAC	**< 0.5 Volts AC drop**	Acc
2-10	.1152 VAC	**< 0.5 Volts AC drop**	Acc
3-11	.1106 VAC	**< 0.5 Volts AC drop**	Acc
4-12	.1018 VAC	**< 0.5 Volts AC drop**	Acc

2.4.3 Energize the relay coil with 120VAC to change the contacts' position of the test specimen.

2.4.4 Apply a nominal 10 amps VAC, resistive, across the **closed** NO contacts of the test specimen. . Record the data in the table below.

Description	Record Data	Acceptance Criteria	Comments/Deviations
5-9	.1447 VAC	**< 0.5 Volts AC drop**	Acc
6-10	.1269 VAC	**< 0.5 Volts AC drop**	Acc
7-11	.1633 VAC	**< 0.5 Volts AC drop**	Acc
8-12	.1108 VAC	**< 0.5 Volts AC drop**	Acc

2.4.5 De-energize and remove test equipment.

2.5 Terminate the test.

2.5.1 Reland the relay and verify reland in accordance with the Lifted Lead Log.

2.5.2 Record: Date /Time of Test End: 04-03-00 11:40 a.m.

3.0 References

3.1 Panel Wiring Drawings: See list provided with relay selection list (page 3).

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Test was acceptable
Michael Cram
04-03-00

Notes:

Certified Instrumentation Technician (signature) Michael Cram Date: 04-03-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) Craig Swenson Date: 4/3/00

QA/QC (signature) Stephen Scott Mora Date: 4-6-2000

LIFTED LEAD LOG

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
EB-33064	1	5130Y	PGLY	5	DKY	4-3-00	SRC	4-3-00	DKY	4-3-00	SRC	4-3-00
		5505Y		6	DKY	4-3-00	SRC	4-3-00	DKY	4-3-00	SRC	4-3-00
		5129Y		9	DKY	4-3-00	SRC	4-3-00	DKY	4-3-00	SRC	4-3-00
		5506Y		10	DKY	4-3-00	SRC	4-3-00	DKY	4-3-00	SRC	4-3-00
		17A05Y		13	DKY	4-3-00	SRC	4-3-00	DKY	4-3-00	SRC	4-3-00
		Grey	RCS2A-6	13	DKY	4-3-00	SRC	4-3-00	DKY	4-3-00	SRC	4-3-00
		Black	"	14	DKY	4-3-00	SRC	4-3-00	DKY	4-3-00	SRC	4-3-00
		5102Y	PGLY	14	DKY	4-3-00	SRC	4-3-00	DKY	4-3-00	SRC	4-5-00

Remarks:

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Commercial Grade Item Upgrade Dedication Form

ECN No. N/A CGI No. CGI-SNF-D-MHM-048 Title: Various ~~P02~~, 06, ~~07, 08, 09~~, 21, 26, ~~44, 45~~, and 85 Interlocks–Siemens Contactor #3TF4~~4~~22-0AK6	Rev. No. 0 Page 1 of 8

Section 1 Part Information

Item No.: **N/A**	Manufacturer: **N/A**	Supplier: **N/A**
Mfg. Part/Model No.: **N/A**	Supplier's P/N: **N/A**	
Part Description: **N/A**		
End Use Description: **N/A**		

ORIGINAL

Section 2a Component Information

Equipment No.: **SSRY, BLPDY, PHHY, PHLY, SSLY, TLPDY**	Specification No.: **None**	Manufacturer: **Siemens**	Past P.O. No.: **N/A**
Manufacturer's Part/ Model No.: **3TF4~~4~~22-0AK6**	Equipment Supplier (if different from manufacturer): **None**		Equip. Supplier's Part No.: **N/A**

Component Description: **3-Pole contactor with120 VAC coil with 2 NO and 2 NC auxiliary contacts. Located on the MHM. The 3-pole 480 VAC 3PH/60HZ main contacts are used to provide line power from the circuit breaker to various motors when control circuit requirements are met. These include Tube Plug Hoist, Turret Locking Pin Disengage, Base Locking Pin disengage, and Shield Skirt raise and lower.**

Section 2b Commercial Availability of the Item

1. Is the Item available from a catalogue from a qualified NQA1 supplier or ISO 9000 supplier (coordinate with project CGI interface Engineer or BTR)?

   [ ] YES (go to #2 below) [X] NO (go to procedure step 6.3.2, proceed to dedicate Item)

   If not available from a qualified NQA1 supplier, is it available from an ISO 9000 supplier? (coordinate with project CGI Interface Engineer or BTR)

   [ ] YES (go to #2 below, procedure step 6.3.2, dedicate Item) [X] NO (procedure step 6.3.2, dedicate Item)

2. List of Candidate qualified NQA1 suppliers or ISO 9000 suppliers, if used: **N/A**

3. Recommended Procurement Strategy (coordinate with project CGI interface Engineer or BTR): **N/A**

Section 2c CGI Determination

CGI Determination Questions:

#1: Is the Item subject to design or specification requirements that are unique to nuclear facilities or activities?

[ ] YES (the Item is not commercial grade) [X] NO (continue)

#2: Is the Item used in applications other than nuclear facilities or activities?

[ ] NO (the item is not commercial grade) [X] YES (continue)

#3: Is the Item ordered from manufacturer/supplier on the basis of specifications set forth in the manufacturer's catalog?

[ ] NO (the item is not commercial grade) [X] YES (continue)

[X] All three criteria have been satisfied. The Item meets the definition of commercial grade.

Commercial Grade Item Upgrade Dedication Form

ECN No. **N/A** CGI No. **CGI-SNF-D-MHM-048**

Title: Various **P02, 06, 07, 08, 09, 21, 26, 44, 45, and 85 Interlocks–Siemens Contactor #3TF4422-0AK6**

Section 2d Reason for Dedication

The above Commercial Grade (CG) described Item is being Dedicated for use in the application cited for the following reason(s):

	Item is being purchased from a non ESL manufacturer supplier as CG to be used in a Safety Class application.
	Item is being purchased from a non ESL manufacturer supplier as CG to be used in a Safety Significant application.
X	Item was purchased from a non ESL manufacturer supplier as CG to be used in a Safety Class application.
	Item was purchased from a non ESL manufacturer supplier as CG to be used in a Safety Significant application.
	Other ('like-for-like', similar, substitution, replacement evaluation)

Section 3 Failure Effects Evaluation

A. Part/Component Safety Function:

1. **Isolates line power from the Turret Rotate Drive motor when permissives are not met.**

1. Part/Component Functional Mode:

Safety Function #1: [X] Active [ ] Passive

Safety Function #2: [ ] Active [ ] Passive

Safety Function #3: [ ] Active [ ] Passive

Active - Mechanical or Electrical change of state is required to occur for the component to perform its safety function

Passive – Change of state is not required for the component to perform its safety function

C. Host Component Safety Function (if applicable):

1. **N/A**

D. Failure Mode(s) and the effects on component or system safety function (see Worksheet 1):

1. **Contact resistance out of spec results in overheating and welding of contacts**

2. **Hot short across contacts results in failure to open the circuit**

3. **Binding of contacts results in failure to open/close circuit**

Section 4 Environmental & Natural Phenomena Hazard Design

Environmental Qualification Required: Yes [ ] No [X]	If yes: Environmental Qualification Requirements Limiting Environmental Conditions: Required Safety Functions: Qualification Period:
Natural Phenomena Hazard (NPH) Design Required: Yes [ ] No [X]	If yes: NPH Design Requirements *Performance Category:* NPH Design Req'ts.: Required Safety Functions:

Section 5 Component Functional Classification

X	Safety Class (SC)		General Service (GS)		*Safety Significant (SS)*

If part/component classification is different from host component/system, document basis. **N/A**

Sections 6 and 7 (Reserved)

Section 8 References (for Functional Classification)

National Codes/Standards: **N/A**

Safety Analysis Report (SAR): **HNF-3672, Rev. 0**

Drawings: **Ederer, Inc. EB-33056, Sheets 15, 28, 30, 32, and 32A**

Vendor Manual/Manufacturer/Supplier Information: **Siemens Industrial Control Products, World Series Contactors, 3TF4 3-Pole with AC coil**

Other: **ALSTOM ESL/R (96) 065 – Rev. D, 100% Design Submittal – June 1998**

Commercial Grade Item Upgrade Dedication Form

Rev. No. 0	
ECN No. N/A CGI No. CGI-SNF-D-MHM-048	Page 3 of 8
Title Various P02, 06, 07, 08, 09, 21, 26, 44, 45, and 85 Interlocks–Siemens Contactor #3TF4422-0AK6	

Section 9 Critical Characteristics

Critical Characteristics	Acceptance Criteria/Tolerances	Acceptance Method	ID	Function
1. Item Identification Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
Manufacturer	**Siemens**	1, IN	X	
Model Number	**3TF42**	1, IN	X	
Coil	**K6**	1, IN	X	
2. Physical Critical Characteristics (for reasonable assurance that the Item delivered is the Item specified)				
Contact configuration	**3 pole NO main contacts, 2 NO and 2 NC Aux. Contacts**	1, IN	X	
3 Performance Critical Characteristics (for reasonable assurance that the Item will perform its intended safety function(s))				
Current carrying capability	**0.5V max. voltage drop across closed contacts at 10 amps resistive on main contacts and at 10 amps, resistive on auxiliary contacts**	1, T		X
Insulation resistance	**10 Megohm min across open contact terminals and terminals to ground (500 VDC meggar)**	1, T		X
Operation	**Contacts open/close at maximum pick-up (96 VAC) and minimum drop-out (36 VAC) voltages**	1, T		X

4. Notes and Legend: Siemens Number 3TF4222-0AK6 is a catalogue ordering number. 3TF42 is the model number of the contactor, the next two numbers are the style and number of auxiliary contacts, and the last two digits is the type of coil (e.g. K6 is a 120VAC, 60 hz coil). Typically the aux contacts do not have a designator on them so visual verification is used.

Acceptance Method (Acc Meth):

1. Special Test and Inspection:
   - 1, IN for Inspection
   - 1,T for Test
2. Commercial Grade Survey
3. Source Verification
1. Vendor/Item History

Section 10 Initial Review and Approval

Approvals:

Designated Engineer: [signature] 4/6/00

Design Authority: [signature] 4/6/00

Quality Assurance: [signature] 4-6-2000

Commercial Grade Item Upgrade Dedication Form

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ECN No. N/A CGI No. CGI-SNF-D-MHM-048

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Title Various P02, 06, 07, 08, 09, 21, 26, 44, 45, and 85 Interlocks–Siemens Contactor #3TF4422-0AK6

WORKSHEET 1
DETERMINATION OF FAILURE MECHANISMS/MODES

Section 1			
Typical Failure Mechanisms	Definition	X = Applicable to Component under Evaluation	
		X?	Indicate Failure Mode
Fracture	Separation of a solid accompanied by little or no macroscopic plastic deformation.		
Corrosion	The gradual deterioration of a material due to chemical or electrochemical reactions, such as oxidation, between the material and its environment.		
Erosion	Destruction of materials by the abrasive action of moving fluids, usually accelerated by the presence of solid particles carried with the fluid.		
Open Circuit	An electrical circuit that is unintentionally broken so that there is no complete path for current flow.		
Short Circuit	An abnormal connection by which an electrical current is connected to ground, or to some conducting body, resulting in excessive current flow.	X	**Failure to open the circuit by contact welding or hot short across the contact base.**
Blockage	Clogging of a filtering medium resulting in the inability to perform its purification function or blockage of flow.		
Seizure	Binding of a normally moving item through excessive pressure, temperature, friction, jamming.	X	**Results in failure of contacts to open**
Unacceptable Vibration	Mechanical oscillations produced are beyond the defined permissible limits due to unbalancing, poor support, or rotation at critical speeds.		
Loss of Properties	A loss of mechanical and physical properties of a material due to exposure to high temperatures, *radiation exposure.*		
Excess Strain	Under the action of excessive external forces the material of the part has been deformed or distorted.		
Mechanical Creep	From prolonged exposure to high temperature and stress, the object will show a slow change in its physical (shape and dimension) and mechanical characteristics.		
Ductile Fracture	Fracture characterized by tearing of metal accompanied by appreciable gross plastic deformation.		
Section 2 Additional Failure Modes Applicable to the Component Under Evaluation			

Commercial Grade Item Upgrade Dedication Form

ECN No. N/A CGI No. CGI-SNF-D-MHM-048

Title: Various P02, 06, 07, 08, 09, 21, 26, 44, 45, and 85 Interlocks–Siemens Contactor #3TF4422-0AK6

Checklist 1 - Acceptance Method 1 - Special Test/Inspection Verification

SECTION 1

Item Description: **Siemens Contactor** System #: **Various**	Equip #: ~~IRLC~~ SSRY, BLPDY, PHHY, PHLY, SSLY, TLPDY Model #: **3TF4422-0AK6**
Manufacturer (Address/Phone): **Siemens Industrial Control Products** **1-800-964-4114**	Supplier (Address/Phone): **Ederer, Inc.**

SECTION 2 CRITICAL CHARACTERISTICS TO BE VERIFIED BY METHOD 1.

Insp	Test	PIT		
X			1.	**Manufacturer**
X			2.	**Contactor Model Number**
X			3.	**Coil Model Number**
X			4.	**Contact Configuration**
	X		5.	**Contact Rating**
	X		6.	**Insulation Resistance**
	X		7.	**Operation**

SECTION 3 BY INSPECTION * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)

Characteristic: **Manufacturer** Sample Size*: **100%**

Acceptance Criteria: **Siemens**

Receipt Inspection Plan / Report #: CGI-SNF-D-MHM-048-TP-048 A, B, C & D

Characteristic: **Contactor Model Number** Sample Size*: **100%**

Acceptance Criteria: **3TF42**

Receipt Inspection Plan / Report #: TP-048 A, B, C & D

Characteristic: **Coil Model Number** Sample Size*: **100%**

Acceptance Criteria: **K6**

Receipt Inspection Plan / Report #: TP-048 A, B, C & D

Characteristic: **Contact Configuration** Sample Size*: **100%**

Acceptance Criteria: **3 Pole NO Main Contacts and 2 NO and 2 NC auxiliary contacts**

Receipt Inspection Plan / Report #: TP-048 A, B, C & D

Commercial Grade Item Upgrade Dedication Form

Rev. No. 0
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ECN No. N/A CGI No. CGI-SNF-D-MHM-048

Title: Various P02, 06, 07, 08, 09, 21, 26, 44, 45, and 85 Interlocks–Siemens Contactor #3TF4422-0AK6

SECTION 4 BY SPECIAL TEST * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)

Characteristic for Test: **Current carrying capabiility** Samp Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **0.5V max. voltage drop across closed contacts at 10 amps resistive on main contacts and at 10 amps, resistive on auxiliary contacts**

Actual Test Value: See TP Test Plan and Report #: TP-048, A, B & C

Characteristic for Test: **Insulation Resistance** Samp Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **10 Megohms min across open contact terminals and terminals to ground, with 500 vdc megger.**

Actual Test Value: See TP Test Plan and Report #: TP-048 A, B & C

Characteristic for Test: **Operation** Samp Size*: [X]Normal[ ]Reduced[ ]Tightened

Acceptance Criteria: **Contacts change state at max. pickup voltage of 96VAC and at min. drop-out voltage of 36VAC**

Actual Test Value: See TP Test Plan and Report #: TP-048 A, B & C

SECTION 5 TEST / INSPECTION SUMMARY (Acceptance Method 1)

1. SUMMARY OF VERIFIED CRITICAL CHARACTERISTICS, THEIR VERIFICATION METHODS, AND RESULTS

ITEM DESCRIPTION: Contactor

Critical Characteristics				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/N	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
Manufacturer	Siemens	X		1, IN	TP-048A,B,C,D	N/A	6	0	XWEST	Larry Price	4/6/00
Contactor Model Number	3TF44 2 CES 4/12/00	X		1, IN	↓	↓	↓	↓	↓	↓	↓
Coil Model Number	K6	X		1, IN	↓	↓	↓	↓	↓	↓	↓
Contact Configuration	3 Pole NO Main Contacts and 2 NO ands 2 NC auxiliary contacts	X		1, IN	↓	↓	↓	↓	↓	↓	↓
Current Carrying Capability	0.5V max voltage drop across closed terminals, 10 amps on main contacts and at 10 amps on aux. contacts, resistive		X	1, T	TP-048A,C	N/A	3	0	XWEST	Larry Price	4/6/00
Insulation Resistance	10 Megohms min across open contact terminals and terminals to ground (500VDC megger)		X	1, T	↓	↓	↓	↓	↓	↓	↓
Operation	Contacts change state at max pick-up voltage of 96VAC and at min drop-out voltage of 36VAC		X	1, T	↓	↓	↓	↓	↓	↓	↓

2. DISPOSITION OF UNVERIFIED OR FAILED CRITICAL CHARACTERISTICS

Critical Characteristic	Disposition

3. SIGNATURE INDICATES ALL CRITICAL CHARACTERISTICS VERIFIED SATISFACTORY OR ACCEPTABLY DISPOSITIONED AND COMMERCIAL GRADE DEDICATION IS SATISFACTORY AND COMPLETE.

See Test Plan TP-048A, B, C, D cited above

Testing Agency Approval: NTC CES 4/12/00 Date CES 4/11/00

Testing Agency QA Engineer: NTC CES 4/12/00 Date

BUYER VERIFICATION

Design Authority: CES Gary Swenson Date 4/12/00

QA Engineer: Stephen Scott Moe Date 4-20-2000

Commercial Grade Item Upgrade Dedication Form	Rev. No. 0
ECN No. N/A CGI No. CGI-SNF-D-MHM-048 Title Various P02, 06, 07, 08, 09, 21, 26, 44, 45, and 85 Interlocks–Siemens Contactor #3TF4422-0AK6	Page 8 of 8

SECTION 6 CONTACTS / PHONE NUMBERS		
	Name	Phone
Design Authority	CRAIG SWENSON	( ) 376-0288
QA		( )
QC		( )
Cog - Engineer		( )
CGI Engineer		( )
Procurement Engineer		( )
Other		( )

SECTION 7 SUPPORTING DOCUMENTATION FOR THIS CHECKLIST		
Initial Procurement Documents		**For Critical Characteristics**
	Drawings:	
X	Manuals (specify type & number): **Siemens Industrial Control Products, Contractor, 3TF4 3-Pole**	**All**
	Design Calculations	
	Installation Instructions	
	Operation Instructions	
	Calibration Instructions	
	Manufacturer's Recommended Spare Parts List	
	Other:	
Procurement Documents:		**For Critical Characteristics**
	Certificate of Conformance/Compliance	
	Seismic Qualification Certificate	
	Environmental Qualification Certificate	
	Test Report (s):	
	Inspection Report (s):	
	CMTRs for ASME Pressure Retaining Materials	
	Valve Seat Leakage Report	
	Weld Records	
	Material Traceability Record	
	Other:	

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI. Eng	DA	QA Post Review*
						3/22/00 NO CHANGE

* QA Post Review of Individual Revisions is allowed

ORIGINAL

ORIGINAL

In-Situ Test Procedure

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) Larry Swenson Date: 3/16/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Belhaven	Michael Cram	MRC
Electrician	J W EBERHART	PCE	J W Eberhart	JWE
Electrician Quality Control	Stephen R Conley	PCE	Stephen R Conley	SRC
Design Authority Representative	Larry W. Price	KWEST	Larry W. Price	LWP
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Current Source capable of 10 amps
Megger Instrument capable of 500 VDC Test Voltage
Adjustable Voltage Power supply capable of 0 to 120 VAC minimum
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: HP 3457A I.D.: BAT 123 Calib. Due date: 07-29-00

Test Instrument type: HP 3457A I.D.: BAT 124 Calib. Due date: 07-30-00

Test Instrument type: AVO BM 807/2 I.D.: 6410-889 Calib. Due date: 02-09-01

Test Instrument type: PRESTO 606 I.D.: 029E/009 Calib. Due date: 01-13-01

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE:

For this In-Situ Test, certain leads must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of leads..

1.0 Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	PHHY	**PHHY**	Acc
Manufacturer:	SIEMENS	**Siemens**	Acc
Model:	3TF4222	**3TF4222**	Acc
Contact Configuration:	YES	**3 pole Main Contacts and 2 NO & 2 NC auxiliary contacts**	Acc
Serial No./Lot No./Date Code:	OK	**N/A**	Acc
Coil:	KG	**K6**	Acc

2.0 Perform the following testing steps:

2.1 Record: Date /Time of Test Beginning: 03-17-00 8:25 am,

2.1.1 Complete the Lifted Lead Log prior to lifting leads.

2.1.2 Lift all leads

2.2 Operation

2.2.1 Regulate voltage to the coil of the contactor and monitor the maximum pick-up voltage and minimum drop-out voltages.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Pick-up Voltage	85.080 VAC	**102 VAC maximum**	Acc
Drop-out Voltage	57.725 VAC	**36 AC minimum**	Acc

2.2.2 De-energize and remove test equipment.

2.3 Insulation Resistance Test

2.3.1 Setup the test equipment and contactor specimen for insulation resistance testing.

2.3.2 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal a terminal to ground of the test specimen. Record data below.

Terminal to Terminal / Ground

Desc. Of Terminal	Desc. Of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
L1	T1	>100Gohm	> 10 Megohms	Acc
L2	T2	>100Gohm	> 10 Megohms	Acc
L3	T3	>100Gohm	> 10 Megohms	Acc
NO AUX 13	NO AUX 14	>100Gohm	> 10 Megohms	Acc
NO AUX 43	NO AUX 44	>100 Gohm	> 10 Megohms	Acc
L1	Ground	>100Gohm	> 10 Megohms	Acc
L2	Ground	>100Gohm	> 10 Megohms	Acc
L3	Ground	>100Gohm	> 10 Megohms	Acc
T1	Ground	>100Gohm	> 10 Megohms	Acc
T2	Ground	>100Gohm	> 10 Megohms	Acc
T3	Ground	>100Gohm	> 10 Megohms	Acc
NO AUX 13	Ground	>100 Gohm	> 10 Megohms	Acc
NO AUX 14	Ground	>100 Gohm	> 10 Megohms	Acc
NO AUX 43	Ground	>100 Gohm	> 10 Megohms	Acc
NO AUX 44	Ground	>100Gohm	> 10 Megohms	Acc
NC AUX 21 or 22	Ground	>100 Gohm	> 10 Megohms	Acc
NC AUX 31 or 32	Ground	>100 Gohm	> 10 Megohms	Acc
A1 or A2 (coil)	Ground	>100 Gohm	> 10Megaohms	Acc

2.4 Contact Rating Test

2.4.1 Setup the test equipment and contactor specimen for contact rating testing.

2.4.2 Manually adjust the contactor or apply 120 VAC to the coil to close the normally open contacts

2.4.3 Apply a nominal 10 amps VAC, resistive, across closed main contacts of the test specimen

2.4.4 Apply a nominal 10 amps VAC, resistive, across the closed NO auxiliary contacts of the test specimen.

Caution: Do not change state of contacts while energized.

2.4.5 Record the following data.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Main Contacts L1 T1 Closed	.0825 VAC	< 0.5 ± 10% Volts AC drop	Acc
Main Contacts L2-T2 Closed	.0426 VAC	< 0.5 ± 10% Volts AC drop	Acc
Main Contacts L3-T3 Closed	.1381 VAC	< 0.5 ± 10% Volts AC drop	Acc
Auxiliary NO Contact 13-14 (closed)	.1407 VAC	< 0.5 ± 10% Volts AC drop	Acc
Auxiliary NO Contact 43-44 (closed)	.1360 VAC	< 0.5 ± 10% Volts AC drop	Acc

2.4.6 De-energize and remove test equipment.

2.4.7 Apply a nominal 10 amps VAC, resistive, across the normally closed auxiliary contacts of the test specimen.

2.4.8 Record the following data.

Caution: Do not change state of contacts while energized.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Auxiliary NC 21-22 Contacts	.1391 VAC	< 0.5 ± 10% Volts AC drop	Acc
Auxiliary NC 31-32 Contacts	.1390 VAC	< 0.5 ± 10% Volts AC drop	Acc

2.4.9 De-energize and remove the test equipment.

2.5 Terminate the test.

2.5.1 Reland the lifted leads and verify reland in accordance with the Lifted Lead Log.

2.5.2 Retorque the terminals to 12 in-pounds.

2.5.3 Record: Date /Time of Test End: 03-17-00 10:00 a.m.

3.0 References

3.1 Elementary Wiring Drawings: EB-33056 Sheet 15

3.2 Y-Channel Main Power Panel Wiring Diagram: ED-33069 Sheet 1

Dedication Test Plan – IST **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-048-TP-048A
Test Specimen: Siemens 3TF4222-0A..1, Eqmt. No.: PHHY **Page 6 of 7**

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Acceptance Criteria has been met
Michael Cram
03-17-00

Notes:

Certified InstrumentationTechnician (signature) Michael Cram Date: 03-17-00.

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

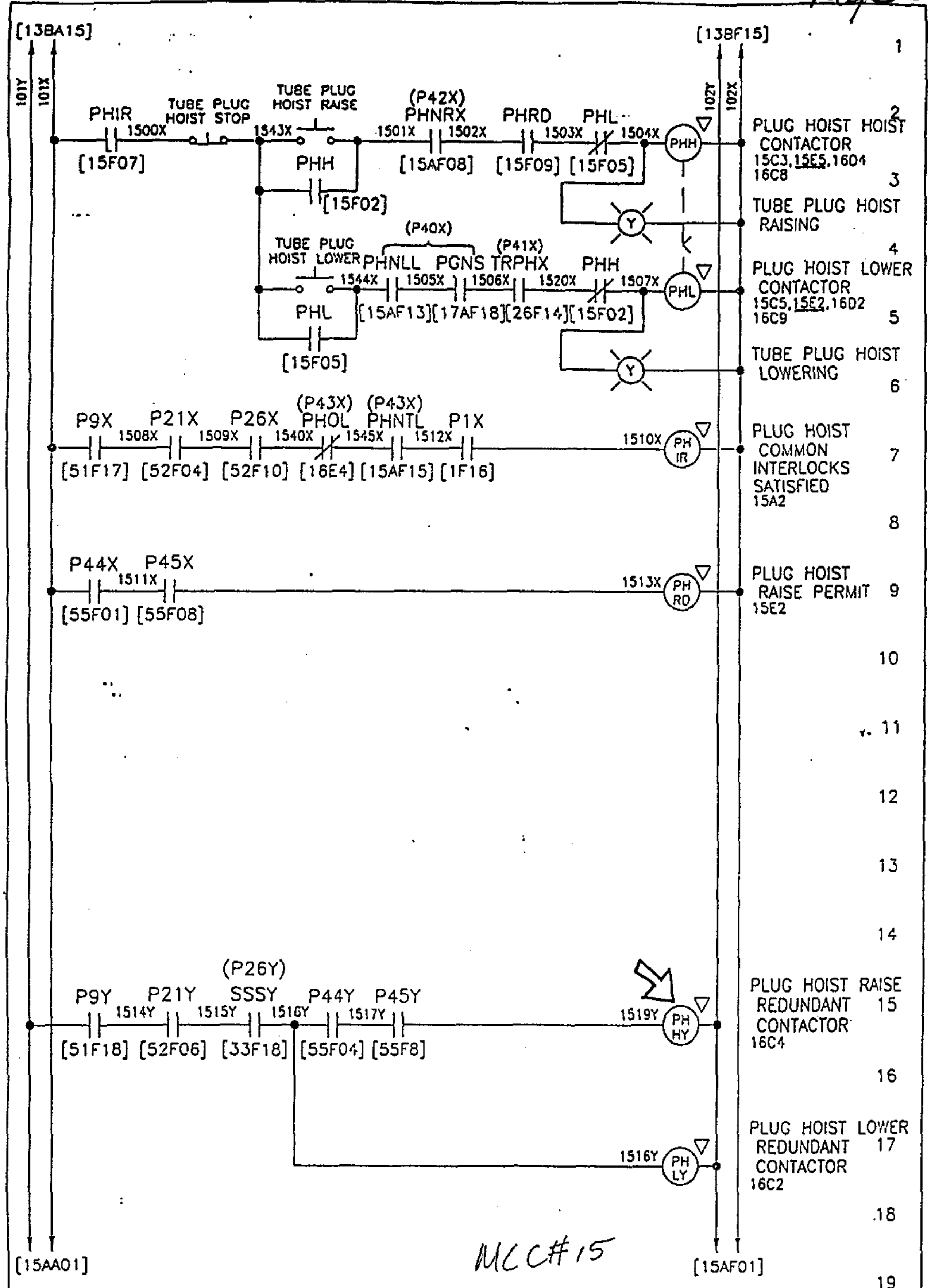
Design Authority (signature) Craig Swenson Date: 3/20/00

QA/QC (signature) Stephen Scott Moss Date: 3-22-2000

LIFTED LEAD LOG

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
EB-33056		1519Y	PHHY	A-1	JWE	3/17/00	SRC	3-17-00	JWE	3/17/00	SRC	3-17-00
		Black	RCS2A-6	A-1	JWE	3/17/00	SRC	3-17-00	JWE	3/17/00	SRC	3-17-00
		Grey	" "	A-2	JWE	3/17/00	SRC	3-17-00	JWE	3/17/00	SRC	3-17-00
		2) 102Y	PHHY	A-2	JWE	3/17/00	SRC	3-17-00	JWE	3/17/00	SRC	3-17-00
		2) PHX-11		L-1	JWE	3/17/00	SRC	3-17-00	JWE	3/17/00	SRC	3-17-00
		2) PHX-12		L-2	JWE	3/17/00	SRC	3-17-00	JWE	3/17/00	SRC	3-17-00
		2) PHX-13		L-3	JWE	3/17/00	SRC	3-17-00	JWE	3/17/00	SRC	3-17-00
		PHT-21		T-1	JWE	3/17/00	SRC	3-17-00	JWE	3/17/00	SRC	3-17-00
		PHT-22		T-2	JWE	3/17/00	SRC	3-17-00	JWE	3/17/00	SRC	3-17-00
		PHT-23		T-3	JWE	3/17/00	SRC	3-17-00	JWE	3/17/00	SRC	3-17-00

Remarks:



HANFORD DWG # H-2-828710 SHT 24 OF 97

A B C D E F G

REVISIONS

LTR	DESCRIPTION	DATE	BY	CHK	ENG	APPD	APPD
C	ADDED PHHY, PHLY & PHLY	6/16/97	JBR	TMM	TMM	JMH	
D	GENERAL REVISIONS	7/25/97	JCR	JMH	TMM	JMH	
E	CHANGE SWITCH TO PUSHBUTTONS	8/18/97	JRS	AH	TMM	JMH	LLA
F	ADDED WIRE #'S	9/4/97	JDR	AHH	TMM	JMH	CM
G	MOVE STOP PUSH BUTTON	10/25/97	JRS	TMM	TMM	JMH	CM
H	DE-INERTING & SIMPLIFICATION	3/9/98	CSO	SEO	CSO		
J	ADD P1X & CORRECT SPELLING	7/20/98	CSO	SEO	CSO		

DRWN	J B RUPP	
DSGN	T M MEADOWS	
CHK	T M MEADOWS	
APPD	J M HAYNICK	
APPD	L L ANDERSON	
APPD		
SCALE	N/A	
FIRST VIEW ON	F-2560	

EDERER INCORPORATED

PLUG HOIST CONTROL ELEMENTARY

DWG NO EB-33056 SHEET 15 OF 15A REV J

EB-33056 15

3TF43

3TF48

Ordering Information

- Select Contactor from table below.
- Complete Catalog Number from coil code table.
  Example: **3TF4010-0AK6**

Additional References

- Overload Relays see pages 361–363
- Accessories see pages 357–360.
- Replacement Parts see pages 912–913.
- Technical Data see pages 376–379.
- Electrical Life Curves see page 381.
- Dimensions see page 394.
- Wiring Diagrams see page 302.

Coil Voltage Codes

AC Voltage 60Hz	50Hz	Code
24	24	C2
120	110	K6
208	209	M2
277	220	U1
240	220	P6
480	380–415	V0
600	500	S0

Ampere Rating Enclosed		1 Phase HP Ratings		3 Phase HP Ratings				Auxiliary Contacts Type			
IEC AC-3	UL	115V	230V	200V	230V	460V	575V	NO	NC	Catalog No	Price $
9	20	½	1½	2	3	5	7½	1	0	3TF4010-0AT†	105.
12	20	1	2	3	3	7½	10	1	0	3TF4110-0AT†	135.
16	30	1	3	5	5	10	15	1	0	3TF4210-0AT†	150.
22	30	2	3	7½	7½	15	20	1	0	3TF4310-0AT†	159.
32	55	3	5	10	10	25	30	1	1	3TF4411-0AT†	180.
38	55	3	7½	10	15	25	30	1	1	3TF4511-0AT†	206.
Auxiliary Contacts may be added to 3TF40–3TF56 for maximum 4 NO and 4 NC①											
45	80	5	10	15	20	40	50	1	1	3TF4611-0AT†	276.
63	80	5	15	20	25	50	60	1	1	3TF4711-0AT†	348.
75	100	7½	15	25	30	60	75	1	1	3TF4811-0AT†	420.
85	105	—	—	30	40	75	100	1	1	3TF4911-0AT†	520.

3TF Contactors—Auxiliary Contact
Replace 6th (NO Aux. Contact) and 7th (NC Aux. Contact) digit in Catalog Number per chart. Example: 3TF4411-0AK6.

Contactors	Auxiliary Contacts NO 6th Digit	NC 7th Digit	Price Adder $
3TF40–3TF43	1	0	STD
	0	1	No Adder
	1	1	12.
	2	2	24.
3TF44–3TF45	1	1	STD
	2	2	24.
3TF46–3TF49	1	1	STD
	2	2	24.
	4②	4②	48.

①See Auxiliary Contact table for standard and optional Auxiliary Contact Configurations.

②Field assembled kit.

Technical Data

	NEMA Size		00		0		1	
Contactor	**Type**	**Units of Measure**	**3TF30/40 CRLOF30/40**	**3TF31/41 CRLOF31/41**	**3TF32/42 CRLOF32/42**	**3TF33/43 CRLOF33/43**	**3TF34/44 CRLOF34/44**	**3TF35/45 CRLOF35/45**
Mechanical life	make/break operations	Mil	15		15		10	
Insulation rating		V	690					
Ambient temperature range		°C	−25 to +55 in operation, −55 to +80 when stored					
Coil ratings (cold coil 1.0 × U_s)		Hz	50	60			50	60
AC operation	Inrush	VA	68	75			87	115
	p.f.		0.82	0.76			0.82	0.75
	Sealed	VA	10	9.4			13	13
	p.f.		0.29	0.29			0.27	0.27
DC operation	*Inrush = Sealed*	W	6.5				11.7	
Coil voltage range:	AC		0.85 to 1.1 × U_s				0.85 to 1.1 U_s	
	at DC 24V		0.8 to 1.2 × U_s				0.8 to 1.1 U_s	
Operating times [1] (Valid for 20% undervoltage to 10% overvoltage cold or warm coil)			(Values are applicable up to and including 20% undervoltage, 10% overvoltage as well as with the coil in cold state and operating temperature)					
AC operation	closing delay	ms	8–35		10–35		13–57	
	opening delay	ms	4–18		5–20		5–10	
DC operation	closing delay	ms	20–170		35–180		54–182	
	opening delay	ms	10–25		10–25		13–17	
Operating times at 1.0 × U_s [1]								
AC operation	*closing delay*	*ms*	10–15		10–25		13–32	
	opening delay	ms	4–18		5–20		5–10	
DC operation	closing delay	ms	30–70		40–80		58–107	
	opening delay	ms	12–20		10–25		13–17	
Resistance to shock (rectangular pulse)	AC	g/ms	7.7/5, 4.4/10		5.8/5, 3.4/10		6.2/5, 3.6/10	
Conductor sizes For contactors without overload relay								
main conductor; solid or stranded	main	AWG	(2) 18–12	(2) 18–12	(2) 14–10	(2) 14–10	(1) 14–3 or (2) 16–6	
auxiliary conductor; solid or stranded	aux	AWG	(2) 18–12	(2) 18–12	(2) 18–12	(2) 18–12	(2) 18–12	
Switching frequency in make/break operations per hour Contactors without overload relay								
	to AC-1	ops./h	1500		1500		1200	1200
	to AC-2	ops./h	1000		750		750	600
	to AC-3	ops./h	1000		750		750	600
	to AC-4	ops./h	250		250		250	200
Contactor with overload relay (avg. value)		1/h	15		15		15	15

Auxiliary contacts

UL and CSA ratings for auxiliary contacts

Auxiliary Contacts within 3TF30 and 3TF31 and 3TF40 through 3TF45	Rated voltage switching capacity continuous current 10 Amp (AC/DC)	AC 600V max NEMA A600		24V	120V	240V	480V	600V
		Make	A	60	60	30	15	12
		Break	A	6	6	3	1.5	1.2
		DC 600V max NEMA P600		24V	125V	250V	300V	600V
		Make	A	1.1	1.1	0.55	0.20	0.20
		Break	A	1.1	1.1	0.55	0.20	0.20
Auxiliary contact blocks for 3TF30 to 3TF35, Cat. 3TX40		AC 600V max NEMA A600						
		DC 600V max. NEMA Q600		24V	125V	200V	300V	600V
		Make	A	0.55	0.55	0.27	0.10	0.10
		Break	A	0.55	0.55	0.27	0.10	0.10

Load/Life Curves shown with 3TF contactor technical data page XXX

[1] The opening time delay is increased when the contactor coil is protected against voltage peaks (diode 6 to 9 times; diode combination 2 to 6 times; varistor ≈ 2 to 6 ms).

3TF4 and CRL0F4

Contactor	**Type**	**Unit of Measure**	**NEMA Size 2** **3TF46 CRL0F46**		**3TF47 CRL0F47**		**NEMA Size 3** **3TF48 CRL0F48**		**3TF49 CRL0F49**
Mechanical life	make/break operations	Mil	10		10		10		10
Insulation rating		V	1000		1000		1000		1000
Ambient temperature range		°C	*−25 to +55 in operation, −50 to +80 when stored*						
Coil ratings (cold coil, 1.0 × U_c)		Hz	50	60			50	60	
AC operation	Inrush	VA	183	185			345	360	
	p.f.		0.5	0.54			0.5	0.4	
	Sealed	VA	17	15			35	31	
	p.f.		0.29	0.29			0.23	0.24	
DC economy circuit	Inrush	W	400	—			420	—	
	Sealed	W	2.1	—			2.7	—	
DC solenoid system	*Closing = Closed*	W	15	—			—	—	
Coil voltage range	AC		0.85 to 1.1 × U_c						
Operating times (valid for 20% undervoltage to 10% overvoltage, cold or warm coil) Total break time = opening delay + arcing time									
AC operation	closing delay	ms	15–40				20–50		
	opening delay[1]	ms	5–25				5–30		
	arcing time	ms	10–15				10–15		
Operating times at 1.0 × U_s									
AC operation	closing delay	ms	17–30				22–35		
	opening delay[1]	ms	5–25				5–30		
Resistance to shock (rectangular pulse)		g/ms	11.2/5		6.6/10		6.6/5		4.8/10
Conductor sizes For contactors without overload relay									
main conductor: solid or stranded		AWG	max. 1/0				max. 1/0		
auxiliary conductor: solid or stranded		AWG	2 × (18 to 12)				2 × (18 to 12)		
Switching frequency in make/break operations per hour (1/h) Contactors without overload relay									
	duty AC-1	1/h	1000		1000		900		900
	duty AC-2	1/h	600		400		400		350
	duty AC-3	1/h	1200		1000		1000		850
	duty AC-4	*1/h*	*400*		*300*		*300*		*250*
Contactors with overload relay (average value)		1/h	15		15		15		15

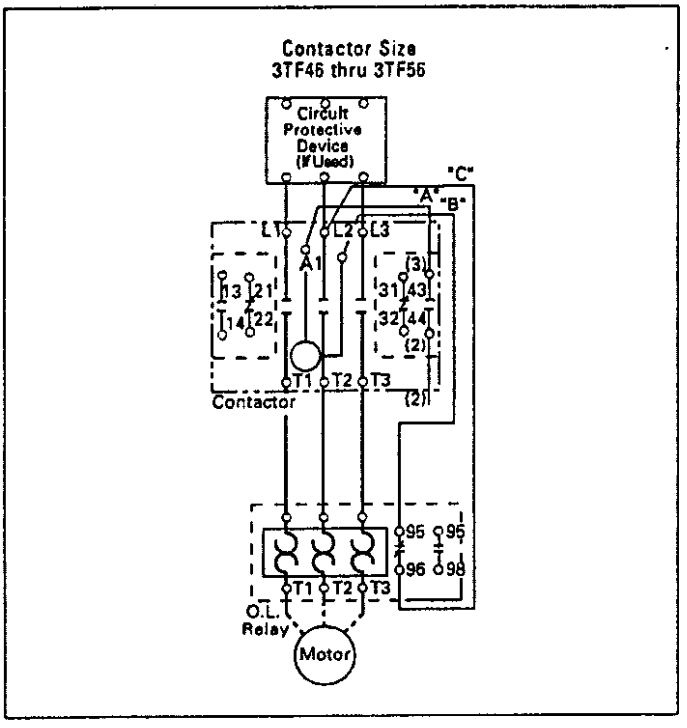
Auxiliary contacts

UL, CSA and CE ratings for auxiliary contacts

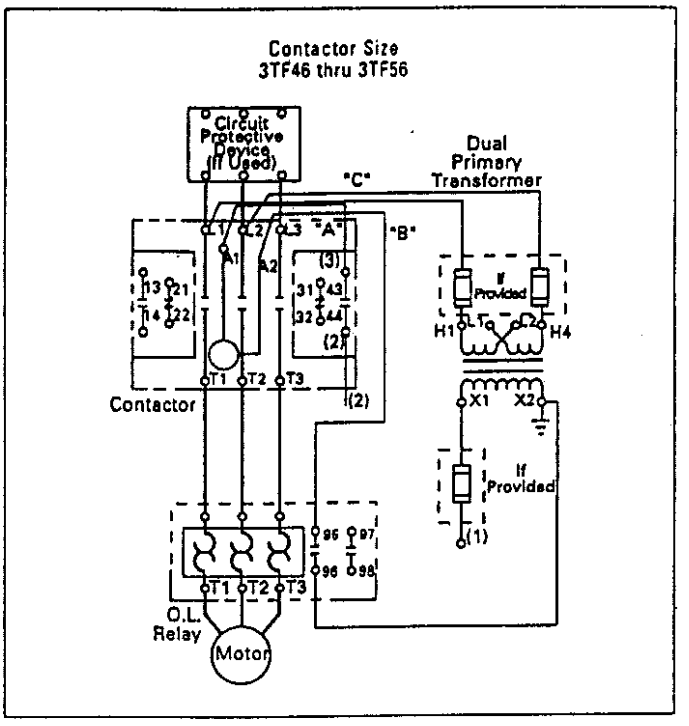
3TF40 thru 3TF57	Rated voltage switching capacity	AC 600V maximum NEMA A600		24V	120V	240V	480V	600V
		Make	A	60	60	30	15	12
		Break	A	6	6	3	1.5	1.2
	Continuous current 10A (AC/DC)	DC 600V maximum NEMA P600		24V	150V	250V	300V	600V
		Make	A	1.1	1.1	0.55	0.20	0.20
		Break	A	1.1	1.1	0.55	0.20	0.20

[1] The opening delay can increase if the coils have voltage spike protection. Diodes may only be attached to contactors up to 3TF44.

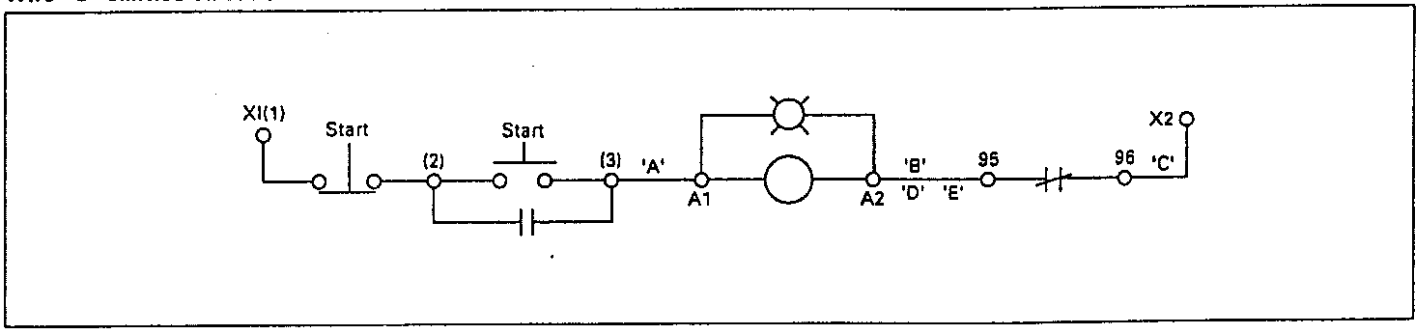
Without Control Power Transformer



With Control Power Transformer



Standard Pilot Control
Wire "C" omitted on starters with coils rated 120V or less.



Note: Starters with Contactor Sizes 3TF40 through 3TF44 are provided with the overload relays which mount directly to the contactor. These overload relays are provided with a contactor coil A2 repeat terminal. Wire "D" is integral with the overload relay. Jumper wire "E" is provided on the overload relay.

Dedication Test Plan – IST
Test Plan No.: CGI-SNF-D-MHM-048-TP-048B
Test Specimen: Siemens 3TF4222-0A..1, Eqmt. No.: PHLY ORIGINAL

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI. Eng	DA	QA Post Review*
						3/22/00 NO CHANGE

* QA Post Review of Individual Revisions is allowed

ORIGINAL

ORIGINAL

In-Situ Test Procedure

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) Larry Swenson Date: 3/16/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Crum	Belhaven	Michael Crum	MRC
Electrician	J W EBERHART	PCE	J W Eberhart	JWE
Electrician Quality Control	Stephen R. Cawley	PE	Stephen R. Cawley	SRC
Design Authority Representative	Larry W. Price	KWEST		
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Current Source capable of 10 amps
Megger Instrument capable of 500 VDC Test Voltage
Adjustable Voltage Power supply capable of 0 to 120 VAC minimum
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: HP 3457A I.D.: BAT 123 Calib. Due date: 07-29-00

Test Instrument type: HP 3457A I.D.: BAT 124 Calib. Due date: 07-30-00

Test Instrument type: AVO BM 802 I.D.: 6410-887 Calib. Due date: 02-09-01

Test Instrument type: PROTO 6106 I.D.: 0295/009 Calib. Due date: 01-13-01

Test Instrument type: _____ I.D.: _____ Calib. Due date: _____

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE:

For this In-Situ Test, certain leads must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of leads..

1.0 Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	PHLY	**PHLY**	Acc
Manufacturer:	SIEMENS	**Siemens**	Acc
Model:	3TF4222	**3TF4222**	Acc
Contact Configuration:	YES	**3 pole Main Contacts and 2 NO & 2 NC auxiliary contacts**	Acc
Serial No./Lot No./Date Code:	OK	**N/A**	Acc
Coil:	K6	**K6**	Acc

2.0 Perform the following testing steps:

2.1 Record: Date /Time of Test Beginning: 03-17-00 8:50a.m

2.1.1 Complete the Lifted Lead Log prior to lifting leads.

2.1.2 Lift all leads

2.2 Operation

2.2.1 Regulate voltage to the coil of the contactor and monitor the maximum pick-up voltage and minimum drop-out voltages.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Pick-up Voltage	86.462 VAC	**102 VAC maximum**	Acc
Drop-out Voltage	61.220 VAC	**36 AC minimum**	Acc

2.2.2 De-energize and remove test equipment.

2.3 Insulation Resistance Test

2.3.1 Setup the test equipment and contactor specimen for insulation resistance testing.

2.3.2 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the test specimen. Record data below.

Terminal to Terminal / Ground

Desc. Of Terminal	Desc. Of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
L1	T1	>100Gohm	> 10 Megohms	Acc
L2	T2	>100Gohm	> 10 Megohms	Acc
L3	T3	>100Gohm	> 10 Megohms	Acc
NO Aux 13	NO Aux 14	>100 Gohm	> 10 Megohms	Acc
NO Aux 43	NO Aux 44	>100Gohm	> 10 Megohms	Acc
L1	Ground	>100Gohm	> 10 Megohms	Acc
L2	Ground	>100Gohm	> 10 Megohms	Acc
L3	Ground	>100Gohm	> 10 Megohms	Acc
T1	Ground	>100Gohm	> 10 Megohms	Acc
T2	Ground	>100Gohm	> 10 Megohms	Acc
~~NC Aux~~ T3	Ground	>100Gohm	> 10 Megohms	Acc
NO Aux 13	Ground	>100Gohm	> 10 Megohms	Acc
NO Aux 14	Ground	>100 Gohm	> 10 Megohms	Acc
NO Aux 43	Ground	>100Gohm	> 10 Megohms	Acc
NO Aux 44	Ground	>100 Gohm	> 10 Megohms	Acc
NC Aux 21 or 22	Ground	>100 Gohm	> 10 Megohms	Acc
NC Aux 31 or 32	Ground	>100Gohm	> 10 Megohms	Acc
A1 or A2 (coil)	Ground	>100Gohm	> 10 Megohms	Acc

2.4 Contact Rating Test

2.4.1 Setup the test equipment and contactor specimen for contact rating testing.

2.4.2 Manually adjust the contactor or apply 120 VAC to the coil to close the normally open contacts

2.4.3 Apply a nominal 10 amps VAC, resistive, across closed main contacts of the test specimen

2.4.4 Apply a nominal 10 amps VAC, resistive, across the closed NO auxiliary contacts of the test specimen.

Caution: Do not change state of contacts while energized.

2.4.5 Record the following data.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Main Contacts L1 T1 Closed	.0464 VAC	**< 0.5 ± 10% Volts AC drop**	Acc
Main Contacts L2-T2 Closed	.0525 VAC	**< 0.5 ± 10% Volts AC drop**	Acc
Main Contacts L3-T3 Closed	.0393 VAC	**< 0.5 ± 10% Volts AC drop**	Acc
Auxiliary NO Contact 13-14 (closed)	.1356 VAC	**< 0.5 ± 10% Volts AC drop**	Acc
Auxiliary NO Contact 43-44 (closed)	.1307 VAC	**< 0.5 ± 10% Volts AC drop**	Acc

2.4.6 De-energize and remove test equipment.

2.4.7 Apply a nominal 10 amps VAC, resistive, across the normally closed auxiliary contacts of the test specimen.

2.4.8 Record the following data.

Caution: Do not change state of contacts while energized.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Auxiliary NC 21-22 Contacts	.0843 VAC	**< 0.5 ± 10% Volts AC drop**	Acc
Auxiliary NC 31-32 Contacts	.1221 VAC	**< 0.5 ± 10% Volts AC drop**	Acc

2.4.9 De-energize and remove the test equipment.

2.5 Terminate the test.

2.5.1 Reland the lifted leads and verify reland in accordance with the Lifted Lead Log.

2.5.2 Retorque the terminals to 12 in-pounds.

2.5.3 Record: Date /Time of Test End: 03-17-00 9:30 a.m.

3.0 References

3.1 Elementary Wiring Drawings: EB-33056 Sheet 15

3.2 Y-Channel Main Power Panel Wiring Diagram: ED-33069 Sheet 1

Dedication Test Plan – IST	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-048-TP-048B	
Test Specimen: Siemens 3TF4222-0A..1, Eqmt. No.: PHLY	Page 6 of 7

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Acceptance Criteria has been met
Michael Cram
03-17-00

Notes:

Certified InstrumentationTechnician (signature) Michael Cram Date: 03-17-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

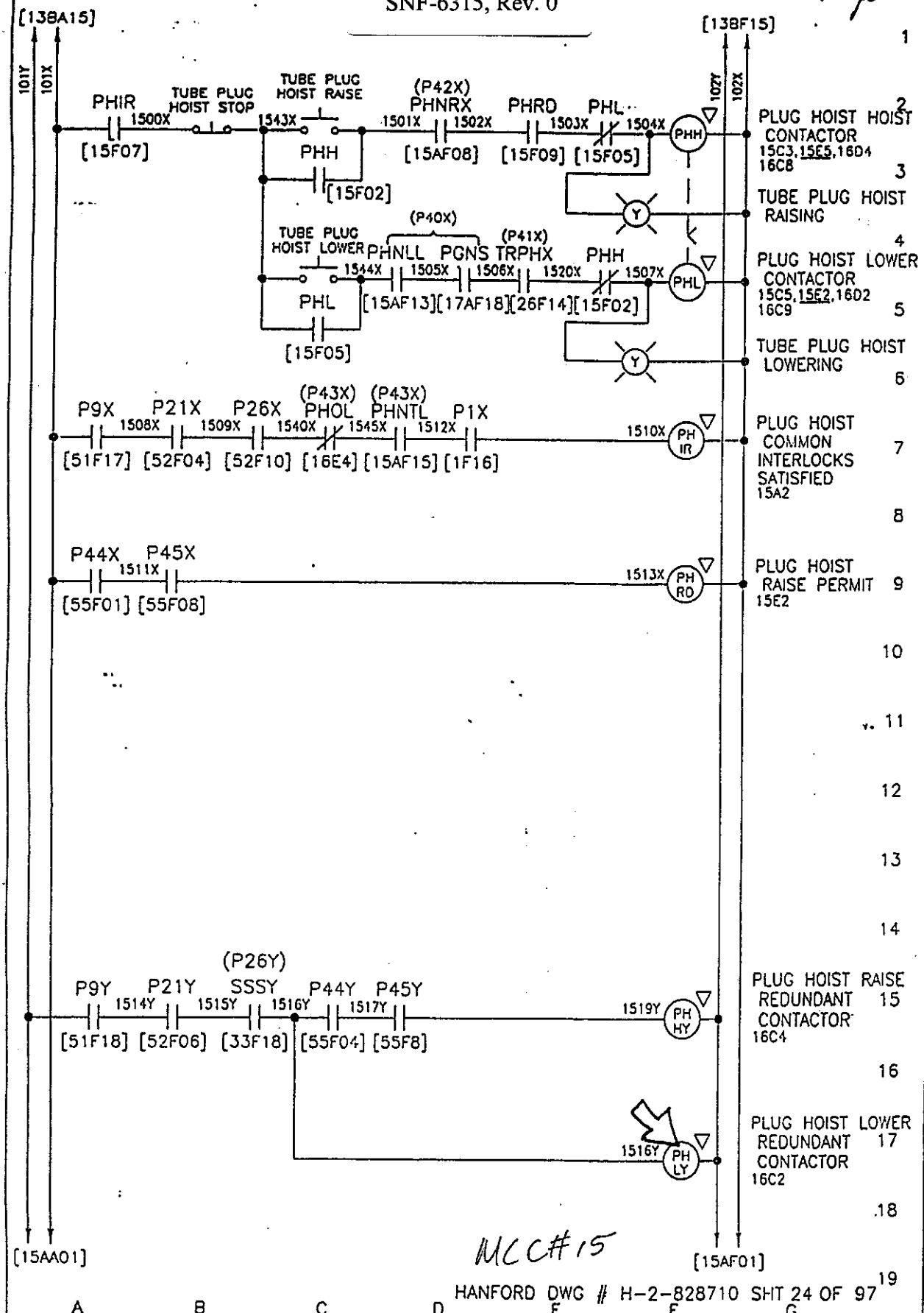
Design Authority (signature) Craig Swenson Date: 3/20/00

QA/QC (signature) Stephen Scott Mosh Date: 3-22-2000

LIFTED LEAD LOG

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
EB-3305C		1516Y	PHLY	A-1	JWE	3/17/00	SRC	3-17-00	JWE	3/17/00	SRC	3-17-00
		Black	RES2A-6	A-1	JWE	3/17/00	SRC	3-17-00	JWE	3/17/00	SRC	3-17-00
		Gray	" "	A-2	JWE	3/17/00	SRC	3-17-00	JWE	3/17/00	SRC	3-17-00
		2) 102Y	PHLY	A-2	JWE	3/17/00	SRC	3-17-00	JWE	3/17/00	SRC	3-17-00
		PHX-11		L-1	JWE	3/17/00	SRC	3-17-00	JWE	3/17/00	SRC	3-17-00
		PHX-12		L-2	JWE	3/17/00	SRC	3-17-00	JWE	3/17/00	SRC	3-17-00
		PHX-13		L-3	JWE	3/17/00	SRC	3-17-00	JWE	3/17/00	SRC	3-17-00
		PHT-11		T-1	JWE	3/17/00	SRC	3-17-00	JWE	3/17/00	SRC	3-17-00
		PHT-12		T-2	JWE	3/17/00	SRC	3-17-00	JWE	3/17/00	SRC	3-17-00
		PHT-13		T-3	JWE	3/17/00	SRC	3-17-00	JWE	3/17/00	SRC	3-17-00

Remarks:

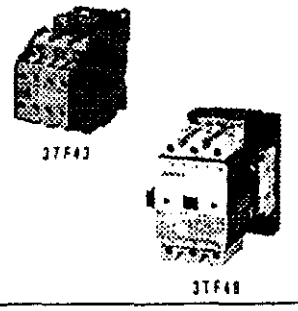


LTR	DESCRIPTION	DATE	BY	CHK	ENG	APPD	APPD
C	ADDED PHHY, PHLY & PHLY	6/16/97	JBR	TMM	TMM	JMH	
D	GENERAL REVISIONS	7/25/97	JCR	JMH	TMM	JMH	
E	CHANGE SWITCH TO PUSHBUTTONS	8/13/97	JRS	AH	TMM	JMH	LLA
F	ADDED WIRE #'S	9/4/97	JBR	JMH	TMM	JMH	EM
G	MOVE STOP PUSH BUTTON	10/23/97	JRS	TMM	TMM	JMH	EM
H	DE-INVERTING & SIMPLIFICATION	3/9/98	CSD	SED	CSD		
J	ADD P1X & CORRECT SPELLING	7/20/98	CSD	SED	CSD		

DRAWN	J B RUPP	4/21/95
CHECK	T M MEADOWS	4/21/95
ENG	T M MEADOWS	4/21/95
APPD	J M MASHECK	4/21/95
APPD	L L ANDERSON	4/21/97
APPD		
SCALE	N/A	
FIRST USED ON	F-256G	

EDERER INCORPORATED
PLUG HOIST CONTROL ELEMENTARY
DWG. NO. EB-33056
SHT 15
REV J

3TF4 3-Pole with AC Coil



Ordering Information

- Select Contactor from table below.
- Complete Catalog Number from coil code table.
  Example: **3TF4010-0AK6**

Additional References

- Overload Relays see pages 361–363
- Accessories see pages 357–360.
- Replacement Parts see pages 912–913.
- Technical Data see pages 376–379.
- Electrical Life Curves see page 381.
- Dimensions see page 394.
- Wiring Diagrams see page 302.

Coil Voltage Codes

AC Voltage 60Hz	50Hz	Code
24	24	C2
120	110	K6
208	208	M2
277	220	U1
240	220	P6
480	380–415	V0
600	500	S0

Ampere Rating Enclosed		1 Phase HP Ratings		3 Phase HP Ratings				Auxiliary Contacts Type			
IEC AC-3	UL	115V	230V	200V	230V	460V	575V	NO	NC	Catalog No	Price $
9	20	½	1½	2	3	5	7½	1	0	3TF4010-0AT†	105.
12	20	1	2	3	3	7½	10	1	0	3TF4110-0AT†	135.
16	30	1	3	5	5	10	15	1	0	3TF4210-0AT†	150.
22	30	2	3	7½	7½	15	20	1	0	3TF4310-0AT†	159.
32	55	3	5	10	10	25	30	1	1	3TF4411-0AT†	180.
38	55	3	7½	10	15	25	30	1	1	3TF4511-0AT†	206.
Auxiliary Contacts may be added to 3TF46–3TF56 for maximum 4 NO and 4 NC①											
45	80	5	10	15	20	40	50	1	1	3TF4611-0AT†	276.
63	80	5	15	20	25	50	60	1	1	3TF4711-0AT†	348.
75	100	7½	15	25	30	60	75	1	1	3TF4811-0AT†	420.
85	105	—	—	30	40	75	100	1	1	3TF4911-0AT†	520.

3TF Contactors—Auxiliary Contact
Replace 6th (NO Aux. Contact) and 7th (NC Aux. Contact) digit in Catalog Number per chart. Example: 3TF4411-0AK6.

Contactors	Auxiliary Contacts NO 6th Digit	NC 7th Digit	Price Adder $
3TF40–3TF43	1	0	STD
	0	1	No Adder
	1	1	12.
	2	2	24.
3TF44–3TF45	1	1	STD
	2	2	24.
3TF46–3TF48	1	1	STD
	2	2	24.
	4②	4②	48.

①See Auxiliary Contact table for standard and optional Auxiliary Contact Configurations.
②Field assembled kit.

Technical Data

	NEMA Size		00		0		1	
Contactor	**Type**	**Units of Measure**	**3TF30/40 CRLOF30/40**	**3TF31/41 CRLOF31/41**	**3TF32/42 CRLOF32/42**	**3TF33/43 CRLOF33/43**	**3TF34/44 CRLOF34/44**	**3TF35/45 CRLOF35/45**
Mechanical life	make/break operations	Mil	15		15		10	
Insulation rating		V	690					
Ambient temperature range		°C	−25 to +55 in operation, −55 to +80 when stored					
Coil ratings								
(cold coil 1.0 × U_s)		Hz	50	60			50	60
AC operation	Inrush	VA	68	75			87	115
	p.f.		0.82	0.76			0.82	0.75
	Sealed	VA	10	9.4			13	13
	p.f.		0.29	0.29			0.27	0.27
DC operation	Inrush = Sealed	W	6.5				11.7	
Coil voltage range:	AC		*0.85 to 1.1 × U_s*				0.85 to 1.1 U_s	
	at DC 24V		0.8 to 1.2 × U_s				0.8 to 1.1 U_s	
Operating times[1] (Valid for 20% undervoltage to 10% overvoltage cold or warm coil)			(Values are applicable up to and including 20% undervoltage, 10% overvoltage as well as with the coil in cold state and operating temperature)					
AC operation	closing delay	ms	8–35		10–35		13–57	
	opening delay	ms	4–18		5–20		5–10	
DC operation	closing delay	ms	20–170		35–180		54–182	
	opening delay	ms	*10–25*		*10–25*		*13–17*	
Operating times at 1.0 × U_s[2]								
AC operation	closing delay	ms	10–15		10–25		13–32	
	opening delay	ms	4–18		5–20		5–10	
DC operation	closing delay	ms	30–70		40–80		58–107	
	opening delay	ms	12–20		10–25		13–17	
Resistance to shock (rectangular pulse)	AC	g/ms	7.7/5, 4.4/10		5.8/5, 3.4/10		6.2/5, 3.6/10	
Conductor sizes								
For contactors without overload relay								
main conductor; solid or stranded	main	AWG	(2) 18–12	(2) 18–12	(2) 14–10	(2) 14–10	(1) 14–3 or (2) 16–6	
auxiliary conductor; solid or stranded	aux	AWG	(2) 18–12	(2) 18–12	(2) 18–12	(2) 18–12	(2) 18–12	
Switching frequency in make/break operations per hour								
Contactors without overload relay								
	to AC-1	cps./h	1500		1500		1200	1200
	to AC-2	cps./h	1000		750		*750*	*600*
	to AC-3	cps./h	1000		750		750	600
	to AC-4	cps./h	250		250		250	200
Contactor with overload relay (avg. value)		1/h	15		15		15	15
Auxiliary contacts								
Ⓤ, ℛ and ratings Ⓒ for auxiliary contacts								

Auxiliary Contacts within 3TF30 and 3TF31 and 3TF40 through 3TF45	Rated voltage switching capacity continuous current 10 Amp (AC/DC)	AC 600V max NEMA A600		24V	120V	240V	480V	600V
		Make	A	60	60	30	15	12
		Break	A	6	6	3	1.5	1.2
		DC 600V max NEMA P600		24V	125V	250V	300V	600V
		Make	A	1.1	1.1	0.55	0.20	0.20
		Break	A	1.1	1.1	0.55	0.20	0.20
Auxiliary contact blocks for 3TF30 to 3TF35, Cat. 3TX40		AC 600V max NEMA A600						
		DC 600V max. NEMA Q600		24V	125V	200V	300V	600V
		Make	A	0.55	0.55	0.27	0.10	0.10
		Break	A	0.55	0.55	*0.27*	*0.10*	0.10
Load/Life Curves shown with 3TF contactor technical data page XXX								

[1] The opening time delay is increased when the contactor coil is protected against voltage peaks (diode 6 to 9 times; diode combination 2 to 6 times; varistor + 2 to 6 ms).

World Series Contactors

3TF4 and CRLOF4

Contactor	Type	Unit of Measure	3TF46 CRLOF46	3TF47 CRLOF47	3TF48 CRLOF48	3TF49 CRLOF49
NEMA Size			2		3	
Mechanical life	*make/break* operations	Mil	10	10	10	10
Insulation rating		V	1000	1000	1000	1000
Ambient temperature range		°C	*−25 to +55 in operation, −50 to +80 when stored*			
Coil ratings (cold coil, 1.0 × U_c)		Hz	50 60		50 60	
AC operation	Inrush	VA	183 185		345 360	
	p.f.		0.5 0.54		0.5 0.4	
	Sealed	VA	17 15		35 31	
	p.f.		*0.29 0.29*		*0.23 0.24*	
DC economy circuit	Inrush	W	400 —		420 —	
	Sealed	W	2.1 —		2.7 —	
DC solenoid system	*Closing = Closed*	W	15 —		— —	
Coil voltage range	AC		0.85 to 1.1 × U_c			
Operating times *(valid for 20% undervoltage to 10% overvoltage,* cold or warm coil) Total break time = opening delay + arcing time						
AC operation	*closing delay*	*ms*	15–40		20–50	
	opening delay[1]	ms	5–25		5–30	
	arcing time	ms	10–15		10–15	
Operating times at 1.0 × U_c						
AC operation	closing delay	ms	17–30		22–35	
	opening delay[1]	ms	5–25		5–30	
Resistance to shock *(rectangular pulse)*		*g/ms*	11.2/5	6.6/10	8.6/5	4.8/10
Conductor sizes For contactors without overload relay						
main conductor: solid or stranded		AWG	*max. 1/0*		*max. 1/0*	
auxiliary conductor: solid or stranded		AWG	2 × (18 to 12)		2 × (18 to 12)	
Switching frequency in make/break operations *per hour (1/h)* Contactors without overload relay						
	duty AC-1	1/h	1000	1000	900	900
	duty AC-2	1/h	600	400	400	350
	duty AC-3	1/h	1200	1000	1000	850
	duty AC-4	1/h	400	300	300	250
Contactors with overload relay (average value)		1/h	15	15	15	15

Auxiliary contacts

UL, CSA and CE ratings for auxiliary contacts

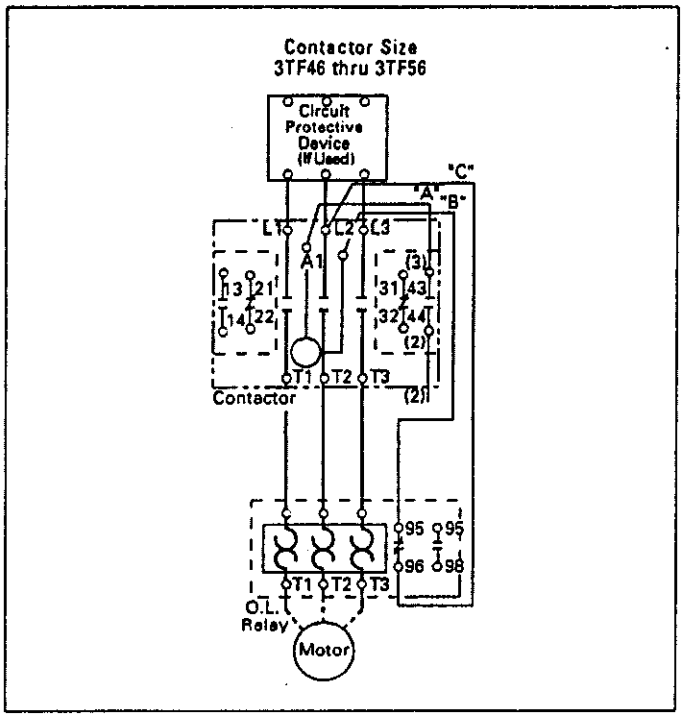
3TF40 thru 3TF57	Rated voltage *switching* capacity	AC 600V maximum *NEMA A600*		24V	120V	240V	480V	600V
		Make	A	60	60	30	15	12
		Break	A	6	6	3	1.5	1.2
	Continuous current 10A (AC/DC)	DC 600V maximum NEMA P600		24V	150V	250V	300V	600V
		Make	A	1.1	1.1	0.55	0.20	0.20
		Break	A	*1.1*	*1.1*	*0.55*	*0.20*	*0.20*

[1] The opening delay can increase if the coils have voltage spike protection. Diodes may only be attached to contactors up to 3TF44

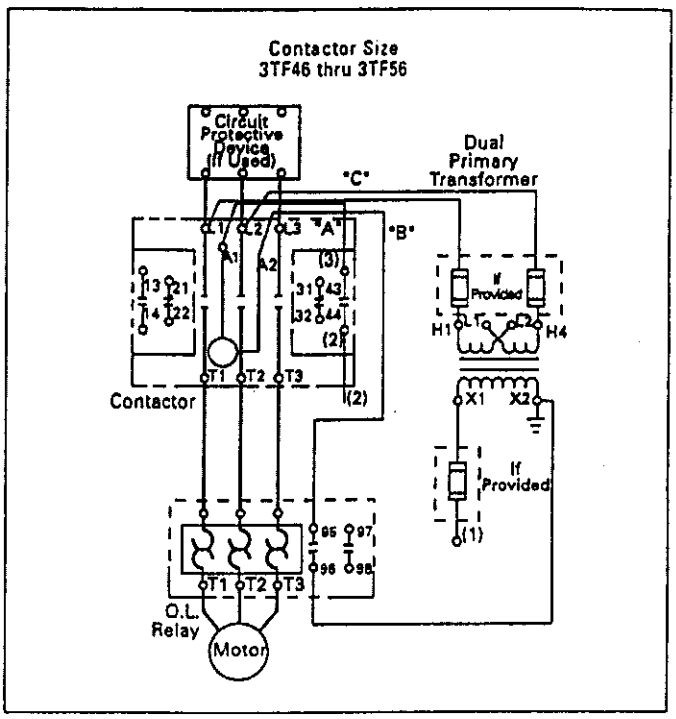
4

Non-Reversing Starters — Type 3TF

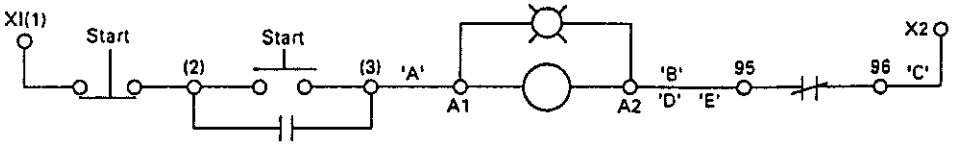
Without Control Power Transformer



With Control Power Transformer



Standard Pilot Control
Wire "C" omitted on starters with coils rated 120V or less.



Note: Starters with Contactor Sizes 3TF40 through 3TF44 are provided with the overload relays which mount directly to the contactor. These overload relays are provided with a contactor coil A2 repeat terminal. Wire "D" is integral with the overload relay. Jumper wire "E" is provided on the overload relay.

Dedication Test Plan – IST
Test Plan No.: CGI-SNF-D-MHM-048-TP-048C
Test Specimen: Siemens 3TF4222-0A..1, Eqmt. No.: SSLY

ORIGINAL

Rev. No. 0

Page 1 of 7

In-Situ Test Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI. Eng	DA	QA Post Review*

* QA Post Review of Individual Revisions is allowed

ORIGINAL

Dedication Test Plan – IST	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-048-TP-048C	
Test Specimen: Siemens 3TF4222-0A..1, Eqmt. No.: SSLY	Page 2 of 7

ORIGINAL

In-Situ Test Procedure

Test Procedure Approval (Obtain prior to testing):

This procedure tests the critical characteristics of the test specimen as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature): [signature] Date: 3/16/00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Certified Instrumentation Technician	Michael Cram	Belhaven	[signature]	MRC
Electrician	J W EBERHART	PCE	[signature]	JWE
Electrician Quality Control	Stephen R Cowley	PCE	[signature]	SRC
Design Authority Representative	LARRY W. PEIRCE	RWEST	[signature]	LWP
Start-Up Representative (As Required)	N/A	N/A	N/A	N/A
Construction Management (As Required)	N/A	N/A	N/A	N/A

RECOMMENDED EQUIPMENT:

Current Source capable of 10 amps
Megger Instrument capable of 500 VDC Test Voltage
Adjustable Voltage Power supply capable of 0 to 120 VAC minimum
MT&E: Multi-Meter, or individual meters for voltage, amperage, and resistance
Note: The collective uncertainty of the calibration standards used for M&TE shall not exceed 25% of the acceptable tolerance for each characteristic being calibrated unless otherwise specified.

Record test instrument(s) type, serial number, and calibration due date:

Test Instrument type: HP 3457A I.D.: BAT 123 Calib. Due date: 07-29-00

Test Instrument type: HP 3457A I.D.: BAT 124 Calib. Due date: 07-30-00

Test Instrument type: AVO BM80/2 I.D.: 6410-889 Calib. Due date: 02-09-01

Test Instrument type: PROTO 6106 I.D.: 0296/009 Calib. Due date: 01-13-01

Test Instrument type: ______ I.D.: ______ Calib. Due date: ______

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment. They shall be trained in precautions to prevent electrical shock. The equipment shall be appropriately grounded.

TEST PROCEDURE:

For this In-Situ Test, certain leads must be removed before testing begins, the Lifted Lead Log on the last page(s) of this procedure will be used for verification of lifting and landing of leads..

1.0 Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	SSLY	**SSLY**	Acc
Manufacturer:	SIEMENS	**Siemens**	Acc
Model:	3TF4222	**3TF4222**	Acc
Contact Configuration:	YES	**3 pole Main Contacts and 2 NO & 2 NC auxiliary contacts**	Acc
Serial No./Lot No./Date Code:	OK	**N/A**	Acc
Coil:	K6	**K6**	Acc

2.0 Perform the following testing steps:

2.1 Record: Date /Time of Test Beginning: 03-17-00 10:40 a.m.

2.1.1 Complete the Lifted Lead Log prior to lifting leads.

2.1.2 Lift all leads

2.2 Operation

2.2.1 Regulate voltage to the coil of the contactor and monitor the maximum pick-up voltage and minimum drop-out voltages.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Pick-up Voltage	94.51	**102 VAC maximum**	Acc.
Drop-out Voltage	43.20	**36 AC minimum**	Acc

2.2.2 De-energize and remove test equipment.

2.3 Insulation Resistance Test

1 Setup the test equipment and contactor specimen for insulation resistance testing.

2.3.2 Apply a nominal 500 VDC via Megger device between each non-continuity terminals; terminal to terminal and terminal to ground of the test specimen. Record data below.

Terminal to Terminal / Ground

Desc. Of Terminal	Desc. Of Terminal/Ground	Record Data	Acceptance Criteria	Comments/Deviations
L1	T1	>100Gohm	> 10 Megohms	
L2	T2	>100Gohm	> 10 Megohms	
L3	T3	>100Gohm	> 10 Megohms	
13	14	>100Gohm	> 10 Megohms	
43	44	>100Gohm	> 10 Megohms	
L1	Ground	>100Gohm	> 10 Megohms	
L2	Ground	>100Gohm	> 10 Megohms	
L3	Ground	>100Gohm	> 10 Megohms	
T1	Ground	>100Gohm	> 10 Megohms	
T2	Ground	>100Gohm	> 10 Megohms	
T3	Ground	>100 Gohm	> 10 Megohms	
13	Ground	>100Gohm	> 10 Megohms	
14	Ground	>100Gohm	> 10 Megohms	
43	Ground	>100Gohm	> 10 Megohms	
44	Ground	>100Gohm	> 10 Megohms	
21 or 22	Ground	>100Gohm	> 10 Megohms	
31 or 32	Ground	>100Gohm	> 10 Megohms	
A1 or A2 (coil)	Ground	>100 Gohm	> 10 Megaohms	

JW Pies JW Pies

2.4 Contact Rating Test

2.4.1 Setup the test equipment and contactor specimen for contact rating testing.

2.4.2 Manually adjust the contactor or apply 120 VAC to the coil to close the normally open contacts

2.4.3 Apply a nominal 10 amps VAC, resistive, across closed main contacts of the test specimen

2.4.4 Apply a nominal 10 amps VAC, resistive, across the closed NO auxiliary contacts of the test specimen.

Caution: Do not change state of contacts while energized.

2.4.5 Record the following data.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Main Contacts L1 T1 Closed	.0441 vac	< 0.5 ± 10% Volts AC drop	Acc
Main Contacts L2-T2 Closed	.0499 vac	< 0.5 ± 10% Volts AC drop	Acc
Main Contacts L3-T3 Closed	.1265 vac	< 0.5 ± 10% Volts AC drop	Acc
Auxiliary NO Contact 13-14 (closed)	.0854 vac	< 0.5 ± 10% Volts AC drop	Acc
Auxiliary NO Contact 43-44 (closed)	.0849 vac	< 0.5 ± 10% Volts AC drop	Acc

2.4.6 De-energize and remove test equipment.

2.4.7 Apply a nominal 10 amps VAC, resistive, across the normally closed auxiliary contacts of the test specimen.

2.4.8 Record the following data.

Caution: Do not change state of contacts while energized.

Description	Record Data	Acceptance Criteria	Comments/Deviations
Auxiliary NC 21-22 Contacts	.0995 vac	< 0.5 ± 10% Volts AC drop	Acc
Auxiliary NC 31-32 Contacts	.0964 vac	< 0.5 ± 10% Volts AC drop	Acc

2.4.9 De-energize and remove the test equipment.

2.5 Terminate the test.

2.5.1 Reland the lifted leads and verify reland in accordance with the Lifted Lead Log.

2.5.2 Retorque the terminals to 12 in-pounds.

2.5.3 Record: Date /Time of Test End: 03-17-00 11:02 a.m

3.0 References

3.1 Elementary Wiring Drawings: EB-33056 Sheet 32

3.2 Y-Channel Main Power Panel Wiring Diagram: ED-33069 Sheet 1

Dedication Test Plan – IST	Rev. No. 0
Test Plan No.: CGI-SNF-D-MHM-048-TP-048C	
Test Specimen: Siemens 3TF4222-0A..1, Eqmt. No.: SSLY	Page 6 of 7

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

Acceptance Criteria has been met.
Michael Cram
03-17-00

Notes:

Certified Instrumentation Technician (signature) Michael Cram Date: 03-17-00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

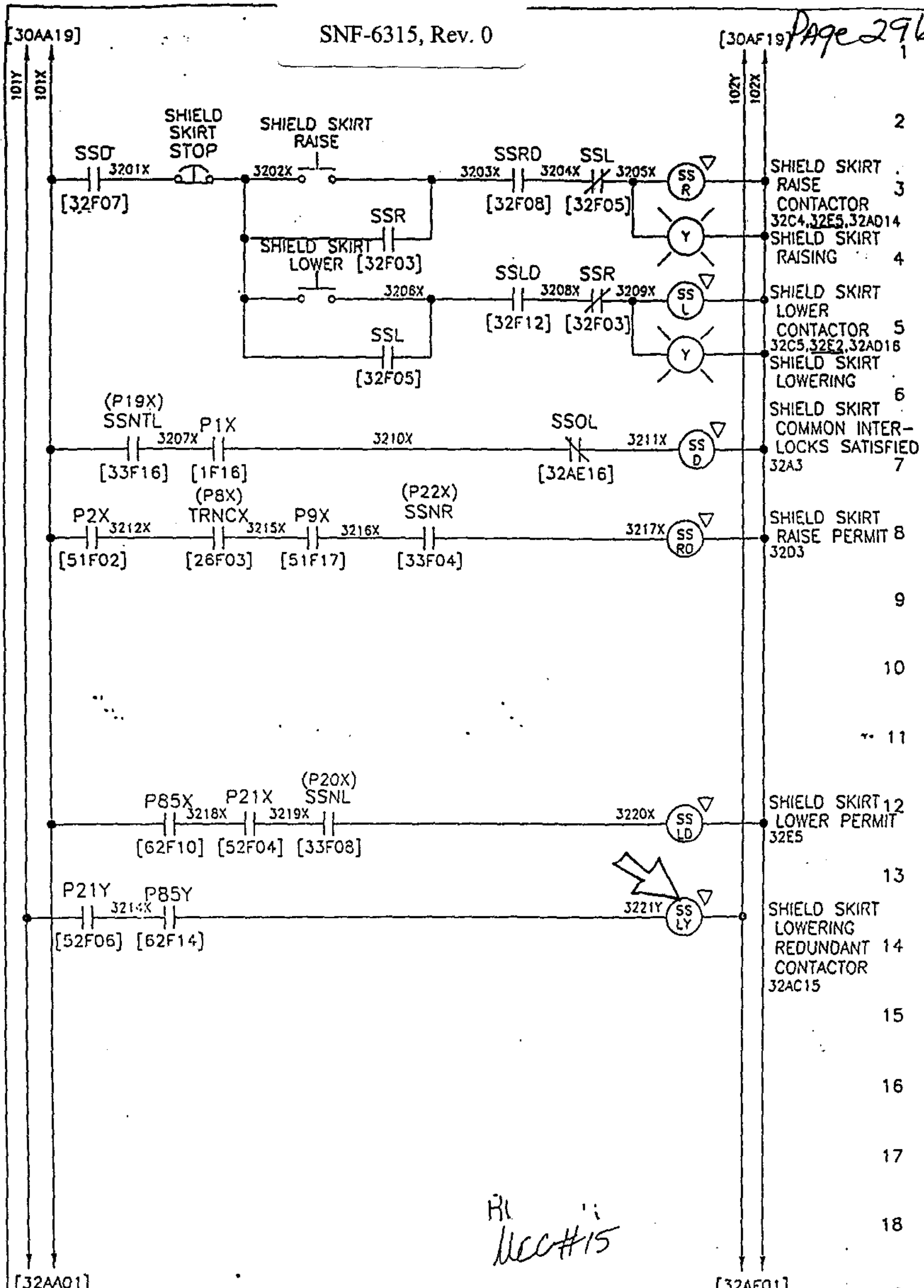
Design Authority (signature) Craig Swenson Date: 3/29/00

QA/QC (signature) Stephen Scott Mohr Date: 3-27-2000

LIFTED LEAD LOG

Drawing #	Sheet #	Wire #	Device #	Terminal #	Lifted By	Date	Lift Verified By	Date	Relanded By	Date	Reland Verified By	Date
FB-33056		3221Y	SSLY	A-1	JWE	3/17/00	SRC	3-17-00	JWE	3/17/00	SRC	3-17-00
		Black	RCS2A-6	A-1	JWE	3/17/00	SRC	3-17-00	JWE	3/17/00	SRC	3-17-00
		Grey	" "	A-2	JWE	3/17/00	SRC	3-17-00	JWE	3/17/00	SRC	3-17-00
		2) 102Y	SSLY	A-2	JWE	3/17/00	SRC	3-17-00	JWE	3/17/00	SRC	3-17-00
		SSX-11	"	L-1	JWE	3/17/00	SRC	3-17-00	JWE	3/17/00	SRC	3-17-00
		SSX-12	"	L-2	JWE	3/17/00	SRC	3-17-00	JWE	3/17/00	SRC	3-17-00
		SSX-13	"	L-3	JWE	3/17/00	SRC	3-17-00	JWE	3/17/00	SRC	3-17-00
		SSL-11	"	T-1	JWE	3/17/00	SRC	3-17-00	JWE	3/17/00	SRC	3-17-00
		SSL-12	"	T-2	JWE	3/17/00	SRC	3-17-00	JWE	3/17/00	SRC	3-17-00
		SSL-13	"	T-3	JWE	3/17/00	SRC	3-17-00	JWE	3/17/00	SRC	3-17-00

Remarks:



HANFORD DWG # H-2-828710 SHT 53 OF 97

REVISIONS

LTR	DESCRIPTION	DATE	BY	CHK	ENG	APPD	APPD
D	GENERAL REVISION	7/29/97	JBR	JMH	TMM	JMH	
E	CHANGE JOB #	8/20/97	JBR	JMH	TMM	JMH	LLA
F	MODIFIED NOMENCLATURE	9/15/97	JBR	JMH	TMM	JMH	EM
G	ADD LAMP LABLES	10/3/97	JRS	JMH	TMM	JMH	LA
H	MODIFY STOP PUSHBUTTON	10/25/97	JRS	TMM	TMM	JMH	EM
J	DE-INERTING & SIMPLIFICATION	3/9/98	CSB	SCO	CSB		
K	GENERAL REVISION	7/20/98	CSB	SCO	CSB		

DRAWN	J H RUPP	4/15/96
CHECKED	T M MEADOWS	4/29/96
ENG	T M MEADOWS	4/22/96
APPD	J M HAYNICK	4/29/96
APPD	L L ANDERSON	8/1/97
APPD		

SCALE N/A
F-2500

EDERER INCORPORATED

SHIELD SKIRT CONTROL ELEMENTARY

DWG NO. EB-33056 SHEET 32 REV K

EB-33056 32

3TF4 3-Pole with AC Coil

3TF43

3TF48

Ordering Information

- Select Contactor from table below.
- Complete Catalog Number from coil code table.
  *Example: **3TF4010-0AK6***

Additional References

- Overload Relays see pages 361–363
- Accessories see pages 357–360.
- Replacement Parts see pages 912–913.
- Technical Data see pages 376–379.
- Electrical Life Curves see page 381
- Dimensions see page 394
- Wiring Diagrams see page 302.

Coil Voltage Codes

AC Voltage 60Hz	50Hz	Code
24	24	C2
120	110	K6
208	208	M2
277	220	U1
240	220	P6
480	380–415	V0
600	500	S0

Ampere Rating Enclosed		1 Phase HP Ratings		3 Phase HP Ratings				Auxiliary Contacts Type		Catalog No	Price $
IEC AC-3	UL	115V	230V	200V	230V	460V	575V	NO	NC		
9	20	½	1½	2	3	5	7½	1	0	3TF4010-0A††	105.
12	20	1	2	3	3	7½	10	1	0	3TF4110-0A††	135.
16	30	1	3	5	5	10	15	1	0	3TF4210-0A††	150.
22	30	2	3	7½	7½	15	20	1	0	3TF4310-0A††	159.
32	55	3	5	10	10	25	30	1	1	3TF4411-0A††	180.
38	55	3	7½	10	15	25	30	1	1	3TF4511-0A††	206.
Auxiliary Contacts may be added to 3TF46–3TF56 for maximum 4 NO and 4 NC①											
45	80	5	10	15	20	40	50	1	1	3TF4611-0A††	276.
63	80	5	15	20	25	50	60	1	1	3TF4711-0A††	348.
75	100	7½	15	25	30	60	75	1	1	3TF4811-0A††	420.
85	125	—	—	30	40	75	100	1	1	3TF4911-0A††	520.

3TF Contactors—Auxiliary Contact
Replace 6th (NO Aux. Contact) and 7th (NC Aux. Contact) digit in Catalog Number per chart. Example: 3TF4411-0AK6.

Contactors	Auxiliary Contacts NO 6th Digit	NC 7th Digit	Price Adder $
3TF40–3TF43	1	0	STD
	0	1	No Adder
	1	1	12.
	2	2	24.
3TF44–3TF45	1	1	STD
	2	2	24.
3TF46–3TF49	1	1	STD
	2	2	24.
	4②	4②	48.

①See Auxiliary Contact table for standard and optional Auxiliary Contact Configurations.

②Field assembled kit.

Technical Data

NEMA Size			00		0		1	
Contactor	**Type**	**Units of Measure**	**3TF30/40 CRLOF30/40**	**3TF31/41 CRLOF31/41**	**3TF32/42 CRLOF32/42**	**3TF33/43 CRLOF33/43**	**3TF34/44 CRLOF34/44**	**3TF35/45 CRLOF35/45**
Mechanical life	make/break operations	Mil	15		15		10	
Insulation rating		V	*690*					
Ambient temperature range		°C	−25 to +55 in operation, −55 to +80 when stored					
Coil ratings (cold coil 1.0 × U_s)		Hz	50	60			50	60
AC operation	Inrush	VA	68	75			87	115
	p.f.		0.82	0.76			0.82	0.75
	Sealed	VA	10	9.4			13	13
	p.f.		0.29	0.29			0.27	0.27
DC operation	Inrush = Sealed	W	6.5				11.7	
Coil voltage range:	AC		0.85 to 1.1 × U_s				0.85 to 1.1 U_s	
	at DC 24V		0.8 to 1.2 × U_s				0.8 to 1.1 U_s	
Operating times[2] (Valid for 20% undervoltage to 10% overvoltage cold or warm coil)			(Values are applicable up to and including 20% undervoltage, 10% overvoltage as well as with the coil in cold state and operating temperature)					
AC operation	closing delay	ms	8–35		10–35		13–57	
	opening delay	ms	4–18		5–20		5–10	
DC operation	closing delay	ms	20–170		35–180		54–182	
	opening delay	ms	10–25		10–25		13–17	
Operating times at 1.0 × U_s[1]								
AC operation	*closing delay*	*ms*	10–15		10–25		13–32	
	opening delay	ms	4–18		5–20		5–10	
DC operation	closing delay	ms	30–70		40–80		58–107	
	opening delay	ms	12–20		10–25		13–17	
Resistance to shock (rectangular pulse)	AC	g/ms	7.7/5; 4.4/10		5.8/5; 3.4/10		6.2/5; 3.6/10	
Conductor sizes For contactors without overload relay								
main conductor, solid or stranded	*main*	AWG	(2) 18–12	(2) 18–12	(2) 14–10	(2) 14–10	(1) 14–3 or (2) 16–6	
auxiliary conductor, solid or stranded	aux	AWG	(2) 18–12	(2) 18–12	(2) 18–12	(2) 18–12	(2) 18–12	
Switching frequency in make/break operations per hour Contactors without overload relay								
	to AC-1	ops./h	1500		1500		1200	1200
	to AC-2	ops./h	1000		750		750	600
	to AC-3	ops./h	1000		750		750	600
	to AC-4	ops./h	250		250		250	200
Contactor with overload relay (avg. value)		1/h	15		15		15	15

Auxiliary contacts

UL, CSA and ratings CSA for auxiliary contacts

Auxiliary Contacts within 3TF30 and 3TF31 and 3TF40 through 3TF45	Rated voltage switching capacity continuous current: 10 Amp (AC/DC)	AC 600V max NEMA A600		24V	120V	240V	480V	600V
		Make	A	60	60	30	15	12
		Break	A	6	6	3	1.5	1.2
		DC 600V max NEMA P600		24V	125V	250V	300V	600V
		Make	A	1.1	1.1	0.55	0.20	0.20
		Break	A	1.1	1.1	0.55	0.20	0.20
Auxiliary contact blocks for 3TF30 to 3TF35, Cat. 3TX40		AC 600V max NEMA A600						
		DC 600V max NEMA Q600		24V	125V	200V	300V	600V
		Make	A	0.55	0.55	0.27	0.10	0.10
		Break	A	0.55	0.55	0.27	0.10	0.10

Load/Life Curves shown with 3TF contactor technical data page XXX

[1] The opening time delay is increased when the contactor coil is protected against voltage peaks (diode 6 to 9 times; diode combination 2 to 6 times; varistor + 2 to 6 ms).

3TF4 and CRLOF4

NEMA Size			2		3	
Contactor	**Type**	**Unit of Measure**	**3TF46 CRLOF46**	**3TF47 CRLOF47**	**3TF48 CRLOF48**	**3TF49 CRLOF49**
Mechanical life	make/break operations	Mil	10	10	10	10
Insulation rating		V	1000	1000	1000	1000
Ambient temperature range		°C	−25 to +55 in operation, −50 to +80 when stored			
Coil ratings (cold coil, 1.0 × U_c)		Hz	50 60		50 60	
AC operation	Inrush	VA	183 185		345 360	
	p.f		0.5 0.54		0.5 0.4	
	Sealed	VA	17 15		35 31	
	p.f		0.29 0.29		0.23 0.24	
DC economy circuit	Inrush	W	400 —		420 —	
	Sealed	W	2.1 —		2.7 —	
DC solenoid system	Closing = Closed	W	15 —		— —	
Coil voltage range	AC		0.85 to 1.1 × U_s			
Operating times (valid for 20% undervoltage to 10% overvoltage, cold or warm coil) Total break time = opening delay + arcing time						
AC operation	closing delay	ms	15–40		20–50	
	opening delay[1]	ms	5–25		5–30	
	arcing time	ms	10–15		10–15	
Operating times at 1.0 × U_s						
AC operation	closing delay	ms	17–30		22–35	
	opening delay[1]	ms	5–25		5–30	
Resistance to shock (rectangular pulse)		g/ms	11.2/5	6.6/10	8.6/5	4.8/10
Conductor sizes For contactors without overload relay						
main conductor: solid or stranded		AWG	max. 1/0		max. 1/0	
auxiliary conductor: solid or stranded		AWG	2 × (18 to 12)		2 × (18 to 12)	
Switching frequency in make/break operations per hour (1/h) Contactors without overload relay						
	duty AC-1	1/h	1000	1000	900	900
	duty AC-2	1/h	600	400	400	350
	duty AC-3	1/h	1200	1000	1000	850
	duty AC-4	1/h	400	300	300	250
Contactors with overload relay (average value)		1/h	15	15	15	15

Auxiliary contacts								
Ⓢ, UL and CE ratings for auxiliary contacts								
3TF40 thru 3TF57	Rated voltage switching capacity	AC 600V maximum		24V	120V	240V	480V	600V
		NEMA A600						
		Make	A	60	60	30	15	12
		Break	A	6	6	3	1.5	1.2
	Continuous current 10A (AC/DC)	DC 600V maximum		24V	150V	250V	300V	600V
		NEMA P600						
		Make	A	1.1	1.1	0.55	0.20	0.20
		Break	A	1.1	1.1	0.55	0.20	0.20

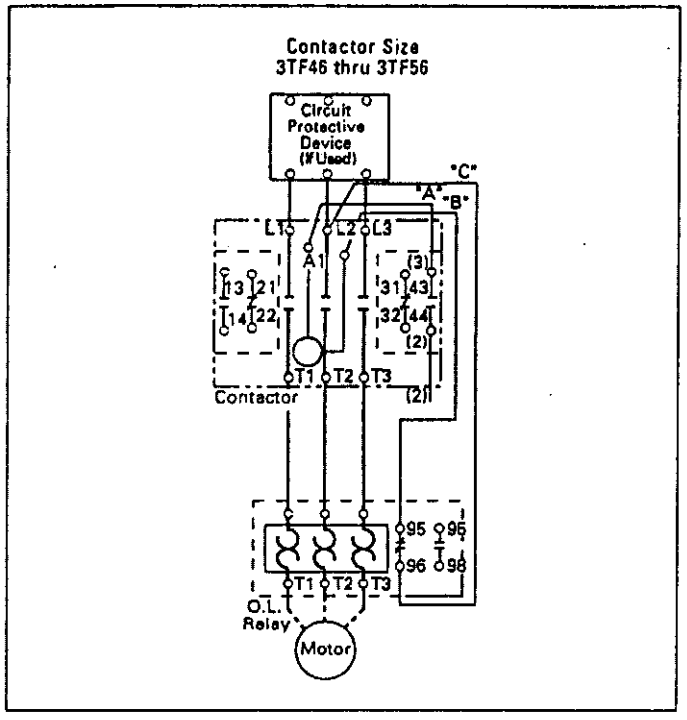
[1] The opening delay can increase if the coils have voltage spike protection. Diodes may only be attached to contactors up to 3TF44.

4

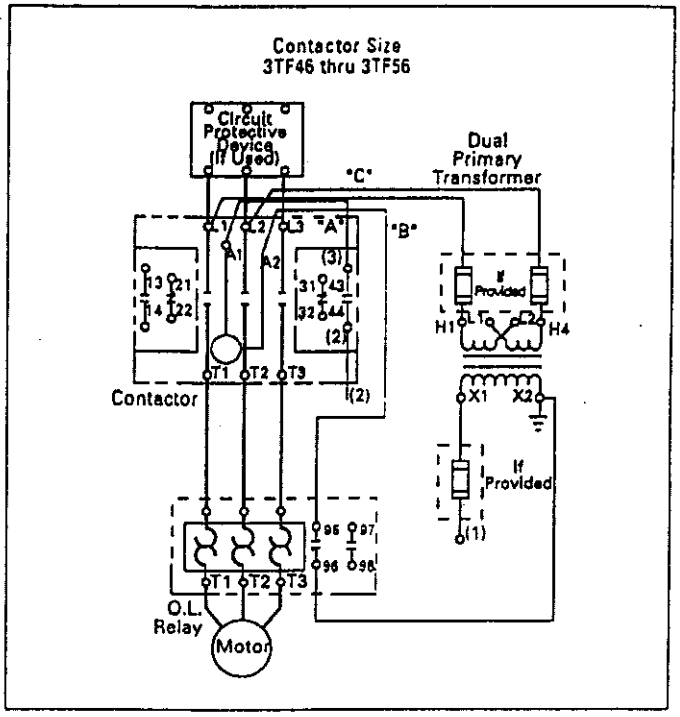
IEC Control

Non-Reversing Starters — Type 3TF

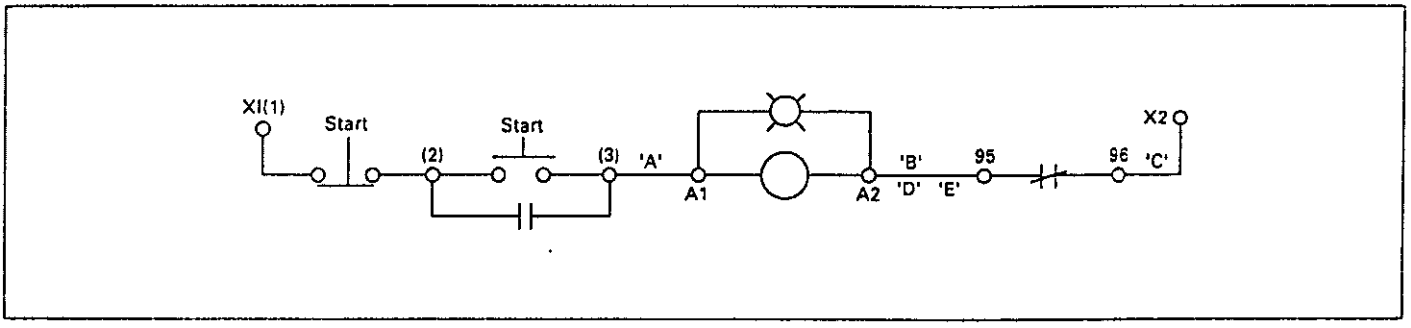
Without Control Power Transformer



With Control Power Transformer



Standard Pilot Control
Wire "C" omitted on starters with coils rated 120V or less.



Note: Starters with Contactor Sizes 3TF40 through 3TF44 are provided with the overload relays which mount directly to the contactor. These overload relays are provided with a contactor coil A2 repeat terminal. Wire "D" is integral with the overload relay. Jumper wire "E" is provided on the overload relay.

In-Situ Inspection Procedure Revision Log

Item	Basis for Change	Para/Page Affected	Desc. Of Change (Add/Change/Delete)	Approvals/Date		
				CGI. Eng	DA	QA Post Review*

* QA Post Review of Individual Revisions is allowed

ORIGINAL

In-Situ Inspection Procedure

Inspection Procedure Approval (Obtain prior to inspection):

This procedure documents the visual verification of the identification critical characteristics of the remaining specimen which were in-situ tested on a sampling basis as identified in the Commercial Grade Dedication. Any changes to this procedure must be made with approval from the Design Authority or his representative.

Design Authority (signature) ERK Craig Dawson Date: 4-6-00

TEST PERSONNEL REQUIRED:

Title	Print Name	Company	Signature	Initials
Electrician	N/A	N/A	N/A	N/A
Electrician Quality Control	N/A	N/A	N/A	N/A
Design Authority Representative	Larry W. Price	XWEST		

SAFETY INSTRUCTIONS: PERSONNEL SAFETY – personnel shall exercise caution around energized electrical equipment.

INSPECTION PROCEDURE:

1.0 Record the following Test Specimen identification information:

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	SSRY	**SSRY**	
Manufacturer:	SIEMENS	**Siemens**	
Model:	3TF4222-0A1	**3TF42**	
Contact Configuration:	3PMC/2 NO & NC AUX Cont	**3 pole Main Contacts and 2 NO & 2 NC auxiliary contacts**	22E
Serial No./Lot No./Date Code:	N/A	**N/A**	
Coil:	K6	**K6**	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	BLPDY	**BLPDY**	
Manufacturer:	SIEMENS	**Siemens**	

Dedication Test Plan – IST **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-048-TP-048D
Test Specimen: Siemens 3TF4222-0A..1, Eqmt. No.:SSRY, BLPDY, TLPDY **Page 3 of 4**

Model:	3TF4222 0A1	3TF42	
Contact Configuration:	3PMC/2NO & NC AUX CONTS	3 pole Main Contacts and 2 NO & 2 NC auxiliary contacts	22E
Serial No./Lot No./Date Code:	N/A	N/A	
Coil:	K6	K6	

Description	Record Data	Acceptance Criteria	Comments/Deviations
Equipment ID No.:	TLPDY	TLPDY	
Manufacturer:	SIEMENS	Siemens	
Model:	3TF4222 0A1	3TF42	22E
Contact Configuration:	3P MC/2 NO & NC AUX CONT	3 pole Main Contacts and 2 NO & 2 NC auxiliary contacts	
Serial No./Lot No./Date Code:	N/A	N/A	
Coil:	K6	K6	

2.0 Record: Date /Time of Test Beginning: 4/7/00 820AM

2.1 Record: Date /Time of Test End: 4/7/00 826 AM

3.0 References

3.1 Elementary Wiring Drawings: EB-33056 Sheet 28, 30, 32A

Summary of Results (e.g.: Acceptance Criteria has been met, Anomalies, Deviations, etc.):

ACCEPTANCE CRITERIA MET.

Dedication Test Plan – IST **Rev. No. 0**
Test Plan No.: CGI-SNF-D-MHM-048-TP-048D
Test Specimen: Siemens 3TF4222-0A..1, Eqmt. No.:SSRY, BLPDY, TLPDY **Page 4 of 4**

Notes: N/A

Design Authority Representative (signature) _____ Date: 4/7/00

Completed Test Evaluation Approval:
Inspection and test results are documented herein and their conformance with acceptance criteria has been evaluated and the test requirements have been satisfied.

Design Authority (signature) _____ Date: 4/7/00

QA/QC (signature) Stephen Scott Mok Date: 4-7-2000

3TF4 3-Pole with AC Coil

3TF43

3TF48

Ordering Information

- Select Contactor from table below.
- Complete Catalog Number from coil code table.
  Example: **3TF4010-0AK6**

Additional References

- Overload Relays see pages 361–363.
- Accessories see pages 357–360.
- Replacement Parts see pages 912–913.
- Technical Data see pages 378–379.
- Electrical Life Curves see page 381.
- Dimensions see page 394.
- Wiring Diagrams see page 302.

Coil Voltage Codes

AC Voltage 60Hz	50Hz	Code
24	24	C2
120	110	K6
208	208	M2
277	220	U1
240	220	P6
480	380–415	V0
600	500	S0

Ampere Rating Enclosed		1 Phase HP Ratings		3 Phase HP Ratings				Auxiliary Contacts Type		Catalog No	Price $
IEC AC-3	UL	115V	230V	200V	230V	460V	575V	NO	NC		
9	20	½	1½	2	3	5	7½	1	0	3TF4010-0A††	105.
12	20	1	2	3	3	7½	10	1	0	3TF4110-0A††	135.
16	30	1	3	5	5	10	15	1	0	3TF4210-0A††	150.
22	30	2	3	7½	7½	15	20	1	0	3TF4310-0A††	159.
32	55	3	5	10	10	25	30	1	1	3TF4411-0A††	180.
38	55	3	7½	10	15	25	30	1	1	3TF4511-0A††	206.
Auxiliary Contacts may be added to 3TF46–3TF56 for maximum 4 NO and 4 NC①											
45	80	5	10	15	20	40	50	1	1	3TF4611-0A††	276.
63	80	5	15	20	25	50	60	1	1	3TF4711-0A††	348.
75	100	7½	15	25	30	60	75	1	1	3TF4811-0A††	428.
85	105	—	—	30	40	75	100	1	1	3TF4911-0A††	520.

3TF Contactors—Auxiliary Contact
Replace 6th (NO Aux. Contact) and 7th (NC Aux. Contact) digit in Catalog Number per chart. Example: 3TF4411-0AK6.

Contactors	Auxiliary Contacts NO 6th Digit	NC 7th Digit	Price Adder $
3TF40–3TF43	1	0	STD
	0	1	No Adder
	1	1	12.
	2	2	24.
3TF44–3TF45	1	1	STD
	2	2	24.
3TF46–3TF49	1	1	STD
	2	2	24.
	4①	4①	48.

①See Auxiliary Contact table for standard and optional Auxiliary Contact Configurations.

②Field assembled kit.