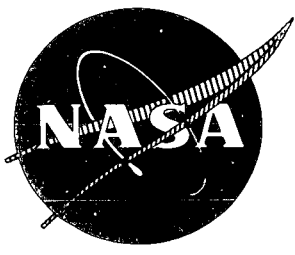


10/1/72 (P) 10/2/72

NASA CR-121010



EVALUATION OF CIRCUMFERENTIAL AIRFLOW UNIFORMITY ENTERING COMBUSTORS FROM COMPRESSORS

VOLUME II - DATA SUPPLEMENT

November 1972

by J. H. Shadowen and W. J. Egan, Jr.

PRATT & WHITNEY AIRCRAFT
FLORIDA RESEARCH AND DEVELOPMENT CENTER

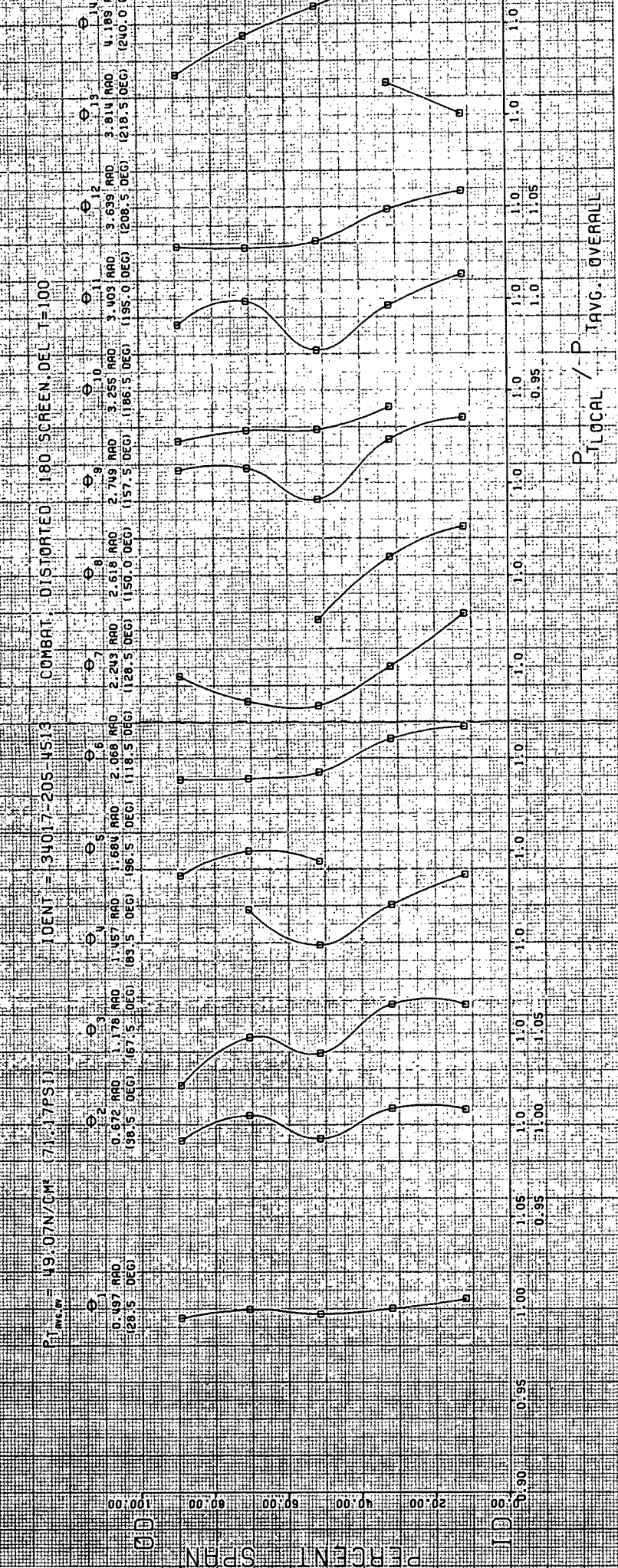


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(NASA-CR-121010)	EVALUATION OF	N73-14277
	CIRCUMFERENTIAL AIRFLOW UNIFORMITY	
	ENTERING COMBUSTORS FROM COMPRESSORS.	
J.H. Shadowen, et al (Pratt and Whitney Aircraft)	Nov. 1972 103 p CSDL 20D	Unclas 47738
		G3/12

F100/F401 RADIAL TOTAL PRESSURE PROFILE AT VARIOUS COMPRESSOR DISCHARGE CIRCUMFERENTIAL LOCATIONS



F.100/F401 RADIAL TOTAL TEMPERATURE PROFILE AT VARIOUS COMPRESSOR DISCHARGE CIRCUMFERENTIAL LOCATIONS

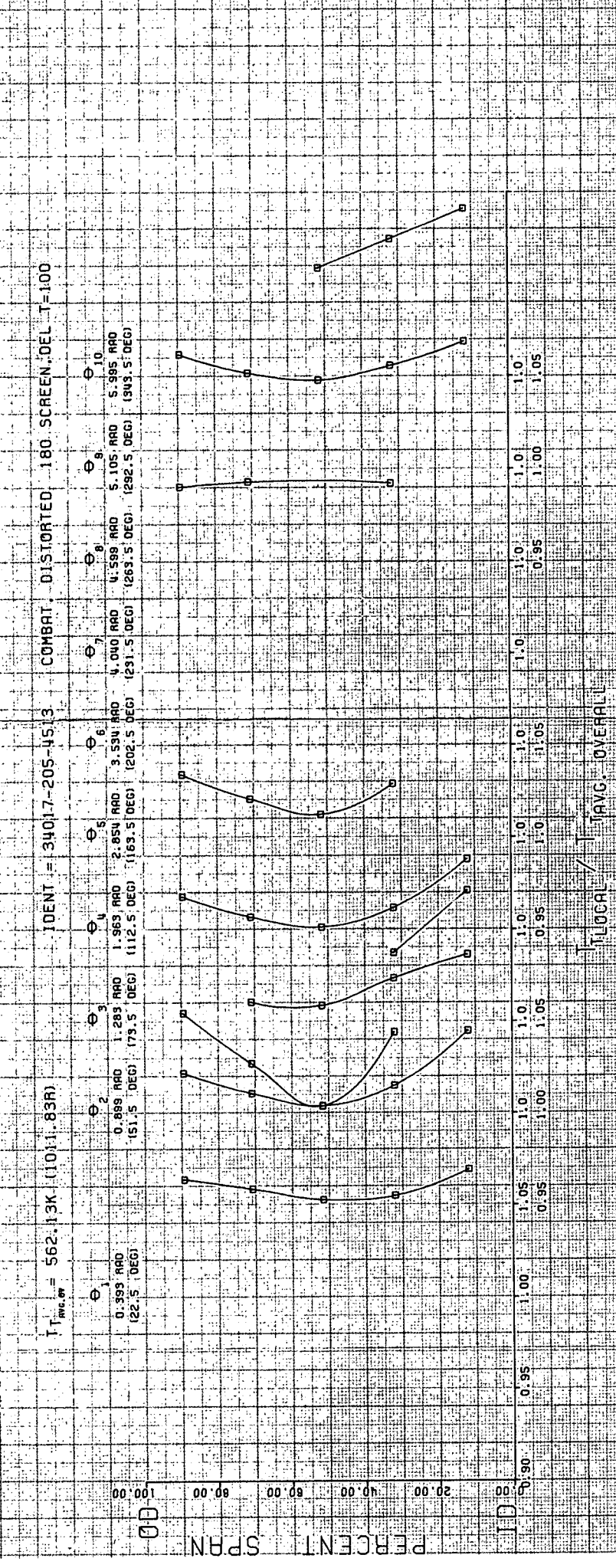


Figure 70.

DF 91933

83

FOLDOUT FRAME 1

DF 91933

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FOLDOUT FRAME 2

DF 91933

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FOLDOUT FRAME 1

DF 91933

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FOLDOUT FRAME 2

DF 91933

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FOLDOUT FRAME 1

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FOLDOUT FRAME 1

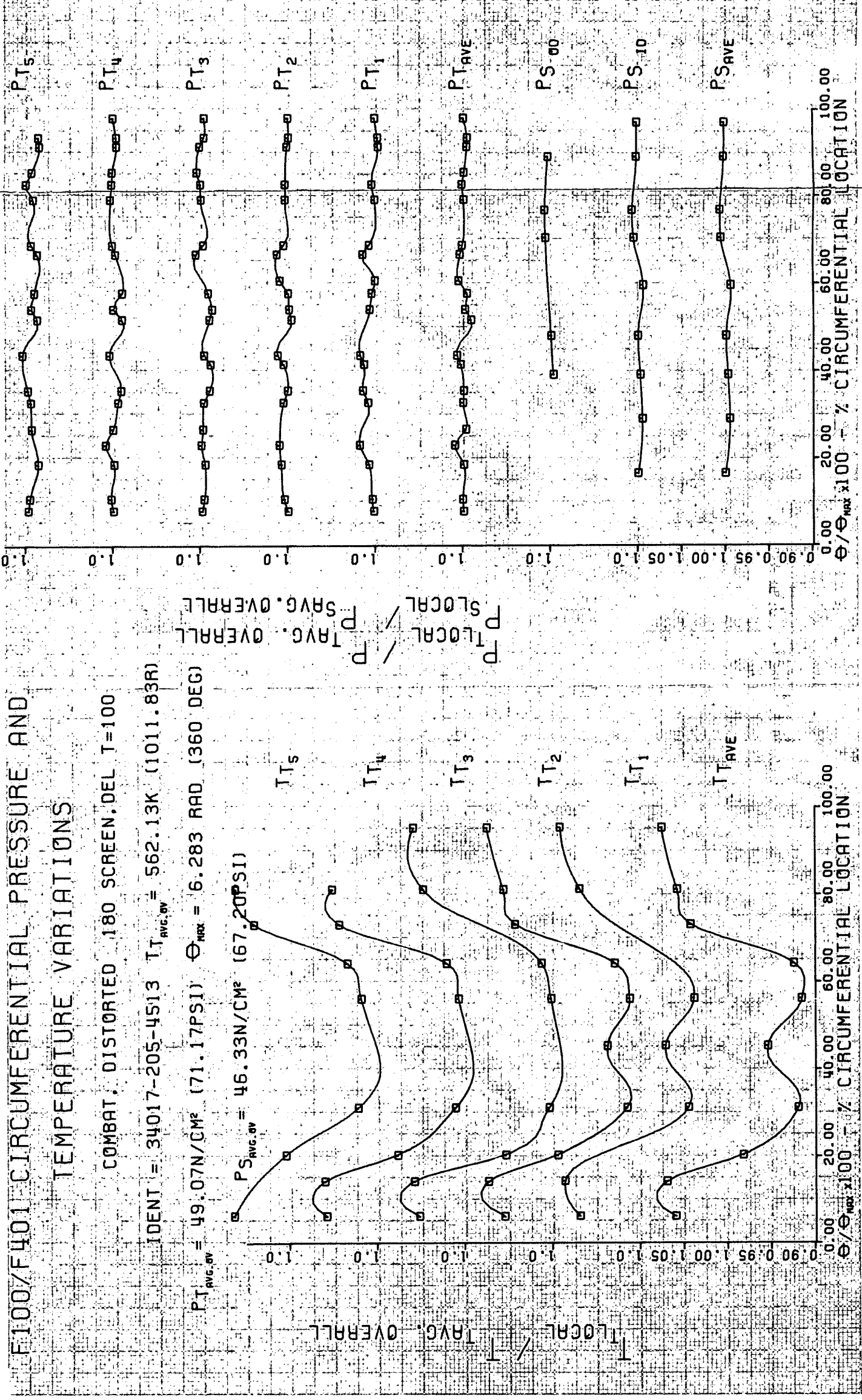


Figure 80.

DF 91999

FOLDOUT FRAME 2

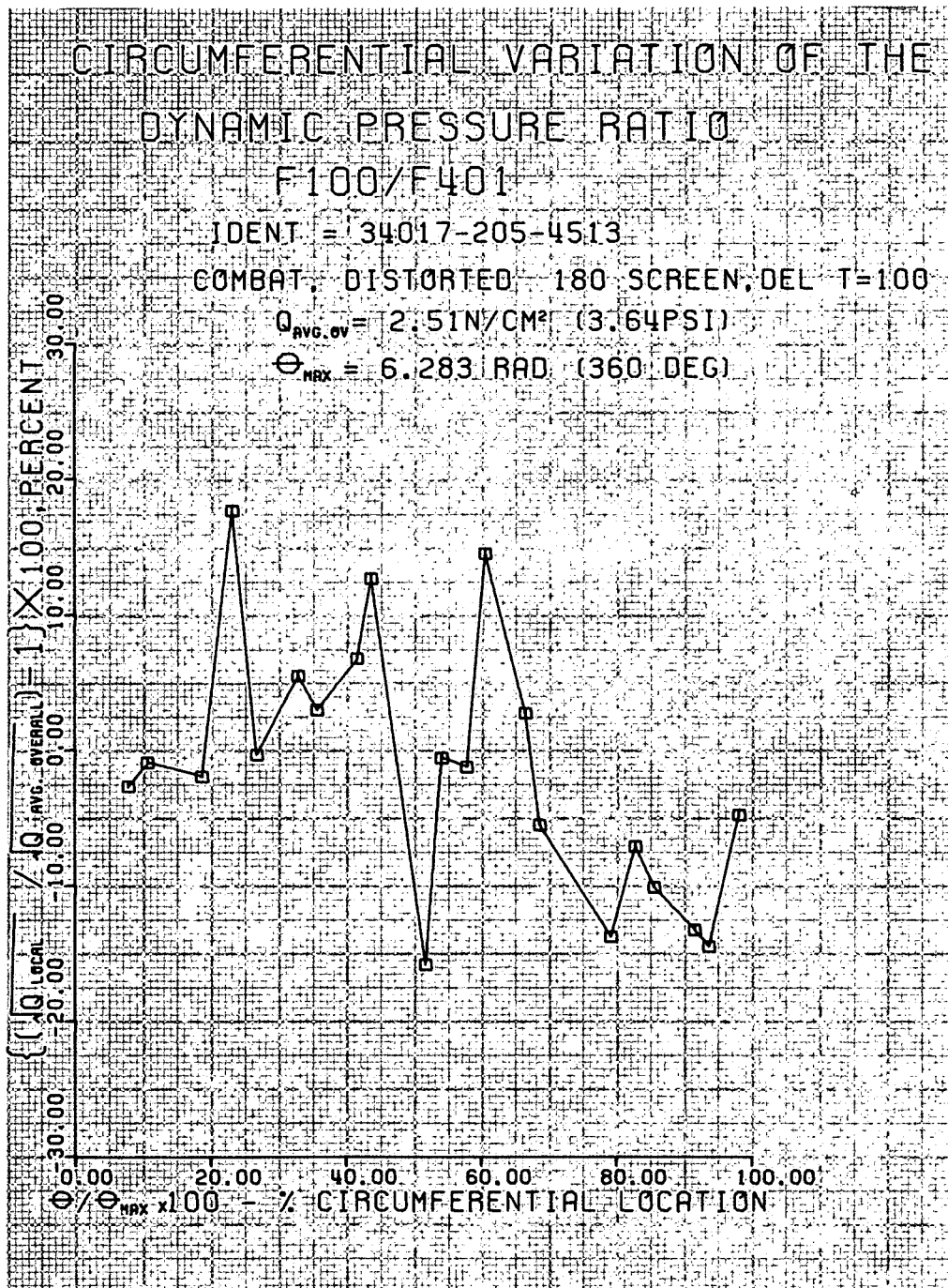
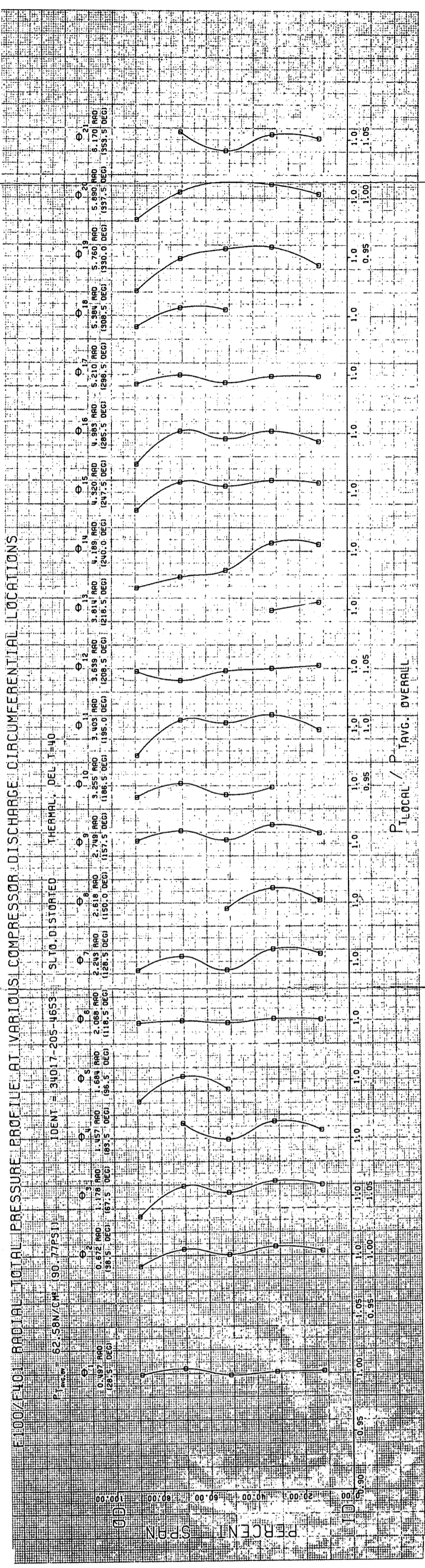


Figure 81.

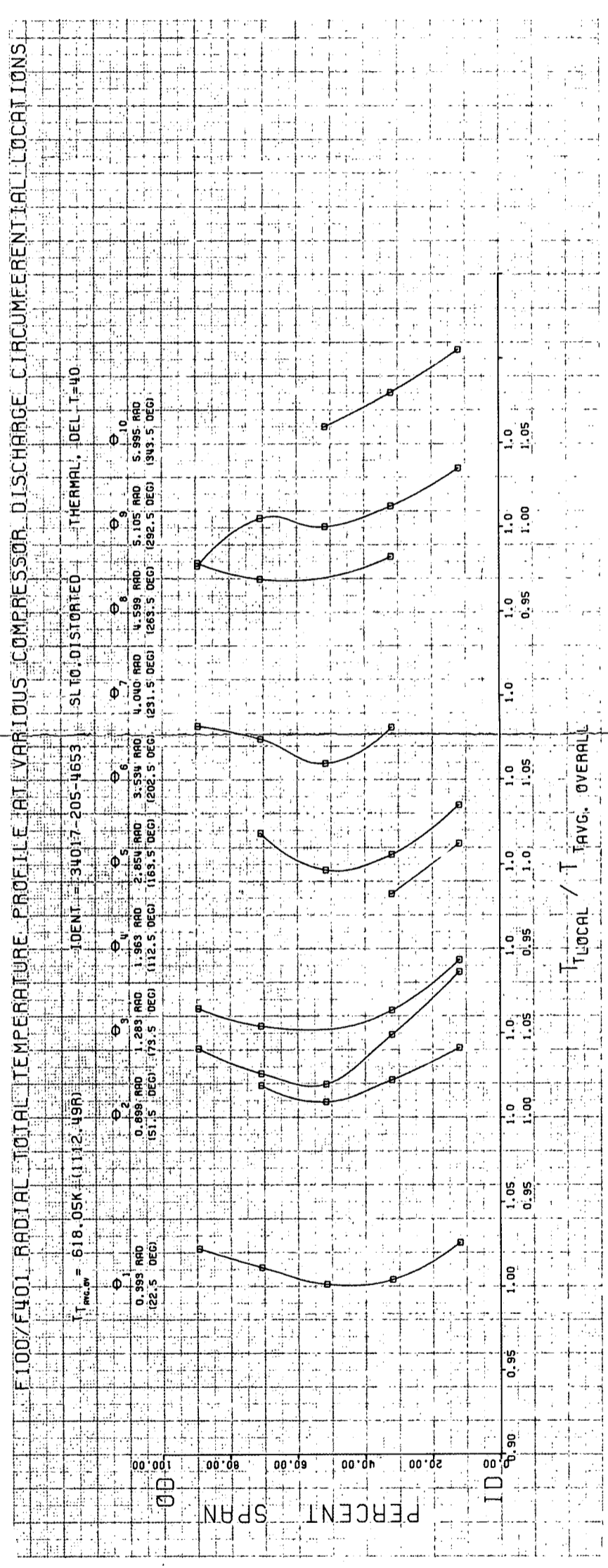
DF 91968

F100/F401 RADIAL TOTAL PRESSURE PROFILE AT VARIOUS COMPRESSOR DISCHARGE CIRCUMFERENTIAL LOCATIONS



DF 91934

F100/F401 RADIAL TOTAL TEMPERATURE PROFILE AT VARIOUS COMPRESSOR DISCHARGE CIRCUMFERENTIAL LOCATIONS



DF 91935

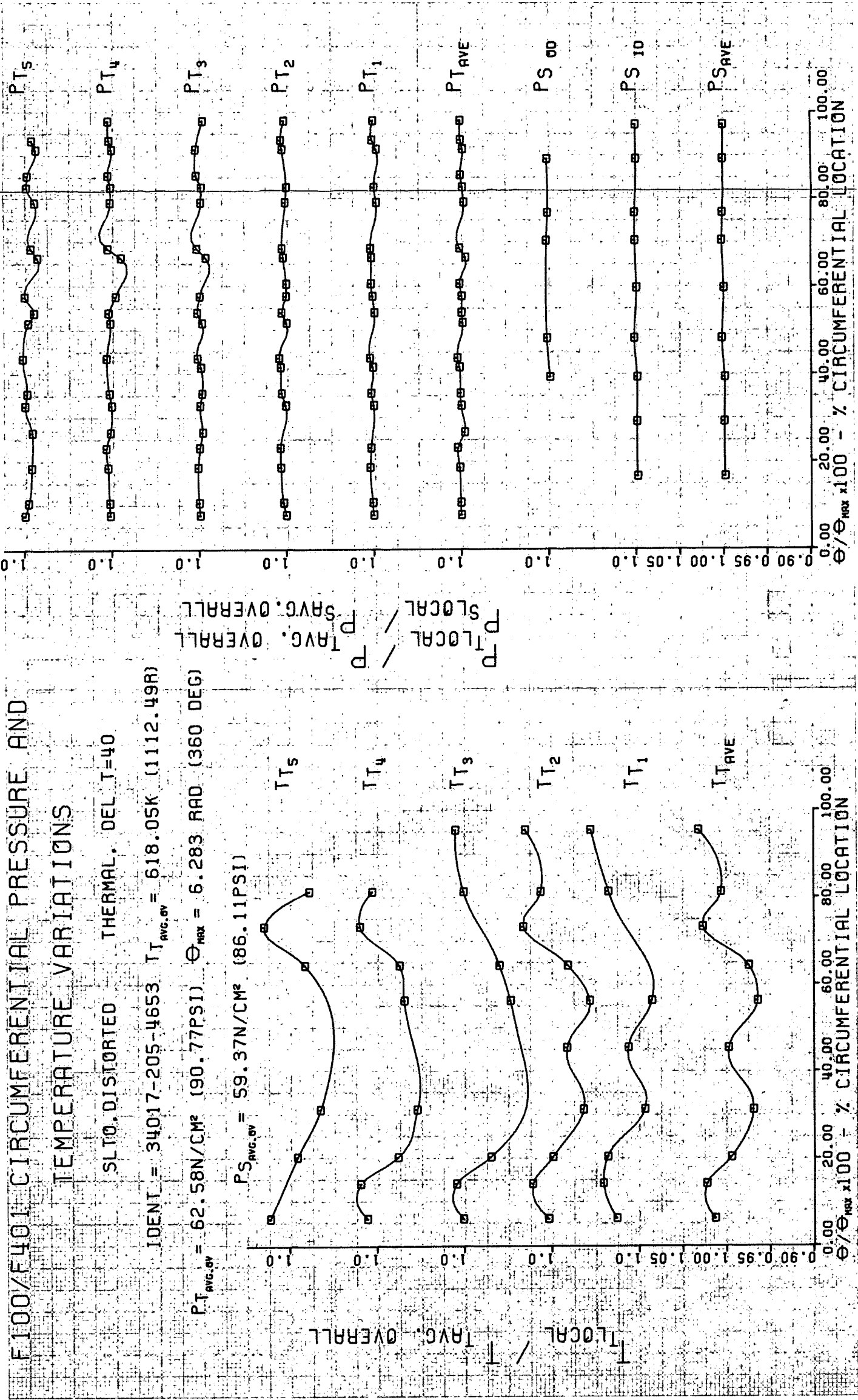
DF 91935

Figure 82.

FOLDOUT FRAME 1

FOLDOUT FRAME 2

FOLDOUT FRAME 3



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Figure 83.

DF 92000

SCHEMATIC DRAWING

2

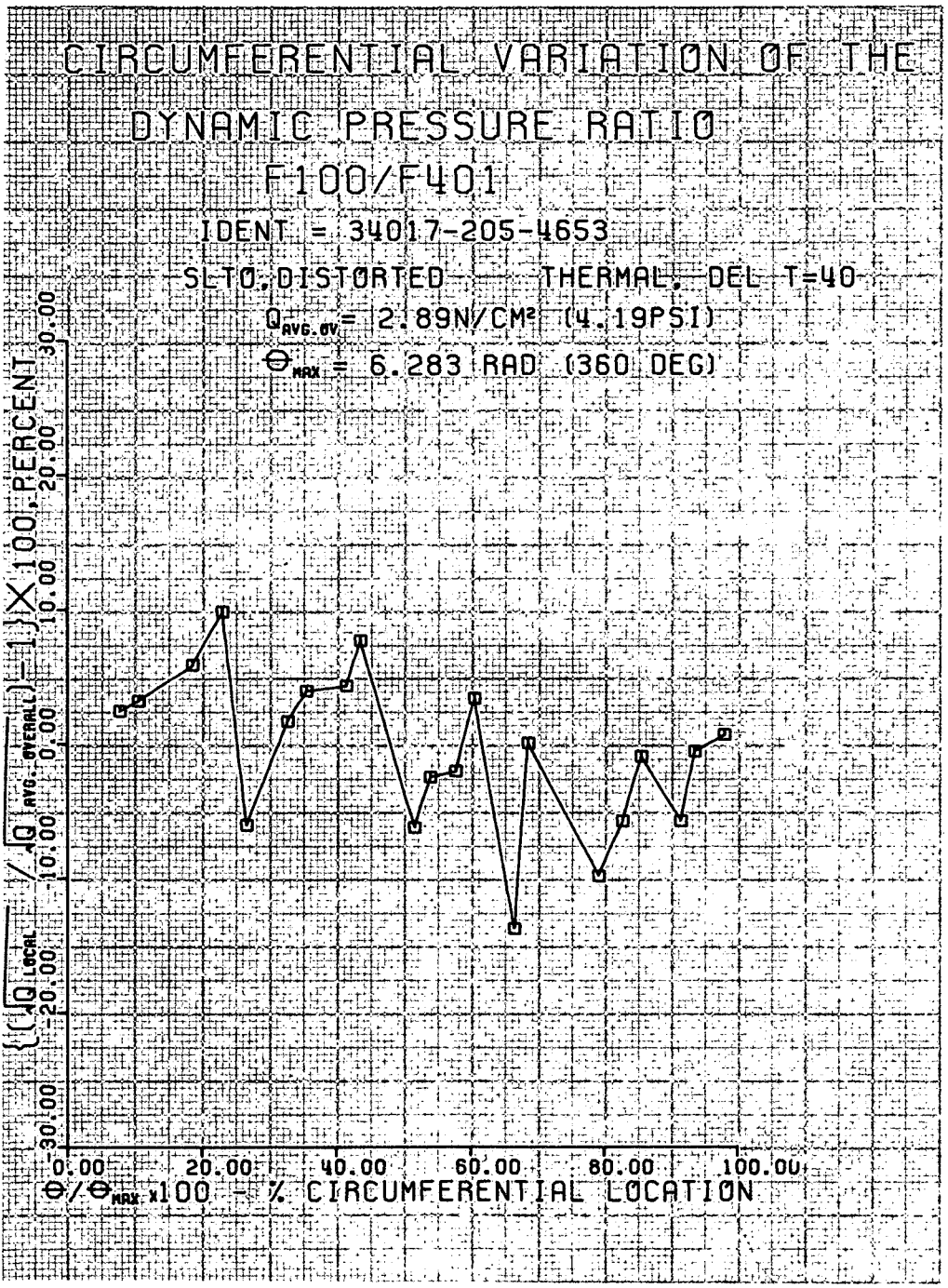


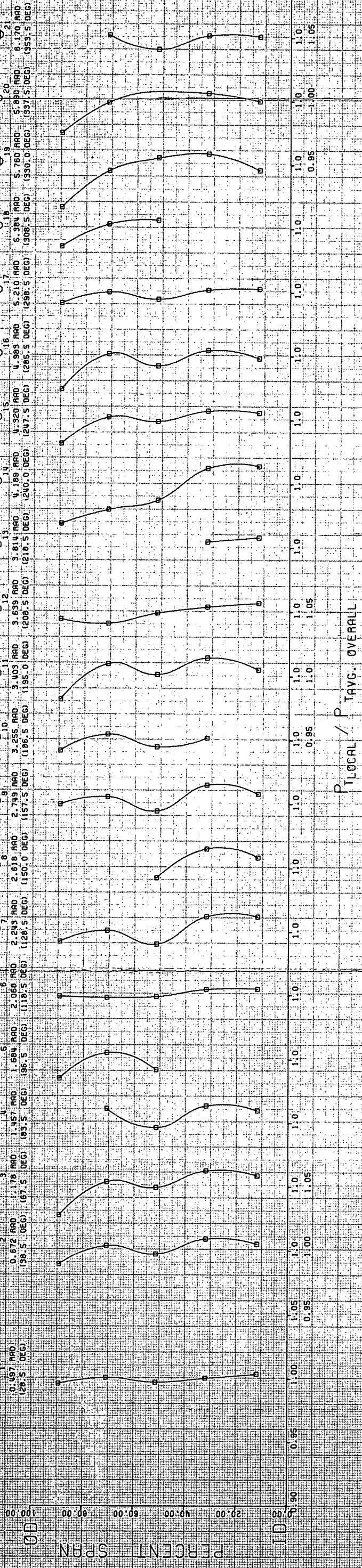
Figure 84.

DF 91969

F100/F401 RADIAL TOTAL PRESSURE PROFILE AT VARIOUS COMPRESSOR DISCHARGE CIRCUMFERENTIAL LOCATIONS

IDENT = 34017-205-6613 SUBSONIC CRUISE, DIST. THERMAL, DEL T = 40

$P_{T, INC, CR}$ = 58.67N/CM² (85.10PSI)



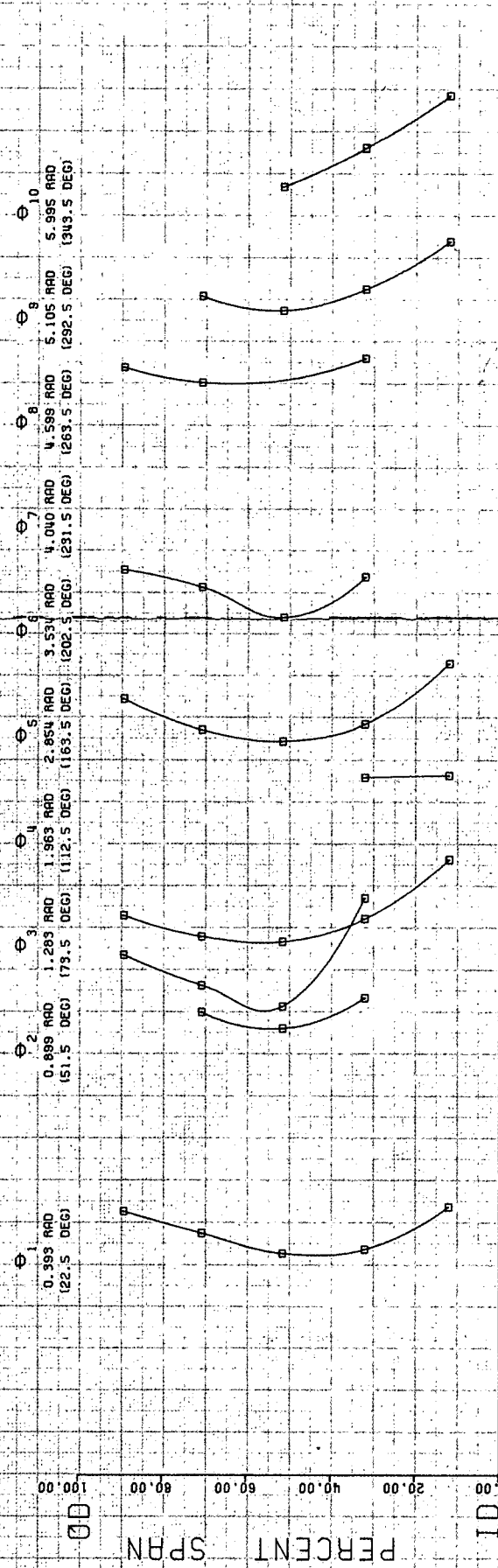
$P_{LOCAL} / P_{TAVG, OVERALL}$

DF 91936

F100/F401 RADIAL TOTAL TEMPERATURE PROFILE AT VARIOUS COMPRESSOR DISCHARGE CIRCUMFERENTIAL LOCATIONS

IDENT = 34017-205-6613 SUBSONIC CRUISE, DIST. THERMAL, DEL T = 40

$T_{T, INC, CR}$ = 578.67K (1041.60R)



$T_{LOCAL} / T_{TAVG, OVERALL}$

Figure 85.

-89-

DF 91937

DF 91936

INPUT DATA FOR RUN NO. 6613

ANGLE RAD. (DEG.)	PT1 - I+D N/CM**2 (PSIA)	PT2 N/CM**2 (PSIA)	PT3 N/CM**2 (PSIA)	PT4 N/CM**2 (PSIA)	PT5 - O+D N/CM**2 (PSIA)
0.491 (28.3)	58.67(85.14)	58.70(85.14)	58.52(84.87)	58.73(85.19)	58.45(84.78)
0.891 (51.5)	59.16(85.80)	59.23(86.24)	59.16(85.80)	59.34(86.39)	59.06(85.91)
1.171 (67.3)	59.23(86.24)	59.44(86.62)	59.44(86.62)	59.34(86.39)	59.34(86.39)
1.451 (83.5)	0.00(0.00)	0.00(0.00)	58.20(84.42)	58.58(85.54)	57.80(83.84)
1.681 (96.5)	0.00(0.00)	0.00(0.00)	58.50(85.38)	58.50(85.38)	58.50(85.38)
1.861 (107.5)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)
2.061 (119.5)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)
2.261 (132.5)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)
2.461 (145.5)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)
2.741 (157.5)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)
3.251 (196.5)	0.00(0.00)	0.00(0.00)	58.37(84.66)	58.67(85.09)	58.67(85.09)
3.451 (207.5)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)
3.631 (218.5)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)
4.181 (247.5)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)
4.311 (247.5)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)
4.521 (269.5)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)
4.751 (285.5)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)
5.091 (297.5)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)
5.101 (297.5)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)
5.991 (343.5)	356.81 (642.2)	342.41 (616.4)	327.91 (590.2)	327.91 (590.2)	338.41 (609.1)

ANGLE RAD. (DEG.)	PT11 - I+D N/CM**2 (PSIA)	PT12 N/CM**2 (PSIA)	PT13 N/CM**2 (PSIA)	PT14 N/CM**2 (PSIA)	PT15 - O+D N/CM**2 (PSIA)
0.491 (28.3)	58.67(85.14)	58.70(85.14)	58.52(84.87)	58.73(85.19)	58.45(84.78)
0.891 (51.5)	59.16(85.80)	59.23(86.24)	59.16(85.80)	59.34(86.39)	59.06(85.91)
1.171 (67.3)	59.23(86.24)	59.44(86.62)	59.44(86.62)	59.34(86.39)	59.34(86.39)
1.451 (83.5)	0.00(0.00)	0.00(0.00)	58.20(84.42)	58.58(85.54)	57.80(83.84)
1.681 (96.5)	0.00(0.00)	0.00(0.00)	58.50(85.38)	58.50(85.38)	58.50(85.38)
1.861 (107.5)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)
2.061 (119.5)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)
2.261 (132.5)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)
2.461 (145.5)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)
2.741 (157.5)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)
3.251 (196.5)	0.00(0.00)	0.00(0.00)	58.37(84.66)	58.67(85.09)	58.67(85.09)
3.451 (207.5)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)
3.631 (218.5)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)
4.181 (247.5)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)
4.311 (247.5)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)
4.521 (269.5)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)
4.751 (285.5)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)
5.091 (297.5)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)
5.101 (297.5)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)	59.34(86.39)
5.991 (343.5)	356.81 (642.2)	342.41 (616.4)	327.91 (590.2)	327.91 (590.2)	338.41 (609.1)

DF 91936

DF 91937

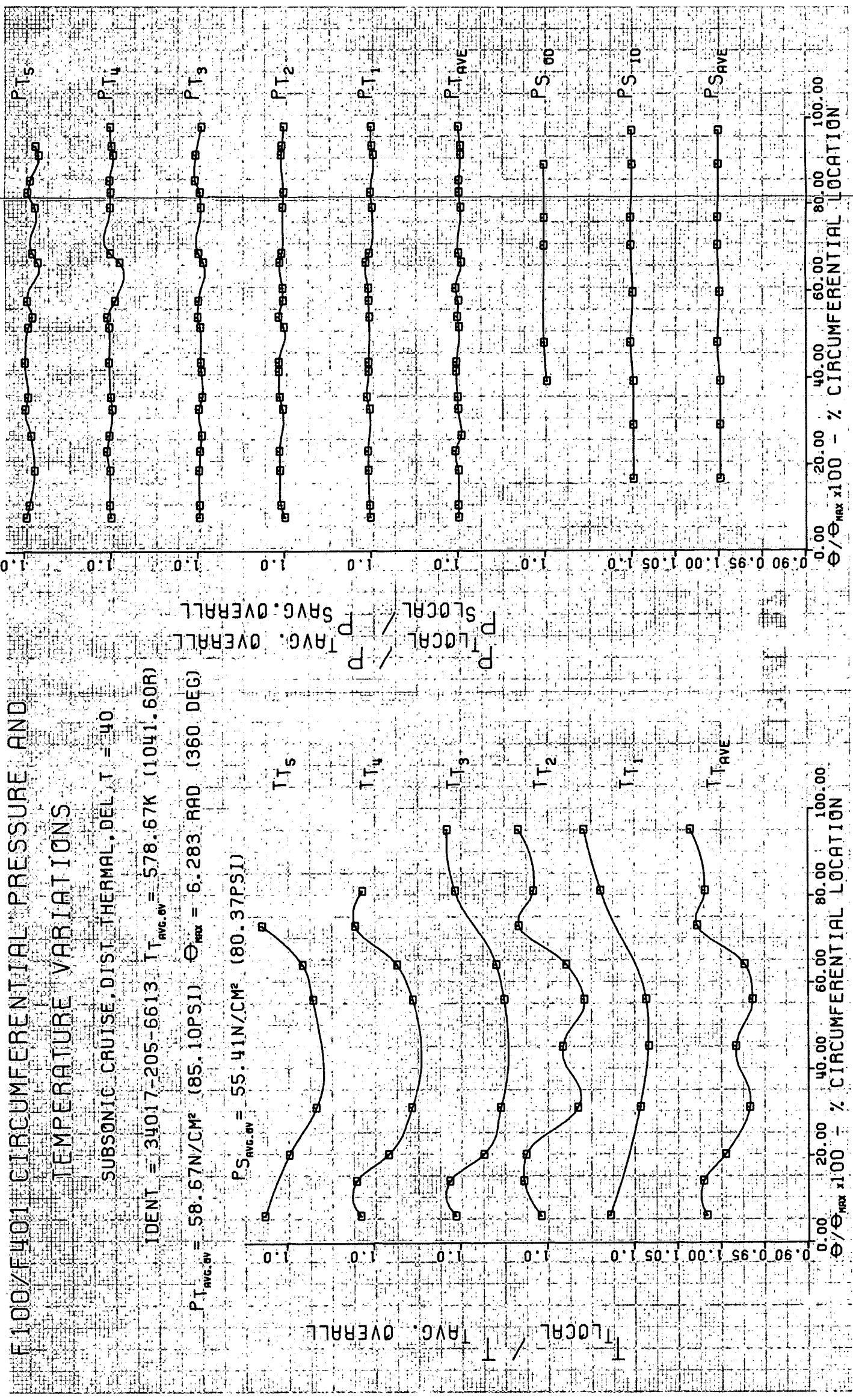
Figure 85.

-89-

FOLDOUT FRAME 1

FOLDOUT FRAME 2

FOLDOUT FRAME 3



-90-

Figure 86.

DF 92001

2

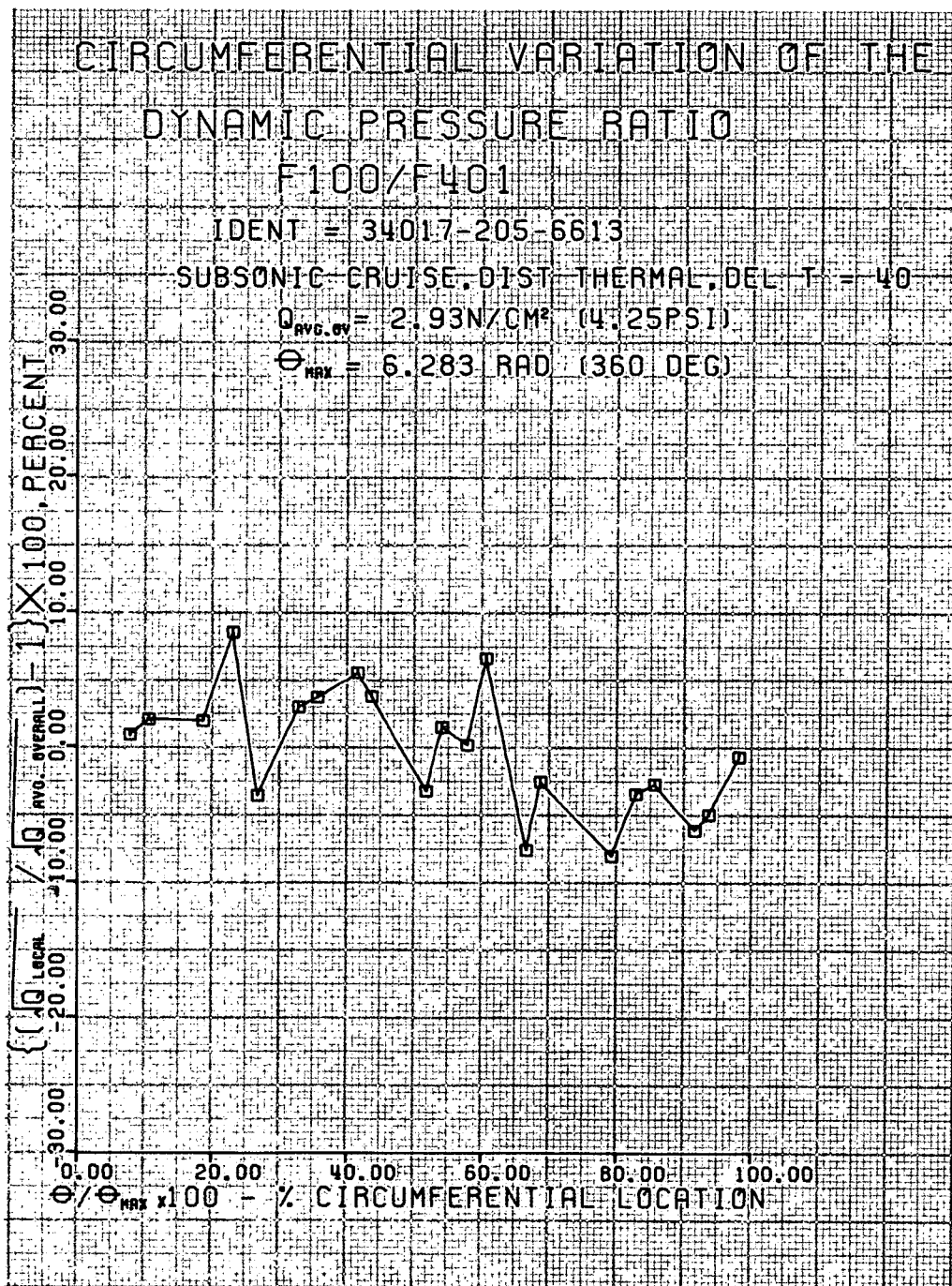
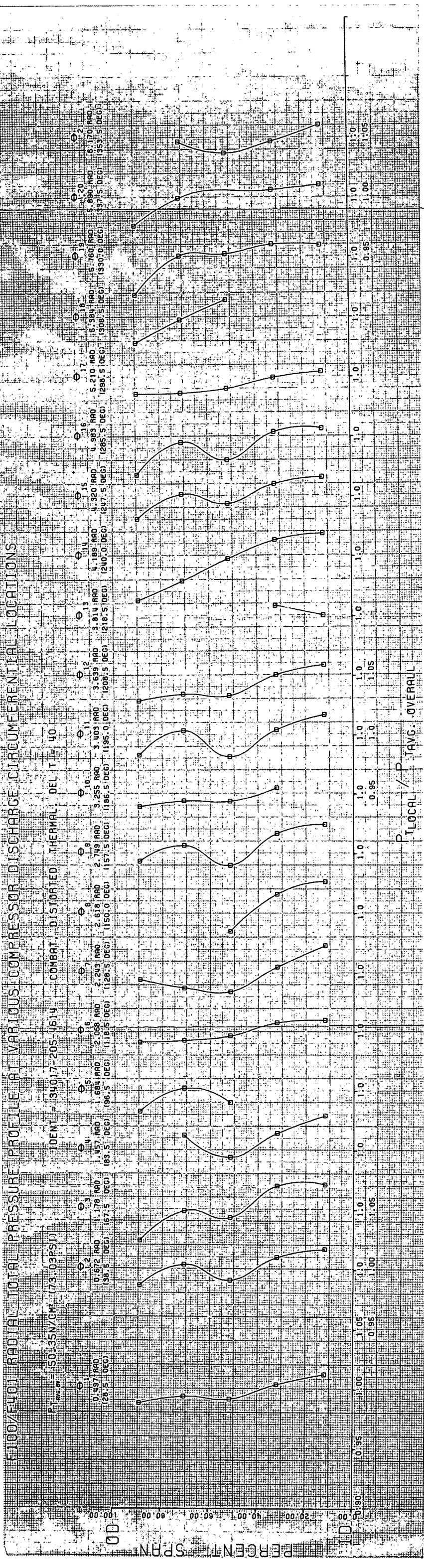


Figure 87.

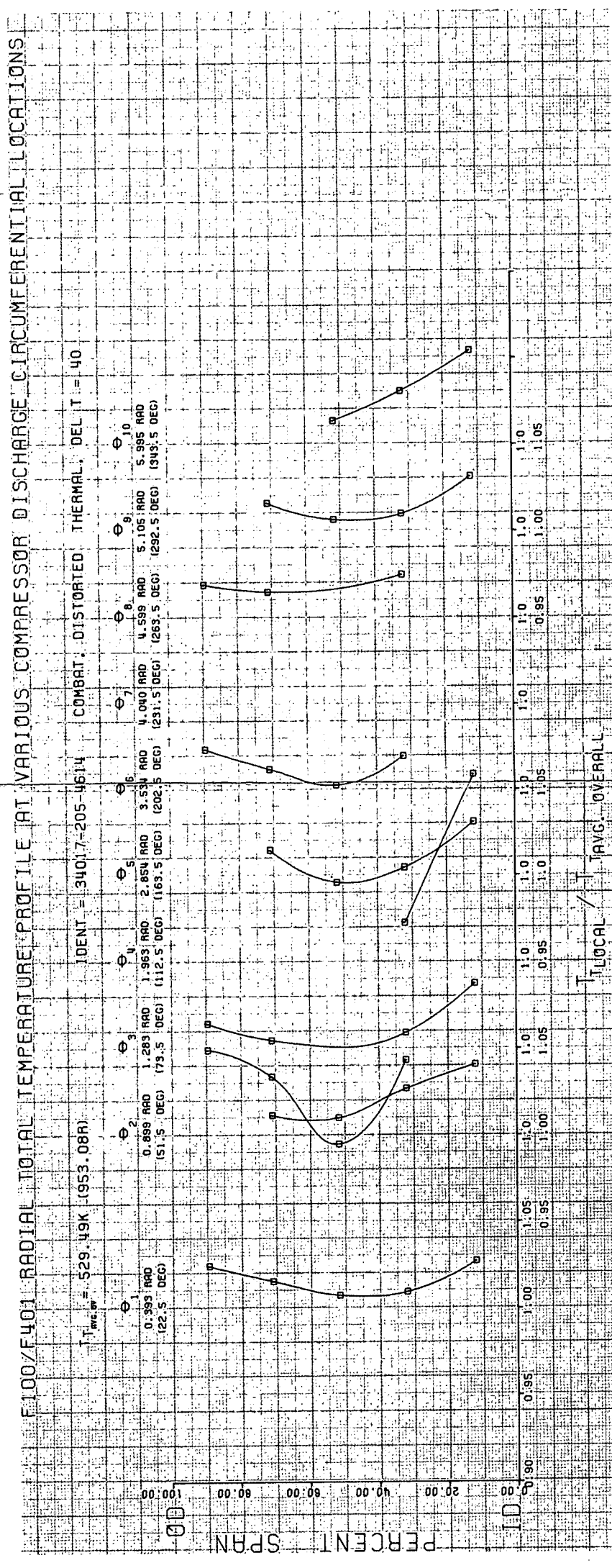
DF 91970

E100/F401 RADIAL TOTAL PRESSURE PROFILE AT VARIOUS COMPRESSOR DISCHARGE CIRCUMFERENTIAL LOCATIONS



DF 91938

E100/F401 RADIAL TOTAL TEMPERATURE PROFILE AT VARIOUS COMPRESSOR DISCHARGE CIRCUMFERENTIAL LOCATIONS



DF 91939

INPUT DATA FOR RUN NO. 4614

ANGLE (DEG.)	PT1 - I.D.	PT2	PT3	PT4	PT5 - O.D.
0.491 (28.5)	50.997(73.36)	50.86(73.34)	49.95(72.45)	50.56(72.43)	49.71(72.41)
1.171 (67.5)	51.441(74.00)	51.37(74.01)	50.03(72.97)	50.32(72.99)	49.71(72.41)
1.445 (83.5)	51.867(74.21)	51.10(74.12)	50.08(72.64)	51.03(74.01)	49.00(71.18)
1.668 (96.5)	50.00(0.00)	0.00(0.00)	45.89(72.36)	50.50(73.24)	49.53(71.86)
2.058(118.5)	50.87(73.78)	50.43(73.64)	46.87(72.91)	49.74(72.51)	50.11(72.68)
2.461(150.0)	51.70(74.99)	51.17(74.22)	49.63(71.99)	0.00(0.00)	0.00(0.00)
2.74(157.5)	51.59(74.63)	51.22(74.28)	49.87(72.33)	50.72(73.55)	50.05(72.60)
3.251(186.5)	0.00(0.00)	0.00(0.00)	50.07(72.53)	50.05(72.45)	49.85(72.31)
3.443(202.5)	51.42(73.71)	50.80(73.30)	49.53(71.84)	49.60(71.95)	49.32(71.95)
3.811(218.5)	50.99(73.09)	50.81(73.70)	0.00(0.00)	0.00(0.00)	0.00(0.00)
4.181(240.0)	51.32(74.44)	51.05(74.05)	50.27(72.91)	49.34(71.57)	48.53(70.38)
4.31(247.5)	51.18(74.23)	50.90(73.93)	50.08(72.63)	50.48(73.21)	49.44(71.71)
4.521(258.5)	50.59(73.38)	50.36(73.04)	49.89(72.36)	49.70(72.09)	49.68(72.05)
5.391(308.5)	0.00(0.00)	0.00(0.00)	50.11(74.14)	50.28(72.92)	49.32(71.54)
5.751(330.0)	50.86(73.77)	50.89(73.81)	50.50(73.24)	50.42(73.13)	48.61(70.80)
5.891(337.5)	50.91(73.84)	50.71(73.55)	0.00(0.00)	50.38(73.05)	49.18(71.36)
6.11(350.0)	50.91(73.84)	50.23(72.85)	49.74(72.14)	50.23(72.68)	0.00(0.00)

DF 91939

DF 91939

-92-

FOLDOUT FRAME 3

FOLDOUT FRAME 2

FOLDOUT FRAME 1

Figure 88.

92

F100/F401 CIRCUMFERENTIAL PRESSURE AND TEMPERATURE VARIATIONS

COMBAT, DISTORTED THERMAL, DEL T = 40

IDENT = 34017-205-4614 $T_{I,AVG.OV} = 529.49K (953.08R)$

$P_{T,AVG.OV} = 50.35N/CM^2 (73.03PSI)$ $\Theta_{MAX} = 6.283 RAD (360 DEG)$

$P_{S,AVG.OV} = 47.27N/CM^2 (68.55PSI)$

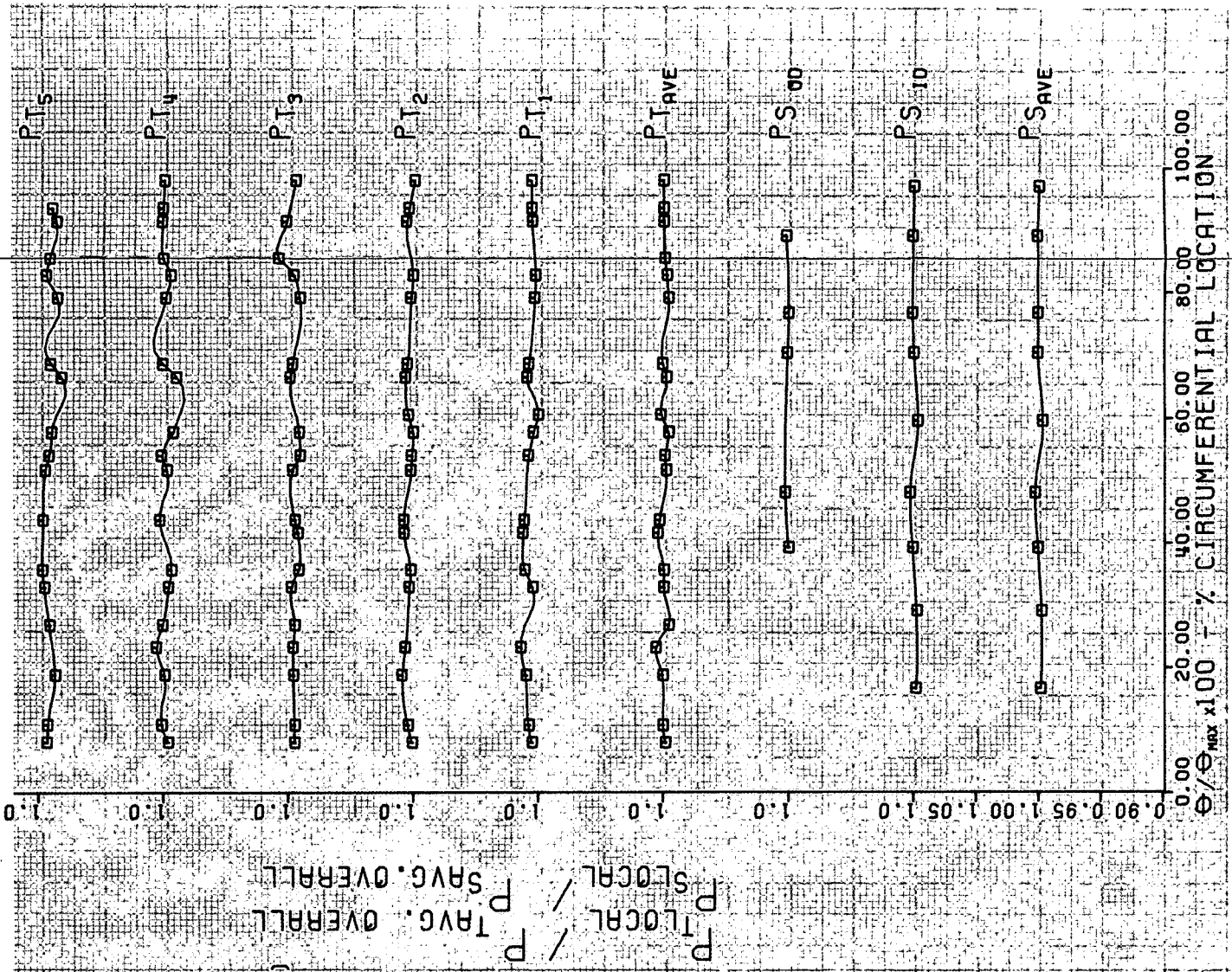
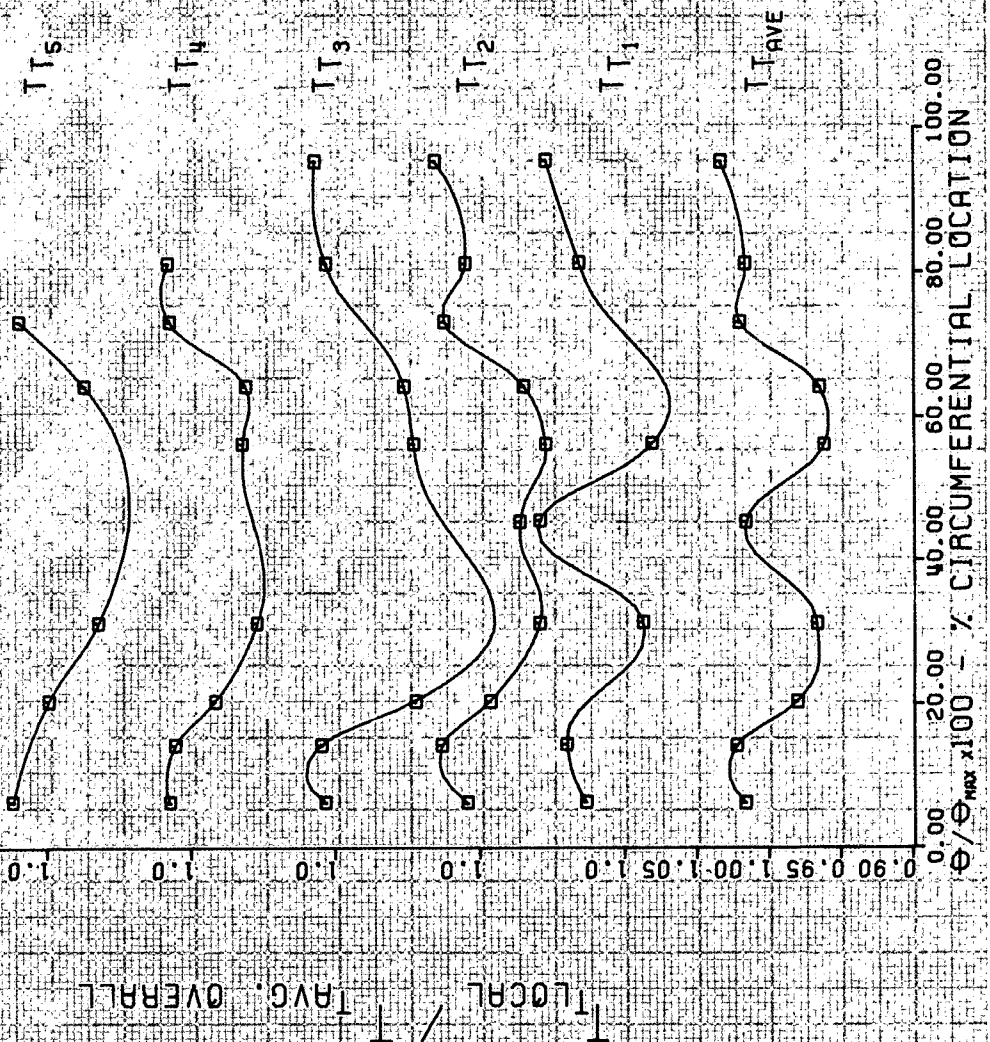


Figure 89.

93-

DF 92002

FOLDOUT FRAME 1

FOLDOUT FRAME 2

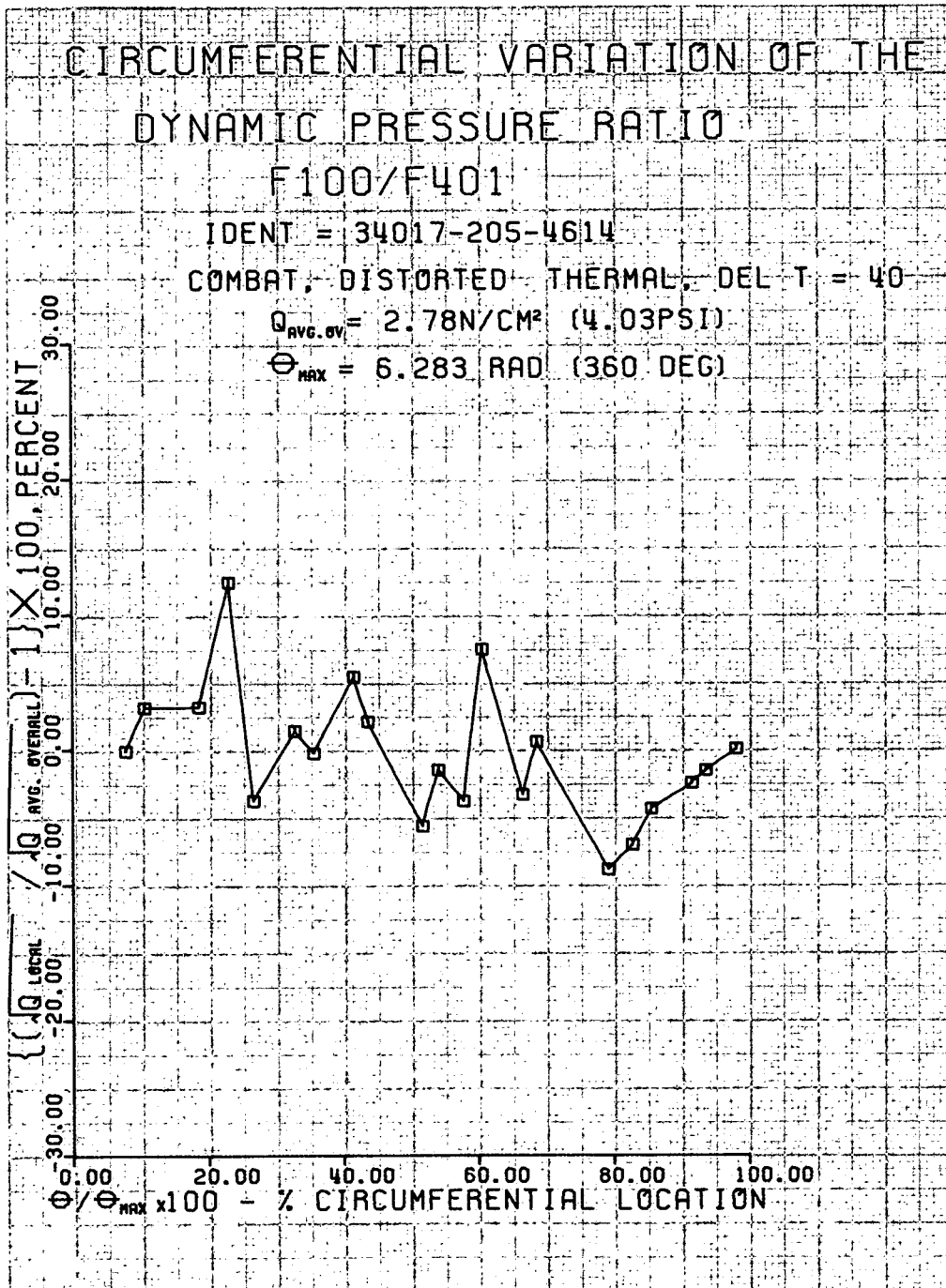
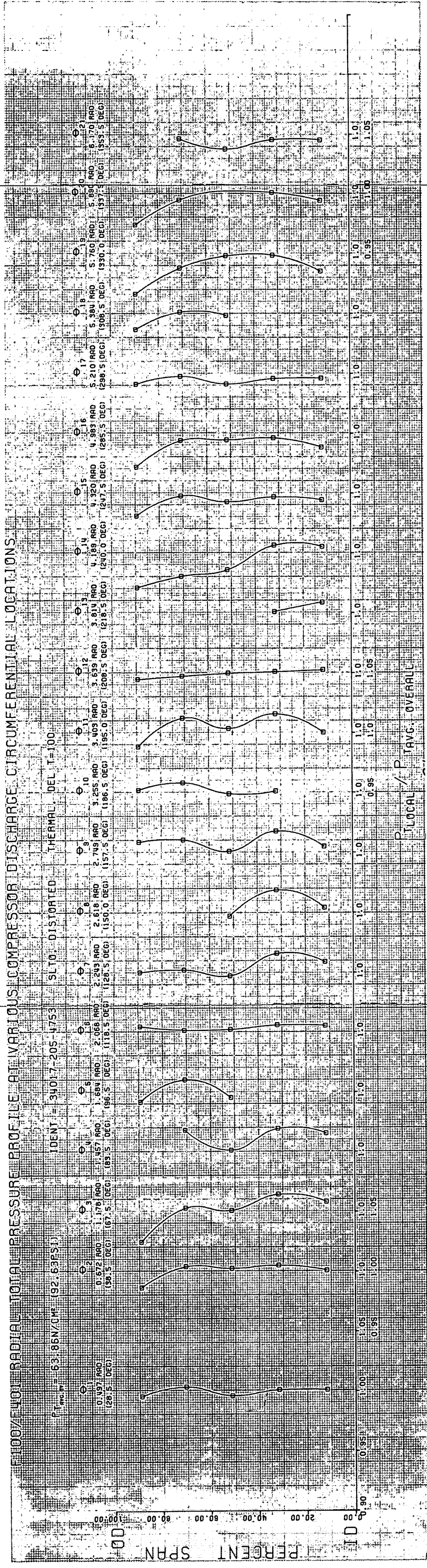
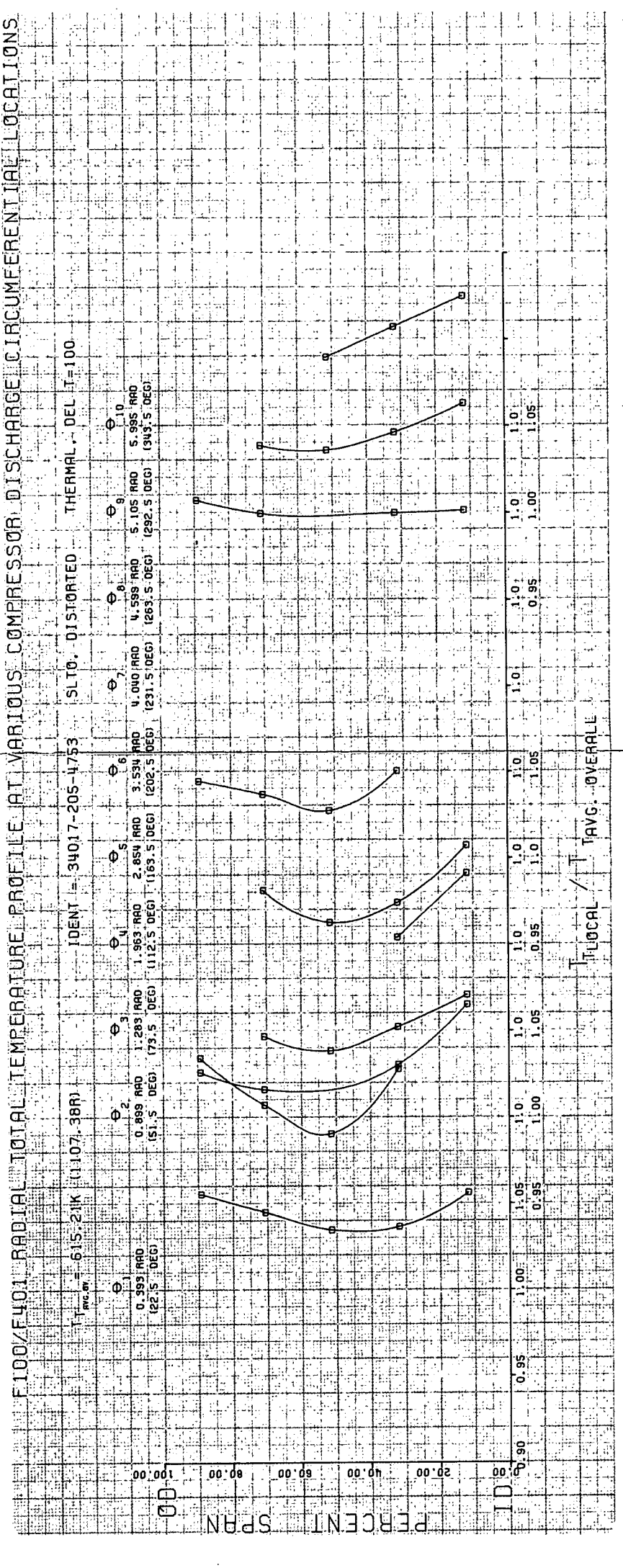


Figure 90.

DF 91971



DF 91940



DF 91941

Figure 91.

INPUT DATA FOR RUN NO. 4753

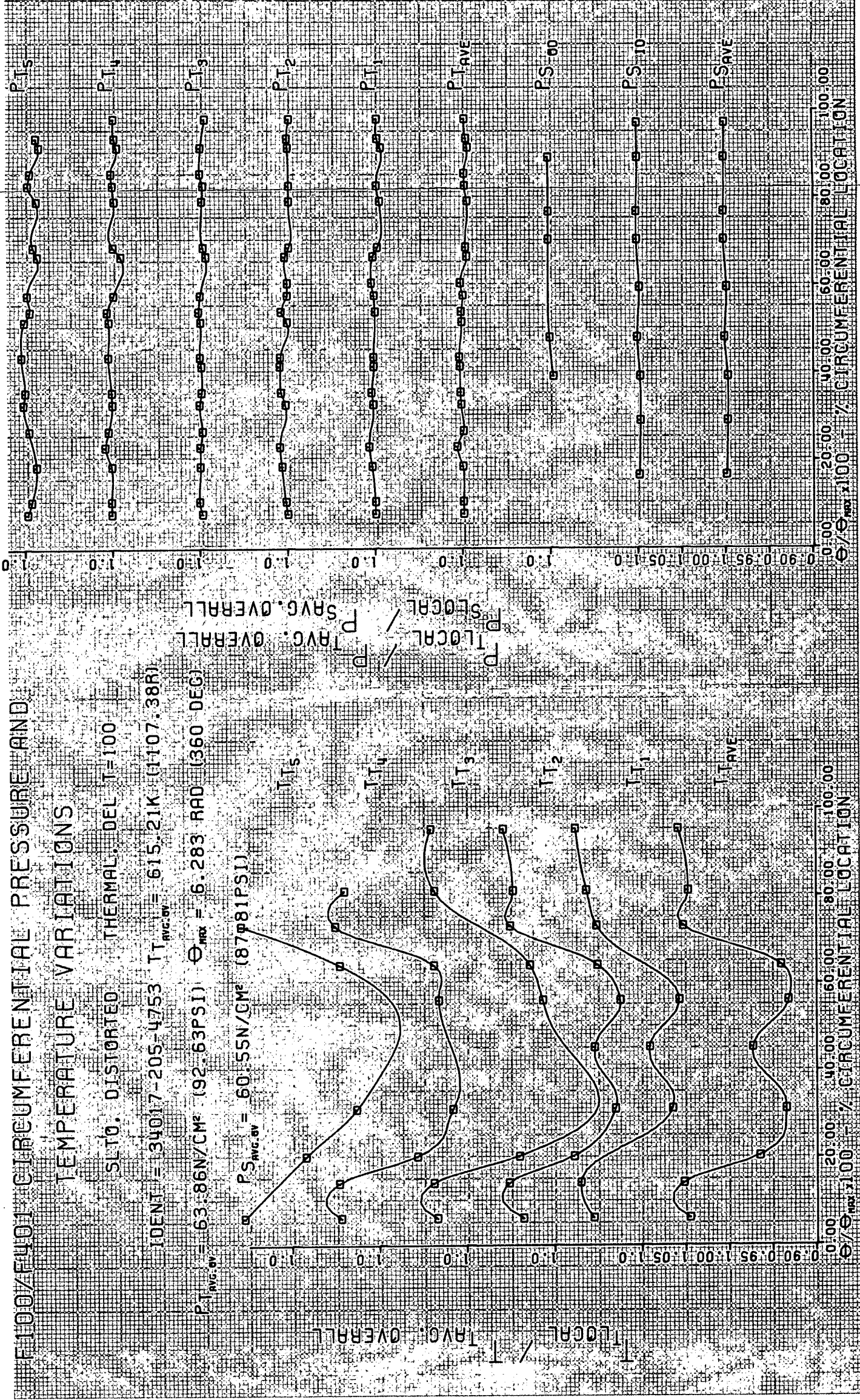
ANGLE RAD. (DEG.)	PT1 - I.D. N/CHEE2 (PSIA)	PT2 N/CHEE2 (PSIA)	PT3 N/CHEE2 (PSIA)	PT4 N/CHEE2 (PSIA)	PT5 - O.D. N/CHEE2 (PSIA)
0.991 (28.5)	63.93192(73)	63.9492(74)	63.62192(28)	64.11192(28)	63.59192(23)
0.671 (38.5)	63.9492(73)	64.21192(13)	64.0492(89)	64.1492(94)	63.01191(39)
1.171 (67.5)	64.0192(40)	64.80192(98)	63.93192(73)	64.06192(92)	62.25190(29)
1.451 (82.5)	64.80192(40)	65.11192(44)	64.95192(75)	65.03192(82)	64.001 (0.00)
2.001 (118.5)	64.21192(13)	64.25192(19)	64.01192(84)	64.18192(66)	64.18192(66)
2.411 (28.5)	64.45192(48)	64.81192(15)	63.71192(40)	64.03192(87)	63.89192(67)
2.611 (28.5)	64.1492(33)	65.07192(38)	63.70192(39)	64.001 (0.00)	64.001 (0.00)
2.751 (126.5)	64.01192(40)	65.00192(28)	63.92192(71)	64.25192(11)	64.42192(44)
3.401 (195.0)	63.88192(66)	64.88192(10)	64.10192(98)	64.66192(78)	63.14191(57)
3.631 (208.5)	64.0492(88)	63.9492(74)	63.86192(63)	63.71192(40)	63.53192(15)
3.811 (218.5)	64.03192(45)	63.9492(74)	64.001 (0.00)	64.001 (0.00)	64.001 (0.00)
4.311 (277.0)	64.55192(14)	64.29192(58)	64.29192(58)	64.29192(58)	62.05190(90)
4.981 (295.5)	63.15191(59)	63.64192(31)	63.94192(16)	63.91192(11)	62.08190(04)
5.201 (288.5)	63.63192(29)	63.62192(27)	63.32191(84)	63.75192(46)	63.31191(83)
5.381 (308.5)	64.001 (0.00)	64.001 (0.00)	63.80192(54)	63.98192(80)	63.05191(45)
5.801 (337.5)	63.30192(10)	63.94192(73)	64.001 (0.00)	63.30192(14)	62.18190(19)
6.161 (353.5)	63.58192(22)	63.60192(25)	63.11191(53)	63.67192(25)	64.001 (0.00)

ANGLE RAD. (DEG.)	T11 - I.D. DEGC (DEG.F)	T12 DEGC (DEG.F)	T13 DEGC (DEG.F)	T14 DEGC (DEG.F)	T15 - O.D. DEGC (DEG.F)
0.991 (28.5)	394.41 (709.9)	392.31 (688.1)	381.21 (686.1)	387.51 (697.6)	394.01 (709.2)
0.671 (38.5)	400.01 (760.0)	342.51 (657.7)	335.91 (646.6)	335.91 (646.6)	350.01 (662.0)
1.171 (67.5)	338.51 (649.4)	317.11 (610.9)	0.01 (0.0)	0.01 (0.0)	314.61 (606.3)
1.451 (82.5)	334.61 (638.4)	331.81 (637.2)	0.01 (0.0)	0.01 (0.0)	314.61 (606.3)
2.001 (118.5)	333.51 (630.4)	313.31 (604.0)	306.31 (581.3)	317.81 (612.2)	314.61 (606.3)
2.411 (28.5)	331.51 (634.7)	330.71 (633.3)	314.11 (607.4)	330.61 (627.1)	335.51 (711.9)
2.611 (28.5)	330.71 (633.3)	330.71 (633.3)	322.21 (622.0)	322.21 (622.0)	335.51 (711.9)
2.751 (126.5)	338.71 (717.8)	338.51 (659.3)	382.21 (688.1)	384.01 (691.3)	384.01 (691.3)
3.401 (195.0)	406.21 (731.2)	395.41 (711.7)	384.61 (692.4)	0.01 (0.0)	0.01 (0.0)

ANGLE RAD. (DEG.)	PSI(O.D.) N/CHEE2 (PSIA)
0.991 (28.5)	60.27187(62)
0.671 (38.5)	60.27187(62)
1.171 (67.5)	60.15187(24)
1.451 (82.5)	60.27187(62)
2.001 (118.5)	60.67188(00)
2.411 (28.5)	60.35187(53)
2.611 (28.5)	60.41188(20)
2.751 (126.5)	60.41188(20)
3.401 (195.0)	60.62187(93)
3.631 (208.5)	60.59187(89)
3.811 (218.5)	60.001 (0.00)
4.311 (277.0)	60.001 (0.00)
4.981 (295.5)	60.001 (0.00)
5.201 (288.5)	60.001 (0.00)
5.381 (308.5)	60.001 (0.00)
5.801 (337.5)	60.001 (0.00)
6.161 (353.5)	60.001 (0.00)

FOLDOUT FRAM 1

FOLDOUT FRAM 2



DF 92003

Figure 92.

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F100/F4U01

Circumferential Location 2

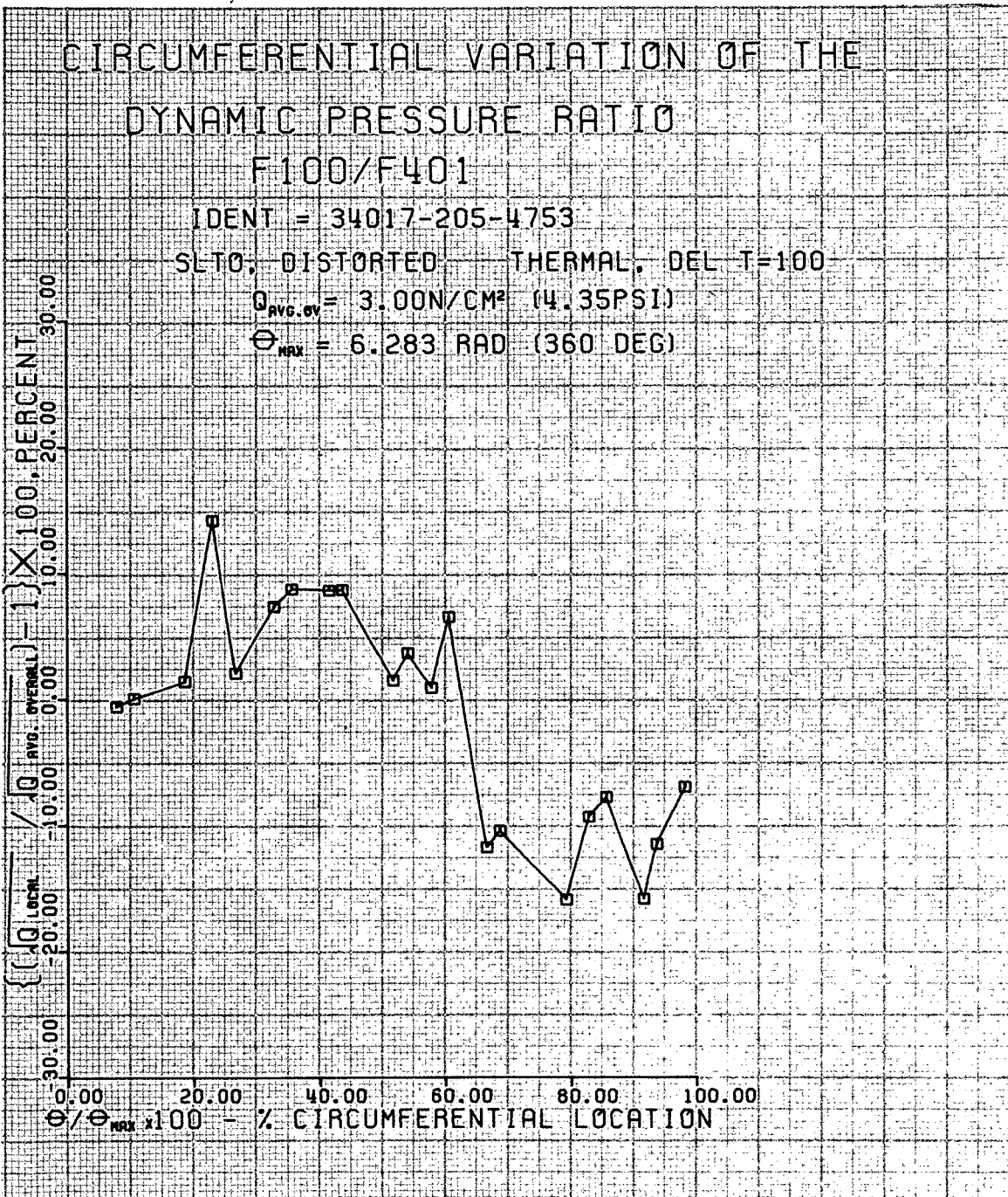


Figure 93.

DF 91972