NASA TECH BRIEF

John F. Kennedy Space Center

Pressurized Lighting System

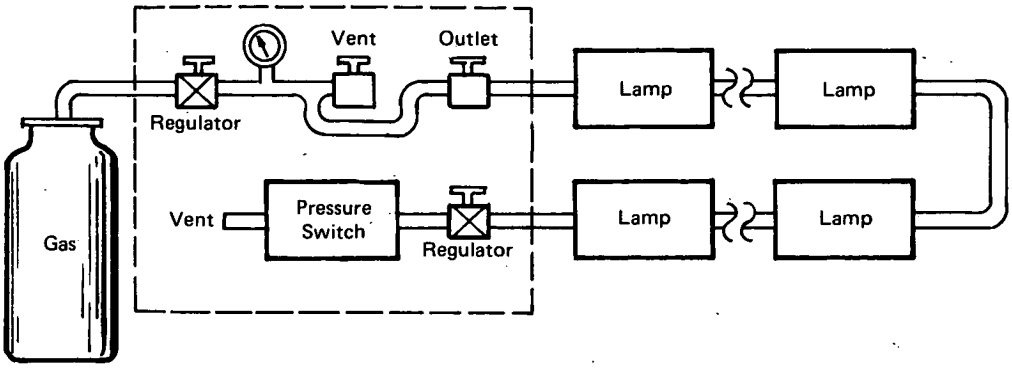

Figure 1. Ventilating Circuit

The problem:

Safe operation of lights in explosive gas or extremely humid environments requires modifications in the lighting assemblies. It is well known that lamps and electrical connectors cannot be in direct contact with explosive gases. An overheated lamp or a minute spark from an exposed connection is sufficient to trigger an explosion. Humidity, on the other hand, corrodes lamp sockets and exposed metal wiring, causing malfunctions in the electrical system. Protection of lights in these environments has been attempted with enclosures that tend to restrict air movement around the lamps which then frequently overheat and burn out.

The solution:

A new safe lighting assembly has been constructed for hostile environments. The assembly is ventilated by an inert gas to prolong the life of the lamps.

How it's done:

The lighting assembly contains a control box, a number of lamps connected in parallel, several pilot lights, and a ventilating circuit. The control box is provided with components for monitoring and controlling the flow of ventilating gas through the lamp assemblies. An inert gas such as nitrogen is supplied by a tank connected to the control box through a pressure regulator that is adjusted to approximately 15 psi (104×10^3 N/m^2) (see Figure 1). When the vent valve is closed, the gas flows through a line, through an outlet valve, through the lamp enclosure, and back to the control box. Before the operation of the light assembly, the entire ventilating system is purged for about five minutes to get rid of trapped air in the system. After purging, the regulator next to the pressure switch is adjusted so that the switch remains closed when the system is operating above 3 psi (20×10^3 N/m^2).

An electrical schematic for the assembly is shown in Figure 2. Power is supplied by a 115-Vac source which is coupled through leads to an input power connector. A pilot light ("line") is connected with the power line to indicate when the power is being fed to the box. Included in the circuit is a pressure switch which remains closed when the pressure in the system is above 3 psi (20×10^3 N/m^2). Two pilot lights ("on" and "off") are used in conjunction with this switch, one indicating a closed position and the other indicating an open. The lamps are turned on by the manual switch which is also connected with a pilot light ("manual") that indicates when the lamps are on.

(continued overleaf)

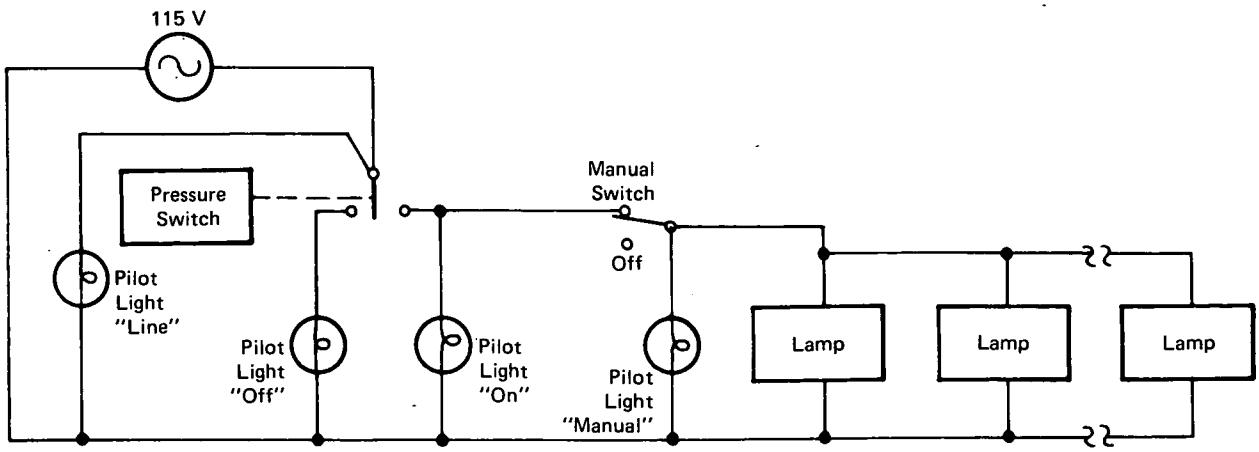

Figure 2. Electrical Schematic for the Lamp Assembly

Because the lamps are fluorescent, they are enclosed in shielding which prevents radio frequency interference (RFI) with any electronic equipment that may be operating in the vicinity.

Note:

Requests for further information may be directed to:

Technology Utilization Officer
Kennedy Space Center
Code AD-PAT
Kennedy Space Center, Florida 32899
Reference: TSP73-10280

Patent status:

This invention has been patented by NASA (U.S. Patent No. 3,673,424). Inquiries concerning nonexclusive or exclusive license for its commercial development should be addressed to:

Patent Counsel
Kennedy Space Center
Code AD-PAT
Kennedy Space Center, Florida 32899

Source: G. A. Phlieger
Kennedy Space Center
(KSC-10644)