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TRPG Turbine Primary Trip

Functional Description

The Gas Turbine Primary Trip (TRPG) terminal board is controlled by the Primary Turbine Protection controller (VTUR or PTUR). TRPG contains nine magnetic relays in three voting circuits to interface with three trip solenoids (ETDs). The TRPG works in conjunction with the TREG to form the primary and emergency sides of the interface to the ETDs. TRPG also accommodates inputs from eight Geiger-Mueller[®] flame detectors for gas turbine applications. There are two board types as follows:

- The H1A and H1B version for TMR applications has three voting relays per trip solenoid.
- The H2A and H2B version for simplex applications has one relay per trip solenoid.

Mark VI System

In the Mark* VI system, the TRPG works with the VTUR board and supports simplex and TMR applications. Cables with molded plugs connect TRPG to the VME rack where the VTUR board is located.

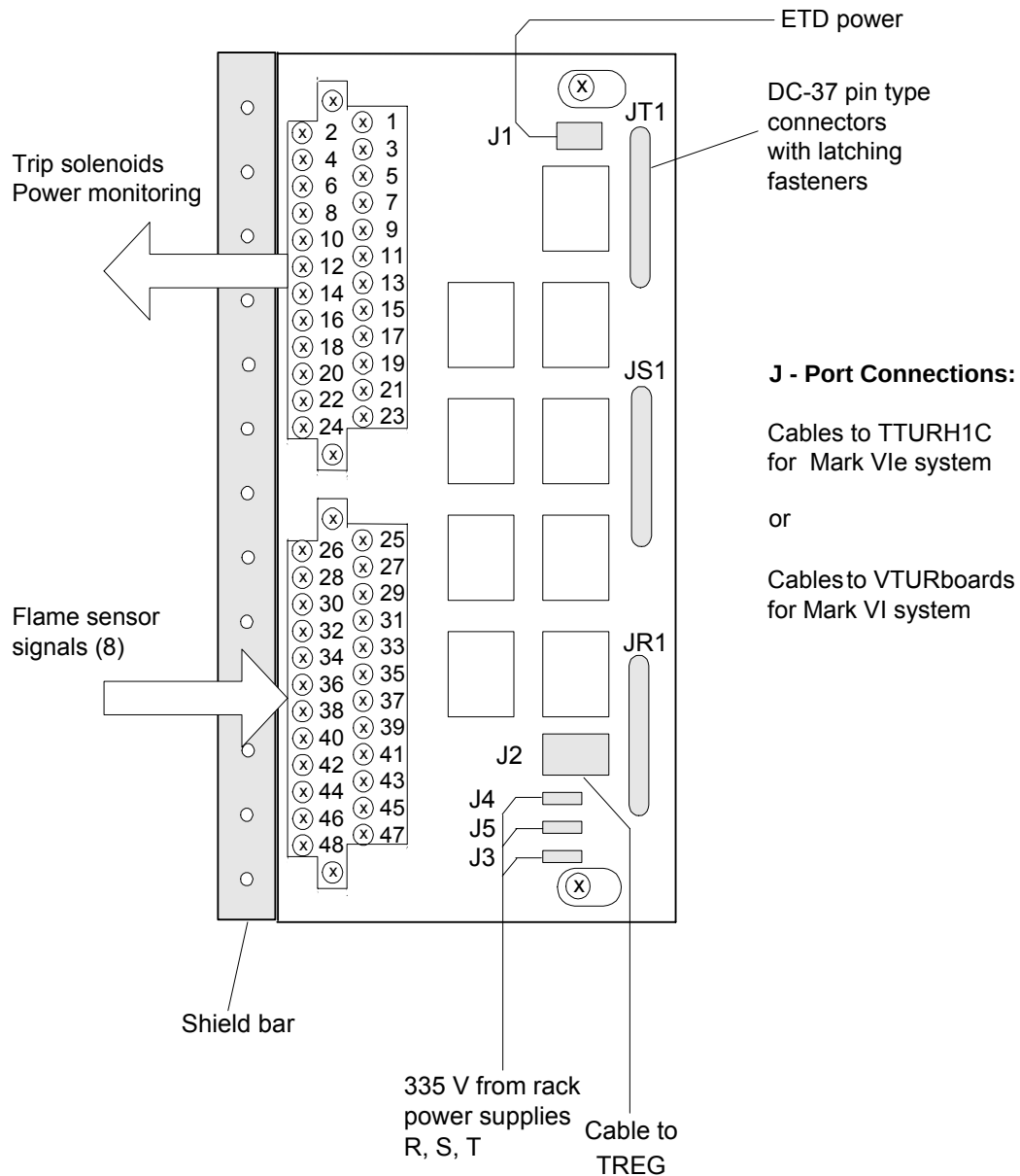
Mark VIe System

In the Mark VIe system, the TRPG is controlled by the PTUR packs on TTURH1C and supports simplex and TMR applications. The I/O packs plug into the D-type connectors on TTURH1C, which is cabled to TRPG.

Version Difference

Board	TMR	Simplex	Output contact, 125 V dc, 1 A	Output contact, 24 V dc, 3 A	28 V Power use
TRPGH1A*	Yes	No	Yes	No	Normal
TRPGH2A*	No	Yes	Yes	No	Normal
TRPGH1B	Yes	No	Yes	Yes	Normal
TRPGH2B	No	Yes	Yes	Yes	Normal
TRPGH3B	Yes	No	Yes	Yes	Special

* H1A and H2A are not used for new applications. TRPGH3B features special handling of 28 V control power and is otherwise identical to a TRPGH1B. Consult factory for additional details.

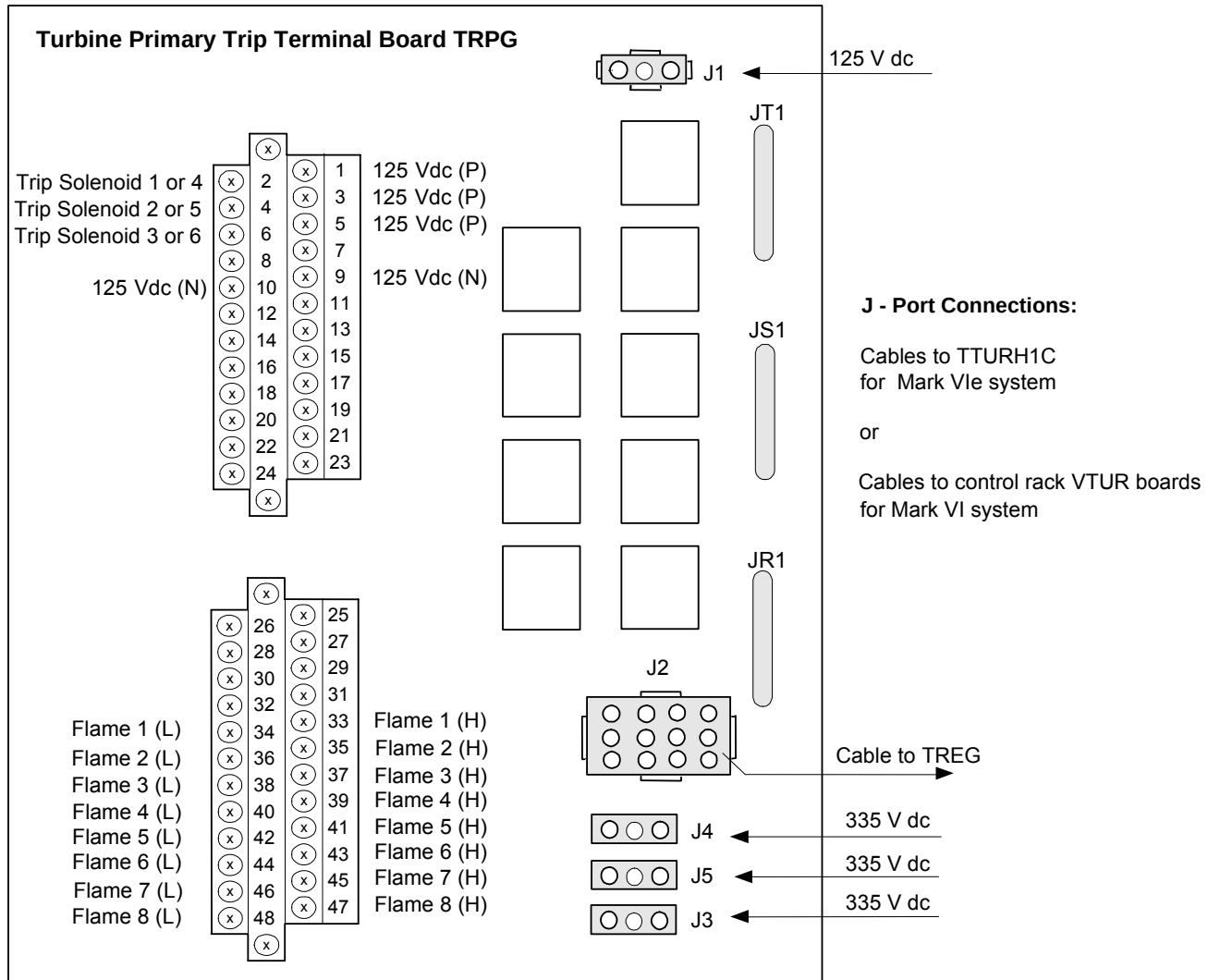


TRPG Terminal Board and Cabling

Installation

Connect the wires for the three trip solenoids directly to the first I/O terminal block.
Connect the wires for the flame detectors (if used) to the second terminal block.
Connect the power for the flame detectors to the J3, J4, and J5 plug.

Connect the 125 V dc power for the trip solenoids to the J1 plug. Transfer power to the TREG board using the J2 plug.



Up to two #12 AWG wires per point with 300 V insulation

Terminal blocks can be unplugged from terminal board for maintenance

TRPG Terminal Board Wiring

Note A metal oxide varister (MOV) and a current limiting resistor are used in each ETD circuit

The primary overspeed trip comes from the controller and is passed to the I/O pack/board, and then to TRPG. TRPG works in conjunction with the TREG board, which is controlled by the emergency overspeed system. This TRPG/TREG combination can drive three ETDs.

Flame Detectors

The primary protection system monitors signals from eight Geiger-Mueller[®] flame detectors. With no flame present, the detector charges up to the supply voltage. The presence of flame causes the detector to charge to a level and then discharge through TRPG. As the flame intensity increases, the discharge frequency increases. When the detector discharges, the I/O pack/board and TRPG convert the discharged energy into a voltage pulse. The pulse rate varies from 0 to 1,000 pulses/sec. These voltage pulses are fanned out to all three modules. Voltage pulses above 2.5 volts generate a logic high, and the pulse rate over a 40 ms time period is measured in a counter.

Specifications

Item	Specification
Trip solenoids	3 solenoids per TRPG
Solenoid rated voltage/current	125 V dc standard with up to 1 A draw 24 V dc is alternate with up to 1 A draw (H1B, H2B, H3B)
Solenoid response time	L/R time constant is 0.1 sec
Current suppression	MOV on TREG
Current economizer	Terminals for optional 10 Ω , 70 W economizing resistor on TREG
Control relay coil voltage supply	Relays are supplied with 28 V dc from JR1, JS1, and JT1
Flame detectors	8 detectors per TRPG
Flame detector supply voltage/current	335 V dc with 0.5 mA per detector

Diagnostics

The I/O board runs the TRPG diagnostics. These include feedback from the trip solenoid relay driver and contact, solenoid power bus, and the flame detector excitation voltage too low or too high. A diagnostic alarm is created if any one of the signals go unhealthy (beyond limits). Connectors JR1, JS1, and JT1 on the terminal board have their own ID device, which is interrogated by the I/O board, and if a mismatch is encountered, a hardware incompatibility fault is created. The ID device is a read-only chip coded with the terminal board serial number, board type, revision number, and the plug location.

Configuration

There are no jumpers or hardware settings on the board.