

Section IV - PIII and PTIII

Over Temperature Protectors

The PIII/PTIII series is recommended for fluoropolymer sheathed heaters where over temperature could result in sheath damage and/or fire hazard.

PIII/PTIII works with PIIIA, the Over Temperature Board, to provide sheath and fire hazard protection through the power contactor. PIIIA is a temperature controller switch with built-in thermocouple testing, momentary “on-board” reset holding circuitry and output contacts that interconnect with the process temperature controller and heater power contactor. The enable terminals provide the ability for loop devices such as level probes, high temperature cutoffs, and so on, to interrupt heater power. You can install a virtually endless loop of interrupt devices (normally closed), linked together in series. See Convert PIII/PTIII/PTI/PTII For Loop Devices..

The PIII/PTIII miniature insulated thermocouple, installed between the heater surface and fluoropolymer sheath, extends to PIIIA with a factory installed temperature set point. This provides the ability for PIIIA to check PIII/PTIII thermocouple status and interrupt the heater power contactor/heater power in the event of an over temperature condition or thermocouple failure. An on-board LED provides indication of proper function. In most cases, you can field-convert PIIIA for over temperature protection of fluoropolymer heaters with PTI or PTII. See Convert PIIIA For PTI/PTII Operation.

Multiple PIII/PTIII s require multiple PIIIA Boards wired to the heater power contactor.

IVA - PIII/PTIII Installations



Warning



Ignition Source



Shock Hazard

Hazardous voltage environments—only qualified electricians should perform Converted PIIIA Board Tests and Troubleshooting which occurs in an open enclosure. Use Extreme care as live circuits are exposed, posing electrocution risk. Proper tools, procedures and protective insulating gloves are required.

The PIII/PTIII extension wires operate at millivolt levels; exercise care when installing this system to ensure proper function. Never apply power of any voltage level to the PIII/PTIII extension wires, as irreparable damage will result.

Never attempt field adjustment of the over temperature set point (dropout temperature) as this can initiate dangerous operating conditions. The over temperature set point is factory adjusted to afford protection for the heater sheath, nonmetallic tanks, tank linings and auxiliary equipment.

Extend Factory / Replacement Wiring

Use only #20 AWG or larger type J thermocouple extension wire when connecting the on-board relay to the power contactor and alarm circuitry to minimize line loss and associated temperature error. Always observe polarity at all connections.

- red lead (negative) is wired to J-
- white lead (positive) is wired to J+

Convert PIIIA For PTI/PTII Operation

- 1 Remove thermocouple lead; Figure 7A.
- 2 Remove and retain enable jumper, Figure 7B.
- 3 Install enable jumper at Thermocouple terminals J- and J+, Figure 7D.
- 4 Install PT-II or PT-I at Enable Terminals.
- 5 Verify conversion before placing heater in service; perform Converted PIII/PIIA Tests.
- 6 Convert PIII/PTIII/PTI/PTII For Loop Devices.
- 7 On the existing enable loop, Figure 7, C, disconnect one leg of the enable circuit.
- 8 Install any gauge jumper wire across J- and J+, Figure 7, E.
- 9 Tie PTII or PTI into loop, Figure 7E.
- 10 Verify conversion before placing heater in service; perform Converted PIII/PIIA Tests.

Troubleshooting and Testing PIII/PTIII/PIIA

PIIA electrically latches by a momentary closure of the reset/start terminals. If PIIIA unlatches or is prevented from latching, check for these items:

- Power interruption (incoming power dropout)
- An open condition in enable terminals (if used)
- PIII/PTIII thermocouple temperature above set point
- Broken/open PIII/PTIII thermocouple or leads
- Reversed thermocouple connection

- Non-illuminated LED—this does not indicate fault condition. If you apply incoming power prior to depressing the reset button, the LED may or may not illuminate (it is wired in the thermocouple “sense” circuitry). Upon reset, the LED should extinguish and remain off.
- Steady Illuminated LED During Reset—Upon attempting to reset, if the LED remains illuminated and the PIIIA relay fails to latch you probably have an open (bad or broken) connection. Either one or both thermocouple leads are not connected or open, or the PIII/PTIII thermocouple in the heater is open.
- PIIIA Reset —If the PIIIA shuts the controller down after a period of time in operation, and reset attempts result in short time operation only, observe the LED. Prior to reset, an illuminated LED indicates a reversed lead condition or incorrect polarity condition. Examine all connections and correct wiring.
- Shorted Thermocouple Leads—shorted leads will result in an ambient temperature signal. If undetected, this condition can result in damage to heater and/or damage to the tank. Always inspect for and correct any possible shorted or damaged thermocouple leads.

Converted PIII/PIIIA Tests

Complete tests before placing heater in service:

- 1 Ensure control set point is above current tank temperature.
- 2 Turn ON control and press RESET/START. The control alarm should silence and the HEATER ON light should illuminate.
- 3 If control does not function as described, turn OFF and recheck wiring.
 - ensure PTII or PTI is wired to enable terminals
 - ensure enable jumper is connected to J- and J+
 - with correct wiring and jumper connections verified, repeat step 2 If you successfully perform step 2, continue to step 4
- 4 Turn OFF power and remove one of the Protector leads connected to enable terminals.
- 5 Turn ON control and press RESET/START.
- 6 The control alarm should remain in alarm mode and the HEATER ON light should remain extinguished.
- 7 If the HEATER ON light is illuminated and/or the control alarm is not in alarm mode, verify at

least one lead is disconnected from the enable terminal and repeat step 4

8 If the control alarm remains in alarm mode and the HEATER ON light remains extinguished, reconnect Protector leads to enable terminals.

9 Consult factory for further corrective action.

10 When you successfully complete the tests above, verify wiring for tight connections and place heater into service.

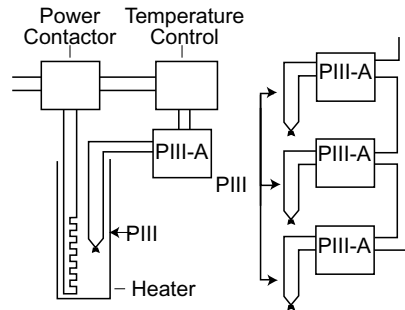


Figure 6 PIII/PTIII Typical Installation

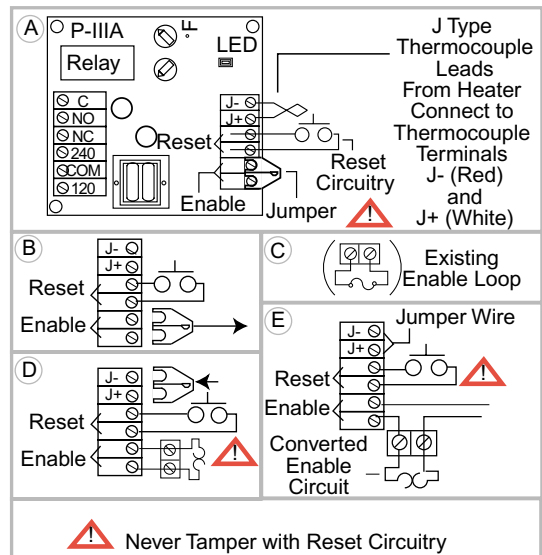


Figure 7 Wiring to Convert PIIIA for PTI/PTII and Loop Devices