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84158
TPI Control Thermostat
Tank Aquastat Control with 10K Sensor

Applicable Trin & Stor Models
- S40, S50, S65, S80, S120
- S80SR, S120SR
- ST80, ST120
- SL35, SL50, SL70

Kit Contents
- 1 x 84158 TPI Control Thermostat

Tools Required
- Screw Driver, Philips #2

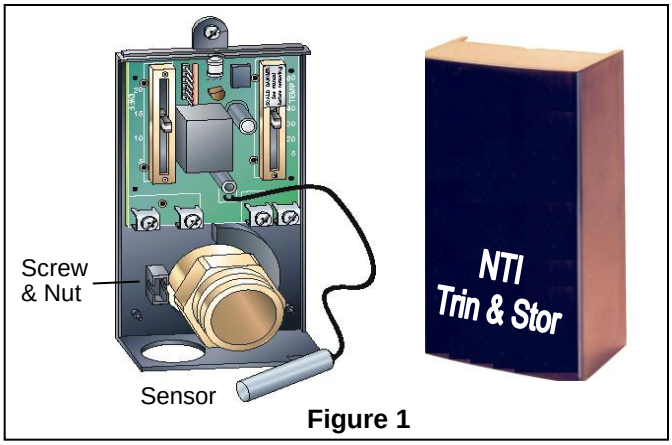

Figure 1

TPI Specifications
- Dimensions 5.0"H x 2.6"W x 1.7"D
- Maximum control power 0.6 W
- Adjustment increment 1°F
- Temperature differential range 5°F to 20°F
- Control voltage 24VAC
- TT contact rating 125V, 10A
- Temperature set point range 110°F to 160°F
- 10k sensor accurate to within 2 degrees

Install the TPI Thermostat in accordance with the boiler installation manual and these installation instructions. Refer to Figures 6 to 9 for possible configurations complete with drawings.

⚠ WARNING **Avoid Shocks** - To avoid electrical shock, turn off electrical power prior to opening any electrical box on the unit. Ensure the power remains off while any wiring connections are being made. Failure to follow these instructions may result in component failure, serious injury or death.

⚠ WARNING **Wire Protection** - When passing 110VAC wiring through the TPI housing, the installer must use appropriate conduit and a chase nipple to securing the wiring and prevent chafing. Failure to follow these instructions

⚠ WARNING **Component Damage** - DO NOT use TPI if it has been under water. Failure to replace damaged electrical components may result in component failure, serious injury or death.

IMPORTANT **Solar Applications** - The TPI is not suitable for solar domestic hot water systems. Use the high temperature sensor / thermostat control provided with the solar thermal system.

TPI Thermostat Wiring
24VA Transformer (Hot, GND) - The TPI requires a 24VAC power supply to function. This power supply may be provided directly from the boiler (check with boiler manufacturer's instructions) or via a field provided 24VAC transformer. Note the TPI may draw up to 0.6 W. Refer to Figures 5 to 8 for configuration examples on the last page.

Pump/TT Output Contacts - The TPI is equipped with a normally open isolated end switch (Pump/TT) that closes when the tank temperature drops below the TPI setting. Connect the Pump/TT contact to the DHW specific input on boilers equipped with DHW priority capabilities or to the priority zone input on zone controllers Figure 9. Alternately, the Pump/TT contact could be used to power a zone valve, see Figure 7. Note the Pump/TT contact is rated for 125V@10A.

⚠ CAUTION Turn off power at the source before working on the water heater or tank. Failure to do so will result in an electrical shock when removing wiring from the TPI.

Installation Instructions

1) Turn off all electrical power to the water heater and boiler before commencing installation.
2) **Mounting the TPI** - Position the hole on the back of the TPI over the immersion well. Mount flush against the tank.
3) Secure the TPI to the immersion well with the screw and nut provided with the TPI (Figure 1).
4) **Installing the Sensor** - Slide the temperature sensor all the way into the immersion well until it contacts the end. The temperature sensor will measure temperature adequately by resting against the bottom of the immersion well. A complete installation does not need the sensor to make intimate contact with the entire well surface to work properly.
5) Temperature sensor is soldered to the TPI. DO NOT bend soldered connection sharply or overwork it.
6) **Wiring the TPI**
   - *Low Voltage* (Figure 2) - Run all 24VAC wiring through the square notch in the bottom of the TPI case. Connect 24VAC supply to 24VAC Terminals on the bottom right corner of the TPI.
   - *Line Voltage* (Figure 3) - If using the PUMP/TT contacts to operate a circulator or another 110VAC output, use the knockout with appropriate close nipple at the bottom of the TPI case.
7) **Adjusting the Temperature** (Figure 4) - Locate the temperature setting slide on the right-hand side of the TPI.
8) The Factory setting is 120ºF (49ºC). To adjust the temperature setting, slide the lever to the desired setting using the indicator scale. Normal range is 100ºF to 140ºF.
9) If domestic hot water is to be stored at temperatures above 115°F (46°C), an anti- scald mixing valve shall be installed on the tank's hot water outlet to mix the water down to safe temperature levels.
10) If setting temperature above 140ºF, read "Safe Temperatures for Potable Water" before removing the SCALD DANGER label on the temperature slide. Higher water temperatures mandatory in Canada may not be permitted in certain US jurisdictions.
11) **Operation and Differential** (Figure 4) - Locate the differential setting slide on the left-hand side of the TPI. Factory setting is 10°. Slide the lever to the desired setting, using the indicator scale.
12) The TPI will close the output contact (call for DHW) when the temperature drops below the setting minus the differential. A small differential with high water setpoints can result in boiler cycling and reduce efficiency.
13) Once wiring is complete, turn on electrical power. Indicator light at the top of the case will be solid green if powered.
14) Replace TPI cover and secure with Black Screw provided.
15) Check water temperature at faucet to verify desired temperature is achieved.

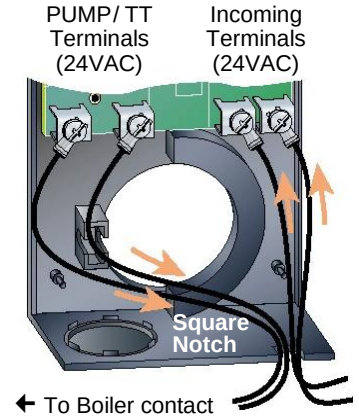

Figure 2

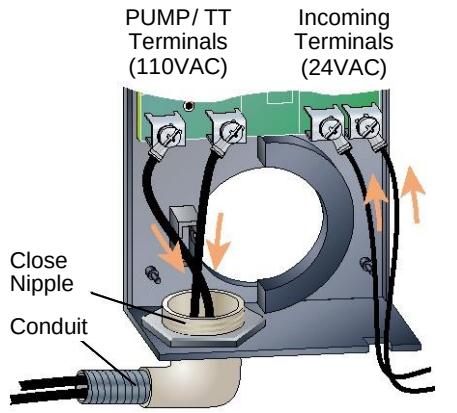

Figure 3

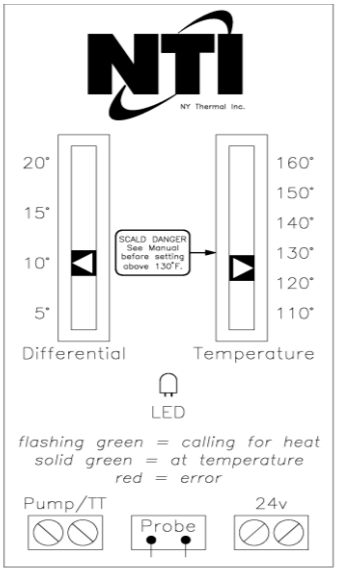

Figure 4

TPI and Boiler Controls

TPI wired to Boiler with DHW Input (Figure 6) - TPI output contacts "Pump/TT" are connected to the boiler's dedicated DHW input. Typically the boiler will achieve DHW priority via circulator control. 24VAC is provided by a field supplied transformer or via a 24VAC supply from the boiler. Refer to boiler I&O manual.

TPI wired to Zone Valve (Figure 7) **-** Typically used in applications where the boiler does not accept a dedicated DHW input. 24VAC is provided by a field supplied transformer or via a 24VAC supply from the boiler, TPI output contacts "Pump/TT" complete 24VAC to a zone valve. Zone valve end switch is connected to boiler heat (T-T) input.

TPI wired to NTI Trinity Boiler (Figure 8) - For illustration purposes, a Trinity LX boiler is shown and described I this configuration. The LX provides DHW priority. To connect the TPI to an LX boiler, wire the TPI 24VAC input to barrier contacts "COM" and "R"; connect TPI output contacts (Pump/TT) to the DHW input terminals, "DHW" and "Sensor COM". Refer to boiler application manual, Appendix B (Lx models) or Trin & Stor installation manual.

TPI wired to DHW Priority Zone (Figure 9) - 24VAC is provided via the transformer incorporated in the zone controller, refer to zone controller I&O manual for details. TPI output contacts "Pump/TT" are connected to the priority zone input (e.g. Zone 4). Priority for DHW is achieved via the zone controller when the priority switch is activated.

Troubleshooting Instructions

Review the indicator light status in Table 1 and Figure 5 as a troubleshooting guide for the TPI Control Thermostat.

Table 1 - Indicator Light Status

Unlit	No power to unit.
Solid Green	Powered. Temperature is in range. No demand. Demand satisfied. Pump/TT output should be open.
Flashing Green	Calling for heat. Temperature is out of range. Pump/TT output should be closed.
Flashing Red	TPI has sensed failure. Replace TPI module.

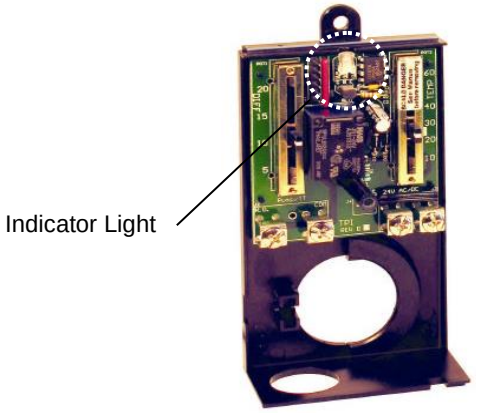

Figure 5

Figure 6 - TPI wired to Boiler with DHW Input

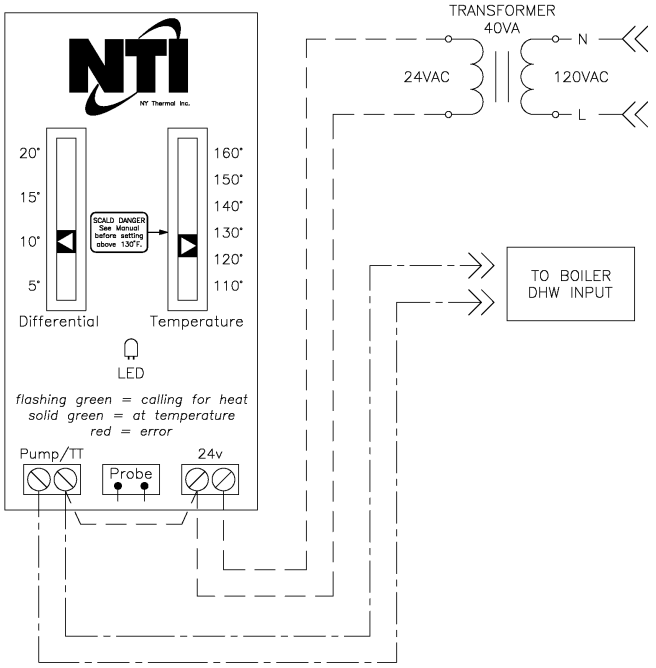

Figure 7 - TPI wired to Zone Valve

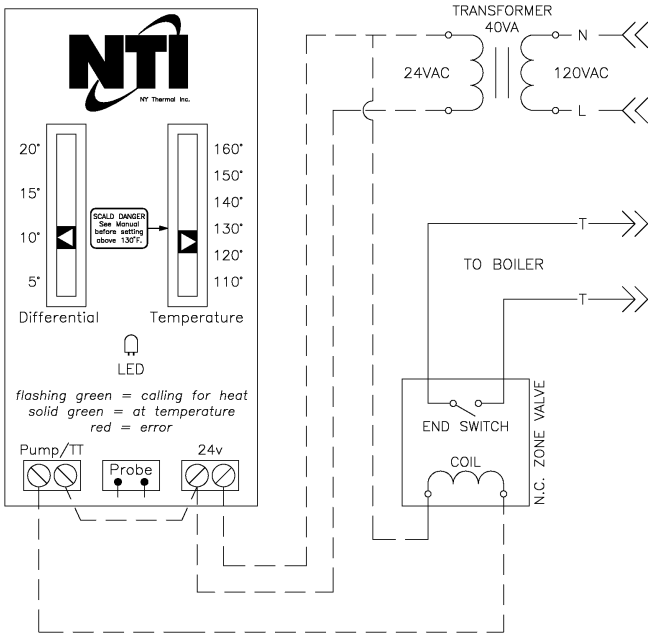

Figure 8 - TPI wired to NTI Trinity LX Boiler

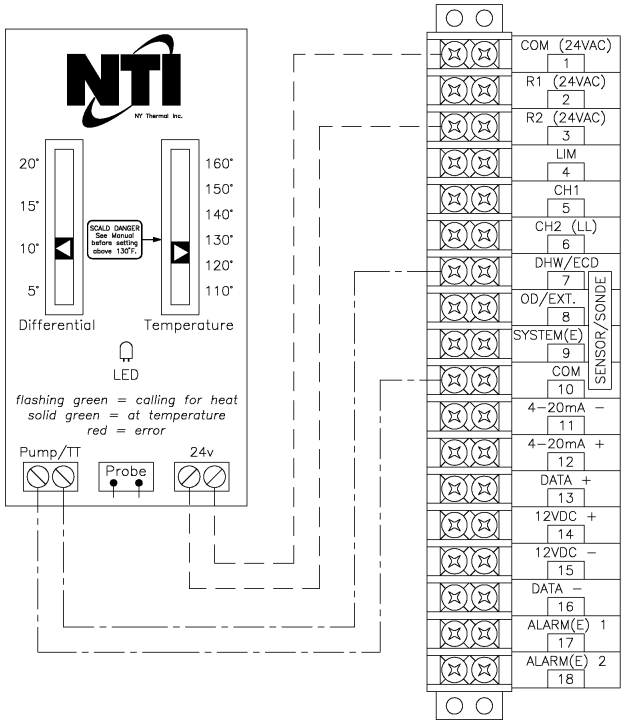

Figure 9 - TPI wired to DHW Priority Zone Controller