

VARI-PRIME™ Installation Kit for **NEOTHERM**®
 Modulating Boilers with EMEA Display
 Model NTH. Sizes 285–850 MBTU/h



FOR YOUR SAFETY: This procedure must be performed by a professional service technician, qualified in hot water boiler installation. Improper connections could create an electrical hazard, which could cause serious injury, property damage, or death.

VARI-PRIME™: A variable pump control that, when used with a variable speed pump, maintains a user-chosen temperature rise between the inlet and outlet of the boiler.

GENERAL PCB OPERATION:

1. The desired Delta T can be set to any of the following values by moving or adding jumpers to the **(JP2)** terminal on the control:
See Figure 2.
 15 deg F/8 deg C 20 deg F/10 deg C 25 deg F/13 deg C 30 deg F/ 16 deg C
 By adding a second jumper, one on "15 deg F" and one on "20 deg F", it is possible to achieve 35 deg F/19 deg C.
 By adding a second jumper, one on "15 deg F" and one on "25 deg F", it is possible to achieve 40 deg F/22 deg C.
2. As shipped, the VARI-PRIME has a jumper on the **(JP4)** terminal, to operate a 0-10 VDC output. If a 4-20 mA output is needed, move the jumper to the **(JP5)** terminal.
3. VARI-PRIME can operate in °F or °C. A jumper on the **(JP1)** terminal has set the default to °F. Remove that jumper for °C.
4. If Main Gas valve is "OFF" AND a call for heat is "TRUE" then the PCB overrides the PID control and runs the pump output at 100% (10 VDC, or 20 mA).
5. Once the Main Gas valve is energized the PCB will maintain pump output at 100% for 60 seconds to allow the system to stabilize. Once the 60 second timer has expired, the PCB will then run the pump output speed based on the jumper setpoint.
6. When "T-" is satisfied, the PCB will run pump at 100% output for the duration of the pump overrun time.
7. The VARI-PRIME PCB has a low end cap to prevent nuisance low flow trips. The cap is factory programmed to 2 VDC.
8. Factory settings are: **Degrees** - Fahrenheit **Output Signal** - 0 -10VDC

INSTALLATION INSTRUCTIONS

P.I.D. CONTROL ADJUSTMENT:

With Variable Speed Pumping, the boiler control **P.I.D.** needs to be adjusted.

- These settings are found in your NeoTherm controls under:
 Advanced Setup>CH Config>CH Config

It is recommended to start with:

P = 20 **I** = 15 **D** = Factory set-point

Depending on pump sizing and application requirements; these **P.I.D.** settings may need to be used to fine-tune boiler performance.

- Once you have adjusted the **P.I.D.** contols, then disconnect power source from boiler.
- Remove front panels from boiler.
- Mount the VARI-PRIME control box in desired location. The side of the boiler is an acceptable mounting location.

Important: Ensure there is nothing on the back side of the jacket before mounting.

- Run the wires from the VARI-PRIME control box, through the chosen 'knock-out' hole and into the boiler. **See Figure 1.** Power wires must be run through conduit from the VARI-PRIME box to the boiler. The Black and White wires are for the 120V pump contact.

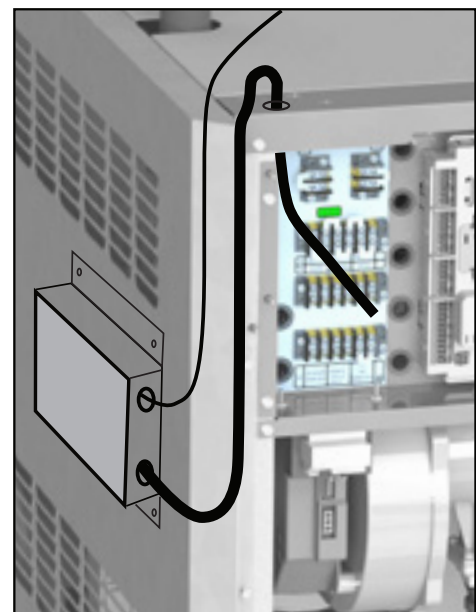
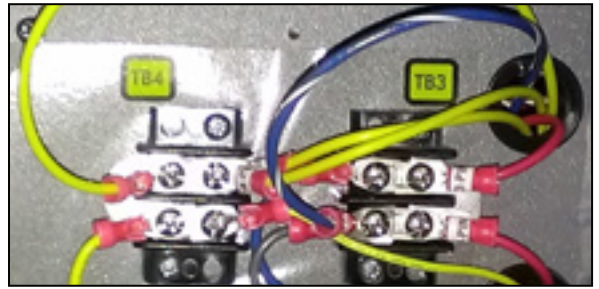


Figure 1

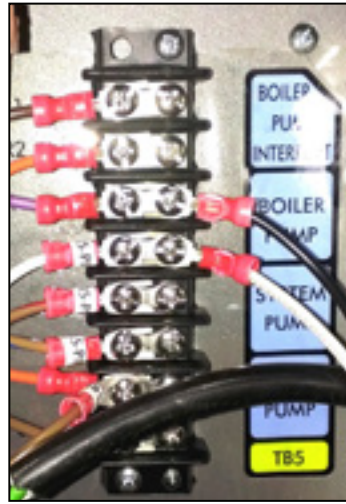
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POWER CONNECTIONS:

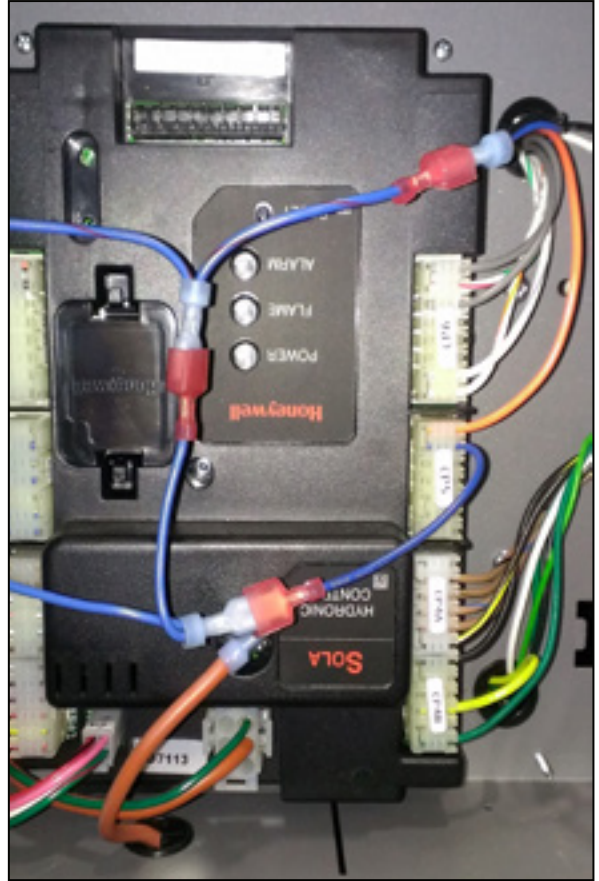
- Connect the Blue wire anywhere on the 24V+ boiler Terminal Block (TB3).
- Connect the Yellow wire anywhere on the 24V Neutral boiler Terminal Block (TB4).



- Connect the White wire to the boiler pump connections on boiler Terminal Block (TB5) across from the other white wire.
- Connect the Black wire to the other boiler pump connection on boiler Terminal Block (TB5).



- Locate the Blue Gas Valve power wire coming from the Sola control. Trace the wire through where it passes into the back panel, and locate the first wire. Disconnect the male/female spade connection. Insert the VARI-PRIME connections as shown.



FIELD CONNECTIONS:

- Remove VARI-PRIME Cover.
- Remove the VARI-PRIME control box from the packaging and familiarize yourself with each connection point. **See Figure 2**

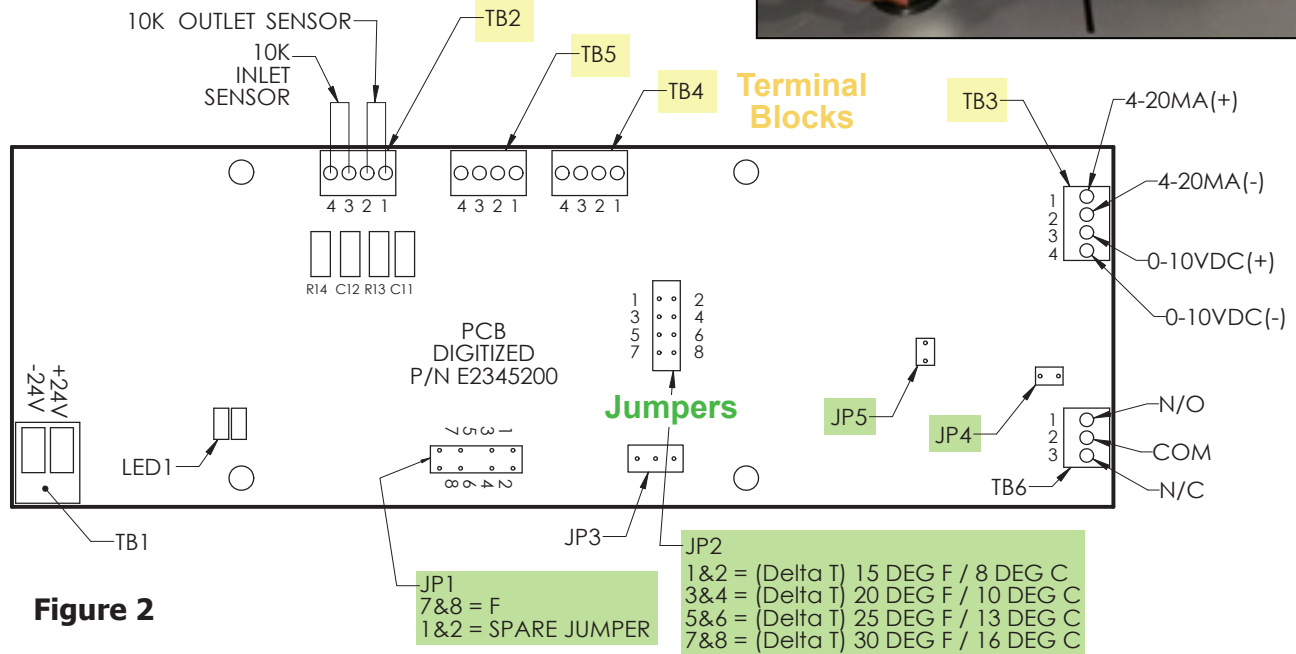
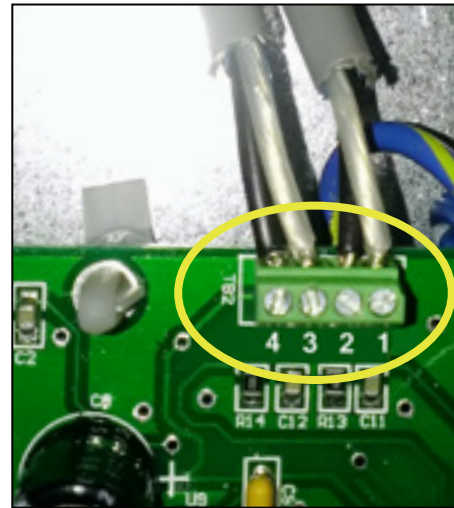


Figure 2

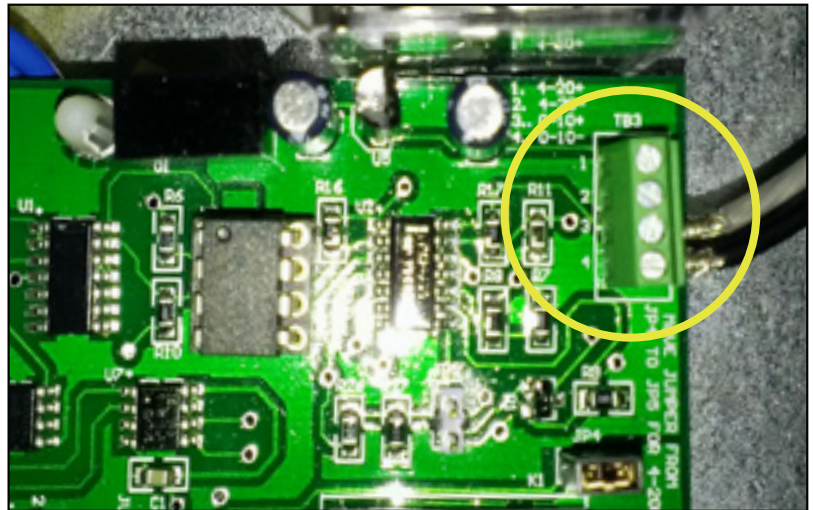
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FIELD CONNECTIONS: (continued)

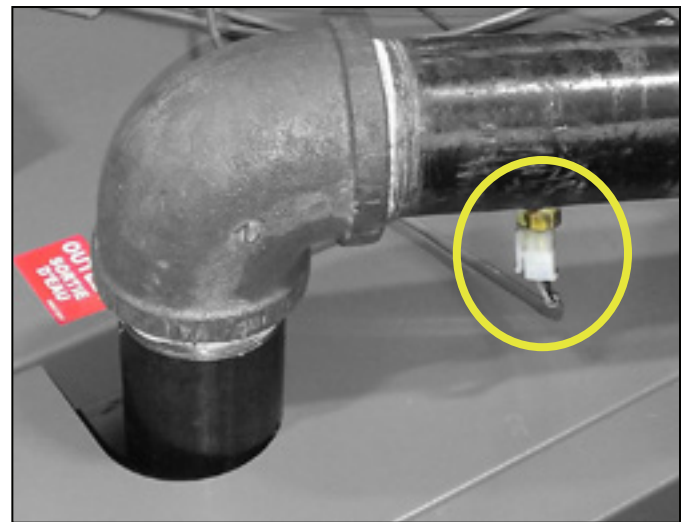
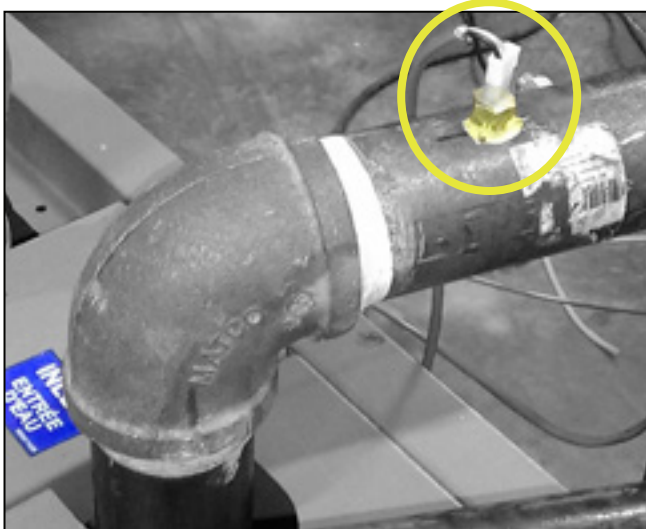
- Using the two (2) supplied thermistor cables, connect one Shielded cable to the 1 and 2 landing points on terminal block **(TB2)** of the VARI-PRIME board.
Important: This wire will be run to the OUTLET sensor.
- Connect the other Shielded cable to the 3 and 4 landing points on terminal block **(TB2)** of the VARI-PRIME board.
Important: This wire will be run to the INLET sensor.



- Connect one end of the VFD signal wire to the VFD on the chosen pump as instructed in pump manual. Connect the other end to the 3 and 4 landing points on terminal block **(TB3)**.
Important: #3 landing point is for 0-10 VDC (+) and #4 is for 0-10 VDC(-).



- Tap two 1/4" NPT threaded holes into water pipes for the sensors. One in the supply pipe and the other in the return. Both sensors need to be inserted into the pipe no more than 12" away from the outside of the boiler jacket. These two sensors will be the Delta T. (Note: Delta T is the difference between supply and return water temperatures) The amount of Delta T is chosen on Vari-Prime terminal block **(JP2)**. Install the Sensors.



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