



VARI-PRIME™ Installation Kit for **NEOTHERM® LC**

Modulating Boilers

Model NTH. Sizes 1000-1700 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-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.** controls, then disconnect power source from boiler.
- Remove front panels from boiler.
- Pull the sliding panel control straight outward, as shown.



Photo 1

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- Mount the VARI-PRIME control box at the top left corner of the control panel as shown in Photo 1 and Figure 1. Pre-drilled holes mark the mounting location.

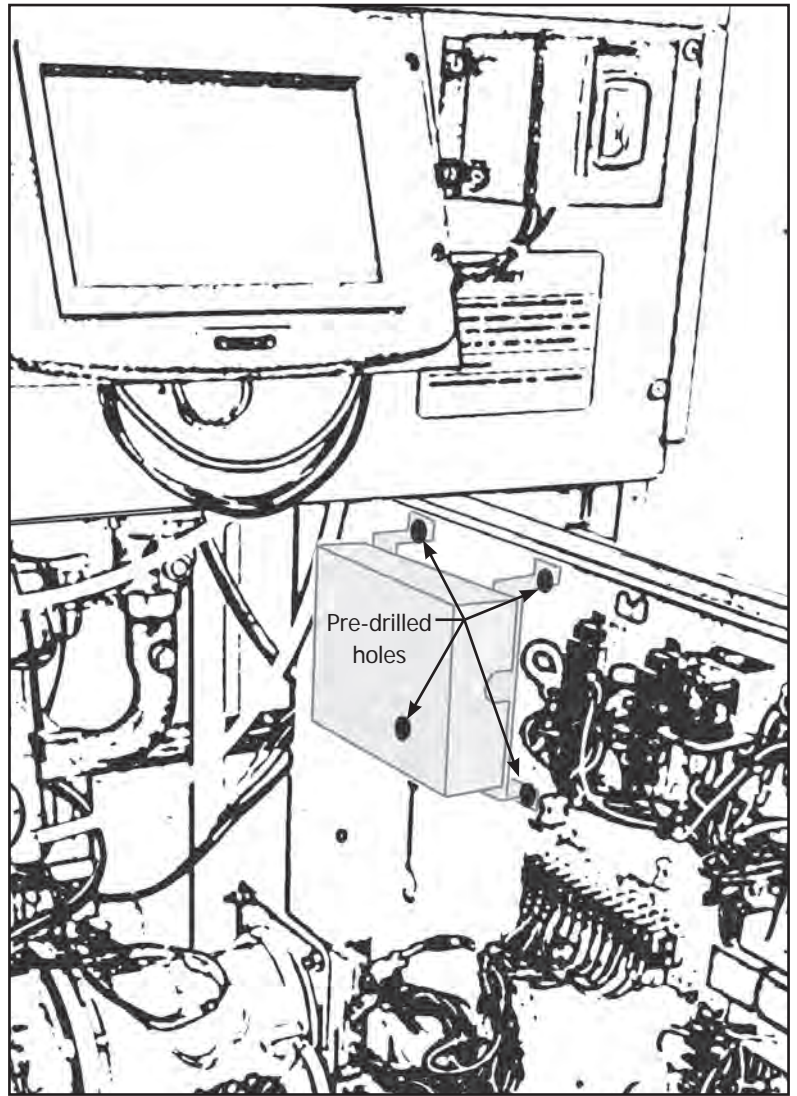


Figure 1

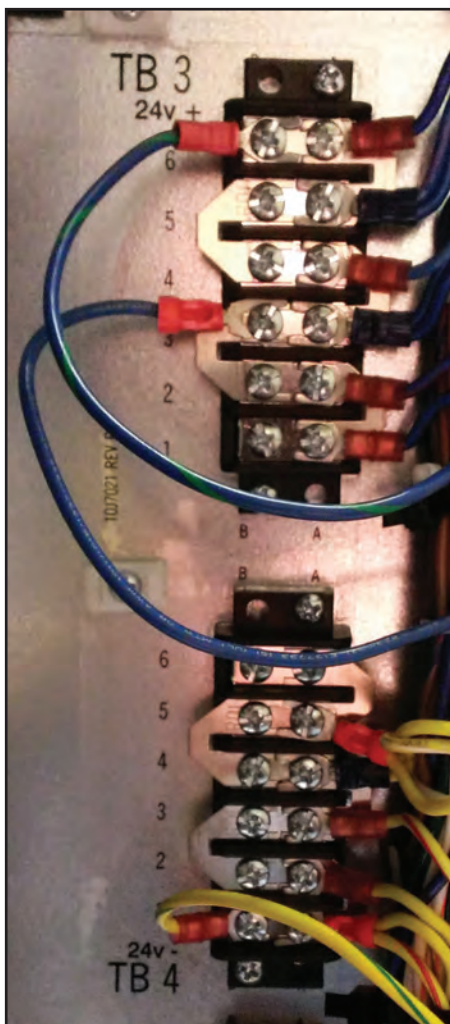


Photo 2

**POWER CONNECTIONS:**

**1000 MBTU/h** and **1700 MBTU/h**

- 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).

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## 1000 MBTU/h

- Connect the White wire to the boiler pump connections on boiler Terminal Block (TB5) across from the other white wire at location 4A.
- Connect the Black wire to the other boiler pump connection on boiler Terminal Block (TB5) at location 3A.

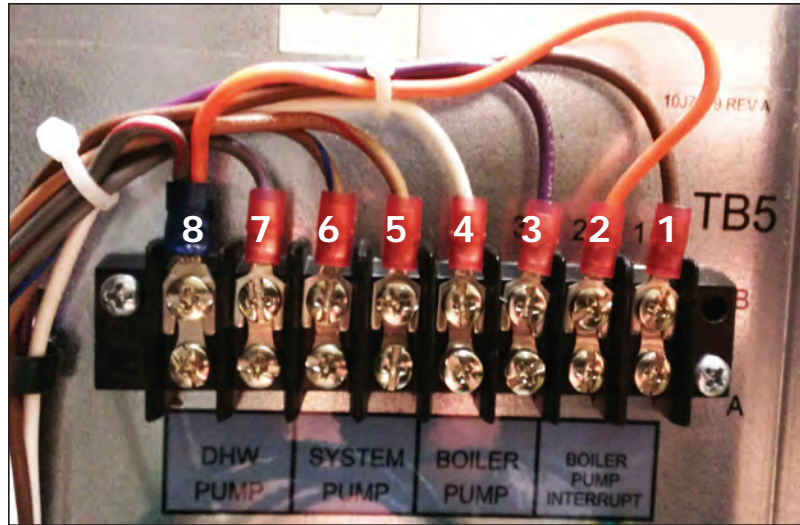


Photo 3

## 1700 MBTU/h

All NeoTherm LC 1700 units include a dry contact that requires an alternate power source.

- Land the field 120V supply onto the #4A boiler pump connection on the boiler terminal block (TB5).
- Connect the Black VARI-PRIME wire to the other boiler pump connection on boiler Terminal Block (TB5) at location 3A.
- Connect the white VARI-PRIME wire, the field 120V supply neutral wire, and the customer supplied 120VAC pump relay neutral wires all together. (See wiring diagram on last page).

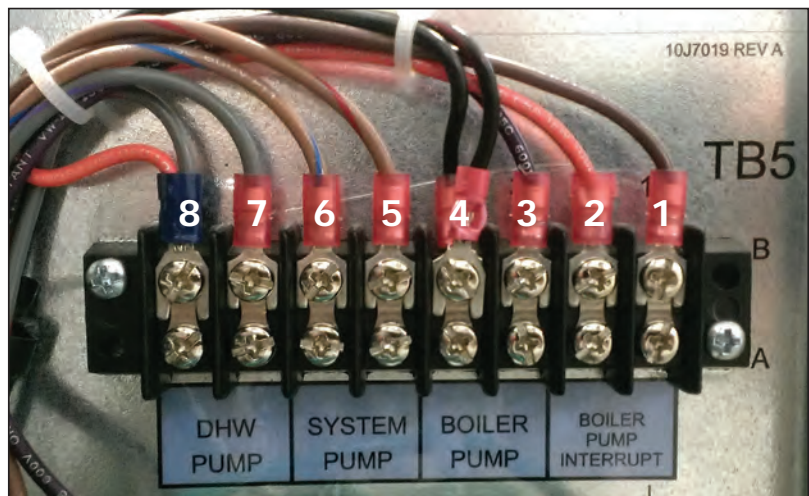


Photo 4

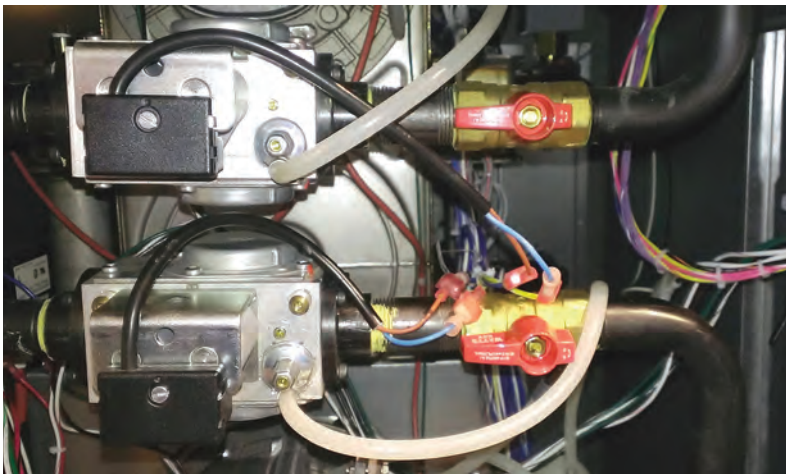


Photo 5

## 1000 MBTU/h

- Locate the Brown wire coming from the top gas valve. Trace the wire to the spade connection with the Blue/White wire. Unplug the connectors and insert the Blue wire and connectors from the VARI-PRIME unit.
- Locate the Brown wire coming from the bottom gas valve. Trace the wire to the spade connection with the Blue/White wire. Unplug the connectors and insert the Blue/Red wire and connectors from the VARI-PRIME unit.

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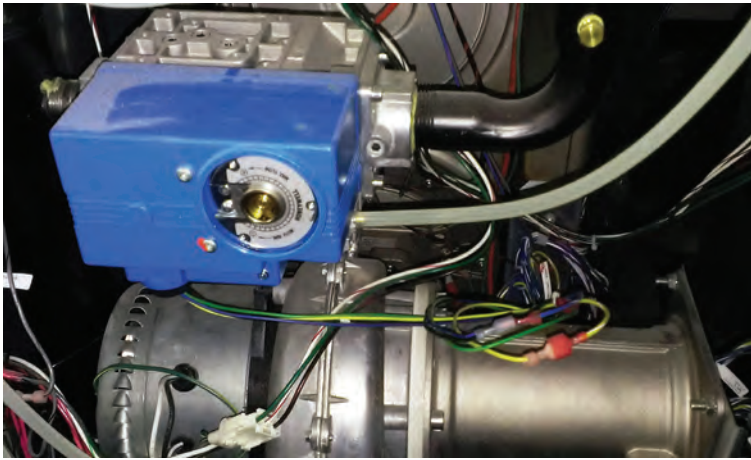


Photo 6

### 1700 MBTU/h

- Locate the Blue and Black wires coming from the top gas valve. Trace the wires to the spade connection with the blue/white wire. Unplug the connectors and insert the blue wire and connectors from the VARI-PRIME unit.
- Locate the Blue and Black wires coming from the bottom gas valve. Trace these wires to the spade connection with the Blue/White wire. Unplug the connectors and insert the Blue/Red wire and connectors from the VARI-PRIME unit.

### 1000 MBTU/h and 1700 MBTU/h

#### FIELD CONNECTIONS:

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

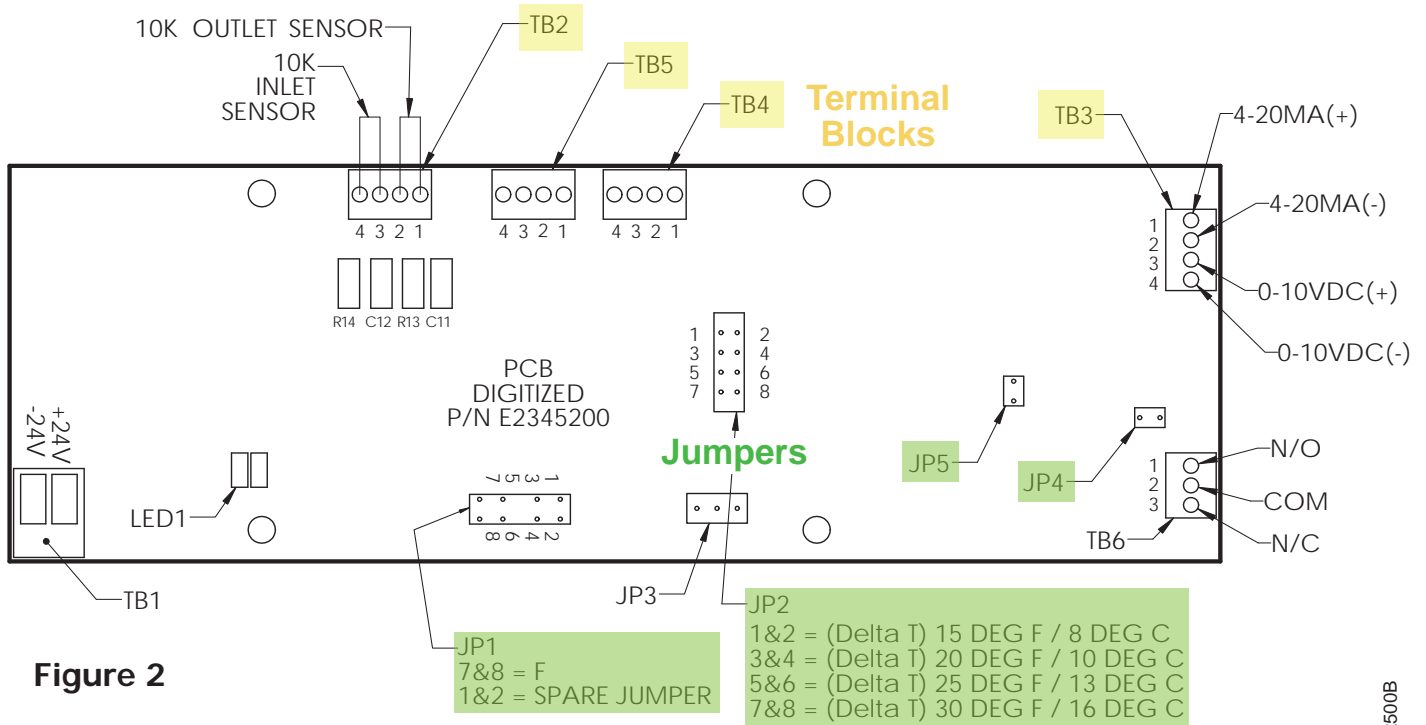


Figure 2

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## 1000 MBTU/h and 1700 MBTU/h

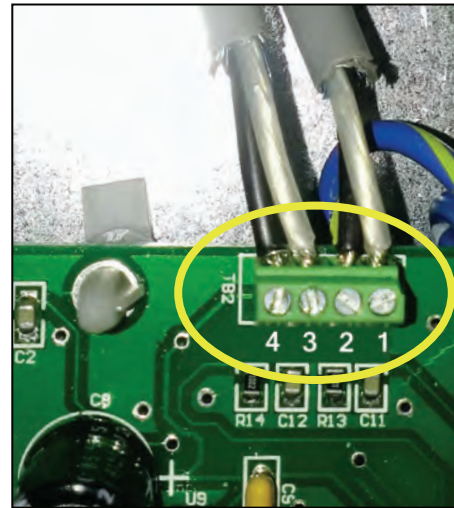
### FIELD CONNECTIONS: (continued)

- 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.

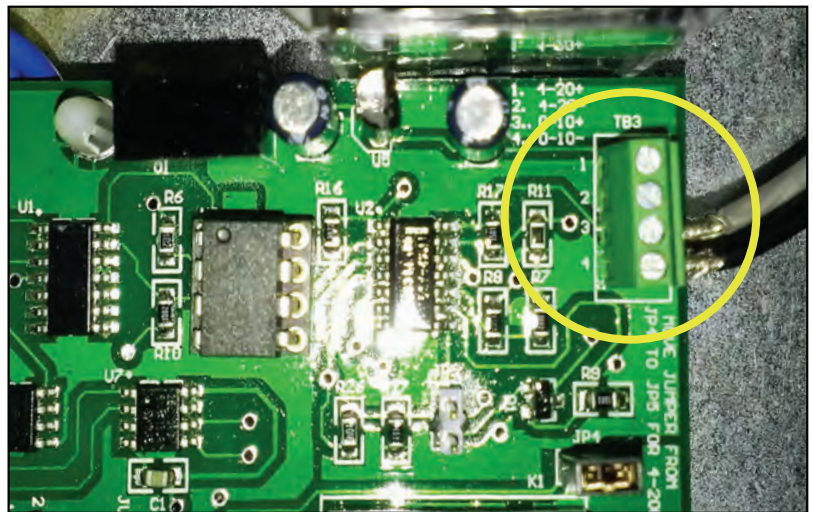
- Connect the other Shielded cable to the 3 and 4 landing points on terminal block (TB2) of the VARI-PRIME board.

**Important:** This wire will be run to the INLET sensor.

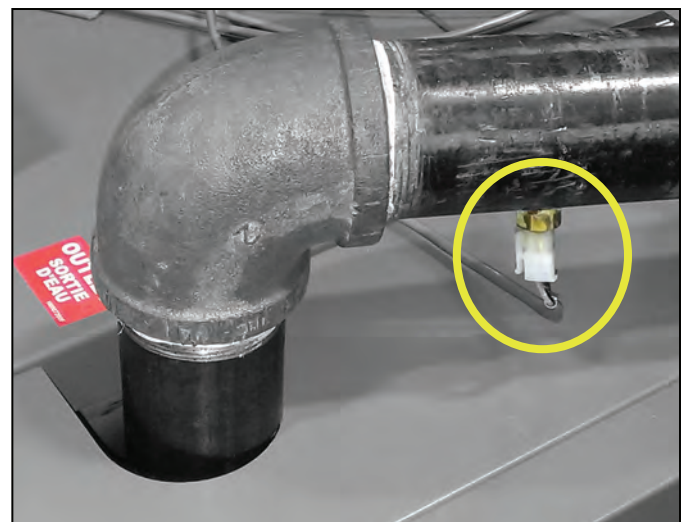
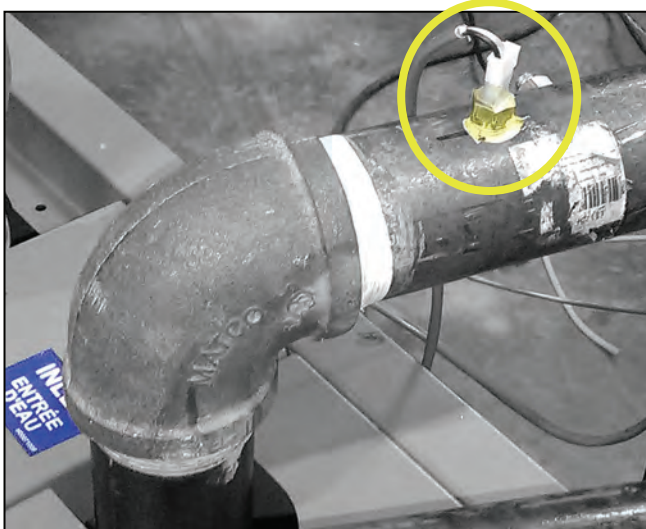


- Connect one end of the VFD signal wire to the VFD on the chosen pump as instructed in pump manual. Connect the other end to the 3 and 4 landing points on terminal block (TB3).

**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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