

# TEMPTRAC INTERFACE GUIDE, GATEWAY SETUP AND POINTS LIST

**Installation and interface must be performed by a qualified controls technician.**

**IMPORTANT:** THIS MANUAL CONTAINS INFORMATION REQUIRED FOR INSTALLATION, INTERFACE AND CONFIGURATION OF THIS EQUIPMENT. READ AND FOLLOW THE INFORMATION IN THIS MANUAL AND ALL OTHER PROVIDED INSTRUCTIONS, LABELS AND MARKINGS BEFORE INSTALLING, OPERATING OR SERVICING THIS UNIT.



## Contents

OVERVIEW OF INTERFACE METHODS: .....	2
TEMPTRAC PROTOCOL .....	4
ITEMS REQUIRED FOR GATEWAY INTERFACE: .....	4
ITEMS REQUIRED FOR MODBUS DIRECT INTERACE: .....	4
IDENTIFY EQUIPMENT: .....	5
WIRING BAS TO GATEWAY AND THEN GATEWAY TO TEMPTRAC: .....	6
WIRING OF TEMPTRAC TO BAS (Direct, no Gateway): .....	7
GATEWAY CONFIGURATION CONNECTION: .....	7
CONFIGURE GATEWAY DIP SWITCHES: .....	8
CONFIGURE THE GATEWAY USING THE HTML INTERFACE: .....	9
CONFIRM OPERATION: .....	10
TROUBLESHOOTING GATEWAY: .....	10
HOOKUP OVERVIEW: .....	11
APPLICATION SPECIFICS: .....	12
POINTS LIST: .....	16
TYPICAL POINTS: .....	16
ALL POINTS INCLUDING ADVANCED: .....	18
ADVANCED MODBUS LIST: .....	25

---

**TO THE INSTALLER / CONTROLS INTEGRATOR:** After installation and integration, these instructions must be given to the equipment user or left near the appliance.

**SPECIAL INSTRUCTIONS TO THE OWNER:** Retain this manual for future reference. These instructions contain important integration information that will help you in maintaining and operating this appliance.

---

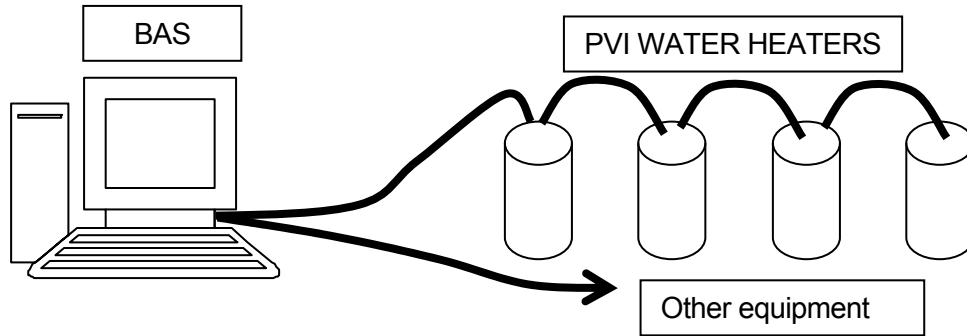


# TEMPTRAC INTERFACE GUIDE, GATEWAY SETUP AND POINTS LIST

## OVERVIEW OF INTERFACE METHODS:

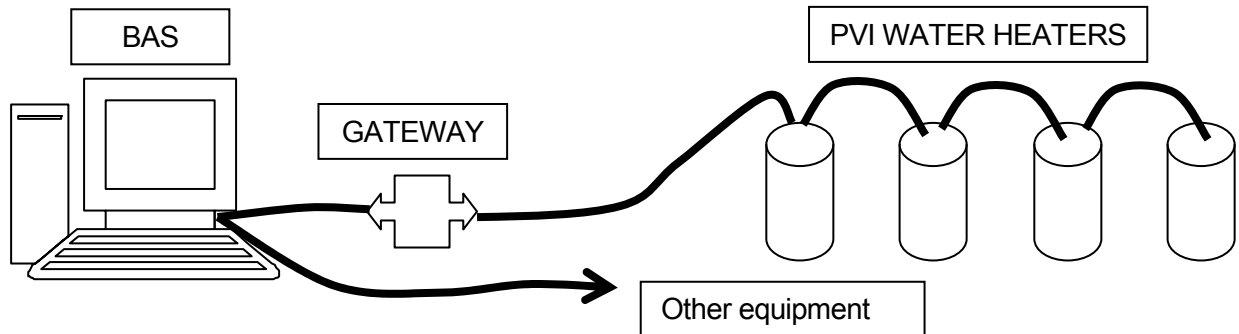
This document is a quick reference for connecting the TempTrac water heater / boiler control to a Building Automation System (BAS). Direct connection via MODBUS RTU or using a gateway to interface to protocols other than MODBUS RTU are the methods covered in this manual.

### BAS to Heaters direct, using MODBUS RTU:



Building Automation System (BAS) connecting directly to water heaters using MODBUS RTU twisted pair wire. (Wiring is RS-485 physical layer.)

### BAS to heaters using a Protocol Gateway:



Building Automation System (BAS) connecting to a PVI gateway. This can provide interface to BACNET MSTP, BACNET IP, LONWORKS, and MODBUS TCP. (Wiring from gateway to heaters is RS-485 physical layer. Wiring from BAS to gateway will depend on Protocol.)

### BAS to heaters using discrete connections:

This is simply control of the heater using the external ENABLE/DISABLE contacts, remote equipment contacts and the alarm contacts. See wiring diagram of equipment for details.

# TEMPTRAC INTERFACE GUIDE, GATEWAY SETUP AND POINTS LIST

## TempTrac Heater MODBUS fixed settings:

Most of the MODBUS RTU and Port settings are not adjustable

Baud Rate: 9600bps (Not adjustable)

Data Length: 8 bit (Not adjustable)

Parity: None (Not adjustable)

Stop Bits: 1 (Not adjustable)

Start/Stop: Silent interval of 3 characters minimum

Minimum Time Between Retry: 500 msec.

Maximum read command is 5 words

## Steps to change the TempTrac MODBUS address:

Editing parameters should be done without any device trying to communicate through the MODBUS port. To avoid interference from a gateway or BAS, you should unplug the MODBUS adapter port on the back of the TempTrac at the white header, while making changes to the TempTrac parameters.

The first step to interfacing with a TempTrac or group of TempTracs will be the assignment of the address number for each boiler. The default for TempTrac is Address #1. You can assign any number in the range of 1-247. This is the limitations of the MODBUS RTU standard.

The MODBUS address is the **Adr** parameter, and it is in the **Pr2** menu.

Enter the Programming mode by pressing the **SET** and **DOWN** key for more than 3 seconds. (Lead with the **SET** key.)

Pressing the **DOWN** key, parameters will display in top, and value in bottom.

Select **Pr2 / PAS** (parameter / value), and press the **SET** key.

The lower display will show the value **0** - - with a flashing zero.

Use **UP** or **DOWN** keys to input the security code in the flashing digit; confirm each digit by pressing **SET**. The security code is **321**.

After hitting **SET** on the last digit, you will be in the **Pr2** menu.

Once you have entered the **Pr2** menu press the **DOWN** key to move through the parameters until the **Adr** parameter appears on the top display.

Now press the **SET** key once and the value number will begin to blink. Use the arrow key to set the address and then hit the **SET** key.

After hitting the **SET**, it will automatically go to the next parameter. Let it time out, or cycle power to the TempTrac.

Each TempTrac on a RS-485 network must have a unique MODBUS address.

## The TempTrac MODBUS adapter port:

The MODBUS adapter is an orange dongle with 2 green screw terminals attached to an 8 inch cable that plugs into the back of the TempTrac at a white header. This can be an option installed on heater, or it may be a separate line item part. When the option is available, it is MBUSC option code. As a standalone part, it is PN: 11807.



# TEMPTRAC INTERFACE GUIDE, GATEWAY SETUP AND POINTS LIST

## TEMPTRAC PROTOCOL

The MODBUS RTU protocol is well established industry protocol and technical references for this are readily available on the Internet.

### Data Types Used

The TempTrac only uses one data type  
Holding Registers (40001 – 49999) Read/Write

Other data types such as Coils are not implemented in the TempTrac control.  
Only the data points in the POINTS LIST should be accessed.

### Physical Layer RS-485

MODBUS RTU uses the physical layer RS-485.

RS-485 (EIA-485): A 2 wire (twisted pair) multi drop network. Each device can send data by holding positive and negative voltage on the line and reversing polarity on the 2 wires. When no devices are transmitting, the line will be tristate. The recommended arrangement of the wires is as a connected series of point-to-point (multi-dropped) nodes, i.e. a line or bus, not a star, ring, or multiply connected network. The number of devices that can be connected to a single line is defined in the RS-485 standard by the input impedance of 32 UNIT LOADs. The wire and circuits interfacing on this 2 wire connection is considered the PHYSICAL LAYER. (RS-485 is the same physical layer as used with BACNET MSTP.)

No provisions for biasing resistors or termination resistors are provided on the control. If required, this will need to be provided externally.

The PVI gateway does provide optional biasing (default) and can provide a termination resistor, if required.

## ITEMS REQUIRED FOR GATEWAY INTERFACE:

One or more water heaters with a TempTrac control (red/orange LED display with 6 tactile buttons) including the RS-485 adapter.

Protonode Gateway with Power supply adapter (when ordering, please specify what protocol is required; BACNET MSTP, BACNET IP, LONWORKS or MODBUS TCP).

Protonode Gateway Manual (Covers general information for the gateway).

PV7069-T.PDF Interface manual that covers specifics for interfacing with the TempTrac system. Also includes the points list for the TempTrac control system. (This document).

120VAC power outlet for the power supply.

Computer with web browser and Ethernet connection capability to configure gateway.

## ITEMS REQUIRED FOR MODBUS DIRECT INTERACE:

One or more water heaters with a TempTrac control (red/orange LED display with 6 tactile buttons) including the RS-485 adapter.

PV7069-T.PDF Interface manual that covers specifics for interfacing with the TempTrac system. Also includes the points list for the TempTrac control system. (This document).



# TEMPTRAC INTERFACE GUIDE, GATEWAY SETUP AND POINTS LIST

## IDENTIFY EQUIPMENT:

The equipment should have a TempTrac mounted on the control panel. The RS-485 adapter may be installed or may ship lose. The gateway and power supply ship lose. The gateway is a grey module that has a wall wart style power supply.



TempTrac Front and side view

TempTrac back, showing adapter dongle.



Protocol Gateway



TempTrac is mounted on the control panel of the equipment. On the back side of the TempTrac is a white header. The RS-485 adapter plugs into this with a 8 inch cable. The orange adapter has 2 green terminals labeled (+) & (-).

The Protocol Gateway, if supplied, comes with a power supply and ships as a loose item.



# TEMPTRAC INTERFACE GUIDE, GATEWAY SETUP AND POINTS LIST

## WIRING BAS TO GATEWAY AND THEN GATEWAY TO TEMPTRAC:

Each gateway has 3 connection points.

The 6 position terminal block contains connection for power and MODBUS RTU (going to heaters).

The Ethernet port is for configuration, BACNET IP, or MODBUS TCP.

The 3 or 2 pin terminal is for the BAS interface: BACNET MSTP, or LONWORKS.

### Power Connection:

Gateway power supply, 6 position terminal +PWR, -PWR.

Use supplied wall wart style power supply. 15VDC. Do not power other devices with same power supply.

If power adapter has not already been connected, cut and discard the connector on the end, strip and terminate the power adapter in the proper terminals. Verify polarity. If another supply is to be used, it must be isolated. Do not use 24VAC power from heater.

### Gateway Connection to Heaters:

Wiring from Gateway to the heaters, use twisted pair wire.

Connector on the orange dongle adapter that is on the end of a 8" cable plugged into the back of the TempTrac.

The wiring is standard 2 wire RS-485 wiring. You will connect all devices together in a daisy chain. We recommend the gateway to be at the start of this connection.

Gateway 6 Pos. terminal	TempTrac Orange adapter	TempTrac #2 Orange adapter
Tx/+	(+)	(+)
Rx/-	(-)	(-)
GND		

### Building Automation Connection:

BAS protocol	Connection Port on Gateway	Labeled
BACNET MSTP	3 TERMINAL CONNECTOR	FIELD
BACNET IP	ETHERNET PORT	ETHERNET
LONWORKS	2 TERMINAL CONNECTOR	LonWorks
MODBUS TCP	ETHERNET PORT	ETHERNET



# TEMPTRAC INTERFACE GUIDE, GATEWAY SETUP AND POINTS LIST

## WIRING OF TEMPTRAC TO BAS (Direct, no Gateway):

The back side of the TempTrac has a white header with an 8 inch cable, connecting to an orange adapter module with 2 green terminals labeled (+) & (-). This is the RS-485 Modbus connection point.

Field connection for BAS	TempTrac Orange adapter	TempTrac #2 Orange adapter	Testing VDC	Results for proper hookup
RS 485 +	(+)	(+)	Positive lead	+ 0.100
RS R85 -	(-)	(-)	Negative lead	To + 5.500
GND				

Ensure the proper polarity, check with a Digital Volt Meter set to Volts DC. Take a reading at the orange adapter from the (-) Terminal to the (+) Terminal. The (+) should be the positive lead when connected.

## GATEWAY CONFIGURATION CONNECTION:

Both the LONWORKS and BACNET gateway have an Ethernet port. Connect the computer using a patch cable or cross-over cable to establish a direct connection to the gateway. Older units may require a cross-over cable or two patch cables with an Ethernet switch. If using BACNET IP or MODBUS TCP interface, connect the BAS Ethernet cable to the gateway when configuration is complete.

At this point, each heater and the gateway should all be powered, and have all wiring finished. The RUN LED will toggle every second to indicate the gateway is running.



# TEMPTRAC INTERFACE GUIDE, GATEWAY SETUP AND POINTS LIST

## CONFIGURE GATEWAY DIP SWITCHES:

The ON position is toward the center of the module, and OFF is toward the edge of the module. Only the BACNET gateway requires dip switch settings. The BACNET gateway is used for MODBUS TPC also.

### DIP SWITCHES S0-3 PROTOCOL

Set Protocol (BACNET and MODBUS gateway only):

The gateway protocol is determined on power up by looking at the “S” dip switches.

If the protocol is changed, the configuration/profiles must be cleared and reconfigured. This is done with the HTML interface.

MODBUS RTU does not require a gateway.

LONWORKS: Configured in hardware, no need to adjust dip switches.

Protocol	S0	S1	S2	S3
BACNET IP	OFF	OFF	OFF	OFF
BACNET MSTP	ON	OFF	OFF	OFF
MODBUS TCP	OFF	ON	OFF	OFF
MODBUS RTU	ON	ON	OFF	OFF

### DIP SWITCHES B0-4 BAUD

3PIN CONNECTOR TO BAS, Configure BAUD:

Default is 38400.

Configures the Baud rate for the 3 position terminal block.

This is the connection that will connect to the Building Automation System (BAS).

This is used only when the protocol is BACNET MSTP.

Baud	B0	B1	B2	B3
9600	ON	ON	ON	OFF
19200	OFF	OFF	OFF	ON
38400 *	ON	ON	OFF	ON
57600	OFF	OFF	ON	ON
76800	ON	OFF	ON	ON

### A0-7 (BACNET MSTP) MAC ADDRESS:

Default is MAC address 3.

Configure the MAC address for the BACNET Gateway by summing the “A” dip switches that are ON.

MAC address range: 1 – 127

1	2	4	8	16	32	64		<-sum for address	
A0	A1	A2	A3	A4	A5	A6	A7	Address	
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	0	Invalid
ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	1	
OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	2	
ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	3 *	Default
OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	4	
ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	5	
OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	6	
ON	ON	ON	OFF	OFF	OFF	OFF	OFF	7	
OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	8	
ON	OFF	OFF	ON	OFF	OFF	OFF	OFF	9	
OFF	ON	OFF	ON	OFF	OFF	OFF	OFF	10	
...	...	...	...	...	...	...	...	...	
ON	ON	ON	ON	ON	ON	ON	OFF	127	





# TEMPTRAC INTERFACE GUIDE, GATEWAY SETUP AND POINTS LIST

## CONFIGURE THE GATEWAY USING THE HTML INTERFACE:

This section will provide the parameters required for the TempTrac control. For more details of the gateway, consult the gateway manual. Connect your computer's Ethernet port to the Ethernet port of the gateway. Using a web browser, browse to the gateway at IP address: **192.168.1.24** default (If you have changed the IP address, go to the appropriate address.).

If the device IP address has been changed and is not known, a utility is available from Feildserver.com. Contact Fieldserver for more information.

Menu options vary depending on if you are configuring a LONWORKS gateway, BACNET Gateway set for BACNET IP, a BACNET gateway set for BACNET MSTP, or a BACNET gateway set for MODBUS TCP.

Using your browser, set the following and SUBMIT after each change.

**MODBUS RTU Baud Rate:** 9600

**MODBUS RTU Parity:** NONE

**MODBUS RTU Data Bits:** 8

**MODBUS RTU Stop Bits:** 1

(BACNET options)

**BACNET Network Number:** Must be unique network number on BACNET network

**BACNET Node Offset:** This will be used to create the DEVICE INSTANCE. Sum the device MODBUS Address and this number. Example 50000 Node Offset + MODBUS address 1 = 50001 Device Instance. Each MODBUS device will have its own Device Instance number.

(BACNET MSTP option)

**BACNET MSTP Max Master:** 127

(BACNET IP option)

**BACNET IP Port:** 47808 (Default)

**BACNET COV:** COV Disable

(BACNET MSTP option)

**BACNET BBMD:** - (Default "-", enabling this is an advanced feature, not recommended)

**BACNET Router:** NO for 1 water heater, YES for multiple water heaters

## SELECT THE DEVICE TYPE (BACNET & LONWORKS):

Press the **ADD** button, under **Node ID** enter the MODBUS address of the first heater. Typically you will have the nearest heater setup as MODBUS address 1, and the next heater MODBUS address 2. All heaters ship from factory with MODBUS Address set to 1. Each heater must have a unique MODBUS address. (See previous section **Setup heater MODBUS address**)

Under **Current profile**, select the proper interface for the TempTrac control.

For BACNET Gateway: Select

**BAC\_IP Temptrac** for BACNET IP

**BAC\_MSTP Temptrac** for BACNET MSTP

For LONWORKS Gateway: Select **LON TempTrac Water Heater**

Press the **Submit** button.

Add additional devices as required.

After adding all devices, restart the gateway by clicking the **SYSTEM RESTART** button.



**PVI**

PVI Industries, LLC • 3209 Galvez Dr • Fort Worth, Texas 76111 • 800/784-8326

# TEMPTRAC INTERFACE GUIDE, GATEWAY SETUP AND POINTS LIST

## CONFIRM OPERATION:

### Heater Communication:

Communication between gateway and heaters is evident by rapid flashing of the TX and RX LEDs on the gateway. If only the TX is flashing (may be as slow as 30 seconds between flashes), that will indicate no response from the heaters.

### Building Automation System Communication:

Using the HTML interface, you can confirm some operations and under USER MESSAGES, confirm there are no errors messages. At this point, the BAS will need to discover the gateway and implement the points into its integration.

## TROUBLESHOOTING GATEWAY:

- ERR Red LED on
  - Gateway is reporting an error.
  - Connect to gateway with HTML interface to view error messages
- PWR LED not on
  - Confirm power on +PWR and –PWR
- TX & RX not flashing
  - Confirm connections to heaters and MODBUS addressing
  - Confirm gateway has been configured
- TX flashing, RX not flashing
  - Gateway is talking to TempTrac, but not getting response from TempTrac. Confirm wiring, confirm TempTrac is configured to proper address, Baud, Parity, Stop bits.

### Verify polarity of all connections:

Set a Digital Volt Meter to read DC Volts. (Capable of reading less than 1.0VDC)

Pos. (red) Probe	Neg. (black) Probe	Min	Max	Actual Reading
Gateway 6 pin terminal block				
+PWR	-PWR	+9.0VDC	+30VDC	
Tx/+	Rx/-	+0.1VDC	+5.5VDC	
Gateway 3 pin terminal block (BACNET MSTP only)				
RS 485 +	RS 485 -	+0.1VDC	+5.5VDC	
TempTrac orange dongle (Each heater)				
(+)	(-)	+0.1VDC	+5.5VDC	
(+)	(-)	+0.1VDC	+5.5VDC	
(+)	(-)	+0.1VDC	+5.5VDC	
(+)	(-)	+0.1VDC	+5.5VDC	
(+)	(-)	+0.1VDC	+5.5VDC	

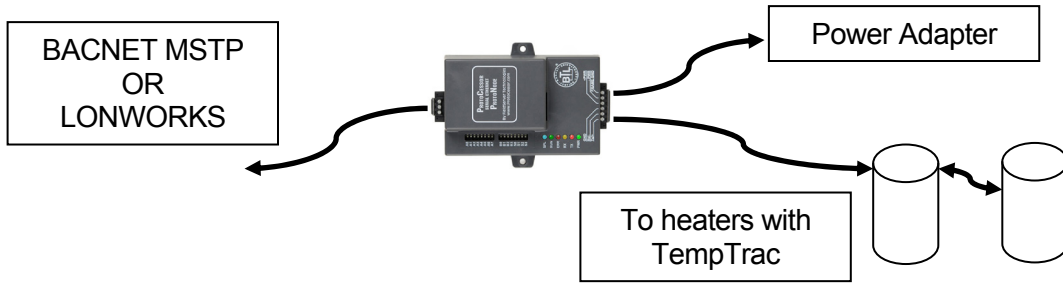
For advance gateway troubleshooting, reference the gateway manual.



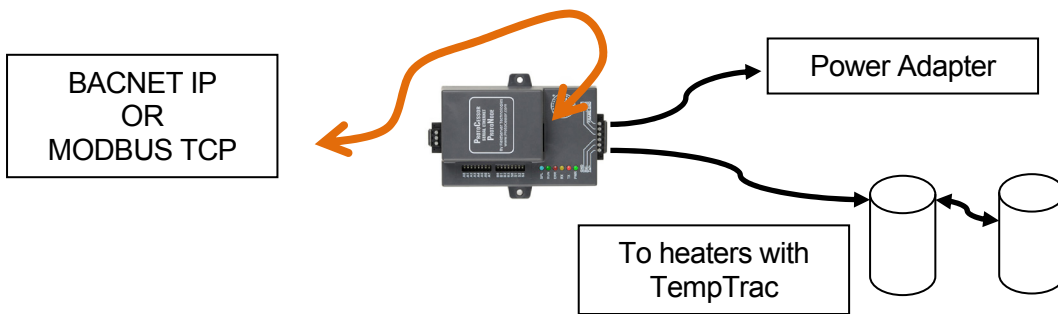
# TEMPTRAC INTERFACE GUIDE, GATEWAY SETUP AND POINTS LIST

## HOOKUP OVERVIEW:

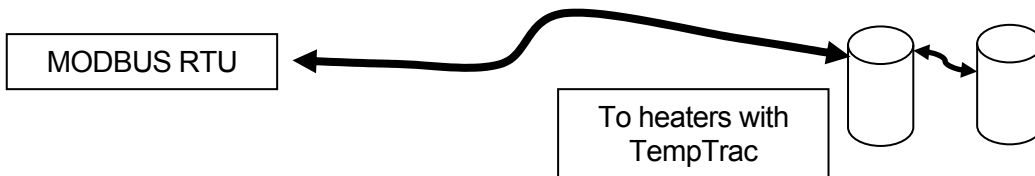
### BACNET MSTP or LONWORKS



### BACNET IP or MODBUS TCP



### MODBUS RTU Direct Connect



# TEMPTRAC INTERFACE GUIDE, GATEWAY SETUP AND POINTS LIST

## APPLICATION SPECIFICS:

Each product that uses the TempTrac control may have subtle differences. The following products address the important information regarding each device.

### Conquest 100 Gallon (199 – 299) & 130 gallon 399: (Smaller Conquest)

Model Numbers: 20 L 100A-GCL, 25 L 100A-GCL, 30 L 100A-GCL, 40 L 130A-GCL

**Probe 1:** Is in the top of the tank, and controls the burner

**Probe 2:** Is in the mid-section and controls the agitator pump using **Relay3**

**Probe 3:** Is in the flue

**Alarm\_AL2:** Alarm on any failure

**Burner\_Relay1:** Burner

**Relay2:** Alarm dry contact

**Relay3:** Agitator pump



#### Discrete connections:

**External Enable:** Terminals R1 – R2, Jumper to enable. Heater ships with jumper on this. An external enable/disable can be attached to this. This is a low current, low voltage contact. It is advised to use a contact with gold plating. If not available, use 2 contacts in parallel.

**Alarm:** A1 & A2 (Output from Heater) Closed = ALARM.

**Remote Proving:** C1 & C2. Ships with factory jumper. Open will prevent burner from operating. Keeping this open will create a lockout condition that will require user intervention.

**Remote Equipment / Burner ON:** Contact that will close P1 – P2 during a heating cycle. Open, the heater is not calling for heat.

**No Setpoint Input:** There is not a discreet method to send a setpoint signal to the Conquest.

### Conquest 130 Gallon (500 – 800): (Larger Modulating Conquest)

Model Numbers: 50 L 130A-GCML, 60 L 130A-GCML, 70 L 130A-GCML, 80 L 130A-GCML

Same as the smaller Conquest with the addition of modulation.

**Modulation Rate:** Modulation rate, Low fire = 0, High Fire = 100

#### Discrete connections:

Same as the smaller Conquest with the following notes:

**No Modulation Input:** There is not discreet way for a building automation system to control the modulation (firing rate) of the Conquest.



# TEMPTRAC INTERFACE GUIDE, GATEWAY SETUP AND POINTS LIST

## **Centauri Boiler, Centauri Plus Boiler, VT3 Boiler:**

Model Numbers: All Centauri, Centauri Plus and VT3 Boilers

**Probe 1:** This temperature is displayed in yellow in the lower section of the display. With SSBCO option, this probe is located in the top of the boiler. Without this option, the probe is shipped uninstalled and should be installed in the BHWR piping to read the temperature of the water entering the boiler.

**Probe 2:** This temperature is displayed in red in the upper section of the display. With SSBCO option, this probe is shipped uninstalled and is intended to be installed in the field in the boiler's HWR piping. Without the SSBCO option, this probe is installed in the top of the boiler providing the outlet water temperature.

**Probe 3:** Is an Auxiliary probe that can be used for outdoor temperature or other temperature readings. This is optional and not standard.

**Alarm\_AL3:** Alarm on any failure

**Burner\_Relay1:** Burner

**Relay2:** Not used

**Relay3:** Isolation Valve control when the OnTrac boiler management system is controlling.

**Modulation Rate:** Modulation rate, Low fire = 0, High Fire = 100



### **Discrete connections:**

**Ext Enable:** Terminals R1 – R2, Jumper to enable. Heater ships with jumper on this. An external enable/disable can be attached to this. (Recommend relay at boiler, min 10A at 24VAC.)

**Remote Equipment:** P1 & P2, this is a contact that is driven any time a call for heat is present. Note this is only provided if the Remote Equipment or Louver options are present.

**Alarm:** A1 & A2 provide a 3 min alarm signal that is present after a failure to ignite burner for 4 minutes. This output will be active for 3 minute and then the communication alarm will become active dropping the call for heat and dropping this signal. It is possible to get this alarm and the alarm condition that caused this alarm can be corrected before the 3 minutes, removing the alarm and not having a lockout or alarm condition over communication. (3 min signal of alarm condition and potential lockout.)



# TEMPTRAC INTERFACE GUIDE, GATEWAY SETUP AND POINTS LIST

## M3 Boiler

**Probe 1:** Is in the top of the tank, and controls the burner. Provides outlet temperature.

**Probe 2:** Is wired but loose and field installed in the boiler HWR piping.

**Probe 3:** Is in the flue.

**Alarm\_AL2:** Alarm on any failure.

**Burner\_Relay1:** Burner

**Relay2:** Alarm dry contact, goes to terminals A1 & A2.

**Relay3:** Isolation Valve control, used with OnTrac group control. Terminals labeled CIRCULATOR 1 & 2.

**Modulation Rate:** Modulation rate, Low fire = 0, High Fire = 100.



### Discrete connections:

**External Enable:** Terminals R1 – R2, Jumper to enable. Heater ships with jumper on this. An external enable/disable can be attached to this. This is a low current, low voltage contact. It is advised to use a contact with gold plating. If not available, use 2 contacts in parallel.

**Alarm:** A1 & A2 (Output from Heater) Closed = ALARM.

**Remote Proving:** C1 & C2. Ships with factory jumper. Open will prevent burner from operating. Keeping this open will create a lockout condition that will require user intervention.

**Remote Equipment / Burner ON:** Contact that will close P1 – P2 during a heating cycle. Open, the heater is not calling for heat.

**No Setpoint Input:** There is not a discrete method to send a setpoint signal to the M3 boiler.

**No Modulation Input:** There is not a discrete way for a building automation system to control the modulation (firing rate) of the Conquest.

## Quickdraw Steam to Water Storage

**Probe 1:** Lower Sensor

**Probe 2:** Upper Sensor

**Relay1:** Control valve

Reference wiring diagram for more details. Options vary greatly on this product.

### Discrete connections:

**External Enable:** Terminals

**Remote Equipment / Heating:** E1 & E2 terminals are closed when heating, and open when not. This is an option REMEQ.

**Alarm:** A1 & A2 terminals are closed when in Alarm. This is an option REMAL.

## Quickdraw Steam to Water Instantaneous

**Probe 1:** Lower Sensor

**Probe 2:** Upper Sensor

**Relay1:** Control valve

Reference wiring diagram for more details. Options may vary on this product.

### Discrete connections:

**External Enable:** Terminals

**Remote Equipment / Heating:** E1 & E2 terminals are closed when heating, and open when not. This is an option REMEQ.

**Alarm:** A1 & A2 terminals are closed when in Alarm. This is an option REMAL.



**PVI**

PVI Industries, LLC • 3209 Galvez Dr • Fort Worth, Texas 76111 • 800/784-8326

# TEMPTRAC INTERFACE GUIDE, GATEWAY SETUP AND POINTS LIST

## Other Equipment and Equipment Custom features:

Reference supplied wiring diagram and the I & O Manual. Contact PVI for additional information.  
Below is a list of other products that can use the TempTrac controller:

Quickdraw Water to water Storage  
EZ PLATE STORAGE  
TURBOPOWER 99  
TURBOPOWER  
POWER VT PLUS  
TRICON  
MAXIM 3  
DURAWATT (With TTRAC option)  
MAXIM (With TTRAC option)  
COBREX STORAGE



**PVI**<sup>®</sup>

PVI Industries, LLC • 3209 Galvez Dr • Fort Worth, Texas 76111 • 800/784-8326

# TEMPTRAC INTERFACE GUIDE, GATEWAY SETUP AND POINTS LIST

## POINTS LIST:

The gateway will provide a full points list, including typical points and advanced points. Normal interface will only require the TYPICAL POINTS. Many points are provided as ADVANCED POINTS and not advised to be used in normal integration. The Advanced Points are present for the purpose of future development and custom applications. Please consult factory if any points not in the TYPICAL POINTS are required.

### Key:

LONWORKS shows multiple devices connected with a device number suffix, (#) represent the device. MODBUS address with “:” to designate single bit usage of register. Number following colon represents bit location, 0 is the least significant bit.

Point Name	Read/Write	Short Description	
<i>MODBUS</i>	Register Type	Address Offset	MODBUS Address
<i>BACNET</i>	BACNET Name	Object Instance	BACNET Units
<i>LONWORKS</i>	Lon Read name_#	Lon Write name_#	Lon Units
NOTES			

## TYPICAL POINTS:

The points that are typically used to interface with the heater. Most integrations only require points from this list.

### TYPICAL POINTS:

Control_CNT	Write	Enable Heater 257=on 1 = off	
<i>MODBUS</i>	Holding Register	1280	41281
<i>BACNET</i>	Enable	128100	
<i>LONWORKS</i>	nvoCtrl_CNT_#		
This can be used to prevent the heater from heating via communication. 257 or 0X0101 = on, 1 or 0x0000 = off The register cannot be read. The register should only be written to with the values 257 and 1, as it has other undocumented functions.			

Setpoint_St1	Read/Write	System Setpoint	
<i>MODBUS</i>	Holding Register	768	40769
<i>BACNET</i>	Setpoint_St1	76900	Deg-F
<i>LONWORKS</i>	nvoSP_St1_#	nviSP_St1_#	Deg_F
This is the setpoint for the heater.			

Probe 1	Read Only	Controlling Probe Degrees F	
<i>MODBUS</i>	Holding Register	256	40257
<i>BACNET</i>	Probe1	25700	Deg-F
<i>LONWORKS</i>	nvoProbe1_#		Deg_F
Probe that provides control of heating. Location can vary depending on equipment and application. See section that discussed the various equipment to determine actual location of probe. Connection on TempTrac is green screw terminals 14 and common 17.			





# TEMPTRAC INTERFACE GUIDE, GATEWAY SETUP AND POINTS LIST

## TYPICAL POINTS:

<b>Probe 2</b>	Read Only	Probe 2 in degrees F	
<i>MODBUS</i>	Holding Register	258	40259
<i>BACNET</i>	Probe2	25900	Deg-F
<i>LONWORKS</i>	nvoProbe2_#		Deg_F

Optional probe on some devices, usually installed on most devices. If installed and enabled, returns the temperature of the probe in degrees F. Connection on TempTrac is green screw terminals 15 and common 17.

<b>Probe 3</b>	Read Only	Probe 3 in degrees F	
<i>MODBUS</i>	Holding Register	260	40261
<i>BACNET</i>	Probe3	26100	Deg-F
<i>LONWORKS</i>	nvoProbe3_#		Deg_F

Optional probe on some devices, not usually installed on most devices. If installed and enabled, returns the temperature of the probe in degrees F. Connection on TempTrac is green screw terminals 16 and common 17.

<b>Burner Runtime</b>	Read/Write	Burner Runtime Hours 0-65535	
<i>MODBUS</i>	Holding Register	848	40849
<i>BACNET</i>	BURNER_HOURS_ou1	84900	Hours
<i>LONWORKS</i>	nvoBrnHr_ou1_#	nviBrnHr_ou1_#	Hours

NOTE: Number of hours the burner has been enabled. Once it reaches 9999. This can be written to, as a way to reset it.

<b>Modulation Rate</b>	Read Only	Monitor the modulation signal	
<i>MODBUS</i>	Holding Register	262	40263
<i>BACNET</i>	Modulation_FR	26300	
<i>LONWORKS</i>	nvoMod_FR_#		

Modulation rate on the analog output 4-20ma is represented as 0-100. This feature was introduced in Firmware 0.5 (5) and is not available from older TempTrac modules already in the field.

<b>Burner_Relay1</b>	Read Only	Status of burner, Relay1 (Output 1)	
<i>MODBUS</i>	Holding Register	2049	42050:0
<i>BACNET</i>	Burner_Relay1	205050	
<i>LONWORKS</i>	nvoBrn_Rel1_#		

This is Bit 0 of the Relay status word. It is the relay that controls the main heating output. Typically the Burner Status. BACNET and LONWORKS have this broke out into state logic points. MODBUS, you will have to break it out yourself. Read value, BITWISE AND with 0x0001, if result = 0, relay is off. If result = 1, relay is on.

<b>Alarm_AL2</b>	Read Only	Status of digital input #2 Alarm	
<i>MODBUS</i>	Holding Register	3328	43329:11
<i>BACNET</i>	Alarm_AL2	332961	
<i>LONWORKS</i>	nvoAlarm_AL2_#		

Digital Input #2 alarm. On some products, this is a general failure to operate alarm. See product specific information. This is Bit 11 of the ALARM STATUS ALL word. Flashes 'AL2' or 'LP' on TempTrac display. In BACNET and LONWORKS, this is broken out into a state logic point.

For MODBUS ALARMS && 0x0800 = 0x0800 Alarm is active. = 0x0000 Alarm is not active.



# TEMPTRAC INTERFACE GUIDE, GATEWAY SETUP AND POINTS LIST

## TYPICAL POINTS:

<b>Alarm_AL3</b>	Read Only	Status of digital input #3 Alarm	
<i>MODBUS</i>	Holding Register	3328	43329:12
<i>BACNET</i>	Alarm_AL3	332962	
<i>LONWORKS</i>	nvoAlarm_AL3_#		

Digital Input #3 alarm. On some products, this is a general failure to operate alarm. See product specific information. This is Bit 12 of the ALARM STATUS ALL word. Flashes 'AL3' or 'HP' on TempTrac display. In BACNET and LONWORKS, this is broken out into a state logic point.  
For MODBUS ALARMS && 0x1000 = 0x1000 Alarm is active. = 0x0000 Alarm is not active.

<b>Com Status</b>	Read Only	Communication Status bit	
<i>MODBUS</i>	Input Register	NA	NA
<i>BACNET</i>	Gateway_TT_Com_OK	200	
<i>LONWORKS</i>	nvoGwyTTCmOK_#		

NOTE: This point is not generated by the heater; it is generated internally by the gateway. It is a status of the communication connection between the gateway and the heater. If active (GOOD), the gateway is talking to the heater. If inactive (NOT\_PRESENT) then the gateway does not have good communication with the heater. This point may take up to 3 minutes to register properly after communication is established or interrupted. If this value if reading NOT\_PRESENT, then no all over values are suspect, as the device is not communicating. Generally the Gateway will hold the last value received. The only way to ensure you have the current values from the heater is to verify this point is ACTIVE as well.

## ALL POINTS INCLUDING ADVANCED:

Points listed below that are not in the TYPICAL POINTS are provided for advanced interface and for custom applications. Contact factory for additional information.

## ALL POINTS INCLUDING ADVANCE:

<b>Control_CNT</b>	Write	Enable Heater 257=on 1 = off	
<i>MODBUS</i>	Holding Register	1280	41281
<i>BACNET</i>	Enable	128100	
<i>LONWORKS</i>	nvoCtrl_CNT_#		

This can be used to prevent the heater from heating via communication. 257 or 0X0101 = on, 1 or 0x0000 = off  
The register cannot be read. The register should only be written to with the values 257 and 1, as it has other undocumented functions.

<b>Setpoint_St1</b>	Read/Write	System Setpoint	
<i>MODBUS</i>	Holding Register	768	40769
<i>BACNET</i>	Setpoint_St1	76900	Deg-F
<i>LONWORKS</i>	nvoSP_St1_#	nviSP_St1_#	Deg_F

This is the setpoint for the heater.

<b>Setpoint_St1 C</b>	Read/Write	System Setpoint	
<i>MODBUS</i>			
<i>BACNET</i>	Setpoint_St1_C	76900	Deg-C
<i>LONWORKS</i>			

Special BACNET point that converts the Setpoint value to degrees C in the gateway. Not available in LONWORKS or MODBUS.



**PVI**

PVI Industries, LLC • 3209 Galvez Dr • Fort Worth, Texas 76111 • 800/784-8326

# TEMPTRAC INTERFACE GUIDE, GATEWAY SETUP AND POINTS LIST

## ALL POINTS INCLUDING ADVANCE:

Hy1	Read	Setpoint Differential	
<i>MODBUS</i>	Holding Register	772	40773
<i>BACNET</i>	Hy1	77300	delta-degrees-Fahrenheit
<i>LONWORKS</i>	nvoHy1_#		

Differential. (if Hy1 is negative) The heater will begin heating when Probe #1 must fall this far below St1 setpoint, and stay on until the heater reaches St1 setpoint.  
 (If Hy1 is positive) The heater will come on when Probe #1 falls to or below St1 setpoint, and will not turn off until it has reached this far above St1 Setpoint. BACNET and LONWORKS, this point is configured as a read only, with MODBUS, there is no protection from changing this value.

St4	Read Only	Modulation Start	
<i>MODBUS</i>	Holding Register	792	40793
<i>BACNET</i>	St4	79300	No Units
<i>LONWORKS</i>	nvoSt4_#		

Starting point of modulation. Related to the St1 setpoint. If Probe 1 is above St1 + St4, then Modulation signal will be low fire. If Probe 1 falls below (St1 + St4) then the analog output signal will modulate based on the setting in the SR register. This is set to No Units in BACNET because it can relative to St1 or is can be independent value. Typically it is configured as relative to St1. BACNET and LONWORKS, this point is configured as a read only, with MODBUS, there is no protection from changing this value.

SR	Read	Modulation bandwidth	
<i>MODBUS</i>	Holding Register	793	40794
<i>BACNET</i>	SR	79400	delta-degrees-Fahrenheit
<i>LONWORKS</i>	nvoSR_#		

Normally this is a negative number. Number of degrees of change in Probe 1 that will modulate from 0 to 100%. St1 + St4 = low fire, St1 + St4 + SR = High Fire. Temperatures above low fire will be low fire, temperatures below high fire will be high fire. In-between, the output will modulate from 4-20mA (0-100%) BACNET and LONWORKS, this point is configured as a read only, with MODBUS, there is no protection from changing this value.

Probe 1	Read Only	Controlling Probe Degrees F	
<i>MODBUS</i>	Holding Register	256	40257
<i>BACNET</i>	Probe1	25700	Deg-F
<i>LONWORKS</i>	nvoProbe1_#		Deg_F

Probe that provides control of heating. Location can vary depending on equipment and application. See section that discussed the various equipment to determine actual location of probe. Connection on TempTrac is green screw terminals 14 and common 17.

Probe 2	Read Only	Probe 2 in degrees F	
<i>MODBUS</i>	Holding Register	258	40259
<i>BACNET</i>	Probe2	25900	Deg-F
<i>LONWORKS</i>	nvoProbe2_#		Deg_F

Optional probe on some devices, usually installed on most devices. If installed and enabled, returns the temperature of the probe in degrees F. Connection on TempTrac is green screw terminals 15 and common 17.



# TEMPTRAC INTERFACE GUIDE, GATEWAY SETUP AND POINTS LIST

## ALL POINTS INCLUDING ADVANCE:

<b>Probe 3</b>	Read Only	Probe 3 in degrees F	
<i>MODBUS</i>	Holding Register	260	40261
<i>BACNET</i>	Probe3	26100	Deg-F
<i>LONWORKS</i>	nvoProbe3_#		Deg_F
Optional probe on some devices, not usually installed on most devices. If installed and enabled, returns the temperature of the probe in degrees F. Connection on TempTrac is green screw terminals 16 and common 17.			

<b>Probe 1 C</b>	Read Only	Controlling Probe Degrees C	
<i>MODBUS</i>			
<i>BACNET</i>	Probe1_C	25790	Deg-C
<i>LONWORKS</i>			
Special BACNET point that converts the Probe value to degrees C in the gateway. Not available in LONWORKS or MODBUS.			

<b>Probe 2 C</b>	Read Only	Probe 2 in degrees C	
<i>MODBUS</i>			
<i>BACNET</i>	Probe2_C	25990	Deg-C
<i>LONWORKS</i>			
Special BACNET point that converts the Probe value to degrees C in the gateway. Not available in LONWORKS or MODBUS.			

<b>Probe 3 C</b>	Read Only	Probe 3 in degrees C	
<i>MODBUS</i>			
<i>BACNET</i>	Probe3_C	26190	Deg-C
<i>LONWORKS</i>			
Special BACNET point that converts the Probe value to degrees C in the gateway. Not available in LONWORKS or MODBUS.			

<b>Manual Modulation</b>	Read/Write	Force modulation to a level	
<i>MODBUS</i>	Holding Register	797	40798
<i>BACNET</i>	PS4	79800	
<i>LONWORKS</i>	NvoPS4_#	NviPS4_#	
Used to force a modulation rate. Typically used by service tech to make combustion adjustments at a particular firing rate. Normal setting is 101 = Auto. This allows the heater to modulate as the load requires. If you put a value 0-100, it will force the heater to that firing rate when operating. 0=Low Fire, 100=High Fire Use with caution. Advise allowing the heater to control its own modulation.			

<b>ALL</b>	Read/Write	Minimum Temperature Alarm	
<i>MODBUS</i>	Holding Register	814	40815
<i>BACNET</i>	ALL	81500	Deg-F
<i>LONWORKS</i>	nvoALL_#	nviALL_#	Deg_F
Minimum temperature for Probe 1. Alarm will be activated if Probe 1 falls below this temperature. See Alarm points.			

<b>ALU</b>	Read/Write	Flame Current for proof of flame	
<i>MODBUS</i>	Holding Register	815	40816
<i>BACNET</i>	ALU	81600	Deg-F
<i>LONWORKS</i>	nvoALU_#	nviALU_#	Deg_F
Maximum temperature for Probe 1. Alarm will be activated if Probe 1 rises above this temperature. See Alarm points.			



# TEMPTRAC INTERFACE GUIDE, GATEWAY SETUP AND POINTS LIST

## ALL POINTS INCLUDING ADVANCE:

<b>Burner Runtime</b>	Read/Write	Burner Runtime Hours 0-65535	
<i>MODBUS</i>	Holding Register	848	40849
<i>BACNET</i>	BURNER_HOURS_ou1	84900	Hours
<i>LONWORKS</i>	nvoBrnHr_ou1_#	nviBrnHr_ou1_#	Hours

NOTE: Number of hours the burner has been enabled. Once it reaches 9999. This can be written to, as a way to reset it.

<b>Maintenance Reminder</b>	Read/Write	Number of burner cycles 0-9999	
<i>MODBUS</i>	Holding Register	851	40852
<i>BACNET</i>	oP1	85200	
<i>LONWORKS</i>	nvoOP1_#	nviOP1_#	

Maintenance feature, set the value to 0.

<b>Output #2 Mode</b>	Read/Write	Output #2 mode, ON, OFF, AUTO	
<i>MODBUS</i>	Holding Register	855	40856
<i>BACNET</i>	TT_2on	85600	
<i>LONWORKS</i>	nvoTT_2on_#	nviTT_2on_#	

TempTrac relay output spade 6 & 7. 0= Force relay off, 1=Force relay ON, 2= Auto (operates from thermostat functions).

<b>Output #3 Mode</b>	Read/Write	Output #2 mode, ON, OFF, AUTO	
<i>MODBUS</i>	Holding Register	856	40857
<i>BACNET</i>	TT_3on	85700	
<i>LONWORKS</i>	nvoTT_3on_#	nviTT_3on_#	

TempTrac relay output spade 8 & 9. 0= Force relay off, 1=Force relay ON, 2= Auto (operates from thermostat functions).

<b>Software Version</b>	Read Only	Firmware revision	
<i>MODBUS</i>	Holding Register	859	40860
<i>BACNET</i>	VERSION_rEL	86000	
<i>LONWORKS</i>	nvoVer_rEL_#		

Software/Firmware revision number. At time of this manual, current version is 0.5 read as 5.

<b>Modulation Rate</b>	Read Only	Monitor the modulation signal	
<i>MODBUS</i>	Holding Register	262	40263
<i>BACNET</i>	Modulation_FR	26300	
<i>LONWORKS</i>	nvoMod_FR_#		

Modulation rate on the analog output 4-20ma is represented as 0-100. This feature was introduced in Firmware 0.5 (5) and is not available from older TempTrac modules already in the field.

<b>RELAYS Status ALL</b>	Read Only	Shows the current state of the 3 output relays	
<i>MODBUS</i>	Holding Register	2049	42050:0,1,2
<i>BACNET</i>	RELAYS	205000	
<i>LONWORKS</i>	nvoRELAYS_#		

This register contains the relay status for all 3 relays. Bit 0 = relay 1 (4&5), Bit 1 = relay 2 (6&7), Bit 2 = relay 3 (8&9). See below breakout of each relay.



# TEMPTRAC INTERFACE GUIDE, GATEWAY SETUP AND POINTS LIST

## ALL POINTS INCLUDING ADVANCE:

<b>Burner_Relay1</b>	Read Only	Status of burner, Relay1 (Output 1)	
<i>MODBUS</i>	Holding Register	2049	42050:0
<i>BACNET</i>	Burner_Relay1	205050	
<i>LONWORKS</i>	nvoBrn_Rel1_#		

This is Bit 0 of the Relay status word. It is the relay that controls the main heating output. Typically the Burner Status. BACNET and LONWORKS have this broke out into state logic points. MODBUS, you will have to break it out yourself. Read value, BITWISE AND with 0x0001, if result = 0, relay is off. If result = 1, relay is on.

<b>Relay2</b>	Read Only	Status of Relay2 (Output 3)	
<i>MODBUS</i>	Holding Register	2049	42050:1
<i>BACNET</i>	Relay2	205051	
<i>LONWORKS</i>	nvoRelay2_#		

This is Bit 1 of the Relay status word. It is the output #2 relay. BACNET and LONWORKS have this broke out into state logic points. MODBUS, you will have to break it out yourself. Read value, BITWISE AND with 0x0002, if result = 0, relay is off. If result = 2, relay is on.

<b>Relay3</b>	Read Only	Status of Relay3 (Output 3)	
<i>MODBUS</i>	Holding Register	2049	42050:2
<i>BACNET</i>	Relay3	205052	
<i>LONWORKS</i>	nvoRelay3_#		

This is Bit 2 of the Relay status word. It is the output #3 relay. BACNET and LONWORKS have this broke out into state logic points. MODBUS, you will have to break it out yourself. Read value, BITWISE AND with 0x0004, if result = 0, relay is off. If result = 4, relay is on.

<b>ALARM STATUS ALL</b>	Read Only	ALL ALARMS STATUS	
<i>MODBUS</i>	Holding Register	3328	43329
<i>BACNET</i>	DIA	332900	
<i>LONWORKS</i>	nvoDIA_#		

Alarm word, each bit represent separate alarms.

<b>Alarm_LA</b>	Read Only	Status of low temperature Alarm	
<i>MODBUS</i>	Holding Register	3328	43329:0
<i>BACNET</i>	Alarm_LA	332950	
<i>LONWORKS</i>	nvoAlarm_LA_#		

Low water temperature alarm. Probe 1 is lower than temperature in ALL point. This is Bit 0 of the ALARM STATUS ALL word. In BACNET and LONWORKS, this is broken out into a state logic point. For MODBUS ALARMS && 0x0001 = 0x0001 Alarm is active. = 0x0000 Alarm is not active.

<b>Alarm_HA</b>	Read Only	Status of high temperature Alarm	
<i>MODBUS</i>	Holding Register	3328	43329:1
<i>BACNET</i>	Alarm_HA	332951	
<i>LONWORKS</i>	nvoAlarm_HA_#		

High water temperature alarm. Probe 1 is higher than temperature in ALU point. This is Bit 1 of the ALARM STATUS ALL word. In BACNET and LONWORKS, this is broken out into a state logic point. For MODBUS ALARMS && 0x0002 = 0x0002 Alarm is active. = 0x0000 Alarm is not active.



# TEMPTRAC INTERFACE GUIDE, GATEWAY SETUP AND POINTS LIST

## ALL POINTS INCLUDING ADVANCE:

Alarm P1	Read Only	Status of Probe 1 Alarm	
<i>MODBUS</i>	Holding Register	3328	43329:2
<i>BACNET</i>	Alarm_P1	332952	
<i>LONWORKS</i>	nvoAlarm_P1_#		

Probe 1 alarm. This can be a disconnected, open or shorted probe. This will shut down heating operation. This is Bit 2 of the ALARM STATUS ALL word. Flashes 'P1' on TempTrac display. In BACNET and LONWORKS, this is broken out into a state logic point.  
For MODBUS ALARMS && 0x0004 = 0x0004 Alarm is active. = 0x0000 Alarm is not active.

Alarm P2	Read Only	Status of Probe 1 Alarm	
<i>MODBUS</i>	Holding Register	3328	43329:8
<i>BACNET</i>	Alarm_P2	332958	
<i>LONWORKS</i>	nvoAlarm_P2_#		

Probe 2 alarm. This can be a disconnected, open or shorted probe. This is Bit 8 of the ALARM STATUS ALL word. Flashes 'P2' on TempTrac display. In BACNET and LONWORKS, this is broken out into a state logic point.  
For MODBUS ALARMS && 0x0100 = 0x0100 Alarm is active. = 0x0000 Alarm is not active.

Alarm P3	Read Only	Status of Probe 1 Alarm	
<i>MODBUS</i>	Holding Register	3328	43329:9
<i>BACNET</i>	Alarm_P3	332959	
<i>LONWORKS</i>	nvoAlarm_P3_#		

Probe 3 alarm. This can be a disconnected, open or shorted probe. This is Bit 9 of the ALARM STATUS ALL word. Flashes 'P3' on TempTrac display. In BACNET and LONWORKS, this is broken out into a state logic point.  
For MODBUS ALARMS && 0x0200 = 0x0200 Alarm is active. = 0x0000 Alarm is not active.

Alarm AL1	Read Only	Status of digital input #1 Alarm	
<i>MODBUS</i>	Holding Register	3328	43329:10
<i>BACNET</i>	Alarm_AL1	332960	
<i>LONWORKS</i>	nvoAlarm_AL1_#		

Digital Input #1 alarm. This is typically not implemented. Refer to product specific details for information on this alarm. This is Bit 10 of the ALARM STATUS ALL word. Flashes 'AL1' on TempTrac display. In BACNET and LONWORKS, this is broken out into a state logic point.  
For MODBUS ALARMS && 0x0400 = 0x0400 Alarm is active. = 0x0000 Alarm is not active.

Alarm AL2	Read Only	Status of digital input #2 Alarm	
<i>MODBUS</i>	Holding Register	3328	43329:11
<i>BACNET</i>	Alarm_AL2	332961	
<i>LONWORKS</i>	nvoAlarm_AL2_#		

Digital Input #2 alarm. On some products, this is a general failure to operate alarm. See product specific information. This is Bit 11 of the ALARM STATUS ALL word. Flashes 'AL2' or 'LP' on TempTrac display. In BACNET and LONWORKS, this is broken out into a state logic point.  
For MODBUS ALARMS && 0x0800 = 0x0800 Alarm is active. = 0x0000 Alarm is not active.



# TEMPTRAC INTERFACE GUIDE, GATEWAY SETUP AND POINTS LIST

## ALL POINTS INCLUDING ADVANCE:

<b>Alarm_AL3</b>	Read Only	Status of digital input #3 Alarm	
<i>MODBUS</i>	Holding Register	3328	43329:12
<i>BACNET</i>	Alarm_AL3	332962	
<i>LONWORKS</i>	nvoAlarm_AL3_#		
<p>Digital Input #3 alarm. On some products, this is a general failure to operate alarm. See product specific information. This is Bit 12 of the ALARM STATUS ALL word. Flashes 'AL3' or 'HP' on TempTrac display. In BACNET and LONWORKS, this is broken out into a state logic point.                      For MODBUS ALARMS &amp;&amp; 0x1000 = 0x1000 Alarm is active. = 0x0000 Alarm is not active.</p>			

<b>Alarm_Nn1</b>	Read Only	Maintenance Alarm for output #1	
<i>MODBUS</i>	Holding Register	3328	43329:13
<i>BACNET</i>	Alarm_Nn1	332963	
<i>LONWORKS</i>	nvoAlarm_Nn1_#		
<p>Maintenance Alarm. This is enabled when the time on ou1 is greater than the value in oP1. Flashes 'Nn1' on TempTrac display. Bit #13 of Alarms. In BACNET and LONWORKS, this is broken out into a state logic point.                      For MODBUS ALARMS &amp;&amp; 0x2000 = 0x2000 Alarm is active. = 0x0000 Alarm is not active.</p>			

<b>Alarm_Nn2</b>	Read Only	Maintenance Alarm for output #2	
<i>MODBUS</i>	Holding Register	3328	43329:14
<i>BACNET</i>	Alarm_Nn2	332963	
<i>LONWORKS</i>	nvoAlarm_Nn2_#		
<p>Maintenance Alarm. This is enabled when the time on ou2 is greater than the value in oP2. Flashes 'Nn2' on TempTrac display. Bit #14 of Alarms. In BACNET and LONWORKS, this is broken out into a state logic point.                      For MODBUS ALARMS &amp;&amp; 0x4000 = 0x4000 Alarm is active. = 0x0000 Alarm is not active.</p>			

<b>Alarm_Nn3</b>	Read Only	Maintenance Alarm for output #3	
<i>MODBUS</i>	Holding Register	3328	43329:15
<i>BACNET</i>	Alarm_Nn3	332963	
<i>LONWORKS</i>	nvoAlarm_Nn3_#		
<p>Maintenance Alarm. This is enabled when the time on ou3 is greater than the value in oP3. Flashes 'Nn3' on TempTrac display. Bit #15 of Alarms. In BACNET and LONWORKS, this is broken out into a state logic point.                      For MODBUS ALARMS &amp;&amp; 0x8000 = 0x8000 Alarm is active. = 0x0000 Alarm is not active.</p>			

<b>Com Status</b>	Read Only	Communication Status bit	
<i>MODBUS</i>	Input Register	NA	NA
<i>BACNET</i>	Gateway_TT_Com_OK	200	
<i>LONWORKS</i>	nvoGwyTTCmOK_#		
<p>NOTE: This point is not generated by the heater; it is generated internally by the gateway. It is a status of the communication connection between the gateway and the heater. If active (GOOD), the gateway is talking to the heater. If inactive (NOT_PRESENT) then the gateway does not have good communication with the heater. This point may take up to 3 minutes to register properly after communication is established or interrupted. If this value if reading NOT_PRESENT, then no all over values are suspect, as the device is not communicating. Generally the Gateway will hold the last value received. The only way to ensure you have the current values from the heater is to verify this point is ACTIVE as well.</p>			





# TEMPTRAC INTERFACE GUIDE, GATEWAY SETUP AND POINTS LIST

## ADVANCED MODBUS LIST:

The following is the direct MODBUS interface addresses. Descriptions of most to the MODBUS parameters are listed in the correlating TYPICAL POINTS defined previously. Many MODBUS parameters are not supported in the gateway interface. This is a complete reference list and contains advanced parameters. All MODBUS points normally required for interface are represented in the TYPICAL POINTS section. If there is a need for interfacing using other parameters, consult factory to confirm proper use.

Label	Firm Version	Description	Range X:Y	Rev	Rev	Hex Add	Register
				0.3	0.5	Modbus	
				Level	Level	base 0	
							40000+
<b>St1</b>	0.3 & 0.5	Set point1	LS1÷US1	Pr1	Pr1	0x300	769
<b>St2</b>	0.3 & 0.5	Set point2	LS2÷US2	Pr1	Pr1	0x301	770
<b>St3</b>	0.3 & 0.5	Set point3	LS3÷US3	Pr1	Pr1	0x302	771
<b>St5</b>	0.3 & 0.5	Set point5 Set point 3 alternate	-20÷70°F	Pr1	Pr1	0x303	772
<b>HY1</b>	0.3 & 0.5	Differential for St1	-22÷22°F	Pr2	Pr2	0x304	773
<b>LS1</b>	0.3 & 0.5	Minimum set point1	-40°F÷SET	Pr2	Pr2	0x305	774
<b>US1</b>	0.3 & 0.5	Maximum set point1	SET ÷ 230°F	Pr2	Pr2	0x306	775
<b>AC1</b>	0.3 & 0.5	Anti-short cycle delay for output 1	0÷30 min.	Pr2	Pr2	0x307	776
<b>S2c</b>	0.3 & 0.5	Configuration of St2: dependent on St1 or independent	diP; ind	Pr3	Pr2	0x308	777
<b>HY2</b>	0.3 & 0.5	Differential for St2	-22÷22°F	Pr2	Pr2	0x309	778
<b>LS2</b>	0.3 & 0.5	Minimum set point2	-40°F÷St2	Pr2	Pr2	0x30A	779
<b>uS2</b>	0.3 & 0.5	Maximum set point2	St2 ÷ 230°F	Pr2	Pr2	0x30B	780
<b>AC2</b>	0.3 & 0.5	Anti-short cycle delay for output 2	0÷30 min.	Pr2	Pr2	0x30C	781
<b>S3c</b>	0.3 & 0.5	Configuration of St3: dependent on St1 or independent	diP; ind	Pr2	Pr2	0x30D	782
<b>HY3</b>	0.3 & 0.5	Differential for set point 3 St3	-22÷22°F	Pr2	Pr2	0x30E	783
<b>LS3</b>	0.3 & 0.5	Minimum set point 3 St3	-40°F÷St3	Pr2	Pr2	0x30F	784
<b>uS3</b>	0.3 & 0.5	Maximum set point 3 St3	St3 ÷ 230°F	Pr2	Pr2	0x310	785
<b>AC3</b>	0.3 & 0.5	Anti-short cycle delay for output 3	0÷30 min.	Pr2	Pr2	0x311	786
<b>o3P</b>	0.3 & 0.5	Probe selection for output 3	Pb1 / Pb2	Pr2	Pr2	0x312	787
<b>SSE</b>	0.3 & 0.5	Set point shift for output 3 enable disable	No; Yes	Pr2	Pr2	0x313	788
<b>HY5</b>	0.3 & 0.5	Differential for set point 5	-22÷22°F	Pr2	Pr2	0x314	789
<b>Ac5</b>	0.3 & 0.5	Anti-short cycle delay for output 3 alternate set point	0÷30 min.	Pr2	Pr2	0x315	790
<b>AcA</b>	0.3 & 0.5	Time delay between the St3 to St5 set point shift	0÷15 min.	Pr2	Pr2	0x316	791



# TEMPTRAC INTERFACE GUIDE, GATEWAY SETUP, AND POINTS LIST

## ANALOGUE OUTPUT 4÷20mA (output 4)

<b>S4c</b>	0.3 & 0.5	Configuration of St4: dependent on St1 or independent	diP; ind	Pr3	Pr2	0x317	792
<b>St4</b>	0.3 & 0.5	Analogue output set point	-100÷100°F	Pr2	Pr2	0x318	793
<b>SR</b>	0.3 & 0.5	Analogue output band width	-100÷100°F	Pr2	Pr2	0x319	794
<b>Th4</b>	0.3 & 0.5	Outlet temperature threshold for forcing to 4ma the analog output	-40°F ÷ 230°F	Pr2	Pr2	0x31A	795
<b>HY4</b>	0.3 & 0.5	Differential for restart working of analog output	-45 ÷ -1 °F	Pr2	Pr2	0x31B	796
<b>Ac4</b>	0.3 & 0.5	Anti-short cycle delay for output 4	0÷30 min.	Pr2	Pr2	0x31C	797
<b>PS4</b>	0.3 & 0.5	Analog output percentage (nu=101)	0÷100, nu	Pr2	Pr2	0x31D	798
<b>PP4</b>	0.3 & 0.5	Analog output percentage with fault probe 1 (nu=101)	0÷100, nu	Pr3	Pr2	0x31E	799

## DYNAMIC RESET

<b>tt</b>	0.3 & 0.5	Outdoor temperature threshold for dynamic reset of St1	-40÷230°F	Pr2	Pr2	0x31F	800
<b>rr2</b>	0.3 & 0.5	Outdoor temperature band width	-100÷100°F	Pr2	Pr2	0x320	801
<b>rr1</b>	0.3 & 0.5	Maximum shift of St1	-100÷100°F	Pr2	Pr2	0x321	802
<b>tt2</b>	0.3 & 0.5	Outdoor temperature threshold to open all the loads	-40÷230°F	Pr2	Pr2	0x322	803
<b>Ht2</b>	0.3 & 0.5	Differential for restart working of controller	-45 ÷ -1 °F	Pr2	Pr2	0x323	804

## DIGITAL INPUTS

<b>i1P</b>	0.3 & 0.5	Digital input 1 polarity	CL÷OP	Pr3	Pr2	0x324	805
<b>i2P</b>	0.3 & 0.5	Digital input 2 polarity	CL÷OP	Pr2	Pr2	0x325	806
<b>i2d</b>	0.3 & 0.5	Digital input 2 alarm delay	0÷255 min.	Pr3	Pr2	0x326	807
<b>i3P</b>	0.3 & 0.5	Digital input 3 polarity	CL÷OP	Pr2	Pr2	0x327	808
<b>i3d</b>	0.3 & 0.5	Digital input 3 alarm delay	0÷255 min.	Pr3	Pr2	0x328	809

## DISPLAY

<b>cF</b>	0.3 & 0.5	Temperature measurement unit	°C ÷ °F	Pr3	Pr2	0x329	810
<b>rES</b>	0.3 & 0.5	Resolution (integer/decimal point) only for °C	in ÷ de	Pr3	Pr2	0x32A	811
<b>dS2</b>	0.3	Default showing for display #2 Top (red)	Pb2, Pb3	Pr2		0x32B	812
<b>dS2</b>	0.5	Default showing for display #2 Top (red) Pb3 will display yellow EXT, Ani will display yellow Valve/M	Pb1,Pb2,Pb3,AnI		Pr2	0x32B	812
<b>dS1</b>	0.3	Default showing for display #1 Bottom (Yellow)	Pb1; tiM	Pr2		0x32C	813
<b>dS1</b>	0.5	Default showing for display #1 Bottom (Yellow) Pb3 will display yellow EXT, Ani will display yellow Valve/M	Pb1,Pb2,Pb3,AnI, TiM		Pr2	0x32C	813



**PVI**

PVI Industries, LLC • 3209 Galvez Dr • Fort Worth, Texas 76111 • 800/784-8326

# TEMPTRAC INTERFACE GUIDE, GATEWAY SETUP, AND POINTS LIST

## ALARMS

<b>Alc</b>	0.3 & 0.5	Temperature alarms configuration: dependent on St1 or independent	rE÷Ab	Pr3	Pr2	0x32D	814
<b>ALL</b>	0.3	minimum temperature alarm for Pb1 (Alarm LA flash only)	-40÷230°F	Pr2	Pr2	0x32E	815
<b>ALL</b>	0.5	minimum temperature alarm for Pb1 (Alarm LA flash and signal on 3329)	-40÷230°F	Pr2	Pr2	0x32E	815
<b>Alu</b>	0.3	MAXIMUM temperature alarm for Pb1 (Alarm HA flash only)	-40÷230°F	Pr3	Pr2	0x32F	816
<b>Alu</b>	0.5	MAXIMUM temperature alarm for Pb1 (Alarm HA flash and signal on 3329)	-40÷230°F	Pr3	Pr2	0x32F	816
<b>AFH</b>	0.3 & 0.5	Differential for temperature alarm recovery	1÷45°F	Pr2	Pr2	0x330	817
<b>ALd</b>	0.3 & 0.5	Temperature alarm delay	0÷255 min.	Pr2	Pr2	0x331	818
<b>dAo</b>	0.3 & 0.5	Delay of temperature alarm at start up 1 = 10 min disp 0.1	0 ÷ 23h 50 min.	Pr2	Pr2	0x332	819

## ANALOGUE INPUTS

<b>oF1</b>	0.3 & 0.5	First probe calibration	-21÷21°F	Pr3	Pr2	0x333	820
<b>P2P</b>	0.3 & 0.5	Second probe presence	No; Yes	Pr2	Pr2	0x334	821
<b>oF2</b>	0.3 & 0.5	Second probe calibration	-21÷21°F	Pr3	Pr2	0x335	822
<b>P3P</b>	0.3 & 0.5	Third probe presence	No; Yes	Pr2	Pr2	0x336	823
<b>oF3</b>	0.3 & 0.5	Third probe calibration	-21÷21°F	Pr3	Pr2	0x337	824

## TIME AND DATE

<b>Hur</b>	0.3 & 0.5	Current hour	0 ÷ 23	Pr2	Pr2	0x338	825
<b>Min</b>	0.3 & 0.5	Current minute	0 ÷ 59	Pr2	Pr2	0x339	826
<b>dAY</b>	0.3 & 0.5	Current day	Sun ÷ SAT	Pr2	Pr2	0x33A	827



**PVI**<sup>®</sup>

PVI Industries, LLC • 3209 Galvez Dr • Fort Worth, Texas 76111 • 800/784-8326

# TEMPTRAC INTERFACE GUIDE, GATEWAY SETUP, AND POINTS LIST

## ENERGY SAVING TIMES

<b>E1</b>	0.3 & 0.5	Energy saving start on Sunday	0 ÷ 23h 50 min. - nu	Pr2	Pr2	0x33B	828
<b>S1</b>	0.3 & 0.5	Energy saving stop on Sunday	0 ÷ 23h 50 min. - nu	Pr2	Pr2	0x33C	829
<b>Sb1</b>	0.3 & 0.5	Set back temperature on Sunday	-40÷40°F	Pr2	Pr2	0x33D	830
<b>E2</b>	0.3 & 0.5	Energy saving start on Monday	0 ÷ 23h 50 min. - nu	Pr2	Pr2	0x33E	831
<b>S2</b>	0.3 & 0.5	Energy saving stop on Monday	0 ÷ 23h 50 min. - nu	Pr2	Pr2	0x33F	832
<b>Sb2</b>	0.3 & 0.5	Set back temperature on Monday	-40÷40°F	Pr2	Pr2	0x340	833
<b>E3</b>	0.3 & 0.5	Energy saving start on Tuesday	0 ÷ 23h 50 min. - nu	Pr2	Pr2	0x341	834
<b>S3</b>	0.3 & 0.5	Energy saving stop on Tuesday	0 ÷ 23h 50 min. - nu	Pr2	Pr2	0x342	835
<b>Sb3</b>	0.3 & 0.5	Set back temperature on Tuesday	-40÷40°F	Pr2	Pr2	0x343	836
<b>E4</b>	0.3 & 0.5	Energy saving start on Wednesday	0 ÷ 23h 50 min. - nu	Pr2	Pr2	0x344	837
<b>S4</b>	0.3 & 0.5	Energy saving stop on Wednesday	0 ÷ 23h 50 min. - nu	Pr2	Pr2	0x345	838
<b>Sb4</b>	0.3 & 0.5	Set back temperature on Wednesday	-40÷40°F	Pr2	Pr2	0x346	839
<b>E5</b>	0.3 & 0.5	Energy saving start on Thursday	0 ÷ 23h 50 min. - nu	Pr2	Pr2	0x347	840
<b>S5</b>	0.3 & 0.5	Energy saving stop on Thursday	0 ÷ 23h 50 min. - nu	Pr2	Pr2	0x348	841
<b>Sb5</b>	0.3 & 0.5	Set back temperature on Thursday	-40÷40°F	Pr2	Pr2	0x349	842
<b>E6</b>	0.3 & 0.5	Energy saving start on Friday	0 ÷ 23h 50 min. - nu	Pr2	Pr2	0x34A	843
<b>S6</b>	0.3 & 0.5	Energy saving stop on Friday	0 ÷ 23h 50 min. - nu	Pr2	Pr2	0x34B	844
<b>Sb6</b>	0.3 & 0.5	Set back temperature on Friday	-40÷40°F	Pr2	Pr2	0x34C	845
<b>E7</b>	0.3 & 0.5	Energy saving start on Saturday	0 ÷ 23h 50 min. - nu	Pr2	Pr2	0x34D	846
<b>S7</b>	0.3 & 0.5	Energy saving stop on Saturday	0 ÷ 23h 50 min. - nu	Pr2	Pr2	0x34E	847
<b>Sb7</b>	0.3 & 0.5	Set back temperature on Saturday	-40÷40°F	Pr2	Pr2	0x34F	848

## WORKING HOURS

<b>ou1</b>	0.3 & 0.5	working hours actual of relay 1	0÷9999 Hours	Pr1	Pr2	0x350	849
<b>ou2</b>	0.3 & 0.5	working hours actual of relay 2	0÷9999 Hours	Pr1	Pr2	0x351	850
<b>ou3</b>	0.3 & 0.5	working hours actual of relay 3	0÷9999 Hours	Pr2	Pr2	0x352	851
<b>oP1</b>	0.3 & 0.5	working hours limit of relay 1, Nn1 Alarm when reached	0÷9999, 0=disabled	Pr2	Pr2	0x353	852
<b>oP2</b>	0.3 & 0.5	working hours limit of relay 2, Nn2 Alarm when reached	0÷9999, 0=disabled	Pr2	Pr2	0x354	853
<b>oP3</b>	0.3 & 0.5	working hours limit of relay 3, Nn3 Alarm when reached	0÷9999, 0=disabled	Pr2	Pr2	0x355	854

## OUTPUTS SETTING

<b>1on</b>	0.3 & 0.5	The output 1 force ON / OFF or Temperature regulation	rEG=2; on=1; oFF=0	Pr2	Pr2	0x356	855
<b>2on</b>	0.3 & 0.5	The output 2 force ON / OFF or Temperature regulation	rEG=2; on=1; oFF=0	Pr2	Pr2	0x357	856
<b>3on</b>	0.3 & 0.5	The output 3 force ON / OFF or Temperature regulation	rEG=2; on=1; oFF=0	Pr2	Pr2	0x358	857



**PVI**

PVI Industries, LLC • 3209 Galvez Dr • Fort Worth, Texas 76111 • 800/784-8326

# TEMPTRAC INTERFACE GUIDE, GATEWAY SETUP, AND POINTS LIST

## OTHER

<b>Adr</b>	0.3 & 0.5	Serial address	0÷247	Pr2	Pr2	0x359	858
<b>Ptb</b>	0.3 & 0.5	Parameter map code always = 1	readable only	Pr2	Pr2	0x35A	859
<b>rEL</b>	0.3 & 0.5	Software release 5 = V0.5, 3 = V0.3	readable only	Pr2	Pr2	0x35B	860
<b>i1S</b>	0.5	Analog output when Digital Input 1 is activated	4-20mA		Pr2	0x35C	861
<b>i1t</b>	0.5	Analog output at i1S extra time if Digital Input 1 is not activated	0÷30 sec.		Pr2	0x35D	862
<b>i1d</b>	0.5	Digital Input 1 Alarm Delay	0÷255 min.		Pr2	0x35E	863
<b>i1F</b>	0.5	If Yes, Digital Input 1 will function as Alarm. Operating only when trying to call for output 1 and Input 1 is active, subject to i1d timer	No; Yes		Pr2	0x35F	864
<b>i2F</b>	0.5	Digital Input 2 will function only when Output 1 is energized	No; Yes		Pr2	0x360	865
<b>i3F</b>	0.5	Digital Input 3 will function only when Output 1 is energized, When Edi is selected, Output 1 will open when digital input 3 is activated	No; Yes; Edi		Pr2	0x361	866
<b>oS2</b>	0.5	Output 2 function: either temp relay or alarm relay	Std; AL		Pr2	0x362	867
<b>(TP1)</b>	0.3 & 0.5	Probe 1 temperature	Degrees F/C		Pr2	0x100	257
	0.3	Probe 1 Information/Status Normal=512 or 0x0200, Fault=515 or 0x0203. Fault will, drop call for heat, buz, Flash Yellow P1, light yellow valve/M	bit (0,1 on) probe failure		Pr2	0x101	258
<b>(TP2)</b>	0.3 & 0.5	Probe 2 temperature	Degrees F/C		Pr2	0x102	259
	0.3	Probe 2 Information/Status Normal=512 or 0x0200, Fault=515 or 0x0203. Fault will buz, Flash Red P2	bit (0,1 on) probe failure		Pr2	0x103	260
<b>(TP3)</b>	0.3 & 0.5	Probe 3 temperature	Degrees F/C		Pr2	0x104	261
	0.3	Probe 3 Information/Status Normal=512 or 0x0200, Fault=515 or 0x0203. Fault will buz, Flash Red P3	bit (0,1 on) probe failure		Pr2	0x105	262
	0.5	Modulation rate output (4 to 20mA)	0÷100%		Pr2	0x106	263
	0.3 & 0.5	Status of Relay 1,2&3	bit 0,1,2		Pr2	0x801	2050
	0.3	Input 3 Alarm, buz, ALMMB, Flashes HP= 4096 or 0x0800	bit # 12 or 13th bit		Pr2	0xD00	3329
	0.3	Input 2 Alarm, buz, Flashes LP= 4096 or 0x0800	bit # 12 or 13th bit		Pr2	0xD00	3329
	0.3	Input 2 & 3, buz, Flashed HP & LP= 4096 or 0x0800	bit # 12 or 13th bit		Pr2	0xD00	3329
	0.5	Low Temperature Alarm, beep, Flash Yellow LA= 1 or 0x0001	bit # 0 or 1st bit		Pr2	0xD00	3329
	0.5	High Temperature Alarm, beep, Flash yellow HA= 2 or 0x0002	bit # 1 or 2nd bit		Pr2	0xD00	3329
	0.5	Probe 1 error, open or shorted, Drops call for heat, yellow valve/M on, Flash Yellow P1=4 or 0x0004	bit # 2 or 3rd bit		Pr2	0xD00	3329
	0.5	Probe 2 error, open or shorted, Flashing red P2=256 or 0x0100	bit # 8 or 9th bit		Pr2	0xD00	3329
	0.5	Probe 3 error, open or shorted, Flashing red P3=512 or 0x0200	bit # 9 or 10th bit		Pr2	0xD00	3329



**PVI**

PVI Industries, LLC • 3209 Galvez Dr • Fort Worth, Texas 76111 • 800/784-8326

# TEMPTRAC INTERFACE GUIDE, GATEWAY SETUP, AND POINTS LIST

0.5	ALARM 1 (stops heating) Input 1, beep, Flash AL1 = 1024 or 0x0400. Will recover if Input 1 goes away, or need for call for heat goes away	bit # 10 or 11th bit	Pr2	0xD00	3329
0.5	ALARM 2 (Lockout, stops heating) Input 2, Flash AL2 & Lguage & valve= 2048 or 0x1000	bit # 11 or 12th bit	Pr2	0xD00	3329
0.5	ALARM 3 (Lockout, stops heating) Input 3/ALMMB/ALOAF, beep, Flash AL3 & Hguage & valve (This is ALARM ON ANY FAILURE)= 4096 or 0x0800	bit # 12 or 13th bit	Pr2	0xD00	3329
0.5	Maintenance Relay1, beep, Flash Nn1 & wrench=8192 or 0x2000 You must reset hours ou1 or set oP1=0	bit # 13 or 14th bit	Pr2	0xD00	3329
0.5	Maintenance Relay2, beep, Flash Nn2 & wrench=16384 or 0x4000 You must reset hours ou2 or set oP2=0	bit # 14 or 15th bit	Pr2	0xD00	3329
0.5	Maintenance Relay3, beep, Flash Nn3 & wrench=32768 or 0x8000 You must reset hours ou3 or set oP3=0	bit # 15 or 16th bit	Pr2	0xD00	3329
0.3 & 0.5	On/Off On=257 or 0x0101, Off=1 or 0x0001 Can be used to reset ALMMB alarm by cycling OFF, wait 30 sec , ON	Low byte is mask, Hi byte is command. Bit # 0 & #8	Pr2	0x500	1281
0.3 & 0.5	Keyboard Lock Lock=2056 or 0x0808, Unlock=8 or 0x0008. If locked PoF is displayed when keypad edit is attempted	Low byte is mask, Hi byte is command. Bit # 3 & #11	Pr2	0x500	1281
0.3 & 0.5	Reset audible alarm when condition is corrected, 4112 or 0x1010 does not reset alarm, just stops the beeping	Low byte is mask, Hi byte is command. Bit # 3 & #12	Pr2	0x500	1281
	Energy Savings Registers are enumerated 0 to 145 w/145=n/u 10 min each with 145=nu  All other enumerations start at 0 and count up				

