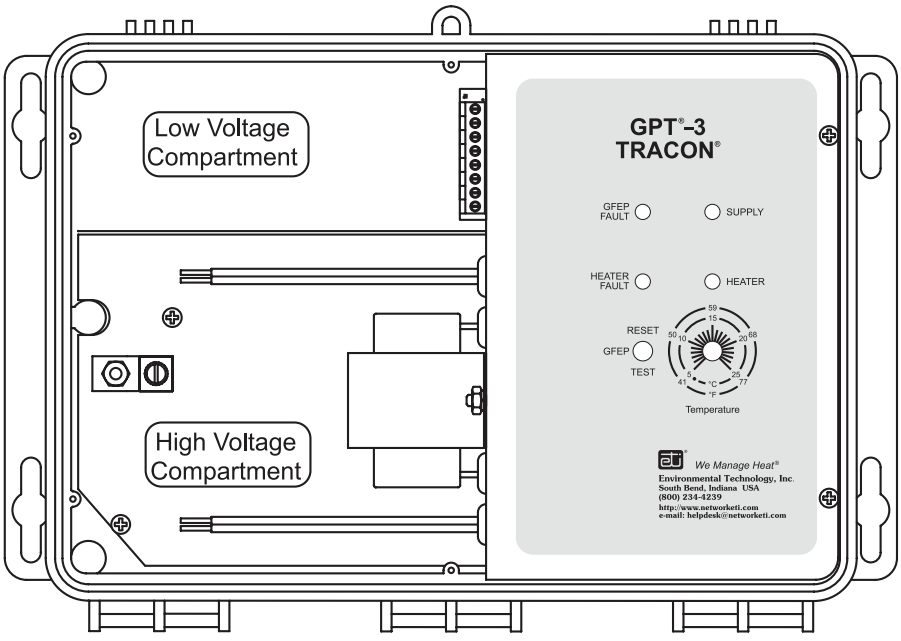
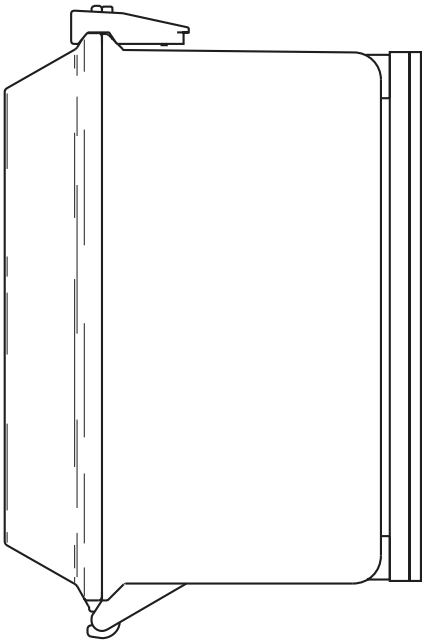
We manage heat®

MANUAL

Freeze Protection Thermostat
TRACON® MODEL GPT–3
Installation and Operation Manual





Environmental Technology, Inc.
1850 N Sheridan Street
South Bend, Indiana 46628
http://www.networketi.com/

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Safety

Make all electrical connections in compliance with the National Electrical Code (NFPA 70) and local electrical code. If you have questions concerning the installation or application, contact Customer Service.

Abnormal Odor or Smoke

In the event of smoke or a burning or abnormal odor, immediately interrupt power to the unit by unplugging the unit or by turning off the circuit breaker protecting the unit.

Electrical Shock / Fire Hazard

Even when the snow melting elements are disconnected, as long as the circuit breaker is on and power is running to the unit, voltage is still being applied to the system's yellow leads. Therefore, never touch the ends of the yellow leads or let the two leads touch each other. Do not let the two yellow leads contact any component inside the unit.

Any installation involving electric heater wiring must be grounded to earth to protect against shock and fire hazard. Suitable ground fault detection and interrupting systems must be in use at all times to reduce shock and fire hazard and to protect equipment.

Electric wiring to heating elements must be installed in accordance with National Electrical Code (NEC) requirements and all other local and applicable electrical codes and any third party standards. Follow the installation instructions contained herein and those provided by the heater manufacturer.

Use a GFEP (Ground Fault Equipment Protection) circuit breaker on each branch circuit connected to the ice melting system. Clearly label each circuit breaker with its function. This is vitally important when there is more than a single point of disconnect.

Size the circuit breaker in accordance with the size of the expected load. The maximum current load for the GPT-3 is 30 Amps maximum. This product is intended for use between electromechanical thermostats and high-end general purpose single and multiple channel temperature controls.

Make certain that the heater shield is properly grounded. Failure to do so may result in damage to the equipment or fire.

Additional Information

More information is made available regularly through our website, www.networketi.com. Please visit us online for Data Sheets, Manuals, White Papers, technical articles, and more. The most current and up to date version of this and every other manual for our products can be found in Acrobat (PDF) format to view online or to print. This is to assist you in installing and using our products to the best effect possible. If you have any comments about this or any other product from Environmental Technology, Inc., please contact us.

Contacting Environmental Technology, Inc.

For assistance, please contact Customer Service. Office hours are from 8:00 AM until 5:00 PM ET.

E-mail: info@networketi.com

Mail: Environmental Technology, Inc.
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South Bend, IN 46628

General

Introduction

The GPT–3 Freeze Protection Thermostat has a calibrated adjustment range of 41° to 77°F (5° to 25°C) with a control band of 2°F (1°C). Heaters operate at ambient temperatures below the set temperature.

The GPT–3 combines temperature control using either constant wattage or self-limiting heaters with GFEP (ground fault equipment protection) and advanced monitoring features. For example, although the GFEP is factory set to trip at 30 mA, this threshhold can be set to 60, 90 or 120 mA to cure nuisance tripping problems. Keeping wet fire sprinklers from freezing is considered to be a higher priority than interrupting heater power in the event of a ground fault condition. The GPT–3 accommodates this requirement by allowing the GFEP to be set only to alarm while the ground fault persists.

Other features include continuous heater monitoring with separate modes for constant wattage and self-limiting heaters. A trickle current verifies heater continuity of both heater types when there is no call for heat. The current flow through constant wattage heaters verifies continuity during operation. Self-limiting heaters employ an independent temperature monitor sensor (included) to measure the hot-end temperature. Depending upon how long it takes the cable to reach its operating temperature such that the monitor sensor is less than 5°F (3°C) below the control sensor temperature, the GPT–3 may momentarily declare a cold heater.

The GPT–3 automatically executes a self-test every 24 hours. First, heaters are de-energized. Then, the GFEP verifies its own operation. Finally, it checks the heaters for ground fault under operating conditions. This entire process takes about two seconds.

Other features include verifying the integrity of both the control and monitor temperature sensors and checking the contactor for open or shorted contacts. A control temperature sensor failure also inhibits contactor operation in addition to asserting an alarm condition.

The GPT–3 automatically accommodates 120, 208, 240 and 277 supply voltages. Since the heaters and the GPT–3 operate from the same supply voltage, the safety hazard created by multiple points of disconnect is eliminated. The heater control contactor is rated for up to 30 amps.

The GPT–3 provides a reverse acting isolated Class 2 alarm relay contact SPDT rated at one amp. Reverse action makes absence of supply voltage an alarmed condition.

Although the GPT–3 housing is NEMA 3R rated for indoor or outdoor service, a protected location is recommended. The operating temperature range is –40° to 136° F (–40° to 58°C). Padlocking the transparent front cover can prevent tampering without interfering with the view of the status indicators.

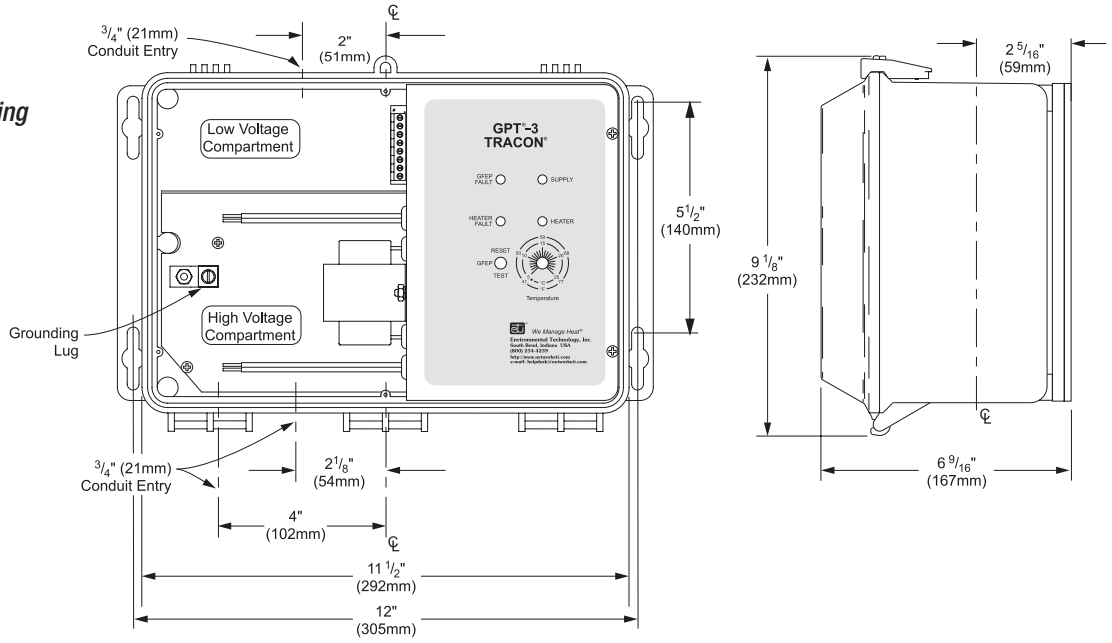


Figure 1. GPT–3 dimensional drawing

Operation

Normal

The GPT–3 requires little or no attention after installation. Although changing the temperature setting can improve heating system performance, this is seldom necessary. Minimum energy use occurs when the the temperature is set to the minimum value providing the desired heating performance.

Normal operation occurs when neither the Fault nor the GFEP indicators operate and the Alarm relay is off. Otherwise, operation is abnormal.

Abnormal

With one exception, operation of either the Alarm relay or Fault indicator or both means that a failure has occurred that requires a qualified electrician to correct. The exception is momentary indication of a self-limiting heater failure as is shown by blinking the Heater indicator when the GPT–3 is used with self-limiting cable. The GPT–3 detects a self-limiting heater failure by measuring its temperature at the far end of the cable. Depending upon how long it takes the cable to reach its operating temperature such that the monitor sensor is less than 5°F (3°C) below the control sensor temperature, the GPT–3 may momentarily declare a cold heater.

Many indicators display additional information concerning equipment failures through flashing (see "How the GPT-3 LEDs Work" at left). Check the Troubleshooting section for additional information since service by qualified personnel is required.

How the GPT-3 LEDs Work

First two seconds (self test): all LEDs on.

After that:

Power LED: always on

Heater LED:
- Off: no alarm, no heat
- On steady: heating
- Flash once: heater open (no trickle current) [no control]
- Flash twice: relay stuck on [no control]
- Flash three times: relay stuck off (constant wattage only) [no control]

GFEP fault LED:
- Off: normal operation
- Blink very rapidly: in ground fault test
- Blink even: ground fault condition [no control if latching mode]
- Flash twice: gfep circuit failure [no control if latching]

Heater Fault LED:
- Off: normal operation
- Blink even: low temp (self-limiting only)
- Flash twice: bad control thermistor [no control]
- Flash three times: bad monitor thermistor

Installation

First

Inspect the package and its contents for damage. In the event of damage, immediately contact Environmental Technology, Inc. Customer Service.

Next

Check the contents of the package against the pro forma Packing List shown below. If discrepancies are found, contact ETI Customer Service before starting the installation.

Pro Forma Packing List

Order Number	Quantity	Description
19425	1	GPT–3 Freeze Protection Thermostat
25076 (or 19272)	2	Temperature Sensor
20656	1	GPT–3 Installation and Operation Manual
18703	4	Wire Nuts, Red

Location

The GPT–3 is suitable for indoor or outdoor mounting on a vertical surface. Although the NEMA 3R rated housing is strong and durable, choose a protected location for an extra safety margin. Always consider the possibilities of tampering and vandalism when choosing a location.

Keep the GPT–3 and the heat cable as close together as is practical to minimize installation costs. There is a 2,000' (610m) limit on temperature sensor extension wiring.

Figure 1 shows mechanical dimensions of the GPT–3. Note the location of the compartment provided for low voltage Class 2 connections.

Supply and Heater Connections

The GPT–3 operates from 120, 208, 240 or 277 volts which it automatically selects. The heaters and GPT–3 operate from the same supply voltage.

The definite purpose DPST heater control contactor is rated for up to 30 AMP loads at 277 volts or less.

Make the supply voltage and heater connections in the compartment provided for this purpose. Use only copper wire for supply, heater and safety ground connections. Select a minimum wire size of 10 AWG with, minimum, 300 volt insulation rated for at least 75ºC.

Figure 2 shows a pictorial wiring diagram of the heater and supply voltage connections. Use appropriately rated wire nuts or bomb splices for all heater and supply connections. Connect the equipment safety ground and heater shield ground to the lug provided for this purpose.

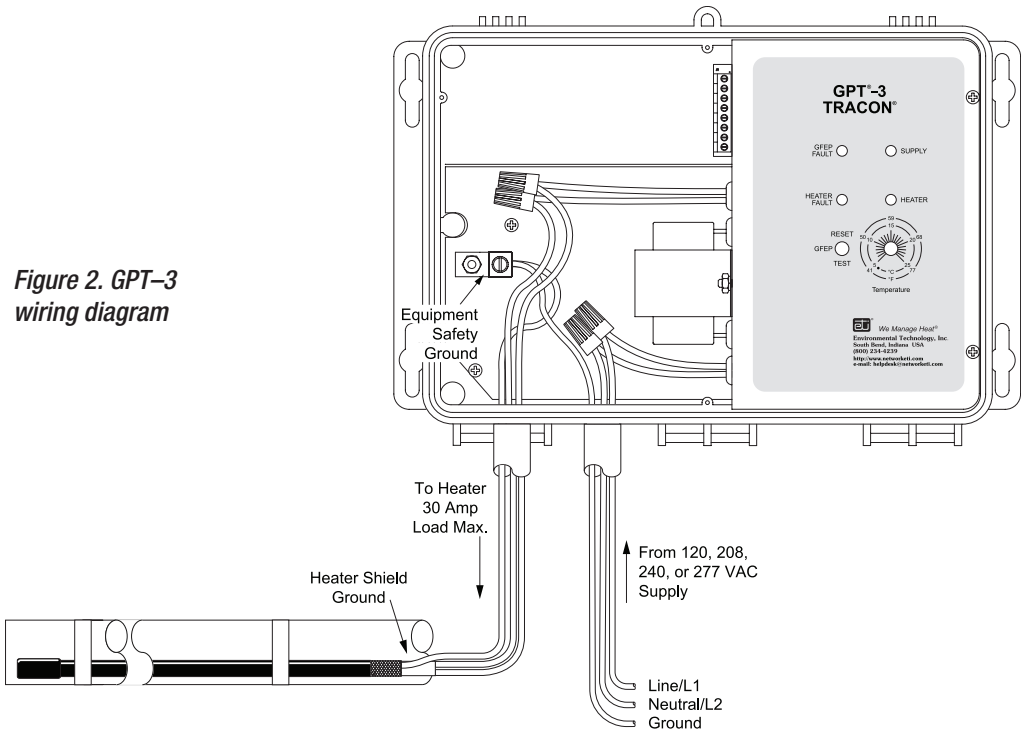


Figure 2. GPT–3 wiring diagram

Sensor and Alarm Relay Connections

General

The two temperature sensors are connected to the terminal block in the low voltage compartment along with the connections to the reverse acting isolated SPDT alarm relay. Use #18 AWG copper wire with insulation rated for 300 volt service for all Class 2 connections unless otherwise noted. Using jacketed extension wiring, although convenient, is not necessary.

Using metallic conduit for extension wires is recommended. Never route Class 2 circuits in the conduit used for supply and heater voltage circuits.

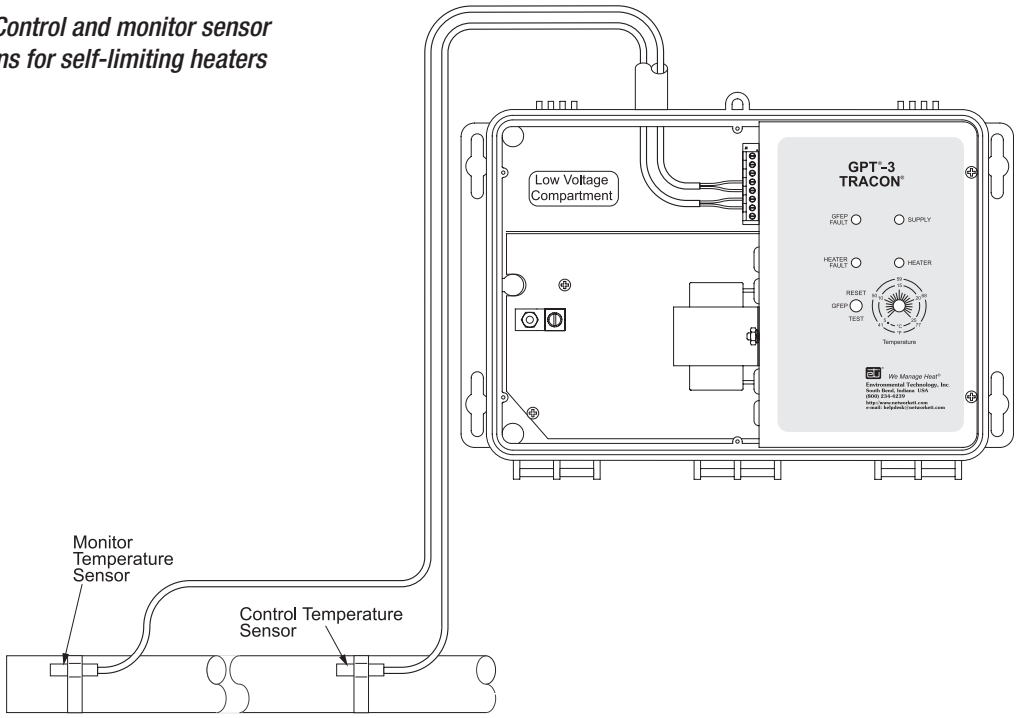
Temperature Sensors

Two identical temperature sensors are supplied with the GPT–3. Each is supplied with 20' (6m) of extension wire. For distances of up to 500' (152m), use #18 AWG copper wire and #12AWG for up to 2,000' (610m). Temperature sensor connections are non-polar.

Systems using self-limiting heaters require two temperature sensors. Figure 3 showsconnection of the two sensors. The GPT–3 comes factory set for self-limiting cable.

Systems using constant-wattage heaters require only one sensor as is shown in Figure 4 on the following page. Upon completion of the installation, dispose of the unused sensor.

Figure 3. Control and monitor sensor connections for self-limiting heaters



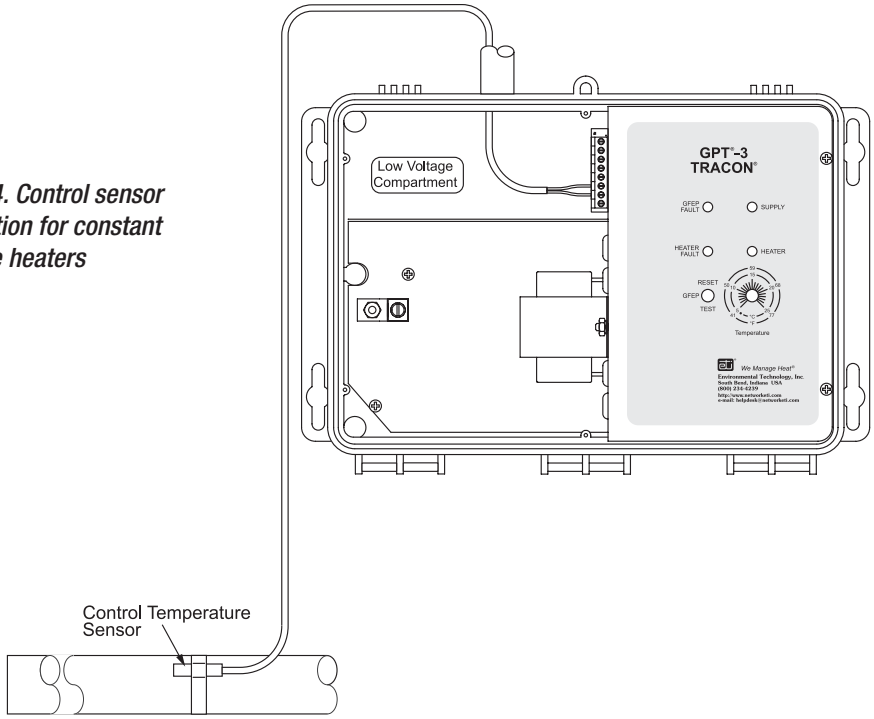


Figure 4. Control sensor connection for constant wattage heaters

Alarm Relay Contacts

Figure 5 shows the alarm relay connections. The relay contacts are rated for one amp in NEC Class 2 service. Contact Customer Service if higher voltage operation is required.

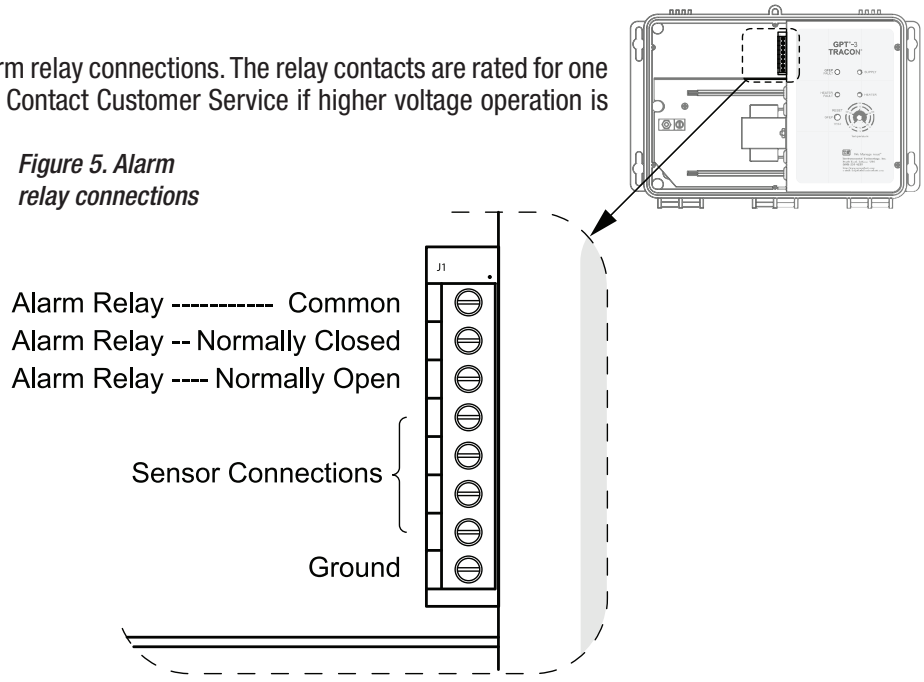


Figure 5. Alarm relay connections

Setup

Factory Settings

The GPT–3 comes set for the most common systems. This includes:

- Self-limiting cable
- GFEP set at 30 mA
- GFEP set for manual reset

The factory DIP switch settings follow:

FACTORY SETTINGS						
Pole	1	2	3	4	5	6
Setting	Off	Off	Off	Off	---	---

Custom Settings

General

The performance of the GPT–3 can be adjusted to match the needs of the application using the DIP switch as shown in Figure 6. Accessing this switch usually requires removing the electronic assembly from its housing. Figure 7 shows the screws that need to be removed to access the DIP switch.

Make any DIP switch changes before making the supply voltage and heater connections. Otherwise, it will probably be necessary to break and re-make these connections.

DIP switch poles that do not require change are labeled 'NC'. Spare switch poles are labeled '---'.

GFEP Mode

Fire protection sprinkler and certain other critical applications consider GFEP secondary in importance to freeze protection. The GPT–3 accommodates these applications by warning of a ground fault condition while it exists. Heaters operate independent of the ground fault condition.

Automatic GFEP Reset Setting						
Pole	1	2	3	4	5	6
Setting	On	NC	NC	NC	---	----

Figure 6. DIP switch detail

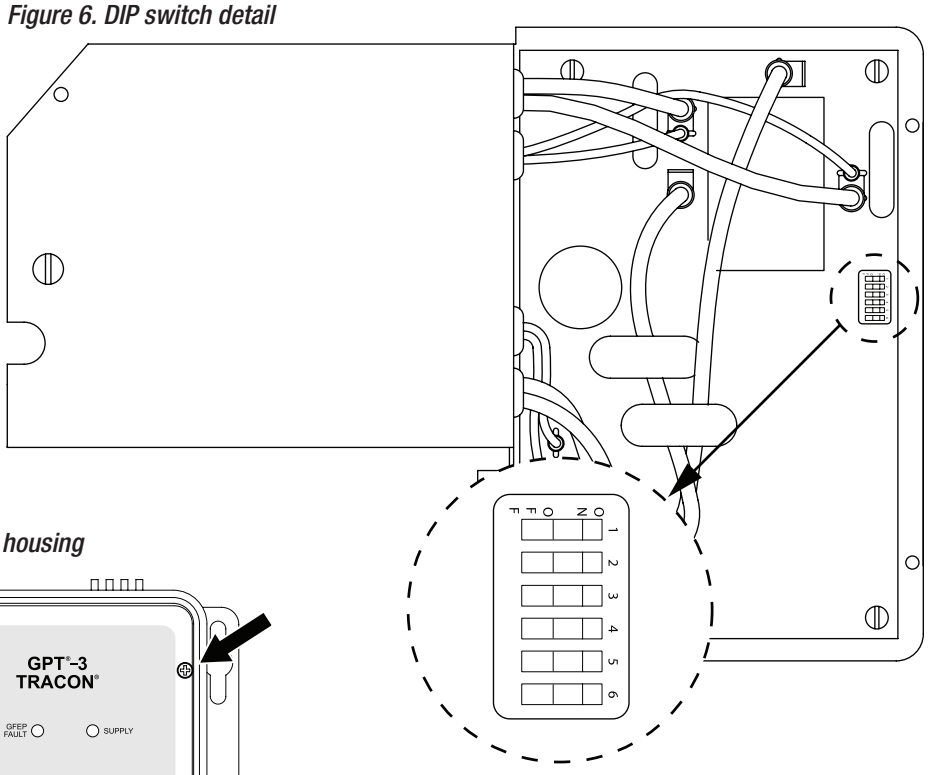
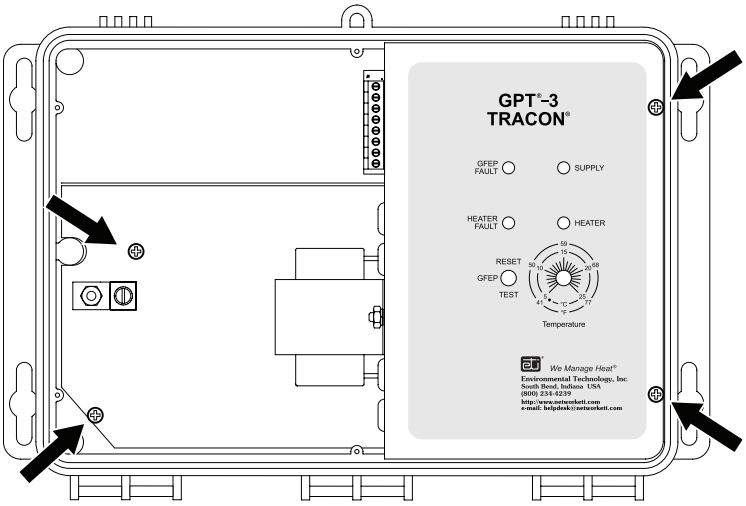


Figure 7. Removing electronic assembly from housing



Current

The GFEP current setting can be increased from its factory set 30 mA value to 120 mA in 30 mA steps. The higher current settings serve the special purpose of eliminating spurious GFEP tripping. Accessing this function was made intentionally difficult to prevent its casual use. The DIP switch settings follow:

60 mA GFEP Setting						
Pole	1	2	3	4	5	6
Setting	NC	NC	On	Off	---	---

90 mA GFEP Setting						
Pole	1	2	3	4	5	6
Setting	NC	NC	Off	On	---	---

120 mA GFEP Setting						
Pole	1	2	3	4	5	6
Setting	NC	NC	On	On	---	---

Constant Wattage Heater Mode

The GPT–3 provides a special operating mode for checking the continuity of constant wattage heaters. The DIP switch setting is shown below:

Constant Wattage Heater Setting						
Pole	1	2	3	4	5	6
Setting	NC	On	NC	NC	---	---

Maintenance

General

The GPT–3 does not require routine maintenance. It contains no field replaceable components.

Troubleshooting

The GPT–3 provides extensive fault diagnosis capability for the purpose of quickly identifying and correcting system problems. Front panel indicators perform multiple functions so as to provide the greatest amount of information. With one exception, one or more indicators flashing in repetitive patterns mean that a fault requiring a qualified technician for correction has occurred. See “How the GPT-3 LEDs Work” at right.

The exception is operation of the HEATER FAULT indicator in a 50% on, 50% off pattern when using self-limiting cable. This can occur when heaters first operate due to the time delay between the application of power and attaining thermal equilibrium.

Detailed troubleshooting instruction can be obtained from either Customer Service or the Environmental Technology, Inc. web site at http://www.networketi.com.

Returns

Contact Customer Service to obtain a Return Authorization before shipping anything to Environmental Technology, Inc. Otherwise, the shipment may be refused.

SPECIFICATIONS

Control	
Range	–41°F to 77°F (–5°C to 25°C)
Dead Band	2°F (1°C)
Electrical	
Supply voltage	120, 208, 240 or 277 volts auto-selected
Load	30 amps maximum
Alarm Relay	Isolated SPDT 1 amp Class 2 contact
Indicators	
Supply (Red)	Power applied
Heater (yellow)	Call for heat
GFEP (red)	Ground fault occurring or has occurred
Fault (red)	Contactor failure
	Temperature sensor failure
	Power-on sensor check failure
GFEP	
Settings	30 mA default, 60, 90, 120 mA selectable
Reset	Manaul Default
Auto-test	Every 24 hours
Heater Monitoring	
Choices	Self-limiting default, constant wattage selectable
Alarm Relay	No Power
	Heater failure
	Contactor failure
	Ground fault of GFEP circuit failure
	Temperature sensor failure
Temperature Limits	
Operating	–40°F to 136°F (–40°C to 58°C)
Storage	–67°F to 167°F (–55°C to 75°C)

ORDERING INFORMATION

Order Number	Description
19425	GPT-3 Freeze Protection Thermostat (QTY 1)

LIMITED WARRANTY

ETI's two year limited warranty covering defects in workmanship and materials applies. Contact Customer Service for complete warranty information.

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