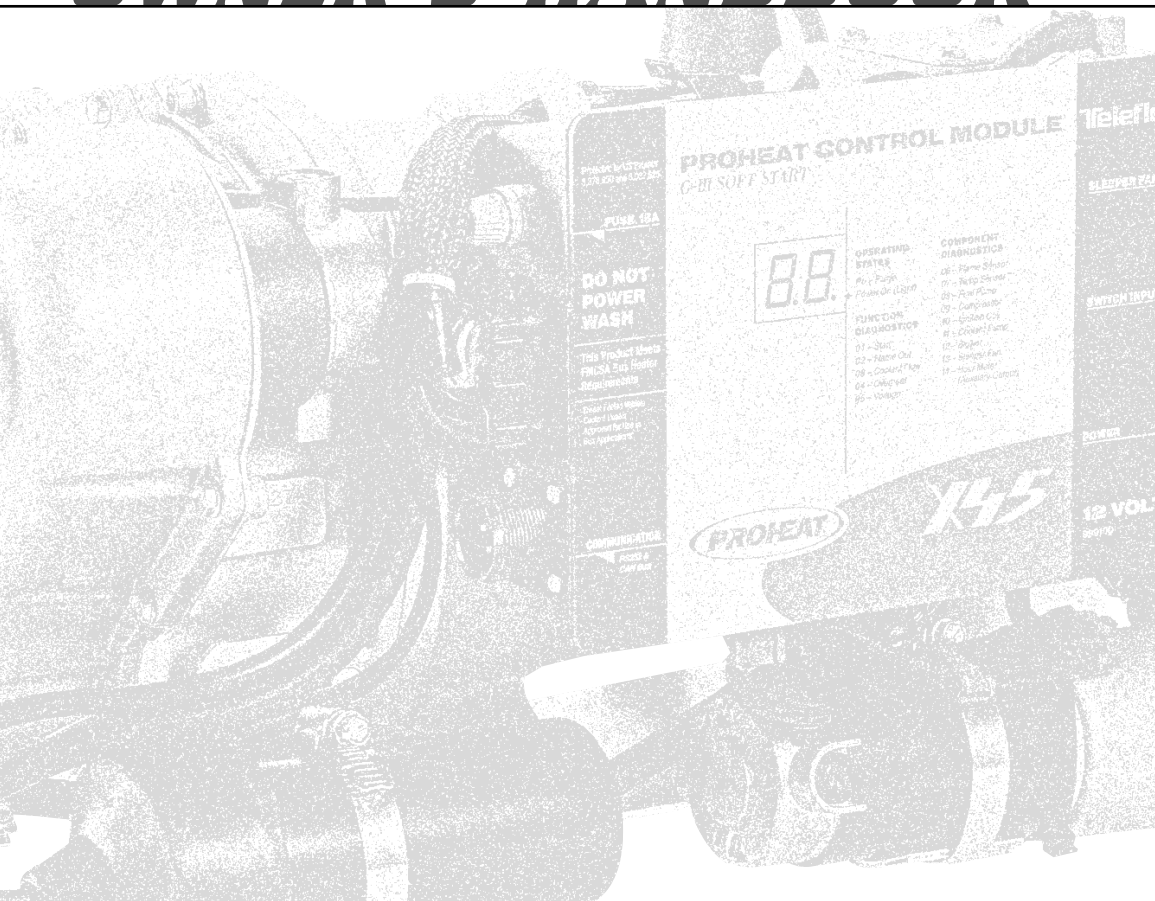


OWNER'S HANDBOOK

X45



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Introduction

Congratulations on your purchase of a PROHEAT diesel-fired heater. This handbook is provided to summarize the operation and maintenance of the PROHEAT for the Owner/Operator.

For complete information, please refer to the Installation and Service Manual 925830 at www.proheat.com

Although trucks have been used throughout this book, applications for PROHEAT are by no means limited to trucks. PROHEAT heaters are designed to be used on any diesel equipped vehicle including: trucks, buses (school, transit and coach), construction equipment, off road equipment, military equipment and cargo.

PROHEAT heaters are used in the following applications:

- Preheats an engine block to ensure reliable cold weather starting. It is recommended that PROHEAT is used year round (winter and summer) to reduce engine wear associated with cold starting.
- With the engine off—supplies heat to the engine and sleeper for comfort and reduced idle time resulting in cost savings through reduced fuel consumption and engine wear.
- With the engine running—adds heat to the coolant system when the engine does not provide adequate reject heat for the vehicles interior. PROHEAT can be operated when the engine is running.
- Provides heat to protect valuable cargo from cold weather damage.

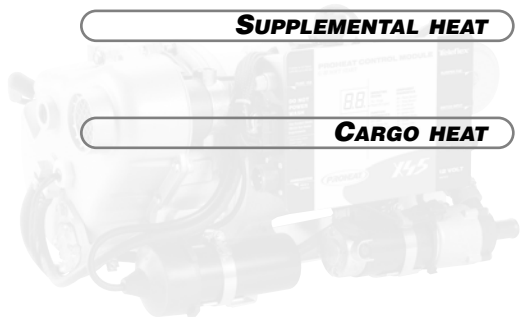
NOTE

ENGINE BLOCK HEAT

ENGINE & SLEEPER HEAT

SUPPLEMENTAL HEAT

CARGO HEAT

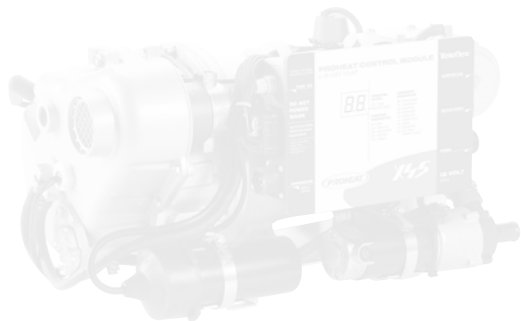


Operating your PROHEAT

Your PROHEAT is controlled by either an ON/OFF manual toggle switch or by the PROHEAT 7-day timer. The timer can be controlled manually, or it can be set to start at a predetermined time. Both devices have a light that indicates when the heater is operational as well as flashing corresponding diagnostic codes indicated by the PCM.

OPERATING SEQUENCE

1. **SWITCH ON** – The ON/OFF switch (or Timer) lamp and the PCM “ON” LED will light. In addition, the Hour Meter (Auxiliary Output) will be powered. The PROHEAT goes to “Precheck”.
2. **PRECHECK** – The PCM performs a short diagnostic cycle. This takes a few seconds to check components for proper ranges, checking for the presence of a flame, short-circuits and open circuits. If there are no errors indicated, the PROHEAT goes to “Ignition”.
3. **IGNITION** – The blower starts first, followed by the coolant pump, ignition spark, air compressor and fuel pump. The ignition electrode sparks for 60 seconds. Once the flame sensor detects a good flame, the PROHEAT goes to “Full Output”. At 60 seconds, the sleeper fan (if equipped) output turns on.
4. **FULL OUTPUT** – The PROHEAT runs at Full Output until the coolant temperature reaches 185°F (85°C) at the heater outlet. The PROHEAT shuts the flame off and goes to “Purge”. Pu is displayed on the PROHEAT Control Module (PCM).
5. **PURGE** – The air compressor and fuel pump shut off immediately. The blower and coolant pump continue to run. After 3 minutes, the blower stops and the PROHEAT goes to “Standby.”
6. **STANDBY** – The coolant pump circulates the coolant through the system until the temperature drops to 150°F (65°C) at the heater outlet; then it will enter Precheck and repeat steps 2 to 6. The PROHEAT will continue to repeat steps 2 to 5 until it is switched “off.”
7. **SWITCH OFF** – If PROHEAT is in Full Output, it will Purge first, then shut “OFF”. If PROHEAT is in Standby, it will shut “OFF” immediately. When switched OFF, the sleeper fan (if equipped) output turns off. When switched OFF, the Hour Meter (Auxiliary Output) will shut off.



Sleeper Fan Operation

Today's sleepers are designed for maximum comfort for the vehicle operator. Generally the units are larger and have accessories that compete for battery power with auxiliary heaters. PROHEAT is a cost-saving component by reducing fuel consumption and engine maintenance. Therefore, it should be given priority over these accessories.

NOTE

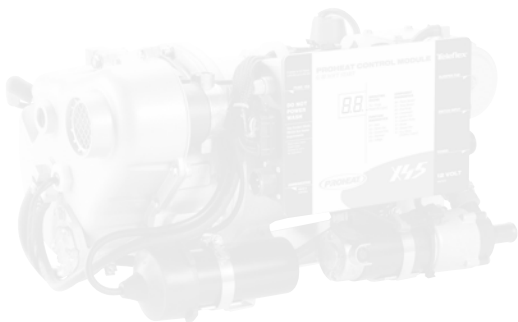
For more information on Sleeper Fan installation, please refer to the Installation and Service Manual 925830 at www.proheat.com

PROHEAT installation recommendations are designed to allow the operator to:

- Run the PROHEAT with the vehicle ignition key in the OFF position
- Return full control to the OEM system when PROHEAT is not being used
- Allow the driver to select the fan speed required for the sleeper size
- Set the desired sleeper ambient temperature using a dedicated thermostat

The vehicle operator's responsibility is to ensure that:

- Coolant valves used in the Heat/AC system are open: These can be manually or electrically operated (electrically operated valves must be opened before shutting the vehicle OFF)
- Blend air doors that control air flow are open: These are electrically operated and must be opened before shutting the vehicle OFF
- When operating the PROHEAT, power consuming accessories such as refrigerators, DVD's, TV's, satellites, heated mirrors, etc. are not used to ensure enough starting amperage for the engine
- Sleeper curtains are closed: The PROHEAT is designed to heat the sleeper and engine as efficiently as possible - heating the cab, fuel tanks and batteries means longer run time which will require more battery power



OEM Heater control panel

The heater control panel in the sleeper and cab must be set as shown in the illustration below. Vehicle sleeper heater panels operate valves in the heating system that may restrict flow to the PROHEAT. If the control panel is on COOL or AC these valves could close and cause the PROHEAT to stop.

NOTE

The PROHEAT is safe-guarded against damage due to flow restrictions; however, heating is greatly diminished without adequate flow.

Restrictions in the coolant system will result in:

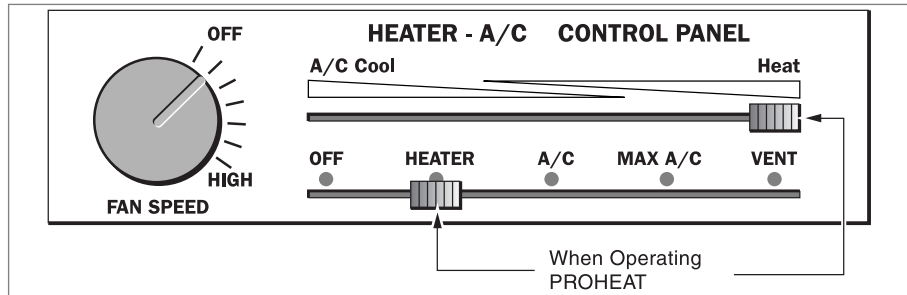
- Coolant Flow Code 03 or Overheat Code 04 diagnostic codes (see page 12)
- Lower air temperature heat output and therefore longer run time to reach desired temperature resulting in increased power consumption
- PROHEAT short cycling

Restrictions in the air flow will result in:

- Less air flow into the sleeper unit, therefore longer run time to reach desired temperature resulting in increased power consumption
- Uneven sleeper ambient air temperature

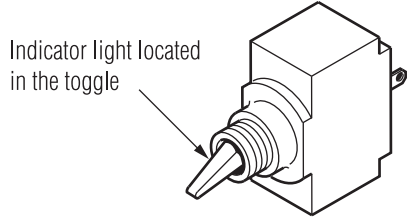
NOTE

This diagram is an example only. Vehicles may have specialized controls. Contact your Distributor/Dealer for details.

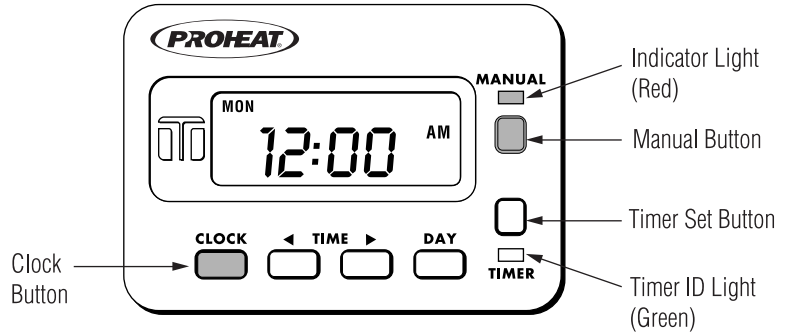
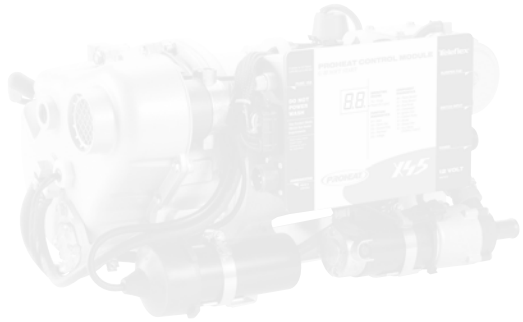


Toggle Switch - Timer

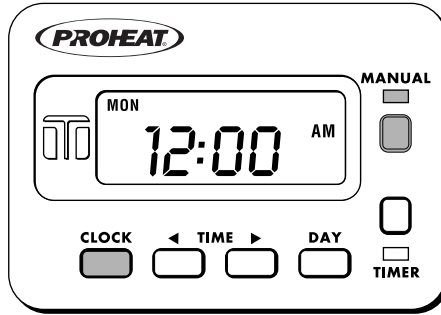
TOGGLE SWITCH



TIMER



Timer Instructions



SETTING CLOCK

- STEP 1** Press and hold "CLOCK"
- STEP 2** Press "◀" or "▶" to set time
- STEP 3** Press "DAY" to advance the day.
- STEP 4** Release "CLOCK".

NOTE

For complete Timer information, please refer to the Timer Installation and Operating Instructions 958828 at www.proheat.com

MANUAL OPERATION

MANUAL button is used to turn the PROHEAT On and Off when desired.

- STEP 1** Press "MANUAL" to turn on the PROHEAT (red light will go on and the heater will operate indefinitely).
- STEP 2** Press "MANUAL" again to turn Off the heater (red light and the PROHEAT will turn Off).

TIMED OPERATION

- STEP 1** Press and Hold "TIMER" (green light will turn on and "T1" will flash).
- STEP 2** Press "◀" or "▶" to set time
- STEP 3** Press "DAY" to advance the day.
- STEP 4** Release "TIMER". (green light and "T1" will remain lit to activate timer).

Caring for your PROHEAT

Your PROHEAT has been designed to operate with a minimum of maintenance. Always return to your authorized PROHEAT dealer for major service. Your PROHEAT dealer has the specialized equipment necessary to keep your PROHEAT running safely and reliably.

For more maintenance information, refer to the Installation and Service Manual 925830 at www.proheat.com

NOTE

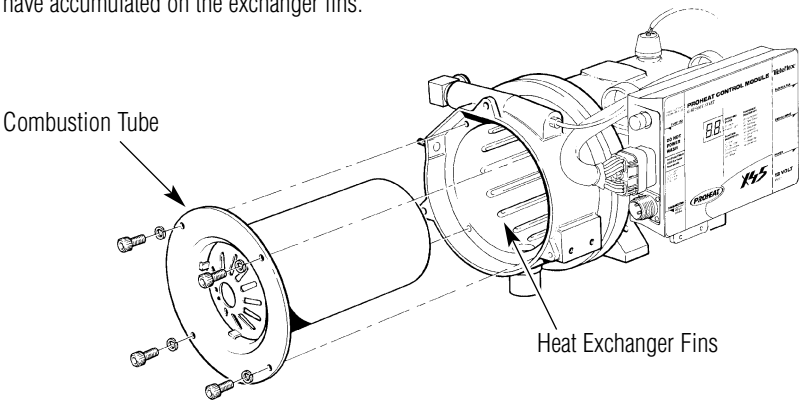
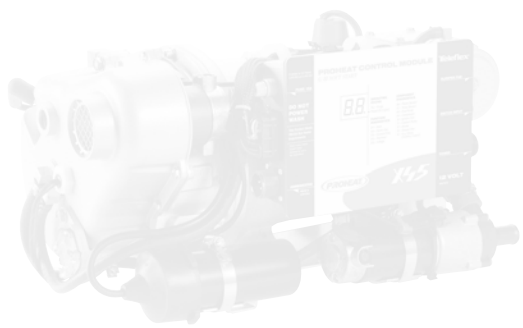
Operate the PROHEAT year round (winter & summer). Use the PROHEAT to preheat the engine before starting. Savings will result from reduced engine idle time and maintenance. This also keeps the PROHEAT components and fuel system in good running order.

CLEAN HEATER ENCLOSURE

Remove the enclosure cover and clean out any accumulated debris and dirt from the enclosure and the PROHEAT.

HEAT EXCHANGER

To maintain optimum heat output, clean any combustion deposits that have accumulated on the exchanger fins.



Caring for your PROHEAT

**EXHAUST SYSTEM**

Check the exhaust system carefully. Ensure that the exhaust pipe is vented safely away from the vehicle sleeper and cab. Check for dents, restrictions or severely corroded areas. Replace the exhaust pipe if necessary. Ensure the exhaust pipe clamp is tight.

CLEAN NOZZLE

Use a degreaser/cleaner or carburetor cleaner to wash any debris out.

CLEAN FLAME SENSOR

Wipe flame sensor glass clean with water and a rag. Glass should be clear.

ELECTRICAL SYSTEM

Check the internal and the external wire harnesses for damage. Replace if required.

FUEL FILTER

Replace fuel filters annually.

CLEAN AIR INTAKE

Check the air inlet screen for restrictions. Clean as required.

COMPRESSOR AIR INTAKE

Check the air filter to ensure clean air is supplied to the nozzle. Replace annually or more often if required.

COOLING SYSTEM

Check heater hoses and connections for signs of leakage or damage. Repair or replace as required.

FUEL SYSTEM

Check for fuel leaks, damaged fuel lines. Ensure that the fuel line clamps are tight.

VEHICLE BATTERIES

Check the condition of the batteries and the wire connections. If unsure of the battery condition, have them load tested.

OPERATION TEST

Run the system for at least 15 minutes or until the heater cycles OFF and then ON. Alternate the thermostat for the sleeper heater (if connected) between low and high settings to ensure that the sleeper heater fan cycles "ON" and "OFF".

Troubleshooting

The PCM (PROHEAT Control Module) has self diagnostics for reliable operation, safety and protection of the PROHEAT. If a problem is detected it shuts the PROHEAT OFF and a diagnostic code is displayed on the PCM Diagnostic Panel. The toggle switch or timer will flash a corresponding number of times.

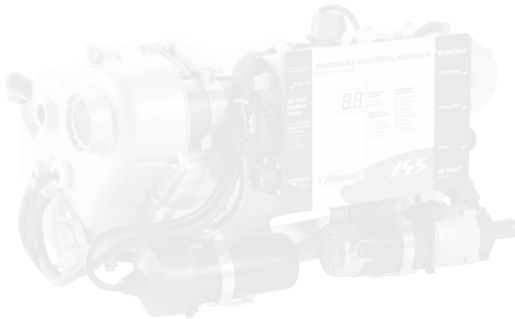
NOTE

For more detailed troubleshooting information, refer to the Installation and Service Manual 925830 at www.proheat.com

PROHEAT will attempt one (1) re-start after a Function or Component Diagnostic Code has been indicated. The re-start will not occur during a purge cycle or if the coolant temperature is above 150°F (65°C). ALWAYS let the PROHEAT attempt two (2) starts so that the PCM can point you to the problem area.

TROUBLESHOOTING STEPS

1. Switch the PROHEAT ON using the toggle switch or timer.
2. Let the PROHEAT run or attempt two (2) starts.
3. Count the number of flashes on the toggle switch or timer.
4. Function Diagnostic codes 01 to 05 are usually caused by vehicle system interface problems.
5. Components Diagnostic codes 06 to 13. These codes indicate an electrical problem ONLY, with PROHEAT components, wiring or the PCM. Refer to your Installation and Service Manual 925830 for further information.
6. For an up to date Installation and Service Manual 925830 or a Distributor/Dealer near you, go to www.proheat.com





Troubleshooting

Operation Indicators/Diagnostic Codes

PROHEAT CONTROL MODULE (PCM) DIAGNOSTIC PANEL

OPERATING STATES

- Pu – Purge
- ← Power On (Light)

FUNCTION DIAGNOSTICS

- 01 – Start
- 02 – Flame Out
- 03 – Coolant Flow
- 04 – Overheat
- 05 – Voltage

COMPONENT DIAGNOSTICS

- 06 – Flame Sensor
- 07 – Temp Sensor
- 08 – Fuel Pump
- 09 – Compressor
- 10 – Ignition Coil
- 11 – Coolant Pump
- 12 – Blower
- 13 – Sleeper Fan
- 14 – Hour Meter (Auxiliary Output)



Example:
LED Display showing
Code 05

OPERATION STATE INDICATORS:

8.8. flashes when power is applied. **ON LIGHT** is lit whenever the PROHEAT is running. **Pu** or **PURGE** indicates that the heater is in the cool down state for 3 minutes after stopping burning fuel.

FUNCTION DIAGNOSTIC CODES:

Function codes indicate why the PROHEAT was shut down. It is possible to have two or more codes alternating at the same time. For example, 03, 04, 03, 04, etc. A function code may be displayed in conjunction with a component code. These codes indicate problems with the system interface to the coolant, fuel and power system of the vehicle as well as mechanical failures of the components.

COMPONENT DIAGNOSTIC CODES:

This section covers individual electrical components. These codes indicate electrical faults **ONLY**. Mechanical failures of a component are not detected electronically and will be indicated by a Function Diagnostic Code. These diagnostic codes are not covered in this handbook. Refer to Installation and Service Manual 925830 at www.proheat.com

NOTE

- A Sleeper Fan Code 13 and Hour Meter (Auxiliary Output) Code 14 diagnostic code will not shut the PROHEAT down. The heater will continue to run, maintaining heat to the engine.
- The X45 fuel pump is driven by the compressor. The Fuel Pump code is retained only for use on earlier model PROHEATS.
- The code number corresponds to the flashes indicated on the toggle switch or timer. Refer to the PROHEAT Installation and Service Manual 925830 at www.proheat.com for details.

Troubleshooting

Function Diagnostics

START (01) & FLAME OUT (02) Diagnostic Code

PROHEAT is designed to burn ULSD, #1, #2 diesel and kerosene. During cold weather, the correct grade of fuel or fuel blend **MUST** be used to prevent gelling and to ensure fuel flow. Problems with the fuel system are indicated by the above codes.

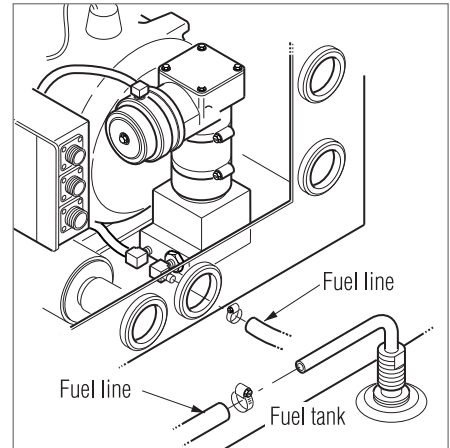
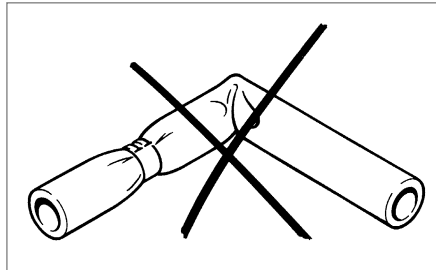
CHECK

Fuel level in tank and quality of fuel:

- Fuel line routing for kinks and restrictions (wire ties too tight, etc.)
- Fuel line condition (cracks, abrasions, etc.)
- Fuel filter (see Installation and Service Manual 925830 at www.proheat.com)

NOTE

On a new installation, running out of fuel or after servicing, the fuel lines may be empty and two (2) ignition cycles may be required in order to purge the air from the fuel system when starting, depending on the length of fuel line.



Troubleshooting

Function Diagnostics

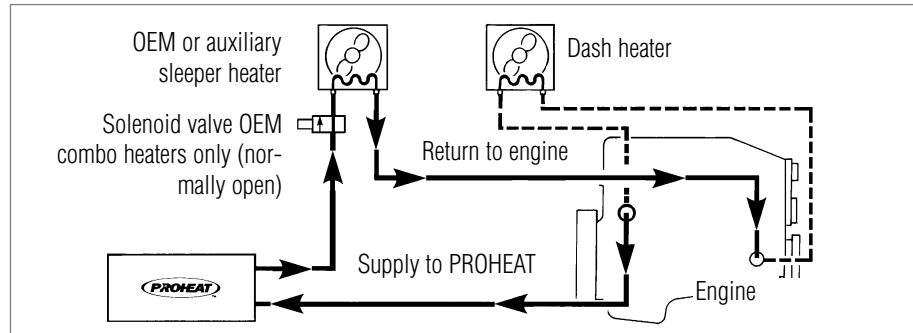
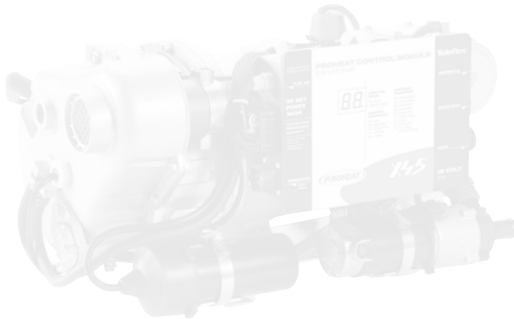
COOLANT FLOW (03) & OVERHEAT (04) Diagnostic Codes

Efficient operation of the heater requires a sufficient amount of coolant in the system and coolant flow. Problems with the vehicle and PROHEAT coolant system are indicated by the above diagnostic codes.

The OVERHEAT sensor has a manual reset. This device protects the heater from damage and the coolant system must be checked thoroughly before resetting. See Installation and Service Manual 925830 at www.proheat.com for details.

CHECK

- For at least 3 gallons of coolant in the system, ensure the radiator is topped up
- That coolant line shut off valves are open
- That sleeper heater coolant controls are in the full heat position
- That dash heater coolant controls (if used) are in the full heat position



This is an example only. Vehicle may have specialized plumbing. Contact your Distributor/Dealer for details.

Troubleshooting

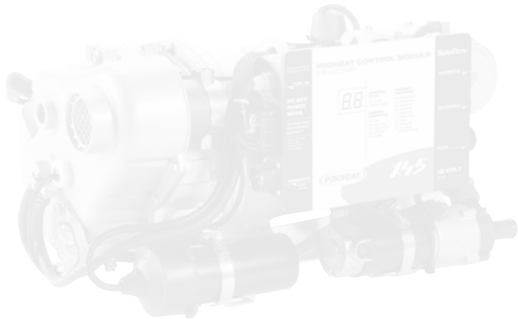
Function Diagnostics

VOLTAGE (05) DIAGNOSTIC CODE:

PROHEAT constantly monitors voltage at the heater. The range for a 12-volt heater is 10 to 15 volts and for a 24-volt heater, 20 to 30 volts. Should the voltage go out of this range, the PROHEAT will shut down and the above code will be indicated.

CHECK

- Voltage with the heater running or trying to start to ensure that the system is loaded
- Wire connections at the battery and the connector at the PROHEAT PCM
- The power harness for routing and abraded areas
- For faulty connections at PROHEAT components and internal harness
- Battery condition (dead cells, cleanliness). Load test if necessary
- That batteries are at least 900 CCA (4 recommended) to ensure an 8 to 9 hour use of the PROHEAT and sleeper fan
- Use of accessories such as heated mirrors, satellites, refrigerators, DVD's, etc. (will shorten the time the PROHEAT can operate)
- Fan speed required in order to move the hot air throughout larger sleepers.



NOTE

Teleflex warrants the PROHEAT Heater to be free of defects in material and workmanship under design usage and service conditions for two (2) years on parts and labour from the date of first installation. Replacement parts are covered for the remainder of the heater's warranty or ninety (90) days, whichever is greater.

This warranty does not apply to damage or failure of the PROHEAT Heater or the vehicle into which it was installed due to improper installation, assembly, maintenance, abuse, neglect, accident, or the use of parts not supplied by Teleflex. Accessories supplied, but not manufactured by Teleflex, shall be covered by the manufacturer's warranty only and not subject to this warranty.

Warranty

This is a warranty summary. For the complete warranty manual, please go to www.proheat.com

Non-standard installations, that is, those requiring a departure from published installation instructions, should not be undertaken without first having consulted Teleflex.

Coverage for warrantable parts, at the discretion of Teleflex will be made to the claimant in the form of repair, replacement or credit. Warranty labour payments will be made only to Registered PROHEAT Service Centres in accordance with the Standard Repair Times (SRT's) as published by Teleflex.

Marine installations

The purchaser and installer are advised that specific rules and regulations are in effect with respect to the installation of heaters in marine applications. These rules and regulations are enforced by regional and federal agencies and/or other agencies having jurisdiction. It is the installer's responsibility to review and comply with all such rules and regulations.

In addition each marine installation must be inspected and approved by an Authorized PROHEAT Dealer. Only those installations which are approved, and so registered, will be eligible for warranty coverage of one (1) year on parts and labour.

THE WARRANTIES SET FORTH HEREIN ARE THE SOLE WARRANTIES MADE BY TELEFLEX IN REGARD TO THE PROHEAT HEATER SYSTEM. TELEFLEX MAKES NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Before the expiration of the warranty, Owner must give notice to a Registered PROHEAT Dealer of failures, if any, considered to be warrantable and deliver the defective heater system to such dealer. Owner is responsible for the cost of all repairs made to the engine or equipment in which it is installed, other than the PROHEAT Heater system. Owner is responsible for lodging, meals and incidental costs incurred by the Owner as a result of a warrantable failure. Owner is responsible for “down-time” expenses, and all business costs and losses resulting from a warrantable failure.

TELEFLEX IS NOT RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

Owner’s responsibility

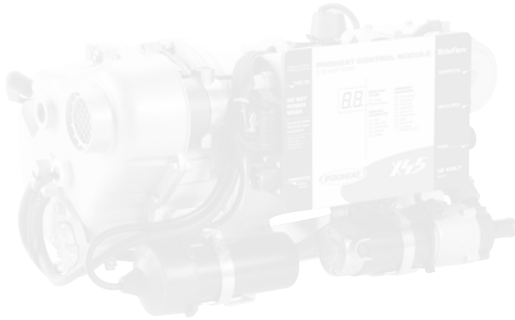
Items Covered Under This Warranty

1. Basic Heater including combustion chamber components, fuel system components, air compressor, ignition components, coolant pump, air blower.
2. Electrical controls provided by PROHEAT including cab mounted controls and PCM.
3. PROHEAT supplied accessories and mounting hardware.

Items Not Covered Under This Warranty

1. PROHEATs no longer within the warranty period.
2. Normal wear and maintenance parts, including fuel filter, air filter, nozzle, and clamps.
3. Parts which malfunction due to improper installation, causing inadequacies in: air, fuel or coolant flow; voltage due to wiring; shock or vibration protection.
4. Any progressive damage to the engine or vehicle arising out of failure of the PROHEAT.
5. PROHEATs which have been modified or use of non-standard parts not approved by Teleflex.
6. PROHEATs that have been abused or damaged.
7. Travel time by a PROHEAT Dealer.
8. Diagnosis or repairs when caused by problems not directly related to the heater or due to empty fuel tanks or poor fuel quality.

IF YOU HAVE ANY QUESTIONS OR CONCERNS ABOUT THE PROHEAT WARRANTY, CONTACT YOUR NEAREST PROHEAT DISTRIBUTOR OR TELEFLEX AT (604) 270-6899.



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THERMAL SYSTEMS

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