PROHEAT®

INSTALLATION AND SERVICE MANUAL
PROHEAT X45

Teleflex®
THERMAL SYSTEMS

1.1 PHYSICAL – X45

1.1.1 X45 HEATER

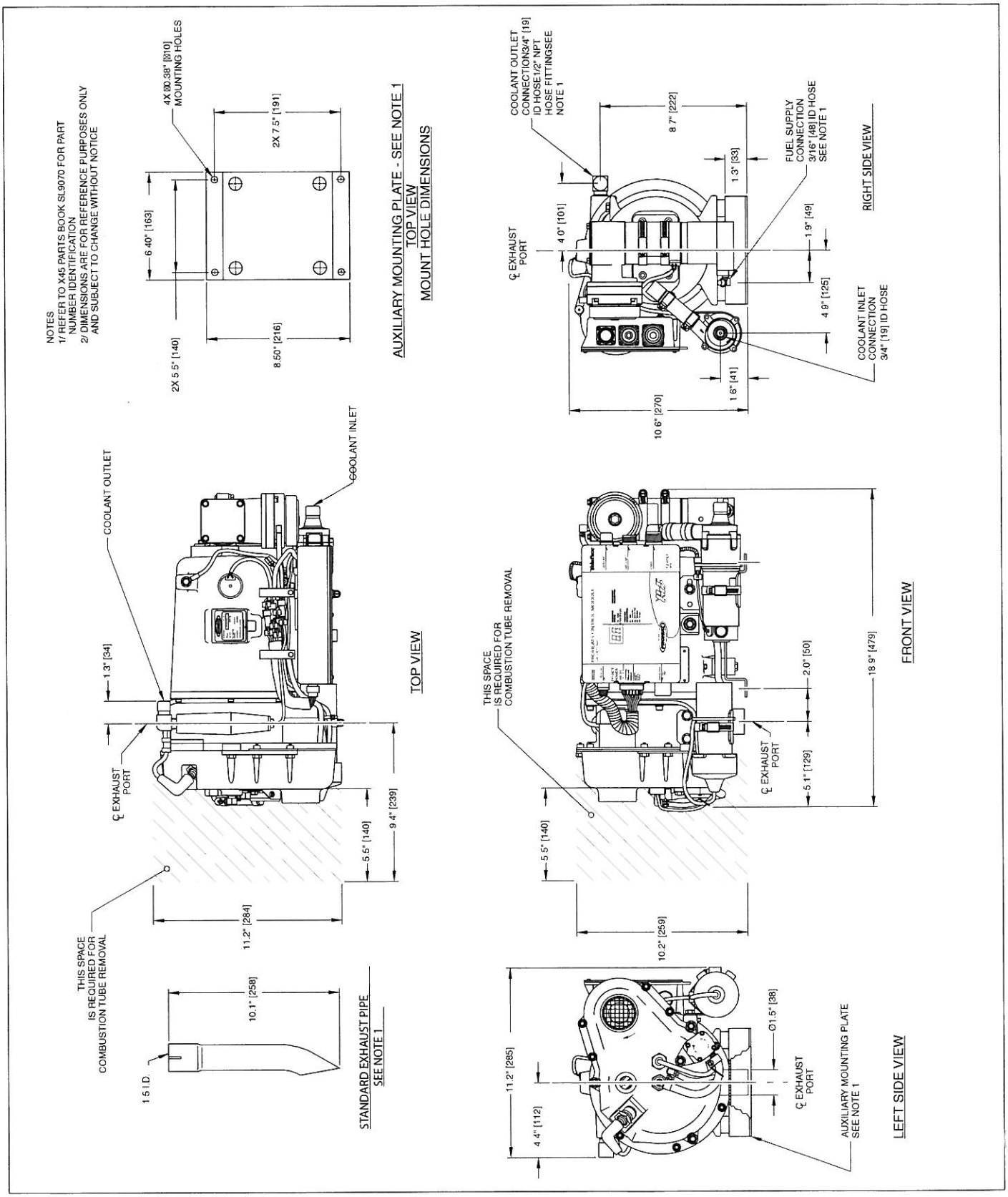


Figure 1-1 Heater Dimensions – X45

3.5 WIRING & ELECTRICAL CONNECTIONS

3.5.1 GENERAL CONSIDERATIONS

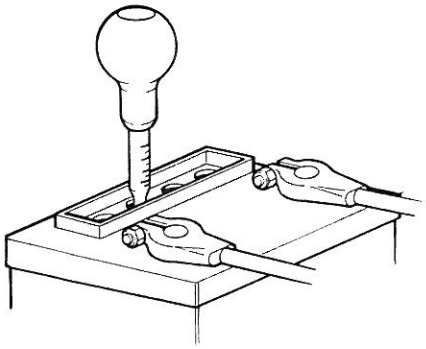


Figure 3-17 Test Battery

- Prior to installation of the PROHEAT Heater system, ensure that the vehicle batteries are in good condition.
- Do not kink or abrade wires when routing them through the vehicle during installation.
- Ensure wires are well supported and secured with tie-wraps.
- Do not use acid core solder when making solder connections.

Major Electrical Connections Required

⚠ WARNING

Do not use on positive ground vehicles.

⚠ CAUTION

If repairs to the vehicle require welding, disconnect the PROHEAT power cable at the PCM. This will prevent damage to the PROHEAT electronics.

⚠ CAUTION

Vehicles using ground side battery disconnect switches must install an in-line 10 Amp fuse on the internal harness (Teleflex part # PK0310). This will prevent damage to the harness and PCM, (refer to Service Bulletin SB0003 in Appendix).

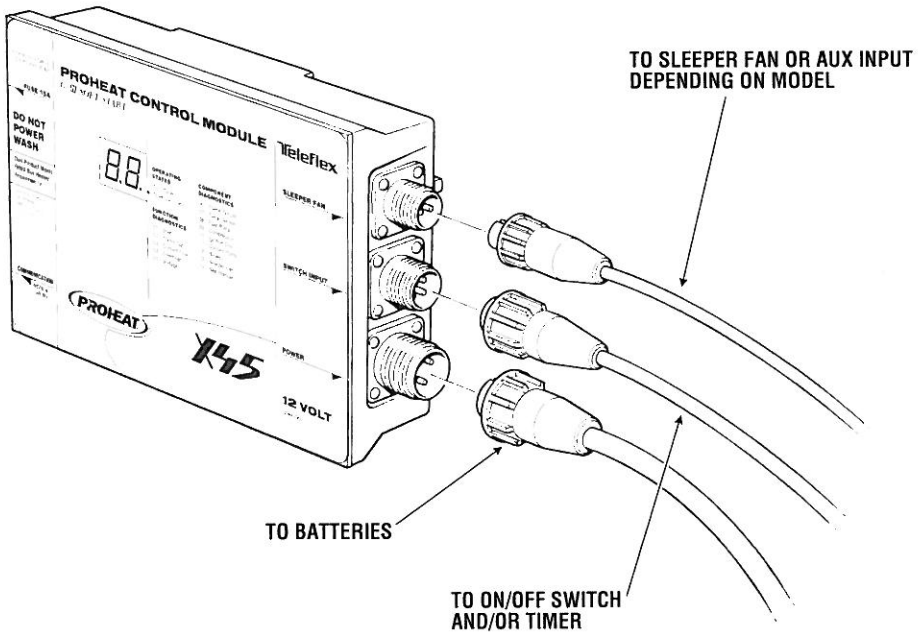


Figure 3-18 Major Electrical Connections

3.5.12 OPTION B – Preheat and Supplemental Mode

The instructions below are general in nature. It is up to the installer to select appropriate switches and use proper electrical connection methods. If more information is required, contact your Authorized Proheat Dealer or Proheat Product Support at www.proheat.com

1. Identify engine run signal. This may be off the alternator, multiplex or others.
2. Install hardware as required on the vehicle as shown in Figure 3-29.
3. Choose either Preheat Option 1 or Preheat Option 2. Install hardware as required on the vehicle as shown in Figure 3-29.
4. Install an Indicator Light near the vehicle operator.

⚠ WARNING

When wiring for Supplemental Mode, ensure to install Mechanic's Disable Switch in order to disable Supplement Mode for safety requirements.

3.5.13 OPTION C – Standard Mode (Proheat Timer Optional) and Supplemental Mode

The instructions below are general in nature. It is up to the installer to select appropriate switches and use proper electrical connection methods. If more information is required, contact your Authorized Proheat Dealer or Proheat Product Support at www.proheat.com

1. Install the timer as per Section 3.5.3 or the switch as per Section 3.5.4. See Figure 3-29.
2. Identify engine run signal. This may be off the alternator, multiplex or others.
3. Route and connect engine run signal to wire A on the auxiliary input connector. Install hardware as required on the vehicle.

NOTICE

Supplemental operation will not override the Standard Mode operation (Proheat Timer runs in Standard Mode).

⚠ WARNING

DO NOT connect an ON/OFF Switch and a Timer in the same circuit.

6. PROHEAT Control Module (PCM)

to the motors and sensors. It has powerful diagnostics to assist in troubleshooting. One of the key features is the diagnostic display on the front of the PCM which has a display LED to to indicate function or component problems. The PCM comes in a "Sleeper Fan 12V" or "Aux Input 12V or 24V" model. The PCM model can be identified by looking at the lexan decal as shown in Figure 4-2.

- The "Sleeper Fan" model has an output with a special current limiting feature which, if used, limits the current draw of the sleeper heater fan to 3 Amps. This is done to control the total current draw on the vehicles batteries. This operation is typically used for truck installations.
- The "Aux Input" model uses two special input pins *(see Electrical Drawing on page 1-4)* that allow for a Preheat Mode and Supplemental Mode operation. This operation is typically used for transit and coach installation.

NOTE: See "Modes of Operation Section" for a description of the operating modes used for both the "Sleeper Fan" and "Aux Input" Models

NOTE: The PROHEAT PCM "Sleeper Fan" circuit has a one minute delay during ignition.

NOTE: The PROHEAT PCM is unique in that it uses "ground-side" switching for the blower, compressor, coolant pump and ignition coil. The positive wire to the motors and ignition coil will show voltage even when the heater is switched "OFF."

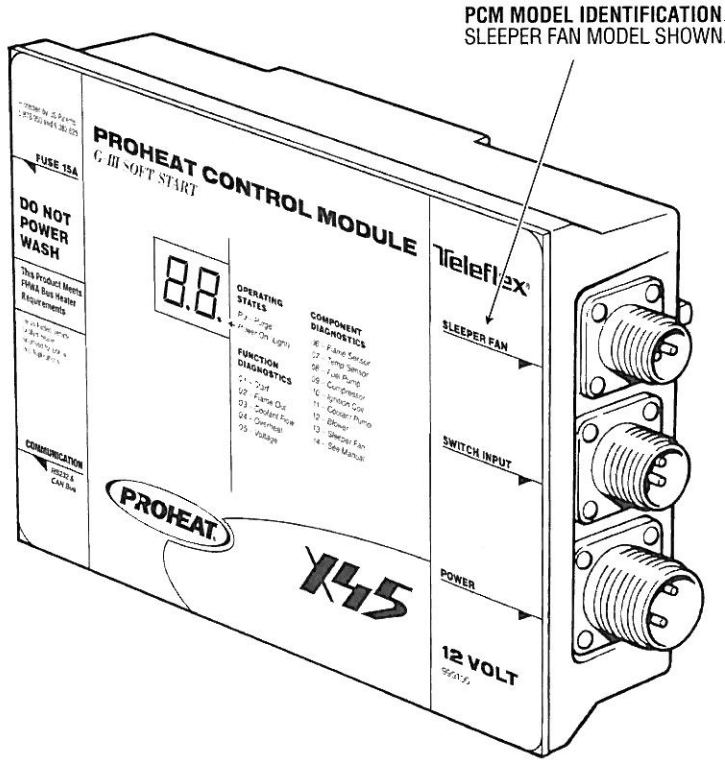
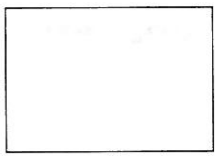


Figure 4-2 *LED will light to indicate a problem. Switch or Timer indicator light will flash to indicate the diagnostic code (page 5-3).*

5.1.1 OPERATION INDICATORS

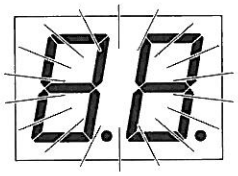


Operation States:

8.8. – Power Up
• – On
Pu – Purge

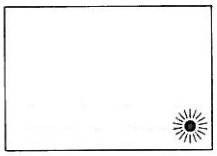
The operation indicators signal normal functioning of the PROHEAT. These two states do not indicate a fault.

Power Up



The Power Up indicator communicates that the PROHEAT power has been supplied. All segments of the LED momentarily flash and then turn off.

On



The ON indicator code communicates that the PROHEAT is operationally "ON" whenever the On LED is solid. This indicates a Mode of Operation *(see page 4-5)* is active.

⚠ WARNING

The "ON" LED indicates that the heater can start at any time. Refer to page 4-5 to page 4-7.

Purge

The PROHEAT will be in the Purge state as defined in the Modes of Operation *(see page 4-5)* when "Pu" is displayed.

3 Coolant Flow

A COOLANT FLOW diagnostic code is displayed when the coolant temperature reaches 185°F (85°C) in less than one minute after ignition. This indicates that the coolant flow is severely restricted or blocked. This feature aids in detecting coolant flow problems that can degrade the PROHEAT performance.

An in-line flow indicator is a valuable troubleshooting tool used to: *(Figure 5-13)*

a) Check the coolant flow and direction.

b) Check for air in the system.

c) Check for restrictions caused by the truck systems ie. Shuttle valves, manual valves, air operated valves.

Check: Coolant Flow

a) **Coolant Lines:** For restrictions and blockages Are clamps tight?

b) **Shut-off Valves:** Ensure that shut-off valves are open and functioning properly.

c) **Fittings:** Fittings must be at least ½" NPT or larger. Avoid using 90° fittings where possible.

d) **Coolant Flow Direction:** The PROHEAT **must** be plumbed so that the coolant pump is pumping the coolant in the same direction as the engine coolant pump. The PROHEAT can be used when the engine is running.

e) **Coolant Pump:** Does the pump function properly? *(page 5-25)*

f) **Coolant System Capacity:** The coolant system must contain at least 3 gallons (11 litres) of coolant. If the system contains less the coolant may reach 185°F in less than 1 minute causing a COOLANT FLOW diagnostic code.

g) **Sleeper Heater:** Many OEM sleeper heaters are combined with an air conditioning system. The solenoid shut-off valve used to cut off coolant flow during the air conditioning mode, must be open when using the PROHEAT. *(Refer to page 3-9.)*

NOTICE

If the coolant system is contaminated with magnetic material, it may cause the impeller to stop turning.

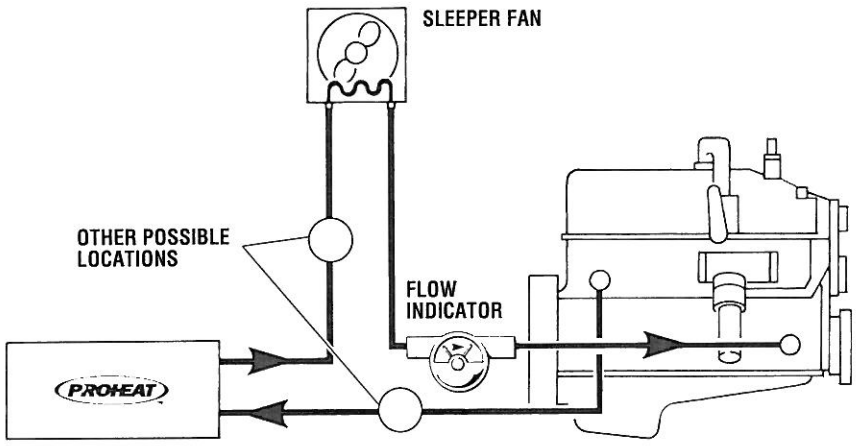


Figure 5-13 Flow Indicator – TK9002

Ignition Coil Electrical Troubleshooting (No code Indicated)

The following material covers the ignition coil mechanical or electrical problems that do not indicate a Code 10. The ignition coil is ground side switched — there is always voltage at the positive terminal to the ignition coil.

Symptom: **No spark at the electrode (No code indicated)**

Check: **High tension wires and electrode**

a) Inspect the high tension lead between the coil and the electrode.

b) Inspect the ground lead between the second electrode and the heater chassis.

c) Is the electrode gap adjusted correctly? *(See page 5-12 for Electrode Gap Detail)*

Test Procedure:

a) Measure ignition coil resistance. Use a multimeter to measure the resistance across the positive and negative terminals. The resistance should be less than 1 ohm. If resistance is "open circuit" or 0 ohms (short circuit) then replace the ignition coil.

NOTE: Remove positive and negative wires from the coil when testing.

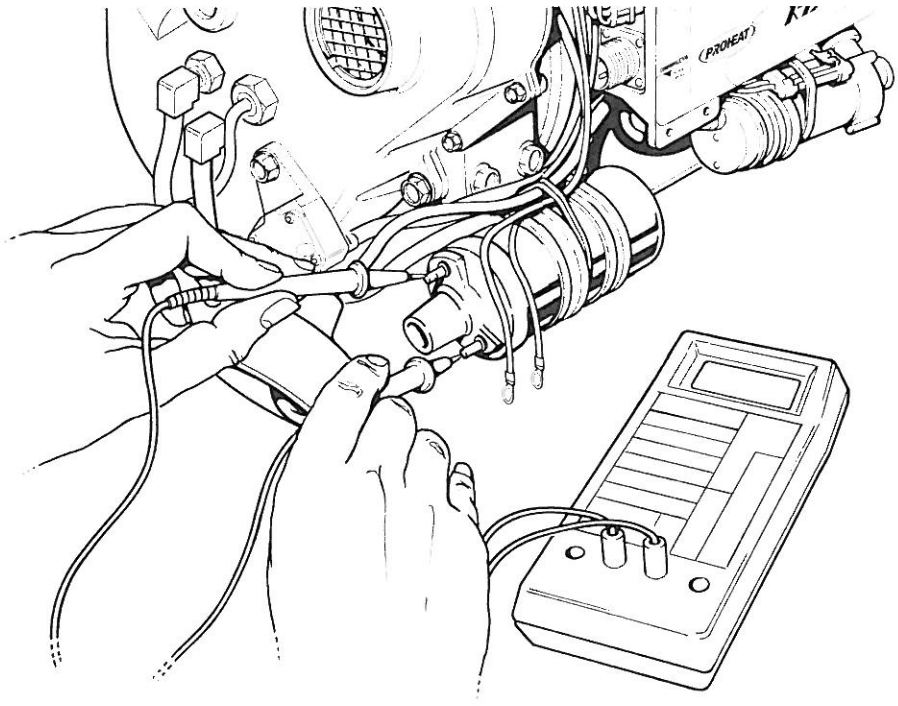


Figure 5-21 Ignition Coil Test

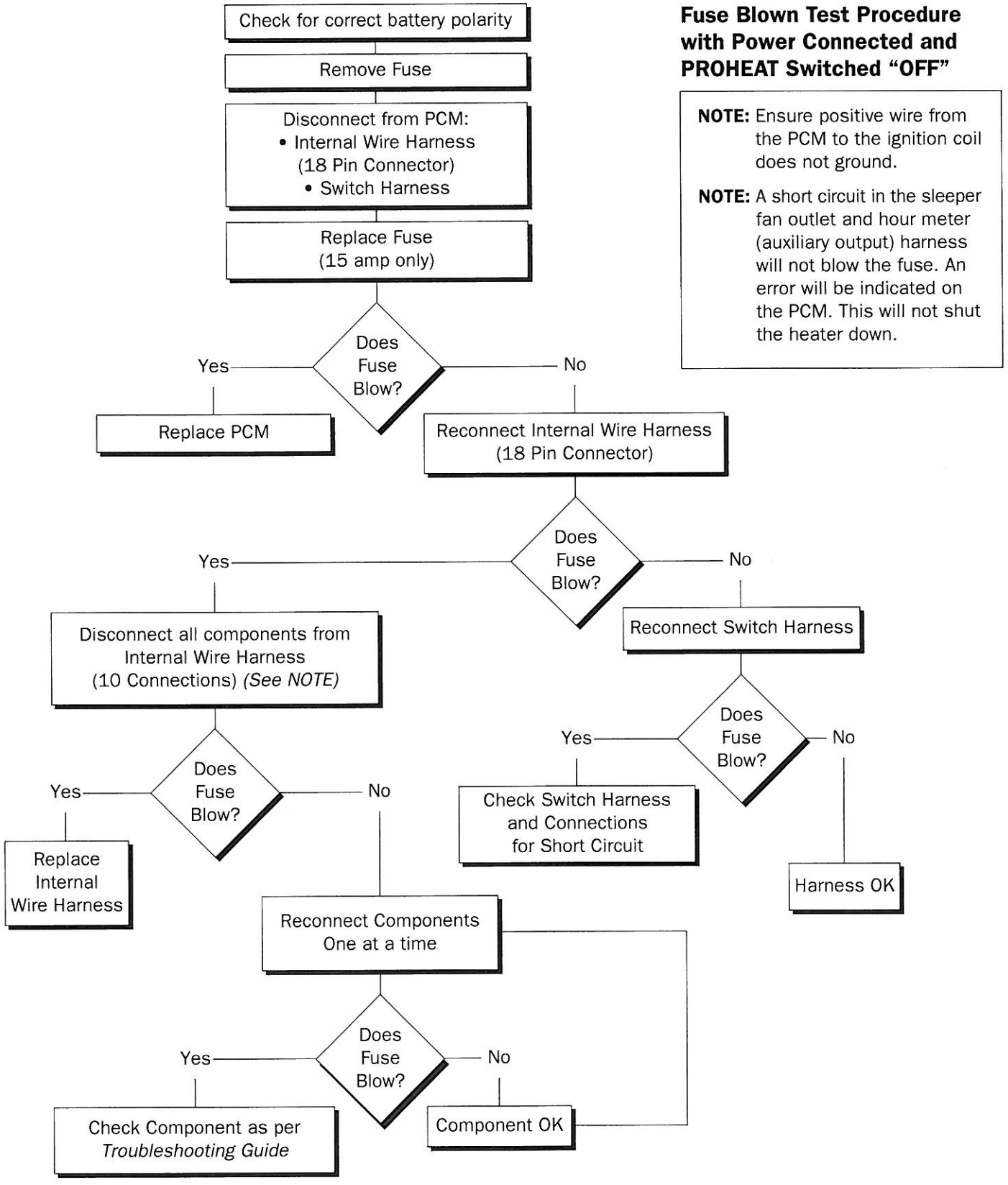
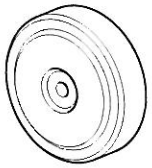


Figure 5-26 Blown Fuse Test Procedure Flow Chart

Replacement Parts

PART #	QTY	DESCRIPTION
825730K	1	Air Filter, X45. 
880035K	1	Fuel Filter, X45. 

PART #	QTY	DESCRIPTION
PK0094	1	X45 Fall Service Kit includes: 1 x Air Filter 1 x Fuel Filter 2 x O-Ring
PK0069	1	X45 Major Service Kit 1 x Electrode 1 x Nozzle 1 x Regulator 1 x Flame Sensor 1 x Ignition Lead 1 x Air Filter 1 x Fuel Filter 2 x O-Ring