INSTALLATION AND USER GUIDE
PROHEAT FUNCTION CONTROLLER (PFC)

Rev. B

CONTENTS

A. SAFETY

Throughout this manual, you will see notes labeled **DANGER**, **WARNING**, **CAUTION** and **NOTICE** to alert you to special instructions or precautions concerning a particular procedure that would be hazardous if performed incorrectly or carelessly.

Observe them carefully!

These safety alerts alone cannot eliminate all hazards. Strict compliance with these special instructions and common sense are major accident prevention measures.

⚠ DANGER

Immediate hazards that will result in severe injury or death.

⚠ WARNING

Hazards or unsafe practices that could result in severe personal injury or death.

⚠ CAUTION

Hazards or unsafe practices that could result in minor injury or product or property damage.

NOTICE

Information that is important to proper installation or maintenance, but is not hazard-related.

SAFETY CONSIDERATIONS

⚠ WARNING

Exhaust

Inhalation of exhaust gas (containing carbon monoxide) may cause severe personal injury and/or death. Anyone suspected of suffering from CO inhalation should be removed from the hazardous area and given medical assistance immediately.

⚠ WARNING

Explosion Hazard

Do not operate heater where combustible fumes or airborne particles, such as sawdust, are present.

⚠ WARNING

Fuel

Exercise extreme caution when working near fuel or fuel-filled equipment. Do not operate heater during fueling operations. In addition, do not smoke or handle open flame equipment, such as a blowtorch, around fuel.

⚠ WARNING

Fire Hazard

Do not place any flammable items around the heater and exhaust pipe.

⚠ WARNING

Batteries

Wear hand and eye protection when working near batteries. Do not smoke or use open flames near batteries.

⚠ WARNING

Electrical

Electric shock can cause severe personal injury, burns, and death. Before working on any unit, disconnect the batteries. Use only approved materials and methods when working on the electrical system and follow local electrical codes. Never work with electricity in wet conditions or when you are feeling fatigued.

⚠ WARNING

Poisons/Toxins

Fuel and coolant are toxic and in some cases, carcinogenic. Wear eye and hand protection at all times. Remove contaminated clothing immediately and wash contaminated skin. Do not breathe in vapors.

⚠ WARNING

Moving/Hot Parts

Moving/hot parts can cause severe injury and or death. Before working on any unit, shut it off. Do not operate any unit until protective covers have been replaced. Always ensure bolts and clamps are correctly torqued and secured. Inspect mechanical components periodically for damage and corrosion.

⚠ WARNING

Coolant

Never remove the filler cap when the engine is hot – escaping steam or scalding water could cause serious personal injury. The coolant level in the expansion tank should be checked at least weekly (more frequently in high mileage or arduous conditions). Always check the level *when the system is cold*. Unscrew the filler cap slowly, allowing the pressure to escape before removing completely. Never run the engine without coolant.

Prevent anti-freeze coming in contact with the skin or eyes. If this occurs, rinse immediately with plenty of water. Anti-freeze will damage painted surfaces.

Never top-up with salt water. Even when travelling in territories where the water supply contains salt, always ensure you carry a supply of fresh (rain or distilled) water.

⚠ DANGER

California Proposition 65 Warning

Do not operate heater in garages or in other closed or unventilated areas.

Diesel exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

Electrical components in this product may contain lead, a chemical known to the State of California to cause cancer and birth defects and other reproductive harm.

B. INTRODUCTION

PROHEAT Function Controller (PFC)

The Proheat Function Controller is a CAN bus enabled, multifunction controller that includes five (5) programmable timers, error code reading and system programming.

Three Timer Modes available

- One time
- Single Day per week
- Multiple days per week

Timer Run time and Heater Mode can be set for each Timer.

A password can be used to prevent unauthorized changes to all settings and Timer programs.

NOTE: Throughout this manual the Proheat Function Controller is called PFC.

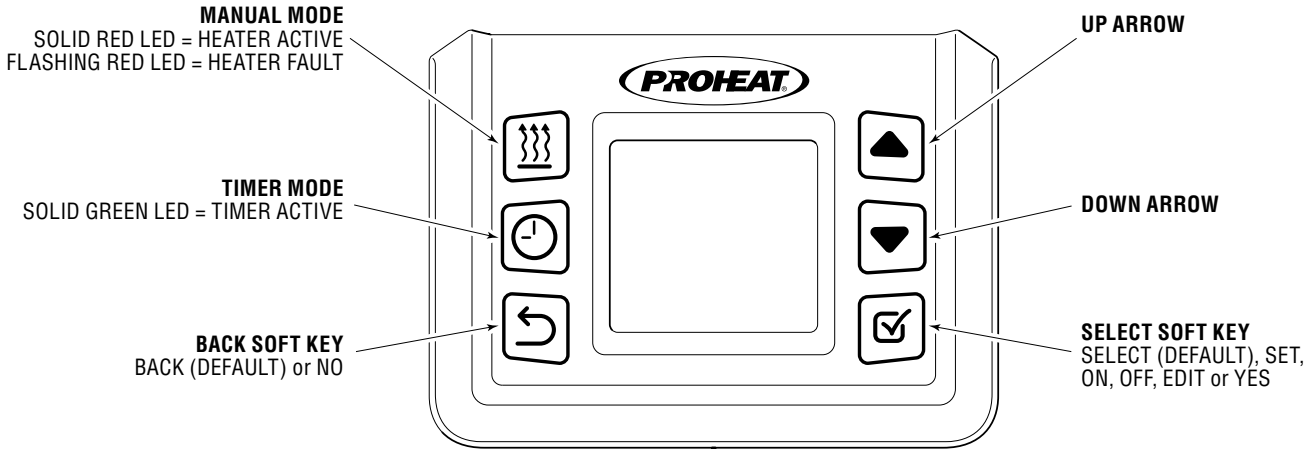

Figure B-1. PFC screen and icons.

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1.0 TECHNICAL SPECIFICATIONS

	PFC
VOLTAGE (Nominal voltage range)	12/24 VDC
CURRENT DRAW (Max)	1.0 Amps
DIMENSIONS (L x W x H)	2.9 x 1.0 x 2.2 inches 73.5 x 25 x 56 mm)
WARRANTY	One year parts and labor

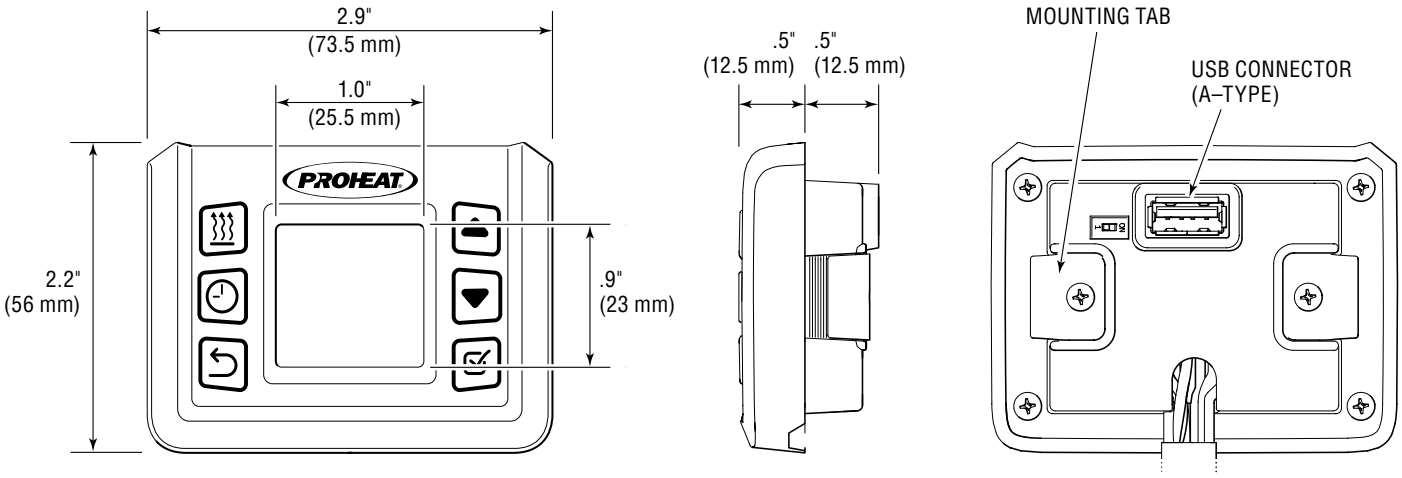

Figure 1-1. PFC dimensions.

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2.0 MOUNTING

The PCF should be mounted in a dry location or in a waterproof box that can be accessed and viewed easily by the operator. There are three ways to mount the PCF.

2.1 Surface Mount

NOTICE

DO NOT kink or abrade harness or wires when routing them through the vehicle during installation. Use grommets on through holes.

Ensure the harness and wires are routed away from all heat sources, sharp edges, and has proper slack when passing from the frame into the cab.

Zip tie the CAN harness to the heaters switch/control harness every 16”, then secure the bundled harness to the vehicle so that it is well supported.

Using the supplied surface mount bracket and the four screws mount the bracket to a flat surface.

If desired the wires can be run through the middle of the surface mounting bracket. To do so a drill a 1/2” hole as shown.

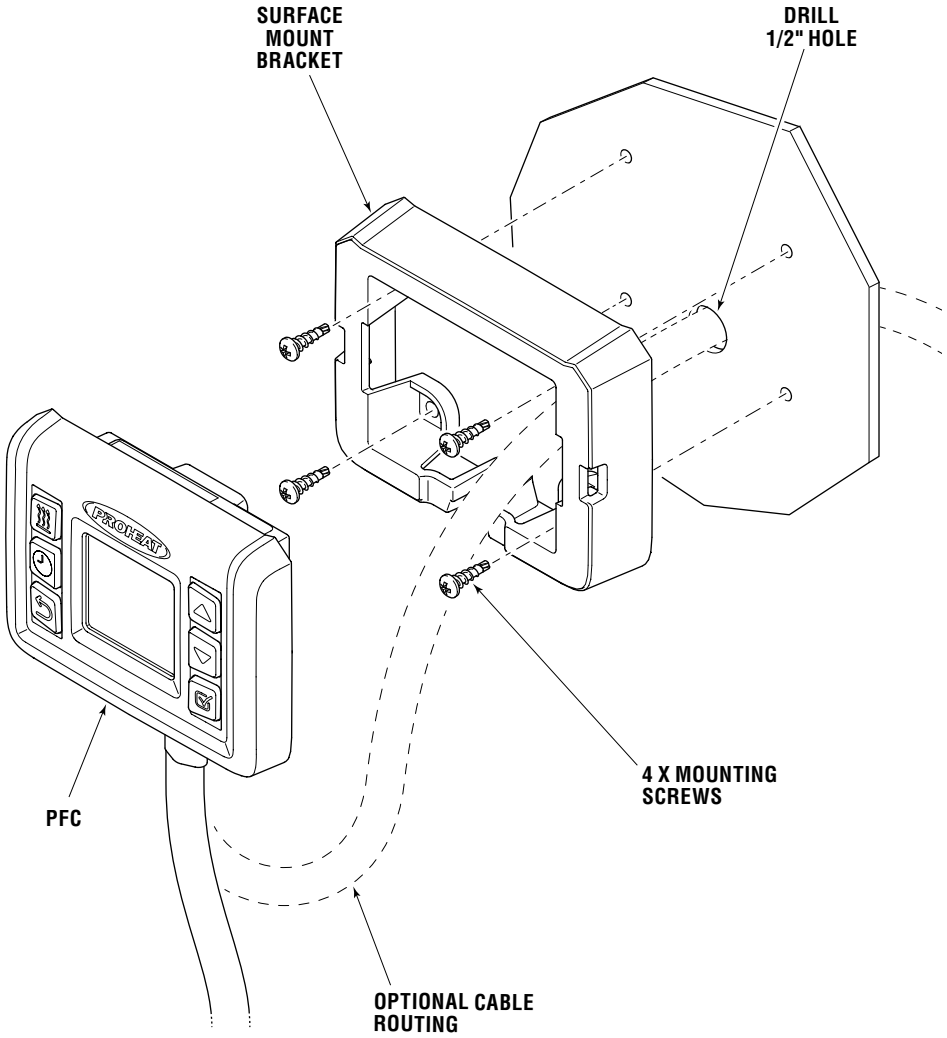


Figure 2-1. PFC with surface mount bracket.

2.2 Dash Mount

The PFC can be mounted above or below the dash using the supplied metal bracket and screws.

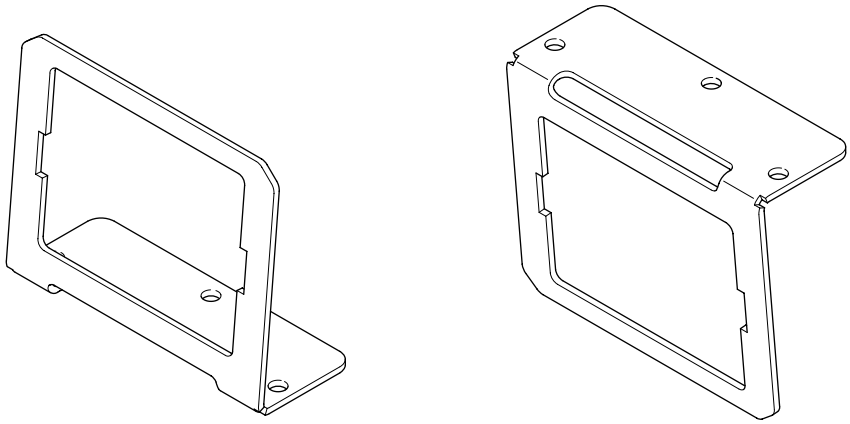


Figure 2-2. Dash mount bracket.

The PFC will now snap into place. The viewing angle can be adjusted once the PFC is snapped in by carefully bending the bracket as needed.

2.3 Flush Mount

NOTICE

Access to the rear of the PFC is needed for removal.

The PFC can be flush mounted to a flat surface. A square opening will need to be cut so the PFC can be snapped into place. Using the Metal Dash mount bracket as a template, trace the opening onto the surface.

Cut out the opening, file any sharp edges or burs.
The PFC will now snap into place.

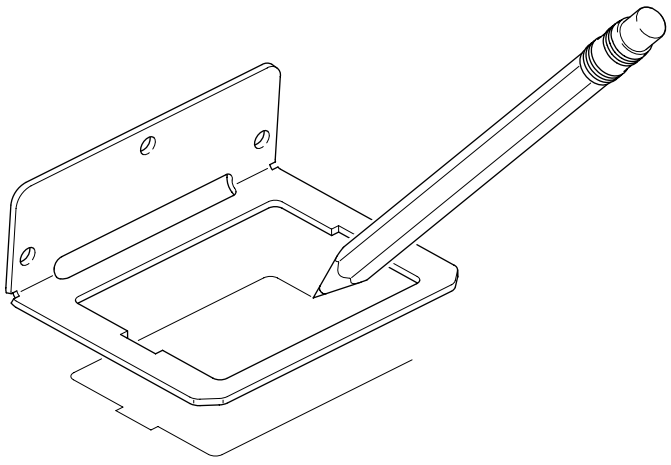


Figure 2-3. Dash mount bracket used as a template for flush mount.

2.4 Removing the PFC

2.4.1 SURFACE MOUNT REMOVAL

Insert flat tip screwdriver and carefully pry the PFC as shown in figure 2-4.

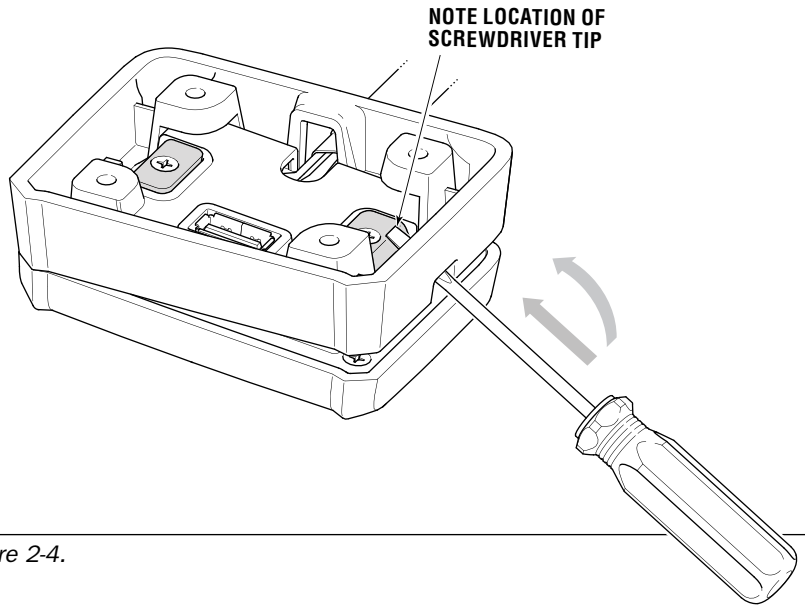


Figure 2-4.

2.4.2 DASH MOUNT REMOVAL

Insert flat tip screwdriver and carefully pry the PFC as shown in figure 2-5.

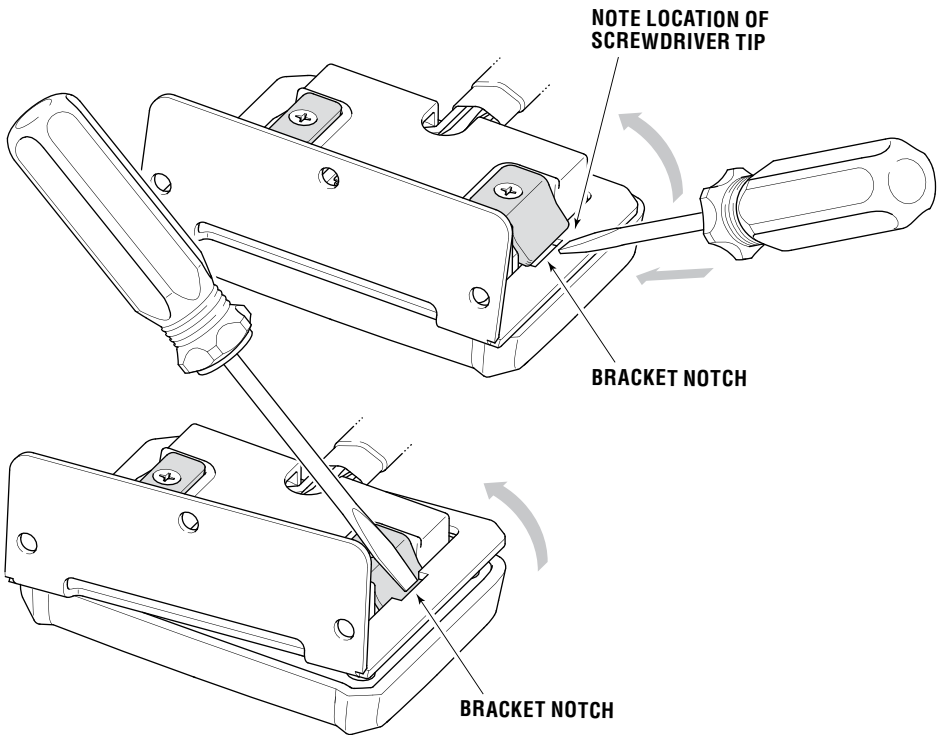


Figure 2-5.

Note: *This page left blank intentionally.*

3.0 WIRING CONNECTIONS

To take full advantage of the PFC's features it must be connected to the heater by way of a digital CAN bus connection.

3.1 General CAN Information

All Backbone connections will have a BLUE wedge lock with a triangular pilot. The Backbone generally runs between all the CAN components or Nodes contained in the network.

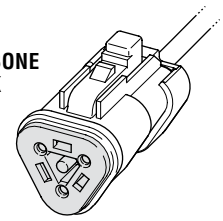


Figure 3-1.

All Nodes will have a GREEN or ORANGE wedge lock with a circular pilot. Each Node is a device on the network such as the Heater and the PFC.

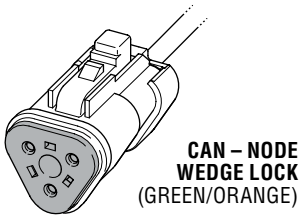


Figure 3-2.

CAN "T" Connections contain Two Backbone connections and One Node connection. They allow you to extend the backbone and or add a node. Depending on the configuration required a Cavity Plug and or a Terminating Resister may fill one or two of the cavities.

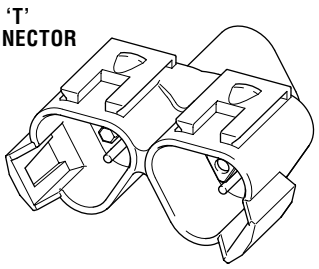


Figure 3-3.

A Terminating Resistor is located at each end of the Backbone to prevent "echoing" or "reflections" into the backbone from a node at the end of the line. Two and only two terminating resistors are required in the network. A Node may contain a Terminating resister.

3.2 Heater and PFC CAN bus Connections

To make the connection from the PFC to the X30 heater you will need to add in the X30 CAN harness as follows.

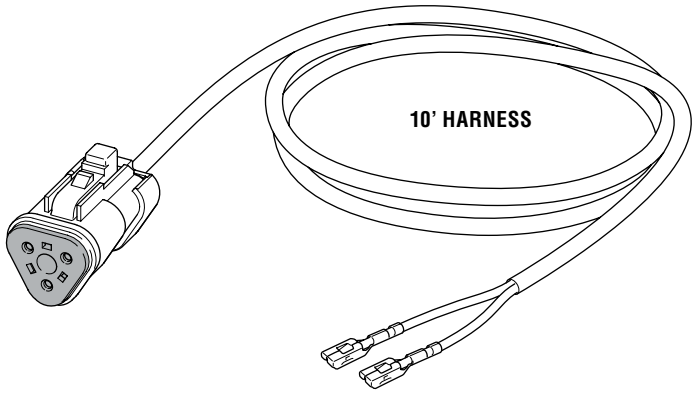


Figure 3-4. X30 CAN harness.

PIN#	DESCRIPTION
1.	Optional Supplemental switch input – active high.
2.	Optional Preheat momentary switch input – active high.
3.	Green – main switch input (standard "ON" signal or pre-heat unlatch) – active high.
4.	Red – power output (constant power. Timer/switch remote panel) (1 amp max).
5.	White – indicator output (high side switched. Dash or Proheat toggle switch light) (1 amp max).
6.	Optional Anti-freeze switch input – active high.
7.	Black – ground (indicator ground) (1 amp max).
8.	Yellow – CAN bus high.
9.	Green – CAN bus low.
10.	Black – CAN bus shield.

NOTE: *Pins 3, 4, 5, and 7 are pre populated from the factory.*

1. Carefully grasp the Blue wedge lock as shown and pull the wedge lock free from the connector body.

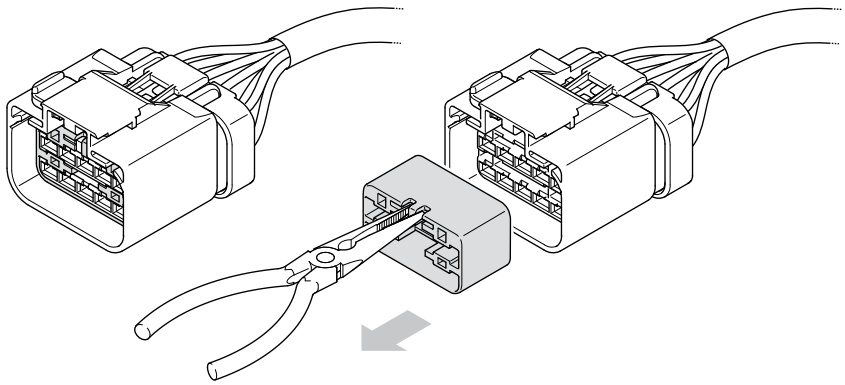


Figure 3-5.

2. From the wire side of the connector, remove the cavity plug from the corresponding terminal(s) and discard.

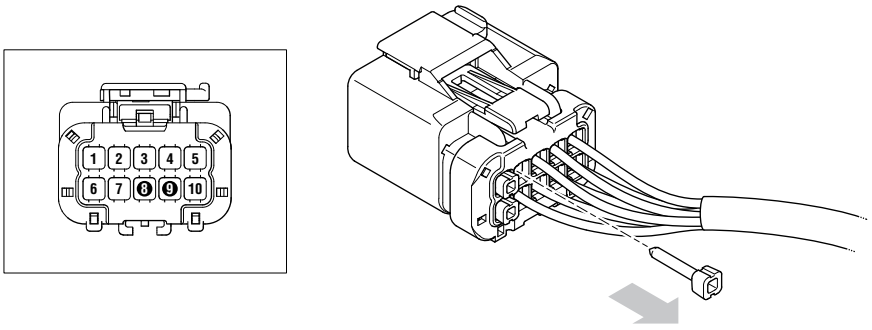


Figure 3-6.

NOTICE

DO NOT attempt to insert any contacts with the blue wedge lock in the closed position.

3. Next align the wire with the cavity. Insert until there is an audible and tactile click. DO NOT force the wires. If you encounter difficulty inserting the wires, rotate the terminal 90° and try again. Repeat steps 2 & 3 for each option you selected.

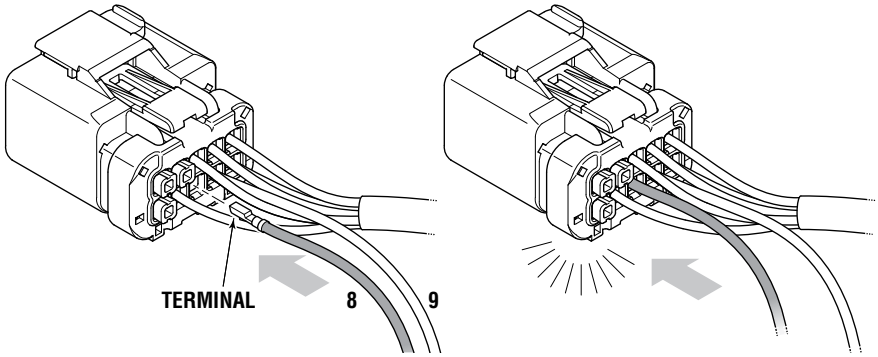
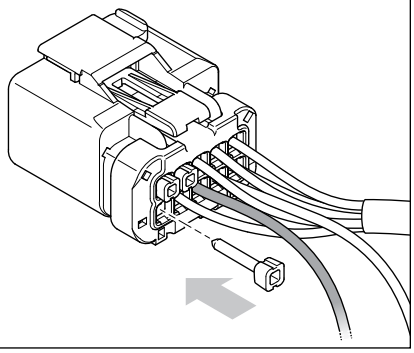


Figure 3-7.

NOTICE

All unpopulated cavities must have cavity plugs installed.



4. Push the blue wedge lock in all the way until it's in the locked position. Then pull slightly on wires to ensure they are fully seated and locked.

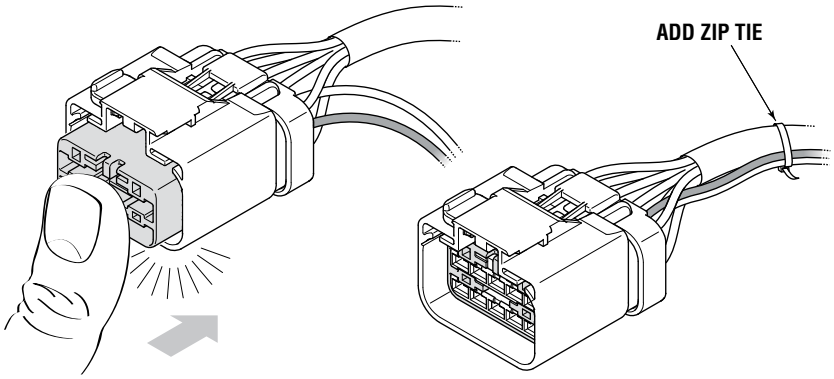


Figure 3-8.

NOTICE

If the wire needs to be removed. Remove the Blue wedge lock. Next gently prying up on the lock tab and pull the wire and out the back (wire side) of the connector until the contact and wire is removed from the connector. Ensure all open cavities are plugged.

5. Add a loop of tape or zip tie to tie the harnesses together.

The harness is now ready to be connected to the X30 and routed to the PFC harness.

DO NOT kink or abrade harness or wires when routing them through the vehicle during installation. Use grommets on through holes.

Ensure the harness and wires are routed away from all heat sources, sharp edges, and has proper slack when passing from the frame into the cab.

Zip tie the CAN harness to the heaters switch/control harness every 16", then secure the bundled harness to the vehicle so that it is well supported.

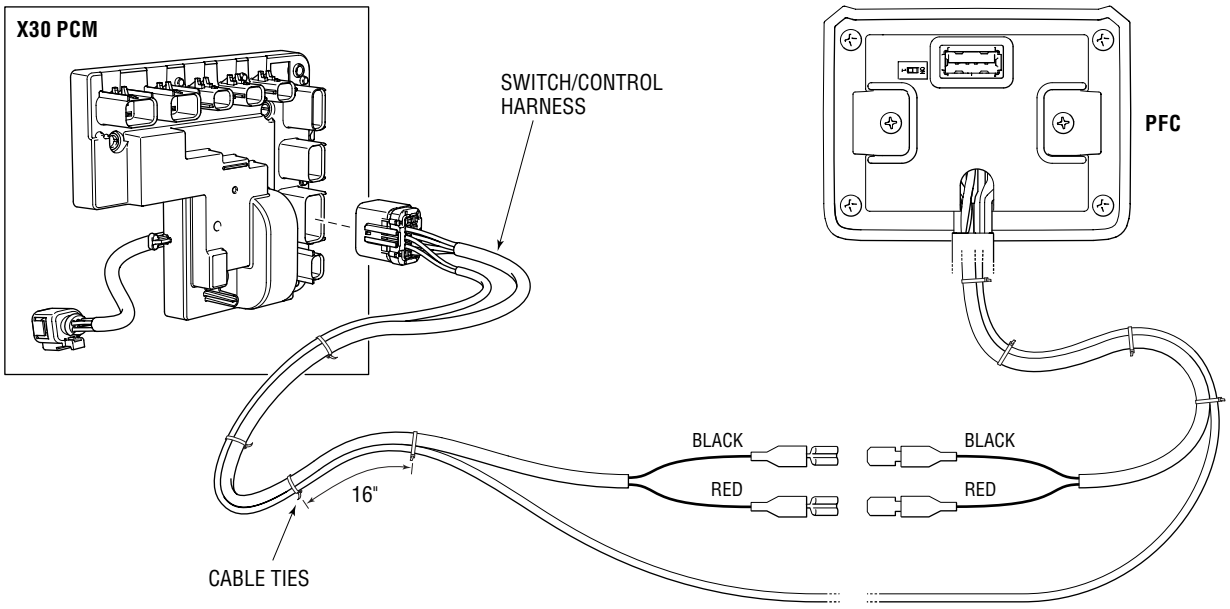


Figure 3-9. Wiring diagram Examples.

3.3 PFC Power and Ground Connections

3.3.1 STANDARD

The PFC positive RED and negative BLACK wires will need to be connected to the existing heater's switch harness positive RED and negative BLACK wires. The other wires should be taped back as they will not be used in this application.

NOTICE

DO NOT kink or abrade harness or wires when routing them through the vehicle during installation. Use grommets on through holes.

Ensure the harness and wires are routed away from all heat sources, sharp edges, and has proper slack when passing from the frame into the cab.

Zip tie the CAN harness to the heaters switch/control harness every 16", then secure the bundled harness to the vehicle so that it is well supported.

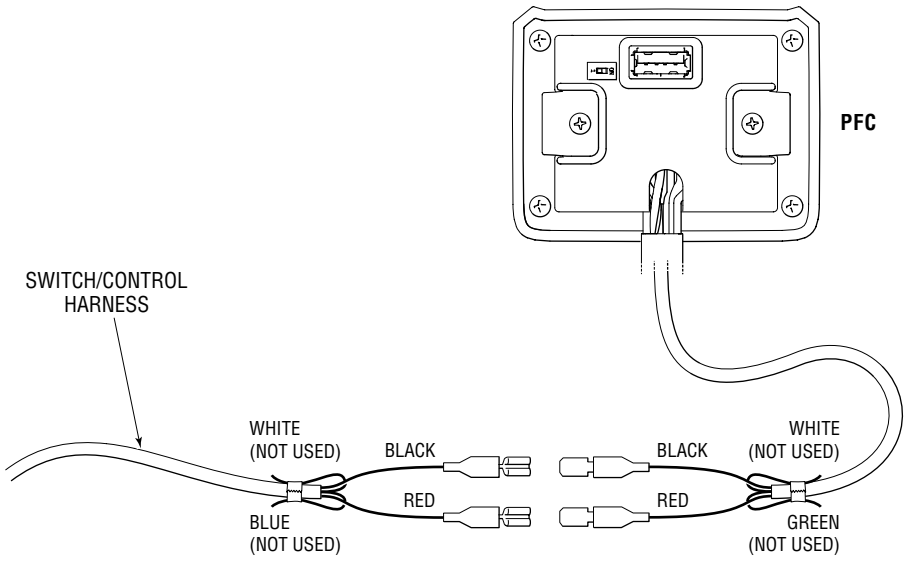


Figure 3-10. PFC connections.

3.3.2 ALTERNATE

NOTICE

DO NOT kink or abrade harness or wires when routing them through the vehicle during installation. Use grommets on through holes.

The PFC must be connected to constant battery power and ground.

A 2 Amp fuse must be added to the positive RED wire at the power source. If a ground side battery disconnect is used on the vehicle a 2 Amp fuse must also be installed on the negative BLACK wire at the ground source.

NOTICE

Ensure the harness and wires are routed away from all heat sources, sharp edges, and has proper slack when passing from the frame into the cab.

Secure the harness and wires to the vehicle so that it is well supported.

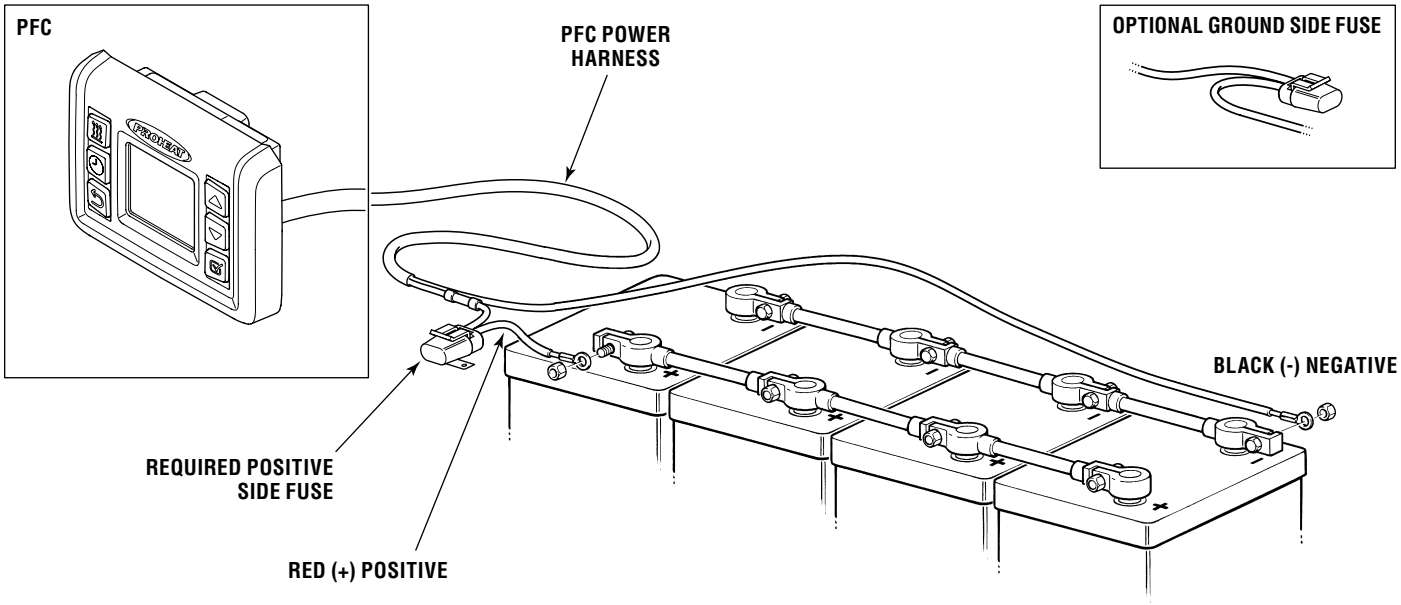


Figure 3-11. Power connection to battery.

3.4 PFC CAN Connector Installation

The PFC comes with the CAN connector body uninstalled for ease of mounting the PFC. Once the PFC is mounted and the harness is routed to the X30 CAN harness you will need to install the CAN connector as follows.

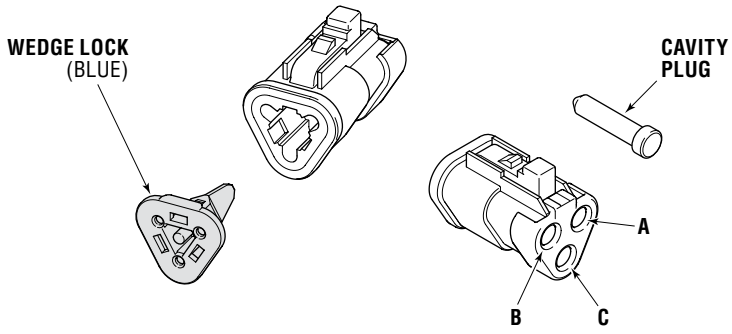


Figure 3-12.

1. From the wire side of the connector align the YELLOW wire terminal with cavity A.
2. Insert until there is an audible and tactile click. If you encounter difficulty inserting the wires, rotate the terminal 90° and try again.

   The terminal should be flush with the connector body.

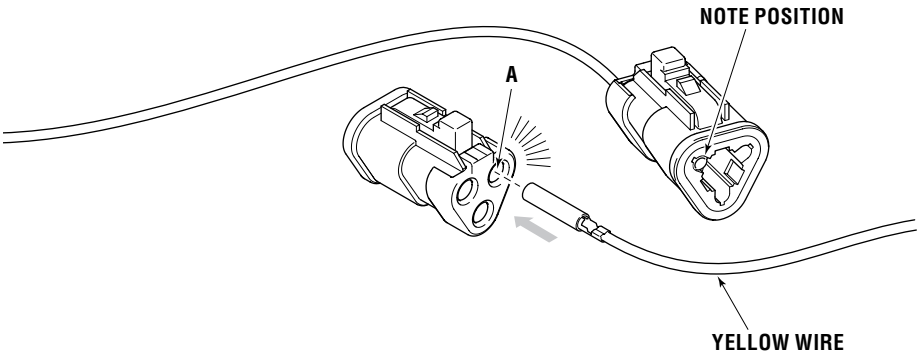


Figure 3-13.

3. Insert the GREEN wire into cavity B as per steps 1 and 2.

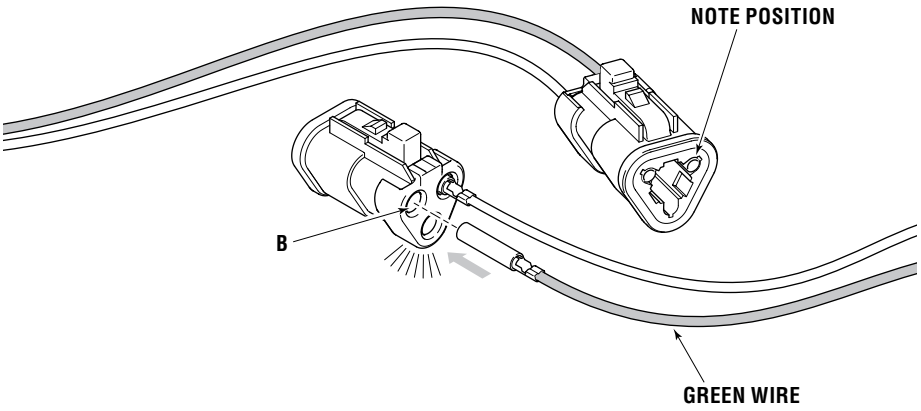


Figure 3-14.

4. Insert the plug into cavity C until fully seated.

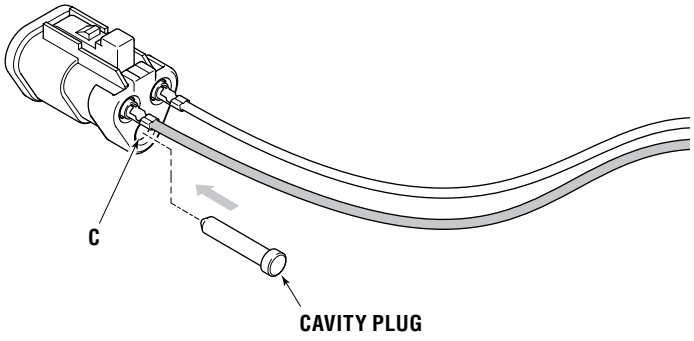


Figure 3-15.

5. Install the BLUE wedge lock with the triangular pilot into the connector body until there is an audible and tactile click.

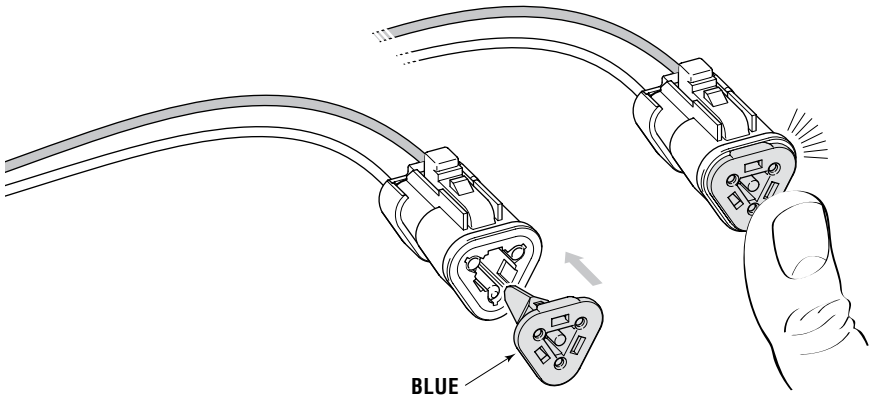


Figure 3-16.

If the wire needs to be removed.

1. Remove the wedge lock.

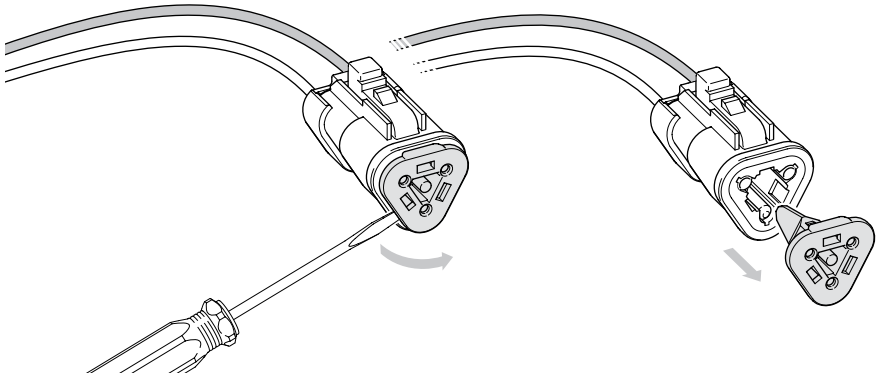


Figure 3-17.

2. Next gently pry on the inner lock tab and then pull the wire out the back (wire side) of the connector until the terminal and wire is removed from the connector. Ensure all open cavities are plugged.

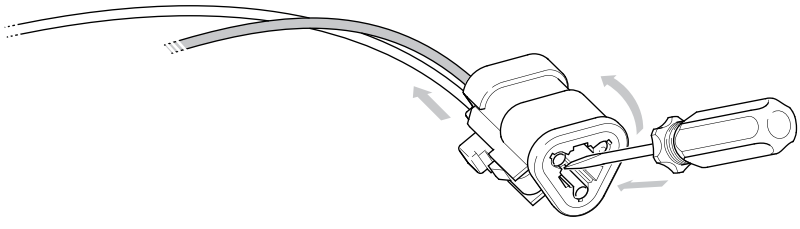


Figure 3-18.

3.4.1 X30 TO PFC

Connect as follows.

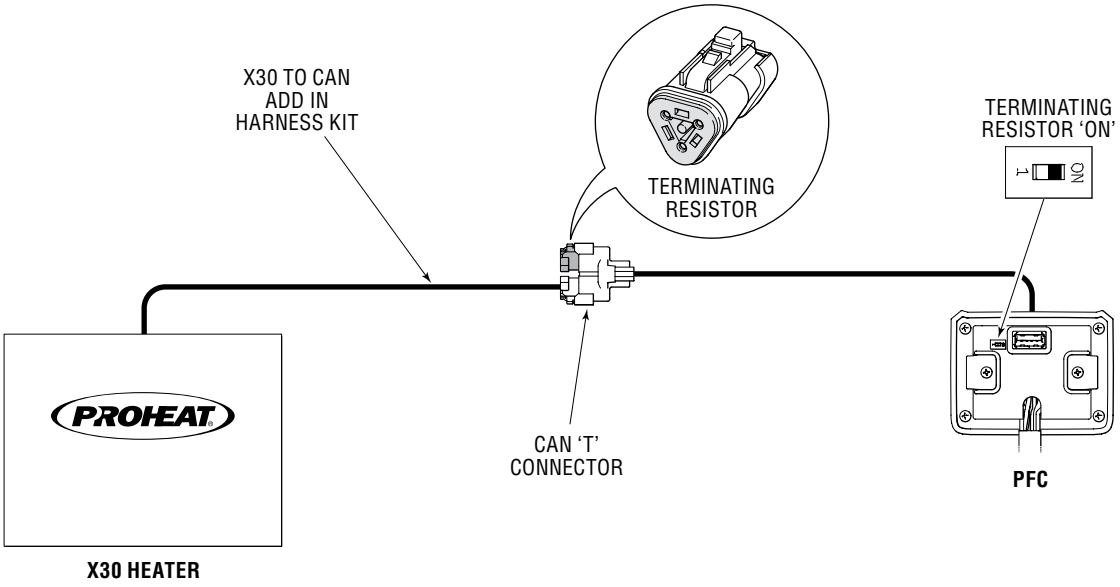


Figure 3-19.

If needed a Backbone extension cable can be added as follows.

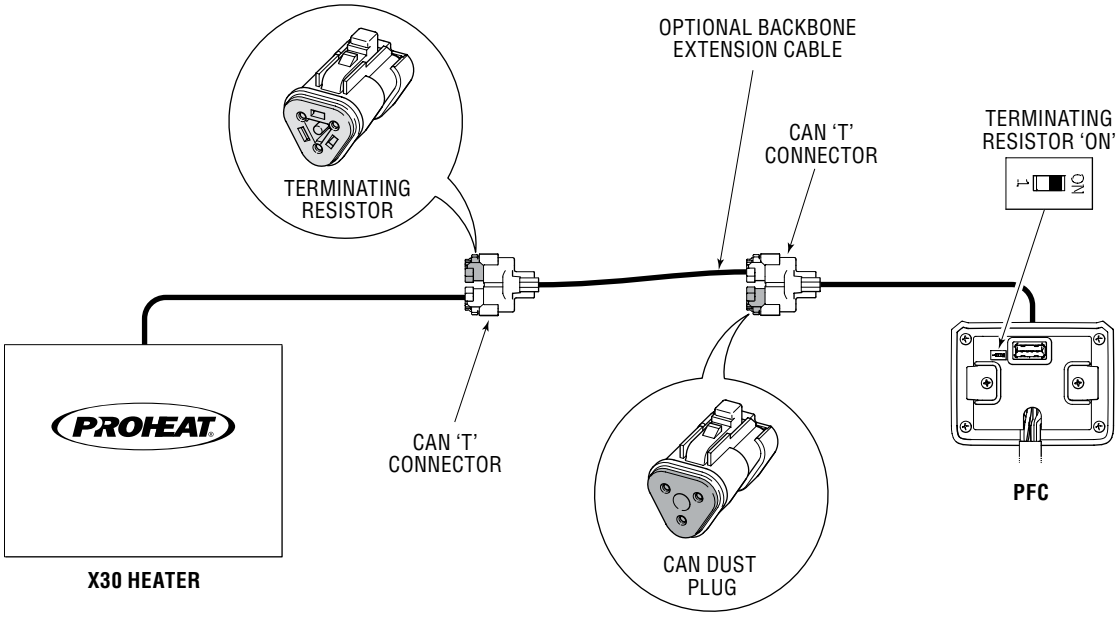


Figure 3-20.

A thermostat can also be added as follows.

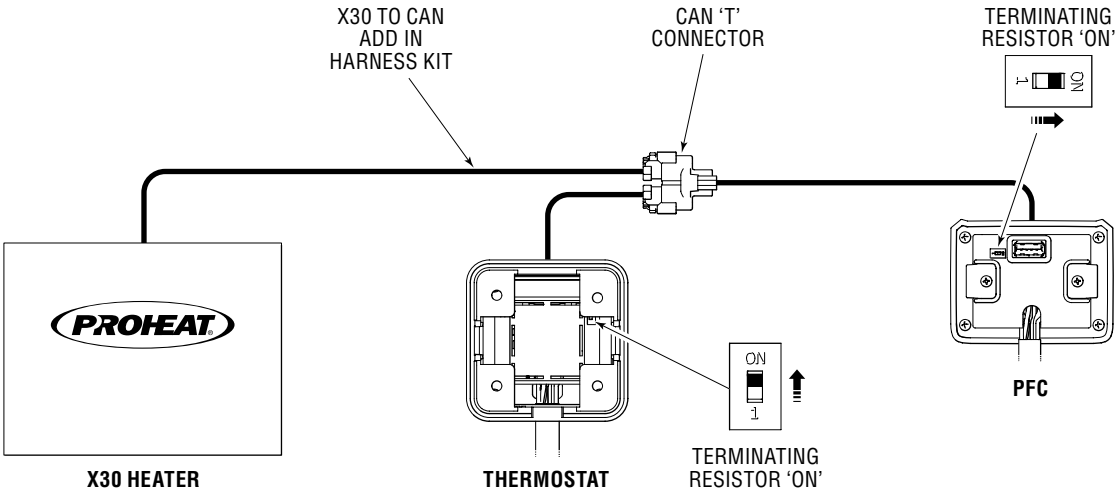


Figure 3-21. Thermostat connection.

NOTICE

DO NOT kink or abrade harness or wires when routing them through the vehicle during installation. Use grommets on through holes.

Ensure the harness and wires are routed away from all heat sources, sharp edges, and has proper slack when passing from the frame into the cab.

Zip tie the CAN harness to the heaters switch/control harness every 16", then secure the bundled harness to the vehicle so that it is well supported.

Optional backbone extension cables
c/w CAN 'T' 149417K and CAN dust plug 149415K

- Part # 149306K Backbone extension 10'
- Part # 149307K Backbone extension 16'
- Part # 149308K Backbone extension 25'

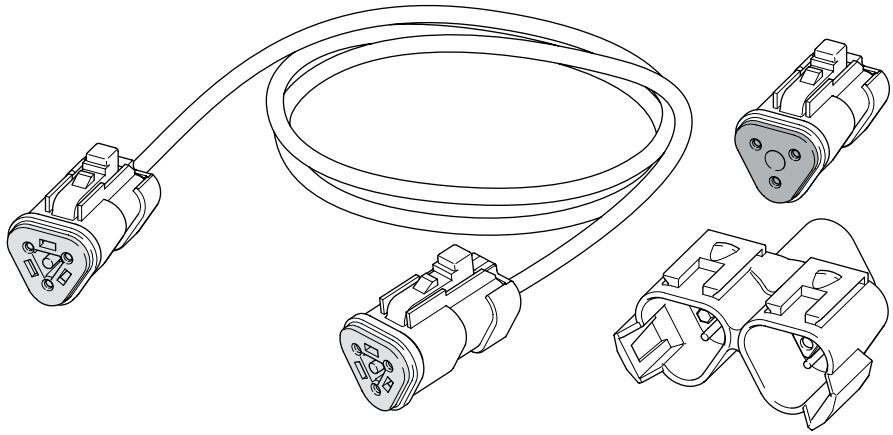
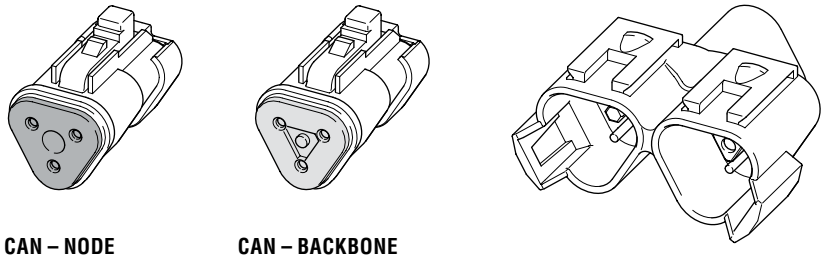


Figure 3-22. CAN backbone extension cable kit.

Optional CAN ‘T’s terminating resistor and dust plugs

- Part # 149415K CAN dust plug
- Part # 149417K CAN ‘T’ connector
- Part # 149418K CAN termination resistor



CAN – NODE DUST PLUG (GREEN/ORANGE)

CAN – BACKBONE TERMINATING RESISTOR (BLUE)

CAN ‘T’ CONNECTOR

Figure 3-23. CAN ‘T’s, Terminating resistor, and dust plugs.

NOTICE

This Manual only covers PFC software version Rev 14.3 Build 0

If you have an older version please update the PFC to the current software version. See page 4-20.

If your Software is newer please download the latest version of the PFC manual at www.proheat.com

4.0 USER GUIDE

4.1 Key Pad

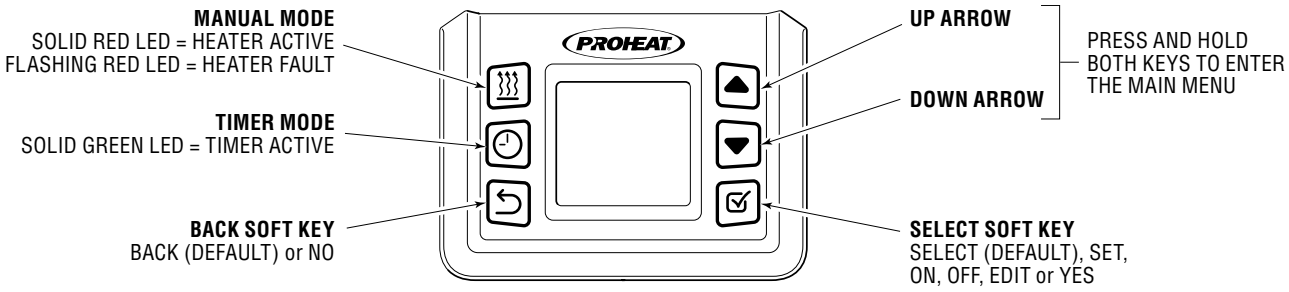


Figure 4-1. PFC key pad buttons.

4.2 Power Up

4.2.1 FIRST TIME POWER UP OR AFTER FACTORY RESET

NOTICE

The PFC Time Zone, Daylight Saving and hour format settings are stored into non volatile memory and will not have to be set again even if the PFC loses power. See Clock Set (page 4-9) for more information.

When the PFC is powered up for the first time or if the PFC has been reset to factory defaults you will need to select your Time Zone, Daylight Savings time (DST) and the Hour format you prefer before the PFC can be used.

In each setting screen the top left corner shows the current setting.

The top right corner shows what the current selection is set to.

Use the ▲▼ arrows to make your selection and the ☑ soft key to change the current setting. This can be confirmed by looking at the top right corner of the screen. Once you have made and set your selection use the ⮌ soft key to move to the next menu.

Common Time Zones	
UTC – 3.5 NST	*Newfoundland*
UTC – 4 AST	*Atlantic*
UTC – 5 EST	*Eastern*
UTC – 6 CST	*Central*
UTC – 7 MST	*Mountain*
UTC – 8 PST	*Pacific*
UTC – 9 ASKT	*Alaska*
UTC – 10 HST	*Hawaii*

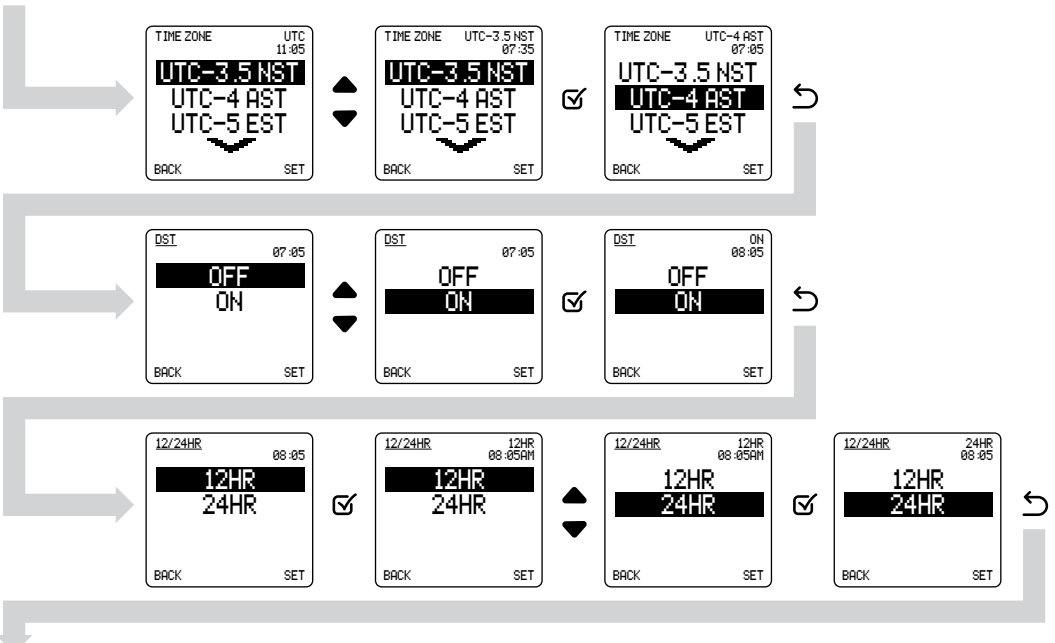


Figure 4-2.

The PFC is now ready to use and will go to the home screen.

4.3 Home Screen, Manual and Timed Heater Operation

4.3.1 HOME SCREEN

NOTICE

The Home Screen will change depending on the active Mode.

Day of the week, Heater Coolant Temperature and Time is always displayed.

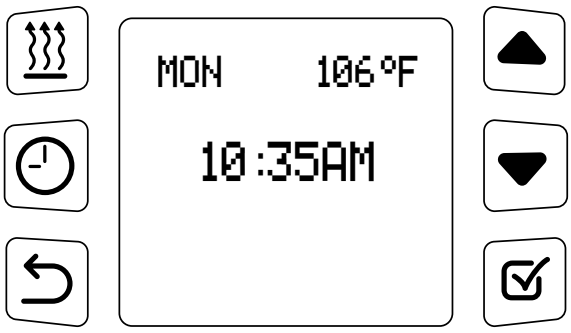


Figure 4-3. Home screen.

4.3.2 MANUAL HEATER OPERATION

NOTICE

"Manual" & "Timer" cannot be active at the same time. If "Manual" is active and the "Timer" button is pressed, the heater will turn off and the Red Manual Button LED will go out.

The "Manual" button is used to turn the heater on and off when desired regardless of set Timers.

Press "Manual" to activate the heater. The Red Manual Button LED will turn on and the heater will operate indefinitely (factory preset).

1. If the Manual Mode Runtime have been set you will see the remaining time left before the heater automatically turns off.
2. When the heater has an active Flame the icon will change to a black background.

Pressing "Manual" button again will de-activate the heater. (The Red LED will go out and the heater will turn off.)

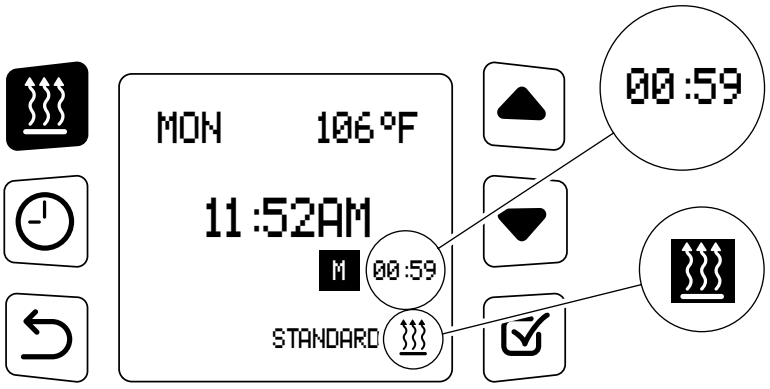


Figure 4-4.

4.3.3 TIMED HEATER OPERATION

When a Timer Mode is enabled you may see a number of different screens depending on how the Timer was programed (see Timer settings).

Press the “Timer” button repeatedly to toggle through and activate T1, T2, T3, T4, T5 or Group Timers. (Green Timer LED will turn on).

The Heater will switch on at the set program(s) time, run for the set duration, then switch off automatically.

If the heater has been turned on by a timer event, Pressing “Manual” button will turn the heater off but leaves the timer(s) schedule active.

Pressing the “Timer” Button repeatedly to toggle through and deactivate the current set timer program(s) (Green Timer LED will go out and screen will not show T1, T2, T3, T4, T5 (or any combination of T1, T2, T3, T4, T5) .

If a password has been set it may not be possible to deactivate the scheduled timer(s).

NOTICE

The Timer may automatically repeat each set program until switched off. See timer settings for more information.

NOTICE

If a Group Timer is selected (T1, T2, T3, T4, T5 (or any combination of T1, T2, T3, T4, T5) you will not see the schedule summary on the home screen.

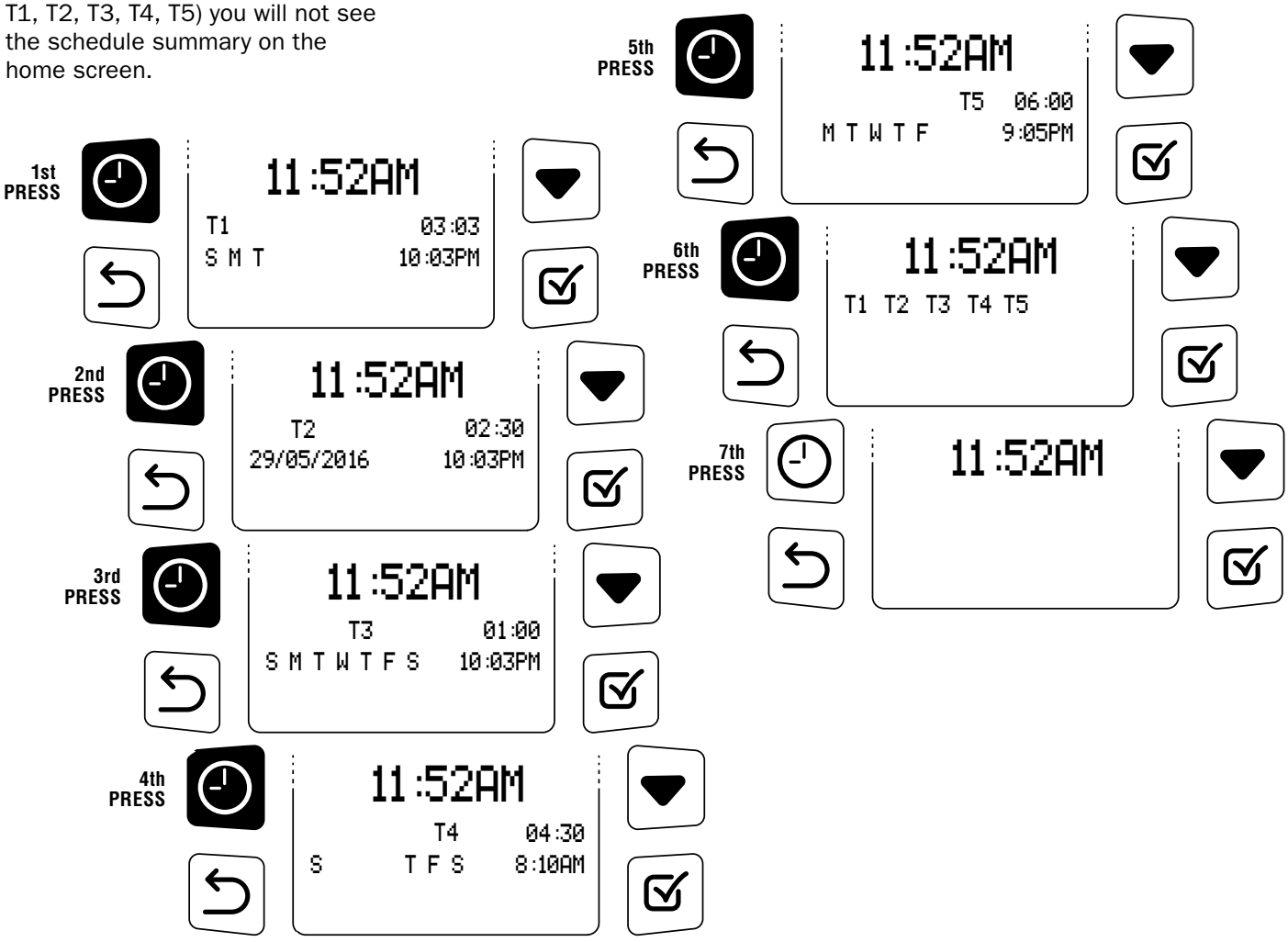


Figure 4-5.

4.3.4 HOME SCREEN — MANUAL MODE WITH TIMER

Manual Mode can be turned on even with a Timer set. The home screen would look similar to the image below.

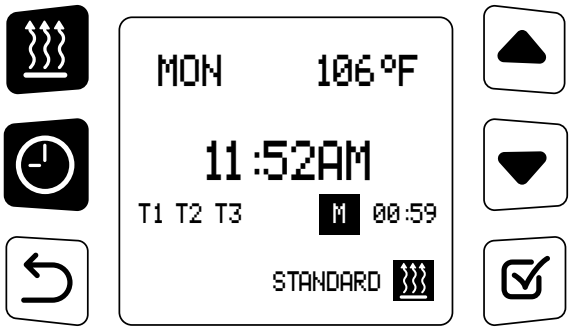


Figure 4-6.

4.3.5 HOME SCREEN — REMINDERS

The PFC has two reminders:

4.3.5.1 Winter Ready Reminder

On September 1st each year, the PFC displays the Winter Ready reminder screen at 8:00 am. This is to remind the end user to do the fall inspection and exercise the heater before winter starts.

NOTICE

This Reminder is factory set and no adjustments can be made.

Figure 4-7.

When the Winter Ready reminder screen is displayed, the PFC flashes all the button LEDs 3 times. To return to the home screen and clear the Winter Ready reminder till next September, press the ⮌ soft key. The PFC will return to the home screen.

4.3.5.2 Maintenance Reminder

If the heater has not been enabled for over 20 days (factory setting) the PFC Maintenance Reminder screen is displayed at 8:00 am to remind the end user to inspect and exercise the heater regularly.

When the Maintenance Reminder screen is displayed, the PFC flashes all the button LEDs 5 times every minute. To return to the home screen and be reminded again the next day, press the ⮌ soft key.

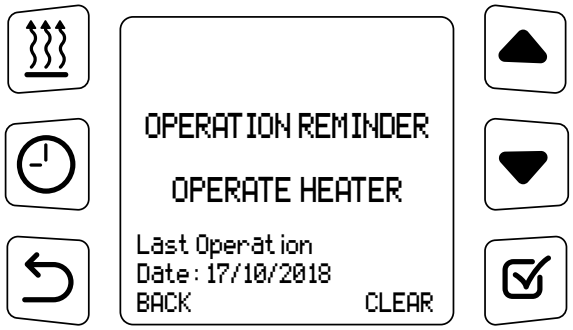


Figure 4-8.

To clear the Maintenance Reminder screen until the end of the of the next period. Press and hold the ☑ soft key for 3 seconds. Once cleared the PFC will return to the home screen.

4.3.6 HOME SCREEN — FAULT

The home screen will show if the heater has an active fault (see Faults for more information.)

Active Fault – Heater is in the HOLD mode and will not function until cleared. To clear the fault the heater must be switched off by pressing the manual button.

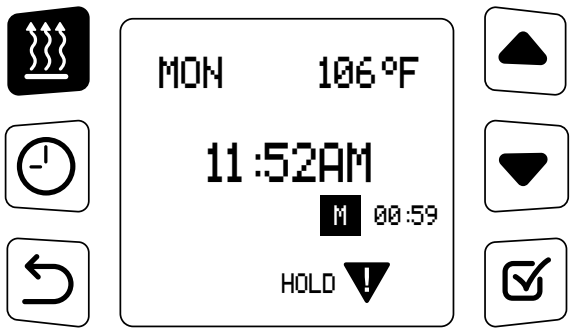


Figure 4-9.

Active Diagnostic – Heater is functioning in the current mode but a non-critical fault has be detected.

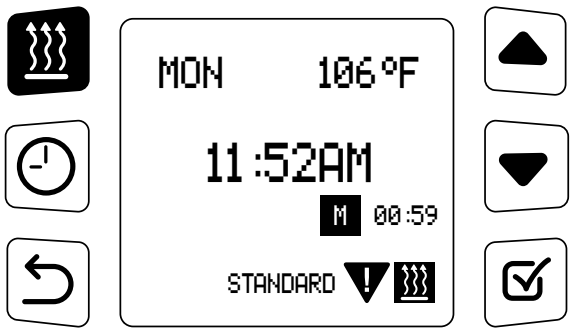


Figure 4-10.

4.4 Main Menu

To enter the main menu and change any settings press and hold the ▲ and ▼ arrows for two seconds then release. Once in the main menu use the up or down arrows to navigate to the setting you wish to change, then press the ☑ soft key to enter that particular setting screen.

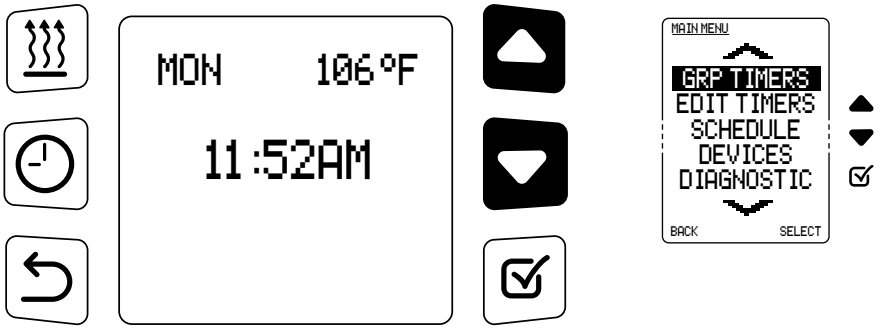


Figure 4-11.

At any time you can return the home screen by simply pressing and holding the ⮌ soft key for two seconds.

4.4.1 MAIN MENU > GRP TIMERS (GROUP TIMERS)

Figure 4-12.

You can set any of the five available Timers (T1, T2, T3, T4 and T5) into a group to create scheduled for up to three active timers per day.

Example: School Bus is used two times per day, any of the three Timers can be grouped together to make a daily schedule so the heater will preheat the bus two times per day.

Example: Construction Equipment can be used on three different shifts, the three Timers can be grouped together to make a daily schedule so the heater will preheat the equipment three times per day.

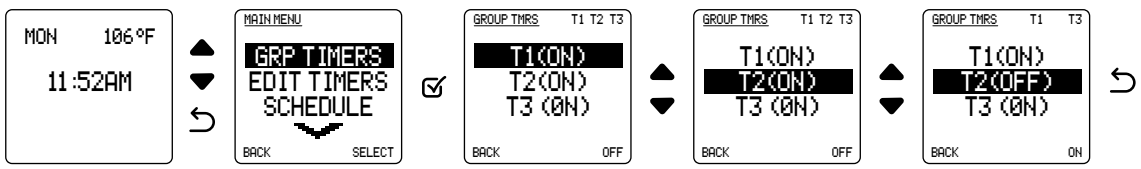


Figure 4-13.

4.4.2 MAIN MENU > EDIT TIMERS

Figure 4-14.

The PFC has five individual Timers (T1, T2, T3, T4 and T5) that can be set. They can be set based on the days of the week or once based on a date. You can set the time you would like the heater to enable, the duration you would like the heater to be enabled for, and the mode (see heater service manual for mode description) you would like the heater to run in.

Example: Set T2 timer for Monday through Friday at 6 am, for 0.5 hours, in Standard Mode. You can also use Edit Timers to clear a timer.

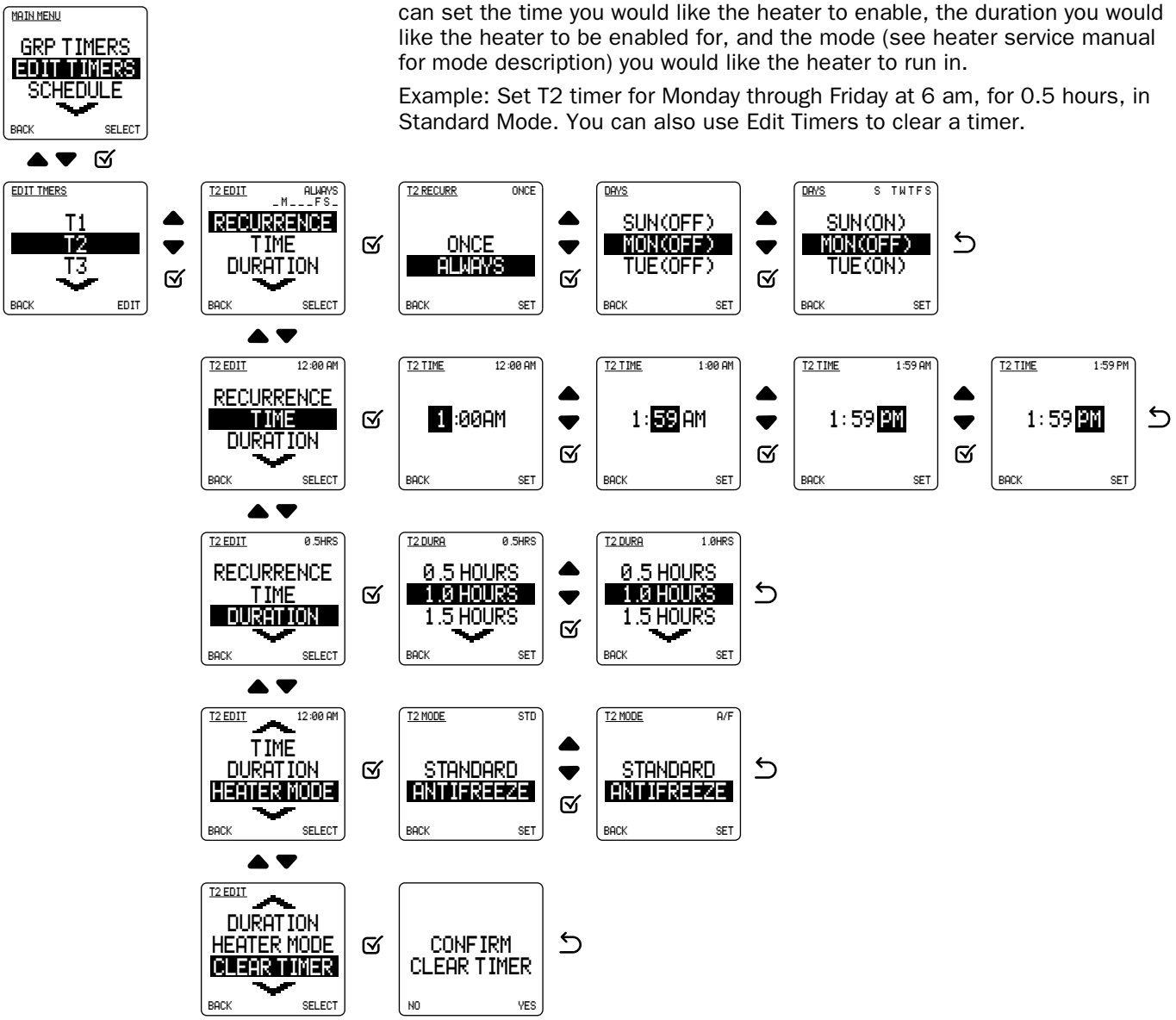


Figure 4-15.

4.4.3 MAIN MENU > DEVICES

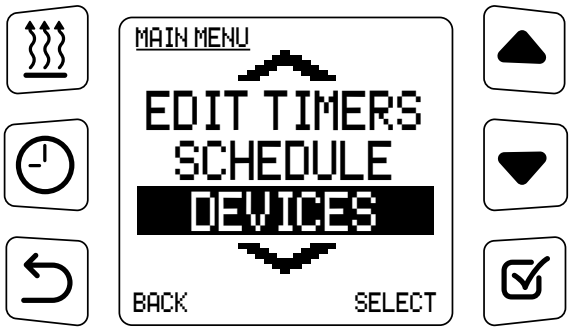


Figure 4-16.

In the DEVICES settings you can change the setting of the PFC & HEATER or an optional THERMOSTAT. In this screen you can also IMPORT or EXPORT the setting of the devices to or from another PFC to save time when working with a fleet or to simply backup your personal settings.

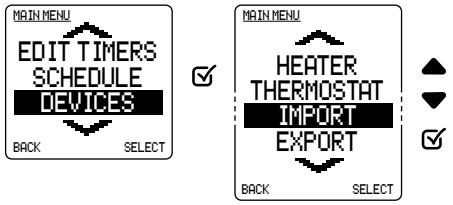


Figure 4-17.

4.4.3.1 Main Menu > Devices > PFC Settings

In the PFC Settings sub menu you can change:

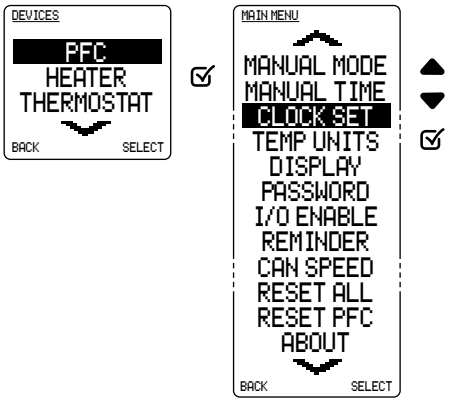


Figure 4-18.

4.4.3.1.1 Main Menu > Devices > PFC > Manual Mode

Used to change what mode the Heater will operate in when the PFC manual button is pressed.

Note: Factory setting is STANDARD.

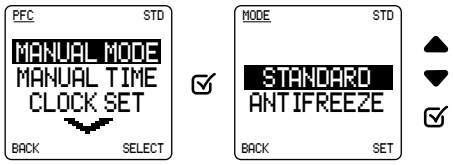


Figure 4-19.

4.4.3.1.2 Manual Time

Used to set the maximum runtime (anywhere from 0.5 to 24 hours) that the heater will operate when it is switched on by pressing the PFC Manual button. Once the Manual run timer expires, the heater switches off automatically.

The Manual runtime countdown timer is shown on the home screen if set.

Note: Factory setting is CONTINUOUS (heater will operate indefinitely until it is switched off).

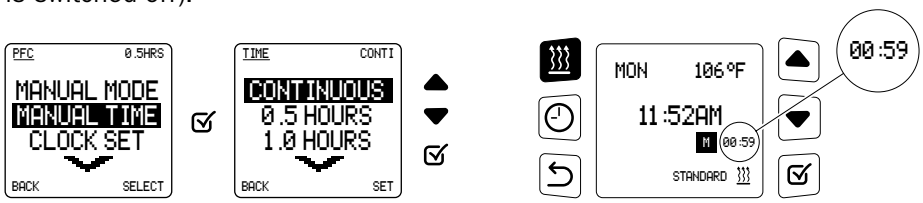


Figure 4-20.

Example: Changing this from CONTINUOUS to a set number of hours (from 0.5–24) is useful in fleets where there is a possibility for the driver to accidentally forget the heater was switched on (by Pressing the Manual button) when exiting the vehicle at the end of their shift.

4.4.3.1.3 Main Menu > Devices > PFC > Clock Set

The Day Light Saving (DST) setting can be set to match your local time zone in the summer.

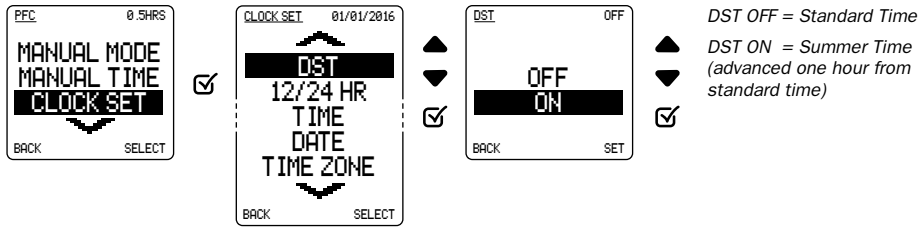
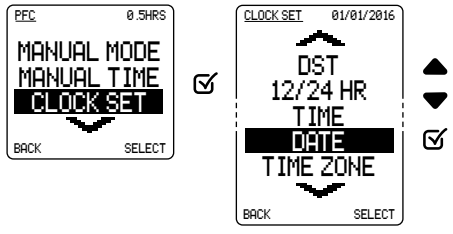


Figure 4-21.

If needed the display hour preference (12/24), Time, Date and Time zone can be adjusted.



Common Time Zones	
UTC – 3.5	*Newfoundland*
UTC – 4	*Atlantic*
UTC – 5	*Eastern*
UTC – 6	*Central*
UTC – 7	*Mountain*
UTC – 8	*Pacific*
UTC – 9	*Alaska*
UTC – 10	*Hawaii*

Figure 4-22.

4.4.3.1.4 Main Menu > Devices > PFC > Temperature Units

Choose how you prefer the temperature units to be displayed.

Note: Factory setting is Fahrenheit.

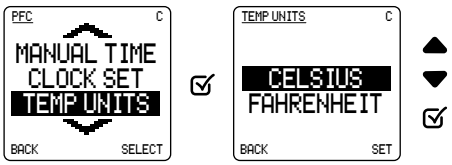


Figure 4-23.

4.4.3.1.5 Main Menu > Devices > PFC > Display

You can adjust the brightness of the active screen and the dimness of the idle screen to better suit your application.

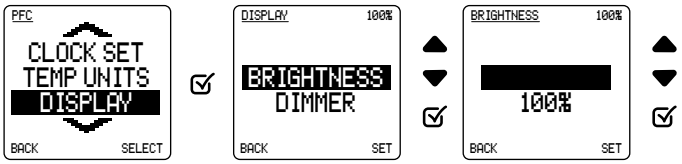


Figure 4-24.

4.4.3.1.6 Main Menu > Devices > PFC > Password

Used to prevent unauthorized changes to the PFC Timers and Settings. You can set you own 5 digit password.

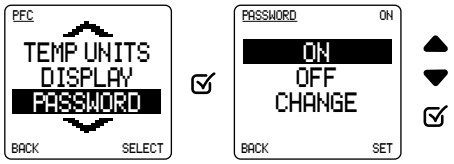


Figure 4-25.

NOTICE

The Password CAN NOT be reset if forgotten. Please write down your password and store in a secure place.

If you are turning the password ON for the first time you will transition directly to the CHANGE Password screen. Use the ▲▼ arrows to change the value 0–9 then press the ☑ soft key to move to the next number until you have set your own 5 digit password.

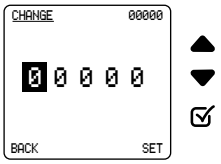


Figure 4-26.

Once the Password is set and is ON you can exit to the home screen. All the settings are now protected. When in the main menu any selection other than Diagnostics will require the password to be entered.

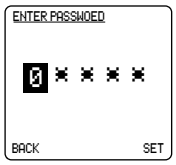


Figure 4-27.

4.4.3.1.7 Main Menu > Devices > PFC > I/O Enable

The PFC's OUTPUT (Blue Wire) and INPUT (White Wire) are disable from the factory. If the PFC is used with a non CAN heater the I/O's need to be enabled.

PFC OUTPUT + (Blue Wire) Main Switch Input to Heater (STANDARD Mode "ON") – HIGH SIDE SWITCHED.

PFC INPUT + (White Wire) Indicator Light OUTPUT from Heater (HIGH SIDE SWITCHED).

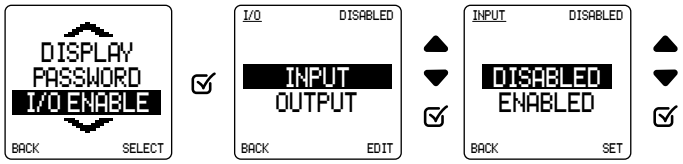


Figure 4-28.

4.4.3.1.8 Main Menu > Devices > PFC > Reminder

Used to set the Maintenance reminder period (0-255 days) and to view the last date the heater was enabled.

The Maintenance Reminder can be disabled by setting the days to 0.

Note: Factory setting is 20 Days.

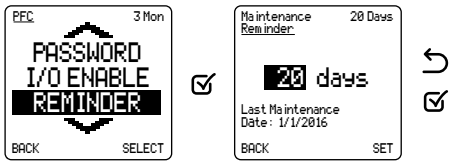


Figure 4-29.

4.4.3.1.9 Main Menu > Devices > PFC > Reset All

Returns all PFC settings including all Timers and the Password to the Factory default.

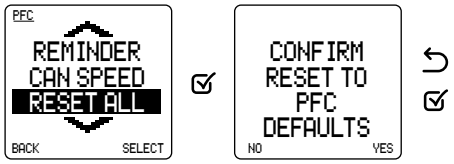


Figure 4-30.

4.4.3.1.10 Main Menu > Devices > PFC > Reset PFC

Used to reboot the PFC. Also used to enter into the software update process. See page 4-20 for Software update instructions.

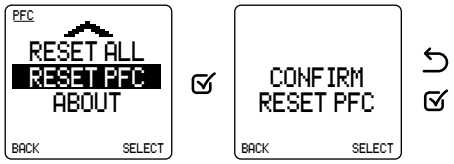


Figure 4-31.

4.4.3.1.11 Main Menu > Devices > PFC > About

To view the PFC Part number, software revision and serial number.

Figure 4-32.

4.4.3.2 Main Menu > Devices > Heater Settings

You must have a Proheat Heater connected to the same CAN network as the PFC. If no Heater is found you cannot adjust any settings.

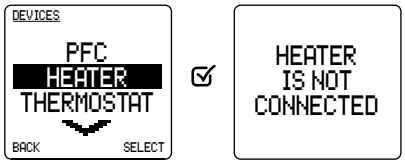


Figure 4-33.

4.4.3.2.1 Main Menu > Devices > Heater > Auto Start

The Auto Start feature (Heater wiring & I/O configuration dependent) on some Proheat heaters will send a high side signal output to and Auto Start module or indictor light when the heater see low voltage or when the heater is in Fault code hold mode.

You can adjust the low Voltage threshold and the Run Time that is outputted to the Auto Start module or indictor light.

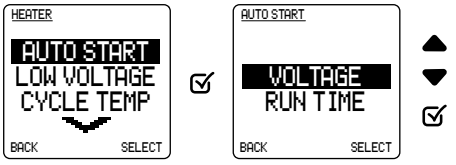


Figure 4-34.

4.4.3.2.1.1 **Main Menu > Devices > Heater > Auto Start > Start Voltage**

Adjust to desired setting for either 12 or 24 Volt systems.

Note: This setting is always 0.5 Volts higher than the low voltage error code.

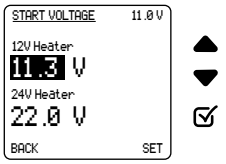


Figure 4-35.

4.4.3.2.1.2 **Main Menu > Devices > Heater > Auto Start > Run Time**

Adjust to desired run time 0-255 Minutes. The factory default is 15 minutes.

Note: Please allow sufficient time for the batteries to be recharged with the engine running.

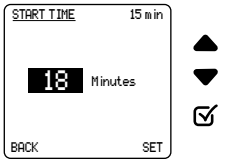


Figure 4-36.

4.4.3.2.2 Main Menu > Devices > Heater > Low Voltage

Adjust the low voltage code 05 limit to desired setting for either 12 or 24 Volt systems.

- The factory default for 12 Volt systems is 9.5 Volts
- The factory default for 24 Volt systems is 18 Volts .

Note: Once the heater reaches the low voltage threshold it will shut down and produce error code 05 and will not turn back on again until the code is cleared.

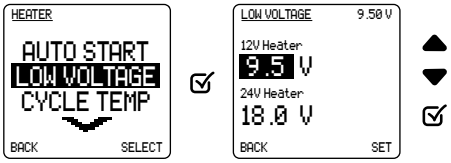


Figure 4-37.

4.4.3.2.3 Main Menu > Devices > Heater > Cycle Temp

Adjust the cycle ON or cycle OFF temperature set points for the four modes.

Typically these settings are used to fine tune the heater to the application, or hold the temperature lower or higher than the stock settings. The ON/OFF settings are kept a minimum of 25°F (15°C) apart and can not be higher than 212°F (100°C)

These settings should be chosen very carefully as the heater may not cycle ON or may not cycle OFF.

Figure 4-38.

4.4.3.2.4 Main Menu > Devices > Heater > Minimum Heat

Adjust the Proheat lowest BTU output % (heater model dependent) for all modes.

This setting should be chosen very carefully as the heater may not cycle OFF as expected.

Use the 'Reset All' (4.4.3.2.7) to return all settings to factory defaults.

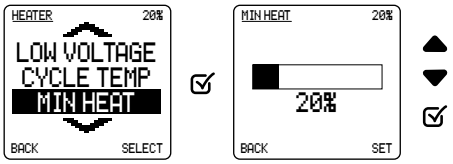


Figure 4-39.

4.4.3.2.5 Main Menu > Devices > Heater > Maximum Heat

Adjust the Proheat highest BTU output % (heater model dependent) for all modes.

This setting should be chosen very carefully as the heater may not cycle OFF as expected.

Use the 'Reset All' (4.4.3.2.7) to return all settings to factory defaults.

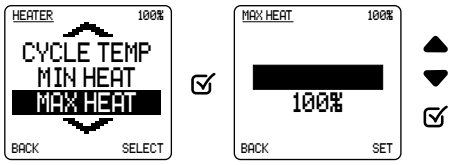


Figure 4-40.

4.4.3.2.6 Main Menu > Devices > Heater > Anti-Freeze Pre Run Time

Adjust the time that the Proheat turns on the pump to sample the system coolant temperature.

A shorter time will give a more accurate reading of the system coolant temperature but will use more battery power.

A longer time will use less battery power but may not be as accurate reading the system coolant temperature.

This setting should be chosen very carefully as the heater may not sense the actual system coolant temperature as expected.

Use the 'Reset All' (4.4.3.2.7) to return all settings to factory defaults.

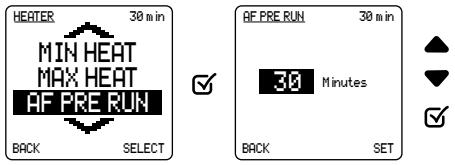


Figure 4-41.

4.4.3.2.7 Main Menu > Devices > Heater > Event Log

The entire Event log in the X30 PCM can be exported to a USB flash drive. This can be viewed on a PC in a CSV format. Please be patient when exporting the event log as it contains up to 1024 records and each record holds 20 plus parameters.

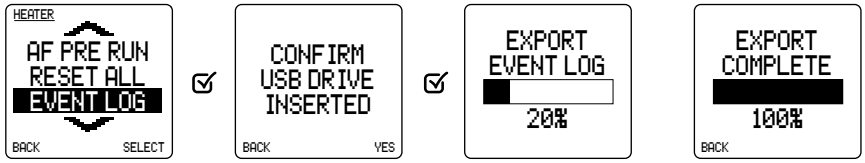


Figure 4-42.

Before you begin you will need:

- A USB flash disk drive with a capacity of at least 16 MB (max USB disk size: 16 GB).

To import:

- Connect your USB flash drive that contains only your saved settings to the PFC's USB port (located on the back of the PFC).
- Then wait 15 seconds for the PFC to recognize the USB flash drive.

If the USB flash drive is not detected or an error occurs during the settings import see the troubleshooting section for more information.

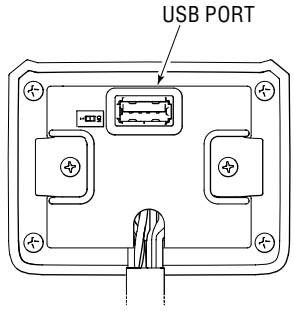


Figure 4-43.

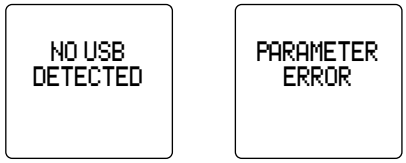


Figure 4-44.

4.4.3.2.8 Main Menu > Devices > Heater > View Log

You can view the last 10 heater PCM events directly on the PFC without exporting them to a USB flash drive.

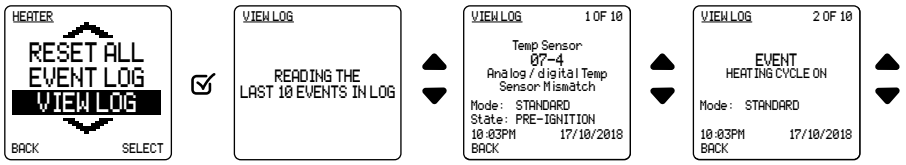


Figure 4-45.

Main Menu > Devices > Heater > About

To view the X30 PCM software revision.

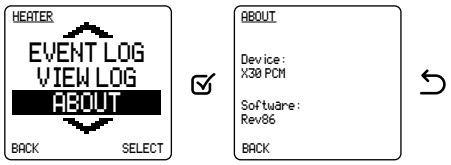


Figure 4-46.

4.4.3.3 Main Menu > Devices > Thermostat Settings

You must have a Proheat Thermostat connected to the same CAN network as the PFC. If no Thermostat is found you cannot adjust any settings.

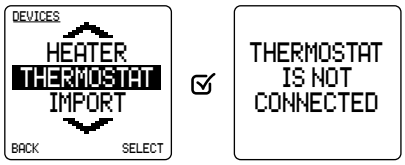


Figure 4-47.

4.4.3.3.1 Main Menu > Devices > Thermostat > Thermostat Display Settings

You can adjust the brightness of the active LED's and the dimness of the idle LED's to better suit your application.

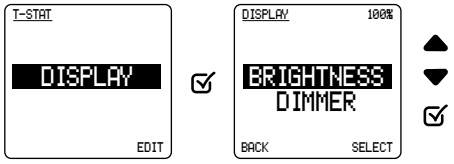


Figure 4-48.

4.4.3.4 Main Menu > Devices > Import

The customized PFC, Heater and Thermostat settings can imported through the PFC (see Export to learn how to save your customized settings) so you do not have to manually program each device.

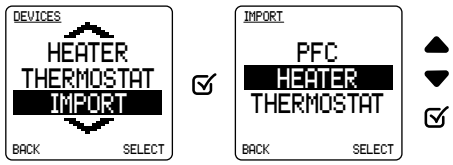


Figure 4-49.

Before you begin you will need:

- A USB flash disk drive with a capacity of at least 16 MB (max USB disk size: 16 GB).

To import:

- Connect your USB flash drive that contains only your saved settings to the PFC's USB port (located on the back of the PFC).
- Then wait 15 seconds for the PFC to recognize the USB flash drive.
- Select the device you want to import the settings for and press select.
- You will be asked to confirm the import.

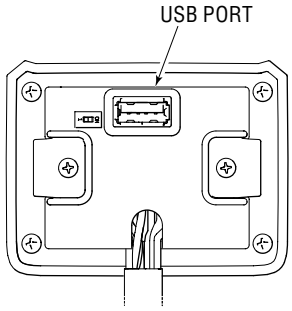


Figure 4-50.

⚠ WARNING

Pressing the YES soft key will DELETE all the Settings for the selected device, and be replaced with the settings from the USB flash drive.

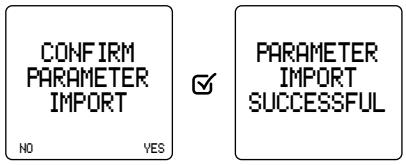


Figure 4-51.

If the USB flash drive is not detected or an error occurs during the settings import see the troubleshooting section for more information.

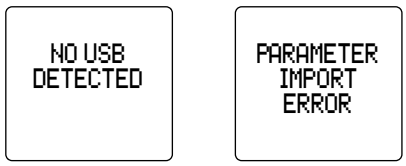


Figure 4-52.

4.4.3.5 Main Menu > Devices > EXPORT

All the customized settings for the PFC, Heater and Thermostat can be Exported to a USB flash drive and then Imported to a different PFC, Heater or Thermostat PFC (see Import to learn how load your custom settings) so you do not have to manually program each new device.

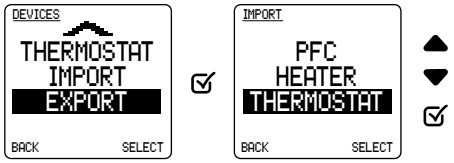


Figure 4-53.

Before you begin you will need:

- A USB flash disk drive with a capacity of at least 16 MB (max USB disk size: 16 GB).
- Drive format: FAT32 or FAT16.
- The flash drive must not contain any files (including documents, music, pictures).

To Export:

- Connect your USB flash drive to the PFC's USB port (located on the back of the PFC).
- Then wait 15 seconds for the PFC to recognize the USB flash drive.
- Select the device you want to Export the settings for and press select.
- You will be asked to confirm the Export.

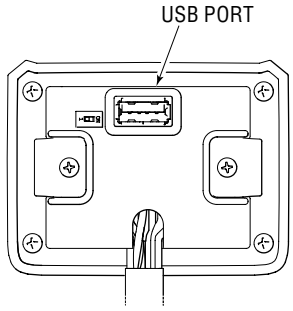


Figure 4-54.

⚠ WARNING

Pressing the YES soft key will DELETE any previously exported PFC, Heater or Thermostat settings stored on the USB flash drive, and be replaced with the new exported files.

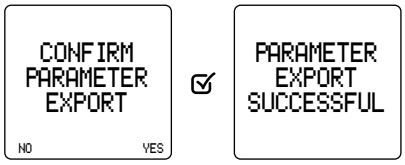


Figure 4-55.

If the USB flash drive is not detected or an error occurs during the settings Export see the troubleshooting section for more information.

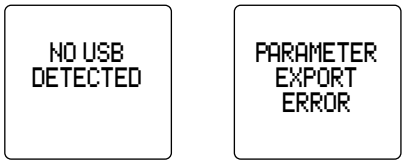


Figure 4-56.

4.4.4 MAIN MENU > DIAGNOSTIC

When an error occurs with the PFC, Heater or Thermostat it will be displayed on the PFC's home screen.

If the Back soft key is pressed the home screen will now only show an error icon.

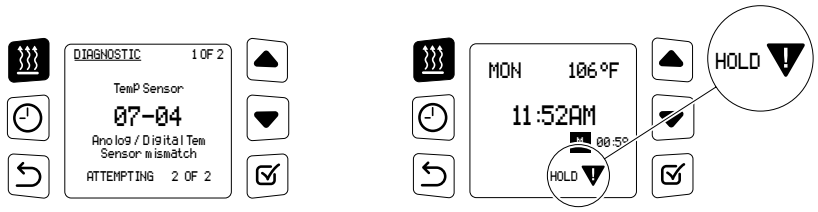


Figure 4-57.

To view what caused the error you can go to the Diagnostic menu.

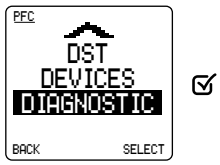
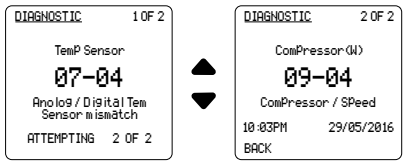


Figure 4-58.



If diagnostic codes occur simultaneously, they can be reviewed by pressing the ▲▼ arrows.

Figure 4-59.

The code(s) number and description that caused the error along with the time and date that it occurred will be shown.

4.5 PFC Software Updating

⚠ WARNING

Performing the Software update WILL DELETE all Settings in the PFC and return the PFC to the factory default settings.

When updating the PFC software all settings will be DELETED. Any previously exported setting flies will also not be compatible with the new PFC software. It is advised to go through the menus and write down all settings before preforming the PFC software update.

Fleet Programing – see below for more information

Requirements

Before you begin you will need:

- 12 volt power to the PFC
- Preloaded USB Flash Drive (skip to step 5 in 4.51 Software Update Instructions)

  OR
- Windows computer with USB Ports
- Blank USB Flash Drive

  The USB flash drive may have a capacity up to 128GB and must be in exFAT, FAT32 or FAT16 format.

  It is recommended to avoid using USB flash drives that have LEDs built-in.

  Recommended USB flash drives include:

  - Proheat 8GB (with Proheat label)
  - LeXar 16GB
  - Kingston 64GB
  - SanDisk 32GB

  USB flash drives not recommended include:

  - LeXar 32GB
  - Kingston 16GB.

4.5.1 SOFTWARE UPDATE INSTRUCTIONS

1. Download the latest PFC software update from www.proheat.com to your computers desktop. Unzip if necessary.
2. Connect the USB flash drive to the computer.
3. Copy the PRG_APP.BIN file directly onto the USB flash drive.
4. Safely eject the USB flash drive from the computer.

⚠ WARNING

When updating the PFC software all settings will be DELETED. Any previously exported setting flie s will also not be compatible with the new PFC software.

It is advised to go through the menus and write down all settings before preforming the PFC software update on the first vehicle.

5. Connect your USB flash drive to the PFC's USB port (located on the back of the PFC).
6. Ensure that the PFC is powered-off by removing the fuse from the 12V power supply.
7. Press and hold the ☑ soft key on the PFC.
8. Power On the PFC by installing the fuse to the 12V power supply.
9. Continue to hold the ☑ soft key until the following screen is displayed:

NOTICE

An alternative to removing the fuse is to use the Reset PFC function (see page 4-12). You must press the ☑ soft key immediately after pressing "YES".

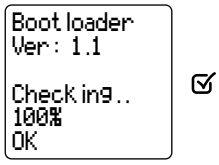


Figure 4-60.

Note: that when the word 'Checking' is displayed and the value is above '10%', the ☑ soft key can be released (the value displayed below 'Checking' does not need to be at 100% in order to release the ☑ soft key).

10. After the PFC checks the Software Application on the USB flash drive, it will record the Software into its internal memory and the following screen will be displayed if the process is successful:

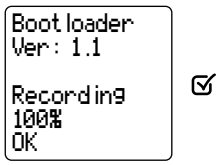


Figure 4-61.

The Proheat Function Controller will then reboot, momentarily display the Proheat logo, then ask the user to select a Time Zone – The Software update is now complete.

11. The PFC will need the Daylight Saving (DST), Time Zone, and Hour Format (12/24) set before you can enter the main menu (see 4.2.1). Your customized settings previous noted can now be entered and any new settings or features that have been included with the PFC software update can also now be set (see 4.4).

12. Active the timer schedules if desired (see 4.3.3)

Fleet PFC Updating see steps 13 through 18 below.

All others – The Software update is now complete and the USB flash drive can be disconnected from the PFC.

4.5.1.1 Fleet PFC Updating

13. Export the new settings (see 4.4.3.5) to USB flash drive that is still installed in the PFC.

(This USB flash drive will be used for the update and importing the same settings to all the subsequent PFC's in the fleet.)

14. Once you have keyed in the new settings (PFC, Heater and/or Thermostat) and exported the customized PFC, Heater and/or Thermostat settings to the same USB flash drive on the first vehicle, the remaining PFC's in the fleet simply need the software update (steps 1 through 10 above) and the PFC, Heater and/or Thermostat customized settings imported (steps 15 through 18 below).

15. The PFC will need the Daylight Saving (DST), Time Zone, and Hour format (12/24) set before the customized settings on the USB flash drive can be imported. These settings are not important as they will be replaced during the import.

16. Once the Home screen is displayed, please follow section 4.4.3.4 IMPORT to import the new PFC, Heater and or Thermostat settings.

17. When the Import is completed the USB flash drive can be disconnected from the PFC.
18. The Software update is now complete and the USB flash drive can be disconnected from the PFC.

    For each PFC in the fleet preform steps 5 through 10 and 15 through 18 using the same USB flash drive.

4.5.2 SOFTWARE UPDATE TROUBLESHOOTING

4.5.2.1 “No Pendrive” Displayed

If the following screen is continuously displayed while following steps 7 through 9 of 4.5.1 Software Update Instructions:

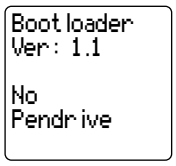


Figure 4-62.

Repeat steps 1 through 10 of 4.5.1 Software Update Instructions with an entirely different USB flash drive. Ensure that the USB flash drive has no built-in LED, is under 128GB, and is exFAT, FAT32 or FAT16 formatted.

4.5.2.2 “No File .BIN” Displayed

If the following screen is continuously displayed while following steps 7 through 9 of 4.5.1 Software Update Instructions:

Figure 4-63.

Disconnect power and remove the USB flash drive from the PFC. Connect the USB flash drive to a computer and confirm that the PRG_APP.BIN file exists on the flash drive.

- If it does exist, repeat steps 4 through 10 of 4.5.1 Software Update Instructions.
- If the file does not exist, repeat steps 2 through 10 of 4.5.1 Software Update Instructions.

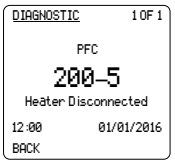
If the Proheat Function Controller continues to display “No File .BIN”, disconnect power and remove the USB flash drive from the PFC. Connect the USB flash drive to a computer and delet the PRG_APP.BIN file from the flash drive. Repeat steps 2 through 10 in 4.5.1 Software Update Instructions.

If the problem persists, repeat steps 1 through 10 of 4.5.1 Software Update Instructions with an entirely different USB flash drive. Ensure that the disk has no built-in LED, is under 128GB, and is exFAT, FAT32 or FAT16 formatted (see Requirements for USB flash drive recommendations).

5.0 TROUBLESHOOTING

If you have a problem with your PFC please follow below.

5.1 PFC CAN Connections



The PFC will display code 200-5 if it is not connected to a heater over CAN.

Note: If the PFC lost its CAN connection to the heater and the power to the PFC was lost at some point the PFC will not display a code. Rather it will just display the home screen without the temperature in the upper right of the display.

Figure 5-1. PFC displaying Code 200-5.

5.1.1 BASIC TROUBLESHOOTING

1. Check the CAN connections as shown in section 5.2, ensure it matches one of the diagrams.
2. Inspect the CAN connectors for damage and corrosion.
3. Inspect the CAN harness and connectors for damage and corrosion.

If no damage or corrosion is found preform the flowing tests to the CAN line.

5.1.2 PFC CAN TERMINATING RESISTOR TEST

A terminating Resistor is located at each end of the Backbone to prevent “echoing” or “reflections” into the backbone from a node at the end of the line. Two and only two terminating resistors are required in the network. A Node may contain a Terminating resister.

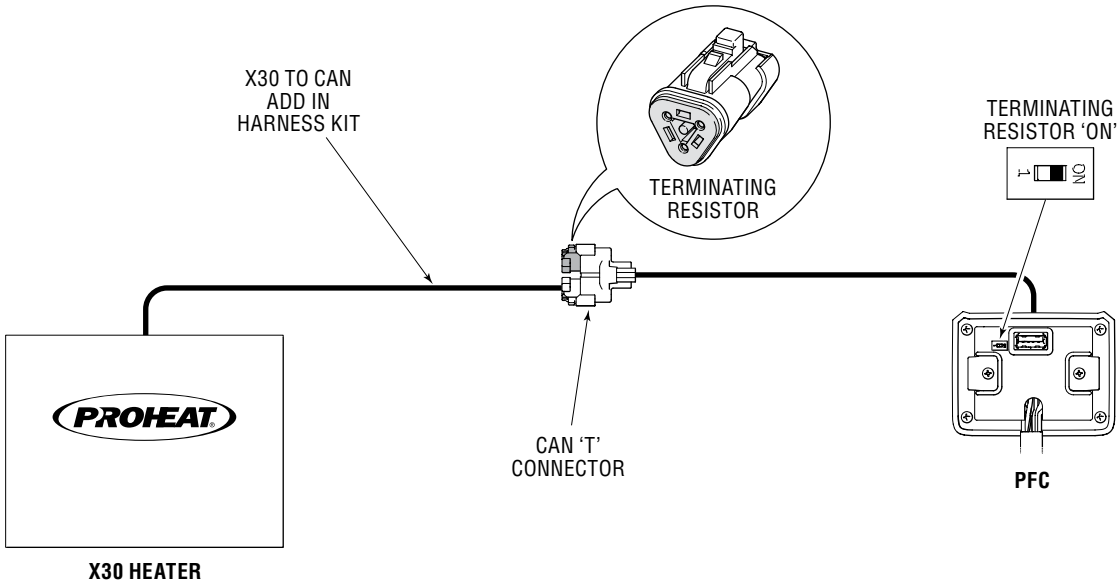


Figure 5-2.

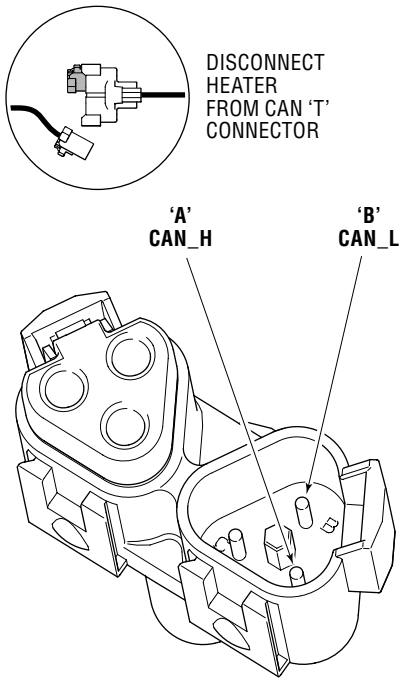


Figure 5-3.

This test measures the series resistance of the CAN_H (Yellow) and CAN_L (Green) wires and the attached terminating resistors to ensure the proper network termination is present.

1. Disconnect all devices (PFC, Heater, and Thermostat) on the CAN network from battery power.
2. Disconnect the Heater from the CAN 'T' connection and measure the resistance between PIN A (CAN_H) and PIN B (CAN_L) of the 'T' connector.

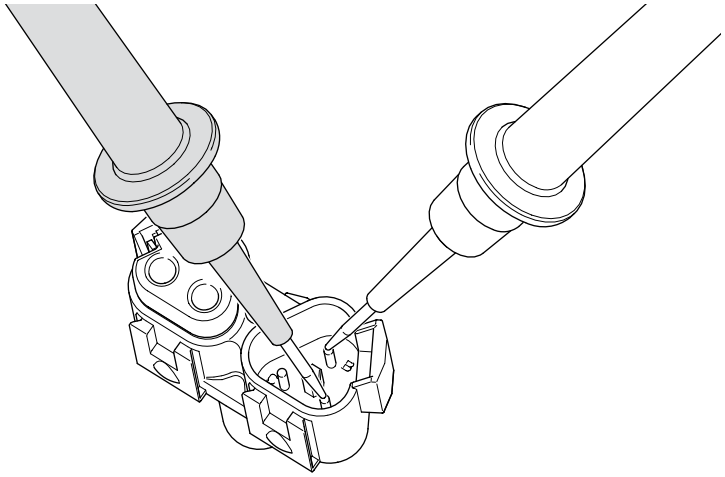


Figure 5-4.

The measured value should be 55–65 Ω.

If the value is below 54 Ω, check:

- Turn the terminating resistor DIP switch on the back of the PFC OFF and test again

If the value is still below 54 Ω, check:

- More than two Terminating resistor plugs in the CAN 'T's
- For a short circuit between CAN_H (Yellow) and CAN_L (Green) wires

If the value is higher than 66 Ω, please make sure that:

- There are no open circuits in the CAN_H (Yellow) or CAN_L (Green) wiring
- Ensure the terminating resistor DIP switch on the back of the PFC is ON and the backbone contains a terminating resistor plug in one of the CAN 'T' connectors

5.2 PFC USB Flash Drive

⚠ WARNING

Formatting the USB flash drive will DELETE all files on the flash drive.

If you get import/export errors or if the PFC cannot detect the USB flash drive:

- Ensure the USB flash drive is 16 GB or smaller
- Reformat the USB flash drive in a Computer
  - Format to FAT32 or FAT16 file system

Then insert the USB flash drive into the PFC and wait 30 seconds, they try again.

If the issue continues please try a different USB flash drive.

6.0 PROHEAT WARRANTY

NOTICE

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

PROHEAT warrants the PROHEAT Function Controller (PFC) to be free of defects in material and workmanship under design usage and service conditions for one (1) year on parts and labour from the date of first installation. Replacement parts are covered for the remainder of the PROHEAT Function Controller's (PFC's) warranty or ninety (90) days, which ever is greater.

This warranty does not apply to damage or failure of the PROHEAT Function Controller (PFC) 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 PROHEAT. Accessories supplied, but not manufactured by PROHEAT, shall be covered by the manufacturer's warranty only and not subject to this warranty.

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

Coverage for warrantable parts, at the discretion of PROHEAT 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 PROHEAT.

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 PROHEAT IN REGARD TO THE PROHEAT FUNCTION CONTROLLER (PFC). PROHEAT MAKES NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

OWNER RESPONSIBILITIES

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 Function Controller (PFC) 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 Function Controller (PFC). 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. **PROHEAT is not responsible for incidental or consequential damages.**

Items Covered Under This Warranty

1. Function Controller (PFC) electrical controls provided by PROHEAT.
2. PROHEAT supplied accessories and mounting hardware.

Items Not Covered Under This Warranty

1. PROHEAT Function Controllers (PFCs) that are no longer within the warranty period.
2. Normal wear.
3. Parts which malfunction due to improper installation, causing inadequacies in 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. PROHEAT Function Controllers (PFCs) which have been modified or use of non-standard parts not approved by PROHEAT.
6. PROHEAT Function Controllers (PFCs) 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 Function Controller (PFC).

If you have any questions or concerns about the PROHEAT warranty, contact your nearest PROHEAT distributor or PROHEAT at (604) 270-6899.

Note: *This page left blank intentionally.*

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