

Peerless® P125

Control Board Upgrade Kit



Installation Instructions



1. OVERVIEW

A. GENERAL

- These instructions are intended to guide a qualified installer in upgrading the control system on a PINNACLE® Boiler from an existing WHA Control Board to the new P125 Control Board. The following kits are available.
 - 91447 P125 Upgrade Kit for PI-80
 - 91448 P125 Upgrade Kit for PI-140
 - 91449 P125 Upgrade Kit for PI-199
- Carefully read these instructions and be sure to understand the function of all connections prior to beginning the upgrade. Contact your PB Heat, LLC Representative for help in answering questions.
- The following parts are included in the Upgrade kit. Be sure all items are present before beginning the installation.

Stock Code	Description	Qty
91456	P125 Control Board (PI-80)	1
91457	P125 Control Board (PI-140)	
91458	P125 Control Board (PI-199)	
91461	P125 Display Module with Ribbon Cable	1
91473	Wire Harness - 120 volt with 6 Pin Connector	1
91475	Wire Harness - 120 volt with 9 Pin Connector (PI-80)	1
91474	Wire Harness - 120 volt with 9 Pin Connector (PI-140 & PI-199)	
91463	Wire Harness - Control 10 Pin/20 Pin (PI-80)	1
91462	Wire Harness - Control 10 Pin/20 Pin (PI-140 & PI-199)	
91476	P125 Spark Cable	1
91435	Supply Return Thermister	2
91444	Edge Card Adapter Harness	1
91446	Blower Outlet Pressure Tap Boot	1
91445	Control Board Sub-base	1
	#8 x 1/2" Stainless Steel Pan Head Screw	6
PI8066	P125 Control Board Upgrade Instructions	1
91498	Blocked Vent Pressure Switch	1
91495	Tube to NPT Nylon Adapter	1
91508	PVC Tubing 18" Long	1

B. INSPECTION

- Inspect the components received and be sure all items are present before beginning the installation.
- Inspect each component for shipping damage. If damage is evident, contact your distributor immediately.
- The "P125" control board will be shipped pre-mounted on the sub-base with all wiring harnesses attached.
- The two thermistors are attached to the wiring harness by Molex connectors.
- The spark cable is attached to the "P125" control board.
- The edge card adapter harness is packaged separately for use only if the combustion air blower attachment requires it.
- The blower outlet pressure tap boot is packaged separately for sealing the pressure tap on the outlet side of the combustion air blower.



WARNING

Be sure that the pressure tap at the outlet of the combustion air blower is sealed before completing the installation. Failure to do so may result in severe personal injury, death, or major property damage.

2. REPLACING THE CONTROL BOARD

A. DISCONNECT ELECTRICITY AND WATER

WARNING

When servicing or replacing any components of this boiler be certain that:

- The gas is off.
- All electrical power is disconnected.

1. Disconnect all electrical power to the boiler before beginning the upgrade.
2. Turn off all make up water to the boiler. Isolate the boiler from the heating system if possible.
3. Raise the lever on the relief valve to assure that there is no pressure in the system.

B. DISCONNECT EXISTING CONTROL

1. Disconnect the existing wiring from the unit. None of the existing internal wires will be re-used.
2. Remove the existing control panel and sub-base by removing the thumb screw and lifting the panel to allow the remaining attachment screw to release through the key slot.
3. Remove the thermistors from the boiler.

DANGER

When servicing or replacing components that are in direct contact with the boiler water, be certain that:

- There is no pressure in the boiler. (Pull the release on the relief valve. Do not depend on the pressure gauge reading).
- The boiler water is not hot
- The electrical power is off

C. INSPECTING THE BOILER

1. Inspect the boiler for signs of leaks or corrosion.
2. Inspect all controls for signs of abnormal wear.
3. Correct any problems with the installation before continuing.

D. INSTALLING THE "P125" CONTROL BOARD

1. Install the new thermistors after removing them from the wiring harness supplied with the upgrade kit.

2. The new control board for the PI-140 and PI-199 will be mounted on the opposite side of the boiler cabinet from the existing control. The new control board for the PI-80 will be mounted on the same side as the existing control. Refer to Figure 1.1 for location guidelines for the PI-80 boiler and Figure 1.2 for location guidelines for the PI-140 and PI-199 boilers.

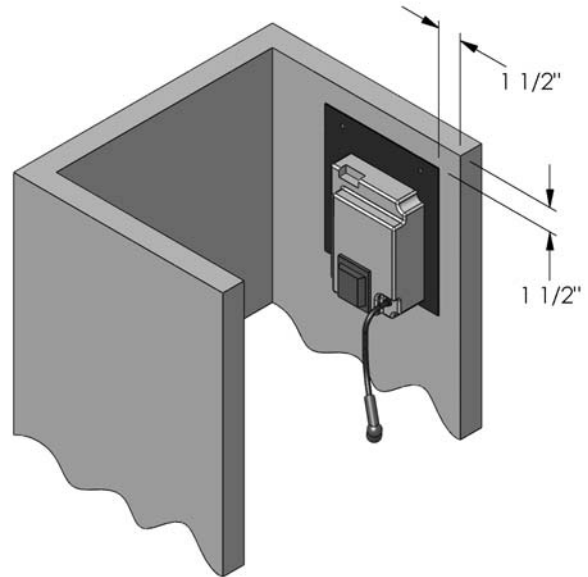


Figure 1.1: Location Guidelines for PI-80 Boilers

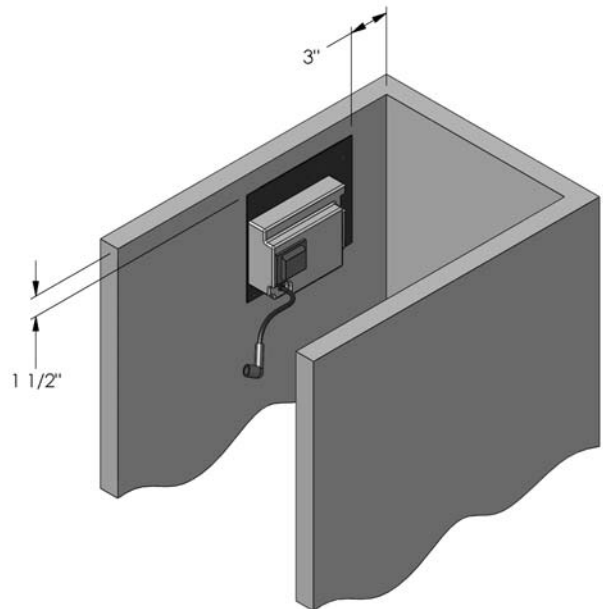


Figure 1.2: Location Guidelines for PI-140/PI-199 Boilers

3. Use the #8 x 1/2" stainless steel pan head screws provided to mount the new sub-base to the cabinet.
4. Connect wires to the correct components. The wires are labeled to identify the component to which they are to be connected. See Figure 1.3 for a component wiring diagram.
5. The two circulator wires, orange (hot) and brown (neutral) are supplied with wire nuts to prevent electrical shock.
 - a) If the boiler circulator is not wired to the control, it is not necessary to remove these nuts.
 - b) If the boiler circulator was previously wired, pay particular attention to the wiring diagram enclosed. The new "P125" board provides a 120 volt supply to the boiler circulator while the WHA control board merely provided a switching contact.
 - c) No external electrical power is required to the circulator.

6. The motor edge card adapter harness supplied with the upgrade kit is intended for connecting control wiring to the motor via an edge card connection. This may not be applicable to all boilers.
7. Apply the blower outlet pressure tap on the outlet side of the blower.

WARNING

Be sure that the pressure tap at the outlet of the combustion chamber is sealed before completing the installation. Failure to do so may result in severe personal injury, death, or major property damage.

8. Connect the "P125" display module to the control board using the ribbon cable connector.
 - a) Be sure that the ribbon is not near the ignition cable. This may cause scrambled characters on the display module.
 - b) The display panel has Velcro® on the back for mounting convenience.
 - c) Check all wiring before starting the unit.

NOTICE

Do not provide an additional 120 volt power wire to the circulator connection. The circulator wires provided with the P125 control board are rated for up to a 4 amp circulator.

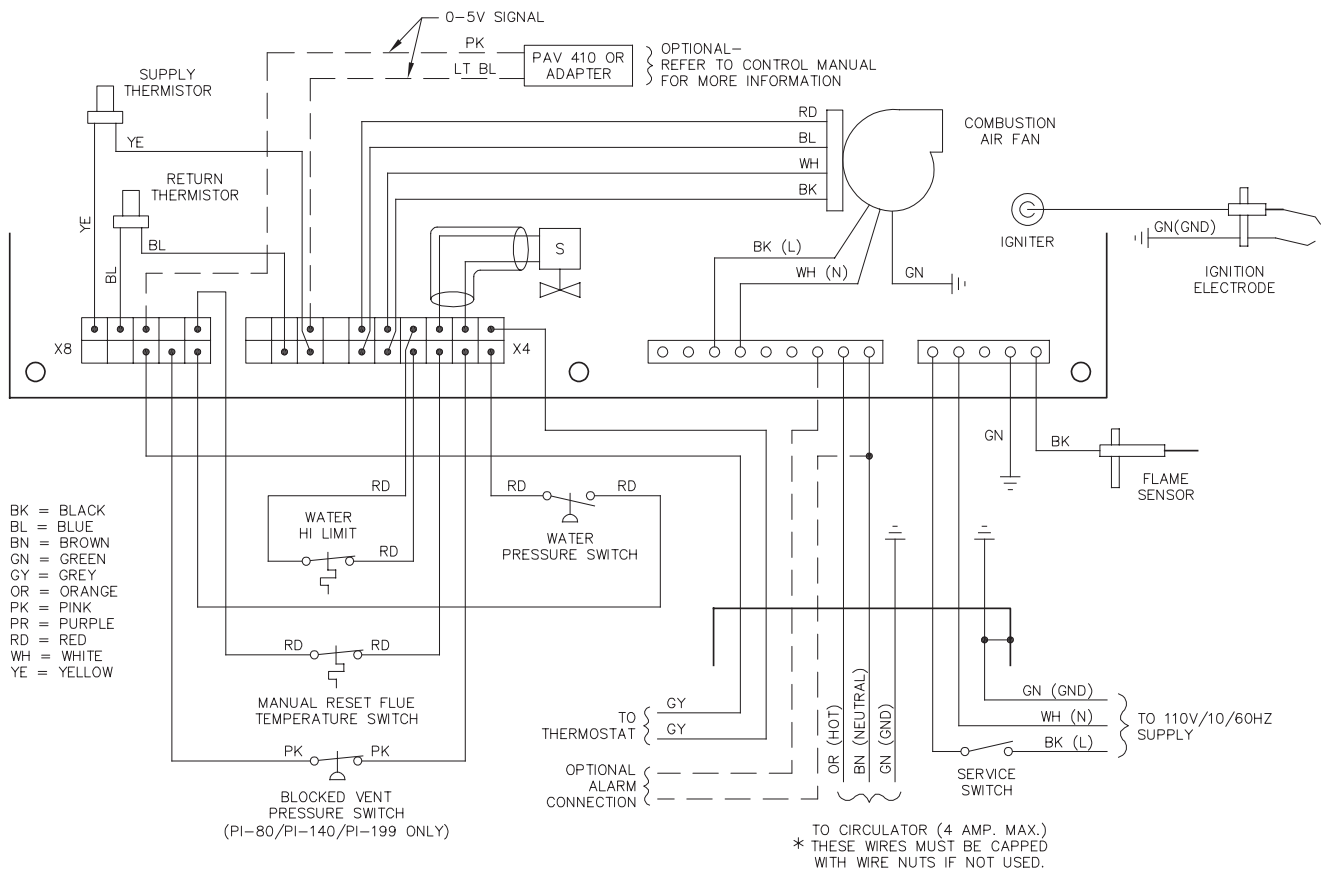


Figure 1.3: Component Wiring Diagram

3. ADDING THE BLOCKED VENT PRESSURE SWITCH

- a) Drill a 21/64" hole in the vent pipe at a convenient location adjacent to the keyhole opening at the rear of the boiler jacket.
- b) Using a 1/8 NPT pipe tap, tap the hole for the nylon adapter (included).
- c) Using two of the screws provided attach the blocked vent pressure switch to the inside of the jacket as illustrated in Figure 3.1.
- d) Attach the PVC tubing from the switch to the nylon adapter as shown.
- e) Connect the two pink wires to the blocked vent pressure switch common and normally closed contacts.

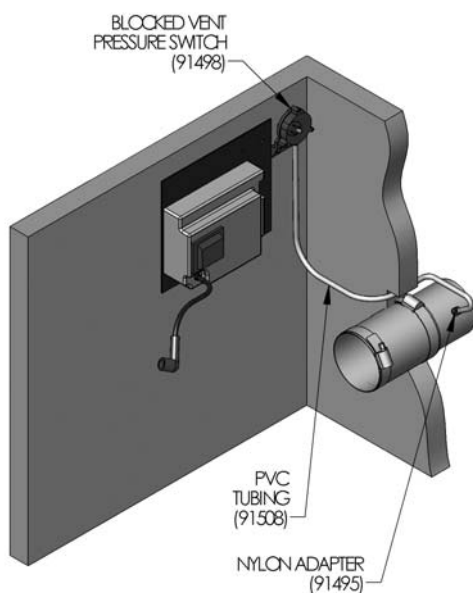


Figure 3.1: Location of the Blocked Vent Pressure Switch

4. START UP PROCEDURE

A. FILL THE BOILER

Fill the boiler and system with water, making certain to vent all air from each high point in the system. Open each vent in the system until all air is released and water begins to be discharged, and then close the vent.

B. TURN ON ELECTRICITY AND GAS

Turn on electricity and gas to the boiler. Check to see if the LED display is lit. The combustion air fan will begin a 5 second purge cycle and then the control will go into Standby Mode.

WARNING

If you smell gas at the unit, use a soap solution or other means for detecting leaks to determine the source of the leak. If no leak is found turn off the gas to the unit and contact your PB Heat Distributor or Representative.

C. SET POINT & DIFFERENTIAL

Adjust set point temperatures and set point differential temperatures by pressing and holding the S3, "PROGRAM" key for 3 seconds.

1. The control will enter the Supply Set Point selection.
2. The display will alternately show "C" and then the current set point temperature.
3. The set point may be adjusted by using the S1/- (to decrease) or S2/+ (to increase) keys on the display module.
4. Pressing the S3 "PROGRAM" key again will advance to the next adjustable value, Set Point Differential, and the display will alternate between "ch" and the set point differential value.
5. The set point differential is the difference between the temperature at which the boiler shuts down (high) and the temperature at which it re-starts (low).
6. The set point differential may be set to values between 5°F (3°C) and 30°F (17°C) in 1°F increments.

7. The boiler will always shut down at a temperature 7°F (4°C) above the set point. The differential temperature is then applied to this value.
8. For example, if the set point is 150°F and the differential is set at 10°F, the boiler supply temperature will reach 157°F before shutting down. The supply temperature will then drop to 147°F before restarting.
9. The set point differential may be adjusted by using the S1/- (to decrease) or S2/+ (to increase) keys on the display module.
10. Pressing the S3 "PROGRAM" key again will advance to the next adjustable value. The display will read "dh" and alternate with numerical value. This value is not applicable to the Pinnacle boiler.
11. Finally, by pressing the S3 "PROGRAM" key again, the display will advance to the Measurement Units selection. The display will alternate between "t" and either "F" for Fahrenheit or "C" for Celsius depending on the units selected. This value may be changed by using the S1/- or S2/+ keys on the display module.
12. Press the S3 "Program" key again to exit the program menu.

D. INSTALLER MENU

The Pavilion 410 Control produces a 0-5 volt DC analog signal that can be directly connected to the P125 Control.

By using an analog interface adapter (91488) the P125 Control can be connected to an external control that produces a 0-10 volt DC analog signal. Depending on the configuration of the control board, the external control can control the modulation (use with tekmar 263 and 265 controls) or the temperature set point.

The following are instructions for programming the P125 control board to accept this signal.

NOTICE

Do not program the P125 control to accept an external signal without the analog interface adapter installed. This will disable the thermostat input and cause the boiler to run continuously.

Using the display module on the P125 control, press and hold the S3 "PROGRAM" key and S4 "RESET" key simultaneously for 3 seconds. The module will display a blinking "000."

Use the S1/- and S2/+ keys to change the display to read "125."

Press the S3 "PROGRAM" key to enter the installer menu. (The control will shut down the boiler if it is in operation.)

The display will alternate between "1" and a value of either "0" or "1". This indicates that parameter number 1 is being programmed. Use the S1/- and S2/+ keys to set the value of this parameter.

Press the S3 "PROGRAM" key to advance to the next parameter. Table 4.1 shows the parameter numbers and function values.

Table 4.1

Parameter Number	Function
1	0 = Internal Control (Default) 1 = External Control from Analog Interface Adapter
2	0 = External Set Point Input (Default) 1 = External Modulation Input
3	0 = Step Modulation Disabled (Default) 1 = Step Modulation Enabled

To save the parameter function value and exit the menu press and hold the S4 "RESET" key for 3 seconds.

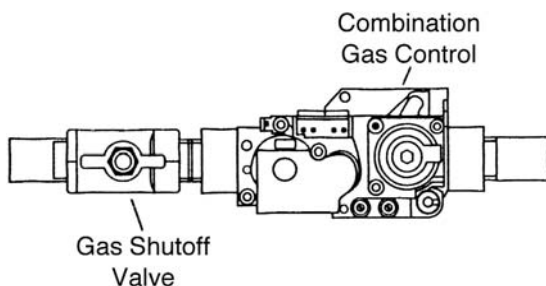
E. LIGHTING AND OPERATING INSTRUCTIONS**FOR YOUR SAFETY READ BEFORE OPERATING**

WARNING: If you do not follow these instructions exactly, a fire or explosion may result, causing property damage, personal injury or loss of life.

- A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
 - B. BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.
- WHAT TO DO IF YOU SMELL GAS**
- Do not try to light any appliance.
 - Do not touch any electric switch; do not use any phone in your building.
 - Immediately call your gas supplier from a neighbor's phone. Follow the gas suppliers' instructions.
 - If you cannot reach your gas supplier, call the fire department.
- C. Use only your hand to turn the gas control knob. Never use tools. If the handle will not turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.
 - D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

OPERATING INSTRUCTIONS

1. STOP! Read the safety information above.
2. Set the thermostat to lowest setting.
3. Turn off all electric power to the appliance.
4. This appliance is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.



5. Remove front cover.
6. Turn gas shutoff valve clockwise to "off". Handle will be vertical, do not force.
7. Wait five (5) minutes to clear out any gas. If you then smell gas, STOP! Follow "B" in the safety information above on this label. If you don't smell gas, go to next step.
8. Turn gas shutoff valve counterclockwise to "on". Handle will be horizontal.
9. Install Front Cover.
10. Turn on all electric power to appliance.
11. Set thermostat to desired setting.
12. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.

TO TURN OFF GAS TO APPLIANCE

1. Set the thermostat to lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. Remove front cover.
4. Turn gas shutoff valve clockwise to "off". Handle will be vertical. Do not force.
5. Install front cover.

F. STATUS MENU

1. The "P125" control board allows service personnel to monitor the status of several system parameters by pressing and holding the S4 "RESET" key for three seconds.
2. The display will alternate between "d1" and the actual supply temperature of the boiler.
3. By pressing the S4 "RESET" key again the display will change to alternating between "d2" and the actual return temperature of the boiler.
4. Table 4.2 shows the description for each of the status display values.
5. To exit the status menu, press the S3, "PROGRAM" key.

Table 4.2: Status Display Descriptions

d1	Supply (Outlet) Temperature (F or C)
d2	Return (Inlet) Temperature (F or C)
d3	Fan Speed (rpm ÷ 10) [ex. 200 = 2000 rpm]
d4	Flame Signal (μ A)
d5	Boiler Circulator Status (0 = Off, 1 = On)
d6	Boiler Set Point (F or C)
d7	Power On Time (Hrs ÷ 1000) [ex. 0.1 = 100 hrs]
d8	Boiler On Time (Hrs ÷ 1000)
d9	Cycles (n ÷ 1000)

G. TROUBLESHOOTING

1. The P125 control board has enhanced troubleshooting features including error codes and fault codes.
2. Error Codes:
 - a) When an error condition occurs the controller will display an error code on the display module.
 - b) These error codes and several suggested corrective actions are included in Table 4.3.
 - c) If errors E00, E13, and E14 are not corrected, the control board will go into a fault condition as described in Paragraph G.3.
3. Fault Codes:
 - a) When a fault condition occurs the controller will illuminate the red "fault" indication light and display a fault code in the format "F##" on the display module.

- b) Note the fault code and refer to Table 4.4 for an explanation of the fault code along with several suggestions for corrective actions.
- c) Press the reset key to clear the fault and resume operation. Be sure to observe the operation of the unit to prevent a recurrence of the fault.



WARNING

When servicing or replacing any components of this boiler be certain that:

- The gas is off.
- All electrical power is disconnected.



DANGER

When servicing or replacing components that are in direct contact with the boiler water, be certain that:

- There is no pressure in the boiler. (Pull the release on the relief valve. Do not depend on the pressure gauge reading).
- The boiler water is not hot
- The electrical power is off



WARNING

Do not use this appliance if any part has been under water. Improper or dangerous operation may result. Contact a qualified service technician immediately to inspect the boiler and to repair or replace any part of the boiler which has been under water.



CAUTION

This appliance has wire function labels on all internal wiring. Observe the position of each wire before removing it. Wiring errors may cause improper and dangerous operation. Verify proper operation after servicing.



CAUTION

If overheating occurs or the gas supply fails to shut off, do not turn off electrical power to the circulating pump. This may aggravate the problem and increase the likelihood of boiler damage. Instead, shut off the gas supply to the boiler at the gas service valve.

Table 4.3: Error Codes

Code	Description	Duration	Corrective Action
E00	High Limit Exceeded	50 Sec.	1. Check circulation pump operation. 2. Assure that there is adequate flow through the boiler by accessing the status menu and assuring that there is less than a 50°F rise from the return thermistor to the supply thermistor. 3. Replace switch if faulty.
E13	Combustion Fan Speed Low. The boiler combustion air fan speed is less than 70% of expected.	60 Sec.	1. Check the combustion air fan wiring. 2. Replace the combustion air fan. 3. Replace the control board.
E14	Combustion Fan Speed High. The boiler combustion air fan speed is more than 130% of expected.	60 Sec.	1. Check the combustion air fan wiring. 2. Replace the combustion air fan. 3. Replace the control board.
PRO	Water Pressure Switch Open	Until Corrected	1. Assure that the system pressure is above 10 psig. 2. Check for leaks in the system piping. 3. Check the switch operation by applying a jumper. (If the switch is not functioning properly replace it.)
FLu	Blocked Vent Pressure Switch Open	Until Corrected	1. Assure that the vent is not blocked. 2. Check the switch operation by applying a jumper. (If the switch is not functioning properly replace it.)

Table 4.4: Fault Codes

Fault Code	Description	Corrective Action
F00	High Limit Exceeded.	1. Check circulation pump operation. 2. Assure that there is adequate flow through the boiler by accessing the status menu and assuring that there is less than a 50°F rise from the return thermistor to the supply thermistor. 3. Check thermistor reading on supply thermistor. Replace switch if faulty.
F01	Vent Temperature Limit Exceeded.	1. Push the red reset button on the switch. 2. Check the flue temperature during operation using a combustion analyzer. 3. Replace the switch if faulty.
F02	Interrupted or Shorted Supply (Outlet) Thermistor.	1. Check the electrical connection to the thermistor on the outlet manifold. 2. Replace thermistor if necessary.
F03	Interrupted or Shorted Return (Inlet) Thermistor.	1. Check the electrical connection to the thermistor on the inlet manifold. 2. Replace thermistor if necessary.
F05	Supply (Outlet) Temperature exceeds 230°F.	1. Check circulation pump operation. 2. Assure that there is adequate flow through the boiler by accessing the status menu and assuring that there is less than a 50°F rise from the return thermistor to the supply thermistor.
F06	Return (Inlet) Temperature Exceeded 230°F.	1. Check circulation pump operation. 2. Assure that there is adequate flow through the boiler by accessing the status menu and assuring that there is less than a 50°F rise from the return thermistor to the supply thermistor.
F09	No flame detected – The boiler will make three attempts at ignition before the control goes into this lockout condition.	1. Watch the igniter through the observation window provided. 2. If there is no spark, check the spark electrode for the proper 1/4" gap. 3. Remove any corrosion from the spark electrode. 4. If there is a spark but no flame, check the gas supply to the boiler. 5. If there is a flame, check the flame sensor.

PINNACLE "P125" Control Board Upgrade Instructions

Table 4.4: Fault Codes (cont'd)

Fault Code	Description	Corrective Action
F10	Loss of Flame Signal – The boiler will relight 4 times before the control goes into this lockout condition.	<ol style="list-style-type: none"> 1. Check the gas pressure to the gas valve while the unit is in operation. 2. Assure that the flame is stable when lit. 3. Check to see if the green light on the display module is out while the boiler is running. 4. If the green light doesn't come on or goes off during operation check the flame signal on the status menu. 5. If the signal reads less than 1 microampere, clean the flame sensor. 6. If the sensor continues to read low, replace it.
F11	False Flame Signal – The boiler will lock out if it senses a flame signal when there should be none present.	<ol style="list-style-type: none"> 1. Turn the gas off to the unit at the service valve. 2. If the flame signal is still present replace the flame rod. 3. If the flame signal is not present after turning off the gas supply, check the gas valve electrical connection. 4. If there is no power to the gas valve, remove the valve and check for obstruction in the valve seat or replace the gas valve. 5. Turn the gas on at the service valve after corrective action is taken.
F13	Combustion Fan Speed Low – The boiler will lock out if it senses that the fan speed is less than 70% of expected for more than 60 seconds.	<ol style="list-style-type: none"> 1. Check the combustion air fan wiring. 2. Replace the combustion air fan. 3. Replace the control board.
F14	Combustion Fan Speed High – The boiler will lock out if the fan speed is more than 130% of expected for more than 60 seconds.	<ol style="list-style-type: none"> 1. Check the combustion air fan wiring. 2. Replace the combustion air fan. 3. Replace the control board.
F18	Gas Valve Error	<ol style="list-style-type: none"> 1. Make sure the connector is correctly connected to the gas valve. 2. Check the electrical wiring from the valve to the control board. 3. Replace the gas valve. 4. Replace control board.
F30	Watchdog	Call factory for further assistance.
F31	Parameter Memory	Call factory for further assistance.
F32	Parameter Memory Write Error	Call factory for further assistance.
F33	Programming Error	Call factory for further assistance.

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CONTROLS



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PeerlessBoilers.com