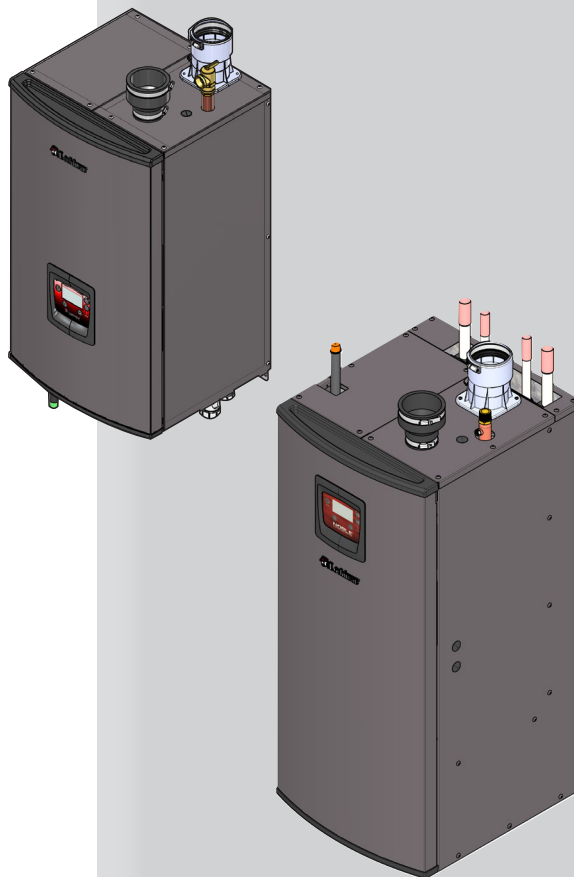


EPIC™

— FIRE TUBE

**Epic Fire Tube Boiler and Combi
User's Information Manual
EPC 110 - 199, EPB 80 - 199 &
EFC 110 - 199
Series 100 - 101 & 110 - 111**



Lochinvar®
HIGH EFFICIENCY BOILERS & WATER HEATERS

⚠ WARNING

If the information in this manual is not followed exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

This appliance **MUST NOT** be installed in any location where gasoline or flammable vapors are likely to be present.

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 near by phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.
- Installation and service must be performed by a qualified installer, service agency, or the gas supplier.


Save this manual for future reference.


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Hazard definitions

The following defined terms are used throughout this manual to bring attention to the presence of hazards of various risk levels or to important information concerning the life of the product.

 **DANGER** DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

 **WARNING** WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

 **CAUTION** CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

CAUTION CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

 **NOTICE** NOTICE indicates special instructions on installation, operation, or maintenance that are important but not related to personal injury or property damage.

Please read before proceeding

NOTICE

The Epic Fire Tube Installation and Service Manual is for use only by a qualified heating installer/service technician. Refer only to this User's Information Manual for your reference. Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury (exposure to hazardous materials) or loss of life. Installation and service must be performed by a qualified installer, service agency or the gas supplier (who must read and follow the supplied instruction before installing, servicing, or removing this boiler. This boiler contains materials that have been identified as carcinogenic, or possibly carcinogenic, to humans).

NOTICE

When calling or writing about the boiler – Please have the boiler model and serial number from the boiler rating plate.

Consider piping and installation when determining boiler location.

Any claims for damage or shortage in shipment must be filed immediately against the transportation company by the consignee.

Factory warranty (shipped with unit) does not apply to units improperly installed or improperly operated.

WARNING

Failure to adhere to the guidelines on this page can result in severe personal injury, death, or substantial property damage.

WARNING

DO NOT install units in rooms or environments that contain corrosive contaminants (see Table 1 on page 4). Failure to comply could result in severe personal injury, death, or substantial property damage.

Boiler service and maintenance –

- To avoid electric shock, disconnect electrical supply before performing maintenance.
- To avoid severe burns, allow boiler to cool before performing maintenance.

Boiler operation –

- Do not block flow of combustion or ventilation air to the boiler. This boiler is equipped with a control which will automatically shut down the boiler should air or vent be blocked. If vent or air blockage is easily accessible and removable, remove it. The boiler should attempt to restart. If blockage is not obvious or cannot be removed, have the boiler and system checked by a qualified service technician.
- Should overheating occur or gas supply fail to shut off, do not turn off or disconnect electrical supply to the circulator. Instead, shut off the gas supply at a location external to the appliance.
- Do not use this boiler if any part has been under water. The possible damage to a flooded appliance can be extensive and present numerous safety hazards. Any appliance that has been under water must be replaced.

Boiler water –

- Thoroughly flush the system (without boiler connected) to remove sediment. The high-efficiency heat exchanger can be damaged by build-up or corrosion due to sediment.
- Do not use petroleum-based cleaning or sealing compounds in the boiler system. Gaskets and seals in the system may be damaged. This can result in substantial property damage.
- Do not use “homemade cures” or “boiler patent medicines”. Serious damage to the boiler, personnel, and/or property may result.
- Continual fresh make-up water will reduce boiler life. Mineral buildup in the heat exchanger reduces heat transfer, overheats the stainless steel heat exchanger, and causes failure. Addition of oxygen carried in by make-up water can cause internal corrosion. Leaks in boiler or piping must be repaired at once to prevent makeup water.

Freeze protection fluids –

- NEVER use automotive antifreeze. Use only inhibited propylene glycol solutions, which are specifically formulated for hydronic systems. Ethylene glycol is toxic and can attack gaskets and seals used in hydronic systems.

1 Prevent combustion air contamination

⚠ WARNING If the boiler combustion air inlet is located in any area likely to cause contamination, or if products which would contaminate the air cannot be removed, you must have the combustion air and vent re-piped and terminated to another location. Contaminated combustion air will damage the boiler, resulting in possible severe personal injury, death, or substantial property damage.

⚠ WARNING If the boiler combustion air inlet is located in a laundry room or pool facility, for example, these areas will always contain hazardous contaminants.

Pool and laundry products and common household and hobby products often contain fluorine or chlorine compounds. When these chemicals pass through the boiler, they can form strong acids. The acid can eat through the boiler wall, causing serious damage and presenting a possible threat of flue gas spillage or boiler water leakage into the building.

Please read the information listed in Table 1. If contaminating chemicals will be present near the location of the boiler combustion air inlet, have your installer pipe the boiler combustion air and vent to another location, per the Epic Fire Tube Installation and Service Manual.

⚠ WARNING To prevent the potential of severe personal injury or death, check for areas and products listed in Table 1 before installing the boiler or air inlet piping.

If contaminants are found, you MUST:

- Remove contaminants permanently.
- OR—
- Relocate air inlet and vent terminations to other areas.

Table 1 Corrosive Contaminants and Sources

Products to avoid:
Spray cans containing chloro/fluorocarbons
Permanent wave solutions
Chlorinated waxes/cleaners
Chlorine-based swimming pool chemicals
Calcium chloride used for thawing
Sodium chloride used for water softening
Refrigerant leaks
Paint or varnish removers
Hydrochloric acid/muriatic acid
Cements and glues
Antistatic fabric softeners used in clothes dryers
Chlorine-type bleaches, detergents, and cleaning solvents found in household laundry rooms
Adhesives used to fasten building products and other similar products
Areas likely to have contaminants
Dry cleaning/laundry areas and establishments
Swimming pools
Metal fabrication plants
Beauty shops
Refrigeration repair shops
Photo processing plants
Auto body shops
Plastic manufacturing plants
Furniture refinishing areas and establishments
New building construction
Remodeling areas
Garages with workshops

2 Maintenance schedule

ANNUAL START-UP

Service technician

General:

- Reported problems
- Inspect interior; clean and vacuum if necessary
- Clean condensate trap.
- Check for leaks (water, gas, flue, condensate)
- Verify flue and air lines in good condition and sealed tight
- Check system water pressure/system piping/expansion tank
- Check fill water meter
- Test boiler water. When test indicates, clean system water with approved system restorer following manufacturer's information.
- Check control settings
- Ignition and flame sense electrodes (sand off any deposits; clean and reposition)
- Wiring and connections
- Perform start-up checkout and performance verification per Section 10 of this manual.
- Flame inspection (stable, uniform)
- Flame signal (at least 4 mA)
- Clean the heat exchanger if flue temperature is more than 54°F above return water temperature.
- Inspect and clean the DHW flow switch filter and sanitary bypass filter in the Combi water set.

If combustion or performance indicate need:

- Clean heat exchanger
- Remove and clean burner using compressed air only
- Clean the blower wheel

Owner maintenance

(see pages 6 - 8 for detailed instructions)

Daily

- Check boiler area
- Check pressure/temperature gauge

Monthly

- Check vent piping
- Check air piping
- Check air and vent termination screens
- Check relief valve
- Inspect condensate drain system

Periodically

- Test low water cutoff (if used)
- Reset button (low water cutoff)

Every 6 months

- Check boiler piping (gas and water) for leaks
- Operate relief valve

End of season months

- Shut boiler down (unless boiler used for domestic hot water)



WARNING

Follow the maintenance procedures given throughout this manual. Failure to perform the service and maintenance or follow the directions in this manual could result in damage to the boiler or system, resulting in severe personal injury, death, or substantial property damage.

2 Maintenance schedule

Maintenance procedures

Boiler must be serviced and maintained

WARNING The boiler must be inspected and started annually at the beginning of the heating season by a qualified service technician. In addition, the maintenance and care of the boiler designated on page 5 of this manual and explained on pages 6 through 8 must be performed to assure maximum boiler efficiency and reliability. Failure to service and maintain the boiler and system could result in equipment failure, causing possible severe personal injury, death, or substantial property damage.

NOTICE The following information provides detailed instructions for completing the maintenance items listed in the maintenance schedule on page 5. In addition to this maintenance, the boiler must be serviced and started up at the beginning of each heating season by a qualified service technician.

Check boiler area

WARNING To prevent potential of severe personal injury, death, or substantial property damage, eliminate all materials discussed below from the boiler vicinity and the vicinity of the boiler combustion air inlet. If contaminants are found:

Remove products immediately from the area. If they have been there for an extended period, call a qualified service technician to inspect the boiler for possible damage from acid corrosion.

If products cannot be removed, immediately call a qualified service technician to re-pipe vent and air piping and locate vent termination/air intake away from contaminated areas.

1. Combustible/flammable materials -- Do not store combustible materials, gasoline or any other flammable vapors or liquids near the boiler. Remove immediately if found.
2. Air contaminants -- Products containing chlorine or fluorine, if allowed to contaminate the boiler intake air, will cause acidic condensate in the boiler. This will cause significant damage to the boiler if allowed to continue.

Read the list of potential materials listed in Table 1 on page 4 of this manual. If any of these products are in the room from which the boiler takes its combustion air, they must be removed immediately or the boiler combustion air (and vent termination) must be relocated to another area.

Check pressure/temperature gauge

1. Make sure the pressure reading on the boiler pressure/temperature gauge does not exceed 24 psi. Higher pressure may indicate a problem with the expansion tank.
2. Contact a qualified service technician if problem persists.

Check vent piping

1. Visually inspect the flue gas vent piping for any signs of blockage, leakage, or deterioration of the piping. Notify your qualified service technician at once if you find any problems.

WARNING Failure to inspect the vent system as noted above and have it repaired by a qualified service technician can result in vent system failure, causing severe personal injury or death.

Check air piping

1. Visually inspect the air inlet termination to be sure it is unobstructed. Inspect the entire length of air piping to ensure piping is intact and all joints are properly sealed.
2. Call your qualified service technician if you notice any problems.

Check relief valve

1. Inspect the boiler relief valve and the relief valve discharge pipe for signs of weeping or leakage.
2. If the relief valve often weeps, the expansion tank may not be working properly. Immediately contact your qualified service technician to inspect the boiler and system.

Inspect condensate system

Inspect/check condensate lines and fittings

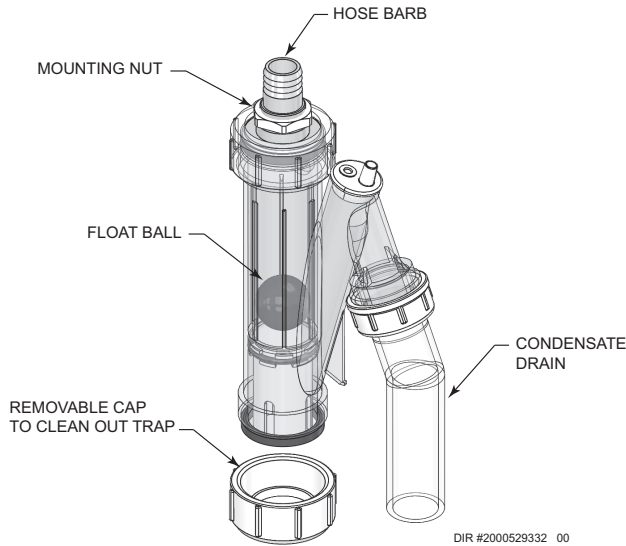
Inspect the condensate drain line, condensate PVC fittings and condensate trap (FIG. 2-1).

2 Maintenance schedule *(continued)*

Clean/Inspect Trap Assembly

Remove the clean out cap on the bottom of the trap. Let the condensate and any debris drain out.

Figure 2-1 Condensate Trap



Condensate drain

1. This boiler is a high efficiency appliance that produces condensate.
2. The bottom of the boiler has a 3/4 inch pipe for connection of a 3/4 inch PVC pipe (FIG. 2-2).
3. Slope condensate tubing down and away from the boiler into a drain or condensate neutralizing filter. Condensate from the Epic Fire Tube will be slightly acidic (typically with a pH from 3 to 5). Install a neutralizing filter if required by local codes.

A Neutralizer Kit is available from the factory.

4. Do not expose condensate line to freezing temperatures.
5. Use only plastic tubing or piping as a condensate drain line (FIG. 2-2).

NOTICE

Use materials approved by the authority having jurisdiction. In the absence of other authority, PVC and CPVC pipe must comply with ASTM D1785 or D2845. Cement and primer must comply with ASME D2564 or F493. For Canada use CSA or ULC certified PVC or CPVC pipe, fittings, and cement.

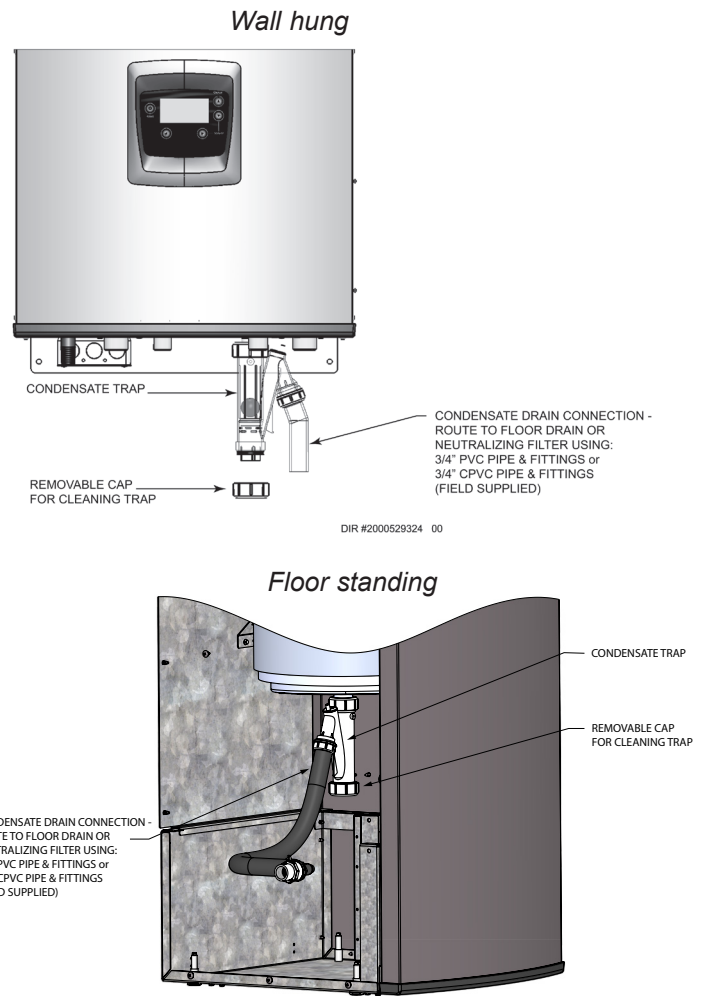
NOTICE

To allow for proper drainage on large horizontal runs, a second line vent may be required and tubing size may need to increase to 1 inch.

The condensate line must remain unobstructed, allowing free flow of condensate. If condensate is allowed to freeze in the line or if the line is obstructed in any other manner, condensate can exit from the boiler tee, resulting in potential water damage to property.

6. A condensate removal pump is required if the boiler is below the drain. When installing a condensate pump, select one approved for use with condensing boilers and furnaces. The pump should have an overflow switch to prevent property damage from condensate spillage.

Figure 2-2 Condensate Disposal



2 Maintenance schedule

Test low water cutoff (if installed)

1. If the system is equipped with a low water cutoff, test the low water cutoff periodically during the heating season, following the low water cutoff manufacturer's instructions.

Reset button (low water cutoff)

1. Testing the low water cutoff shuts the unit off. Press the RESET button on the low water cutoff to turn the unit back on.

Check boiler piping (gas and water)

1. Remove the boiler front access door and perform a gas leak inspection per steps 1 through 7 of the Operating Instructions on page 9. If gas odor or leak is detected, immediately shut down the boiler following the procedures on page 9. Call a qualified service technician.
2. Visually inspect for leaks around water piping. Also inspect the circulators, relief valve, and fittings. Immediately call a qualified service technician to repair any leaks.

WARNING Have leaks fixed at once by a qualified service technician. Failure to comply could result in severe personal injury, death, or substantial property damage.

3. Replace the front access door.

Operate relief valve

1. Before proceeding, verify that the relief valve outlet has been piped to a safe place of discharge, avoiding any possibility of scalding from hot water.

WARNING To avoid water damage or scalding due to valve operation, a metal discharge line must be connected to the relief valve outlet and run to a safe place of disposal. This discharge line must be installed by a qualified heating installer or service technician in accordance with the instructions in the Epic Fire Tube Installation and Service Manual. The discharge line must be terminated so as to eliminate possibility of severe burns or property damage should the valve discharge.

2. Read the boiler pressure/temperature gauge to make sure the system is pressurized. Lift the relief valve top lever slightly, allowing water to relieve through the valve and discharge piping.
3. If water flows freely, release the lever and allow the valve to seat. Watch the end of the relief valve discharge pipe to ensure that the valve does not weep after the line has had time to drain. If the valve weeps, lift the seat again to attempt to clean the valve seat. If the valve continues to weep afterwards, contact your qualified service technician to inspect the valve and system.
4. If water does not flow from the valve when you lift the lever completely, the valve or discharge line may be blocked. Immediately shut down the boiler, following the operating instructions on page 9 of this manual. Call your qualified service technician to inspect the boiler and system.

Shut boiler down (unless boiler is used for Domestic Water)

1. Follow "To Turn Off Gas to Appliance" on page 9 of this manual.
2. Do not drain the system unless exposure to freezing temperatures will occur.
3. Do not drain the system if it is filled with an antifreeze solution.
4. DO NOT shut down boilers used for domestic water heating, they must operate year-round.

3 Operating instructions

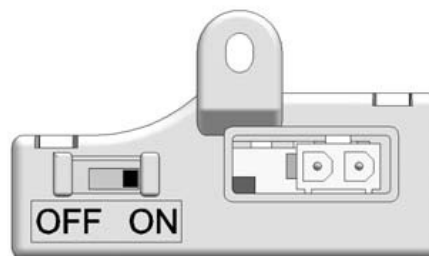
FOR YOUR SAFETY READ BEFORE OPERATING

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

- | | |
|--|--|
| <p>A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do <u>not</u> try to light the burner by hand.</p> <p>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.</p> <p>WHAT TO DO IF YOU SMELL GAS</p> <p>Do not try to light any appliance.</p> <p>Do not touch any electric switch; do not use any phone in your building.</p> | <p>Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.</p> <p>If you cannot reach your gas supplier, call the fire department.</p> <p>C. Use only your hand to move the gas control switch. Never use tools. If the switch will not move by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.</p> <p>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.</p> |
|--|--|

OPERATING INSTRUCTIONS

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. STOP! Read the safety information above on this label. 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 door. 6. Move switch to the "OFF" position. 7. Wait five (5) minutes to clear out any gas. If you then smell gas, STOP! Follow "B" in the safety information above this label. If you don't smell gas, go to next step. | <ol style="list-style-type: none"> 8. Move the switch to the "ON" position. 9. Install front door. 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

- | | |
|---|--|
| <ol style="list-style-type: none"> 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 door. | <ol style="list-style-type: none"> 4. Move switch the "OFF" position. 5. Install front door. |
|---|--|

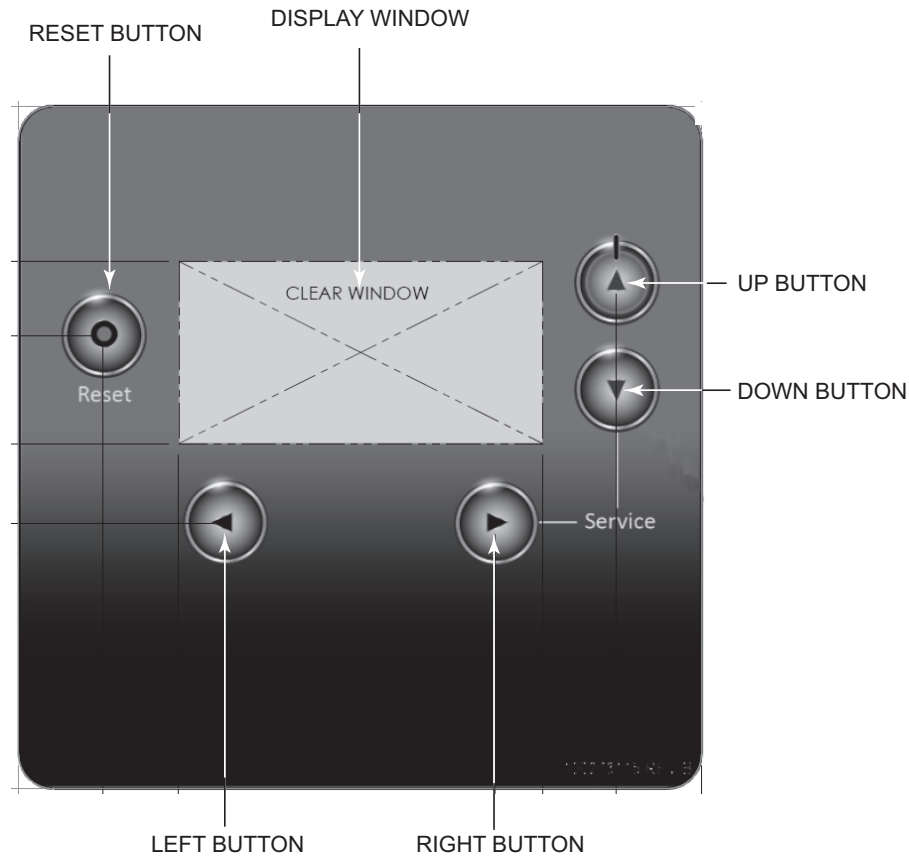
4 SMART SYSTEM control module



Epic Fire Tube control module

Use the control panel (FIG. 4-1) to set temperatures, operating conditions, and monitor boiler operation.

Figure 4-1 Control Panel



The information below shows the functions of the buttons on the display:

- MENU / ENTER = ►
- SETPOINTS = ▲ and ▼
- SAVE = ◀
- RESET = ●

Access modes

User

Press the ◀ button.

Installer

Most parameters are available only to the installer, accessible by entering the installer menu: Press the ► button.

Saving parameters

To save parameters and exit programming:

Press the ► button to go to the end of the Parameter List, then press ► again. Otherwise, the parameters will be saved automatically after Timeout.

To enter a parameter and continue programming:

Press the ▲ or ▼ button to change parameters. Press ► to move to the next parameter and to the end of the Parameter List. Press ◀ to save and return to the Base Screen. Otherwise, the parameters will be saved automatically after Timeout.

4 SMART SYSTEM control module *(continued)*

Set space heating operation

Determine controlling sensor

For space heating systems, the temperature control can be based on the outlet or the system supply sensor (optional). The control will automatically switch to the system supply sensor once it is connected.

Verify space heat circulator operation

The Space Heating Mode controls the boiler pump and the diverter valve. When the boiler control receives a space heating call for heat and the boiler is not heating a DHW (Domestic Hot Water) call, and the set point is not met, it turns on the boiler pump and places the diverter valve in the space heating position. After the space heating call for heat ends, the boiler pump continues to run for a short period of time. This pump delay is factory set to 30 seconds. After this pump delay, the pump is turned off and the diverter valve is placed into the DHW position.

Adjust set point temperature

1. Press the ◀ button to access the SETPTS Menu.
2. Press the ▲ and ▼ buttons to adjust the SH SETPT (Cold Day) parameter.
3. Press the ◀ button to save the new SH set point and return to the default screen.

Set domestic hot water (DHW) operation

Verify DHW operation





The DHW Heating Mode controls the boiler pump and the diverter valve. When the boiler control receives a DHW call for heat from the DHW flow switch, it turns on the boiler pump and puts the diverter valve in the DHW position to route boiler water through the brazed plate heat exchanger. During the call, the boiler control will modulate to maintain the DHW outlet temperature to the DHW set point.

After the DHW call for heat ends, the boiler pump continues to run for a short period of time. This pump delay is factory set to 30 seconds.

Adjust DHW set point temperature

1. Press the ◀ button to access the SETPTS Menu.
2. Press the ▶ button to page to the DHW SETPT parameter.
3. Press the ▲ and ▼ buttons to adjust the set point.
4. Press the ◀ button to save the new DHW set point and return to the default screen.

4 SMART SYSTEM control module

OPERATION	DISPLAY
<p>6. If flame is detected, it holds the firing rate steady for a few seconds to let the flame stabilize, then it begins to modulate the firing rate based on a set point or some other command.</p>	<pre> RUN 41% FLAME:1.04MA OUTLET : 124°F INLET : 109°F SYSTEM : 117°F(118°F) [←] - SETPTS [→] - MENU </pre> 
<p>7. If the space heating call for heat is active and the DHW flow switch starts a DHW call for heat, the diverter valve will move to the DHW position and the boiler will switch to the DHW Mode. This will divert the boiler's outlet water from the heating system to the brazed plate heat exchanger. The control will then modulate to maintain the DHW outlet temperature at the DHW set point.</p>	<pre> RUN 41% FLAME:1.04MA DWH : 124F(130°F) OUTLET : 124°F INLET : 109°F </pre> 
<p>8. Once all calls for heat are satisfied, the control will turn off the burner. The blower will continue to run during the postpurge period.</p>	<pre> POST -PURGE ANTI -CYCLING OUTLET : 124°F INLET : 109°F SYSTEM : 117°F [←] - SETPTS [→] - MENU </pre> 
<p>9. Any pumps that are running will continue to run for their respective pump delay times before turning off. A 60 second anti-cycle period will start, which will delay any new space heating call for heat until it times out.</p>	<pre> BLOCKED ANTI -CYCLING OUTLET : 124°F INLET : 109°F SYSTEM : 117°F [←] - SETPTS [→] - MENU </pre> 
<p>10. In Standby, ready to start a new cycle.</p>	<pre> STANDBY OUTLET : 124°F INLET : 109°F SYSTEM : 117°F [←] - SETPTS [→] - MENU </pre>

Notes

Notes

Revision A (PCP #3000024821 / CN #500014945) initial release.

Revision B (PCP #3000027055 / CN #500016866) reflects the removal of information related to an external flow switch.

Revision C (PCP #3000031515 / CN #500021060) reflects the addition of series numbers.

Revision D (PCP #3000053701 / CN #500040266) reflects the addition of EFC110-199.

Revision E (PCP #3000054662 / CN #500041224) reflects updates throughout the manual that were missed in previous revisions.