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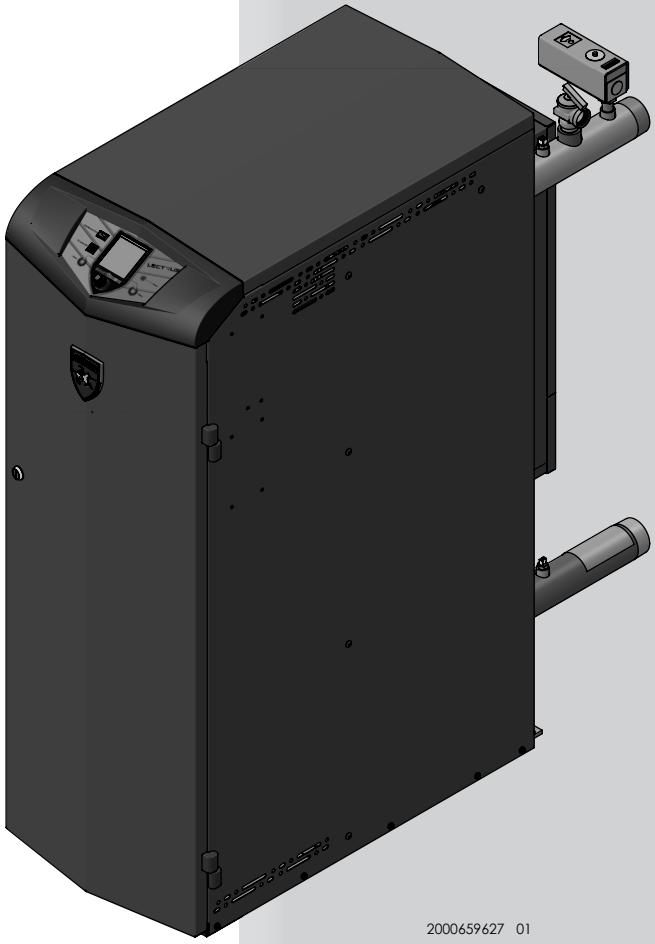
LECTRUS™

User's Information Manual
Models: KEB0015 - KEB0150



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⚠ WARNING This manual must only be used by a qualified heating installer / service technician. Read all instructions, including this manual and the Lectrus Service Manual, before installing. Perform steps in the order given. Failure to comply could result in severe personal injury, death, or substantial property damage.

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

Save this manual for future reference.

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Lochinvar®
HIGH EFFICIENCY BOILERS & WATER HEATERS

Contents

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

⚠WARNING

Installer – Read all instructions, including Lectrus Installation and Operation and the Lectrus Service Manuals, before installing. Perform steps in the order given.

User – The Installation and Operation manual is for use only by a qualified heating installer/service technician. Refer to this manual for your reference.

Have this boiler serviced/inspected by a qualified service technician, at least annually.

Failure to comply with the above could result in severe personal injury, death, or substantial property damage.

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

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.

⚠WARNING

DO NOT install units in rooms or environments that contain corrosive contaminants (see Table 1C on page 8). Failure to comply could result in severe personal injury, death, or substantial property damage.

When servicing boiler –

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

Boiler operation –

- Should overheating occur do not turn off or disconnect electrical supply to circulator. Instead, shut off power to the boiler only.
- 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 to remove debris. Use an approved pre-commissioning cleaner (see Start-Up Section of the Lectrus Installation and Operation Manual), without the boiler connected, to clean the system and remove sediment. The pressure vessel can be damaged by build-up or corrosion due to sediment.
  NOTE: Cleaners are designed for either new systems or pre-existing systems. Choose accordingly.
- Continual fresh make-up water will reduce boiler life. Addition of oxygen carried in by makeup water can cause internal corrosion. Leaks in the boiler or piping must be repaired at once to prevent adding 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.

Grounding Instructions –

- This boiler must be grounded in accordance with the National Electrical Code and/or local codes. These must be followed in all cases. Failure to ground this boiler properly may also cause erratic control system operation on ELECTRONIC CONTROL.
- This boiler must be connected to a grounded metal, permanent wiring system, or an equipment grounding conductor must be run with the circuit conductors and connected to the equipment grounding terminal or lead on the boiler.

1 Maintenance

Typical Preventative Maintenance List

NOTICE This list may not be all inclusive! Read and understand entire Installation and Operation and Service Manuals, and take into consideration any modifications and / or optional equipment for this unit:

⚠WARNING MAIN POWER MUST BE TURNED OFF TO DO ELECTRICAL CHECKS!

***Table 1A** Service and Maintenance Schedules*

Maintenance Schedule	
Daily	• Ensure valves, connections, piping, gaskets, etc. are not leaking • Check pressure/temperature gauge
Weekly	• Verify that boiler water properties are within desired parameters
7-14 Days after STARTUP	• Re-torque screws on distribution, fuse blocks and contactors to their specified torque (typically 45 – 50 in – lbs.) • Re-torque any bolts on copper distribution from disconnects or circuit breakers to typical torque values for the size of bolt used. • Send Startup form to Lochinvar.
Monthly to Every Six Months	• Check for any heating element gasket leaks • Clean cooling fans to maintain proper air flow • Check fuses and heating elements with an ohm meter for proper values. • Look for signs of overheating on fuses, fuse blocks, contractors, and wires. Any discolored, charred, or melted components should be replaced. Ensure all screws are torqued to their proper values for any replaced components. • Check boiler piping (water) for leaks • Operate relief valve
Annually	• Inspect interior of tank for sludge or scale. Clean tank and modify water treatment chemistry as necessary. • Replace brittle element gaskets, valve gaskets and as necessary. • Re-torque ALL distribution, fuse block and contactor screws to the proper value. • Re-torque any bolts on copper distribution from disconnects or circuit breakers to typical torque values for the size of bolt used.
End of season months	• Shut boiler down (unless boiler used for domestic hot water)
Periodically	• Test low water cutoff • Reset button (low water cutoff)

1 Maintenance

Maintenance and annual startup

Table 1B *Service and Maintenance Schedules*

Service technician (see the following pages for instructions)	
Annual Startup	**General:** • Address reported problems • Inspect interior; clean and vacuum if necessary • Check for leaks (water) • 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 • Check wiring and connections

⚠ DANGER **If this boiler may be frozen**, immediately shut off power to the appliance and contact the factory for further instructions. Operation when the pressure vessel, internal pipes, or pressure relief valves are frozen, will result in internal pressure build-up and a deadly steam explosion. Neither the Freeze Protection feature of the boiler control module, nor the use of glycol eliminates the possibility of freezing.

⚠ WARNING Follow the Service and maintenance procedures given throughout this manual and in component literature shipped with the boiler. Failure to perform the service and maintenance could result in damage to the boiler or system. Failure to follow the directions in this manual and component literature could result in severe personal injury, death, or substantial property damage.

⚠ WARNING The boiler should be inspected annually only by a qualified service technician. In addition, the maintenance and care of the boiler designated in Table 1A and Table 1B, and explained on the following pages must be performed to assure maximum boiler efficiency and reliability. Failure to service and maintain the boiler and system could result in equipment failure.

⚠ WARNING Electrical shock hazard – Turn off power to the boiler and disconnect the main feed before any service operation on the boiler except as noted otherwise in this instruction manual. Failure to turn off electrical power could result in electrical shock, causing severe personal injury or death.

Address reported problems

Inspect any problems reported by the owner and correct before proceeding.

Inspect boiler area

Verify that boiler area is free of any combustible materials, gasoline and other flammable vapors and liquids.

Inspect boiler interior

1. Open the top panel and front door and inspect the interior of the boiler.
2. Vacuum any sediment from inside the boiler and components. Remove any obstructions.

Check all piping for leaks

⚠ WARNING Eliminate all system or boiler leaks. Continual fresh makeup water will reduce boiler life. Minerals can build up in sections, reducing heat transfer, overheating pressure vessel, and causing pressure vessel failure. Leaking water may also cause severe property damage and risk of electrocution.

1. Inspect all water piping and verify to be leak free.
2. Look for signs of leaking lines and correct any problems found.

1 Maintenance

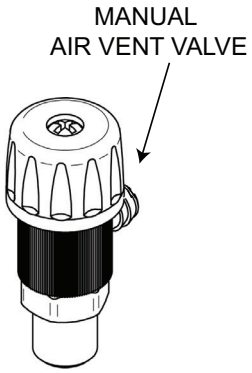
Check water system

1. Verify all system components are correctly installed and operational.
2. Check the cold fill pressure for the system. Verify it is correct (must be a minimum of 12 psi (82.7 kPa)).
3. Watch the system pressure as the boiler heats up (during testing) to ensure pressure does not rise too high. Excessive pressure rise indicates expansion tank sizing or performance problem.

Check air vents

1. Reference FIG. 1-1 below.
2. Visually inspect vent to make sure that no leaks are present.
3. If there is leaking, tighten the pin valve.
4. If the leaking continues, replace the air vent.

Figure 1-1 *Manual Air Vent*



Check expansion tank

Expansion tanks provide space for water to move in and out as the heating system water expands due to temperature increase or contracts as the water cools. Tanks may be open, closed or diaphragm or bladder type. See Section 3 - Hydronic Piping of the Installation and Operation manual for suggested best location of expansion tanks and air eliminators.

Check fill water meter

Check fill water meter for water usage. If the amount exceeds 5% of your system volume, you could have a leak. Have the system checked for leaks and repaired by a qualified service technician.

Test boiler water

Test boiler water. Reference Section 5 of the Lectrus Installation and Operation Manual for guidelines. When test indicates, clean system water with approved system restorer following the manufacturer's information.

Check boiler relief valve

1. Inspect the relief valve and lift the lever to verify flow. Before operating any relief valve, ensure that it is piped with its discharge in a safe area to avoid severe scald potential. Read Section 3 - Hydronic Piping of the Lectrus Installation and Operation Manual before proceeding further.

⚠WARNING Safety relief valves should be re-inspected AT LEAST ONCE EVERY THREE YEARS, by a licensed plumbing contractor or authorized inspection agency, to ensure that the product has not been affected by corrosive water conditions and to ensure that the valve and discharge line have not been altered or tampered with illegally. Certain naturally occurring conditions may corrode the valve or its components over time, rendering the valve inoperative. Such conditions are not detectable unless the valve and its components are physically removed and inspected. This inspection must only be conducted by a plumbing contractor or authorized inspection agency – not by the owner. Failure to re-inspect the boiler relief valve as directed could result in unsafe pressure buildup, which can result in severe personal injury, death, or substantial property damage.

⚠WARNING Following installation, the valve lever must be operated AT LEAST ONCE A YEAR to ensure that waterways are clear. Certain naturally occurring mineral deposits may adhere to the valve, rendering it inoperative. When manually operating the lever, water will discharge, and precautions must be taken to avoid contact with hot water and to avoid water damage. Before operating lever, check to see that a discharge line is connected to this valve directing the flow of hot water from the valve to a proper place of disposal. Otherwise, severe personal injury may result. If no water flows, valve is inoperative. Shut down the boiler until a new relief valve has been installed.

2. After following the above warning directions, if the relief valve weeps or will not seat properly, replace the relief valve. Ensure that the reason for relief valve weeping is the valve and not over-pressurization of the system due to expansion tank waterlogging or under-sizing.

1 Maintenance

Check all boiler wiring

1. Inspect all boiler wiring, making sure wires are in good condition and securely attached.

Check control settings

1. Set the SMART SYSTEM control module display to Parameter Mode and check all settings. See Section 1 of the Lectrus Service Manual. Adjust settings if necessary. See Section 1 of the Lectrus Service Manual for adjustment procedures.
2. Check settings of external limit controls (if any) and adjust if necessary.

Perform start-up and checks

1. Start boiler and perform checks and tests specified in Section 5 - Start-up of the Installation and Operation Manual.
2. Verify cold fill pressure is correct and that operating pressure does not go too high.

Review with owner

1. Review the Lectrus User's Information Manual with the owner.
2. Emphasize the need to perform the maintenance schedule specified in this manual (and in the Lectrus Installation and Operation Manual as well).
3. Remind the owner of the need to call a licensed contractor should the boiler or system exhibit any unusual behavior.
4. Remind the owner to follow the proper shutdown procedure and to schedule an annual start-up at the beginning of the next heating season.

Cleaning boiler pressure vessel

1. Shut down boiler:
   - Follow the "To Turn Off Appliance" instructions for the boiler in Section 5 - Startup of the Lectrus Installation and Operation Manual.
   - Do not drain the boiler unless it will be exposed to freezing temperatures. If using freeze prevention fluids in the system, do not drain.
2. Allow time for the boiler to cool to room temperature if it has been operational or powered.
3. Remove the screws securing the inspection opening cover plate on the back of the unit (see Figure 1-2).
4. Unscrew the 3" NPT brass plug from the opening.

⚠WARNING The boiler contains insulating fiber materials. Use care when handling these materials per instructions in the Lectrus Service Manual. Failure to comply could result in severe personal injury.

5. Use a vacuum cleaner to remove any accumulation inside the boiler. Do not use any solvent.
6. Using a clean cloth dampened with warm water, wipe out the inside. Rinse out debris with a low-pressure water supply.
7. Allow the pressure vessel to thoroughly dry.
8. Reassemble the unit. Confirm that the pressure vessel is filled, checked for leaks, and that any air is purged.
9. Resume operation.

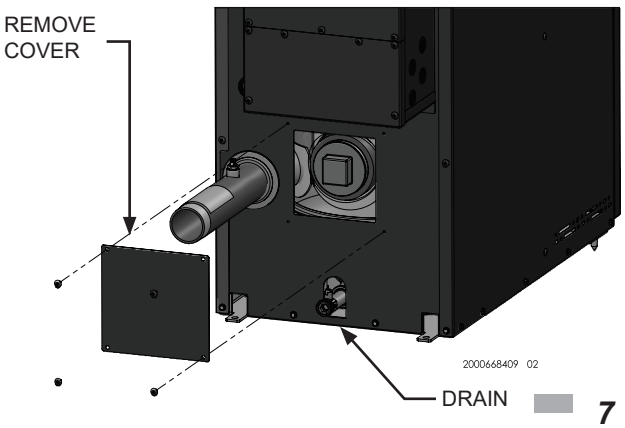
Electrical System Maintenance

1. Clean the control cabinets periodically (as often as needed) to keep both the interior and the exterior free of dust, moisture, and foreign matter. The interior cleaning of the electrical panels must be done with the POWER OFF!

NOTICE For units supplied with control cabinet cooling fans, the condition of the fan filter must be periodically checked, and the filters cleaned or replaced as necessary.

2. With the POWER OFF, periodically check the tightness of electrical connections; particularly at power entrance lugs, fuses (line side) and contractors (load side). This should be done at time of commissioning, at 7 – 14 days thereafter and at least annually. Replace any components that show signs of heat damage (IE: discoloration, charring, melted insulation, etc.). See Table 5A - Torque Specifications in the Lectrus Installation and Operation Manual.
3. Inspect the condition of the contactors. Look for burned or corroded contacts or overheated coils and wires. If the contactors chatter or hum during operation, they should be either disassembled and cleaned to remove dust or other foreign material in the mechanism or replaced.
4. Inspect the heating elements. Make sure that the terminal contacts are tight, clean, and corrosion-free.
5. Check all the wiring throughout the unit for frayed or brittle insulation. Replace any wiring showing insulation degradation.

Figure 1-2 *Remove inspection cover*



1 Maintenance

Table 1C 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

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

2 Start-up

Installation must comply with:

- Local, state, provincial, and national codes, laws, regulations, and ordinances.
- National Electrical Code.
- For Canada only: CSA C22.1 Canadian Electrical Code Part 1 and any local codes.

Before locating the boiler, check:

1. Check for nearby connection to:
   - System water piping
   - Electrical power
2. Locate the appliance so that if water connections should leak, water damage will not occur. When such locations cannot be avoided, it is recommended that a suitable drain pan, adequately drained, be installed under the appliance. Under no circumstances is the manufacturer to be held responsible for water damage in connection with this appliance, or any of its components.
3. Check area around the boiler. Remove any combustible materials, gasoline, and other flammable liquids.

⚠WARNING Failure to keep boiler area clear and free of combustible materials, gasoline, and other flammable liquids and vapors can result in severe personal injury, death, or substantial property damage.

4. The Lectrus must be installed so that control system components are protected from dripping or spraying water or rain during operation or service.
5. If a new boiler will replace an existing boiler, check for and correct system problems, such as:
   - System leaks causing oxygen corrosion or pressure vessel damage from hard water deposits.
   - Incorrectly sized expansion tank.
   - Lack of freeze protection fluids in boiler water causing system and boiler to freeze and leak.
   - Debris left from existing piping, if not flushed and cleaned with an appropriate cleaner.
6. Check around the boiler for any potential air contaminants that could risk corrosion to the boiler or the boiler room air supply. Prevent room air for cabinet cooling contamination. Remove any of these contaminants from the boiler area.

⚠WARNING DO NOT install the boiler in a room likely to freeze.

⚠WARNING This appliance is certified as an indoor appliance. Do not install the appliance outdoors or locate where the appliance will be exposed to freezing temperatures.

Do not install the appliance where condensation may form on the inside or outside of the appliance, or where condensation may fall onto the appliance.

Failure to install the appliance indoors could result in severe personal injury, death, or substantial property damage.

Provide clearances:

Clearances from combustible materials

1. Hot water pipes—at least 1/4" (6 mm) from combustible materials.
2. See FIG.'s 1-1 and 1-2 on page 8 of the Installation and Operation manual for other clearance minimums.

Clearances for service access

1. See FIG.'s 1-1 and 1-2 on page 8 of the Installation and Operation manual for recommended service clearances. If you do not provide the minimum clearances shown, it may not be possible to service the boiler without removing it from the space.

Electrical System Checks

⚠WARNING All POWER supplying boiler should be off and locked out! with the unit(s) main power switch(es) OFF and locked out.

❑ Inspect all components, external and internal, to assure that there has been no damage during shipment or installation.

With a Megohm Meter (500VDC minimum), check contactor load side terminals to ground. If a reading of <1 megohm is obtained, consult the Factory.

❑ Remove element access panel(s) and open doors to the electrical control panel(s). Run an inspection of the tightness of all electrical connections (IE: at fuse lugs, power entrance lugs, contactors, heating elements).

All branch circuit connections should be tightened to the values listed on the component or to the values listed on Table 5A - Torque Requirements in the Installation and Operation Manual. Torque to avoid component damage from heat build-up.

This tightness inspection is vital because the vibration during shipment can often loosen electrical connections. If this is not done, damage may occur to component parts when power is switched on, and those damaged parts will not be covered under the manufacturer's Limited Warranty.

NOTICE See Maintenance Section on rechecking the torque on these components after an initial break-in period. Typically, one to two weeks after start-up and then at least annually.

❑ With an ohmmeter, check the resistance between the phases on the load side of the contactors. Each should read the same and approximately what is shown on the wiring diagram.

❑ Check the electrical panels for loose material, dust and / or moisture. Thoroughly vacuum the panels if dust or foreign materials have accumulated there.

2 Start-up

Set space heating operation

Determine controlling sensor

For space heating systems, the temperature control can be based on one of three sensors: the inlet, outlet, or system supply sensor. The SMART SYSTEM control is programmed at the factory to control the temperature of the outlet sensor. The control will automatically switch to the system supply sensor once it is connected. If it is desired to base the temperature control on the inlet sensor, the appropriate parameter must be changed in the control. See the Lectrus Service Manual for a detailed explanation of this procedure.

Verify space heat circulator mode

The Space Heating Mode controls both the system pump (if connected), and the boiler pump. When the SMART SYSTEM control receives a space heating call for heat, it turns on the system pump. If the set point is not met, or the system sensor is not connected, it also turns on the boiler pump. After the space heating call for heat ends, the system pump continues to run for a short period of time. The system pump can be programmed to run continuously, except during outdoor shutdown. Other settings may affect the operation of the boiler and system pumps, as explained on the following pages. If the boiler pump was running, it continues to run for a short period of time as well. The system pump delay is factory set to 30 seconds. The boiler pump delay is factory set to 1 minute. If different delays are desired, the appropriate parameters in the control must be changed. See the Lectrus Service Manual for a detailed explanation of this procedure.

Adjust set point temperature(s)

NOTICE Please note that the brackets ([]) denote screen status.

The NAVIGATION dial may be used during normal operation to adjust the space heating and tank set point temperatures.

1. From the Status Screen press the NAVIGATION dial.
2. Turn the NAVIGATION dial to select the appropriate set point.
3. Press the NAVIGATION dial to adjust the temperature. Rotate the NAVIGATION dial to change the setting.
4. Once the desired temperature is displayed, press the RIGHT SELECT [SAVE] key.
5. If necessary, repeat Steps 3 and 4 to make adjustments to additional set points.
6. Press the RIGHT SELECT [HOME] key to upload the changes.
7. If the RIGHT SELECT [SAVE] key is not pressed, the new settings will be discarded.

Purge air from water system

1. Purge air from system:
   a. Connect a hose to the purge valve (see purge/drain valve in the piping diagrams on pages 18 through 23 in the Installation and Operation manual). Route the hose to an area where water can drain and be seen.
   b. Close the boiler or system isolation valve between the purge valve and fill connection to the system.
   c. Close zone isolation valves.
   d. Open the quick-fill valve on the cold-water makeup line.
   e. Open purge valve.
   f. Open the isolation valves one zone at a time. Allow water to run through the zone, pushing out the air. Run until no noticeable air flow is present. Close the zone isolation valves and proceed with the next zone. Follow this procedure until all zones are purged.
   g. Close the quick-fill water valve and purge valve and remove the hose. Open all isolation valves. Watch that system pressure rises to correct cold-fill pressure.
   h. After the system has operated for a while, eliminate any residual air by using the manual air vents located throughout the system.
   i. If purge valves are not installed in the system, open the manual air vents in the system one at a time, beginning with the lowest floor. Close the vent when water squirts out. Repeat with remaining vents.
2. Open the automatic air vent (diaphragm-type or bladder type expansion tank systems only) one turn.
3. Open other vents:
   a. Starting on the lowest floor, open air vents one at a time until water squirts out.
   b. Repeat with remaining vents.
4. Refill to correct pressure.

Check thermostat circuit(s)

1. Disconnect the two external wires connected to each of the heat/loop demand terminals on the connection board.
2. Connect a voltmeter across these two incoming wires. Close each thermostat, zone valve, and relay in the external circuit one at a time and check the voltmeter reading across the incoming wires.
3. There should NEVER be a voltage reading.
4. If a voltage does appear under any condition, check, and correct the external wiring. (This is a common problem when using 3-wire zone valves.)
5. Once the external thermostat circuit wiring is checked and corrected if necessary, reconnect the external thermostat circuit wires to the connection board. Allow the boiler to cycle.

2 Start-up *(continued)*

Test 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)

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

⚠ 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 Lectrus Installation and Operation Manual. The discharge line must be terminated so as to eliminate possibility of severe burns or property damage should the valve discharge.

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.
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. Call your qualified service technician to inspect the boiler and system.

Final checks before starting the boiler

- ❑ Read the Lectrus Service Manual to familiarize yourself with SMART SYSTEM control module operation. Read this manual for the proper steps to start the boiler.
- ❑ Verify the boiler and system are full of water and all system components are correctly set for operation.
- ❑ Verify the preparation procedures of Section 2 have been completed.
- ❑ Verify electrical connections are correct and securely attached. Refer to Table 5A - Torque Requirements in the Installation and Operation manual.

If boiler does not start correctly

1. Check for loose connections, blown fuse or service switch off?
2. Is boiler water temperature above 230°F (110°C)?
3. Is thermostat set below room temperature?

If none of the above corrects the problem, refer to the Troubleshooting Section of the Lectrus Service Manual.

Check system and boiler

❑ Check water piping

1. Check system piping for leaks. If found, shut down the boiler and repair immediately.
2. Vent any remaining air from the system using manual vents. Air in the system will interfere with circulation and cause heat distribution problems and noise.

Minimum Equipment Required for Startup and Troubleshooting

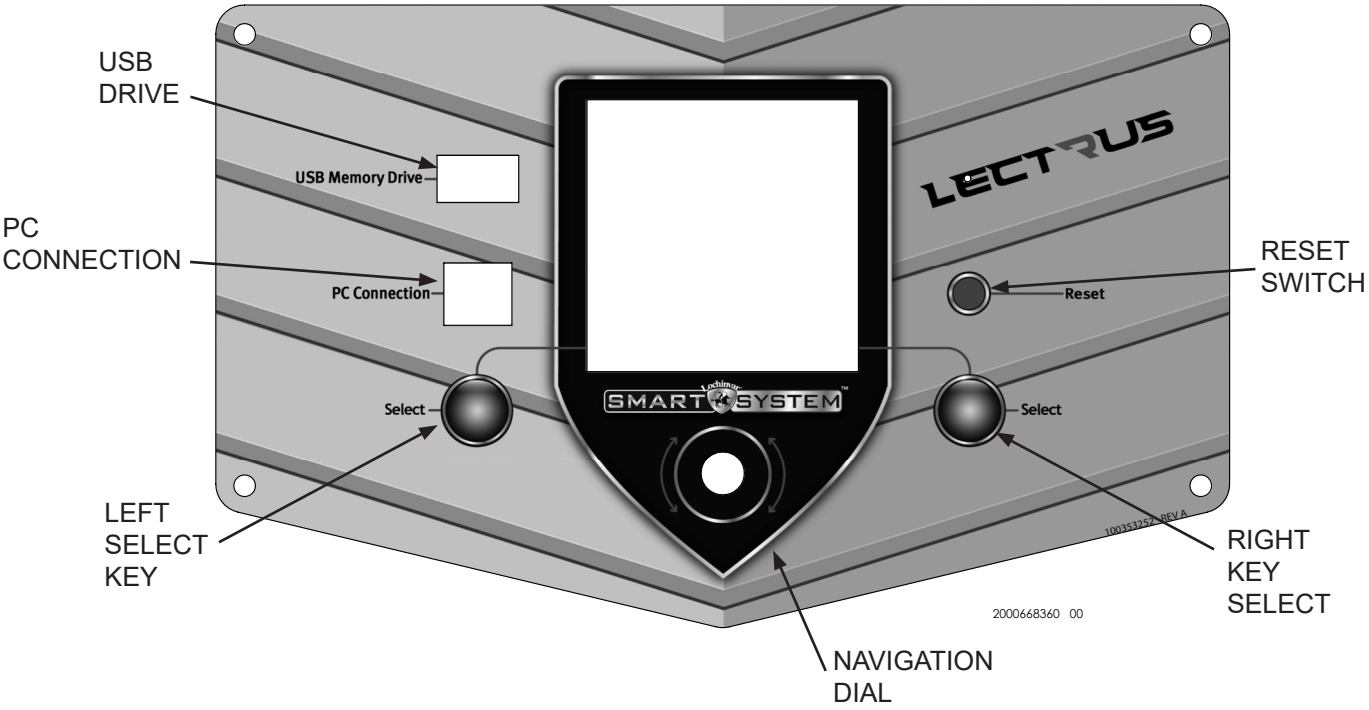
- ❑ Volt-Ohm Meter
- ❑ Clamp-On Ammeter
- ❑ Megohm Meter
- ❑ Torque Wrench - inch lbs
- ❑ Torque Wrench - foot lbs
- ❑ Personal Protective Equipment

3 Operating information

SMART SYSTEM™ Lectrus control module

Use the control panel (FIG. 3-1) to set temperatures, operating conditions, and monitor boiler operation.

Figure 3-1 *Control Panel*



The information on the bottom of the display shows the functions of the two SELECT keys (on either corner), and the NAVIGATION dial (in the center):

MENU = Left SELECT Key
SETPOINTS = NAVIGATION Dial - Pressing Down
SHDN = Right SELECT Key

Access modes

User

The user can adjust space heating and tank target temperatures by pressing the NAVIGATION dial when "↓SETPOINTS" is flashing at the bottom of the display. The date and time, and the temperature units can also be changed.

Installer

Most parameters are available only to the installer, accessible by entering the installer password, see the Lectrus Service Manual.

Saving parameters *(reference the Parameter Table in the Lectrus Service Manual)*

NOTICE Please note that the brackets ([]) denote screen status.

CAUTION Before changing parameters, note the settings so that the unit can be returned to its original operating parameters if needed.

To save parameters and exit programming:

Press the RIGHT SELECT [SAVE] key and then press the RIGHT SELECT [HOME] key.

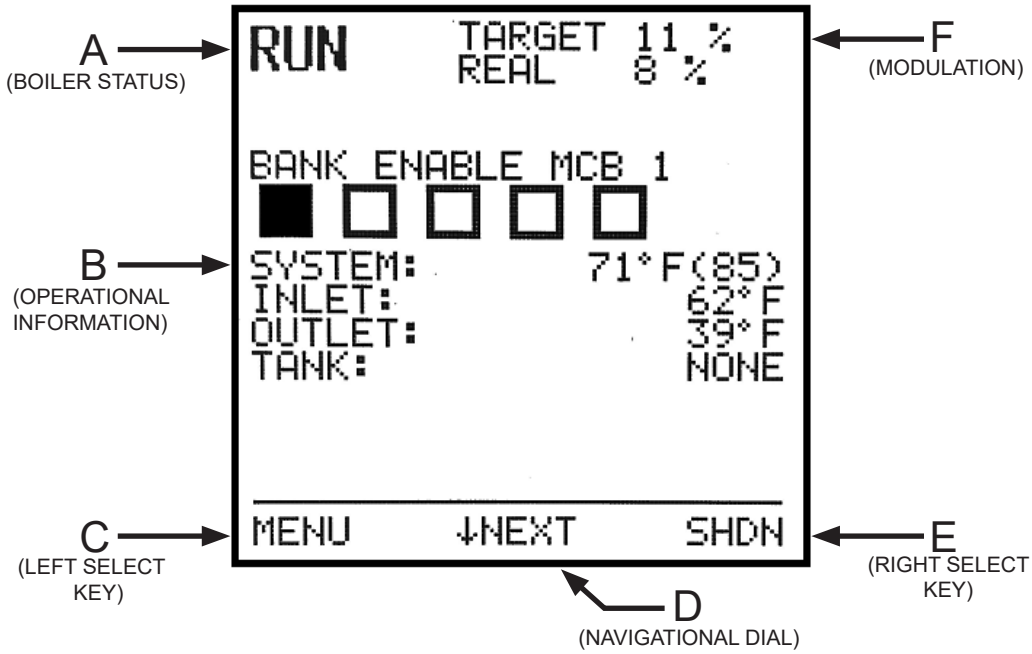
To enter a parameter and continue programming:

Press the RIGHT SELECT [SAVE] key 1 time to return to the parameter listings; press again to return to the menu listings. Remember to press the RIGHT SELECT [HOME] key when finished programming to save the changes made.

See the Lectrus Service Manual for a detailed description of parameters and access modes.

3 Operating information

Figure 3-2 *Status Display Screen*



Status Display Screens NOTE: All screens show modulation status, heat demands, lockout/blocking, bank status, and soft keys.		
Section	**Display**	**Description**
A (Boiler Status)	**STANDBY**	The unit has not received a call for heat from a remote thermostat nor has it received a call for heat from a DHW thermostat.
	WATER CHECK	The unit is checking all safety circuits including the presence of water.
	STARTUP	The unit is enabling the regulating and limiting device.
	RUN	The unit is running and heating water.
	SHUTDOWN	The unit has been placed in the OFF position.
	SETPOINT MET	The controlled temperature has exceeded its set point and its offset.
	BLOCKING	The unit has detected a condition that has temporarily interrupted the current call for heat.
	BANK ENABLE	The number of squares indicates the number of banks available. If the bank is ON, the square is filled. If the bank is OFF, the square is empty.

3 Operating information *(continued)*

Status Display Screens *(cont'd)* NOTE: All screens show burner status, heat demands, lockout/blocking, pump status, and soft keys.		
Section	**Display**	**Description**
B (Operational Information)	**HOME SCREEN**	- System Temperature - Inlet Temperature - Outlet Temperature - Tank Temperature
	BMS SCREEN	- BMS in - Rate out - Sys pump speed - BLR pump speed
	PUMP STATUS	- CH pump - HW pump - SYS pump
	HISTORY SCREEN	- SH Runtime - SH Cycles - DHW runtime - DHW cycles - Power Hours
	FAULT SCREEN	Last 10 faults: (Press the navigation dial to go through faults) - Fault name - Date - Time
C (Left Select Key)	**MENU**	Press the left select key to access the installer menu.
D (Navigation Dial)	**NEXT SCREEN**	Rotate the knob to access the different screens
E (Right Select Key)	**SHDN**	Press and hold the Right key to shut down the unit or to turn it back ON.
	SAVE	Within the installer menus, the button will be used to save the current value.
F (Modulation)	**TARGET**	Target modulation per the Boiler Control
	REAL	Real modulation feedback from the MCB

NOTES

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Revision Notes: *Revision A (PCP #3000060390 / CN #500046379) initial release.*
Revision B (PCP #3000061447 / CN #500047320) reflects an update to figure 3-2.

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