Installation, Operation and Service Manual

3 to 9 sections boiler

Three section boiler shown

Conforms to: UL STD 726
Certified to: CSA STD B140.0 and B140.7

Intertek
5023144

INSTALLATIONS MUST MEET ALL LOCAL AND FEDERAL CODES THAT MAY DIFFER FROM THIS MANUAL

Please read the manual in its entirety before beginning installation.
This manual must be kept with the boiler for future reference.

PN 615000673 Rev. A, (06/09/2025)

TABLE OF CONTENTS
Boiler – Oil

1.0 IMPORTANT SAFETY ADVICE

Please read and understand this manual before installing, operating or servicing the boiler. To ensure you have a clear understanding of the operating procedures of the appliance please take the time to read the section **IMPORTANT SAFETY ADVICE** in this manual.

CAUTION

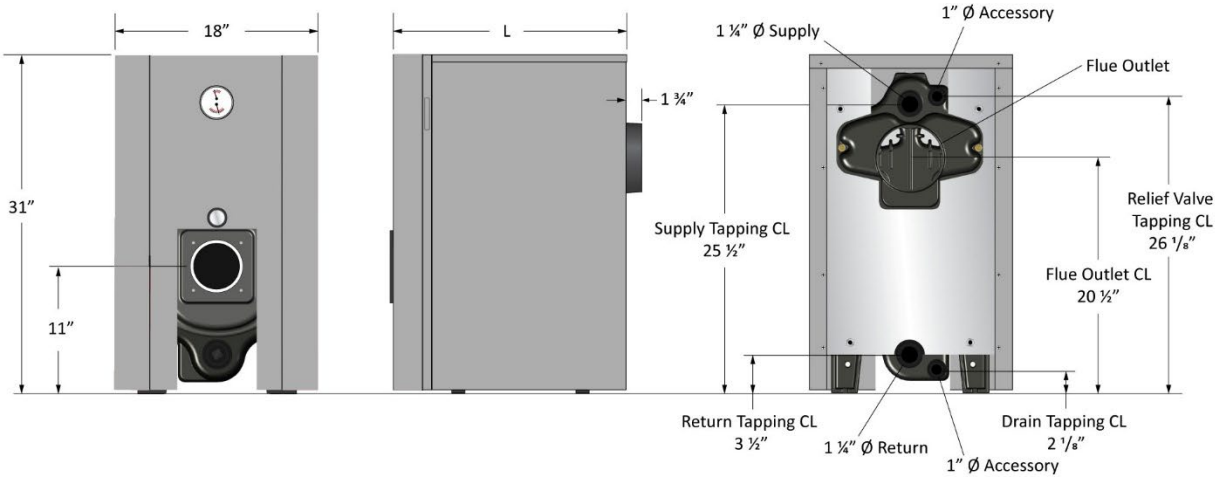
DO NOT START THE BURNER UNTIL ALL FITTINGS, COVERS AND DOORS ARE IN PLACE.
DO NOT TAMPER WITH THE BOILER OR CONTROLS, CALL A QUALIFIED BURNER TECHNICIAN.
DO NOT STORE OR USE GASOLINE OR OTHER FLAMMABLE VAPOURS AND LIQUIDS IN THE VICINITY OF THIS UNIT OR ANY OTHER APPLIANCE.
NEVER BURN GARBAGE, PAPER OR ANY OTHER COMBUSTIBLE MATERIAL IN THE UNIT, AND NEVER LEAVE COMBUSTIBLE MATERIAL AROUND IT.
ALWAYS KEEP A CLEAR SPACE AROUND THE APPLIANCE

IMPORTANT

This manual contains instructional and operational information for the OIL-FIRED Boiler. Read the instructions thoroughly before installing the boiler or starting the burner. Consult local authorities about your local FIRE SAFETY REGULATIONS. All installations must be in accordance with local, state or provincial codes. Improper installation will void the warranty.

2.0 PRODUCT INFORMATION

PHYSICAL DIMENSIONS



No. of Sections	Length (inches)	Weight (pounds)	Shipping Weight (pounds)	Water Content (us gal)	Flue Size (inches)
3	18.5	275	310	6	5
4	23.0	338	379	7.5	5
5	27.5	401	447	9	5
6	31.75	464	515	10.5	6
7	36.25	527	586	12	6
8	40.5	590	654	13.5	6
9	45.0	653	722	15	6

CLEARANCES

Proper clearances must be maintained not only from combustible materials but also to provide adequate access for servicing. All installations must comply with local codes and CSA B139 and NFPA 31. Consult local fire codes for required clearances.

CLEARANCE (minimum) FOR SERVICING

Top	10"	(254 mm)
Front	24"	(609 mm)
Rear	24"	(609 mm)
Control Mounted Side (Left/Right)	24"	(609 mm)
Non-Control Mounted Side (Left/Right)	6"	(152 mm)

CLEARANCE (minimum) TO COMBUSTIBLES

Top	10"	(254 mm)
Front	24"	(609 mm)
Rear	24"	(609 mm)
Control Mounted Side (Left/Right)	24"	(609 mm)
Non-Control Mounted Side (Left/Right)	6"	(152 mm)
Chimney Connector	18"	(457 mm)

Floor must be non-combustible.

DRAFT PRESSURE

Breech draft pressure -0.015'' w.c. draft required

TEMPERATURE DELTA: 20°F

FLUE PIPE CONNECTION
CHIMNEY or DVS-100 Direct Vent System (3, 4 & 5 section boiler only)

CLEANOUTS
Rear removable smoke hood & front combustion chamber swing door

FUEL
Not heavier than No.2 fuel oil

CAUTION: Do not use gasoline, crankcase drainings, or any oil containing gasoline.

ELECTRICAL
120 Volts, 60Hz, 15 amps. fuse or breaker

AIR SUPPLY
CAUTION: Adequate air supply for both combustion and ventilation must be available.
See page 20 for details.

3.0 UNIT INSTALLATION

The installation of the unit shall be in accordance with regulations of the authorities having jurisdiction and be in accordance with CSA B139, NFPA31 and NFPA211.

3.1 PLACEMENT & LEVELING OF THE UNIT

The boiler should be located on a firm foundation in an easily accessible area that meets the previously discussed clearances and air requirements. In situations where the floor may be uneven the boiler may be leveled by the insertion of metal shims under the legs.

3.2 TRIM KIT COMPONENT INSTALLATION

If you purchased the “packaged” version of this boiler, the jacket has been factory installed. The trim kit components need to be field installed following instructions 3.2 and 3.3.

If you purchased the “knockdown” version of this boiler, the trim kit components and jacket need to be field installed following the instructions in sections 3.2 and 3.3.

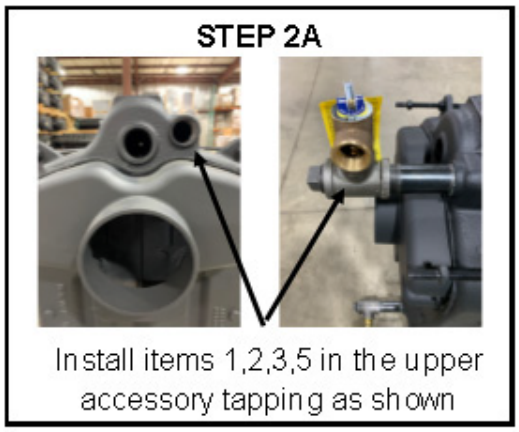
STEP 1: VERIFY CONTENTS OF TRIM KIT

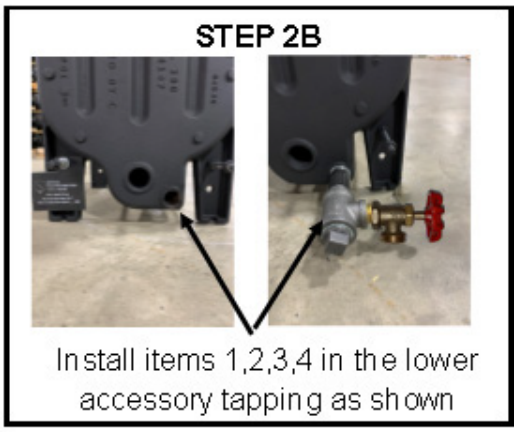
The boiler trim kit package includes:

Boiler Trim Kit Components			
Item	**Part no.**	**Description**	**Qty**
1	240013908	1" x 2 1/2" Nipple	2
2	240010727	1" x 1" x 3/4" Tee	2
3	1395004	1" Plug	2
4	240009323	Drain Valve	1
5	VR-001.01	Pressure Relief Valve	1
6	240009345	T&P Gauge	1
7	240007708	Thermistor 48"	1
8	240007713	Grommet	1
9	240013907	Remote Mount Kit	1
10	240009347	Hydrostat 3250 Plus	1
11	240007147	Flexible Oil Line	1

STEP 2: INSTALL TRIM COMPONENTS (FOR PACKAGED & KNOCKDOWN)

Trim Kit items 1-6 should be installed now, prior to system piping. The remaining items will be installed during later steps in the manual. All threaded connections require the application of a high quality pipe thread sealant.





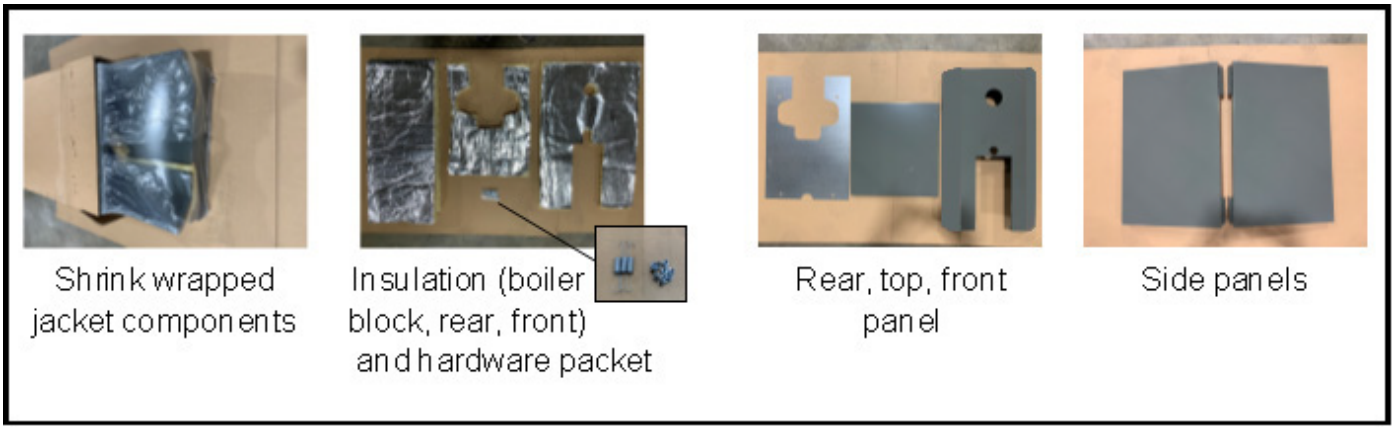
3.3 JACKET ASSEMBLY (FOR KNOCKDOWN ONLY) AND CONTROL INSTALLATION (FOR PACKAGED & KNOCKDOWN)

The boiler jacket has been designed for ease of assembly and removal. The following are step by step instructions. A philips screwdriver, 17mm socket and ratchet, 17mm wrench or adjustable wrench are needed.

STEP 1: VERIFY CONTENTS OF JACKET ASSEMBLY PACKAGE (FOR KNOCKDOWN ONLY).

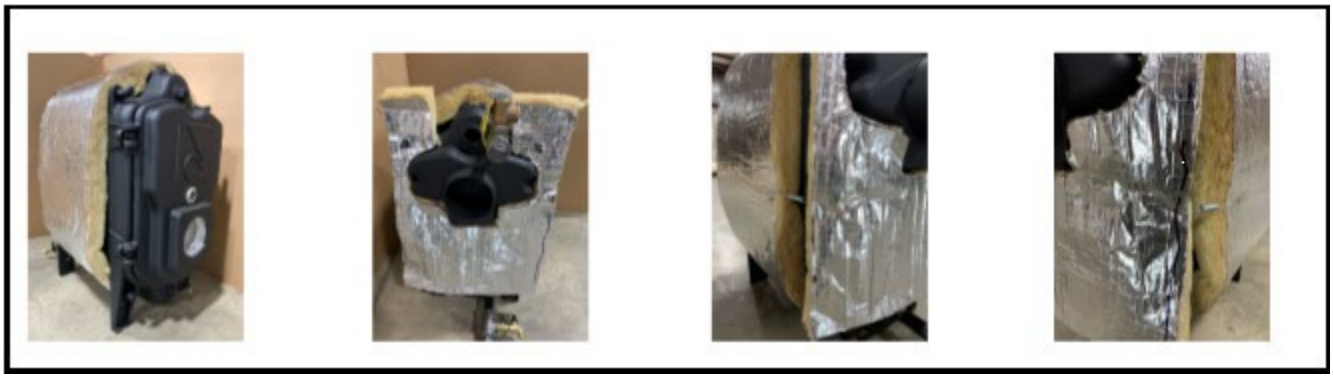
Your jacket assembly will contain boiler block insulation, rear of block insulation, front panel insulation, two (2) side panels, rear panel, top panel, front panel and a fastening package with screws and foil tape for fastening insulation. See jacket content photos below.

NOTE: If you are installing a 7, 8, or 9 section boiler, the jacket will be supplied in two boxes. Box 1: 4, 5, or 6 section boiler jacket (respectively). Box 2: rear jacket extension which includes a top, two (2) side panels, block insulation and additional fastening screws.



STEP 2: INSULATION INSTALLATION (FOR KNOCKDOWN ONLY)

Drape the large piece of boiler block insulation directly over the block taking care to provide equal coverage on both sides. **If installing a 7,8, or 9 section boiler, the extension insulation should be draped over the rear 3 sections of the boiler**. Install the rear insulation piece by sliding it over the upper tie rods and around the flue collar as shown. Secure the rear insulation to the boiler block insulation using the foil tape provided.

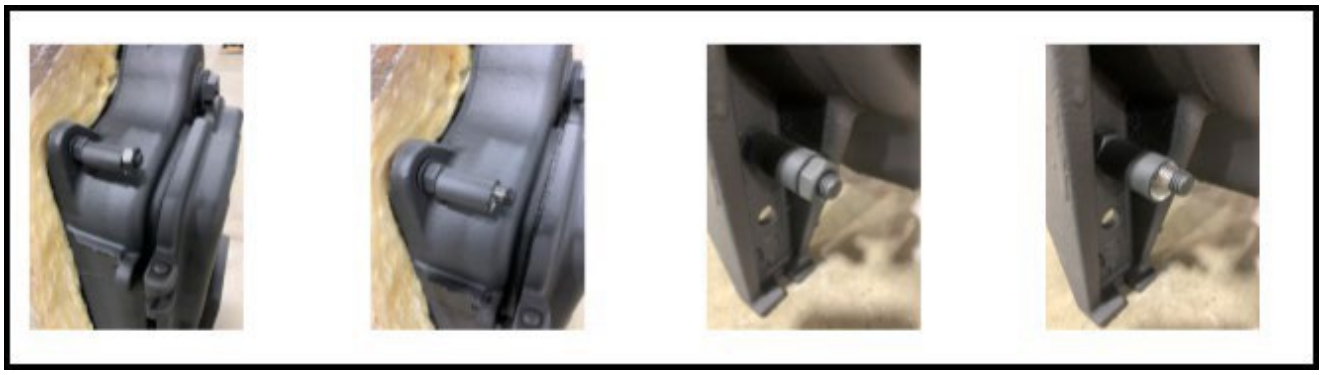


STEP 3: REAR PANEL INSTALLATION (FOR KNOCKDOWN ONLY)

Remove the four nuts from the rear of the tie rods. Slide the rear panel onto the tie rods until it sits flush against the spacers. Re-install the nuts. Tighten the nuts to secure the rear panel.

STEP 4: SIDE PANEL ATTACHMENT (FOR KNOCKDOWN ONLY)

Remove the four nuts from the front of the tie rods.



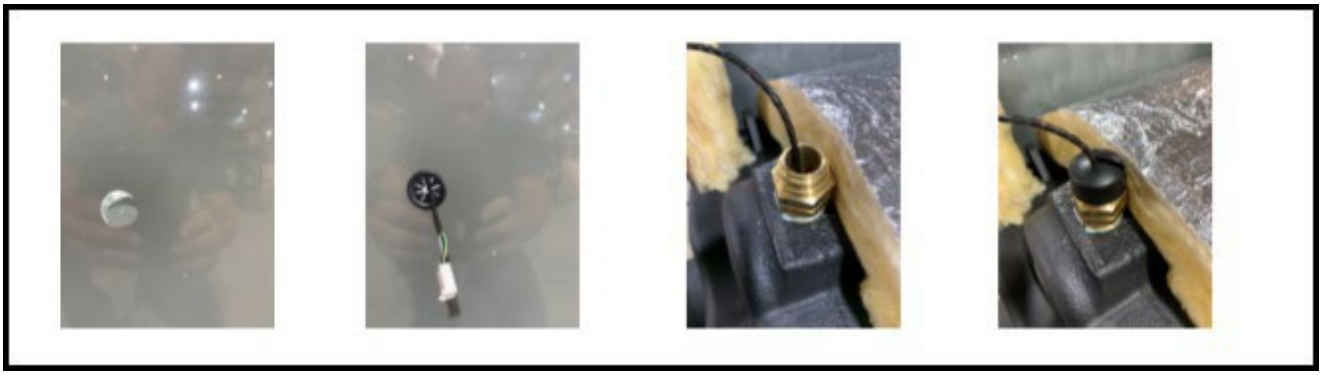
STEP 4: SIDE PANEL ATTACHMENT CONTINUED (FOR KNOCKDOWN ONLY)

Align the left and right panel so the knock out on the side of each panel is located toward the upper front corner of the boiler. Install each side panel by sliding the front mounting holes over the front tie rods. The back of the side panel can then be slid over the rear panel. **If installing a 7,8, or 9 section boiler, the extension side panels must be screwed to the boiler side panels prior to mounting. Make sure the slotted holes on the extension side panels are facing toward the back of the boiler.**

Re-install the nuts on the front tie rods and tighten. Secure the back of the side panels to the rear panel with the sheet metal screws provided.

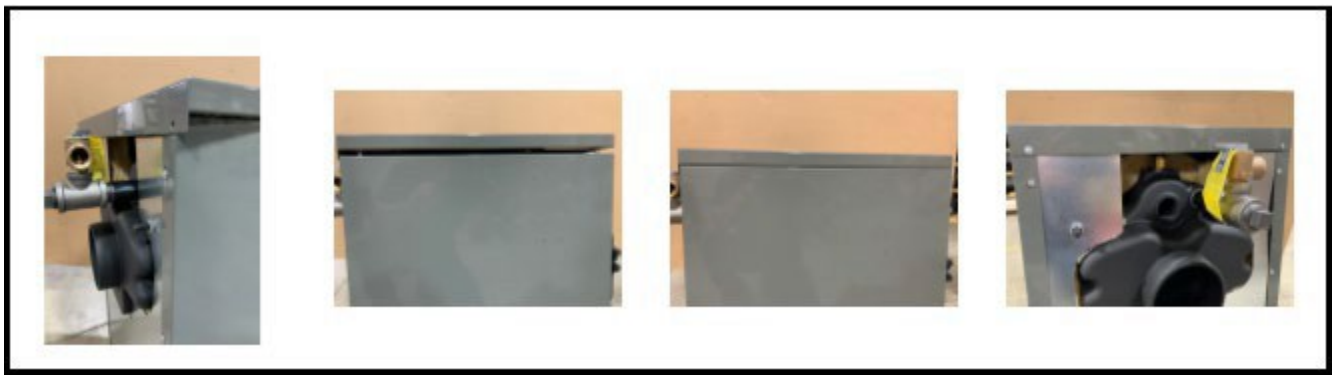
STEP 5: CONTROL SENSOR ATTACHMENT (FOR PACKAGED & KNOCKDOWN)

The control sensor must be routed through the side panel knock out. For Packaged, remove jacket front and top panels. For Knockdown, complete prior to jacket top and front panel installation. The boiler operating control can be mounted on either side of the boiler. Once the control mounting side has been selected, remove the corresponding knockout, install the plastic sensor protector and feed the sensor wire through the hole. Route the sensor wire over the boiler insulation to the immersion well in the top rear section of the boiler. Make sure the sensor bulb is fully inserted into the brass well and secure with the grommet provided.



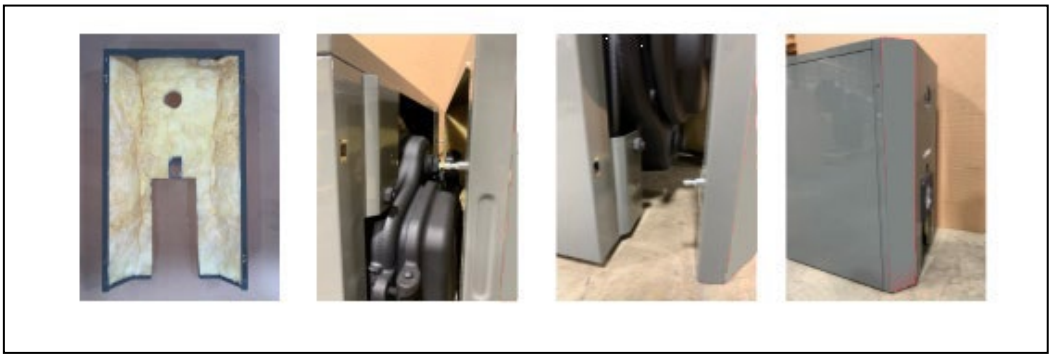
STEP 6: TOP PANEL ATTACHMENT (FOR PACKAGED & KNOCKDOWN)

Affix the top panel by placing the holes located on the underside of the panel over the jacket affixing pins. Press down on the top panel and it will snap in place. Secure the top panel to the back of the side panels with 2 sheet metal screws provided in the hardware packet. **If installing a 7,8, or 9 section boiler, the extension top panel will be mounted in the same way.**



STEP 7: FRONT PANEL ATTACHMENT (FOR PACKAGED & KNOCKDOWN)

Align the front panel pins with corresponding side panel clips. Push the front panel toward the boiler and pins will snap into the clips. Be sure to engage all four pins on the front panel.



The jacket installation is now complete.

STEP 8: CONTROL MOUNTING (FOR PACKAGED & KNOCKDOWN)

The operating control can be mounted on the side of the boiler where the sensor wire was installed. The jacket side panels have been pre- drilled holes for mounting the control. Follow the mounting instructions and use the hardware provided with the control.

Three section boiler illustrated

HydroStat 3250
plus boiler control

The boiler is now ready for piping and connection to the fuel system, heating and domestic hot water, thermostat and 120 Volt 60 cycle AC current.

CAUTION: Safety relief valve discharge should be piped downward to within 6" of the floor or to a drain. The valve must be mounted in a vertical position.

4.0 PIPING

Prior to connecting the boiler to an existing piping system, certain procedures must be followed. The system must be flushed to ensure that scale and sludge will not be introduced to the boiler. This is a must when replacing a boiler in what was once an open gravity system.

This boiler is a low mass boiler with low water content and steps must be taken to ensure that the boiler is not inundated with cold return water from an existing high-volume standing cast iron system. If the boiler is installed in a high-volume system a bypass loop must be installed.

Manual shut off valves must be installed on both the supply line and on the boiler bypass loop. Bypass loop piping MUST be the same size as the supply and return piping. ASME Boiler Code requires that feed or make-up water be introduced to the piping system and not directly into the boiler. Pressure reducing valve should be installed and adjusted to 12 psi cold water. The pressure relief valve must be piped from the boiler and downward to within 6" of the floor or to a height to meet existing code. An expansion tank, circulating pump and automatic air eliminators must be part of the system. The relief valve, backflow preventer and drain valve should be piped to a drain with piping that is the same size as the relief valve outlet, according to code.

All piping, including heating, domestic hot water and fuel lines must be done in accordance with all local codes. It is suggested that you refer to the Water Installation Survey and Hydronic Institute Residential Hydronic Heating Installation/Design Guide. All piping must be properly sized, free from defect and be made of copper, steel, brass, aluminum or PEX.

Circulation Pump

A calculation for proper pump selection must be performed for all installations. The pump(s) should not be operated at maximum working pressures above 30 psi or maximum working temperatures above 200°F and within limits advised by the manufacturer. The pump must not be operated unless the system has been flushed, bled of all air and completely filled with water.

Recommended locations for the circulator, expansion tank, relief valve and other trim are shown in Figures 1 - 7.

Figure 1: A typical installation with no domestic hot water and no by-pass loop installed.

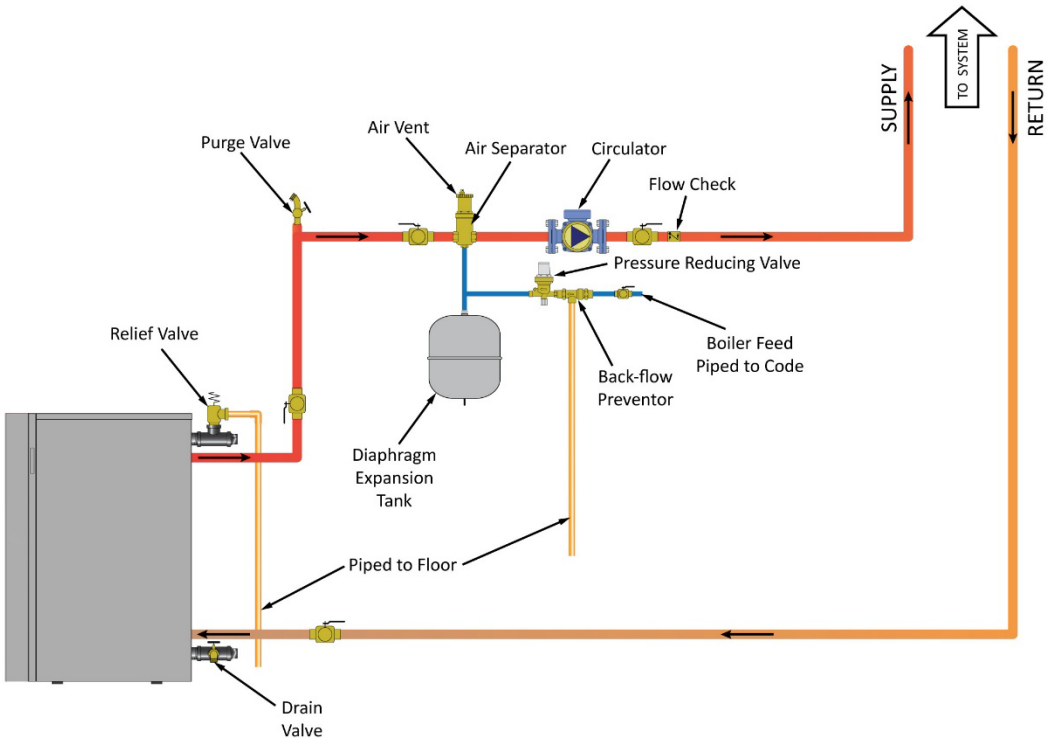


Figure 2: A typical installation with no domestic hot water and with a by-pass loop installed. By-pass MUST be same size as supply / return pipes.

(For fixed low temperature adjust throttling valves to maintain at least 130°F - 140°F in boiler return)

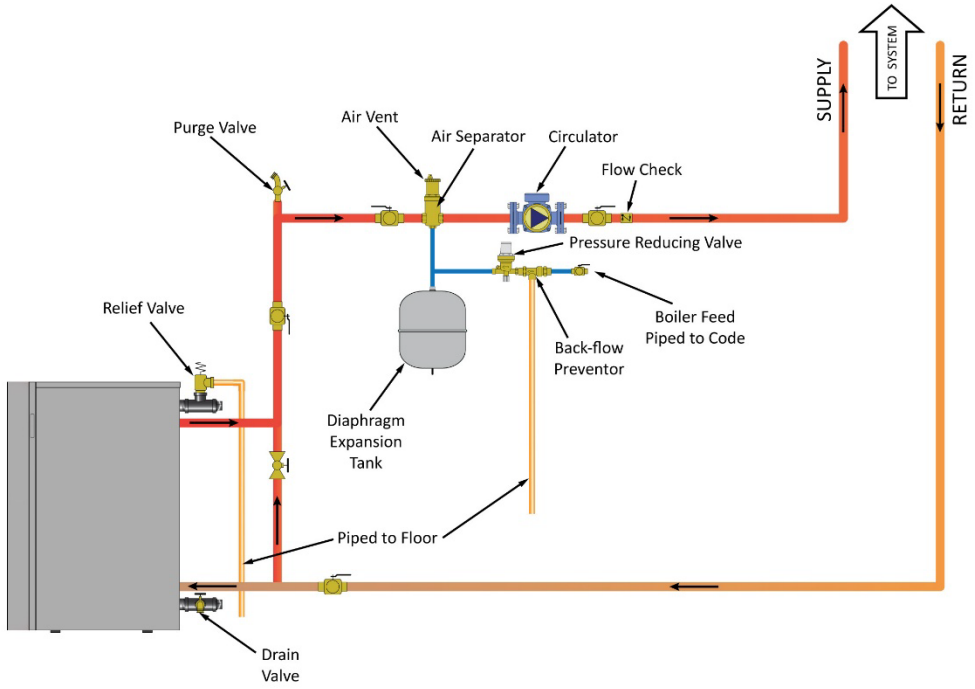


Figure 3: A typical installation with domestic hot water supplied by an indirect heater and with no by-pass loop installed.

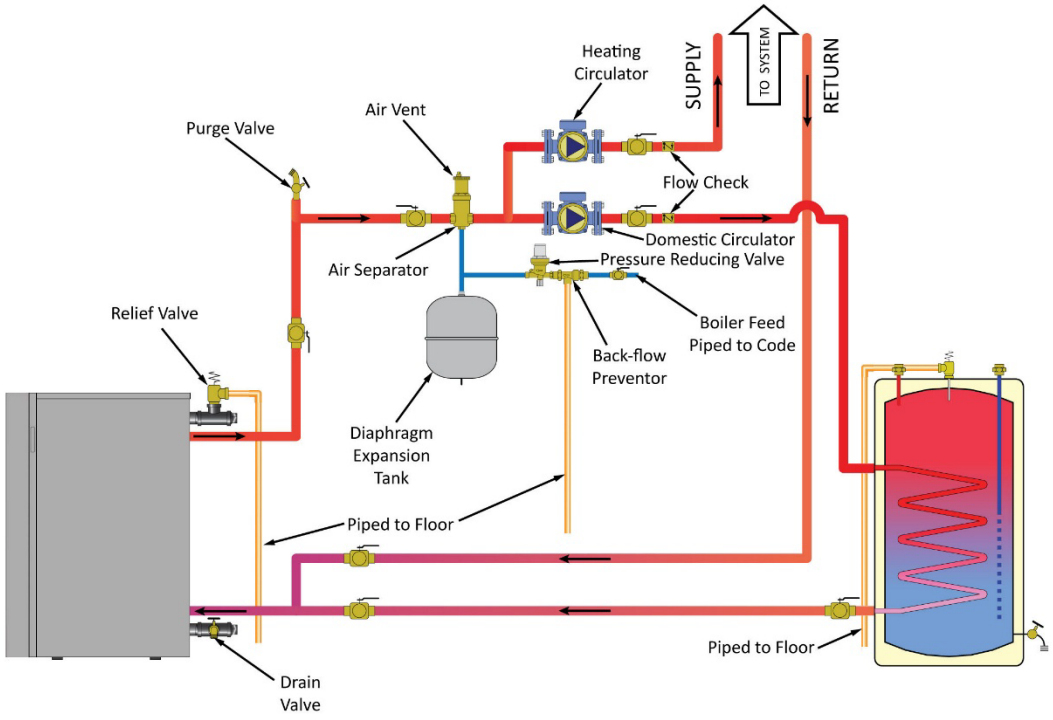


Figure 4: A typical installation with domestic hot water supplied by an indirect heater connected to boiler accessory tappings.

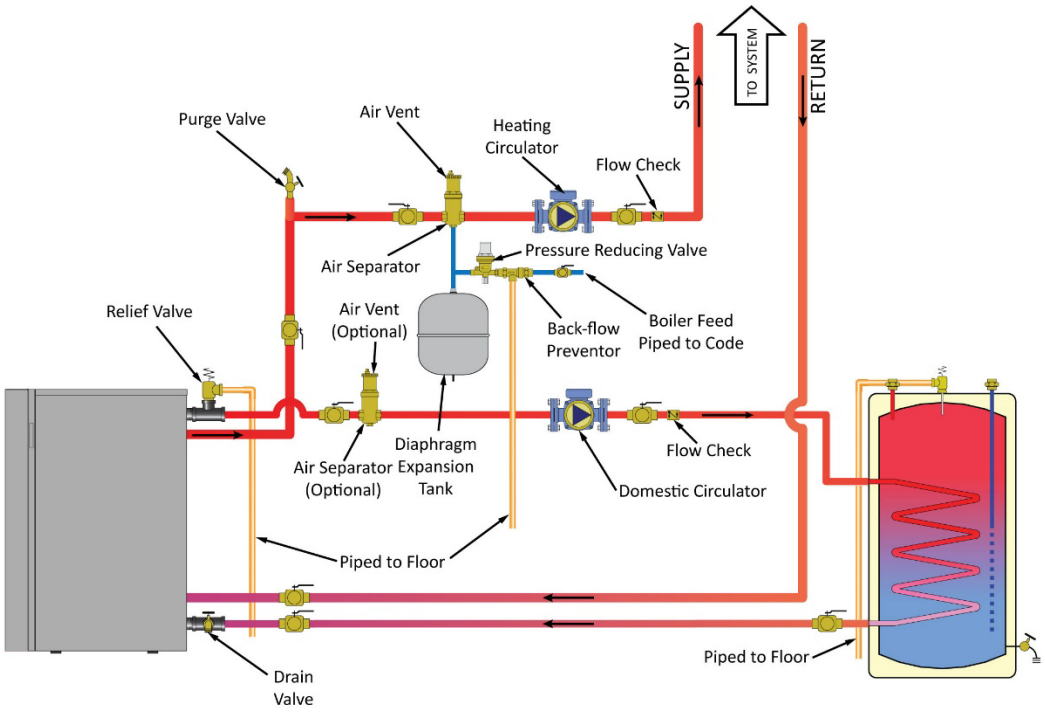


Figure 5: A typical installation with domestic hot water supplied by an indirect heater connected to boiler accessory tappings and a by-pass on the heating circuit. By-pass MUST be same size as supply / return pipes. (For fixed low temperature adjust throttling valves to maintain at least 130°F - 140°F in boiler return)

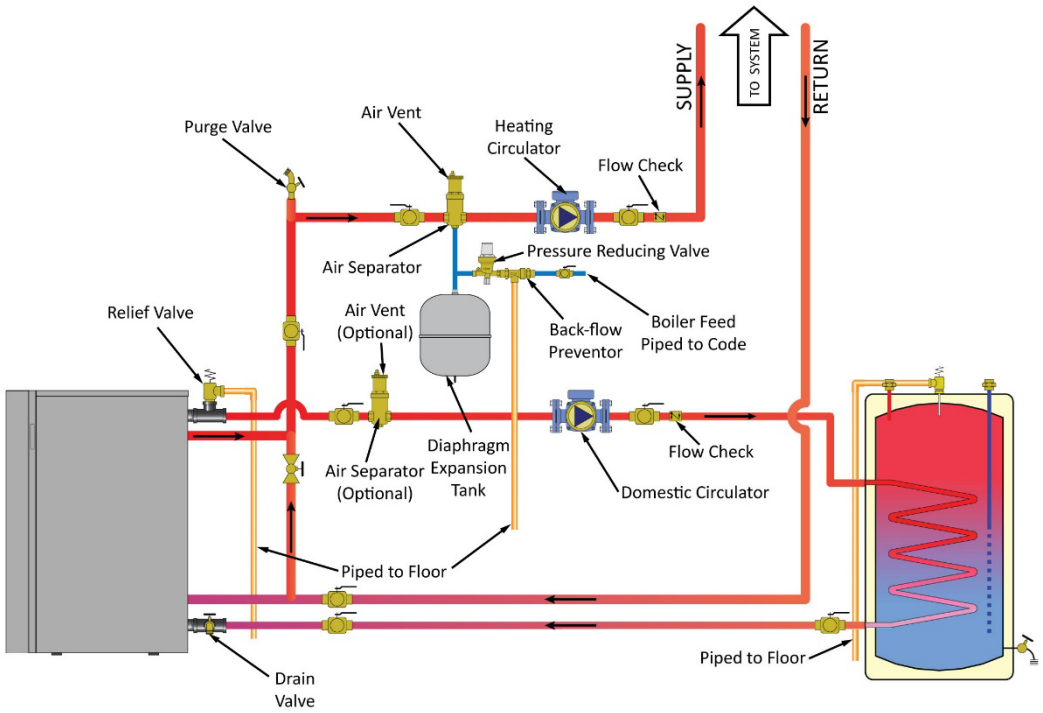


Figure 6: Primary / Secondary piping with domestic hot water supplied by an indirect heater connected to boiler accessory tappings.

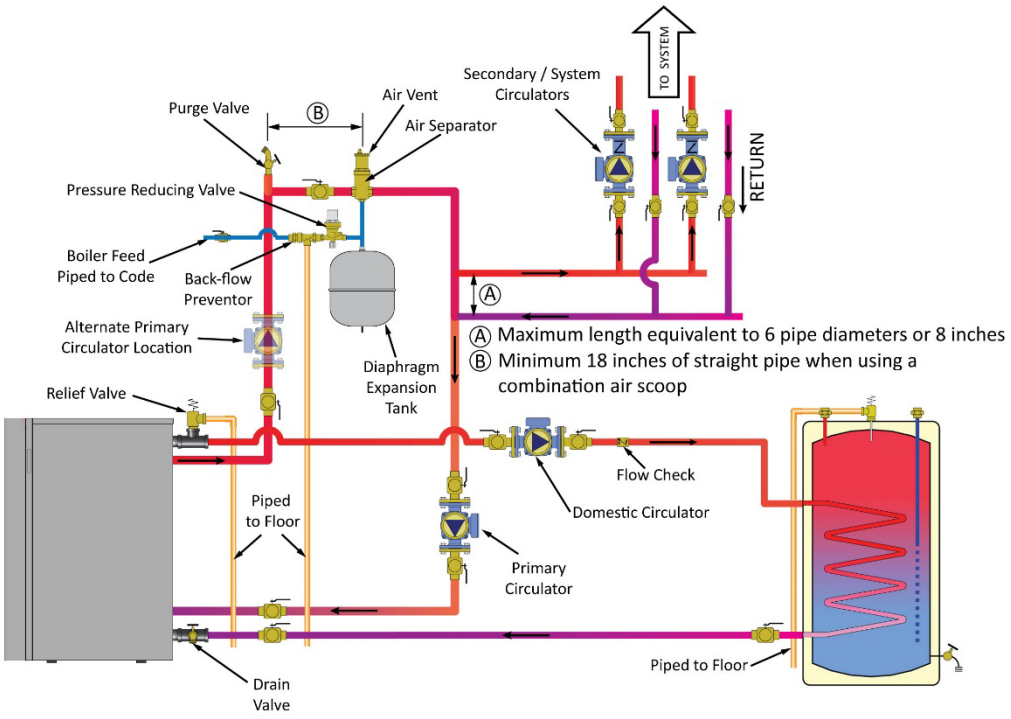
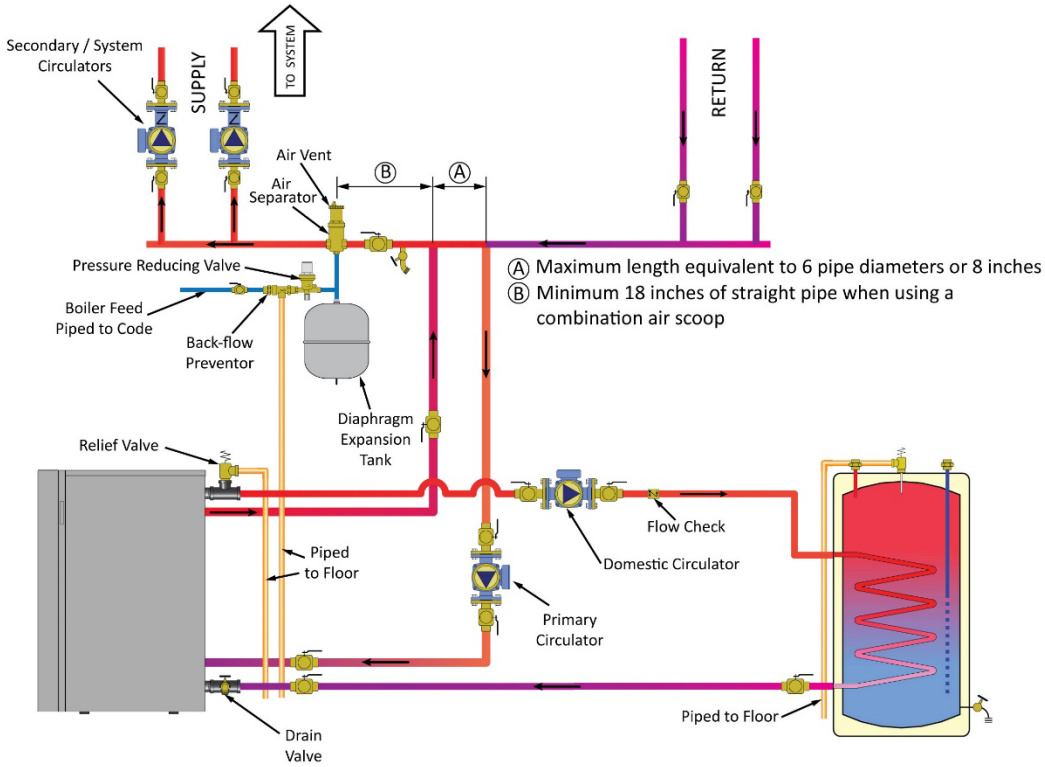


Figure 7: Alternative Primary / Secondary piping with domestic hot water supplied by an indirect heater connected to boiler accessory tappings.



5.0 ELECTRICAL WIRING

All external wiring must be performed in compliance with existing electrical codes within the local jurisdiction. In Canada, in compliance with the requirements of CSA STANDARD C22.1 and the Canadian Electrical Code. In the USA, in compliance with the requirements of NFPA 70, National Electrical Code. Connections should be carried out in accordance with this manual and only by qualified individuals.

- The boiler and burner should only be operated on 120 Vac.
- Field connections should be properly sized and protected with a minimum **15A** fuse or circuit breaker.
- A separate fused disconnect must be installed as required by code so that power can be shut off for servicing.
- The boiler must be grounded to the main service ground.

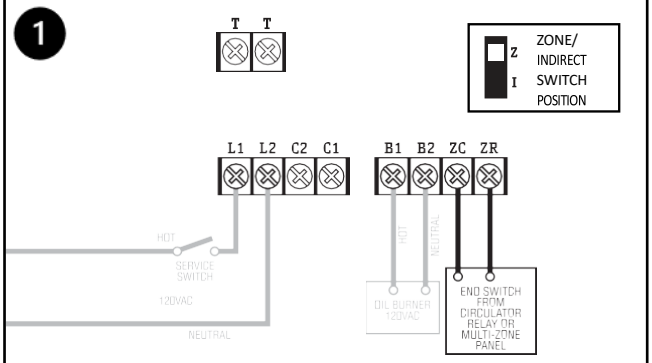
The connections must be made in a manner to ensure that there is no crossing of the neutral with the phase, a proper ground is provided, and all three wires are connected to the operating control.

Typical wiring for line voltage oil burner with Fuel Smart HydroStat 3250 and one heating zone

HEATING ONLY – No Indirect Water Heater

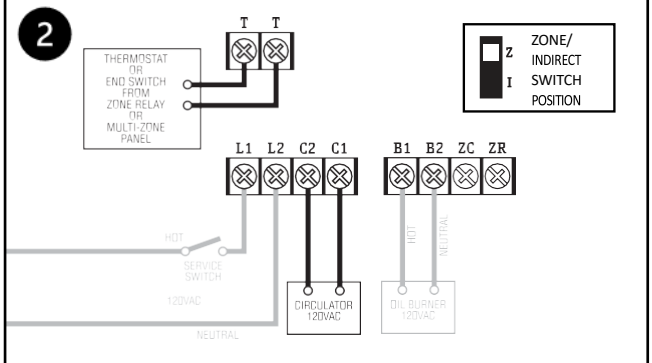
CHOOSE 1 OR 2 BELOW

MULTIPLE CIRCULATORS



Connect end switch from circulator relay or multi-zone panel to

SINGLE CIRCULATOR



Connect thermostat or end switch from zone relay or multi-zone panel to **T-T.** Connect circulator to **C2-C1.** Move Zone/Indirect Switch up to **Z.**

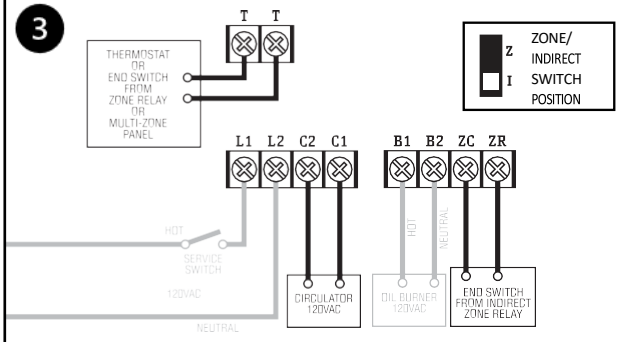
HEATING and Indirect Water Heater

IMPORTANT: When installing with an indirect water heater, the Zone/Indirect Switch must be set in the **I** position. When set in the **I** position, calls to **ZC-ZR** will bypass the Thermal Targeting feature and allow the boiler to fire to the high limit setting to heat the indirect tank. The indirect signal must be separate from all heating zone signals. If you choose not to separate the indirect signal from the heating zones, the Economy Feature should be turned OFF to ensure that the boiler supplies adequate temperature to heat the indirect tank (see page 7).

CHOOSE FROM 3 THROUGH 5 BELOW

SINGLE CIRCULATOR

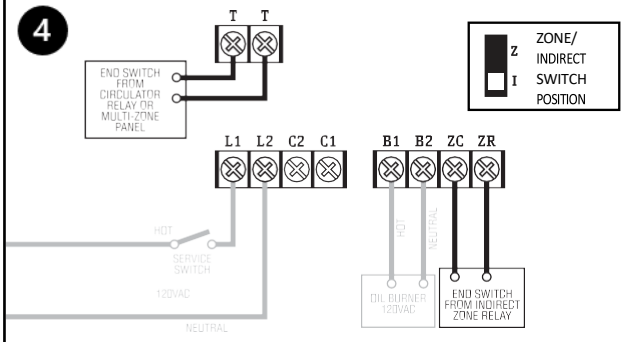
3



Connect thermostat or end switch from zone relay or multi-zonepanel to **T-T.** Connect circulator to **C2-C1.** Connect end switch from indirect zone relay to **ZC-ZR.** Move Zone/Indirect Switch down to **I.**

MULTIPLE CIRCULATORS

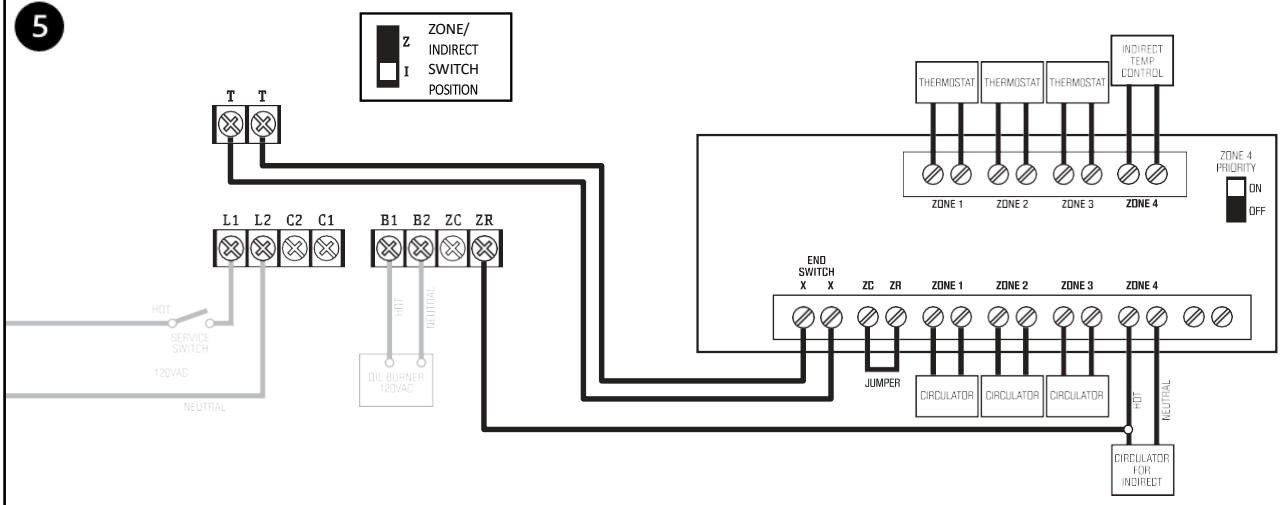
4



Connect end switch from heating circulator relays or multi-zone panel to **T-T.** Connect end switch from indirect circulator relay to **ZC-ZR.** Move Zone/Indirect Switch to **I.**

MULTIPLE CIRCULATORS — Typical Zone Panel with Priority Zone

5



NOTE: The wire from **ZR** to the hot terminal of the indirect circulator will ensurethat indirect calls will fire to limit and receive priority over heating calls.

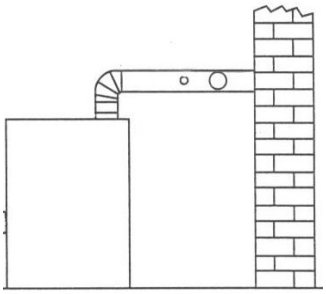
6.0 CHIMNEY INFORMATION

Natural Draft Applications

CAUTION: Oil fired units must always be connected to flues with sufficient draft.

Specific guidelines should be followed to prevent the occurrence of the following conditions:

- Reverse flow of flue gas during or after burner shutdown.
- Positive outlet draft conditions.
- Condensation of flue gasses
- Damage to masonry chimney



Chimney Connection

To insure safe and efficient boiler operation flue gasses must be released through a clean, properly sized chimney with adequate draft that meets all local codes and regulations and be in accordance with CSA B139, NFPA31, NFPA211 and local regulations. Always inspect and clean the chimney to ensure that it is free from obstructions. Never connect the boiler to a chimney or liner serving an open fireplace.

A 5” diameter flue pipe must be used for connection of the 3,4,5, section boiler flue outlet to the chimney for the entire length of the connection. A 6” diameter flue pipe must be used for connection of the 6,7,8,9, section boiler flue outlet to the chimney for the entire length of the connection. The chimney connector must be made with the proper gauge thickness and diameter of fluepipe as required by CSA B139, NFPA31, NFPA211, and local codes, be properly supported and use as few 90 degree turns as possible. The distance between the boiler and the chimney depends on whether or not elbows are used. The distance should be at least 24” if no elbows are used and 12” if elbows are used. The same holds true for the maximum length of the flue pipe. It must be no longer than 10’ if no elbows are used and 6’ if elbows are used.
Drafts in excess of -0.015” w.c. will require the installation of a barometric damper.

Condensation

This boiler series is a high efficiency boiler and as a result improper venting can lead to condensing temperatures in the chimney connector and the venting system. If condensing temperatures of below 325 Degrees F are reached in the chimney connector, then additional steps to ensure proper draft must be taken. Make sure that all joints are properly sealed with a high temperature silicone or mastic. If after sealing the joints the condition still exists, then inspect the chimney for suitability. If the masonry, brick, block chimney or tile chimney liner is in poor condition a new chimney liner rated for oil may have to be installed. In the event the condition still exists after installation of a new liner consult factory.

7.0 FUEL SYSTEM

The fuel system piping must comply with the fuel pump manufacturers' specifications which are included with the burner. In addition, all fuel system piping must comply with local codes and ordinances.

- The quality of your fuel oil is of **great importance**. For most instances your burner is designed to burn clean, water free, #2 fuel oil.

- The oil supply line should be constructed of seamless heavy wall copper tubing with flared fittings. Only oil resistant pipe dope should be used on threaded connections. The use of **Teflon Tape** will void manufacturers' warranty. Lines must be airtight, clean and free of kinks. All joints and threaded fittings must be checked for leaks. A vacuum gauge should be employed when testing the installation. It is recommended that older fuel lines be replaced.

- A two-pipe system should only be used when the oil supply is well below the pump. A return fuel line may be used on inside installations where the tank level is below the level of the burner. The return line must be equal in diameter to the suction line. The minimum size for the oil line is 3/8" copper tubing. Do NOT install any valve in the return line.

- An **oil de-aerator** is recommended when the oil tank is located 5' or more below the burner.

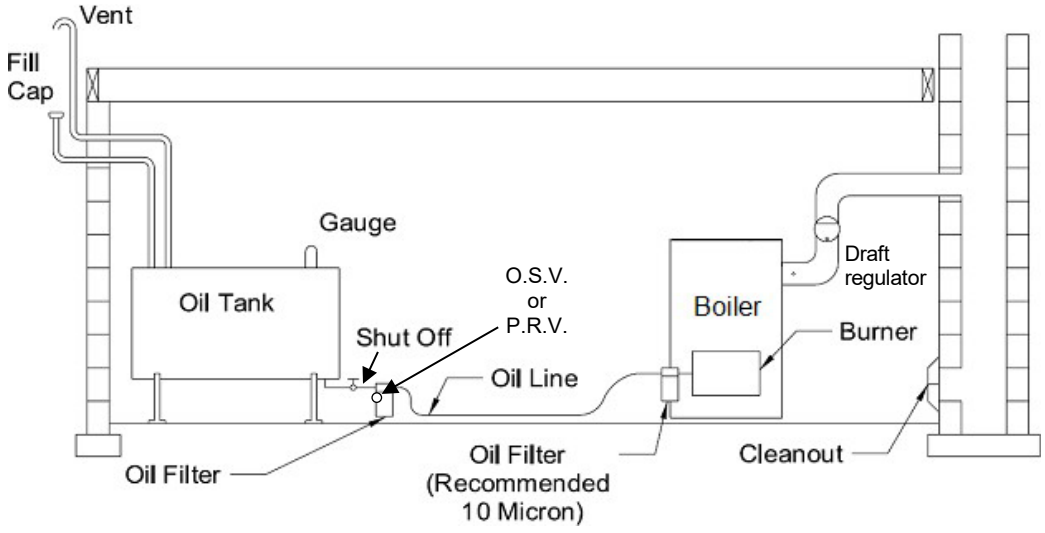
- Shut off valves must be installed in the supply line at or near the oil storage tank and at the burner in compliance with all codes. Inspect the shut off valve spindle packing for tightness to ensure that there are no air leaks. The burner should be tagged to indicate that the fuel supply has been closed off. The electrical circuit to the burner must be cut off by removing the fuse or circuit breaker to ensure that no operation of the burner will occur while the fuel supply is shut off.

  CAUTION: ALWAYS KEEP THE OIL SUPPLY VALVE SHUT OFF IF THE BURNER IS SHUT DOWN FOR AN EXTENDED PERIOD OF TIME.

- Only certified fuel storage tanks and accessories approved as prescribed by local code may be used.

- The installation of 2, 10 micron oil filters, one at the tank and the other at the burner is recommended.

- Automatic oil safety valves (O.S.V. / P.R.V.) are recommended to provide automatic shut-off for the oil supply incase the line between O.S.V. device and burner fuel pump is broken or damaged.



OIL TANK AND PIPING

COMBUSTION & VENTILATION AIR

Install openings and ductwork to the boiler room providing fresh outside combustion and circulating air, as required by installation code CSA B139, NFPA31, NFPA211 and local codes. If the boiler is installed in a confined room and all air is taken from an adjacent, unconfined, indoor space, provide 2 openings of not less than 1 sq in. of free area per 1,000 BTU/h boiler input. If air is taken from outdoors, directly, each opening shall have a free area of 1 sq in. per 4,000 BTU/h. The space will be provided with 2 permanent openings, one near the top of the room and the other near the bottom. Oil burners must have sufficient air to allow the vent system to operate properly.

8.0 BURNER INSTALLATION AND SETTING

ASSEMBLY & INSTALLATION OF BURNER

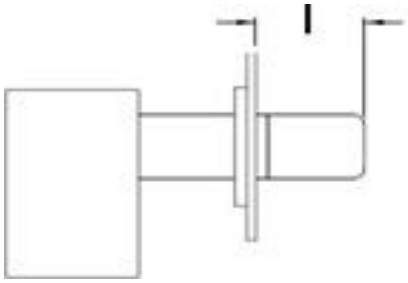
ASSEMBLY Check that the burner model is correct for boiler rating required. Assemble as per burner manufacturer's instructions.

SELECT NOZZLE Select oil input, nozzle and burner configuration as shown on boiler operating decal.

INSTALL NOZZLE Install selected nozzle, check for clean seating and tighten into the nozzle adaptor.

ELECTRODES See burner manufacturer's instructions for correct setting

INSERTION



BURNER INSERTION (I)

	in	mm
RIELO, CARLIN	3	76
BECKETT	3.75	95

MOUNT BURNER Tighten top nut first so burner tips down slightly. The burner is always installed in an upright position, secured using the four (4) washers and nuts.

PUMP BY-PASS PLUG For one pipe system factory setting (no plug).

SET BURNER FOR EFFICIENT OPERATION

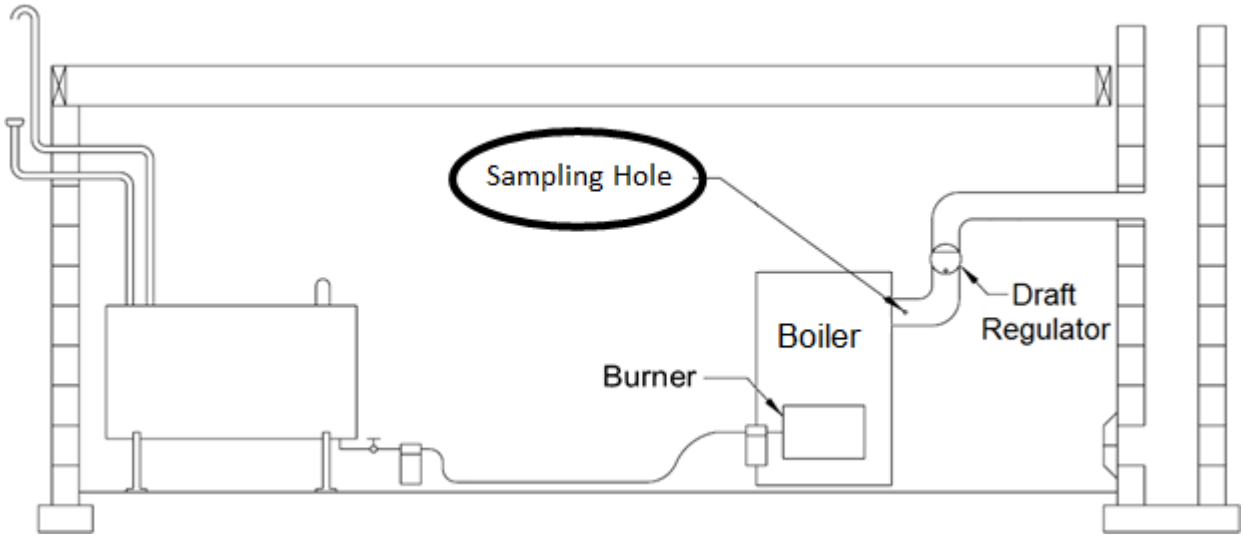
BURNER SETTING Use burner settings in the table on page 24, or operating decal, as a guide to set the burner, particularly for nozzle changes. **These settings are only starting points for the adjustments and are not meant as final settings.**

PUMP PRESSURE Refer to the table on page 24 or operating decal.

AIR SETTING Use air settings on page 24 as a guide to set air adjustment. **These settings are only starting points for the adjustments and are not meant as final settings.**

DRAFT REGULATOR The draft regulator should be installed at least 3 flue pipe diameters from breeching or elbow of the furnace.

SAMPLING HOLE On smoke/vent pipe, drill a 3/8" round opening. The hole should be at least 2 flue pipe diameters from breeching or elbow of the boiler.



REAR FLUE BOILER ILLUSTRATION

Preliminary Oil Burner Adjustments

- Adjust Draft Regulator for breech draft of -0.015" W.C. after chimney has reached operating temperature and while burner is running.

- Use smoke tester and adjust air if necessary for minimum smoke (not to exceed trace) with minimum of excess air. Check using suitable instrumentation to confirm CO_2 of 11 to 13%. If flame appears stringy instead of solid fire, try another nozzle of same type. Flame should be solid and compact.

- Turn off burner and remove pressure gauge. Install gauge port/bleeder plug and tighten. Start burner again.

Final Burner Adjustments: Final burner adjustments must be made using combustion test instruments.

- Check breech draft to verify -0.015" WC or otherwise adjust draft to -0.015" WC

- After operating 10 minutes to warm up boiler, use combustion test equipment to take smoke reading in flue pipe between boiler and draft regulator. Smoke reading should be zero to trace (Shell Bacharach Scale).

- New boiler may require more than 10 minutes to burn clean due to oil film on new heat exchanger. If smoke reading is zero, gradually close burner's air adjustment to obtain smoke reading showing trace smoke reading. Once smoke reading is trace, measure CO_2 and as insurance margin increase air to sufficiently reduce CO_2 by 1/2% to 1%.

- If clean fire cannot be obtained, it is necessary to verify burner head alignment. If fire continues to be smoky, replace nozzle.

9.0 TECHNICAL INFORMATION

Boiler Specifications

Unit Model	**C3067	**C4098	**C5123	**C6154	**C7189	**C8225	**C9250
Energy Star Approved	YES	YES	YES	YES	YES	NO	NO
Number of sections	3	4	5	6	7	8	9
Firing Rate (USGPH)	0.67	0.98	1.23	1.54	1.89	2.25	2.5
Input (BTU/h)	93,398	136,612	171,462	214,676	263,466	313,650	348,500
Output (BTU/h)	80,602	117,896	147,972	185,265	227,371	270,680	300,756
AFUE (%)	87	87	87	87	87	-	-
Thermal Efficiency (%)	-	-	-	-	-	87	87
Riello Oil Burner	40 F3	40 F5	40 F5	40 F5	40 F10	40 F10	40 F10
Delavan Nozzle	0.55 x 80B	0.80 x 80B	1.00 x 80B	1.25 x 60B	1.50 x 60B	1.75 x 60B	2.00 x 60B
Pump P. 1 pipe sys.(psi)	185	185	185	185	185	185	185
Pump P. 2 pipes sys. (psi)	165	165	165	165	165	165	165
Turbulator Setting	0.0	0.0	1.0	3.0	2.0	3.0	5.0
Insertion Depth	3"	3"	3"	3"	3"	3"	3"
Air Gate Adjustment	1.9	2.3	3.0	4.0	3.9	4.8	4.8
Beckett Oil Burner	AFG70MPASN*	AFG70MPASN	AFG70MLASN	AFG70MLASN			
Delavan Nozzle	0.60 60B	0.85 60B	1.00 60B	1.25 60B			
Burner Head	L2	L2	V1	V1			
Head Setting	N/A	N/A	0	2			
Pump Pressure (psi)	140	140	150	150			
Air Setting	8/1	10/2	10/1	5.5/4			
Insertion Depth	3.75"	3.75"	3.75"	3.75"			
Carlin Oil Burner	EZ-LF	EZ-LF	EZ-1	EZ-1			
Delavan Nozzle	0.55 70B	0.85 70B	0.90 70W	1.10 45A			
Head Setting	0.5	2.5	3	5			
Pump Pressure (psi)	150	150	190	200			
Air Setting	45%	75%	75%	80%			
Insertion Depth	3"	3"	3"	3"			

*Beckett AFG for CB3 boiler includes low firing rate baffle

**Client ID (does not affect performance)

Heating capacity and AFUE based on 13.5% CO2 with -0.015" W.C. draft in breech and #1 smoke. Tested in accordance with U.S. Department of Energy test procedure.

WARNING: Do not operate if any controls have been exposed to and/or submerged in water. Contact a qualified technician for inspection prior to use.

10.0 BOILER START UP AND OPERATION

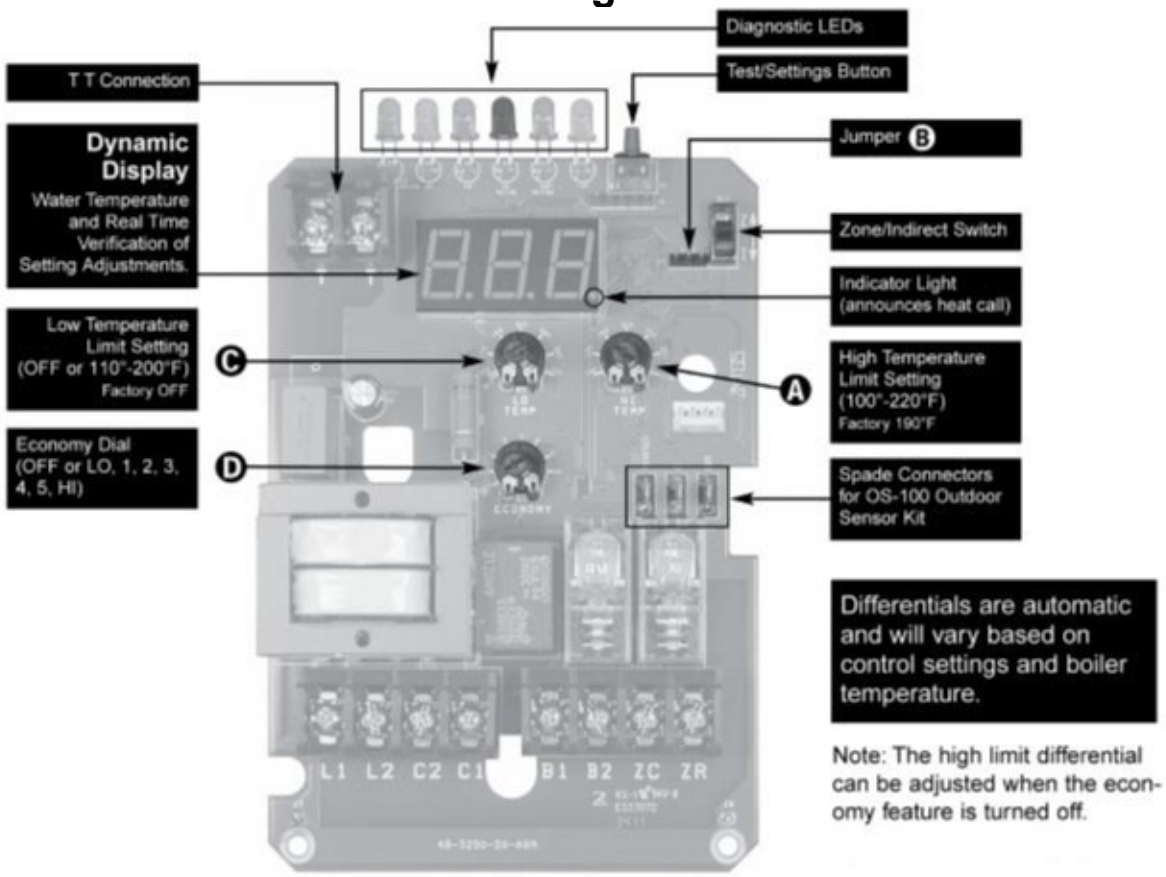
CAUTION: DO NOT ATTEMPT TO START THE BURNER WHEN EXCESS OIL HAS ACCUMULATED, WHEN THE UNIT IS FULL OF VAPOR OR WHEN THE COMBUSTION CHAMBER IS VERY HOT

10.1 START UP PROCEDURE

- Prior to start up make sure the service switch is in the **OFF** position.
- Check all fittings and wiring.
- Ensure that the boiler and the entire heating system are completely filled with water and that all air has been purged from the system. Verify that proper system pressure has been achieved. The minimum PSIG is 12.
- Check to ensure that clean, quality #2 heating oil has been used to fill your storage tank. Inspect for oil leaks.
- Open all manual shutoffs throughout the system.
- Set operating controls to the recommended settings.
- Follow the manufacturer's instructions for proper light off and setting. Using accurate combustion test equipment to adjust the burner for proper "steady state" operation. The use of accurate instruments is necessary to achieve maximum efficiency, reliable operation and the lowest operational costs.
- Adjust the thermostat to the manufacturer's instruction
- Place this manual, the control manual and the burner manual along with related consumer information in an easily accessible location. Installers should make the consumer aware of the content and location of this information.

10.2 HYDROSTAT 3250 CONTROL

Setting the control



NOTE: Settings can be checked using the TEST/SETTINGS Button. See page 27 for details.

Setting the High Limit

The high limit is factory set at 190°F. To adjust, turn the HI TEMP Dial **A** until the desired setting is displayed. (Setting range: 100°-220°F)

Setting the Low Limit

The low limit is designed to maintain temperature in boilers equipped with tankless coils used for domestic hot water. The low limit is factory set to OFF. Prior to adjusting, remove the jumper (not equipped on all units) **B**. Then turn the LO TEMP Dial **C** clockwise until the desired temperature is displayed. For proper operation, the low temperature limit setting should be at least 10° below the high limit setting. **NOTE:** For cold start operation, the low limit must be turned OFF. **IMPORTANT:** If low limit temperature cannot be set above 140°F, remove jumper **B**. (Setting range: OFF or 110°-200°F).

Setting the Economy Feature

The Economy Feature is factory set for a 1 zone heating system. To adjust, turn the ECONOMY Dial **D** until the number displayed equals the number of heating zones. **Do not include indirect water heaters in the number of heating zones.** The Economy Feature conserves fuel by reducing boiler temperature (see "How Thermal Targeting Works" on page 27). If the heating system is unable to supply needed heat to the house, the ECONOMY Dial should be turned to a lower setting (example: In a three zone house, turn the dial to 2 or 1). Conversely, if the boiler provides adequate heat, added fuel savings can be achieved by selecting a higher setting If the heating and indirect water heater signals were not separated when wiring the control, the Economy Feature should be turned OFF to ensure the boiler supplies adequate temperature to heat the indirect tank.

Setting the Zone/Indirect Switch

See WIRING on pages 16-17.

SETTING	
OFF	Disables economy function. Will allow boiler to fire until hi-limit temp is reached and re-fire with a 10° subtractive differential.
LO	Provides lowest level of fuel savings. Use this setting only if the house does not stay warm at higher settings.
1	Recommended setting for single zone systems
2	Recommended setting for Two zone systems
3	Recommended setting for Three zone systems
4	Recommended setting for Four zone systems
5	Recommended setting for Five zone systems
HI	Provides highest level of fuel savings

SYSTEM START-UP

At initial start up, with the Economy Feature active, the control establishes a 145°F target temperature. To test the high limit shut-off function, the Economy Dial must be turned to OFF. Once tested, restore the Economy setting. If the heating demand is high, the target will increase over time to satisfy the heat load.

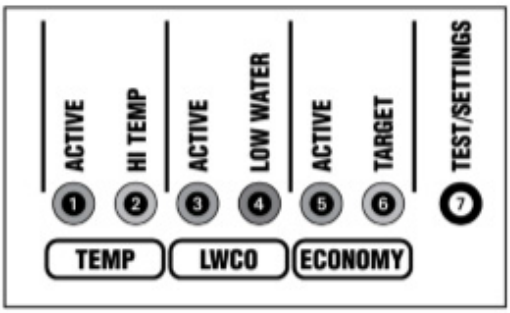
NOTE:

- Smart DHW Priority: During a call from an indirect water heater, the control will de-energize the circulator contacts (C1/C2) to heat only the indirect tank ensuring an adequate supply of domestic hot water. The control will re-energize the circulator when the indirect tank is satisfied or if the boiler temperature reaches 170°F. If the indirect call continues for 45 minutes, the control will override the priority function energizing the circulator to provide space heating.

HOW THERMAL TARGETING WORKS

Thermal Targeting technology analyzes thermostat activity and continually evaluates how much heat the house requires. When it is very cold outside, the heat demand is high and the Fuel Smart HydroStat will raise the boiler's Target temperature to provide needed heat to the home. When the outside temperature is milder, the heat demand is lower. During these periods, the Fuel Smart HydroStat will lower the boiler's Target temperature – saving fuel – while continuing to provide comfort to the house.

LED LEGEND and TEST/SETTINGS BUTTON



❶ TEMP **ACTIVE** Indicates that the Fuel Smart HydroStat control is powered and that the temperature function is active.

❷ TEMP **HI TEMP** Illuminates when the boiler water temperature reaches the high limit setting. It will remain lit until the water temperature falls 10°. The Fuel Smart HydroStat prevents burner operation while this LED is on. See Differential explanation on page 26.

❸ LWCO **ACTIVE** Indicates that the low water cut-off (LWCO) function of the Fuel Smart HydroStat is active. When the control is installed with a Hydrolevel Electro-Well™, this LED will be on at all times when the control is powered. **IMPORTANT:** If the control is installed with a well other than the Electro-Well™, this LED will not illuminate indicating that the control is not providing low water cut-off functionality.

❹ LWCO **LOW WATER** Indicates that the boiler is in a low water condition. The HydroStat control will prevent burner operation during this condition. If the LOW WATER light is blinking, the control has been programmed to provide lock-out protection in the event a low water condition is detected. Pressing the TEST/SETTINGS button will reset the control.

IMPORTANT: The system must be checked by a qualified heating professional prior to resuming operation.

⚠ **WARNING: ALLOW THE BOILER TO FULLY COOL BEFORE ADDING WATER.**

❺ ECONOMY **ACTIVE** Indicates that the Thermal Targeting function is active and the Fuel Smart HydroStat will reduce boiler temperature to conserve fuel. The Economy feature is activated using the ECONOMY dial. (See "How Thermal Targeting Works" on page 27 for more information).

❻ ECONOMY **TARGET** When the Economy feature is active, the Fuel Smart HydroStat continually sets target temperatures below the high limit setting to maximize fuel efficiency. When the boiler water reaches the target temperature, the LED illuminates and the burner will shut down. The boiler water will continue to circulate and heat the house as long as the thermostat call continues. The LED will stay lit until the boiler temperature drops below the differential set point at which point the boiler will be allowed to fire again. See Differential explanation on page 26.
NOTE: This LED illuminates regularly during normal boiler operation.

❼ **TEST/SETTINGS** Button

To Test Low Water Cut-Off: Press and hold the Test/Settings button for 5 seconds. The display will read LCO.

LWCO TEST LCO

The red Low Water light should illuminate and the burner circuit (B1 and B2) should de-energize. **NOTE:** The control must be installed with a Hydrolevel Electro-Well™ for low water cut-off functionality.

To View Current Settings: Press and release the Test/Settings Button in short intervals to sequentially display the following settings:

HIGH LIMIT SETTING HL
▼
LOW LIMIT SETTING LL
▼
ECONOMY SETTING ECO
▼
CURRENT TARGET TEMPERATURE OOO

The display will return to boiler temperature (default) if Test/Settings Button in not pressed for 5 seconds.

11.0 MAINTENANCE / SERVICE

CAUTION: CONTACT SERVICE PERSONNEL BEFORE REMODELING (MODIFYING THE SYSTEM), FOR ANNUAL SERVICING/MAINTENANCE, BEFORE EXTENDED PERIODS OF SHUTDOWN, AND BEFORE START-UP.

Your heating appliance is designed to be maintained and serviced only by your heating professional. The following sections provide information on maintenance and service-related activities. In the event a problem occurs consult your heating professional.

- **To achieve maximum efficiency, Boilers feature stainless steel removable baffles**

No. of Sections	No. of Baffles	2nd Pass	3rd Pass
3	4	2	2
4	4	2	2
5	2	2	2
6	2		2
7	2		2
8	2		2
9	2		2

CONDENSATION
If you have condensation in your chimney, make sure that the chimney size is according to the tables in CSA B139, NFPA31 and NFPA211, and local codes. The temperature at the entrance of the chimney can be increased by insulating the flue pipe between the boiler and the chimney base. If this is not sufficient, consider cutting or removing some flue baffles in the boiler. BE AWARE THAT REMOVING BAFFLES REDUCES THE UNIT EFFICIENCY AND A MODIFIED UNIT IS NO LONGER ENERGY STAR APPROVED.

HOMEOWNER SERVICE CAUTION

In the event of a problem with the heating system the homeowner should perform the following limited activities.

- Check to make sure that there is fuel in the tank and that oil valves are open.
- Set the thermostat above existing room temperature.
- Check for blown fuses or circuit breakers and make sure power switches are in an on position.

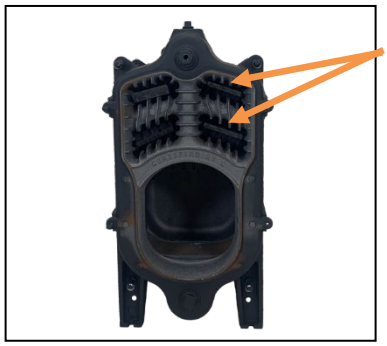
- **NEVER TAMPER WITH CONTROLS, WIRING OR PIPING!**

11.1 CLEANING THE BOILER

Boiler cleaning should only be performed by a qualified service technician and must only be performed when the boiler is out of service. The following steps should be followed:

- Shut off electrical power to the boiler
- Remove the front panel by pulling it forward using the two finger indentations on the top sides of the front panel.
- Open the front swing door by removing the 2 bolts on the side opposite the door hinges; this will expose the chamber area as well as the second and third passes. **(A)**
- Remove the stainless steel baffles. With a cleaning brush clean the boiler section, second and third passes. Reinstall stainless steel baffles. **(B)**
- Remove flue pipe from the boiler exhaust hood. Remove any soot that may have collected in the smoke hood. **(C)**

A



B

C

- Reattach the flue pipe to the boiler exhaust hood.
- Close the swing door. Reinstall bolts and tighten to a **MAXIMUM of 6 ft-lb of torque**.
- Refit the front jacket panel.
- Restore electrical power to the boiler

11.2 BURNER NOTES

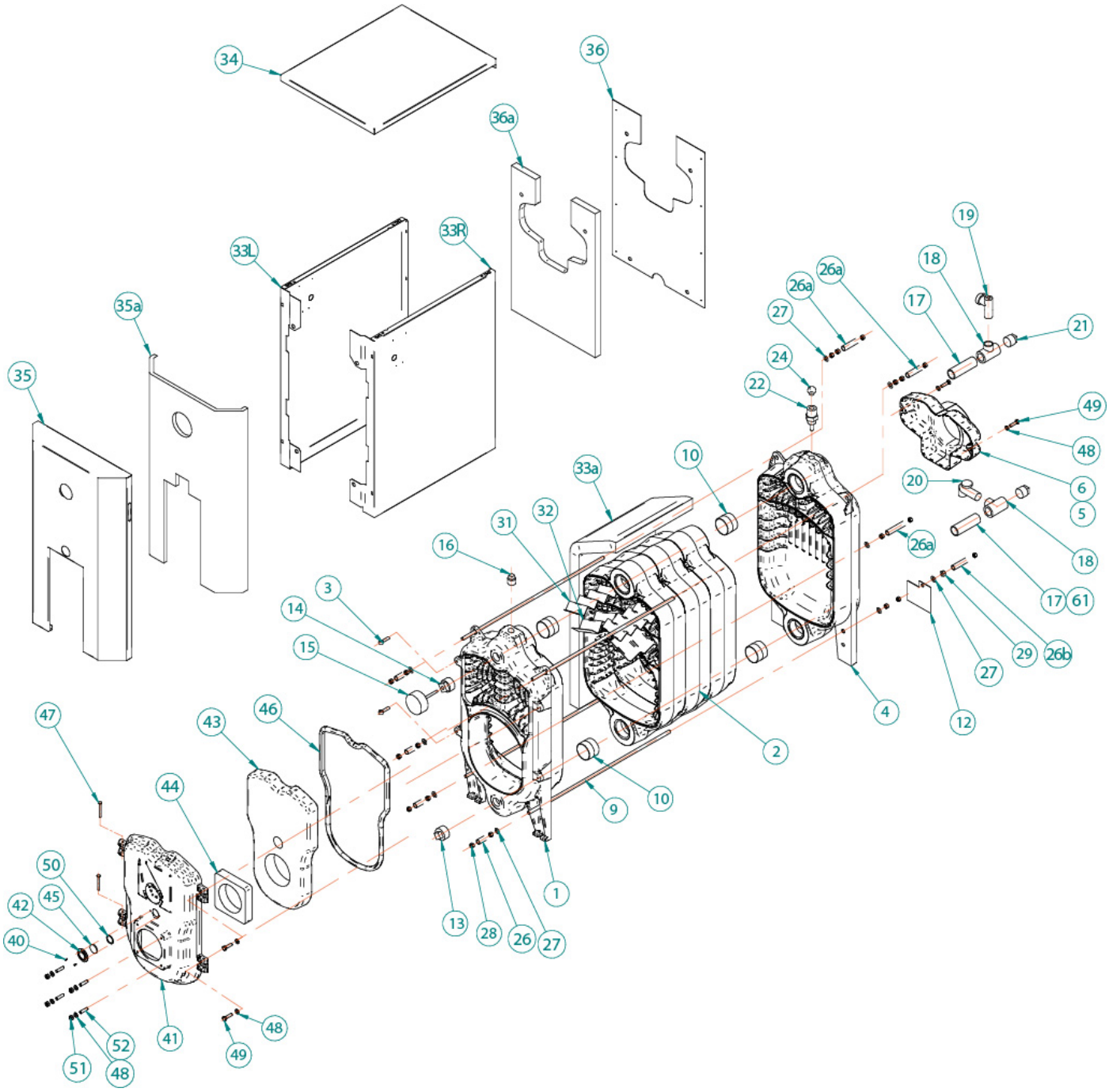
The burner manufacturer has supplied instructions for servicing and maintenance. Required burner maintenance should be performed as instructed. In addition, the following fuel and related items should be serviced on a regular basis:

- Replace fuel filter when clogged or at least once a year.
- Service fuel filters and fuel unit.
- Service burner housing and fan.
- **Replace nozzle** using only the size and type recommended by the boiler manufacturer.
- Service ignition system.
- Perform testing and check for proper operation of the primary control.

11.3 PERFORM COMBUSTION TEST

The burner must be adjusted to insure proper CO_2 levels with no more than a slight trace of Smoke. Continue adjustments until the proper level is achieved. **See section 9.**

12.0 EXPLODED VIEW



Exploded View List

Item	Part Number	Description	Qty
1	n/a	Front Section (See Block Complete)	1
2	n/a	Intermediate Section (See Block Complete)	-
3	201000170	M8x1.25 Hinge Eye Bolt	2
4	n/a	Rear Section (See Block Complete)	1
5	n/a	6" Flue Collar - 6, 7, 8, 9 Section (Not Available)	1
6	n/a	5" Flue Collar - 3 ,4, 5 Section (Not Available)	1
9	n/a	Tie Rod M10 (Not Available)	4
10	n/a	Push Nipple (Not Available)	8
12	n/a	ASME Plate (Not Available)	1
13	1395002	1-1/4" NPT Plug	1
14	240009346	1-1/4" x 1/4" Bushing	1
15	240009345	P & T Gauge/Tridicator	1
16	1395001	3/4" NPT Plug	1
17	240013908	1" x 2-1/2" NPT Nipple	2
18	240010727	1" x 1" x 3/4" NPT Tee	2
19	VR-001.01	PRV 3/4"	1
20	240009323	Drain Valve 3/4"	1
21	1395004	1" NPT Plug	2
22	240007709	Immersion Well 3/4"	1
24	240007713	Grommet	1
26	201000171	Front Jacket Spacer 1-1/4"	4
26A	201000172	Rear Jacket Spacer 3"	1
26B	201000173	Rear Jacket Spacer 2-1/4"	3
27	201000174	M10 Flat Washer	9
28	201000175	M10x1.5 Hex Nut	19
29	n/a	M10 Nut Anti Tamper (Not Available)	1
31	240013922	Turbulator Upper , 3 Section	2
31	240013924	Turbulator Upper, 4 Section / Lower, 5 Section	2
31	240013926	Turbulator Upper , 5 Section	2
31	240013928	Turbulator Upper , 6 Section	2
31	240013929	Turbulator Upper , 7-9 Section	2
32	240013923	Turbulator Lower, 3 Section	2
32	240013925	Turbulator Lower, 4 Section	2
33A	550004510	Boiler Block Insulation, 3 Section	1
33A	550004511	Boiler Block Insulation, 4 Section	1
33A	550004512	Boiler Block Insulation, 5 Section	1
33A	550004513	Boiler Block Insulation, 6 Section	1
33L	550004493	Jacket Side Panel - Left, 3 Section	1
33L	550004494	Jacket Side Panel - Left, 4 Section	1
33L	550004495	Jacket Side Panel - Left, 5 Section	1
33L	550004496	Jacket Side Panel - Left, 6 Section	1
33R	550004497	Jacket Side Panel - Right, 3 Section	1
33R	550004498	Jacket Side Panel - Right, 4 Section	1
33R	550004499	Jacket Side Panel - Right, 5 Section	1
33R	550004500	Jacket Side Panel - Right, 6 Section	1
34	550004501	Jacket Panel - Top, 3 Section	1
34	550004502	Jacket Panel - Top, 4 Section	1
34	550004503	Jacket Panel - Top, 5 Section	1
34	550004504	Jacket Panel - Top, 6 Section	1
35	550004505	Jacket Panel - Front	1

Exploded View List

35A	n/a	Jacket Panel - Front Insulation (See Jacket Panel - Front)	1
36	550004506	Jacket Panel - Rear	1
36A	550004515	Jacket Panel - Rear Insulation	1
40	201000176	Rivet - Sight Glass	2
41	240013935	Front Door	1
42	240013932	Sight Glass Frame	1
43	240013936	Door Insulation Block	1
44	240013937	Burner Tube Insulation	1
45	240013933	Sight Glass	1
46	240013938	Door Rope Gasket	1
47	201000177	Hinge Pin	1
48	201000178	M8 Flat Washer-Burner Mounting	6
49	201000179	M8x1.25x50mm Stud Full Thrd-Door Closure	2
49A	201000182	M8x1.25 Hex Nut, Serrated Flange-Door Closure	2
50	240013934	Sight Glass Gasket	2
51	201000181	M8x1.25 Hex Nut-Burner Mounting	4
52	201000180	M8x1.25 Stud, Thrd Ends-Burner Mounting	4
Not Shown	912000161	3 Section Block, Complete (Includes 1-14, 16, 22, 26-32, 40-52)	-
Not Shown	912000162	4 Section Block, Complete (Includes 1-14, 16, 22, 26-32, 40-52)	-
Not Shown	912000163	5 Section Block, Complete (Includes 1-14, 16, 22, 26-32, 40-52)	-
Not Shown	912000164	6 Section Block, Complete (Includes 1-14, 16, 22, 26-32, 40-52)	-
Not Shown	912000165	7 Section Block, Complete (Includes 1-14, 16, 22, 26-32, 40-52)	-
Not Shown	912000166	8 Section Block, Complete (Includes 1-14, 16, 22, 26-32, 40-52)	-
Not Shown	912000167	9 Section Block, Complete (Includes 1-14, 16, 22, 26-32, 40-52)	-
Not Shown	201000183	Jacket Clip	-
Not Shown	240013939	Front Door-Complete (Includes 40-52)	-
Not Shown	240009347	Control, Hydrostat 3250 Plus	-
Not Shown	240007708	Sensor/Thermistor, 48"	-
Not Shown	240013907	Remote Mount Kit, Control	-
Not Shown	2400007147	Flex Oil Line	-
Not Shown	550004507	Extension Side Panel - Left, 7-9 Section	-
Not Shown	550004508	Extension Side Panel - Right, 7-9 Section	-
Not Shown	550004509	Extension Top, 7-9 Section	-
Not Shown	550004514	Extension Insulation, 7-9 Section	-

13.0 START-UP TEST RESULTS

Model**:** _____ Serial Number: _____

Boiler, # sections ☐

Date of installation: _____

Installer (name & address): _____

_____

_____

TEST RESULTS

Size of unit (Btu/h): _____

Nozzle: _____ Oil Pressure (psi): _____

Chimney size _____ Direct vent system (DVS) _____

Burner adjustments: Riello **F3/BF3**_____ Riello **F5/BF5**_____ Beckett AFG_____

Carlin **EZLF**_____ Carlin **EZ10**_____

Turbulator:_____ Air Gate:_____ Air Band_____ Air Shutter_____

Head Setting (Carlin)_____

Air Setting (Carlin)_____

Smoke result: #0_____ TRACE_____ #1_____

Combustion Results: _____ CO_2 %

Chimney draft: _____ " W.C.

Ambient temperature: _____ °F

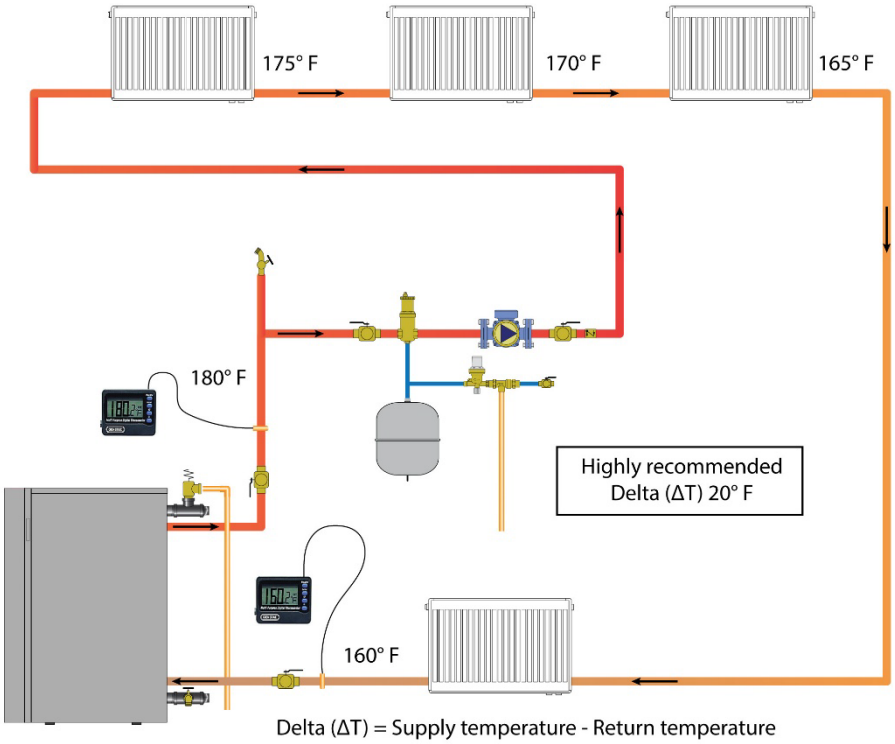
Gross flue temperature: _____ °F

System Delta Temperature: _____ °F
(method shown on next page)

DELTA TEMPERATURE TEST PROCEDURE

Delta Temp = Supply Temp – Return Temp

This is an example only for a Delta temperature test procedure comprehension



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