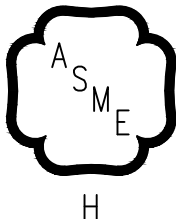


# INSTALLATION, OPERATING AND SERVICE INSTRUCTIONS CG-E™ SERIES GAS BOILER



BEFORE INSTALLATION: READ THIS MANUAL

## SAVE THESE INSTRUCTIONS

Installing contractor and homeowner should read and be informed as to the proper installation and operation of this boiler. The manufacturer will not be responsible for improper installation or operation. This manual and all associated instruction material should be conspicuously posted near the boiler.

For service or repairs to boiler, call your heating contractor. When seeking information on boiler, provide Boiler Model Number and Serial Number as shown on Rating Label.

Boiler Model Number CG __ E	Boiler Serial Number	Installation Date
Heating Contractor		Phone Number
Address		



**New Yorker®**  
RESIDENTIAL HEATING BOILERS

The City of New York requires a Licensed Master Plumber supervise the installation of this product.

The Massachusetts Board of Plumbers and Gas Fitters has approved the CG-E™ Series Boiler. See the Massachusetts Board of Plumbers and Gas Fitters website, [http://license.reg.state.ma.us/pubLic/pl\\_products/pb\\_pre\\_form.asp](http://license.reg.state.ma.us/pubLic/pl_products/pb_pre_form.asp) for the latest Approval Code or ask your local Sales Representative.

The Commonwealth of Massachusetts requires this product to be installed by a licensed Plumber or Gas fitter.

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

DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death, serious injury or substantial property damage.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in moderate or minor injury or property damage.

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death, serious injury or substantial property damage.

NOTICE

Indicates special instructions on installation, operation, or maintenance which are important but not related to personal injury hazards.

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**Table 1A: Dimensions and Connections**

Boiler Model	Depth	Width	Height	Supply NPT (inch)	Return NPT (inch)	Vent (inch)	Gas NPT (inch)	Relief Valve NPT (inch)	Drain NPT (inch)
CG30E	32	14	40	1¼	1¼	4	½	¾	¾
CG40E	32	16	40	1¼	1¼	5	½	¾	¾
CG50E	32	19	40	1¼	1¼	6	½	¾	¾
CG60E	32	22	40	1¼	1¼	6	½	¾	¾
CG70E	32	25	40	1¼	1¼	7	¾	¾	¾
CG80E	32	28	40	1¼	1¼	7	¾	¾	¾
CG90E	32	31	40	1¼	1¼	8	¾	¾	¾

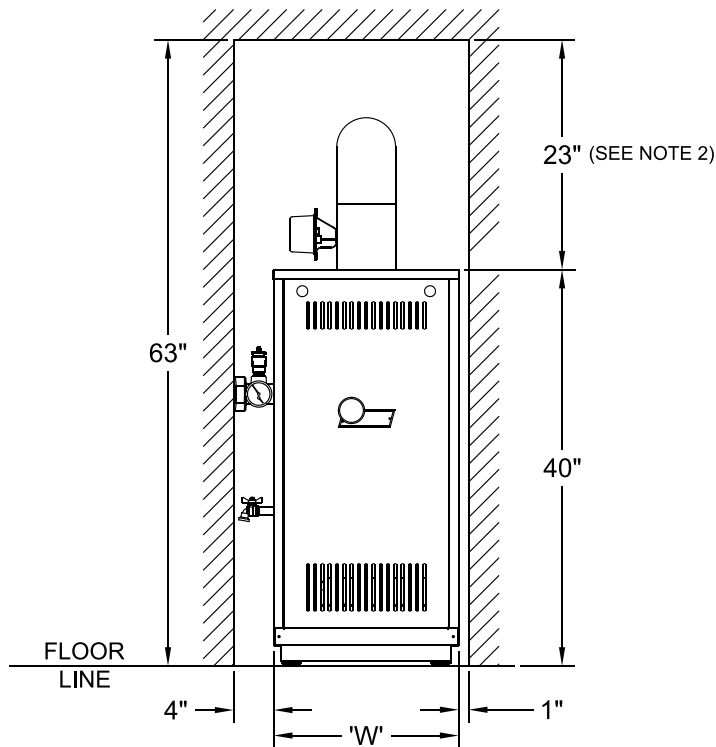
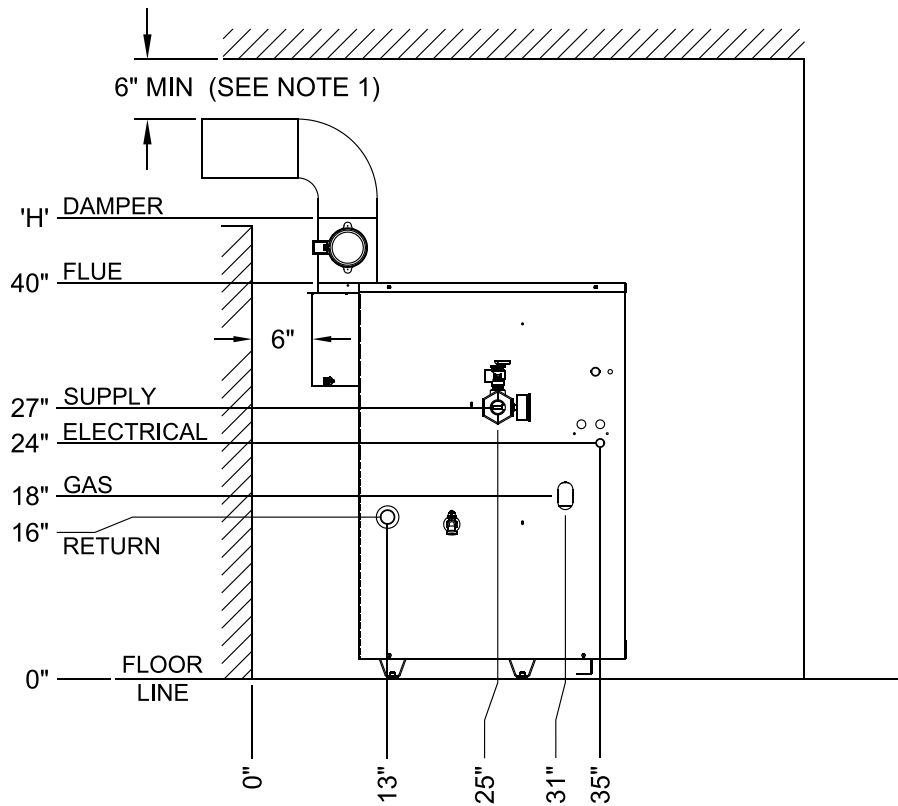
**Table 1B: Inputs, Weights and Volumes**

Boiler Model	Input (MBH) <sup>(1)</sup>	Shipping Weight (lbs)	Empty Weight (lbs)	Water Content (gal)
CG30E	70	254	180	2
CG40E	105	304	231	3
CG50E	140	357	284	4
CG60E	175	405	332	5
CG70E	210	462	382	6
CG80E	245	518	438	7
CG90E	280	564	484	8

<sup>(1)</sup> Input ratings can be used for elevations up to 2000 ft. Refer to System Start-up and Checkout Sections for elevations 2000 ft. or higher.

### **Electrical Requirements: 120VAC, 60 Hz, 1-ph, Less than 12A**

Maximum Allowable Working Pressure - 50 psi. Boiler shipped from factory with a 30 psi relief valve.



MODEL	'W'	'H'
CG30E	14"	45"
CG40E	16"	45"
CG50E	19"	45-1/2"
CG60E	22"	45-1/2"
CG70E	25"	46"
CG80E	28"	46"
CG90E	31"	47"

**NOTES:**

1. MINIMAL RADIAL DISTANCE AROUND VENT PIPE AND BREECHING FOR SINGLE-WALL METAL PIPE VENT CONNECTOR. OTHERWISE, FOLLOW VENT CONNECTOR MANUFACTURER'S RECOMMENDED CLEARANCES.
2. ADD HEIGHT REQUIRED TO MAINTAIN 6" CLEARANCE FROM ALL BREECHING COMPONENTS.

**Figure 1: Minimum Clearance to Combustible Materials and Alcove Dimensions**

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## I. Pre-Installation

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### WARNING

**Carefully read all instructions before installing boiler. Failure to follow all instructions in proper order can cause personal injury or death.**

- A. Inspect shipment** carefully for any signs of damage. All equipment is carefully manufactured, inspected and packed. Our responsibility ceases upon delivery of boiler to carrier in good condition. Any claim for damage or shortage in shipment must be filed immediately against carrier by consignee. No claims for variances or shortages will be allowed by Boiler Manufacturer, unless presented within sixty (60) days after receipt of equipment.
- B. Installation must conform** to the requirements of the authority having jurisdiction. In the absence of such requirements, installation must conform to *National Fuel Gas Code*, ANSI Z223.1/NFPA 54.
- C. Appliance is design certified for installation on combustible flooring.** The boiler must not be installed on carpeting.
- D. Provide clearance between boiler jacket and combustible material** in accordance with local fire ordinance. Refer to Figure 1 for minimum clearance from combustible material for alcove installation. Provide 1/2" clearance from water piping to combustible materials.
- E. Provide practical service clearances.** A minimum of 24" from the left side and front jacket panels is recommended for servicing but may be reduced to minimums shown in Figure 1.

- F. Install on level floor.** For basement installation provide concrete base if floor is not level or if water may be encountered on floor around boiler.

### CAUTION

**ASSURE THAT THE FRONT AIR DAM is in place and undamaged. A damaged front air dam will negatively affect the performance of this boiler, which can cause serious property damage, personal injury or death.**

- G. Protect gas ignition system components** from water (dripping, spraying, rain, etc.) during boiler operation and service (circulator replacement, condensate trap, control replacement, etc.).
- H. Provide combustion and ventilation air** in accordance with the section "Air for Combustion and Ventilation," of the *National Fuel Gas Code*, ANSI Z223.1/NFPA 54, or applicable provisions of local building codes.

### WARNING

**Adequate combustion and ventilation air must be provided to assure proper combustion.**

- I. Do not install boiler where gasoline** or other flammable vapors or liquids, or sources of hydrocarbons (i.e. bleaches, cleaners, chemicals, sprays, paint removers, fabric softeners, etc.) are used or stored.

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## II. Unpack Boiler

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### CAUTION

**Do not drop boiler. Do not bump boiler jacket against floor.**

- A.** Move boiler to approximate installed position.
- B.** Remove all crate fasteners.
- C.** Lift outside container and remove with all other inside protective spacers and bracing. Save two of the wooden slats from the container sleeve for use in Steps E and F.
- D.** Remove all boiler hold-down fasteners.
- E.** Tilt the boiler to one side and slide a wooden slat under the two raised feet.
- F.** Tilt the boiler to the other side and slide another wooden slat under the two raised feet.
- G.** Slide the boiler forward or backward off the skid using the two wooden slats as runners.
- H.** Move boiler to its permanent location.

### III. Water Piping and Trim

#### WARNING

Failure to properly pipe boiler may result in improper operation and damage to boiler or building.

- A. Design and install boiler and system piping** to prevent oxygen contamination of boiler water. Oxygen contamination sources are system leaks requiring addition of makeup water, fittings, and oxygen permeable materials in distribution system. Eliminate oxygen contamination by repairing system leaks, repairing fittings, and using non-permeable materials in distribution system.
- B. Install circulator** with flanges, gaskets and bolts provided.
- C. Install Safety Relief Valve.** See Figure 2. Safety Relief Valve must be installed with spindle in vertical position.

#### WARNING

Safety relief valve discharge piping must be piped near floor to eliminate potential of severe burns. Do not pipe in any area where freezing could occur. Do not install any shut-off valves.

- D. Connect system supply and return piping** to boiler. Refer to Figures 2, 5 and 6. Also consult Residential Hydronic Heating Installation and Design I=B=R Guide. Maintain minimum ½ inch clearance from hot water piping to combustible materials.

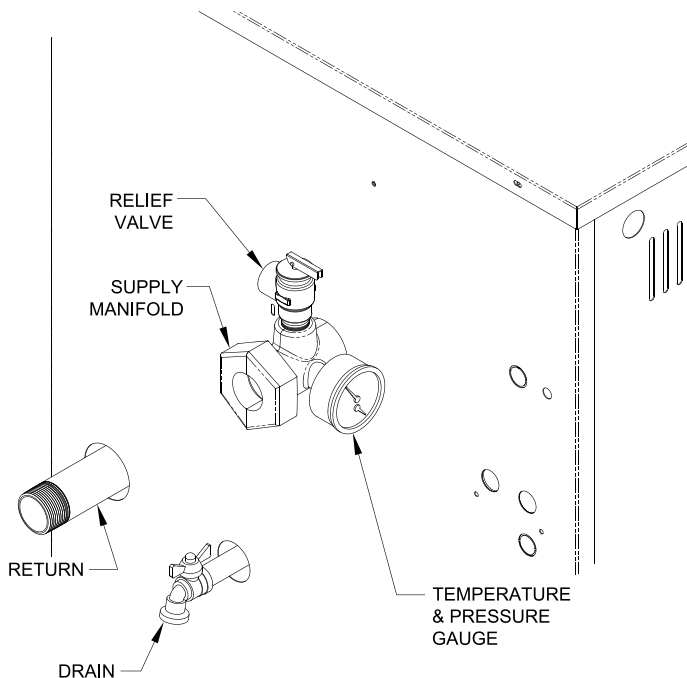


Figure 2: Near Boiler Piping

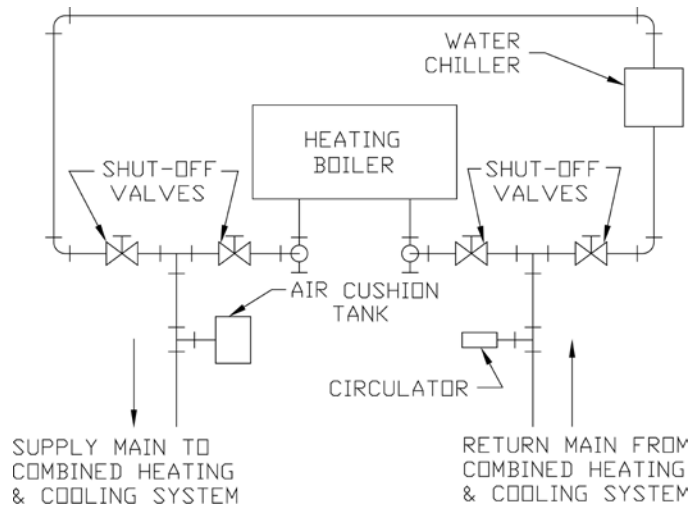


Figure 3: Recommended Piping for Combination Heating & Cooling (Refrigeration) Systems

- E. If boiler is used in connection with refrigeration systems,** boiler must be installed with chilled medium piped in parallel with the heating boiler using appropriate valves to prevent chilled medium from entering boiler. See Figure 3. Also consult Residential Hydronic Heating Installation and Design I=B=R Guide.
- F. If boiler is connected to heating coils** located in air handling units where they may be exposed to refrigerated air, boiler piping must be equipped with flow control valves or other automatic means to prevent gravity circulation of boiler water during operation of cooling system.
- G. Use a boiler bypass** if the boiler is to be operated in a system which has a large volume or excessive radiation where low boiler water temperatures may be encountered (i.e. converted gravity circulation system, etc.).

#### CAUTION

Boiler return water cannot be lower than 130°F for proper function.

Install bypass between boiler supply and return in near boiler piping as shown in Figures 5 and 6. Bypass should be same size as the supply and return lines with valves located in bypass and supply outlet as illustrated in Figures 5 and 6 in order to regulate water flow to maintain higher boiler water temperatures. Set by-pass and boiler supply valves to half throttle position to start. Operate boiler until system water temperature reaches normal operating range.

Adjust valves to provide 180° to 200°F supply water temperature. Opening the boiler supply valve will raise system temperature, while opening by-pass valve will lower system supply temperature.

**H. If it is required to perform a long term pressure test** of the hydronic system, the boiler should first be isolated to avoid a pressure loss due to the escape of air trapped in the boiler.

To perform a long term pressure test including the boiler, ALL trapped air must first be removed from the boiler.

A loss of pressure during such a test, with no visible water leakage, is an indication that the boiler contained trapped air.

## I. Optional LWCO Installation

### WARNING

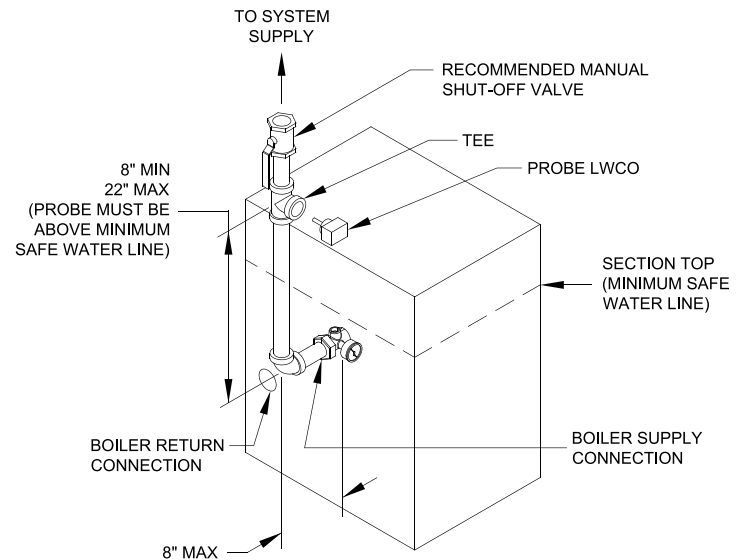
**DO NOT ATTEMPT to cut factory wires to install an aftermarket Low Water Cut Off (LWCO). Only use connections specifically identified for Low Water Cut Off.**

**In all cases, follow the Low Water Cut Off (LWCO) manufacturer's instructions.**

1. A low water cutoff is required to protect a gas-fired hot water boiler when any connected heat distributor (radiation) is installed below the top of the hot water boiler (i.e. baseboard on the same floor level as the boiler). In addition, some jurisdictions require the use of a LWCO with a hot water boiler as a redundant safety control.

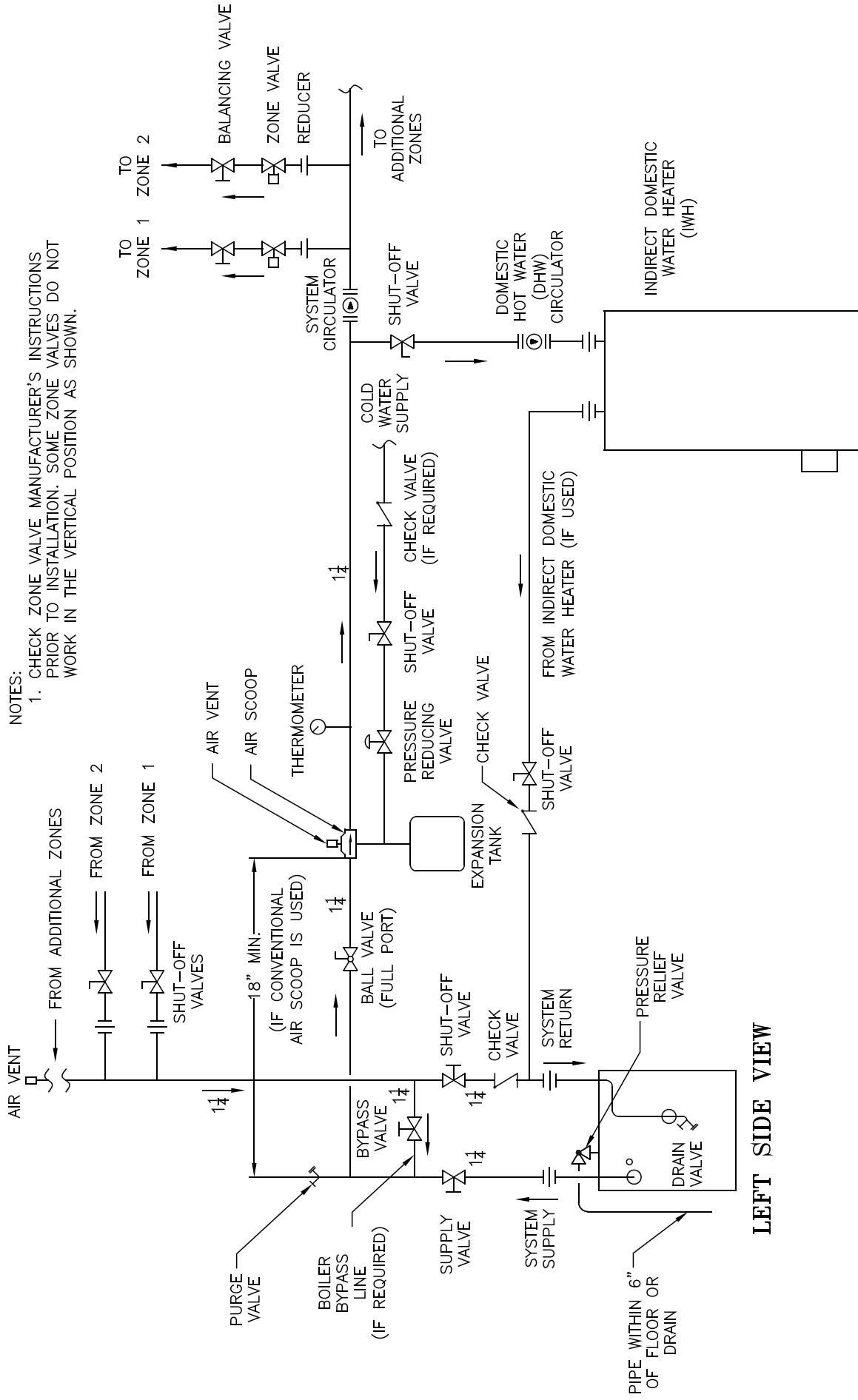
It is recommended that the LWCO control is installed above the boiler to provide the highest level of protection. However, where the LWCO control is approved by the LWCO control manufacturer for installation in a high boiler tapping of a water boiler, the use of the listed LWCO control is permitted when it is installed according to the LWCO manufacturer's instructions.

2. The recommended location for a LWCO on gas hot water boilers is above the boiler, in the supply piping. The minimum safe water level of a water boiler is at the uppermost top of the boiler; that is, it must be full of water to operate safely.
3. Typically, in residential applications, a probe type LWCO is used instead of a float type, due to their relative costs and the simplicity of piping for a probe LWCO.
4. Piping and fittings required to install LWCO are **field supplied**.



**Figure 4: Recommended Probe LWCO Location**

5. When constructing a piping tree to install LWCO select fittings (tees, elbows etc) and nipples to have the same size (NPT) as boiler supply connection. At minimum, 1-1/4" tee with 3/4" branch outlet is required to connect the probe LWCO to the supply piping. See Figure 4. **DO NOT REDUCE THE SIZE OF NEAR BOILER SUPPLY FITTINGS AND NIPPLES.**
6. Installation of manual shutoff valve located above the LWCO and the boiler is recommended to allow servicing. Thus LWCO probe can be removed for inspection without draining the heating system. An annual inspection of the probe is recommended.
7. The presence of water covering properly installed LWCO probe will cause the normally open contact of the LWCO to close, thus providing continuity of the 24 VAC service to the boiler gas valve. When water level drops below probe, LWCO contact opens up breaking 24V supply to gas valve and preventing the boiler to fire.
8. CG-E Series gas hot water boilers have a "plug-in" provision in factory wiring that will accept optional 24VAC probe LWCO harness connector. The optional LWCO kit (P/N 104083-01) includes 24VAC probe LWCO, Harness and Instructions addressing piping, wiring and testing after installation.



**Figure 5: Recommended Water Piping for Zone Valve Zoned Heating Systems**





## IV. Venting

### A. Install Vent Damper

OPEN THE VENT DAMPER CARTON and remove the Installation Instructions. READ THE INSTALLATION INSTRUCTIONS THOROUGHLY before proceeding.

The automatic gas control valve supplied on each CG-E Series boiler provides the redundancy referenced in the vent damper Installation Instructions.

#### CAUTION

**Do not use one vent damper to control two heating appliances.**

1. The vent damper must be the same size as the outlet of the Draft Hood supplied with the boiler (see Table 1A). Unpack the damper carefully - DO NOT FORCE IT CLOSED! Forcing the damper may damage the gear train and void the warranty.
2. Mount the vent damper assembly onto the canopy/diverter. (Refer to Figure 7 and to instructions packed with the vent damper for specific instructions). Do not modify either the draft hood or vent damper.

#### NOTICE

**Provide adequate clearance for servicing.**

3. Locate vent damper position indicating means to be visible following installation.

#### WARNING

**Provide 6" minimum clearance between damper and combustible construction.**

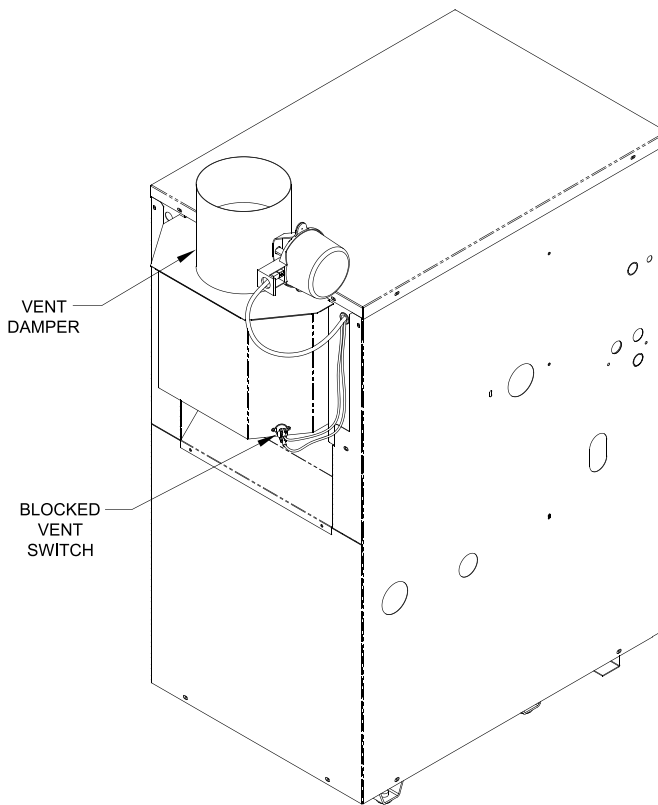
4. Plug the factory harness vent damper connector into damper motor polarized receptacle.

#### DANGER

**Inspect existing chimney before installing boiler. Failure to clean or replace perforated pipe or tile lining will cause severe injury or death.**

**B. Inspect chimney** and remove any obstructions or restrictions. Clean chimney if previously used for solid or liquid fuel-burning appliances or fireplaces.

**C. Install vent system** in accordance with "Venting of Equipment" of the *National Fuel Gas Code*, ANSI Z223.1/NFPA 54, or applicable provisions of local building codes. The CG-E Series boiler is a Category I, draft hood equipped appliance.



**Figure 7: Vent Damper Installation**

#### WARNING

### D. If an Existing Boiler is Removed:

When an existing boiler is removed from a common venting system, the common venting system is likely to be too large for proper venting of the appliances remaining connected to it.

At the time of removal of an existing boiler, the following steps shall be followed with each appliance remaining connected to the common venting system placed in operation, while the other appliances remaining connected to the common venting system are not in operation:

- a. Seal any unused openings in the common venting system.
- b. Visually inspect the venting system for proper size and horizontal pitch and determine there is no blockage or restriction, leakage, corrosion, and other deficiencies which could cause an unsafe condition.
- c. Insofar as is practical, close all building doors and windows and all doors between the space in which the appliances remaining connected to the common venting system are located and other spaces of the

building. Turn on clothes dryers and any appliance not connected to the common venting system. Turn on any exhaust fans, such as range hoods and bathroom exhausts, so they will operate at maximum speed. Do not operate a summer exhaust fan. Close fireplace dampers.

- d. Place in operation the appliance being inspected. Follow the Lighting (or Operating) Instructions. Adjust thermostat so appliance will operate continuously.
- e. Test for spillage at the draft hood relief opening after 5 minutes of main burner operation. Use the flame of a match or candle, or smoke from a cigarette, cigar or pipe.

- f. After it has been determined that each appliance remaining connected to the common venting system properly vents when tested as outlined above, return doors, windows, exhaust fans, fireplace dampers and any other gas-burning appliance to their previous condition of use.
- g. Any improper operation of the common venting system should be corrected so the installation conforms with the *National Fuel Gas Code*, ANSI Z223.1/NFPA 54. When resizing any portion of the common venting system, the common venting system should be resized to approach the minimum size as determined using the appropriate tables in Chapter 13 of the *National Fuel Gas Code*, ANSI Z223.1/NFPA 54.

## V. Gas Piping

**A. Size gas piping.** Design system to provide adequate gas supply to boiler. Consider these factors:

1. Allowable pressure drop from point of delivery to boiler. Maximum allowable system pressure is  $\frac{1}{2}$  psig. Actual point of delivery pressure may be less; contact gas supplier for additional information. Minimum gas valve inlet pressure is listed on rating label.
2. Maximum gas demand. Consider existing and expected future gas utilization equipment (i.e. water heater, cooking equipment).
3. See Table 1B for boiler inputs.

**B. Connect boiler gas valve to gas supply system.**

1. Use methods and materials in accordance with local plumbing codes and requirements of gas supplier. In absence of such requirements, follow *National Fuel Gas Code*, ANSI Z223.1/NFPA 54.
2. Use thread (joint) compounds (pipe dope) resistant to action of liquefied petroleum gas.

3. Install sediment trap, ground-joint union and manual shut-off valve upstream of boiler gas control valve. See Figure 8.

4. All above ground gas piping upstream from manual shut-off valve must be electrically continuous and bonded to a grounding electrode. Do not use gas piping as grounding electrode. Refer to *National Electrical Code*, ANSI/NFPA 70.

**C. Pressure test.** The boiler and its gas connection must be leak tested before placing boiler in operation.

1. Protect boiler gas control valve. For all testing over  $\frac{1}{2}$  psig, boiler and its individual shutoff valve must be disconnected from gas supply piping. For testing at  $\frac{1}{2}$  psig or less, isolate boiler from gas supply piping by closing boiler's individual manual shutoff valve.
2. Locate leaks using approved combustible gas detector, soap and water, or similar nonflammable solution. Do not use matches, candles, open flames, or other ignition source.

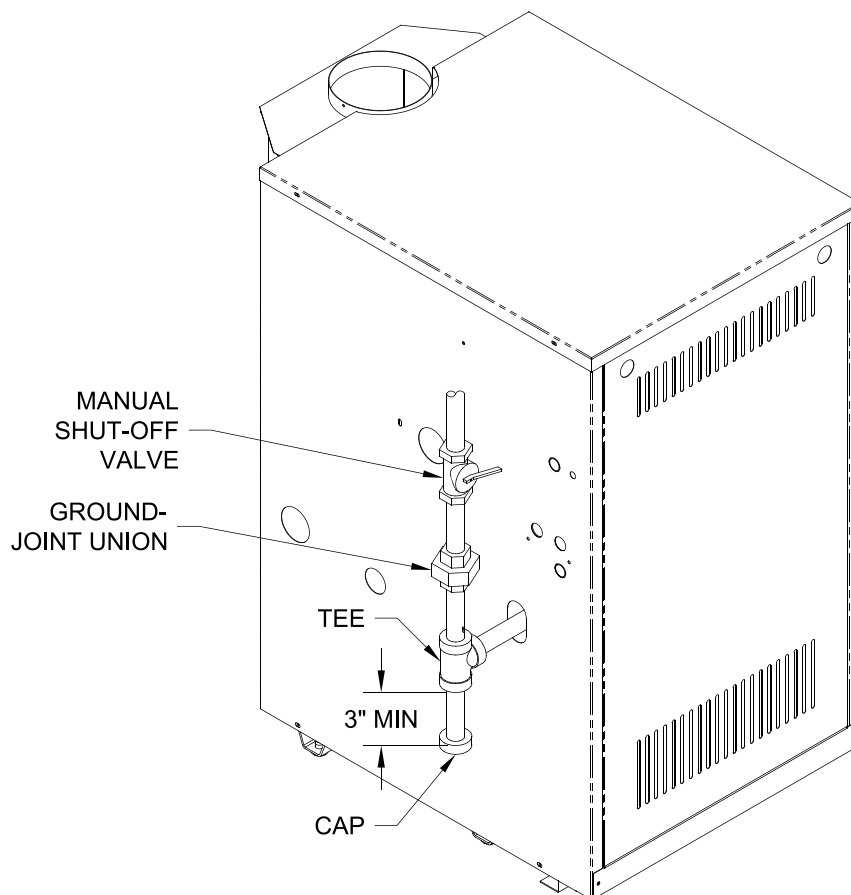


Figure 8: Pilot and Gas Piping

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## VI. Electrical

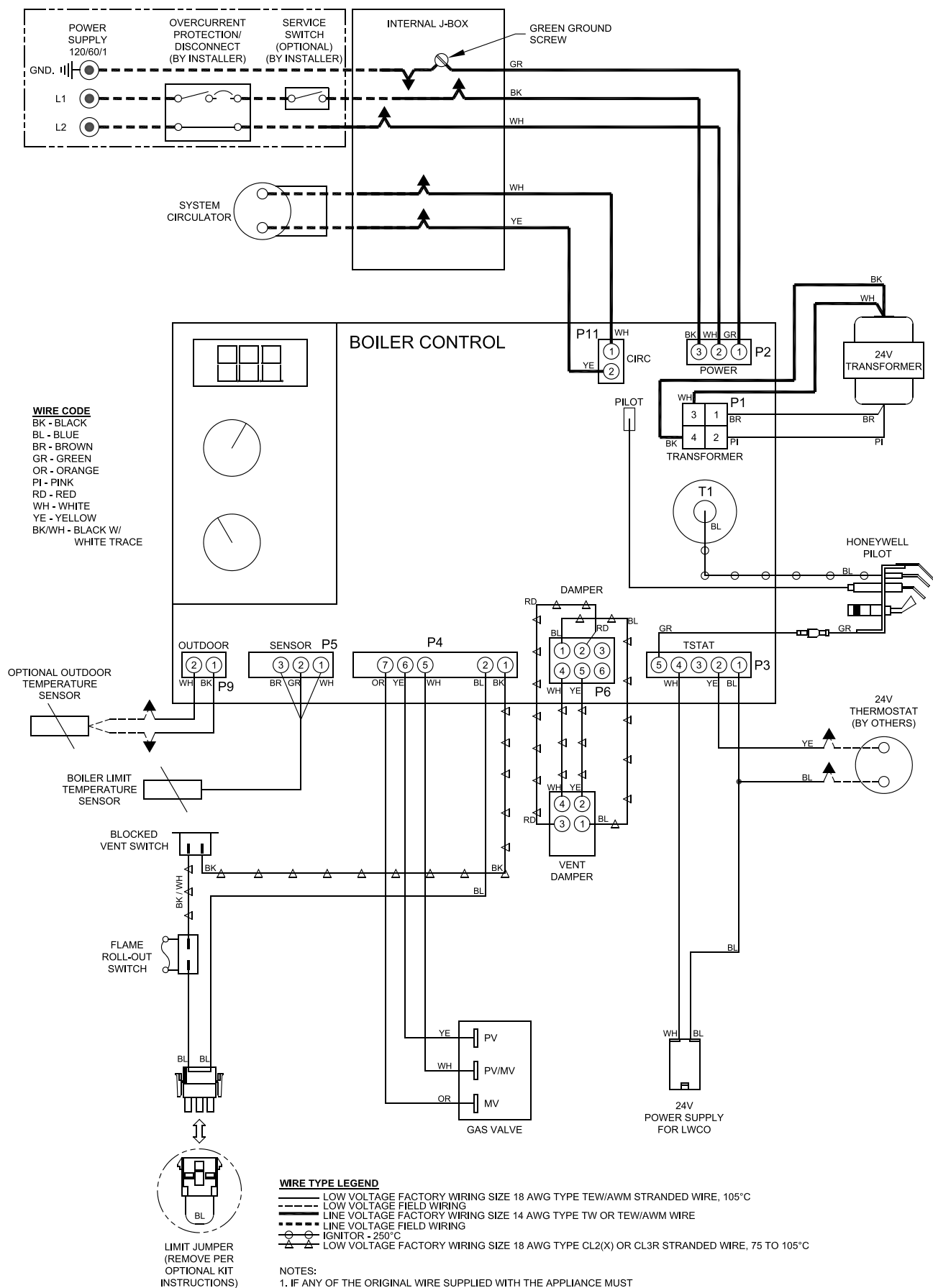
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- A. General.** Install wiring and electrically bond boiler to ground in accordance with requirements of authority having jurisdiction, or in absence of such requirements, with the *National Electrical Code*, ANSI/NFPA 70.
- B. Install thermostat.** Locate on inside wall approximately 4 feet above floor. Do not install on outside wall, near fireplace, or where influenced by drafts or restricted air flow, hot or cold water pipes, lighting fixtures, television, or sunlight. Allow free air movement by avoiding placement of furniture near thermostat.
- C. Wire boiler.** Boiler is rated for 120 VAC, 60 hertz, less than 12 amperes. A separate electrical circuit must be run from the main electrical service with an over-current device/disconnect in the circuit. A service switch is recommended and may be required by some local jurisdictions. Connect to black and white wires and green ground screw. See Figures 9 and 10.

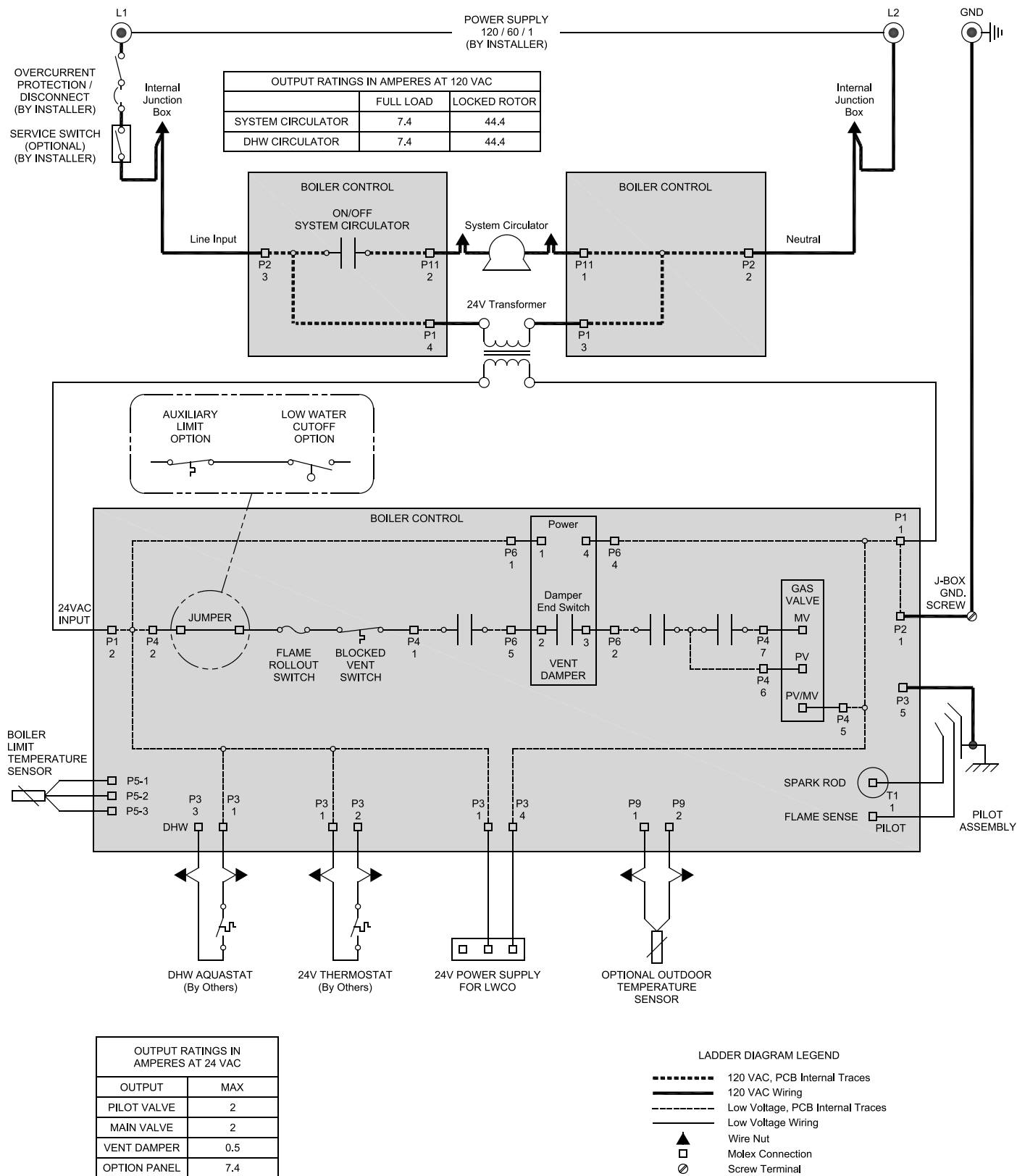
- D. For installations using zone valves** provide separate transformer for zone valve wiring. Consult zone valve manufacturer for assistance. See Figure 11.

### CAUTION

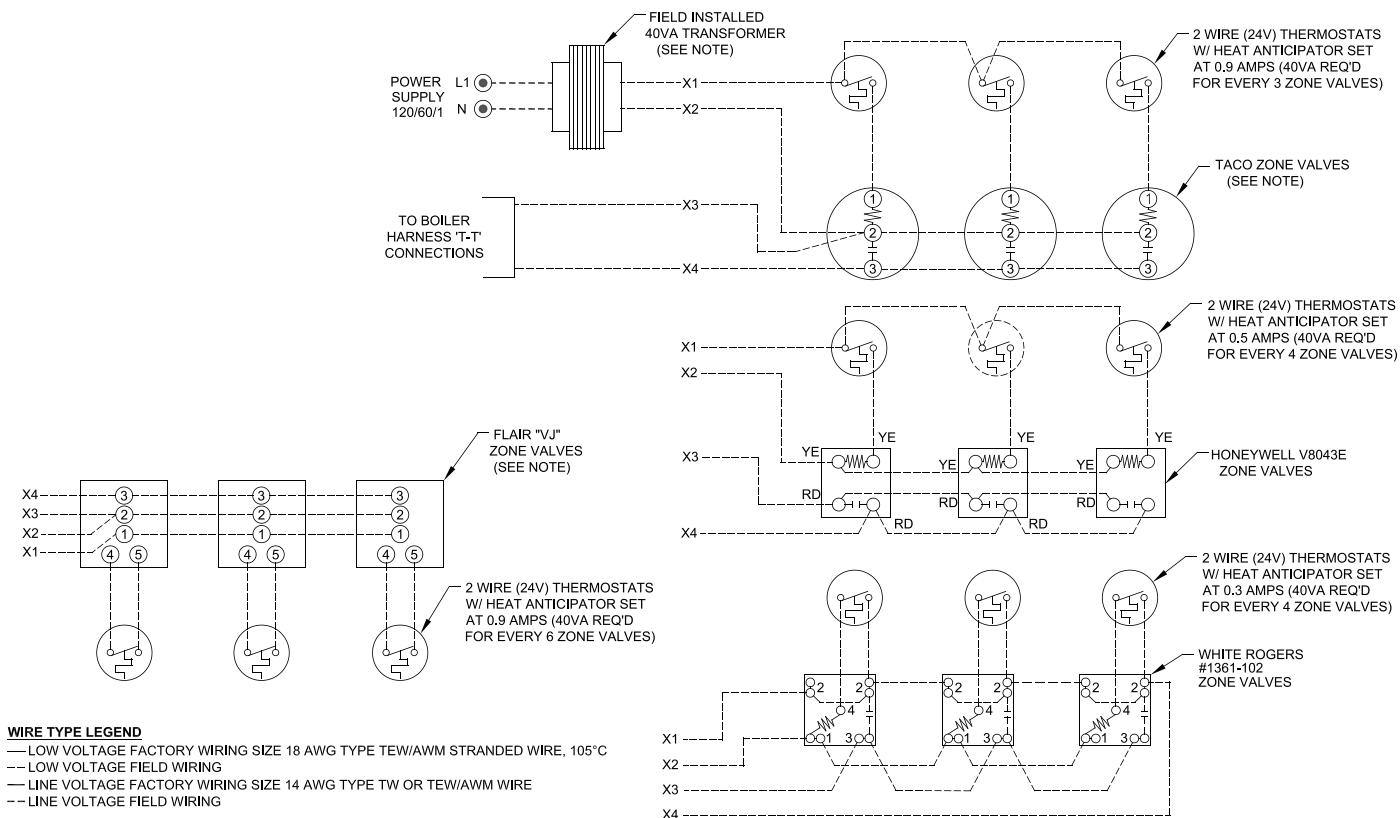
**This boiler contains controls which may cause the boiler to shut down and not restart without service. If damage due to frozen pipes is a possibility, the heating system should not be left unattended in cold weather; or appropriate safeguards and alarms should be installed on the heating system to prevent damage if the boiler is inoperative.**



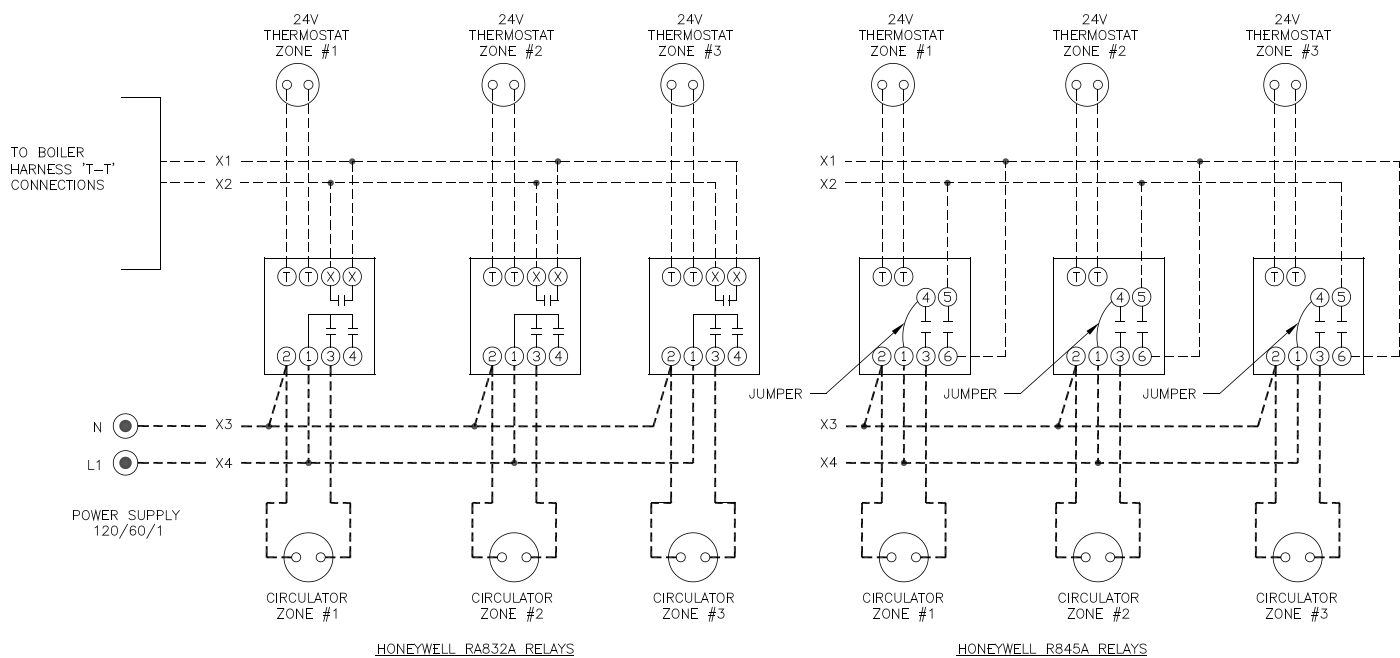
**Figure 9: Wiring Connection Diagram**



**Figure 10: Schematic Ladder Diagram**



**Figure 11: Wiring Schematic, Zone Valves**



**Figure 12: Wiring Schematic, Zone Circulators**