Read all instructions before installing

**Installer**

Leave this manual in the envelope and affix near the boiler.

Consider venting and piping locations when determining boiler location.

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

**User**

Boiler Manual is only to be used and boiler installed by a qualified installer/service technician.

User’s Information Manual is for your reference.

Regular service by your qualified service technician is recommended.
When Calling or Writing About the Boiler

Please have boiler model number from boiler rating label and CP number from boiler jacket. You may list the CP number in the space provided on page 33.
# Table of Contents

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Special note on combustion air supply:
All boilers experience some condensation in section assembly during start-up. Flue gas condensate is slightly acidic. In most cases pH level is not harmful to vents or drains. When combustion air is contaminated by vapors from products or areas listed below, condensate acidic levels increase. Higher acidic levels attack many materials, including stainless steels.

You may need to isolate the boiler if installation is in an area containing contaminants listed below, which will induce acidic contamination.
Products causing contaminated air:
1. spray cans containing chloro/fluorocarbons
2. permanent wave solutions
3. chlorinated waxes/cleaners
4. chlorine-based swimming pool chemicals
5. calcium chloride used for thawing
6. sodium chloride used for water softening
7. refrigerant leaks
8. paint or varnish removers
9. hydrochloric acid/muriatic acid
10. cements and glues
11. antistatic fabric softeners used in clothes dryers
12. chloride-type bleaches, detergents, and cleaning solvents found in household laundry rooms
13. adhesives used to fasten building products
14. . . . and other similar products
Areas causing contaminated combustion air:
1. dry cleaning/laundry areas and shops
2. metal fabrication plants
3. beauty shops
4. refrigeration repair shops
5. photo processing plants
6. auto body shops
7. plastic manufacturing plants
8. furniture refinishing areas and shops
9. new building construction
10. remodeling areas
11. . . . and other similar areas

To prevent potential of severe personal injury or death, check for products or areas listed above before installing boiler. If found:
- remove products permanently.
- OR
- isolate boiler and provide outside combustion air. See national, provincial or local codes for further information.

Installations must comply with latest editions:
- U.S.
  - National, state and local codes, laws, regulations and ordinances.
  - Standard for Controls and Safety Devices for Automatically Fired Boilers, ANSI/ASME CSD-1, when required.
  - National Electrical Code.
- Canada
  - National, provincial and local codes, laws, regulations and ordinances.
  - CAN/CGA B149.1 or B149.2 Installation Code.

Before locating boiler:
- Check for nearby connections to:
  - System water piping.
  - Venting connections.
  - Gas supply piping.
  - Electrical power.
- Check area around boiler. Remove any combustible materials, gasoline and other flammable liquids.

![WARNING](image)
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.

- Boiler must be installed so that gas control system components are protected from dripping or spraying water or rain during operation or service.
- If new boiler will replace existing boiler, check for and correct system problems, such as:
  1. System leaks, causing oxygen corrosion or section cracks from hard water deposits.
  2. Incorrectly sized expansion tank.
  3. Lack of antifreeze in boiler water, causing system and boiler to freeze and leak.
Provide clearances:

- Hot water pipes - at least 1/2 inch from combustible materials.
- Recommended service clearances - Figure 1.
- Minimum clearances for tight spaces - Figure 2.

Recommended service clearances

Minimum clearances for tight spaces
When removing existing boiler from common venting system:

**WARNING** Failure to follow all instructions listed below can result in flue gas spillage and carbon monoxide emissions, causing severe personal injury or death.

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.

1. Seal any unused openings in the common venting system.
2. 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.
3. 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 any 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.
4. Place in operation the appliance being inspected. Follow the operating instructions. Adjust thermostat so appliance will operate continuously.
5. Test for spillage at 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.
6. 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 conditions of use.

Any improper operation of the common venting system should be corrected so the installation conforms with the National Fuel Gas Code, ANSI Z223.1-latest edition. Correct by resizing to approach the minimum size as determined using the appropriate tables in Part 11 of that code. Canadian installations must comply with CAN/CGA B149.1 or B149.2 Installation Code.

Lay a foundation, if needed:

CGi boiler is approved for use on combustible flooring; however, boiler must not be installed on carpeting.

**WARNING** Do not install boiler on carpeting even if a foundation is used. Fire can result, causing severe personal injury, death or substantial property damage.

1. For residential garage installation, install boiler so burners are at least 18 inches above floor to avoid contact with gasoline fumes.
2. A level concrete or masonry foundation is required when:
   - Water could flood area.
   - Non-level conditions exist.

<table>
<thead>
<tr>
<th>Boiler Model</th>
<th>Length Inches</th>
<th>Width Inches</th>
<th>Min. Height Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>CGI - 25</td>
<td>25</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>CGI - 3</td>
<td>25</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>CGI - 4</td>
<td>25</td>
<td>15</td>
<td>2</td>
</tr>
<tr>
<td>CGI - 5</td>
<td>25</td>
<td>18</td>
<td>2</td>
</tr>
<tr>
<td>CGI - 6</td>
<td>25</td>
<td>21</td>
<td>2</td>
</tr>
<tr>
<td>CGI - 7</td>
<td>25</td>
<td>24</td>
<td>2</td>
</tr>
</tbody>
</table>
**Place the boiler:**
1. Leave boiler in crate and on pallet until installation site is ready.
2. Move entire crate and pallet next to selected location.
3. Remove crate.
4. Remove boiler from pallet:
   a. Tilt left side of boiler up and place a board under left legs.
   b. Tilt boiler the other way and place a board under right legs.
   c. Slide boiler backward off pallet and into position.

   **NOTICE** Do not drop boiler or bump jacket on floor or pallet. Damage to boiler can result.

5. Check level. Shim legs, if needed. Do not alter legs.
6. Remove front jacket door. Remove base access panel.
7. Check for correctly-sized manifold orifices from Table 2. The orifice size is stamped on the orifice spud barrel.

   **DANGER** Correctly-sized manifold orifices must be used. Failure to do so will result in severe personal injury, death or substantial property damage.

8. Level and straighten burners.

   **DANGER** Burners must be properly seated in burner rest slots with their openings face up. Main burner orifices must inject down center of burner. Failure to properly seat burners will result in severe personal injury, death or substantial property damage.

9. Reinstall burner access panel.

   **DANGER** Burner access panel must be in position during boiler operation to prevent momentary flame rollout on main flame ignition. Failure to do so will result in severe personal injury, death or substantial property damage.

**Perform hydrostatic pressure test:**
1. Pressure test boiler before attaching piping or electrical supply.
2. Remove shipping nipple from supply outlet. Remove relief valve.
3. Install air vent in tapping on top of boiler.
4. Plug remaining tappings, including relief valve opening.
5. Connect water supply. Fill boiler and purge all air. Test at 1-1/2 times working pressure.

   **WARNING** Do not leave boiler unattended. A cold water fill could expand and cause excessive pressure, resulting in severe personal injury, death or substantial property damage.

6. Check for maintained gauge pressure for more than 10 minutes. Visually check for leaks if gauge pressure drops.
7. Drain boiler and repair leaks if found.

   **DANGER** Do not use petroleum-based compounds to repair leaks. Severe damage to boiler will occur, resulting in severe personal injury, death or substantial property damage.

8. Retest boiler after repairing leaks.
9. Remove testing plugs and air vent.

---

**TABLE 2 - Manifold orifice size**

<table>
<thead>
<tr>
<th>Natural Gas</th>
<th>Propane</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S.</td>
<td></td>
</tr>
<tr>
<td>2.0 MM *</td>
<td>1.3 MM *</td>
</tr>
<tr>
<td>Canada</td>
<td></td>
</tr>
<tr>
<td>0 TO 2000 FT.</td>
<td>2000-4500 FT.</td>
</tr>
<tr>
<td>2.0 MM #49</td>
<td>1.3 MM #56</td>
</tr>
</tbody>
</table>

* For elevations above 2000 feet, contact your local Weil-McLain sales office for details.
General piping information:

- If installation is to comply with ASME or Canadian requirements, an additional high temperature limit is needed. Install control in supply piping between boiler and isolation valve. Set second control to minimum 20°F above set point of first control. Maximum allowable set point is 240°F. See page 37 for wiring.
- Use a low water cutoff device when:
  - Boiler is installed above radiation level.
  - Required by certain state or local codes or insurance companies.
Use low water cutoff designed for water installations. Probe type is recommended. Purchase and install in tee in supply line above boiler.
- Use backflow check valve in cold water supply as required by local codes.
- Install boiler so that chilled medium is piped in parallel with heating boiler. Use appropriate valves to prevent chilled medium from entering boiler. Consult I=B=R Installation and Piping Guides.
- If boiler is connected to heating coils located in air handling units where they can be exposed to refrigerated air, use flow control valves or other automatic means to prevent gravity circulation during cooling cycle.

Install piping:
1. See Figure 3A or 3B and Table 3 for near-boiler piping and single-zone piping. See page 10 for boilers used with refrigeration systems. See page 11 to complete multiple-zone piping or pages 12 – 17 to complete piping for radiant panel systems or converted gravity systems.
2. Install relief valve vertically in tapping on side of boiler. See Figure 3A or 3B and the tag attached to the relief valve for manufacturer’s instructions.

**WARNING**
Pipe relief valve discharge line near floor close to floor drain to eliminate potential of severe burns. Do not pipe to any area where freezing could occur. Do not plug, valve, or place any obstruction in discharge line.

**DIAPHRAGM expansion tank (Figure 3A):**
1. Ensure expansion tank size will handle boiler and system water volume and temperature. Tank must be located in boiler return piping as close to boiler as possible, before inlet side of circulator. See tank manufacturer’s instructions for details.

**CAUTION**
Undersized expansion tanks cause system water to be lost from relief valve and makeup water to be added through fill valve. Eventual section failure can result.

2. Install automatic air vent as shown.

**CLOSED expansion tank (Figure 3B):**
1. Ensure expansion tank size will handle boiler and system water volume and temperature. See tank manufacturer’s instructions for details.

**CAUTION**
Undersized expansion tanks cause system water to be lost from relief valve and makeup water to be added through fill valve. Eventual section failure can result.

2. Connect tank to 1/2” N.P.T. tapping located behind supply outlet, using 1/2” N.P.T. piping. Pitch any horizontal piping up towards tank 1 inch per 5 feet of piping.

**TABLE 3 - WATER PIPING SIZE**

<table>
<thead>
<tr>
<th>BOILER MODEL</th>
<th>TO SYSTEM</th>
<th>FROM SYSTEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>CGI - 25</td>
<td>¼”</td>
<td>¼”</td>
</tr>
<tr>
<td>CGI - 3</td>
<td>1”</td>
<td>1”</td>
</tr>
<tr>
<td>CGI - 4</td>
<td>1”</td>
<td>1”</td>
</tr>
<tr>
<td>CGI - 5</td>
<td>1”</td>
<td>1”</td>
</tr>
<tr>
<td>CGI - 6</td>
<td>1¼”</td>
<td>1¼”</td>
</tr>
<tr>
<td>CGI - 7</td>
<td>1¼”</td>
<td>1¼”</td>
</tr>
</tbody>
</table>

* All piping sizes based on 20°F temperature rise through boiler.
Near boiler piping

For low return temperature systems, see additional requirements shown on pages 10 through 17.

**WARNING** For systems with low return water temperature possible (such as converted gravity systems and radiant heating systems), refer to the special piping suggestions of pages 12 – 17. Failure to prevent low return water temperature to the boiler could cause corrosion of the boiler sections or burners, resulting in severe personal injury, death or substantial property damage.
Piping MULTIPLE ZONES:
1. Follow instructions on pages 8 and 9 to install near-boiler piping. (Also refer to Piping for radiant heating systems or converted gravity systems if applicable.)
2. See Figure 5A or 5B to complete installation.
3. Zoning with circulators:
   a. Size each circulator to individual circuit requirements.
   b. Remove circulator on boiler.
4. Zoning with zone valves:
   a. Install balancing valves to adjust flow to distribute heat to all zones.
   b. Separate relay is required for each circulator.

Piping for RADIANT HEATING SYSTEMS or CONVERTED GRAVITY SYSTEMS

Converted gravity (or steam) systems
Whenever possible, use the primary/secondary piping shown in Figure 6A or 6B. This piping design allows changing boiler flow rate without affecting primary circuit flow rate.
If Figure 6A or 6B cannot be used, use the boiler by-pass piping shown in Figure 7A or 7B.
You can also use the piping shown in Figure 8 (system by-pass) if the reduced flow rate in the heating system will not cause heat distribution problems.

WARNING Failure to prevent low return water temperature to the boiler could cause corrosion of the boiler sections or burners, resulting in severe personal injury, death or substantial property damage.

Radiant heating systems
Preferably, use primary/secondary piping, as shown in either Figure 6A or 6B. Alternatively, use the method of either Figure 7A or 7B. Do not use the piping of Figure 8, because this method does not control radiant system supply temperature.

If radiant system tubing has no oxygen barrier, a heat exchanger must be used.

WARNING Radiant heating system piping should include a means of regulating the boiler return water temperature AND the system supply temperature (such as provided by an injection pumping control). Boiler return water temperature will be adequately controlled using the methods shown in this manual provided the system supply temperature is relatively constant.

- DO NOT apply the methods in this manual if the system is equipped with an outdoor reset control. Instead, provide controls and piping which can regulate the boiler return water temperature at no less than 130 °F regardless of system supply temperature. Contact your Weil-McLain representative for suggested piping and control methods. Failure to prevent cold return water temperature to the boiler could cause corrosion damage to the sections or burners, resulting in possible severe personal injury, death or substantial property damage.

Piping for use with REFRIGERATION SYSTEMS:
The boiler must be installed so the chilled medium is piped in parallel with the heating boiler, using appropriate valves to prevent the chilled medium from entering boiler. Use piping as shown in Figure 4.
If the boiler is connected to heating coils located in air handling units where they can be exposed to refrigerated air, gravity circulation during the cooling cycle must be prevented with flow control valves or other automatic means.
Typical piping for MULTIPLE ZONE installations

Applicable for systems with boiler return water temperature at least 130 °F
(Refer to pages 12 through 17 for low temperature systems)

Zoning with circulators

Zoning with zone valves

FIGURE 5A

FIGURE 5B

Legend (For Figures 5A and 5B)

1 Isolation valve
2 Flow/check valve
3 Circulator
5 Zone valve
6 Drain valve
9 Relief valve
10 Automatic air vent
11 Fill valve
12 Diaphragm expansion tank
(see Figure 3B if using closed type expansion tank. DO NOT use automatic air vent with closed type expansion tank.)
13 In-line air separator and automatic vent, if used
(Note that the fill valve must always be connected to the expansion tank, regardless of location of expansion tank, circulator or air separator.)

WARNING
For systems with low return water temperature possible (such as converted gravity systems and radiant heating systems), refer to the special piping suggestions of pages 12 – 17. Failure to prevent low return water temperature to the boiler could cause corrosion of the boiler sections or burners, resulting in severe personal injury, death or substantial property damage.
Piping for RADIANT HEATING SYSTEMS or CONVERTED GRAVITY SYSTEMS —
By-pass arrangements using PRIMARY/SECONDARY piping (preferred)

Figures 6A and 6B show suggested piping arrangements for low temperature systems using primary/secondary piping. (For alternatives, see pages 14 through 17.)

Primary/secondary piping is preferred because the flow rate and temperature drop in the heating circuit(s) is determined only by the heating circuit pumps(s). So adjustment of the by-pass valves in the boiler circuit will not cause a change in the heating circuit flow rate and temperature distribution.

The by-pass valves (items 7a and 7b) provide mixing of hot boiler outlet water with cooler system return water — set to assure a minimum return water temperature (at least 130 °F) to the boiler. Set the valves as explained in the following section.

Temperature gauges

Gauge 4a is suggested, but optional on any system.

Gauge 4b is optional on converted gravity systems, but required on radiant heating systems — to display the water temperature being supplied to the radiant tubing.

Gauge 8 is required on all systems to assure the return water temperature is accurately set for a minimum of 130 °F. If this gauge is not available, however, adjust the valves such that the boiler-mounted pressure/temperature gauge reads at least 150 °F when the system return water is cold (approximately 60 °F water temperature).

Failure to prevent low return water temperature to the boiler could cause corrosion of the boiler sections or burners, resulting in severe personal injury, death or substantial property damage.

Adjust valves as follows (Fig. 6A & 6B only):

1. Set the valves while the system is cool, setting for the coldest expected water temperature (usually 60 °F since the system will often drop to room temperature between cycles).
2. Start with valve 7a fully closed and 7b fully open.
3. Gradually open valve 7a while closing valve 7b until the temperature at gauge 8 reads 130 °F when gauge 4a reads 60 °F.
4. Note that valve 7a regulates the amount of hot water from the boiler supply which mixes with return water. Valve 7b regulates the amount of system water flowing through the boiler secondary loop.

Failure to prevent cold return water temperature to the boiler could cause corrosion damage to the sections or burners, resulting in possible severe personal injury, death or substantial property damage.
By-pass arrangements using PRIMARY/SECONDARY piping (PREFERRED)
for RADIANT HEATING SYSTEMS or CONVERTED GRAVITY SYSTEMS
(Do not apply to systems using outdoor reset controls)

Zoning with circulators

Zoning with zone valves

FIGURE 6A

FIGURE 6B

Legend (For Figures 6A and 6B)

1  Isolation valve
2  Flow/check valve
3  Circulator
4  System temperature gauges
5  Zone valve
6  Drain valve
7  System temperature valves
   (see instructions at left for adjusting valves)
8  Blend temperature gauge
9  Relief valve
10 Automatic air vent
11 Fill valve
12 Diaphragm expansion tank
   (see Figure 3B if using closed type expansion tank. DO NOT use automatic air vent with
   closed type expansion tank.)
13 In-line air separator and automatic vent, if used
   (Note that the fill valve must always be
   connected to the expansion tank, regardless of
   location of expansion tank, circulator or air separator.)
Piping for RADIANT HEATING SYSTEMS or CONVERTED GRAVITY SYSTEMS — Alternate by-pass piping arrangements

Figures 7A and 7B are alternative piping suggestions for large water content (converted gravity or steam systems) or radiant heating systems — for use when primary/secondary piping can’t be applied. (Figure 8 is another alternative, using system by-pass in place of boiler by-pass piping. Figure 8, however, is not suitable for radiant heating applications because it does not protect the radiant system from possible high water temperature.)

This piping method is called a "boiler by-pass" because part of the pump flow is by-passed around the boiler (through valve 7a). This method reduces the flow rate through the boiler, in order to raise the average water temperature in the boiler enough to prevent flue gas condensation. Boiler by-pass piping is effective for some boilers — including the CGI — provided the flow rates are adjusted according to the instructions following.

Boiler by-pass piping keeps system flow rate as high as possible and temperature drop as low as possible, helping to equalize the building heat distribution.

**Temperature gauges**

Gauge 4a is optional if the by-pass valves will be adjusted using cold (or room temperature) return water to the boiler. (When setting the valves without gauge 4a installed — using cold or room temperature water — assume the return water temperature to be 60 °F. Set the valves so gauge 8 reads at least 120 °F.)

Gauge 4b is optional on converted gravity systems, but **required** on radiant heating systems — to display the water temperature being supplied to the radiant tubing.

Gauge 8 is **required** on all systems to assure reliable adjustment of the by-pass valves. The boiler-mounted pressure/temperature gauge can be used if a separate temperature gauge is not installed.

**WARNING** Failure to prevent low return water temperature to the boiler could cause corrosion of the boiler sections or burners, resulting in severe personal injury, death or substantial property damage.

**WARNING** Radiant heating system piping should include a means of regulating the boiler return water temperature **AND** the system supply temperature (such as provided by an injection pumping control).

- Boiler return water temperature will be adequately controlled using the methods shown in this manual provided the system supply temperature is relatively constant.
- **DO NOT** apply the methods in this manual if the system is equipped with an outdoor reset control. Instead, provide controls and piping which can regulate the boiler return water temperature at no less than 130 °F regardless of system supply temperature. Contact your Weil-McLain representative for suggested piping and control methods.

- Failure to prevent cold return water temperature to the boiler could cause corrosion damage to the sections or burners, resulting in possible severe personal injury, death or substantial property damage.

**Adjust valves as follows (Fig. 7A & 7B only):**

1. Start with valve 7a fully closed and 7b fully open.
2. Gradually open valve 7a while closing valve 7b until the temperature at **gauge 8** reads 60 °F higher than gauge 4a. A minimum 60 °F temperature rise through the boiler assures a low enough flow rate and high enough average temperature to prevent condensation even with low system return water temperature.
3. Valve 7a regulates the system flow rate, while valve 7b regulates the boiler flow rate.
4. The boiler-mounted temperature/pressure gauge may be used in place of a separate gauge 8.
Alternate by-pass piping arrangements
for RADIANT HEATING SYSTEMS or CONVERTED GRAVITY SYSTEMS
Alternatives to Figures 6A and 6B
(Do not apply to systems using outdoor reset controls)

Boiler by-pass — Zoning with circulators

Boiler by-pass — Zoning with zone valves

Legend (For Figures 7A and 7B)

1 Isolation valve
2 Flow/check valve
3 Circulator
4 System temperature gauges
5 Zone valve
6 Drain valve
7 System temperature valves
   (see instructions at left for adjusting valves)
8 Blend temperature gauge
9 Relief valve
10 Automatic air vent
11 Fill valve
12 Diaphragm expansion tank
   (see Figure 3B if using closed type expansion tank. DO NOT use automatic air vent with closed type expansion tank.)
13 In-line air separator and automatic vent, if used
   (Note that the fill valve must always be connected to the expansion tank, regardless of location of expansion tank, circulator or air separator.)
Piping for CONVERTED GRAVITY SYSTEMS — Alternate by-pass piping arrangement for large water content systems

Figure 8 is an alternate piping method that provides return water temperature control for boilers installed on large water content systems (converted gravity or steam systems).

Do not apply the piping of Figure 8 on radiant heating systems. It provides no method of regulating the water temperature provided to the system, and could result in excessive water temperature in the radiant tubing.

This piping method is called a “system by-pass” because part of the pump flow by-passes the system (through valve 7a). This by-passed hot water from the boiler outlet mixes with cooler system return water temperature in order to provide minimum 130 °F return water to the boiler. Valve 7b will most often be full open, but may need to be slightly closed on some low pressure drop systems in order to cause enough flow through valve 7a.

System by-pass piping as shown in Figure 8 can be used with either zone-valve zoning or circulator zoning. When used with circulator zoning, however, the boiler circulator, item 3, must be piped as shown. It cannot be used as one of the zoning circulators.

Do not apply system by-pass piping if the reduced flow in the system could cause poor heat distribution. That is, system by-pass piping reduces the flow in the system and increases the water temperature supplied to the system. This can cause increased heat from radiators at the beginning of the system and reduced heat from radiators near the end of the system.

Failure to prevent low return water temperature to the boiler could cause corrosion of the boiler sections or burners, resulting in severe personal injury, death or substantial property damage.

WARNING Radiant heating system piping should include a means of regulating the boiler return water temperature AND the system supply temperature (such as provided by an injection pumping control).

- Boiler return water temperature will be adequately controlled using the methods shown in this manual provided the system supply temperature is relatively constant.

- DO NOT apply the methods in this manual if the system is equipped with an outdoor reset control. Instead, provide controls and piping which can regulate the boiler return water temperature at no less than 130 °F regardless of system supply temperature. Contact your Weil-McLain representative for suggested piping and control methods.

- Failure to prevent cold return water temperature to the boiler could cause corrosion damage to the sections or burners, resulting in possible severe personal injury, death or substantial property damage.

Adjust valves as follows (Figure 8 only):

1. Start with valve 7a fully closed and 7b fully open.
2. Gradually open valve 7a while closing valve 7b until the temperature at gauge 8 reads at least 130 °F at all times.
3. Valve 7a regulates the amount of boiler supply water mixed with return water. Valve 7b causes a pressure drop in the system needed to balance flow through valve 7a and the system.
4. The valve adjustment should be done with the system at the coldest expected temperature (60 °F for converted gravity systems or high mass radiant systems).
Alternate by-pass piping arrangement
for CONVERTED GRAVITY (OR STEAM) SYSTEMS
Alternate to Figure 7A/7B — for converted gravity (or steam) systems only
(Do not apply to radiant heating systems)

System by-pass — Applies to ANY zoning method

Legend

1 Isolation valve
2 Flow/check valve
3 Circulator
4 System temperature gauges
5 Zone valve
6 Drain valve
7 System temperature valves
   (see instructions at left for adjusting valves)
8 Blend temperature gauge
9 Relief valve
10 Automatic air vent
11 Fill valve
12 Diaphragm expansion tank
   (see Figure 3B if using closed type expansion tank. DO NOT use automatic air vent with closed type expansion tank.)
13 In-line air separator and automatic vent, if used
   (Note that the fill valve must always be connected to the expansion tank, regardless of location of expansion tank, circulator or air separator.)
Boiler must be vented and supplied with combustion and ventilation air as described in these instructions. Failure to do so will cause severe personal injury or death.

**Venting method definitions:**

1. **Chimney draft venting** - Category I appliance. (non-positive vent static pressure and vent gas temperature that avoids excessive condensate production in vent). See page 19. Chimney draft installation using:
   a. Vent connector (single or doublewall) sized to eliminate positive pressure in vent system. Diameter increases immediately at boiler.
   b. Doublewall metal vent (B-vent) or chimney with liner approved by National Fuel Gas Code, ANSI Z223.1-latest edition, or in Canada, CAN/CGA B149.1 or B149.2 Installation Code.

2. **Direct exhaust** - Category III appliance (positive vent static pressure and vent gas temperature that avoids excessive condensate production in vent). See pages 20-28. Direct exhaust installation using:
   a. Vent pipe specified in these instructions.
   b. Vent termination through outside wall, roof or unused chimney. Tight chimney areas will make vent joint construction very difficult.

**Combustion and ventilation air source:**

Combustion and ventilation air openings must comply with Section 5.3 of National Fuel Gas Code ANSI Z223.1-latest edition, or applicable building codes. Canadian installations must comply with CAN/CGA B149.1 or B149.2 Installation Code.

**WARNING** Provide adequate combustion and ventilation openings to assure proper combustion, and prevent possibility of flue gas spillage and carbon monoxide emissions, which can result in severe personal injury or death. Do not install exhaust fan in boiler room.

For boilers located in confined rooms or in buildings of tight construction:

1. A confined room, as defined by National Fuel Gas Code, is less than 50 cubic feet per 1000 Btuh input of all appliances in the room.

2. When air is taken from inside the building — Provide 2 permanent openings, one within 12 inches of ceiling, one within 12 inches of floor. Minimum dimension of each rectangular opening should be at least 3 inches. Each opening must be at least 1 square inch per 1000 Btuh input of all fuel burning appliances (plus requirements for any equipment that can pull air from room, including clothes dryer and fireplace), but not less than 100 square inches. Openings must freely connect with areas having adequate air flow from outside.

3. When air is taken from outdoors — follow either method described below:
   a. Provide 2 permanent openings, one within 12 inches of ceiling, one within 12 inches of floor. Minimum dimension of each rectangular opening should be at least 3 inches. Openings must connect directly or by ducts with outdoors or spaces (crawlspace or attic) that freely connect to outside air. Size as listed below:
      1) Through outside wall or vertical duct - at least 1 square inch per 4000 Btuh input of all fuel burning appliances (plus requirements for any equipment that can pull air from room, including clothes dryer and fireplace).
      2) Through horizontal ducts - 1 square inch per 2000 Btuh input of all fuel burning appliances (plus requirements for any equipment that can pull air from room, including clothes dryer and fireplace).
   b. When boiler clearances from sides and back are at least 1 inch and from the front at least 6 inches, 1 permanent opening may be provided within 12 inches from ceiling. Opening must connect directly or by ducts with outdoors or spaces (crawlspace or attic) that freely connect to outside air. Size as listed below:
      1) 1 square inch per 3000 Btuh of total input rating all fuel burning appliances (plus requirements for any equipment that can pull air from room, including clothes dryer and fireplace) . . . and . . .
      2) Not less than the sum of all vent connectors in the room.

Boiler must be vented and supplied with combustion and ventilation air as described in these instructions. Failure to do so will cause severe personal injury or death.
Chimney Draft Venting

General venting information:
1. Use doublewall metal vent (B-vent) or chimney with liner as required by National Fuel Gas Code, ANSI Z223.1-latest edition, or in Canada, CAN/CGA B149.1 or B149.2 Installation Code.
2. To prevent downdrafts, chimney should extend at least 3 feet above highest point where it passes through a roof and at least 2 feet higher than any portion of a building within a horizontal distance of 10 feet.
3. To vent with another appliance, see National Fuel Gas Code, ANSI Z223.1-latest edition, or in Canada, CAN/CGA B149.1 or B149.2 Installation Code.
4. Inspect existing chimney before installing boiler. Failure to clean or replace perforated pipe or lining will cause severe personal injury or death.
5. Do not connect breeching to any portion of a mechanical draft system that can operate under positive pressure.
6. Maintain minimum 2” clearance from combustible materials to vent pipe.
7. Do not use chimney with an open fireplace.
8. Make horizontal runs as short as possible. Long runs can cause condensation.
9. When longer runs are used, support pipe with appropriate hangers.
10. To prevent blockage, do not vent into bottom of chimney.
11. Vent pipe must not go beyond inside wall of chimney.
12. Vent passing through floors or ceilings must be firestopped.
13. See Figure 9 and Table 4 to connect boiler to venting system.

<table>
<thead>
<tr>
<th>TABLE 4 - Chimney draft venting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiler Model</td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td>CGi - 25</td>
</tr>
<tr>
<td>CGi - 3</td>
</tr>
<tr>
<td>CGi - 4</td>
</tr>
<tr>
<td>CGi - 5</td>
</tr>
<tr>
<td>CGi - 6</td>
</tr>
<tr>
<td>CGi - 7</td>
</tr>
</tbody>
</table>

* See WARNING below regarding sizing and applicable codes.

WARNING Vent sizing given in Table 4 is only a general guideline. The vent connector and chimney must be designed, sized and constructed in compliance with all applicable codes, including:
- Canada — CAN/CGA B149.1 or B149.2 Installation Code.
Failure to correctly size and install the vent system could result in severe personal injury, death, or substantial property damage.
Follow instructions on this page when determining vent location to avoid possibility of severe personal injury, death or substantial property damage.

1. Gases will form white plume in winter. Plume could obstruct window view.
2. Prevailing winds could cause freezing of condensate and water/ice buildup on building, plants or roof.
3. Locate or guard vent to prevent accidental contact by people or pets.
4. Do not terminate vent in window well, stair well, alcove, courtyard, or other recessed areas.
5. Vent termination must be located more than 4 feet below or 4 feet horizontally from any door, window or gravity air inlet into any building, and more than 1 foot above grade or anticipated snowline. In addition, vent termination must be at least 7 feet above public walkway and 3 feet above any forced air inlet within 10 feet. Stay well away from trees, shrubs, and decorative items. Site conditions may dictate greater clearances. See Figure 10.
6. Vent must terminate at least 4 feet horizontally, and in no case above or below, unless a 4 foot horizontal distance is maintained, from electric meters, gas meters, regulators, relief valves, and other equipment.
7. Locate or guard vent to prevent condensate from damaging exterior finishes.
8. Do not extend exposed vent pipe outside of building. Condensate could freeze and block vent pipe.
9. Terminate vent at least 6 feet away from adjacent walls.
10. Do not terminate vent closer than 5 feet below roof overhang or parapet.
11. Do not terminate vent above any door, window or gravity air inlet into any building. Condensate can freeze, causing ice formations.
12. Do not connect:
   • Any other appliance to vent pipe.
   • Multiple boilers to a common vent pipe.
13. Do not wrap or insulate vent pipe and fittings.
14. Winds over 40 mph can cause nuisance boiler shutdown if boiler is sidewall vented.
15. Canadian installations - Do not terminate vent less than 6 feet from another combustion air inlet or less than 3 feet from any other building opening or any gas service regulator.
16. For location of vertical termination, see vent pipe manufacturer’s instructions.
Select vent pipe:
The following special gas vent systems comply with UL-1738 and ULC-S636 Standards and are certified by AGA and CGA as the only systems suitable for use with CGi boilers:
- Heat-Fab, Inc. Saf-T Vent®
- Flex-L International, Inc. StaR-34
- Z-Flex Z-Vent II
- ProTech System FasNSeal™

Connect starter to boiler:
1. Follow information on pages 18 and 20 before proceeding.
2. Follow national, state, local or provincial codes when venting the CGi boiler.
3. Limitations to use of Heat-Fab, Inc. Saf-T Vent®; Flex-L International, Inc. StaR-34; Z-Flex Z-Vent II; or ProTech Systems FasNSeal™ Special Gas Vent Systems –
   a. Do not mix types or manufacturers of vent materials.
   b. Maintain minimum 2” clearance from combustible materials to vent pipe.
4. Connect starter to blower housing outlet as shown in Figure 11, 12, 13 or 14.
   a. Seal with sealant specified by vent pipe manufacturer, using 3/8” bead (not required for FasNSeal™).
   b. Tighten strap at band clamp screw until strap is snug around blower housing.
Construct vent run:

1. Follow vent pipe manufacturer’s instructions to construct vent run and for methods of supporting vent runs.

   - Do not mix types or manufacturers of vent materials.
   - Clean joints before sealing. See vent pipe manufacturer’s instructions to clean joints. Use their specified sealant. Do not use screws.
   - Install vent pipe with seams on top of vent runs.
   - Saf-T Vent® and StaR-34 only - If needed, use slip connector to adjust for nonstandard pipe lengths. See vent pipe manufacturer’s instructions for use.

**WARNING** Sealant recommended by vent pipe manufacturer must be used as indicated. Vent piping must be sealed gas-tight to prevent possibility of flue gas spillage and carbon monoxide emissions, resulting in severe personal injury or death.

### TABLE 5 - Venting system length Vs number of elbows, 3" diameter vent

<table>
<thead>
<tr>
<th>Maximum number of elbows*</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum length — Feet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CGi- 3 through 6</td>
<td>55</td>
<td>48</td>
<td>41</td>
<td>34</td>
<td>27</td>
<td>20</td>
</tr>
<tr>
<td>CGi-7</td>
<td>35</td>
<td>28</td>
<td>21</td>
<td>14</td>
<td>7</td>
<td>--</td>
</tr>
</tbody>
</table>

* Do not include termination elbow when counting maximum number of elbows.

<table>
<thead>
<tr>
<th>Description</th>
<th>Saf-T Vent®</th>
<th>StaR-34 ▲</th>
<th>Z-Vent II ▲</th>
<th>FasNSeal™ ▲</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Weil-McLain Part Number</td>
<td>Saf-T Vent® Part Number ▲</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CGi Starter</td>
<td>699-999-015</td>
<td>73WMCGIS</td>
<td>SRAWCG3</td>
<td>SVEWMFA03</td>
</tr>
<tr>
<td>Termination Coupling with Screen</td>
<td>699-999-001</td>
<td>73WMTERM</td>
<td>--</td>
<td>SVSTPX03</td>
</tr>
<tr>
<td>Termination Elbow with Screen</td>
<td>699-999-069</td>
<td>1314TERM</td>
<td>SRTE-03</td>
<td>SVSTEX0390</td>
</tr>
<tr>
<td>45° Elbow</td>
<td>699-999-010</td>
<td>7311GC</td>
<td>SRE4503</td>
<td>SVEEWC0345</td>
</tr>
<tr>
<td>90° Elbow</td>
<td>699-999-011</td>
<td>7314GCTR</td>
<td>SRE9003</td>
<td>SVEEWC0390</td>
</tr>
<tr>
<td>6&quot; Pipe</td>
<td>699-999-003</td>
<td>7301GC</td>
<td>SR06P03</td>
<td>SVEPW03.5</td>
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<tr>
<td>12&quot; Pipe</td>
<td>699-999-004</td>
<td>7302GC</td>
<td>SR12P03</td>
<td>SVEPW0301</td>
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<tr>
<td>18&quot; Pipe</td>
<td>699-999-005</td>
<td>7304GC</td>
<td>--</td>
<td>SVEPW0318</td>
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<tr>
<td>24&quot; Pipe</td>
<td>699-999-006</td>
<td>7305GC</td>
<td>SR24P03</td>
<td>SVEPW0303</td>
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<tr>
<td>36&quot; Pipe</td>
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<td>--</td>
<td>SR36P03</td>
<td>SVEPW0303</td>
</tr>
<tr>
<td>37 ½&quot; Pipe</td>
<td>699-999-007</td>
<td>7307GC</td>
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<td>48&quot; Pipe</td>
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<td>--</td>
<td>SVEPW0304</td>
</tr>
<tr>
<td>49 ½&quot; Pipe</td>
<td>699-999-008</td>
<td>7308GC</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>60&quot; Pipe</td>
<td>699-999-012</td>
<td>7360GC</td>
<td>SR60P03</td>
<td>SVEPW0305</td>
</tr>
<tr>
<td>Slip Connector (Note 1)</td>
<td>699-999-009</td>
<td>7324GC9</td>
<td>SRSJ03</td>
<td>--</td>
</tr>
<tr>
<td>Horizontal Support</td>
<td>699-999-016</td>
<td>7323GC</td>
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<td>--</td>
</tr>
<tr>
<td>Horizontal Drain Tee</td>
<td>699-999-014</td>
<td>7320GC</td>
<td>SRTDH03</td>
<td>SVEDWC03</td>
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<tr>
<td>Joiner Band</td>
<td>--</td>
<td>--</td>
<td>SRJB-14</td>
<td>--</td>
</tr>
<tr>
<td>Sealant</td>
<td>As specified by individual vent pipe manufacturer</td>
<td>Not required</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE 1** — Use to adjust for nonstandard pipe lengths and Saf-T Vent® only, before termination coupling to terminate run.

▲ — Weil-McLain part number — parts available through Weil-McLain distributor.

❚ — Vent pipe manufacturer part number — parts available through vent pipe manufacturer.
Direct Exhaust with AL29-4C

Venting through wall with Saf-T Vent® –
1. Do not mix types or manufacturers of vent materials.
2. Maintain minimum 2" clearance from combustible materials to vent pipe.
3. See Figures 15 and 16. Vent must terminate at least one foot above anticipated snowline.
   Vent must be terminated only with a Saf-T Vent® elbow with integral screen or elbow and termination coupling with screen.
4. Do not seal slip connector to inside or outside plate.
5. If passing through noncombustible wall, provide hole diameter large enough to insert the slip connector.
6. Install inline drain section as close as possible to boiler, in first horizontal run. See Figure 15.

**WARNING**
Condensate drain line — use only silicone tubing rated for at least 400 °F for the condensate drain line. Using any other material could cause flue gas leakage, potentially resulting in severe personal injury, death or substantial property damage.

**CAUTION**
On some installations, the condensate drain fitting may be omitted, provided:
- Vent manufacturer shows this option in their instructions.
- Vent is sloped **toward termination** as shown by dotted lines in drawing above.
- The vent is installed per Weil-McLain and vent manufacturer instructions.
Condensate drippage from such vents may accumulate on the ground below. Consider traffic in the area to avoid hazard due to ice accumulation.
Venting through wall with StaR-34 –
1. Do not mix types or manufacturers of vent materials.
2. Maintain minimum 2" clearance from combustible materials to vent pipe.
3. See Figures 17 and 18. Vent must terminate at least one foot above anticipated snowline. Vent must be terminated only with StaR-34 elbow with integral screen.
4. Do not seal vent pipe to inside or outside plate.
5. Install horizontal drain tee as close as possible to boiler, in first horizontal run. See Figure 17.

**WARNING**
Condensate drain line — use only silicone tubing rated for at least 400 °F for the condensate drain line. Using any other material could cause flue gas leakage, potentially resulting in severe personal injury, death or substantial property damage.

**CAUTION**
On some installations, the condensate drain fitting may be omitted, provided:
- Vent manufacturer shows this option in their instructions.
- Vent is sloped **toward termination** as shown by dotted lines in drawing above.
- The vent is installed per Weil-McLain and vent manufacturer instructions. Condensate drippage from such vents may accumulate on the ground below. Consider traffic in the area to avoid hazard due to ice accumulation.
Venting through wall with Z-Vent II –
1. Do not mix types or manufacturers of vent materials.
2. Maintain minimum 2" clearance from combustible materials to vent pipe.
3. See Figures 19 and 20. Vent must terminate at least one foot above anticipated snowline. Vent must be terminated only with a Z-Vent II elbow with integral screen or elbow and termination coupling with screen.
4. Do not seal vent pipe to inside or outside plate.
5. Install horizontal drain tee as close as possible to boiler, in first horizontal run. See Figure 19.

**WARNING**

Condensate drain line — use only silicone tubing rated for at least 400 °F for the condensate drain line. Using any other material could cause flue gas leakage, potentially resulting in severe personal injury, death or substantial property damage.

**CAUTION**

On some installations, the condensate drain fitting may be omitted, provided:
- Vent manufacturer shows this option in their instructions.
- Vent is sloped *toward termination* as shown by dotted lines in drawing above.
- The vent is installed per Weil-McLain and vent manufacturer instructions.

Condensate drippage from such vents may accumulate on the ground below. Consider traffic in the area to avoid hazard due to ice accumulation.
Venting through wall with FasNSeal™ –
1. Do not mix types or manufacturers of vent materials.
2. Maintain minimum 2" clearance from combustible materials to vent pipe.
3. See Figures 21 and 22. Vent must terminate at least one foot above anticipated snowline. Vent must be terminated only with FasNSeal™ elbow with integral screen or elbow and termination coupling with screen.
4. Do not seal vent pipe to inside or outside plate.
5. Install horizontal drain tee as close as possible to boiler, in first horizontal run. See Figure 21.

**WARNING** Condensate drain line — use only silicone tubing rated for at least 400 °F for the condensate drain line. Using any other material could cause flue gas leakage, potentially resulting in severe personal injury, death or substantial property damage.
Venting through roof – Saf-T Vent®
1. Do not mix types or manufacturers of vent materials.
2. Maintain minimum 2" clearance from combustible materials to vent pipe.
3. Follow vent manufacturer’s instructions for method to vent through roof. See Figure 23.
   a. Vent pipe must extend through roof flashing, jacket or thimble.
   b. Vent may pass through floor, inside wall or concealed space when installed according to vent pipe manufacturer’s instructions.
4. Install drain tee as close as possible to boiler, in first horizontal run. See Figure 23.

Venting through roof – StaR-34 Vent
1. Do not mix types or manufacturers of vent materials.
2. Maintain minimum 2" clearance from combustible materials to vent pipe.
3. Follow vent manufacturer’s instructions for method to vent through roof. See Figure 24.
   a. Vent pipe must extend through roof flashing, jacket or thimble.
   b. Vent may pass through floor, inside wall or concealed space when installed according to vent pipe manufacturer’s instructions.
4. Install drain tee as close as possible to boiler, in first horizontal run. See Figure 24.

**WARNING** Condensate drain line — A condensate drain fitting is always required for through-the-roof vents. Use only silicone tubing rated for at least 400 °F for the condensate drain line. Using any other material could cause flue gas leakage, potentially resulting in severe personal injury, death or substantial property damage.
Venting through roof – Z-Vent II
1. Do not mix types or manufacturers of vent materials.
2. Maintain minimum 2” clearance from combustible materials to vent pipe.
3. Follow vent manufacturer’s instructions for method to vent through roof. See Figure 25.
   a. Vent pipe must extend through roof flashing, jacket or thimble.
   b. Vent may pass through floor, inside wall or concealed space when installed according to vent pipe manufacturer’s instructions.
4. Install drain tee as close as possible to boiler, in first horizontal run. See Figure 25.

Venting through roof – FasNSeal™
1. Do not mix types or manufacturers of vent materials.
2. Maintain minimum 2” clearance from combustible materials to vent pipe.
3. Follow vent manufacturer’s instructions for method to vent through roof. See Figure 26.
   a. Vent pipe must extend through roof flashing, jacket or thimble.
   b. Vent may pass through floor, inside wall or concealed space when installed according to vent pipe manufacturer’s instructions.
4. Install drain tee as close as possible to boiler, in first horizontal run. See Figure 26.

WARNING
Condensate drain line — A condensate drain fitting is always required for through-the-roof vents. Use only silicone tubing rated for at least 400 °F for the condensate drain line. Using any other material could cause flue gas leakage, potentially resulting in severe personal injury, death or substantial property damage.
Gas Piping

To install gas piping:
1. Remove jacket front panel and refer to Figure 27 to pipe gas to boiler.
   a. Install drip leg at inlet of gas connection to boiler. Where local utility requires drip leg to be extended to the floor, use appropriate length of pipe between cap and tee.
   b. Install ground joint union for servicing, when required.
   c. Install manual shutoff valve in gas supply piping outside boiler jacket when required by local codes or utility requirements.
   d. In Canada, when using manual main shutoff valve, it must be identified by installer.
2. Support piping with hangers, not by boiler or its accessories.
3. Purge all air from gas supply piping.

**WARNING** Do not check for gas leaks with an open flame — use the bubble test. Failure to use bubble test or check for leaks can result in severe personal injury, death or substantial property damage.

   a. Close manual main shutoff valve during any pressure testing at less than 13” W.C.
   b. Disconnect boiler and gas valve from gas supply piping during any pressure testing at greater than 13” W.C.
5. Use pipe dope compatible with propane gases. Apply sparingly only to male threads of pipe joints so that pipe dope does not block gas flow.

**WARNING** Failure to apply pipe dope as detailed above can result in severe personal injury, death or substantial property damage.

6. Follow good piping practices.

**Natural gas:**
1. Refer to Table 6 for pipe length and diameter. Based on rated boiler input (divide by 1000 to obtain cubic feet per hour).
2. Inlet gas pressure: 5” W.C. minimum
   13” W.C. maximum
   Manifold gas pressure: 3.5” W.C.
3. Install 100% lockup gas pressure regulator in supply line if inlet pressure exceeds 13” W.C. Adjust for 13” W.C. maximum.

**Propane gas:**
1. Contact gas supplier to size pipes, tanks and 100% lockup gas pressure regulator.
2. Adjust regulator supplied by gas supplier for 13” W.C.
3. Inlet gas pressure: 11” W.C. minimum
   13” W.C. maximum
   Manifold gas pressure: 10” W.C.

**TABLE 6 - Natural gas pipe delivery schedule**

<table>
<thead>
<tr>
<th>Length of pipe in feet</th>
<th>* Capacity of pipe in cubic feet of gas per hour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1/2”</td>
</tr>
<tr>
<td>10</td>
<td>132</td>
</tr>
<tr>
<td>20</td>
<td>73</td>
</tr>
<tr>
<td>30</td>
<td>63</td>
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<td>40</td>
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<td>50</td>
<td>45</td>
</tr>
<tr>
<td>60</td>
<td>38</td>
</tr>
<tr>
<td>75</td>
<td>31</td>
</tr>
</tbody>
</table>

* Based on 0.60 specific Gravity, 0.30” W.C. pressure drop.

NOTE: For additional piping schedules, see ANSI Z223.1. Canadian installations must comply with CAN/CGA B149.1 or B149.2 Installation Code.
General wiring requirements:

WARNING Electric shock hazard. For your safety, turn off electrical power supply at service panel before making any electrical connections. Failure to do so can cause severe personal injury, death or substantial property damage.

- Installations must follow latest editions of national, state, provincial or local codes or regulations including:
  - National Electrical Code.

- Wiring must be N.E.C. Class 1. If original rollout thermal fuse element wire as supplied with boiler must be replaced, type 200°C wire or equivalent must be used. If other original wiring as supplied with boiler must be replaced, type 105°C wire or equivalent must be used.

- Boiler is shipped with controls completely wired.

Junction box (furnished):

1. Connect 120VAC line voltage as shown on wiring diagram on boiler or on page 37.

2. Fused disconnect or service switch (15 amp. recommended) may be mounted on this box. Some local codes may require or prohibit installation of fused disconnect or service switch on boiler.

Thermostat:

1. Connect thermostat as shown on wiring diagram on boiler.

2. Install on inside wall away from influences of drafts, hot or cold water pipes, lighting fixtures, television, sunrays or fireplaces.

3. If thermostat has a heat anticipator, set heat anticipator in thermostat to match power requirements of equipment connected to it (such as ignition control and gas valve, zone valve contacts). Wiring diagram on boiler gives setting for ignition control and gas valve. Also see instructions with thermostat.

Fill the system:

1. Close manual and automatic air vents and boiler drain cock.

2. Fill to correct system pressure. Correct pressure will vary with each installation. Normal cold water fill pressure for residential systems is 12 psig. Boiler water pH 7.0 to 8.5 is recommended.

3. Open automatic air vent one turn.

4. Open other vents.
   a. Starting on the lowest floor, open air vents one at a time until water squirts out. Close vent.
   b. Repeat with remaining vents.

5. Refill to correct pressure.
**Start-Up**

**Inspect base insulation:**
Check to make sure insulation is secure against all four sides of the base. If insulation is damaged or displaced, do not operate boiler. Replace or reposition insulation.

**WARNING** Failure to replace damaged insulation or reposition insulation can result in a fire hazard, causing severe personal injury, death or substantial property damage.

**To place in operation:**
1. Be sure boiler has been completely filled with water.
2. For **natural** gas boilers - Follow operating instruction on boiler to place boiler in operation, then go to step 3.
   For **propane** boilers only - Follow operating instruction on boiler to place boiler in operation, comply with the "WARNING" information below, then go to step 3.
   Your propane supplier mixes an odorant with the propane to make its presence detectable. In some instances, the odorant can fade, and the gas may no longer have an odor.
   Propane gas can accumulate at floor level. Smell near the floor for the gas odorant or any unusual odor. If you suspect a leak, do not attempt to operate boiler.
   - Periodically check the odorant level of your gas.
   - Inspect boiler and system at least yearly to make sure all gas piping is gas-tight.
   - Consult your propane supplier regarding installation of a gas leak detector. There are some products on the market for this purpose. Your supplier may be able to suggest an appropriate device.

3. If boiler starts, go to step #5.
   If boiler fails to start, go to step #4.
4. If boiler fails to start, check for following conditions:
   a. Loose connections or blown fuse?
   b. Limit setting below boiler water temperature?
   c. Thermostat set below room temperature?
   d. Gas not turned on at meter and at boiler?
   e. Incoming natural gas pressure less than 5" W.C. or propane less than 11" W.C.?
   f. If above fails to eliminate the trouble, refer to “Troubleshooting” section, starting on page 42.

5. Make sure boiler goes through several normal operating cycles.
6. Turn thermostat or operating control to desired setting.

**POSSIBLE CANCER HAZARD BY INHALATION**
**CAN CAUSE RESPIRATORY, SKIN AND EYE IRRITATION**

This product contains fiberglass wool and ceramic fiber materials. Airborne fibers from these materials have been listed by the State of California as a possible cause of cancer through inhalation. Apply special care when handling ceramic fiber materials (chamber lining and base insulation). Ceramic fibers can be converted to chrysotoblates, a substance listed as a probable cause of cancer.

Suppliers of fiberglass wool products recommend the following precautions be taken when handling these materials.

**Precautionary measures:**
- Avoid breathing fiberglass dust and contact with skin and eyes.
- Use NIOSH approved dust/mist respirator.
- Wear long-sleeved, loose fitting clothing, gloves and eye protection.
- Wash work clothes separately from other clothing. Rinse washer thoroughly.
- Operations such as sawing, blowing, tearout and spraying may generate airborne fiber concentration requiring additional protection.

**First aid measures:**
- Eye contact - Flush eyes with water to remove dust. If symptoms persist, seek medical attention.
- Skin contact - Wash affected areas gently with soap and warm water after handling.
Check pilot burner flame:
1. Proper pilot flame characteristics:
   a. Blue flame.
   b. Inner cone engulfing pilot flame sensor.
   c. Pilot flame sensor glowing cherry red.
2. Improper pilot flame characteristics:
   a. Overfired - Large flame lifting or blowing past pilot flame sensor.
   b. Underfired - Small flame; inner cone not engulfing pilot flame sensor.
   c. Lack of primary air - Yellow flame tip.
   d. Incorrectly heated pilot flame sensor.

Check main burner flames:
1. Proper main burner flames - see Figure 29. Yellow-orange streaks may appear (caused by dust).
2. Improper main burner flame characteristics:
   a. Overfired - Large flames
   b. Underfired - Small flames.
   c. Lack of primary air - Yellow tipping on flames; sooting will occur.

Inspect venting system:
1. Inspect all parts of venting system for deterioration from corrosion, physical damage, sagging. Correct all conditions found.

2. Direct Exhaust boilers - In addition to step #1, check for gas-tight seal at all vent pipe connections, joints and seams.

   **WARNING** Seal vent system gas-tight to prevent flue gas spillage and carbon monoxide emissions, which can result in severe personal injury, death or substantial property damage.

**Tips for water systems:**
- Check boiler and system piping for leaks. Continual makeup water will reduce boiler life. Minerals can build up in sections, reducing heat transfer and causing cast iron to overheat, resulting in section failure. For unusually hard water areas (above 7 grains hardness), consult local water treatment company.

   **DANGER** Failure to maintain recommended pH and repair leaks can cause section iron corrosion, leading to section failure and leaks. Do not use petroleum-based sealing or stop-leak compounds in boiler systems. Severe damage to boiler will occur, resulting in severe personal injury, death or substantial property damage.

- Boiler water pH of 7.0 to 8.5 is recommended; pH level outside that range can damage boiler. Consult local water treatment company.

When using antifreeze:
- Use antifreeze especially made for hydronic systems. Inhibited propylene glycol is recommended.

   **WARNING** Do not use automotive, ethylene glycol, undiluted or petroleum-based antifreeze. Severe personal injury, death or substantial property damage can result.

   - 50% solution provides protection to about -30°F. Do not exceed 50% mixture.
   - Local codes may require a backflow preventer or actual disconnect from city water supply.
   - Determine quantity according to system water content. Boiler water content is listed on page 54 of manual. Percent of solution will affect sizing of heat distribution units, circulator and expansion tank.
   - Follow antifreeze manufacturer’s instructions.
Check-Out Procedure

Check off steps as completed.

1. Boiler and heat distribution units filled with water.
2. Cap on automatic air vent(s), if used, opened one full turn.
3. Air purged from system.
5. Correctly sized manifold orifices installed. Check page 7 for correct size.

Correctly-sized manifold orifices must be used. Failure to do so will result in severe personal injury, death or substantial property damage.

6. Operating instruction label on boiler followed for proper start-up. Also refer to “To Place in Operation,” page 31.
7. Proper burner flame observed. Refer to “Check Main Burner Flames,” page 32.
8. Test limit controls: While burners are operating, move indicator on high limit control below actual boiler water temperature. Burners should go off while circulator continues to operate. Move indicator above boiler water temperature and burners should reignite.
9. Test any additional field-installed controls: If boiler has low water cutoff, additional high limit or other controls, test for operation as outlined by manufacturer. Burners should be operating and should go off when controls are tested. When controls are restored, burners should reignite.
10. Test ignition system shutoff device:
   - Connect manometer to outlet side of gas valve. Start boiler, allowing for normal start-up cycle to occur and main burners to ignite. With main burners on, manually shut off gas supply at manual main shut-off gas valve. Burners should go off. Open manual main shutoff gas valve. Manometer should confirm there is no gas flow. Pilot will relight, flame sensing element will sense pilot flame and main burners will reignite.
   - High limit control set to design temperature requirements of system.
   - For multiple zones, flow adjusted so it is about the same in each zone.
   - Thermostat heat anticipator set properly? Refer to “Thermostat,” page 30, and wiring diagram on jacket front panel.
   - Boiler cycled with thermostat. Raise to highest setting. Boiler should go through normal start-up cycle. Lower to lowest setting. Boiler should go off.

   Measure gas input (for natural gas only):
   a. Operate boiler for 10 minutes.
   b. Turn off other appliances.
   c. At natural gas meter, measure time in seconds required to use one cubic foot of gas.
   d. Calculate gas input:
      \[
      \text{Gas Input (Btu/hr)} = \frac{3600 \times 1000}{\text{number of seconds}}
      \]
   e. Btu/hr calculated should approximate input rating on rating label.

   Check manifold gas pressure by connecting manometer to downstream test tapping on main gas valve. Manifold pressure for natural gas should be 3.5" W.C. and for propane should be 10" W.C.

   Several operating cycles observed for proper operation.

   Room thermostat set to desired room temperature.

   Installation and Service Certificate on this page completed.

   All instructions shipped with this boiler reviewed with owner, returned to envelope and given to owner or displayed near boiler.

Installation and Service Certificate

<table>
<thead>
<tr>
<th>Boiler Model</th>
<th>Series</th>
<th>CP Number</th>
<th>Date Installed</th>
</tr>
</thead>
</table>

| BTU Input | □ Installation instructions followed. | □ Check-out sequence performed. | □ Above information certified to be correct. | □ Information reviewed and left with owner. |

Installer ____________________________
(Company - Address - Phone) ____________________________
(Installer’s signature)
Suggested Minimum Service

Also refer to additional instructions packed with boiler.
Verify proper operation after servicing.

Annual service call by qualified service technician to include:

1. Check burners and flueways; clean if necessary. Refer to “Cleaning Boiler Heating Surfaces” (this page) and “Clean Main Burners” (page 35).
4. Visually inspect pilot and main burner flames. See page 32.
5. Visually inspect venting system. See page 32.
6. Check operation of low water cutoff, if used, and additional field-installed controls. Refer to manufacturer’s instructions.
7. Check that boiler area is free from combustible materials, gasoline and other flammable vapors and liquids.
8. Check for and remove any obstruction to the flow of combustion or ventilation air.
9. Follow instructions on circulator to oil, if oil lubricated. Over-oiling will damage circulator. Water-lubricated circulators do not need oiling.
11. Check relief valve. Follow manufacturer’s instructions on relief valve tag.
12. Check for leaks in boiler and piping. If found, repair at once.

Warning

Failure to repair leaks can cause iron corrosion, leading to section failure and leaks. Do not use petroleum-based sealing or stop-leak compounds in boiler systems. Severe damage to boiler will occur, resulting in severe personal injury, death or substantial property damage.

13. Check automatic air vent for leakage. If leaking, remove vent cap and push valve core in to wash off accumulated sediment on valve seat. Release valve, replace cap and open one turn.

Shutdown procedure:

1. Follow “To Turn Off Gas to Appliance” instructions on boiler.
2. Do not drain system unless it will be exposed to freezing temperatures. If using antifreeze in system do not drain.

Cleaning boiler heating surfaces:

- POSSIBLE CANCER HAZARD BY INHALATION
- CAN CAUSE RESPIRATORY, SKIN AND EYE IRRITATION

This product contains fiberglass wool and ceramic fiber materials. Airborne fibers from these materials have been listed by the State of California as a possible cause of cancer through inhalation. Apply special care when handling ceramic fiber materials (chamber lining and base insulation). Ceramic fibers can be converted to chrysotobalites, a substance listed as a probable cause of cancer.

Suppliers of fiberglass wool products recommend the following precautions be taken when handling these materials.

Precautionary measures:
- Avoid breathing fiberglass dust and contact with skin and eyes.
- Use NIOSH approved dust/mist respirator.
- Wear long-sleeved, loose fitting clothing, gloves and eye protection.
- Wash work clothes separately from other clothing. Rinse washer thoroughly.
- Operations such as sawing, blowing, tearout and spraying may generate airborne fiber concentration requiring additional protection.

First aid measures:
- Eye contact - Flush eyes with water to remove dust. If symptoms persist, seek medical attention.
- Skin contact - Wash affected areas gently with soap and warm water after handling.

1. Follow shutdown procedure.
2. Remove venting system connection to boiler.
3. Remove top jacket panel. Turn back insulation.
4. Remove collector box/transition assembly. Clean sealant from assembly and sections.
5. Remove radiation plates hanging between sections.
7. Place newspapers in base of boiler to collect soot.
8. Clean between sections with wire flue brush.
Cleaning boiler heating surfaces (cont'd):
9. Remove newspaper and soot. Vacuum or brush base and surrounding area.

**WARNING** Obtain gas-tight seal to prevent flue gas spillage and carbon monoxide emissions, resulting in severe personal injury or death.

12. Replace insulation and jacket top panel.
13. Replace main burners.

**DANGER** Burner tubes must be seated in burner rest slots with openings face up. Main burner orifices must inject down center of burner. Failure to properly seat burners will result in severe personal injury, death or substantial property damage.


**NOTICE** Excessive sooting indicates improper gas combustion. If found check for proper combustion and make any necessary adjustments.

Clean main burners:
Vacuum or brush burners to remove dust and lint.

**DANGER** Burner tubes must be seated in burner rest slots with openings face up. Main burner orifices must inject down center of burner. Failure to properly seat burners will result in severe personal injury, death or substantial property damage.

Also refer to additional instructions packed with boiler. Verify proper operation after servicing.
Sequence of Operation

1. Select correct operating instruction from Table 7, according to the kind of gas valve. It should match operating instruction label on the boiler.
2. Raise room thermostat to call for heat.
3. Blower and circulator energize. After pressure switch proves proper airflow, ignition control initiates 30 second pre-purge.
4. Ignition control sparks the pilot and opens pilot valve in main gas valve.
5. a. If pilot does not light within 15 seconds, pilot valve is closed and spark generator is turned off. Ignition control initiates a 5 to 6 minute wait period, while blower and circulator continue operating.
   b. If pilot lights and ignition control senses flame current, spark generator is turned off and main valve opens.
6. During main burner operation:
   a. Ignition control monitors pilot flame current. If signal is lost, main valve closes, spark generator activates, and sequence returns to Step #5.
   b. If power is interrupted, control system shuts off pilot and main gas valves, and restarts at Step #1 when power is restored.
7. In the event the limit control shuts down the boiler, the blower de-energizes, causing the pressure switch circuit to open, then the ignition control closes main gas valve.
8. Thermostat is satisfied: pilot and main gas valves are closed. Blower and circulator are shut off.
9. Boiler is now in the off cycle.
10. Repeat Steps #1 through 7 several times to verify operation.
11. Return thermostat to normal setting.
12. Set thermostat heat anticipator setting indicated in notes on wiring diagram.

**TABLE 7 - Gas valve operating instruction page**

<table>
<thead>
<tr>
<th>Gas valve</th>
<th>25</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>VR8204</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>VR8304</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>35</td>
</tr>
<tr>
<td>WR36E</td>
<td>36</td>
<td>36</td>
<td>36</td>
<td>36</td>
<td>36</td>
<td>—</td>
</tr>
<tr>
<td>WR36C</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>37</td>
</tr>
</tbody>
</table>
Operating Instructions

Honeywell VR8204/VR8304 gas valve operating instructions

FOR YOUR SAFETY READ BEFORE OPERATING

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

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

OPERATING INSTRUCTIONS

1. STOP! Read the safety information above on this label.
2. Set the thermostat to lowest setting.
3. Turn off all electric power to the appliance.
4. This appliance is equipped with an ignition device which automatically lights the pilot. Do not try to light the pilot by hand.
5. Turn gas control knob clockwise to "OFF."
6. Wait 5 minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, STOP! Follow "B" in the safety information above on this label. If you don't smell gas, go to the next step.
7. Turn gas control knob counter clockwise to "ON."
8. Turn on all electric power to the appliance.
9. Set thermostat to desired setting.
10. If the appliance will not operate, follow the instructions "To Turn Off Gas to Appliance" and call your service technician or gas supplier.
11. Replace front panel.

TO TURN OFF GAS TO APPLIANCE

1. Set the thermostat to lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. Turn gas control knob clockwise to "OFF."
4. Replace front panel.
FOR YOUR SAFETY READ BEFORE OPERATING

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

A. This appliance is equipped with an ignition device which automatically lights the pilot. Do not try to light the pilot by hand.
B. BEFORE operating, smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.
C. Use only your hand to turn the gas control knob. Never use tools. If the knob will not turn by hand, do not try to repair it. Call a qualified service technician. Force or attempted repair may result in a fire or explosion.
D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

OPERATING INSTRUCTIONS

1. STOP! Read the safety information above on this label.
2. Set the thermostat to lowest setting.
3. Turn off all electric power to the appliance.
4. This appliance is equipped with an ignition device which automatically lights the pilot. Do not try to light the pilot by hand.
5. Turn gas control knob clockwise (counterclockwise) to "OFF".
6. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, STOP! Follow "B" in the safety information above on this label. If you don't smell gas, go to the next step.
7. Turn gas control knob counter-clockwise (clockwise) to "ON."
8. Turn on all electric power to the appliance.
9. Set thermostat to desired setting.
10. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.
11. Replace front panel.

TO TURN OFF GAS TO APPLIANCE

1. Set the thermostat to lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. Turn gas control knob clockwise (counterclockwise) to "OFF." Do not force.
4. Replace front panel.
FOR YOUR SAFETY READ BEFORE OPERATING

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

A. This appliance is equipped with a thermocouple which automatically lights the pilot. Do not try to light the pilot by hand.

B. BEFORE operating, smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS:
• Do not try to light any appliance.
• Do not touch any electric switch; do not use any phone in your building.
• Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.

C. If you cannot reach your gas supplier, call the fire department.

D. Use only your hand to turn the gas control knob. Never use tools. If the knob will not turn by hand, don't try to repair it. Call a qualified service technician. Force or attempted repair may result in a fire or explosion.

E. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

OPERATING INSTRUCTIONS

1. STOP! Read the safety information above on this label.
2. Set the thermostat to lowest setting.
3. Turn off all electric power to the appliance.
4. This appliance is equipped with an ignition device which automatically lights the pilot. Do not try to light the pilot by hand.
5. Depress gas control knob slightly and turn clockwise to "OFF".
   NOTE: Knob cannot be turned to "OFF" unless knob is depressed slightly. Do not force.
6. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas:
   STOP! Follow "B" in the safety information above on this label. If you don't smell gas, go to the next step.
7. Turn gas control knob counterclockwise to "ON".
8. Turn on all electric power to the appliance.
9. Set thermostat to desired setting.
10. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.
11. Replace front panel.

TO TURN OFF GAS TO APPLIANCE

1. Set the thermostat to lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. Depress gas control knob slightly and turn clockwise to "OFF". Do not force.
4. Replace front panel.
Troubleshooting procedure:

**WARNING** Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.

**WARNING** Never jumper (bypass) rollout thermal fuse element or any other device except for momentary testing as outlined in Troubleshooting Charts. A fire or explosion can result, causing severe personal injury, death or substantial property damage.

**DANGER** Burner access panel must be in position during boiler operation to prevent momentary flame rollout on ignition of main flame. Failure to do so will result in severe personal injury, death or substantial property damage.

1. Before troubleshooting:
   a. Have a voltmeter that can check 120VAC and 24VAC, a microammeter with minimum scale range of 0-25, and a continuity checker.
   b. Have an inclined manometer with 0-2” W.C. range.
   c. Check for 120VAC (min. 102VAC to max. 132VAC) to boiler.
   d. Make sure thermostat is calling for heat and contacts (including appropriate zone controls) are closed. Check for 24VAC between thermostat wire nuts and ground.

2. Check that air pressure switch hoses are correctly and securely installed and are not damaged.

3. Check gas pressures:
   a. With boiler off: 13” W.C. maximum natural or propane gas pressure upstream of gas valve.
   b. With boiler on:
      • 5” W.C. minimum natural gas pressure or 11” W.C. propane gas pressure upstream of gas valve.
      • 3-1/2” W.C. minimum natural gas pressure or 10” W.C. propane gas pressure downstream tapping on gas valve. Can be adjusted by regulator on gas valve.

Checking air pressure switch:

**NOTICE** Make sure boiler water temperature is 100°F or cooler before starting procedure to obtain appropriate readings.

1. Remove white hose from silver hose barb on left side of pressure switch as you face the boiler. See Figure 30.
2. Install a tee into white hose. Run another piece of hose from the tee to the pressure switch.
3. Attach third leg of tee to suction side of manometer.
4. Remove red hose from red hose barb on right side of pressure switch.
5. Install a tee into red hose. Run another piece of hose from the tee to the right side of the pressure switch.
6. Attach third leg of tee to pressure side of manometer.
7. Close manual main shutoff gas valve and set thermostat to call for heat. Blower will run but pilot and main burners will not ignite.
8. Check for 24VAC between normally open terminal on pressure switch and terminal C on transformer.
9. If manometer reading is above the set point (see Table 8) of the switch, but if there are not 24VAC across N.O. terminal on pressure switch and terminal C, replace pressure switch.
10. If reading is lower than set point, look for the following causes:
    a. Blockage in hoses.
    b. Obstruction in blower housing outlet.
    c. Loose blower wheel on motor shaft.
    d. Blower motor not at correct rpm.
    e. Blower back plate not sealed properly.
    f. Blockage in block assembly.
    g. Blockage in flue pipe or termination.
    h. Incorrect pressure switch.
11. When pressure reading is correct and pressure switch is operating properly, remove tees and reinstall:
    a. White hose to silver hose barb on left side of pressure switch.
    b. Red hose to red hose barb on right side of pressure switch.
**TABLE 8 - Pressure switch settings***

<table>
<thead>
<tr>
<th>Boiler Model</th>
<th>Inches W.C.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CGI - 25</td>
<td>1.18&quot;</td>
</tr>
<tr>
<td>CGI - 3</td>
<td>1.18&quot;</td>
</tr>
<tr>
<td>CGI - 4</td>
<td>1.18&quot;</td>
</tr>
<tr>
<td>CGI - 5</td>
<td>0.96&quot;</td>
</tr>
<tr>
<td>CGI - 6</td>
<td>0.75&quot;</td>
</tr>
<tr>
<td>CGI - 7</td>
<td>0.59&quot;</td>
</tr>
</tbody>
</table>

* For elevations above 2000 feet, contact your local Weil-McLain sales office for details.

---

**CHECKING AIR PRESSURE SWITCH**

**FIGURE 30**

- Original white hose to pressure switch
- Original red hose to pressure switch
- Red hose to red hose barb on pressure switch
- White hose to silver hose barb on pressure switch

Suction

Pressure
### CHART 1 — Blower and Circulator will not operate

- **Is there 24VAC at terminals R & C on transformer?**
  - NO
  - YES
  - Is circuit breaker thrown or fuse blown at service disconnect?
    - NO
    - YES
    - Replace transformer after checking for loose connections.
  - Replace relay.
    - NO
    - YES
    - Check for loose connections at circulator.

- **Is there 24VAC at terminals G & C on transformer?**
  - NO
  - YES

- **Is there 24VAC at common terminal of pressure switch and terminal C on transformer?**
  - NO
  - YES
  - Replace pressure switch.
  - Replace thermostat after making sure thermostat is set to call for heat.

- **Is vent blocked?**
  - NO
  - YES
  - Correct the vent condition.

### CHART 2 — Blower will not operate — But Circulator does operate

- **Momentarily bypass high temperature limit switch. Does blower motor run?**
  - NO
  - YES

- **Is 120VAC available to motor and limit circuit in junction box?**
  - NO
  - YES
  - Correct wiring.
  - Replace limit control after checking for correct setting.

- **Replace limit control after checking for correct setting.**

- **Replace motor if it hums.**
### CHART 3 — No spark — System does not operate

<table>
<thead>
<tr>
<th>VISUALLY CHECK — Is ground wire connected from “GND(Burner)” to ignition control mounting screw; and ground wire connected from transformer terminal C to case ground?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NO</strong></td>
</tr>
<tr>
<td>Correct by making connections.</td>
</tr>
<tr>
<td><strong>Check pressure switch. Is reading more than setting on switch?</strong></td>
</tr>
<tr>
<td><strong>NO</strong></td>
</tr>
<tr>
<td><strong>Refer to step #10, page 42 and correct problem.</strong></td>
</tr>
<tr>
<td><strong>Check for open thermostat or relay or check for loose wire connections, defective rollout thermal fuse element, or open LWCO (if used) or limit contacts.</strong></td>
</tr>
<tr>
<td><strong>DANGER</strong> If LWCO or rollout thermal fuse element contacts are open, determine cause and correct condition. Failure to do so will cause severe personal injury, death or substantial property damage.</td>
</tr>
<tr>
<td><strong>Is there 24VAC between terminal C on transformer and N.O. contact on pressure switch?</strong></td>
</tr>
<tr>
<td><strong>NO</strong></td>
</tr>
<tr>
<td><strong>Is there 24VAC across terminals 24V and 24V(GND)?</strong></td>
</tr>
<tr>
<td><strong>NO</strong></td>
</tr>
<tr>
<td><strong>Open thermostat contact for 15 seconds. Close thermostat contacts. Wait 30 seconds. Is there 24VAC across terminals PV &amp; MV/PV?</strong></td>
</tr>
<tr>
<td><strong>NO</strong></td>
</tr>
<tr>
<td><strong>Replace ignition control.</strong></td>
</tr>
<tr>
<td><strong>Is spark wire securely connected to spark generator?</strong></td>
</tr>
<tr>
<td><strong>NO</strong></td>
</tr>
<tr>
<td><strong>Is spark wire in good condition (not cut, brittle, burnt or cracked)?</strong></td>
</tr>
<tr>
<td><strong>NO</strong></td>
</tr>
<tr>
<td><strong>Is spark electrode ceramic cracked?</strong></td>
</tr>
<tr>
<td><strong>NO</strong></td>
</tr>
<tr>
<td><strong>Replace pilot assembly.</strong></td>
</tr>
<tr>
<td><strong>Replace pilot assembly. Turn ON supply voltage. Operate boiler several cycles.</strong></td>
</tr>
</tbody>
</table>
To check ignition system ground for CHART 5, Page 47

Pilot assembly and ignition control must share common ground with main burner. Nuisance shutdowns are often caused by poor or erratic ground.

- Check for good metal-to-metal contact between pilot burner bracket and main burner, and between main burner and burner rest.
- Check ground lead from GND (BURNER) terminal on the ignition control to ignition control mounting screw, and from terminal C on transformer to the transformer case ground. Make sure connections are clean and tight. If wire is damaged or deteriorated, replace with No. 18 ga. moisture-resistant, thermoplastic insulated wire with 105°C minimum rating.

CHART 4 — Spark is present — Pilot will not light

Are pilot valve connections securely made to terminals PV and MV/PV on ignition control?

<table>
<thead>
<tr>
<th>NO</th>
<th>YES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct the conditions.</td>
<td>Is inlet natural gas pressure at least 5.0&quot; W.C. and not over 14.0&quot; W.C.; propane at least 11.0&quot; W.C. and not over 14.0&quot; W.C.?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NO</th>
<th>YES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is manual hand valve open?</td>
<td>Is gas present at pilot burner assembly? At gas valve, remove MV wire leading from ignition control (see wiring diagram for correct gas valve connection). Using a match taped to a long screwdriver or pilot lighter rod, manually light pilot.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NO</th>
<th>YES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open manual hand valve.</td>
<td>Contact gas supplier to correct gas pressure.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NO</th>
<th>YES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make sure gas cock is on and pilot line is not kinked or obstructed. Check for clean pilot orifice. If okay, replace gas valve.</td>
<td>Is spark gap 0.125&quot; and located in pilot gas stream?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NO</th>
<th>YES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replace pilot assembly.</td>
<td>Block any draft around boiler. Check for clean pilot orifice.</td>
</tr>
</tbody>
</table>
CHART 5 — Pilot lights — Main valve will not come on

Does spark stay on for more than a few seconds after pilot is established?

NO | YES
--- | ---

Is there 24VAC between terminals MV and MV/PV on ignition control?

NO | YES
--- | ---

Replace ignition control.

Make sure sense wire is not wrapped around any pipe or accessories.

Is inlet natural gas pressure at least 5.0" W.C. and not over 14.0" W.C.; propane at least 11.0" W.C. and not over 14.0" W.C.?

NO | YES
--- | ---

Correct.

Is manual hand valve open?

NO | YES
--- | ---

Open manual hand valve.

Is main gas valve wiring secure?

NO | YES
--- | ---

Correct wiring.

Replace gas valve.

Contact gas supplier to correct gas pressure.

Is main gas valve shorted out to metal surface?

NO | YES
--- | ---

Correct.

Replace pilot assembly.

Is there continuity of sense wire and is insulation okay?

NO | YES
--- | ---

Replace pilot assembly.

Set up microammeter to measure output current in flame sensor circuit as follows:

a. Detach sense lead from ignition control. Attach negative lead from microammeter to sense terminal on ignition control.

b. Attach positive lead to sense wire from pilot assembly.

c. Disconnect main valve lead from terminal MV on ignition control.

d. Energize system. Spark should ignite pilot. As soon as pilot is burning, microammeter should read at least 1.0 microamp for Honeywell S8680K or U.T. 1003-513.

e. Is flame current signal less than 1.0 microamp?

NO | YES
--- | ---

Replace ignition control.

Check for correct gas pressure, clean pilot assembly, and tight mechanical and electrical connections. Also check for proper system grounding. See box on page 46.
Replacement parts must be purchased through a local Weil-McLain Distributor. When ordering, specify boiler model and size and include description and part number of replacement part. Results from using modified or other-manufactured parts will not be covered by warranty and may damage boiler or impair operation.

Weil-McLain Part Numbers are found in Weil-McLain Boilers and Controls Repair Parts Lists.
# Parts List

## CGi Section Assembly

<table>
<thead>
<tr>
<th>FIG. NO.</th>
<th>DESCRIPTION</th>
<th>WEIL-MCLAINE PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Left Hand End Section, 51124</td>
<td>311-103-815</td>
</tr>
<tr>
<td>2</td>
<td>Right Hand End Section, 51128</td>
<td>311-103-821</td>
</tr>
<tr>
<td>3</td>
<td>Intermediate Section, 51125</td>
<td>311-103-818</td>
</tr>
<tr>
<td>N.S.</td>
<td>Replacement Section Assembly: CGi-25 &amp; 3</td>
<td>321-114-315</td>
</tr>
<tr>
<td>N.S.</td>
<td>Replacement Section Assembly: CGi-4</td>
<td>321-114-316</td>
</tr>
<tr>
<td>N.S.</td>
<td>Replacement Section Assembly: CGi-5</td>
<td>321-114-317</td>
</tr>
<tr>
<td>N.S.</td>
<td>Replacement Section Assembly: CGi-6</td>
<td>321-114-318</td>
</tr>
<tr>
<td>N.S.</td>
<td>Replacement Section Assembly: CGi-7</td>
<td>321-114-319</td>
</tr>
<tr>
<td>N.S.</td>
<td>Section Replacement Kit (includes: Seals and Sealant for 1 joint)</td>
<td>381-354-527</td>
</tr>
<tr>
<td>4</td>
<td>7/16 Tie Rod w/o Nut (3 per Boiler): CGi-25 &amp; 3</td>
<td>560-234-500</td>
</tr>
<tr>
<td>7/16 Tie Rod w/o Nut (3 per Boiler): CGi-4</td>
<td>560-234-501</td>
<td></td>
</tr>
<tr>
<td>7/16 Tie Rod w/o Nut (3 per Boiler): CGi-5</td>
<td>560-234-502</td>
<td></td>
</tr>
<tr>
<td>7/16 Tie Rod w/o Nut (3 per Boiler): CGi-6</td>
<td>560-234-503</td>
<td></td>
</tr>
<tr>
<td>7/16 Tie Rod w/o Nut (3 per Boiler): CGi-7</td>
<td>560-234-504</td>
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</tr>
<tr>
<td>5</td>
<td>7/16 Nut (2 per Tie Rod)</td>
<td>561-928-235</td>
</tr>
<tr>
<td>6</td>
<td>7/16 Washer (1 per Tie Rod)</td>
<td>562-248-684</td>
</tr>
<tr>
<td>7</td>
<td>Radiation Plate (1 per Joint)</td>
<td>460-003-700</td>
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<tr>
<td>8</td>
<td>Collector Hood and Transition Assembly: CGi-25</td>
<td>381-354-581</td>
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<tr>
<td>Collector Hood and Transition Assembly: CGi-3</td>
<td>381-354-582</td>
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<td>Collector Hood and Transition Assembly: CGi-4</td>
<td>381-354-583</td>
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<td>381-354-584</td>
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<tr>
<td>Collector Hood and Transition Assembly: CGi-6</td>
<td>381-354-585</td>
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<tr>
<td>Collector Hood and Transition Assembly: CGi-7</td>
<td>381-354-586</td>
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<tr>
<td>9</td>
<td>High Limit, 30 differential, w/well, case, cover and screw - HW L4080B1386 or WR 11B83-17</td>
<td>510-312-254</td>
</tr>
<tr>
<td>10</td>
<td>Inducer Fan Assembly Kit (includes Inducer Fan Assembly, Gasket, and Nuts)</td>
<td>381-354-580</td>
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<tr>
<td>11</td>
<td>Gasket for Inducer</td>
<td>590-317-627</td>
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</table>
## CGi Base Assembly

### Parts List

<table>
<thead>
<tr>
<th>FIG. NO.</th>
<th>DESCRIPTION</th>
<th>WEIL-MCLAIN PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Base Pan Angle - Right Hand</td>
<td>450-030-474</td>
</tr>
<tr>
<td>2</td>
<td>Base Pan Angle - Left Hand</td>
<td>450-030-475</td>
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<tr>
<td>3</td>
<td>Base Pan: CGi-25 &amp; 3</td>
<td>450-003-730</td>
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<tr>
<td></td>
<td>Base Pan: CGi-4</td>
<td>450-003-731</td>
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<td>Base Pan: CGi-5</td>
<td>450-003-732</td>
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<td>Base Pan: CGi-6</td>
<td>450-003-733</td>
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<td>Base Pan: CGi-7</td>
<td>450-003-734</td>
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<tr>
<td>4</td>
<td>Base Side Panel</td>
<td>460-003-710</td>
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<td>5</td>
<td>Base Front Cross Tie: CGi-25 &amp; 3</td>
<td>460-003-777</td>
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<tr>
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<td>Base Front Cross Tie: CGi-4</td>
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<td>Base Front Cross Tie: CGi-6</td>
<td>460-003-780</td>
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<td>Base Front Cross Tie: CGi-7</td>
<td>460-003-781</td>
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<td>Base Back Cross Tie: CGi-25 &amp; 3</td>
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<td>Base Back Cross Tie: CGi-4</td>
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<td>Base Back Cross Tie: CGi-7</td>
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<td>Manifold: CGi-25</td>
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<td>Manifold: CGi-3</td>
<td>591-126-616</td>
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<td>591-126-619</td>
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<td>Manifold: CGi-7</td>
<td>591-126-556</td>
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<td>8</td>
<td>Access Panel: CGi-25 &amp; 3</td>
<td>460-003-741</td>
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<td>Access Panel: CGi-4</td>
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<td>Access Panel: CGi-7</td>
<td>460-003-745</td>
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<td>9</td>
<td>Base Insulation Set: CGi-25-5</td>
<td>381-354-518</td>
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<td>Base Insulation Set: CGi-6-7</td>
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<td>10</td>
<td>Burner Rest: CGi-25</td>
<td>450-003-742</td>
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<td>Burner Rest: CGi-3</td>
<td>450-003-736</td>
</tr>
<tr>
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<td>Burner Rest: CGi-4</td>
<td>450-003-737</td>
</tr>
<tr>
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<td>Burner Rest: CGi-5</td>
<td>450-003-738</td>
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<tr>
<td></td>
<td>Burner Rest: CGi-6</td>
<td>450-003-739</td>
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<td>Burner Rest: CGi-7</td>
<td>450-003-740</td>
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<td>11</td>
<td>Burner, Regular</td>
<td>512-200-060</td>
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<tr>
<td>12</td>
<td>Main Burner Orifice, 2.0mm, Natural</td>
<td>560-528-997</td>
</tr>
<tr>
<td></td>
<td>Main Burner Orifice, 1.3mm, Propane</td>
<td>560-528-998</td>
</tr>
<tr>
<td>13</td>
<td>Boiler Leg Kit</td>
<td>550-320-219</td>
</tr>
<tr>
<td>14</td>
<td>Rollout Thermal Fuse Element, Microtemp G4AM0600228C or Elmwood Sensors RD226-001</td>
<td>512-050-230</td>
</tr>
</tbody>
</table>
### Parts List

<table>
<thead>
<tr>
<th>FIG. NO.</th>
<th>DESCRIPTION</th>
<th>WEIL-MCLAIN PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Transformer/Relay Assembly - HW R825D1000 or WR 631-9001</td>
<td>510-312-167</td>
</tr>
<tr>
<td></td>
<td>Transformer (Relay not included) - HW R8285K1004 or WR S84A-85</td>
<td>510-312-166</td>
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<tr>
<td></td>
<td>Relay - HW R8222U1006 or WR 91-112006-11000</td>
<td>510-350-223</td>
</tr>
<tr>
<td>2</td>
<td>Jacket Panels, Rear &amp; Door: CGI-25 &amp; 3</td>
<td>431-223-160</td>
</tr>
<tr>
<td></td>
<td>Jacket Panels, Rear &amp; Door: CGI-4</td>
<td>431-223-161</td>
</tr>
<tr>
<td></td>
<td>Jacket Panels, Rear &amp; Door: CGI-5</td>
<td>431-223-162</td>
</tr>
<tr>
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<td>Jacket Panels, Rear &amp; Door: CGI-6</td>
<td>431-223-163</td>
</tr>
<tr>
<td></td>
<td>Jacket Panels, Rear &amp; Door: CGI-7</td>
<td>431-223-164</td>
</tr>
<tr>
<td>3</td>
<td>Jacket Panel, Left Side</td>
<td>431-223-240</td>
</tr>
<tr>
<td>4</td>
<td>Jacket Panel, Top: CGI-25 &amp; 3</td>
<td>431-223-245</td>
</tr>
<tr>
<td></td>
<td>Jacket Panel, Top: CGI-4</td>
<td>431-223-246</td>
</tr>
<tr>
<td></td>
<td>Jacket Panel, Top: CGI-5</td>
<td>431-223-247</td>
</tr>
<tr>
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<td>Jacket Panel, Top: CGI-6</td>
<td>431-223-248</td>
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<tr>
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<td>Jacket Panel, Top: CGI-7</td>
<td>431-223-249</td>
</tr>
<tr>
<td>5</td>
<td>Jacket Panel, Interior: CGI-25 &amp; 3</td>
<td>431-223-270</td>
</tr>
<tr>
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<td>Jacket Panel, Interior: CGI-4</td>
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<td>Jacket Panel, Interior: CGI-5</td>
<td>431-223-272</td>
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<td>431-223-273</td>
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<td>Jacket Panel, Interior: CGI-7</td>
<td>431-223-274</td>
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<td>Jacket Panel, Right Side</td>
<td>421-208-160</td>
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<tr>
<td>7</td>
<td>Jacket Cross Tie, Bottom Front: CGI-25 &amp; 3</td>
<td>431-214-124</td>
</tr>
<tr>
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<td>431-214-125</td>
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<td>431-214-126</td>
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<td>431-214-127</td>
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<td>Jacket Cross Tie, Bottom Front: CGI-7</td>
<td>431-214-128</td>
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</tbody>
</table>
# Parts List

## CGI Boiler Trim Assembly

<table>
<thead>
<tr>
<th>FIG. NO.</th>
<th>DESCRIPTION</th>
<th>MANUFACTURER</th>
<th>MANUFACTURER'S PART NUMBER</th>
<th>WEIL-MCLAIN PART NUMBER</th>
<th>CGI SERIES 1 BOILER SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ASME Pressure Relief Valve, 30 PSIG, 3/4 male inlet</td>
<td>Conbraco</td>
<td>10-407-05</td>
<td>511-546-921</td>
<td>1 1 1 1 1 1 1</td>
</tr>
<tr>
<td></td>
<td>ASME Pressure Relief Valve, 30 PSIG, 3/4 male inlet</td>
<td>Watts</td>
<td>M335</td>
<td>511-546-921</td>
<td>1 1 1 1 1 1 1</td>
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<tr>
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<td>ASME Pressure Relief Valve, 30 PSIG, 3/4 female inlet</td>
<td>Conbraco</td>
<td>10-408-05</td>
<td>511-546-924</td>
<td>1 1 1 1 1 1 1</td>
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<td>ASME Pressure Relief Valve, 30 PSIG, 3/4 female inlet</td>
<td>Watts</td>
<td>335</td>
<td>511-546-924</td>
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<tr>
<td>2</td>
<td>Combination Pressure-Temperature Gauge, 2-1/2, short shank</td>
<td>Ametek</td>
<td>PTA-1088</td>
<td>510-218-099</td>
<td>1 1 1 1 1 1 1</td>
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<tr>
<td></td>
<td>Combination Pressure-Temperature Gauge, short shank</td>
<td>ENFM</td>
<td>4104</td>
<td>510-218-099</td>
<td>1 1 1 1 1 1 1</td>
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<tr>
<td>3</td>
<td>Drain Valve, 3/4</td>
<td>Conbraco</td>
<td>31-606-01</td>
<td>511-210-423</td>
<td>1 1 1 1 1 1 1</td>
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<tr>
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<td>Drain Valve, 3/4</td>
<td>Hammond Valve</td>
<td>710</td>
<td>511-246-392</td>
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<tr>
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<td>Drain Valve, 3/4</td>
<td>Matco-Norca</td>
<td>205F04</td>
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<td>Watts</td>
<td>BD-2C</td>
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<td>Circulator</td>
<td>Bell &amp; Gossett</td>
<td>NRF-22-103253</td>
<td>511-405-118</td>
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<td>Circulator</td>
<td>Bell &amp; Gossett</td>
<td>100</td>
<td>511-405-115</td>
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<td>Circulator</td>
<td>Grundfos</td>
<td>UP15-42FR-TB4</td>
<td>511-405-126</td>
<td>1 1 1 1 1 1 1</td>
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<td>Circulator</td>
<td>Taco</td>
<td>007</td>
<td>511-405-113</td>
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<td>Taco</td>
<td>110</td>
<td>511-405-116</td>
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<tr>
<td>5</td>
<td>Circulator Gasket, Universal</td>
<td>Weil-McLain</td>
<td>-</td>
<td>590-317-535</td>
<td>2 2 2 2 2 2 2</td>
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<tr>
<td></td>
<td>N.S. Circulator Hardware Kit, 3/4 (see note below)</td>
<td>Weil-McLain</td>
<td>-</td>
<td>381-354-530</td>
<td>1 - - - - - -</td>
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<tr>
<td></td>
<td>N.S. Circulator Hardware Kit, 1&quot; (see note below)</td>
<td>Weil-McLain</td>
<td>-</td>
<td>381-354-525</td>
<td>- 1 1 1 - - -</td>
</tr>
<tr>
<td></td>
<td>N.S. Circulator Hardware Kit, 1-1/4 (see note below)</td>
<td>Weil-McLain</td>
<td>-</td>
<td>381-354-526</td>
<td>- 1 1 1 1 1 1</td>
</tr>
<tr>
<td>6</td>
<td>Wiring Harness for Circulator (B&amp;G UP15, Grundfos NRF-22 and Taco 007)</td>
<td>Weil-McLain</td>
<td>-</td>
<td>591-319-793</td>
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<tr>
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<td>Wiring Harness for Circulator (B&amp;G 100, Taco 110)</td>
<td>Weil-McLain</td>
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<td>591-319-842</td>
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</tr>
</tbody>
</table>

Circulator Hardware Kit contains 1 flange, 1 gasket, 2 nuts and 2 screws.

Limit control See page 49.
## CGi Gas Control Assembly

### Parts List

<table>
<thead>
<tr>
<th>FIG. NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CGi Gas Control Assembly</td>
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### Gas Components for Natural Gas Only

<table>
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<tr>
<th>FIG.</th>
<th>PART NO.</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>1N</td>
<td>Honeywell VR8204A2001</td>
<td>Gas Valve, 1/2 x 1/2, Nat. 511-044-381</td>
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<tr>
<td>1N</td>
<td>White-Rodgers 36E36-266</td>
<td>Gas Valve, 1/2 x 1/2, Nat. 511-044-381</td>
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<td>1N</td>
<td>Honeywell VR8304M4002</td>
<td>Gas Valve, 3/4 x 3/4, Nat. 511-044-353</td>
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<tr>
<td>1N</td>
<td>White-Rodgers 36C68-478</td>
<td>Gas Valve, 3/4 x 3/4, Nat. 511-044-353</td>
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<td>2N</td>
<td>Weil-McLain</td>
<td>Pilot Assembly Kit, w/orifice and burner with pilot bracket, Nat. 510-811-221</td>
</tr>
</tbody>
</table>

### Gas Components for Propane Gas Only

<table>
<thead>
<tr>
<th>FIG.</th>
<th>MANUFACTURER</th>
<th>PART NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1P</td>
<td>Honeywell VR8204M2701</td>
<td>Gas Valve, 1/2 x 1/2, LP 511-044-354</td>
<td></td>
</tr>
<tr>
<td>1P</td>
<td>White-Rodgers 36E36-291</td>
<td>Gas Valve, 1/2 x 1/2, LP 511-044-354</td>
<td></td>
</tr>
<tr>
<td>1P</td>
<td>Honeywell VR8304M4010</td>
<td>Gas Valve, 3/4 x 3/4, LP 511-044-355</td>
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</tr>
<tr>
<td>1P</td>
<td>White-Rodgers 36C68-479</td>
<td>Gas Valve, 3/4 x 3/4, LP 511-044-355</td>
<td></td>
</tr>
<tr>
<td>2P</td>
<td>Weil-McLain</td>
<td>Pilot Assembly Kit, w/orifice and burner with slanted pilot bracket, LP 510-811-222</td>
<td></td>
</tr>
</tbody>
</table>

### Gas Control Components for Natural and Propane Gas

<table>
<thead>
<tr>
<th>FIG.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Ignition Control module Honeywell S8680K-2000 511-330-099</td>
</tr>
<tr>
<td>3</td>
<td>Ignition Control module United Technologies 1003-513 511-330-099</td>
</tr>
<tr>
<td>N.S.</td>
<td>Wiring Harness Weil-McLain 591-319-795</td>
</tr>
<tr>
<td>N.S.</td>
<td>Pilot Tubing,.12 O.D., aluminum Weil-McLain 560-742-860</td>
</tr>
<tr>
<td>5</td>
<td>Pressure Differential Switch,.118 W.C. Tri-Delta FS6206A-2417 511-624-450</td>
</tr>
<tr>
<td>N.S.</td>
<td>Pressure Differential Switch Tubing,.12 I.D., red, pressure switch to collector hood Lydall 590-317-650</td>
</tr>
<tr>
<td>N.S.</td>
<td>Pressure Differential Switch Tubing,.12 I.D., white, pressure switch to transition Lydall 590-317-651</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>CGI-25</td>
<td>50,000</td>
</tr>
<tr>
<td>CGI-3</td>
<td>67,000</td>
</tr>
<tr>
<td>CGI-4</td>
<td>100,000</td>
</tr>
<tr>
<td>CGI-5</td>
<td>133,000</td>
</tr>
<tr>
<td>CGI-6</td>
<td>167,000</td>
</tr>
<tr>
<td>CGI-7</td>
<td>200,000</td>
</tr>
</tbody>
</table>

▲ Add PIN for natural gas boiler; PIL for propane gas.
* Based upon standard test procedures prescribed by the United States Department of Energy.
** Net I=B=R ratings are based on net installed radiation of sufficient quantity for the requirements of the building and nothing need be added for normal piping and pick-up. Ratings are based on a piping and pick-up allowance of 1.15. An additional allowance should be made for unusual piping and pick-up loads.
+ Refer to National Fuel Gas Code, ANSI Z223.1-latest edition, or in Canada, CAN/CSA B149.1 or B149.2 Installation Code for chimney sizing and vent connector lengths. CGI boiler may also be vented directly outside using 3" vent pipe as specified in CGI Boiler Manual.

NOTES:
1) CGI boilers for residential radiant panel systems, converted gravity heating systems, or other low-water temperature applications should be installed with balancing valves and bypass piping equal to the supply and return size to avoid excessive flue gas condensation due to lower operating water temperatures. For alternate piping, contact your Weil-McLain sales office.
2) A.G.A. design certified for installation on combustible flooring. Tested for 50 psi working pressure.
### Dimensions

**Top view**

- **11-1/8**
- **2-1/4**

**Left side**

- **13-11/16**
- **4-3/4**

**Front**

- **2-3/8**
- **9**

**Right side**

- **19**
- **1-5/8**

**Supply Outlet Pipe Size**

- **CGi-25**: 1 ½" ¾"
- **CGi-3**: 1 ¼" 1"
- **CGi-4**: 1 ¼" 1"
- **CGi-5**: 1 ¼" 1"
- **CGi-6**: 1 ¼" 1 ¼"
- **CGi-7**: 1 ¼" 1 ¼"

**Return Inlet Pipe Size**

- **CGi-25**: ½" ½"
- **CGi-3**: ½" ½"
- **CGi-4**: ½" ½"
- **CGi-5**: ½" ½"
- **CGi-6**: ½" ½"
- **CGi-7**: ¾" ¾"

**Gas Connection Pipe Size (All Gases)**

- **CGi-25**: ½" ½"
- **CGi-3**: ½" ½"
- **CGi-4**: ½" ½"
- **CGi-5**: ½" ½"
- **CGi-6**: ½" ½"
- **CGi-7**: ¾" ¾"

**Gas Manifold Pipe Size (All Gases)**

- **CGi-25**: ½" ½"
- **CGi-3**: ½" ½"
- **CGi-4**: ½" ½"
- **CGi-5**: ½" ½"
- **CGi-6**: ½" ½"
- **CGi-7**: ¾" ¾"

**"W" Dimension**

- **CGi-25**: 10"
- **CGi-3**: 10"
- **CGi-4**: 13"
- **CGi-5**: 16"
- **CGi-6**: 19"
- **CGi-7**: 2"