Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

**WHAT TO DO IF YOU SMELL GAS**

- Do not try to light any appliance.
- Do not touch any electrical 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.

Installation and service must be performed by a qualified installer, service technician or the gas supplier.
### Please read this page first

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<td>Warnings and definitions</td>
<td>1, 2, and 3</td>
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<tr>
<td>Prevent air contamination</td>
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<td>3</td>
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<tr>
<td>Identify boiler components</td>
<td>The illustration on page 4, will show you the location of the main components.</td>
<td>4</td>
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<tr>
<td>Maintain boiler</td>
<td>Set up a plan for maintaining the boiler using the schedule included in this manual. Schedule an annual start-up by a qualified service technician before every heating season.</td>
<td>5</td>
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<tr>
<td>Start — or — Shutdown boiler</td>
<td>Use the Operating instruction sheet for the gas valve installed on your boiler. Ask your service technician if you are unsure which one.</td>
<td>10</td>
</tr>
<tr>
<td>Troubleshoot common problems</td>
<td>Use the common problems/solutions table to resolve typical heating system/boiler problems.</td>
<td>11</td>
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</table>

### Hazard definitions

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

- **⚠️ DANGER** - Indicates presence of hazards that will cause severe personal injury, death or substantial property damage.
- **⚠️ WARNING** - Indicates presence of hazards that can cause severe personal injury, death or substantial property damage.
- **⚠️ CAUTION** - Indicates presence of hazards that will or can cause minor personal injury or property damage.
- **NOTICE** - Indicates special instructions on installation, operation or maintenance that are important but not related to personal injury or property damage.

### Boiler service and maintenance

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

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

**Air contamination**
- To prevent potential of severe personal injury or death, check for products or areas listed in table at right before installing boiler. If any of these contaminants are found:
  - remove contaminants permanently.
  - — OR —
  - isolate boiler and provide outside combustion air. See national, provincial or local codes for further information.

**Service and maintenance**
- To avoid electric shock, **disconnect electrical supply** before performing maintenance.
- To avoid severe burns, **allow boiler to cool** before performing maintenance.
- You must **maintain** the boiler as outlined in the manual and have the boiler **started up and serviced at least annually by a qualified service technician** to ensure boiler/system reliability.

**Boiler operation**
- **Do not block flow of combustion or ventilation air** to boiler. This boiler is equipped with a control which will automatically shut down the boiler should vent be blocked. If vent or air blockage is easily accessible and removable, remove it. The boiler should attempt to restart within an hour. If blockage is not obvious or cannot be removed, have the boiler and system checked by a qualified service technician.
- **Should overheating occur or gas supply fail to shut off**, do not turn off or disconnect electrical supply to pump. Instead, **shut off the gas supply at a location external to the appliance**.
- **Do not use this boiler if any part has been under water**. Immediately call a qualified service technician to inspect the boiler and to replace any part of the control system and any gas control, which has been under water.
- **Have the building monitored when it is vacant** for an extended period. Safety controls can shut down the boiler at any time. The loss of heat can result in significant damage due to freezing.

**Boiler water**
- **DO NOT** use petroleum-based cleaning or sealing compounds in boiler system. Water seal deterioration will occur, causing leakage between sections and damage to heating system components. This can result in substantial property damage.
- **DO NOT** use “homemade cures” or “boiler patent medicines”. Serious damage to boiler, personnel and/or property may result.
- Continual fresh **makeup water will reduce boiler life**. Mineral buildup in sections reduces heat transfer, overheats cast iron, and causes section failure. Addition of oxygen and other gases can cause internal corrosion. Leaks in boiler or piping must be repaired at once to prevent makeup water.
- **Do not add cold water to hot boiler**. Thermal shock can cause sections to crack.

---

**Products to avoid**
- Spray cans containing chloro/fluorocarbons
- Permanent wave solutions
- Chlorinated waxes/cleaners
- Chlorine-based swimming pool chemicals
- Calcium chloride used for thawing
- Sodium chloride used for water softening
- Refrigerant leaks
- Paint or varnish removers
- Hydrochloric acid/muriatic acid
- Cements and glues
- Antistatic fabric softeners used in clothes dryers
- Chlorine-type bleaches, detergents, and cleaning solvents found in household laundry rooms
- Adhesives used to fasten building products and other similar products

**Areas likely to have contaminants**
- Dry cleaning/laundry areas and establishments
- Swimming pools
- Metal fabrication plants
- Beauty shops
- Refrigeration repair shops
- Photo processing plants
- Auto body shops
- Plastic manufacturing plants
- Furniture refinishing areas and establishments
- New building construction
- Remodeling areas
- Garages with workshops
Boiler components

CGt

1. Control module
2. Transformer
3. Inducer
4. Air pressure switch
5. High limit
6. Boiler circulator
7. Tankless heater low limit control
8. 3-Way valve
9. Tankless heater
10. Wires to ambient temperature switch
11. Relay

a. Supply to system
b. Return from system
c. Stainless steel burners
d. Flue outlet
e. Gas valve
f. Pressure/temperature gauge
g. Relief valve
h. Air vent connection
i. Flame rollout thermal fuse element (TFE)
j. Burner holding bracket
k. Pilot burner and bracket
l. Gas manifold
m. Cast iron boiler sections
n. Flue collector
o. Junction box
p. Drain valve
q. Burner shield
r. Tee 1 x 1 x 1/2 NPT
Maintain boiler using schedule below

<table>
<thead>
<tr>
<th><strong>Service technician</strong></th>
<th><strong>Owner maintenance</strong></th>
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<tr>
<td>(covered in Boiler Manual — for use only by a qualified service technician)</td>
<td>(see following pages for instructions)</td>
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<tr>
<td><strong>Inspect:</strong></td>
<td><strong>Daily</strong></td>
</tr>
<tr>
<td>• Reported problems</td>
<td>• Check boiler area</td>
</tr>
<tr>
<td>• Boiler area</td>
<td>• Check air openings</td>
</tr>
<tr>
<td>• Air openings</td>
<td>• Check boiler pressure/temperature gauge</td>
</tr>
<tr>
<td>• Flue gas vent system</td>
<td><strong>Monthly</strong></td>
</tr>
<tr>
<td>• Pilot and main burner flames</td>
<td>• Check boiler interior piping</td>
</tr>
<tr>
<td>• Water piping</td>
<td>• Check venting system</td>
</tr>
<tr>
<td>• Boiler heating surfaces</td>
<td>• Check air vents</td>
</tr>
<tr>
<td>• Burners, base and inlet air box</td>
<td>• Check boiler relief valve</td>
</tr>
<tr>
<td><strong>Service:</strong></td>
<td><strong>Periodically</strong></td>
</tr>
<tr>
<td>• Oiled-bearing circulators</td>
<td>• Check automatic air vents (if used)</td>
</tr>
<tr>
<td><strong>Start-up:</strong></td>
<td><strong>Every 6 months</strong></td>
</tr>
<tr>
<td>• Perform start-up per manual</td>
<td>• Test low water cutoff (if used)</td>
</tr>
<tr>
<td><strong>Check/test:</strong></td>
<td><strong>End of season</strong></td>
</tr>
<tr>
<td>• Gas piping</td>
<td>• Operate relief valve</td>
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<td>• Cold fill and operating pressures</td>
<td>• Shut down procedure</td>
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<td>• Air vents and air elimination</td>
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<td>• Limit controls and cutoffs</td>
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<tr>
<td>• Expansion tank</td>
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<td>• Boiler relief valve</td>
<td></td>
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<tr>
<td><strong>Review:</strong></td>
<td></td>
</tr>
<tr>
<td>• Review with owner</td>
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</table>

**Tankless water heater**

If boiler is used to supply domestic hot water, limit control should be set to supply adequate hot water. Weil-McLain tankless heaters are rated at 200°F boiler water temperature. To get rated output, set low limit at 200°F. Limit can be adjusted to meet system hot water requirements. Lowering the setting will cause a slight variation in water temperature but will decrease burner on-off cycling. High limit should be set at least 20° above low limit.
User maintenance procedures

Boiler must be serviced & maintained

**WARNING**

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

**NOTICE**

The following information provides detailed instructions for completing the maintenance items listed in the maintenance schedule, page 6. In addition to this maintenance, the boiler must be serviced and started up at the beginning of each heating season by a qualified service technician.

Component information

Rollout thermal fuse element

Cuts off gas flow should flame rollout occur. See Figure 1.

**WARNING**

Do not attempt to place boiler in operation if rollout thermal fuse element cuts off gas flow. Immediately call a service technician. Failure to do so can cause severe personal injury, death or substantial property damage.

Check daily

**Boiler area**

To prevent potential of severe personal injury, death or substantial property damage, eliminate all materials as discussed below from the boiler vicinity. If found:

- Remove products immediately from the area. If they have been there for an extended period, call a qualified service technician to inspect the boiler and vent system for possible damage from acid corrosion.
- If products cannot be removed, immediately call a qualified service technician to install an outside combustion air source for the boiler (if not already installed).

1. Combustible/flammable materials — Do not store combustible materials, gasoline or any other flammable vapors or liquids near the boiler. Remove immediately if found.
2. Air contaminants — See listing of contaminants on page 3.

**Pressure/temperature gauge**

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

**Air openings**

Verify that combustion and ventilation air openings to the boiler room and/or building are open and unobstructed.
Check monthly

Boiler piping

Visually inspect for leaks around piping, circulators, relief valve and other fittings. Immediately call a qualified service technician to repair any leaks.

**WARNING**

Have leaks fixed at once by a qualified service technician. Continual fresh makeup water will reduce boiler life. Minerals can build up in sections, reducing heat transfer, overheating cast iron, and causing section failure.

**WARNING**

Do not use *petroleum-based cleaning or sealing compounds* in boiler system. Severe damage to boiler and system components can occur, resulting in possible severe personal injury, death or substantial property damage.

Venting system

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

1. Visually inspect all parts or the flue gas venting system for any signs of blockage, leakage or joints or deterioration of the piping.
2. Notify your qualified service technician at once if you find any problem.

Boiler relief valve

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

Check condensate drain system

1. Inspect condensate drain fittings and tubing. Verify that condensate can flow freely to drain.

Automatic air vents (if used)

1. See Figure 3.
2. Remove the cap from any automatic air vent in the system and check operation by depressing valve B slightly with the tip of a screwdriver.
3. If the air vent valve appears to be working freely and not leaking, replace cap A, twisting all the way on.
4. Loosen cap A one turn to allow vent to operate.
5. Have vent replaced if it does not operate correctly.

---

**Figure 2** Relief valve

**Figure 3** Automatic air vent
Check monthly continued

Pilot burner flame

Proper pilot flame (see Figure 4):
1. Blue flame.
2. Inner cone engulfing pilot flame sensor.
3. Pilot flame sensor glowing cherry red.

Improper pilot flame:
1. Overfired — Large flame lifting or blowing past pilot flame sensor.
2. Underfired — Small flame. Inner cone not engulfing pilot flame sensor.
3. Lack of primary air — Yellow flame tip.
4. Incorrectly heated pilot flame sensor.

Main burner flame

Proper main burner flame (see Figure 5):
1. Yellow-orange streaks may appear (caused by dust).

Improper main burner flame:
1. Overfired — Large flames.
2. Underfired — Small flames.
3. Lack of primary air — Yellow tipping on flames (sooting will occur).

Service periodically

Test low water cutoff (if installed)

If the system is equipped with a low water cutoff, test the low water cutoff periodically during the heating season, following the low water cutoff manufacturer’s instructions.
Service every 6 months

Operate boiler relief valve

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

1. Before proceeding, verify that the relief valve outlet has been piped to a safe place of discharge, avoiding any possibility of scalding from hot water.
2. Read the boiler pressure/temperature gauge to make sure the system is pressurized.
3. Lift the relief valve top lever slightly, allowing water to relieve through the valve and discharge piping.
4. If water flows freely, release the lever and allow the valve to seat. Watch the end of the relief valve discharge pipe to ensure that the valve does not weep after the line has had time to drain. If the valve weeps, lift the seat again to attempt to clean the valve seat. If the valve continues to weep afterwards, contact your qualified service technician to inspect the valve and system.
5. If water does not flow from the valve when you lift the lever completely, the valve or discharge line may be blocked. Immediately shutdown the boiler, following the instructions on the inside jacket top Lighting Instructions. Call your qualified service technician to inspect the boiler and system.

End-of-season shutdown

Follow boiler shutdown procedure

1. Follow “TURN OFF GAS TO APPLIANCE” on the Operating instructions on the inside of the jacket panel. You will also find these instructions on page 10 of this manual.
2. Do not drain system unless exposure to freezing temperatures will occur.
3. Do not drain the system if it is filled with an antifreeze solution.
4. Do not shut down boilers used for domestic water heating. They must operate year-round.
Operating instructions

- Gas valve — Honeywell VR8204 and White-Rodgers 36E

FOR YOUR SAFETY READ BEFORE OPERATING

A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner 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. See below.

C. 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.

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.

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 depart-

OPERATING INSTRUCTIONS

1. STOP! Read the safety information above on this label.

2. Set the thermostat to lowest setting.

3. Turn off all electrical power to the appliance.

4. Remove jacket front panel.

5. This appliance is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.

6. Turn Gas control knob clockwise \(\Rightarrow\) to OFF.

7. 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. If you don’t smell gas, go to the next step.

8. Turn Gas control knob counterclockwise \(\Leftarrow\) to ON.

9. Turn on all electric power to the appliance.

10. Set thermostat to desired setting.

11. If the appliance will not operate, follow the instructions “TO TURN OFF GAS TO APPLIANCE” below and call your service technician or gas supplier.

12. Replace jacket front panel.

TO TURN OFF GAS TO THE APPLIANCE

1. Set the thermostat to lowest setting.

2. Turn off all electric power to the appliance if service is to be performed.

3. Remove jacket front panel.

4. Turn Gas control knob clockwise \(\Rightarrow\) to OFF. Do not force.

5. Replace jacket front panel.
## Common problems and solutions

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<th>Common Causes</th>
<th>Possible Corrections</th>
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<tr>
<td>Rapid cycling — boiler turns on and off frequently</td>
<td>Thermostat installed where drafts or heat affect reading</td>
<td>Locate thermostat on inner wall away from heat sources or cool drafts.</td>
</tr>
<tr>
<td></td>
<td>Heat anticipator in thermostat adjusted incorrectly</td>
<td>Adjust thermostat per manufacturer’s instructions.</td>
</tr>
<tr>
<td></td>
<td>Incorrect limit setting</td>
<td>Set limit according to system needs. Maximum setting is 220°F. Increase limit setting to decrease cycling.</td>
</tr>
<tr>
<td></td>
<td>Insufficient water flow through boiler</td>
<td>Check all valves to and from boiler. Return to proper setting.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Confirm circulator size.</td>
</tr>
<tr>
<td>Frequent release of water through relief valve</td>
<td>Expansion tank sized too small</td>
<td>Call qualified service technician to check expansion tank operation and size.</td>
</tr>
<tr>
<td></td>
<td>Flooded expansion tank</td>
<td>Call qualified service technician to check expansion tank operation.</td>
</tr>
<tr>
<td></td>
<td>Inoperative limit control</td>
<td>Call qualified service technician to replace limit control.</td>
</tr>
<tr>
<td>Need to frequently add makeup water</td>
<td>Leaks in boiler or piping</td>
<td>Have qualified service technician repair leaks at once to avoid constant use of makeup water. Makeup water can cause mineral deposits which, in turn, can cause boiler section failure. Do not use petroleum-base stop-leak compounds.</td>
</tr>
<tr>
<td>Black water condition</td>
<td>Oxygen corrosion due to leaks in boiler and piping</td>
<td>Have qualified service technician repair at once. Keep pH of water between 7.0 to 8.5.</td>
</tr>
<tr>
<td>Popping or percolating noise heard in boiler</td>
<td>Mineral deposits in sections due to constant use of makeup water</td>
<td>Call qualified service technician to de-lime boiler, if necessary. In some cases, deposits will be too heavy to remove with de-liming procedures.</td>
</tr>
<tr>
<td></td>
<td>Have qualified service technician repair leaks to eliminate need for constant makeup water.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Incorrect pH of boiler water</td>
<td>Call qualified service technician to check pH level and correct. pH should be maintained between 7.0 to 8.5.</td>
</tr>
<tr>
<td></td>
<td>Insufficient water flow through boiler</td>
<td>Check all valves to and from boiler. Return to proper setting.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Confirm circulator size.</td>
</tr>
<tr>
<td>Metal flakes found in vent outlet or vent — flueway corrosion</td>
<td>Contaminated combustion air supply — See page 3 in this manual.</td>
<td>Provide outside air for combustion. Kit available through Weil-McLain distributor. Have qualified service technician pipe-up kit.</td>
</tr>
<tr>
<td></td>
<td>Condensation of combustion gases in boiler sections</td>
<td>Have qualified service technician inspect system piping and controls to verify proper regulation of return water temperature.</td>
</tr>
<tr>
<td>Some radiators or baseboard units do not heat or are noisy</td>
<td>Air in system</td>
<td>Bleed air from system through air vents in radiators or baseboard units.</td>
</tr>
<tr>
<td></td>
<td>Low system pressure</td>
<td>Fill to correct pressure.</td>
</tr>
<tr>
<td></td>
<td>High limit set too low</td>
<td>Check for leaks in boiler or piping. Have qualified service technician repair at once.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Adjust high limit to higher setting.</td>
</tr>
<tr>
<td>Domestic water from tankless heater is hot then suddenly turn cold.</td>
<td>Mineral deposits insulate internal waterways of heater.</td>
<td>Have qualified service technician delime or replace coil.</td>
</tr>
<tr>
<td>OR</td>
<td>Boiler stop-leak compound has been added to boiler water and is insulating outside of coil.</td>
<td>Have qualified service technician remove and clean coil AND drain and flush boiler to remove stop-leak.</td>
</tr>
<tr>
<td>Domestic water from tankless heater is always lukewarm.</td>
<td>Incorrect mixing valve setting for tankless heater</td>
<td>Have qualified service technician adjust mixing valve setting.</td>
</tr>
<tr>
<td></td>
<td>Domestic flow rate too high.</td>
<td>Have qualified service technician install flow check valve set to rating of tankless heater.</td>
</tr>
<tr>
<td></td>
<td>Incorrect setting on tankless heater control.</td>
<td>Have qualified service technician raise tankless control setting. Adjust differential on tankless control to lower setting.</td>
</tr>
<tr>
<td></td>
<td>3-Way valve does not work</td>
<td>Have qualified service technician inspect the 3-way valve wiring, actuator and body. Check operation of valve. If actuator does not move when the boiler is shut off and there is a call for domestic water replace valve and actuator.</td>
</tr>
</tbody>
</table>