68 and 68V Oil-Fired Boiler Manual

Includes:
- Installation
- Start-up
- Service
- Parts

68 BOILER
REAR FLUE OUTLET

68V BOILER
TOP FLUE OUTLET

READ ALL INSTRUCTIONS BEFORE INSTALLING
To the owner: Installation and service should be performed by qualified contractor.
To the installer: Leave all instructions with boiler for future reference.

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

Part No. 550-110-494/0487WP
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IMPORTANT: When calling or writing about the boiler,
PLEASE GIVE THE MODEL, SERIES, AND C.P. NUM-
BER, located on the boiler nameplate.

Any reuse or reproduction of the artwork and copy in
this manual is strictly prohibited without the written
consent of Weil-McLain.

WARNING
DO NOT USE PETROLEUM—BASED CLEANING OR SEALING COMPOUNDS IN BOILER SYSTEM.
SEVERE DAMAGE TO THE BOILER WILL OCCUR.
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 a hazard which will cause severe personal injury, death or substantial property damage if ignored.

**WARNING** indicates the presence of a hazard which can cause severe personal injury, death or substantial property damage if ignored.

**CAUTION** indicates presence of a hazard which will or can cause minor personal injury or property damage if ignored.

**NOTICE** indicates special instructions on installations, operation, or maintenance which are important but not related to personal injury hazards.

**WARNING**

FAILURE TO FOLLOW ALL INSTRUCTIONS IN PROPER ORDER CAN CAUSE PERSONAL INJURY OR DEATH. READ ALL INSTRUCTIONS BEFORE INSTALLING.

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### Section I: Pre-Installation

**CODES**

Installations must comply with all local codes, laws, regulations and ordinances. When required, the installations must conform to American Society of Mechanical Engineers Safety Devices for Automatically Fired Boilers, No. CSD-1.

**AIR SUPPLY FOR COMBUSTION**

Adequate combustion and ventilation air must be provided to assure proper combustion and prevent the possibility of flue gas spillage.

**WARNING** Exhaust fan must not be used in boiler area.

1. In buildings of conventional frame, masonry or metal construction, infiltration is normally adequate to provide combustion air for boilers in unconfined rooms.

2. If the space is in a building of unusually tight construction, air should be obtained from outdoors or from spaces which freely connect with outdoors (see 4 below).

3. For boilers in confined rooms, two permanent openings shall be provided: one within 12 inches from the ceiling and one within 12 inches from the floor of the room. Each opening shall be at least one square inch per 1,000 BTUH (140 sq. in. per 1 GPH) boiler input, but must not be less than 100 sq. inches. These openings shall freely connect with areas having adequate infiltration from outside.

4. When all air is provided from outdoors the confined space shall be provided with two openings as outlined above. These openings shall connect directly or by ducts with outdoors or spaces (crawl or attic) that freely connect with the outdoors and shall be of the size listed below for that particular arrangement:

   - **(a)** One square inch per 4,000 BTUH (35 sq. in. per 1 GPH) of boiler input for direct outdoor air supply through an outside wall or through vertical ducting directly to outside.

   - **(b)** One square inch per 2,000 BTUH (70 sq. in. per 1 GPH) of boiler input for direct outdoor air through horizontal ducting.

   - **(c)** All ducting shall be of the same size as the opening to which it is connected with minimum dimensions of no less than 3 x 3 inches or 9 square inches of area.

   - **(d)** Other size ducting must comply with local codes.

5. For boilers installed in closets, alcoves, undercounters, etc., see pages 6 and 7.

**CHIMNEY OR VENT REQUIREMENTS**

Designed for NATURAL DRAFT FIRING ONLY. Use a Class A chimney.

Minimum chimney or vent sizes:

- **Boiler sizes 2-7 - 8" x 8" square (63/4 x 63/4 inside liner) or 8" round**
  - 15 feet high
- **Boiler sizes 8-9 - 12" x 12" square (10% x 10% inside liner) or 12" round**
  - 20 feet high

In most cases a chimney or vent extended at least 3 feet above the highest part of the roof or other structure within 30 feet will be sufficient to prevent downdrafts. Increase chimney cross-sectional area and height at least 4 percent for each 1,000 feet above sea level.

**WARNING** Inspect existing chimney or vent before installing new boiler. Failure to remove blockage, clean, or replace damaged pipe can cause severe injury or death.

An induced draft fan may be necessary if:

1. Excessive resistance to flow of combustion gases can be expected.
2. Cross-section area of chimney is smaller than minimum recommended.
3. Chimney height is less than recommended.

If an induced draft fan is used, overfire draft should not exceed -.02 inches water column.
SELECT THE BOILER LOCATION
CONSIDER ALL CONNECTIONS TO THE BOILER BEFORE SELECTING A LOCATION.

**WARNING**
To avoid personal injury, death or property damage, keep boiler area clear and free from combustible materials, gasoline and other flammable vapors and liquids.

**STANDARD MINIMUM CLEARANCES**
24 inches—front and top
6 inches—Flue pipe to combustible materials.
6 inches—Right and left sides (except steam with tankless heater)
15 inches—Left side for steam with tankless heater.
6 inches—Back (top outlet)

**SPECIAL CLOSE CLEARANCES—See Pages 6 and 7.**

**RESIDENTIAL GARAGE INSTALLATION**

**WARNING**
Install boiler so burner is at least 18 inches above the floor.

**BOILER FOUNDATION**
Boiler may be installed on non-carpeted combustible flooring. Boiler legs provide approximately one inch air space for natural aeration.

Boiler must be installed on level surface. If non-level conditions exist or if area could flood, build LEVEL concrete or solid brick foundation. See Figure 1 and Table I.

### TABLE I BOILER FOUNDATION SIZES

<table>
<thead>
<tr>
<th>Boiler Size</th>
<th>Packaged Water Only</th>
<th>All Other Boilers</th>
</tr>
</thead>
<tbody>
<tr>
<td>268</td>
<td>12½&quot;</td>
<td>—</td>
</tr>
<tr>
<td>368</td>
<td>15½&quot;</td>
<td>15½&quot;</td>
</tr>
<tr>
<td>468</td>
<td>15½&quot;</td>
<td>19½&quot;</td>
</tr>
<tr>
<td>568</td>
<td>18½&quot;</td>
<td>21½&quot;</td>
</tr>
<tr>
<td>668</td>
<td>21½&quot;</td>
<td>24½&quot;</td>
</tr>
<tr>
<td>768</td>
<td>24½&quot;</td>
<td>27½&quot;</td>
</tr>
<tr>
<td>868</td>
<td>—</td>
<td>30½&quot;</td>
</tr>
<tr>
<td>968</td>
<td>—</td>
<td>33½&quot;</td>
</tr>
</tbody>
</table>

**L = Length of Foundation**

**Section II: Installing Boiler**

**PLACEMENT**
Position boiler close to chimney. Provide minimum clearances as indicated.

**NOTICE**
When transporting with crate removed, do not tip boiler forward. Damage to burner may result.

**For 8 and 9-section blocks:**
1. To split block:
   a. Remove cleanout plate.
   b. Remove (3) 5½" tie rods.
   c. Pull block apart. Save rods, nuts, washers, elastomer seals, and cope seal.
2. Move divided block to location.
3. Reassemble:
   a. Clean port openings with dry rag. DO NOT USE OIL. Place elastomer seals in port openings.
   b. Re-form cope seal and place in sealing groove.
   c. Draw sections together evenly until metal-to-metal contact is made at nipple ports.
   d. Replace cleanout plate.

**HYDROSTATIC PRESSURE TEST**
Pressure test BEFORE attaching piping or electrical supply. Install, but do not hook up, tankless heater (if used).

**CAUTION**
DO NOT pressure test with water level control installed. Damage to control can occur.

1. Remove shipping nipple.
2. Install drain valve.
3. Install valve at highest tapping to vent air.
4. Connect water supply.
5. Plug remaining tappings.
6. Fill boiler. Vent all air. Test at 1½ times working pressure for more than 10 minutes.

**WARNING**
DO NOT LEAVE BOILER UNATTENDED. Cold water fill could expand and cause excess pressure.
7. Check for maintained gauge pressure.
8. Check for leaks. Repair if found.

**CAUTION**
Repair leaks at once. Damage to boiler can result. NEVER use petroleum-based stop leak compounds. Seal damage and leakage between sections will occur.

9. Drain boiler and remove testing plugs.
10. On initial start-up, check for leaks in system piping. If found, repair at once.

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>SIZE</th>
<th>WATER</th>
<th>STEAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>3/8&quot;</td>
<td>Drain</td>
<td>Drain</td>
</tr>
<tr>
<td>D (in plate)</td>
<td>1 1/2&quot;</td>
<td>High-Limit Control (bushed to 3/4&quot;)</td>
<td>Skim Tapping</td>
</tr>
<tr>
<td>D (in water heater)</td>
<td>3/4&quot;</td>
<td>Combination High-Limit and Operating Control</td>
<td>—</td>
</tr>
<tr>
<td>H</td>
<td>1/4&quot;</td>
<td>Combination Pressure and Temperature Gauge</td>
<td>Pressure Gauge and Pressure Limit Control</td>
</tr>
<tr>
<td>K₁</td>
<td>3/4&quot;</td>
<td>Water Relief Valve</td>
<td>Gauge Glass and/or Low-Water Cutoff (bushed to 1/2&quot;)</td>
</tr>
<tr>
<td>K₂</td>
<td>3/4&quot;</td>
<td>Plugged</td>
<td>Gauge Glass and/or Low-Water Cutoff (bushed to 1/2&quot;)</td>
</tr>
<tr>
<td>N</td>
<td>3/4&quot;</td>
<td>To Compression Tank</td>
<td>Steam Relief Valve</td>
</tr>
<tr>
<td>U₁ (in steam heater)</td>
<td>3/4&quot;</td>
<td>—</td>
<td>Heater Operating Control (368 through 568 Boilers)</td>
</tr>
<tr>
<td>U₂</td>
<td>3/4&quot;</td>
<td>Plugged</td>
<td>Heater Operating Control (668-568 Boilers)</td>
</tr>
</tbody>
</table>

**FIGURE 2**
JACKET ASSEMBLY
(For non-packaged boilers)
Refer to jacket erecting instructions packed in the jacket carton.

BREECHING ERECTION
Back outlet (68)—see Figure 3.
Top outlet (68V)—see Figure 4.
Use full-sized breeching (P-268 can be reduced to 5 inches). See page 3 for chimney size.

Connection must be above bottom of chimney to avoid blockage. Breeching must not enter chimney far enough to cause obstruction. Use a thimble or slip joint where breeching enters the chimney to allow removal for cleaning.

CAUTION
Avoid long horizontal breechings, excessive numbers of elbows or tees, or other obstructions restricting flow of combustion gases.

Water boilers can be located in close-clearance areas (such as alcove, closet, under counters, etc.) only when all instructions in this section are followed. Substitute these instructions for corresponding material in manual. All other procedures and practices must remain the same.

Standard minimum clearances (shown on page 4) should be used where possible. Where closer clearances are required:
Top of boiler—if less than 24" are available, provide removable surface to allow for cleaning boiler flueways. Distance between combustible surface and boiler can be no less than 2 inches.
Right and/or left side—2 inches minimum.
Front of boiler—2 inches minimum from burner.
Double-wall flue pipe to combustible surface—as listed in Table III and Figures 7 and 8 or 9.

NOTICE
Flue pipe clearances must take precedence over jacket clearances.

Section III: Close Clearance Installation

1. Install boiler using clearances listed.
2. Install barometric control 18–20 inches from boiler in breeching.
3. Obtain and use kit, part no. 386-500-050.
   a. Attach manual reset temperature switch near upper surface of enclosed area. See Figure 5.
   b. Install switch leads to burner primary control. See Figure 6.
4. Provide two fresh air openings when installing in confined space. Size each opening one square inch per 1,000 BTU (140 sq. in. per 1 GPH) input. Locate openings near top and bottom of enclosed space.
5. WARNING TO THE HOMEOWNER: If red button on manual reset temperature switch has popped out, CALL YOUR SERVICEMAN IMMEDIATELY.
TABLE III PROTECTION REQUIRED FOR CLEARANCES LESS THAN 6 INCHES *

<table>
<thead>
<tr>
<th>WHEN DESIRED MINIMUM CLEARANCE FROM DOUBLE-WALL VENT PIPE TO COMBUSTIBLE SURFACE IS:</th>
<th>USE THE FOLLOWING PROTECTION **</th>
</tr>
</thead>
<tbody>
<tr>
<td>3&quot;</td>
<td>⅛ insulating millboard*** spaced out 1&quot; ■</td>
</tr>
<tr>
<td>3&quot;</td>
<td>28 gage sheet metal on ¾ insulating millboard***</td>
</tr>
<tr>
<td>2&quot;</td>
<td>28 gage sheet metal spaced out 1&quot; ■</td>
</tr>
<tr>
<td>2&quot;</td>
<td>28 gage sheet metal on ⅛ insulating millboard*** spaced out 1&quot; ■</td>
</tr>
<tr>
<td>2&quot;</td>
<td>22 gage sheet metal on ⅛&quot; mineral wool bats reinforced with wire or equivalent</td>
</tr>
<tr>
<td>4&quot;</td>
<td>⅛ insulating millboard***</td>
</tr>
</tbody>
</table>

NOTES:
* All clearances measured from outer surface of equipment to combustible surface, not to the protection used.
** Apply to combustible surface unless otherwise noted. Cover all surfaces as specified in Table III and Figure 7. Thicknesses are minimum.
*** Factory fabricated board made of noncombustible materials, normally fibers, having thermal conductivity in range of 1 BTU inch per sq. ft. per °F or less. ■ Spacers shall be made of noncombustible material.
Failure to properly pipe boiler may result in improper operation and damage to boiler or building.

**WATER BOILER**

Boiler has built-in air elimination system. A separate air eliminating device is not needed if expansion tank is piped as shown.

Refer to table IV and Figures 10 and 11.

1. Size expansion tank to system design requirements.

   Undersized expansion tanks cause system water to be lost from relief valve and make-up water added through fill valve. Eventual section failure can result. Expansion tank installation:

   a) Closed type expansion tank—connect from the 3/4" N.P.T. tapping "N" to the expansion tank using 3/4" N.P.T. piping. Horizontal expansion tank piping must pitch upward toward tank at least 1 inch for each 5 feet of piping.

   ![Diagram of Closed Type Expansion Tank](image1)

   **FIGURE 10**

   **PIPING CONNECTIONS FOR WATER BOILERS WITH CLOSED-TYPE EXPANSION TANK**

   b) Closed diaphragm pre-pressurized type expansion tank—may be located anywhere in the system, preferably near the boiler.

   ![Diagram of Closed Diaphragm Pre-Pressurized Tank](image2)

   **FIGURE 11**

   **PIPING CONNECTIONS FOR WATER BOILERS WITH CLOSED DIAPHRAGM PRE-PRESSURIZED TANK**

   ![Table IV: Water Boiler Pipe Sizes](image3)

   **TABLE IV: WATER BOILER PIPE SIZES**

<table>
<thead>
<tr>
<th>Boiler Size</th>
<th>Supply Pipe Size &quot;A&quot;</th>
<th>Return Pipe Size &quot;B&quot;</th>
<th>Piping to Expansion Tank &quot;C&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>268/268V</td>
<td>1&quot; N.P.T.</td>
<td>1&quot; N.P.T.</td>
<td>3/4&quot; N.P.T.</td>
</tr>
<tr>
<td>368-468/368V-468V</td>
<td>1 1/4&quot; N.P.T.</td>
<td>1 1/4&quot; N.P.T.</td>
<td>3/4&quot; N.P.T.</td>
</tr>
<tr>
<td>568-768/568V-768V</td>
<td>1 1/2&quot; N.P.T.</td>
<td>1 1/2&quot; N.P.T.</td>
<td>3/4&quot; N.P.T.</td>
</tr>
<tr>
<td>868-968</td>
<td>2&quot; N.P.T.</td>
<td>1 1/2&quot; N.P.T.</td>
<td>3/4&quot; N.P.T.</td>
</tr>
</tbody>
</table>

   *Minimum pipe size with 20°F temperature rise through the boiler.

2. Connect supply, return and cold water fill piping.

3. Install water relief valve in K1 tapping.

**WARNING**

Relief valve discharge piping must be piped near to the floor or to a floor drain to eliminate potential of severe burns. Do not pipe where freezing could occur.

4. Low water cut-off:

   i) Should be installed if boiler is located above radiation level.

   ii) May be required on water boilers by certain state, local or territorial codes or by insurance companies.

   Use a low water cut-off designed for water installations. An electrode probe type is recommended. Install in a tee in supply piping above boilers.

5. **If the system is to comply with ASME codes**, an additional high temperature limit is needed. Purchase and install in supply piping from the boiler.
6. For multiple zoning with circulators, these changes must be made (see Figure 12):
   a) Size each circulator to individual circuit requirements.
   b) Remove circulator and preformed pipe (when furnished as standard equipment).
   c) From 1½" N.P.T. tapped return inlet at front of boiler, construct a pipe manifold according to the number of circulators used.
   d) Install circulators.
   e) Install flow control values to prevent gravity circulation.

   f) Install balancing valves to adjust the flow so it is about the same in each zone.
   g) Separate relays (Honeywell R845A, White-Rodgers 829A-845, or equivalent) are required for each additional circulator.

7. For multiple zoning with zone valves, install balancing valves to adjust the flow so it is about the same in each zone. A separate transformer is recommended to power zone valves. Refer to zone valve manufacturer's instructions.

MULTIPLE ZONING WITH CIRCULATORS
FIGURE 12
USE WITH REFRIGERATION SYSTEM

The boiler must be installed so that chilled medium is piped in parallel with the heating boiler with appropriate valves to prevent the chilled medium from entering the boiler. Consult I=B=R Installation and Piping Guides.

2. To protect boiler from condensation formed by low water temperature returned from large water content converted gravity systems, etc., see Figure 15.

FIGURE 13
PIPING FOR COMBINATION HEATING & COOLING (REFRIGERATION) SYSTEMS

BYPASS PIPING

BYPASS PIPING IS NOT NORMALLY REQUIRED ON TYPICAL BASEBOARD SYSTEM.

Bypass piping should be used for the following installations. Bypass, supply, and return piping should be same size.

1. To protect system radiant panels, plaster, etc. from high temperature water supplied from boiler, see Figure 14.

3. To protect boiler from condensation while protecting system from high water temperatures, as in large water content radiant ceiling panels, see Figure 16.

FIGURE 15

FIGURE 14

FIGURE 16
STEAM BOILER

1. Connect piping near boiler as shown in Table V and Figures 17 or 18.
2. Connect cold water fill supply piping close to boiler in the condensate return piping.
3. Install steam relief valve in "N" tapping.

**WARNING** Relief valve discharge piping must be piped near to floor or to a floor drain to eliminate potential of severe burns. Do not pipe where freezing could occur.

### TABLE V  STEAM BOILER PIPE SIZES

<table>
<thead>
<tr>
<th>Steam Boiler Size</th>
<th>Riser Pipe Size</th>
<th>Header*</th>
<th>Equalizer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>H</td>
</tr>
<tr>
<td>356–756</td>
<td>2&quot;</td>
<td>—</td>
<td>2&quot;</td>
</tr>
<tr>
<td>866–968</td>
<td>2&quot;</td>
<td>2&quot;</td>
<td>2½&quot;</td>
</tr>
</tbody>
</table>

*24" minimum from water line to the bottom of header.

---

**FIGURE 17**
Piping connections for size 3–7 steam boilers

**FIGURE 18**
Piping connections for size 8–9 steam boilers
REPLACEMENT BOILER CONNECTIONS
ONE-PIPE STEAM SYSTEM

Recommended piping for replacement boiler on older one-pipe steam system is shown below.

Some installations may require an added water tank for additional steaming capacity. By installing two plugged tees as shown in Figure 19, a tank can easily be added if necessary. Obtain Bulletin AE-8403 from your Weil-McLain distributor for tank sizing.

NOTE:
SWING JOINTS NOT SHOWN

FIGURE 19
RECOMMENDED PIPING FOR REPLACEMENT STEAM BOILER—ONE-PIPE SYSTEM
Section V: Tankless & Storage Heater Hook-up

TANKLESS HEATER HOOK-UP
Install as shown in Figure 20 (water boiler) or Figure 21 (steam boiler). 268/268V cannot use a tankless heater.

1. Install automatic mixing valve.
2. Install flow regulating valve. Size according to intermittent draw of heater as shown in Table VI.
3. Operating control with a small differential scale is recommended. Install in temperature control tapping in heater plate.
4. In hard water areas, it is advisable to soften cold domestic supply water to tankless heater to prevent lime build-up.

![Figure 20: Tankless Heater Piping (Water Boiler)](image)

![Figure 21: Tankless Heater Piping (Steam Boiler)](image)

TABLE VI: STEAM AND FORCED HOT WATER BOILER TANKLESS HEATER RATINGS

<table>
<thead>
<tr>
<th>Boiler Size</th>
<th>Heater No.</th>
<th>*Intermittent Draw GPM 100°F, Average Temp. Rise</th>
<th>**Continuous Draw GPM 100°F Temp. Rise</th>
<th>Inlet and Outlet Tappings</th>
<th>Temp. Control Tapping</th>
</tr>
</thead>
<tbody>
<tr>
<td>WATER</td>
<td>368/368V</td>
<td>E-624</td>
<td>3.00</td>
<td>2.00</td>
<td>1/2&quot;</td>
</tr>
<tr>
<td></td>
<td>468/468V</td>
<td>E-624</td>
<td>3.25</td>
<td>2.70</td>
<td>1/2&quot;</td>
</tr>
<tr>
<td></td>
<td>568/568V</td>
<td>E-624</td>
<td>3.35</td>
<td>3.30</td>
<td>1/2&quot;</td>
</tr>
<tr>
<td></td>
<td>668/668V</td>
<td>E-626</td>
<td>3.50</td>
<td>4.00</td>
<td>1/2&quot;</td>
</tr>
<tr>
<td></td>
<td>768/768V</td>
<td>E-632</td>
<td>4.25</td>
<td>4.60</td>
<td>1/2&quot;</td>
</tr>
<tr>
<td></td>
<td>868-968</td>
<td>E-632</td>
<td>4.50</td>
<td>4.75</td>
<td>1/2&quot;</td>
</tr>
<tr>
<td>STEAM</td>
<td>368</td>
<td>35-S-29</td>
<td>3.00</td>
<td>2.00</td>
<td>3/4&quot;</td>
</tr>
<tr>
<td></td>
<td>468</td>
<td>35-S-29</td>
<td>3.25</td>
<td>2.70</td>
<td>3/4&quot;</td>
</tr>
<tr>
<td></td>
<td>568</td>
<td>35-S-29</td>
<td>3.50</td>
<td>3.30</td>
<td>3/4&quot;</td>
</tr>
<tr>
<td></td>
<td>668</td>
<td>35-S-29</td>
<td>3.75</td>
<td>4.00</td>
<td>3/4&quot;</td>
</tr>
<tr>
<td></td>
<td>768-968</td>
<td>35-S-29</td>
<td>4.00</td>
<td>4.60</td>
<td>3/4&quot;</td>
</tr>
</tbody>
</table>

Well-McCam ratings based on 60 PSIG domestic water pressure at heater.

* Gallons of water per minute heated from 40° to 140°F, with 200°F boiler water temperature.
** Continuous draw—no recovery period.

Not available on 268/268V boilers.

STORAGE HEATER HOOK-UP
(forced hot water boiler only)

NOTICE
62-2-E Storage Heater cannot be used with 268/268V thru 568/568V forced hot water boilers or any size steam boiler.

1. Locate tank as high as possible above boiler.
2. Vertical type storage tank can be used if bottom of tank can be located above top of boiler.
3. To provide gravity circulation:
   a. Horizontal supply from heater to tank must pitch upward 1 inch for each 10 feet of piping.
   b. Horizontal return from tank to heater must pitch downward 1 inch for each 10 feet of piping.
4. Locate return piping above storage heater.
5. Use as few elbows and pipe fittings as possible

TABLE VII: STORAGE HEATER RATINGS

<table>
<thead>
<tr>
<th>Boiler Size</th>
<th>Storage Heater Number</th>
<th>160° Boiler Water Heater Capacity Gallons 40°–140° Rise</th>
<th>212° Boiler Water Heater Capacity Gallons 40°–140° Rise</th>
</tr>
</thead>
<tbody>
<tr>
<td>668–968</td>
<td>668–768V</td>
<td>50 in 3 Hours</td>
<td>70 in 3 Hours</td>
</tr>
<tr>
<td></td>
<td>62-2-E</td>
<td>50–90 Gallons</td>
<td>75–125 Gallons</td>
</tr>
</tbody>
</table>

Recommended Storage Tank 50–90 Gallons 75–125 Gallons

*No. 62-2-E storage heater cannot be used with 268/268V through 568/568V water boilers or with any steam boilers.
Section VI: Non-packaged Boilers—Control & Burner Installation

**WARNING**
Failure to properly install, pipe and wire boiler controls may result in severe damage to boiler, building and personnel.

**WATER BOILER CONTROLS**
1. Install control where shown on tapping table, page 5.

**STEAM BOILER CONTROLS**
1. Connect a low water cut-off to gauge glass tapping K1 and K2. Refer to Figure 23. Follow instructions packed with control. Pipe drain near the floor or floor drain.
2. Install the pigtail syphon, pressure gauge and steam pressure limit control. See Figure 23.

**OIL BURNER**
For B-68/68V boiler:
1. Place gasket over end of air tube.
2. Loosely screw three mounting bolts into boiler mounting plate. Use three bolts provided.
3. Mount burner.
4. Tighten mounting bolts.

For A-68/68V boiler:
1. Secure universal mounting flange and gasket to burner mounting plate. Use three bolts provided.
2. Position burner so it is level to 1/2° tilt downward. Air tube should be flush to 1/4 inch recessed from inside wall of combustion chamber.

![Figure 23 Steam Controls](image)

Section VII: Wiring & Fuel Line Piping

**WIRING**
For your safety, turn off electrical power supply at service entrance panel before making any electrical connections to avoid possible electrical shock hazard.

Wiring must comply with the National Electrical Code and any additional national, state, or local codes.
See wiring diagram, page 15 for proper wiring.

All safety circuit wiring must be N.E.C. Class 1.

For any additional electrical safety controls, use No. 14 gauge wire. Electrical supply wiring to burner should be No. 14 gauge or heavier with fused disconnect switch. Be sure boiler is properly grounded at switch box.

**FUEL LINE PIPING**
Refer to separate burner manual and any local or national code requirements which may apply to sizing and installing the fuel line piping.
FORCED HOT WATER BOILER
WITH OR WITHOUT HEATER

GRAVITY HOT WATER BOILER
WITHOUT HEATER

STEAM BOILER
WITH OR WITHOUT HEATER

WARNING
Electrical shock hazard. Can cause severe injury or death. Disconnect power before installing and/or servicing.

NOTES:
1. All wiring must comply with the National Electrical Code and any additional National, State, or Local code requirements having jurisdiction.
2. All safety circuit wiring must be N.E.C. Class I.
3. Refer to control components instruction sheets packed with the boiler for application information.
4. Use 90°C thermoplastic wire, or equivalent, if any of the original wire must be replaced.

WEIL-McLAIN
Michigan City, Indiana 46360
A Marley Company

OIL-FIRED BOILER WIRING DIAGRAM

MC 3454-0387-WM
WATER TREATMENT

Never use petroleum based stop-leak compounds. Water seal deterioration will occur, resulting in leakage between sections.

Continual make-up water will reduce boiler life. Minerals can build up in the sections, reducing heat transfer, overheating the cast iron, and causing section failure.

For unusually hard water areas or low pH conditions (less than 7.0) consult local water treatment company.

Freeze protection (when used):
Use antifreeze especially made for hydronic systems. Inhibited propylene glycol is recommended. DO NOT use undiluted or automotive type antifreeze.
50% solution provides maximum protection to about –30°F. Local codes may require a back-flow preventer or actual disconnection from city water supply.
Determine quantity according to system water content. Boiler water content is listed on page 18.
Follow antifreeze manufacturer’s instructions.

FILLING WATER BOILER
1. Close manual air vents, drain cocks, and automatic air vent, if used.
2. Fill to correct system pressure. Correct pressure will vary with each application.
3. Open automatic air vent two turns, if used.
4. a) Starting on 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.
6. Close, then open automatic air vent, if used, one full turn for normal boiler operation.

FILLING STEAM BOILER
1. Do not fill (except for leakage tests) until boiler is ready to be fired.
2. Fill to normal waterline, halfway up gauge glass.
3. Boiler water pH 7.0 to 8.5 is recommended.
4. Follow skimming procedure.

BURNER ADJUSTMENT

CAUTION
Final burner adjustments must be made using combustion test equipment to assure proper operation. DO NOT FIRE BOILER WITHOUT WATER OR SECTIONS WILL OVERHEAT.

1. Refer to burner manual for start-up. Adjust air band to provide a clean yellow flame without smokey tips.
2. Allow boilers to heat to design conditions.
3. Using combustion test equipment, adjust burner for:
   a) 0 smoke with maximum CO2.
   b) –0.02 inches W.C. negative draft overfire.

SKIMMING STEAM BOILER

CAUTION
Clean newly installed steam boiler to remove oil and grease. Failure to properly clean can result in violent fluctuations of water level, water passing into steam mains, or high maintenance costs on strainers, traps and vents. Do NOT use petroleum based products in boiler.

1. Provide 1½" piping from boiler skim tapping to floor drain.
2. Adjust waterline to midpoint of skim piping.
3. Fire boiler to maintain a temperature below steaming rate during skimming process.
4. Feed in water to maintain water level. Cycle burner to maintain temperature below steaming.
5. Continue skimming until discharge is clear. This may take several hours.
6. Drain boiler. While boiler is warm but NOT HOT, flush all interior surfaces under full pressure until drain water runs clear.
7. Remove skim piping and plug tapping.
8. Close drain cock. Fill with fresh water to waterline. Start burner and steam for 15 minutes to remove dissolved gases. Stop burner.
9. Check traps and air vents for proper operation.
Section IX: Check-out Procedure

CHECK-OUT PROCEDURE
(Check-off steps as completed.)

☐ 1. Water boiler:
   a. System properly filled with water?
   b. Air purged from system?
   c. Automatic air vent, if used, open one turn?

☐ 2. Steam boiler:
   a. Boiler properly filled with water?
   b. System vents operating properly?
   c. Boiler properly skimmed?

☐ 3. Air purged from oil piping? Piping checked for leaks?

☐ 4. Proper draft and burner flame? Final adjustment made with combustion test equipment?

☐ 5. Test safety controls: If boiler is equipped with a low water cut-off or additional safety controls, test for operation as outlined by manufacturer. Burner should be operating and should go off when controls are tested. When safety devices are restored, burner should reignite.

☐ 6. Test limit control: While burner is operating, move indicator of limit control below actual boiler water temperature or pressure. Burner should go off. Circulator should continue to operate (water boilers only). Raise limit control above boiler water temperature or pressure and burner should reignite.

☐ 7. Limit control set to design temperature or pressure requirements of system? Maximum limit setting 240°F. (water boilers)—15 psi (steam boilers).

☐ 8. For multiple zones, flow adjusted so it is about the same in each zone (water boilers only)?


☐ 10. Boiler cycled with thermostat? Raise to highest setting. Boiler should go through normal start-up cycle. Lower to lowest setting. Boiler should go off.

☐ 11. Several operating cycles observed for proper operation?

☐ 12. Room thermostat set to desired temperature?

☐ 13. All instructions shipped with boiler reviewed with owner or maintenance person, returned to envelope and given to owner or displayed near boiler?

☐ 14. On initial start-up, check for leaks in system piping. If found, repair at once.

________________________________________________________________________________________

Installation and Service Certificate

BOILER MODEL ______________ SERIES ___________ CP NUMBER _______________ DATE INSTALLED ________________

BTU INPUT ___________________________ ☐ Installation instructions have been followed.

☐ Check-out sequence has been performed.

☐ Above information is certified to be correct.

☐ Information received and left with owner/maintenance person.

Installer __________________________ (Company) __________________________ (Address)

(Phone) __________________________ (Installer’s Signature)
### Ratings

<table>
<thead>
<tr>
<th>BOILER</th>
<th>I = B = R BURNER CAPACITY GPH</th>
<th>100% HEATING CAPACITY MBH</th>
<th>NET I = B = R RATINGS**</th>
<th>I = B = R CHIMNEY</th>
<th>BOILER WATER CONTENT (GAL.)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>STEAM SQ. FT.</td>
<td>STEAM MBH</td>
<td>WATER MBH</td>
<td>SIZE INCHES</td>
<td>HEIGHT FEET</td>
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<tr>
<td>PREFIX</td>
<td>NUMBER</td>
<td>STEAM</td>
<td>WATER</td>
<td>STEAM</td>
<td>WATER</td>
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<tr>
<td>P</td>
<td>266/268V</td>
<td>0.70</td>
<td>—</td>
<td>86</td>
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<td>113</td>
<td>114</td>
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<td>—</td>
<td>151</td>
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<td>179</td>
<td>181</td>
<td>560</td>
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<td>770</td>
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</table>

*Based on standard test procedures prescribed by the United States Department of Energy at combustion condition of 13% CO2.

** 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. Water ratings are based on a piping and pick-up allowance of 1.15. Steam ratings are based on an allowance of 1.333. An additional allowance should be made for unusual piping and pick-up loads.

---

### Dimensions (Inches)

#### 68 Rear Flue Outlet

<table>
<thead>
<tr>
<th>BOILER SIZE</th>
<th>A (IN)</th>
<th>B (IN)</th>
<th>PACKAGED WATER</th>
<th>PACKAGED STEAM OR KNACKED DOWN WATER OR STEAM</th>
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<tbody>
<tr>
<td>266</td>
<td>—</td>
<td>9½</td>
<td>10¾</td>
<td>—</td>
</tr>
<tr>
<td>366</td>
<td>—</td>
<td>9½</td>
<td>13¾</td>
<td>13¾</td>
</tr>
<tr>
<td>466</td>
<td>—</td>
<td>12½</td>
<td>13¾</td>
<td>16¼</td>
</tr>
<tr>
<td>568</td>
<td>—</td>
<td>15½</td>
<td>16¼</td>
<td>19¾</td>
</tr>
<tr>
<td>668</td>
<td>—</td>
<td>18½</td>
<td>19¼</td>
<td>22¼</td>
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<td>768</td>
<td>—</td>
<td>21½</td>
<td>22¼</td>
<td>25¾</td>
</tr>
<tr>
<td>868</td>
<td>25 ¼</td>
<td>24½</td>
<td>—</td>
<td>28¼</td>
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<tr>
<td>968</td>
<td>28 ¼</td>
<td>27½</td>
<td>—</td>
<td>31¾</td>
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</tbody>
</table>

*Jacket extension increases length 17½ in.

---

### Diagrams

- **Packaged Front (Water)**
  - 15" minimum heater clearance.

- **Packaged Front (Steam)**

- **Assembled Front**
68 REAR FLUE OUTLET (Continued)

PACKAGED SIDE (WATER)

PACKAGED SIDE (STEAM)

ASSEMBLED LEFT SIDE

BACK

INTERMEDIATE
68V TOP FLUE OUTLET

**DIMENSIONS**

<table>
<thead>
<tr>
<th>BOILER SIZE</th>
<th>A</th>
<th>B</th>
<th>E</th>
<th>L*</th>
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<tr>
<td>268V+</td>
<td>5</td>
<td>9</td>
<td>5</td>
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<td>388V</td>
<td>5</td>
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<td>488V</td>
<td>6</td>
<td>12</td>
<td>7</td>
<td>13</td>
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<tr>
<td>568V</td>
<td>6</td>
<td>15</td>
<td>7</td>
<td>16</td>
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<tr>
<td>666V</td>
<td>7</td>
<td>18</td>
<td>7</td>
<td>19</td>
</tr>
<tr>
<td>766V</td>
<td>7</td>
<td>21</td>
<td>7</td>
<td>22</td>
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</table>

+ 268V available as packaged unit only

* Jacket extension increases length 17 1/4 in.
## PARTS LIST

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<th>DESCRIPTION</th>
<th>PART NUMBER</th>
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<tbody>
<tr>
<td>1</td>
<td>Front Section, P-69-W (6815)</td>
<td>316-601-216</td>
</tr>
<tr>
<td></td>
<td>Front Section, P-68-S, A or B-66-W or S (6813)</td>
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</tr>
<tr>
<td>2</td>
<td>Intermediate Section (6915)</td>
<td>316-601-222</td>
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<td>Intermediate Section w/legs, A or B-668/968-W or S (6916)</td>
<td>316-601-222</td>
</tr>
<tr>
<td>3</td>
<td>&quot;&quot;T&quot;&quot; Back Section, Wide, P-66-S, A or B-66-W or S (6819) (except 968/968)</td>
<td>316-601-231</td>
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<tr>
<td></td>
<td>&quot;&quot;T&quot;&quot; Back Section, Wide w/Supply, A or B-868/968-W or S (6819)</td>
<td>316-601-234</td>
</tr>
<tr>
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<td>Back Section, Narrow, P-268-WP-468-W thru P-768-W (6814)</td>
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<tr>
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<td>Back Section, Wide, P-368-W (6817)</td>
<td>316-601-229</td>
</tr>
<tr>
<td>4</td>
<td>Elastomer Seal, 6&quot; (top)</td>
<td>592-890-007</td>
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<tr>
<td>5</td>
<td>Elastomer Seal, 3&quot; (bottom)</td>
<td>592-880-010</td>
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<tr>
<td>6</td>
<td>Tie Rod—1/2 x 81/2 (P-368-W)</td>
<td>560-234-466</td>
</tr>
<tr>
<td></td>
<td>1/2 x 10 (P-368-W)</td>
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<tr>
<td></td>
<td>10 x 11/2 (P-368-W)</td>
<td>560-234-468</td>
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<tr>
<td></td>
<td>10 x 12 (P-368-W)</td>
<td>560-234-471</td>
</tr>
<tr>
<td></td>
<td>10 x 17 (P-368-W)</td>
<td>560-234-474</td>
</tr>
<tr>
<td></td>
<td>10 x 20 (P-768-W)</td>
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</tr>
<tr>
<td></td>
<td>10 x 10 (P-368-S, A or B-368-W or S)</td>
<td>560-234-473</td>
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<tr>
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<td>10 x 12 (P-368-S, A or B-368-W or S)</td>
<td>560-234-479</td>
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<td>10 x 14 (A or B-368-W or S)</td>
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<td>10 x 11/2 (A or B-368-W or S)</td>
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<tr>
<td></td>
<td>10 x 14 (A or B-368-W or S)</td>
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<tr>
<td></td>
<td>10 x 3/4 (A or B-368-W or S)</td>
<td>560-234-480</td>
</tr>
<tr>
<td></td>
<td>Reg. Hex Nut, 10-13</td>
<td>560-234-464</td>
</tr>
</tbody>
</table>

**Can be purchased at local supply house.**

**NOTE:** Order burner parts directly from burner manufacturer.

---

### Section XI: Replacement Parts

<table>
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<tr>
<th>REF. NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
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<tr>
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<td>Cleanout Plate—268/368</td>
<td>591-641-862</td>
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<tr>
<td></td>
<td>Washer, Plain Type A 3/8 - 43 x 1.00 x 0.03</td>
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</tr>
<tr>
<td></td>
<td>Cope Seal (7&quot; per joint)</td>
<td>591-641-862</td>
</tr>
<tr>
<td>8</td>
<td>Cleanout Plate Gasket—268/368</td>
<td>591-221-250</td>
</tr>
<tr>
<td></td>
<td>468</td>
<td>591-221-250</td>
</tr>
<tr>
<td></td>
<td>686</td>
<td>591-221-250</td>
</tr>
<tr>
<td></td>
<td>766</td>
<td>591-221-250</td>
</tr>
<tr>
<td></td>
<td>966</td>
<td>591-221-250</td>
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<tr>
<td></td>
<td>Tankless Heater w/Gasket (Steam) 35-5-29</td>
<td>591-221-250</td>
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<td>9</td>
<td>Rectangular Heater Cover Plate (Steam)</td>
<td>591-640-934</td>
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<td>10</td>
<td>Rectangular Heater Cover Plate Gasket (Steam)</td>
<td>590-317-679</td>
</tr>
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<td>11</td>
<td>Round Cover Plate—3 3/4&quot; Opening (Water)</td>
<td>592-234-217</td>
</tr>
<tr>
<td></td>
<td>1 1/2&quot; Opening (Steam)</td>
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<td>Tankless Heater w/Gasket (Water)—E 624</td>
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<td></td>
<td>E 632</td>
<td>590-221-870</td>
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<td>Round Heater Cover Plate Gasket (Water)</td>
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<td>13</td>
<td>Universal Burner Mounting Plate Assy (includes burner mounting plate, refractory, and insulation)</td>
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<td>14</td>
<td>Observation Port Shutter</td>
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<td>Refractory Blanket 268/368</td>
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<td>18</td>
<td>Return Pipe Manifold</td>
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# 68V BOILER

## PARTS LIST

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<th>PART NUMBER</th>
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<td>2</td>
<td>Intermediate Section (6825)</td>
<td>316-601-243</td>
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<tr>
<td>3</td>
<td>Back Section, Wide, P-368V-W, A or B-368V-W (6827) Back Section, Narrow, P-468V-W thru P768V-W, A or B-468V-W thru A or B-768V-W (6824)</td>
<td>316-601-246</td>
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<tr>
<td>4</td>
<td>Elastomer Seal, 6&quot; (top)</td>
<td>592-800-007</td>
</tr>
<tr>
<td>5</td>
<td>Elastomer Seal, 3&quot; (bottom)</td>
<td>592-800-010</td>
</tr>
<tr>
<td>6</td>
<td>Tie Rod—1/2 x 81/2 (286V) 1/2 x 103/4 (568V) 1/2 x 113/2 (668V) 1/2 x 141/2 (668V) 1/2 x 171/2 (668V) 1/2 x 201/2 (768V) Reg. Hex Nut, 1/4-13 Lockwasher, 1/2 Helical Spring</td>
<td>560-234-465 560-234-467 560-234-469 560-234-471 560-234-474 560-234-478</td>
</tr>
<tr>
<td>8</td>
<td>Cleanout Plate Gasket—268V/368V 468V 568V 668V 768V</td>
<td>591-221-260 591-221-261 591-221-262 591-221-263 591-221-264</td>
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<td>9</td>
<td>Round Heater Cover Plate—3/4&quot; Opening (Water) Tankless Heater w/Gasket (Water)</td>
<td>590-243-217 590-921-670</td>
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<td>10</td>
<td>Universal Burner Mounting Plate Assy (includes burner mounting plate, refractory, and insulation) Front Refractory Ceramelt Insulation</td>
<td>343-500-540 591-000-061 591-221-054</td>
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<td>11</td>
<td>Observation Port Shutter</td>
<td>460-039-887</td>
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<td>12</td>
<td>Secondary Air Shutter</td>
<td>460-039-886</td>
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<td>13</td>
<td>Rear Refractory Back Refractory Pin</td>
<td>591-000-060 591-000-054</td>
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<td>15</td>
<td>Vertical Flue Collector 268V/368V 468V 568V 668V 768V</td>
<td>450-020-100 450-020-101 450-020-102 450-020-103 450-020-104</td>
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<td>16</td>
<td>Return Pipe Manifold</td>
<td>591-124-002</td>
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