Control Supplement

EGH-105 to EGH-125
Natural gas‡

CSD-1 control system

‡ For propane boilers, install EGH liquefied petroleum (propane) gas conversion kit in addition to following the instructions in this Control Supplement.

WARNING

This supplement must only be used by a qualified heating installer/service technician. Before installing, read all instructions, including this supplement, the boiler manual and any related documents. Perform steps in the order given. Failure to comply could result in severe personal injury, death or substantial property damage.

Part No. 550-110-677/1112
Please read this page first

Hazard definitions

The following terms are used throughout this Control Supplement 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.

To the installer:

This Control Supplement must only be used by a qualified installer/service technician. Read these instructions completely before beginning the installation. Failure to follow these instructions can cause severe personal injury, death or substantial property damage.

This Control Supplement is for CSD-1 controls on EGH-105 to EGH-125 boilers only, specifically for:

- Steam boilers *with or without* tankless heater.

This document is only intended as a supplement to the *EG, PEG and EGH (Series 5) Boiler Manual*. Follow all instructions in the *EG, PEG and EGH Manual* in addition to the instructions in this Control Supplement.

The installation must conform to the requirements of the authority having jurisdiction, or, in the absence of such requirements, to the National Fuel Gas Code, ANSI Z-223.1/NFPA-54 (latest edition). Where required by the authority having jurisdiction the installation must conform to the American Society of Mechanical Engineers (ASME) Safety Code for Controls and Safety Devices for Automatically-Fired Boilers, Number CSD-1.

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</tbody>
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# Carton guide

## Table 1  Boiler cartons

Verify that the correct cartons are available before beginning assembly. Note that the Base assembly and Trim & controls cartons for CSD-1 are special. The CSD-1 ignition control panel (in Base assembly carton) consists of ignition control module, impulse relay and lighted push-button switch mounted and wired on a panel base.

<table>
<thead>
<tr>
<th>Carton</th>
<th>Comments</th>
<th>EGH-105</th>
<th>EGH-115</th>
<th>EGH-125</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section assembly</td>
<td>With tankless opening</td>
<td>321-711-120</td>
<td>321-711-130</td>
<td>321-711-140</td>
</tr>
<tr>
<td>Base assembly (a)</td>
<td>CSD-1</td>
<td>381-700-507</td>
<td>381-700-508</td>
<td>381-700-509</td>
</tr>
<tr>
<td>Base panels</td>
<td></td>
<td>381-700-251</td>
<td>381-700-256</td>
<td>381-700-261</td>
</tr>
<tr>
<td>Jacket</td>
<td></td>
<td>411-800-281</td>
<td>411-800-291</td>
<td>411-800-301</td>
</tr>
<tr>
<td>Collector hood</td>
<td></td>
<td>450-014-757</td>
<td>450-014-758</td>
<td>450-014-759</td>
</tr>
<tr>
<td>Draft hood</td>
<td></td>
<td>450-206-242</td>
<td>450-206-243</td>
<td>450-206-244</td>
</tr>
<tr>
<td>Float low water cutoff (steam)</td>
<td>Gravity return (M&amp;M #67W1-1)</td>
<td>381-700-341</td>
<td>381-700-341</td>
<td>381-700-341</td>
</tr>
<tr>
<td></td>
<td>Pumped return (M&amp;M #42-A)</td>
<td>511-114-531</td>
<td>511-114-531</td>
<td>511-114-531</td>
</tr>
<tr>
<td>Vent damper (optional) (b)</td>
<td>Steam boilers only</td>
<td>381-800-446</td>
<td>381-800-447</td>
<td>381-800-447</td>
</tr>
<tr>
<td>Tankless heater (option)</td>
<td></td>
<td>386-700-350</td>
<td>386-700-350</td>
<td>386-700-350</td>
</tr>
<tr>
<td>Trim &amp; control (see below)</td>
<td>Steam, CSD-1, Gravity return — or —</td>
<td>381-700-408</td>
<td>381-700-408</td>
<td>381-700-408</td>
</tr>
<tr>
<td></td>
<td>Steam, CSD-1, Pumped return</td>
<td>381-700-410</td>
<td>381-700-410</td>
<td>381-700-410</td>
</tr>
</tbody>
</table>

Note a  – Base assembly includes burner tubes, gas train components, pilot assembly and control panel (with ignition control).

Note b  – EGH vent dampers meet ASME CSD-1 requirements (paragraph CF-210(c) because they comply with ANSI Z21.13.

## Steam trim and control carton

### Gravity return

- Pressure limit control, automatic reset
- Pressure limit control, manual reset
- Probe low water cutoff, manual reset
- Transformer/relay
- Wire harness, steam gravity return
- Crimp spade wire terminations
- ASME Relief valve
- Pressure gauge
- Gauge glass and valves
- Brass cross, brass nipple, bushings (3) and siphons (3) for mounting pressure controls and gauge

### Pumped return

- Pressure limit control, automatic reset
- Pressure limit control, manual reset
- Probe low water cutoff, manual reset
- Transformer/relay
- Wire harness, steam pumped return
- Crimp spade wire terminations
- ASME Relief valve
- Pressure gauge
- Gauge glass and valves
- Brass cross, brass nipple, bushings (3) and siphons (3) for mounting pressure controls and gauge

Part Number 550-110-677/1112
Installation

Place the boiler

Refer to the EG, PEG & EGH Manual. Read and follow all of its guidelines.

Complete the following steps of the EG, PEG & EGH Manual:

- Placing the boiler
- Installation of optional water heaters, steam boilers only
- Hydrostatic pressure test
- Installation of flue collector hood
- Installation of (burner) drawer assembly and front access panel and back base channel
- Jacket installation
- Draft hood installation

Install gas train

Connect gas train assembly to burner manifold:

- Apply pipe dope to 1” nipple for insertion into burner manifold coupling (Figure 1, item 1). Insert and tighten nipple.
- Pipe lower half of ground joint union to the 1” nipple (Figure 1, item 2).
- Knock out the jacket gas valve opening on the desired side of the boiler (may be routed through either right or left side).
- Place gas train in position (either routed to the left, as shown, or to the right) and tighten the ground joint union loosely. Position the gas train assembly and tighten the union.
- Connect vent lines (routed to outside per code requirements) to 1/4” tubing vent connections on main gas valve and pilot gas pressure regulator (Figure 3, item 3).
- Connect pilot gas tubing (1/8” aluminum) to adapter in pilot gas valve outlet (Figure 1, item 4).
- Crimp connect two 1/4” spade terminals (provided) to ends of pilot gas valve wires (Figure 1, item 5).

Install vent/breeching

Install vent system and breeching per EG, PEG & EGH Manual. If optional vent damper is used, install vent damper (page 5) before installing breeching.
Install optional vent damper (if supplied)

If not installing a vent damper, proceed to next section (Piping connections).

Once a vent damper has been operated on an EGH boiler, the boiler will no longer operate without a damper installed.

Only dampers listed in the Replacement parts list in this Supplement are certified for use with EGH Series 5 boilers. Any other damper installed could cause severe personal injury or death.

Minimum clearances — Provide a minimum of 6” between the damper and any combustible material. (Provide a minimum of 46” between EGH jacket top and a combustible ceiling.)

Damper must be installed directly on top of draft hood so that it serves only that boiler. DO NOT modify draft hood or damper, or make another connection between draft hood and damper or boiler. This will void CSA certification and will not be covered by Weil-McLain warranty. Any changes will cause severe personal injury, death or substantial property damage.

Screws or rivets used to secure the damper to the vent pipe and the draft hood must not interfere with rotation of the damper blade.

Install damper directly on top of draft hood, with arrow pointing straight up. Install so the damper blade indicator is visible to the user. See Figure 2.

Screws or rivets used to secure the damper to the vent pipe and the draft hood must not interfere with rotation of the damper blade.

Install damper harness between damper actuator and knockout in right top of boiler jacket. Knock out opening in jacket top and install strain relief bushings in jacket and actuator wiring openings. Insert wires and secure strain relief clamps. See Figure 5 or 7 as applies.

Keep wiring harnesses clear of all hot surfaces.

**WARNING**

LINE UP KEYWAY WHEN CONNECTING PLUGS.

FORCING A MISMATCH CAN CAUSE A HAZARDOUS CONDITION.

Read and apply the harness plug warning label (above) so that it is visible after installation.

Remove dummy plug from damper connector in boiler wiring harness. Plug damper harness receptacle into damper harness plug. See Figure 5 or 7 as applies.

By-passing (jumpering) damper will cause flue products such as carbon monoxide to escape into the house. This will cause severe personal injury or death.

After boiler has operated once, if either end of harness is disconnected, the system will shut down. The boiler will not operate until the harness is reconnected.
Piping connections

Connect steam piping to the boiler per EG, PEG & EGH Manual.

Install boiler controls — steam boilers

**WARNING** All water level controls must mount on the left end of the boiler. Failure to do so could result in nuisance shutdowns and possible lockout on the manual reset control due to water level variations from end to end. Substantial property damage could result from freezing due to loss of heat.

**NOTICE** All controls must mount on left end of the boiler. The correct tappings are available only on the left end section.

Install steam trim components as required by CSD-1, latest edition. See Figure 3 and Table 2. See also Figure 8 or Figure 10 for finished assembly.

- CSD-1 requires two low water cutoffs (one manual reset) and two limit controls (one manual reset) as shown in the illustration.
- For float type (automatic reset only) low water cutoffs other than those shown in this Supplement, refer to EG, PEG & EGH Manual for mounting and piping instructions.

**NOTICE** Install a blowdown valve on any float type low water cutoff as described in the EG, PEG & EGH Manual

Plug all unused tappings.

All piping and control connections must also comply with the EG, PEG & EGH Manual.
Optional heaters — *steam boilers only*

Install optional tankless heater, if used, (steam boiler only) per **EG, PEG & EGH Manual.**

### Figure 3
Steam boiler connections

![Steam boiler connections diagram](677-07)

### Table 2
Steam boiler connections

<table>
<thead>
<tr>
<th>Tapping</th>
<th>Application</th>
<th>W-M Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>McDonnell &amp; Miller PS852M-24 M/R probe LWCO</td>
<td>511-114-530</td>
</tr>
<tr>
<td>C</td>
<td>Not used — plug tapping</td>
<td>——</td>
</tr>
<tr>
<td>D</td>
<td>Drain connection (per <strong>EGH manual</strong>)</td>
<td>——</td>
</tr>
<tr>
<td>E</td>
<td>ASME relief valve (per <strong>EGH manual</strong>)</td>
<td>——</td>
</tr>
<tr>
<td>G</td>
<td>Not used — plug tapping</td>
<td>——</td>
</tr>
<tr>
<td>L</td>
<td>Pressure gauge Pressure limit, automatic reset Honeywell L404C-1147 M/R limit</td>
<td>510-218-045 510-312-135 510-312-060</td>
</tr>
<tr>
<td>S</td>
<td>Skim tapping (per <strong>EGH manual</strong>)</td>
<td>——</td>
</tr>
<tr>
<td>V</td>
<td>Gas supply connection (right or left)</td>
<td>——</td>
</tr>
</tbody>
</table>

Plug all tappings not used.
Gas piping

Size and connect gas supply piping per **EG, PEG & EGH Manual**.

The gas supply can enter from either the right or left side of the jacket. Be sure the gas train is directed to the correct side.

---

**WARNING**

Support gas line securely. Do not support weight of gas line off of boiler gas train.

Purge air from gas piping and perform gas line and gas connection leak test **EG, PEG & EGH Manual**.

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Wiring

For your safety, turn off electrical power supply before making any electrical connections to avoid possible shock hazard.

**WARNING**

A strain relief bushing and adapter must be used at each point where wiring passes through the boiler jacket or control cases to protect wiring insulation.

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Assembly illustrations and wiring diagrams

This Supplement contains two (2) wiring diagrams and associated assembly illustrations. Refer to the following, as applicable:

- Steam boilers, gravity return — Figures 4 and 5
- Steam boilers, pumped return — Figures 6 and 7

**General**

Refer to **EG, PEG & EGH Manual** for further information.

All wiring must be installed in accordance with the requirements of the National Electrical Code and any additional national, state or local code requirements having jurisdiction. All line voltage wiring external to boiler jacket must be N.E.C. class 1.

Provide a separate electrical circuit with a fused disconnect switch (15 amp recommended) to supply the boiler. Wiring to the boiler must be No. 14 gauge or heavier, installed in conduit.

The boiler must be electrically grounded in accordance with the National Electrical Code, ANSI/NFPA No. 70, latest edition.

Use 105 °C thermoplastic wire, or equivalent, if any original wire must be replaced (except for pilot spark and sense wires).

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**Wiring procedure**

1. Mount all controls as directed in **Install Boiler Controls Section**, page 6, of this Supplement. Refer to the assembly illustration for the type of boiler installed (Figure 5 or 7).
2. Mount the junction box supplied with the boiler on the inside left (or right) side of the jacket as shown in the assembly illustration (using screws and nuts provided). *Mount the junction box on the same end of the boiler as the controls will be mounted.*
3. Attach the transformer/relay to the junction box.
4. Mount the CSD-1 control panel on the jacket interior panel as shown in the appropriate assembly illustration (Figure 5 or 7), using screws and nuts provided.
5. Crimp connect ¼" spade terminals (provided) to the pilot gas valve wires if not already done in **Installation Section**, page 4 of this Supplement.
6. If optional vent damper is installed, make sure damper harness has been routed through a strain relief bushing in the jacket and damper actuator as directed in **Installation Section**, page 4 of this Supplement. Secure damper harness conduit to top of jacket with clamps provided.
7. The main gas valve wires are pre-attached to the CSD-1 control panel. The spark and sense wires from the pilot are factory installed to the pilot. Connect these wires as shown in the wiring diagram.
8. Use the wiring harness provided with the boiler to complete wiring of the remaining components according to the appropriate wiring diagram and assembly illustration.
CSD-1 control system — Natural gas

Wiring — sequence of operation

General
The following sequence of operation applies to all wiring diagrams in this Supplement.

Call for heat
On a call for heat (from thermostat or operating control):

1. Limit control and water level control contacts are assumed closed.
2. Vent damper (if provided) will open.
3. Ignition control checks for signal at pilot. (No signal should be present.)
   - If no signal is sensed (normal condition):
     a. Pilot solenoid opens.
     b. Pilot ignition spark begins.
     c. Pilot ignites.
     d. Pilot proves.
   - If a signal is sensed (abnormal condition) by the ignition control, the control will lock-out.

   **NOTICE**
   On failure to establish pilot flame signal within 15 seconds, the ignition control will turn off the pilot gas valve. It will wait 5 minutes, then retry for ignition. If the second ignition attempt fails, the ignition control will lockout and illuminate the red lockout light.

   This will activate the alarm contact of the impulse relay, providing an isolated contact closure across terminals A1 and A2 of the CSD-1 control panel terminal strip. The contact rating is 15 amps at 250VAC.

   To reset the boiler, push the red reset button on the CSD-1 control panel.

4. Once pilot is proved the ignition control activates main gas valve. Main burners will ignite and boiler will continue to fire until terminated by limit action or no call for heat.

Lockout modes
In addition to lockout on flame-sense failure, the boiler may also experience lockout due to shutdown of a manual reset control.

**NOTICE**

The boiler is equipped with a manual reset limit control and a manual reset low water cutoff. Should the limit control lockout, it can only be reset by pressing the reset button on the control. The manual reset probe low water cutoff can be reset after lockout by pressing the reset button on the control or by interrupting power momentarily.

**CAUTION**

Steam boilers — Do not substitute another manual reset low water cutoff for the one specified and supplied with the boiler. Other controls may not operate as intended and could cause serious operating problems or failures.

Troubleshooting
Refer to **Check-out procedure — troubleshooting**, page 22, of this Supplement and to component manufacturer’s literature supplied in the boiler manual envelope for further information on operating conditions.
Wiring — steam gravity return

Figure 4
Steam boiler wiring — ladder and schematic diagrams

WARNING
ELECTRICAL SHOCK HAZARD. CAN CAUSE SEVERE INJURY OR DEATH. DISCONNECT POWER BEFORE INSTALLING AND/OR SERVICING.

NOTES:
1. ALL WIRING MUST BE INSTALLED IN ACCORDANCE WITH:
   A. U.S.A. - NATIONAL ELECTRICAL CODE AND ANY OTHER NATIONAL, STATE OR LOCAL CODE REQUIREMENTS.
   B. CANADA - C.S.A. C22.1 CANADIAN ELECTRICAL CODE PART 1 AND ANY OTHER NATIONAL, PROVINCIAL OR LOCAL CODE REQUIREMENTS.
2. ALL CONTACTS SHOWN WITHOUT POWER APPLIED OFF SHELF CONDITION.
3. IF ORIGINAL WIRE AS SUPPLIED WITH THE APPLIANCE MUST BE REPLACED, TYPE 105º C OR ITS EQUIVALENT MUST BE USED.
4. REFER TO CONTROL COMPONENT INSTRUCTIONS PACKED WITH BOILER FOR APPLICATION INFORMATION.
5. THERMOSTAT - FOR SINGLE ZONE SYSTEMS, THERMOSTAT ANTICIPATOR SETTING IS 0.40 AMP. FOR MULTIPLE ZONE SYSTEMS USING ZONE VALVES OR CIRCULATORS, REFER TO COMPONENT MANUFACTURER'S INSTRUCTIONS FOR APPLICATION WIRING AND THERMOSTAT ANTICIPATOR SETTING.
   BCP 3M.C. - FOR BCP 3M.C. CONNECTION IN PLACE OF THERMOSTAT, REFER TO BCP 3M.C INSTALLATION OPERATING MANUAL.
6. L.W.C.O., PRESSURE CONTROLS, WIRED IN SERIES.
7. DENOTES FIELD INSTALLED CHASSIS GROUND.
8. PILOT LEAD WIRE ARE NOT FIELD REPLACABLE, REPLACE PILOT ASSEMBLY IF NECESSARY.
9. OPERATING CONTROL REQUIRED WITH TANKLESS HEATER.
10. ALARM CONTACT RATINGS: 15 AMP @ 250 VAC.

LOW VOLTAGE FIELD
HIGH VOLTAGE FIELD
THERMOCOUPLE LEAD
LOW VOLTAGE FACTORY
HIGH VOLTAGE FACTORY
IGNITION CABLE

CONTROL MODULE TERMINAL
IGNITION CONTROL PANEL TERMINAL
TRANSFORMER TERMINAL
IGNITION CONTROL PANEL LAMP
CSD-1 control system — Natural gas

EGH-105 to EGH-125 Control Supplement
When using a tankless heater, knockout the opening in the inner panel. Locate the controls to allow room for the tankless heater piping. The tankless heater temperature control (not shown) installs in the heater tapping.

Install strain relief bushings wherever electrical wiring passes through jacket.

Vent connections — Connect with ¼" tubing and run vent line outside building per code requirements.
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CSD-1 control panel</td>
<td>14</td>
<td>Pilot shutoff valve</td>
</tr>
<tr>
<td>2</td>
<td>Ignition control</td>
<td>15</td>
<td>Leak test valves with plugs</td>
</tr>
<tr>
<td>3</td>
<td>Impulse relay and lighted push-button alarm silencing switch</td>
<td>16</td>
<td>Gas supply connection</td>
</tr>
<tr>
<td>4</td>
<td>Terminal Strip</td>
<td>17</td>
<td>Burner manifold</td>
</tr>
<tr>
<td>5</td>
<td>Transformer/relay</td>
<td>18</td>
<td>Limit control, automatic reset</td>
</tr>
<tr>
<td>6</td>
<td>Junction box</td>
<td>19</td>
<td>Limit control, manual reset</td>
</tr>
<tr>
<td>7</td>
<td>Damper (optional)</td>
<td>20</td>
<td>Pressure gauge</td>
</tr>
<tr>
<td>8</td>
<td>Damper connector</td>
<td>21</td>
<td>Siphons</td>
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<td>9</td>
<td>Dummy plug</td>
<td>22</td>
<td>Gauge glass &amp; valves</td>
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<tr>
<td>10</td>
<td>Damper harness</td>
<td>23</td>
<td>Probe LWCO, manual reset</td>
</tr>
<tr>
<td>11</td>
<td>Main gas valve</td>
<td>24</td>
<td>Float LWCO, automatic reset</td>
</tr>
<tr>
<td>12</td>
<td>Manual gas valve</td>
<td>25</td>
<td>Wire harness</td>
</tr>
<tr>
<td>13</td>
<td>Pilot gas valve</td>
<td>26</td>
<td>Pilot spark &amp; sense wires</td>
</tr>
<tr>
<td>13a</td>
<td>Pilot gas pressure regulator</td>
<td>27</td>
<td>Pilot gas tubing</td>
</tr>
</tbody>
</table>
Wiring — steam pumped return

Figure 6
Steam boiler wiring — ladder and schematic diagrams

WARNING

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

NOTES:
1. All wiring must be installed in accordance with:
   A. U.S.A. National Electrical code and any other national, state or local code requirements.
   B. Canada U.S.A. C.S.I., Canadian electrical code part 1 and any other national, provincial or local code requirements.
2. All contacts shown without power applied-off shelf condition.
3. If original wiring as supplied with the appliance must be replaced, type 105°C or its equivalent must be used.
4. Refer to control component instructions packed with boiler for application information.
5. Thermostat: For single zone systems, thermostat anticipator setting is 0.40 A.m.p.
   For multiple zone systems using zone valves or circulators, refer to component manufacturers instructions for application wiring and thermostat anticipator setting.
   BOP/EMS: For BOP/EMS connection in place of thermostat. Refer to BOP/EMS installation/operating manual.
7. Denotes field installed chassis ground.
8. Pilot lead wires are not field replaceable. Replace pilot assembly if necessary.
9. Operating control required with tankless heater.
10. Alarm contact ratings: 15 A.m.p. @ 250 VAC.
11. Remove jumper bar between terminal "H" and terminal "C".

550-225-028/0212
When using a tankless heater, knockout the opening in the inner panel. Locate the controls to allow room for the tankless heater piping. The tankless heater temperature control (not shown) installs in the heater tapping.

Install strain relief bushings wherever electrical wiring passes through jacket.

Vent connections — Connect with ¼” tubing and run vent line outside building per code requirements.

Figure 7
Control assembly — steam, pumped return
<table>
<thead>
<tr>
<th>1</th>
<th>CSD-1 control panel</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Ignition control</td>
</tr>
<tr>
<td>3</td>
<td>Impulse relay and lighted push-button alarm</td>
</tr>
<tr>
<td>4</td>
<td>silencing switch</td>
</tr>
<tr>
<td>5</td>
<td>Terminal Strip</td>
</tr>
<tr>
<td>6</td>
<td>Transformer/relay</td>
</tr>
<tr>
<td>7</td>
<td>Junction box</td>
</tr>
<tr>
<td>8</td>
<td>Damper (optional)</td>
</tr>
<tr>
<td>9</td>
<td>Damper connector</td>
</tr>
<tr>
<td>10</td>
<td>Damper harness</td>
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<tr>
<td>11</td>
<td>Main gas valve</td>
</tr>
<tr>
<td>12</td>
<td>Manual gas valve</td>
</tr>
<tr>
<td>13</td>
<td>Pilot gas valve</td>
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<tr>
<td>13a</td>
<td>Pilot gas pressure regulator</td>
</tr>
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<td>14</td>
<td>Pilot shutoff valve</td>
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<td>Leak test valves with plugs</td>
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<td>Burner manifold</td>
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<td>19</td>
<td>Limit control, manual reset</td>
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<td>20</td>
<td>Pressure gauge</td>
</tr>
<tr>
<td>21</td>
<td>Siphons</td>
</tr>
<tr>
<td>22</td>
<td>Gauge glass &amp; valves</td>
</tr>
<tr>
<td>23</td>
<td>Probe LWCO, manual reset</td>
</tr>
<tr>
<td>24</td>
<td>Float LWCO, pump control, auto reset</td>
</tr>
<tr>
<td>25</td>
<td>Wire harness</td>
</tr>
<tr>
<td>26</td>
<td>Pilot spark &amp; sensor wires</td>
</tr>
<tr>
<td>27</td>
<td>Pilot gas tubing</td>
</tr>
</tbody>
</table>
**Final adjustments**

**Before proceeding:**
1. Follow *EG, PEG & EGH Manual* instructions for *Final Adjustments*, including filling the boiler and skimming steam boilers.

   **WARNING** Skimming the boiler as described the *EG, PEG & EGH Manual* requires firing the boiler. Always follow boiler *Operating instructions*, Figure 8, when starting the boiler. Failure to do so could result in severe personal injury, death or substantial property damage.

2. Inspect base insulation as instructed in the *EG, PEG & EGH Manual*.

**To place boiler in operation:**
1. Follow *Operating instructions*, Figure 8, to start boiler.

2. If boiler starts correctly, proceed with *Check-out procedure*, page 20 of this Supplement.

3. If boiler fails to start, check:
   - Loose connection or blown fuse?
   - Limit setting below boiler water temperature or steam pressure?
   - Thermostat below room temperature?
   - Manual reset device needs to be reset?
   - Gas not turned on at meter and boiler?
   - Incoming natural gas pressure less than 5” W. C.?

4. If above fails to eliminate the trouble, refer to *Check-out procedure — troubleshooting* in this Supplement, page 22.
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. See below.

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.

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 front panel.
5. This appliance is equipped with an ignition device which automatically lights the pilot. Do not try to light the pilot by hand.
6. Turn gas control knob clockwise \( \sim \) to “OFF.”
7. When equipped with vent damper, verify damper blade is in full open position.
8. 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.
9. Turn gas control knob counterclockwise \( \sim \) to “ON.”
10. Turn on all electric power to the appliance.
11. Set thermostat to desired setting.
12. If the appliance will not operate, follow the instructions “To Turn Off Gas To The Appliance” and call your service technician or gas supplier.
13. Replace 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 front panel.
4. Turn gas control knob clockwise \( \sim \) to “OFF.” Do not force.
5. Replace front panel.
Check-out procedure — operation

**WARNING** Always follow boiler *Operating instructions*, Figure 8, page 19 when starting the boiler. Failure to do so could result in severe personal injury, death or substantial property damage.

1. Increase setting of room thermostat (or operating control) to call for heat.

2. Vent damper (if provided) will slowly open. When damper is fully open, the ignition control will open pilot gas valve and start spark.

**DANGER** Vent damper must be in open position when appliance main burners are operating. If damper is not in open position, flue products will spill into the building, causing severe personal injury or death.

3. If pilot lights and proves within 15 seconds, the ignition control turns off the spark and opens the main gas valve (dual valves in single body). Main burners ignite.

**NOTICE** If pilot does not light and prove within 15 seconds, the ignition control shuts off pilot gas and spark and waits 5 minutes. It then will retry. If the second ignition attempt fails, the ignition control will lockout and close the alarm contact of the impulse relay.

4. During main burner operation:
   - The ignition control monitors pilot flame current. If signal is lost, main valve is closed, spark is activated, and the operating sequence returns to step 3.
   - If power is interrupted, the control system shuts off pilot and main gas valves and restarts at Step 1 when power is restored.

5. Stop the call for heat (lower thermostat or operating control).
   - Pilot and main gas valves will close.
   - Damper (if provided) will close.

6. Boiler is now in the off cycle.

7. Repeat steps 1 through 6 several times to verify operation.

8. Return thermostat or operating control to normal setting.
CSD-1 control system — Natural gas

Check-out procedure — leak test

For your safety, turn off electrical power supply before making any electrical connections to avoid possible shock hazard.

1. Turn off power to the boiler and remove the (RED) wire from terminal TH of the main gas valve (Figure 9, item 1). Tape off terminal end of removed wire and restore power to the boiler.

2. Close manual gas valve (Figure 9, item 2).

3. Check that both leak test valves (Figure 9, items 3 and 4) are closed. Then remove plugs and insert 1/8" NPT hose barb fittings as shown in Figure 9.

4. Attach a U-tube manometer to first leak test valve (Figure 9, item 3).

5. Open first leak test valve (Figure 9, item 3) and check for pressure. See NOTICE at right.

6. Close first leak test valve (Figure 9, item 3) and remove manometer.

7. Attach manometer to second leak test valve (Figure 9, item 4).

8. Apply call for heat to boiler and check that electronic pilot proves.

9. Open second leak test valve (Figure 9, item 4) and check for pressure. See NOTICE below.

10. Close second leak test valve and remove manometer.

11. Remove call for heat to boiler. Turn off power to the boiler.

12. Remove hose barbs from leak test valves and replace plugs.

13. Replace (RED) wire to terminal TH of gas valve.

14. Open manual gas valve (Figure 9, item 2) and restore power to boiler.

Notice

When checking for pressure at the leak test valves, it is normal to find a small pressure reading. If the pressure continues to rise after opening the leak test valve, the main valve seat is leaking and should be replaced.

Figure 9
Leak test procedure
Check-out procedure — troubleshooting

Verify proper operation after servicing

**WARNING** Never jumper (bypass) any device except for momentary testing as outlined in Troubleshooting Charts. Substantial property damage and/or severe personal injury could occur.

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

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

Before troubleshooting:

a. Have a voltmeter that can check 120V AC, 24V AC, a microammeter with minimum scale range of 0–25, and continuity tester.
b. Check for 120V AC (minimum 102 – maximum 132) to boiler.
c. Check for 24V AC at secondary side of transformer.
d. Make sure thermostat is calling for heat and contacts (including appropriate zone controls) are closed. Check for 24V AC between thermostat wire nuts and ground.

In event of actuator failure:

**Effikal or Field Controls damper:**

If troubleshooting chart recommends replacing actuator and actuator is not immediately available, damper blade can be fixed in an open position to allow boiler operation. Manually turning blade can cause actuator damage. Follow these instructions only in case of no heat or damper actuator malfunction. See Figure 10.

1. Move damper service switch to “HOLD DAMPER OPEN” position. Apply call for heat to boiler. Damper blade should then rotate to open position and boiler will fire.

2. If Step 1 does not open damper, manually rotate damper blade to open position using wrench or pliers on flat shaft between damper and actuator (Figure 10). Boiler will fire. Verify that damper service switch is in “HOLD DAMPER OPEN” position.

3. Do not leave damper permanently in this position. Replace actuator immediately. If damper is left in open position, boiler will not operate at published efficiencies.

See damper manufacturer’s instructions packed with damper for additional information.

**Johnson damper:**

If troubleshooting chart recommends replacing actuator and actuator is not immediately available, damper blade can be fixed in an open position to allow boiler operation. Follow these instructions only in case of no heat or damper actuator malfunction. See Figure 10.

1. Turn off power to boiler. Failure to turn off power to boiler can result in severe personal injury, death or substantial property damage.

2. Refer to damper manufacturer’s instructions for procedure to fix damper in open position.

3. Turn on power to boiler.

4. Using wrench or pliers on flat shaft section, manually rotate damper blade until green light turns on. Boiler will fire.

5. Do not leave damper permanently in this position. Replace actuator immediately. If damper is left in open position, boiler will not operate at published efficiencies.

See damper manufacturer’s instructions packed with damper for additional information.

**Figure 10**

Temporary manual opening of vent damper — refer also to vent damper manufacturer’s instructions.
# Check-out procedure — troubleshooting

## TS-1: No Spark — System (boiler without vent damper) does not work

### 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?

<table>
<thead>
<tr>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
</table>

### Is 24VAC present across terminals 24V and 24V(GND)?

<table>
<thead>
<tr>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
</table>

### Open thermostat (or operating control) contacts for 15 seconds. Close thermostat contacts. Is 24VAC across terminals PV & MV/PV?

<table>
<thead>
<tr>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
</table>

### Securely connect spark wire. Then turn ON supply voltage. Retest.

### Replace ignition control. Retest.

### Replace pilot assembly. Retest.

### Is spark gap 0.125" and isolated in pilot gas stream?

<table>
<thead>
<tr>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
</table>

### Replace pilot assembly, turn ON supply voltage. Operate system several complete heat cycles.

### Replace ignition control. Retest.

### Replace pilot assembly, turn ON supply voltage, operate system several complete heat cycles.
Check-out procedure — troubleshooting

**TS-2: No Spark — System (boiler with vent damper) does not work**

1. Secure connections.
2. Check for loose wire connections or bad relay on transformer.
3. Check for open thermostat, circulator relay, operating control, limit control or LWCO. Check the CSD-1 control panel, impulse relay and push-button switch.
   **WARNING:** If limit controls or water level controls lockout on manual reset, determine cause and correct condition. Failure to do so could result in severe personal injury, death or substantial property damage.
4. Check for out of round stack section. Does motor rotate open?
   - **No**
   - **Yes**
     - Replace actuator. Retest.
5. Open thermostat contacts for 30 seconds. Damper will rotate to closed position. Close thermostat contacts. Damper will rotate to open position. Is 24VAC present across terminals PV and MV/PV?
   - **No**
   - **Yes**
6. Check continuity of each wire in wiring harness to damper. Does continuity exist for each wire?
   - **No**
   - **Yes**
     - Replace damper wiring harness. Retest.
     - Replace ignition control. Retest.
     - Remove damper harness from boiler wiring harness. TEMPORARILY install jumper between terminal 2 and terminal 5 on damper plug in boiler wiring harness. See figure below. Does boiler fire?
       - **No**
       - **Yes**
         - Replace damper actuator. Retest.
9. Is damper harness securely plugged in at both ends?
   - **No**
   - **Yes**
10. Is 24VAC present across transformer terminals C & Y?
    - **No**
    - **Yes**
11. Is 24VAC present across terminal C and yellow wire on damper connector?
    - **No**
    - **Yes**
12. Is damper rotated open?
    - **No**
    - **Yes**
13. Is 24VAC present across terminals PV and MV/PV?
    - **No**
    - **Yes**
14. Is spark present now?
    - **No**
    - **Yes**
      - Turn OFF supply voltage.
      **WARNING:** Electrical shock hazard. Failure to turn off power before proceeding could cause severe personal injury or death.
15. Securely connect and turn ON supply voltage. Retest.
16. Check spark wire. Is it securely connected to ignition control?
   - **No**
   - **Yes**
18. Is condition of spark wire good (not brittle, burned or cracked)?
   - **No**
   - **Yes**
19. Is spark gap 0.125” and located in pilot gas stream?
   - **No**
   - **Yes**
20. Is spark electrode ceramic cracked?
    - **No**
    - **Yes**
22. Replace ignition control. Retest.
23. Replace pilot assembly.
24. Turn ON supply voltage and operate system several complete cycles.
**TS-3: Pilot lights — Main valve will not come on (boiler with or without damper)**

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

<table>
<thead>
<tr>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Is 24VAC between terminals MV and MV/PV on ignition control?
  - No
  - Yes
  - Replace ignition control. Retest.

- Is inlet gas pressure at least 5.0" W.C. and not over 14" W.C.?
  - No
  - Yes
  - Contact gas supplier to correct.

- Is main valve wiring secure at terminals?
  - No
  - Yes
  - Correct wiring. Retest.
  - Replace valve. Retest.

- Check for continuity of sense wire and condition of insulation.
  - NOT OK
  - OK
  - Replace pilot assembly. Retest.

- Does system have proper flame signal?
  - 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 the system. Spark should ignite the pilot. As soon as pilot is burning, microammeter should read at least 0.5 microamp for U.T. # 1003-615.
    - e. Is flame current signal less than the minimum specified in d above?
      - No
      - Yes
      - Check for proper gas pressure, clean pilot assembly, tight mechanical and electrical connections. Also check for proper system grounding per following page.

**WARNING**
Electrical shock hazard. Failure to turn off power before proceeding could cause severe personal injury or death.

- Turn OFF supply voltage.
- Make sure sense wire is not wrapped around any pipe or accessories.
- Is sense wire securely attached to sense terminal and pilot assembly?
  - No
  - Yes
  - Correct and retest.

- Is sensing probe ceramic cracked?
  - No
  - Yes
  - Replace pilot assembly. Retest.

- Is sense wire or sensing probe shorted out to metal surface?
  - No
  - Yes
  - Correct and retest.
Check-out procedure — troubleshooting

**TS-3: Pilot lights — Main valve will not come on** - continued from previous page

<table>
<thead>
<tr>
<th>Turn OFF supply voltage.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WARNING</strong> Electrical shock hazard. Failure to turn off power before proceeding could cause severe personal injury or death.</td>
</tr>
</tbody>
</table>

**To check ignition system grounding** (instruction for continuation of TS-3)

| 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 ignition control to ignition control mounting screw and from **C** on transformer to transformer case ground. Make sure connections are clean and tight. If wire is damaged or deteriorated, replace with No. 18 gauge moisture-resistant, thermoplastic insulated wire with 105 °C minimum rating. |

**TS-4: Spark is present - pilot will not light (boiler with or without damper)**

<table>
<thead>
<tr>
<th>Are pilot valve wiring connections CORRECT and securely fastened?</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
</tr>
</tbody>
</table>

Connect securely to terminal **PV** on ignition control and terminal **TR** on main gas valve.

<table>
<thead>
<tr>
<th>Is inlet gas pressure at least 5.0&quot; W.C. and not over 14&quot; W.C.?</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
</tr>
</tbody>
</table>

Is pilot shutoff valve open?

| No | Yes |
|------------------------------------------|
| Open pilot shutoff valve. | Contact gas supplier to correct gas pressure. |

Is gas present at pilot burner assembly?

<table>
<thead>
<tr>
<th>CAUTION Remove <strong>MV</strong> wire from ignition control. Use a match taped to a long screwdriver or pilot lighter rod and manually light pilot.</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
</tr>
</tbody>
</table>

Is spark gap 0.125" and located in pilot gas stream?

| No | Yes |
|------------------------------------------|
| Block any draft around boiler. Check for clean pilot orifice. | Replace pilot assembly. |

Make sure pilot shutoff valve is open, 24VAC is present to pilot valve and pilot line is not kinked or obstructed. Check for clean pilot orifice. If OK, replace pilot gas valve.
Service and maintenance

Follow EG, PEG & EGH Manual, for service and maintenance of boiler.
Replacement parts — steam boilers

Figure 11 Steam boiler assembly
Before replacing any parts on the boiler — Turn off power to boiler and shut off gas supply. Failure to comply could result in severe personal injury, death or substantial property damage.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Boiler Model</th>
<th>Supplier</th>
<th>Manufacturer part number</th>
<th>Weil-McLain part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Main burner, stainless steel</td>
<td>EGH-105 – 125</td>
<td>Weil-McLain</td>
<td>—</td>
<td>512-200-000</td>
</tr>
<tr>
<td>2</td>
<td>Main burner, SS with pilot bracket</td>
<td>EGH-105 – 125</td>
<td>Weil-McLain</td>
<td>—</td>
<td>512-200-001</td>
</tr>
<tr>
<td>4</td>
<td>Pilot burner (not shown)</td>
<td>EGH-105 – 125</td>
<td>PSE</td>
<td>E48A-1</td>
<td>511-330-221</td>
</tr>
<tr>
<td>5</td>
<td>Main gas valve</td>
<td>EGH-105 – 125</td>
<td>Robertshaw</td>
<td>7000DERHC-S7C</td>
<td>511-044-287</td>
</tr>
<tr>
<td>6</td>
<td>Manual gas valve, 1” NPT</td>
<td>EGH-105 – 125</td>
<td>Watts</td>
<td>FBV3-06</td>
<td>511-246-290</td>
</tr>
<tr>
<td>7</td>
<td>Leak test valve</td>
<td>EGH-105 – 125</td>
<td>Key Gas</td>
<td>—</td>
<td>511-246-339</td>
</tr>
<tr>
<td>8</td>
<td>Pilot gas valve</td>
<td>EGH-105 – 125</td>
<td>Honeywell</td>
<td>V8046C-1014</td>
<td>511-044-039</td>
</tr>
<tr>
<td>8a</td>
<td>Pilot gas pressure regulator</td>
<td>EGH-105 – 125</td>
<td>Maxitrol</td>
<td>RV20VL</td>
<td>510-933-195</td>
</tr>
<tr>
<td>9</td>
<td>Pilot shutoff valve</td>
<td>EGH-105 – 125</td>
<td>Conbraco</td>
<td>53-300-01</td>
<td>511-246-345</td>
</tr>
<tr>
<td>10</td>
<td>Pilot tubing, Alum. 1/8” O.D. x 34” long</td>
<td>EGH-105 – 125</td>
<td>Available at local supply house</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Ignition control</td>
<td>EGH-105 – 125</td>
<td>United Technologies</td>
<td>1003-615</td>
<td>511-330-086</td>
</tr>
<tr>
<td>13</td>
<td>Push-button switch</td>
<td>EGH-105 – 125</td>
<td>Honeywell Eaton Controls</td>
<td>AML12CBA2AA 22IK18180</td>
<td>511-624-580</td>
</tr>
<tr>
<td>14</td>
<td>Lens cover</td>
<td>EGH-105 – 125</td>
<td>Honeywell Eaton Controls</td>
<td>AML51-C1OR 220PM02A</td>
<td>511-624-581</td>
</tr>
<tr>
<td>15</td>
<td>Light bulb</td>
<td>EGH-105 – 125</td>
<td>TI-3/4</td>
<td>Available at local supply house</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Wiring harness, pumped return steam</td>
<td>EGH-105 – 125</td>
<td>Weil-McLain</td>
<td>—</td>
<td>591-391-888 591-391-887</td>
</tr>
<tr>
<td>17</td>
<td>Vent damper assembly — optional (not for use in Canada)</td>
<td>EGH-105 — 10”</td>
<td>Effikal Field Controls Johnson</td>
<td>RVGP-KS-10BKF GVD-10 Q35GP-2 (note 1)</td>
<td>381-800-446</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EGH-115 — 12”</td>
<td>Effikal Field Controls Johnson</td>
<td>RVGP-KS-12BKF Controls GVD-12 Q35GR-2 (note 1)</td>
<td>381-800-447</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EGH-125 — 12”</td>
<td>Effikal Field Controls Johnson</td>
<td>RVGP-KS-12BKF Controls GVD-12 Q35GR-2 (note 1)</td>
<td>381-800-447</td>
</tr>
<tr>
<td>18</td>
<td>Vent damper actuator</td>
<td>EGH-105 – 125</td>
<td>Effikal</td>
<td>RVGP</td>
<td>510-512-337</td>
</tr>
<tr>
<td>19</td>
<td>Vent damper harness</td>
<td>EGH-105 – 125</td>
<td>Weil-McLain</td>
<td>—</td>
<td>591-391-795</td>
</tr>
<tr>
<td>20</td>
<td>Limit control, automatic reset</td>
<td>EGH-105 – 125</td>
<td>Honeywell White-Rodgers</td>
<td>PA-404-A P47EA-1</td>
<td>510-312-135 510-311-023</td>
</tr>
<tr>
<td>21</td>
<td>Limit control, manual reset</td>
<td>EGH-105 – 125</td>
<td>Honeywell</td>
<td>L4004C-1147</td>
<td>510-312-060</td>
</tr>
<tr>
<td>22</td>
<td>Probe LWCO, manual reset</td>
<td>EGH-105 – 125</td>
<td>McDonnell &amp; Miller</td>
<td>PS852M-24</td>
<td>511-114-530</td>
</tr>
<tr>
<td>23a</td>
<td>Float LWCO, automatic reset</td>
<td>EGH-105 – 125</td>
<td>McDonnell &amp; Miller</td>
<td>67W-1</td>
<td>511-114-494</td>
</tr>
<tr>
<td>23b</td>
<td>Float LWCO/ pump control auto reset</td>
<td>EGH-105 – 125</td>
<td>McDonnell &amp; Miller</td>
<td>42-A</td>
<td>511-114-531</td>
</tr>
<tr>
<td>24</td>
<td>Pressure gauge</td>
<td>EGH-105 – 125</td>
<td>Ametek</td>
<td>P505K</td>
<td>510-218-045</td>
</tr>
</tbody>
</table>

Note 1 — Johnson damper assembly consists of M358C actuator and Y15 vent pipe.

Replacement parts must be purchased through a local Weil-McLain distributor. When ordering, specify boiler model and series and include description and 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.

Refer to boiler manual for parts not listed above.