Model 750-HW-MT-120 © Probe Type High Water Manual Reset Control Unit

Applications:
Conductance type control for steam boilers when a manual reset high water alarm or cut-off is required.

<table>
<thead>
<tr>
<th>WARNING</th>
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<tbody>
<tr>
<td>• Before using product, read and understand instructions.</td>
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<td>• Save these instructions for future reference.</td>
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<tr>
<td>• All work must be performed by qualified personnel trained in the proper application, installation, and maintenance of plumbing and electrical equipment and/or systems in accordance with all applicable codes and ordinances.</td>
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<tr>
<td>• Boiler manufacturer schematics should always be followed. In the event that the boiler manufacturer’s schematic does not exist, or is not available from the boiler manufacturer, refer to the schematics provided in this document.</td>
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<tr>
<td>• To prevent serious burns, allow the control and surrounding equipment to cool to 80°F (27°C) and allow pressure to release to 0 psi (0 bar) before servicing.</td>
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<tr>
<td>• To prevent an electrical fire or equipment damage, electrical wiring insulation must have a rating of 167°F (75°C) if the liquid's temperature exceeds 180°F (82°C).</td>
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<tr>
<td>• This control can be installed in series with all other limit and operating controls installed on the boiler. After installation, check for proper operation of all the limit and operating controls, before leaving the site.</td>
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<td>• When using mixed voltages, do not jumper from terminal 1 to terminal 3.</td>
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<td>• To prevent electrocution, when the electrical power is connected to the control, do not touch the terminals, or electrical wires.</td>
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<td>• To prevent electrical shock, turn off the electrical power before making electrical connections.</td>
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Failure to follow this warning could cause property damage, personal injury or death.

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SPECIFICATIONS

The Model 750-HW-MT-120 control provides continuous protection against a high water condition in steam boilers. It can be used to interrupt the burner circuit to turn off the burner, interrupt the feedwater pump circuit to turn off the pump, or both. The control can also be used to provide an alarm (light, horn or both) when a high water condition occurs. The manual reset function will require that the unit be reset after water has dropped below the level of the probe.

Control Unit
Temperature Ratings:
  Storage: -40˚F to 135˚F (-40˚C to 57˚C)
  Ambient: 32˚F to 135˚F (0˚C to 57˚C)
Humidity: 85% (non-condensing)
Electrical Enclosure Rating: NEMA 1 General Purpose

RS-1-BR1 Remote Sensor
Maximum Steam Pressure: 250 psi (17.6 kg/cm²)
Maximum Water Pressure: 250 psi (17.6 kg/cm²)
Maximum Water Temperature: 406˚F (208˚C)
Electrical Enclosure Rating: NEMA 1 General Purpose
Connection Size: 1” NPT

RS-1-LP
Maximum Steam Pressure: 15 psi (1.0 kg/cm²)
Maximum Water Pressure: 160 psi (11.2 kg/cm²)
Maximum Water Temperature: 250˚F (121˚C)
Electrical Enclosure Rating: NEMA 1 General Purpose
Connection Size: 3/4” NPT

Electrical Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Voltage</th>
<th>Motor Switch Rating (Amperes)</th>
<th>Pilot Duty</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Full Load</td>
<td>Locked Rotor</td>
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<tr>
<td>120 VAC</td>
<td>120 VAC</td>
<td>7.2</td>
<td>43.2</td>
</tr>
<tr>
<td></td>
<td>240 VAC</td>
<td>3.6</td>
<td>21.6</td>
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Manual Reset
If a high water condition occurs (water on probe), the manual reset button must be pressed once the water level is restored to a level below the probe.

Control Voltage: 120 VAC
Hz: 50/60
Control Power Consumption: 3 VA (max.)
Probe Sensitivity: 20,000 ohm
STEP 1 - Where to Install the Remote Sensors

Determine where to install the remote sensor based on the following requirements:

**Option A**

*a.* The Remote Sensor can be installed directly in a 1” or larger tapping in the top of the boiler.

*b.* The probe of the RS-1-BR-1 Remote Sensor will need to be cut to appropriate length based upon the level where high water cutoff/alarm is desired.

*c.* The probe of the RS-1-LP Remote Sensor is approximately 2” long therefore high water cutoff/alarm will occur at that level.

*d.* There must be a minimum 1/4” (6.4mm) clearance between the probe and any grounding surface inside the boiler or pipe.

**Option B**

*a.* The Remote Sensor can be installed directly into the 1” fittings of the boiler’s equalizing piping.

*b.* If installed in the upright or vertical position:
   - The probe of the RS-1-BR-1 Remote Sensor will need to be cut to appropriate length based upon the level where high water cutoff/alarm is desired.
   - The probe of the RS-1-LP Remote Sensor is approximately 2” long therefore high water cutoff/alarm will occur at that level.

*c.* If installed in the sideways or horizontal position:
   - The probe of the RS-1-BR-1 Remote Sensor cannot exceed 4” in length.

**NOTE:** The Remote Sensors **SHOULD NOT** be installed in equalizing piping that is smaller than 1” NPT.

*d.* There must be a minimum 1/4” (6.4mm) clearance between the probe and any grounding surface inside the boiler or pipe.
STEP 2 - Installing the Remote Sensor

For the Model RS-1-BR-1 sensors, only:

a. Cut the probe (purchased separately) to desired length. Screw, clockwise, the threaded stainless steel probe extension (A) into the remote sensor (B). Carefully tighten the locking nut to approximately 1 ft•lb (1.7 N•m). Do not cut the clear plastic protective tube.

For All Remote Sensors

b. Apply a small amount of pipe dope to the first threads (L) of the remote sensor.

IMPORTANT: Do not use Teflon® tape or thread sealant.

c. Insert the remote sensor (B) into the boiler tapping (M) as determined in Step 1.

d. Using a wrench (N), tighten the brass hex adapter (P) on the remote sensor (B) to approximately 63 ft•lb (85 N•m). DO NOT TIGHTEN BY TURNING THE SENSOR HOUSING.
STEP 3 - Installing the Control Box

a. Using the flatblade screwdriver or nut driver (C), loosen the two (2) screws (D) and remove cover (E).

![Diagram](image)

IMPORTANT: To protect control from damage caused by liquid or debris, mount as shown with buttons on top.

b. Using the four (4) 3/16" (4.8mm) mounting holes (F), attach the control (G) to the boiler jacket, entry plate, or other suitable location.

NOTE: Mounting hardware is not included.

STEP 4 - Electrical Wiring

**IMPORTANT**

Boiler manufacturer schematics should always be followed. In the event that the boiler manufacturer's schematic does not exist, or is not available from the boiler manufacturer, refer to the schematics provided in this document.

**WARNING**

To prevent an electrical fire or equipment damage, electrical wiring must have a rating of 167°F (75°C) if the liquid's temperature exceeds 180°F (82°C). Failure to follow this warning could cause property damage, personal injury or death.

![Diagram](image)

- Mount Control Box in a suitable location near the boiler's main electrical panel.

![Diagram](image)

NOTE

Boiler sight glass must be visible from location of Control Box and must be within 25 feet of Control Body.

![Diagram](image)

a. Remove the sensor housing cover (Q).

1. **For Model RS-1-BR-1**, using a flathead screwdriver (R), remove the four (4) screws and separate the housing cover (Q) from the sensor (B).

2. **For Model RS-1-LP**, using a flathead screwdriver or nut driver (R), loosen the two (2) screws and separate the housing cover (Q) from the sensor (B).
b. For all wire connections to the terminal block (M).
   1. Strip about 1/3" (8.5 mm) of insulation from the wire.
   2. Loosen the terminal screw (N), DO NOT REMOVE, and move the wire clamping plate (P) back until the plate touches the back side of the screw head.
   3. Insert the stripped end of the wire under the wire clamping plate (P) and securely tighten the terminal screw (N).

**Wiring Diagram Legends**
1. Bold lines indicate action to be taken in Step shown.
2. Dotted black lines indicate internal wiring.

**Remote Sensor Wiring:**
- Connect wire from probe end to Terminal ‘P’
- Connect wire from remote sensor green ground screw to chassis green ground screw

**Control Wiring:**
- Connect 120V hot wire to terminal 1
- Connect 120V neutral wire to terminal 2
- Connect jumper wire from Terminal 1 to Terminal 3
- Connect wire from beginning of limit circuit (thermostat, gas valve, limits, etc.) to terminal 5
- Connect wire from end of limit circuit to terminal 2
c. Secure the sensor housing cover (Q).
   1. For model RS-1-BR-1, using the flatblade screwdriver (R), tighten the four (4) screws into the housing (Q) to approximately 3 ft•lb (4 N•m).
   2. For model RS-1-LP, using the flatblade screwdriver or nut driver (R), tighten the two (2) screws into the housing (Q) to approximately 2 ft•lb (2.6 N•m).

d. Secure the control housing cover by using the flatblade screwdriver or nut driver (R) to tighten the two (2) screws (D) to approximately 2 ft•lb (2.6 N•m).

STEP 5 - Testing and Diagnostic Procedures

Start-Up
   a. Before filling the system, turn on the electric power to the boiler.
      1. Upon initial power up, the Green and Red lights will flash simultaneously 4 times.
      2. The Green light will turn "ON".
      3. The Red light will turn "OFF" and the burner will turn "ON" as long as there is water off the probe.

Manually Testing Control
   b. Slowly fill the boiler with water.
      1. When water touches the probe, the Green light will remain "ON".
      2. The Red light will turn "ON" and the burner will turn "OFF", when water touches the probe.

Testing Control Using "Test Button"
   c. Depressing test button with "water off probe" (manual reset units only):
      (Must depress and hold test button to activate test cycle.)
      1. When test cycle is activated the Red and Green lights will flash simultaneously 3 times.
      2. The Red light will turn "ON".
      3. Burner will turn "OFF".
      4. The Green light will continue flashing as long as test button is depressed.
      (Release test button. You must depress the manual reset button to unlock the high water cut-off.)
      5. After depressing manual reset button, the Green and Red lights will flash simultaneously 4 times.
      6. Then the Green light will turn "ON" and the Red light will turn "OFF".
      7. The burner will turn "ON" as long as there is water off the probe.
If control fails to operate as required, perform the following diagnostic checks:

1. Check to be sure that the water level in the boiler is below the level of the probe.
2. Re-check all wiring to ensure proper connections as specified in boiler manufacturer’s wiring diagrams or these instructions.
3. Check to ensure that Teflon® tape has not been used on the threaded connection of the remote sensor to the boiler.
4. Re-check the electrical ground connection for the remote sensor and control unit.

MAINTENANCE SCHEDULE:

• Inspect probe annually or more frequently for scale build-up and clean or replace if necessary. Make certain there is no scale or build-up on the probe or its white Teflon® insulator. Be careful not to damage the Teflon® insulator.

<table>
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<tr>
<td>Replace Probe if:</td>
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<tr>
<td>• Teflon® insulator is cracked or worn.</td>
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<tr>
<td>• Probe is loose.</td>
</tr>
<tr>
<td>Failure to follow this caution could cause property damage, personal injury or death.</td>
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• Replace probe every 10 years. More frequent replacement of the probe is required if it is used in locales where significant water treatment is required, or in applications with high make-up water requirements.

• Replace the control unit every 15 years.

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<td>Clean probe by wiping with non-abrasive cloth and rinsing with clean water. DO NOT use sharp instruments to remove any accumulations of rust or scale.</td>
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