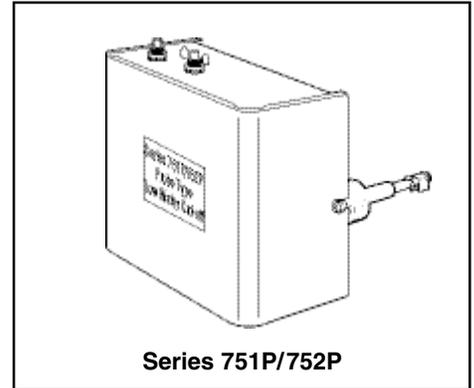


McDonnell & Miller
Installation & Maintenance
Instructions
MM-283

Series 751P
Series 752P
Probe Type Low Water Cut-Off



Applications:

- Primary conductance type control for commercial or industrial hot water boilers.
- Secondary control for commercial or industrial steam boilers.

⚠ WARNING

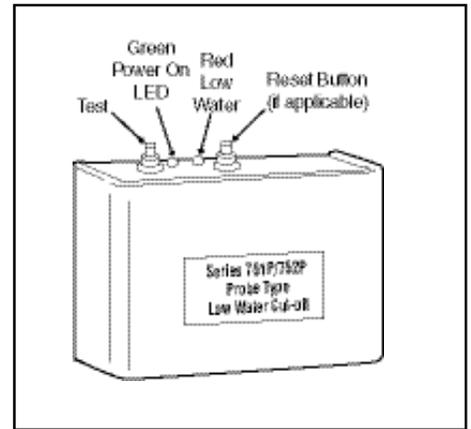


- Before using product, read and understand instructions.
- Save these instructions for future reference.
- All work must be performed by qualified personnel trained in the proper application, installation, and maintenance of plumbing and electrical equipment and/or systems in accordance with all applicable codes and ordinances.
- 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.
- 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.
- 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).
- This low water cut-off must 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.
- When using mixed voltages, do not jumper from terminal 1 to terminal 3.
- To prevent electrocution, when the electrical power is connected to the control, do not touch the terminals, or electrical wires.
- To prevent electrical shock, turn off the electrical power before making electrical connections.

Failure to follow this warning could cause property damage, personal injury or death.

SPECIFICATIONS

The Series 751P & Series 752P probe type LWCO's provide protection against low water conditions for commercial and industrial applications. These controls are fully CSD-1 compliant and can be used as the primary LWCO on hot water boilers and as the secondary LWCO (manual reset) on steam boilers.



Automatic Reset Models

Whenever water is below the level of the probe, the control will go into a low water condition. When the water level has been restored, the control will automatically return to a run condition.

Manual Reset Models

If a low water condition occurs (water off probe), the manual reset button must be pressed once the water level is restored to a level above the probe.

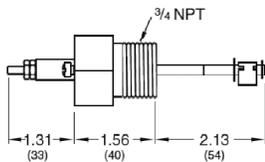
Control Unit

Temperature Ratings:

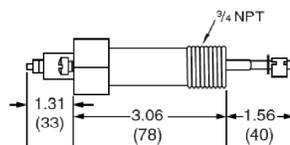
Storage: -40°F to 135°F (-40°C to 57°C)
Ambient: 32°F to 135°F (0°C to 57°C)

Humidity: 85% (non-condensing)

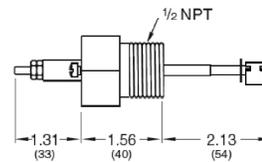
Electrical Enclosure Rating: NEMA 1 General Purpose



Standard Probe



'U' Probe



'RX2' Probe

Electrical Specifications

Model	Control Voltage	Switch Contact Rating (Pilot Duty)
752P-MT-24	24VAC	50VA@24VAC or 125VA@120VAC
752P-MT-U-24		
752P-MT-SP-24		
751P-MT-120	120VAC	
751P-MT-U-120		
751P-MT-SP-120		

Hz: 50/60

Control Power Consumption: 3 VA (max.)

Probe Sensitivity: 20,000 ohm

(water/glycol mixtures up to 50% concentration may be used)

CSD-1 Code Compliance

On Manual Reset units, if the control is in a low water condition (water off probe) when there is an interruption of power, the control will remain in a low water condition when power is restored. The reset button will need to be pressed when the water level is restored to a level above the probe.

Probe Specifications

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)

Connection Size: 3/4" NPT

STEP 1 - Where to Install

a. Based on the following criteria locate a suitable position for the probe (A):

For all Applications:

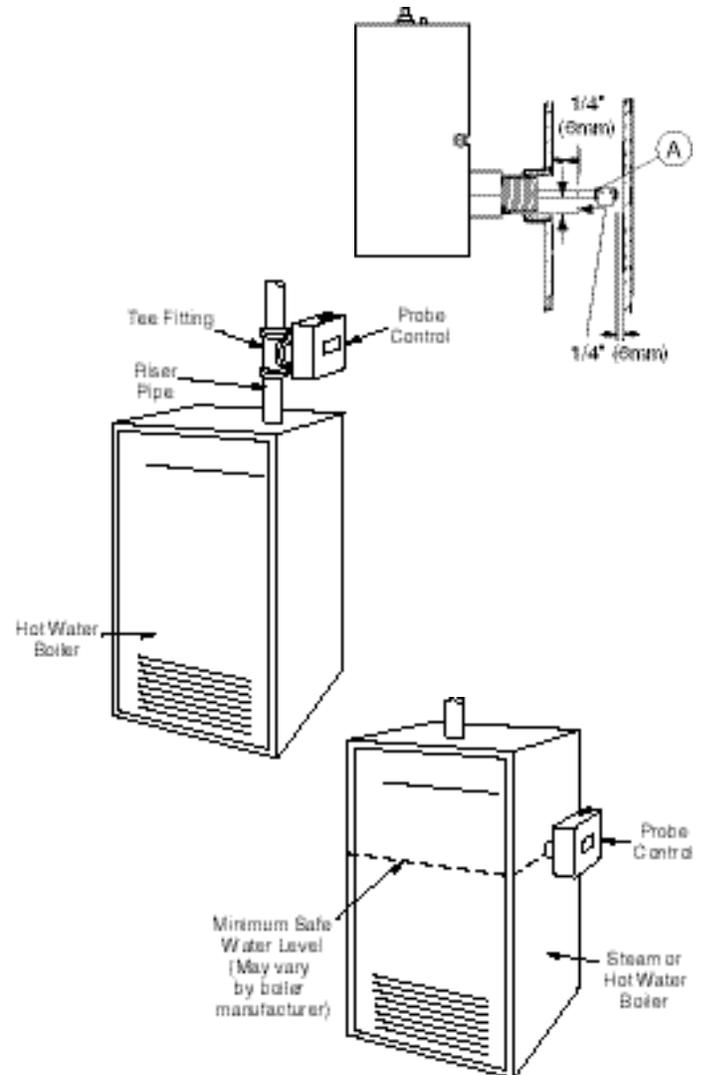
1. Make sure probe is installed above minimum safe water line as determined by the boiler manufacturer.
2. Make sure that ends and sides of the probe are at least 1/4" (6.4mm) from all internal metal surfaces.
3. Make sure the probe is positioned to shut off the boiler before the water level falls below the lowest visible part of the gauge glass.

For Steam Boilers:

1. Refer to boiler manufacturers instructions to determine suitable tapping for the probe.

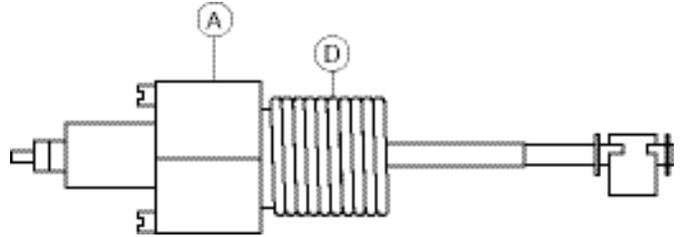
For Hot Water Boilers:

1. Refer to boiler manufacturers instructions to determine suitable tapping for the probe.
2. Locate probe in supply piping using a tee fitting.



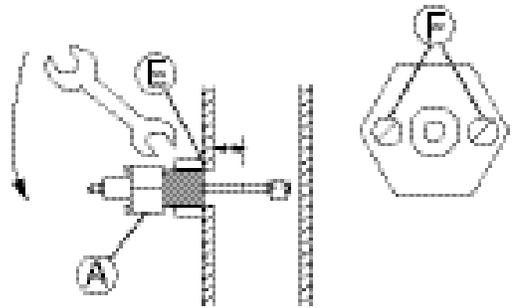
- b. Apply a small amount of pipe dope to the first external threads (D) of the probe (A).

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

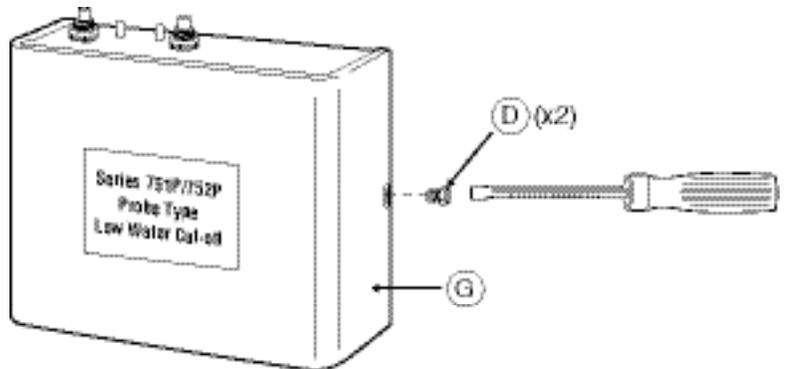


- c. Using a wrench, tighten the probe (A) into the tapped connection (E) that was determined in Step 1 of these instructions. Tighten to 47 ft•lb (64 N•m).

NOTE: Be sure to align the probe so that the mounting screws (F) are in a horizontal position.

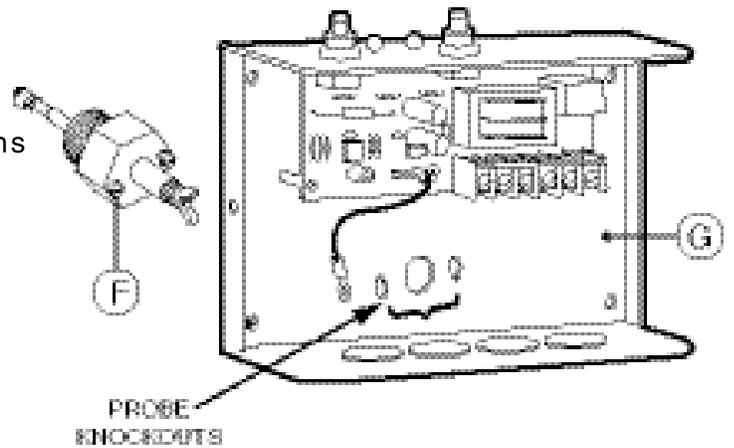


- d. Using the flatblade screwdriver, loosen the two (2) screws that secure the cover (G) to the control about 1-1/2 turns and remove cover.



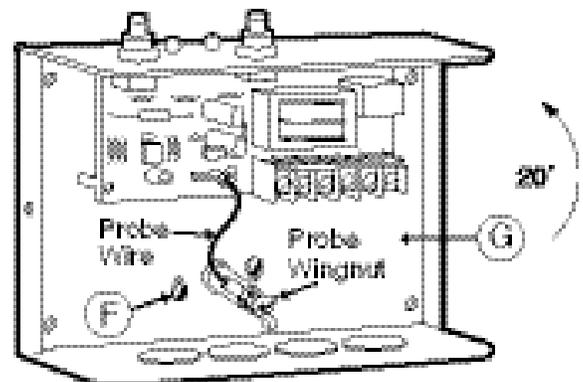
a. Push out the probe knockouts and remove completely from the control housing.

b. Using a flatblade screwdriver, loosen the probe mounting screws (F) 1/8" (3mm) about 1-1/2 turns and slip the control housing (G) over these two screws at a 20° angle.



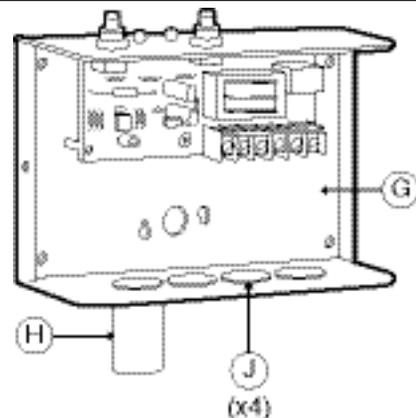
c. Rotate the control housing (G) 20° counterclockwise so that the slots in the control base are firmly under the screw heads. Tighten the mounting screws (F) to approximately 2 ft•lb (2.6 N•m).

d. Remove wingnut from probe and position ring terminal of probe wire on threaded probe rod. Secure with wingnut.



e. Electrical Conduit Connection

- Connect electric conduit using knockouts provided.
- Follow accepted electrical practices when installing fittings and making connections.
- Refer to and follow codes and standards when selecting the types of electrical fittings and conduit.



STEP 5 - Electrical Wiring

WARNING



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

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.

NOTE

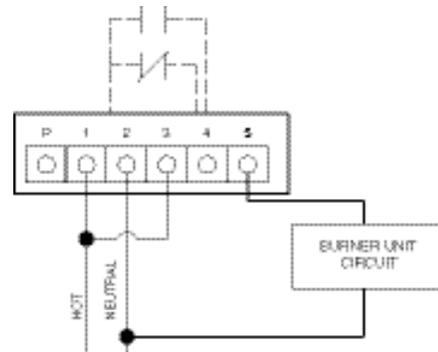
Probe wires should be minimum 18 AWG stranded with glass braided Silicone jacket (UL 3071) suitable for high temperature (200°C) service.

Wiring Diagram Legends

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

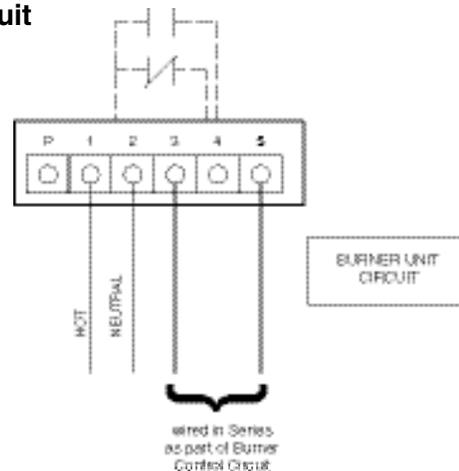
Control Wiring: Same voltage for control and burner circuit

- Connect hot wire to terminal 1
- Connect neutral wire to terminal 2
- Connect jumper wire from Terminal 1 to Terminal 3
- Connect wire from beginning of Burner circuit (thermostat, gas valve, limits, etc.) to terminal 5
- Connect wire from end of Burner circuit to terminal 2



Control Wiring: Different voltage for control and burner circuit

- Connect hot wire to terminal 1
- Connect neutral wire to terminal 2
- Locate Boiler Burner Safety Circuit and connect wires to Terminals 3 & 5 as shown to interrupt circuit



STEP 6 - Testing and Diagnostic Procedures

Series 750 LWCO with Green Power On LED and Red Low Water LED

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 and Red lights will turn "ON".
3. The burner will never turn "ON" during power up, If water is off the probe.

b. Now fill the boiler with water.

(auto reset units only)

1. When water touches the probe, the Green light will remain "ON".
2. The Red light will turn "OFF" and the burner will turn "ON" as long as there is water on the probe.

(manual reset units only)

(When water returns to the probe, nothing will happen until the manual reset button is depressed.)

1. After depressing manual reset button, the Green and Red lights will flash simultaneously 4 times.
2. Then the Green light will turn "ON" and the Red light will turn "OFF".
3. The burner will turn "ON" as long as there is water in the probe.

Manually Testing Control

c. Slowly drain the boiler of water.

(both auto and manual reset units)

1. When the water drops off the probe, the Green light will remain "ON".
2. The Red light will turn "ON" and the burner will turn "OFF", if water is off the probe.

Testing Control Using "Test Button"

d. Depressing the test button with "water on probe" (auto 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. The burner will turn "OFF".
4. The Green light will continue flashing as long as the test button is depressed.

(Release test button, if water is still on probe.)

5. The Green lights will stop flashing and turn "ON".

6. Then Red light will turn "OFF".

7. The burner will turn "ON" as long as there is water in the probe.

e. Depressing the test button with "water on probe" (manual resets 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. The burner will turn "OFF".
4. The Green light will continue flashing as long as the test button is depressed.

(Release test button. You must depress the manual reset button to unlock the low 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".

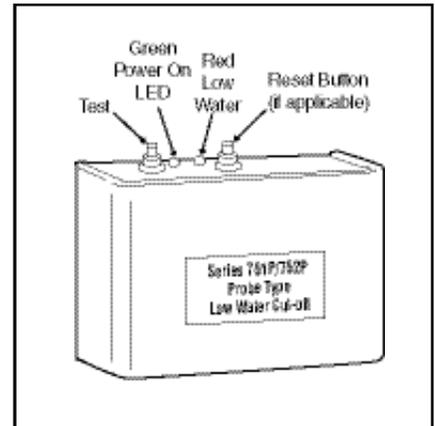
7. The burner will turn "ON" as long as there is water in the probe.

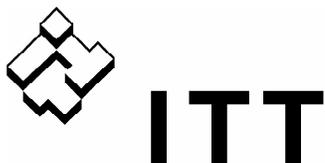
f. Depressing the test button with "water off probe" (both auto and manual reset units):

(Since control is in "low water" the Green light will flash and the Red light will remain "ON". The burner will remain "OFF".

CSD-1 Compliance

On manual Reset units, if the control is in a low water condition (water off probe) when there is an interruption of power, the control will remain in a low water condition when power is restored. The reset button will need to be pressed when the water level is restored to a level above the probe.





If control fails to operate, perform the following diagnostic checks.

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

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 it's white Teflon® insulator. Be careful not to damage the Teflon® insulator.
- **Test the low water cut-off annually or more frequently, if required by code.**

CAUTION

Replace Probe if:

- Teflon® insulator is cracked or worn.
- Probe is loose.

Failure to follow this caution could cause property damage, personal injury or death.

- **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 low water cut-off every 15 years.**

NOTE

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.

