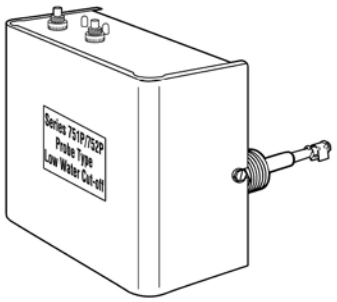
McDonnell & Miller
a xylem brand

INSTRUCTION MANUAL
MM-283E

210995

GUARDDOG®

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



Series 751P/752P

Applications:

– Primary conductance type control for commercial or industrial hot water boilers.

– Secondary control for commercial or industrial steam boilers.

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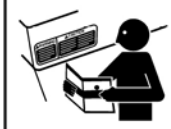
⚠ WARNING





- Before using this 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, steam, 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 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 of the limit and operating controls, before leaving the site.
- When using mixed voltages,do not jumper from terminal 1to 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.
- California Proposition 65 warning! This product contains chemicals known to the state of California to cause cancer and birth defects or other reproductive harm.
- Previous controls should never be installed on a new system. Always install new controls on a new boiler or system.

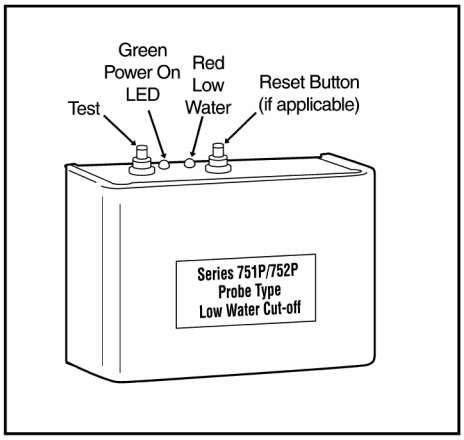
Failure to follow this warning could cause property damage, personal injury or death.

CAUTION:

- A more frequent replacement interval may be necessary based on the condition of the unit at time of inspection. McDonnell & Miller's warranty is one (1) year from date of installation or two (2) years from the date of manufacture.

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.



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.

Manual Reset units follow CSD-1 Code Compliance.

CSD-1 Code Compliance

On Manual Reset Units, if the control is in low water condition (water is off the probe) and there is a sudden power interruption, the control will remain in low water condition (Burner Off) even if the power is restored. The Reset Button must be depressed to make the control back to function, after the water level is re-established to the probe.

Lock Out Delay

When a low water condition occurs the burners turns off and Red LED begins to blink. When the water level is restored to a level above the probe within 30 sec, the boiler will return to the normal operation. If the water level remains in low condition, control will go to a low water condition and Red LED will be solid Red.

Control Unit

Temperature Ratings:

Storage: -40˚F to 135˚F (-40˚C to 57˚C)
Ambient: 32˚F to 120°F (0˚C to 49˚C)

Humidity: 85% (non-condensing)

Electrical Enclosure Rating: NEMA 1 General Purpose

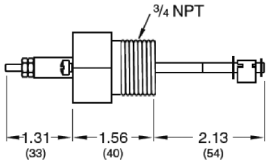
Probe Specifications

Maximum Steam Pressure: 15 psi (1.0 kg/cm^2)

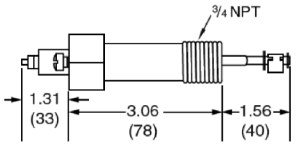
Maximum Water Pressure: 160 psi (11.2 kg/cm^2)

Maximum Water Temperature: 250°F (121° C)

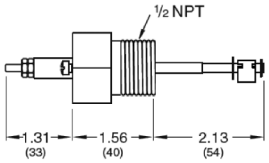
Connection Size: 3/4" NPT



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)

STEP 1 - Where to Install

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

For all Applications:

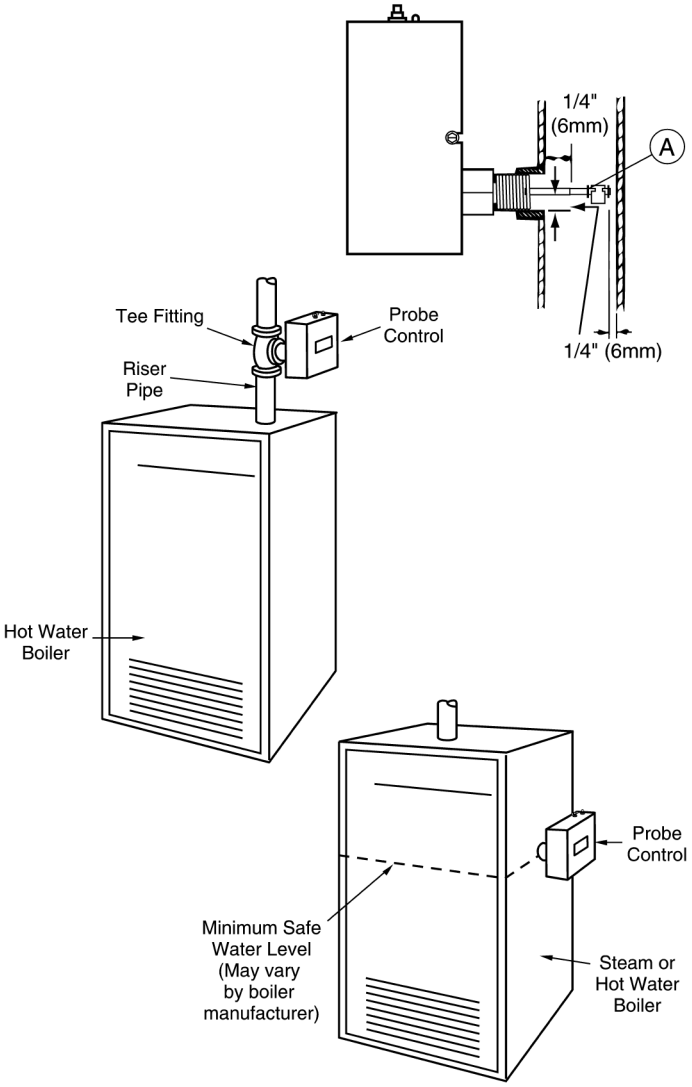
1. Make sure probe is installed above minimum safe water line as determined by the boiler manufacturer.
2. Make sure that ends and sides of the probe are at least 1/4” (6.4mm) from all internal metal surfaces.
3. Make sure the probe is positioned to shut off the boiler before the water level falls below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

For Steam Boilers:

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

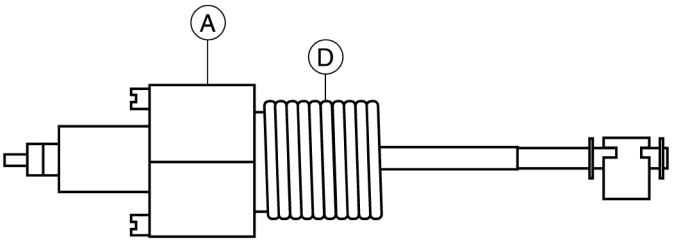
For Hot Water Boilers:

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

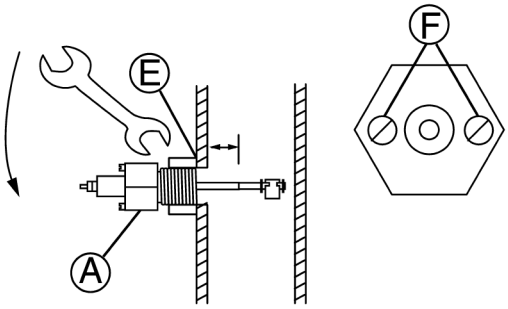


b. Apply a small amount of pipe dope to the first external threads (D) of the probe (A).

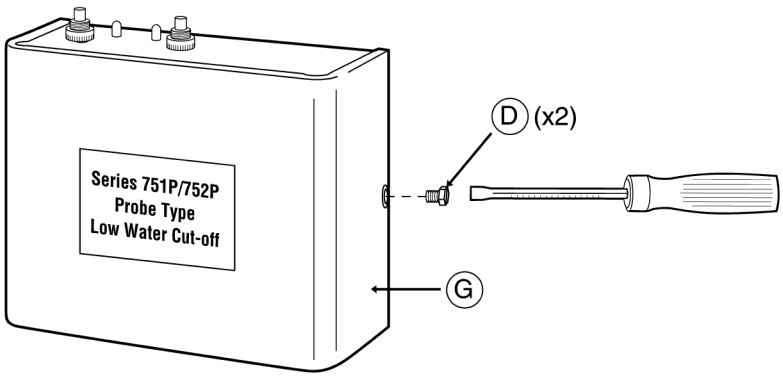
IMPORTANT: Do not use PTFE tape or thread sealant.



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.

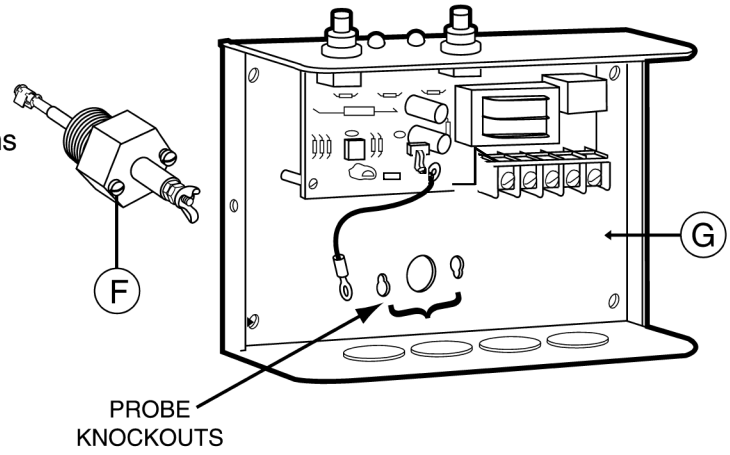


d. Using the flatblade screwdriver, loosen the two (2) screws that secure the cover (G) to the control about 1-1/2 turns and remove cover.



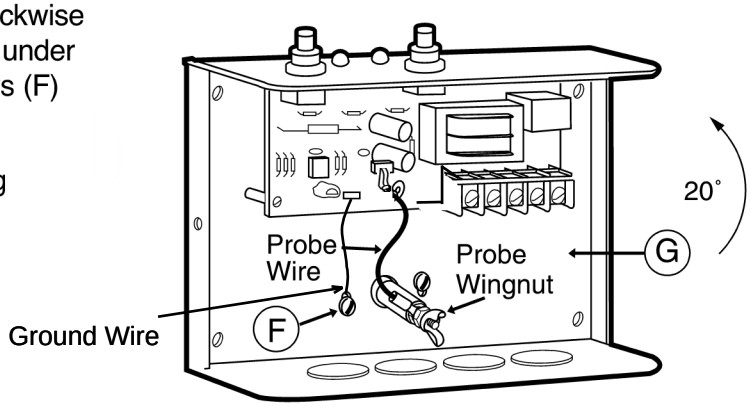
a. Push out the probe knockouts and remove completely from the control housing.

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.



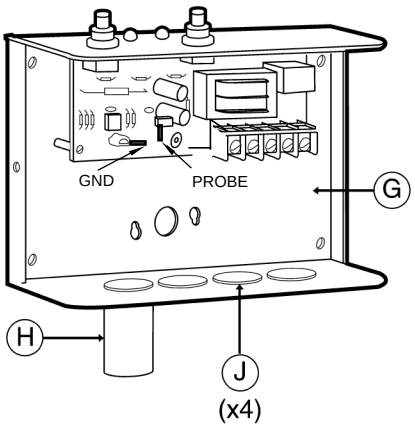
c. Rotate the control housing (G) 20˚ counterclockwise so that the slots in the control base are firmly under the screw heads. Tighten the mounting screws (F) to approximately 2 ft•lb (2.6 N•m).

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. (J)
- 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

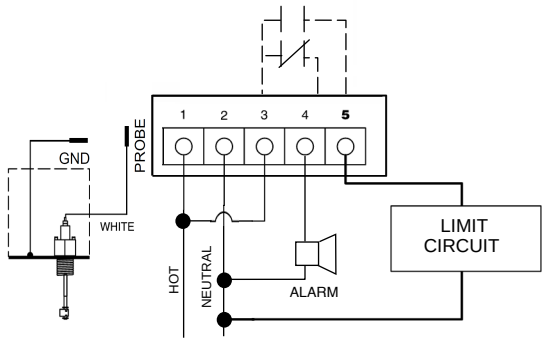
Probe wires should be minimum 18 AWG stranded with glass braided Silicone jacket (UL 3071) suitable for high temperature (200°C) service.

Wiring Diagram Legends

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

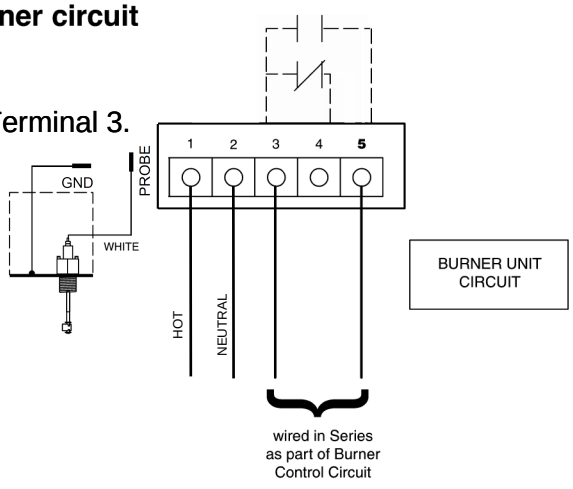
Control Wiring: Same voltage for control and burner circuit

- Connect hot wire to terminal 1
- Connect neutral wire to terminal 2
- Connect jumper wire from Terminal 1 to Terminal 3
- Connect a wire from Terminal 5 to the next safety device of the Burner's safety circuit, such as thermostat, gas valve, limits, etc.
- Connect wire from end of Burner circuit to Terminal 2.



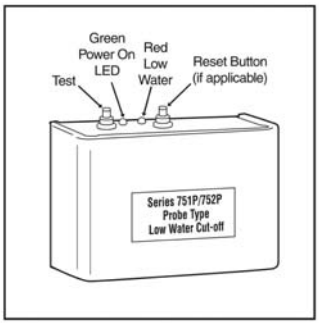
Control Wiring: Different voltage for control and burner circuit

- Connect hot wire to terminal 1
- Connect neutral wire to terminal 2
- Connect hot wire from the separate power supply to Terminal 3.
- Connect a wire from Terminal 5 to the next safety device in the circuit.
- Connect probe wire from probe to "probe connection on PCB"
- Connect ground wire from "GND" connection on PCB to chasis green screw



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 light will turn "ON".
3. Red LED will be flashing for 30 sec. and turn solid on afterward.
4. The burner will never turn "ON" during power up, if water is off the probe.

b. Now fill the boiler with water.

(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 be "ON" as long as there is water on the probe.

Manually Testing Control

c. Slowly drain the boiler of water.

1. When the water drops off the probe, the Green light remains "ON".
2. The Red light starts flashing and the burner will turn "OFF", if water is off the probe.
   Red LED will turn "OFF" and burner turns "ON" if water returns to probe during 30 sec.
   Red LED will turn "ON" burner turns "OFF" if water below probe.

Testing Control Using "Test Button"

d. Depressing the test button with "water on probe." :

(Must depress and hold test button for 30 sec. to activate test cycle, Red LED will flash and Green is "ON".)

1. Both Red and Green LEDs stay "ON" after test cycle is activated.
2. The burner will turn "OFF".

(Release test button. You must depress the manual reset button to unlock the low water cut-off.)

3. Then the Green light will turn "ON" and the Red light will turn "OFF", after Red and Green lights flash simultaneously 4 times.
4. The burner will turn "ON" as long as there is water on the probe.

CSD-1 Compliance

On Manual Reset Units, if the control is in low water condition (water is off the probe) and there is a sudden power interruption, the control will remain in low water condition (Burner Off) even if the power is restored. The Reset Button must be depressed to make the control back to function, after the water level is re-established to 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 PTFE tape has not been used on the threaded base of the electrode to the boiler.
4. Re-check the electrical ground connection 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 PFA insulator. Be careful not to damage the PFA insulator.
- **Test the low water cut-off annually or more frequently, if required by code.**

⚠ CAUTION

Replace Probe if:
- **PFA 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.

xylem
Let's Solve Water

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