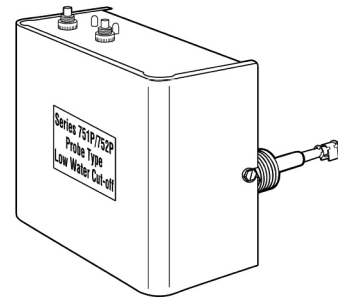




## Series 751P Series 752P Probe Type Low Water Cut-Off

### Applications:

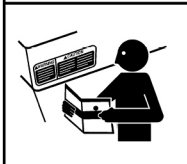
- Primary conductance type control for commercial or industrial hot water boilers.
- Secondary control for commercial or industrial steam boilers.



Series 751P/752P



### **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 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 1 to terminal 3.
- To prevent electrocution, when the electrical power is connected to the flow switch, do not touch the terminals, or electrical wires.

- To prevent electrical shock, turn off the electrical power before making electrical connections.

- This product can expose you to chemicals including Lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to: [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

- Previous controls should never be installed on a new system. Always install new controls on a new boiler or system.

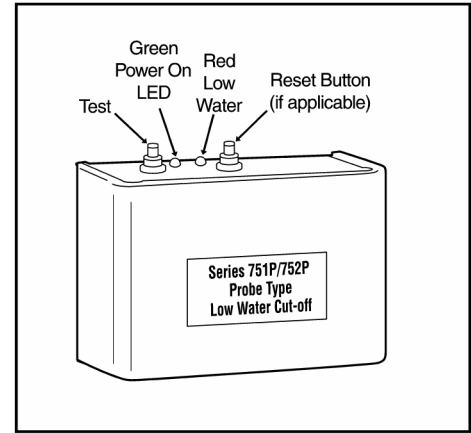
Failure to follow this warning could cause property damage, personal injury or death.

### **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.

## Control Unit

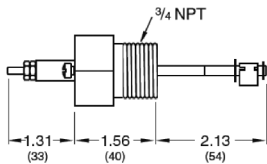
### Temperature Ratings:

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

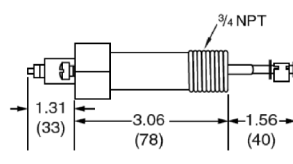
Ambient: 32°F to 120°F (0°C to 49°C)

Humidity: 85% (non-condensing)

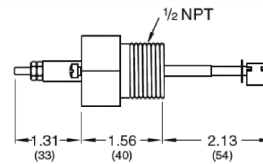
Electrical Enclosure Rating: NEMA 1 General Purpose



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 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 turn 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.

## Probe Specifications

Maximum Steam Pressure: 15 psi (1.0 kg/cm<sup>2</sup>)

Maximum Water Pressure: 160 psi (11.2 kg/cm<sup>2</sup>)

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:

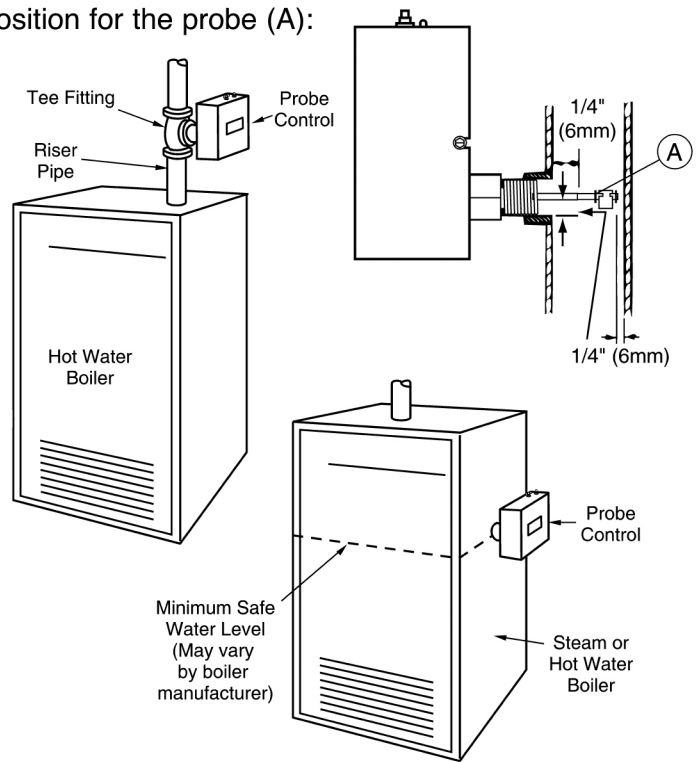
1. Make sure probe is installed above minimum safe water line as determined by the boiler manufacturer.
2. Make sure that ends and sides of the probe are at least 1/4" (6.4mm) from all internal metal surfaces.
3. Make sure the probe is positioned to shut off the boiler before the water level falls below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



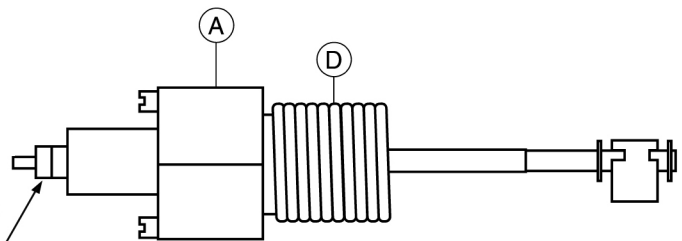
## STEP 2 - Installing the Probe

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

### WARNING

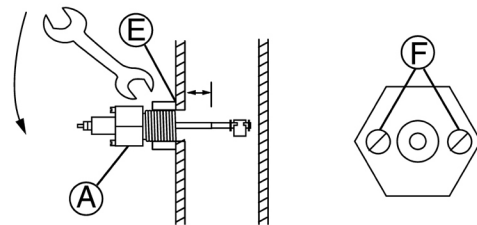
Do not use PTFE tape. Only use pipe sealant. Failure to follow these instructions will cause the probe not to function as intended and could cause property damage, personal injury or death.

**IMPORTANT:** Do not attempt to loosen or tighten the factory installed hexnuts.

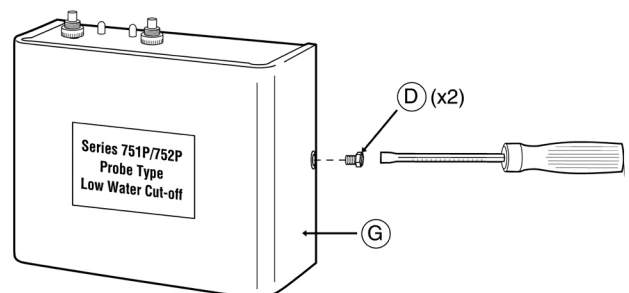


b. Using a wrench, tighten the probe (A) into the tapped connection (E) that was determined in Step 1 of these instructions. Tighten to 47 ft·lb (64 N·m).

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



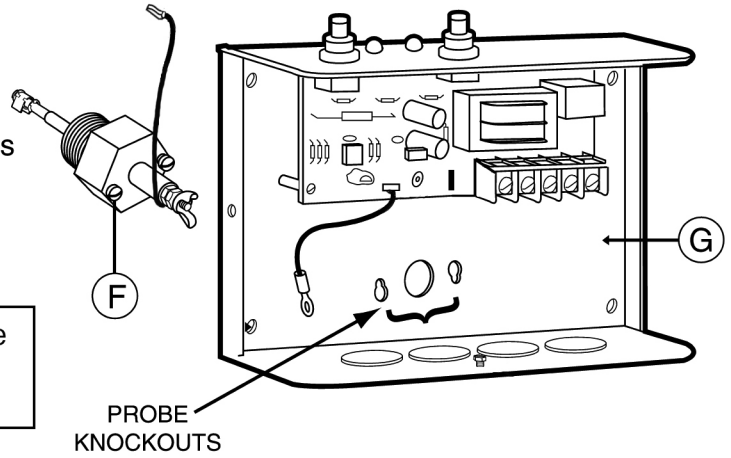
c. Using the flatblade screwdriver, loosen the two (2) screws that secure the cover (G) to the control about 1-1/2 turns and remove cover.



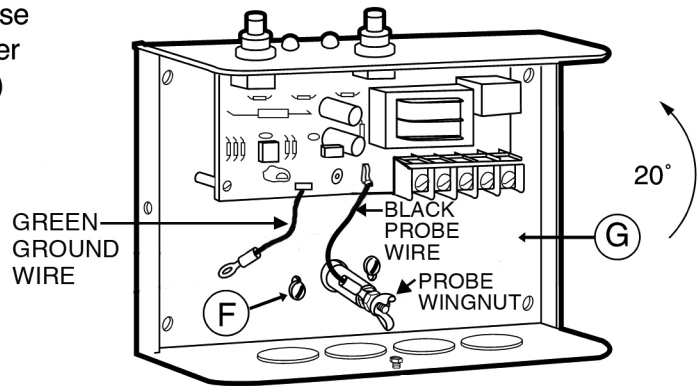
## STEP 3 - Installing the Control Box

- 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.

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

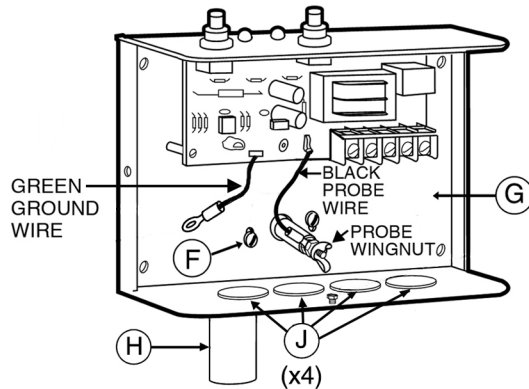


- c. Rotate the control housing (G) 20° counterclockwise so that the slots in the control base are firmly under the screw heads. Tighten the mounting screws (F) to approximately 2 ft•lb (2.6 N•m).
- d. Remove wingnut from probe and position ring terminal of probe wire on threaded probe rod. Do not loosen or remove hexnuts. Place ring terminal on top of hexnuts and under the lockwasher and windnuts. Secure with wingnut. Do not tighten hexnuts.



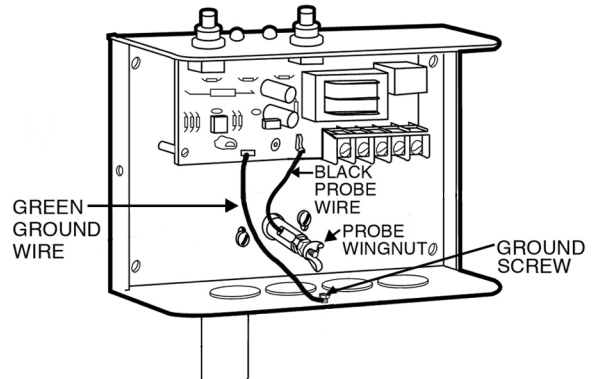
### e. Electrical Conduit Connection

- 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.



### f. Remote Sensor Wiring

- Connect black wire from probe end to Terminal connection "PROBE" on PCB.
- Connect green wire from green screw on the controller's metal chassis to Terminal connection "GND" on PCB.



## STEP 4 - Electrical Wiring

### WARNING



To prevent 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.

### 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.

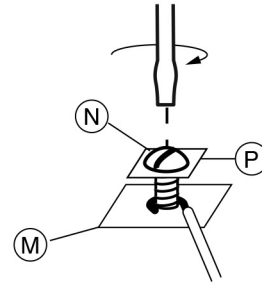
### NOTE

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

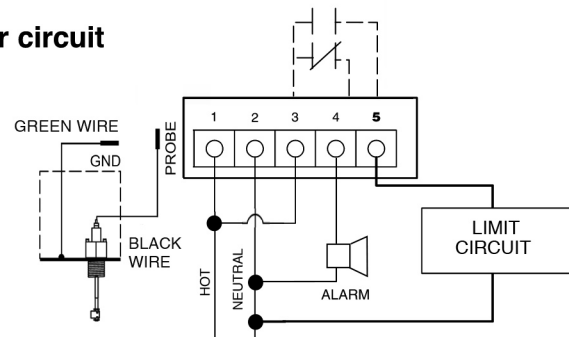
1. Bold lines indicate action to be taken in Step shown.
2. Dotted black lines indicate internal wiring.

- a. 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).



### b. 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.



### WARNING

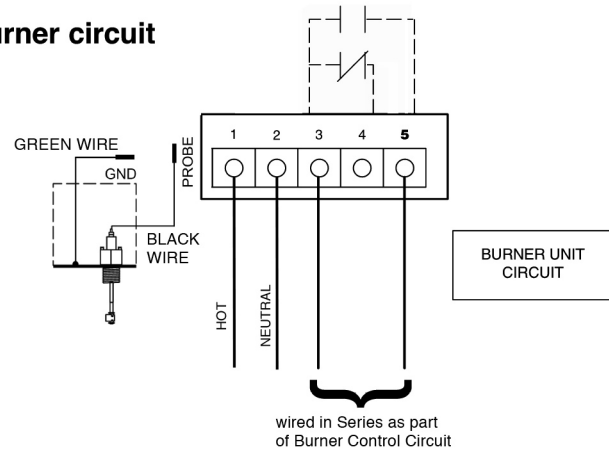
- Electrical connections are to be made by a qualified electrician in accordance with all applicable codes, ordinance and good practices.
- The probe wire must be connected to the terminal connection marked with "Probe" from PCB and ground wire must be connected to the terminal connection marked with "GND" from PCB. Failure to follow these instructions could result in property damage, personal injury or death.



## STEP 4 - Electrical Wiring

### c. 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 black wire from probe end to Terminal connection "PROBE" on PCB.
- Connect green wire from ground screw on the controller's metal chassis to Terminal connection "GND" on PCB.



## STEP 5 - 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".)*

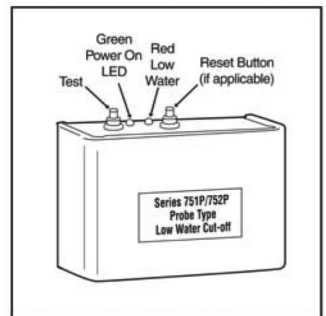
1. Both Red and Green LEDs stay "ON" after test cycle is activated.
2. The burner will turn "OFF".

*(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<sup>9</sup> 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.**

### WARNING

- **Regular maintenance is required. Failure to follow the device maintenance could result in property damage, personal injury or death.**

### 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.**

## COMMERCIAL WARRANTY

**Warranty.** For goods sold to commercial buyers, Seller warrants the goods sold to Buyer hereunder (with the exception of membranes, seals, gaskets, elastomer materials, coatings and other "wear parts" or consumables all of which are not warranted except as otherwise provided in the quotation or sales form) will be (i) be built in accordance with the specifications referred to in the quotation or sales form, if such specifications are expressly made a part of this Agreement, and (ii) free from defects in material and workmanship for a period of one (1) year from the date of installation or two (2) years from the date of manufacture, whichever shall occur first, unless a longer period is specified in the product documentation (the "Warranty").

Except as otherwise required by law, Seller shall, at its option and at no cost to Buyer, either repair or replace any product which fails to conform with the Warranty provided Buyer gives written notice to Seller of any defects in material or workmanship within ten (10) days of the date when any defects or non-conformance are first manifest. Under either repair or replacement option, Seller shall not be obligated to remove or pay for the removal of the defective product or install or pay for the installation of the replaced or repaired product and Buyer shall be responsible for all other costs, including, but not limited to, service costs, shipping fees and expenses. Seller shall have sole discretion as to the method or means of repair or replacement. Buyer's failure to comply with Seller's repair or replacement directions shall terminate Seller's obligations under this Warranty and render the Warranty void. Any parts repaired or replaced under the Warranty are warranted only for the balance of the warranty period on the parts that were repaired or replaced. Seller shall have no warranty obligations to Buyer with respect to any product or parts of a product that have been: (a) repaired by third parties other than Seller or without Seller's written approval; (b) subject to misuse, misapplication, neglect, alteration, accident, or physical damage; (c) used in a manner contrary to Seller's instructions for installation, operation and maintenance; (d) damaged from ordinary wear and tear, corrosion, or chemical attack; (e) damaged due to abnormal conditions, vibration, failure to properly prime, or operation without flow; (f) damaged due to a defective power supply or improper electrical protection; or (g) damaged resulting from the use of accessory equipment not sold or approved by Seller. In any case of products not manufactured by Seller, there is no warranty from Seller; however, Seller will extend to Buyer any warranty received from Seller's supplier of such products.

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## LIMITED CONSUMER WARRANTY

**Warranty.** For goods sold for personal, family or household purposes, Seller warrants the goods purchased hereunder (with the exception of membranes, seals, gaskets, elastomer materials, coatings and other "wear parts" or consumables all of which are not warranted except as otherwise provided in the quotation or sales form) will be free from defects in material and workmanship for a period of one (1) year from the date of installation or two (2) years from the product date code, whichever shall occur first, unless a longer period is provided by law or is specified in the product documentation (the "Warranty").

Except as otherwise required by law, Seller shall, at its option and at no cost to Buyer, either repair or replace any product which fails to conform with the Warranty provided Buyer gives written notice to Seller of any defects in material or workmanship within ten (10) days of the date when any defects or non-conformance are first manifest. Under either repair or replacement option, Seller shall not be obligated to remove or pay for the removal of the defective product or install or pay for the installation of the replaced or repaired product and Buyer shall be responsible for all other costs, including, but not limited to, service costs, shipping fees and expenses. Seller shall have sole discretion as to the method or means of repair or replacement. Buyer's failure to comply with Seller's repair or replacement directions shall terminate Seller's obligations under this Warranty and render this Warranty void. Any parts repaired or replaced under the Warranty are warranted only for the balance of the warranty period on the parts that were repaired or replaced. The Warranty is conditioned on Buyer giving written notice to Seller of any defects in material or workmanship of warranted goods within ten (10) days of the date when any defects are first manifest.

Seller shall have no warranty obligations to Buyer with respect to any product or parts of a product that have been: (a) repaired by third parties other than Seller or without Seller's written approval; (b) subject to misuse, misapplication, neglect, alteration, accident, or physical damage; (c) used in a manner contrary to Seller's instructions for installation, operation and maintenance; (d) damaged from ordinary wear and tear, corrosion, or chemical attack; (e) damaged due to abnormal conditions, vibration, failure to properly prime, or operation without flow; (f) damaged due to a defective power supply or improper electrical protection; or (g) damaged resulting from the use of accessory equipment not sold or approved by Seller. In any case of products not manufactured by Seller, there is no warranty from Seller; however, Seller will extend to Buyer any warranty received from Seller's supplier of such products.

**THE FOREGOING WARRANTY IS PROVIDED IN PLACE OF ALL OTHER EXPRESS WARRANTIES. ALL IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED TO ONE (1) YEAR FROM THE DATE OF INSTALLATION OR TWO (2) YEARS FROM THE PRODUCT DATE CODE, WHICHEVER SHALL OCCUR FIRST. EXCEPT AS OTHERWISE REQUIRED BY LAW, BUYER'S EXCLUSIVE REMEDY AND SELLER'S AGGREGATE LIABILITY FOR BREACH OF ANY OF THE FOREGOING WARRANTIES ARE LIMITED TO REPAIRING OR REPLACING THE PRODUCT AND SHALL IN ALL CASES BE LIMITED TO THE AMOUNT PAID BY THE BUYER FOR THE DEFECTIVE PRODUCT. IN NO EVENT SHALL SELLER BE LIABLE FOR ANY OTHER FORM OF DAMAGES, WHETHER DIRECT, INDIRECT, LIQUIDATED, INCIDENTAL, CONSEQUENTIAL, PUNITIVE, EXEMPLARY OR SPECIAL DAMAGES, INCLUDING BUT NOT LIMITED TO LOSS OF PROFIT, LOSS OF ANTICIPATED SAVINGS OR REVENUE, LOSS OF INCOME, LOSS OF BUSINESS, LOSS OF PRODUCTION, LOSS OF OPPORTUNITY OR LOSS OF REPUTATION.**

Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which may vary from state to state.

To make a warranty claim, check first with the dealer from whom you purchased the product or call +1-847-966-3700 for the name and location of the nearest dealer providing warranty service.

**xylem**  
Let's Solve Water

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