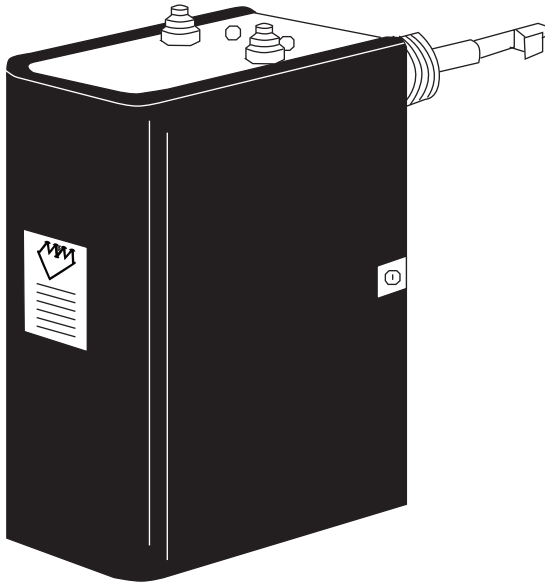


Installation, Operation,
and Maintenance Manual

MM-289Õ



PSE-800-M Low Water Cut-off



McDonnell & Miller

a xylem brand

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1 Introduction and Safety

1.1 Introduction

Purpose of this manual

The purpose of this manual is to provide necessary information for:

- Installation
- Operation
- Maintenance



CAUTION:

Read this manual carefully before installing and using the product. Improper use of the product can cause personal injury and damage to property, and may void the warranty.

NOTICE:

Save this manual for future reference, and keep it readily available at the location of the unit.

1.2 Safety



WARNING:

- The operator must be aware of safety precautions to prevent physical injury.
- Operating, installing, or maintaining the unit in any way that is not covered in this manual could cause death, serious personal injury, or damage to the equipment. This includes any modification to the equipment or use of parts not provided by Xylem. If there is a question regarding the intended use of the equipment, please contact a Xylem representative before proceeding.
- Do not change the service application without the approval of an authorized Xylem representative.



CAUTION:

You must observe the instructions contained in this manual. Failure to do so could result in physical injury, damage, or delays.


1.2.1 Safety terminology and symbols



About safety messages

It is extremely important that you read, understand, and follow the safety messages and regulations carefully before handling the product. They are published to help prevent these hazards:

- Personal accidents and health problems
- Damage to the product and its surroundings
- Product malfunction



Hazard levels

Hazard level	Indication
 <p>DANGER:</p>	<p>A hazardous situation which, if not avoided, will result in death or serious injury</p>

Hazard level	Indication
 WARNING:	A hazardous situation which, if not avoided, could result in death or serious injury
 CAUTION:	A hazardous situation which, if not avoided, could result in minor or moderate injury
NOTICE:	Notices are used when there is a risk of equipment damage or decreased performance, but not personal injury.

Special symbols

Some hazard categories have specific symbols, as shown in the following table.

Electrical Hazard	Permanent-magnet hazard
 Electrical Hazard:	 CAUTION:

1.3 User safety

General safety rules

These safety rules apply:

- Always keep the work area clean.
- Pay attention to the risks presented by gas and vapors in the work area.
- Avoid all electrical dangers. Pay attention to the risks of electric shock or arc flash hazards.
- Always bear in mind the risk of drowning, electrical accidents, and burn injuries.

Safety equipment

Use safety equipment according to the company regulations. Use this safety equipment within the work area:

- Hard hat
- Safety goggles, preferably with side shields
- Protective shoes
- Protective gloves
- Gas mask
- Hearing protection
- First-aid kit
- Safety devices

NOTICE:

Never operate a unit unless safety devices are installed. Also see specific information about safety devices in other chapters of this manual.

Electrical connections

Electrical connections must be made by certified electricians in compliance with all international, national, state, and local regulations. For more information about requirements, see sections dealing specifically with electrical connections.

2 Product Description

2.1 General description

Description

The probe is a manual reset low water cut-off control. The control unit has a red LED light to alert personnel to a low water condition and a green LED to indicate normal operation.

Lockout delay

When a low water condition occurs, the burner turns off and the red LED begins to blink. When the water level is not restored to a level above the probe within 60 seconds, the control locks out. Press the reset button when the water level is restored to a level above the probe.

Power interruption

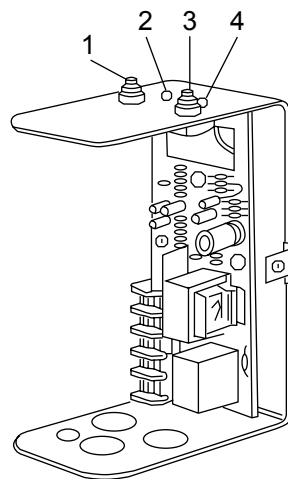
The control will automatically reset after a loss of power as long as there is water on the probe before and after the power loss occurred.

CSD-1 code compliance

For manual reset units, when the control is in a low water condition and there is an interruption of power the control remains in that condition when power is restored. Press the reset button when the water level is restored to a level above the probe.

NOTICE:

Flood hazard. Do not use manual reset models with automatic water feeders.



1. Test button
2. Power on LED, green
3. Reset button
4. Low water LED, red

Figure 1: Control unit

2.2 Operational specifications

Control unit ratings

Storage temperature	-40°F to 135°F (-40°F to 57°C)
Ambient temperature	32°F to 120°F (0°F to 49°C)
Humidity	85% non-condensing

Probe specifications

Maximum steam pressure: 15 psi (1.0 kg/cm²)

Probe dimensions in inches (mm)

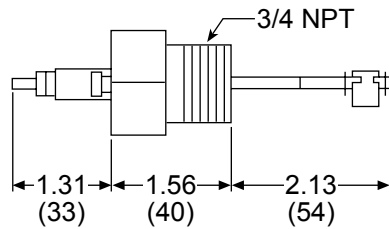


Figure 2: Standard probe

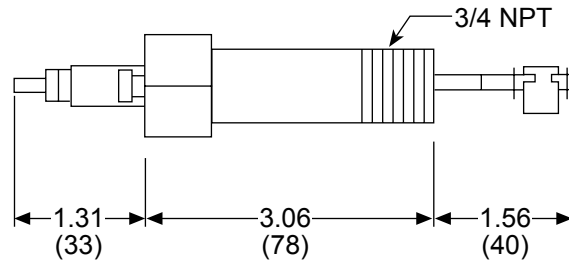


Figure 3: "U" probe

2.3 Electrical specifications

Ratings

Model	Control Voltage	Motor Switch rating		Pilot rating
PSE-802-M-24	24 VAC	N/A		50 VA
PSE-802-M-U-24				
PSE-801-M-120	120 VAC	7.5 FLA	43.2 LRA	125 VA
PSE-801-M-U-120				

Hertz

50/60

Control power consumption

- 1.7 VA at 24 VAC
- 3.6 VA at 120 VAC

Electrical enclosure rating

- NEMA 1 general purpose

Agency listings



3 Installation

3.1 Determine location for the probe installation



DANGER:

Electrical hazard sufficient to kill. Always disconnect and lock out the power before you service the unit.

NOTICE:

- Low water cut-off must be installed in series with all other limit and operating controls on the boiler. Check for proper operation of all of the limit and operating controls before leaving the site.
 - All work must be performed by qualified personnel trained in the proper application, installation, and maintenance of plumbing, steam and electrical equipment or systems in accordance with all applicable codes and regulations.
-

Use the following criteria to locate a suitable position to install the probe .

- Install probe in a tapping on the boiler that is designated by the boiler manufacturer. Review boiler IOMs or contact manufacturer for location of tapping.
- Probe must be installed below the location or level of the existing automatic reset low water cut-off (LWCO). Installing the probe above this location could result in nuisance shutdowns or lockouts.
- Install probe in a location above the minimum safe water level as designated by the boiler manufacturer.
- Installing the probe in a location other than a tapping designated by the boiler manufacturer could result in nuisance shutdowns of the burner.
- There must be at least 1/4 in of clearance between the end or sides of the probe and the wall of any piping or fitting.
- Do not install the probe in any pipe extension that covers all or part of the probe rod. Water that is retained in a pipe extension and touches the probe prevents the probe from recognizing a low water condition. The burner will not shut off.

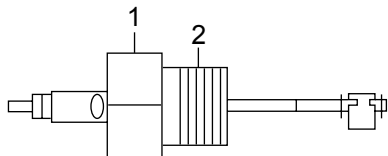
3.2 Install the probe

1. Apply a small amount of pipe sealant to the external threads (2) of the probe (1).

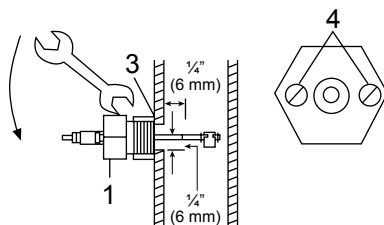


WARNING:

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.

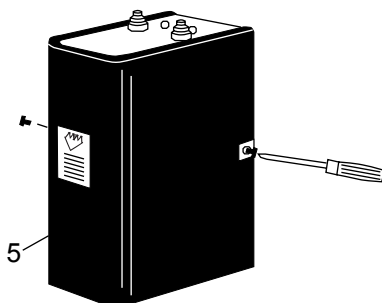


2. Tighten the probe (1) into the tapped connection (3) to 47 ft·lb (64 N·m). Be sure to align the probe so that the mounting screws (4) are in a horizontal position.

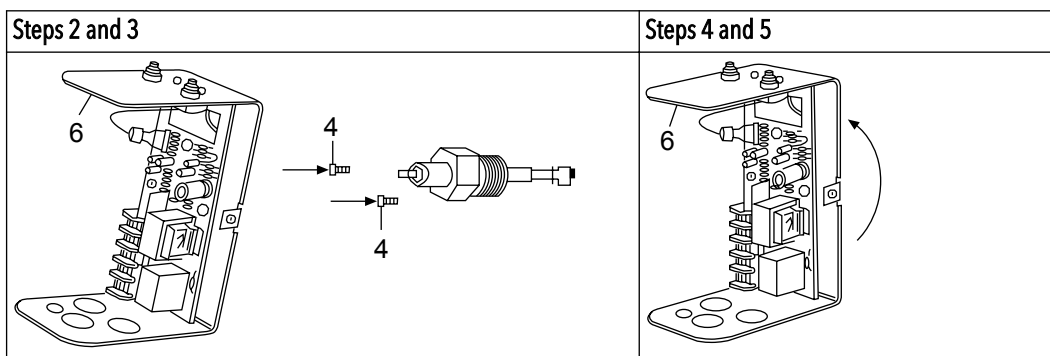


3.3 Install the control housing

1. Loosen the screws that secure the cover (5) to the control housing about 1-1/2 turns. Remove cover.

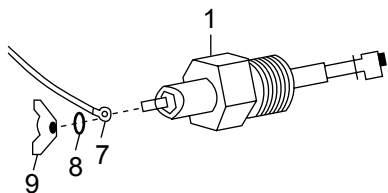


2. Loosen the probe mounting screws (4) 1-1/2 turns or 1/8" (3 mm).
3. Slip the control housing (6) over the two screws at a 20° angle.
4. Rotate the control housing (6) 20° counter-clockwise so that the slots in the control base are under the screws heads.
5. Tighten the mounting screws to approximately 2 ft·lbs. (2.6 N·M)

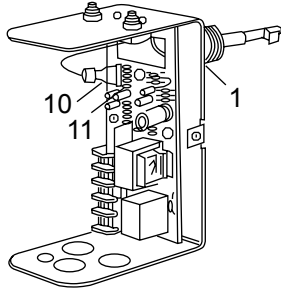


3.4 Wire the probe to the control housing

1. Slip the ring terminal (7) followed by the lock washer (8) over the threaded end of the probe (1).
2. Tighten the wingnut (9) onto the probe to 1/2 ft·lb (.65 N·m).



3. Connect the probe (1) to the wiring circuit by sliding the female quick-connect terminal of the probe wire (10) onto the male spade terminal (11). The male spade terminal is marked J1.



3.5 Control to boiler wiring



WARNING:

- Fire hazard. Electrical wiring must have a rating of 167°F (75°C) if the liquid exceeds 180°F (82°C).
- When installing jumper wire make sure you are not introducing a second voltage source into the burner circuit and thereby bypassing other safety, limit, and operating controls.

Select a wiring method after reviewing the wiring diagrams and notes.

- Voltage of new manual reset LWCO must be the same as the existing automatic reset LWCO.
- Make sure the Factory jumper bar is installed on the existing auto reset probe type LWCO connecting terminals H and C. If there is no jumper bar connecting Terminals H and C, then consult the factory to discuss wiring options.
- For Option B, the power to the automatic reset LWCO turns off when the new manual reset LWCO detects a low water condition. The water feeder does not operate until the new manual reset LWCO detects water on the probe.
- For options A and C, the power to the new manual reset LWCO turns off when the existing auto reset LWCO detects a low water condition, reducing the chance of nuisance lockouts. The water feeder continues to operate because there is still power to the existing auto reset LWCO. Power to the new manual reset LWCO is restored when the auto reset LWCO detects water on the probe.

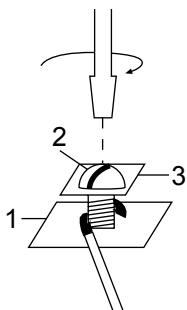
3.6 Electrical conduit connections

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

3.7 Wire connections to the terminal block

Use the following instructions for all wire connections to the terminal block.

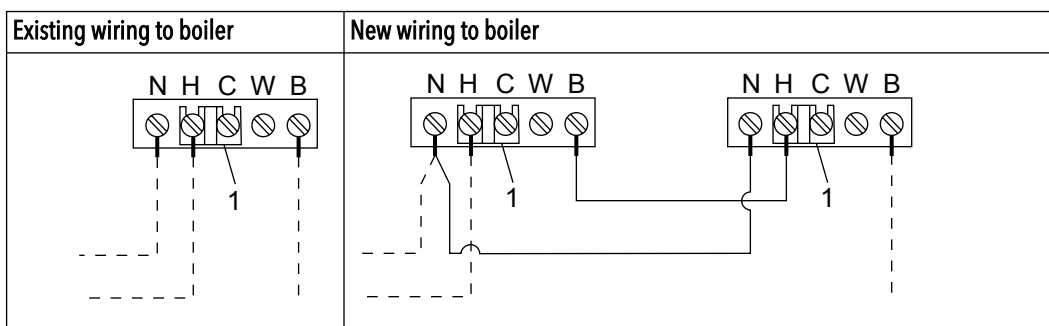
1. Strip about 1/3" (8.5 mm) of insulation from the wire.
2. Loosen the terminal screw (2) but do not remove it.
3. Move the wire clamping plate (3) back until the plate touches the back side of the screw head.
4. Insert the stripped end of the wire between the terminal block (1) and the wire clamping plate (3).
5. Tighten the terminal screw (2).



3.8 Option A wiring

Voltage of the new manual reset LWCO is the same as the existing auto reset LWCO

1. Remove existing wire from terminal B of existing Auto Reset LWCO and connect to terminal B of new Manual Reset LWCO.
2. Connect new wire from terminal B of existing Auto Reset LWCO to terminal H of new Manual Reset LWCO.
3. Connect new wire from terminal N of existing Auto Reset LWCO to terminal N of new Manual Reset LWCO.



1. Factory jumper bar

----- Dashed lines indicate existing wires.

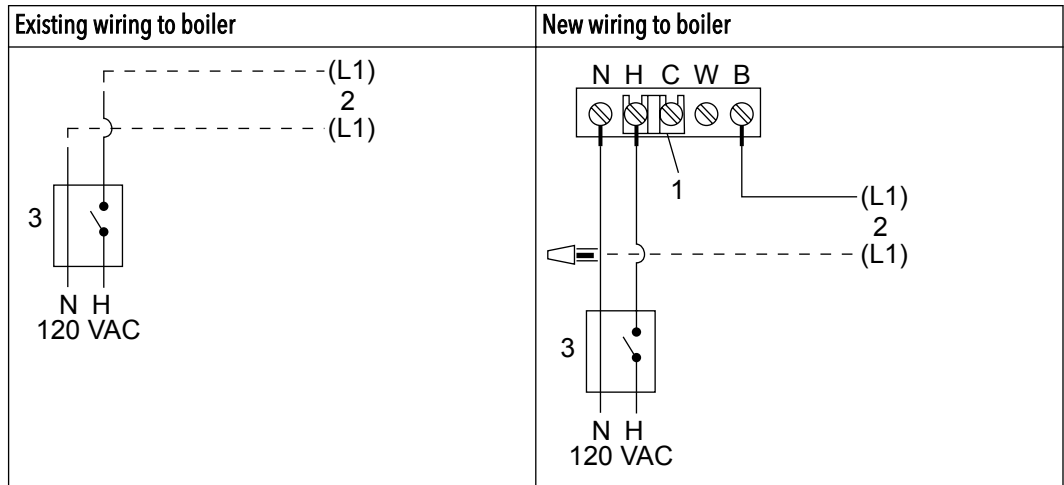
_____ Solid lines indicate new wires.

Water feeder should be wired to existing Auto Reset LWCO. Wiring diagrams for the water feeder can be found in the water feeder installation instruction manual.

3.9 Option B wiring

Wiring a new 120 V manual reset LWCO to a boiler. Burner circuit voltage could be 24 V or 120 V. Existing LWCO could be either probe or float type.

1. Remove the existing hot "H" wire from the service switch and the L1 connection on the boiler.
2. Connect a new hot "H" wire from the service switch to terminal H on the LWCO.
3. Connect a new hot "H" wire from terminal "B" on the LWCO to the L1 connection on the boiler.
4. Connect a new wire to terminal "N" of the LWCO and splice it to the existing neutral "N" wire.

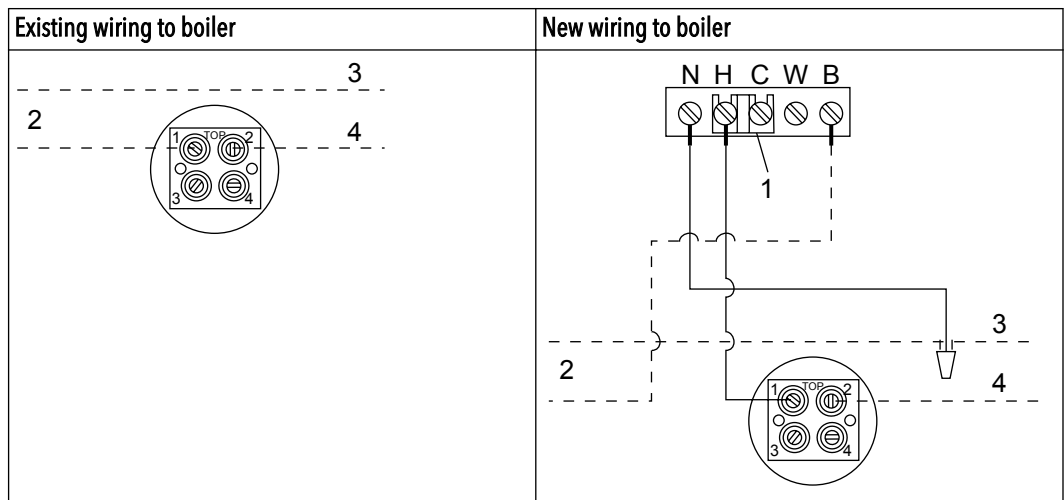


1. Factory jumper bar
 2. Boiler connections
 3. Service switch
- Dashed lines indicate existing wires.
 _____ Solid lines indicate new wires.

3.10 Option C wiring

Wiring a new manual reset LWCO to a boiler with a Model 67 LWCO. Voltage of the new manual reset LWCO must be the same voltage as the burner circuit.

1. Remove existing wire from terminal 1 of the Model 67 LWCO and connect it to Terminal B of the new manual reset LWCO.
2. Connect a new wire from terminal 1 of Model 67 LWCO to terminal H of the new manual reset LWCO.
3. Connect a new wire to terminal N of new manual reset LWCO and splice it to the existing neutral wire.



1. Factory jumper bar
 2. To burner
 3. Neutral
 4. Hot
- Dashed lines indicate existing wires.
 _____ Solid lines indicate new wires.

4 Commissioning, Startup, Operation, and Shutdown

4.1 Start up the boiler

1. Before filling the system, turn on the electric power to the boiler.
 - a) Upon initial power up, the green and red lights will flash simultaneously four times.
 - b) The green light will turn on and the red light will begin to flash.
 - c) After 60 seconds, the red light will stop flashing and will remain on.
 - d) The burner will never turn on as long as there is no water on the probe.
2. Fill the boiler with water.
 - a) When water touches the probe, the green and red lights will remain on.
 - b) After depressing manual reset button, the green and red lights will flash four times simultaneously.
 - c) The green light will then turn on and the red light will turn off.
 - d) The burner will turn on as long as there is water on the probe.

4.2 Test the probe

Drain water from the boiler.

- a) The burner turns off and the Red light begins to flash when there is no water on the probe.
- b) After 60 seconds, the red light will stop flashing and will remain on.

IMPORTANT: If water returns to the level of the probe at any time while the red light flashes, then the control automatically resets.
- c) The control is now locked out. The manual reset button has to be depressed when water touches the probe.

4.3 Test the manual reset button

1. Test the cycle by depressing and holding the test button. The burner turns off and the red light begins to flash.
2. Red light stops flashing and remains on after 60 seconds.
3. Control is now locked out and burner remains off when test button is released.
4. Depress manual reset button. Green and red lights flash simultaneously four times.
5. Green light turns on and red light turns off.
6. Burner turns on as long as there is water on the probe.

5 Maintenance

5.1 Maintenance schedule



WARNING:

- Maintenance and service must be performed by skilled and qualified personnel only.
 - Replace probe when PFA insulator is cracked or worn or probe is loose.
-
- Test the low water cut-off annually.
 - Remove and inspect the self-cleaning probe every five years.
 - Use a non-abrasive cloth and rinse with clean water when the probe requires cleaning. Do not use sharp instruments to remove accumulations of rust or scale.
 - Replace probe every ten years.
 - Replace the low water cut-off control box every 15 years.

6 Troubleshooting

6.1 Probe fails to operate

Perform the following diagnostic checks if the probe fails to operate as required:

1. Check that the water level in the boiler is at or above the level of the probe.
2. Recheck all wiring to ensure proper connections as specified in the wiring diagrams of the boiler manufacturer or in this instruction manual.
3. Check to ensure that PTFE tape has not been used on the threaded connection of the electrode to the boiler.
4. Some foaming is common in certain boilers. Refer to recommendations from the boiler manufacturer for cleaning the boiler and piping when excessive foaming occurs.

7 Product warranty

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 shipment (which date of shipment shall not be greater than thirty (30) days after receipt of notice that the goods are ready to ship), 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.

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To make a warranty claim, check first with the dealer from whom you purchased the product or visit www.xylem.com for the name and location of the nearest dealer providing warranty service.



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