

# Ultra Setter™ Pressure Independent Control Valves

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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 message levels




#### 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
- Product malfunction

#### Definitions

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

Safety message level	Indication
 <b>WARNING:</b>	A hazardous situation which, if not avoided, could result in death or serious injury
 <b>CAUTION:</b>	A hazardous situation which, if not avoided, could result in minor or moderate injury
 <b>Electrical Hazard:</b>	The possibility of electrical risks if instructions are not followed in a proper manner
<b>NOTICE:</b>	<ul style="list-style-type: none"> <li>• A potential situation which, if not avoided, could result in undesirable conditions</li> <li>• A practice not related to personal injury</li> </ul>

## 1.2.2 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.

### Precautions before work

Observe these safety precautions before you work with the product or are in connection with the product:

- Provide a suitable barrier around the work area, for example, a guard rail.
- Make sure that all safety guards are in place and secure.

- Make sure that you have a clear path of retreat.
- Make sure that the product cannot roll or fall over and injure people or damage property.
- Make sure that the lifting equipment is in good condition and is properly rated for the load to be lifted.
- Use a lifting harness and safety line, as required.
- Allow all system and pump components to cool before you handle them.
- Make sure that the product has been thoroughly cleaned.
- Disconnect and lock out power before you install or service the actuator.
- Check the explosion risk before you weld or use electric hand tools.

**Wash the skin and eyes**

Follow these procedures for chemicals or hazardous fluids that have come into contact with your eyes or your skin:

Condition	Action
Chemicals or hazardous fluids in eyes	<ol style="list-style-type: none"> <li>1. Hold your eyelids apart forcibly with your fingers.</li> <li>2. Rinse the eyes with eyewash or running water for at least 15 minutes.</li> <li>3. Seek medical attention.</li> </ol>
Chemicals or hazardous fluids on skin	<ol style="list-style-type: none"> <li>1. Remove contaminated clothing.</li> <li>2. Wash the skin with soap and water for at least 1 minute.</li> <li>3. Seek medical attention, if necessary.</li> </ol>

## 1.3 Protecting the environment

**Emissions and waste disposal**

Observe the local regulations and codes regarding:

- Reporting of emissions to the appropriate authorities
- Sorting, recycling and disposal of solid or liquid waste
- Clean-up of spills

**Exceptional sites**




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**CAUTION: Radiation Hazard**

Do NOT send the product to Xylem if it has been exposed to nuclear radiation, unless Xylem has been informed and appropriate actions have been agreed upon.

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**Recycling guidelines**

Always follow local laws and regulations regarding recycling.

# 2 Transportation and Storage

## 2.1 Inspect the delivery

### 2.1.1 Inspect the package

1. Inspect the package for damaged or missing items upon delivery.
2. Note any damaged or missing items on the receipt and freight bill.
3. File a claim with the shipping company if anything is out of order.  
If the product has been picked up at a distributor, make a claim directly to the distributor.

### 2.1.2 Inspect the unit

1. Remove packing materials from the product.  
Dispose of all packing materials in accordance with local regulations.
2. Inspect the product to determine if any parts have been damaged or are missing.
3. If applicable, unfasten the product by removing any screws, bolts, or straps.  
For your personal safety, be careful when you handle nails and straps.
4. Contact the local sales representative if there is any issue.

# 3 Product Description

## 3.1 General description

The Ultra Setter™ and Ultra Setter™ Compact are pressure independent combination temperature control, balance, and commissioning valves for use in closed HVAC systems.




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**WARNING:**

California Proposition 65 warning! This product contains chemicals known to the state of California to cause cancer and birth defects or other reproductive harm.

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**NOTICE:**

This product is not intended for potable water applications.

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**NOTICE:**

This product is not intended for use in open systems. An open system is one that is exposed to atmospheric pressure at any point, such as a cooling tower system.

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### Ultra Setter features

- Internal automatic balancing cartridge
- External control actuator
- 1/4" NPT readout port
- Threaded NPT end connections

### Ultra Setter Compact features

- Internal automatic balancing cartridge
- External control actuator
- Union end connection upstream
- Threaded NPT end connection downstream
- One 1/4" NPT readout port in the valve body
- One readout port through the stem of the integral isolation valve
- Compact can also be used as a pressure independent flow limiting valve when used without an actuator.

### Actuator

Model	Actuator		
Ultra Setter	0-10 V <sub>DC</sub> Analog	3-Position Tri-State	
Ultra Setter Compact	0-10 V <sub>DC</sub> Analog	3-Position Tri-State	24 V On/Off

### 3.1.1 Operational limits

Valve		Maximum Limitations	
		Temperature °F (°C)	Max. working pressure PSI (kPa)
Ultra Setter and Ultra Setter Compact	NPT	32°F (0°C) to 250°F (120°C) – Fluid	360 PSI (2500 kPa)
		34°F (1°C) to 122°F (50°C) – Ambient	
	Sweat	Based on solder type	ASTM Std. B16.18

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Type Solder	Maximum Limitations 1/2"-1"		Maximim Limitations 1 1/4"-2"	
	Pressure PSI (kPa)	Temp. °F (°C)	Pressure PSI (kPa)	Temp. °F (°C)
95-5 Tin-Antimony	300 (2069)	200 (93)	300 (2069)	175 (79)
	250 (1724)	225 (107)	250 (1724)	200 (93)
	200 (1379)	250 (121)	175 (1207)	250 (121)



# 4 Installation

## 4.1 Installation precautions




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**CAUTION:**

- The valve can be damaged if improper sweating (soldering) is used with the union connection. Before sweating the union connection to the valve, remove the union nut and O-ring from the valve body, then sweat the union tailpiece with union nut into place.
  - Make sure that all connecting pipe work is water tight.
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**NOTICE:**

- The valve body may be damaged if you overtighten when using PTFE pipe compound or PTFE tape on pipe threads.
  - Avoid damaging the valve operating mechanism by using too much joint compound. Apply compound sparingly to male threads only.
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**Safety rules**

- Service should not be performed on any valve in an active hydronic loop.
- Before attempting to make any required adjustments, properly isolate and drain the branch loops or system that require service and allow the valves to reach a safe handling temperature and zero pressure condition.
- Use proper safety equipment including gloves, goggles, or similar tools to avoid contact with system fluids and common hazards.
- Use proper tools and lifting equipment when installing or servicing the valve. Be sure it is properly supported at all times.
- Failure to follow these instructions could result in personal injury, death, and property damage.

## 4.2 Install NPT connection

1. Apply pipe compound conservatively to male connecting fittings only.

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**NOTICE:**

- Do not overtighten when using PTFE impregnated pipe compound or PTFE tape on pipe threads. Doing so may damage the valve body.
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2. Check connections for leaks.

## 4.3 Install sweat connection




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**CAUTION:**

- Heat associated with the use of silver solder may damage valve components and void the product warranty. Do not use silver solder.
  - Excessive use of solder or flux may result in damage to the internal valve components. Do not use excessive solder or flux.
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1. Clean tube ends and valve connections thoroughly with a fine grade emery cloth or fine grit sandpaper.
2. Adjust the valve to the full open position.
3. Wrap the valve in a cool wet rag.
4. Direct the flame being careful to avoid subjecting the valve to excessive heat.

5. Allow the valve to cool before touching or operating.
6. Check the soldered connection for leaks.

## 4.4 Install the actuator

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### NOTICE:

To install an actuator on a valve already in line, close the shutoff valves (upstream first, then downstream) in the piping or turn off the pump. This procedure allows the differential pressure in the valve to drop.

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1. Remove the protective cover from the valve stem.



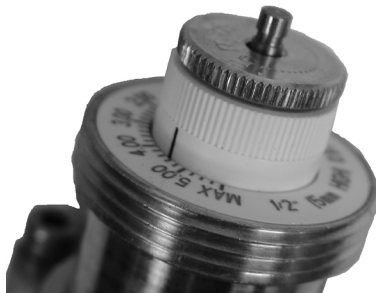
2. Loosen knurled nut.



3. Set the required flow rate setting.



4. Retighten the knurled nut by hand.



5. Assemble actuator to valve and wire connections per actuator manufacturer's instructions.

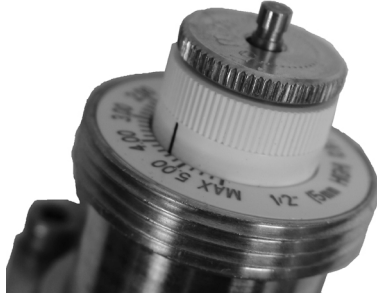
## 4.5 Install as flow limiting valve compact only

The UltraSetter Compact valve can be used as a flow limiting valve when not used with an actuator.

1. Remove the protective cover from the valve stem.



2. Loosen knurled nut.



3. Make the required setting.



4. Retighten the knurled nut by hand.
5. Replace protective cap and tighten until the bottom of the protective cap is lined up with the bottom of the threads on the valve housing.

Continued tightening of the cap restricts the flow in the valve.



## 4.6 Attach insulation

To maximize energy savings, attach insulation to the valve after the system has been balanced. Tape or other acceptable means can be used to secure the insulation to the valve. The insulation must not cover the actuator.

# 5 Operation

## 5.1 Recommended operating procedures




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**WARNING:**

- Burn hazard. Water temperatures higher than 100°F (38°C) can be dangerous. Take all necessary precautions to prevent water or steam leakage.
  - Hot water leakage can occur from readout valves during probe insertion and during hookup of readout kit. Follow the safety instructions supplied with readout probes and readout kits.
  - Installation and maintenance must be performed by a qualified professional.
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**CAUTION:**

Avoid pipe strain. This can cause breakage and water loss over time.

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**Safety rules**

- Service should not be performed on any valve in an active hydronic loop.
  - Before attempting to make any required adjustments, properly isolate and drain the branch loops or system that require service and allow the valves to reach a safe handling temperature and zero pressure condition.
  - Use proper safety equipment including gloves, goggles, or similar tools to avoid contact with system fluids and common hazards.
  - Failure to follow these instructions could result in personal injury and property damage.
1. Ensure that the valve is fully open.
  2. Using Bell & Gossett Model RP250-B Readout Probes, attach a Bell & Gossett differential pressure readout kit to the readout valves on the desired valve.
  3. Measure the pressure differential across the readout valves (P/T ports) in the valve body. Confirm that the value obtained is greater than the minimum value indicated in the valve submittal. If it is not, then investigate the causes and if necessary, report to the designer.
  4. Adjust the flow setting dial to the specified design flow rate as described above. Lock the dial-in position and record settings.
  5. Repeat the process for all valves on the branch.
  6. Measure the flow rate indicated at the flow measurement device on the branch. Confirm that the value recorded is equal to the desired flow, or the sum of the flows that are set at any downstream valves. If it is not, then investigate the causes and if necessary, report to the designer.  
When a flow measurement device is not present on the branch, measure the differential pressure across the valve and verify the minimum differential pressure listed in the submittal to achieve desired flow rate.
  7. Repeat this procedure until all valves in the system have been set and their summated flows checked against upstream flow measurement devices or differential pressure verification.
  8. Measure the differential pressure across the valve on the system index terminal (usually the most remote terminal from the pump). Adjust the pump speed until the pressure differential across this valve is equal to the minimum value indicated in the submittal.
  9. Determine the pressure differential at the sensor location. Set the pump speed to control such that the value indicated at the sensor is maintained constant under all conditions.

10. Measure and record the total flow rate, pressure differential, and energy consumption at the pump.
11. Run all two port valves to their closed positions. Measure and record the total flow rate, pressure differential, and energy consumption at the pump. Calculate and report the overall energy saving that is achieved between full load and minimum load operation.

# 6 Maintenance

## 6.1 Precautions




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**WARNING:**

- All procedures must be performed by qualified personnel.
  - When the process fluid is hazardous, thermal (hot or cold), or corrosive, take extra precautions. Employ the appropriate safety devices and be prepared to control a process media leak.
  - Always wear protective clothing and equipment to safeguard the eyes, face, hands, skin, and lungs from the particular fluid in the line.
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## 6.2 Valve inspection

Periodically inspect the valve for signs of leakage or corrosion.




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**WARNING:**

Risk for property damage, serious personal injury or death. You must replace the valve if corrosion or leakage is found.

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## 6.3 Service cartridge caps and drain caps

Any field adjustment of factory installed drain caps or cartridge caps affects the compression of the seal and can cause leakage. This adjustment necessitates the removal, cleaning, and resealing of those parts per the following instructions.

1. Remove the cap from the valve. Do not damage the valve, cap threads, or O-ring seal.
2. Perform the necessary service on the valve or system.  
If the valve or any of the components appear to have been damaged, replace them.
3. Make sure that the male threads of the cap and the female threads of the valve are clean and that there is no debris present.
4. Make sure that the O-ring seal is seated on the cartridge cap.

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**NOTICE:**

Do not use any thread sealant or lubricant when assembling the cartridge or drain cap as it can prevent the O-ring seal from sealing properly.

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5. Thread cap into the valve until it is finger tight.
6. Tighten cap to the following specification:

Component	Seal	Torque
Cartridge cap – all sizes	O-ring	25.0 ft-lbs. + 7.0 ft-lbs. / 0

## 6.4 Reseal the valve

The P/T readout ports and drain plugs come pre-assembled with a leading industrial thread sealant, Loctite, and are tightened to appropriate levels. Any field adjustment of factory installed components breaks the original thread seal and could cause leakage. This adjustment necessitates the removal, cleaning, and resealing of those parts per the following instructions.

1. Remove the desired component from the valve.
2. Clean off all of the old thread sealant using a wire brush and gentle abrasion if necessary.

If the component or Suction Diffuser Plus appears to have been damaged, replace it.

3. Starting with the second thread of the NPT male valve component, apply a 360° bead of Loctite 567 thread sealant/lubricant as shown. Follow Loctite handling precautions as noted on the product label.



4. If Loctite is not available, it is recommended that you use RectorSeal No. 5 pipe thread sealant for all non-glycol based applications, or any PTFE thread sealing tape. Be sure to follow the manufacturer-specific handling precaution and application instructions as noted on the product label.
5. Thread component into the valve until it is finger tight.
6. Apply torque to the following specification:

Size	Type	Torque, ft-lbs	Torque, Nm
1/4"	P/T Readout Port, drain plug	9.0 ft-lbs. + 3.0 ft-lbs. / 0	12.2 Nm + 4.1 Nm / 0

**NOTICE:**

- The use of thread sealants and lubricants on threads also provides lubricity. Over-application of torque can damage the valve port or component.
7. Properly assembled valve components will immediately seal to moderate pressure (6 bar [100 PSI] or less). For maximum pressure resistance, allow the Loctite 567<sup>1</sup> or RectorSeal No. 5<sup>2</sup> thread sealant to cure for 24 hours. PTFE tape typically does not require curing to achieve maximum pressure resistance.

<sup>1</sup> Loctite and Loctite 567 are registered trademarks of Henkel Ag & Co.

<sup>2</sup> RectorSeal No.5 is a registered trademark of RectorSeal Corporation.

# 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 eighteen (18) months 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.

**THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ANY AND ALL OTHER EXPRESS OR IMPLIED WARRANTIES, GUARANTEES, CONDITIONS OR TERMS OF WHATEVER NATURE RELATING TO THE GOODS PROVIDED HEREUNDER, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREBY EXPRESSLY DISCLAIMED AND EXCLUDED. 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.**

## 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 eighteen (18) months 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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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 visit [www.xyleminc.com](http://www.xyleminc.com) for the name and location of the nearest dealer providing warranty service.

# Xylem |'zīləm|

- 1) The tissue in plants that brings water upward from the roots;
- 2) a leading global water technology company.

We're a global team unified in a common purpose: creating advanced technology solutions to the world's water challenges. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. Our products and services move, treat, analyze, monitor and return water to the environment, in public utility, industrial, residential and commercial building services, and agricultural settings. With its October 2016 acquisition of Sensus, Xylem added smart metering, network technologies and advanced data analytics for water, gas and electric utilities to its portfolio of solutions. In more than 150 countries, we have strong, long-standing relationships with customers who know us for our powerful combination of leading product brands and applications expertise with a strong focus on developing comprehensive, sustainable solutions.

For more information on how Xylem can help you, go to [www.xylem.com](http://www.xylem.com)



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Visit our Web site for the latest version of this document and more information

The original instruction is in English. All non-English instructions are translations of the original instruction.

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