



Laing Thermotech Series ecocirc[®] Variable Speed Smart ECM Circulator

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1 Introduction and Safety

1.1 Introduction

Purpose of the manual

The purpose of this manual is to provide the necessary information for working with the unit. Read this manual carefully before starting work.

Read and keep the manual

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

Intended use



WARNING:

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 and the surroundings. 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.



WARNING: Risk Of Electric Shock

This Pump Has Not Been Investigated For Use In Swimming Pool Or Marine Areas.



CAUTION:

The ULus listed pumps are tested and evaluated with water only.

Other manuals

See also the safety requirements and information in the original manufacturer's manuals for any other equipment furnished separately for use in this system.

1.2 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
	DANGER:	A hazardous situation which, if not avoided, will result in death or serious injury
	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		Magnetic fields hazard	
	Electrical Hazard:		CAUTION:

1.3 User safety

All regulations, codes, and health and safety directives must be observed.

The site

- Observe lockout and tagout procedures before starting work on the product, such as transportation, installation, maintenance, or service.
- Pay attention to the risks presented by gas and vapors in the work area.
- Always be aware of the area surrounding the equipment, and any hazards posed by the site or nearby equipment.

Qualified personnel

This product must be installed, operated, and maintained by qualified personnel only.

Protective equipment and safety devices

- Use personal protective equipment as needed. Examples of personal protective equipment include, but are not limited to, hard hats, safety goggles, protective gloves and shoes, and breathing equipment.
- Make sure that all safety features on the product are functioning and in use at all times when the unit is being operated.

1.4 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



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.

1.5 Spare parts



CAUTION:

Only use the manufacturer's original spare parts to replace any worn or faulty components. The use of unsuitable spare parts may cause malfunctions, damage, and injuries as well as void the warranty.

2 Transportation and Storage

2.1 Examine the delivery

2.1.1 Examine the package

1. Examine the package for damaged or missing items upon delivery.
2. Record any damaged or missing items on the receipt and freight bill.
3. If anything is out of order, then file a claim with the shipping company.

If the product has been picked up at a distributor, make a claim directly to the distributor.

2.1.2 Examine the unit

1. Remove packing materials from the product.
Dispose of all packing materials in accordance with local regulations.
2. To determine whether any parts have been damaged or are missing, examine the product.
3. If applicable, unfasten the product by removing any screws, bolts, or straps.
Use care around nails and straps.
4. If there is any issue, then contact a sales representative.

2.2 Storage guidelines

Storage location

The product must be stored in a covered and dry location free from heat, dirt, and vibrations.

NOTICE:

Protect the product against humidity, heat sources, and mechanical damage.

NOTICE:

Do not place heavy weights on the packed product.

3 Product Description

3.1 Product design

Usage

The pump is used for systems with variable flow rates to optimize the pump operation and decrease energy consumption.

Applications

- Potable water system with a stainless steel body
- Heating for hot water
- Cooling for cold water
- Solar water heating
- Geothermal energy

3.2 Features and functions

- Has electronic control
- Energy-efficient
- Has built-in electrical overload and dry-run protection to keep the pump safe

Software

The following features in the software protect the pump and motor:

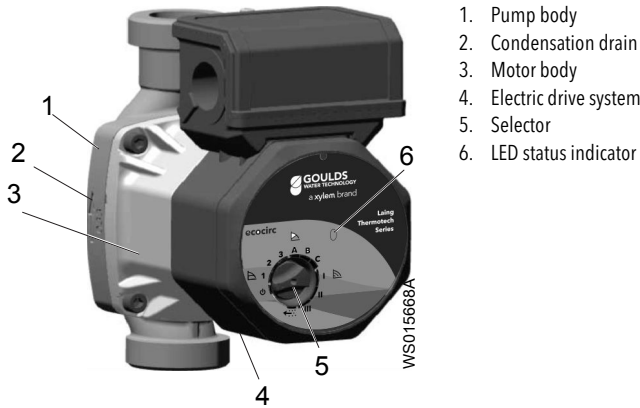
- Anti-lock functionality
- Generator mode management
- Overtemperature
- Overvoltage and overcurrent
- Motor overload
- Motor fault

3.2.1 Operating modes

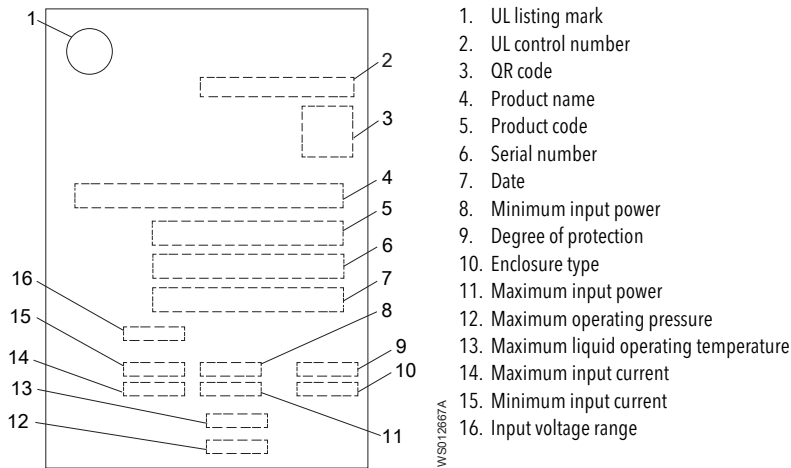
- Standby
- Constant pressure with three curves
- Proportional pressure with three curves
- Fixed speed with three curves
- Air purge

3.3 Parts

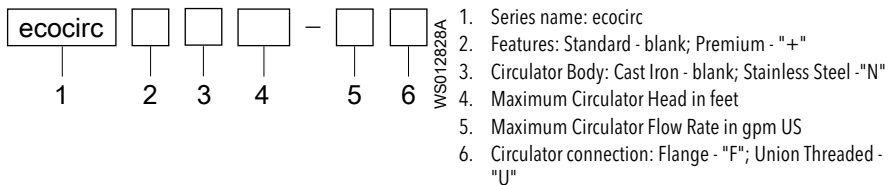
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3.4 Data plate



Identification code



4 Installation

4.1 Mechanical installation

4.1.1 Precautions

Before starting work, make sure that the safety instructions in the chapter [Introduction and Safety](#) on page 3 have been read and understood.



WARNING:

Do not operate the unit in an area where explosive gases are present.



WARNING:

The heating of water and other fluids causes volumetric expansion. The associated forces can cause the failure of system components and the release of high-temperature fluids. In order to prevent this, install properly sized and located compression tanks and pressure-relief valves. Failure to follow these instructions can result in serious personal injury or death, or property damage.



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.



WARNING:

Do not install this pump in submersible locations. This is a non-submersible pump.



WARNING:

Do not install this pump in outdoor locations. This is an indoor use only pump.



DANGER: Do not install this pump in swimming pools or marine areas. Failure to follow these instructions could result in serious personal injury, death and/or property damage.



CAUTION:

CAUTION: PROPERTY DAMAGE HAZARD. It is not advisable to install circulators in an attic or upper floor over finished living space. If the circulator must be installed over head, or over expensive equipment, provide adequate drainage in the event of leakage. Failure to follow these instructions could result in property damage.



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.



CAUTION:

The operator must be aware of safety precautions to prevent physical injury.

NOTICE:

Do not use this pump to handle liquids containing abrasive, solid or fibrous substances, toxic or corrosive liquids, potable liquids other than water or liquids not compatible with the pump construction material. Water pH must be maintained between 7-9 and water hardness must not exceed 14 grains/gallon, with suspended solids less than 100 PPM. An improper use of the product leads to the loss of the warranty.

4.1.2 Requirements

- The pump must not be installed at the lowest point in the system.
- The pump must not touch other pumps.
- The pipes must be supported independently to prevent them from weighing on the pump.
- Before the pipes are connected to the pump, they must be cleaned of unwanted material and welding residue.
- If a check valve is used, it must be installed in the discharge nozzle of the pump.

4.1.3 Install the pump

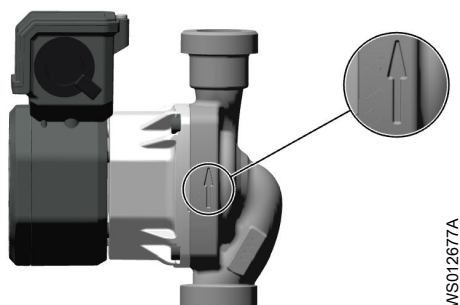
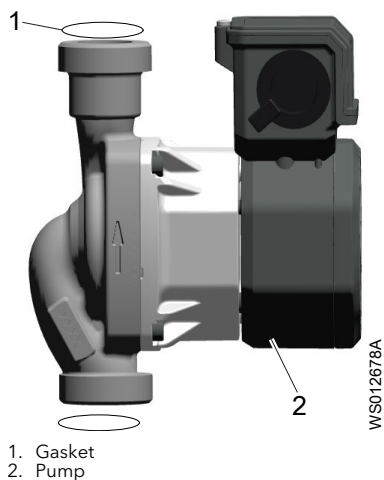


Figure 1: Correct direction of the liquid flow

1. Install the pump with new gaskets.
The gaskets must be between the pipe flanges.



2. Install the pump in one of the following correct positions.

Correct	Incorrect
	

3. Use a torque wrench to tighten the nuts on the companion flange fasteners.

Fasteners	Torque
Companion flange fasteners	13 Nm (115 lbf.in)
Union threaded ring nuts	See Torque specification on page 21

4.1.4 Rotate the motor body of the pump

The motor assembly of the pump can be rotated to $\pm 90^\circ$.

1. Remove the screws from the pump body.



1. Pump body
 2. Screw
 3. Junction box
2. Rotate the pump housing.



3. Install the junction box in one of the following correct positions.

Correct	Incorrect
	

4. Use a torque wrench to tighten the screws of the pump body.
The torque must be 5 Nm (44 lbf.in).



4.1.5 Insulation housing

4.1.5.1 Requirements

NOTICE:

Improper installations shown above can cause the pump to fail prematurely and create an electrical hazard and/or damage caused by water leakage.

- Only use the pump thermal shells that are included in the delivery. Do not insulate the motor housing, the electronics can overheat and cause the pump to thermally overload.
- The thermal shells that are included with the pump must only be used in hot water circulation applications with fluid temperature above 68°F (20°C). The thermal shells are permeable to water vapor.
- The pump housing must not be insulated past the motor flange. If the vapor barrier insulation is used for cold water applications, the flange drain path must remain open to allow for condensation to drain out of the motor housing.

4.1.5.2 Install the insulation housing

Install the insulation housing on the pump.



4.2 Electrical installation

4.2.1 Precautions

Before starting work, make sure that the safety instructions have been read and understood.



DANGER: Electrical Hazard

Before starting work on the unit, make sure that the unit and the control panel are isolated from the power supply and cannot be energized. This applies to the control circuit as well.



DANGER: Crush Hazard

Moving parts can entangle or crush. Always disconnect and lock out power before servicing to prevent unexpected startup. Failure to do so could result in death or serious injury.

**WARNING: Electrical Hazard**

Risk of electrical shock or burn. A certified electrician must supervise all electrical work. Comply with all local codes and regulations.

**WARNING: Electrical Hazard**

There is a risk of electrical shock or explosion if the electrical connections are not correctly carried out, or if there is fault or damage on the product. Visually inspect equipment for damaged cables, cracked casings or other signs of damage. Make sure that electrical connections have been correctly made.

**WARNING:**

To Reduce The Risk of Electric Shock, See Instruction Manual for Proper Installation

**CAUTION: Electrical Hazard**

Prevent cables from becoming sharply bent or damaged.

4.2.1.1 Grounding (earthing)

Grounding (earthing) must be done in compliance with all local codes and regulations.

If necessary, a grounded metal conduit must be used.

**DANGER: Electrical Hazard**

All electrical equipment must be grounded (earthed). Test the ground (earth) lead to verify that it is connected correctly and that the path to ground is continuous.

**WARNING: Electrical Hazard**

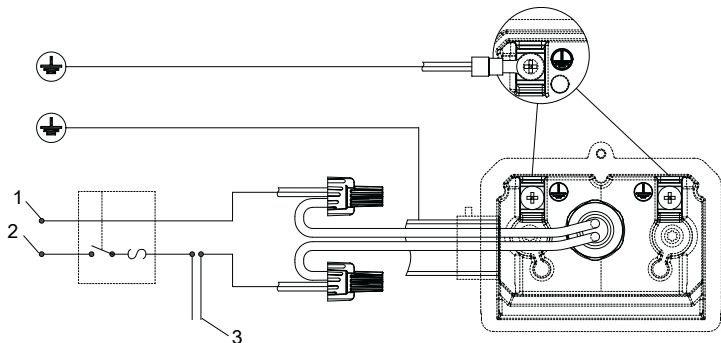
Risk of electrical shock. The ground (earth) lead must be sufficiently longer than the phase leads to make sure that the ground lead is the last to become disconnected if the cable is jerked loose.

4.2.2 Requirements

- The National Electrical Code (NEC), Canadian Electrical Code (CEC), and local codes must be followed.
- If the branch circuit is fitted with a ground fault circuit interrupter, it must be applicable to use with the inverter-driven appliances.
- The electrical cables must be protected from high temperature and vibration.
- The current type and voltage of the power supply connection must follow the specifications on the nameplate of the pump.
- The electrical wires must be 14 AWG or larger.
- The high-voltage wires and low-voltage wires must be routed in separate conduit.
- Before connecting the power supply wiring, check that the power supply is switched off.

4.2.3 Connect the pump to the power supply

1. Remove the screw from the cover of the terminal box.
2. Remove the cover from the terminal box.
3. Put the high-voltage wires through the conduit fitting.
The conduit fitting must be ½ in trade size (12.7 mm).
4. Connect the wires according to the wiring diagram by using the UL certified wire nut connectors.
 - a) If applicable, connect the ground wire.
 - b) If applicable, put all the low voltage wires through the separate conduit fitting.



1. Neutral
2. Line
3. Remote control (If necessary)
5. Put the cover on the terminal box.
6. Tighten the screw of the cover.

5 Operation

5.1 Precautions

Before starting work, make sure that the safety instructions in the chapter [Introduction and Safety](#) on page 3 have been read and understood.



WARNING: Crush Hazard

Risk of automatic restart.



CAUTION:

Do not exceed the maximum working pressure of the pump.
This information is listed on the nameplate of the pump.

5.2 Requirements

Before starting the pump, follow all the instructions in the chapter [Installation](#) on page 9.

The pump must be vented fully.

The minimum suction pressure for the pump must be set as given in the table [Minimum suction pressure](#) on page 21.

5.3 Start the pump

Turn on the power supply.

On the user interface, the blinking yellow light shows that the pump has started.

5.4 Operating modes

The user interface has the following operating modes:



Position	Operating mode	LED status	Description
	Standby	Blinks yellow	The pump is on standby

Position	Operating mode	LED status	Description
Performance curve: 1. Low 2. Intermediate 3. High	Operation at constant pressure	-	This position is selected for in-floor heating systems. The pressure stays constant, when the water flow is increased or decreased.
Performance curve: A. Low B. Intermediate C. High	Operation at proportional pressure	-	This position is selected for two-pipe heating systems. The pressure changes according to the actual demand for heat. The performance is selected according to the features of the system or heat demand.
Constant pump speed: I. Low II. Intermediate III. High	Operation at constant pump speed	-	This position is selected for one-pipe heating systems. The speed stays constant, when the water flow is increased or decreased. The speed is selected according to the features of the system or number of valves that can be opened at the same time.
	Air purge	Blinks green	This position is selected to remove the dissolved gases from the pump. The air purge must be done for 3 minutes. If necessary, allow the air purge for more than 3 minutes according to the features of the system.

6 Maintenance

6.1 Precautions

Before starting work, make sure that the safety instructions in the chapter *Introduction and Safety* on page 3 have been read and understood.



Electrical Hazard:

Disconnect and lock out electrical power before installing or servicing the unit.



WARNING:

- Always wear protective gloves when handling the pumps and motor. When pumping hot liquids, the pump and its parts may exceed 40°C (104°F).
- Maintenance and service must be performed by skilled and qualified personnel only.
- Observe accident prevention regulations in force.

6.2 Examine the pump

Visually examine the pump for leaks.

If there are leaks, the pump must be replaced.

7 Troubleshooting

7.1 Precautions

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Before starting work, make sure that the safety instructions in the chapter [Introduction and Safety](#) on page 3 have been read and understood.



DANGER: Electrical Hazard

Troubleshooting a live control panel exposes personnel to hazardous voltages. Electrical troubleshooting must be done by a qualified electrician.



DANGER: Crush Hazard

Moving parts can entangle or crush. Always disconnect and lock out power before servicing to prevent unexpected startup. Failure to do so could result in death or serious injury.

7.2 Insufficient cooling or heating of the pump

LED status	Cause	Remedy
Green	The performance of the pump is low.	1. Do one of the following methods to start the pump: – Increase the speed of the pump to increase the head – Select another operating mode 2. If the problem continues, replace the pump.
Blinks red	The dry run of the pump is detected.	1. Check that the pump does not contain air. 2. Check that the liquid pressure of the pump is according to the working limits. 3. Check that the pump is installed correctly. 4. Start the air purge process. 5. If the problem continues, replace the pump.

8 Technical Specification

8.1 Environmental requirements

Feature	Value
Operating environment	Non-aggressive, nonexplosive atmosphere, and no frost
Operating temperature	-10°C to 40°C (14°F to 104°F)
Relative humidity	< 95% at 40°C (104°F), non-condensing

8.2 Torque specification

Joint size	Pipe material	Torque, Nm (lbf.ft)
G1	Plastic	50 (37)
G1	Cast iron	85 (63)
G1¼	Cast iron	105 (78)
G1½	Cast iron	125 (92)
G2	Cast iron	165 (122)

8.3 Minimum suction pressure

Pressure, MPa (psi)	Head, m (ft)	Temperature, °C (°F)
0.005 (0.725)	0.5 (1.6)	50 (122)
0.03 (4.35)	3 (10)	95 (203)
0.1 (14.5)	10 (33)	110 (230)

8.4 Electrical data

Feature	Description
Power supply voltage	115 V ±10%, 50/60 Hz
Insulation class	155 F
Degree of protection	IP44

8.5 Pumped liquid

Feature	Description
Temperature	-10°C to 110°C (14°F to 230°F)
Concentration of glycol mixture	≤50%

The pump can be used with water/propylene glycol mixtures up to 50% with a maximum viscosity of 50cST at 14°F (-10°C). The pump has built-in overload and thermal protection to protect the pump from overload due to increased fluid

viscosity. Pump performance is based on 77°F (25°C). Therefore pumping of glycol mixtures will affect max performance, depending on mixture concentration and temperature.

8.6 Maximum operating pressure

- 1 MPa (145 psi)

8.7 Sound pressure

- ≤ 43 dBA ± 2

dBA is measured in free field at a distance of 1 meter from the pump.

9 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 from the date of installation or from the date of shipment (which date of shipment shall not be greater than 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 from the date of installation or 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 FROM THE DATE OF INSTALLATION OR 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 visit www.xyleminc.com for the name and location of the nearest dealer providing warranty service.

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10 Cybersecurity

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Xylem values system security and resilience. Defending against cybersecurity threats is a shared responsibility. Xylem builds products that are secure by design. Our customers have a responsibility to understand the risks inherent in their processes and take steps to operate and maintain their solutions securely. This section reviews security features and provides guidance to help securely operate this product. For details and updates on Xylem product cybersecurity visit xylem.com/security

10.1 Xylem product cybersecurity

Xylem performs appropriate due care in building security and resilience into products. Xylem performs the following security activities for defense-in-depth:

- Security engineers perform **threat modeling** to identify **testable controls**
- Code is scanned for flaws with **static analysis** tools and hardened
- **Product components are analyzed** and hardened
- Security controls are verified through **automated and manual tests**
- Xylem maintains relationships with customers, integrators, and the cybersecurity research community and the **Product Security Incident Response Team (PSIRT)** coordinates the collection, analysis, remediation, and responsible disclosure of vulnerability and remediation information to keep products secure
- Cloud connections, data flows, and cloud infrastructure are continuously monitored by the **Product Security Operations Center (PSOC)**
- Product security is **governed through a three lines of defense** model that includes: product developers, product security engineers, and audit staff

10.2 Notice - inclusion of third-party PLCs and associated software

This product includes Programmable Logic Controllers (PLCs) manufactured by Schneider Electric to enable feedback control of the system. As with all software, periodically vulnerabilities are discovered in software and the vendor will release patches or updates. Xylem will follow these releases and provide updates. Please contact your Xylem sales representative with any questions about the product or contact product.security@xylem.com regarding security questions.

10.3 Notice- inclusion of third-party PLCs and associated software

Certain industrial protocols (such as Modbus and BACnet) do not offer security protections at protocol-level and may be exposed to additional cyber security risks. Customers using such protocols should implement the security recommendations provided.

10.4 Security recommendations for end-user

e-MTV is developed considering security best practices. The following guidance provides recommendation for secure operations, hardening and account management. In the table below: *Safeguards* describe the security guidance, *Security Context & Rationale* provide overview of security features and value of the security safeguard, and *References* provide additional resources for further investigation for implementing the recommended safeguards.

Table 1:

Safeguard	Security Context & Rationale	References
Restrict physical access • Ensure physical access to assets is limited. Include physical isolation to protect the environment and equipment therein. • Ensure strict control over physical access in and out of the facility. • Physical access to communication lines should be restricted.	The communication ports have been hardened to restrict access and ensure integrity of device operations. This safeguard supports the ability to further limit exposure associated with physical threats to the device such as rogue/malicious device joining over Modbus or BACnet.	ATT&CK for ICS: M0801 NIST SP 800-53 Rev5: AC-3, PE-3 ISA/IEC 62443-3-3: SR 2.1
Ensure that the device is not exposed to internet, using below recommendations: • Secure the network access to the device using VPN connections. • Implement firewall & define rules to protect device from Denial-of-service attempts. • Protect the network address information of device using Network Address Translation (NAT) technique.	This safeguard ensures that data and SCADA controls are not exposed to internet. This also helps in preventing Man-in-the-middle attacks when the device is accessed via Modbus or BACnet, because these protocols are insecure-by-design. We recommend using network segmentation and segregation to minimize access to sensitive information for those systems and people who don't need it, while ensuring that the organization can continue to operate effectively.	ATT&CK for ICS: M0930 NIST SP 800-95 NIST SP 800-44 v2 ISA/IEC 62443-3-3: SR 5.1, SR 7.1
Ensure cybersecurity policies, awareness, and training to the operators, administrators and other personnel.	This safeguard prevents social engineering attacks and promotes awareness related to cybersecurity.	ATT&CK for ICS: M0917 NIST SP 800-53 Rev5: AT-2 ISA/IEC 62443-2-4: SP.01

Safeguard	Security Context & Rationale	References
Ensure patch management is done regularly and updated appropriately. Xylem monitors updates to Schneider PLCs and when there are security updates Xylem will provide updated software. Ensure that the configuration recipe is backed up prior to installing any updates.	This safeguard prevents attacks related to using components with known vulnerabilities. Sometime vulnerabilities are discovered, and Xylem works with partners to deploy updates that improve security and resilience. This safeguard mitigates exploitation risks and ensures security patches are available, but it is up to operators to pay attention to updates through xylem.com/security and to properly install them.	ATT&CK for ICS: M0951 NIST SP 800-53 Rev5: MA-2 ISA/IEC 62443-2-3
Ensure hardening guidelines are implemented, only desired ports and services should be open, and RBAC should be followed.	This safeguard helps in prevention of attacks due to misconfigurations or default configurations.	ATT&CK for ICS: M0937, M0918, M0801 NIST SP 800-53 Rev5: AC-3(7), SC-7(5) ISA/IEC 62443-3-3: SR 2.1, SR 5.1
Ensure strong password policy is implemented and default credentials should not be used, passwords must be changed periodically.	This safeguard will help in prevention of passwords and account takeover attacks.	ATT&CK for ICS: M0927 NIST SP 800-53 Rev5: IA-5 ISA/IEC 62443-3-3: SR 1.7
Conduct backups of the configuration recipe according to the directions provided in Section [5.5.12] of this IOM. In the cases where control commands for Xylem equipment are issued from SCADA or BMS, regularly check the integrity of communication between these systems and availability of backups.	The ability of up-to-date backups provides for recovery from control system failures or misconfigurations. This provides systems resilience, including against ransomware. Xylem can provide baseline system software (Schneider firmware and control software), but operators are responsible for their configurations.	ATT&CK for ICS: M0953 NIST SP 800-53 Rev5: CP-9 ISA/IEC 62443-3-3: SR 7.3
Implement specific inventory, logging and monitoring of hardware and report security-related incidents to Xylem at product.security@xylem.com . These might include unexpected operations, confirmed tampering, or theft of the device.	Devices are hardened and Xylem provides PSIRT to help customers investigate potential security incidents. This safeguard supports the ability to track assets and recognize potential security events.	ATT&CK for ICS: M0947 NIST SP 800-53 Rev5: SM-8 ISA/IEC 62443-3-3: SR 1.11, SR 2.8, SR 3.4

For additional information see references:

1. ATT&CK for ICS available online: <https://attack.mitre.org/mitigations/ics/>
2. NIST SP 800-53 Rev 5 available online: <https://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.800-53r5.pdf>
3. ISA/IEC 62443 standards available for purchase from ISA, IEC, or ANSI.

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 settings. Xylem also provides a leading portfolio of smart metering, network technologies and advanced analytics solutions for water, electric and gas utilities. 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



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