Smart Pump Range

Installation, Operation
and Maintenance Manual

LOWARA
a xylem brand

e-LNEEE e-LNTEE
e-LNESE e-LNTSE

Applicare qui l'adesivo col codice a barre

Apply the adhesive bar code nameplate here

Cod.001080138EN rev.C ed.02/2018
Software Version 151.00

Table of Contents

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:

Before installing and using the product, make sure that you read and fully understand this manual in all its parts. Improper use of the product can cause personal injuries and damage to property, as well as making the warranty null and void.

NOTICE:

This manual is an integral part of the product. It must always be made available to the user, stored in the proximity of the product, and well kept.

1.2 Safety

1.2.1 Danger levels and safety symbols

Before using the product, and in order to avoid the following risks, make sure that you carefully read, understand and comply with the following danger warnings:

- Injuries and health hazards
- Damage to the product
- Product malfunction.

Hazard levels

Hazard level	Indication
DANGER:	It identifies a dangerous situation which, if not avoided, causes serious injury, or even death.
WARNING:	It identifies a dangerous situation which, if not avoided, may cause serious injury, or even death.
CAUTION:	It identifies a dangerous situation which, if not avoided, may cause small or medium level injuries.
NOTICE:	It identifies a situation which, if not avoided, may cause damage to property but not to people.

Special symbols

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

Symbol	Description
	**Electrical hazard**
	**Magnetic hazard**
	**Hot surface hazard**
	**Ionizing radiation hazard**
	**Potentially explosive atmosphere hazard (ATEX EU Directive)**
	**Cut and abrasion hazard**
	**Crushing hazard (limbs)**

Other symbols

Symbol	Description
	**User** Specific information for the users of the product.
	**Installer / Maintenance technician** Specific information for personnel responsible for the installation of the product within the system (hydraulic and/or electric system), and for maintenance operations.

1.2.2 User safety

Strictly comply with current health and safety regulations.

WARNING:

This product must be used only by qualified users.

For the purposes of this manual, in addition to the provisions of any local regulations, qualified personnel means any individuals who, due to their experience or training, are capable of recognising any existing hazards and to avoiding dangers during the installation, the use and the maintenance of the product.

Inexperienced users

WARNING:

FOR THE EUROPEAN UNION

- This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved.
- Children shall not play with the appliance.
- Cleaning and user maintenance shall not be made by children without supervision.

FOR OTHER COUNTRIES

- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- Children should be supervised to ensure that they do not play with the appliance.

1.2.3 General safety rules

WARNING:

- Always keep the work area clean.
- Pay attention to the risks presented by gas and vapors in the work area.
- Always bear in mind the risk of drowning, electrical accidents, and burn injuries.

DANGER: Electrical hazard

- Avoid all electric dangers; pay attention to the risk of electric shock or electric arcs
- Unintended rotation of motors creates voltage and can charge the unit, resulting in death, serious injury, or equipment damage. Ensure that motors are blocked to prevent unintended rotation.

Magnetic fields

The removal or installation of the rotor in the motor casing generates a strong magnetic field.

DANGER: Magnetic hazard

The magnetic field may be dangerous for anyone wearing peacemakers, or any other medical devices sensitive to magnetic fields.

NOTE

The magnetic field may attract metal debris on the rotor surface, causing damage to the same.

Electrical connections

DANGER: Electrical hazard

- The connection to the electric power supply must be completed by an electrician possessing the technical-professional requirements outlined in the current regulations

Precautions before work

WARNING:

- Install a suitable barrier around the working 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.
- Use a lifting harness, a safety line, and a breathing device as required.
- Allow all pump system components to cool before handling them

- Make sure that the product has been thoroughly cleaned
- Disconnect and lock out power before you service the pump.
- Check the explosion risk before you weld or use electric hand tools.

Precautions during work

WARNING:

- Never work alone.
- Always wear personal protective equipment
- Always use suitable working tools
- Always lift the product by its lifting device.
- Stay clear of suspended loads.
- Beware of the risk of a sudden start if the product is used with an automatic level control.
- Beware of the starting jerk, which can be powerful.
- Rinse the components in water after you disassemble the pump.
- Do not exceed the maximum working pressure of the pump.
- Do not open any vent or drain valve or remove any plugs while the system is pressurized.
- Make sure that the pump is isolated from the system and that all pressure is released before disassembling the pump, removing plugs, or disconnecting the piping
- Never operate the pump without a properly installed coupling guard.

In case of contact with chemical substances or dangerous liquids

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	1. Hold your eyelids apart forcibly with your fingers. 2. Rinse the eyes with eyewash or running water for at least 15 min. 3. Seek medical attention.
Chemicals or hazardous fluids on skin	1. Remove contaminated clothing. 2. Wash the skin with soap and water for at least 1 min. 3. Seek medical attention, if necessary.

1.2.4 Protection of the environment

Disposal of packaging and product

Comply with the current regulations on sorted waste disposal.

1.2.5 Sites exposed to ionizing radiations

WARNING: Ionizing radiation hazard

If the product has been exposed to ionizing radiations, implement the necessary safety measures for the protection of people. If the product needs to be despatched, inform the carrier and the recipient accordingly, so that appropriate safety measures can be put in place.

1.3 Spare parts

Identify the spare parts with the product codes directly on the site www.lowara.com/spark. Contact Xylem or the Authorised Distributor for technical information.

1.4 Product warranty

For information on the warranty refer to the documentation of the sale contract.

2 Transportation and Storage

Packaging inspection

1. Check that quantity, descriptions and product codes match the order.
2. Check the packaging for any damage or missing components.
3. In case of immediately detectable damage or missing parts:
   - Accept the goods with reserve, indicating any findings on the transport document, or
   - Reject the goods, indicating the reason on the transport document.

In both cases, promptly contact Xylem or the Authorised Distributor from whom the product was purchased.

Unpacking and inspection of the unit

1. Remove packing materials from the product.
2. Release the product by removing the screws and/or cutting the straps, if fitted.

CAUTION: Cut and abrasion hazard

Always wear personal protective equipment.

3. Check the product for integrity and to make sure that there are no missing components.
4. In case of damage or missing components, promptly contact Xylem or the Authorised Distributor.

2.1 Unit handling

The unit must be harnessed and lifted as shown in Figure 1.

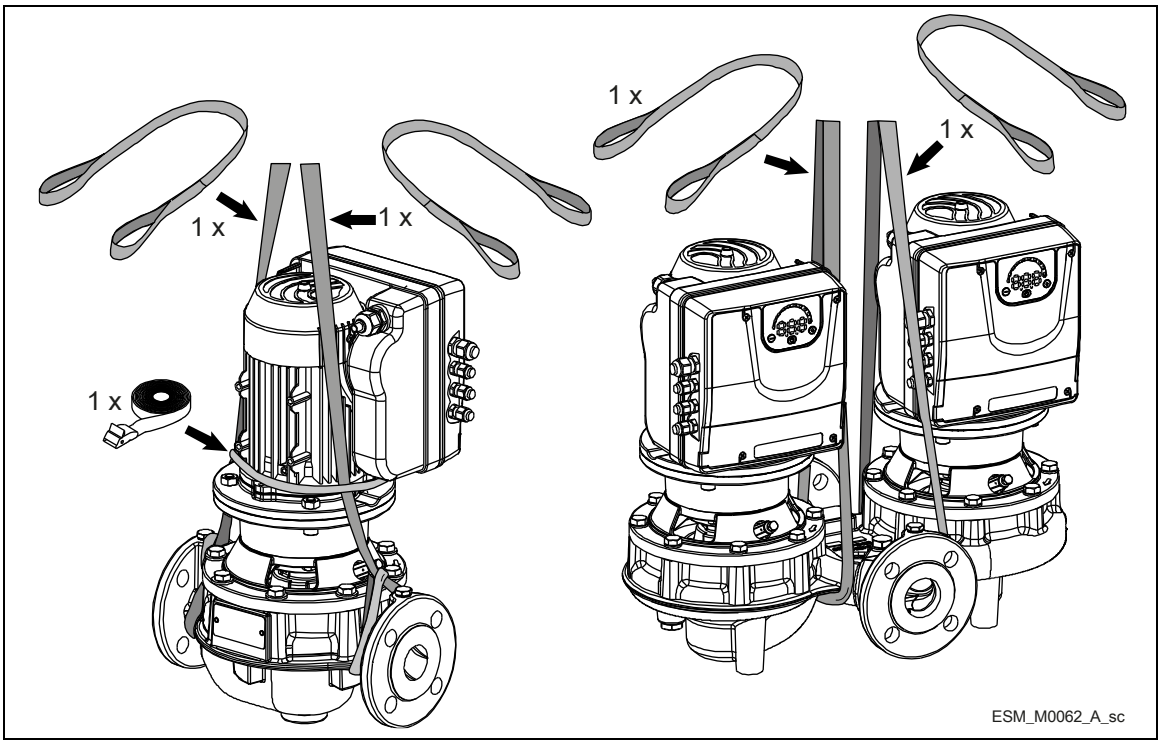


Figure 1: Lifting

WARNING: Crushing hazard (limbs)

- The product and its components may be heavy: risk of crushing
- Always wear personal protective equipment
- Manual handling of the product and its components must be in compliance with the current regulations on "manual load handling", to avoid unfavourable ergonomic conditions causing risks of back-spine injury.
- Use cranes, ropes, lifting straps, hooks and clasps that comply with current regulations and that are suitable for the specific use
- Make sure that the harnessing does not damage the unit
- During the lifting operations, always avoid sudden movements that could compromise the stability of the load
- During handling, make sure to avoid injury to people and animals, and/or damage to property.

2.2 Storage

The product must be stored:

- In a covered and dry place
- Away from heat sources
- Protected from dirt
- Protected from vibrations
- At an ambient temperature between -25°C and +65°C (-13°F and 149°F), and relative humidity between 5% and 95%.

NOTICE:

- Do not place heavy loads on top of the product
- Protect the product from collisions.

3 Technical Description

3.1 Designation

Single stage in-line pump.

3.2 Data plates

The data plate is a label showing:

- The main product details
- The identification code

Approval and certifications

For the approvals see the motor data plate:

- CE only
- CE + c UL us

3.2.1 Motor

Motor data plate

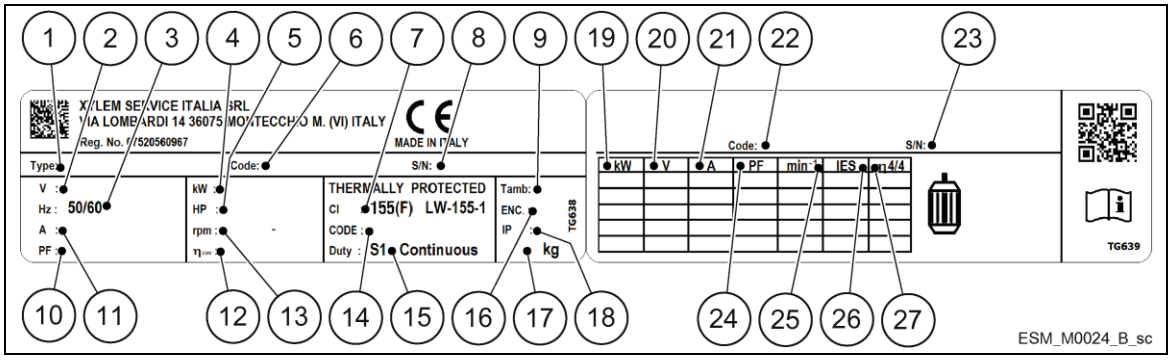


Figure 2: Motor data plate

1. Type definition code
2. Rated voltage
3. Rated frequency
4. Rated power [kW]
5. Rated power [HP]
6. Part number
7. Insulation class
8. Serial number
9. Maximum ambient temperature
10. Power factor
11. Rated current
12. Motor drive efficiency
13. Full power speed range
14. Code letter for locked rotor
15. Duty type
16. Enclosure type (NEMA)
17. Weight
18. Protection class
19. Shaft power
20. Voltage
21. Current
22. Part number
23. Serial number
24. Power factor
25. Speed
26. Power drive system efficiency class (according to EN 50598-2)
27. Full load efficiency

Motor type definition code

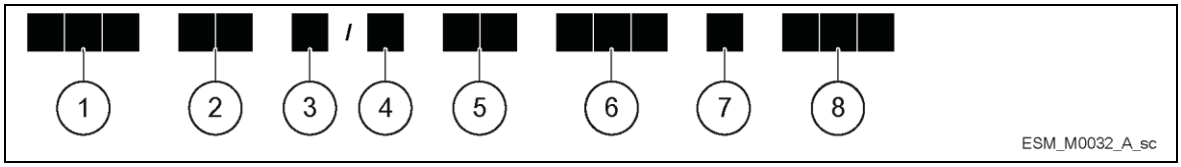


Figure 3: Motor type definition code

1.	Series	ESM
2.	Motor frame dimension	90R: Oversized Flange
		80: Standard Flange
3.	Shaft extension	□□: Standard shaft extension
		S8: Custom Shaft extension
4.	Power supply	1: single phase power supply
		3: three phase power supply
5.	Shaft power•10 [kW]	03: 0.37kW (0.50HP)
		05: 0.55 kW (0.75 HP)
		07: 0.75 kW (1.00 HP)
		11: 1.10 kW (1.50 HP)
		15: 1.50 kW (2.00 HP)
		22: 2.20 kW (3.00 HP)
6.	Motor frame arrangement	SVE: Flange with tapped holes and shaft w/o keyseat
		B14: Flange with tapped holes
		B5: Flange with free holes
		HMHA:Suitable for 1÷5 e-HME monolithic pumps
		HMHB: Suitable for 1÷5 e-HME pumps w/sleeve
		HMVB:Suitable for 1÷5 VM pumps
		HMHC:Suitable for 10÷22 e-HME pumps
		HMVC:Suitable for 10÷22 VM pumps
		LNEE: Suitable for In-Line pumps
		56J: Compliant to NEMA 56 Jet standard
		56C: Compliant to NEMA 56C standard
7.	Reference market	□□: Standard
		EU:EMEA
		US: North America
8.	Voltage	208-240 : 208-240VAC 50/60Hz
		380-460 : 380-460VAC 50/60Hz
		230/400: 208-240/380-460VAC 50/60Hz

3.2.2 Pump

e-LNEEE/e-LNESE/e-LNTEE/e-LNTSE data plate

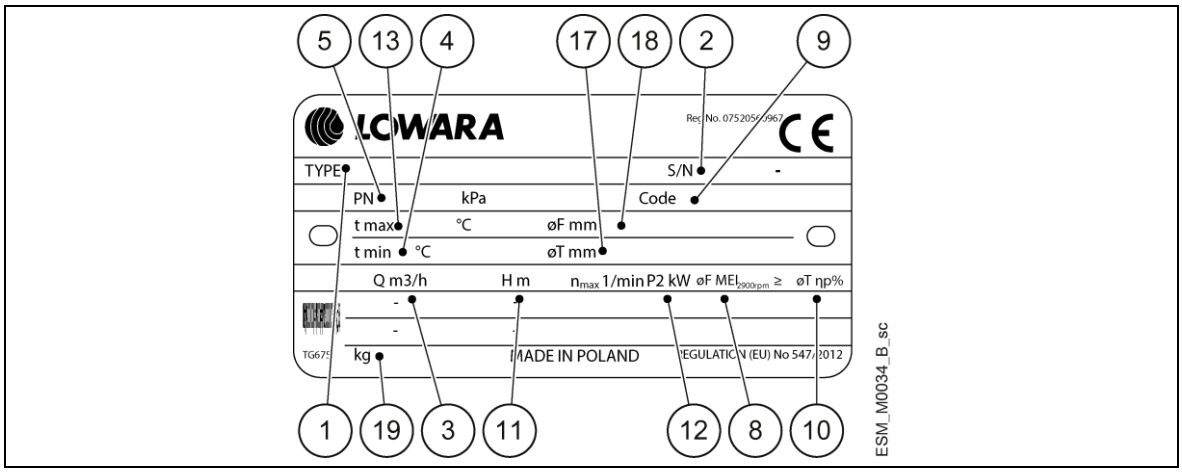


Figure 4: e-LNEEE/e-LNESE/e-LNTEE/e-LNTSE data plate

1. Pump unit set type
2. Serial number (date+progressive number)
3. Flow range
4. Minimum temperature of the handled liquid
5. Maximum operating pressure
8. Minimum efficiency index at 2900 rpm
9. Pump unit set code
10. Hydraulic efficiency in best efficiency point
11. Head range
12. Pump rated power
13. Maximum temperature of the handled liquid
17. Trimmed impeller diameter (only included for trimmed impellers)
18. Impeller nominal diameter (only included for trimmed impellers)
19. Pump mass

e-LNEEE/e-LNESE/e-LNTEE/e-LNTSE identification code

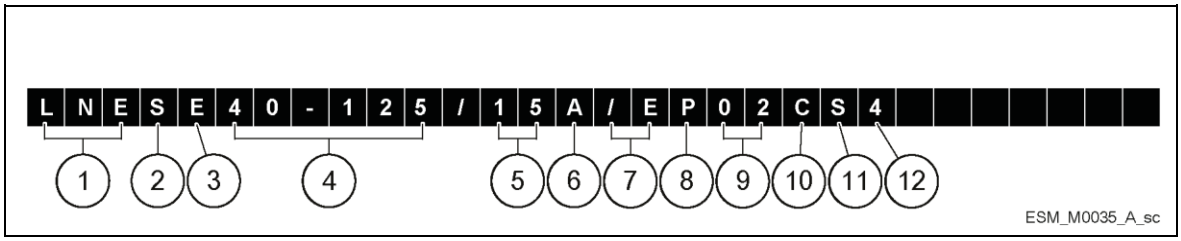


Figure 5: e-HME type definition code

1.	Pump type	[LNE] = in line, single [LNT] = in line, twin
2.	Coupling	[E]= Extended shaft [S] = Rigid shaft
3.	Motor operation	[E] = e-SM
4.	Pump size	Delivery piping diameter - impeller rated diameter
5.	Motor power	kW x 10
6.	Special trimmed impeller	[A or B] = Shortened average diameter that does not optimise the power of the motor [X] = Shortened average diameter to meet the needs of customers
7.	Motor design	[/E] = e-SM
8.	Number of poles	[P] = e-SM
9.	Electric voltage + frequency	[02] = 1x208-240 V [04] = 3x380-460 V [05] = 3x208-240/380-460 V
10.	Pump body material	[C] = Cast iron
11.	Impeller material	[C] = Cast iron [S] = Stainless steel [B] = Bronze [N] = Cast stainless steel (1.4408) [R] = Duplex (1.4517)
12.	Mechanical seal + O-ring configuration	[4] = SiC/Carbon/EPDM [2] = SiC/Carbon/FKM [Z] = SiC/SiC/EPDM [W] = SiC/SiC/FKM [L..] = Tungsten carbide/Metal impregnated carbon/EPDM [U..] = Tungsten carbide/Metal impregnated carbon/FKM

3.3 Design and layout

The unit can be fitted with the features the application requires.

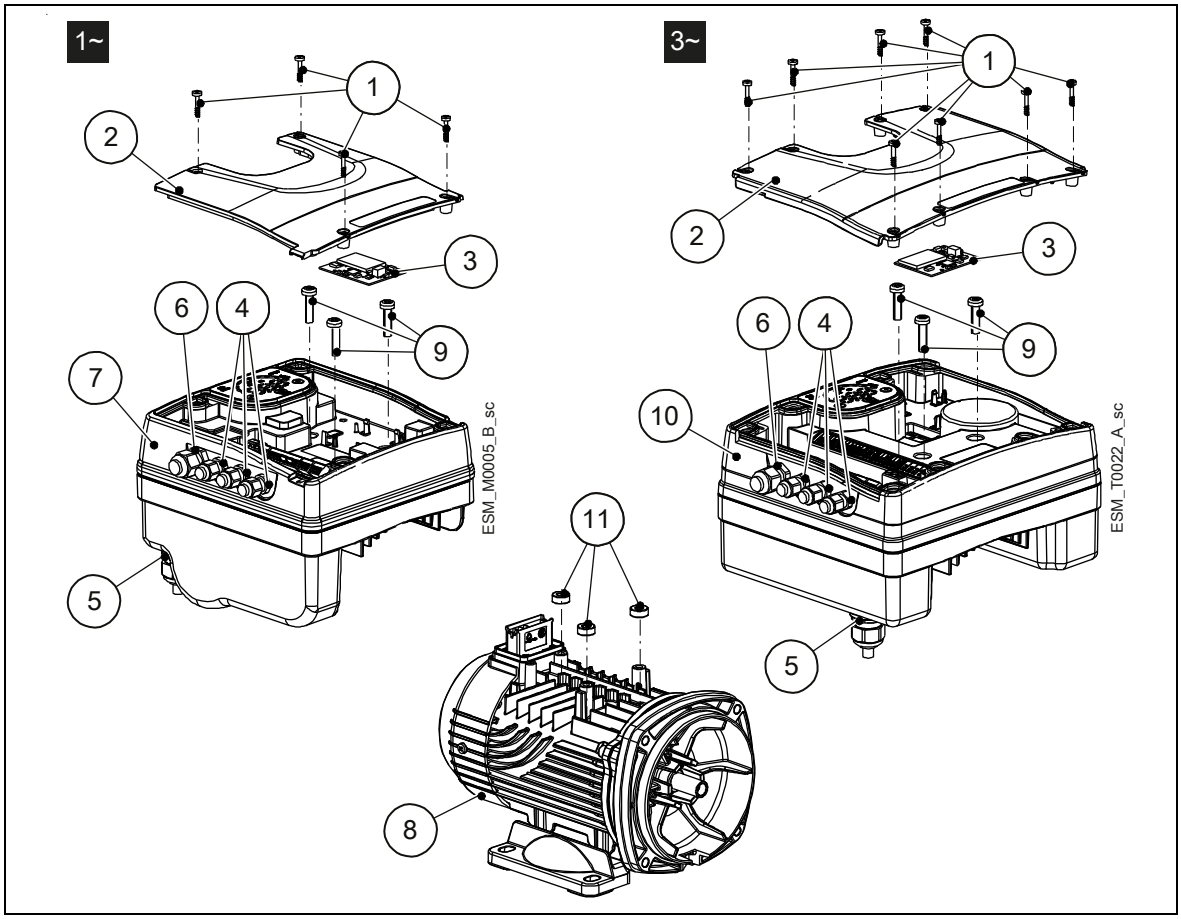


Figure 9: Main components - Single-phase and three-phase models

Table 1: Description of components

Position number	Description	Tightening torque ±15%	
		[Nm]	[in•lbs]
1	Screw	1.4	12.4
2	Terminal Box Cover	-	-
3	Optional module with strip	-	-
4	M12 I/O cable gland	2.0	17.7
5	M20 cable gland for power supply cables	2.7	23.9
6	M16 I/O cable gland	2.8	24.8
7	Drive (single-phase model)	-	-
8	Motor	-	-
9	Screw	6.0	53.1
10	Drive (three-phase model)	-	-
11	Spacer	-	-

Pre-assembled ex factory components

Table 2: Included components

Component		Quantity	Notes	
Plug for Cable Gland	M12	3		
	M16	1		
	M20	1		
Cable gland and lock nut	M12	3	Cable Outer Diameter:	3.7 to 7.0 mm (0.145÷0.275 in)
	M16	1		4.5 to 10.0 mm (0.177÷0.394 in)
Cable Gland	M20	1		7.0 to 13.0 mm (0.275÷0.512 in)

Optional components

Table 3: Optional components

Component	Description
Sensors	The following sensors can be used with the unit: • Level-sensor
RS485 Module	For the connection of a multi-pump system to a supervision system, via cable (Modbus or BACnet MS/TP protocol)
Wireless Module	To connect and interact wireless with e-SM Drive
Adaptor	M20 Metric to 1/2" NPT Adapter (item is always supplied for US market)

3.4 Intended use

- Water distribution
- Cooling and supply of hot water in factories and civil systems
- Filtering systems
- Heating systems
- Condensation transport
- Remote heating
- Industry in general
- Food and beverage sector factories

Pumped liquids

- Cold water
- Hot water
- Clean liquids
- Liquids that are not chemically and mechanically aggressive for the materials of the pump.

3.4.1 Application alternatives

Actuator (constant speed)

The unit operates as an actuator according to speed set point; this is done through user interface, the corresponding analog input or the communication bus.

Controller (constant pressure)

This mode is set as the default operating mode, and is used for single pump operating units.

3.5 Improper use

WARNING:

Improper product use can create dangerous conditions and cause personal injuries and damage to property

Improper product use can make the warranty void.

Examples of improper use:

- Pumping liquids that are not compatible with the electric pump construction materials
- Pumping hazardous, toxic, explosive, flammable or corrosive liquids
- Pumping drinking liquids other than water, such as wine or milk

Examples of improper installation:

- Hazardous locations, such as explosive or corrosive atmospheres.
- Room with very high air temperature and/or poor ventilation
- Outdoor installations where there is no protection against rain or freezing temperatures

DANGER:

It is strictly prohibited to use this product to pump flammable or explosive liquids, or both.

NOTE:

- Do not use the product to pump liquids containing abrasive, solid, or fibrous substances.
- Do not use the product for flow rates exceeding the flow rates specified in the data plate.

3.6 Special applications

Contact Xylem or the Authorised Distributor in the following cases:

- If liquids with a density and/or viscosity value exceeding that of water (such as water and glycol mixture) must be pumped
- If the pumped liquid is chemically treated (for example softened, deionized, demineralized etc.)
- Any situations different from the ones described and relating to the nature of the liquid.

4 Installation

4.1 Mechanical installation

4.1.1 Installation area

DANGER: Potentially explosive atmosphere hazard

The operation of the unit in environments with potentially explosive atmospheres or with combustible dusts (e.g.: wood dust, flour, sugars and grains) is strictly forbidden.

WARNING:

- Always wear personal protective equipment
- Always use suitable working tools
- When selecting the place of installation and connecting the unit to the hydraulic and electric power supplies, strictly comply with current regulations.
- Ensure that the input protection rating of the unit (IP 55, NEMA Type 1) is suitable for the installation environment.

CAUTION:

- Input protection: to ensure the IP55 (NEMA type 1) protection index make sure that the unit is closed correctly.
- Before opening the terminal box cover, check that there is no liquid in the unit
- Make sure that all unused cable glands and cable holes are correctly sealed
- Make sure that the plastic cover is correctly closed
- Do not leave the terminal box without cover: risk of damage due to contamination.

4.1.2 Unit installation

- See the Quick Startup Guide instructions (code 001080130)
- Position the unit as shown in Figure 10
- Install the unit according to the systems liquid flow.
- The arrows on the pump body indicate the flow and the rotation direction
- The standard rotation direction is clockwise (looking at the fan cover)
- Always install a backflow-prevention device on the suction side.
- Always install the pressure sensor on the delivery side, after the check valve.

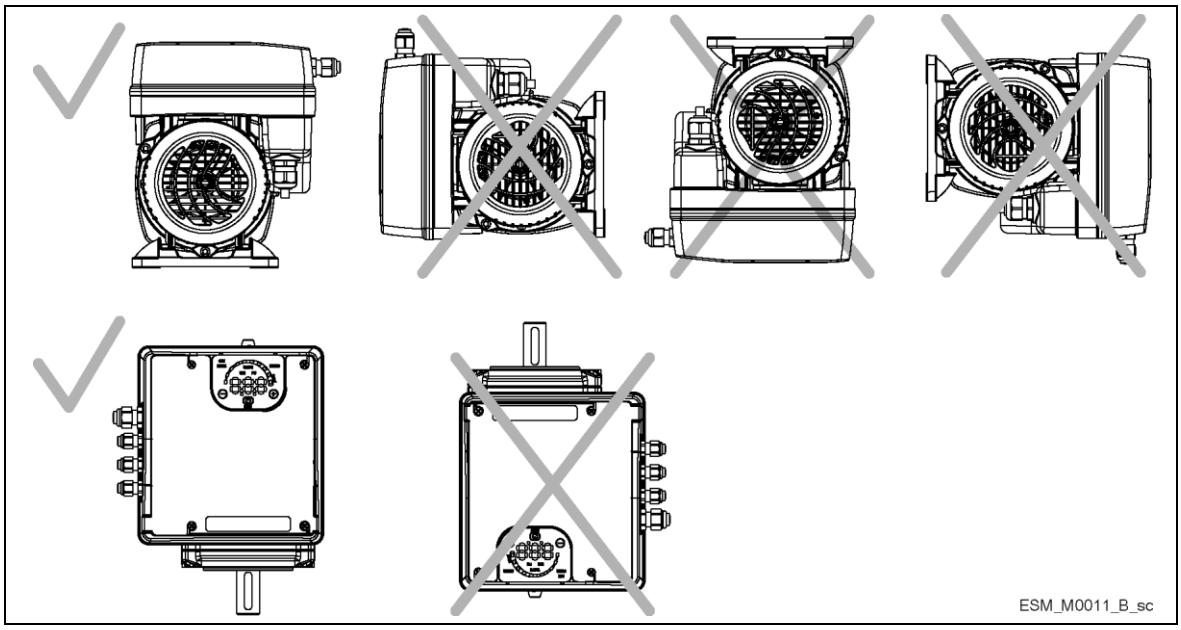


Figure 10: Permitted positions

4.1.3 Outdoor unit installation

In case of outdoor unit installation, ensure appropriate cover (see example in Figure 11).
The size of the cover must be such that the motor is not exposed to snow, rain or direct sunlight; comply with the guidelines of Par. 9, Table 16.

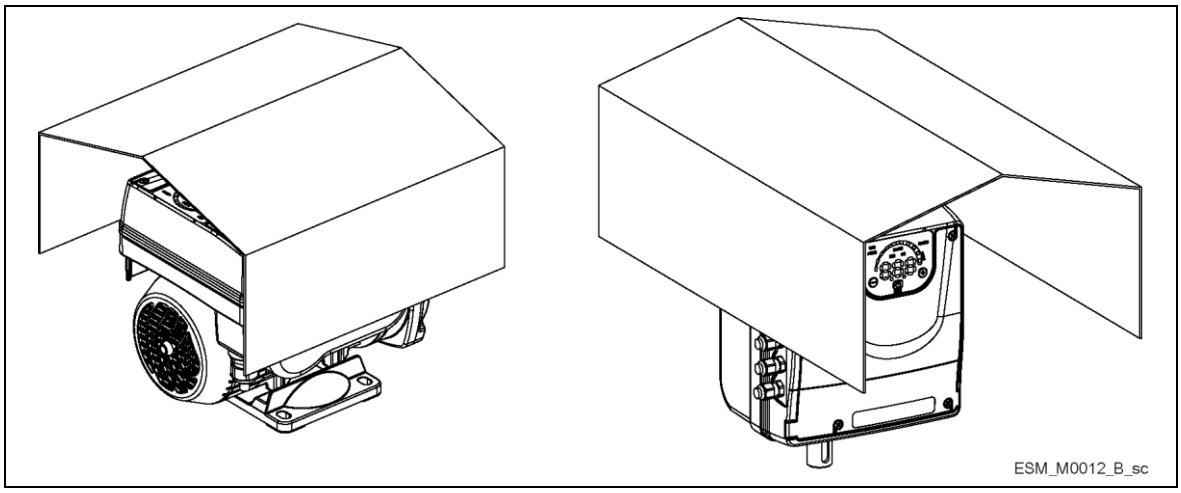


Figure 11: Outdoor installation

Minimum spacing

Area	e-SM Drive model	Free Distance
Above the unit	103..105..107..111..115	> 260mm (10.2 in)
Center-distance between units (to ensure space for cabling)	103..105..107..111..115	> 260mm (10.2 in)
	303..305..307..311..315..322	≥ 300mm (11.8 in)

4.2 Electrical Installation

DANGER: Electrical hazard

The connection to the electric power supply must be completed by an electrician possessing the technical-professional requirements outlined in the current regulations.

4.2.1 Electrical requirements

Local directives prevail on the specific requirements indicated below.

Electrical connection checklist

Check that the following requirements are met:

- The electrical leads are protected from high temperature, vibrations, and collisions.
- The current type and voltage of mains connection must correspond to the specifications on the data plate on the pump.
- The power supply line is provided with:
  - High sensitivity earth leakage circuit breaker (30 mA) [RCD residual current device] suitable for fault currents to the earth, with pushbutton AC or DC components (single-phase version), or pushbutton AC or DC and direct current components (three-phase version)
  - A mains isolator switch with a contact gap of at least 3 mm.

The electrical control panel checklist

NOTICE:

The control panel must match the ratings of the electric pump. Inappropriate combinations do not guarantee the protection of the unit.

Check that the following requirements are met:

- The control panel must protect the pump against short-circuit. A time lag fuse or a circuit breaker (Type C model is suggested) can be used to protect the pump.
- The pump has built in overload and thermal protection, no additional overload protection is required.

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.

Grounding (earthing)

DANGER: Electrical hazard

- Always connect the external protection conductor to the ground terminal before attempting to make any other electrical connections
- Connect all the electric accessories of the pump and the motor to the ground, making sure that the connections are completed correctly
- Check that the protection conductor (ground) is longer than the phase conductors; in case of accidental disconnection of the power supply conductor, the protection conductor (ground) must be the last one to detach itself from the terminal.

Use a cable with several strands to reduce electric noise.

4.2.2 Wire types and ratings

- All cables must comply with local and national standards in terms of section and ambient temperature
- Use cables with minimum heat resistance +70°C (158°F); to ensure compliance with UL (Underwriters Laboratories) regulations, all power supply connections must be completed using the following types of copper cables with minimum resistance +75°C: THW, THWN
- Cables must never enter into contact with the motor body, the pump and the piping.
- The wires connected to the power supply terminals and the fault signal relay (NO, C) must be separated from the others by means of reinforced insulation.

Table 4: Electric connection cables

e-SM Drive models	Power supply input cable + PE		Tightening torque	
	Wire numbers x Max. copper section	Wire numbers x Max. AWG	Mains and motor cable terminals	Earth Conductor
103, 105, 107, 111, 115	3 x 1.5 mm^2 3 x 0.0023 sq.in	3 x 15 AWG	Spring connectors	Spring connectors
303, 305, 307, 311, 315, 322	4 x 1.5 mm^2 4 x 0.0023 sq.in	4 x 15 AWG	0.8 Nm 7.1 lb-in	3 Nm 26.6 lb-in

Control cables

External volt free contacts must be suitable for switching < 10 VDC.

NOTICE:

- Install the control cables separate from the power supply cables and the fault signal relay cable
- If the control cables are installed in parallel with the power supply cable or the fault signal relay, the distance between the cables must exceed 200 mm
- Do not intersect the power supply cables; should this be necessary, a 90°intersection angle is permitted.

Table 5: Recommended control cables

e-SM Drive control cables	Wires number x Max. copper Section	AWG	Tightening torque
All I/O conductors	0.75÷1.5 mm^2 0.00012÷0.0023 sq.in	18÷16 AWG	0.6 Nm 5.4 lb-in

4.2.3 Power supply connection

WARNING: Electrical hazard

Contact with electric components may cause death, even after the unit has been switched off. Before any interventions on the unit, the network voltage and any other input voltages must be disconnected for the minimum time indicated in Table 9.

WARNING:

Only connect the electronic drive to Safety Extra Low Voltage circuits (SELV = very low safety voltage). Circuits intended for use with external communication and control equipment are designed to ensure insulation from the dangerous adjoining circuits inside the unit. Communication and control circuits inside the unit are floating in relation to the mass and are classed as SELV. They must only be connected to other SELV circuits, in order to maintain all the circuits within the SELV limits and avoid mass loops. The physical and electric separation of the communication and control circuits from non-SELV electric circuits must be maintained both inside and outside the inverters.

Table 6: Power supply wiring procedure

	Reference
1. Open the terminal box cover (2) by removing the screws (1). 2. Insert the power cable in the M20 cable gland (5)	Fig. 9
3. Connect the cable according to the wiring diagram. 4. Connect the earth conductor (mass), making sure that it is longer than the phase conductors. 5. Connect the phase leads.	Fig. 12
6. Close the cover (2) and tighten the screws (1).	Fig. 9

Table 7: I/O wiring procedure

	Reference
1. Open the terminal box cover (2) by removing the screws (1).	Fig. 9
2. Connect the cable according to the wiring diagram.	Fig. 13
3. Close the cover (2) and tighten the screws (1).	Fig. 9

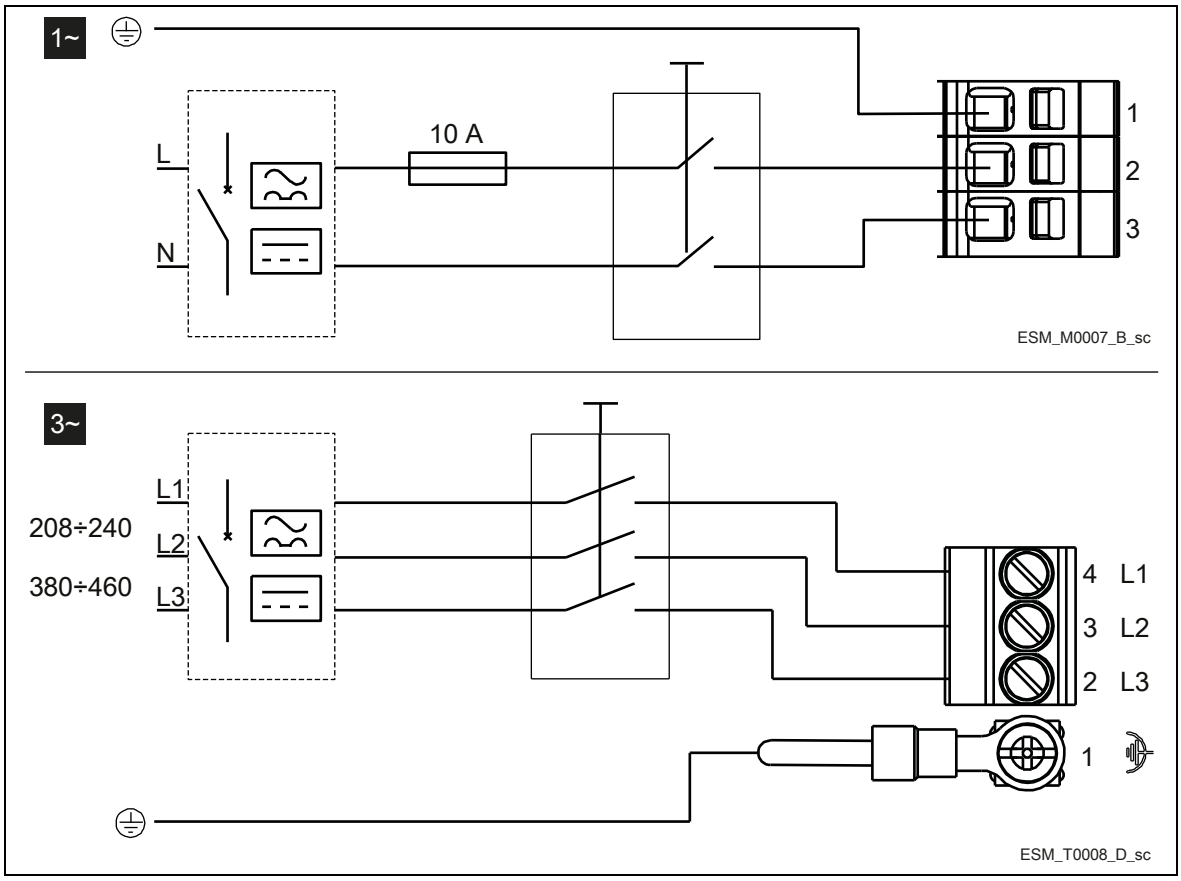


Figure 12: Wiring diagram

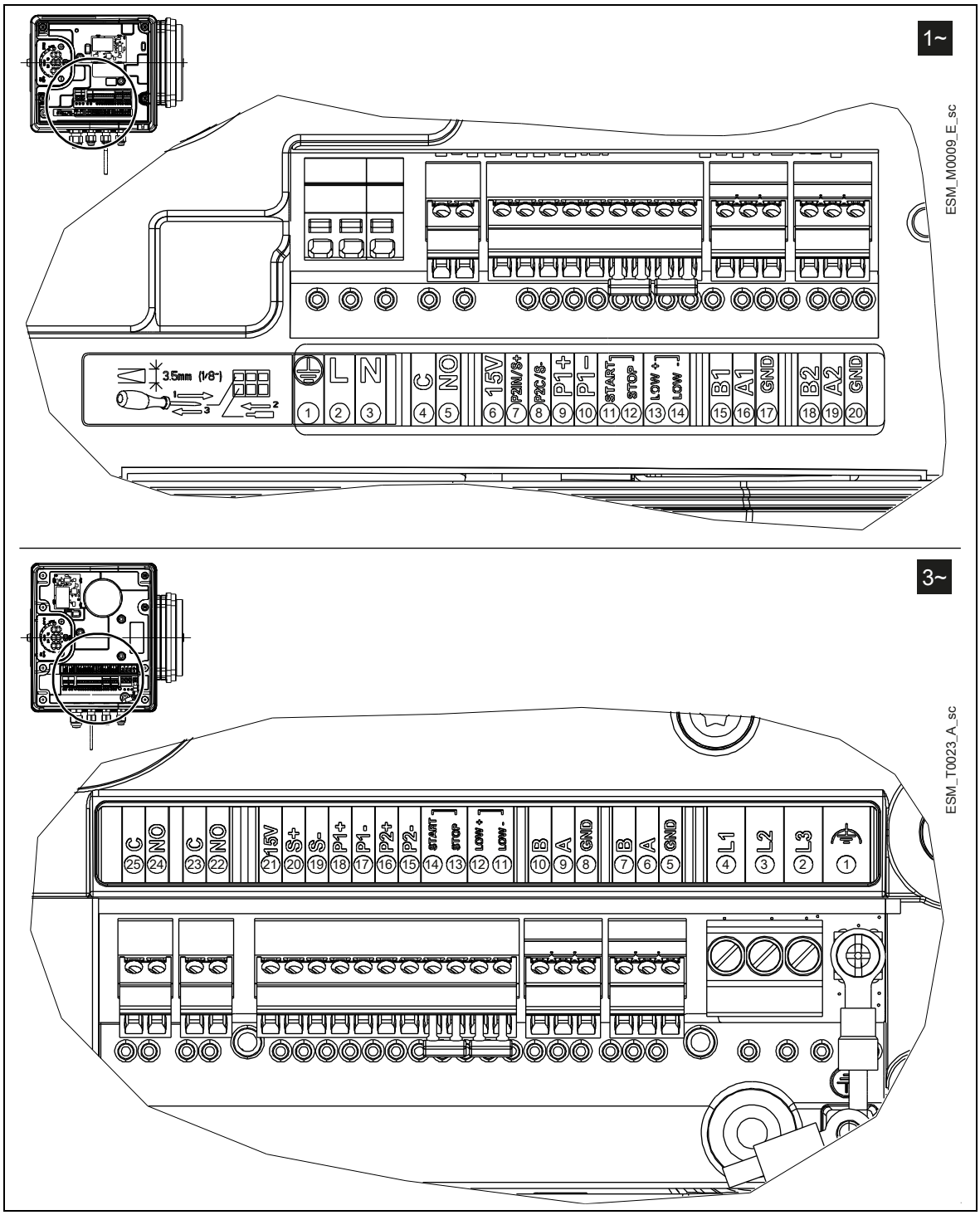


Figure 13: Connection label

Table 8: I/O terminals

	Item	Terminals	Ref.	Description	Notes
1~	Fault signal	C	4	COM - error status relay	
		NO	5	NO - error status relay	
	Auxiliary Voltage Supply	15V	6	Auxiliary voltage supply +15 VDC	15VDC, Σ max. 100 mA
	Analog input 0-10V	P2IN/S+	7	Actuator mode 0-10 V input	0÷10 VDC
		P2C/S-	8	GND for 0-10 V input	GND, electronic ground (for S+)
	External Pressure	P1+	9	Power supply external sensor +15	15VDC, Σ max. 100 mA

	sensor [also Differential]			VDC	
		P1-	10	External sensor 4-20 mA input	4÷20 mA
	External Start/Stop	START	11	External ON/OFF input reference	Default short circuited Pump is enabled to RUN
		STOP	12	External ON/OFF input	
	External Lack of Water	LOW+	13	Low water input	Default short circuited Lack of water detection: enabled
		LOW-	14	Low water reference	
	Communication Bus	B1	15	RS485 port 1: RS485-1N B (-)	ACT, HCS control mode: RS 485 port1 for external communication MSE, MSY control mode: RS 485 port 1 for multi-pump systems
		A1	16	RS485 port 1: RS485-1P A (+)	
		GND	17	Electronic GND	
	Communication Bus	B2	18	RS485 port 2: RS485 port 2: RS485-2N B (-) active only with optional module	RS 485 port2 for external communication
		A2	19	RS485 port 2: RS485 port 2: RS485-2P A (+) active only with optional module	
		GND	20	Electronic GND	

3~	Fault signal	C	25	COM - error status relay	In case of power cables: use the M20 cable gland
		NO	24	NO - error status relay	
	Motor running signal	C	23	Common contact	In case of power cables: use the M20 cable gland
		NO	22	Normally open contact	
	Auxiliary Voltage Supply	15V	21	Auxiliary voltage supply +15 VDC	15VDC, Σ max. 100 mA
	Analog input 0-10V	S+	20	Actuator mode 0-10 V input	0÷10 VDC
		S-	19	GND for 0-10 V input	GND, electronic ground (for S+)
	External Pressure sensor [also Differential]	P1+	18	Power supply external sensor +15 VDC	15VDC, Σ max. 100 mA
		P1-	17	External sensor 4-20 mA input	4÷20 mA
	External pressure sensor	P2+	16	Power supply external sensor +15 VDC	15VDC, Σ max. 100 mA
		P2-	15	Sensor 4-20 mA input	4÷20 mA
	External Start/Stop	Start	14	External ON/OFF input	Default short circuited Pump is enabled to RUN
		Stop	13	External ON/OFF input reference	
	External Lack of Water	LoW+	12	Low water input	Default short circuited Lack of water detection: enabled
		LoW-	11	Low water reference	
	Communication Bus	B2	10	RS485 port 2: RS485 port 2: RS485-2N B (-) active only with optional module	RS 485 port2 for external communication
		A2	9	RS485 port 2: RS485 port 2: RS485-2P A (+) active only with optional module	
		GND	8	Electronic GND	
	Communication Bus	B1	7	RS485 port 1: RS485-1N B (-)	ACT, HCS control mode: RS 485 port 1 for external communication Control mode MSE, MSY: RS 485 port 1 for multi-pump systems
		A1	6	RS485 port 1: RS485-1P A (+)	
		GND	5	Electronic GND	

5 Operation

In case of co-existance of two or more of the following conditions:

- high ambient temperature
- High liquid temperature
- duty points insisting on unit maximum power
- persisting undervoltage of mains,

may jeopardise the life of the unit, and/or derating may occur: for further information contact Xylem or the Authorised Distributor.

5.1 Wait times

WARNING: Electrical hazard

Contact with electric components may cause death, even after the unit has been switched off. Before any interventions on the unit, the network voltage and any other input voltages must be disconnected for the minimum time indicated in Table 9.

Table 9: Wait times

e-SM Drive model	Minimum waiting times (min)
103, 105, 107, 111, 115	4
303, 305, 307, 311, 315, 322	5

WARNING: Electrical hazard

Frequency converters contain DC-link capacitors that can remain charged even when the frequency converter is not powered.
To avoid electrical hazards:

- Disconnect the AC power supply
- Disconnect all types of permanent magnet motors
- Disconnect all DC-link remote power supplies, including the battery backups, the Uninterrupted Power Supply units and the DC-link connections to other frequency converters
- Wait for the capacitors to discharge completely before carrying out any maintenance or repairs; see Table 9 for the waiting times

6 Programming

Precautions

NOTICE:

- Carefully read and follow the following instructions before starting the programming activities, to avoid wrong settings that may cause malfunctioning
- All modifications must be done by qualified technicians.

6.1 Control panel

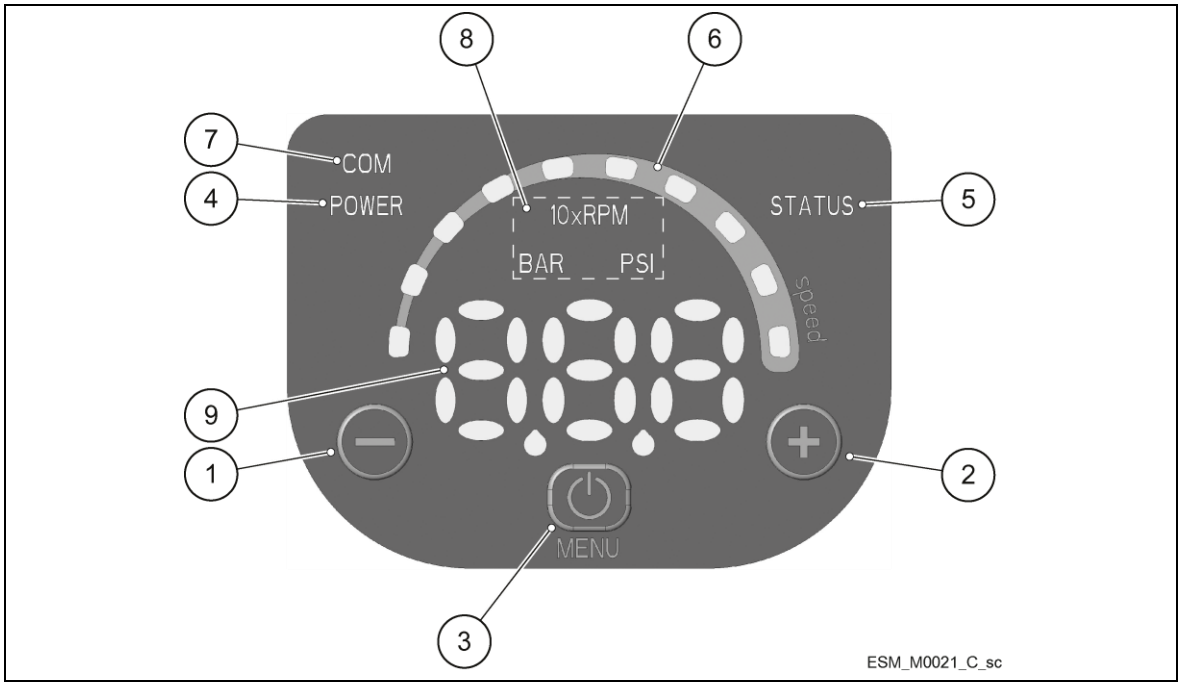


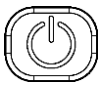
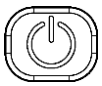
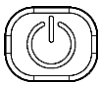
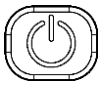
Figure 14: Control panel

Table 10: Description of the control panel

Position number	Description	Para.
1	Decrease button	6.2
2	Increase button	6.2
3	START/STOP and menu access button	6.2
4	POWER LED	6.3.1
5	Status LED	6.3.2
6	Speed LED bar	6.3.3
7	Communication LED	6.3.4
8	Unit of measure LEDs	6.3.5
9	Display	6.4

6.2 Description of the buttons

Table 11: Functions of push buttons

Push button	Function
	• Main view (see Par. 6.4.1): decreases the required value for the selected control mode • Parameter menu (see Par. 6.4.2): decreases the displayed parameter index • Parameter view / editing (see Par. 6.4.2): decreases the value of the displayed parameter • Zero pressure auto-calibration (see Par. 6.5, P44): automatic calibration of the pressure sensor.
	• Main view (see Par. 6.4.1): increases the required value for the selected control mode • Parameter menu (see Par. 6.4.2): increases the displayed parameter index • Parameter view / editing (see Par. 6.4.2): increases the value of the displayed parameter • Zero pressure auto-calibration (see Par. 6.5, P44): automatic calibration of the pressure sensor.
	• Main view (see Par. 6.4.1): START/STOP the pump • Parameter menu (see Par. 6.4.2): switches to parameter view / editing • Parameter view / editing (see Par. 6.4.2): saves the value of the parameter.
 long press	• Main view (see Par. 6.4.2): switches to parameter selection • Parameters Menu: switches to Main Visualization
 and 	Main view: alternates between Speed and Head units of measure (see Par. 6.4.1).
 and 	Main view: alternates between Speed and Head units of measure (see Par. 6.4.1).

6.3 LEDs description

6.3.1 POWER (power supply)

When ON (**POWER**) the pump is powered and the electronic devices are operational.

6.3.2 STATUS

LED	Status
Off	Pump unit stopped
Green steady	Pump unit in operation
Flashing green and orange	Non-locking alarm with the pump unit in operation
Orange steady	Non-locking alarm with the pump unit stopped
Red steady	Locking error, the pump unit cannot be started

6.3.3 SPEED (speed bar)

It consists of 10 LEDs, each representing, in percentage steps between 10 and 100%, the speed range between parameter P27 (minimum speed) and parameter P26 (maximum speed).

LED bar	Status
On	Motor in operation; the speed corresponds to the percentage step represented by the LEDs ON in the bar (e.g.: 3 LEDs ON = speed 30%)
First LED flashing	Motor in operation; the speed is lower than the absolute minimum, P27
Off	Motor stopped

6.3.4 COM (communication)

Condition 1

- The communication bus protocol is the Modbus RTU protocol; the P50 parameter is set to the Modbus value
- No optional communication module is used.

LED	Status
Off	The unit cannot detect any valid Modbus messages on the terminals provided for the communication bus
Green steady	The unit has detected a communication bus on the provided terminals and has recognised the correct addressing
Green flashing	The unit has detected a communication bus on the provided terminals and has not been addressed correctly
From green steady to off	The unit has not detected a valid Modbus RTU message for at least 5 seconds
From green steady to flashing	The unit has not been addressed correctly for at least 5 seconds

Condition 2

- The communication bus protocol is the BACnet MS/TP protocol; the P50 parameter is set to the BACnet value
- No optional communication module is used.

LED	Status
Off	The unit has received no valid requests from other BACnet MS/TP devices for at least 5 seconds
On steady	The unit is exchanging information with another BACnet MS/TP device

Condition 3

The optional communication module is being used.

LED	Status
Off	RS485 or wireless connection faulty or missing
Flashing	The unit is exchanging information with the communication module

6.3.5 Unit of measurement

LED on	Measurement active	Notes
10xRPM	Impeller rotation speed	The display shows the speed in 10xRPM
BAR	Hydraulic head	The display shows the value of the head in bar
PSI		The display shows the value of the head in psi

6.4 Display

6.4.1 Main visualization

Display	Mode	Description
OFF	**OFF**	Contacts 11 and 12 (see Par. 5.4) are not short-circuited. Note: It has lower display priority than STOP mode.
StP	**STOP**	Pump stopped manually. If the pump is switched on after setting P04 = OFF (see Par. 6.5.1), it is stopped so that the motor is not in operation, and STP flashes (StP → StP). To manually stop the pump: • Example A. CPP/PPP control mode with initial requested value (Head) of 1.00 bar and minimum value 0.5 bar: 420 BAR → press → StP once. • Example B. ACT control mode with initial required value (speed) of 200 10xRPM and minimum value 80 10xRPM: 200 10xRPM → press → StP once.
ON	**ON**	Pump on; the motor starts following the selected control mode. It appears for a few seconds when contacts 11 and 12 (see Par. 5.4) are short circuited and the pump is not in STOP mode. To manually set the pump to ON mode: • Example A. CPP/PPP control mode, reaching a requested value (pressure) of 1.00 bar, starting with a minimum value of 0.5 bar, after a manual stop: StP → press → ON → once after a few seconds… → 420 BAR • Example B. ACT control mode that reaches a requested value (speed) of 200 10xRPM, starting with a minimum value of 80 10xRPM after manual stop: StP → press → ON → once, and after a few seconds… → 200 10XRPM With the pump in operation, it is possible to display the Actual Head and the Actual Speed: • Example A CPP/PPP control mode with Actual Head 1.00 bar and corresponding Actual Speed 352 10xRPM: 420 BAR → + → 352 10XRPM → after 10 seconds or + → 420 BAR. • Example B ACT control mode with Actual Speed 200 10xRPM and corresponding Actual Head of 2.37 bar: 200 10xRPM → + → 237 BAR → after 10 seconds or + → 200 10xRPM.

6.4.2 Parameters menu visualization

The parameter menu gives the possibility to:

- select all the parameters (see Par. 6.5)
- access Parameter View / Editing (see Par. 6.2).

Parameter	Description
Power on	If after switching ON, parameter Menu View is accessed with P23 = ON, P20 flashes: P20 → P20. Enter the password to display and change the parameters.
Password timeout	If with P23 = ON no button is pressed for over 10 minutes from the last parameter Menu View, both the view and the editing of the parameters are disabled. Enter the password again to display and change the parameters.
Parameters Menu	With P23 = OFF, or after entering the password (P20), it is possible to both display and edit the parameters. When accessing the Parameter Menu, the display shows: P01 → P01 P02 → P02 ... P69 → P69 The flashing parameter, indicating the selection possibility.
Parameters Editing/Visualization	The value of a parameter may be changed using the buttons, or the Modbus and BACnet communication protocols. When returning to the Parameter Menu, the displayed parameter index is increased automatically. For further information see Par. 6.5. • Example A (P20) from 000 to 066: P20 → P20 → ⏻ → 000 → 000 → ⊕ ... until ... → 066 → 066 → ⏻ sets the desired value → P21 → P21 • Example 2 (P26) from 360 to 300: P26 → P26 → ⏻ → 360 → 360 → ⊖ ... until... → 300 → 300 → ⏻ sets the desired value → → P26 → P26.

6.4.3 Alarms and errors visualization

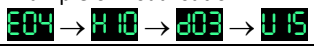
Parameter	Description
Alarm	In case of alarm, the corresponding code appears on the display in alternation to the Main View. For example: A01 → 356 (ex. BAR) A02 → 285 (ex. 10xRPM) ... For further information see Par. 6.7.
Error	In case of error, the corresponding identification code appears on the display. For example: E01 E02 ... For further information see Par. 6.7.

6.5 Software parameters

Parameters are marked differently in the manual depending on their type:

Mark	Parameter type
No mark	Applicable to all units
👁	Read only

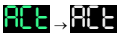
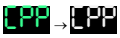
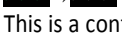
6.5.1 Status Parameters

No.	Parameter	Unit of measurement	Description
P01	**Required value**	bar/psi/ rpmx10	This parameter shows the SOURCE and the VALUE of the active required value. Visualization cycles between SOURCE and VALUE occur every 3 seconds. SOURCES: • SP (SP): internal required value Setpoint related to the control mode selected. • VL (UL): external required value speed Setpoint related to 0-10V input. VALUE can represent a Speed or a Head, depending on the selected control mode: in case of Head, the unit of measure is defined by parameter P41.
P05	**Operating time months**		Total months of connection to the electric mains, to add to P06.
P06	**Operating time hours**	h	Total hours of connection to the electric mains, to add to P05.
P07	**Motor Time Months**		This parameter shows the total operating time months, to be added to P08.
P08	**Motor time hours**	h	This parameter shows the total operating time hours, to be added to P07.
P09	**1st error**		This parameter stores the last error occurred in chronological order. The information displayed switches through the values: • (Exx): xx indicates the error code • (Hyy): yy is the value of hours referred to P05-P06 when the error Exx happened • (Dww): ww is the value of days referred to P05-P06 when the error Exx happened • (Uzz): zz is the value of weeks referred to P05-P06 when the error Exx happened Example of visualisation: 
P10	**2nd error**		Saves the penultimate error in chronological occurred. Other characteristics: like P09.
P11	**3rd error**		Saves the third from the last error in chronological occurred. Other characteristics: like P09.
P12	**4th error**		Saves the fourth from the last error in chronological occurred. Other characteristics: like P09.
P13	**Power Module Temperature**	°C	Temperature of the power module.
P14	**Inverter Current**	A	This parameter shows the actual current supplied by the frequency converter.
P15	**Inverter Voltage**	V	This parameter shows the actual estimated input voltage of the frequency converter.
P16	**Motor Speed**	rpmx10	This parameter shows the actual motor rotational speed.
P17	**Software version**		This parameter shows the Control Board software version.

6.5.2 Settings Parameters

No.	Parameter	Description
P20	**Password entering [0÷999]**	The user can enter here the system password, which gives access to all system parameters: this value is compared with the one stored in P22. When a correct password is entered, the system remains unlocked for 10 minutes.
P21	**Jog mode [MIN÷MAX*]**	It deactivates the internal controller of the unit and forces the actual Control Mode (ACT): the motor starts and the value of P21 becomes the temporary ACT setpoint. It can be changed by just entering a new value on P21 without confirming it; otherwise, it causes immediate exit from temporary control.
P22	**System password [1÷999]**	This is the system password, and must be the same as the password entered in P20. Default: 66.
P23	**Lock Function [OFF, ON]**	By using this function, the user can lock or unlock parameter setting in the main menu. When ON, enter the P20 password to change the parameters. Default: ON.

6.5.3 Drive Configuration Parameters

No.	Parameter	Unit of measurement	Description
P25	**Control mode [0-2]**		This parameter sets the Control Mode: ACT=0, CPP=1 e PPP=2
			ACT: Actuator mode.  A single pump maintains a fixed speed at any flow rate. ACT will always try to minimize the difference between the speed setpoint and the actual rotational speed of the motor.
			CCP: PI constant pressure.  The pump maintains a constant pressure delta (difference between delivery and suction pressure) irrespective of the flow rate. No absolute pressure sensor is required. The control algorithm will work in sensorless mode. In any case, as an alternative it will be possible to use an external pressure sensor (for the connections see par. 4.3.3, configured from P40): CPP will always try to reduce to the minimum the error between the pressure setpoint and the pressure feedback signal.
			PPP: PI proportional pressure.  This is a control mode during which the pump keeps a proportional pressure delta (difference between delivery and suction pressure) irrespective of the flow needed. The pressure increases with the increase of the flow. The control algorithm will work in sensorless mode. In any case, as an alternative it will be possible to use an external pressure sensor (for the connections see par. 4.3.3, configured from P40): PPP will always try to reduce to the minimum the error between the pressure setpoint and the pressure feedback signal.
P26	**Max RPM set [ACT set÷Max*]**	rpmx10	Maximum pump speed setup.
P27	**Min RPM set [Min*÷ACT set]**	rpmx10	Minimum pump speed setup.

* Depending on the type of pump used

6.5.4 Sensor Configuration Parameters

No.	Parameter	Unit of measurement	Description
P40	**Sensor selection [0÷2]**		Sets the external pressure sensor parameters: nOS = no sensor 4÷20 mA Differential sensor = d1 Two individual 4÷20 mA pressure sensors.
P41	**Pressure Sensor Unit Of Measure [BAR, PSI]**		This parameter sets the unit of measure (bAr, PSI) for the pressure sensor. It affect the head view LED parameter (see Par. 6.3.4). Default: bar.
P42	**Full scale value for pressure Sensor 1 4÷20mA [0.0÷25.0BAR] / [0.0÷363PSI]**	bar/psi	Setting of the full scale value of the 4÷20mA pressure sensor 1 connected to analogue inputs 17 and 18. Default: depending on the type of pump.
P43	**Full scale value for pressure Sensor 2 4÷20mA [0.0÷25.0BAR] / [0.0÷363PSI]**	bar/psi	Setting of the full scale value of the 4÷20mA pressure sensor 2 connected to analogue inputs 15 and 16. Default: bar.
P44	**Zero Pressure Auto-Calibration**	bar/psi	This parameter lets the user perform the initial auto-calibration of the pressure sensor. It is used to compensate for the offset signal of the sensor at zero pressure caused by the tolerance of the sensor itself. Procedure: 1. Access P44 when the hydraulic system is at a 0 pressure, without liquid inside, or with the pressure sensor disconnected from the piping: the actual pressure value of 0 is displayed. 2. Start the auto-calibration by pressing ⊕ or ⊖ (see Par. 6.2). 3. At the end of the auto-calibration, the 0 (zero) pressure is displayed, or the "---" (---) message, if the sensor signal is out of the permitted tolerance.
P48	**Lack of liquid input [DIS, ALR, ERR]**		Enabling/disabling of the management of the lack of liquid at the input (see par. 4.3.3, terminals 13 and 14). It defines the behaviour of the unit when the lack of water input is enabled and the switch is open: • dIS (DIS): the unit does not manage the information from the "lack of liquid" input" • ALr (ALr): the unit reads the "lack of liquid" input (enabled) and upon opening of the circuit breaker reacts by displaying the A06 rotary alarm and keeping the motor in operation • Err (Err):The unit reads the "lack of liquid" input (enabled) and upon opening of the circuit breaker reacts by stopping the motor and generating the corresponding E11 error. The error condition is removed when the switch closes again and the motor is started. Default: ERR.

6.5.5 RS485 Interface Parameters

No.	Parameter	Unit of measurement	Description
P50	**Communication protocol [MOD, BAC]**		This parameter selects the specific protocol on the communication port: • MOd (MOD): Modbus RTU • bAC (BAC): BACnet MS/TP. Default: MOD.
P51	**Communication protocol - Address [1÷247]/[0÷127]**		This parameter sets the desired address for the unit, when connected to an external device, depending on the protocol selected in P50: • MOD: any value in the 1÷247 range • BAC: any value in the 0÷127 range.
P52	**Comm Protocol – BAUDRATE [4.8, 9.6, 14.4, 19.2, 38.4, 56.0, 57.6 KBPS]**	kbps	This parameter sets the desired baud rate for the communication port. Default: 9.6 kbps.
P53	**BACnet Device ID Offset [0÷999]**		This parameter sets the hundreds, tens and units of the BACnet Device ID. Default: 002. Device ID default: 84002.
P54	**Comm Protocol – Configuration** [8N1, 8N2, 8E1, 8o1]		This parameter sets the length of the data bits, the parity and the length of the STOP bits. Default: 8N1

6.5.6 Test Run Configuration Parameters

Test Run is a function that starts the pump after the last stop, in order to prevent it from blocking.

No.	Parameter	Unit of measurement	Description
P65	**Test Run – Time Start [0-100]**	h	This parameter sets the time after which, once the pump has stopped for the last time, the Test Run will start. Default: 100 h.
P66	**Test Run – Speed [P27-Max]**	rpmx10	This parameter sets the pump rotational speed for the Test Run. The Min and Max speeds depend on the pump type. Default: 200 rpmx10.
P67	**Test Run – Time Duration[0-180]**	s	This parameter sets the duration of the Test Run. Default: 10 s.

6.5.7 Special Parameters

No.	Parameter	Unit of measurement	Description
P68	**Default Values Reload [NO, RES]**		If set to RES, after confirmation this parameter performs a factory reset that reloads the default parameter values.
P69	**Avoid Frequent Parameters Saving [NO, YES]**		This parameter limits the frequency with which the unit stores the required value P02 in the EEPROM memory, in order to extend its life. This could be particularly useful in applications with BMS control devices that require continuous variation of the value for fine tuning purposes. Default: NO.

6.6 Technical references

6.6.1 Example: ACT control mode with analog 0-10V input

Graph

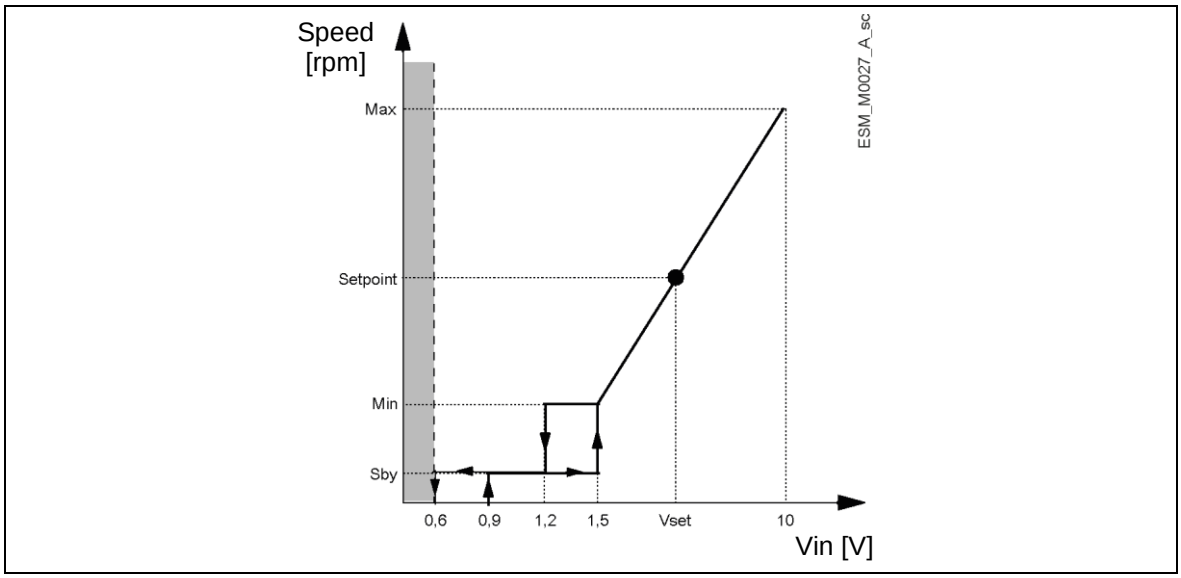


Figure 15: ACT control mode diagram

Table 12: Description

Grey area	→ Missing input Voltage detection threshold
Speed [rpm]	→ Actual speed relative to the 0-10V analogue input voltage value (see Par. 4.3.3, table 8 contacts 7 and 8)
Max	→ P26 (Max RPM set)
Min	→ P27 (Min RPM set)
Setpoint	→ Example of Actual Speed related to a specific Vset Voltage value
Sby	→ Input Voltage at which the motor goes in Stand By
Vin [V]	→ Input Voltage value to control the pump in ACT mode Different thresholds are managed by the pump, from Non-detection to Max speed)

For further information on the control mode and the ACT regulation parameters, see Par. 6.5.3.

7 Maintenance

Precautions

DANGER: Electrical hazard

- Before attempting to use the unit, check that it is unplugged and that the pump and the control panel cannot restart, even unintentionally. This also applies to the auxiliary control circuit of the pump.
- Before any interventions on the unit, the network power supply and any other input voltages must be disconnected for the minimum time indicated in Table 9 (the capacitors of the intermediate circuit must be discharged by the built-in discharge resistors).

1. Make sure that the cooling fan and the vents are free from dust.
2. Make sure that the ambient temperature is correct according to the limits of the unit.
3. Make sure that qualified personal perform all modifications of the unit.
4. Make sure that the unit is disconnected from the power supply before any work is carried out. Always consider the pump and motor Instruction.

Function and parameter control

In case of changes to the hydraulic system:

1. Make sure that all functions and parameters are correct
2. Adjust the functions and parameters if necessary.

8 Troubleshooting

In case of alarm or error, the display shows and ID code and the STATUS LED turns on (also see Par. 6.3.2).
In case of several alarms and/or errors, the display shows the main one.

Alarms and errors:
- are saved with date and time
- can be reset by switching the unit off for at least 1 minute.

Errors cause the triggering of the status relay on the following terminal box pins:
- single-phase version: pins 4 and 5
- three-phase version: pins 24 and 25

8.1 Alarm codes

Table 14: Alarm codes

code	Description	Cause	Remedy
A03	Derating	Temperature too high	• Lower the room temperature • Lower the water temperature • Lower the load
A05	Data memory alarm	Data memory corrupted	1. Reset the default parameters using parameter P68 2. Wait 10 s 3. Restart the pump If the problem continues, contact Xylem or the Authorised Distributor
A06	LOW alarm	Lack of water detection (if P48= ALR)	Check the water level in the system
A15	EEPROM write failure	Data memory damaged	Stop the pump for 5 minutes and then restart it again; if the problem continues, contact Xylem or the Authorised Distributor
A20	Internal alarm		Stop the pump for 5 minutes and then restart it again; if the problem continues, contact Xylem or the Authorised Distributor

8.2 Error codes

Table 15: Error codes

code	Description	Cause	Remedy
E01	Internal communication error	Internal communication lost	Stop the pump for 5 minutes and then restart it again; if the problem continues, contact Xylem or the Authorised Distributor
E02	Motor overload error	• High motor current • Current absorbed by the motor too high	Stop the pump for 5 minutes and then restart it again; if the problem continues, contact Xylem or the Authorised Distributor
E03	DC-bus overvoltage error	• DC-bus overvoltage • External conditions cause the operation of the pump from generator	Check: • the system configuration • the position and integrity of the check valve or the clapet valve

code	Description	Cause	Remedy
E04	Rotor blocked	• Motor stall • Loss of rotor synchronism or rotor blocked by external materials	• Check that there are no foreign bodies preventing the pump from turning • Stop the pump for 5 minutes and then start it again If the problem continues, contact Xylem or the Authorised Distributor
E05	EEPROM Data memory error	EEPROM Data memory corrupted	Stop the pump for 5 minutes and then restart it again; if the problem continues, contact Xylem or the Authorised Distributor
E06	Grid voltage error	Voltage supply out of operating range	Check: • the voltage • the connection of the electric system
E07	Motor winding temperature error	Motor thermal protection trip	• Check for impurities near the impeller and rotor. Remove them if necessary • Check the conditions of installation,and the water and air temperature • Wait for the motor to cool down • If the error persists, stop the pump for 5 minutes and then start it again If the problem continues, contact Xylem or the Authorised Distributor
E08	Power module temperature error	Frequency converter thermal protection trip	Check the conditions of installation,and the air temperature
E09	Generic hardware error	Hardware error	Stop the pump for 5 minutes and then restart it again; if the problem continues, contact Xylem or the Authorised Distributor
E10	Dry-run error	Dry run detection	Check if there are any leaks in the system and refill the system
E11	LOW error	Lack of water detection (if P48= ERR)	Check the water level in the system
E12	Pressure sensor error	Missing pressure sensor (not present in ACT mode)	Check the condition of the sensor connection cables
E14	Low pressure error	Pressure below minimum threshold (not present in ACT mode)	Check the settings of parameters P45 and P46
E15	Loss of phase error	One of the three power supply phases is missing (three-phase versions only)	Check the connection to the power supply network
E31	Pressure sensor error 1	No pressure sensor 1 detected	Check the condition of the sensor connection cables
E32	Pressure sensor error 2	No pressure sensor 2 detected	Check the condition of the sensor connection cables

See also Par. 6.3.2 and Par. 6.4.3.

9 Technical Data

Table 16: Electrical, Environmetal and Installation specifications

	e-SM Drive model										
	103	**105**	**107**	**111**	**115**	**303**	**305**	**307**	**311**	**315**	**322**
Input											
Input frequency [Hz]	50/60 ± 2										
Main supply	LN					L1 L2 L3					
Nominal input voltage [V]	208÷240 ±10%					208÷240 / 380÷460 ±10%					380÷460 ±10%
Maximum current absorbed (AC) in continuous service (S1) [A]	See data plate										
PDS Efficiency Class	IES2										
Output											
Min.÷Max. Speed [rpm]	800÷3600										
Leakage Current [mA]	< 3,5										
I/O auxiliar + 15VDC power supply [mA]	Imax < 40										
Fault signal relay	1 x NO Vmax < 250 [VAC] , Imax < 2 [A]					1 x NO Vmax < 250 [VAC] , Imax < 2 [A]					
Motor status relay	-					1 x NO Vmax < 250 [VAC] , Imax < 2 [A]					
EMC (Electro Magnetic Compatibility)	See Par. Declarations. Installations must be performed in accordance with the EMC good practice guidelines (e.g. avoid "eyebolts" on the transmission side)										
Sound pressure LpA [dB(A)] @ [rpm]	< 62 @3000 < 66 @3600										
Insulation class	155 F										
Protection class	IP 55, Enclosure Type 1 Protect the product from direct sunlight and rainfall										
Relative humidity (storage & operating)	5% ÷ 95% RH										
Storage temperature [°C] /[°F]	-25÷65 (-13÷149)										
Operating temperature [°C] /[°F]	-20÷50 (-4÷122)										
Air Pollution	Pollution Degree 2										
Installation altitude a.s.l. [m] / [ft]	< 1000 / 3280 Derating may occur at higher altitudes										

9.1 Dimensions and weights

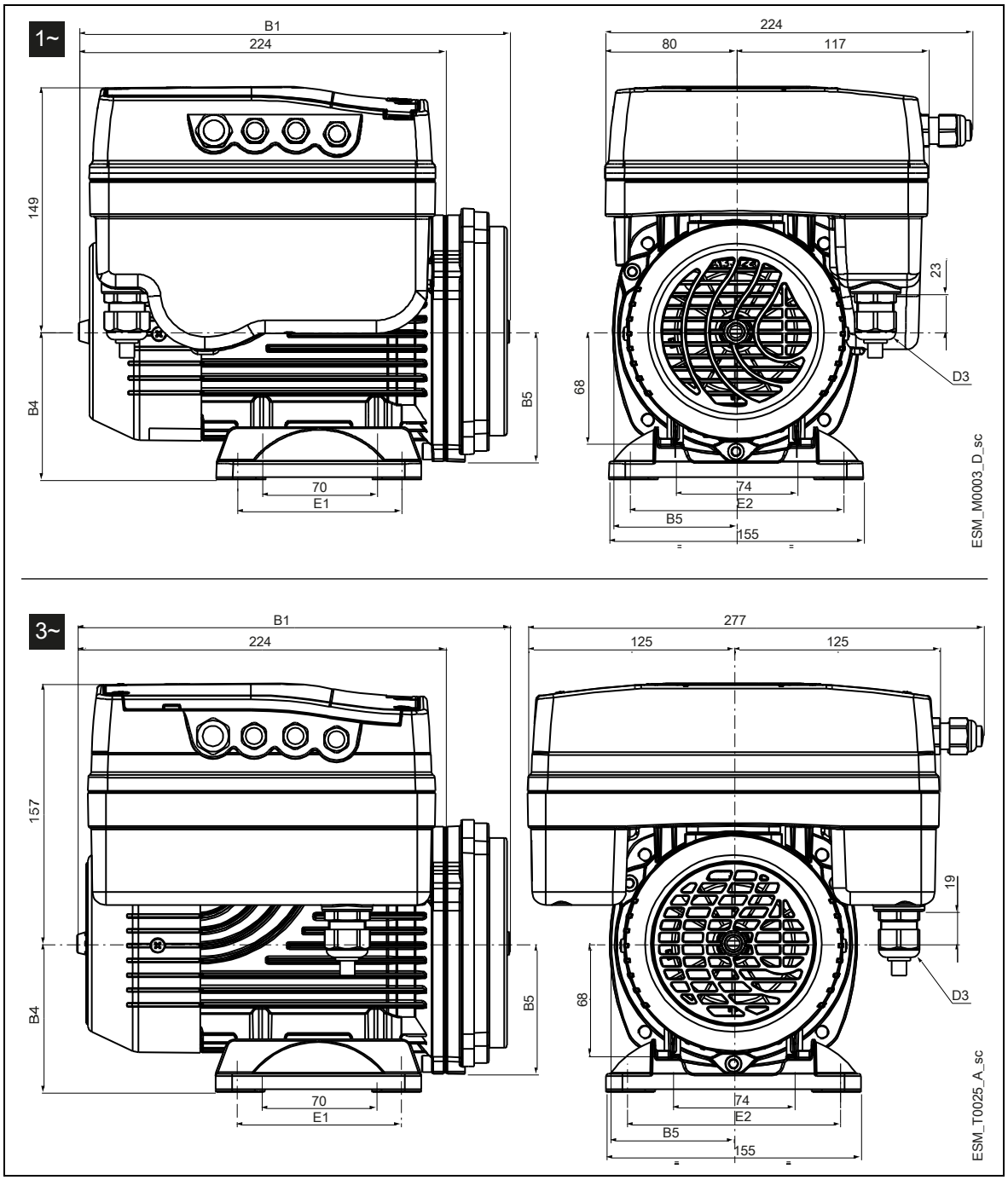


Figure 16: Dimensions

Table 17: Dimensions and weights

Model			Net weight (motor + drive) [kg]					B1	B4	B5	D3	E1	E2
			1~		3~			[mm]					
			103 105 107	111 115	303 305 307	311 315	322						
ESM90R...LNEE			7.4	8.9	13	14.4	16	376	-	79	M20	-	-
ESM90RS8...LNEE			7.3	8.8	12.8	14.2	15.8	343	-	79		-	-
ESM90R...B14-SVE			7.5	9	13.1	14.5	16	292	-	79		-	-
ESM90R...B5			7.5	9	13.1	14.5	16	292	-	100		-	-
ESM80...HMHA	80...HMHA US	80...HMHA EU	7.5	9	13	14.5	16	263	90	79		100	125
ESM80...HMHB	80...HMHB US	80...HMHB EU	7.6	9.2	13.2	14.6	16.1	268	90	80		100	125
ESM80...HMVB	80...HMVB US	80...HMVB EU	7.4	8.9	13	14.4	16	268	-	80		-	-
ESM80...HMHC	80...HMHC US	80...HMHC EU	7.9	9.4	13.4	14.8	16.4	272	90	91		100	125
ESM80...HMVC	80...HMVC US	80...HMVC EU	7.6	9.1	13.2	14.6	16.2	272	-	91		-	-
ESM80...BG			7.3	8.8	12.9	14.3	15.9	282	-	108		-	-
ESM90R...56J			7.5	9.1	13	14.5	16.1	307	89	83	NPT 1/2"	76	124
ESM90R...56C			7.2	8.8	12.6	14.3	15.8	294	-	83		-	-

... = 103, 105, 107, 111, 115, 303, 305, 307, 311, 315, 322
- = motor foot not found

10 Declarations

10.1 EC Declaration of Conformity (Original)

Xylem Service Italia S.r.l., with headquarters in Via Vittorio Lombardi 14 - 36075 Montecchio Maggiore VI - Italy, hereby declares that the product:

Integrated variable speed drive in-line electric pump, with or without pressure transmitters (see adhesive on the first page)

fulfils the relevant provisions of the following European Directives:

- Machinery 2006/42/EC (ANNEX II - natural or legal person authorised to compile the technical file: Xylem Service Italia S.r.l.)
- Eco-design 2009/125/EC, Regulation (EU) no. 547/2012 (water pump) if MEI marked,

and the following technical standards:

- EN 809:1998+A1:2009, EN 60204-1:2006+A1:2009
- EN 50598-1:2014, EN 50598-2:2014+A1:2016

Montecchio Maggiore, 22/03/2017
Amedeo Valente
(Director of Engineering and Research & Development)
rev.02

10.2 EU Declaration of Conformity (No EMCD24)

1. Apparatus model/Product:
   see adhesive on the first page
2. Name and address of the manufacturer:
   Xylem Service Italia S.r.l.
   Via Vittorio Lombardi 14
   36075 Montecchio Maggiore VI
   Italy
3. This declaration of conformity is issued under the sole responsibility of the manufacturer.
4. Object of the declaration:
   Integrated variable speed drive in-line electric pump, with or without pressure transmitters (see adhesive on the first page)
5. The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:
   Directive 2014/30/EU of 26 February 2014 (electromagnetic compatibility)
6. References to the relevant harmonised standards used or references to the other technical specifications, in relation to which conformity is declared:
   EN 60730-1:2011, EN 61800-3:2004+A1:2012 (Category C2), EN 55014-1:2006+A1:2009+A2:2011, EN 55014-2:1997+A1:2001+A2:2008, EN 61000-6-2:2005, EN 61000-6-3:2007+A1:2011
7. Notified body: -
8. Additional information: -

Signed for and on behalf of: Xylem Service Italia S.r.l.
Montecchio Maggiore, 22/03/2017
Amedeo Valente
(Director of Engineering and Research & Development)
rev.01

Xylem Service Italia S.r.l.
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www.xyleminc.com/brands/lowara

LOWARA
a xylem brand