Installation, Operation and Maintenance manual





DOC Submersible pump units



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1 Introduction and Safety

1.1 Introduction

Purpose of this manual

This manual provides information on how to do the following in the correct manner:

- Installation
- Operation
- Maintenance.



CAUTION:

This manual is an integral part of the unit. Make sure to have read and understood the manual before installing the unit and putting it to use. The manual must always be made available to the user, stored in the proximity of the unit, and well kept.

Supplementary instructions

The instructions and warnings of this manual apply to the standard unit as described in the sale documentation. Special version pumps may be supplied with supplementary instruction manuals. For situations not considered in the manual or in the sales document, contact Xylem or the Authorised Distributor.

1.2 Safety

1.2.1 Danger levels and safety symbols

Before using the unit, the user must read, understand and comply with the indications of the danger warnings in order to avoid the following risks:

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

Danger 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.
	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.

Complementary symbols

Symbol	Description
	Electrical hazard
	Hot surface hazard
	Danger, system pressurized
	Do not use flammable liquids
	Do not use corrosive liquids
	Read the instruction manual

1.2.2 User safety

Strictly comply with current health and safety regulations.



WARNING:

This unit must be used only by qualified users. Qualified users are people able to recognise the risks and avoid hazards during installation, use and maintenance of the unit.

Inexperienced users



WARNING:

- For EU countries: this product may be used by children aged 8 years and above and persons with reduced physical, sensory or mental capabilities, or who lack experience and knowledge, provided that they are being supervised and have been instructed on how to use it safely, and understand the hazards involved. Children must not play with the product. Cleaning and maintenance must not be carried out by children without supervision.
- For countries outside the EU: this product is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or who lack experience and knowledge, unless they are being supervised and have been instructed on how to use it by a person responsible for their safety. Children should be supervised to ensure that they do not play with the product.

1.2.3 Protection of the environment

Disposal of packaging and product

Comply with the current regulations on sorted waste disposal.

1.2.4 Sites exposed to ionizing radiations



WARNING: Ionizing radiation hazard

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

2 Handling and Storage

2.1 Handling of the packed unit



WARNING: Crushing hazard (limbs)

The unit and its components may be heavy: risk of crushing.

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WARNING:

Always wear personal protective equipment.



WARNING:

WARNING:

Check the gross weight marked on the packaging.



WARNING:

Take appropriate measures during transport, installation and storage to prevent contamination from external substances.

Handle the unit in compliance with the current regulations on "manual load handling", to avoid

The Manufacturer delivers the unit and its components in a cardboard box.

undesirable ergonomic conditions causing risks of back-spine injury.

2.2 Unit inspection upon delivery

Inspect the package

- 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



CAUTION: Cut and abrasion hazard

Always wear personal protective equipment.

- 1. Remove packing materials from the product.
- 2. Check the unit for integrity and to make sure that there are no missing components.
- 3. In case of damage or missing components, promptly contact Xylem or the Authorised Distributor.

2.3 Unit handling

Lift the unit using the handle.





DANGER: Electrical hazard

Holding the unit by the supply cord or the float switch is strictly forbidden.



WARNING:

During handling, make sure to avoid injury to people and animals, and/or damage to property.

2.4 Storage

Storage of the packed unit

The unit must be stored:

- In a covered and dry place
- Away from heat sources
- Protected from dirt
- Protected from vibrations
- At an ambient temperature between -20°C and 70°C (-4°F and 158°F), and relative humidity between 5% and 95%.

NOTICE:

Do not place heavy loads on top of the unit.

NOTICE:

Protect the unit from collisions.

Long-term storage of the unit

- 1. Fully empty the unit manually by turning it upside down.
- 2. Follow the same instructions for the storage of the packed unit.

For further information about preparation for long-term storage, please contact Xylem or the Authorised Distributor.

3Technical Description

3.1 Designation

Submersible pump units for draining clean or dirty water.

3.2 Data plate



Figure 1: Single-phase



Figure 2: Three-phase

Position number	Description	Position number	Description
1	Model	7	Maximum liquid temperature
2	Flow rate range	8	Rated output
3	Head range	9	Minimum head
4	Motor data	10	Maximum immersion depth
5	Manufacturing date	11	Serial number
6	Pump unit code		

3.3 Identification code



Position number	Description	Notes
1	Series name	
2	Frequency	Empty = 50 Hz 6 = 60 Hz
3	Impeller type	Empty = two-channel VX = vortex
4	Float presence	Empty = with float SG = without float
5	Phase	Empty = single phase T = three-phase
6	Version	
7	Float type	Empty = with float GW = with bell float

3.4 Names of the main components



Position number	Description	Position number	Description
1	Supply cord	5	Cable stop
2	Handle	6	Float switch
3	Discharge port	7	Bell float (DOC GW)
4	Suction filter		

3.5 Intended use

- Drainage of flooded areas
- Emptying of rain water wells storing rain water from rooftops and gutters
- Emptying of tanks and other containers
- Pumping of waste water from washing machines, baths and sinks, from bottom building parts down to sewer level
- Emptying of swimming pools, ponds and fountains
- Irrigation of gardens and vegetable gardens using water from rainwater reservoirs.

Pumped liquids

- Clean water
- Wastewater
- With suspended solids
- With suspended filaments (VX versions only)
- Chemically and mechanically non aggressive
- Non flammable and/or explosive.

Observe the operating limits in **Technical Information** on page 23.

3.6 Improper use



WARNING:

The unit was designed and built for the use described in the Intended Use section. Any other uses are prohibited, as they could compromise the safety of the user and the efficiency of the unit itself.



DANGER:

It is prohibited to use this unit to pump flammable and/or explosive liquids.



DANGER: Potentially explosive atmosphere hazard

It is prohibited to start the unit in environments with potentially explosive atmospheres or with combustible dusts.



DANGER: Electrical hazard

Do not use the unit in swimming pools or similar places when people are inside.

Examples of improper use

- Pumping liquids with long fibres
- Pumping liquids not compatible with the construction materials of the unit
- Pumping liquids with temperatures higher than what shown in **Technical Information** on page 23
- Pumping hazardous, toxic, explosive, flammable or corrosive liquids
- Pumping sea water.

4 Installation

4.1 Precautions

Before starting, make sure that the safety instructions shown in **Introduction and Safety** on page 4 have been fully read and understood.



DANGER:

All the hydraulic and electrical connections must be completed by a technician possessing the technical-professional requirements outlined in the current regulations.

It is prohibited to start the unit in environments with potentially explosive atmospheres or with

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WARNING:

WARNING:

combustible dusts.

Always wear personal protective equipment.

Always use suitable working tools.

DANGER: Potentially explosive atmosphere hazard

WARNING:

When selecting the place of installation and connecting the unit to the hydraulic and electric power supplies, strictly comply with current regulations.

The unit may be used:

- with manual or automatic operation, for example connected to a level switch
- as mobile unit or in permanent installations, for example inside an existing tank or in a prefabricated lifting station.

Dedicated lifting stations are available: contact Xylem or the Authorised Distributor for further information.

4.1.1 Installation area

- 1. Follow the provisions in **Operating environment** on page 23.
- 2. Remove any solid sediments found.
- 3. Check that the bottom is solid, and if possible even.
- 4. If the unit is installed in a tank or a lifting station, check that their sizes are appropriate for the unit and that the perimeter is even and without obstacles.
- 5. If the unit is fitted with a float, check that the tank or lifting station sizes do not impair the free movement of the float.

The figure shows the minimum sizes of the tank or the lifting station, depending on model.





Model	H, mm (in)	L, mm (in)
3	330 (12.9)	400 (15.7)
7	370 (14.6)	400 (15.7)
7VX	395 (15.6)	400 (15.7)
3 GW	330 (12.9)	220 (8.7)
7 GW, 7WX GW	370 (14.6)	220 (8.7)

4.1.2 Permitted positions



4.2 Start and stop levels

The float switch controls the start and stop of the unit (intermittent operation)

NOTICE:

The unit may only operate for a few minutes while only partially submerged in the liquid, for example during emptying operations.

DOC3, DOC7, DOC7VX

To adjust the level difference between start and stop, change the length of the float cable using the cable stop found on the handle:

- Short cable: decrease the distance between minimum and maximum level, more frequent starts and stops
- Long cable: increase the distance between minimum and maximum level, less frequent starts and stops.

The figure shows the minimum (H1) and the maximum (H2) permitted levels for operation depending on the model.



Model	H1, mm (in)	H2, mm (in)
3	50 (2)	310 (12.2)
7	90 (3.5)	350 (13.8)
7VX	115 (4.5)	375 (14.8)

DOC3 GW, DOC7 GW, DOC7VX GW

The level difference between start and stop cannot be adjusted. The figure shows the minimum (H1) and the maximum (H2) permitted levels for operation depending on the model.



Model	H1, mm (in)	H2, mm (in)	
3 GW	56 (2.2)	131 (5.2)	
7 GW	96 (3.8)	171 (6.7)	
7VX GW	121 (4.8)	196 (7.7)	

4.3 Hydraulic connection



DANGER:

All the hydraulic and electrical connections must be completed by a technician possessing the technical-professional requirements outlined in the current regulations.



DANGER: Electrical hazard

Holding the unit by the supply cord or the float switch is strictly forbidden.



WARNING:

Piping must be sized to ensure safety at the maximum operating pressure.



WARNING:

Install appropriate seals between the unit couplings and the pipings.

4.3.1 Guidelines for the hydraulic system

- 1. Attach the piping, rigid or flexible, to the discharge port.
- 2. Support the piping independently to prevent it from weighing on the unit.
- 3. Install a check valve on the pipes.
- 4. Install a gate valve downstream the check valve.

For units without float to be used for automatic operation, install a device stopping the unit when the liquid level reaches the minimum permitted limit, see **Start and stop levels** on page 14.





Position number	Description	Position number	Description
1	Gate valve	5	Electric supply cord
2	Check valve	6	Discharge pipe
3	Tank	7	Unit
4	Float		

4.4 Electrical connection



DANGER:

All the hydraulic and electrical connections must be completed by a technician possessing the technical-professional requirements outlined in the current regulations.



DANGER: Electrical hazard

Before starting work, check that the unit is unplugged and that the pump unit, the control panel and the auxiliary control circuit cannot restart, even unintentionally.

4.4.1 Ground



DANGER: Electrical hazard

Always connect the external protection conductor (ground) to the ground terminal before attempting to make any other electrical connections.



DANGER: Electrical hazard

Connect the pump unit and any electric accessories to a socket with protection conductor (ground).



DANGER: Electrical hazard

Check that the external protection conductor (ground) is longer than the phase conductors; In case of accidental disconnection of the unit from the phase conductors, the protection conductor must be the last one to detach itself from the terminal.



DANGER: Electrical hazard

Install suitable systems for protection against indirect contact, in order to prevent lethal electric shocks.

4.4.2 Guidelines for electrical connection

- 1. Check that:
 - The mains voltage and frequency match the specifications on the data plate
 - The supply cord is protected from high temperatures, vibrations, collisions and abrasions.
- 2. Check that the power supply line is provided with:
 - a short circuit protection device of appropriate size
 - a mains disconnection device with contact opening distance ensuring complete disconnection for overvoltage III category conditions
 - an RCCB earth leakage switch with tripping current < 30 mA.

4.4.3 Guidelines for the control electric panel

NOTICE:

The electric panel must match the ratings on the unit data plate. Improper combinations could damage the motor.

Motor	Safety features
Single-phase	 Automatic reset thermal-ampere protection, in-built (motor protector) From short circuit, by the installer: aM fuses (motor start-up), or thermal magnetic switch with C curve and Icn ≥ 4.5 kA, or other similar device.
Three-phase	 Thermal, by the installer: trip class 10 A overload thermal relay + aM fuses (motor start-up), or start class 10 A motor protection thermal magnetic switch From short circuit, by the installer: aM fuses (motor start-up), or thermal magnetic switch with C curve and Icn ≥ 4.5 kA, or other similar device.

• If required, install phase failure sensitive thermal relays.

Motor protection from overtemperature

- Single-phase: the unit is equipped with built-in capacitor and thermal overload protection, and stops automatically in case of overtemperature. After 2-4 minutes the thermal overload protection gives the restart consent.
- Three-phase: Install an appropriate motor protector with D curve in the control panel, in accordance with the current shown in the data plate.

5 Use and operation

5.1 Precautions



DANGER: Electrical hazard

DANGER: Electrical hazard

Using the unit outdoors with a cable less than 10 m (32 ft) long is forbidden.

Do not use the unit in swimming pools or similar places when people are inside.



WARNING: Electrical hazard

Check that the unit is properly connected to the mains power supply.



DANGER: Injuries hazard

Do not insert your hands at the bottom of the unit when in operation: risk of personal injury caused by moving components.



The unit, equipped with a single-phase motor with automatic reset thermal overload protection, could restart inadvertently after it has cooled down: risk of physical injury.



It is prohibited to put combustible materials near the unit.

WARNING:



WARNING:

Do not hold the unit by the handle during operation.

WARNING:

Make sure that the drained liquid cannot cause damage or injuries.

NOTICE:

Dry run of the unit is forbidden.

NOTICE:

Make sure that the suction port is completely submerged in the liquid before start-up.

NOTICE:

The unit may only operate for a few minutes while only partially submerged in the liquid, for example during emptying operations.

See Mechanical characteristics on page 23.

5.2 Checking the direction of rotation (three-phase motors)

- 1. Place the unit in the vertical position on a level and flat surface.
- 2. Looking at the unit from the top, start and then stop it immediately: the rotation direction is correct if the unit impulse movement at start-up tends to turn it clockwise. This means that the motor is turning clockwise as it should.



5.3 Starting and stopping

Float switch version

- 1. Connect the plug to the mains and/or turn on the switch: depending on the position of the float, the unit stays idle or starts to operate.
- 2. With the unit in operation, check that:
 - No liquid is leaking from the pipes
 - There is no unwanted noise or vibrations
 - There are no vortexes nearby the suction port
 - Liquid is actually being pumped.
- 3. When the float reaches the low position (minimum liquid level), the pump automatically stops.

Version without float switch

- 1. Connect the plug to the mains and/or turn on the switch: the unit starts.
- 2. With the unit in operation, complete the same checks as for the float version.
- 3. Once the unit has taken up liquid to the minimum level, disconnect the plug from the mains and/or turn off the switch to switch it off.

6 Maintenance

6.1 Precautions

Before starting, make sure that the instructions shown in **Introduction and Safety** on page 4 have been fully read and understood.



WARNING:

Maintenance must be done by a technician possessing the technical-professional requirements outlined in the current regulations.



WARNING:

Always wear personal protective equipment.



WARNING:

Always use suitable working tools.



DANGER: Electrical hazard

Before starting work, check that the unit is unplugged and that the pump unit, the control panel and the auxiliary control circuit cannot restart, even unintentionally.

6.2 Maintenance every 6 months of operation

- 1. Check the integrity of the supply cord; if the cable is damaged contact Xylem or the Authorised Distributor for its replacement.
- 2. Carefully clean the unit, particularly near the suction port.

6.3 Long periods of inactivity

- 1. Rinse the unit with soft water.
- 2. Empty the unit and the piping.
- 3. Put the unit out of service.
- 4. Protect the unit against freezing.

6.4 Spare parts ordering

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.

7 Troubleshooting

7.1 Precautions



WARNING:

Maintenance must be done by a technician possessing the technical-professional requirements outlined in the current regulations.

WARNING:

Observe the safety requirements in the chapters on Use and Operation and Maintenance.



WARNING:

If a fault cannot be corrected or is not mentioned, contact Xylem or the Authorised Distributor.

7.2 The unit does not start

Cause	Remedy		
Power supply cut off	Restore the power supply		
Float low	Adjust the float		
Fuses blown	Replace fuses		
The thermal overload protection of the motor has been triggered	 Reset the thermal overload protection on the control panel, and/or Check the liquid level, and/or Disconnect the electric power supply and wait 2 minutes before reconnecting it 		
Supply cord is damaged	Contact Xylem or the Authorised Distributor for the replacement		
Control panel faulty	Check and repair or replace the control panel		

7.3 The thermal overload protection triggers

Cause	Remedy		
High liquid temperature	Contact Xylem or the Authorised Distributor		
Presence of solid or fibrous substances in the liquid (unit overload)	Remove the substances		
It is calibrated at a value too low in relation to the rated current of the motor	Recalibrate		
Input voltage outside the rated limits	Make sure the voltage values are correct		
Unbalanced input voltage	Make sure the voltage of the three phases is balanced		
Wrong working curve (flow rate below or above the permitted limits)	Bring the flow rate back within the permitted limits		
Impeller seized	Contact Xylem or the Authorised Distributor		
Motor turns in the wrong direction	Check the direction of rotation and change it if necessary		
Motor or cable short circuit	Contact Xylem or the Authorised Distributor		

7.4 The unit runs but there is little or no flow rate

Cause	Remedy	
Tank liquid level too low	Increase the installation depth, and/orAdjust the float	
Foreign bodies in the unit	Remove the foreign bodies	
Discharge pipe throttled	Remove the throttling	
Piping and/or unit clogged	Remove the clogging	
Undersized unit	Contact Xylem or the Authorised Distributor	

7.5 The unit never stops

Cause	Remedy
Motor turns in the wrong direction	Check the direction of rotation and change it if necessary
Float not adjusted correctly	Adjust the float
The float cannot move freely	Release the float
Float faulty	Contact Xylem or the Authorised Distributor
Undersized unit	Contact Xylem or the Authorised Distributor
Impeller worn	Contact Xylem or the Authorised Distributor

8Technical Information

8.1 Operating environment

Non-aggressive, non-explosive atmosphere, and not subjected to frost.

Temperature of pumped liquid

0 to 40°C (32 to 104°F).

NOTICE:

If the temperature exceeds the stated limits, contact Xylem or the Authorised Distributor.

Suspended impurities

Model	Maximum diameter, mm (in)
DOC	≤ 10 (0.4)
DOC VX	≤ 20 (0.8)

8.2 Maximum head

Frequency Hz	Model	Head, m (ft)	
50	3CG	6.9 (23)	
	7CG, 7T	11.1 (36)	
	7VXCG, 7VXXT	7.2 (24)	
60	36CG	6.8 (22)	
	76CG, 76T	10.6 (35)	
	76VXCG, 76VXT	6.7 (22)	

8.3 Maximum number of starts per hour

40.

8.4 Mechanical characteristics

Electric supply cord length

10 m (33 ft)

Minimum pumped liquid level

NOTICE:

Make sure that the suction port is completely submerged in the liquid before start-up.

Model	1~		3~	Minimum level of the unit	
	With and without float	With bell float		support base, mm (in)	
DOC with shallow suction device (optional)	•	•	•	3 (0.12)	
DOC	•	•	•	20 (0.8)	
DOC VX	•		•	45 (1.8)	

Maximum immersion depth

5 m (16 ft)

NOTICE:

The supply cord must be at least 3 m (10 ft) out of the liquid.

Protection class

IPX8.

8.5 Electrical specifications

Permitted tolerances for the supply voltage

Frequency Hz	Phase ~	No. of conductors + earth	UN, V ± %
50	1	2 - 1	220-240 ± 6
	3	3 - 1	230/400 ± 10
60	1	2 - 1	220-230 ± 6
	3	3 - 1	220/380 ± 5

8.6 Sound pressure

Unit position	LpA sound pressure level measured in free field at a distance of one metre, dB \pm 2		
Submerged	Non-applicable		
Partially submerged	< 70 dB (A)		

8.7 Dimensions and weights





DOC_M0010_A_ph

Model	A, mm (in)	B, mm (in)	C, mm (in)	Weight, kg (lb)
3, 3 GW	245 (9.64)	188 (7.40)	155 (6.10)	4 (8.8)
7, 7 GW	285 (11.22)	228 (8.98)	155 (6.10)	6 (13.2)
7VX	310 (12.20)	252 (9.92)	175 (6.89)	6 (13.2)

9 Disposal

9.1 Precautions



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WARNING:

The unit must be disposed of through approved companies specialised in the identification of different types of materials (steel, copper, plastic, etc.).

WARNING:

It is prohibited to dispose of lubricating fluids and other hazardous substances in the environment.

10Declarations

10.1 EC Declaration of Conformity (Original)

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

Pump unit (see the label on the Safety and Other Information manual)

fulfils the relevant provisions of the following European Directive:

 Machinery 2006/42/EC (ANNEX II - natural or legal person authorised to compile the technical file: Xylem Service Italia S.r.l. - Via Vittorio Lombardi 14 36075 Montecchio Maggiore VI - Italy)

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and the following technical standards: EN 809:1998+A1:2009, EN 60335-1:2012+A11:2014, EN 60335-2-41:2003+A1:2004+A2:2010¹, EN 62233:2008

Montecchio Maggiore, 12/06/2018

Amedeo Valente (Director of Engineering and R&D)

rev.01

10.2 EU Declaration of Conformity (n. EMCD30)

- 1. Apparatus model/Product: see the label on the Safety and Other Information manual
- 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: Pump unit
- 5. The object of the declaration described above is in conformity with the relevant Union harmonization legislation:
 - 2014/30/EU Directive of 26 February 2014 (electromagnetic compatibility)
- References to the relevant harmonized standards used or references to the other technical specifications, in relation to which conformity is declared: EN 61000-6-1:2007, 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, 12/06/2018

Amedeo Valente (Director of Engineering and R&D)

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Lowara is a trademark of Xylem Inc. or one of its subsidiaries.

¹ Except section 25.8 for models with supply cords of less than 10 m (33 ft)

11Warranty

11.1 Information

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

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 innovative solutions to meet our world's water needs. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. We move, treat, analyze, and return water to the environment, and we help people use water efficiently, in their homes, buildings, factories and farms. 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, backed by a legacy of innovation.

For more information on how Xylem can help you, go to www.xylem.com

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