

Installation, Operation
and Maintenance Manual



ENM 10

FLYGT
a xylem brand

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Introduction and Safety

Introduction



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.
- Observe accident prevention regulations in force.
- Save this manual for future reference, and keep it readily available at the location of the unit.

Purpose of this manual

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

- Installation
- Operation
- Maintenance

Safety

Precautions



WARNING:

- The operator must be aware of safety precautions to prevent physical injury.
- You must observe the instructions contained in this manual. Failure to do so could result in physical injury, damage, or delays.
- 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.[R]
- A certified electrician must supervise all electrical work. Comply with all local codes and regulations. [R]


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
- Product malfunction

Hazard levels

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

Hazard level	Indication
 WARNING:	A hazardous situation which, if not avoided, could result in death or serious injury
 CAUTION:	A hazardous situation which, if not avoided, could result in minor or moderate injury
NOTICE:	<ul style="list-style-type: none"> • A potential situation which, if not avoided, could result in undesirable conditions • A practice not related to personal injury

Electrical hazards

Electrical hazards are indicated by the following specific symbol. This symbol warns for presence of a dangerous voltage.



Electrical Hazard:

User safety and health

Introduction

All government regulations, local health and safety directives must be observed.

Prevent danger due to electricity

All danger due to electricity must be avoided. Electrical connections must always be carried out in compliance with the following:

- The standard connections shown in the product documentation that is delivered together with the product
- All international, national, state, and local regulations. (For details, consult the regulations of your local electricity supplier.)

For more information about requirements, see sections dealing specifically with electrical connections.

Product warranty

Coverage

Xylem undertakes to remedy faults in products from Xylem under these conditions:

- The fault is due to defects in design, materials, or workmanship.
- The fault is reported to a Xylem representative within the warranty period.
- The product is used only under the conditions described in this manual.
- All service and repair work is done by qualified and authorized personnel. All modifications must be done by qualified technicians.
- Genuine Xylem parts are used.

Limitations

The warranty does not cover faults caused by these situations:

- Deficient maintenance
- Improper installation
- Modifications or changes to the product and installation made without consulting Xylem

Introduction and Safety

- Incorrectly executed repair work
- Normal wear and tear

Xylem assumes no liability for these situations:

- Bodily injury
- Material damage
- Economic loss

Warranty claim

Xylem products are high quality products with expected reliable operation and long life. However, should the need arise for a warranty claim, then contact your Xylem representative.

Qualification of personnel

All work on the product should be carried out by certified electricians or Xylem authorized mechanics.

Xylem disclaims all responsibility for work done by untrained, unauthorized personnel.

Support

Xylem only supports products that have been tested and approved. Xylem does not support unapproved equipment.

Product Description

Introduction

Product description

The ENM-10 is the simplest possible method for level control. A mechanical switch in a plastic casing, freely suspended at the desired height from its own cable. When the liquid level reaches the regulator, the casing will tilt and the mechanical switch will close or break the circuit, thereby starting or stopping a pump or actuating an alarm device. No wear, no maintenance. In sewage pumping stations, for ground water and drainage pumping – in fact, for most level control applications – the ENM-10 is the ideal solution.

Liquid density

The product is available in different versions for different liquid densities.

Temperature limit

The regulator can withstand up to 60°C (140°F).

Manual coverage

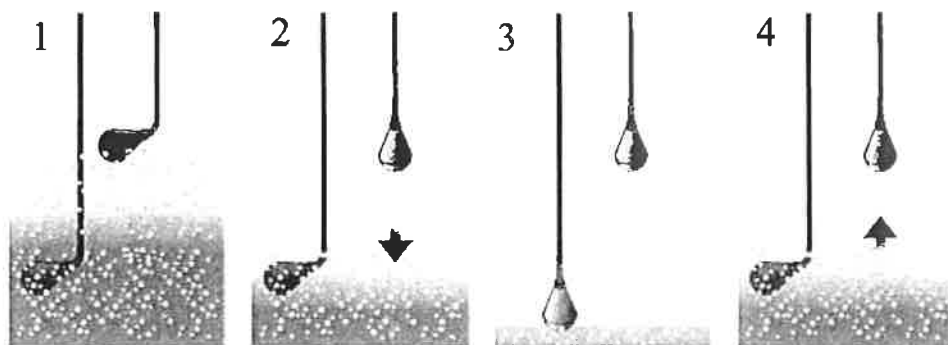
This manual is applicable to the following versions:

- Standard version Blue casing of ENM-10
- EX-version Black casing of ENM-10.

Available languages

For manuals in other languages, visit tpi.xyleminc.com

Process description



WS004996A

1. When the pumped media reaches a predetermined level, the upper level regulator tips over to horizontal position and the pump starts to drain the basin.
2. The basin is drained of fluid.
3. The pump stops when the lower level regulator returns to the vertical position.
4. The basin fills up again. The process restarts.

Material

Standard version

Part	Material
Regulator casing	Polypropylene
Cable sheath	PVC or Nitrile/PVC rubber compound

The plastic components are welded and screwed together. Adhesive is never used. Impurities and deposits will not adhere to the smooth casing.

EX-version

The version for Ex-applications has a black casing, made conductive by adding carbon to the polypropylene.

Cable lengths

For liquids with specific density between 0.95 and 1.10 g/cm³, the following cables are available:

Version	Lengths m (ft)
Standard	<ul style="list-style-type: none"> • 6 m (20 ft) • 13 (42) • 20 (65) • 30 (100) • 50 (167)
Ex-version	<ul style="list-style-type: none"> • 6 m (20 ft) • 13 (42) • 20 (65) Nitrile/PVC rubber cable

Electrical data

Country	Electrical data
Canada	5 A, 250 V, DC 10 A, 250 V, AC
Denmark	10 A, 250 V, AC
Switzerland	6 A, 250 V, AC
Sweden	10 A, 230 V, AC Resistive load 3 A, 250 V, AC Inductive load 5 A, 30 V, DC Resistive load *1 mA, 5 V, DC, Gold Contact

* Part no: 594 79 19 and 594 79 20

Micro switch

The level regulator contains a micro switch, max rated 250 VAC/10 A.

Low-voltage supply

In many cases, local codes require that the regulator is connected to a low-voltage supply, even though it is approved for a higher voltage.

It is recommended that the regulator is connected to a low-voltage supply, 48 V or 24 V, and a protective transformer.

Electrical data for Ex-approved installation -

Description	Data
Maximum input voltage, U_i	30 V
Maximum input current, I_i	100 mA
Maximum input power, P_i	1.2 W
Depth of immersion	Max 20 m

For cable

Description	Data
Maximum internal capacitance, C_i :	1.8 nF
Maximum internal inductance, L_i :	10 μ H

Installation

There are special rules that apply to installation in an explosive atmosphere. Intrinsically safe circuits are normally required: Ex i. Use a EX-safety barrier, for example, Prod. No. 84 01 07.

Approvals

CE, CSA, SEMKO, NEMKO, DEMKO, EX

LVD approval according to EN61058

CSA approval: Cert No. 1330172

Cl.I Zone 0, Gr. IIC;

CL.I Div.1 Gr A, B, C and D

Cl.II Gr. E, F and G

Cl.III when installed to the certified Intrinsically Safe relay, Ex ia, rated for the locations per submitter control drawing and installation manual.

Ex-approvals

IECEX ia IIC T4 Ga: $-20^{\circ}\text{C} < \text{Ta} < 60^{\circ}\text{C}$

IECEX NEMKO 09.008

ATEX II 1G ia IIC T4

NEMKO 10ATEX 1082

Applied standards

- EN 60079-0:2009/IEC 60079-0:2007
- EN 60079-11:2007/IEC 60079-0:2006
- EN 60079-26:2007/IEC 60079-26:2006

Intrinsically safe circuits are required for the automatic control system.

Use a Ex-safety barrier: For example, Prod. No. 84 01 07



Mechanical Installation

Precautions



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

General

To conform to local regulations, the regulators are normally connected through a transformer to a low-tension control circuit.

Make sure that two regulators are used, one for starting and one for stopping.

If an alarm is required at a given level, then connect a third regulator.

Identical regulators can be used for all functions.

Make sure that the cables do not become tangled during the installation.

The regulator cables must hang freely from each other.

Electrical Installation

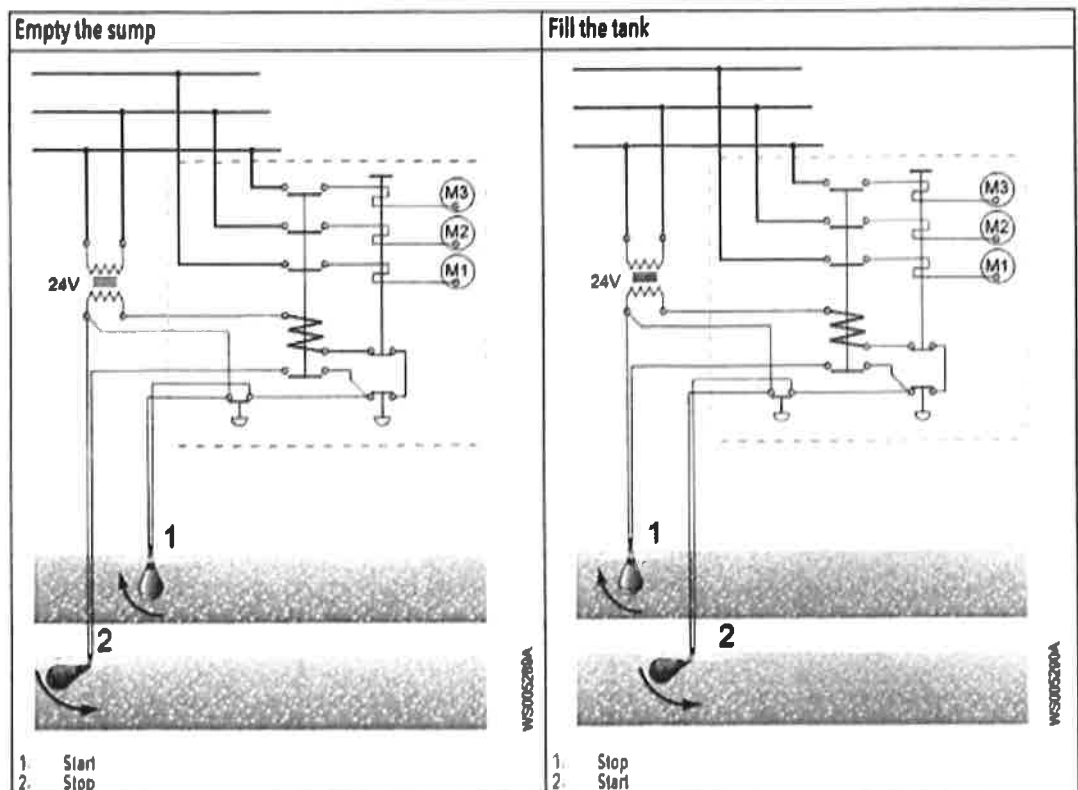
Precautions



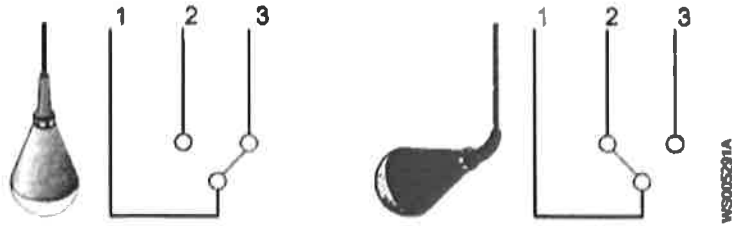
WARNING:

- 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. [R]
- 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. [R]
- A certified electrician must supervise all electrical work. Comply with all local codes and regulations. [R]
- All electrical equipment must be grounded (earthed). Make sure that the ground (earth) lead is correctly connected by testing it. [R]
- Make sure that all unused conductors are insulated. [R]

Wiring diagrams



Connection table



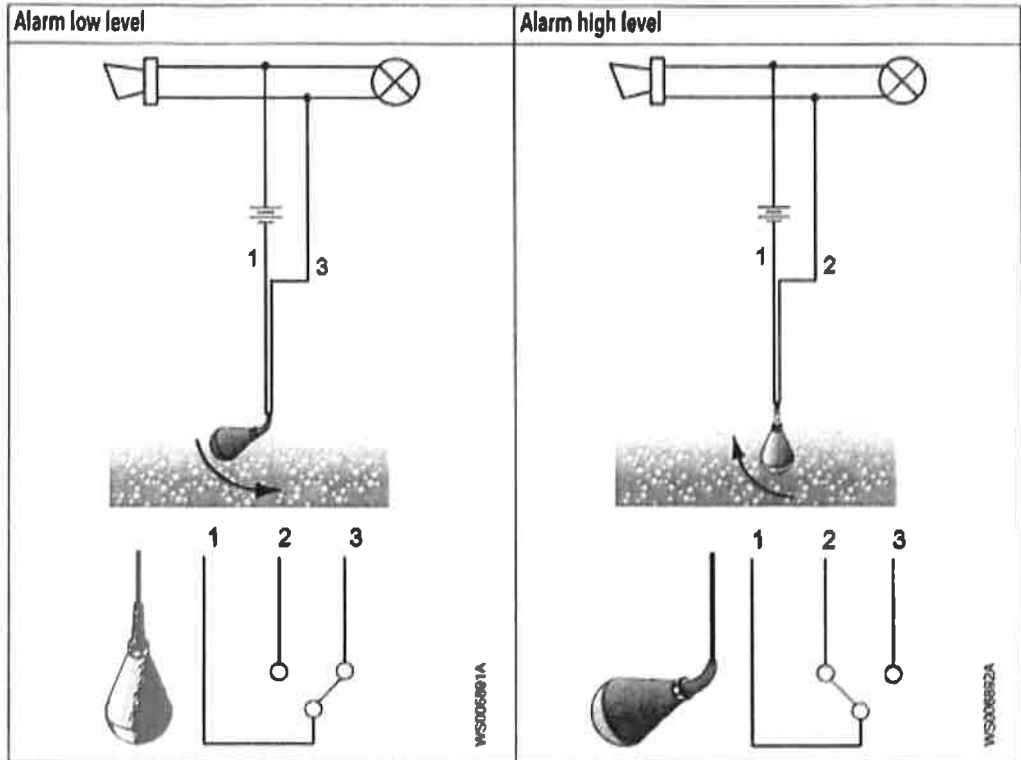
Cable	Connections to empty a sump	Connections to fill a tank
1	X	X
2	X	Insulate
3	Insulate	X

Color code

Cable	1	2	3
Color	EU: Grey US: Red	Black	EU: Brown US: White

Connection for audible or visible alarm

Wiring diagrams



Description of position

Cable	1	2	3
Alarm high level	X	X	Insulate
Alarm low level	X	Insulate	X

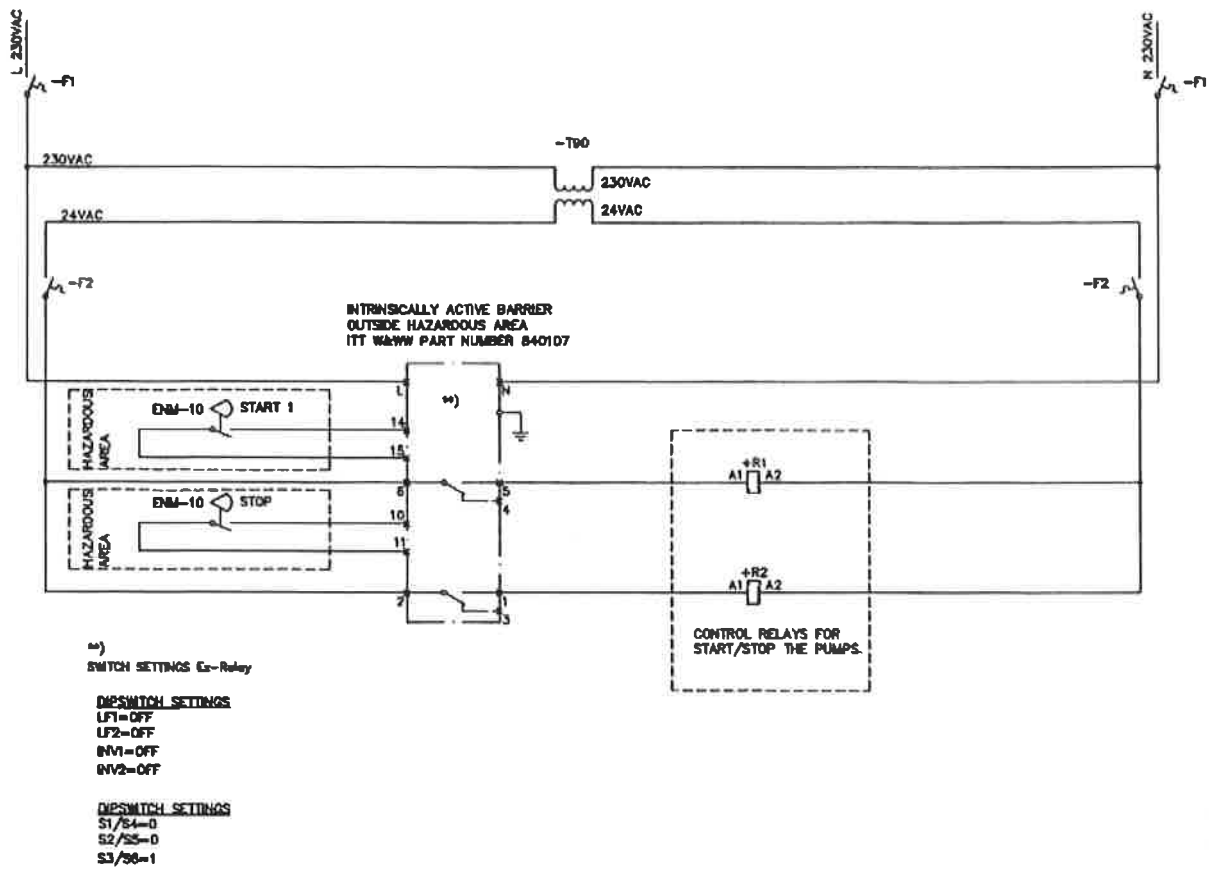
Color code

Cable	1	2	3
Color	EU: Grey US: Red	Black	EU: Brown US: White

Ex-installation

EX-safety barrier

Intrinsically safe circuits are required for the automatic control system. EX-safety barrier (Prod. No. 84 01 07) must be installed.



Maintenance

General

To ensure its continual operation:

- Clean the product, especially when fat/grease covers the plastic surface
- Make an ocular inspection of the regulator. Make sure neither cable, protective sleeve or plastic casing show any signs of damage.
- A damaged regulator cannot be repaired in any way, due to the hermetic encapsulation. If the product is found to be damaged, replace it with a new one

EX-Installations

Make absolutely sure that the Ex-barrier is operating correctly.

- The LED changes when the switch is toggled.

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

We're 12,500 people 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 xyleminc.com

Refer to www.xylemwatersolutions.com/contacts/ for contact details of your local sales and service representative.



Xylem Water Solutions
Manufacturing AB
361 80 Emmaboda
Sweden
Tel: +46 471 24 70 00
Fax: +46 471 24 74 01
<http://tpi.xyleminc.com>

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

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Installation and Operating
Manual

EN

Installations- och
drifhandbok

SE



LTU601

FLYGT
a xylem brand

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1 Introduction and Safety

1.1 Introduction

Purpose of the manual

The purpose of this manual is to provide necessary information for installation, operation, and maintenance of the unit.

Read and keep the manual

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



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.

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.




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

Hazard level	Indication
NOTICE:	Notices are used when there is a risk of equipment damage or decreased performance, but not personal injury.

Special symbols

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

Electrical Hazard	Permanent-magnet hazard
 Electrical Hazard:	 CAUTION:

1.3 User safety

Introduction

All government regulations, local health and safety directives must be observed.

Prevent danger due to electricity

All danger due to electricity must be avoided. Electrical connections must always be carried out in compliance with the following:

- The standard connections shown in the product documentation that is delivered together with the product
- All international, national, state, and local regulations. (For details, consult the regulations of your local electricity supplier.)

For more information about requirements, see sections dealing specifically with electrical connections.

Power lock-out



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.

Qualification of personnel



WARNING: Electrical Hazard

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

All work on the product must be carried out by certified electricians or Xylem authorized mechanics.

Xylem disclaims all responsibility for work done by untrained, unauthorized personnel.

1.4 Disposal of packaging and product

Observe the local regulations and codes in force regarding sorted waste disposal.

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.

1.6 Warranty

For information about warranty, see the sales contract.

1.7 Support

Xylem only supports products that have been tested and approved. Xylem does not support unapproved equipment.

2 Product Description

2.1 General description

The package

The package includes:

- Level transmitter unit sensor
- Cable holder

About the level sensor

The level sensor is designed for submerged measuring of liquid levels in open channels, drains, or tanks.

Operating in both clean, and heavily polluted, viscous fluids, suitable applications include pump stations, sewage plants, waterworks, and industrial process tanks.

Signal output is a standard 4-20 mA direct current, proportional to the measured level.

Features

- Durability and high resistance to grime, deposits, and chemicals due to seamless encapsulated design, and choice of materials
- 2-wire 4-20 mA, passive signal cable with pressure equalizing tubing
- Steel reinforced cable provides tensile strength.
- Cable lengths for the standard measuring ranges: 12 m (39.37 ft) cable for 0-3 m (0-98.4 ft), 0-5 m (0-16.4 ft), and 0-10 m (0-32.8 ft) ranges.

Available languages

For manuals in other languages, visit <http://tpi.xyleminc.com>.

2.2 Approvals and standards

CE conformity

Directive	Description
The EMC directive	In accordance with EN 61000-6-1:1999, EN 61000-6-2:1999, EN 61000-6-3:2001, EN 61000-6-4:2001
Ingress protection rating	IP 68

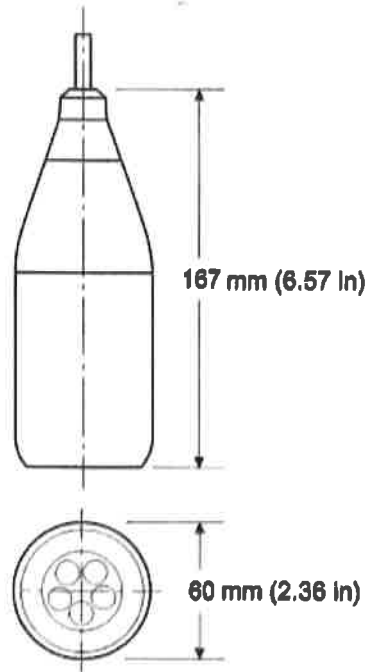
2.3 Wiring and parts

Wiring

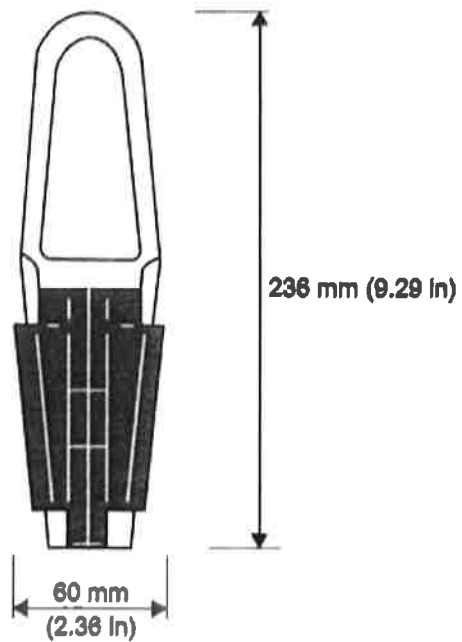
Wire color	Description
Red or white	+ 10-30 V DC
Brown	Signal/4 - 20 mA
Black	Signal ground/shield (P/E connection)

2 Product Description

Sensor body dimensions



Cable fitting dimensions



The image shows the dedicated cable fitting for the free-hanging sensor unit.

3 Mechanical Installation

Precautions

Before starting work, make sure that the safety instructions in the chapter *Introduction and Safety* (page 2) have been read and understood.

3.1 Mounting configuration

The level sensor is submersible.

- When it hangs free from the cable with dedicated suspension attachment, it is not position-dependent.¹

3.2 Mount the unit

1. Lower the sensor carefully into the liquid media so that it penetrates the surface slowly.
Never drop the sensor into the liquid or allow it to fall freely.
2. Continue lowering the sensor until it reaches its working position, which is at the bottom of its range (≥ 4 mA).
Do not exceed this depth.
3. Where applicable, secure the sensor to the cable holder.

3.3 Care and handling

The level sensor is of a robust construction through choice of materials and design, making it tolerant of chemical and mechanical damage. However, precautions must be taken to avoid corrosive media, over-pressure, and sharp impact.

Low pH

Acidic conditions in the media, for example $\text{pH} < 4$, can reduce the life span of the sensor. For more information, please contact your local sales and service representative.

Cleaning

If needed, carefully clean the sensor and rinse in a mild detergent.

Mechanical damage

Direct probing of the diaphragm can damage the sensor, voiding the warranty. Never allow the sensor to fall into the liquid, or deliberately drop it into the liquid.

¹ In case of turbulence, the sensor can be immersed in a pipe, with inside diameter minimum 65 mm (2.56 in)

4 Electrical Installation

Precautions

Before starting work, make sure that the safety instructions in the chapter *Introduction and Safety* (page 2) 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: Electrical Hazard

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



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.



CAUTION: Electrical Hazard

Prevent cables from becoming sharply bent or damaged.

4.1 Connect the sensor

The sensor is connected to the 4-20 mA input.

1. Connect the red or white wire to the power + 10-30 V DC terminal.
2. Connect the brown wire to the signal/4- 20 mA terminal.
3. Connect the black wire to the signal ground/shield terminal (P/E connection).

4.2 Increase the cable length

When the supplied cable length is insufficient, observe the following:

- Due to the pressure equalization hose in the cable, it cannot be spliced directly to another cable. Instead, use the junction box for this purpose (Part number 839505).
- Use a shielded cable, to safe guard against electrical disturbance. Signal cables must never be run in the proximity of power cables.

5 Technical Reference

5.1 Technical data

Electrical specifications

Feature	Description
Measuring principle	Piezoresistive
Supply voltage	10-30 V DC
Output signal	2-wire 4-20 mA, passive transmitter
Linearity / Stability	Better than $\pm 0.5\%$ FS / $\pm 0.1\%$ FS
Measurement accuracy	Better than $\pm 0.25\%$ FS @ 10-30 °C (50-86 °F) Better than $\pm 0.5\%$ FS @ full temperature range
Long time stability	Better than $\pm 0.5\%$ FS per year

Temperature specifications

Feature	Description
Process medium temperature	Nominal -10-60°C (14-140°F)
Temperature deviation, zero point	Better than $\pm 0.02\%$ / °C
Temperature deviation, full range	Better than $\pm 0.02\%$ / °C

Materials specifications, standard

Component	Description
Sensor body, including plastic encapsulation	Stainless steel 1.4404 AISI 316 L, Polypropylene (PPS)
Diaphragm	Stainless steel 1.4404 AISI 316 L
Cable	2 x 0.5 mm (0.078 x 0.02 in) (pressure), 5 x 0.15 mm (0.19 x 0.006 in) (data), shielded, Polyurethane rubber (PUR)

5.2 Sensor variants

Measuring ranges specifications

To order, refer to the part numbers listed.

Nominal measuring range, mWG	0-2 m (0-6.56 ft)	0-3 m (0-9.84 ft)	0-5 m (0-16.4 ft)	0-10 m (0-32.81 ft)
Part number; For free hanging mounting, 6 m (19.68 ft)cable	-	834525	-	-
Part number; For free hanging mounting, 12 m (39.37 ft)cable	-	834521	834522	834523
Part number; For free hanging mounting, 20 m (65.61 ft)cable	840033	-	834537	834538
Part number; For free hanging mounting, 35 m (114.83 ft)cable	840034	-	-	-
Part number; For free hanging mounting, 65 m (213.25 ft)cable	840035	-	-	-
Part number; With threaded connection for pipe mounting, 12 m (39.37 ft)cable	-	834527	834528	834529

- Minimum programmable range 0-2 m (0-6.56 ft)
- Maximum programmable range 0-12 m (0-39.37 ft)
- Maximum overpressure 3 bar

Optional part numbers

Part number	Option
834526	Copper ring
Unique part number per order	Non-standard cable lengths
Unique part number per order	Non-standard measuring range

Accessories and spare parts

Part number	
834530	Operator panel, for level indication
839505	Junction box, for cable with pressure equalization hose, including surge arrester
Unique part number per order	Cable (spare)
832174	Cable holder (spare)

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

We're 12,500 people 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 xylem.com

Refer to www.xylemwatersolutions.com/contacts/ for contact details of your local sales and service representative.

xylem
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Xylem Water Solutions
Manufacturing AB
361 80 Emmaboda
Sweden
Tel: +46-471-24 70 00
Fax: +46-471-24 47 01
<http://tpi.xylem.com>

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

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