xylem
Let's Solve Water

Installation, Operation, and Maintenance Manual

899751_16.0

ENM 10

Level switch

FLYGT
a xylem brand

Table of Contents

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.

The equipment, and its functioning, may be impaired if used in a manner not specified by the manufacturer.

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		Magnetic fields 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.

1.3.1 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.

1.3.2 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.

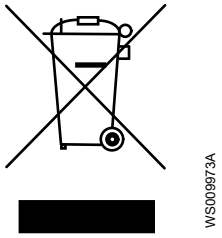
Xylem disclaims all responsibility for work done by untrained, unauthorized personnel.

1.4 End-of-life product disposal

Handle and dispose of all waste in compliance with local laws and regulations.

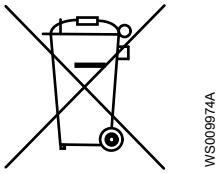
EU and UK only: Correct disposal of this product — waste electrical and electronic equipment

- EU: Directive 2012/19/EU on waste electrical and electronic equipment (WEEE)
- UK: SI 2013 No. 3113



This marking on the product, accessories, or literature shows that the product should not be disposed of with other waste at the end of its working life.

EU and UK only: Correct disposal of batteries in this product



This marking on the battery, manual, or packaging shows that the batteries in this product should not be disposed of with other waste at the end of its working life. Where marked, the chemical symbols Hg, Cd, or Pb indicate that the battery contains mercury, cadmium, or lead above the reference levels in 2006/66/EC or UK SI 2008 No. 2164. If batteries are not properly disposed of, these substances can cause harm to human health or the environment.

To protect natural resources and to promote material reuse, please separate batteries from other types of waste and recycle them through your local, free battery return system.

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 Product design

The ENM10 is an electromechanical level switch that is used in level control applications. The level switch is installed freely hung at the defined height. When the liquid level reaches the level switch, it closes or breaks the circuit. The level switch is connected to control circuit for the following reasons:

- To start or stop a machine
- To turn on or turn off an alarm

Liquid density

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

Temperature limit

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

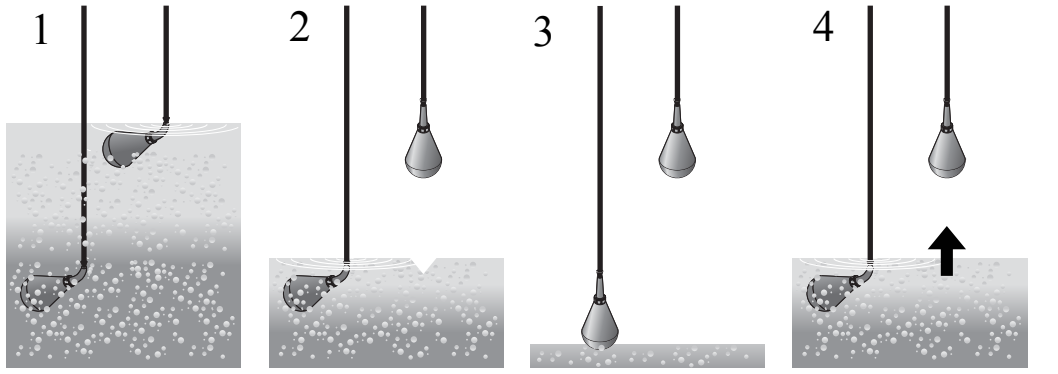
Manual coverage

This manual is applicable for the versions shown in the following table:

Version	Casing
Standard	Blue
Ex	Black

The Ex version is not for the North American market.

2.2 Process description



WS004996A

1. When the pumped media reaches a predetermined level, the upper level of the level switch 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 of the level switch returns to the vertical position.
4. The basin fills up again. The process restarts.

2.3 Technical data

Materials

Denomination	Standard version	Ex version
Level switch casing	Polypropylene	Polypropylene with black conductive casing
Bend relief	EPDM rubber	NBR-PVC rubber
Cable sheath	PVC	NBR-PVC rubber

The plastic components are welded and screwed together.

Lengths

For liquids with specific density between 0.95 g/cm^3 and 1.10 g/cm^3, the following cables are available:

Version	Lengths m (ft)
Standard	• 6 m (20 ft) • 13 m (43 ft) • 20 m (66 ft) • 30 m (98 ft) • 50 m (164 ft)
Ex	• 6 m (20 ft) • 13 m (43 ft) • 20 m (66 ft) • 30 m (98 ft) • 50 m (164 ft)

Diameter

The cable diameter for all product variants is 6.7 mm (0.26 in), +/- 0.2 mm (0.00787 in).

2.4 Electrical data

Country	Electrical data
Canada	5 A, 30 V, DC 10 A, 250 V, AC
Denmark	10 A, 250 V, AC
Switzerland	6 A, 250 V, AC
Sweden	10 A, 250 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 numbers: 594 79 19–21, 594 79 40–42, and 594 79 49–50

Micro switch

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

Low-voltage supply

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

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

2.5 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:	4.0 nF
Maximum internal inductance, L_I:	29.0 µH

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.

2.6 Approvals and standards

Standard approvals

LVD approval according to EN61058

CSA approval: Certificate Number 1330172

Cl. I Zone 0, Gr. IIC

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

Cl.II Gr. E, F, and G

Ex approvals

Temperature rating: -20°C≤Ta≤60°C

IECEx ia IIC T4 Ga

IECEx NEMKO 09.0008

ATEX II 1G Ex ia IIC T4 Ga

NEMKO 10 ATEX 1082

UKEX II 1G Ex ia IIC T4 Ga

DNV 22 UKEX 35644

Applied standards for ATEX, UKEX, and IECEx

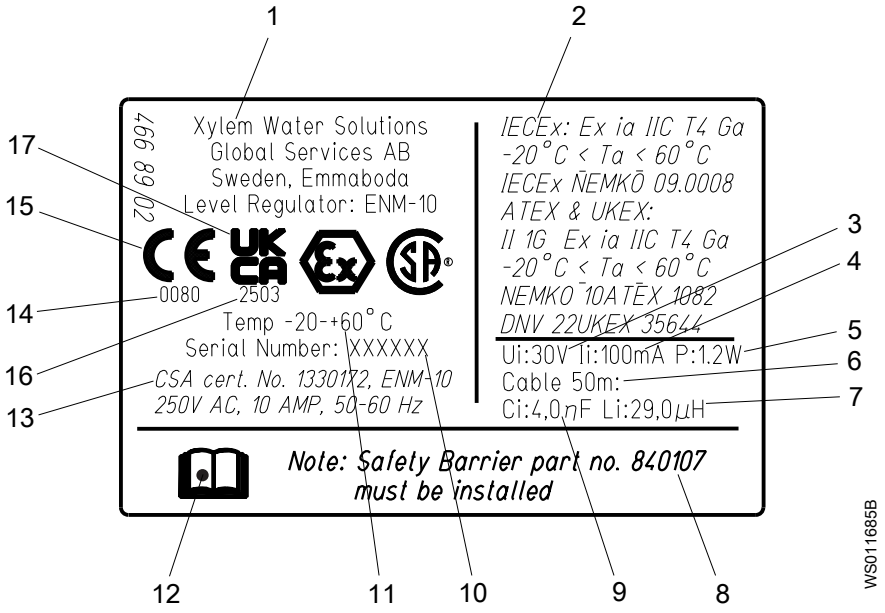
- EN IEC 60079-0:2018
- EN 60079-11:2012 / IEC 60079-11:2011

Intrinsically safe circuits are required for the automatic control system. Use a Zener barrier, for example, part number 84 01 07.

The electrical connections must comply with the Ex regulations of the national submitter.

0080 2503

Data plate



1. Manufacturer and country of origin
2. Approval
3. Input voltage
4. Input current
5. Input power
6. Cable length
7. Internal inductance
8. Safety barrier part number 840107 must be installed.
9. Internal capacitance
10. Serial number
11. Temperature range
12. Read the installation manual
13. CSA approval
14. Notified Body number
15. CE marking
16. Approved Body number
17. UKCA marking

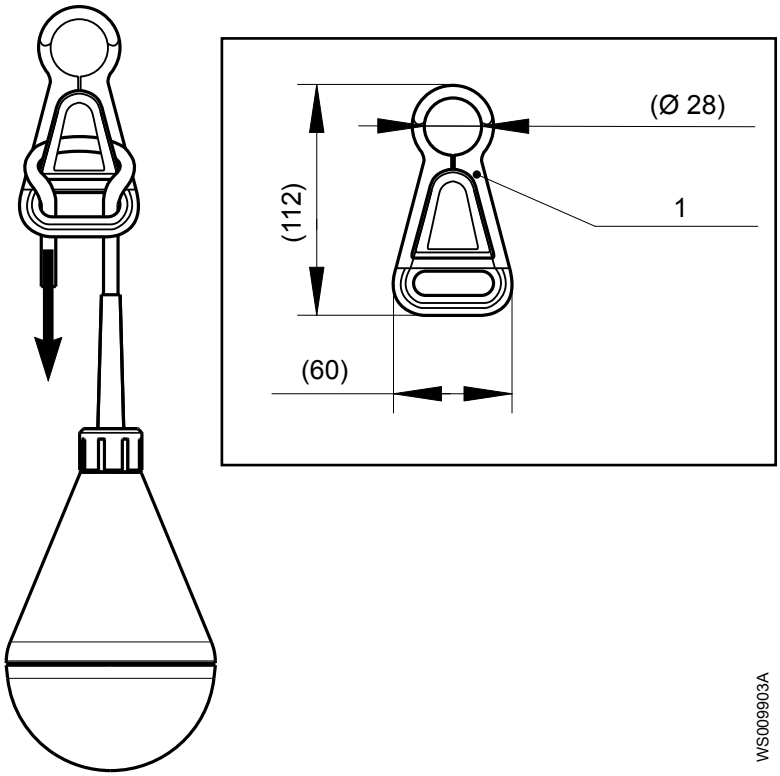
3 Mechanical Installation

3.1 Precautions

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

3.2 Requirements

- The level switch is connected through a transformer to a low-voltage control circuit to follow the local regulations.
- Two level switches must be used one for start and other for stop. If an alarm is necessary at a given level, then third level must be connected.
- The identical level switch can be used for all functions.
- The cables must not be tangled during the installation.
- The cables of level switch must hang freely from each other.



1. Cable holder

Part	Part number
Cable holder	83 46 02

4 Electrical Installation

4.1 Precautions

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

DANGER: Electrical Hazard

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

DANGER: Electrical Hazard

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

WARNING: Electrical Hazard

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

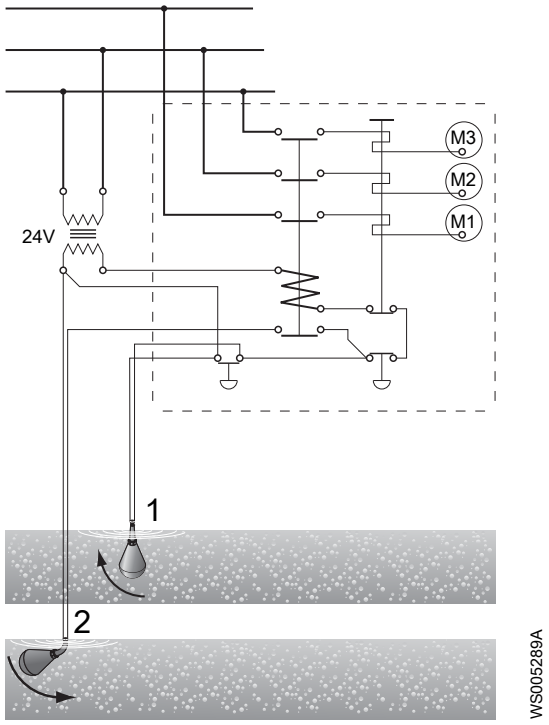
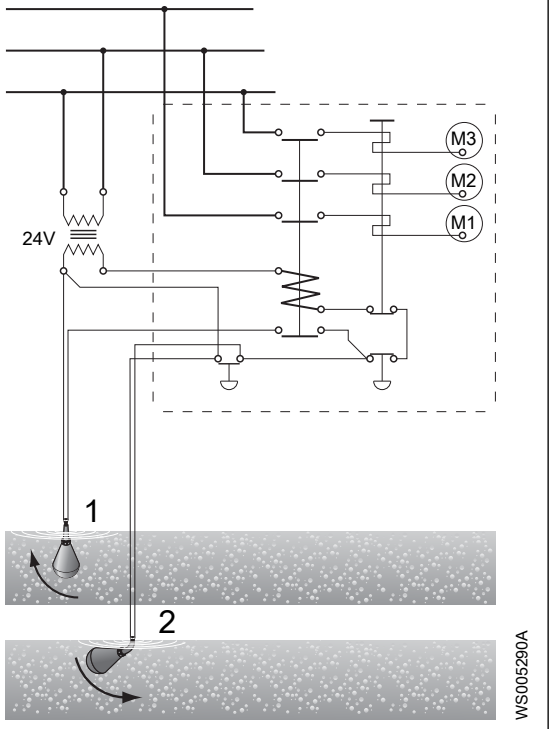
WARNING: Electrical Hazard

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.

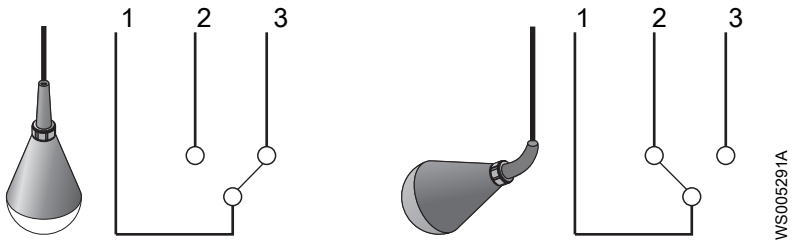
CAUTION: Electrical Hazard

Prevent cables from becoming sharply bent or damaged.

4.2 Wiring diagrams

Empty the sump	Fill the tank
	
1. Start 2. Stop	1. Stop 2. Start

Connection table



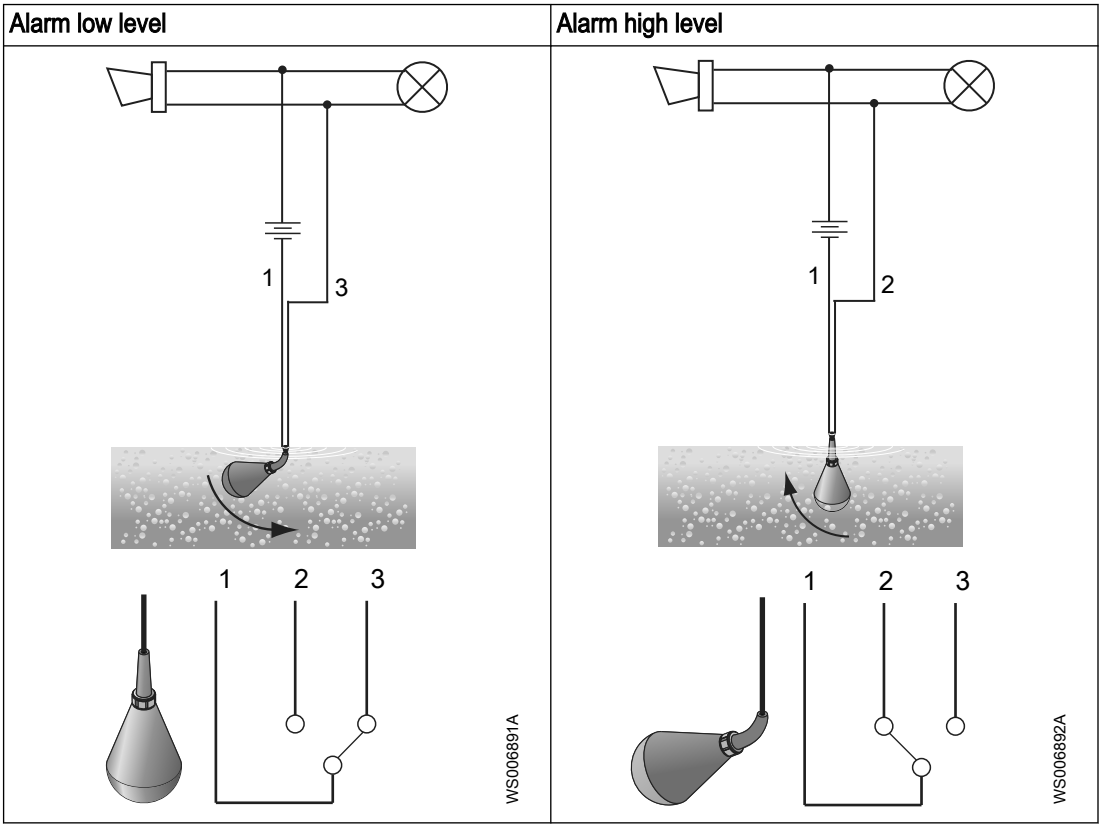
Cable	Connections to empty a sump	Connections to fill a tank
1	X	X
2	X	Insulate
3	Insulate	X

Color code

Cable	1	2	3
Color	Grey	Black	Brown

4.3 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

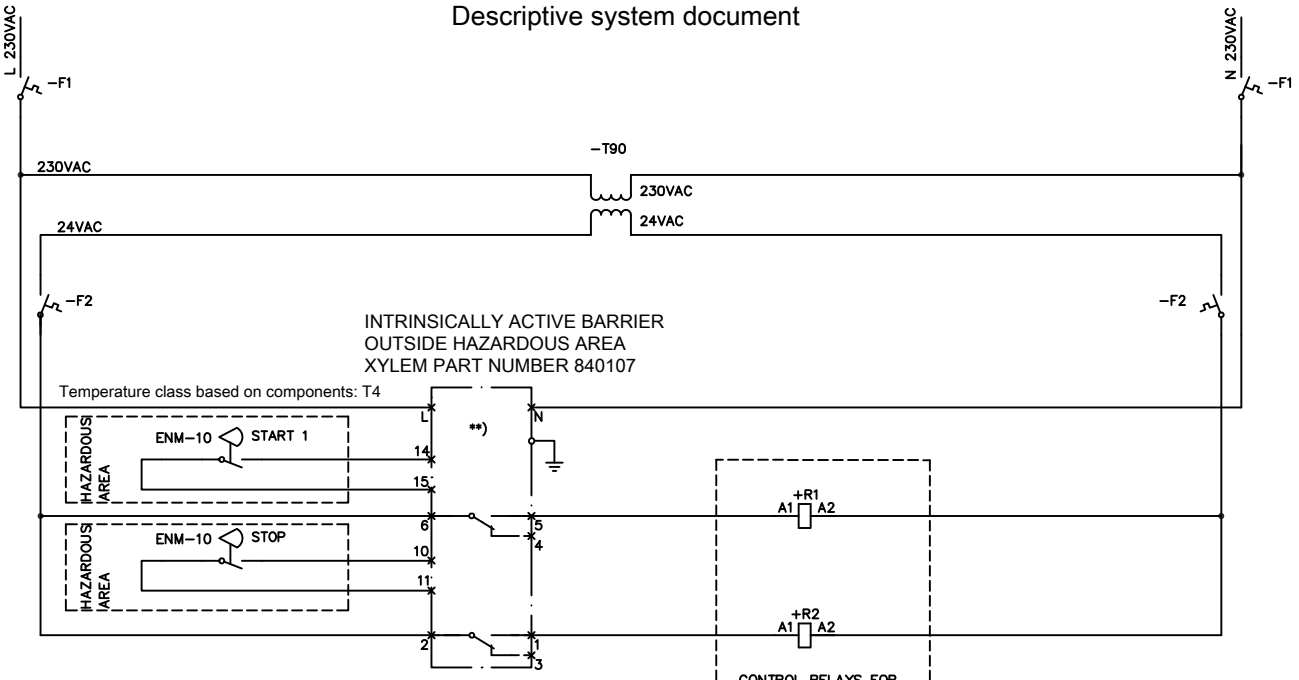
Cable	1	2	3
Color	Grey	Black	Brown

4.4 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.

Descriptive system document



**)
SWITCH SETTINGS Ex-Relay

DIPSWITCH SETTINGS
LF1=OFF
LF2=OFF
INV1=OFF
INV2=OFF

DIPSWITCH SETTINGS
S1/S4=0
S2/S5=0
S3/S6=1

Electrical data for ENM 10
Interrupting capacity of micro switch:
AC, resistive load, 250 V 10 A
AC, inducive load, 250 V 3 A
cos Ø=0.5
DC, 30 V 5 A
cable length: 6-50 m

Eletrical data for instrinsically active barrier
Xylem part number 840107
Supply voltage: 120-230 V, 48-62 Hz
Voltage input: Uo = 8.2 V
Max. permissible external capacitance: Co = 16.2 µF
Max. permissible external inductance: Lo = 230 mH
Input resistance: R = 1000 Ω

WS006893C

5 Maintenance

5.1 Requirements

- The level switch must be cleaned of when fat or grease on the plastic surface.
- An ocular inspection must be done for the level switch.
- The following items of the level switch must be examined for the damage:
  - Cable
  - Protective sleeves
  - Plastic casing
- If the level switch is damaged, it must be replaced with a new level switch.

  The damaged level switch cannot be repaired because of the hermetic encapsulation.

EX-installations

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

- The LED changes when the switch is toggled.

Xylem |’zīləm|

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

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

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

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