xylem
Let's Solve Water

Installation, Operation, and Maintenance manual

885814_3.0

Level probe

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.

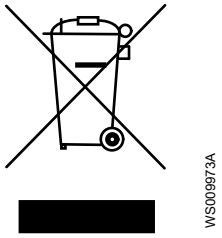
All work on the product must be carried out by certified electricians or Xylem authorized mechanics.

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 only: Correct disposal of this product — WEEE Directive on waste electrical and electronic equipment

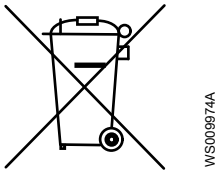


This marking on the product, accessories or literature indicates that the product should not be disposed of with other waste at the end of its working life.

To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate these items from other types of waste and recycle them responsibly to promote the sustainable reuse of material resources.

Waste from electrical and electronic equipment can be returned to the producer or distributor.

EU only: Correct disposal of batteries in this product



This marking on the battery, manual or packaging indicates 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 Directive 2006/66/EC. 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 re-use, 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 Introduction

Usage

The level probe is a conductivity sensor that measures the level or vertical height of a liquid in a wet well. It uses the conductive properties of the liquid to complete a circuit with a controller. The level probe is intended to be supplied by limited energy source.

The level probe is used with the Flygt MultiSmart pump station controller or any pump controlling device with any of the following 4–20 mA signal converters.

- MIO 201
- MTIC

A signal converter cannot be used for variable frequency drive (VFD) applications because of electromagnetic compatibility (EMC) disturbances from these devices.

If the level probe is not used as specified by Xylem, the protection that is provided by the level probe may be impaired.

Materials

Part	Material
Sensors	Avesta 254 SMO high-grade stainless steel alloy
Casing	uPVC extruded tube
Cable	PVC or PVC multicore

2.2 Technical data

Electrical specifications

NOTICE:

Only apply AC voltage to the sensors. Do NOT apply DC voltage since it results in the destruction of the sensors.

Feature	Value
Voltage, sensor	10 V AC The peak value that the controller supplies
Current, sensor	< 1 mA Controller output impedance Z_o = 15 kOhm
Maximum voltage, level probe	16 V AC rms (root mean square), 22.6 V peak The peak value for equipment with accessible parts that are installed in wet locations in accordance with UL 61010–1. The value must be checked to make sure that it is safe for the intended use. The lowest voltage from all the applicable standards must be used.

Environmental requirements

Feature	Value
Maximum submersible depth	20 m (66 ft)
Maximum ambient temperature	40°C (104°F)
Liquid temperature, non-freezing	0°C – 40°C (32°F – 104°F)
Cable temperature, non-flexing	-40°C – 80°C (-40°F – 176°F)

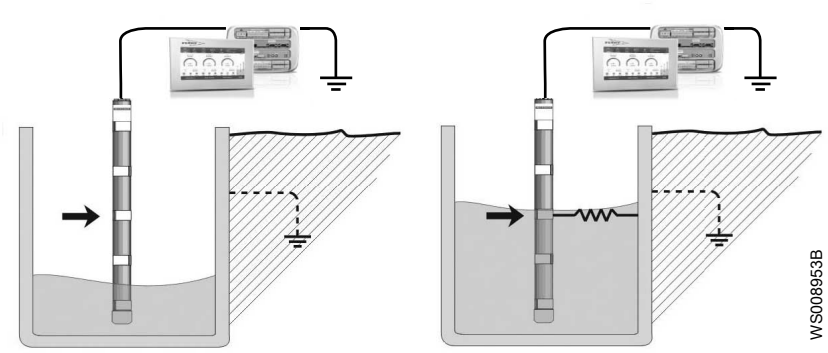
Feature	Value
Relative humidity	5% – 95%
Installation category	I

Storage requirements

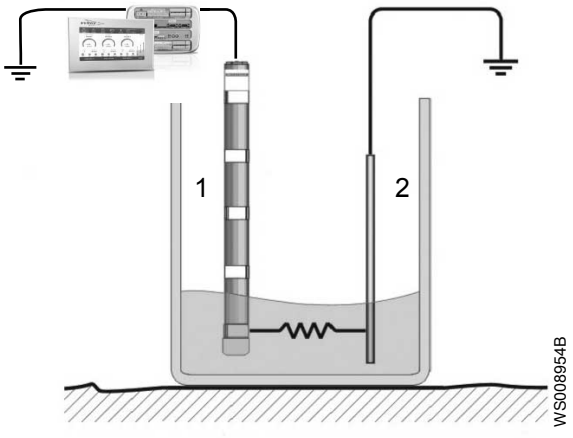
Feature	Value
Storage temperature	-20°C – 70°C (-4°F – 158°F)
Storage humidity, non-condensing	5% – 95%

2.3 Process description

- When the liquid level rises and comes into contact with the probe sensor, a circuit is completed through the liquid and ground (earth).

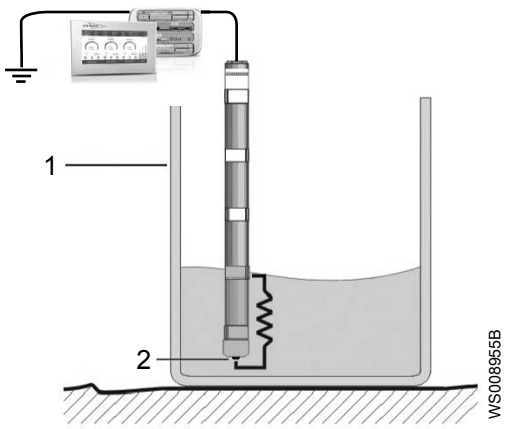


- If the wet well is of non-conductive material and there are no grounded metal objects in it, then the system needs a ground (earth) reference rod. The rod has to be of stainless steel, minimum 6 mm (0.2 in) in diameter and long enough to remain in the liquid always.



1. Wet well of PVC, fiberglass, or other non-conductive materials
2. Stainless steel rod

- In non-sewage water applications, it is possible to replace the ground (earth) reference rod with a custom level probe. The custom level probe has an earth button at the end. In this way, the return path for the level signal is no longer through the ground but instead, back through another conductor in the level probe.



1. Wet well of PVC, fiberglass, or other non-conductive materials
2. Earth button

2.4 Approvals and standards

Approval and directive	Description
CE EMC 2004/108/EC, LVD 2006/95/EC	Emission: EN 61000-6-4:2007, EN 61000-6-2:2005 Safety: EN 61010-1:2001
UL	ANSI/UL 61010-1 CAN/CSA-C22.2 No 61010-1 (2012)
CSA	CAN/CSA-C22.2 No 61010-1-12 UL Std No 61010-1 (3rd Ed)

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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

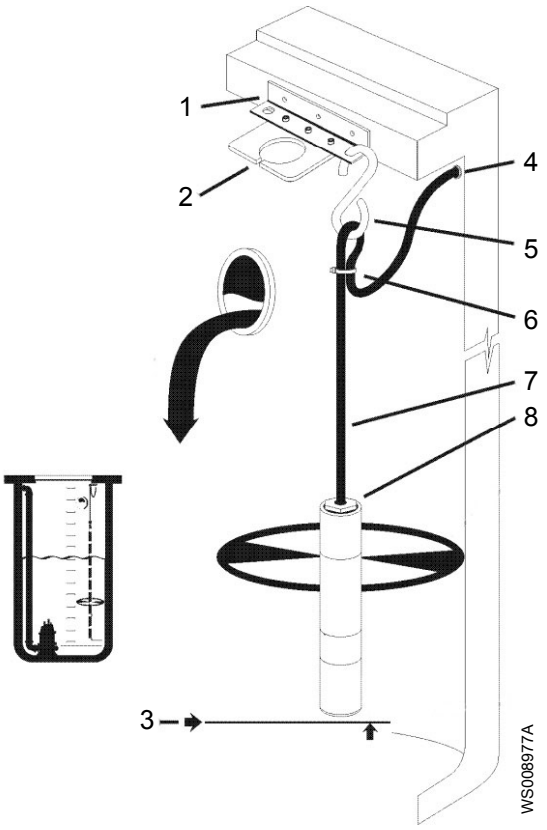
- Do not install the level probe in a stagnant area or corner where grease and debris collect.
- Make sure that the inflow does not run directly on the level probe.
- Do not use the sensor at the end as ground (earth).
- If the wet well is made of non-conductive material and does not have grounded metal objects in it, then install a ground (earth) reference rod.

3.3 Install the level probe

- Before deciding on the location of the level probe, pump down the wet well as low as possible.

  Suspend the level probe from the required position to make sure that the clearance distance from any surface is 300 mm (12 in) to prevent tangling.
- The cable of the level probe must be buried outside the wet well and in a separate metal conduit.

  The cable must also be protected so that the level probe can function properly.



1. MTAK 1 standard mounting bracket
2. Flexible level probe cleaning device
3. Minimum pumping level
4. Cable seal
5. Stainless steel hook
6. Cable tie
7. Cable
8. Level probe

The level probe is supported by a cable that is suspended from the standard mounting bracket. The mounting bracket is delivered with the level probe.

For maximum self-cleaning effect, the level probe is installed close to but not directly below the inflow. The surface agitation of the inflow area helps to keep the level probe clean.

1. Install the standard mounting bracket onto the inner wall of the wet well.

   Make sure that there is clearance from the covers and ladder access.
2. Thread the cable of the level probe through the stainless steel hook.
3. Attach the hook onto the mounting bracket.
4. Adjust the cable length until the end of the level probe is 12 mm (0.5 in) above the minimum pumping level or 50.8 mm (2 in) above the pump volute.
5. Install the level probe in a turbulent area of the wet well.
6. Install the level probe 300 mm (12 in) from the inflow point so that the turbulence of the inflow helps to keep the level probe clean.

   Make sure that there is a distance of 300 mm (12 in) between the level probe and all objects in the wet well, including the walls.

   Make sure that the bottom of the level probe is 12 mm (0.5 in) above the minimum pumping level.
7. Fasten the cable to the hook using cable ties.

   Make sure that the level probe hangs vertically so that it does not swirl to allow the level probe to indicate the actual liquid level.

   Make sure that the liquid does not splash onto the level probe. Liquid makes multiple points on the level probe turn conductive to ground (earth) and results in incorrect level readings.
8. Pull the loose end of the cable through the conduit and connect it to the control panel.

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 The level probe connection

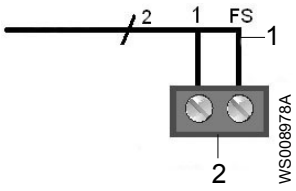
The sensor points are numbered from 1 to x. 1 is the sensor that is closest to the cabled end of the level probe and x is the last sensor at the bottom of the level probe.

4.3 Standard level probe

Install for one and three sensors

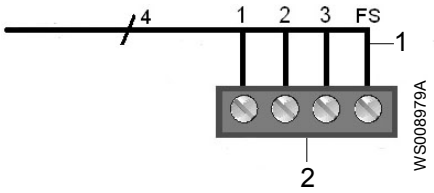
The orange wire is for the fail-safe feature. It is labeled as FS. If the fail-safe feature is not needed, leave the wire disconnected and trim it or use a cable tie to keep it out of the way.

1. Connect the level probe with one sensor.



1. Orange wire
2. Probe inputs

2. Connect the level probe with three sensors.



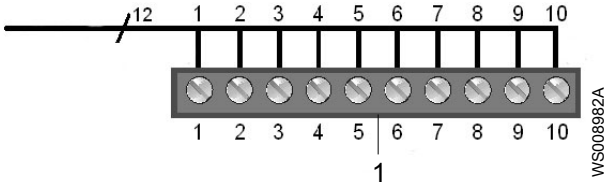
1. Orange wire
2. Probe inputs

Install for ten sensors

There are two additional wires. The red wire is labeled as POS and the black wire is labeled as NEG.

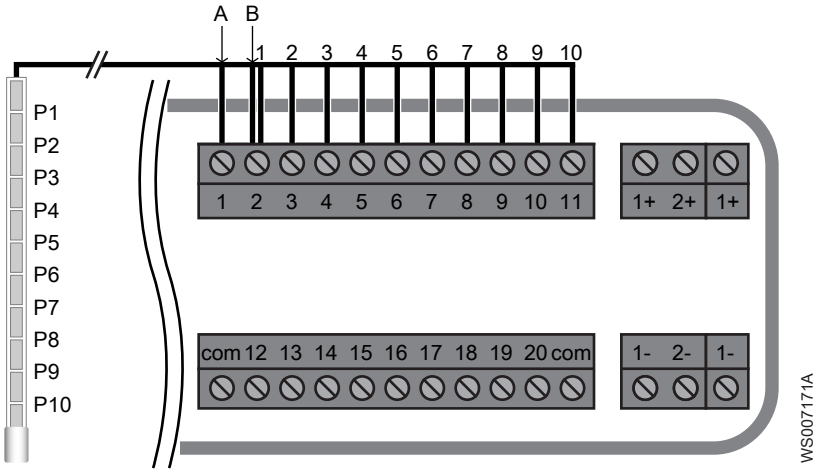
If the fail-safe feature is not needed, leave the wire disconnected and trim it or use a cable tie to keep it out of the way.

1. Connect the level probe without Flygt MultiSmart.

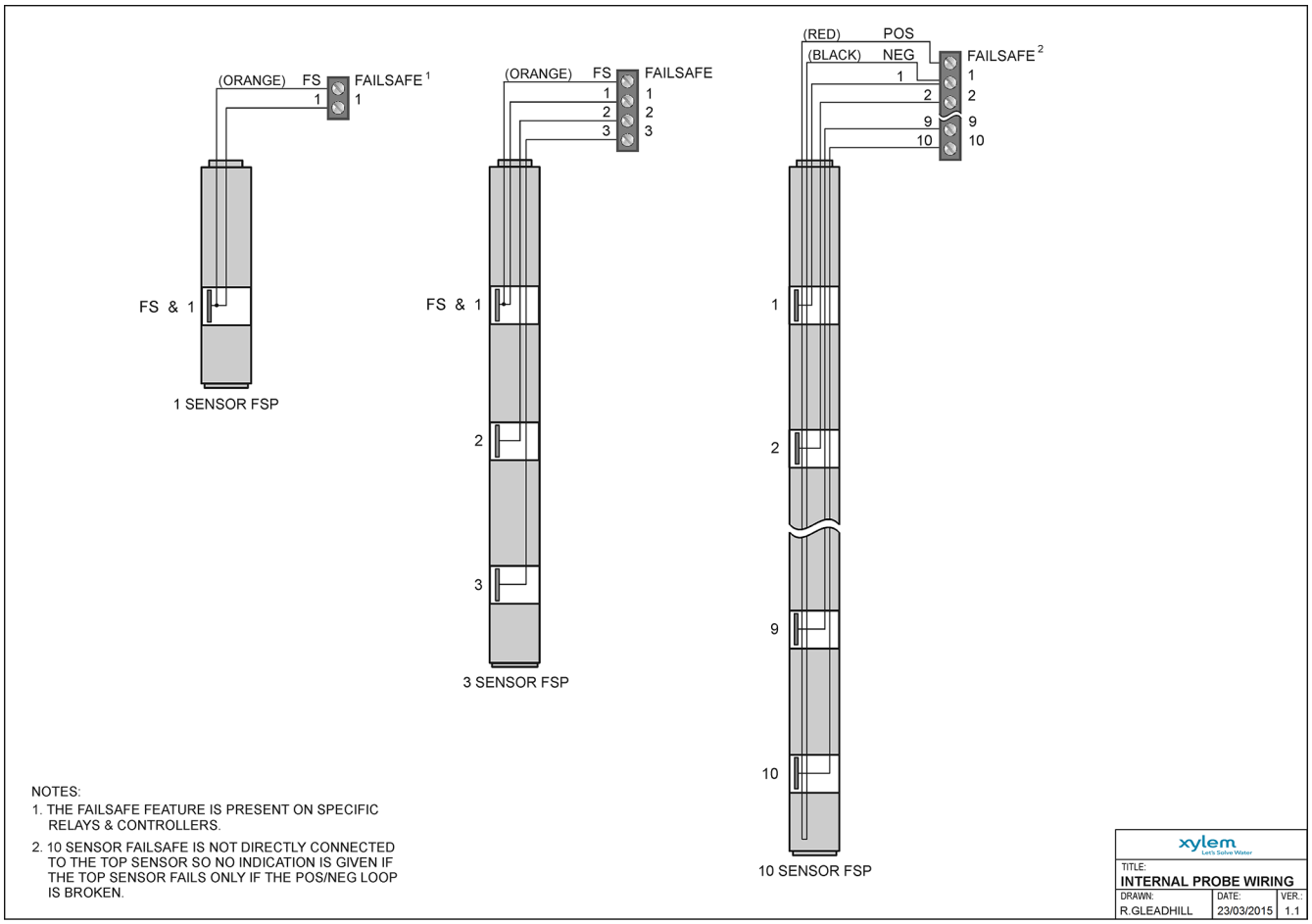


1. Probe inputs

2. Connect the level probe with Flygt MultiSmart. There are two additional wires. The red wire is labeled POS (A) and the black wire is labeled NEG (B). See also *Internal level probe wiring* on page 12.



4.4 Internal level probe wiring



5 Maintenance

Precautions

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

DANGER: Inhalation Hazard

Before entering the work area, make sure that the atmosphere contains sufficient oxygen and no toxic gases.

DANGER: Inhalation Hazard

The chamber or tank where the equipment is installed should be treated as a confined space. Always follow the applicable safety laws, regulations and guidelines for confined spaces.

5.1 Guidelines

A level probe cleaning device is integrated in the standard mounting bracket. To ensure its continual operation, follow these guidelines:

- Make sure that there is enough slack in the cable.

  This procedure enables the level probe to be pulled through the mounting bracket or removed from the wet well for cleaning.
- Make sure that the level probe is properly positioned.

  For more information, see *Mechanical Installation* on page 8.

6 Troubleshooting

Precautions

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

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.

6.1 Common problems

Symptom	Cause	Remedy
The controller fails to activate when expected.	The sensors can be faulty.	1. Remove the level probe connection from the controller. 2. Short circuit the level probe inputs on the controller to ground (earth). 3. Start with the lowest sensor point of the level probe and work up to the sensor that is closest to the cabled end. 4. Check the light-emitting diodes (LED) of the controller for signs that there is a malfunction in a sensor or the controller.
The controller fails to activate.	There is a problem with the setup or the analog controller is faulty.	See the Installation, Operation, and Maintenance manual of the controller. If the controller functions, check the following: • When the level probe or the probe segment is submerged, use a continuity tester to measure the resistance to ground (earth) of the sensor.

Symptom	Cause	Remedy
	There is a problem with the circuit.	If the circuit is open, then the wires are faulty. • Check the cables for damages. If the circuit is closed, there can be external contamination. This contamination can be due to excess oil that insulates the level probe. • Check the grounding (earthing) on the reference rod and the controller. • Check that there is ground (earth) continuity across the installation.
The pumps start too early.	There is external contamination with extreme conductivity.	Check that the sensitivity is set to the lowest setting on the controller.
Excessive fats build up on the level probe.	-	Move the level probe to a more turbulent area of the wet well, close to the inflow.
The level probe functions erratically.	When the level probe cable is in the same conduit as the pump power cables, it can cause inductance into the level probe cable. This inductance can create false readings.	Check if there are any junctions in the cable of the level probe, especially where moisture can enter.
The high alarm activates after a delay when the sensor is immersed.	There can be a delay of 20 to 60 seconds because of moisture that slowly penetrates the buildup of thick sludge and affect the sensor. Over time and depending on the installation, the thick sludge can clog and dry out the sensor completely.	If there is a buildup on the sensor, then clean the level probe with the integrated cleaning device in the mounting bracket. Increase the sensitivity of the sensor.

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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