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Let's Solve Water

Installation, Operation, and Maintenance Manual

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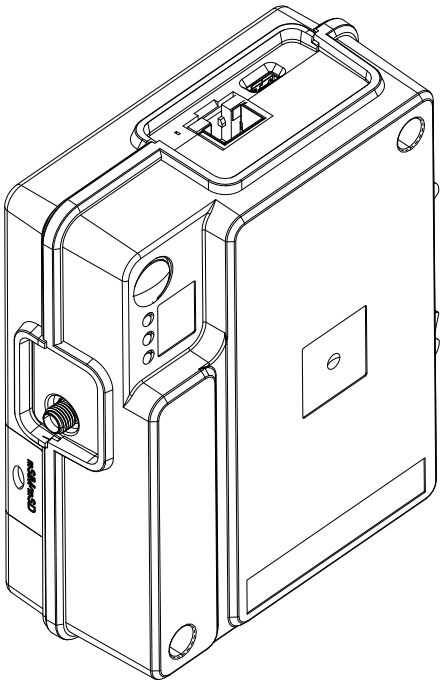

CCD 401

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Notes

- The modem is designed to be used with Xylem Cloud Services only and not as a stand-alone modem.
- Xylem reserves the right to remotely upgrade the software and configuration files in the modem. It is the Purchaser’s responsibility to ensure that the modem is connected at all times to enable such upgrades.
- Xylem aims to provide mobile coverage where the modem is marketed but there is no guarantee from Xylem or obligation to ensure that cellular coverage exists in the Purchaser’s location. It is the sole responsibility of the Purchaser to ensure adequate coverage in order for the modem to function properly at all times.
- The modem is delivered with a built-in SIM card. Xylem has roaming agreements with selected operators depending on geography, enabling the modem to transmit data. Xylem reserves the right to change these operators. This might have an effect on the connectivity of the modem. It is the responsibility of the Purchaser to ensure adequate connection of the modem at all times.
- It is the responsibility of the Purchaser to ensure that the modem fulfills the mobile standards in the location. This includes upgrading to a new modem if standards change over time, at Purchaser’s sole cost.

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.

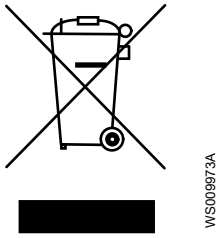
All work on the product must be carried out by certified electricians or Xylem authorized mechanics.

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

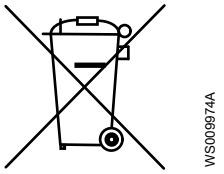


This marking on the product, accessories or literature indicates that the product should not be disposed of with other waste at the end of its working life.

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

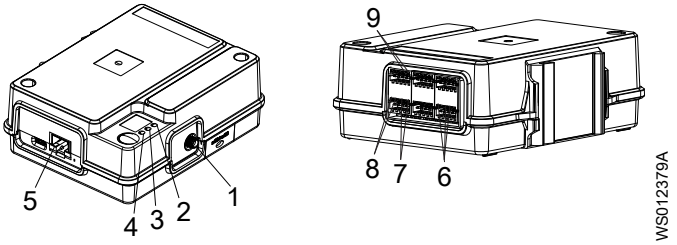
2.1 Product design

CCD 401 is a wireless unit that is used in pumping stations.

The unit sends data over the Long Term Evolution (LTE) network with fall-back to the 2G or 3G depending on geography and supported radio standard.

The unit allows remote monitoring and data collection from any location.

2.2 Parts



Part	LED	Description
1	-	Antenna
2		Network signal strength
3		Yellow shows connection to the cloud service
4		Green shows power is on
5	-	Ethernet terminal
6	-	Digital and analog input
7	-	RS-232 terminals
8	-	Input power
9	-	RS-485 terminals

Extra parts

Part number	Description
851062	2G/3G/4G LTE Antenna wall mount 1.5 m cable SMA-m
851063	2G/3G/4G LTE Antenna wall mount 4 m cable SMA-m
851064	2G/3G/4G LTE Antenna cabinet mount 0.5 m cable SMA-m
851065	2G/3G/4G LTE Antenna cabinet mount 1.5 m cable SMA-m

3 Installation

3.1 Connection and configuration: Alarm management

3.1.1 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.

3.1.2 Requirements

These requirements apply for the electrical installation:

- The mains voltage and frequency must agree with the specifications for the product.
- Circuit breakers must be installed between the main voltage line and this unit.
- All fuses and circuit breakers must have the proper rating, and comply with local regulations.
- The cables must be in accordance with the local rules and regulations.
- If the power cable is jerked loose, then the ground (earth) conductor must be the last conductor to come loose from its terminal. Make sure that the ground (earth) conductor is longer than the phase conductors at both ends of the cable.

3.1.3 Cables

These requirements apply for cable installation:

- The cables must be in good condition, not have any sharp bends, and not be pinched.
- The sheathing must not be damaged and must not have indentations or be embossed at the cable entry.
- The minimum bending radius must not be below the accepted value.
- The cables must have the appropriate temperature rating.

3.1.4 Antenna

These requirements apply for the antenna installation:

- The antenna must be kept away from the radio or EMC source.
- The antenna cables must be kept away from other electronics.
- The length of the antenna cables must be as short as possible.
- The antenna cables can run the full length but they must not be bent to avoid interference and crosstalk.

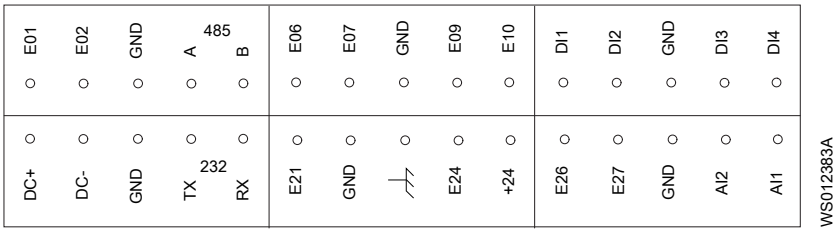
3.2 Install the equipment to the unit

- Before installation of the unit, record the serial number or take a picture of the serial number of the unit. After installation, the serial number is not seen.
- The unit must not be installed over 2 m (6.56 ft) height from the ground.

1. Attach the antenna.

   For more information about the antenna, see *Antenna* on page 12.
2. Install the unit on a DIN rail.
3. Select one of the following steps to connect a device to the unit.

   For more information about the devices that connect with the unit, go to the support site at xylem.com/avensor.



   – Connect the Modbus TCP to the RJ45.
   – Connect the RS-232 cable from the pump controller to the terminals.

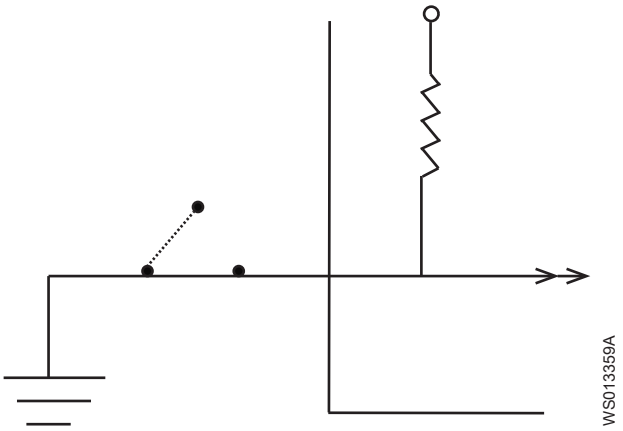
Terminal	Unit terminal
232 RX	RTU Tx
232 TX	RTU Rx
GND	Ground (earth)

   – Connect the RS-485 cable from the pump drive to the terminals.

Terminal	Unit terminal
485 A	A
485 B	B
GND	Ground (earth)

   – Connect the two signals leads from the digital switch to the terminals.

     Digital input is active when connected to GND and it is inactive when open.



Terminal	Description
DI1	Digital input 1
DI2	Digital input 2
DI3	Digital input 3
DI4	Digital input 4

– Connect the 4-20 mA analog input device to the terminals.

Terminal	Description
AI1	Analog input 1
AI2	Analog input 2

For more information about the terminals, see *Terminals* on page 11.

4. Connect the power leads to the power input terminals.
5. Connect the signal ground (chassis ground) to the external chassis ground.
   For more information about the terminals, see *Terminals* on page 11.
6. Turn on the power of the equipment and if necessary, the separate power supply.
7. Configure the connected devices.
   For more information, go to the support site at xylem.com/avensor.

3.3 Check the mobile connection

The unit is turned on.

1. Check the network signal strength.

LED	State	Description
	Solid green	Excellent or good signal strength
	Solid red	Medium or fair signal strength
	Unlit	Poor or no signal

The state of LED must be solid green to avoid the connectivity problems.

2. If the signal strength is too low, move the external antenna to another position.
   For more information, see *Terminals* on page 11.
3. Check the connection to the cloud service.

LED	State	Connection
	Blink or solid yellow	Yes
	Unlit	No

The connection procedure takes maximum 15 minutes.

The unit must not be disconnected during the connection procedure.

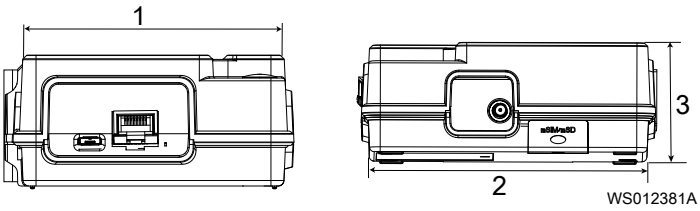
4 Troubleshooting

4.1 Symptoms and remedies

Symptom	Remedy
The connection to the cloud service is slow.	• Make sure that the equipment is not disconnected from the cloud service. Repeated disconnections can make the reconnection slow. • Check the signal strength and install or move the external antenna to improve the signal strength.

5 Technical Reference

5.1 Dimensions



Part	Dimension
1	101 mm (4.0 in)
2	127 mm (5.0 in)
3	46 mm (1.8 in)

5.2 Environmental requirements

Feature	Value
Operating temperature	-30°C to +55°C (-22°F to +131°F)
Storage temperature	-50°C to +85°C (122°F to +185°F)
Operating humidity	95% relative humidity, non-condensing

5.3 Material

- Plastic, blend of polycarbonate (PC) and acrylonitrile butadiene styrene (ABS)

5.4 Electrical data

Feature	Description
Supply voltage	24 VDC
Current	Maximum 200 mA at 24 VDC
Degree of protection of enclosure	IP40

5.5 Radio data

The unit has a radio modem that supports the following bands:

CCD 401 version	Network (Frequency/band)
CE (European version)	LTE Cat 1 bands 3, 7, and 20 GPRS 900/1800 MHz Fallback
NA (North America version)	LTE Cat 1 bands 2, 4, and 12

5.6 Terminals

Terminal	Description
E01	Not used
E02	Not used
GND	Signal ground
485 A	RS-485, 120 ohm termination resistor, A
485 B	RS-485, 120 ohm termination resistor, B
E06	Not used
E07	Not used
GND	Signal ground
E09	Not used
E10	Not used
DI1	Digital input 1, Pull up input
DI2	Digital input 2, Pull up input
GND	Signal ground
DI3	Digital input 3, Pull up input
DI4	Digital input 4, Pull up input
DC+	Input power, +24 VDC
DC-	Input power, ground (earth)
GND	Signal ground
232 TX	RS-232, Tx, RTU Rx
232 RX	RS-232, Rx, RTU Tx
E21	Not used
GND	Signal ground
⏚	Signal ground (chassis ground)
E24	Not used
+24	+24 VDC supply, maximum 50 mA
E26	Not used
E27	Not used
GND	Signal ground
AI2	Analog input 2, 4-20 mA
AI1	Analog input 1, 4-20 mA

Antenna

- SMA connector
- Maximum 4 m (13.1 ft) cable
- Torque 0.56 Nm (0.41 lb.ft)

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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Visit our Web site for the latest version of this document and more information

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

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