

Operating Instructions

Connect Sensor FXA30, FXA30B

Fieldgate

Low-power cellular sensor gateway for wireless drop-in networking to remotely monitor industrial environments and control systems

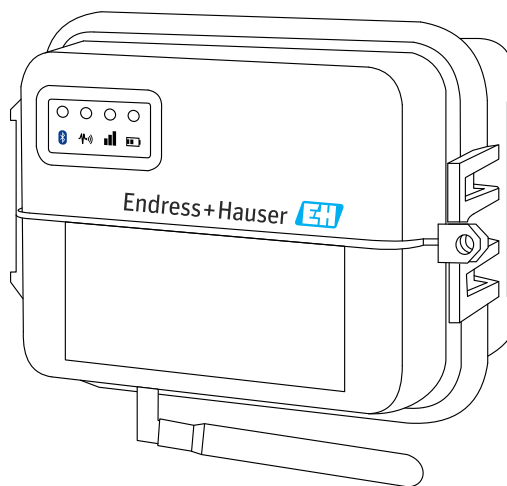


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1 Important document information

1.1 Document function

These Operating Instructions contain all the information that is required in various phases of the life cycle of the device: from product identification, incoming acceptance and storage, to mounting, connection, operation and commissioning through to troubleshooting, maintenance and disposal.

1.2 Document conventions

1.2.1 Safety symbols

DANGER

This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.

WARNING

This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury.






CAUTION

This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.




NOTICE

This symbol contains information on procedures and other facts which do not result in personal injury.













1.2.2 Electrical symbols

Symbol	Meaning
	Direct current
	Alternating current
	Direct current and alternating current
	Ground connection A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system.
	Protective Earth (PE) A terminal which must be connected to ground prior to establishing any other connections. The ground terminals are situated inside and outside the device: <ul style="list-style-type: none"> ▪ Inner ground terminal: Connects the protective earth to the mains supply. ▪ Outer ground terminal: Connects the device to the plant grounding system.

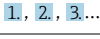


1.2.3 Communication specific symbols

Symbol	Meaning
	LED Light emitting diode is off.
	LED Light emitting diode is on.
	LED Light emitting diode is flashing.

1.2.4 Symbols for certain types of information


Symbol	Meaning
	Permitted Procedures, processes or actions that are permitted.
	Preferred Procedures, processes or actions that are preferred.
	Forbidden Procedures, processes or actions that are forbidden.
	Tip Indicates additional information.
	Reference to documentation
	Reference to page
	Reference to graphic
	Notice or individual step to be observed
	Series of steps
	Result of a step
	Help in the event of a problem
	Visual inspection

1.2.5 Symbols in graphics

Symbol	Meaning	Symbol	Meaning
1, 2, 3,...	Item numbers		Series of steps
A, B, C, ...	Views	A-A, B-B, C-C, ...	Sections
	Hazardous area		Safe area (non-hazardous area)

1.3 Documentation

Document	Purpose and content of the document
Technical Information TI01356S	Planning aid for your device The document contains all the technical data on the device and provides an overview of the accessories and other products that can be ordered for the device.
Brief Operating Instructions KA01320S	Guide that takes you quickly to the 1st measured value The Brief Operating Instructions contain all the essential information from incoming acceptance to initial commissioning.

 For an overview of the scope of the associated Technical Documentation, refer to the following:

- The *W@M Device Viewer*: enter the serial number from the nameplate (www.endress.com/deviceviewer)
- The *Endress+Hauser Operations App*: Enter the serial number from the nameplate.

1.4 Terms and abbreviations

Term/abbreviation	Explanation
BA	Document type "Operating Instructions"
KA	Document type "Brief Operating Instructions"
TI	Document type "Technical Information"
SD	Document type "Special Documentation"
XA	Document type "Safety Instructions"
FIS	Field Information Server A web-based operating portal for managing the lifecycle & diagnostics of worldwide applied gateways in the Inventory Management System.
SupplyCare Hosting	Cloud-based inventory management platform for transparent information within the supply chain
APN	Access Point Name
CLI	Command Line Interface
DHCP	Dynamic Host Configuration Protocol
IMEI	International Mobile Equipment Identity
LED	Light Emitting Diode
TCP	Transmission Control Protocol
USB	Universal Serial Bus
URL	Uniform Resource Locator

1.5 Registered trademarks

DIGI®

Digi, Digi International, and the Digi logo are trademarks or registered trademarks in the United States and other countries worldwide of Digi International Inc.

Modbus™

Registered trademark of Schneider Electric USA, Inc.

Internet Explorer 11

Registered trademark of the MICROSOFT CORPORATION.

Firefox®

Registered trademark of of the Mozilla Foundation

Chrome™


Registered trademark of Google Inc.

All other trademarks mentioned in this document are the property of their respective owners.

2 Basic safety instructions

2.1 Installation considerations

Read all instructions before installing and powering the unit and keep these instructions in a safe place for future reference.

 When installing in a C1D2 area, you must use C1D2 listed, IP66 rated conduit and conduit fittings to maintain applicable safety ratings on the Connect Sensor FXA30/FXA30B.


- USB (P2) (J1) and SIM (P6) connectors are intended for maintenance use within a Division 2 classified area. These connectors can only be used if the power is disconnected or the area is known to be free of ignitable concentrations of flammable gases or vapors. All external or field wiring must be in accordance with NFPA 70 Article 501.10 (B).
- Connect Sensor FXA30/FXA30B is intended for fixed installations only.
- Push button switches are not for normal operational or maintenance use in hazardous locations.
- If the device shows any signs of damage or malfunction when connecting the battery, remove the battery connection immediately and contact your supplier for repair or replacement.
- Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. Use only the accessories and battery provided by Endress+Hauser; connecting non-approved accessories and batteries may damage the unit.
- Connect Sensor FXA30/FXA30B must be maintained by Endress+Hauser or a Endress+Hauser qualified technician only. Always use the designated battery, order number 71329969, from Endress+Hauser. You must remove the unit from the installation or unclassified hazard location before opening the enclosure due to the risk of batteries falling into a protected area.
- When inserting wires into the terminal block, we recommend tightening torque to 0.2 Nm.
- Allowable wire size for terminal blocks is 0.5 to 1.5 mm².

2.2 ATEX requirements

- Connect Sensor FXA30/FXA30B must be installed in an enclosure that provides a degree of protection not less than IP 54, in accordance with EN 60079-15.
- Connect Sensor FXA30/FXA30B should be used in an area of not more than pollution degree 2, as defined in EN 60664-1.

2.3 Warnings: Explosion hazards

Review the following explosion hazard warnings for the Connect Sensor FXA30/FXA30B.

 The Connect Sensor FXA30/FXA30B unit contains internal batteries.

WARNING

Connect Sensor FXA30/FXA30B is suitable for use in UL/cUL Class I, Division 2, Groups A, B, C, and D hazardous locations or non-hazardous locations only.

- ▶ Substitution of any component may impair suitability for Class I, Division 2.

WARNING

EXPLOSION HAZARD

- ▶ Batteries must only be changed in an area free of ignitable concentrations.

⚠ WARNING**EXPLOSION HAZARD**

- ▶ Do not disconnect while the circuit is live or unless the area is free of ignitable concentrations.

⚠ WARNING**Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry.**

- ▶ ESD damage occurs when electronic components are improperly handled and can result in complete or intermittent failures.

2.4 Certifications

The following certifications apply to the Connect Sensor FXA30/FXA30B device.

2.4.1 RF exposure statement

In order to comply with RF exposure limits established in the ANSI C95.1 standards, ensure users maintain a distance from the product of no less than 200 mm (7.87 in).

2.4.2 FCC certifications and regulatory information

Radio frequency interface (RFI) (FCC 15.105)

This device has been tested and found to comply with the limits for Class B digital devices pursuant to Part 15 Subpart B, of the FCC rules. These limits are designed to provide reasonable protection against frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, you are encouraged to attempt to correct the interference with one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a different circuit from the receiver.
- Consult the dealer or an experienced radio/TV technician for help.

Labeling requirements (FCC 15.19)

This device complies with Part 15 of FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

If the FCC ID is not visible when the unit is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module FCC ID.

Modifications (FCC 15.21)

Changes or modifications to this equipment not expressly approved by Digi may void the user's authority to operate this equipment.

2.4.3 UL/cUL conformity

Conformity to UL / cUL standards in the United States and Canada is in accordance with the following:

Standard	Title	Issue date
UL2054	UL Standard for Safety for Household and Commercial Batteries	October 29, 2004
UN 38.3	Recommendations on the Transport of Dangerous Goods Manual of Tests and Criteria	2009
UL60950-1	Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use	October 14, 2014

3 Incoming acceptance and product identification


3.1 Product identification

The following options are available for identifying the gateway:

- Nameplate specifications
- Order code with breakdown of the device features on the delivery note

3.2 Scope of delivery

- Connect Sensor FXA30/FXA30B
- Hard copy of Brief Operating Instructions
- Battery (depending on ordered option)

 Please note the device accessories like antenna in the "Accessories" section of the Operating Instructions.

3.3 Manufacturer

DIGI INTERNATIONAL INC.

11001 Bren Road East

Minnetonka, MN 55343 USA

3.4 Vendor

Endress+Hauser SE+Co. KG

Hauptstrasse 1

79689 Maulburg


Germany

Phone: +49 7622 28-0

4 Product description

4.1 Function and system design

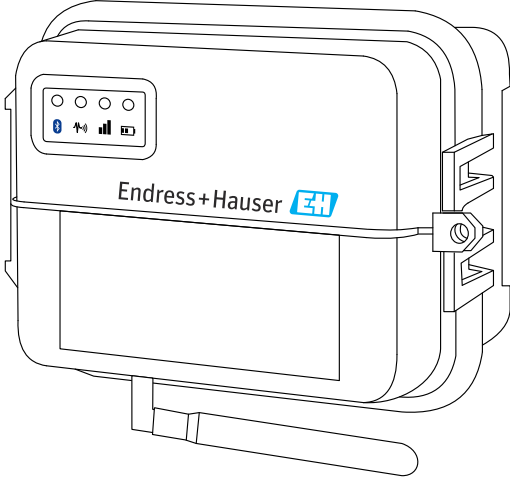
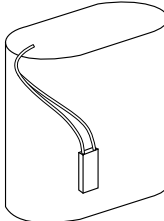
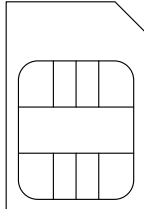
Connect Sensor FXA30/FXA30B is a low-power cellular sensor gateway for wireless drop-in networking to remotely monitor industrial environments and control systems, such as inventory level, flow, pressure as well as any other process variable. To power Connect Sensor FXA30/FXA30B, use either the internal battery or an external power source, such as solar panels, for setups with no power or limited power. Connect Sensor FXA30/FXA30B includes an external input/output (I/O) interface inside a waterproof enclosure for connecting sensors. The sensors gather information (sensor readings) from their environment, and Connect Sensor FXA30/FXA30B reports that information to SupplyCare Hosting using a lowbandwidth cellular connection.

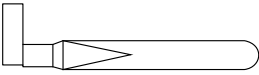
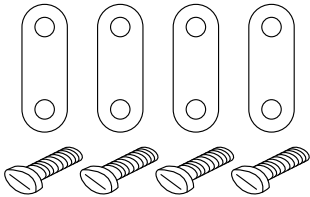
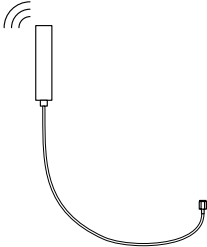
 Make sure there is adequate cellular network coverage where you plan to install the gateway before purchasing cellular service.

4.2 Product design

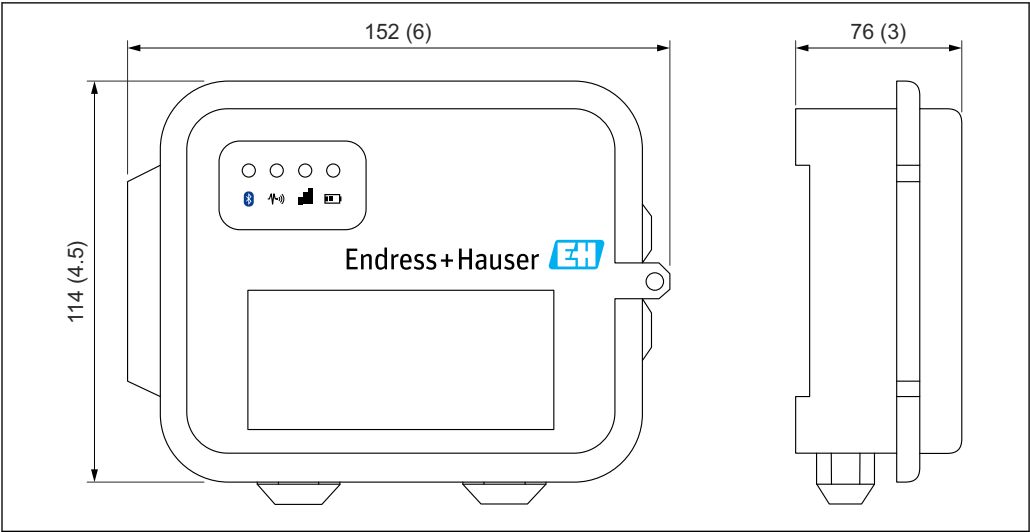
4.2.1 Components

These sections include a list of Connect Sensor FXA30/FXA30B components, and reference information about the Connect Sensor FXA30/FXA30B LEDs, ports, and buttons.

Component	Description
Connect Sensor FXA30/FXA30B	
Battery Only included when explicitly ordered in bundle or as accessory. Accessory order No. 71329969	
Activated SIM card Included when a data communication contract is purchased with the Connect Sensor FXA30/FXA30B	

Component	Description
<p>Cellular antenna for LTE and GSM (not part of the standard delivery)</p> <p>Network and Frequencies</p> <ul style="list-style-type: none"> ■ GSM900; 890 to 960 MHz ■ GSM1800; UMTS 1 710 to 2 170 MHz ■ LTE2600; 2 500 to 2 690 MHz ■ Nominal Impedance: 50 Ω ■ VSWR: 2.5 : 1 ■ Polarization: Linear ■ Vertical Radiation Pattern: Omni ■ Power Rating: 3 W ■ Gain: 0 to 2 dBi ■ Weight: 47 g (1.66 oz) ■ Dimensions: <ul style="list-style-type: none"> ■ Height: 228 mm (9 in) ■ Width: 25 mm (1 in) ■ Operating Temperature: <ul style="list-style-type: none"> -30 to +70 °C (-22 to 158 °F) ■ Connector: SMA (m) <p>Order No. 71329987</p>	
<p>Wall Mounting Kit 4 Mounting Feet 4 Mounting Screws Order No. 71336975</p>	
<p>Fixed Antenna LTE, GSM ,UMTS (not part of the standard delivery) For indoor and outdoor use 3 meter cable length</p> <p>Network and Frequencies</p> <ul style="list-style-type: none"> ■ LTE800; 790 to 862 MHz ■ GSM900; 890 to 960 MHz ■ GSM1800; UMTS 1 710 to 2 170 MHz ■ LTE2600; 2 500 to 2 690 MHz ■ Polarization: vertical ■ Gain: \approx 2 dBi ■ VSWR: \leq 1.9 : 1 ■ Return loss: > 10 dB ■ Nominal Impedance: 50 Ω ■ UV Resistance: Existsts (housing flares are possible) ■ Cable: 3 m (9.84 ft); Low Loss ■ Connector: SMA (m) <p>Order No. 71327395</p>	

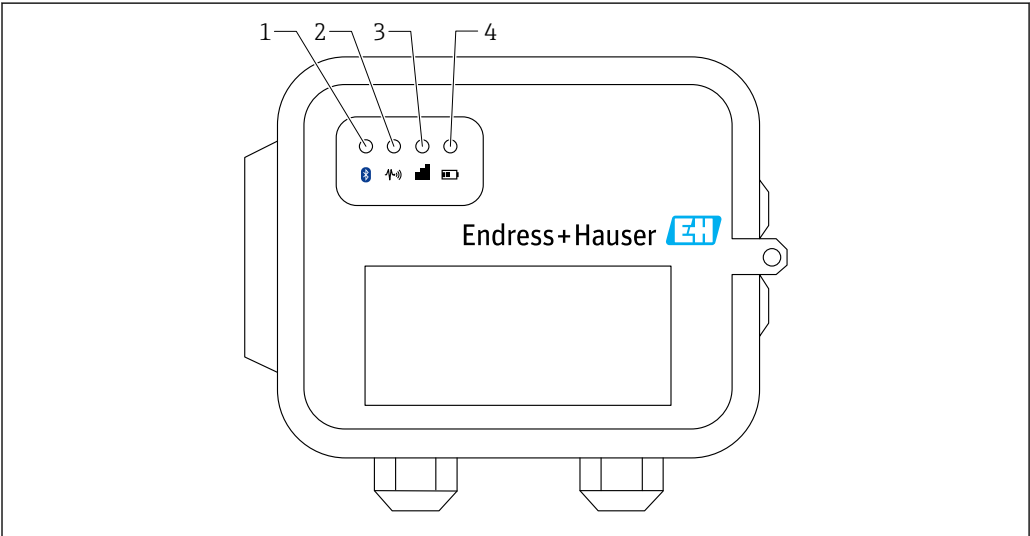
4.2.2 Dimensions



1 Dimensions in mm (in)







4.2.3 Display elements (device status indicator / LED)

Connect Sensor FXA30/FXA30B has four LED indicators to monitor Bluetooth connection, sensor activity, cellular connection, and battery life. If Connect Sensor FXA30/FXA30B is powered and all LEDs are off, it is in sleep mode.



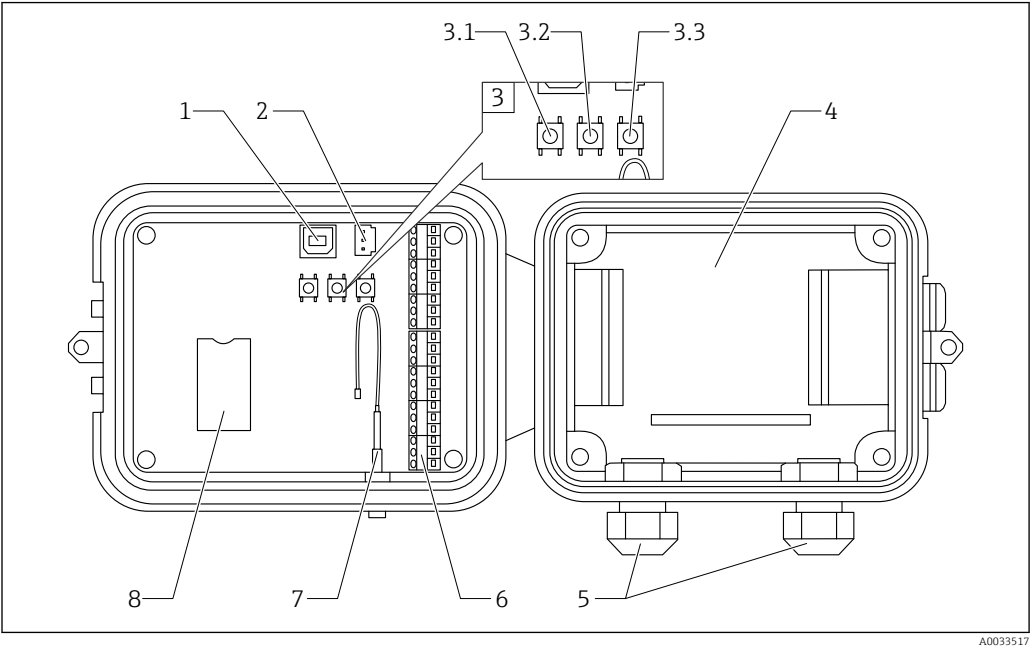
- 1 Bluetooth
- 2 Sensor reading
- 3 Cellular
- 4 Battery

Item	LED	State	Description
1	Bluetooth		Indicator light for Bluetooth communication Yellow blinking: Bluetooth is on The bluetooth module is thought for future use together with an App.
2	Sensor reading		Indicator light for the sensor(s): Green blinking: One or more sensors are reading the environment

Item	LED	State	Description
3	Cellular		Indicator light for the cellular network connection: Solid purple: Connect Sensor FXA30/FXA30B is waking
			Indicator light for the cellular network connection: Red blinking: Searching for the cellular network
			Indicator light for the cellular network connection: Blue blinking: Connected to the cellular network and attempting to communicate with FIS
			Indicator light for the cellular network connection: Solid light: Successfully sent data to FIS;
			turns off after a few seconds
4	Battery		Indicator light for battery function: Solid purple: Connect Sensor is waking

4.2.4 Ports and buttons

The following figure shows the controls for setting up and configuring Connect Sensor FXA30/FXA30B.



- 1 Console port
- 2 Battery port
- 3 Control buttons
- 3.1 Wake button
- 3.2 Factory button
- 3.3 Reset button
- 4 Battery tray
- 5 Cable glands
- 6 Input/Output (I/O) interface
- 7 Cellular antenna port
- 8 SIM Card tray

Item	Name	Description
1	Console port	Connects Connect Sensor FXA30/FXA30B to a computer using a USB type A to B cable for access to the command line interface (CLI).
2	Battery port	Connects the battery wire to power Connect Sensor FXA30/FXA30B
3.1	Wake button	Wakes Connect Sensor FXA30/FXA30B
3.2	Factory button	Removes all configuration changes and restores Connect Sensor FXA30/FXA30B to its original factory default settings when you press and hold it for a 3 seconds. If you press this button, but do not hold it down, the device briefly wakes and returns to sleep mode—no settings are affected.
3.3	Reset button	Restarts the device when it is not responding to input (from the CLI or otherwise). Pressing this button does not remove previous configuration changes.
4	Battery tray	Holds the battery in place
5	Cable glands	Thread sensor cables through these openings into Connect Sensor FXA30/FXA30B
6	Input/Output (I/O) interface	Wire analog or digital input and output sensors or power to this interface
7	Cellular antenna port	Connects an external cellular antenna to Connect Sensor FXA30/FXA30B
8	SIM Card tray	Connects the SIM card to Connect Sensor FXA30/FXA30B

4.3 Product specifications

The following table provides a summary of general product specifications for Connect Sensor FXA30/FXA30B.

Specifications	
Management	
Configuration and management	<ul style="list-style-type: none"> Endress+Hauser Field Information Server (FIS) Local USB to Serial CLI Protocol
Protocol	TCP
SIM Slots	1, standard size
Power	
Battery	7.2 V, 14 Ah, Lithium Thionyl Chloride, nonrechargeable, replaceable
Battery self discharge	<1%/year if stored at +30 °C (+86 °F)
External power requirement	8 to 30 V _{DC} at 1 A
Power draw, sleeping	86.4 µW
Power draw, continuous monitoring	400 mW
Power draw, peak transmit	14.4 W
Sensor protocol support (FXA30B only)	
MODBUS	MODBUS RTU and ASCII, connect to up to 4 sensors
Analog input	
Input	4 × analog input: 4 to 20 mA 4 × Modbus RS-485 (Connect Sensor FXA30B only)
Input current range	4 to 22 mA (Current loop input)
Digital input	
Ports	1 digital input or pulse counter input
Input Range	<ul style="list-style-type: none"> 0 to 0.6 V_{DC} logic low; 2.2 to 30 V_{DC} logic high
Max. input voltage	30 V _{DC}
Max. pulse count frequency	2 kHz
Output power	
Ports	5
Output voltage options	24 V _{DC}
Max. current output	200 mA per sensor
Environmental	
Environmental Operating temperature	−35 to +70 °C (−31 to 158 °F)
Storage temperature	−40 to +85 °C (−40 to 185 °F)
Relative humidity	90% (Non-condensing after 90%)
Ingress Protection (IP) rating	IP66
Physical	
Dimensions (L x W x H)	<ul style="list-style-type: none"> Length: 152 mm (6 in) Width: 114 mm (4.5 in) Height: 76 mm (3 in)
Weight	0.57 kg (1.25 lb)
LEDs	<ul style="list-style-type: none"> Bluetooth Sensor reading Cellular Battery

Specifications	
Enclosure material	10% fiberglass reinforced polycarbonate
Enclosure rating	NEMA Type 4, 4X, 6, and 6P UL 94 V-0

4.4 Hardware enhancements

In addition to the features of the Connect Sensor FXA30 the Connect Sensor FXA30B is equipped with the following functions:

Modbus protocol


4.5 Battery life

Connect Sensor FXA30/FXA30B uses sleep and wake modes to manage power use. The device wakes only for sensor readings and sending the scheduled readings to SupplyCare Hosting. It is in sleep mode at all other times to maintain low power consumption.

Extend battery life by scheduling less frequent sensor readings and communication uplinks. Scheduling more frequent sensor readings and communication uplinks may shorten the battery life.

4.6 Continuous Monitoring Feature

For some customers, the scheduling paradigm of the standard Connect Sensor FXA30B offering does not fulfill their requirements. Alternatively a firmware image that trades alarm reactivity for power consumption is available. When using the continuous monitoring feature, the Connect Sensor FXA30B never "sleeps" and reports immediately (outside scheduled reports) when a measurement reaches a configured limit on a channel. For best performance and ease of use it is recommended that you use an external power source rather than relying on the battery within the Connect Sensor FXA30B. If the battery is used, the battery life will be significantly reduced. The Connect Sensor FXA30B battery can be used as a short-term battery backup if the external power source fails.

For more information about the continuous monitoring feature, see →  40

4.7 Cell modem transmit (TX) output power

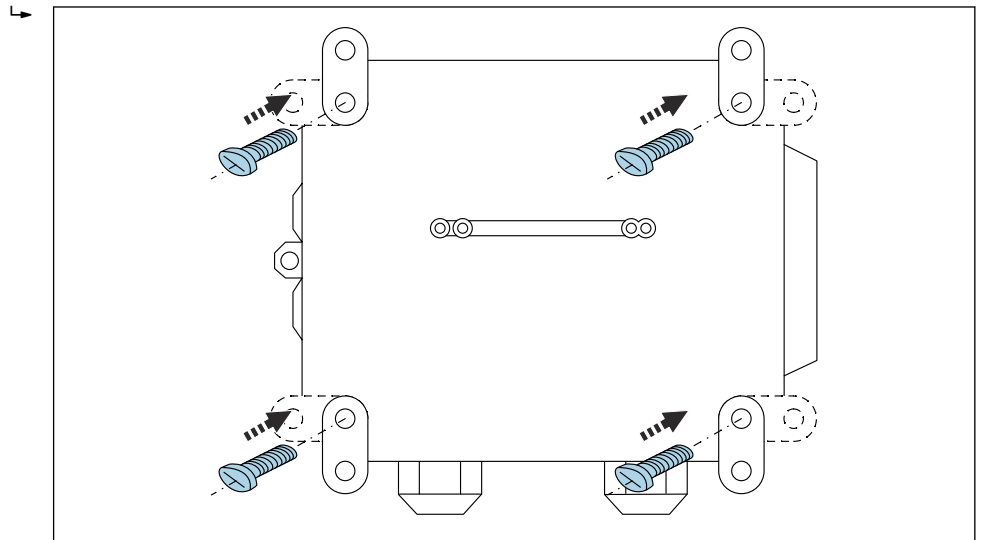
Modem	Band	Power Class
HE910-D	GSM 850 / 900	4 (2 W)
	DCS 1800 / PCS 1900	1 (1 W)
	EDGE, 850/900 MHz	E2 (0.5 W)
	EDGE, 1800/1900 MHz	Class E2 (0.4 W)
	WCDMA FDD B1, B2, B4, B5, B8	Class 3 (0.25 W)
LE910-NA1	LTE All Bands (for North America use only)	Class 3 (0.2 W)
	WCDMA All Bands	Class 3 (0.25 W)
LE910-SV1	LTE All Bands (for North America use only)	Class 3 (0.2 W)

5 Installation

5.1 Mounting

Wall mounting

1. Use Mounting kit Connect Sensor FXA30/FXA30B and fix the 4 brackets with the supplied screws on backside of the housing.

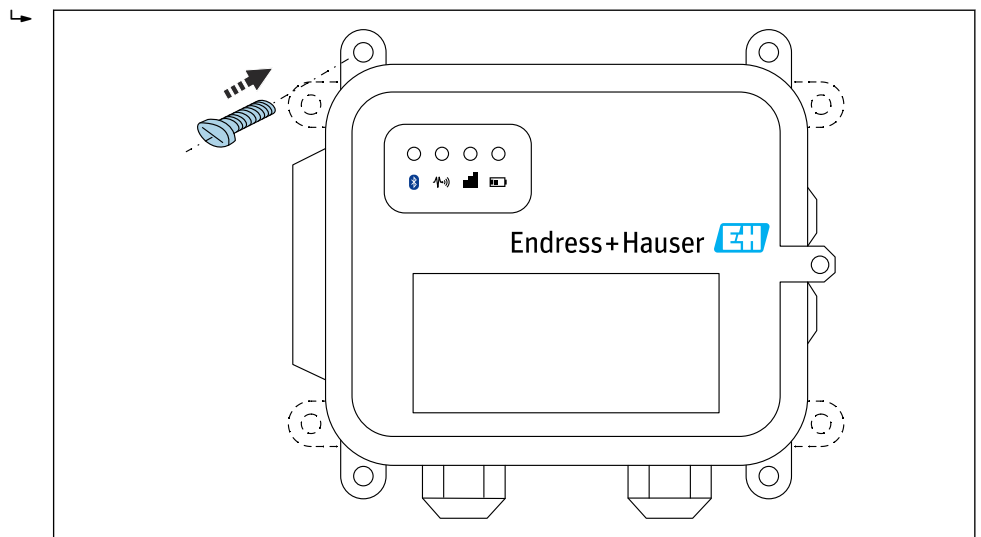


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2 Backside

The Mounting kit Connect Sensor FXA30/FXA30B can be ordered as accessory via Order code : 71336975

2. Only to be fastened at stable materials (e.g. metal, brick, concrete) using suitable fastening material (to be supplied by customer).



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3 Frontside

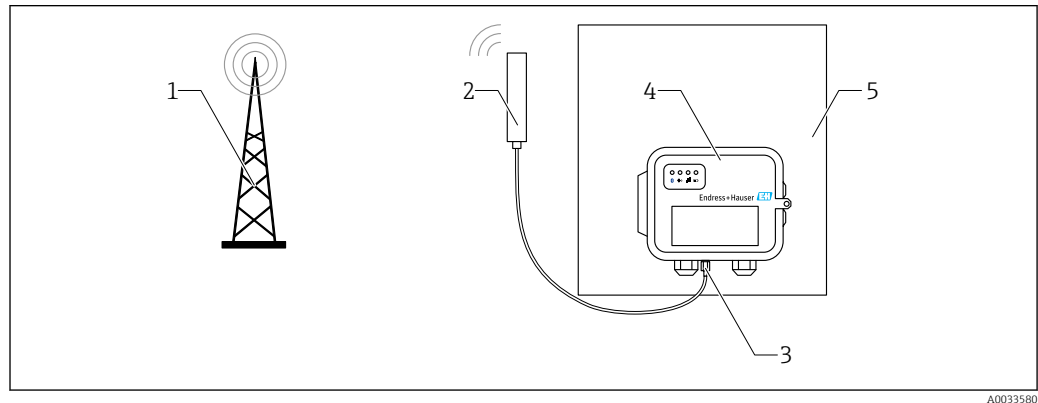
5.2 Antenna


Connect Sensor FXA30/FXA30B require an external antenna for wireless communication via UMTS (2G/3G) or LTE (North America).

If Connect Sensor FXA30/FXA30B is mounted inside a cabinet, the antenna must be mounted outside the cabinet.

Suitable antennas are available as an accessory →  63.

 In areas with weak UMTS (2G/3G) or LTE (North America) reception, it is advisable to first check the communication before securing the antenna permanently.



 4 Connection: SMA connection

- 1 UMTS (2G/3G) or LTE network
- 2 Antenna for Connect Sensor FXA30/FXA30B
- 3 SMA connection
- 4 Connect Sensor FXA30/FXA30B
- 5 Control cabinet

6 Assembling

Before wiring sensors to the I/O interface, assemble Connect Sensor FXA30/FXA30B to make sure it works and check the cellular network coverage in the install area.

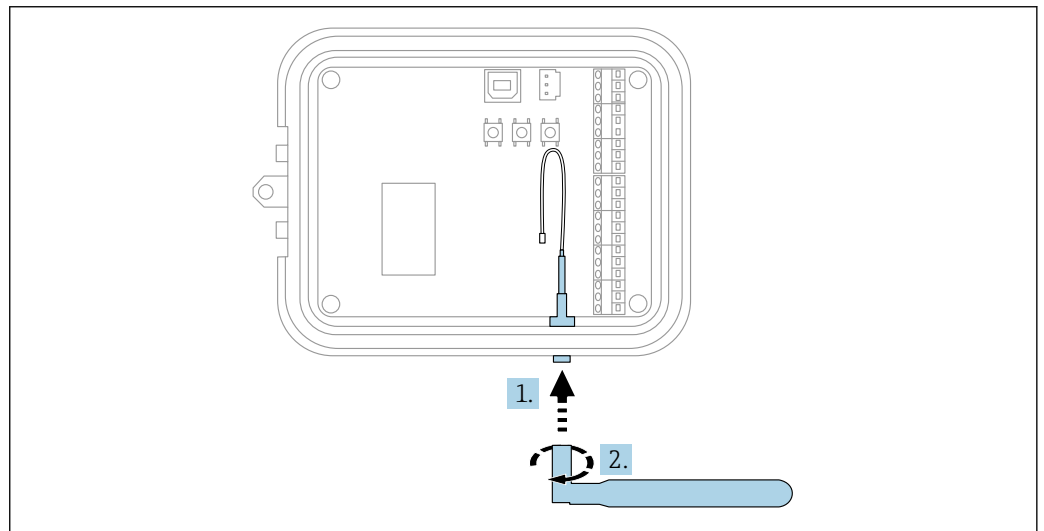
Make sure you have the following required equipment:

- Battery or Direct Current source
- Activated SIM card
- Cellular antenna

i We recommend that you complete configuration, including verifying cellular and FIS connectivity, before wiring external sensors to Connect Sensor FXA30/FXA30B.

6.1 Connect the cellular antenna

i You must use a passive (non-amplified) antenna with the Connect Sensor FXA30/FXA30B.



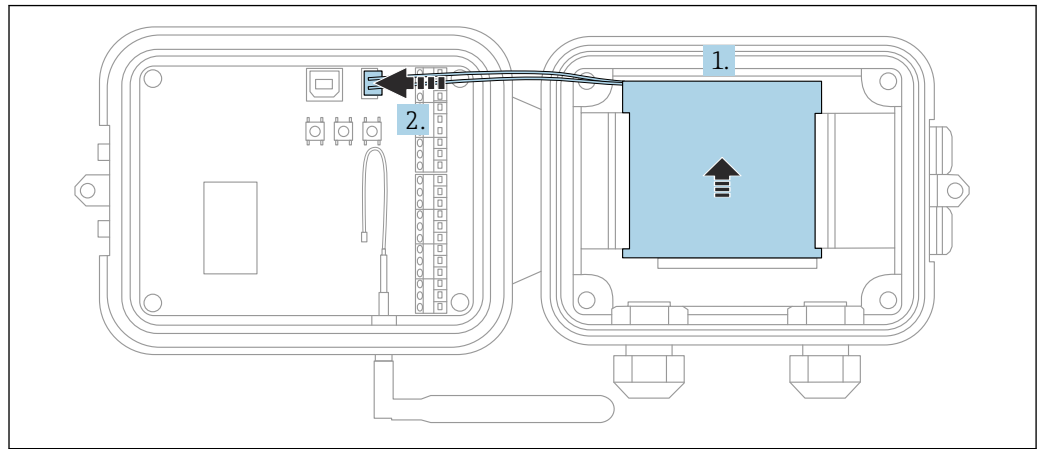
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5 *Connect the cellular antenna*

1. Plug antenna to cellular antenna port
2. Tighten the antenna connection

6.2 Connect the battery

Open the Connect Sensor FXA30/FXA30B enclosure.



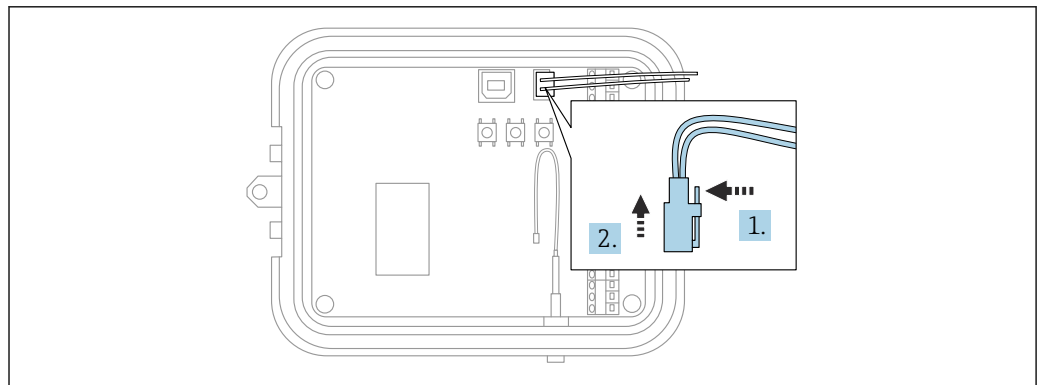
A0033552

6 Connect the battery

1. Insert battery to battery tray
2. Connect battery to battery port

6.3 Disconnect the battery

Open the Connect Sensor FXA30/FXA30B enclosure.



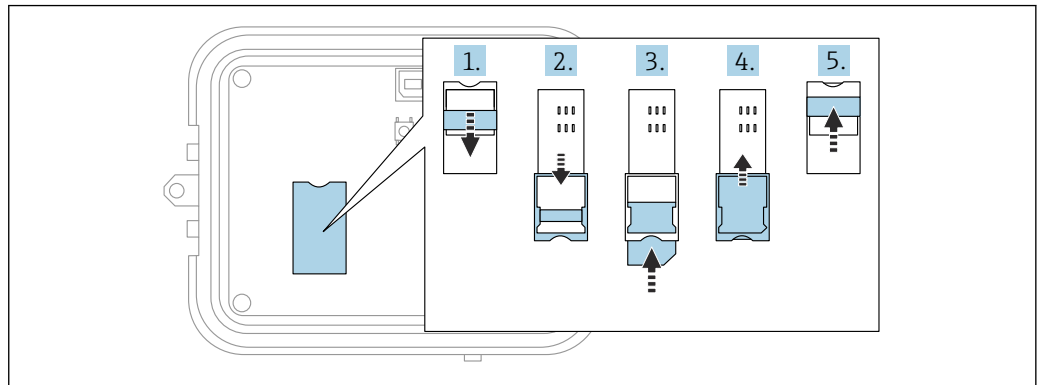
A0033521

7 Disconnect the battery

1. Press secure pin back
2. Pull plug out of battery port

6.4 Insert SIM card

Open the Connect Sensor FXA30/FXA30B enclosure.



A0033518

 8 Insert SIM card

1. Unlock SIM Card tray
2. Swing open the SIM Card tray
3. Insert SIM Card (Standard SIM)
4. Clap SIM Card tray back
5. Lock SIM Card tray

7 Configure the cellular connection

i If you purchased a Data communication contract with the Connect Sensor FXA30/FXA30B, then the cellular connection is already configured on your Connect Sensor FXA30/FXA30B and you can skip this section.

Connect Sensor FXA30/FXA30B is configured with a default APN that you need to change to register Connect Sensor FXA30/FXA30B on the cellular network for your cellular service provider. Use the command line interface (CLI) to initially configure the cellular connection.

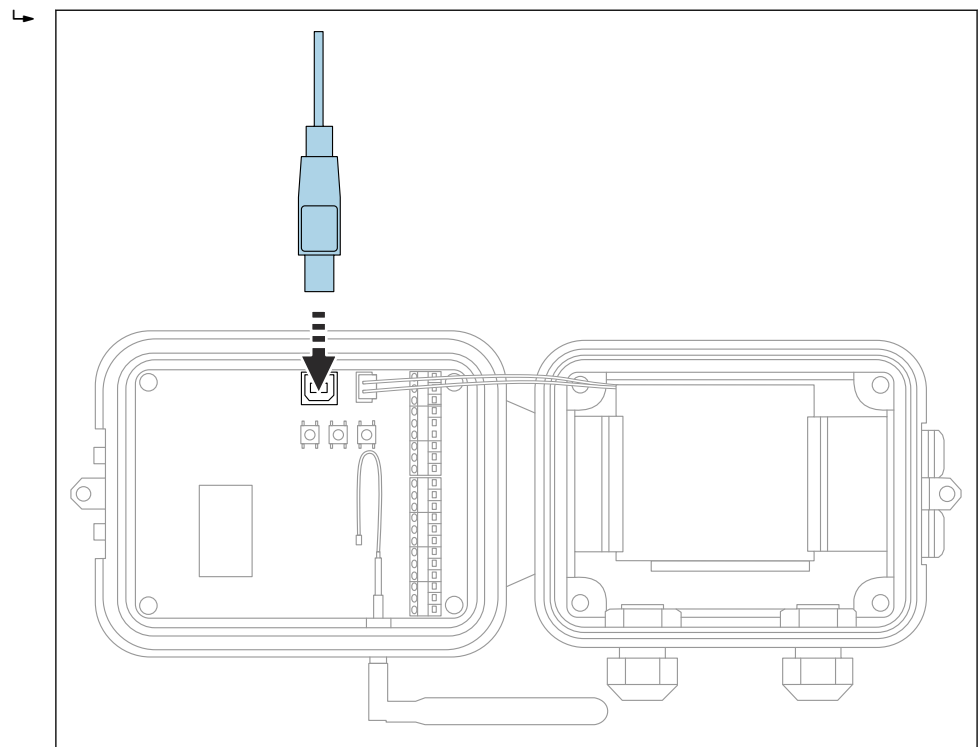
Before you begin, make sure you have the following required equipment and information:

- Computer running a terminal emulator program for example Microsoft Windows command line
- USB type A to B cable
- APN from your cellular service provider

7.1 Register on cellular network

To register Connect Sensor FXA30/FXA30B on a cellular network:

1. Open the enclosure and make sure the battery is connected and the SIM card is installed.
2. Connect a USB type A to B cable from your computer to the USB type B port. You may need to install device drivers or wait for your computer to automatically install them when connecting Connect Sensor FXA30/FXA30B to a computer using a USB cable. It is recommended the use of drivers available at <http://www.ftdichip.com/Drivers/VCP.htm>




A0033519


3. Open a terminal program on a computer (e.g.: Putty) and connect to Connect Sensor FXA30/FXA30B using the following configuration:
 - ↳ **Connection port:** Connect to the COM port associated with the USB cable connected to Connect Sensor FXA30/FXA30B
 - Baud rate or bits per second:** 115200
 - Data:** 8 bit
 - Parity:** None
 - Stop:** 1 bit
 - Flow control:** None
4. Press the **Wake** button
5. At the command prompt, type **set apn=thecellular.apn** where **thecellular.apn** is the string supplied by your cellular service provider.
6. Press **Enter**
 - ↳ The terminal program displays the APN configuration setting's current value and the pending value.
7. If required, set a user name, password, and PIN for the SIM card. At the command prompt, type the following and press **Enter** after each command:
 - ↳ **set usr=<username>** (Where **username** is the name of your cellular account)
 - set pwd=<password>** (Where **password** is the password for your cellular account)
 - set pin=<pin>** (Where **pin** is the PIN for your SIM card)
8. Type **activate** at the command prompt and press **Enter** to immediately make the change.
 - ↳ Connect Sensor FXA30/FXA30B immediately wakes up to report the change to FIS.
 - After the change completes, it goes to sleep again.

7.1.1 Check the cellular connection

Make sure the cellular network provides an adequate signal where you install Connect Sensor FXA30/FXA30B to maintain a consistent cellular connection.

 Proper network coverage helps reduce power consumption, leading to improved battery life.

To check the cellular network connection at the install location:

1. Press the Wake button.
2. Make sure the cellular LED blinks blue to show it is connected to the cellular network.
3. If Connect Sensor FXA30/FXA30B does not connect to the cellular network, see →  59

You can now complete I/O interface wiring.

Data storage

■ Standard-Firmware:

In case of problems with the uplink mobile connection, the Connect Sensor FXA30B can store the measured data of up to 63k data points.

■ Continuous Monitoring Firmware:

Connect Sensor FXA30B can store 5 minutes of measured data (resolution 1 second) before and after an alarm event.

8 Electrical connection

WARNING

Hazardous electric voltage


Risk of electric shock and injury from startle response.

- ▶ De-energize all power sources before connecting.
- ▶ Before commissioning the device, measure the supply voltage and compare it with the voltage specifications on the nameplate. Only connect the device if the supply voltage measured matches the specifications.

8.1 Power options


8.1.1 Power the Connect Sensor FXA30/FXA30B

While Connect Sensor FXA30/FXA30B has an internal battery for power, you can use an external power source, such as solar panels or other DC sources. For an external power source, use the external power input to power the Connect Sensor FXA30/FXA30B device.

-  When Connect Sensor FXA30/FXA30B is connected to an external power source, the external power source becomes the primary power source and the internal battery becomes a backup power source.
If the external power source is unable to power Connect Sensor FXA30/FXA30B (such as when it has an unacceptable voltage range), it automatically switches to the internal battery as the power source.
- The external power inputs accept a DC range of 8 to 30 V_{DC}

8.1.2 Power the sensors

The Connect Sensor FXA30/FXA30B can power sensors connected to the analog, digital, or serial power outputs. In order to configure the Connect Sensor FXA30/FXA30B power options the cloud interface on the Field Information Server is to be used.

-  If you have a Modbus-enabled device that must get power from the Connect Sensor FXA30B, the Modbus device must be wired to the serial power output.

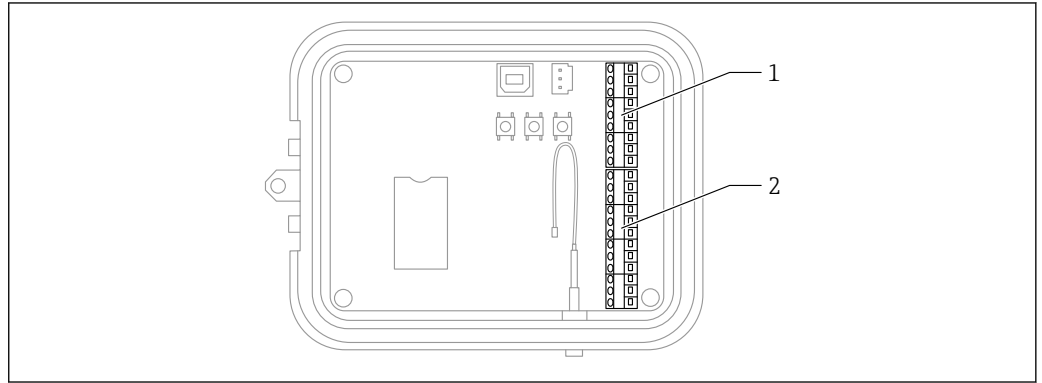
Note the following:

- The sensor power output voltage is 24 V_{DC}
- The maximum output current for each sensor power output connector is 200 mA

8.2 Terminal assignment

8.2.1 I/O interface pin assignments

Connect Sensor FXA30/FXA30B has two I/O connectors, a 9-pin connector and a 12-pin connector.

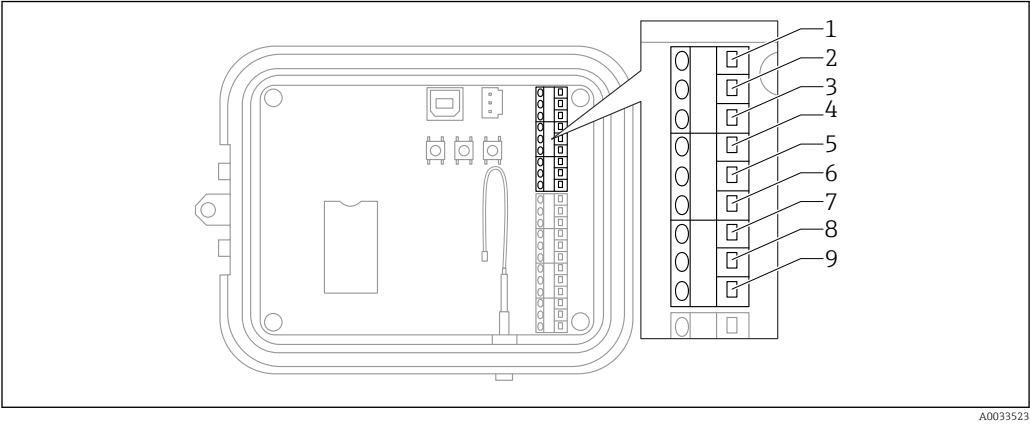


A0033522

 9 I/O interface pin assignments

- 1 9-pin connector
- 2 12-pin connector

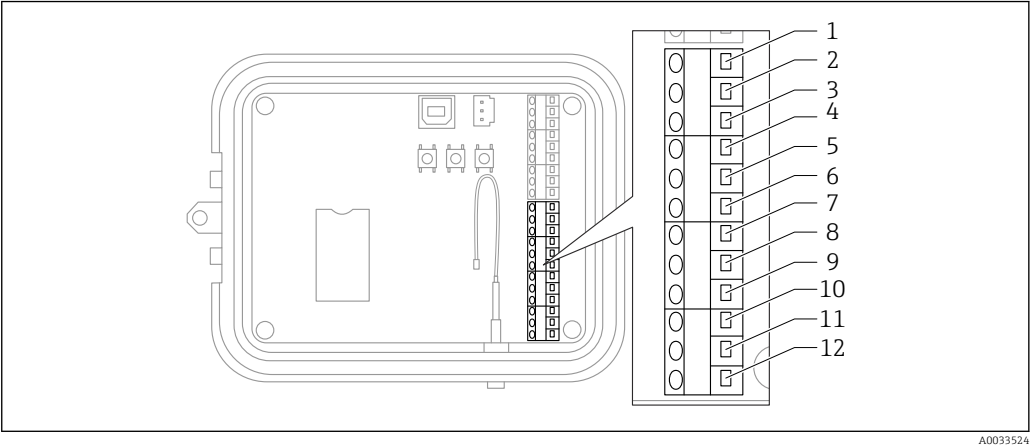
9-pin connector details



10 9-pin connector details

Pin number	Assignment	Signal
1	SGnd	Serial interface ground
2	SRX/-	Serial interface Modbus -
3	STX/+	Serial interface Modbus +
4	SPwr	Serial interface power output
5	EXT GND IN	External power supply, ground
6	EXT PWR IN	External power supply, positive input
7	DGnd	Digital interface, ground
8	DIO	Digital interface I/O
9	DPwr	Digital interface power output

12-pin connector details



A0033524


11 12-pin connector details

Pin number	Assignment	Signal
1	A 4 GND	Analog interface 4, ground
2	A 4 IN	Analog interface 4, analog input
3	A 4 Pwr	Analog interface 4, power output+
4	A 3 GND	Analog interface 3, ground
5	A 3 IN	Analog interface 3, analog input
6	A 3 Pwr	Analog interface 3, power output
7	A 2 GND	Analog interface 2, ground
8	A 2 IN	Analog interface 2, analog input
9	A 2 Pwr	Analog interface 2, power output
10	A 1 GND	Analog interface 1, ground
11	A 1 IN	Analog interface 1, analog input
12	A 1 Pwr	Analog interface 1, power output

8.3 Wire sensors to the I/O interface


To wire sensors to the Connect Sensors FXA30/FXA30BI/O interface, you need the following equipment:

- Screwdriver, slot-headed 0.4 × 2.5 × 80 mm
- Wire size Ø 1.29 to 0.25 mm (16 to 30 AWG) for each pin connector

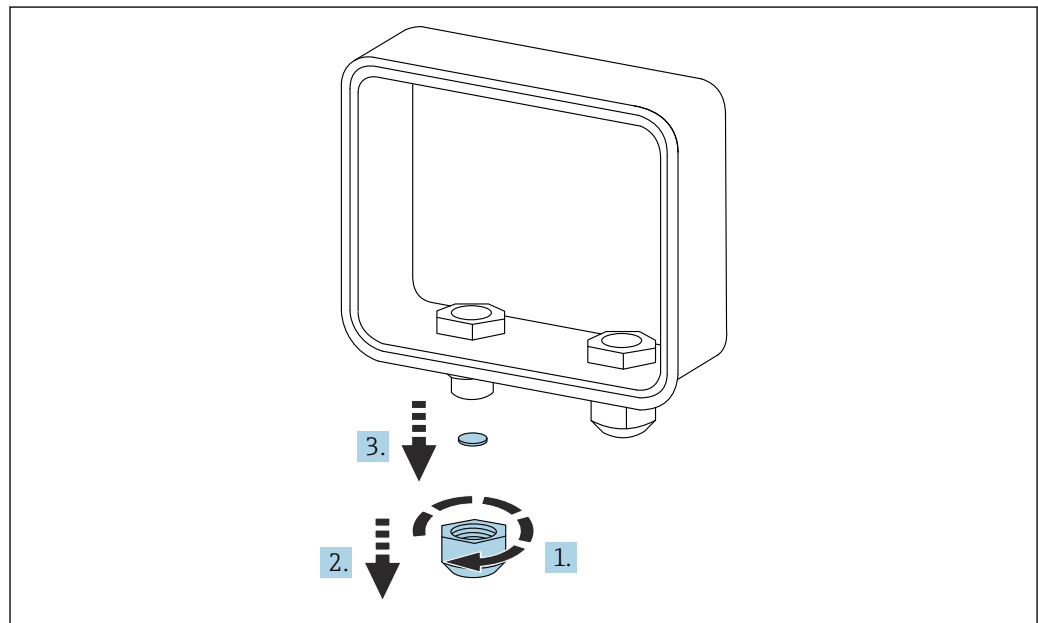
 All external or field wiring must be in accordance with NFPA 70 Article 501.10(B).

NOTICE

Wiring Connect Sensors FXA30/FXA30B

- ▶ Open Connect Sensors FXA30/FXA30B enclosure and disconnect all power sources.
- ▶ Make sure external power source is switched off.
- ▶ Disconnect the battery →  22.

8.3.1 Unscrew gland cap



A0033526

 12 Unscrew gland cap

1. Unscrew gland cap
2. Pull gland cap down
3. Remove plastic seal

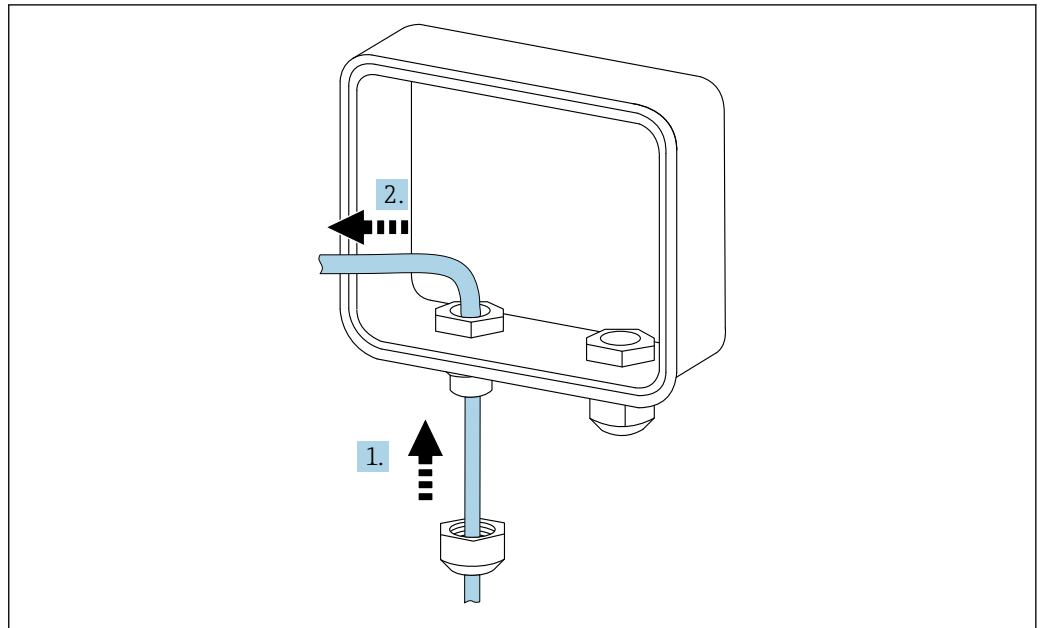
NOTICE

Over tightening an unused cable gland cap,

can force out the plastic hole cover, unsealing the cable gland

- ▶ Make sure the plastic hole cover stays in place to keep it sealed.

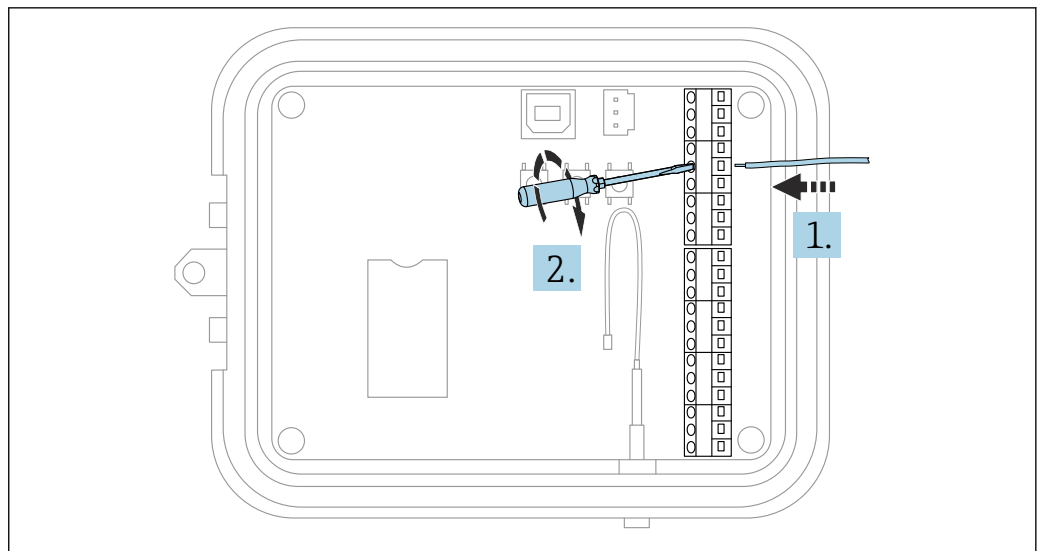
8.3.2 Insert sensor cable



13 Insert sensor cable

1. Run sensor cable through gland cap
2. Push sensor cable through cable gland

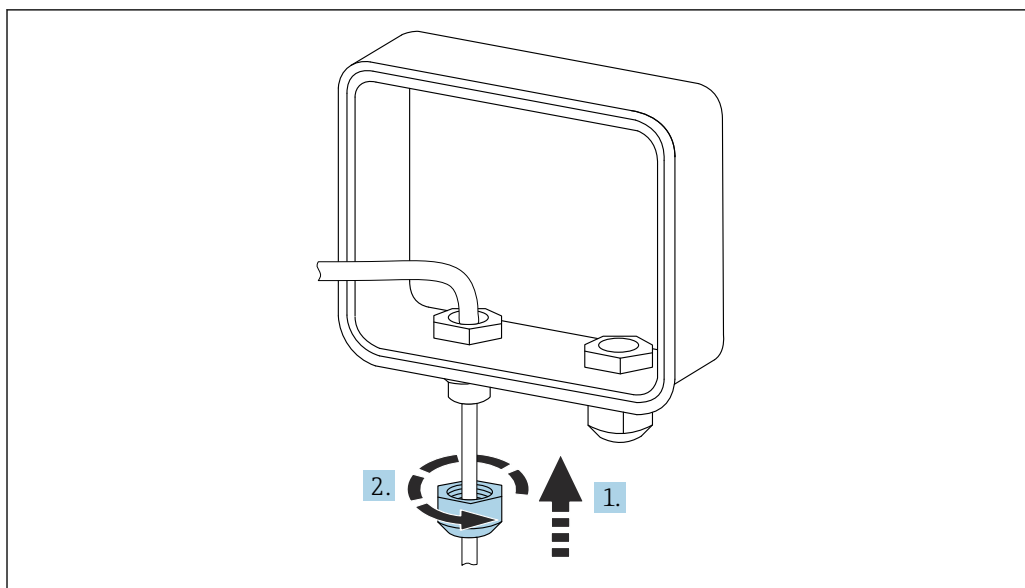
8.3.3 Connect wire



14 Connect wire

1. If necessary use screwdriver to loosen the I/O interface connector screw. Slide wire into terminal side of connector
2. Tighten screw to 0.2 Nm to secure wire to connector

8.3.4 Tighten gland cap



A0033528

15 Tighten gland cap

1. Push gland cap to gland
2. Tighten cap to the cable gland to seal and secure the wire

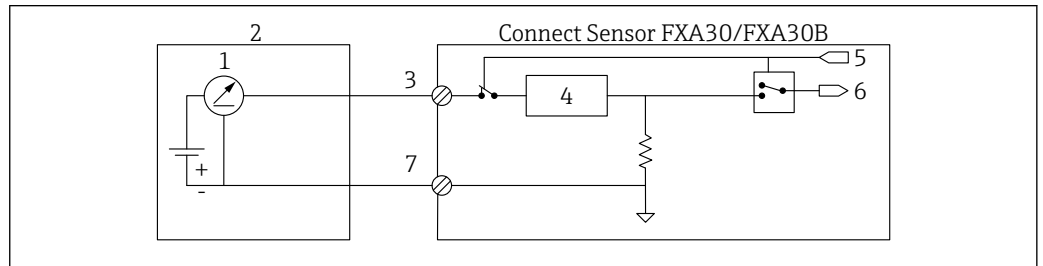
8.4 Analog input

The analog inputs have the following modes of operation, which are disabled by default.

8.4.1 Current loop

Connect Sensor FXA30/FXA30B can monitor a 4 to 20 mA current input. The following schematics show wiring options for 4 to 20 mA inputs.

Self-powered

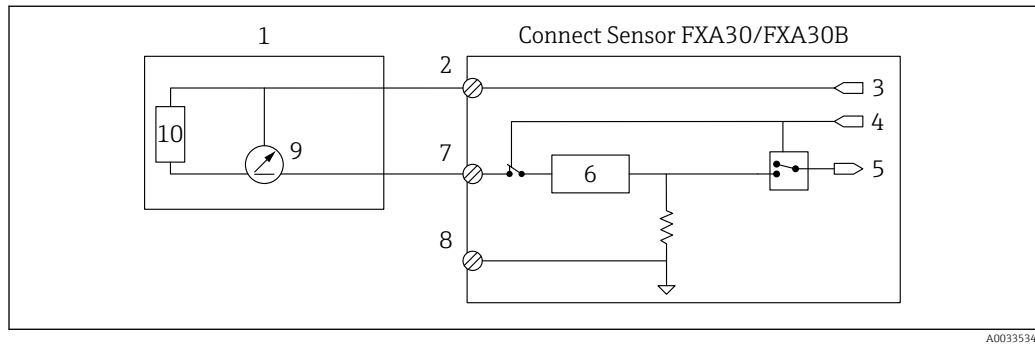


16 This figure shows the schematic when the external sensor is self-powered or powered from a source other than Connect Sensor FXA30/FXA30B.

- 1 4 to 20 mA Output
- 2 External Sensor
- 3 Analog Input
- 4 Current Loop Protector
- 5 Analog Select Signal (Current Mode)
- 6 Analog Input
- 7 Analog Ground

2-wire (loop-powered) sensors

You can connect the Connect Sensor FXA30/FXA30B to a 4 to 20 mA 2-wire sensor, which is also known as a loop-powered sensor.

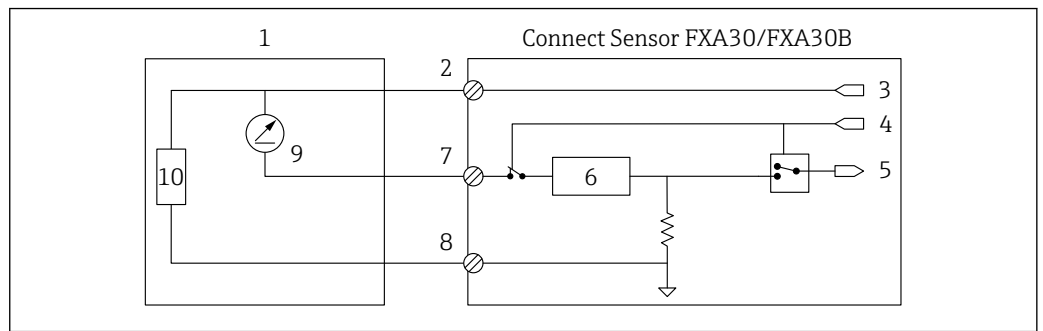


A0033534

17 This figure shows the schematic when using power from the Connect Sensor FXA30/FXA30B current loop to power a sensor.

- 1 External Sensor
- 2 Power
- 3 Sensor Power
- 4 Analog Select Signal (Current Mode)
- 5 Analog Input
- 6 Current Loop Protector
- 7 Analog Input
- 8 Analog Ground
- 9 4 to 20 mA Output
- 10 Sensor Circuitry

3-wire sensors



A0033535

 18 This figure shows the schematic when the analog power output from Connect Sensor FXA30/FXA30B is powering the sensor.

- 1 External Sensor
- 2 Power
- 3 Sensor Power
- 4 Analog Select Signal (Current Mode)
- 5 Analog Input
- 6 Current Loop Protector
- 7 Analog Input
- 8 Analog Ground
- 9 4 to 20 mA Output
- 10 Sensor Circuitry

8.5 Digital Input

Connect Sensor FXA30/FXA30B has one digital input pin. You can configure the pin as a digital input or pulse counter, but not more than one input function simultaneously.

8.5.1 Digital input and pulse counter

When configuring the pin as a digital input, it allows the following modes of operation:

- Input mode:

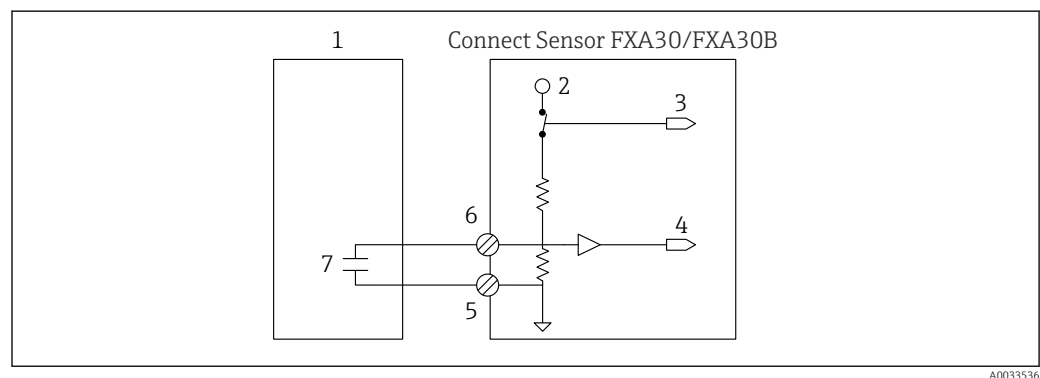
Connect Sensor FXA30/FXA30B gets the digital input value at scheduled sensor readings. You can configure Connect Sensor FXA30/FXA30B to wake from sleep mode when an input value changes (rising edge or falling edge wake).

- Pulse counter:

When connected to a mechanical meter, Connect Sensor FXA30/FXA30B counts pulses during Connect Sensor FXA30/FXA30B sleep cycles and reports them to Connect Sensor FXA30/FXA30B during normal reporting intervals.

Each mode has a pull-up resistor that you can enable or disable. The pull-up indicates the digital input's state when there is no external voltage.

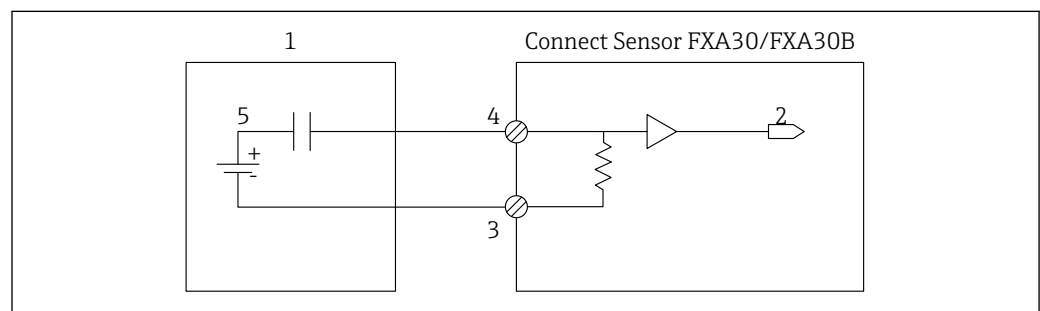
i If you enable the pull-up resistor, it will constantly draw power. Depending on the current flow to the sensor, you may need to externally power the Connect Sensor FXA30/FXA30B.



A0033536

19 The figure shows a digital input with the pull-up resistor enabled where it is driving an external relay.

- 1 External Sensor
- 2 3.3 V
- 3 Pull-up Enable (On)
- 4 Digital Input
- 5 Digital Ground
- 6 Digital I/O
- 7 External Contact



A0033537

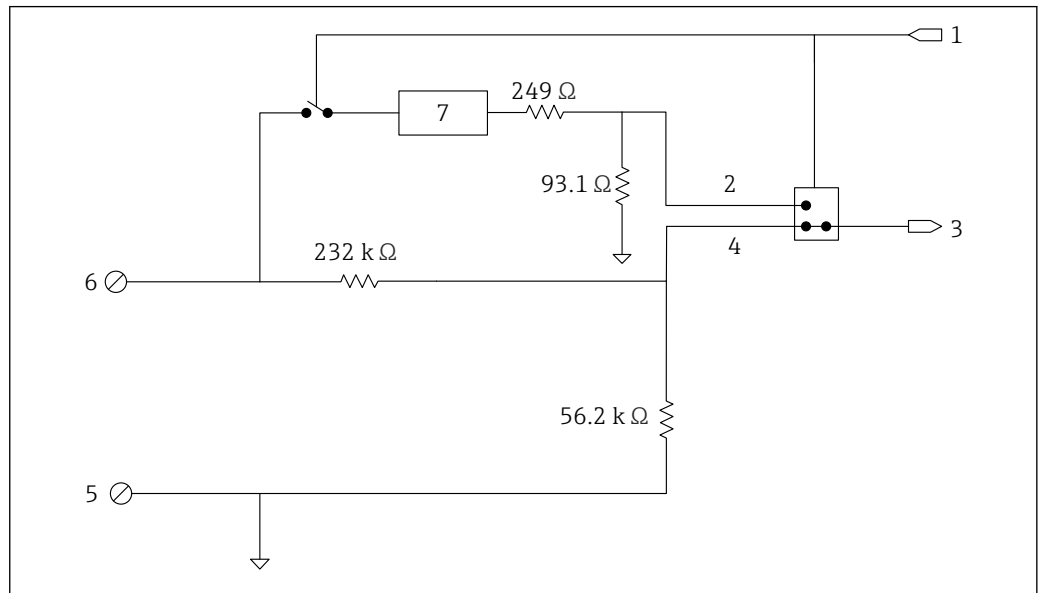
20 The figure shows a digital input with the pull-up resistor disabled.

- 1 External Sensor
- 2 Digital Input
- 3 Digital Ground
- 4 Digital I/O
- 5 External Contact

8.6 I/O schematics

The following sections show electrical wiring schematics for the Connect Sensor FXA30/FXA30B I/O connectors.

8.6.1 Analog input schematic

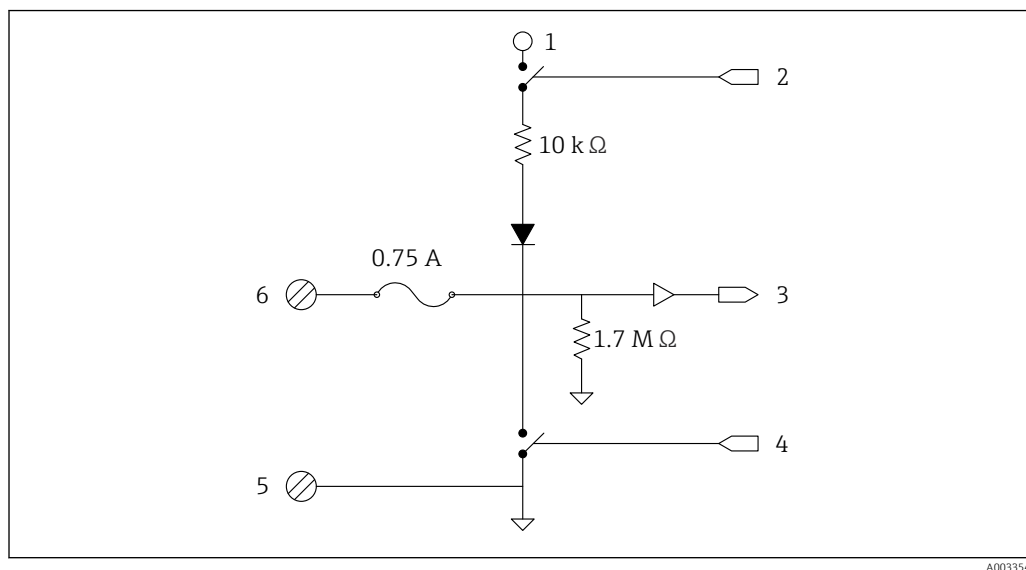


A0033540

21 The image is an overview of the analog input wiring diagrams.

- 1 Analog Select Signal
- 2 Current Loop Signal
- 3 Analog Input
- 4 Voltage Input Signal
- 5 Analog Ground
- 6 Analog input
- 7 Current Loop Protector

8.6.2 Digital I/O schematic



A0033541

22 The image is an overview of the digital I/O wiring diagrams.

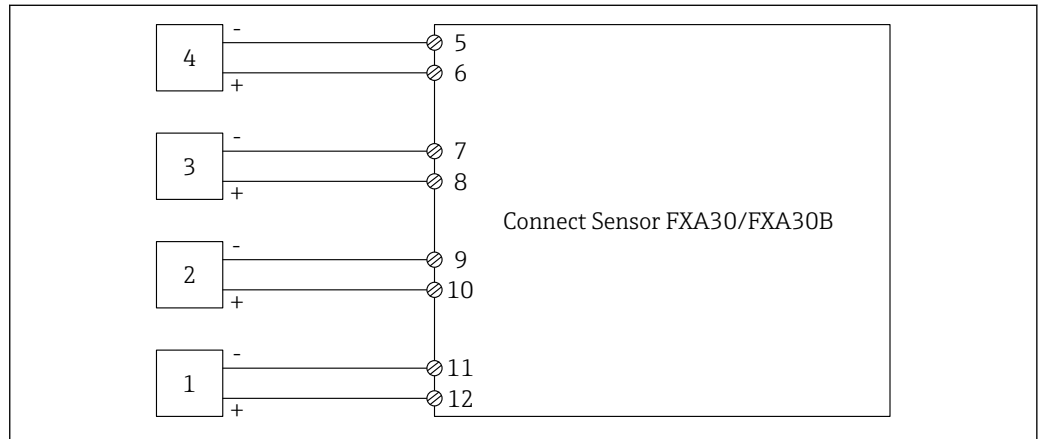
- 1 Analog Select Signal
- 2 Current Loop Signal
- 3 Analog Input
- 4 Voltage Input Signal
- 5 Analog Ground
- 6 Analog input
- 7 Current Loop Protector

8.7 Wiring Overview

The analog inputs have the following modes of operation, which are disabled by default.

8.7.1 Standard Firmware

Wiring Connect Sensor FXA30/FXA30B with Standard Firmware



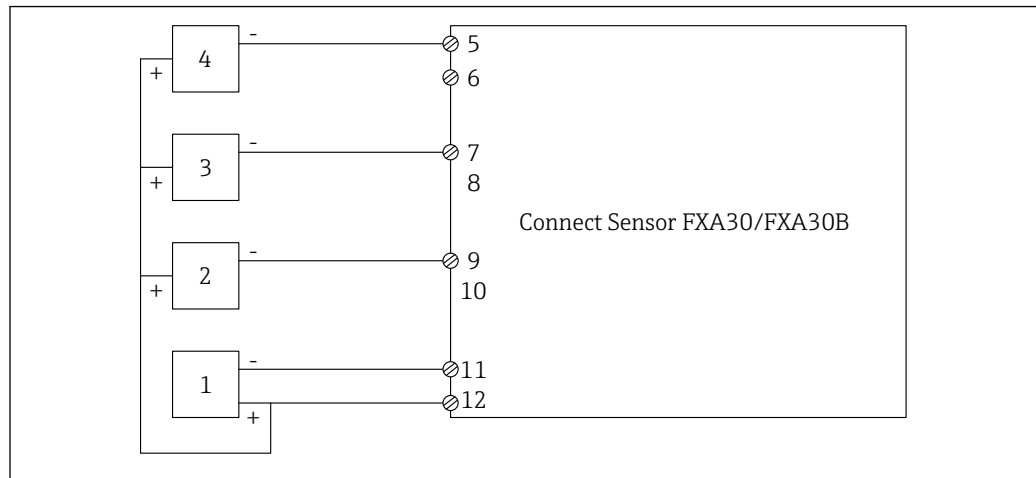
A0033931

23 Standard Mode

- 1 External Sensor (1)
- 2 External Sensor (2)
- 3 External Sensor (3)
- 4 External Sensor (4)
- 5 A4IN (Analog Input 4)
- 6 A4Pwr (Sensor 4 Power)
- 7 A3IN (Analog Input 3)
- 8 A3Pwr (Sensor 3 Power)
- 9 A2IN (Analog Input 2)
- 10 A2Pwr (Sensor 2 Power)
- 11 A1IN (Analog Input 1)
- 12 A1Pwr (Sensor 1 Power)

8.7.2 Firmware "Continuous Monitoring"

Wiring Connect Sensor FXA30/FXA30B with special Firmware **"Continuous Monitoring"**



A0039932

24 Continuous Monitoring (daisy chain)

- 1 External Sensor (1)
- 2 External Sensor (2)
- 3 External Sensor (3)
- 4 External Sensor (4)
- 5 A4IN (Analog Input 4)
- 6 -
- 7 A3IN (Analog Input 3)
- 8 -
- 9 A2IN (Analog Input 2)
- 10 -
- 11 A1IN (Analog Input 1)
- 12 A1Pwr (Sensor 1 to 4 Power)

9 Commissioning

9.1 Commissioning into FIS


9.1.1 Introduction

Field Information Server (FIS) is a web-based operating portal for managing the lifecycle and diagnostics of worldwide applied gateways in the Inventory Management System.

9.1.2 Requirements for the personnel

The personnel for configuration, commissioning, diagnostics and maintenance must fulfill the following requirements:


- Trained, qualified specialists: must have a relevant qualification (training) for this specific function and task
- Are authorized by the hosting service owner (Endress+Hauser)
- Before beginning work, the specialist staff must have read and understood the instructions in the Operating Instructions and supplementary documentation as well as in the certificates (depending on the application)
- Following instructions and basic conditions

 Facility operating personnel is not supposed to have access to this system.

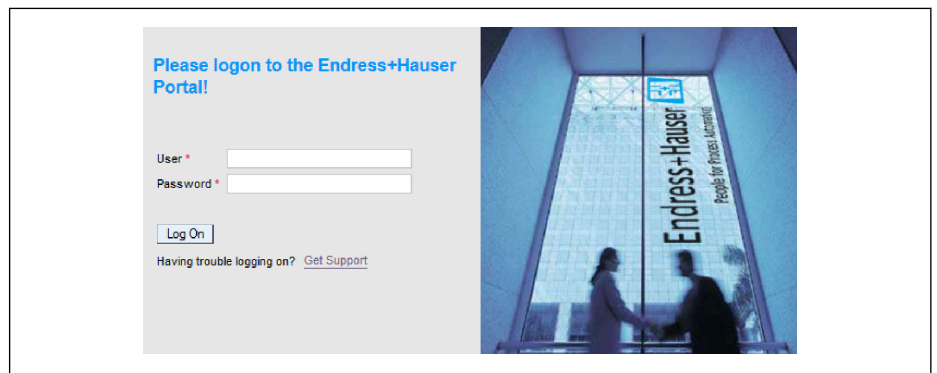
9.1.3 Starting the program

The use of following Web Browsers is recommended to avoid any drawback and ensure that all features are supported:

- Internet Explorer 11
- Firefox® > 38.0 or later
- Chrome™ browser > 36.0 or later

 Please, notice that the number of visible functionalities inside the menus or elements inside a page, depends on user access rights.

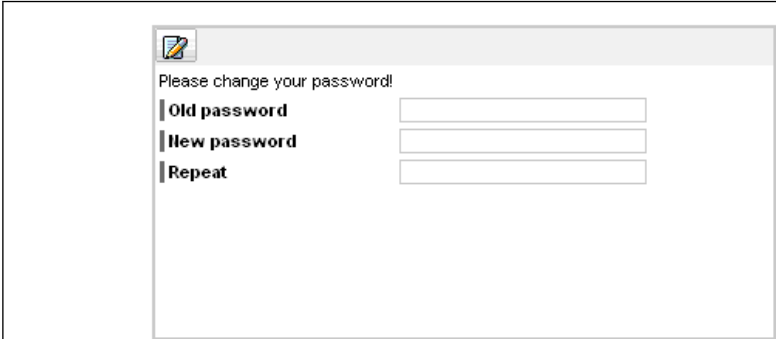
1. Start your Web browser
2. Specify the URL for the Field Information Server. The URL is:
<https://portal.endress.com>
↳ The following page appears:




A0033611-EN

3. Enter your **User** name (login name) and your **Password**
4. Click **Log On** to confirm your entries


5. The first time you log on, you are asked to change your password





A0033612-EN

6. Click  to edit the password.

7. Enter your current password in the **Old password** field. Enter your new password in the **New password** and **Repeat** fields.

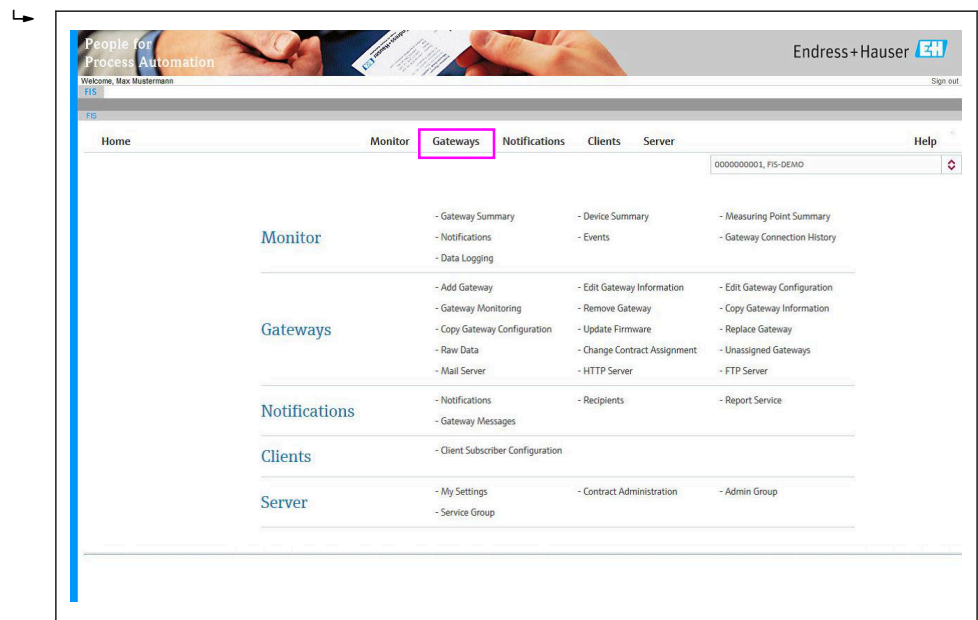
8. Click  to save the new password.

 If the password is not correct, you are asked to enter the password again. If you have forgotten or want to reset your password, use the **Get Support** link on the **Log in** page.

 For details about Field Information Server (FIS) please refer to the online help via the menu "Help". All FIS views and parameters are described.

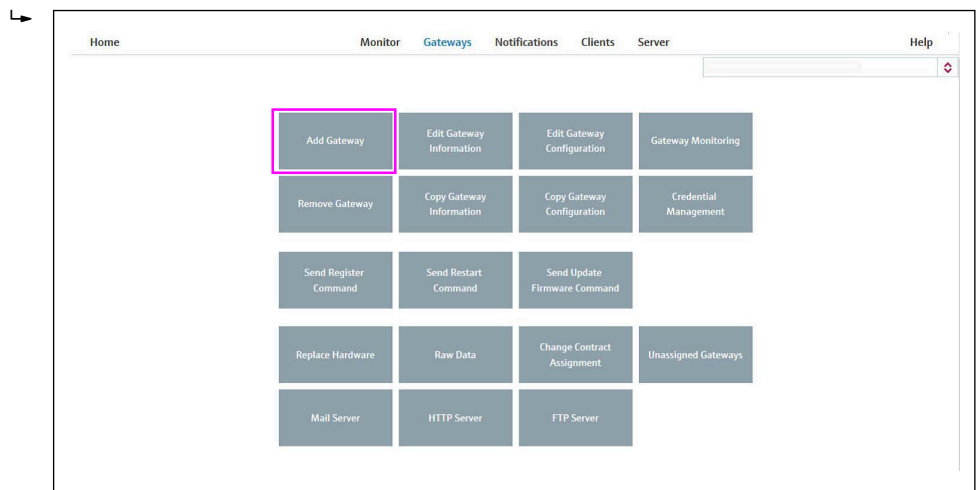
9.1.4 Add a Gateway

1. From Home Page please select from Navigation bar the main menu **Gateways**



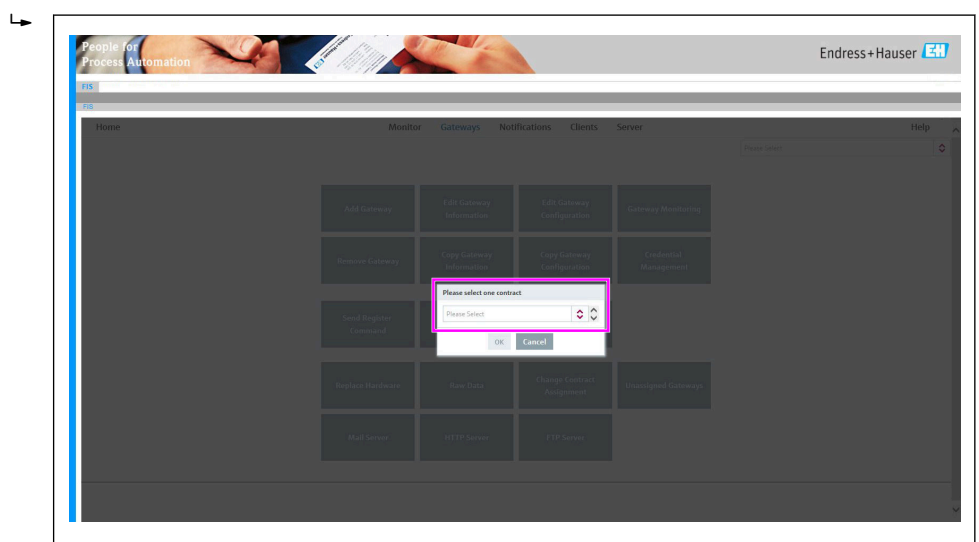
A0033585-EN

2. Inside the Gateway section, please, click on **Add Gateway**



A0033586-EN

3. First please check that the selected contract (dropdown list) is the one where you want to add a new gateway. The contract selection dropdown is only available when the user is authorized on more than one contract.



A0033619

4. Add gateway

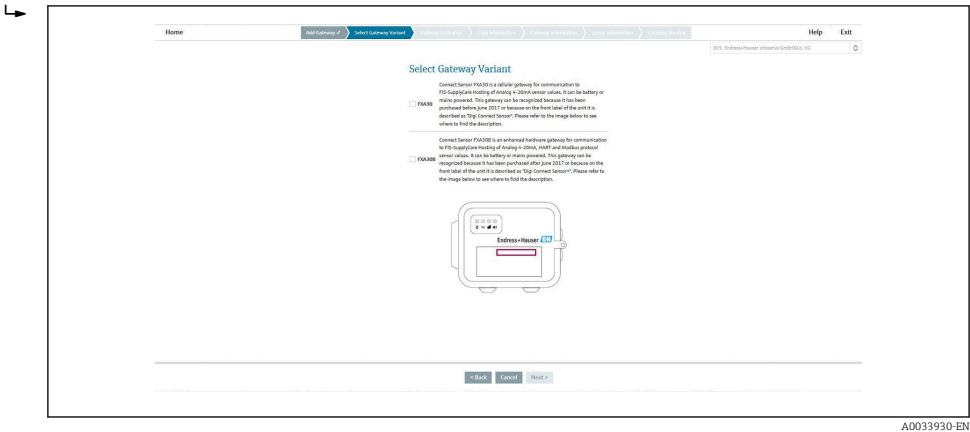
Inside the **Add Gateway** wizard, please choose the gateway model **Connect Sensor FXA30/FXA30B**



A0033587-EN

5. Select Gateway Variant

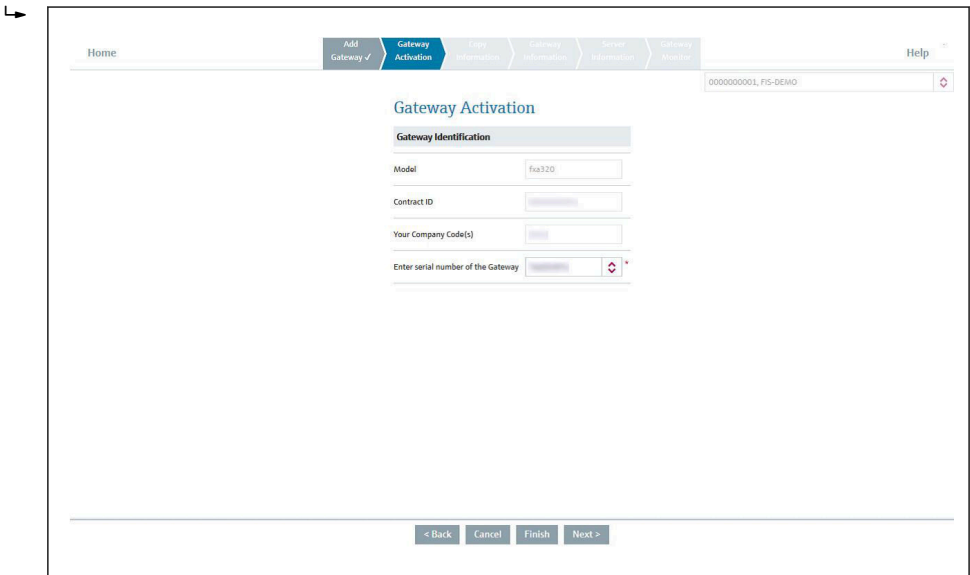
Inside the step **Select Gateway Variant**, please select the gateway variant depending on your device



6. Click on **Next**

7. Gateway Activation

Inside the step **Gateway Activation**, please, check that the information about Model, Contract ID, Company Code are correct for the gateway you want to **add**.



8. Identify the gateway by entering the IMEI number of the gateway. This number can be found for example on the front of the Gateway.



9. Click on **Next**

10. Copy Information

Copy a part of the information from an existing gateway, which the user wants to take as reference, to the new gateway. By default all check boxes but no gateways are selected. Select a gateway in the Overview Table (displays all the gateways of the contract) to copy the information from. Select the check boxes in the Information to be copied section for the information you wish to copy (**Gateway Information** and **Gateway Monitor**). Select at least one check box if you have selected a gateway (otherwise an error message will be displayed). If you do not wish to copy information from an existing gateway, deselect all check boxes or deselect the gateway.



A0033590-EN

11. Click on Next

12. Gateway Information

The fields on the Gateway Information page are already filled with the selected information from the **Copy Information** page and can be edited by the user.



A0033591-EN

13. Click on Next

14. Server Information

Select one Server from the **Server Name** Dropdown list.

A0033592-EN

15. Click on Next**16. Gateway monitoring**

Configure if the monitoring should take place periodically (Periodic Schedule) or by a time table (Time Schedule).

➤ Per default the gateway monitoring is pre-configured for the gateway data send interval. If the gateway default send interval shall be changed, this shall happen inside the menu **Edit Gateway Configuration**. After reconfiguring the data send interval, please, do not forget to change the monitoring interval inside the menu **Gateway Monitor**.

A0033620

17. Click on Finish

➤ **Add Gateway** wizard is closed. The Gateway is completely commissioned inside Field Information Server and ready for client application like SupplyCare Hosting.

18. Starting from now the Connect Sensor FXA30/FXA30B can be powered on and the first connection can be made via "wake" button on device.

NOTICE

Per default the gateway monitoring is pre-configured for the gateway data send interval.

If the gateway default send interval shall be changed, this shall happen inside the menu "Edit Gateway Configuration".

- ▶ After reconfiguring the data send interval, please, do not forget to change the monitoring interval inside the menu **Gateway Monitor**.



For adding a gateway inside SupplyCare Hosting, please, refer to SupplyCare Hosting documentation.



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9.1.5 Change Gateway configuration

Connect Sensor FXA30/FXA30B configuration can be changed at any time via the sub menu **Edit Gateway Configuration** inside menu **Gateways**.

The table displays all the gateways available inside the selected contract. The filters and sort functionalities can be used to easily find a specific gateway.

After selecting a gateway inside the table, the configuration can be edited by clicking on **Edit Gateway Configuration** inside action bar. A gateway content specific pop-up window will appear with all configurable parameters.

A0033593-EN

The Parameters are grouped per functionality; please use the dropdown list to select which kind of function shall be edited.

A0033594-EN

By clicking **Save**, the new configuration is saved. This new configuration is transmitted during the next communication with the gateway.

By clicking **Cancel**, the modifications are canceled and no new configuration will be send to the gateway.

The configuration synchronization progress can be followed via the configuration synchronization Status

State of the configuration synchronization	
Pending	The offline modified configuration in FIS has not yet been synchronized with the gateway
Synchronized	The offline configuration in FIS is same as the configuration of the gateway
Rejected/Error	The gateway has rejected the offline communication in FIS or an error occurred during communication
Not supported	The gateway has not sent configuration to FIS or does not support offline configuration

9.1.6 Change monitor configuration

The Gateway monitoring section allows configuring the monitoring schedule for a gateway. All gateways of the selected contract are displayed.

If for a specific gateway the **Measurement/Send Interval** parameter has been modified, the monitoring interval should be mapped on configured **Send Interval** (or at least one multiple of it).

Select a gateway inside the **Gateway Table** where the monitoring interval should be adjusted and click on **Edit** to set it in edition mode. The gateway monitoring can be changed and validated via **Save** button, or rejected via **Cancel** button inside Action bar.

9.1.7 Gateway structure

The gateway underneath structure (devices, sensors) and corresponding tags and descriptions can be checked via the sub menu **Edit Gateway Information**.



Information about gateways structure are only available after the first connection between the gateway and FIS.

9.1.8 Firmware Update

Firmware update can be triggered via Field Information page **"Send Update Firmware Command"**.

On this page a user can see the current firmware version of the gateway and select a version to update to.

1. Select the new Firmware Version via **"Update to Firmware Version"**
2. Trigger the update via the check box **"Select"**

The firmware update progress can be followed via the Firmware Update Status.

State of the firmware update	
Ready	Gateway is ready for a firmware update
Pending	Update is triggered but pending until a connection have been established

State of the firmware update	
Requested	Request have been transmitted, now Field Information Server is waiting for the response of the gateway
Rejected/Error	The gateway has rejected the firmware update or an error occurred during communication

10 Parameter details

10.1 Cellular Data Service

Name	Comment
Measurement / Transmission Interval	Configuration of the measurement and transmission interval periods. Default: 8h / 24h First value is measurement interval / second value is the send interval.
Offset to UTC midnight (min)	Range: 0 to 1439 min Default: 0 min

NOTICE

The configured "Transmission Interval" is shorter than 8h

A pop-up window appears to warn the user that the configured cellular service may generate additional costs

► Check configured **Transmission Interval**

10.2 Analog: 4 to 20 mA Current Loop

Analog Input 1 to 4 are used to retrieve measurements from sensor(s) via 4 to 20 mA current loop.

Table is valid for Analog: 4 to 20 mA Current Loop 1 to 4 input

Name	Comment
Interface enable	<input type="checkbox"/> ON <input checked="" type="checkbox"/> OFF Default: OFF
Continuous monitoring enable	Only for special Firmware " Continuous Monitoring " <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF Default: ON
Sensor description	Description of the sensor
High alarm enable	Allow event triggered transmission for high alarm threshold. <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF Default: OFF
High alarm threshold	Value in mA Alarm threshold configuration. If on the input a measured value (during a measurement cycle) is above the high threshold, it will trigger a transmission to cloud also if no one was planned (measurement cycle only). Default: 20.0 mA Range: 0.0 to 25.0 mA
Low alarm enable	Allow event triggered transmission for low alarm threshold. <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF Default: OFF

Name	Comment
Low alarm threshold	Value in mA Alarm threshold configuration. If on the input a measured value (during a measurement cycle) is below the low threshold, it will trigger a transmission to cloud also if no one was planned (measurement cycle only). Default: 4.0 mA Range: 0.0 to 25.0 mA
Hysteresis	Value in mA. Prevent multiple alarms from being triggered when the value is near the high or the low threshold. Default: 1 mA Range: 0.0 to 25.0 mA

NOTICE**Configuring an Alarm**

A pop-up window appears to warn the user that the configured cellular service may generate additional costs

- Check configured **Alarm**

10.3 Analog: Power Output

Analog Power Output are used for powering the sensore directly from Connect Sensor FXA30/FXA30B (via battery or external power supply).



For gateways with "**Continuous Monitoring**" special Firmware, only **Analog Power Output 1** is available.

The wiring for powering the sensor has to be made via a daisy chain from **Analog Power Output 1** → 40.

Table is valid for Analog: Power Output 1 to 4

Name	Comment
Power output enable	Power output enabled or disabled. This configuration is used for "loop powered" sensor. <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF Default: OFF
Output level	Level of voltage output 24 V
Read delay (s)	Time in seconds that the sensor power is enabled before Connect Sensor FXA30/FXA30B reads its value. This allows the sensor to stabilize to get an accurate reading. Value in seconds Default: 30 s Range: 0 to 120 s

NOTICE**Configuring an Alarm**

A pop-up window appears to warn the user that the configured cellular service may generate additional costs

- Check configured **Alarm**

10.4 Modbus Settings (FXA30B only)

10.4.1 Modbus station addresses and locations

In Modbus, a station address acts as a unique identifier for the external sensor device. A station address is assigned when the external sensor device is configured and installed. Multiple stations listen to the bus and can respond only to the commands that match their unique station address.

The Connect Sensor FXA30B acts as a master to the slave station addresses. All Modbus devices connected to the Connect Sensor FXA30B must have the exact same serial configuration.

In the Connect Sensor FXA30B configuration you can specify a list of variable addresses for each station address. The variable addresses identify the values that should be pulled from each station device.

If Connect Sensor FXA30B is configured to read a variable that is unsupported by a Modbus station, no data sample is stored.

10.4.2 Finding the Modbus address

A Modbus variable address includes a combination of the reading category, the logical address of the information, and the interpretation method. Together these create a variable address that can be added to a variable list in the Connect Sensor FXA30B configuration.

Step 1: Determine the reading category

The reading category is the single digit prefix of the variable address. Each variable type has a unique prefix.

Modbus variable type	Number of bits	Prefix value
Coil	1	0
Discrete input	1	1
Input register	16	3
Holding register	16	4

Step 2: Determine the logical address

Many Modbus device specifications list variables using a 0-based physical address. Since Modbus uses a 1-based logical address, the logical address is calculated by adding one to the physical address. The logical address must have either four or five digits, padded on the left by zeroes if required.

For each configured station address, you can configure a corresponding variable list. The variable list is limited to 63 characters, which limits the number of variables to between 8 and 10.

A variable address can be either 5 or 6 decimal digits in length.

Five decimal digits:

00001 - 09999	Coils: physical addresses 0 - 9998
10001 - 19999	Discrete inputs: physical addresses 0 - 9998
30001 - 39999	Input registers: physical addresses 0 - 9998
40001 - 49999	Holding registers: physical addresses 0 - 9998

Six decimal digits:

00001 - 065536	Coils: physical addresses 0 - 65535
10001 - 165536	Discrete inputs: physical addresses 0 - 65535
30001 - 365536	Input registers: physical addresses 0 - 65535
40001 - 465536	Holding registers: physical addresses 0 - 65535

Step 3: Determine the interpretation method

Generally, a single-bit value is interpreted as either 0 or 1, and a 16-bit value is interpreted as an integer between 0 and 65535. These are the default interpretations for the four categories, and no extra specification is required.

Some Modbus devices, however, specify that a pair of consecutive 16-bit registers should be combined and the 32-bits be interpreted as an IEEE 754 floating point value instead. To indicate this, the Connect Sensor variable address requires a suffix of either 'f' or 'F':

If the 32-bit value can be represented as DCBA, where D represents the most significant byte of the value, and A represents the least significant byte of the value, two floating point encodings are supported as follows:

f	IEEE 754 floating point value with bytes in the following order: B A D C
F	IEEE 754 floating point value with bytes in the following order: D C B A

10.4.3 Examples

- If the device specification defines a simple holding register at physical address 4002, the prefix is 4, the logical address is 4003, and there is no interpretation suffix. The combined logical address is 44003.
- If the device specification defines a coil at physical address 17, the prefix is 0, the logical address is 0018 (zero padded), and there is no interpretation suffix. The combined logical address is 00018.
- If the device specification defines an input register at physical address 7002 that is 32-bit floating point value with bytes presented in D C B A order, the prefix is 3, the logical address is 7003, and the interpretation suffix is 'F'. The combined logical address is 37003F.

10.4.4 Modbus settings FXA30B




Table is valid for Modbus Settings

Name	Comment
Interface enable	<input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF Default: OFF
Mode	Specifies the Modbus serial transmission mode. Selection: <ul style="list-style-type: none"> ■ rtu ■ ascii Default: rtu

Name	Comment
Serial baud rate	Selection: <ul style="list-style-type: none"> ■ 600 ■ 1200 ■ 1800 ■ 2400 ■ 4800 ■ 9600 ■ 14400 ■ 19200 ■ 28800 ■ 34400 ■ 57560 ■ 115200 ■ 230400 Default: 9600
Serial data bits	The number of data bits that can be sent in a packet. Selection: <ul style="list-style-type: none"> ■ 7 ■ 8 Default: 8
Serial stop bits	The bit that marks the end of a unit transition. Selection: <ul style="list-style-type: none"> ■ 1 ■ 2 Default: 1
Serial parity	The check bit for detecting an error in transmission. Selection: <ul style="list-style-type: none"> ■ none ■ odd ■ even Default: even
Station 1 slave address	The station address number that is configured for the Modbus sensor device. Range: 0...247 (integer)
Station 1 variable list	Comma-separated list of variable addresses. Maximum string size: 63
Station 2 slave address	The station address number that is configured for the Modbus sensor device Range: 0...247 (integer)
Station 2 variable list	Comma-separated list of variable addresses. Maximum string size: 63
Station 3 slave address	The station address number that is configured for the Modbus sensor device Range: 0...247 (integer)
Station 3 variable list	Comma-separated list of variable addresses. Maximum string size: 63
Station 4 slave address	The station address number that is configured for the Modbus sensor device Range: 0...247 (integer)
Station 4 variable list	Comma-separated list of variable addresses. Maximum string size: 63


10.5 Device Settings

Following parameters are general purpose configuration parameter for the Connect Sensor FXA30/FXA30B:

Name	Comment
SSL	SSL encryption for communication between the Connect Sensor FXA30/FXA30B and FIS <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF Default: ON  SSL encryption increase drastically amount of data and may impact the cellular communication costs.
Board temperature	Enable to transmit board temperature as measurements. <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF Default: OFF
Command line interface	Enable or disable the command line interface for local configuration. <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF Default: ON
Bluetooth	Enable or disable bluetooth connection to device. <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF Default: OFF  Not in use. There is no E+H app available at the moment.
Bluetooth device name	Device name used for Bluetooth communication.  Not in use. There is no E+H app available at the moment.

10.6 Digital Input

Pin **din1** of the Connect Sensor FXA30/FXA30B can be used as digital input.

Name	Comment
Interface enable	Enable or disable to use the din1 pin as digital input. <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF Default: OFF  By enabling the Digital Input, it must be check that the Pulse Counter function is set to off. If not it must be done and following message must pop up: "Warning: by activating this functionality, Pulse Counter functionality has been disabled"
Sensor description	Description of the sensor
Wake on rising edge	Enable or disable the wake of the device (also from sleep mode) on a rising edge of the input. <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF Default: OFF
Wake on falling edge	Enable or disable the wake of the device (also from sleep mode) on a falling edge of the input. <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF Default: OFF

Name	Comment
Enable pull-up	Enable or disable pull-up resistor <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF Default: OFF
High alarm	Enable or disable that high alarm during a measurement cycle trigger a data transmission to FIS. <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF Default: OFF
Low alarm	Enable or disable that low alarm during a measurement cycle trigger a data transmission to FIS. <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF Default: OFF


NOTICE**Configuring an Alarm (high, low, wake...)**

A pop-up window appears to warn the user that the configured cellular service may generate additional costs

- Check configured **Alarm**

10.7 Digital Pulse Counter

Pin **din1** of the Connect Sensor FXA30/FXA30B can be used as digital pulse counter.

Name	Comment
Interface enable	Enable or disable to use the din1 pin as digital pulse counter. <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF Default: OFF  By enabling the pulse counter, it must be check that the digital input function is set to off. If not it must be done and following message must pop up: "Warning: by activating this functionality, Digital Input functionality has been disabled"
Sensor description	Description of the sensor
High alarm	Enable or disable that high alarm during a measurement cycle trigger a data transmission to FIS. <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF Default: OFF
High alarm threshold	Trigger an alarm when the pulses counted between reads is above the threshold. Default: 0 Range: 0 to 4 294 967 295 (32bit integer)
Low alarm enable	<input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF Default: OFF
Low alarm threshold	Trigger an alarm when the pulses counted between reads is below the threshold. Default: 0 Range: 0 to 4 294 967 295

Name	Comment
Hysteresis	Prevent multiple alarms from being triggered when the value is near the high or the low threshold. Default: 0 pulse(s) Range: 0 to 4 294 967 295 pulse(s)
Enable pull-up	Enable or disable pull-up resistor <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF Default: OFF

NOTICE**Configuring an Alarm**

A pop-up window appears to warn the user that the configured cellular service may generate additional costs

- Check configured **Alarm**

10.8 Serial: Power Output (FXA30B only)

Serial Power Output are used for powering the modbus devices directly from Connect Sensor FXA30B (via battery or external power supply).


Name	Comment
Power output enable	<input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF Default: OFF
Output level	Level of output voltage <ul style="list-style-type: none"> ■ 3.3 V ■ 5 V ■ 15 V ■ 24 V Default: 3.3 V
Read delay(s)	Value in seconds Time in seconds that the modbus devices power is enabled before Connect Sensor FXA30/ FXA30B reads its value. This allows the sensor to stabilize to get an accurate reading. Range: 0 to 120 s Default: 30 s

11 Diagnostics and troubleshooting

This section provides troubleshooting information and resources for Connect Sensor FXA30/FXA30B. You need physical access to the device to perform the procedures in this section.

11.1 LEDs used for troubleshooting

Use the Connect Sensor FXA30/FXA30B four LEDs when troubleshooting the device. These LEDs have specific behaviors that provide information for Bluetooth connection, sensor activity, cellular connection, and battery life. If Connect Sensor FXA30/FXA30B is powered and all LEDs are off, it is in sleep mode.

Details →  14

11.2 Device not responding

Try the following procedures when your Connect Sensor FXA30/FXA30B is not responding, such as when the LEDs do not light up after pressing the **Wake** button. You need physical access to the device to complete the steps.

11.2.1 Check the battery

The battery may be disconnected or no longer working. Try the following:

- Make sure the battery wires are firmly connected to the Battery port
- Connect a different battery to the device, if you have an additional battery

11.2.2 Reset the device

This procedure forces the device to restart and retain its configuration.

1. Open the Connect Sensor FXA30/FXA30B enclosure.
2. Press the **Reset** button to force a reset when the Connect Sensor FXA30/FXA30B device does not respond to any inputs.
 - ↳ Pressing **Reset** cancels all operations and completes a power cycle, then Connect Sensor FXA30/FXA30B enters sleep mode. The device retains the last successful changes you made to its configuration.
3. "Wake" the device and wait for the proper LED light sequence to indicate it is responding.

11.2.3 Restore factory defaults to the device

This procedure removes all configuration changes and returns the device to its factory default settings.

Use this procedure when the device is still not responding after pressing the **Reset** button.

1. With the Connect Sensor FXA30/FXA30B enclosure open, press and hold the "Factory" button for at least 3 seconds until the LEDs flash purple.
 - ↳ The device is reset to its factory defaults.
2. Reconfigure Connect Sensor FXA30/FXA30B to work with your sensors and environment.

11.3 Device not connected to the cellular network

When Connect Sensor FXA30/FXA30B cannot connect to the cellular network, use the following troubleshooting steps. You need physical access to the device to complete the steps.



- Basic cellular connection troubleshooting: You can resolve most cellular connection issues using these steps.
- Advanced cellular connection troubleshooting: If the device still cannot connect to the cellular network, get the network connection status from the device. Then please contact Endress+Hauser for support: www.addresses.endress.com

11.4 Basic cellular connection troubleshooting

The following basic troubleshooting steps resolve most cellular connection issues for a Connect Sensor FXA30/FXA30B. You need physical access to the device to complete the steps.

11.4.1 Verify SIM configuration

Verify the following for your device:

1. Make sure the SIM card is inserted correctly into the SIM tray; see →  23
2. Make sure you are using the correct APN and that the PIN, user name, and password are configured, if required; see →  24
3. Contact your cellular service provider to make sure your SIM card is activated and assigned to a contract.

11.4.2 Check cellular antenna

Make sure the cellular antenna is securely installed on the device and is not damaged.

11.4.3 Verify cellular network coverage

Work with your cellular service provider to make sure there is adequate network coverage for the device installation area. If possible, do one of the following:

1. Move the device to an area with adequate cellular network coverage
2. Use a cabled antenna to move the antenna to get a better signal without moving the device

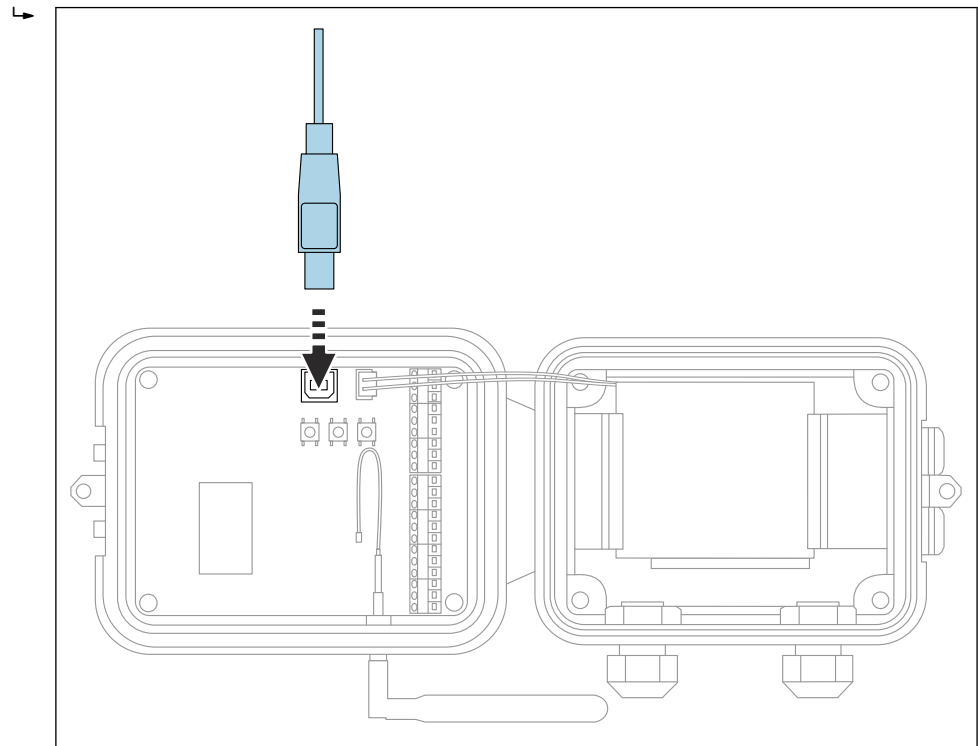
11.4.4 Check battery life

Older batteries may not have enough power to connect to the cellular network and you may need to replace the battery. If Connect Sensor FXA30/FXA30B has been deployed awhile, check the battery life:

Connect to your device using the CLI:

1. Open the enclosure and make sure the battery is connected and the SIM card is installed.

2. Connect a USB type A to B cable from your computer to the USB type B port. You may need to install device drivers or wait for your computer to automatically install them when connecting Connect Sensor FXA30/FXA30B to a computer using a USB cable. Digi recommends drivers available at <http://www.ftdichip.com/Drivers/VCP.htm>.



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3. Open a terminal program on a computer and connect to Connect Sensor FXA30/FXA30B using the following configuration:
 - ↳ **Connection port:** Connect to the COM port associated with the USB cable connected to Connect Sensor FXA30/FXA30B
 - Baud rate or bits per second:** 115200
 - Data:** 8 bit
 - Parity:** None
 - Stop:** 1 bit
 - Flow control:** None
4. Press the **Wake** button and wait 5-10 seconds after the cellular LED starts blinking.
5. Type **status** at the command prompt.
6. Find the **Battery Life** field to see how much battery life remains.
7. Replace the battery, if needed.

11.5 Device does not connect to Field Information Server (FIS)

If your Connect Sensor FXA30/FXA30B does not connect to Field Information Server (FIS)

1. Get the correct 15-digit device IMEI number on the Connect Sensor FXA30/FXA30B label.
2. Go to FIS and sign in with your user name and password.
3. Verify that the 15-digit device IMEI number on the Connect Sensor FXA30/FXA30B label is the same as the one in FIS.
4. Add your device to FIS if the numbers do not match.

12 Maintenance

The measuring device requires no special maintenance.

12.1 Exterior cleaning

When exterior-cleaning the device, always use cleaning agents that do not attack the surface of the housing and the seals.

13 Repair

13.1 General notes

13.1.1 Repair concept

The Endress+Hauser repair concept is devised in such a way that repairs can only be carried out through device replacement.

13.1.2 Replacing a device

Once the device has been replaced, parameters must be reconfigured.

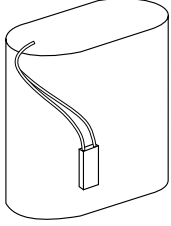

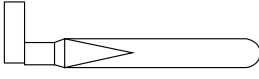
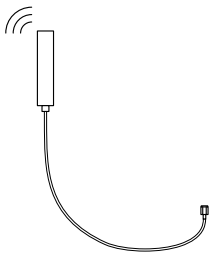
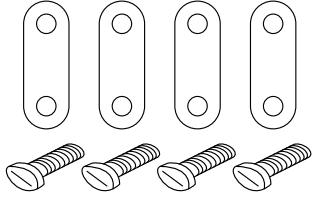
13.1.3 Return

The measuring device must be returned if the wrong device has been ordered or delivered. As an ISO-certified company and also due to legal regulations, Endress+Hauser is obliged to follow certain procedures when handling any returned products that have been in contact with medium. To ensure safe, swift and professional device returns, please refer to the procedure and conditions for returning devices provided on the Endress+Hauser website at <http://www.endress.com/support/return-material>

13.1.4 Disposal

When disposing, separate and recycle the device components based on the materials.

14 Accessories

Accessory	Description
Battery-Lithium-thionyl-chloride FXA30 	<ul style="list-style-type: none"> Material: Lithium-thionyl chloride (Li-SOCL2) Type: ER34615 7,2V 14Ah Non-rechargeable Hazards Id. UN38.3 Weight: 227 g (8 oz) Connector cable <p> Batteries are considered hazardous goods and may be charged by import taxes depending on the country of delivery.</p> <p>Order code: 71329969</p>
Cellular antenna FXA30, 3G/4G/LTE, Swivel 	<p>Usage: FXA30 with LTE or GSM</p> <ul style="list-style-type: none"> Frequencies: <ul style="list-style-type: none"> 698 to 960 MHz 1 710 to 2 170 MHz 2 500 to 2 700 MHz Nominal impedance: 50 Ω VSWR: 2.5:1 Polarization: linear vertical Radiation pattern: omni directional Power rating: 3 W Gain: 0 min-2 max. Weight: 47 g (1.66 oz) Height: 228 mm (9 in) Width: 25 mm (1 in) Operating temperature: -30 to +70 °C (-22 to +158 °F) <p>Order code: 71329987</p>
Fixed Antenna: LTE, GSM, UMTS, WLAN 	<p>Fixed antenna for mounting on vertical surfaces. Usage: FXA42, FXA30</p> <ul style="list-style-type: none"> Applikation: <ul style="list-style-type: none"> LTE 800 MHz LTE 2.6 GHz GSM 900 MHz GSM 1 800 MHz UMTS WLAN 2.4 GHz (WiMAX, WiFi) Cable lenght: 3 m (9.9 ft) Indoor and outdoor use Mounting via bracket Omnidirectional characteristic Radiator protected by a plastic tube HF-cable connected directly to antenna 100 mm (4 in) clearance between antenna by 15 dB isolation <p>Order code: 71327395</p>
Mounting kit FXA30 	<p>For wall mounting.</p> <ul style="list-style-type: none"> 4× small bracket 4× screw <p>Order code: 71336975</p>



www.addresses.endress.com
