Digi Connect Sensor Family

Hardware Guide

Revision history–90002609

Revision	Date	Description
D	January 2026	Updated information about changing the SIM card in a device. **Connect Sensor XRT-M** Updated information about replacing the SIM card. ■ Connect Sensor XRT-M device descriptions **Connect Sensor XRT-M NEMA** Updated information about the mini USB port. ■ Connect Sensor XRT-M NEMA device descriptions
C	October 2025	**Connect Sensor XRT-M NEMA** Updated information about the mini USB port. ■ Connect Sensor XRT-M NEMA device descriptions ■ List of Connect Sensor XRT-M NEMA components and accessories Added information about changing the SIM card. ■ Connect Sensor XRT-M NEMA device descriptions Updated the cellular connection instructions. ■ Step 3: Check the cellular connection **Connect Sensor XRT-M** Updated information about the mini USB port. ■ Connect Sensor XRT-M device descriptions ■ List of Connect Sensor XRT-M components and accessories Added information about changing the SIM card. ■ Connect Sensor XRT-M device descriptions Updated the cellular connection instructions. ■ Step 4: Check the cellular connection **Legacy device: Connect Sensor+** ■ Legacy device: Connect Sensor+
B	May 2025	Updated hardware descriptions: Applicable hardware
A	January 2025	Initial release

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Contents

Connect Sensor XRT-M hardware reference

Legacy device: Connect Sensor+

Digi Connect Sensor Family Hardware Guide

This guide contains information about assembling the Connect Sensor family hardware.

Applicable hardware

This manual supports configuration on hardware listed below.

Digi Connect Sensor XRT-M

SKU	Description
CSENSE-M110	Digi Connect Sensor XRT-M ▪ DIN rail mountable modular telemetry

Digi Connect Sensor XRT-M NEMA

SKU	Description
CSENSE-M210	Digi Connect Sensor XRT-M NEMA ▪ NEMA case ▪ Batteries are included
CSENSE-M210-N	Digi Connect Sensor XRT-M NEMA, no batteries ▪ NEMA case ▪ Batteries are not included

Note For information about Connect Sensor+ with Digi Axess (CSENSE-S210), see Legacy device: Connect Sensor+.

Assemble the hardware

Each device type connected to Digi Axess has a unique assembly process. Select your device from the list below.

- Assemble the Connect Sensor+ hardware
- Assemble the Connect Sensor XRT-M NEMA hardware
- Assemble the Connect Sensor XRT-M hardware

Assemble the Connect Sensor XRT-M NEMA hardware

The following steps explain how to connect your Connect Sensor XRT-M NEMA hardware and power the device.

Before you begin

- Review the Safety notices: Connect Sensor XRT-M NEMA.

Follow the steps below to assemble your device.

Step 1: Open the box and remove components needed for assembly

For the initial Connect Sensor XRT-M NEMA assembly, you will need these items from the box.

Component	Description
Connect Sensor XRT-M NEMA	The Connect Sensor XRT-M NEMA device in a NEMA case. A SIM card is installed in the device by default. For details about the components in the device case, see Connect Sensor XRT-M NEMA device descriptions. 
Two batteries	Two lithium metal batteries. The batteries can be installed to power the Connect Sensor XRT-M NEMA. See Step 2: Install the batteries in the Connect Sensor XRT-M NEMA. **Note** If you purchased a CSENSE-M210-N, batteries are not included. **Note** For battery safety information, see Connect Sensor XRT-M NEMA battery replacement, care, and safety.
Magnet	One Digi magnet keychain. The magnet is inside the case. A magnet is used to manually wake the device. See Manually wake the Connect Sensor XRT-M NEMA. 
Cable glands	Two cable glands, contained in a plastic bag. These are used to contain the sensor wires connected to the Connect Sensor

Component	Description
	XRT-M NEMA.
SIM card holder	The cardboard holder that originally held the SIM card is included in the Connect Sensor XRT-M NEMA case. You do not need to keep this card.

For information about all of the Connect Sensor XRT-M NEMA components, see List of Connect Sensor XRT-M NEMA components and accessories.

NEXT STEP: Proceed to Step 2: Install the batteries in the Connect Sensor XRT-M NEMA.

Step 2: Install the batteries in the Connect Sensor XRT-M NEMA

The Connect Sensor XRT-M NEMA is powered by two metal lithium batteries. This step explains how to install the batteries.

Note If you purchased a CSENSE-M210-N, batteries are not included.

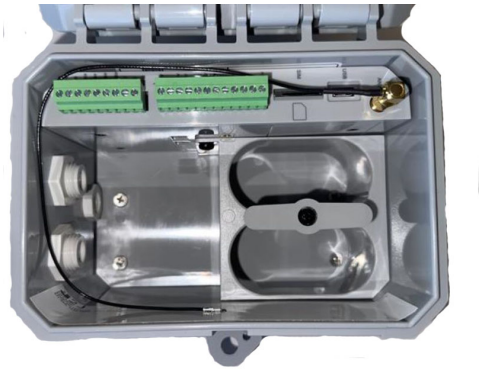
Before you begin

- Before connecting the batteries to the Connect Sensor XRT-M NEMA, review the battery safety information and make sure you have the necessary tools and equipment.
- Review the MSDS (Material Safety Data Sheet) for the battery, which can be found at: www.digi.com/documentation/ConnectSensor.
- Prior to installing a battery, each battery should be inspected for any signs of damage. If a battery appears to be damaged or is dropped during the installation, do not use the battery and dispose of it properly. See Battery safety for more information.

To connect the batteries:

1. Orient the Connect Sensor XRT-M NEMA so that you can access the top of the case.

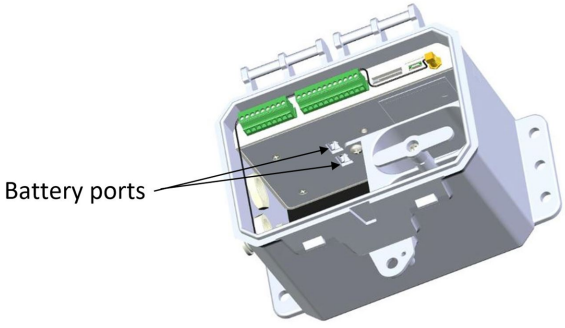
2. Open the case.
3. Turn the battery holder so that the holder arms are parallel to the battery tray.



4. Insert one battery into each slot in the battery tray. Make sure the battery and its wiring are properly placed, so that the battery wires can be placed in the empty space in the case.
5. Turn the battery holder so that the holder arms hold the batteries in place. The holder arms will click into place.

   Note Make sure that the holder arms are over the batteries as shown. This is required to properly hold the batteries in the battery holder.

6. Connect the battery to the battery ports.
   a. Hold the battery connector for one of the batteries and push the battery connector into the bottom battery port.
   b. Hold the battery connector for the second battery and push the battery connector into the top battery port.



7. Close the cover on the device. The cover snaps into place.

Note The Connect Sensor XRT-M NEMA enclosure may require some force to close. This is intended as part of the design to ensure a robust seal in damp or dusty environments. For details about closing the Connect Sensor XRT-M NEMA enclosure, see Close the Connect Sensor XRT-M NEMA case.

NEXT STEP: Proceed to Step 3: Check the cellular connection.

Step 3: Check the cellular connection

Make sure the cellular network provides an adequate signal where you install Connect Sensor XRT-M NEMA to maintain a consistent cellular connection. Proper network coverage helps reduce power consumption, leading to improved battery life.

Note If you purchased CSENSE-M210-N, batteries are not included, and the Connect Sensor XRT-M NEMA is not operational. You must install the batteries yourself before you check the cellular connection. See Replace the batteries in a Connect Sensor XRT-M NEMA.

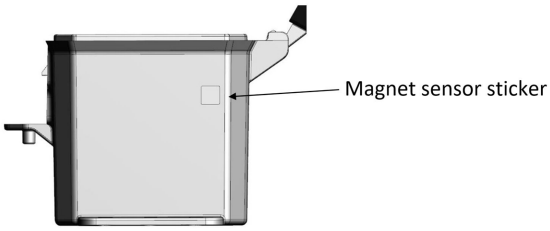
Note If the Connect Sensor XRT-M NEMA is deployed in an area without Cat-M1 cellular service, you can switch to the device from Cat-M1 to NB-Iot to allow a cellular connection. See Establish a connection to NB-IoT.

Before you begin

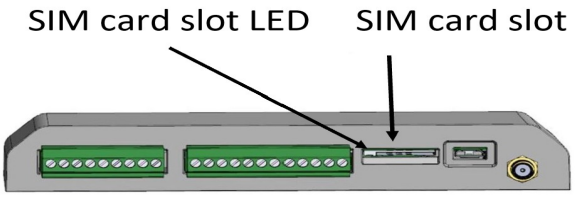
- Make sure you have a magnet available before you begin. A magnet is required to wake the device.

To check the cellular network connection at the install location:

1. Orient the device so you can open the lid of the case.
2. Open the case.
3. Locate the magnet sensor sticker on the side of the device.



4. Swipe the magnet across magnet sensor sticker to wake the device and force a cellular connection to Digi Axess.
5. As the cellular connection is made, the SIM LED light that is inside the SIM tray changes color to show the progression of the connection. Check that the LED light remains solid green, to show that a connection has been established.



Behavior	LED indication
Wake the device manually, using a magnet.	LED flashes red and blue together for 1 second
Cellular connection has initialized, and is trying to connect.	LED flashes green
Cellular connection is successful.	LED is solid green

6. Close the cover on the device. The cover snaps into place.

   Note The Connect Sensor XRT-M NEMA enclosure may require some force to close. This is intended as part of the design to ensure a robust seal in damp or dusty environments. For details about closing the Connect Sensor XRT-M NEMA enclosure, see Close the Connect Sensor XRT-M NEMA case.

NEXT STEP: Proceed to Step 4: Register the device.

Step 4: Register the device

Your Connect Sensor XRT-M NEMA must be registered with Digi Axess so that you can access the device in Digi Axess and map its location.

Before you begin

You will need the serial number or IMEI for the device. This information is on the label on the back of the device.

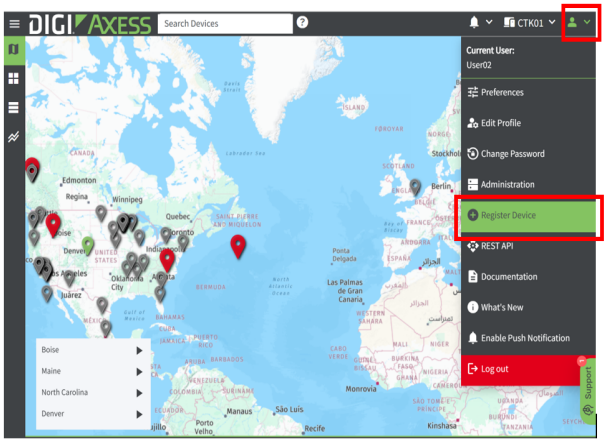
To register your device:

1. Log in to a device's web UI from Digi Axess.
   a. Navigate to digiaxess.com in your web browser.
   b. Click **Login**. The **Digi Axess Log In** page displays.
   c. Enter your user name and password.
      - **User name**: Enter the user name for your **Digi Axess** account. Verify the user name with your system administrator.
      - **Password**: Enter the password for your **Digi Axess** account.
   d. Click **Submit** to log in to **Digi Axess**.

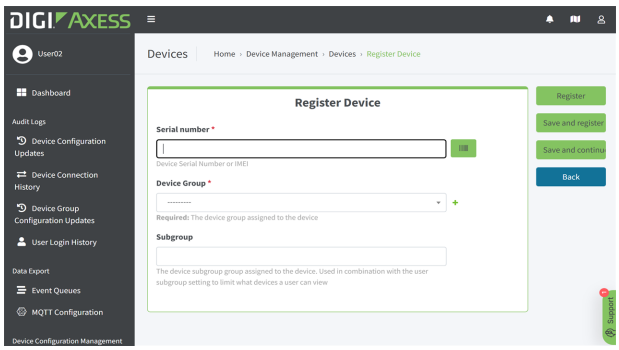
      Note If you have multi-factor authentication enabled, you must log in using MFA.

e. The **Digi Axess** update banner displays, on top of the **Digi Axess** map. If the banner does not display, it has been ignored in a previous session.
   - Click **Don't Show Again** to permanently turn off the banner.
   - Click **Ignore** to close the banner.

2. Access the Digi Axess **Register Device** page.
   a. In the toolbar, click the down arrow next to the user profile icon. The **Account** menu displays.



   b. Click **Register Device**. The **Register Device** page displays.



3. In the **Serial Number** field, enter the unique identifier for the device. You can enter the device's serial number or IMEI. As an alternative, click the **Scan Barcode** button next to the field and use a camera or a saved image to enter an identifier.

> **Note** The serial number and IMEI are on the label on the back of the device.

4. From the **Device Group** list box, select a device group from the drop-down list.

   For initial registration, normally only one device group is available as a default. If more than one is available, contact your system administrator to determine which group you should select.
5. (Optional) In the **Subgroup** field, enter a subgroup name.
6. Click **Register**. The **Set Device Location Source** page displays.
7. Name and define the device's physical location.

a. By default, the device's serial number displays in the **Location Name** field. If desired, you can type over the default entry and enter a descriptive name for the device's physical location.
b. Select a **Location Source** option, which defines the method used to configure the physical location for the device.
   - **None**: No physical location is defined. The device is unmapped and won't appear on the Digi Axess map. You can specify a location at a later time.
   - **Manual**: Manually enter the latitude and longitude of the physical location of the device.
   - **GPS**: The physical location is determined by the device's internal GPS. The location is updated the next time the device wakes and connects to Digi Axess.
c. Click **Set** to save your changes. The **Set Device Configuration** page displays.

8. In the **Set Device Configuration** page, from the **Choose a Configuration** list box, select an initial configuration for the device.
   - **Demo Configuration**: This is the default configuration, and displays basic information in the Device Summary page: **Analog in Voltage**, **Digital in**, and **Case Temperature**.
   - **Blank Configuration**: No data displays. You must manually configure the device in the device's **Administration** page.
   - **Saved Configuration**: Select a configuration that you have previously created and saved. The configuration is applied to this device.
9. Click **Set** to save your change.
10. You can wake the Connect Sensor XRT-M NEMA and verify the device registration.

NEXT STEP: Proceed to Step 5: Verify Connect Sensor XRT-M NEMA registration.

Step 5: Verify Connect Sensor XRT-M NEMA registration

After you have registered your device, you can wake the device and verify that it is mapped correctly in Digi Axess.

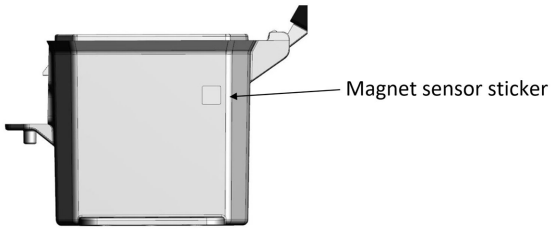
Note If you chose the **None** option for the **Location Source** during the initial registration, the Connect Sensor XRT-M NEMA will not be mapped in Digi Axess.

Before you begin

You will need a magnet to wake the device. Make sure you have a magnet available.

To verify the device registration:

1. Wake the Connect Sensor XRT-M NEMA.
   a. Locate the magnet sensor sticker on the side of the device.

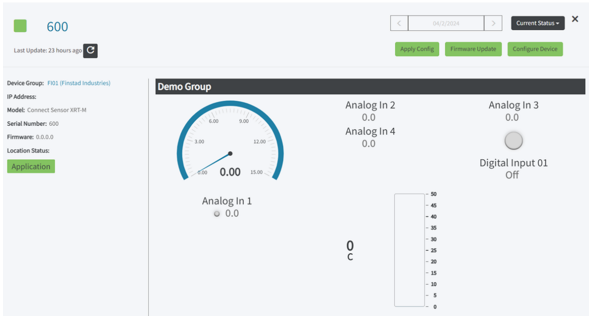


   b. Swipe the magnet across magnet sensor sticker to wake the device and force a cellular connection to Digi Axess.
   c. Check that the LED light remains solid green, to show that a connection has been established. For more information about the cellular LED process, see Step 3: Check the cellular connection.
2. Log into Digi Axess at digiaxess.com in your web browser, and enter the user name and password.

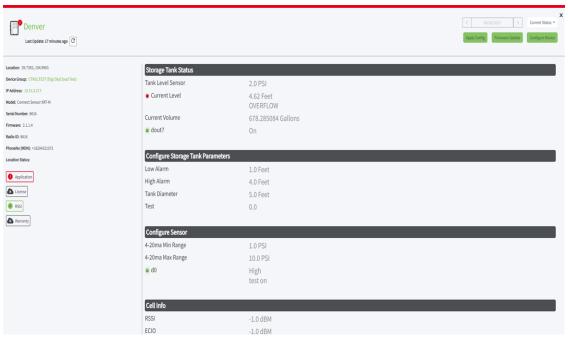
   Or, if you are already logged into Digi Axess, click the map icon to return the Digi Axess map.

3. Use the **Search Devices** field in the toolbar to find the device that you just registered. You can search by serial number or location name.

4. As you type, devices that match the entry display. Continue typing to limit the list of devices and then click on the tile to select a device. The Device Summary page for the selected device displays.
5. The information that displays in the Device Summary page depends on the configuration option you chose during initial registration.
   - **Demo Configuration**: This is the default configuration, and displays basic information in the Device Summary page: Analog in Voltage, Digital in, and Case temperature.



- **Blank Configuration**: No data displays. You must manually configure the device in the device's **Administration** page.
- **Saved Configuration**: Data for the options in the saved configuration display.



NEXT STEP: Proceed to Step 6: Wire the input sensors.

Step 6: Wire the input sensors

You can wire the analog and digital input sensors or power using the input interface. For wiring instructions, see Wire the sensors to the Connect Sensor XRT-M NEMA I/O interface.

CAUTION! You must disconnect both batteries and any external power from the Connect Sensor XRT-M NEMA before wiring sensors to the I/O interface.

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

HARDWARE ASSEMBLY IS COMPLETE

NEXT STEP: CONFIGURATION: You can log into the device's web UI from Digi Axess and configure the device. Proceed to Step 7: Configure the Connect Sensor XRT-M NEMA.

Step 7: Configure the Connect Sensor XRT-M NEMA

After the Connect Sensor XRT-M NEMA has been registered, you can log into the device's web UI from Digi Axess and configure the device.

For detailed configuration information, refer to Configure a Connect Sensor from the webUI in the *Digi Axess and Connect Sensor Configuration User Guide*.

Assemble the Connect Sensor XRT-M hardware

The following steps explain how to connect your Connect Sensor XRT-M hardware and power the device.

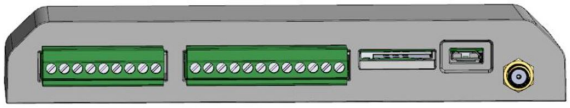
Before you begin

- Review the Safety notices: Connect Sensor XRT-M.

Follow the steps below to assemble your device.

Step 1: Open the box and remove components needed for assembly

For the initial Connect Sensor XRT-M assembly, you will need these items from the box.

Component	Description
Connect Sensor XRT-M	The Connect Sensor XRT-M device.  For details about the components in the device, see Connect Sensor XRT-M device descriptions.
Magnet	One Digi magnet. A magnet is required to manually wake the device. See Manually wake the Connect Sensor XRT-M. 

For information about all of the Connect Sensor XRT-M components, see List of Connect Sensor XRT-M components and accessories.

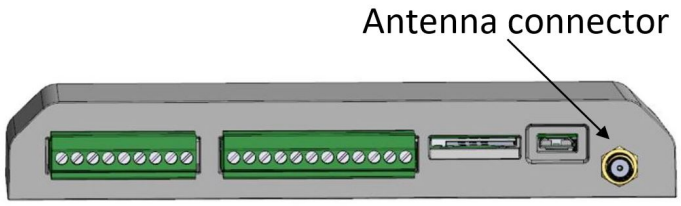
NEXT STEP: Proceed to Step 2: Attach a cellular antenna.

Step 2: Attach a cellular antenna

You should attach a cellular antenna to the Connect Sensor XRT-M to ensure a connection to the cellular network.

Note A cellular antenna must be purchased separately. You can purchase an antenna from Digi: 76000926 Antenna - Cellular, 3G/4G/LTE (indoor) or 76002067 Antenna - Cellular, 3G/4G/LTE (outdoor).

1. Orient the Connect Sensor XRT-M so that you can access the antenna connector.



2. Place the connection end of the antenna onto the metal female SMA connector on the Connect Sensor XRT-M.
3. Tighten the housing at the connection end of the antenna.

NEXT STEP: Proceed to Step 3: Wire power to the Connect Sensor XRT-M.

Step 3: Wire power to the Connect Sensor XRT-M

The Connect Sensor XRT-M is powered by an external power source that is wired to the device.

Note If you wire the power source in backwards you will not harm the device.

Power source requirements

- 9-30 V DC source

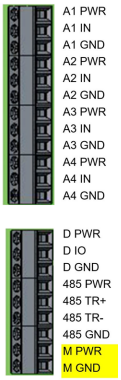
Tools needed

- You will need a slot-headed 0.4x2.5x80 mm screwdriver to loosen and tighten the pins.

To wire the power source:

1. Orient the Connect Sensor XRT-M so the top of the device is facing you.
2. Locate the 9-pin connector.
3. Unplug and remove the Phoenix connector from the 9-pin connector.
4. Connect the wires of the power source to the Connect Sensor XRT-M.
   a. Use a slot-headed 0.4x2.5x80 mm screwdriver to loosen the screws for the following pins: **M GND** and **M PWR**. The pins are highlighted in the graphic below.
   b. Connect the negative wire to **M GND**.
   c. Connect the positive wire to **M PWR**.

d. Tighten the screws for the pins: **M GND** and **M PWR**.



5. Plug the Phoenix connector back into the 9-pin connector.

NEXT STEP: Proceed to Step 4: Check the cellular connection.

Step 4: Check the cellular connection

Make sure the cellular network provides an adequate signal where you install Connect Sensor XRT-M to maintain a consistent cellular connection.

Note If the Connect Sensor XRT-M is deployed in an area without Cat-M1 cellular service, you can switch to the device from Cat-M1 to NB-Iot to allow a cellular connection. See Establish a connection to NB-IoT.

1. Locate the magnet sensor sticker on the side of the device.

2. Swipe the magnet across magnet sensor sticker to wake the device and force a cellular connection to Digi Axess.
3. Review the LED sequence to confirm a cellular connection.

Behavior	LED indication
Wake manually, using a magnet	Red & Blue on together for 1 sec
Cell initialized, trying to connect	Green LED flashes (2Hz)
Cell has connection	Green LED on solid

4. Check that the LED light remains solid green, to show that a connection has been established.

NEXT STEP: Proceed to Step 5: Register the device.

Step 5: Register the device

Your Connect Sensor XRT-M must be registered with Digi Axess so that you can access the device in Digi Axess and map its location.

Before you begin

You will need this information to register your device:

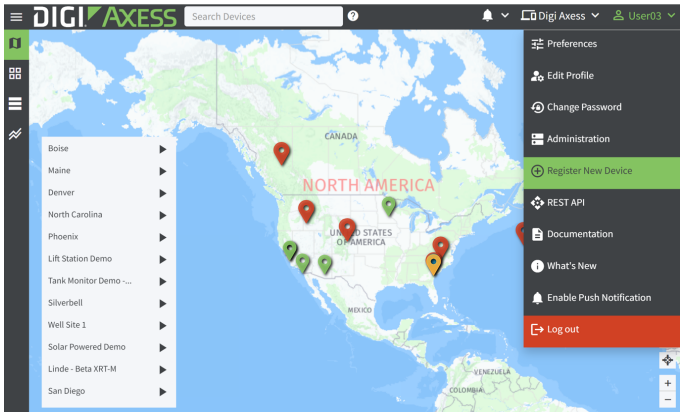
- Serial number or IMEI
- The device group in which the device should be included.

To register your device:

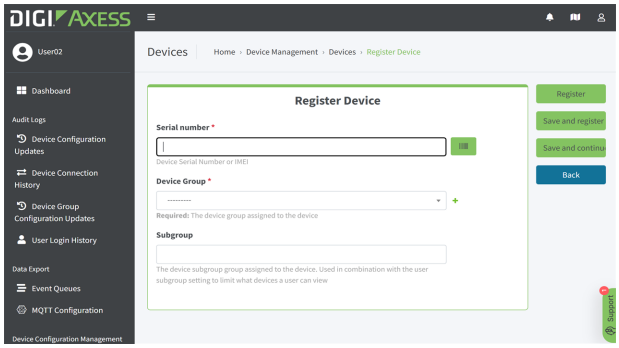
1. Log in to a device's web UI from Digi Axess.
   a. Navigate to digiaxess.com in your web browser.
   b. Click **Login**. The **Digi Axess Log In** page displays.
   c. Enter your user name and password.
      - **User name**: Enter the user name for your **Digi Axess** account. Verify the user name with your system administrator.
      - **Password**: Enter the password for your **Digi Axess** account.
   d. Click **Submit** to log in to **Digi Axess**.

      Note If you have multi-factor authentication enabled, you must log in using MFA.

   e. The **Digi Axess** update banner displays, on top of the **Digi Axess** map. If the banner does not display, it has been ignored in a previous session.
      - Click **Don't Show Again** to permanently turn off the banner.
      - Click **Ignore** to close the banner.
2. Access the Digi Axess Admin page.
   a. In the toolbar, click the down arrow next to your user name. The **User Profile** menu displays.



b. Click **Register New Device**. The **Register Device** page displays.



3. In the **Serial Number** field, enter the unique identifier for the device. You can enter the device's serial number or IMEI.

   As an alternative, click the **Scan Barcode** button next to the field and use a camera or a saved image to enter an identifier.
4. From the **Device Group** list box, select a device group from the drop-down list.
5. (Optional) In the **Subgroup** field, enter a subgroup name.
6. Click **Register**.
7. Wake the device to display the configurations that were chosen during the registration process.
   a. Locate the magnet sensor sticker on the side of the device.

   b. Swipe the magnet across magnet sensor sticker to wake the device and force a cellular connection to Digi Axess.

NEXT STEP: Proceed to Step 6: Wire the input sensors.

Step 6: Wire the input sensors

You can wire the analog and digital input sensors or power using the input interface. For wiring instructions, see Wire the sensors to the Connect Sensor XRT-M I/O interface.

CAUTION! You must disconnect power from the Connect Sensor XRT-M before wiring sensors to the I/O interface.

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

ASSEMBLY IS COMPLETE

Connect Sensor XRT-M NEMA hardware reference

List of Connect Sensor XRT-M NEMA components and accessories

Connect Sensor XRT-M NEMA includes the following components in the box.

Component	Description
Connect Sensor XRT-M NEMA	The Connect Sensor XRT-M NEMA device. The device has a SIM card installed by default. For details about the components in the device case, see Connect Sensor XRT-M NEMA device descriptions. 
Battery pack	Two lithium metal batteries. The batteries can be installed to power the Connect Sensor XRT-M NEMA. See Step 2: Install the batteries in the Connect Sensor XRT-M NEMA. **Note** If you purchased a CSENSE-M210-N, batteries are not included. **Note** For battery safety information, see Connect Sensor XRT-M NEMA battery replacement, care, and safety.
Magnet	One Digi magnet keychain. The magnet is inside the case. A magnet is used to manually wake the device. See Manually wake the Connect Sensor XRT-M NEMA. 
Cable glands	Two cable glands, contained in a plastic bag. These are used with the cable gland connectors on the device to contain the

Component	Description
	sensor wires connected to the Connect Sensor XRT-M NEMA. See Wire the sensors to the Connect Sensor XRT-M NEMA I/O interface and Wire a power source to the Connect Sensor XRT-M NEMA.
SIM card holder	The cardboard holder that originally held the SIM card is included in the Connect Sensor XRT-M NEMA case. You do not need to keep this card.

Optional accessories

The following accessories are optional. Part numbers are included for accessories that are available through Digi International Inc..

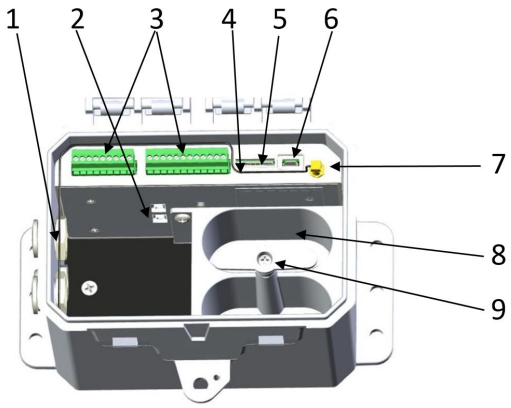
Component	Description
Magnet mount kit	The kit includes four magnets separated by plastic discs, four thumb nuts, and four screws.  See (Optional) Install the magnet mount on a Connect Sensor XRT-M NEMA for installation instructions. --- **CAUTION!** The magnets are extremely powerful. Keep magnets separated. If they touch each other they are difficult to separate. Use caution when handling the magnets to avoid injury due to pinching. --- Part Number: ■ 76002151 Digi Connect Sensor XRT-M NEMA Magnetic Mount Kit
Pole mount kit	The kit includes the items needed to mount the Connect Sensor XRT-M NEMA on a pole. Part Number: ■ 76002152 Digi Connect Sensor XRT-M Pole Mount Kit
Additional batteries	Replacement batteries can be ordered from Digi International Inc.. Part Numbers: ■ One battery: 76002149 Digi Connect Sensor+ Battery (1x) ■ Two batteries: 76002150 Digi Connect Sensor+ Battery (2x) For instructions on how to replace batteries, see Replace the batteries in a Connect Sensor XRT-M NEMA.

Component	Description
Internal antenna	A replacement antenna can be ordered from Digi International Inc.. Part Number: ■ 76002155 Digi Connect Sensor XRT-M Internal Antenna
USB type A to B cable	You will need a USB type A to B cable if you use the mini USB port on the device for troubleshooting, switching the cellular network from Cat-M1 to NB-IoT, or updating the cellular carrier network information when replacing a SIM card.

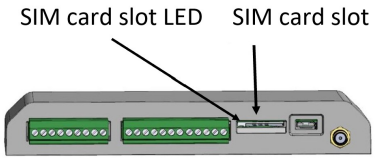
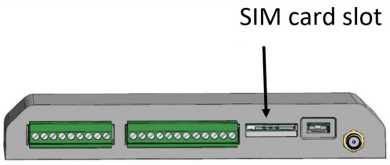
Connect Sensor XRT-M NEMA device descriptions

Interior components

The following figure shows the Connect Sensor XRT-M NEMA components inside the case.



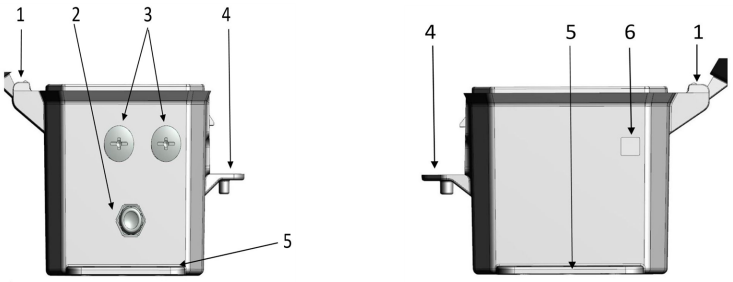
Item	Name	Description
1	**Cable gland connectors**	Two cable gland connectors, used with the cable glands to contain the sensor wires. An accessory pack of two cable glands is included in the device box. For information, see List of Connect Sensor XRT-M NEMA components and accessories. For information about threading sensor wires through the cable glands and connectors, see Wire the sensors to the Connect Sensor XRT-M NEMA I/O interface. **Note** Using gaskets, seals, glands or plugs other than those supplied by Digi may void certifications and regulatory approvals.
2	**Battery ports**	Two battery ports. The ports connect the battery wires to the device and power the device. For information about installing batteries, see Step 2: Install the batteries in the Connect Sensor XRT-M NEMA.
3	**Terminal block**	Wire sensors or a power source to the 9-pin and 12-pin interfaces. For information about wiring sensors to the terminal block, see Wire the

Item	Name	Description
		sensors to the Connect Sensor XRT-M NEMA I/O interface. For details about the pins, see Connect Sensor XRT-M NEMA I/O interface pin assignments.
4	**SIM card LED**	An LED is located on the inside of the SIM card tray. The LED indicates the status of the device when awake.  See Connect Sensor XRT-M NEMA LED status indicators.
5	**SIM card slot**	The Connect Sensor XRT-M NEMA includes a pre-installed SIM card from Digi's AT&T Global Service. Digi's AT&T Global Service provides cellular service designed specifically for the Connect Sensor XRT-M.  **Note** If necessary, you can replace the Digi-provided SIM card with your own SIM. This requires you to update the APN information for the device. For complete instructions, see Replace the SIM card and change the cellular network settings.
6	**Mini USB port**	The mini USB port is used to connect the Connect Sensor XRT-M NEMA to a computer for access to the command line interface (CLI). This feature is used for troubleshooting or switching the cellular network from Cat-M1 to NB-IoT. You will need a USB type A to B cable. **Note** For detailed CLI command information, see Connect Sensor CLI commands.
7	**Internal cellular antenna**	One internal cellular cable antenna. The antenna is connected to the Connect Sensor XRT-M NEMA case by default.
8	**Battery tray**	The battery tray is shaped to hold two lithium batteries. The batteries should be placed in the tray with the battery wires facing into the empty space inside the case. Do not place the batteries so the battery wires are against the side of the case.
9	**Battery holder**	The battery holder holds the batteries in place after they have been installed. You can twist the holder parallel to the batteries to remove them and install replacement batteries.

Item	Name	Description
		See Step 2: Install the batteries in the Connect Sensor XRT-M NEMA or Replace the batteries in a Connect Sensor XRT-M NEMA.

Exterior components

The following figure shows the exterior case components. Orient the device so the device is as shown, with the lid hinge on the left.

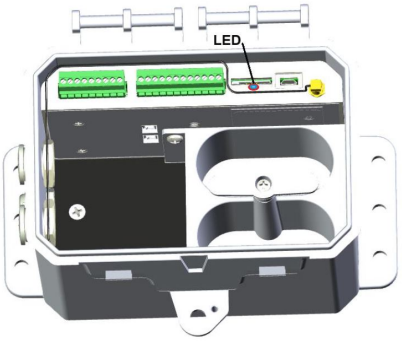


Item	Name	Description
1	**Hinge**	The hinge for the lid of the case.
2	**Vent**	A valve used to vent the Connect Sensor XRT-M NEMA.
3	**Cable gland connectors**	Two cable gland connectors, used with the cable glands to contain the sensor wires. An accessory pack of two cable glands is included in the device box. For information, see List of Connect Sensor XRT-M NEMA components and accessories. For information about threading sensor wires through the cable glands and connectors, see Wire the sensors to the Connect Sensor XRT-M NEMA I/O interface. **Note** Using gaskets, seals, glands or plugs other than those supplied by Digi may void certifications and regulatory approvals.
4	**Clasp**	When closed, the clasp provides a space to attach a lock to the case.
5	**Rack mounting brackets**	Use the rack mounting brackets on either side of the case to mount the Connect Sensor XRT-M NEMA on a rack.
6	**Magnet sensor sticker**	Marks the location of the magnet sensor sticker. Swipe a magnet over the sensor sticker to manually wake the Connect Sensor XRT-M. For more information, see Manually wake the Connect Sensor XRT-M NEMA.

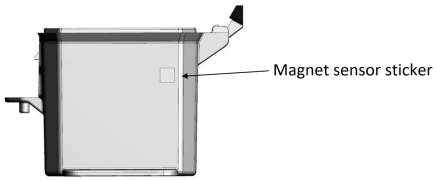
Connect Sensor XRT-M NEMA LED status indicators

The table below describes the status options show by the LED. The LED works only if you manually wake the device using the magnet.

1. Orient the device so you can open the lid.
2. Orient the device so you can open the lid.
3. Locate the LED on the edge of the SIM card tray.



4. Wake the Connect Sensor XRT-M. Locate the magnet sensor sticker on the side of the device and swipe the magnet across the sticker.



5. Review the LED sequences.

LED sequences

Behavior	LED indication
Wake by user (as by magnet)	Red & Blue on together for 1 sec
While sensors are being sampled	Blue LED flashes (2Hz), generally on for a very short period
Cell initialized, trying to connect	Green LED flashes (2Hz)
Cell has connection	Green LED on solid
Cell completes with success	Blue LED on solid 3 sec
Cell completes with failure	Red LED on solid 3 sec
During FW update	Toggle quickly between Red and Blue LED

Wire the sensors to the Connect Sensor XRT-M NEMA I/O interface

This section explains how to wire sensors to the Connect Sensor XRT-M NEMA and use the cable glands on the device to contain the sensor wires.

Before you begin, review the pin assignments. See Connect Sensor XRT-M NEMA I/O interface pin assignments.

Equipment needed

To wire third-party sensors or a power source to the Connect Sensor XRT-M NEMA I/O interface, you need the following equipment:

- The accessory pack of two cable glands.
- A slot-headed 0.4 x 2.5 x 80 mm screwdriver
- Wire size 1.29-0.25 mm (16-30 AWG) for each pin connector

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

Note Using gaskets, seals, glands or plugs other than those supplied by Digi may void certifications and regulatory approvals.

Disconnect power from the device before you begin

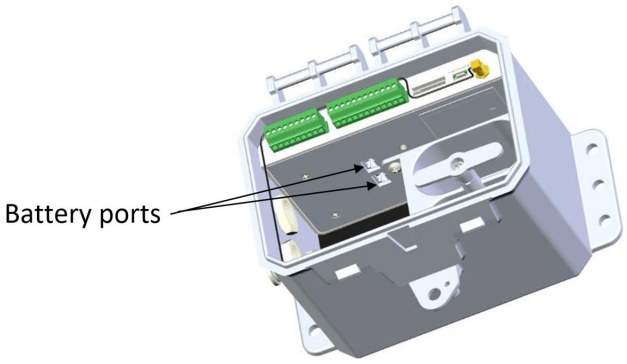
CAUTION! You must disconnect both batteries and external power from the Connect Sensor XRT-M NEMA before wiring sensors to the I/O interface.

WARNING! If you disconnect the batteries and reconnect them, it resets the cycle counter. The default is 7,000 cycles.

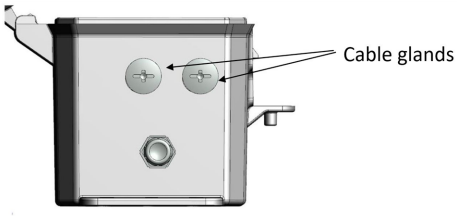
To wire sensors to the I/O interface:

1. Orient the Connect Sensor XRT-M NEMA so the top of the device is facing you.
2. Open the case.
3. Disconnect any external power source from the Connect Sensor XRT-M NEMA.
4. Disconnect the batteries inside the case.
   a. The battery wires are connected to a battery port on the side of the device. Pinch the battery connector and pull it from the battery port.

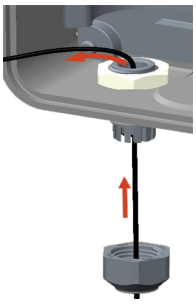
b. Repeat this step for each battery.



5. Remove the plug from on of the cable gland connectors on the side of the device.
   a. Using either a wrench or your fingers, unscrew the plug on the outside of the case from the nut on the inside of the case.
   b. Retain the nut for the next step.



6. Connect a cable gland to the case.
   a. Remove a cable gland from the accessory pack.
   b. Insert the end of the cable gland with the screw into the space from which you removed the plug.
   c. Carefully screw the nut retained from the previous step onto the cable gland screw. You may need to use a wrench to tighten the screw and securely attach the cable gland. Take care to not over-tighten the nut.
7. Twist the cable glands open.
8. Run the sensor cable through the cable glands and thread it through the cable gland connector.



9. Connect the sensor cable to a pin on the terminal block.
   a. Use the screwdriver to loosen the I/O interface connector screw.
   b. Slide the wire into the terminal side of the connector.
   c. Tighten the screw to 0.2 N-m to secure the wire to the connector.
10. Twist the cable gland closed to seal and secure the sensor cables.
11. Connect the batteries to the battery ports.
    a. Hold the battery connector for one of the batteries and push the battery connector into the bottom battery port.
    b. Hold the battery connector for the second battery and push the battery connector into the top battery port.
12. Close the cover on the device. The cover snaps into place.

Note The Connect Sensor XRT-M NEMA enclosure may require some force to close. This is intended as part of the design to ensure a robust seal in damp or dusty environments. For details about closing the Connect Sensor XRT-M NEMA enclosure, see Close the Connect Sensor XRT-M NEMA case.

Connect Sensor XRT-M NEMA I/O interface pin assignments

The Connect Sensor XRT-M NEMA has two I/O interfaces: a 9-pin and a 12-pin.

For detailed information about wiring a power source, see Wire a power source to the Connect Sensor XRT-M NEMA.

A1 PWR
A1 IN
A1 GND
A2 PWR
A2 IN
A2 GND
A3 PWR
A3 IN
A3 GND
A4 PWR
A4 IN
A4 GND

D PWR
D IO
D GND
485 PWR
485 TR+
485 TR-
485 GND
M PWR
M GND

12-pin interface

Assignment	Signal
A1 PWR	Power Analog interface 1, power output
A1 IN	IN Analog interface 1, analog input
A1 GND	Ground Analog interface 1, ground
A2 PWR	Power Analog interface 2, power output
A2 IN	IN Analog interface 2, analog input
A2 GND	Ground Analog interface 2, ground
A3 PWR	Power Analog interface 3, power output GND Analog interface 2, ground
A3 IN	IN Analog interface 3, analog input
A3 GND	Ground Analog interface 3, ground
A4 PWR	Analog interface 4, power output
A4 IN	Analog interface 4, analog input
A4 GND	Analog interface 4, ground

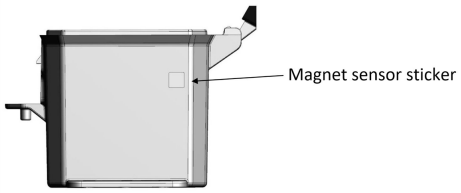
9-pin interface

Assignment	Signal
D PWR	Digital interface power output
D IO	Digital interface I/O 9-30 volts DC input
D GND	Digital interface, ground
485 PWR	Serial interface power output
485 TR+	Serial interface Modbus +
485 TR-	Serial interface Modbus –
485 GND	Serial interface ground
M PWR	External power source, positive input
M Gnd	External power source, ground

Manually wake the Connect Sensor XRT-M NEMA

The Connect Sensor XRT-M NEMA is in sleep mode until it wakes to connect to Digi Axess at a scheduled time. You can wake the device manually, if needed, using the magnet supplied with the device. Waking the Connect Sensor XRT-M NEMA manually forces a connection to Digi Axess.

1. You must physically be near enough to the Connect Sensor XRT-M NEMA to touch it.
2. Locate the magnet sensor sticker on the side of the device.



3. Swipe a magnet across the magnet sensor sticker to wake the Connect Sensor XRT-M NEMA.

4. The LED on the edge of the SIM card slot shows the status of the device. Refer to the LED wake sequence in the table below.
5. The Connect Sensor XRT-M NEMA connects to Digi Axess when it successfully connects to the cellular network.

LED wake sequence

The LED on the edge of the SIM card slot shows the status of the device. When the device wakes, the device connects to Digi Axess and pushes any collected data, and collects any configuration changes that are pushed from Digi Axess. This process make take a few minutes.

Behavior	LED indication
Wake by user (as by magnet)	Red & Blue on together for 1 sec
While sensors are being sampled	Blue LED flashes (2Hz), generally on for a very short period
Cell initialized, trying to connect	Green LED flashes (2Hz)
Cell has connection	Green LED on solid
Cell completes with success	Blue LED on solid 3 sec
Cell completes with failure	Red LED on solid 3 sec
During firmware update	Toggle quickly between Red and Blue LED

Connect Sensor XRT-M NEMA battery replacement, care, and safety

This section includes information about battery replacement, care, and safety.

Note In addition to powering the device with two batteries, you can also power the device with a wired 9-30 VDC power source.

Replace the batteries in a Connect Sensor XRT-M NEMA

The Connect Sensor XRT-M NEMA is powered by two metal lithium batteries. When the batteries are depleted, you can replace them.

Both batteries must be replaced at the same time. Do not replace just one battery.

Note If you purchased CSENSE-M210-N, batteries are not included. You must either install two batteries or power the device with a wired power source.

Before you begin

- Before connecting the batteries to the Connect Sensor XRT-M NEMA, review the battery safety information and make sure you have the necessary tools and equipment.
- Review the MSDS (Material Safety Data Sheet) for the battery.

Prior to installing a replacement battery, each battery should be inspected for any signs of damage. If a battery appears to be damaged or is dropped during the installation, do not use the battery and dispose of it properly. See Battery safety for more information.

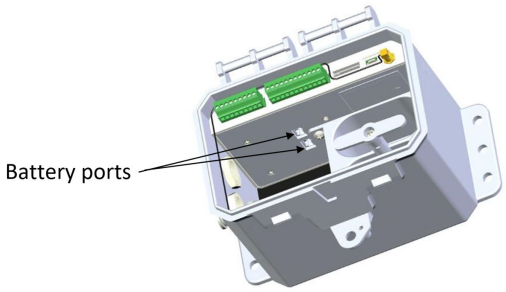
To replace the batteries:

1. Open the case.
2. Disconnect any external power source from the Connect Sensor XRT-M NEMA.
3. Twist the battery holder parallel to the batteries so that you are able to remove the batteries.
4. Remove both of the batteries.

WARNING! Both batteries must be disconnected and both batteries removed and replaced with a new battery.

   a. The battery wires for each battery are connected to a battery port on the side of the device, with one battery port per battery. Pinch the battery connector for the first battery and pull it from the battery port.
   b. Remove the existing battery.
   c. Repeat the process for the second battery.
5. Place the new batteries in the battery holder. Make sure the battery and its wiring are properly placed, so that the battery wires can be placed in the empty space in the case.
6. Connect the batteries to the battery ports.
   a. Hold the battery connector for one of the batteries and push the battery connector into the bottom battery port.
   b. Hold the battery connector for the second battery and push the battery connector into

the top battery port.



7. Close the cover on the device. The cover snaps into place.

Note The Connect Sensor XRT-M NEMA enclosure may require some force to close. This is intended as part of the design to ensure a robust seal in damp or dusty environments. For details about closing the Connect Sensor XRT-M NEMA enclosure, see Close the Connect Sensor XRT-M NEMA case.

Battery safety

Always use the designated battery, model number 76002150, from Digi International Inc.

Allow only a trained technician to replace the lithium thionyl chloride batteries used in a Connect Sensor XRT-M NEMA.

Prior to installing a replacement battery, each battery should be inspected for any signs of damage. If a battery appears to be damaged or is dropped during the installation, do not use the battery and dispose of it properly. See Replace the batteries in a Connect Sensor XRT-M NEMA for more information.

Do not attempt to recharge the Connect Sensor lithium battery, as it could explode.

When the Connect Sensor XRT-M NEMA is installed in C1D2 environments, do not disconnect the battery until the environment around the Connect Sensor XRT-M NEMA is vented or known to be free of any flammable gas concentrations.

Battery life in a Connect Sensor XRT-M NEMA

Connect Sensor XRT-M NEMA uses sleep and wake modes to manage power use. The device wakes only for sensor readings and sending reports to Digi Axess. It is in sleep mode at all other times to maintain low power consumption.

The batteries are well-suited to producing power even under extreme temperatures, and are designed to maintain a steady voltage throughout the usable life of the battery. Once the battery is almost entirely depleted, there is a measurable drop in supplied power.

Digi Axess enables customers to be notified when a device has completed a fixed number of delivery cycles in order to allow for the planning of battery replacement before the device stops reporting. When the Digi Axess power indicator for a device goes red, the battery has reached its threshold of measurable power loss, and the device is likely within 50 delivery cycles of its end of life.

WARNING! If you disconnect the batteries and reconnect them, it resets the cycle counter. The default is 7,000 cycles.

Digi calculations for battery life assumes the following conditions:

- Adequate cellular network coverage where Connect Sensor XRT-M NEMA is installed.
- Connect Sensor XRT-M NEMA sends reports to Digi Axess a maximum of two times a day.
- Connect Sensor XRT-M NEMA is not powering high-current sensors with long read delays.

Battery depletion

A battery will be depleted before the expected time range when any of these conditions are met:

- **Temperature fluctuation**: The temperature at the device's location affects the battery. Battery power is used more quickly in a cold environment than in a warm environment. A battery in a device located where the temperature is consistently 20° F will not last as long as a battery in a device located where the temperature is consistently 80° F.
- **Scheduling reports**: Scheduling more than two reports a day may shorten the battery life.

Wire a power source to the Connect Sensor XRT-M NEMA

An external power source can be wired to the device.

When used with batteries, the wired power source is the main power source and the batteries are the backup power source.

Note If you wire the power source in backwards you will not harm the device.

Power source requirements

- 9-30 V DC source

Equipment needed

To wire third-party sensors or a power source to the Connect Sensor XRT-M NEMA I/O interface, you need the following equipment:

- The accessory pack of two cable glands.
- A slot-headed 0.4 x 2.5 x 80 mm screwdriver
- Wire size 1.29-0.25 mm (16-30 AWG) for each pin connector

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

Note Using gaskets, seals, glands or plugs other than those supplied by Digi may void certifications and regulatory approvals.

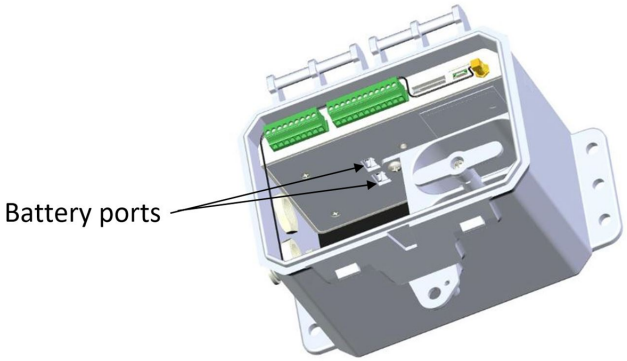
Disconnect power from the device before you begin

CAUTION! You must disconnect both batteries and external power from the Connect Sensor XRT-M NEMA before wiring sensors to the I/O interface.

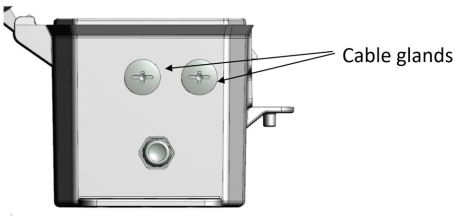
WARNING! If you disconnect the batteries and reconnect them, it resets the cycle counter. The default is 7,000 cycles.

To wire the power source:

1. Orient the Connect Sensor XRT-M NEMA so the top of the device is facing you.
2. Open the case.
3. Disconnect any external power source from the Connect Sensor XRT-M NEMA.
4. Disconnect the batteries inside the case.
   a. The battery wires are connected to a battery port on the side of the device. Pinch the battery connector and pull it from the battery port.
   b. Repeat this step for each battery.

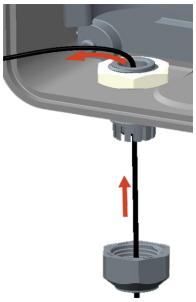


5. Remove the plug from the cable gland connectors on the side of the device.

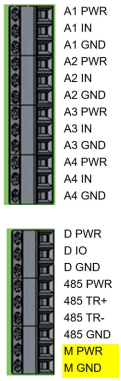


6. Screw a cable gland onto the cable gland connector.
7. Twist the cable glands open.

8. Run the positive and negative wires from the power source through one of the cable glands in the device



9. Locate the 9-pin connector.
10. Unplug and remove the Phoenix connector from the 9-pin connector.
11. Connect the wires of the power source to the correct pins on the terminal block.
    a. Use a slot-headed 0.4x2.5x80 mm screwdriver to loosen the screws for the following pins: **M GND** and **M PWR**. The correct pins are highlighted in the graphic below.
    b. Connect the negative wire to **M GND**.
    c. Connect the positive wire to **M PWR**.
    d. Tighten the screws to 0.2 N-m to secure the wires to the connector: **M GND** and **M PWR**.



12. Plug the Phoenix connector back into the 9-pin connector.
13. Twist the cable gland closed to seal and secure the sensor cables.
14. Connect the batteries to the battery ports.
    a. Hold the battery connector for one of the batteries.
    b. Push the battery connector into the bottom battery port.
    c. Hold the battery connector for the other battery.
    d. Push the battery connector into the top battery port.
15. Close the cover on the device. The cover snaps into place.

Note The Connect Sensor XRT-M NEMA enclosure may require some force to close. This is intended as part of the design to ensure a robust seal in damp or dusty environments. For

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details about closing the Connect Sensor XRT-M NEMA enclosure, see Close the Connect Sensor XRT-M NEMA case.

Close the Connect Sensor XRT-M NEMA case

All Connect Sensor XRT-M NEMA products are shipped to you closed. You will need to open the device to wire third-party sensors to the Connect Sensor XRT-M NEMA I/O interface. After you have opened the enclosure, it may require some force to close. This is intended as part of the design to ensure a robust seal in damp or dusty environments.

Note Using gaskets, seals, glands or plugs other than those supplied by Digi may void certifications and regulatory approvals.

If you have problems closing the enclosure after either of these operations, please follow these instructions:

1. Ensure the gasket is fully seated in the groove on the enclosure.
2. Place the device on a flat, stable surface.
3. Apply pressure to the top of the Connect Sensor XRT-M NEMA until the top of the case snaps onto the body of the case.

   Note The Connect Sensor XRT-M NEMA enclosure may require some force to close. This is intended as part of the design to ensure a robust seal in damp or dusty environments.

(Optional) Install the magnet mount on a Connect Sensor XRT-M NEMA

You can install a magnet mount on a so that you can securely place the device on a metal object.

Make sure you have the following equipment available:

- Magnet mount accessory pack. See Connect Sensor XRT-M NEMA device descriptions for purchasing information.
- Appropriate screw driver.

Note You can skip this step if you did not purchase the magnet mount accessory pack.

1. Turn Connect Sensor XRT-M NEMA to access the top of the device.
2. Remove one magnet from the set of four magnets in the accessory pack.

   CAUTION! The magnets are extremely powerful. Keep magnets separated. If they touch each other they are difficult to separate. Use caution when handling the magnets to avoid injury due to pinching.
3. Place one magnet under one of the holes in the mounting bracket. Be sure to match the hole in the magnet to the hole in the bracket.
4. Remove one of the screws from the accessory pack.

5. Put one screw through the hole in the magnet and through the mounting bracket hole in the device.
6. Remove one thumb nut from the accessory pack.
7. Place one thumb nut on top of the screw.
8. Screw the magnet and thumb nut onto the corner of the device. You may need to use a Phillips head screwdriver.
9. Repeat this process to screw the remaining magnets onto the rack mounting holes on the Connect Sensor XRT-M NEMA. When you have completed this process, a magnet should be screwed onto each corner of the device.

Safety notices: Connect Sensor XRT-M NEMA

Product covered

USL, CNL: Class I, Division 2, Groups A, B, C, and D Hazardous Locations.

Connect Sensor: 50002094-02

Installation considerations for the Connect Sensor XRT-M NEMA

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

  Note When installing in a C1D2 area, you must use C1D2 listed, IP66 rated conduit and conduit fittings to maintain applicable safety ratings on the device.

- All external or field wiring must be in accordance with NFPA 70 Article 501.10(B).
- All external or field wiring requires flexible or rigid conduit.
- The device is intended for fixed installations only.
- 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 the manufacturer; connecting non-approved accessories and batteries may damage the device.
- Do not attempt to repair the product. Any attempt to service or repair the device by the user will void the product warranty.
- Using gaskets, seals, glands or plugs other than those supplied by Digi may void certifications and regulatory approvals.
- When inserting wires into the terminal block, we recommend tightening torque to 0.2N-m.
- Allowable wire size for terminal blocks is 0.5-1.5mm^2.

Warnings: Explosion hazards

Review the following explosion hazard warnings for the Connect Sensor XRT-M NEMA device.

Note The Connect Sensor XRT-M NEMA device contains internal batteries.

WARNING! Connect Sensor XRT-M NEMA 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 EQUIPMENT 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.

WARNING! When the Connect Sensor XRT-M NEMA is installed in C1D2 environments, do not open the Connect Sensor XRT-M NEMA enclosure or disconnect the battery or any other connections to the Connect Sensor XRT-M NEMA until the environment around the device is vented or known to be free of any flammable gas concentrations.

WARNING - EXPLOSION HAZARD USB is not to be connected in a hazardous environment.

Remarque L'unité Connect Sensor XRT-M NEMA contient des batteries internes.

AVERTISSEMENT! L'unité Connect Sensor XRT-M NEMA est adaptée pour utilisation seulement dans des endroits non dangereux ou des endroits dangereux UL/cUL de classe I, division 2, groupes B, C et D. Le remplacement de tout composant risquerait de compromettre la convenance à la classe I, division 2.

AVERTISSEMENT - RISQUE D'EXPLOSION: LES BATTERIES DOIVENT ÊTRE REMPLACÉES DANS UN ENDROIT EXEMPT DE CONCENTRATIONS INFLAMMABLES.

AVERTISSEMENT - RISQUE D'EXPLOSION: NE DÉCONNECTEZ PAS LORSQUE LE CIRCUIT EST SOUS TENSION OU À MOINS QUE LA ZONE SOIT LIBRE DE TOUTE CONCENTRATION INFLAMMABLE.

AVERTISSEMENT! Les décharges électrostatiques peuvent endommager le matériel et nuire aux circuits électriques. Les dommages des décharges électrostatiques surviennent lorsque les composants électroniques sont mal manipulés et peuvent entraîner une défaillance complète ou intermittente.

AVERTISSEMENT! Lorsque le Connect Sensor XRT-M NEMA est installé dans des environnements C1D2, n'ouvrez pas le boîtier du Connect Sensor XRT-M NEMA et ne débranchez pas la batterie ou toute autre connexion au Connect Sensor XRT-M NEMA tant que l'environnement autour de l'appareil n'est pas ventilé ou connu pour être exempt de toute concentration de gaz inflammable.

AVERTISSEMENT - RISQUE D'EXPLOSION - L'USB ne doit pas être connecté dans un environnement dangereux.

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 20 cm (approximately 7.8 inches).

UL/cUL conformity for Connect Sensor XRT-M NEMA

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
UL 60950-1	Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use	October 14, 2014

Technical ratings: Connect Sensor XRT-M NEMA

Product covered

USL, CNL: Class I, Division 2, Groups A, B, C, and D Hazardous Locations.

Connect Sensor: 50002094-02

Electrical

Model	Power Model	Electrical Rating	Max Ambient Temp
50002094-02	Powered by External Class 2 or Limited Power Source	8-30 VDC, 1 A	-35 to 70° C
50002094-02	Wuhan Voltec Energy Sources Co., Ltd. ER34615M-2S1P-3W P/N 2900094	7.2 Vdc, 25 mWh	-35 to 60° C

Environmental

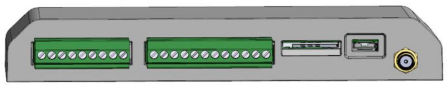
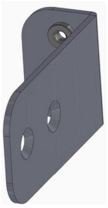
- Temperature Code: T6

Connect Sensor XRT-M hardware reference

List of Connect Sensor XRT-M components and accessories

Connect Sensor XRT-M includes the following components in the box.

Note The Connect Sensor XRT-M is a mains-powered device and does not use batteries.

Component	Description
Connect Sensor XRT-M	The Connect Sensor XRT-M device.  For details about the device components, see Connect Sensor XRT-M device descriptions.
Bracket	Some kits may include a bracket. The bracket is used to connect the Connect Sensor XRT-M to the DIN rail clip.  For installation instructions, see Attach a DIN rail clip to a Connect Sensor XRT-M.
DIN rail clip kit	Some kits may incude a DIN rail clip. A DIN rail clip can be attached to the bracket, which is then attached to the back of the Connect Sensor XRT-M. You can then connect the device to a DIN rail.  For installation instructions, see Attach a DIN rail clip to a Connect Sensor XRT-M.
Magnet	One Digi magnet key chain.

Component	Description
	A magnet is required to manually wake the device. See Manually wake the Connect Sensor XRT-M. 

Required accessories

Component	Description
External cellular antenna	One cellular antenna is required to complete a connection to a cellular network. You can purchase an antenna from Digi International Inc.. Part Numbers: ■ 76000926 Antenna - Cellular, 3G/4G/LTE (indoor) ■ 76002067 Antenna - Cellular, 3G/4G/LTE (outdoor)

Optional accessories

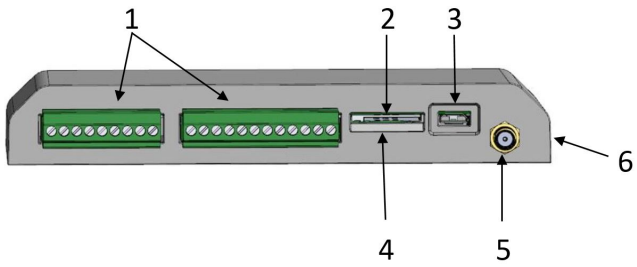
The following accessory is optional.

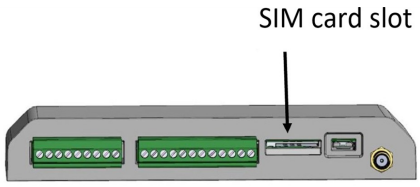
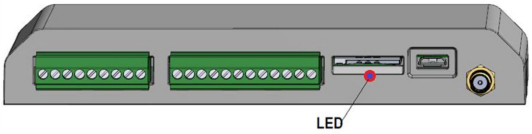
Component	Description
USB type A to B cable	You will need a USB type A to B cable if you use the mini USB port on the device for troubleshooting, switching the cellular network from Cat-M1 to NB-IoT, or updating the cellular carrier network information when replacing a SIM card.

Connect Sensor XRT-M device descriptions

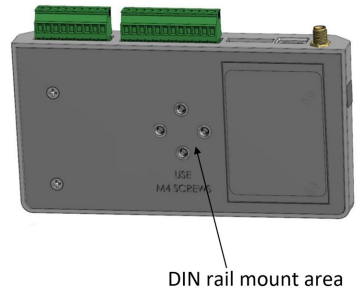
The following figure shows the Connect Sensor XRT-M components.

Top of the Connect Sensor XRT-M



Item	Name	Description
1	**Terminal block**	Wire analog or digital input and output sensors or a power source to this interface. For information about wiring sensors to the terminal block, see Wire the sensors to the Connect Sensor XRT-M I/O interface. For details about the pins, see Connect Sensor XRT-M I/O interface pin assignments.
2	**SIM card slot**	The Connect Sensor XRT-M includes a pre-installed SIM card from Digi's AT&T Global Service. Digi's AT&T Global Service provides cellular service designed specifically for Connect Sensor XRT-M.  **Note** If necessary, you can replace the Digi-provided SIM card with your own SIM. This requires you to update the APN information for the device. For complete instructions, see Replace the SIM card and change the cellular network settings.
3	**Mini USB port**	The mini USB port is used to connect the Connect Sensor XRT-M NEMA to a computer for access to the command line interface (CLI). This feature is used for troubleshooting or switching the cellular network from Cat-M1 to NB-IoT. You will need a USB type A to B cable. **Note** For detailed CLI command information, see Connect Sensor CLI commands.
4	**SIM card LED**	An LED is located on the edge of the SIM card slot. The LED indicates the status of the device when awake. See Connect Sensor XRT-M LED status indicators. 
5	**Cellular antenna**	One cellular antenna connector. See Step 2: Attach a cellular antenna.
6	**Magnet sensor sticker**	Marks the location of the magnet sensor sticker. Swipe a magnet over the sensor sticker to manually wake the Connect Sensor XRT-M. For more information, see Manually wake the Connect Sensor XRT-M.

Back of the Connect Sensor XRT-M

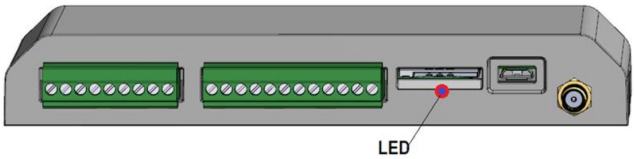


Name	Description
DIN rail mount area	You can use the DIN rail mount area on the back of the Connect Sensor XRT-M to mount the device to a combination of the device bracket and a DIN rail clip. For installation instructions, see Attach a DIN rail clip to a Connect Sensor XRT-M.

Connect Sensor XRT-M LED status indicators

The table below describes the status options show by the LED. The LED works only if you manually wake the device using the magnet.

1. Locate the LED on the edge of the SIM card tray.



2. Wake the Connect Sensor XRT-M. Locate the magnet sensor sticker on the side of the device and swipe the magnet across the sticker.

3. Review the LED sequences.

LED sequences

Behavior	LED indication
Wake by user (as by magnet)	Red & Blue on together for 1 sec
While sensors are being sampled	Blue LED flashes (2Hz), generally on for a very short period
Cell initialized, trying to connect	Green LED flashes (2Hz)
Cell has connection	Green LED on solid
Cell completes with success	Blue LED on solid 3 sec
Cell completes with failure	Red LED on solid 3 sec
During FW update	Toggle quickly between Red and Blue LED

Wire the sensors to the Connect Sensor XRT-M I/O interface

This section explains how to wire sensors to the Connect Sensor XRT-M.

Before you begin, review the pin assignments. See Connect Sensor XRT-M I/O interface pin assignments.

To wire third-party sensors to the Connect Sensor XRT-M I/O interface, you need the following equipment:

- A slot-headed 0.4 x 2.5 x 80 mm screwdriver
- Wire size 1.29-0.25 mm (16-30 AWG) for each pin connector

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

To wire sensors to the I/O interface:

1. Disconnect the power source.

   > **Note** You must disconnect power from the Connect Sensor XRT-M before wiring sensors to the I/O interface.

2. Connect the sensor cable to a pin on the terminal block.
   a. Use the screwdriver to loosen the I/O interface connector screw.
   b. Slide the wire into the terminal side of the connector.
   c. Tighten the screw to 0.2 N-m to secure the wire to the connector.
   d. Repeat for each sensor cable.
3. Reconnect the power source.

Connect Sensor XRT-M I/O interface pin assignments

The Connect Sensor XRT-M has two I/O interfaces: a 9-pin and a 12-pin.

12-pin interface

Assignment	Signal
A1 PWR	Power Analog interface 1, power output
A1 IN	IN Analog interface 1, analog input
A1 GND	Ground Analog interface 1, ground
A2 PWR	Power Analog interface 2, power output
A2 IN	IN Analog interface 2, analog input
A2 GND	Ground Analog interface 2, ground
A3 PWR	Power Analog interface 3, power output GND Analog interface 2, ground
A3 IN	IN Analog interface 3, analog input
A3 GND	Ground Analog interface 3, ground
A4 PWR	Analog interface 4, power output
A4 IN	Analog interface 4, analog input
A4 GND	Analog interface 4, ground

9-pin interface

Assignment	Signal
D PWR	Digital interface power output
D IO	Digital interface I/O 9-30 volts DC input
D GND	Digital interface, ground
485 PWR	Serial interface power output
485 TR+	Serial interface Modbus +
485 TR-	Serial interface Modbus -
485 GND	Serial interface ground
M PWR	External power source, positive input
M Gnd	External power source, ground

Manually wake the Connect Sensor XRT-M

The Connect Sensor XRT-M is in sleep mode until it wakes to connect to Digi Axess at a scheduled time. You can wake the device manually, if needed, using the magnet supplied with the device. Waking the Connect Sensor XRT-M manually forces a connection to Digi Axess.

1. You must physically be near enough to the Connect Sensor XRT-M to touch it.
2. Locate the magnet sensor sticker on the side of the device.
3. Swipe a magnet across the magnet sensor sticker to wake the Connect Sensor XRT-M.

4. The LED on the edge of the SIM card slot shows the status of the device. See Connect Sensor XRT-M LED status indicators.
5. The Connect Sensor XRT-M NEMA connects to Digi Axess when it successfully connects to the cellular network.

Attach a DIN rail clip to a Connect Sensor XRT-M

Some kits may include a bracket and a DIN rail clip. You can attach a DIN rail clip to the bottom of the Connect Sensor XRT-M using the bracket that comes with the device. You can then attach the device to a DIN rail.

Determine the direction that you want the Connect Sensor XRT-M to face you when attached the DIN rail: vertically or horizontally. You must attach the clip to the bracket accordingly.

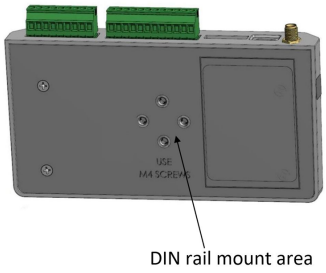
Before you begin

Make sure you have the following items:

- Bracket and two screws
- DIN rain clip and two screws
- Appropriate screwdriver

To attach the bracket and DIN rail clip to the device:

1. Attach the DIN rail clip to the bracket.
   a. Orient the bracket so that you are holding the long side of the bracket in your hand, and the short side is facing up.
   b. Place the DIN rail clip onto the short side of bracket, with the clip sections facing up. Make sure that the clip orientation matched the desired device orientation: vertical or horizontal.
   c. Line up the holes on the bracket and the clip.
   d. Use two screws to attach the clip to the bracket.
2. Attach the bracket and clip combination to the device.
   a. Orient the Connect Sensor XRT-M so you can access the bottom of the device.
   b. Place the long side of the bracket along the bottom of the device, with the short side that has the clip attached against the back edge.
   c. Line up the holes in the bracket with the holes on the bottom of the device.



   d. Use an appropriate screwdriver and the screws included in the kit to attach the bracket to the device.

Safety notices: Connect Sensor XRT-M

Digi products are designed to the highest standards of safety and international standards compliance for the markets in which they are sold. However, cellular-based products contain radio devices that require specific consideration. Make sure you read and understand all of the safety notices, warnings, and cautions for this product. Digi International assumes no liability for failure to comply with these precautions.

Installation considerations for the Connect Sensor XRT-M

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

Note When installing in a C1D2 area, you must use C1D2 listed, IP66 rated conduit and conduit fittings to maintain applicable safety ratings on the device.

- All external or field wiring must be in accordance with NFPA 70 Article 501.10(B).
- The device is intended for fixed installations only.
- Do not attempt to repair the product. Any attempt to service or repair the device by the user will void the product warranty.
- When inserting wires into the terminal block, we recommend tightening torque to 0.2N-m.
- Allowable wire size for terminal blocks is 0.5-1.5mm^2.

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 20 cm (approximately 7.8 inches).

UL/cUL conformity for Connect Sensor XRT-M

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
UL 60950-1	Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use	October 14, 2014

Legacy device: Connect Sensor+

The Connect Sensor+ with Digi Axess (CSENSE-S210) has been replaced by the Digi Connect Sensor XRT-M (CSENSE-M210) and is now End of Life (EOL). The replacement product, CSENSE-M210, offers a more robust exterior enclosure, a protected board, dual batteries, and an integrated antenna. The change was effective immediately as of the notification date, 11/25/2024.

The information in this section contains information specific to Connect Sensor+ with Digi Axess (CSENSE-S210) when using Digi Axess. Otherwise, all other information in this document is applicable to the Connect Sensor+.

Applicable hardware

SKU	Description
CSENSE-S210	Connect Sensor+, LTE Verizon (Digi Axess)

Assemble the Connect Sensor+ hardware

The following steps explain how to connect your Connect Sensor+ hardware and power on the device with a battery.

Before you begin

- Review the Safety notices: Connect Sensor+.
- Check with your system administrator to confirm that the M2M SIM card in the Connect Sensor+ has been activated.

Follow the steps below to assemble your device.

Before you begin: Activate the SIM card in your devices

Your device has been shipped with a pre-installed SIM card from M2M Wireless (www.m2mwireless.com). M2M Wireless provides cellular service designed specifically for your device, including seamless access to Digi Axess over a secure private network (VPN).

Follow these instructions to contact M2M Wireless and activate cellular service.

For users that do not have an M2M account

Do one of the following:

- Email support@m2mwireless.com with the subject line **New Digi Account**, and ask for support in setting up an account.
- Call (805) 701-0151, and M2M will guide you through the new account set up process.

For users that do have an M2M account

Do one of the following:

- Email support@m2mwireless.com with subject line **SIM Activation – Digi Account**. Please provide the following in the body of the email:
  - ICCID (on SIM cutout)
  - IMEI (on device label)
  - Plan size (MBs)
  - Private (recommended) or Public IP
- Activate a SIM by logging in to the M2M web portal at m2mwireless.com/Billing2/login.php, navigating to **MDN** on the top toolbar, and then clicking on the **Activation** radio button. Make sure you have the ICCID (on SIM cutout), IMEI (on device label), plan size (MBs) and preference for Public or Private IP handy to complete the activation.

WARNING! Digi strongly recommends using the supplied SIM from M2M Wireless. **Use of a SIM without secure VPN access to Digi Axess risks moving configurations and sensor data in clear text over a public network**.

Step 1: Open the box and remove components needed for assembly

For the initial assembly, you will need these items from the box:

Component	Description
Connect Sensor+	
Battery	One lithium metal battery. For battery safety information, see Battery safety and Battery care and maintenance. 

In addition, you also need to provide:

Component	Description
Cellular antenna	One cellular antenna. 

For information about all of the Connect Sensor+ components, see List of Connect Sensor+ Digi Axess components and accessories.

NEXT STEP: Proceed to Step 2: Assemble the Connect Sensor+.

Step 2: Assemble the Connect Sensor+

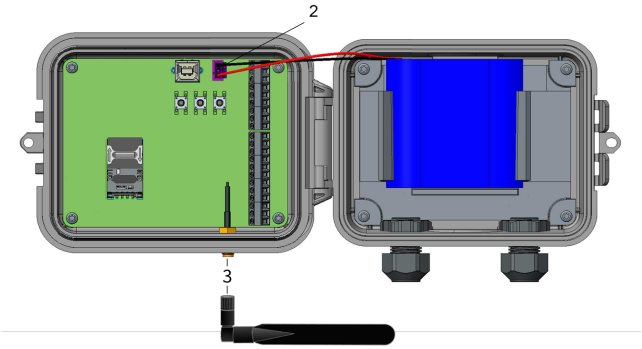
This section describes how to assemble the Connect Sensor+ hardware.

CAUTION! This product contains a lithium metal battery. Prior to installation, the battery should be inspected for any signs of damage. If the battery appears to be damaged or is dropped during the installation, do not use the battery and be sure to dispose of it properly. See Battery inspection for more information.

Follow these steps to assemble Connect Sensor+:

1. Orient the Connect Sensor+ as shown below and open the Connect Sensor+ enclosure.

2. Insert and connect the battery.
   a. Orient the battery so that the connection wires are at the top of the battery, as shown.
   b. Connect the wiring to the battery port.
3. Connect the cellular antenna.
   a. Place the connection end of the antenna onto the metal female SMA connector on the Connect Sensor+.
   b. Tighten the plastic housing at the connection end of the antenna.
4. Leave the cover open for the next assembly step.



NEXT STEP: Proceed to Step 3: Check the cellular connection.

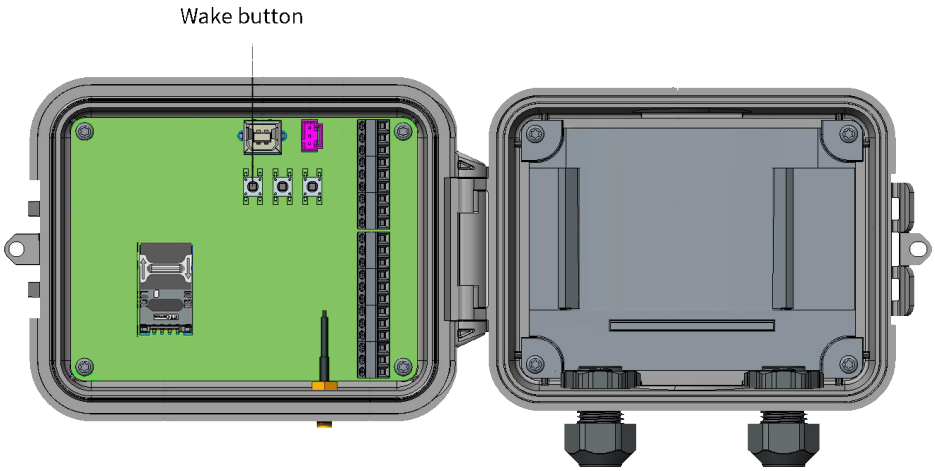
Step 3: Check the cellular connection

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

Note 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 inside the Connect Sensor+ to wake the device.



> **Note** If the cover is closed, swipe a magnet across the magnet icon on the outside of the device.

2. The LED indicators light up in a predetermined sequence. For detailed information, see Manually wake the Connect Sensor+.

> **Note** If Connect Sensor+ does not connect to the cellular network, see Device not connected to the cellular network.

3. Leave the cover open for the next assembly step.

NEXT STEP: Proceed to Step 4: Wire the input sensors.

Step 4: Wire the input sensors

You can wire the analog and digital input sensors or power using the input interface. For detailed information, see Wiring the Connect Sensor+ I/O interface.

The Connect Sensor+ cover must be open to wire sensors to the Connect Sensor+. If you choose to wire sensors at a later time, you should close the cover, which snaps in place.

> **Note** The Connect Sensor+ enclosure may require some force to close. This is intended as part of the design to ensure a robust seal in damp or dusty environments. For details about closing the Connect Sensor+ enclosure, see Closing the Connect Sensor+.

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

NEXT STEP: Proceed to Step 5: Register the device.

Step 5: Register the device

Your Connect Sensor+ must be registered with Digi Axess so that you can access the device in Digi Axess and map its location.

Before you begin

You will need this information to register your device:

- Serial number or IMEI
- The device group in which the device should be included.

To register your device:

1. Log in to a device's web UI from Digi Axess.
   a. Navigate to digiaxess.com in your web browser.
   b. Click **Login**. The **Digi Axess Log In** page displays.
   c. Enter your user name and password.
      - **User name**: Enter the user name for your **Digi Axess** account. Verify the user name with your system administrator.
      - **Password**: Enter the password for your **Digi Axess** account.
   d. Click **Submit** to log in to **Digi Axess**.

      Note If you have multi-factor authentication enabled, you must log in using MFA.

   e. The **Digi Axess** update banner displays, on top of the **Digi Axess** map. If the banner does not display, it has been ignored in a previous session.
      - Click **Don't Show Again** to permanently turn off the banner.
      - Click **Ignore** to close the banner.
2. Access the Digi Axess Admin page.
   a. In the toolbar, click the down arrow next to your user name. The **User Profile** menu displays.
   b. Click **Register New Device**. The **Register Device** page displays.
3. In the **Serial Number** field, enter the unique identifier for the device. You can enter the device's serial number or IMEI.

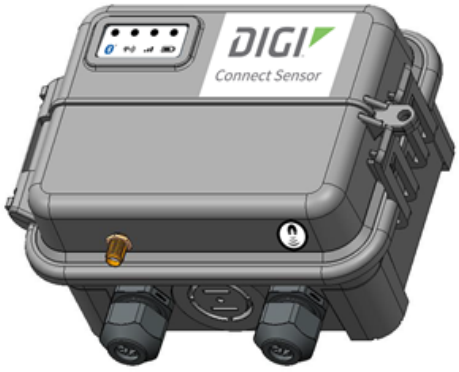
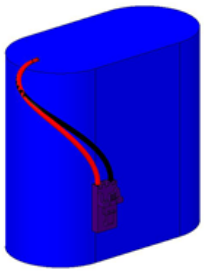
   As an alternative, click the **Scan Barcode** button next to the field and use a camera or a saved image to enter an identifier.
4. From the **Device Group** list box, select a device group from the drop-down list.
5. (Optional) In the **Subgroup** field, enter a subgroup name.
6. Click **Register**.

ASSEMBLY IS COMPLETE

List of Connect Sensor+ Digi Axess components and accessories

Connect Sensor+ includes the following components.

Included in the box

Item	Name
Connect Sensor+	
Battery	One lithium metal battery.  **Note** For battery safety information, see Battery safety and Battery care and maintenance.
SIM card	The SIM card is included and installed by default, but must be activated by M2M Wireless. 

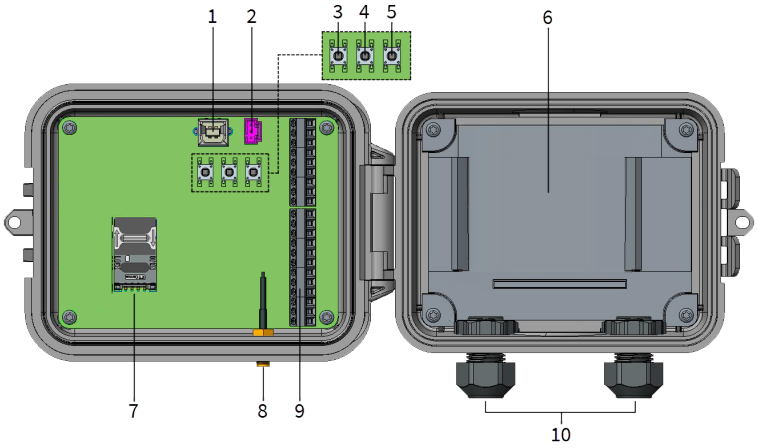
Optional accessories

The following accessories are available through Digi International Inc. For more information, visit the Digi Connect Sensor+ product page.

Component	Description
Cellular antenna	One cellular antenna.  Part Number: 76000926 Antenna - Cellular, 3G/4G/LTE (indoor)
Magnet	Used for manually waking the device.  Part Number: 76000927 Digi Connect Sensor+ Magnetic Key Chain
Magnet mount accessory pack	The pack includes four screws, and four magnets separated by plastic discs.  See Install the magnet mount on a Connect Sensor+ for installation instructions. **CAUTION!** The magnets are extremely powerful. Keep magnets separated. If they touch each other they are difficult to separate. Use caution when handling the magnets to avoid injury due to pinching. Part Number: 76002066 Digi Connect Sensor+ Magnetic Mount Kit

Connect Sensor+ ports and buttons

The following figure shows the Connect Sensor+ device components.



Item	Name	Description
1	**Console port**	Connects Connect Sensor+ to a computer using a USB type A to B cable for access to the command line interface (CLI). Note If you need to use the CLI, contact Digi for more information on CLI support.
2	**Battery port**	Connects the battery wire to power the Connect Sensor+.
3	**Wake button**	Wakes Connect Sensor+. See Manually wake the Connect Sensor+.
4	**Factory button**	Reserved for future use.
5	**Reset button**	Restarts the device. Pressing this button does not remove previous configuration changes. See Reset the Connect Sensor+.
6	**Battery tray**	Holds the battery in place.
7	**SIM card tray**	Connects the SIM card to Connect Sensor+. An M2M SIM card is inserted by default. Check with your system administrator to confirm that the M2M SIM card in the Connect Sensor+ has been activated.
8	**Cellular antenna port**	Connects an external cellular antenna to Connect Sensor+.
9	**Terminal block**	Wire analog or digital input and output sensors or power to this interface. For information about wiring sensors to the terminal block, see Wiring the Connect Sensor+ I/O interface.
10	**Cable glands**	If you have wired sensors to the terminal block (item 9), you should thread sensor cables through the cable glands on the Connect Sensor+. For information about threading sensor wires through the cable glands, see Wire the sensors to the Connect Sensor+ I/O interface. Note Using gaskets, seals, glands or plugs other than those supplied by Digi may void certifications and regulatory approvals.

Manually wake the Connect Sensor+

If Connect Sensor+ is powered and all LEDs are off, it is in sleep mode. You can wake the device manually, if needed.

Note The LED indicators only light up when you wake the device by manual intervention: pressing the Wake button inside the device or using a magnet. When the device automatically wakes up as scheduled to take and push readings, the LEDs do not light up since no one may be physically present to see the LED start-up sequence. See Connect Sensor LED start-up sequence.

Manually wake the device: Magnet swipe

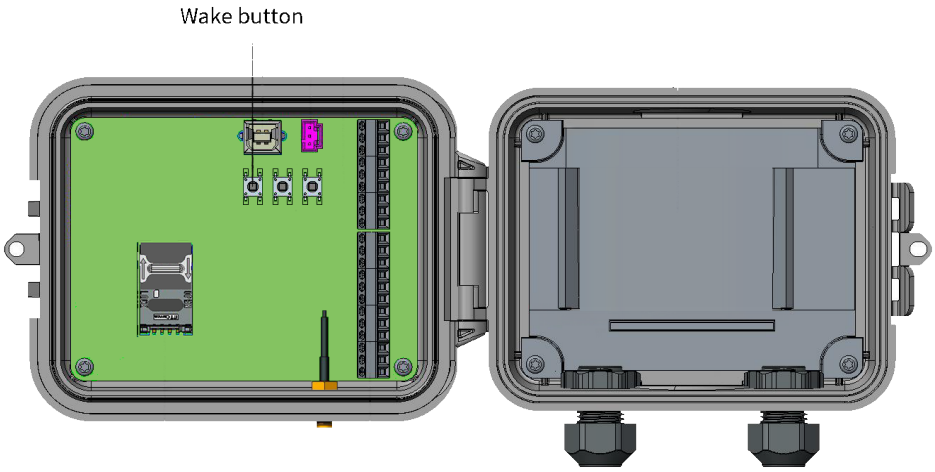
You can swipe a magnet across the top of the device to wake the Connect Sensor+.

When you wake Connect Sensor+, the LED indicators light up in a predetermined sequence as the device wakes up.

Manually wake the device: Wake button

You can wake the Connect Sensor+ by pressing the Wake button inside the device.

1. Open the device.
2. Press the Wake button inside the device.



3. When you wake Connect Sensor+, the LED indicators light up in a predetermined sequence as the device wakes up.
4. Close the cover on the device. The cover snaps into place.

> **Note** The Connect Sensor+ enclosure may require some force to close. This is intended as part of the design to ensure a robust seal in damp or dusty environments. For details about closing the Connect Sensor+ enclosure, see Closing the Connect Sensor+.

Connect Sensor+ LED start-up sequence

The LED indicators light up in a predetermined sequence when you manually wake the Connect Sensor+.

1. Press the Wake button inside the device or swipe a magnet across the device.
2. The cellular and battery LEDs light up purple for one second and then turn off.
3. The sensor LED blinks green as readings are taken and then turns off when readings are complete.
4. If Bluetooth is enabled, the Bluetooth LED blinks yellow for 30 seconds. If a Bluetooth device is attached, the Bluetooth LED turns solid and remains lit.

Note If Bluetooth is not enabled, the Bluetooth LED does not light up.

5. Connect Sensor+ takes and pushes data readings.
   a. The cellular LED blinks red while the Connect Sensor+ attempts to bring up the modem and connect to the cellular network.
   b. The Connect Sensor+ takes a battery life reading. The battery LED blinks either blue or red, depending on the status of the battery life.
   c. The cellular LED blinks blue until the connection to Digi Axess is complete.
   d. The Connect Sensor+ pushes the data. When the data transfer is complete, the cellular LED is solid blue.
   e. After a few seconds, the cellular LED turns off.

Closing the Connect Sensor+

All Connect Sensor+ products are shipped to you closed. You will need to open the device to install the battery, the SIM card, and to wire third-party sensors to the Connect Sensor+ I/O interface. After you have opened the enclosure, it may require some force to close. This is intended as part of the design to ensure a robust seal in damp or dusty environments.

Note Using gaskets, seals, glands or plugs other than those supplied by Digi may void certifications and regulatory approvals.

If you have problems closing the enclosure after either of these operations, please follow these instructions:

1. Ensure the gasket is fully seated in the groove on the enclosure.
2. Place the device on a flat, stable surface.
3. Apply pressure to the top of the Connect Sensor+ and pull the front door clip closed with your finger.

Wiring the Connect Sensor+ I/O interface

You can wire analog and digital inputs and outputs on the Connect Sensor+ general purpose I/O interface.

Note If you are using a Modbus-enabled external sensor device, you must wire the sensor device to a serial output.

Prerequisites

- Disconnect the battery before you begin wiring sensors to the input interface.
- Cellular connectivity of the Connect Sensor+ must have been completed and tested before wiring sensors to the input interface. After setting up the Connect Sensor+ and wiring the input interface, use Digi Connect Sensor Family Hardware Guide to remotely configure I/O settings.

Wire the sensors to the Connect Sensor+ I/O interface

This section explains how to wire sensors to the Connect Sensor+, using the cable glands on the device.

Note Using gaskets, seals, glands or plugs other than those supplied by Digi may void certifications and regulatory approvals.

To wire third-party sensors to the Connect Sensor+ I/O interface, you need the following equipment:

- A slot-headed 0.4 x 2.5 x 80 mm screwdriver
- Wire size 1.29-0.25 mm (16-30 AWG) for each pin connector

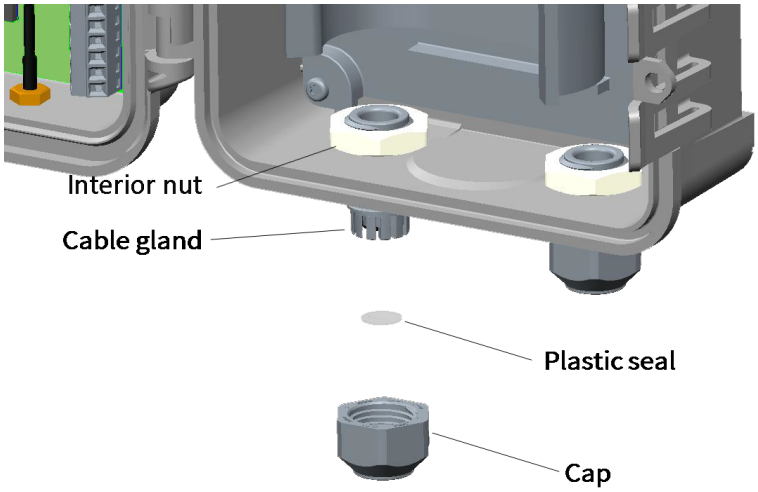
Note All external or field wiring must be in accordance with NFPA 70 Article 501.10(B).

To wire sensors to the I/O interface:

1. Open the Connect Sensor+ enclosure and disconnect all power sources.

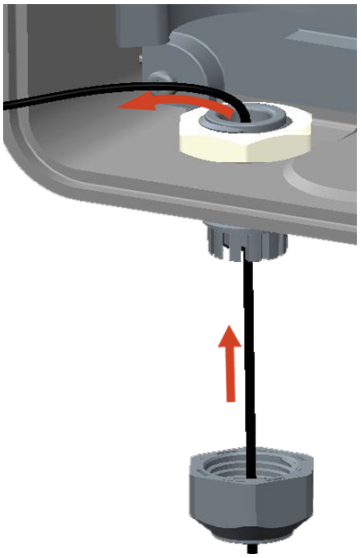
   CAUTION! You must disconnect power from the Connect Sensor+ before wiring sensors to the I/O interface.

2. Unscrew the gland cap and remove the plastic seal.

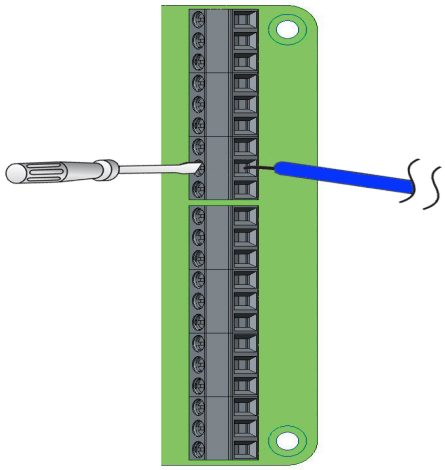


Note For an unused cable gland, make sure the plastic hole cover stays in place to keep it sealed. Over tightening an unused cable gland cap can force out the plastic hole cover, unsealing the cable gland.

3. Run the sensor cable through the cap and thread it through the cable gland.



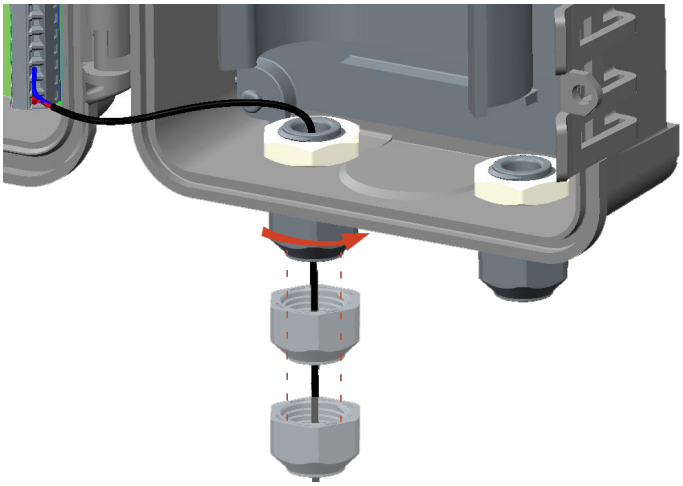
4. Use the screwdriver to loosen the I/O interface connector screw.
5. Slide the wire into the terminal side of the connector.
6. Tighten the screw to 0.2 N-m to secure the wire to the connector.



7. Seal and secure the wire.
   a. Hold the cable gland and tighten the interior nut to secure the rubber seal between the device and the cable gland. This ensures that the rubber seal does not buckle.

      Note If the rubber seal is buckled, water intrusion may occur.

   b. Tighten the cap to the cable gland to seal and secure the wire.

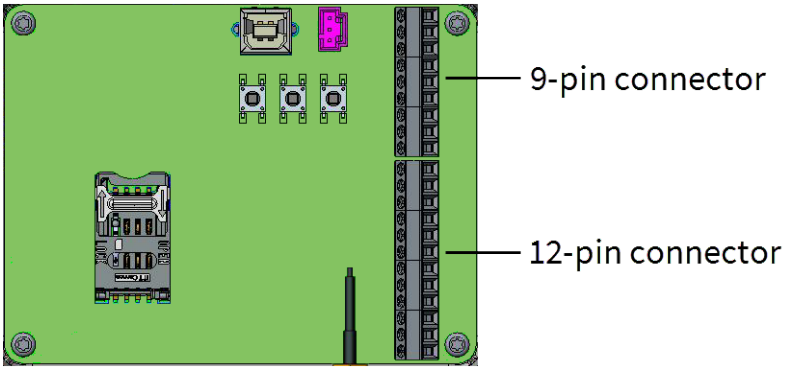


8. Close the cover on the device. The cover snaps into place.

> **Note** The Connect Sensor+ enclosure may require some force to close. This is intended as part of the design to ensure a robust seal in damp or dusty environments. For details about closing the Connect Sensor+ enclosure, see Closing the Connect Sensor+.

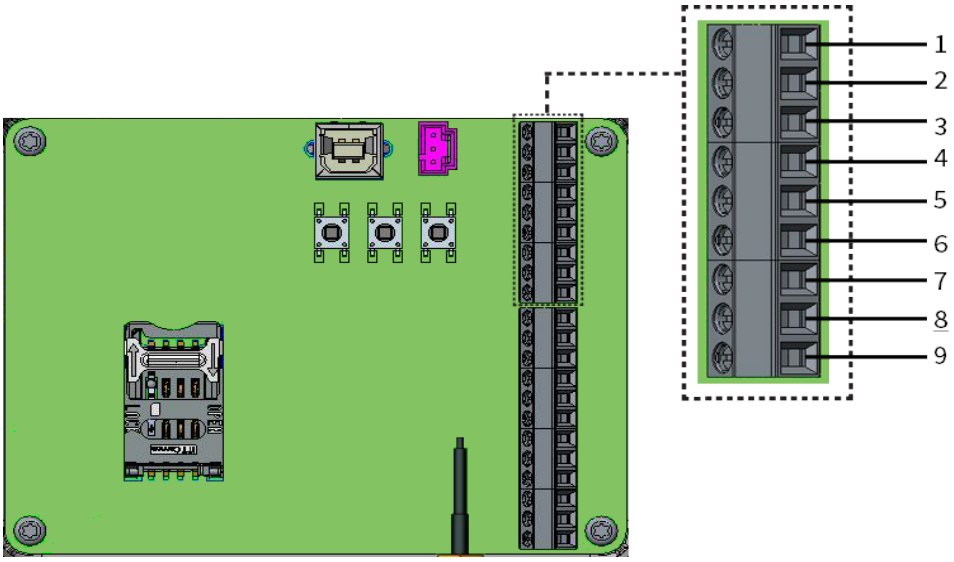
Connect Sensor+ I/O interface pin assignments

The Connect Sensor+ has two I/O connectors: a 9-pin connector and a 12-pin connector.



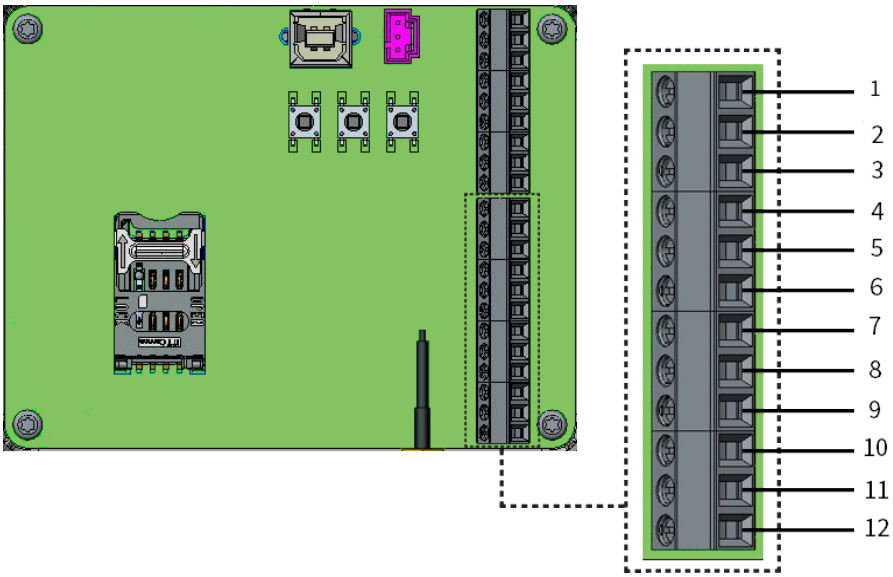
The pin assignments and signals are shown in the following images and tables.

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 source, ground
6	EXT PWR IN	External power source, positive input
7	DGnd	Digital interface, ground
8	DIO	Digital interface input
9	DPwr	Digital interface power output

12-pin connector details



Pin number	Assignment	Signal
1	A4 GND	Analog interface 4, ground
2	A4 IN	Analog interface 4, analog input
3	A4 Pwr	Analog interface 4, power output
4	A3 GND	Analog interface 3, ground
5	A3 IN	Analog interface 3, analog input
6	A3 Pwr	Analog interface 3, power output
7	A2 GND	Analog interface 2, ground
8	A2 IN	Analog interface 2, analog input
9	A2 Pwr	Analog interface 2, power output
10	A1 GND	Analog interface 1, ground
11	A1 IN	Analog interface 1, analog input
12	A1 Pwr	Analog interface 1, power output

Analog input

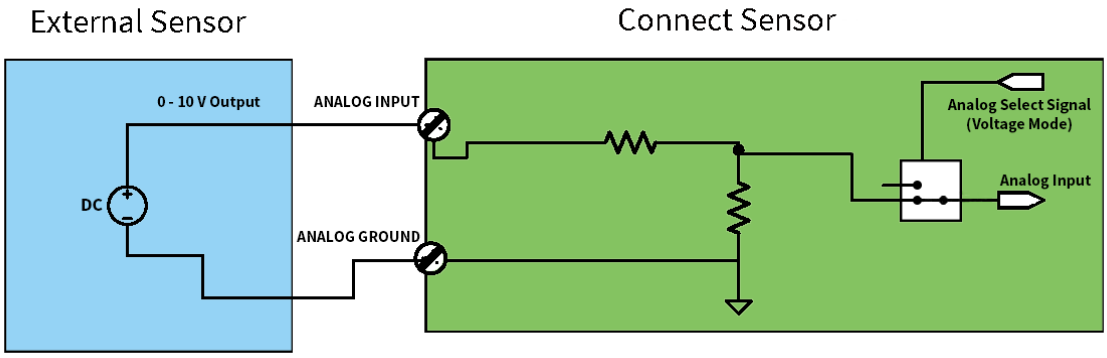
The analog inputs have the following modes of operation, which are disabled by default. You can enable or disable the modes, but use only one mode for each input.

Voltage input

The Connect Sensor+ can monitor a voltage input from 0 V to 10 V. The following schematics show wiring options for 0-10 V input.

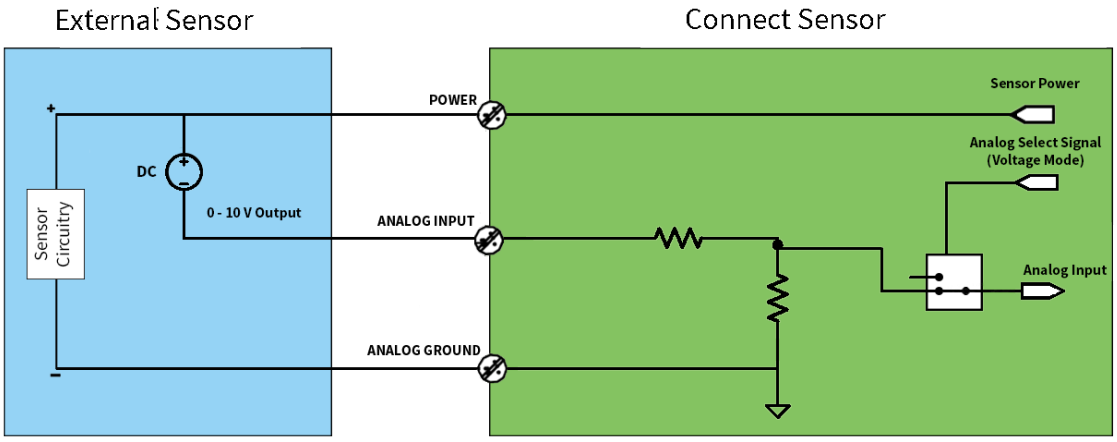
Self-powered

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



3-wire sensors

This figure shows the schematic when using power from the Connect Sensor+ to power the sensor.

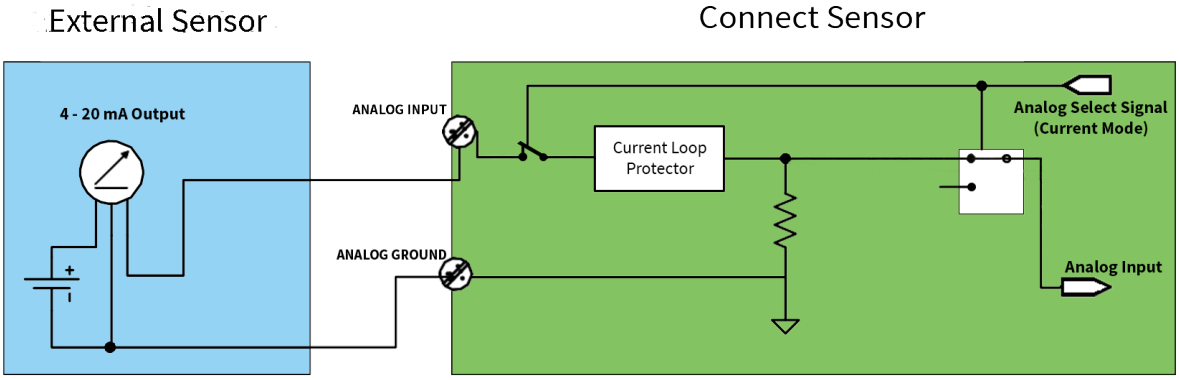


Current loop

The Connect Sensor+ can monitor a current input from 4 mA to 20 mA. The following schematics show wiring options for 4-20 mA inputs.

Self-powered

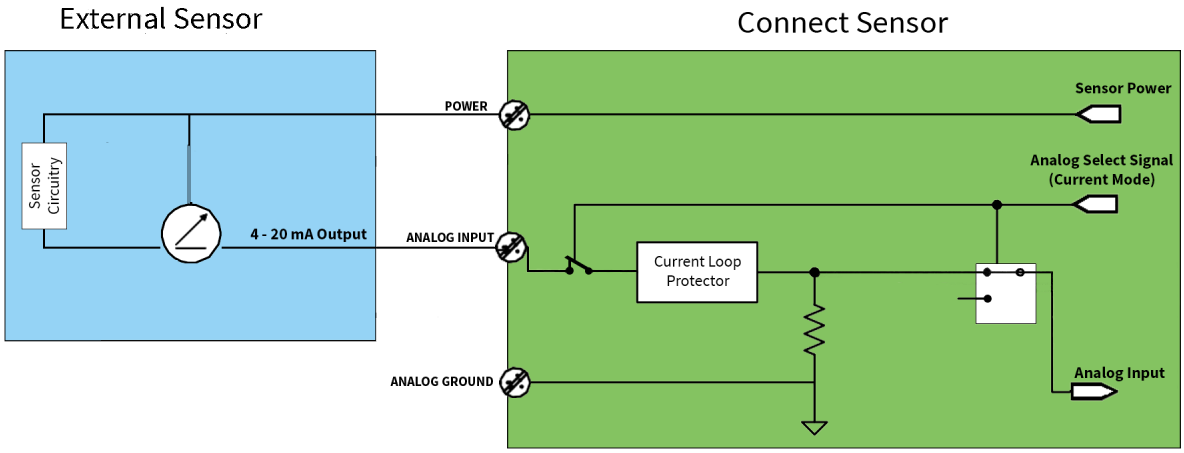
This figure shows the schematic when the external sensor is self-powered or powered from a source other than the Connect Sensor+.



2-wire (loop-powered) sensors

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

This figure shows the schematic when using power from the Connect Sensor+ current loop to power a sensor.



Calculating supply voltage for a 2-wire (loop-powered) sensor

The power output from the Connect Sensor+ is configurable. The configured voltage value for the Connect Sensor+ is between the **Power** and **Analog Ground** terminals, as shown in the schematic above. The voltage across the terminals of the external sensor device (between **Power** and **Analog Input**) fluctuates, depending on the loop current. The fluctuation occurs because the variable loop current through the resistance inside the Connect Sensor+ changes the voltage between the **Analog Input** and **Ground** terminals. This is expected behavior for a 4/20 mA 2-wire interface.

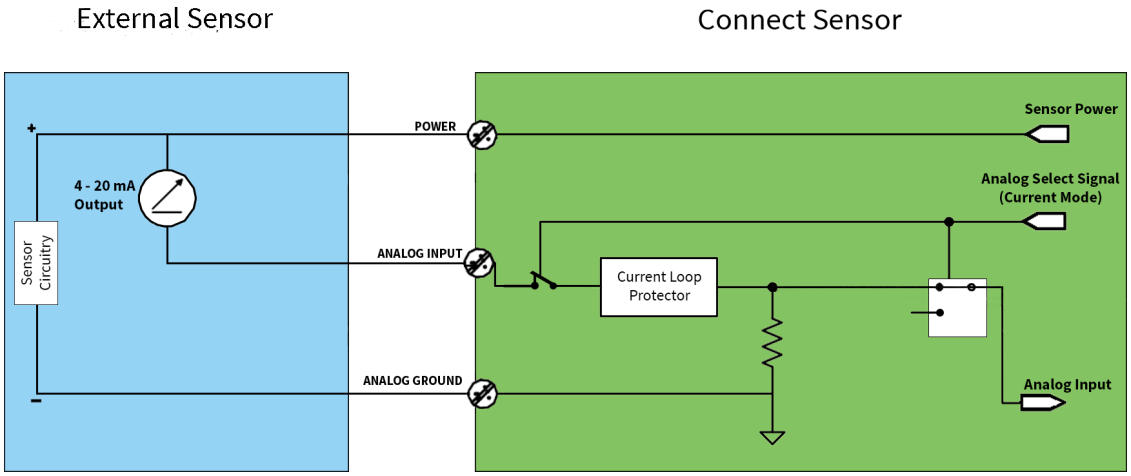
When determining the value for the output power, you must calculate the range of voltages to determine whether the voltage setting is sufficient. The voltage across the external sensor device terminals (**Power** and **Analog Input**) is always less than the configured voltage.

For example, calculate an estimate of the range of voltage across the external sensor device terminals (**Power** to **Analog Input**) when the Analog Output voltage is set to 24 V. The nominal internal resistance of the Connect Sensor+ is 375 ohms, but may vary across current flow and temperature.

- Max: 24 V - (4 mA *375 ohms) ≈ 22.5 V
- Min: 24 V - (20 mA *375 ohms) ≈ 16.5 V

3-wire sensors

This figure shows the schematic when the analog power output from the Connect Sensor+ is powering the sensor.



Digital I/O pin

The Connect Sensor+ has one digital I/O pin. You can configure the pin as a digital input or a pulse counter, but no more than one I/O function simultaneously.

Digital input and pulse counter

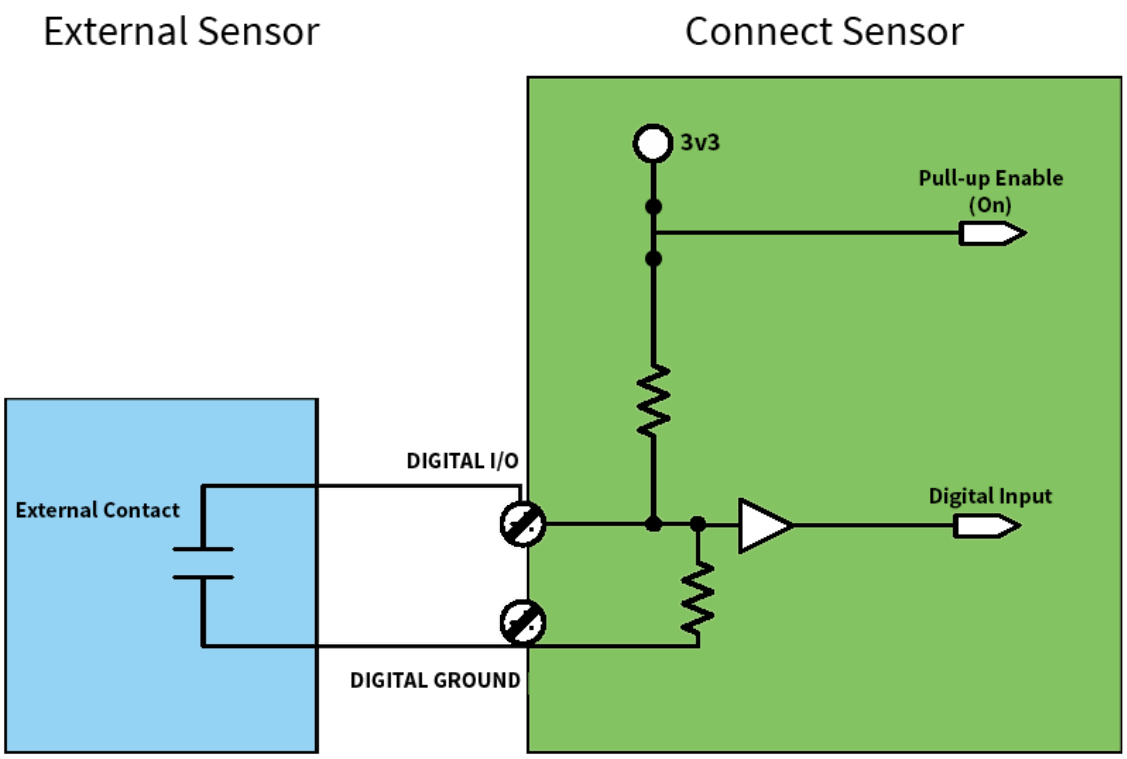
When configuring the digital I/O pin, it allows the following modes of operation:

- **Input mode:** The Connect Sensor+ gets the digital input value at scheduled sensor readings. You can configure it to send an alarm report for specific input values or when an input value changes. You can also configure the Connect Sensor+ to wake from sleep mode when an input value changes (rising edge or falling edge wake).
- **Pulse counter:** When connected to a mechanical meter, the Connect Sensor+ counts pulses during Connect Sensor+ sleep cycles and reports them to Digi Connect Sensor Family Hardware Guide during normal reporting intervals.

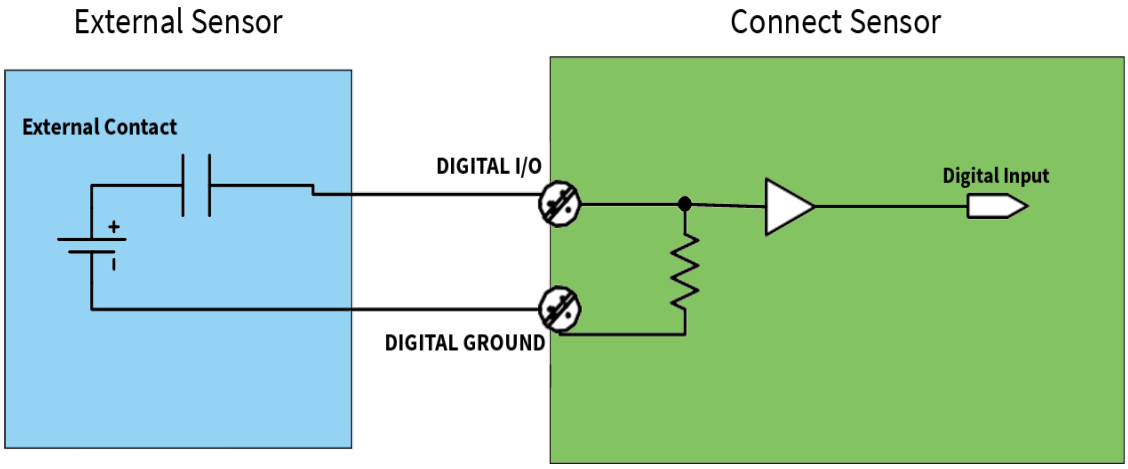
Each mode has a pull-up resistor that you can enable or disable. The pull-up indicates the digital input's state when there is no external voltage.

Note 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+.

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



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



Modbus serial power output

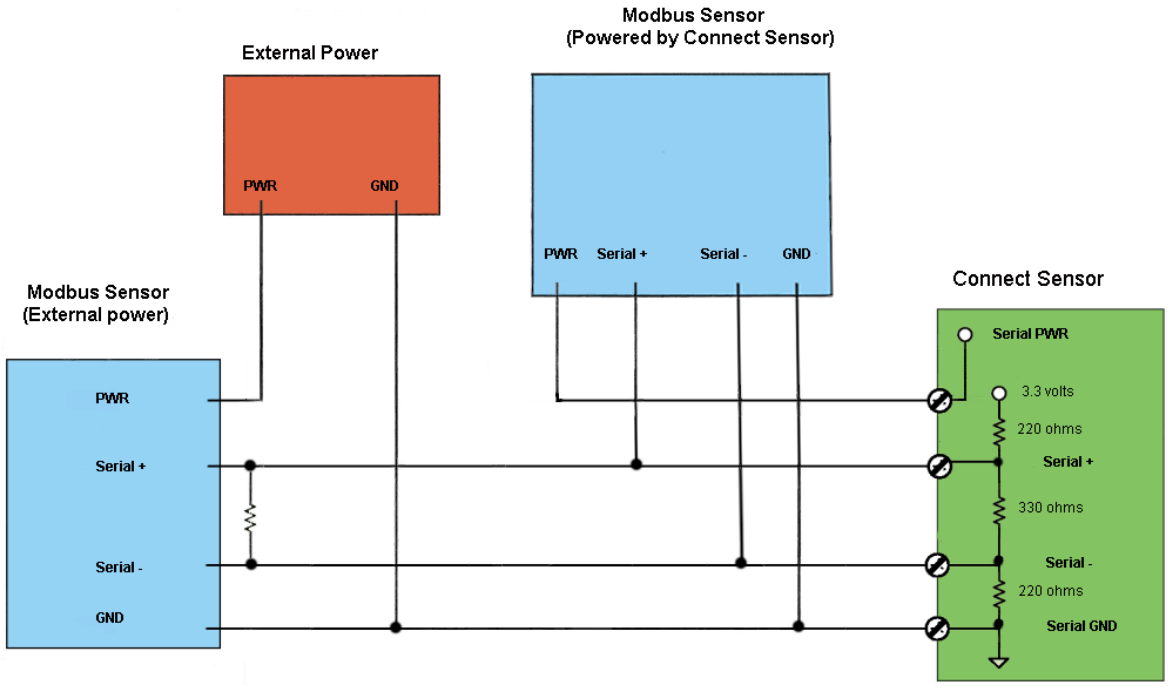
Connect Sensor+ can monitor a Modbus-enabled external sensor device.

Biasing and termination are needed when a Modbus sensor is connected on a long wiring harness and the sensor does not provide its own termination and biasing. Termination is only applied at the

two ends of the 485 bus (not in the middle), and bias typically is applied only once on the whole bus.

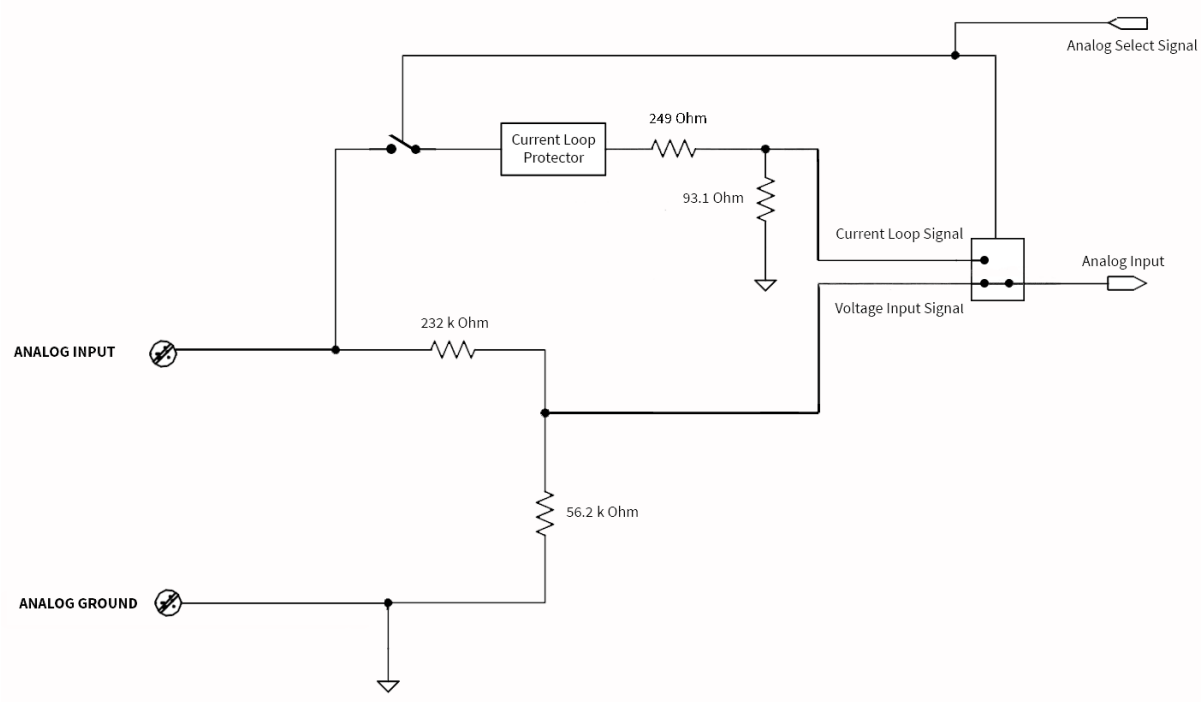
For detailed information about implementing Modbus over a serial line, refer to the Modbus documentation at www.modbus.org.

The schematic below shows how to wire the device, depending on the power source for the Modbus device: Connect Sensor+ or powered from a source other than the Connect Sensor+.



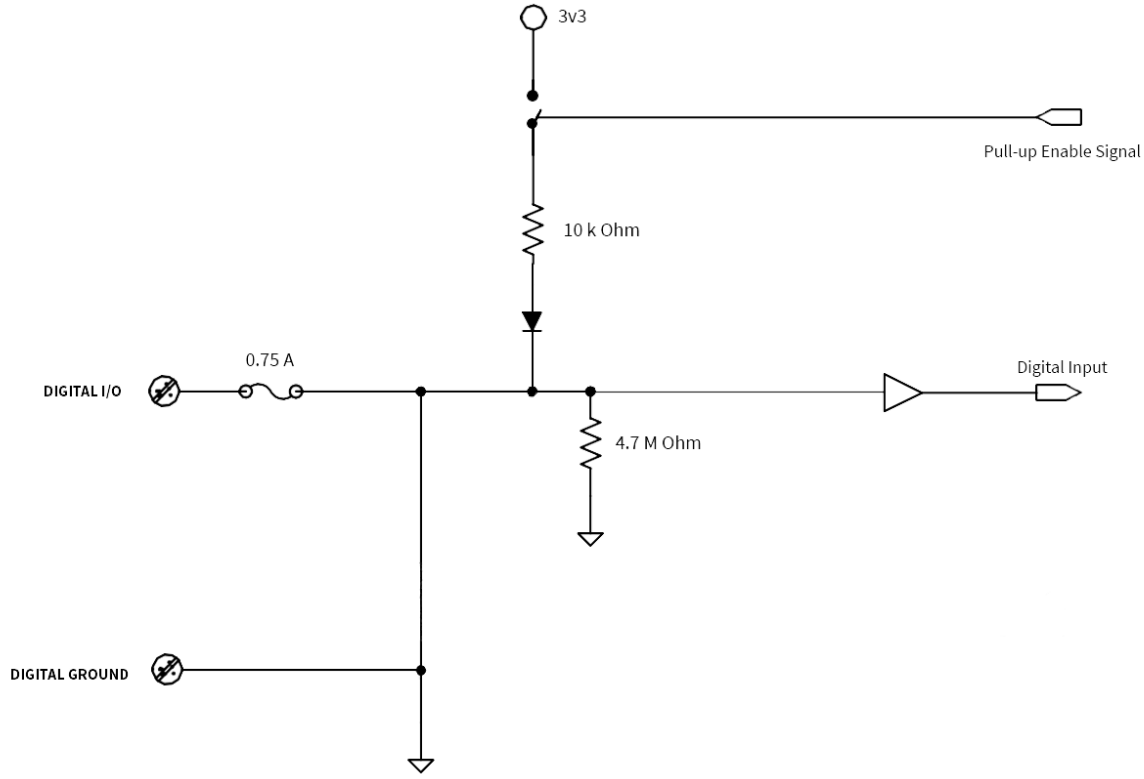
Analog input schematic

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



Digital I/O schematic

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



Device not connected to the cellular network

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

Verify SIM configuration

1. Verify the following for your device:
   a. Make sure the SIM card is inserted correctly into the SIM tray.
   b. Make sure you are using the correct APN and that the PIN, user name, and password are configured, if required.
2. Contact your cellular service provider to make sure your SIM card is activated and assigned to a contract.

Check cellular antenna

- Make sure the cellular antenna is securely installed on the device and is not damaged.
- Verify that the antenna installed on the device matches the available network. For example, a 3G antenna may not work as expected when installed on an LTE-only device.

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:

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

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 has been deployed for some time, check the battery life.

Manually configure the cellular connection

The Connect Sensor+ is configured with a default APN that you need to change to register Connect Sensor+ 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:

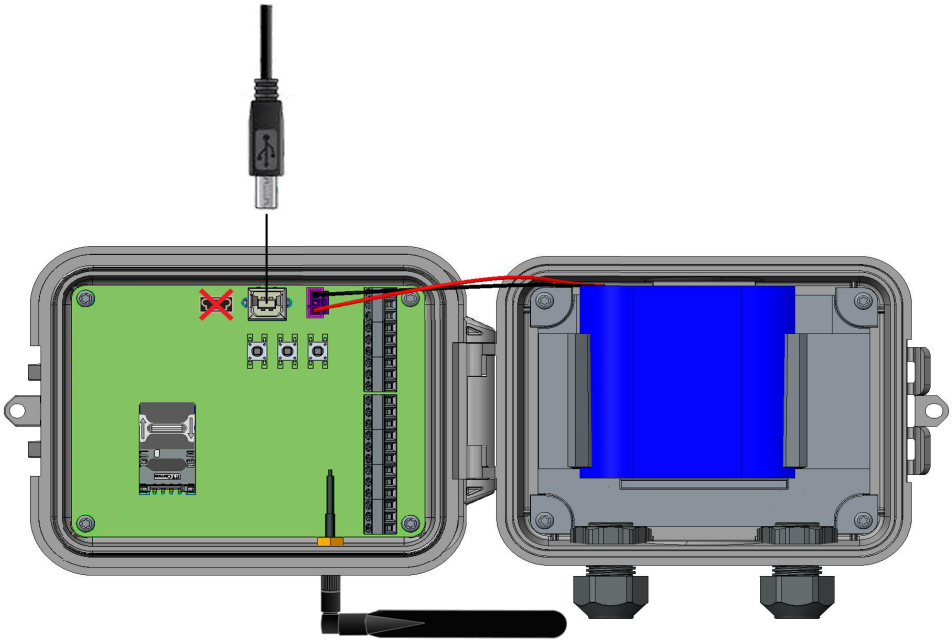
- Computer running a terminal emulator program
- USB type A to B cable
- APN from your cellular service provider
- The battery and SIM card must be properly installed.

To register Connect Sensor+ 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.

Note Do not use the mini USB port, which is covered by a red X in the graphic below.

You may need to install device drivers or wait for your computer to automatically install them when connecting Connect Sensor+ to a computer using a USB cable.



3. Open a terminal program on a computer and connect to Connect Sensor+ using the following configuration:
   - **Connection port:** Connect to the COM port associated with the USB cable connected to Connect Sensor+.
   - **Baud rate or bits per second:** 115200
   - **Data:** 8 bit
   - **Parity:** None
   - **Stop:** 1 bit
   - **Flow control:** None
4. Press the Wake button on the device.
5. At the command prompt, type **set apn=<*yourCarrierAPN*>** where ***yourCarrierAPN*** 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+ goes to sleep and immediately wakes up to report the change to Digi Connect Sensor Family Hardware Guide. After the change completes, it goes to sleep again.
9. (Optional) Verify the new settings:
   a. Press the **Wake** button.
   b. At the command prompt type **set commandname** where **commandname** is one of the settings you updated, such as **apn**.

Battery care and maintenance

Note Before you open a Connect Sensor+ be sure to review the Battery safety information.

Battery life

The battery life will stay at 100% during the useful life of a battery. When the battery life is at 50% there is enough battery life to power the Connect Sensor+ as expected for a month, which gives you to time to replace the battery.

The battery will last 2 to 3 years in these conditions:

- Adequate cellular network coverage where Connect Sensor+ is installed.
- Connect Sensor+ sends reports to Digi Axess a maximum of two times a day.
- Connect Sensor+ is not powering high-current sensors with long read delays.

Battery sleep and wake modes

Connect Sensor+ uses sleep and wake modes to manage power use. The device wakes only for sensor readings and sending reports to Digi Axess. It is in sleep mode at all other times to maintain low power consumption.

Battery percentage and external power

The device can be powered by either external power connected to the device, or by an internal battery that is connected to the device.

In some situations, the device may use both sources. For example, the battery may be used as the power source if the external power fails. If you have an alarm set to show that external power has failed, the battery would be use to send the report.

If the device is using the external power source and the battery is connected to the device, then the battery life is 100%. This will occur whether the battery has any battery life remaining or if the battery has been depleted or removed.

Battery depletion

A battery will be depleted before 2 years when any of these conditions are met:

- **Temperature fluctuation**: The temperature at the device's location affects the battery. Battery power is used more quickly in a cold environment than in a warm environment. A battery in a device located where the temperature is consistently 20° F will not last as long as a battery in a device located where the temperature is consistently 80° F.
- **Scheduling reports**: Scheduling more than two reports a day may shorten the battery life to less than 2 years.

Battery inspection

CAUTION! This product contains a lithium metal battery. Prior to installation, the battery should be inspected for any signs of damage. If the battery appears to be damaged or is dropped during installation, do not use the battery and dispose of it properly.

The MSDS (Material Safety Data Sheet) for the battery can be found at: www.digi.com/documentation/ConnectSensor.

Battery passivation

Some types of Connect Sensor lithium batteries experience passivation when the battery is not used for a period of time. If you are using external power, and never use the battery, the battery will passivize within the Connect Sensor.

Battery passivation can cause the battery to report a low battery percentage for a time after initial installation. As the device uses the battery, the passivation is removed and the battery percentage increases to a maximum of 90 - 100% (depending on the temperature). The passivation removal process could take a week or more, if the number of times Connect Sensor+ wakes to send reports to Digi Axess is once per day or less.

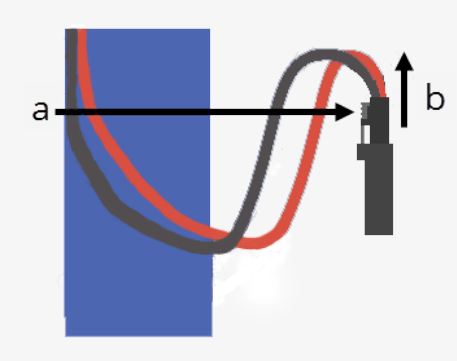
Note Passivation may never be removed if the device sends reports to Digi Axess too infrequently.

Replace a battery

Before replacing the battery, review the battery safety information and make sure you have the necessary tools and equipment. For more information about battery life, see Battery life.

1. Open the enclosure.
2. Disconnect the battery.

a. Press in the tab at the top of the battery wire connector.
b. Pull up on the connector.



3. Remove the existing battery.
4. Place the new battery in the battery holder and connect the wiring to the battery port. Make sure the battery and its wiring are properly placed.
5. Press the Wake button and wait for the battery LED to slowly blink blue five times and then remain off.
6. Close the cover on the device. The cover snaps into place.

> **Note** The Connect Sensor+ enclosure may require some force to close. This is intended as part of the design to ensure a robust seal in damp or dusty environments. For details about closing the Connect Sensor+ enclosure, see Closing the Connect Sensor+.

Reset the Connect Sensor+

This procedure forces the device to restart. This resets only the hardware. The device's configuration is retained.

1. Open the Connect Sensor+ enclosure.
2. Press the Reset button to force a reset when the Connect Sensor+ device does not respond to any inputs.
   Pressing Reset cancels all operations and completes a power cycle, then the Connect Sensor+ 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.
4. Close the cover on the device. The cover snaps into place.

> **Note** The Connect Sensor+ enclosure may require some force to close. This is intended as part of the design to ensure a robust seal in damp or dusty environments. For details about closing the Connect Sensor+ enclosure, see Closing the Connect Sensor+.

Install the magnet mount on a Connect Sensor+

You can install a magnet mount on a Connect Sensor+ so that you can securely place the device on a metal object.

Make sure you have the following equipment available:

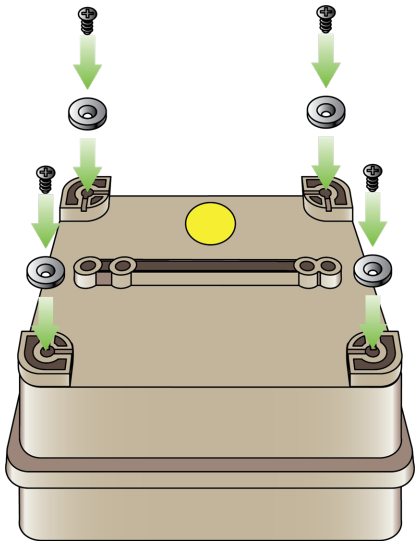
- Magnet mount accessory pack. For purchasing information, see the magnet mount accessory pack information.
- Appropriate screw driver.

Note You can skip this step if you did not purchase the magnet mount accessory pack.

1. Turn Connect Sensor+ to access the bottom of the device.
2. Remove one magnet from the set of four magnets in the accessory pack.

CAUTION! The magnets are extremely powerful. Keep magnets separated. If they touch each other they are difficult to separate. Use caution when handling the magnets to avoid injury due to pinching.

3. Place the magnet on one corner of the device. Be sure to match the hole in the magnet to the hole in the corner.
4. Remove one of the screws from the accessory pack.
5. Using the screwdriver, screw the magnet onto the device.
6. Repeat this process to screw the remaining magnets onto the corners of the Connect Sensor+. When you have completed this process, a magnet should be screwed onto each corner of the device.



Safety notices: Connect Sensor+

Assembly safety information

The following safety information provides guidelines when assembling the Connect Sensor device. For additional safety guidelines, see Safety notices.

CAUTION! The device is sensitive to electrostatic discharge (ESD).

The Connect Sensor device must be maintained only by Digi or a Digi qualified technician.

- Move the device to a non-hazardous and unclassified area before opening the enclosure and connecting the hardware.
- To avoid the risk of the battery falling into a protected area, do not assemble the device in the installation area.
- You may be required to have a licensed electrician install or perform maintenance on this equipment. Always follow applicable local, state, and federal codes and guidelines.

Battery safety

Always use the designated battery, model number 76000912, from Digi International Inc.

Allow only a trained technician to replace the lithium thionyl chloride batteries used in Connect Sensor.

Prior to installation, the battery should be inspected for any signs of damage. If the battery appears to be damaged or is dropped during the installation, do not use the battery and dispose of it properly. See Battery inspection for more information.

Do not attempt to recharge the Connect Sensor lithium battery, as it could explode.

When the Connect Sensor is installed in C1D2 environments, do not disconnect the battery until the environment around the Connect Sensor is vented or known to be free of any flammable gas concentrations.

Safety notices

Digi products are designed to the highest standards of safety and international standards compliance for the markets in which they are sold. However, cellular-based products contain radio devices that require specific consideration. Make sure you read and understand all of the safety notices, warnings, and cautions for this product. Digi International assumes no liability for failure to comply with these precautions.

Installation considerations

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

  Note When installing in a C1D2 area, you must use C1D2 listed, IP66 rated conduit and conduit fittings to maintain applicable safety ratings on the device.

- 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).
- The device 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 the manufacturer; connecting non-approved accessories and batteries may damage the device.
- Do not attempt to repair the product. Any attempt to service or repair the device by the user will void the product warranty.
- Using gaskets, seals, glands or plugs other than those supplied by Digi may void certifications and regulatory approvals.
- When inserting wires into the terminal block, we recommend tightening torque to 0.2N-m.
- Allowable wire size for terminal blocks is 0.5-1.5mm^2.

Warnings: Explosion hazards

Review the following explosion hazard warnings for the Connect Sensor+ device.

Note The Connect Sensor+ device contains internal batteries.

WARNING! Connect Sensor+ 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.

WARNING! When the Connect Sensor is installed in C1D2 environments, do not open the Connect Sensor+ enclosure or disconnect the battery or any other connections to the Connect Sensor+ until the environment around the device is vented or known to be free of any flammable gas concentrations.

Remarque L'unité Connect Sensor+ contient des batteries internes.

AVERTISSEMENT! L'unité Connect Sensor+ est adaptée pour utilisation seulement dans des endroits non dangereux ou des endroits dangereux UL/cUL de classe I, division 2, groupes B, C et D. Le remplacement de tout composant risquerait de compromettre la convenance à la classe I, division 2.

AVERTISSEMENT - RISQUE D'EXPLOSION: LES BATTERIES DOIVENT ÊTRE REMPLACÉES DANS UN ENDROIT EXEMPT DE CONCENTRATIONS INFLAMMABLES.

AVERTISSEMENT - RISQUE D'EXPLOSION: NE DÉCONNECTEZ PAS LORSQUE LE CIRCUIT EST SOUS TENSION OU À MOINS QUE LA ZONE SOIT LIBRE DE TOUTE CONCENTRATION INFLAMMABLE.

AVERTISSEMENT! Les décharges électrostatiques peuvent endommager le matériel et nuire aux circuits électriques. Les dommages des décharges électrostatiques surviennent lorsque les composants électroniques sont mal manipulés et peuvent entraîner une défaillance complète ou intermittente.

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 20 cm (approximately 7.8 inches).

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
UL 60950-1	Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use	October 14, 2014

Technical specifications: Connect Sensor+

Maximum power and frequency bands

This section contains the maximum power and frequency bands for Connect Sensor+.

Maximum power	Associated frequencies
2 W	Cellular 850 and 900 MHz bands
1 W	Cellular 1800 and 1900 MHz bands

Cell modem transmit (TX) output power

Modem	Band	Power Class
LE910-SV1	LTE All Bands	Class 3 (0.2W)

Regulatory information: Connect Sensor+

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 device 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.

Declaration of Conformity (DoC)

Digi has issued Declarations of Conformity for the Connect Sensor concerning emissions, EMC, and safety. For more information, see www.digi.com/resources/certifications.

Important note

Digi customers assume full responsibility for learning and meeting the required guidelines for each country in their distribution market. Refer to the radio regulatory agency in the desired countries of operation for more information.