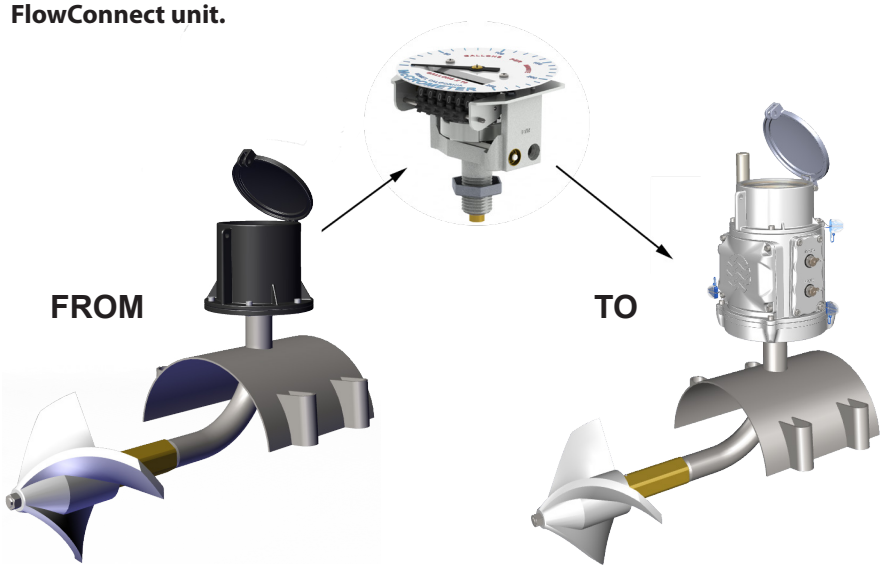
Retrofit Instruction: From Mc Propeller with a mechanical register to FlowConnect unit with a mechanical register

OVERVIEW OF THE PROCEDURE

This describes the procedure for retrofitting a Mc Propeller flow meter with a mechanical register to a FlowConnect unit. The existing mechanical register is removed from the flow meter and re-used in the FlowConnect unit.



IMPORTANT!
Although the retrofit can be performed while water is flowing, the examples in this instruction show a pipe with no water flowing. If you choose not to shut off the water flow before performing the retrofit, be aware that the drive cable will be spinning.

1 - Retrofit Procedure

STEP 1: Inventory the parts
STEP 2: Remove the mechanical unit and base plate
STEP 3: Remove the battery cover from the FlowConnect unit
STEP 4: Remove the base plate from the FlowConnect unit
STEP 5: Attach the FlowConnect base plate
STEP 6: Attach desiccants packs in the FlowConnect unit base plate
STEP 7: Attach the FlowConnect unit to the base plate
STEP 8: Remove the canopy from the FlowConnect unit
STEP 9: Insert the drive cable extension
STEP 10: Re-install the mechanical register into the FlowConnect body
STEP 11: Re-attach the canopy to the FlowConnect unit
STEP 12: Attach the antenna
STEP 13: Connect the batteries and attach the battery cover
STEP 14: Attach the tamper evident seals

2 - Installing Sensors and Solar Panel

1: Recommended standards
2: Installing a solar panel
3: Installing a rain gauge
4: Installing a pressure sensor

3 - Connecting Inputs and Outputs

1: Power connector
2: Inputs connector
3: Outputs connector

PARTS AND MATERIALS

Part Number	*Description*	*Quantity*
30122-20	IOM Manual	1
TOB007	MC Base Plate	1
TOB018	O-Ring for Base Plate	1
Bagged items:		
10023-00	Flat Gasket	1
10273	O-ring -021	1
10274	O-ring -121	1
R0142-00	Brass Bushing	1
15016-10	Tamper evident seals	3
TOB010	Register holder	1
10790	Screws for register holder	2
D0100-1.5	Drive shaft extension	1
Bagged items:		
10015-00	Desiccant	2
10804	Cable tie	2
10790	#6 screw x 3/16" SS	2
	Antenna or antenna extension	1

TOOLS REQUIRED

5/32" hex driver, T-shape wrench recommended
Phillips screwdriver
Standard flat head screwdriver
Precision flat head screwdriver
Wire cutter
Ratchet socket driver, ½" drive
1-3/8" socket

LOCATION OF ACCESSIBLE COMPONENTS

The figure below shows the location and names of the components you will work with in this IOM.

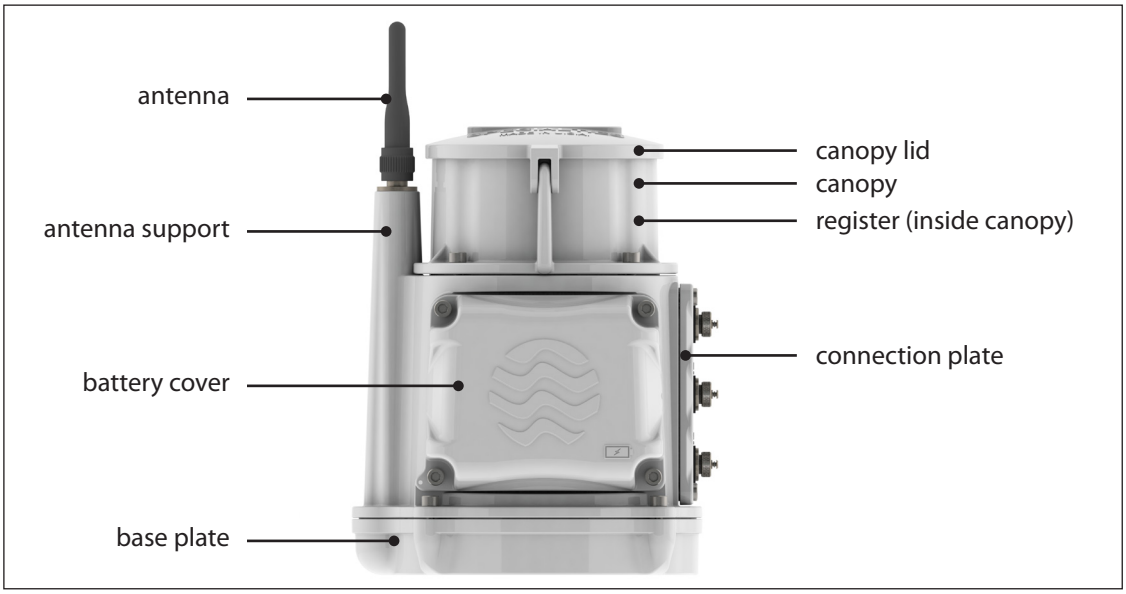


Figure 1. Accessible Components

1 - Retrofit Procedure

STEP 1: Inventory the parts

a. Check the parts received against the parts list on the previous page.
b. Compare the serial numbers engraved on the lids to confirm they match.
c. Confirm the serial number on the FlowConnect unit corresponds to information on a silver label located on the bottom of the base plate.

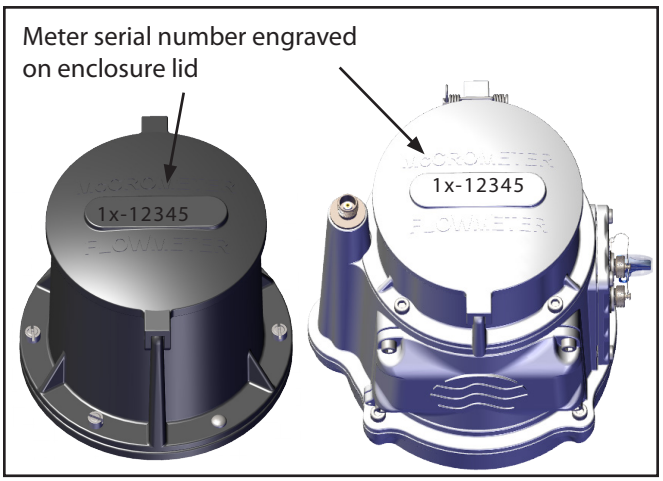
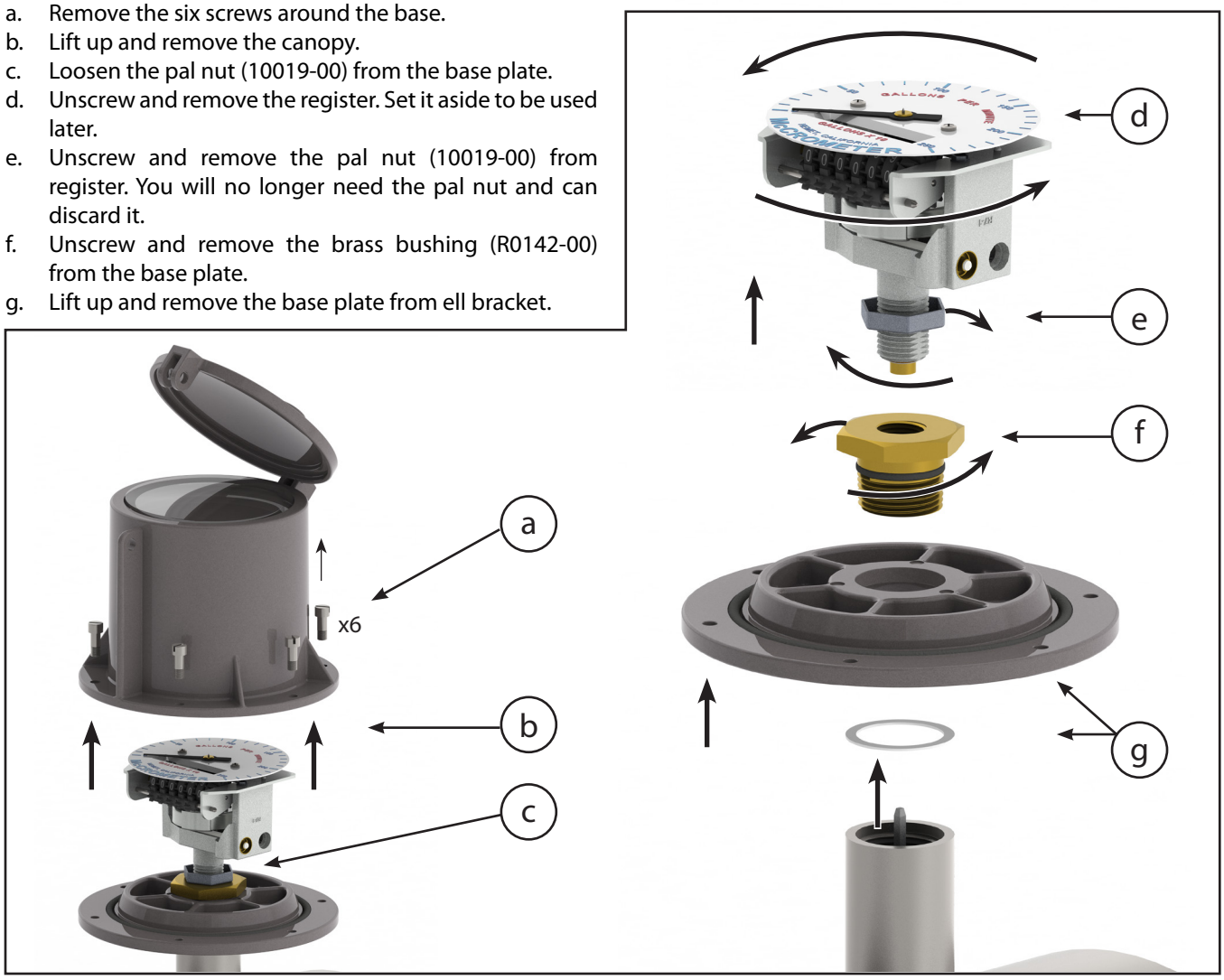


Figure 2. Checking engraved serial numbers on lids

STEP 2: Remove the mechanical unit and base plate

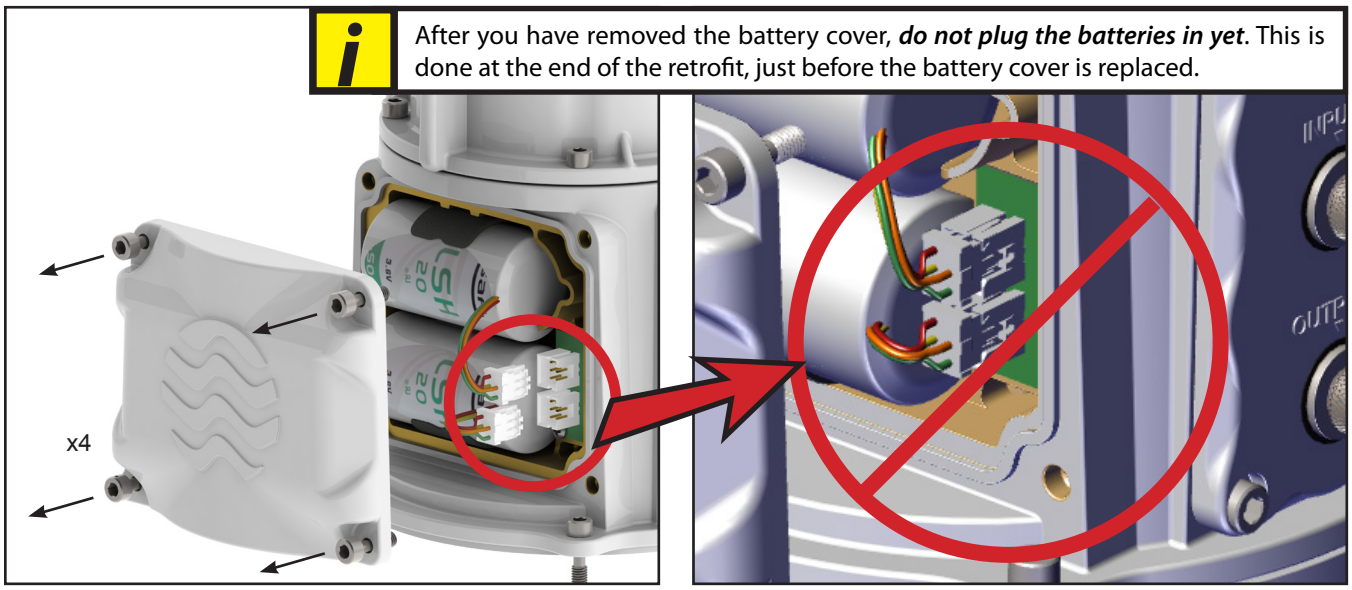
a. Remove the six screws around the base.
b. Lift up and remove the canopy.
c. Loosen the pal nut (10019-00) from the base plate.
d. Unscrew and remove the register. Set it aside to be used later.
e. Unscrew and remove the pal nut (10019-00) from register. You will no longer need the pal nut and can discard it.
f. Unscrew and remove the brass bushing (R0142-00) from the base plate.
g. Lift up and remove the base plate from ell bracket.



STEP 3: Remove the battery cover from the FlowConnect unit

In order to attach the FlowConnect unit to the base plate, you MUST remove the battery cover. The screws for the base plate are not accessible when the battery cover is on.

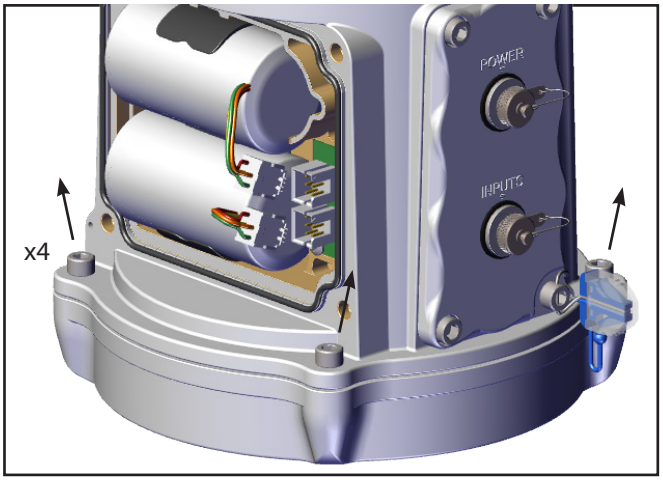
To remove the battery cover, remove the four screws as shown below.



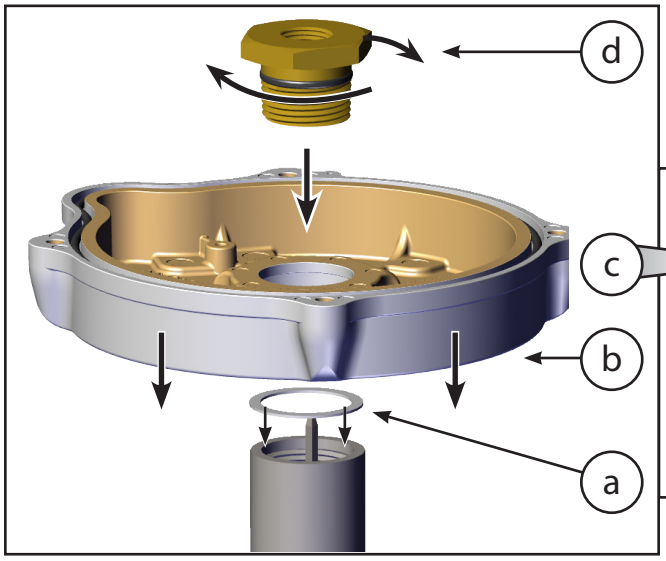
STEP 4: Remove the base plate from the FlowConnect unit

Unscrew the four captive screws holding the body to the base plate and remove the base plate.

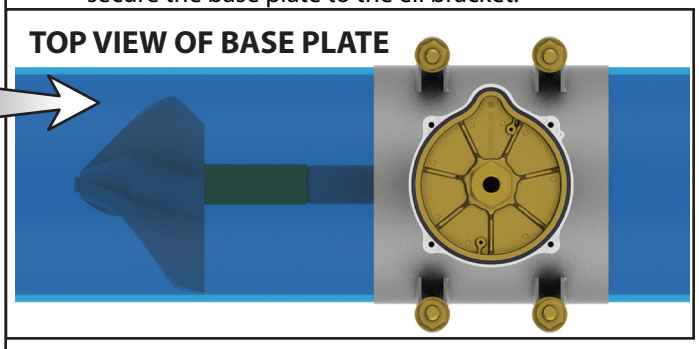
Set the FlowConnect unit body aside in a clean, dry place.



STEP 5: Attach the FlowConnect base plate

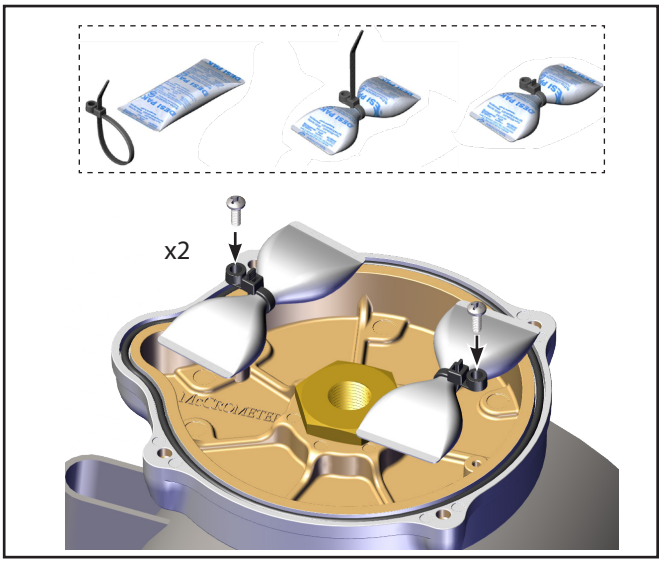


a. Set the flat gasket (10023-00) on top of the ell bracket.
b. Set the FlowConnect base plate (TOB007) on top of the ell bracket, making sure it is flush against the flat gasket.
c. Align the nub with the pipe as shown below.
d. Insert and tighten the brass bushing (R0142-00) to secure the base plate to the ell bracket.



STEP 6: Attach desiccants packs in the FlowConnect unit base plate

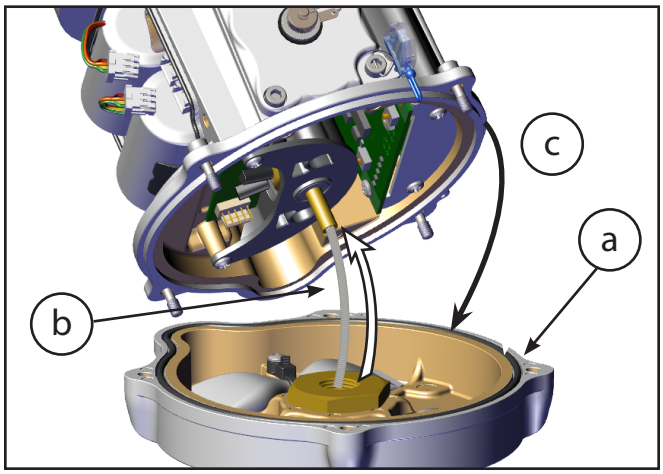
Wrap and tighten a cable tie (10804) around two desiccant packs (10013-00) and screw them in place in the FlowConnect base plate.

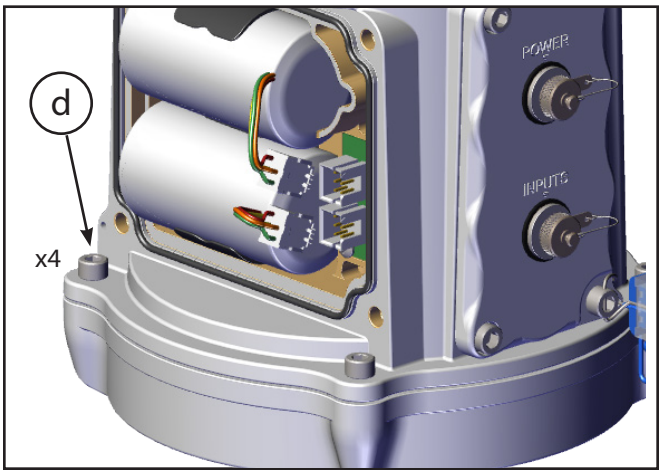


STEP 7: Attach the FlowConnect unit to the base plate

a. Check the O-ring in the base plate. If it is not already there, set the O-ring in the groove in the base plate.
b. Pull the drive cable up a few inches from the drive shaft column and insert it into the drive shaft receptacle at the bottom of the FlowConnect unit.
c. Set the FlowConnect unit down flat on the base plate.

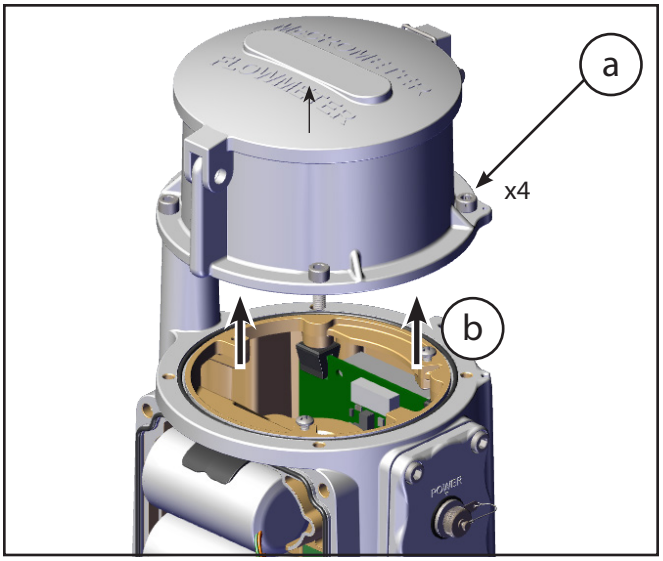
d. Tighten the four screws around the base of FlowConnect unit to secure it to the base plate.





STEP 8: Remove the canopy from the FlowConnect unit

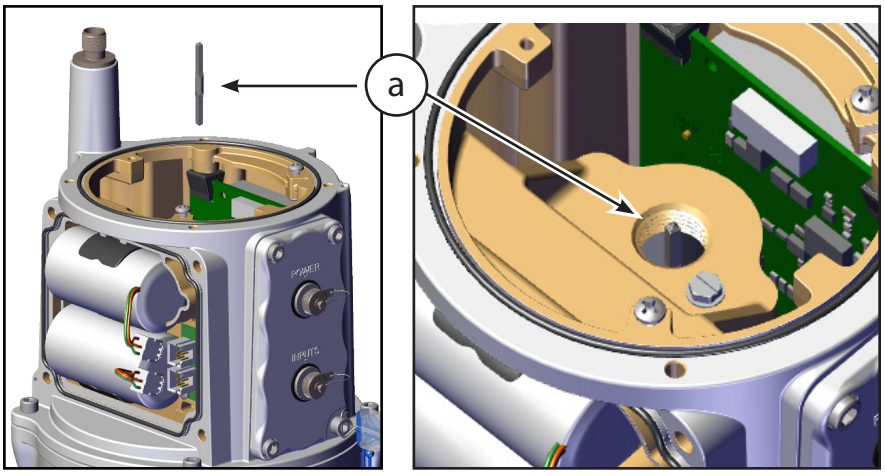
a. Remove the four screws at the bottom of the canopy (TOB002).
b. Lift up and remove the canopy (TOB002).



STEP 9: Insert the drive cable extension

a. Set the drive cable extension in the recepticle inside the FlowConnect unit. You will feel when it is fully in place.

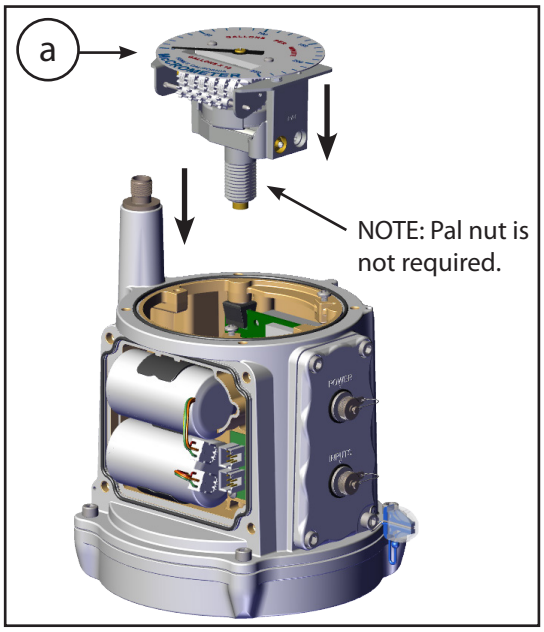
- If there is no water flowing through the pipe, grip the drive cable extension with your fingers and spin it to ensure it engages the propeller. You will feel resistance, but it should spin slowly.
- If there is water flowing, you will see the drive cable extension spin, which will indicate that it is properly in place.

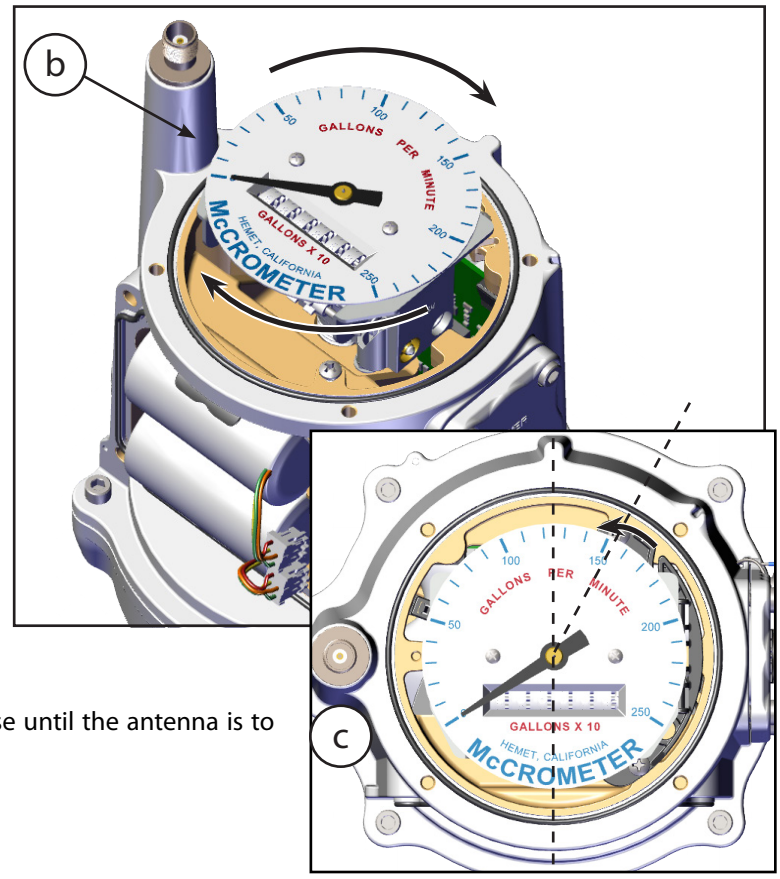


STEP 10: Re-install the mechanical register into the FlowConnect body

a. Insert the mechanical register that you removed in STEP 1 into the FlowConnect unit.

b. Screw in the mechanical register until it bottoms out.



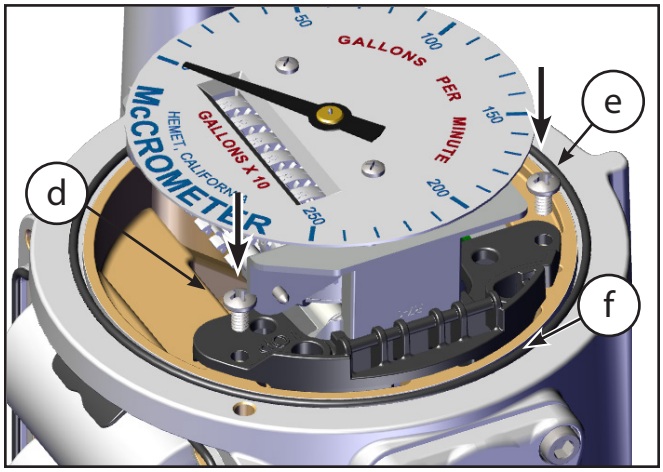


c. Rotate the mechanical register counterclockwise until the antenna is to the left of the dial face.

d. Insert and place the register holder (TOB010) into position opposite the antenna, to the right of the register.

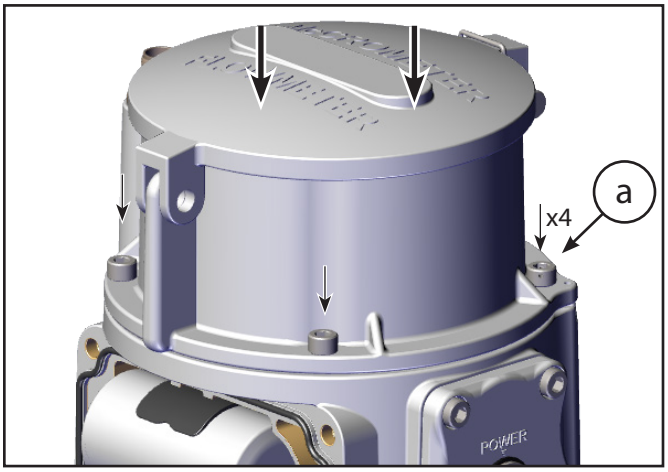
e. Tighten the screws to secure the register fixture and the register to the FlowConnect housing.

f. Ensure that the O-ring is still in its groove.



STEP 11: Re-attach the canopy to the FlowConnect unit

a. Re-attach the canopy (TOB002) to the FlowConnect unit with the original four screws. Note: The screws for the canopy are removable. Make sure the security screw shown below at right is returned to the hole next to the security hole in the chassis.



STEP 12: Attach the antenna

The antenna MUST be attached before the batteries are inserted! Powering up the unit without the antenna may damage the modem!

Attach the cellular antenna or antenna extension by screwing it to the antenna post.

Figure 3. Attaching the cellular antenna

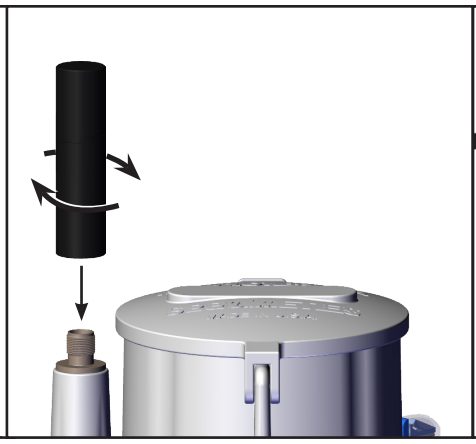


Figure 4. Attaching the satellite antenna

Figure 5. Attaching the antenna extension

STEP 13: Connect the batteries and attach the battery cover

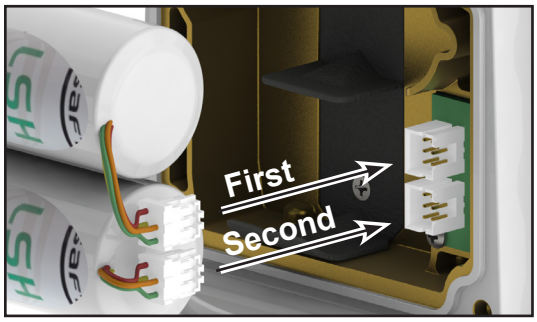


Figure 6. Non-rechargeable batteries

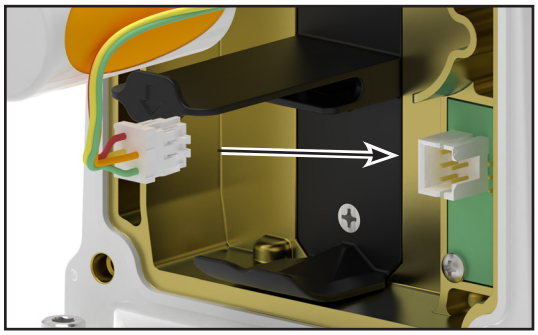
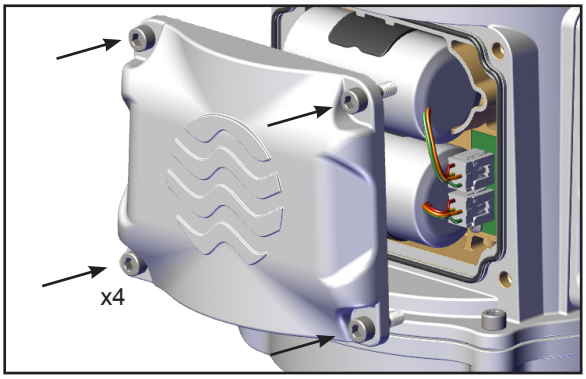


Figure 7. Rechargeable batteries

Non-rechargeable batteries must be connected in the order shown at left. Rechargeable batteries come as a single pack of three with one connector. Ensure the batteries are in place and plug the leads into the connectors in the order shown in Figure 6 and Figure 7.



When replacing the battery cover, make sure the O-ring is set in place flat and even, without any twisting.

Set the cover in position over the battery compartment. It will set easily in place. Tighten the four screws snug and hand tight.

STEP 14: Attach the tamper evident seals

When the retrofit is completed, attach the three tamper evident seals located at the canopy (Figure 8), the base plate (Figure 9) and the battery cover (Figure 10). There are already two other seals on the FlowConnect unit.

Each tamper evident seal is attached through the hole in the security screw and a small hole in the chassis next to the security screw.

a. Thread the wire end through the security hole in the screw and through the hole in the chassis next to the screw.

b. When the wire is fully threaded through, insert the wire through the hole in the center of the blue lock piece, then fold it over the top and down into the center groove.

c. Flatten the wire and snap the clasp over the blue lock piece.

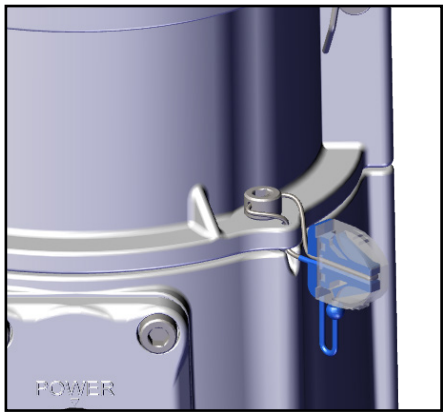


Figure 8. Tamper evident seal on the canopy

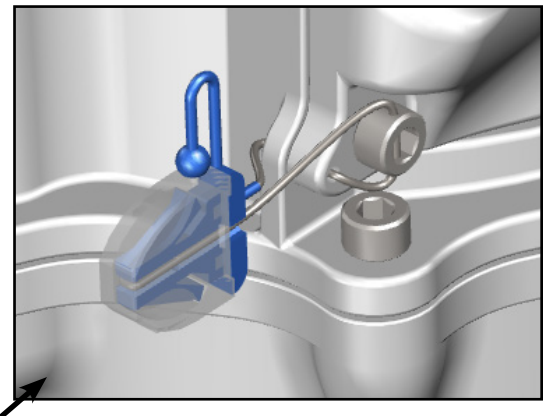


Figure 9. Tamper evident seal on battery cover

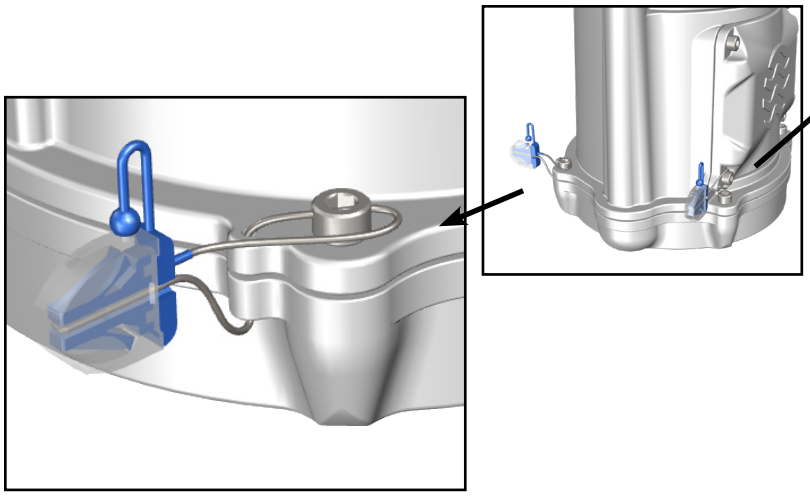


Figure 10. Tamper evident seal on the base plate

2 - Installing Sensors and Solar Panel

The method you use to install a sensor mount will depend on the sensor type and local site conditions. The site location for a pressure sensor, the aerial mast to mount a rain gauge, or the need for cable protection, may vary.

Because each user's requirements and conditions will vary, McCrometer does not require any particular way of mounting or securing the sensor pole. However, we do provide recommended standards for how your sensor mount should be installed. These standards are flexible enough to allow you to install your sensors under most conditions while being able to take into account your local circumstances.

1: Recommended standards

Pole set

You may choose to use the McCrometer pole set, or you may use a pole set more to your preferences.

Pole and aerial height

Height of 5' to 10', elevating an antenna 4' to 5' feet above surrounding obstructions.

Pole diameter

Any pole that is 1.25" to 2" in diameter will work with McCrometer sensors.

Solar panel orientation

If you are installing a solar panel, orient it so that it is facing south in the northern hemisphere.

Securing / anchoring

There are many ways to install and secure an aerial mast for a solar panel, rain gauge, or antenna extension. We recommend installing the mast plumb. The lower part of the mast may be buried or cemented into the ground, or it may be secured to surrounding fixed objects. The installation should be secure enough to withstand the expected environmental conditions (such as strong wind) as well as foot traffic at or near the installation site.

Cable protection

We recommend you consider cable protection for use against animals, foot traffic, or vehicle traffic around the installation site. Common methods include the use of metal or flexible conduit sufficient to accommodate the ½" connectors used on solar panels and sensor cables.

Cable management

It is recommended that you secure sensors or extension cables near any sharp metal edges such as hose clamps.

We also recommend securing cables about every 12" - 18" along the aerial mast.

Additional site protection

Some sites may require additional protection from damage from livestock or vandalism. Fencing, cattle guards, or other measures may be necessary.

2: Installing a solar panel

TOOLS AND MATERIALS

Tools and Materials:

Solar Panel kit (200.733.522 or 200.733.520)
7 mm socket driver
5-pin male to female extension cable

Use a hose clamp and 7 mm socket driver to attach the solar panel to the top of the pole.

Orient the solar panel south so that it gets a maximum amount of light.

Connect the extension cable to the solar panel. When you are finished, the other end of the cable will be plugged into the FlowConnect unit (see next section).

If you are also installing a rain gauge with a solar panel, they should be mounted on the same pole, directly opposite each other (Figure 11).

3: Installing a rain gauge

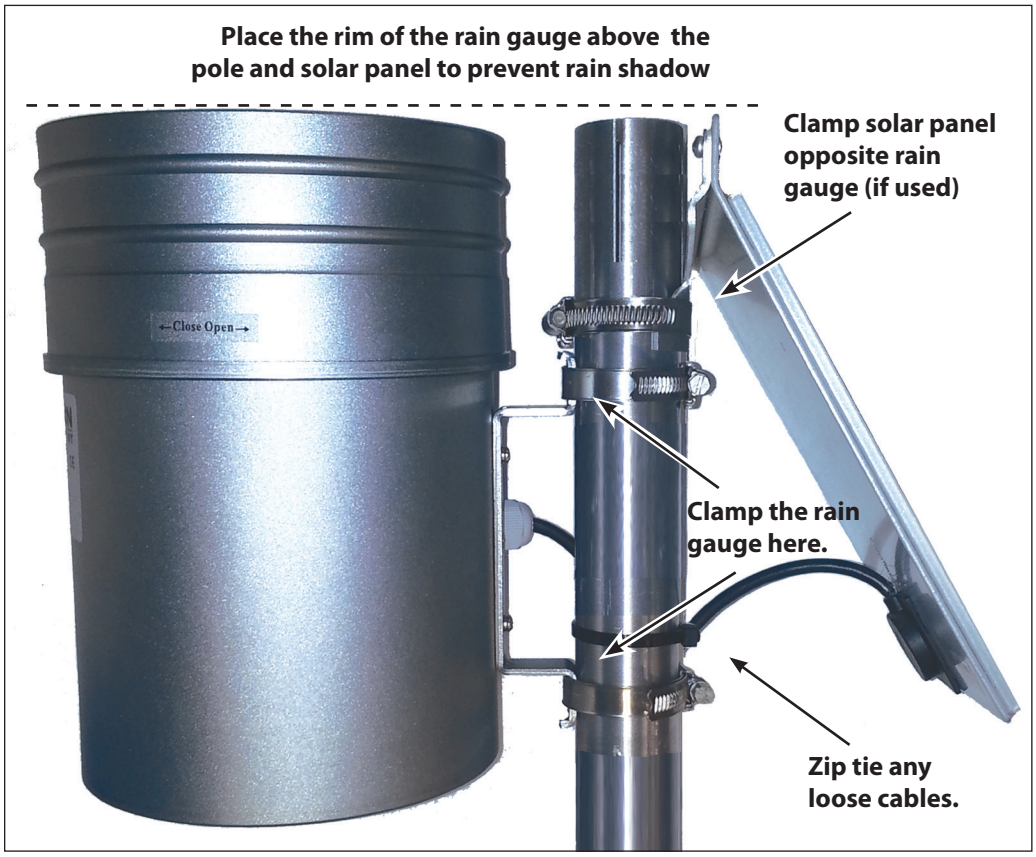
TOOLS AND MATERIALS

Tools and Materials:

Rain Gauge kit, model RG1
7 mm socket driver
7-pin male to female extension cable

Use a 7 mm socket driver and two hose clamps to secure the rain gauge to the top of the pole such that the mouth of the rain gauge is level with the end of the pole (Figure 11).

Connect the extension cable to the rain gauge. When you are finished, the other end of the cable will be plugged into the FlowConnect unit (see next section).



When all sensors have been installed, secure all loose cables with zip ties, especially cables near sharp metal edges such as hose clamps.

Secure cables about every 12" - 18".

Figure 11. Solar panel and rain gauge attached to pole mount

4: Installing a pressure sensor

If you want to install a pressure sensor that can transmit measurement data to the FlowConnect unit, you will need the tools and materials listed at right.

This instruction is for a pipe that has an existing pressure gauge. If your pipe does not already have a location tapped and threaded, that will need to be done first. When completed, follow this instruction from step 2 below.

TOOLS AND MATERIALS

Note: Sensor parts are sold individually or as a bundle. The parts listed below are for sensor and cable bundles.

PA-1 sensor and 10 m cable bundle (500.000.119) or
PA-1 sensor and 5 m cable bundle (500.000.120)
Cable for PA-1 pressure sensor
PA-1 pressure sensor 0-30 bar (200.733.162)
Crescent wrench or adjustable wrench
Channel locks (need to accommodate 3/4" pressure gauge)
Brass or steel wire brush

WARNING!
Never remove a gauge while the line is under pressure!

a. Remove the existing gauge from the pipe.

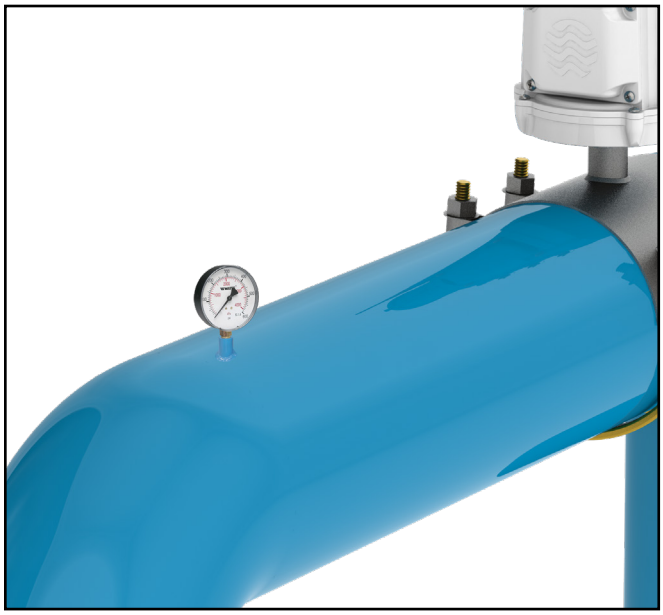
b. Clean the interior pipe threads and remove any debris.

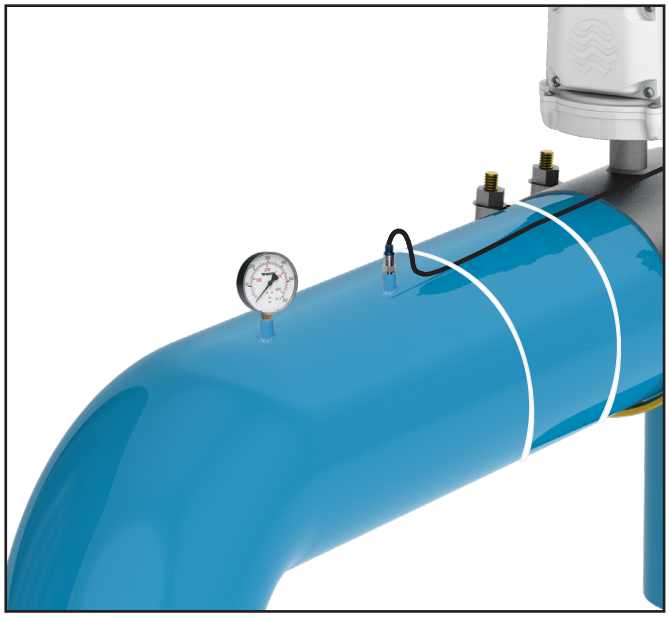
c. Wrap the pipe threads on the pressure sensor with Teflon tape.

d. Screw in the pressure sensor by hand until it is tight, then use the channel locks to fully tighten it.

e. Connect the extension cable to the pressure sensor.

f. Coil and secure any extra sensor cable with zip ties to prevent cable from being damaged or becoming a hazard.





3 - Connecting Inputs and Outputs

IMPORTANT!
Before purchasing any sensors, be sure to confirm that they are compatible with the FlowConnect system.

Figure 12 and Figure 13 below show possible methods of connecting inputs, outputs, and external power to the FlowConnect system. The examples in the figures show a FlowConnect with rechargeable batteries. If your system does not have rechargeable batteries, the connection plate will have only two connectors, Inputs and Outputs.

See the following page for discussion of the Power, Inputs, and Outputs connectors.

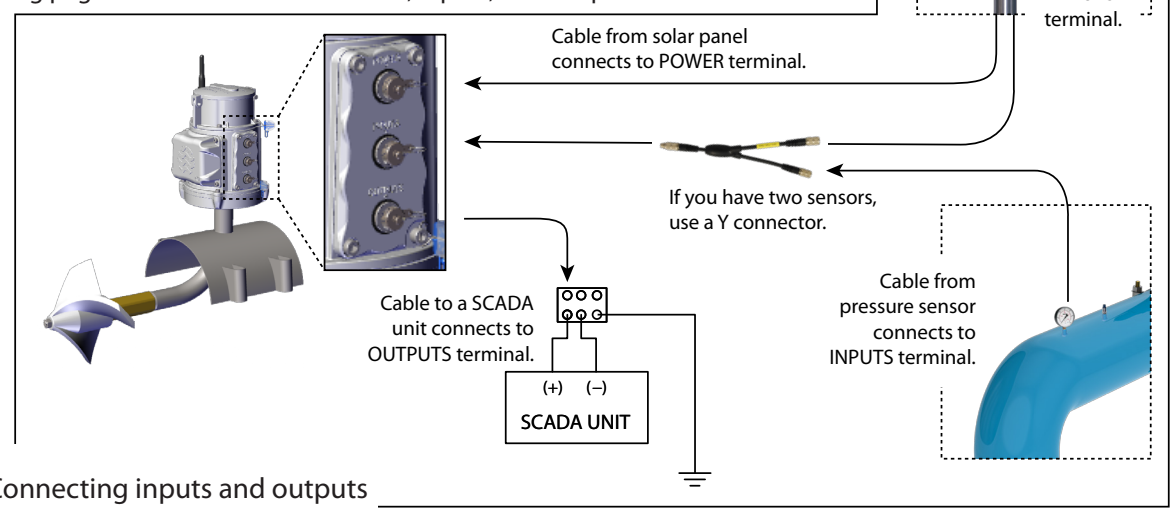
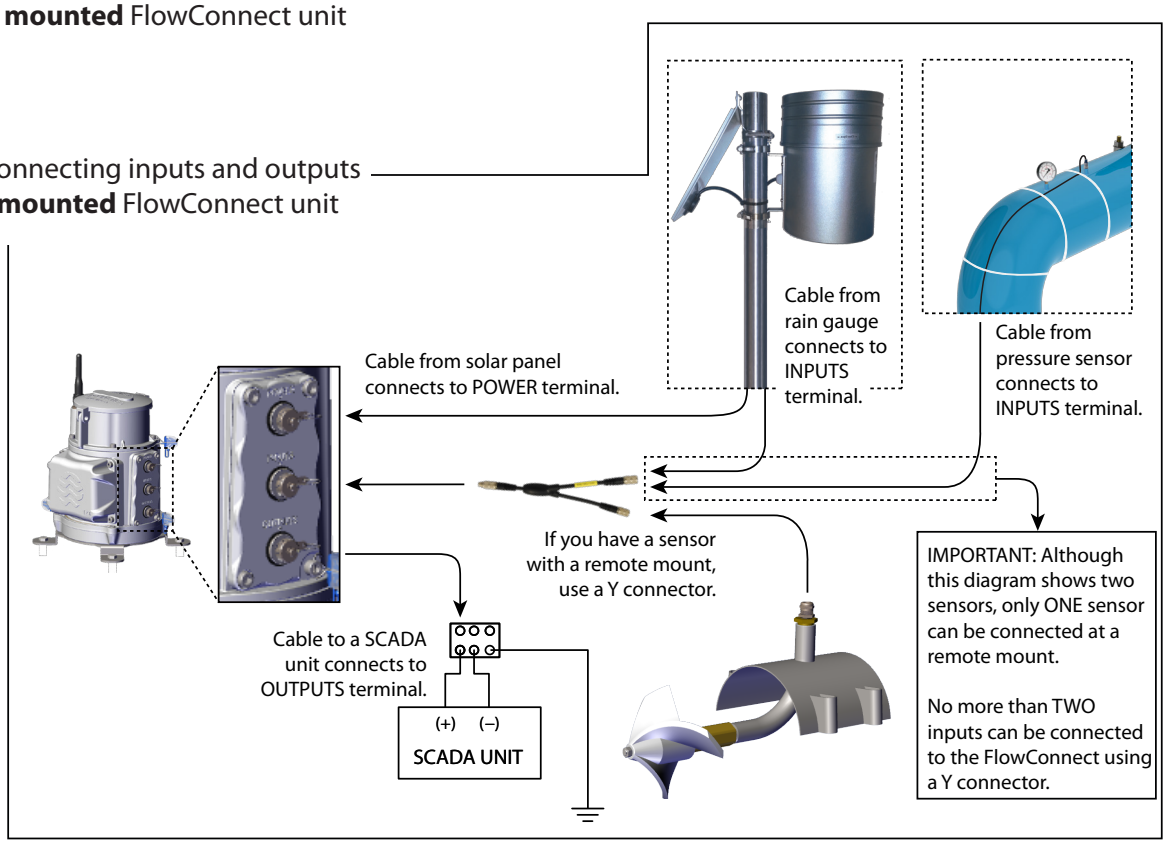


Figure 12. Connecting inputs and outputs to a **meter mounted** FlowConnect unit

Figure 13. Connecting inputs and outputs a **remote mounted** FlowConnect unit



1: Power connector

For models with rechargeable batteries, a solar panel can be connected through the Power connector at the top of the connector plate.

2: Inputs connector

The FlowConnect unit supports up to two analog inputs through the Inputs connector. Inputs are most often sensors, such as a rain gauge or a pressure sensor. The Inputs connector will either be in the middle or at the bottom of the connector plate.

For simple configurations with just one sensor, plug the sensor directly into the Inputs port. To connect more than one sensor to the Inputs port, a Y-Cable (200.720.510) is needed. No more than two sensors can be connected at once, so only one Y-Cable is required.

3: Outputs connector

The Outputs connector is only available on FlowConnect models with a digital register. It provides 4-20mA and pulse output options. To enable the FlowConnect to send a 4-20mA or pulse output to another system, such as a SCADA system, an output cable (5M-025-OE) is required. If you choose to use this option, use the table below as a guide for wire colors:

Output Cable Wire Color:	Grey	Green	Brown	Yellow	White
Open Collector Pulse Only				Pulse (-)	Pulse (+)
Optically Isolated Pulse and 4-20mA	4-20mA (+)	4-20mA (-)		Pulse (-)	Pulse (+)
Relay Pulse and 4-20mA	4-20mA (+)	4-20mA (-)	Normally Closed	Common	Normally Open

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