

# Battery Powered Electromagnetic Flow Meter

## Quick Start Installation Guide

30124-79 Rev. 1.7  
April 20, 2021

### About This Quick Start Guide

This Quick Start Guide is a supplement to the Installation, Operation and Maintenance manual supplied with this meter. It is intended to be a quick reference for the basic installation and reading of the McMag<sup>2000</sup>. For more detailed information concerning the external connections, external power, or pulse output, please refer to the meter manual ([30124-77 McMag<sup>2000</sup> IOM manual](#)) available at [www.mccrometer.com](http://www.mccrometer.com)).



#### **WARNING!**

**Insure that the line is depressurized before beginning installation! Incorrect installation or removal of meters can result in serious injury or death.**

Read the instructions in this guide on the proper procedures carefully.

- Any person installing, inspecting, or maintaining a McCrometer flowmeter should have a working understanding of piping configurations and systems under pressure.
- Before adjusting or removing any meter, be certain the system has depressurized completely.
- Be careful when lifting meters. Meters can cause serious injury if lifted incorrectly or dropped.

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## General Installation Considerations

Proper meter installation is the first step to ensure excellent meter performance. Follow these instructions closely. Consult an authorized service representative or the Factory for any circumstances encountered which are not covered in this guide.

All McCrometer products are tested and inspected during manufacture and prior to shipping. An inspection should be performed at the time of unpacking to detect any damage that might have occurred during shipment.

- All magnetic flow meters are calibrated for a full pipeline only; if less, the flowmeter will over-measure the flow.
- Although a minimum line pressure is not necessary for an accurate measurement, a full pipe is necessary.
- With the meter installed, check the rate-of-flow indicator. It should be stable to the point that it can be easily read. Some indicator movement is normal due to variations in flow. Erratic movement of the indicator is normally caused by flow variations and the system should be checked. Drastic variations in flow can decrease meter accuracy. If you suspect a problem with the meter, please contact your local McCrometer representative.

## Flow Direction

It is very important to install the flow meter relative to the flow of the water. The sensor must face the flow direction in order for it to make proper measurements. (Figure 1)

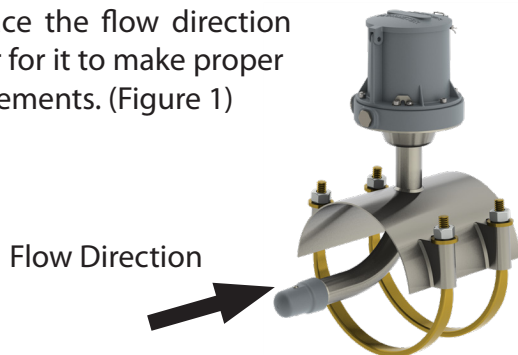


Figure 1. Flow Direction

## Pipe Run Requirements

Flow meters are velocity sensing devices and are vulnerable to certain upstream disturbances. Because of this, meters need certain lengths of straight pipe before and after the meter. These distances relate to the diameter of the pipe used. Obstructions can include elbows, valves, pumps, and changes in pipe diameter. The uneven flow created by these obstructions can vary with each system.

Both upstream and downstream distances are measured from the center of the saddle as shown below. In a typical installation to achieve  $\pm 2\%$  accuracy the McMag<sup>2000</sup> flow meter should be installed a minimum of five diameters upstream from most flow disturbers and two diameters downstream of the meter, or when used with a flow straightener, 1.5 diameters upstream and 1 diameter downstream. (Figure 2)

Configuration	A	B
With or without straightening vanes	5	2
With flow straightener	1.5	1

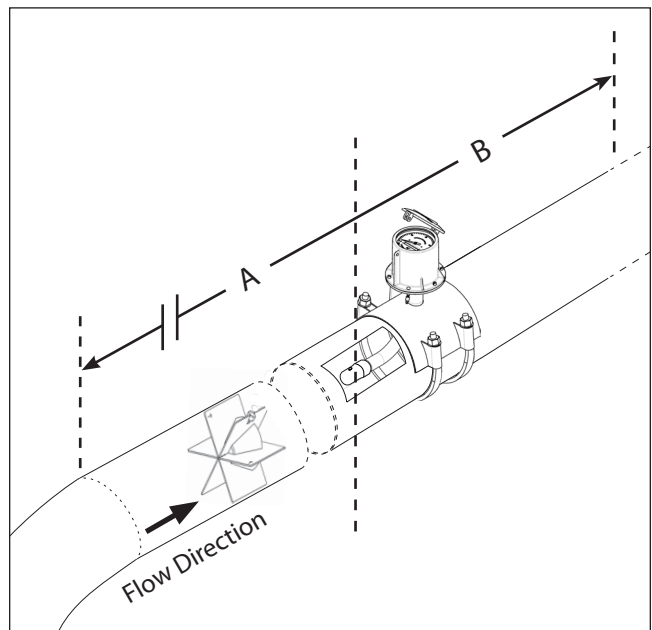


Figure 2. Pipe Run Requirements

## Basic Installation Steps

The McMag<sup>2000</sup> is a saddle type meter. It may be installed directly onto an existing pipe. Follow these steps for a new flow meter installation.

1. Cut or hole-saw a round hole minimum 3" in diameter in the pipe and remove all burrs, slag, and rough edges from the inside and outside of the cutout section.
2. Loosen and remove the nuts and washers from the straps. Remove the straps from the saddle.
3. Apply lubrication to the gasket and inner diameter of U-bolts with MolyKote lubricant or equivalent.
4. Place saddle with gasket in place over the cut out.
5. Place U-bolts underneath the pipe and through the saddle clips.
6. Place the provided washers and nuts on the U-bolts that have been installed through the saddle clips.
7. Start tightening down the nuts evenly in a figure 8 pattern.
  - 7a. Tighten the nuts to **40 ft. lbs.** evenly using a figure 8 pattern.
  - 7b. Tighten the nuts to **60 ft. lbs.** evenly using a figure 8 pattern.
  - 7c. Tighten the nuts to **80 ft. lbs.** evenly using a figure 8 pattern.
8. Go back around and loosen all of the nuts. Do not back the nuts completely off of the U-bolts. The goal is to release force and tension off of the saddle and the gasket.
9. Repeat steps 7a through 7c exactly as described. Any step that is skipped may result in an improper seal.
10. Apply pressure/turn on pump.
11. Verify the saddle is not leaking water. If it is, repeat steps 5 through 7 until the saddle has sealed.

### NOTE

The McMag<sup>2000</sup> should not be connected to any earth ground. Connecting to an earth ground may adversely affect meter performance.

## Replacing an Existing Saddle Meter

The McMag<sup>2000</sup> has been designed for easy replacement in the field for Mc Propeller flow meters. When the existing saddle meter has been removed, follow the basic installation instructions above. The replacement flow meter will be fully assembled and ready to install.

### NOTE

The McMag<sup>2000</sup> can be used to replace existing 4" to 16" Mc Propeller saddle meters. The meter CANNOT be used to replace a Water Specialties bolt on saddle meter.

## Installing a Flow Straightener or Straightening Vanes

McMag2000 can be used with a flow straightener or straightening. Installation instructions can be found in a separate document, [30125-39, Flow Straightener Installation](#), which can be found on the McCrometer Web site.

After installation, the converter must be configured for use with one of three types of flow straighteners. See "Converter Configuration" for configuration.

## Mc Propeller-to-McMag<sup>2000</sup> Conversion Kit

Check the parts received against the parts list at right and Figure 3. Contact the factory to report any discrepancies.

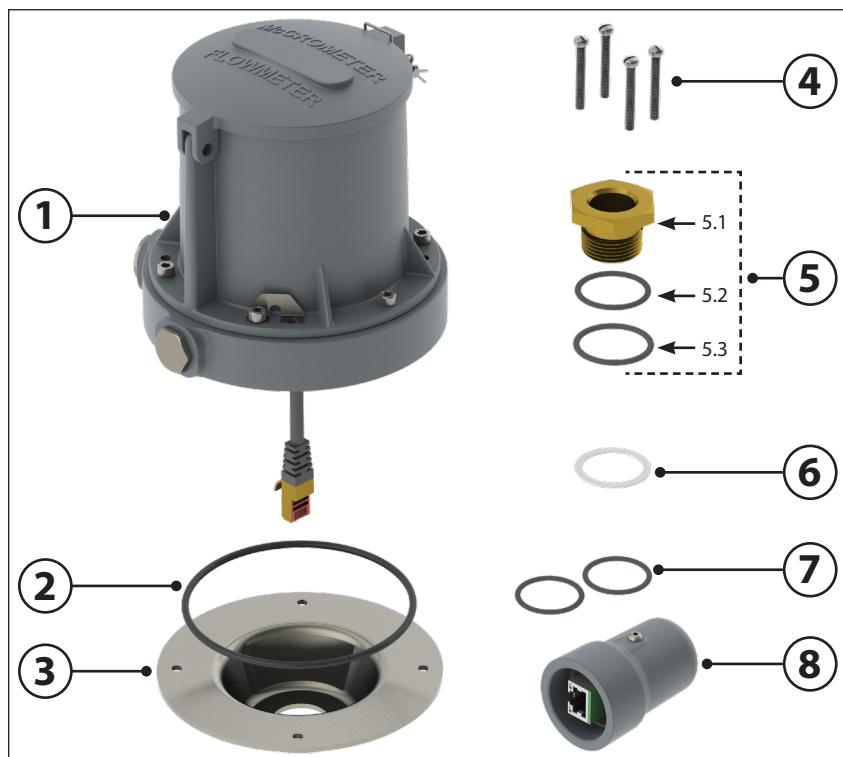


Figure 3. Conversion Kit

Item #	Description	Part #
1	Converter Unit	G2-CONV
2	O-Ring (243 Buna)	1-1551-38
3	Base Plate	R0138-10
4	Screw 10-32 x 1.25" Long	10730
5	<b>Bushing and O-Ring Assembly</b>	
5.1	Bushing	R0155-00
5.2	O-Ring (021 Buna)	10273
5.3	O-Ring (121 Buna)	10274
6	Gasket	10023-00
7	O-Ring (024 Buna)	10110-10
8	Sensor	EA540-00



### IMPORTANT

During the retrofit procedure, make sure you insert all four screws when attaching the converter unit to the base plate. The converter will not be grounded if the grounding jumper is not connected with both screws. (See exploded view in Figure 3 and Figure 4.)

## Retrofitting an Existing Mc Propeller Flow Meter

Mc Propeller 4" to 16" saddle flow meters can be retrofit to a McMag<sup>2000</sup> flow meter. When the existing saddle meter has been removed, follow the instructions below for converting and reinstalling the flow meter.

The McMag<sup>2000</sup> flow meter reuses the saddle and U bolts from an existing flow meter. The converter, canopy, base plate, propeller, and bearing housing are not used. You may wish to keep these components as replacement parts for other propeller flow meters you have.

## Converting the flow meter

Refer to Figure 3 and Figure 4 for the conversion procedure.

1. Remove the flow meter that will be converted to an McMag<sup>2000</sup>.
2. Remove all parts from the saddle. Keep the saddle and the U bolts. All other parts will not be used.
3. Connect the base plate (#3) to the saddle with the bushing, two O-rings, and gasket (items #5, 6, 7).
4. Place the O-ring (#2) on top of the base plate (#3) and feed the end of the converter cable through the ell.
5. Plug the cable into the sensor (#8).



### IMPORTANT

Be careful when starting the threads not to cross-thread.

Hand-tighten only. Do not overtighten the sensor onto the ell! This may damage the sensor and the sealing surface.



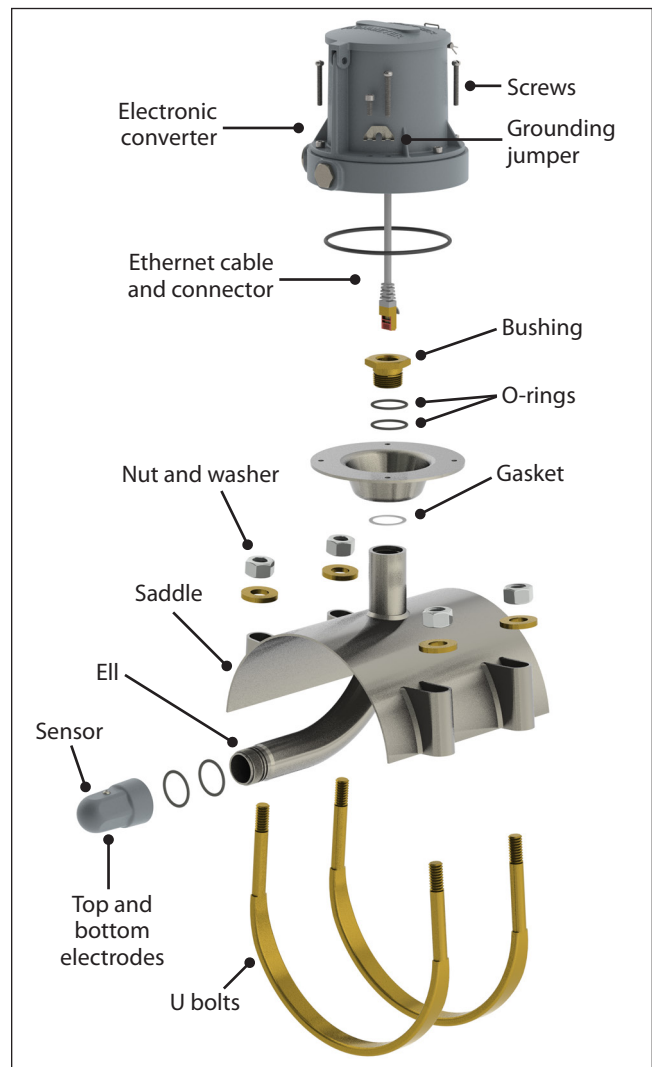
### IMPORTANT

**Do not skip the next step! This must be done to prevent damage to the Ethernet cable.**

6. Twist the sensor counter-clockwise 4-5 times and then screw the sensor onto the ell.
7. Twist any excess length of cable into the cup section of the base plate and secure it with screws (#4), ensuring the O-ring is properly seated in the groove in the bottom of the converter.
8. Install the saddle as described above.

## Re-inserting the flow meter

9. Loosen and remove the nuts and washers from the straps. Remove the straps from the saddle.
10. Apply lubrication to the gasket and inner diameter of U-bolts with MolyKote lubricant or equivalent.
11. Place saddle with gasket in place over the cut out.



**Figure 4. McMag<sup>2000</sup> assembly**

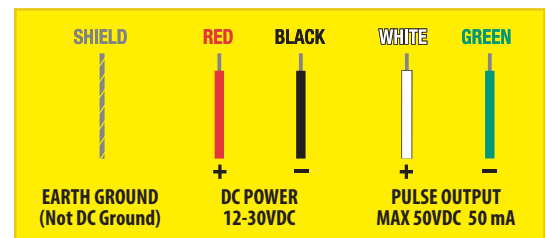
12. Place U-bolts underneath the pipe and through the saddle clips.
13. Place the provided washers and nuts on the U-bolts that have been installed through the saddle clips.
14. Start tightening down the nuts evenly in a figure 8 pattern.
  - 14a. Tighten the nuts to **40 ft. lbs.** evenly using a figure 8 pattern.
  - 14b. Tighten the nuts to **60 ft. lbs.** evenly using a figure 8 pattern.
  - 14c. Tighten the nuts to **80 ft. lbs.** evenly using a figure 8 pattern.
15. Go back around and loosen all of the nuts. Do not back the nuts completely off of the U-bolts. The goal is to release force and tension off of the saddle and the gasket.
16. Repeat steps 14a through 14c exactly as described. Any step that is skipped may result in an improper seal.
17. Apply pressure/turn on pump.
18. Verify the saddle is not leaking water. If it is, repeat steps 15 through 17 until the saddle has sealed.

## Converter Wiring and Grounding

Refer to the wiring diagram at right (Figure 5) for proper connection.

This is required for installations with DC power input and pulse output, and applies to both new installations and retrofits.

Converters with optional DC power input and/or pulse output will have an open-ended cable ready for connection to your system.



**Figure 5. Wiring diagram**

### NOTE

*The bare shield wire on the cable should always be connected to earth ground.  
The converter housing should NOT be connected to an earth ground.*

## Operation

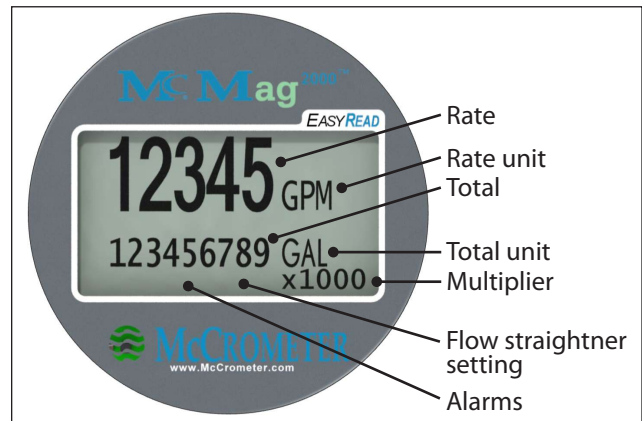
The McMag<sup>2000</sup> comes pre-configured from the Factory based on the installation parameters provided to McCrometer at the time of order. Other than activating the display, there is nothing required of the user for the basic operation of the flow meter.

## Converter Display

The display is activated when the lid is opened. (Figure 6) The display will remain active for 30 seconds. The screen will automatically deactivate after 60 seconds. See Figure 7 below for display descriptions and symbols.



**Figure 6. Lift lid to activate the display**



**Figure 7. Interface Screen**

### NOTE

To save battery life, always close the lid after reading the display. If the lid is kept open, the display will remain on, reducing battery life. If the lid is lost, contact the factory immediately for a replacement.

### NOTE

The McMag2000 converter display is light activated and requires a minimum amount of light to appear. Environments where light is low, such as in dimly lit buildings or outdoors after sundown may prevent the display from appearing when the lid is raised. There is an optical sensor embedded in the display located under the McCrometer "swirl" logo at the lower left. If the display does not appear, a flashlight will provide sufficient light to bring it up.

## Converter Configuration

The converter can be programmed to customize how the data is measured and stored. The configuration tool runs only on Windows 7, 8, or 10 and requires a computer with a USB port. You must have your flow meter's serial number before you begin.

### Software Installation and Configuration

1. Remove the nut that protects the USB port from the base of the converter and plug in a mini-USB cable. (Figure 8) Connect the other end to a laptop computer.
2. Install the software. Follow all instructions during installation.
3. Start the software and when the main interface appears, follow the instructions shown before setting up your customized configuration. (Figure 9)
4. When you have set up your configuration file, you can change the settings listed below. Using the configuration tool is mostly self-explanatory.
  - Flow rate unit of measure
  - Totalizer unit of measure
  - Multiplier
  - Pulse enable: 1 pulse per x per unit of measure
  - Pipe ID
  - Totalizer preset
  - Enable with flow straightener / type of straightener
5. If you have a flow straightener, click the "vanes upstream" selection and enter the password. You can select one of the three types:
  - FS** FS100 or FS200 flow straightener
  - TRI** Tri-vane bolt-in straightener
  - HEX** Six-vane straightener (often used with flanged pipes)



Figure 8. Plug in mini-USB cable

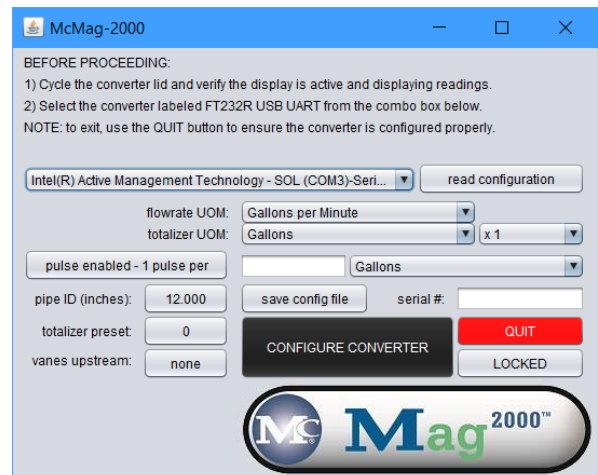


Figure 9. Configuration tool interface