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 Dura Mag. For more detailed information concerning the external connections, external power, pulse output, or data logger, please refer to the meter manual (30122-53 Dura Mag IOM manual) or the data logger manual (30121-87 McLogger IOM) downloadable from www.mccrometer.com).

WARNING!
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.
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 flowmeters are calibrated for a full pipeline only; if less, the flowmeter will over register 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.

Pipe Run Requirements

The meter needs to be located a minimum distance before and after flow disturbances, such as elbows, pumps, partially opened valves, and changes in pipe diameter. The uneven flow created by these obstructions can vary with each system.

The minimum distance is measured in pipe diameters (D). To ensure accuracy locate the sensor upstream and downstream of flow disturbances as shown in the table below.

<table>
<thead>
<tr>
<th>Meter size</th>
<th>Upstream</th>
<th>Downstream</th>
</tr>
</thead>
<tbody>
<tr>
<td>2” &amp; 3”</td>
<td>3D</td>
<td>1D</td>
</tr>
<tr>
<td>4” and above</td>
<td>2D</td>
<td>1D</td>
</tr>
</tbody>
</table>

Flow direction

Upstream distance

Downstream distance

Measured from the end of the flange
Flow Direction
It is very important to install the flow meter relative to the flow of the water. There is a sticker on the Dura Mag that indicates the direction of flow.

Sensor Position and Location

Pipe Diameters
For proper accuracies any 90 or 45 degree elbows, valves, partially opened valves etc. should be placed not closer than two pipe diameters upstream and one pipe diameter downstream.

Flow Direction
It is very important to install the flow meter relative to the flow of the water. There is a sticker on the Dura Mag that indicates the direction of flow.

Sensor Orientation

The following installation recommendations should be followed (see figures below):

Horizontal installation
In horizontal pipe runs, the meter should be installed so that the junction box is vertical ensuring the electrodes are positioned to prevent coating by sediments or loss of electrode contact due to air bubbles.

Vertical installation
In vertical pipe runs, the flow should be upward. In slurry application, a vertical position ensures optimal distribution of solids under all flow conditions.

Less than full pipes
In pipes which may encounter less than a full pipe of fluid, the meter must be positioned in a trap to ensure that the sensor is always completely filled with liquid.

McCROMETER
Grounding

Information For Grounding Ring Installations

All Dura Mag flow meter installations require minimum grounding with a 12-gauge ground wire to an earth ground. The preferred method of installation is connecting the Dura Mag to its own isolated grounding rod. Installation must conform to NEC requirements. Flanges on the Dura Mag sensor have a non-conductive coating and may not require grounding rings. When installing into a PVC or plastic pipe system, grounding rings are recommended for all sizes.

See the Dura Mag IOM Manual, Lit. # 30122-53, for more information on grounding using grounding rods and grounding rings.

1. **Sensor grounding for meters with minimal ground noise**

Attach the provided 12 gauge wire, or equivalent, to the sensor ground lug. Then connect this sensor ground lug to an earth ground point.

2. **Sensor grounding for meters in an electrically noisy environment**

If there is electrical noise in the fluid column or electrical current in the pipe, it can be minimized or eliminated using grounding rings or by grounding the pipeline.

   a. **Conductive uncoated pipe**

   Attach the provided 12 gauge wire, or equivalent, to the ground lug. Then connect the sensor ground lug to an earth ground point. Next, connect the two mating pipe sections with a 12 gauge wire or equivalent and connect them both to the earth ground. The Dura Mag should be electrically isolated from the pipeline.
b. Non-conductive or internally coated pipe

When pipes are non-conductive, such as PVC or internally coated pipe, you must substitute direct grounding with grounding rings.

Attach the provided 12 gauge wire or equivalent to the sensor ground lug. Then connect this sensor ground lug to an earth ground point; refer to NEC or local grounding regulations for wiring requirements in making this connection.

Next, connect the two mating grounding rings with a 12 gauge wire or equivalent, attached to the grounding ring lugs, and connect them both to the earth ground. The Dura Mag should be electrically isolated from the pipeline.

**Activating The Display**

For the purpose of conserving power the display remains blank until activated. To activate the screen, press and hold the activation button for two seconds and then let it go. The screen will automatically deactivate after 60 seconds.

**CAUTION**

If the lid is left up, propped up or broken off, display could be damaged by sun exposure. If the lid is broken off, contact the Factory for a lid replacement kit. In the meantime, set the lid on the meter in its proper position and use the boot to hold it in place.
Operation

The Dura Mag 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 Boot

The Dura Mag comes with a boot to help protect the meter. The boot simply slips over the electronics enclosure. When installing the boot, ensure the corners of the boot fit snugly over the lip of the enclosure.

To remove the boot, grip two corners and pull them away from the lip of the enclosure and then pull upwards.

Display Descriptions

Upon activating the display, the Dura Mag automatically cycles through four display screens.

a. Active alarms

The first screen display shows any active alarms. In the sample below, there is one alarm active for an empty pipe.

b. Battery life

The second screen display shows the battery life remaining for both battery packs and the flow totalizer. In the sample below, both battery packs are at 99% and total flow is 500 kilogallons.

c. Flow rate and totalizer

The third screen display shows the flow rate and the flow totalizer. In the sample below, flow rate is 15 gallons per minute and total flow is 500 kilogallons.

d. Flow rate and percent of full scale

The fourth screen display shows the flow rate and percent of full scale. In the sample below, the flow rate is 15 gallons per minute and the meter is running at 80% of full scale.

NOTE

It is HIGHLY recommended that the boot be utilized at all times when the meter is not being read. The boot adds protection to the meter and ensures proper closure of the lid, ensuring the maximum battery life.