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**STEP 1: VERIFY FLOW METER SERIAL NUMBERS**

Verify the system serial numbers on both the sensor and converter match to ensure a properly calibrated system. The Meter Serial Number is located on the side of the sensor body on a silver label.

The tag on the side of the converter has the converter model number, the converter serial number and the meter serial number.

**TOOLS**

**Tools Provided:**
- Two - 9/16” or 3/4” reversible ratchet wrenches. (Size is dependent on the size of the retaining rods supplied with the sensor and determined at the time of order.)
- One - Pipe wrench capable of a 4” span
- One - 7/16” wrench or crescent wrench
- One - Sensor Insertion Tool (3/8” or 1/2”)

**NOTE:** It is recommended that the Sensor Insertion Tool be used for easier and faster installation. See STEP 12.

**Tools recommended for installation:**
- One - Pipe wrench capable of a 4” span
- One - 7/16” wrench or crescent wrench
- One - Sensor Insertion Tool (3/8” or 1/2”)

**SAFETY WARNINGS**

**WARNING:** Incorrect installation or removal of FPI Mag meters can result in serious injury or death. Read the instructions and the safety warnings in the supplied manual carefully before installation. This guide is not intended as a substitute for reading the manual.

**CONTENTs**

1 - FPI Mag Sensor
2 - Long threaded retaining rods
3 - Short threaded retaining rods
1 - Converter
2 - Calibration Certificate
1 - FPI Mag Installation, Operation and Maintenance Manual
1 - Converter Installation, Operation and Maintenance Manual
2 - 9/16” or 3/4” reversible ratchet wrenches
1 - Pipe thread sealant
8 - Hex nuts (3/8” or 1/2”)
4 - Locking cotter pins
2 - Sensor and power cables with Quick-Connect
1 - Brass ball valve & SS nipple
2 - Protective caps for retaining rods

**STEP 2: DETACH THE CABLE QUICK CONNECTS**

The meter cables are fitted with IP68 rated Quick-Connect fittings at the sensor connection. Detach the cable prior to sensor installation. IMPORTANT: When the cables are not attached to the sensor, connect the end caps to the sensor and cable connections to keep them free of dirt and corrosion. When the cables are attached to the sensor, connect the end caps together.

**STEP 12: SENSOR GROUNDING**

FPI Mag meter is electrically continuous to a conductive (non-PVC) pipe through the retaining rods. Additional grounding may be required to a dedicated earth ground via ring terminal and 10 AWG wire (not provided). 

VFD’s and chemical injection mechanisms may have adverse effects on the electromagnetic signal. Contact the factory for further information on grounding effects.

**STEP 11: CONVERTER TERMINAL BOARD CONNECTIONS**

Not Applicable to HART or Profibus Options - For HART or Profibus Configurations, see Converter IOM (LIT# 30120-46)

All electrical cables enter the converter through compression fittings located on the side of the converter. Ensure that all compression glands are properly tightened and all unused fittings are plugged so the case remains sealed.

All connections are made on the terminal board. To access the terminal board, loosen the four screws on the front of the converter and lift the converter open.

#### CONTACT INFORMATION

**www.mccrometer.com**

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**STEP 3: SENSOR INSTALLATION LOCATION**

This Quick Start Guide is designed to provide installation instructions when the location of the sensor installation has been predetermed. If not, see the FPI Mag Installation, Operation and Maintenance manual (Lit. No. 30120-48), Section 2.0 Installation, STEP 3 - Verify Sensor Installation Location - Upstream And Downstream Straight Pipe Runs.

**STEP 4: SENSOR CLEARANCE**

The sensor will protrude from the pipe during installation and when installed requiring sufficient clearance from any obstruction.

<table>
<thead>
<tr>
<th>Line size (inches)</th>
<th>Distance H</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot;</td>
<td>24&quot;</td>
</tr>
<tr>
<td>3&quot;</td>
<td>30&quot;</td>
</tr>
<tr>
<td>4&quot;</td>
<td>36&quot;</td>
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<td>5&quot;</td>
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<td>60&quot;</td>
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<tr>
<td>9&quot;</td>
<td>66&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td>72&quot;</td>
</tr>
<tr>
<td>11&quot;</td>
<td>78&quot;</td>
</tr>
</tbody>
</table>

**STEP 5: PIPE VALVE INSTALLATION**

**WARNING:** Pressurized pipes should only be hot tapped, cut, or drilled by qualified personnel using high quality saddles, valves and stainless steel nipples. If possible, depressurize the pipe before attempting any installation.

The sensor comes standard with a 2” Stainless Steel ball valve and a 2” x close stainless steel nipple. The 2” x close stainless steel nipple is to be used if the installation site has a female fitting, i.e., a welded coupling. If the installation site has a male fitting, i.e., a 2” nipple, then the supplied 2” x close stainless steel nipple is not required for the sensor installation. Use the supplied pipe sealant or Teflon thread tape when installing the valve onto the pipe.

**STEP 6: OPTIONAL COMPRESSION SEAL DISASSEMBLY FOR INSTALLATION**

The sensor assembly can be installed onto the pipe valve as a whole unit. On larger pipe size installations this can be cumbersome or impractical. In such cases, the compression seal assembly can be removed from the sensor for easier installation onto the pipe valve. Once the compression seal assembly is installed onto the pipe valve, then the sensor can be re-installed into the compression seal assembly.

**NOTE:** If this step is skipped, proceed to STEP 8.

1. Loosen, but do not remove, the bolts and nuts on the compression seal relieving the pressure on the compression seal assembly.
2. On the compression seal assembly, remove the locking cotter pins from the bottom of the two retaining rods under the 3/8” or 1/2” nuts.
3. Remove the 3/8” or 1/2” nuts from the retaining rods.
4. Slide the sensor out of the compression seal. The retaining rods will also slide out of the compression seal assembly. Carefully set the sensor and attached hardware to the side.

At this point the compression seal assembly can be installed onto the valve.

**STEP 7: SENSOR INSTALLATION INTO PIPE VALVE**

The sensor assembly uses a compression seal, which keeps the sensor watertight when the pipe is under pressure. Care must be taken when installing the sensor to avoid leaks:

1. Visually inspect all elements of the installation to ensure they are structurally sound and of high quality materials, including all welds, couplings and nipples.
2. Put a generous amount of the supplied pipe sealant on the compression seal threads. Teflon tape may also be used. **NOTE:** If pipe sealant gets on the sensor electrodes the velocity signal may be lost.
3. Place the compression seal threads over the pipe valve. Turn the entire sensor assembly clockwise to secure the assembly to the valve. The seal is secure when a large amount of force is required to turn the assembly. Line up the arrow on the top plate with the direction of the flow. The sides of the bottom plate should be parallel with the pipe.

**STEP 8: SENSOR RE-ASSEMBLY AFTER OPTIONAL COMPRESSION SEAL ASSEMBLY INSTALLATION**

**IMPORTANT:** Use this step if you removed the compression seal assembly (STEP 6) and installed it onto the pipe valve after it was cleaned and assembled. This will act as a lubricant to facilitate the insertion of the sensor and ensure its proper axial loading.

<table>
<thead>
<tr>
<th>Sensor Load</th>
<th>Sensor Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>78&quot;-138&quot;</td>
<td>100 lb.</td>
</tr>
<tr>
<td>72&quot;-78&quot;</td>
<td>70 lb.</td>
</tr>
<tr>
<td>66&quot;-72&quot;</td>
<td>50 lb.</td>
</tr>
<tr>
<td>63&quot;-66&quot;</td>
<td>40 lb.</td>
</tr>
</tbody>
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**STEP 9: INSERTING THE SENSOR**

**NOTE:** If the short retaining rods are not used, run a 3/8” or 1/2” nut down against each captive nut to prevent the captive nut from rotating.

A load is now applied at the top of the sensor forcing the bottom of the sensor to seat against the far wall of the pipe. The amount of load is indicated by the three lines and set screw at the top of the sensor. The bottom line indicates a 300 lb. load.

Recommended sensor loads are 300 lbs. or less for low pressure plastic pipes and 450 lbs. for low pressure metal pipes. For applications other than low pressure sensor load should be increased. Follow the instructions below until the set screw is between the top and middle lines. Consult factory for the appropriate loading for your application.

If the meter was disassembled to assist in the installation of the compression seal assembly on to the valve it is important to ensure that the meter is properly reassembled with both retaining rods completely installed with the 3/8” or 1/2” nuts properly tightened.

Ensure the two compression seal bolts are hand tightened. Barely crack open the valve and tighten compression seal bolts as required to minimize leaks. A towel draped around the compression seal can reduce spray if necessary.

Open the valve completely. Failure to open the valve completely will cause the valve to scrape the sensor during insertion and may result in permanent damage to the sensor.

Insert the sensor into the pipe by simultaneously rotating the two captive nuts on the top plate clockwise until the foot of the sensor reaches the far wall of the pipe and the load spring is compressed. It is recommended that the Sensor Insertion Tool be used to rotate the captive nuts to ensure the top plate compresses evenly.

**NOTE:** If the short retaining rods are not used, run a 3/8” or 1/2” nut down against each captive nut to prevent the captive nut from rotating.

**WARNING:** The compression seal/sensor assembly may be under pressure. Serious injury may result if proper procedures are not followed. Do not attempt to install the sensor without the retaining rods fully assembled.

**IMPORTANT:** The minimum port inside diameter for all installation valves is 1-7/8” (44mm).

**STEP 10: INSTALLING THE SHORT RETAINING RODS**

After the sensor has been inserted and the load adjusted, shorter retaining rods can be installed and the longer ones removed. This will make the sensor more compact.

1. Install the two short retaining rods through the two holes in the top plate opposite the two captive nuts with the long retaining rods. Once the short retaining rods are passed through the top plate, thread one nut per rod onto the bottom of the rod about one inch.
2. Insert the two short rod ends through the corresponding holes on the compression seal bottom plate. Thread a nut onto the bottom of each short retaining rod.
3. Tighten the nuts above and below the compression seal bottom plate to secure the short retaining rods to the bottom plate.
4. Attach the locking cotter pins to each end of the short retaining rods.
5. Secure the short retaining rods to the top plate with one 3/8” or 1/2” nut per rod.
6. Remove the long retaining rods.
7. Check and adjust the “Sensor Load” as indicated in Step 9.
8. Secure the 3/8” or 1/2” nuts on the top plate by running a second jam nut down and tightening it against the first nut.
9. Attach a locking cotter pin to the top ends of the short retaining rods.
10. Place the protective caps on the ends of the two retaining rods over the cotter pins.