FMG900 SERIES
Insertion Magnetic Flow Meter
<table>
<thead>
<tr>
<th>OMEGAnet® Online Service</th>
<th>Internet e-mail</th>
</tr>
</thead>
<tbody>
<tr>
<td>omega.com</td>
<td><a href="mailto:info@omega.com">info@omega.com</a></td>
</tr>
</tbody>
</table>

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It is the policy of OMEGA Engineering, Inc. to comply with all worldwide safety and EMC/EMI regulations that apply. OMEGA is constantly pursuing certification of its products to the European New Approach Directives. OMEGA will add the CE mark to every appropriate device upon certification.

The information contained in this document is believed to be correct, but OMEGA accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.

**WARNING:** These products are not designed for use in, and should not be used for, human applications.
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The complete lack of moving parts of the FMG900 Series insertion flow sensor is the source of its reliability. Brass and stainless steel models withstand a variety of temperature, pressure, and chemical conditions. The FMG900 Series has no rotor to stop turning in dirty water and there are no bearings to wear out.

A rapidly reversing magnetic field is produced in the lower housing. As the fluid moves through this field, a voltage is generated that is measured and translated into a frequency signal proportional to flow rate. This square wave signal can be sent directly to a PLC or other control or can be converted using any of the Omega family of indicators and converters.

The adapter fitting of the sensor is standard male NPT, and can be directly threaded into ordinary saddles or threaded weld fittings. The FMG905/906/907/908 include an isolation valve, allowing hot-tap installation, or installation and removal under pressure; a bronze ball valve is standard, with a 316 stainless steel valve option if needed.

Reverse flow output and immersibility are optional.

### FEATURES

- Cable Strain Relief
- Lower Housing
- Brass or 316 Stainless Shaft
- Compression Nut
- Adapter Fitting
  - 1 1/2" Male NPT threads
- Sensor Housing
- Electrodes and Cap

### SPECIFICATIONS*

<table>
<thead>
<tr>
<th>Pipe Sizes</th>
<th>3” to 48” (up to 72” optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials</td>
<td>Shaft/Fitting 316 SS or Brass</td>
</tr>
<tr>
<td>Electrodes</td>
<td>Hastelloy</td>
</tr>
<tr>
<td>Electrode Cap</td>
<td>PVDF</td>
</tr>
<tr>
<td>Housing</td>
<td>Cast powder-coated aluminum</td>
</tr>
<tr>
<td>Valve Assembly (115/215 Only)</td>
<td>Bronze (stainless optional) with bronze ball valve</td>
</tr>
<tr>
<td>O-Ring (115/215 Only)</td>
<td>EPDM</td>
</tr>
<tr>
<td>Power</td>
<td>Full Power 12-25 Vdc, 250 mA</td>
</tr>
<tr>
<td>Low Power</td>
<td>12-25 Vdc, 40 mA average with 250 mA peaks</td>
</tr>
<tr>
<td>Flow Range</td>
<td>0.28 to 20 ft/sec (0.08 - 6.09 m/sec)</td>
</tr>
<tr>
<td>Fitting Size</td>
<td>FMG901/902/903/904 1-1/2&quot; Male NPT</td>
</tr>
<tr>
<td></td>
<td>FMG905/906/907/908 2” Male NPT</td>
</tr>
<tr>
<td>Temperature</td>
<td>Ambient 0˚ to 160˚ F (-17˚ to 72˚ C)</td>
</tr>
<tr>
<td>Fluid</td>
<td>32˚ to 200˚ F (0˚ to 93˚ C)</td>
</tr>
<tr>
<td>Pressure</td>
<td>200 psi (13.8 bar)</td>
</tr>
<tr>
<td>Minimum Conductivity</td>
<td>20 microSiemens/cm</td>
</tr>
<tr>
<td>Calibration Accuracy</td>
<td>+/- 1% of full scale</td>
</tr>
<tr>
<td>Output</td>
<td>Square wave pulse, opto isolated, 550 Hz @ 20 ft/sec</td>
</tr>
<tr>
<td></td>
<td>6 mA max, 30 Vdc forward flow standard; reverse flow optional</td>
</tr>
<tr>
<td>Empty Pipe Detection</td>
<td>Software, defaults to zero flow</td>
</tr>
<tr>
<td>Regulatory</td>
<td>CE Mark</td>
</tr>
</tbody>
</table>

*Specifications subject to change.
**Piping.** For best results, the sensor should be installed with at least ten diameters of straight pipe upstream and five downstream. Certain extreme situations such as partially-opened valves are particularly difficult and may require more straight diameters upstream (see page 6 for straight pipe recommendations).

**DISTORTED FLOWS**

*Distorted Flow Profile*

Faster Flow Causes Meter To Read High

FLOW

10X

5X

**Immersion.** The FMG900 Series sensors are not designed for underwater operation. Even occasional immersion can cause damage. If occasional immersion is possible, such as when a vault floods, then the -40 option, (immersion) is recommended.

**Chemical Injection or Fertigation.** When any magmeter, by any manufacturer, is used in a chemical injection application (including fertigation), the chemical line must be placed downstream of the magmeter OR far enough upstream for complete mixing to occur before the fluid reaches the meter. When unmixed chemical or fertilizer alternates with water passing through the meter, the rapid changes in conductivity may cause sudden spikes and drops in the meter’s reading, resulting in inaccurate measurement. The magmeter will restabilize, however, with a steady flow of fluid of uniform conductivity.

**Caution:** These flow sensors are not recommended for installation downstream of a boiler feedwater pump where installation fault may expose the flow sensor to boiler pressure and temperature. Maximum recommended temperature is 200 °F.

**Caution:** In chemical injection or fertigation applications, install chemical line downstream of magmeter, or far enough upstream to allow complete mixing of fluids before the meter.

**POSITIONING THE METER**

*Fair (Unacceptable position if air is present)*

*Best Position*

*Fair (Unacceptable position if fluid contains sediment)*

Vertical flow in upward direction is the preferred installation orientation, since it improves low-flow performance and avoids problems with trapped air and sediment. Bottom, top, and vertical pipe installations are all acceptable if required by the piping layout.
FMG901/902/903/904 INSTALLATION

**Fitting Installation.** FMG901/902 sensors come with a 1-1/2” male NPT pipe thread adapter fitting. Any fitting that provides the matching NPT female thread may be used. Installation procedure compensates for fitting height differences. Cut a minimum 1-3/4” hole in the pipe. If possible, measure the wall thickness and write it down for use in depth setting. Then install the threaded fitting (saddle, weldolet, etc.) on the pipe.

**Meter Installation.** Loosen the compression nut so that the adapter slides freely. Pull the meter fully upward and finger-tighten the compression nut. Using a thread sealant, install the adapter in the pipe fitting. Do not overtighten. Now loosen the compression nut, lower the meter to the appropriate depth setting (see diagram and instructions that follow). Be sure flow is in the direction of the arrow on the housing. Tighten compression nut fully.

FMG905/906/907/908 INSTALLATION

‘Hot tap’ meters are designed so they can be installed and serviced without depressurizing the pipe.

**Fitting Installation.** The FMG905/906/907/908 sensors have a 2” NPT thread for compatibility with the 2” isolation valve. Any fitting that provides matching NPT female thread may be used. The installation procedure compensates for differences in fitting height.

If initial installation is performed on an unpressurized pipe, cut a minimum 1-3/4” hole in the pipe. If possible, measure the wall thickness and write it down for use in depth setting. Then install the threaded fitting (saddle, weldolet, etc.) on the pipe.

If it is necessary to do the initial installation under pressure, any standard hot tap drilling machine with 2” NPT adapter, such as a Transmate or a Mueller, can be used. Ordinarily, it is not necessary to use an installation tool, due to the small diameter tube the meter can be installed by hand at all but the highest pressures.

**Meter Installation.** Remove the sensor unit from the valve assembly. Using a thread sealant, install the valve assembly on the pipe fitting. If the initial installation is a pressure (“hot”) tap, remove the 1-1/2” x 2” adapter bushing at the back of the valve. Thread the tapping machine on, open the valve, and tap using a minimum of 1-3/4” or maximum 1-7/8” cutter. After retracting the machine and closing the valve, reinstall the flow sensor. When the sensor is secure, open the valve and adjust depth setting (see diagram and instructions that follow). Be sure flow is in the direction of the arrow on the housing. Tighten locking collar and compression nut fully.
**PROPER DEPTH SETTING**

Depth Setting. It is important for accuracy that the sensor be inserted to the correct depth into the pipe.

1. In Table 1, find Dimension C for your sensor model and pipe size. Subtract wall thickness of your pipe (Table 2) to find Dimension D.

2. Measuring from the outside of the pipe to the joint in the housing, as shown in the diagram, adjust the sensor to Dimension D and hand-tighten compression nut.

3. Align the conduit housing with the centerline of the pipe, as shown. Be sure the arrow on the housing points in the direction of flow.

4. Check Dimension D one more time.

5. Tighten the compression nut fully.

**Caution!** Never attempt to remove a flow sensor when there is pressure in the pipe unless it is specifically designed for hot tap installation and removal. Loosen the compression nut slowly to release any trapped pressure. If fluid sprays out when removing the sensor, stop turning and depressurize the pipe. Failure to do so could result in the sensor being thrown from the pipe, resulting in damage or serious injury.
### TABLE 1: DIMENSION “C”

<table>
<thead>
<tr>
<th>NOMINAL PIPE SIZE</th>
<th>3&quot;</th>
<th>4&quot;</th>
<th>6&quot;</th>
<th>8&quot;</th>
<th>10&quot;</th>
<th>12&quot;</th>
<th>14&quot;</th>
<th>16&quot;</th>
<th>18&quot;</th>
<th>20&quot;</th>
<th>24&quot;</th>
<th>30&quot;</th>
<th>36&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>FMG905/907</td>
<td>17.04</td>
<td>16.93</td>
<td>16.69</td>
<td>16.46</td>
<td>16.22</td>
<td>15.99</td>
<td>15.75</td>
<td>15.52</td>
<td>15.28</td>
<td>15.05</td>
<td>14.58</td>
<td>13.87</td>
<td>13.17</td>
</tr>
</tbody>
</table>

### TABLE 2: PIPE WALL THICKNESS

<table>
<thead>
<tr>
<th>NOMINAL PIPE SIZE</th>
<th>3&quot;</th>
<th>4&quot;</th>
<th>6&quot;</th>
<th>8&quot;</th>
<th>10&quot;</th>
<th>12&quot;</th>
<th>14&quot;</th>
<th>16&quot;</th>
<th>18&quot;</th>
<th>20&quot;</th>
<th>24&quot;</th>
<th>30&quot;</th>
<th>36&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVC/Steel Sch. 40</td>
<td>0.216</td>
<td>0.237</td>
<td>0.280</td>
<td>0.322</td>
<td>0.365</td>
<td>0.406</td>
<td>0.438</td>
<td>0.500</td>
<td>0.562</td>
<td>0.593</td>
<td>0.687</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PVC/Steel Sch. 80</td>
<td>0.300</td>
<td>0.337</td>
<td>0.432</td>
<td>0.500</td>
<td>0.593</td>
<td>0.687</td>
<td>0.750</td>
<td>0.843</td>
<td>0.937</td>
<td>1.031</td>
<td>1.218</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stainless Steel (10S)</td>
<td>0.120</td>
<td>0.120</td>
<td>0.134</td>
<td>0.148</td>
<td>0.165</td>
<td>0.180</td>
<td>0.188</td>
<td>0.188</td>
<td>0.218</td>
<td>0.250</td>
<td>0.312</td>
<td>0.312</td>
<td></td>
</tr>
<tr>
<td>Stainless Steel (40S)</td>
<td>0.216</td>
<td>0.237</td>
<td>0.280</td>
<td>0.322</td>
<td>0.365</td>
<td>0.375</td>
<td>0.375</td>
<td>0.375</td>
<td>0.375</td>
<td>0.375</td>
<td>0.375</td>
<td>0.375</td>
<td></td>
</tr>
<tr>
<td>Copper Tubing (Type L)</td>
<td>0.090</td>
<td>0.110</td>
<td>0.140</td>
<td>0.200</td>
<td>0.250</td>
<td>0.280</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Copper Tubing (Type K)</td>
<td>0.109</td>
<td>0.134</td>
<td>0.192</td>
<td>0.271</td>
<td>0.338</td>
<td>0.405</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brass Pipe</td>
<td>0.219</td>
<td>0.250</td>
<td>0.250</td>
<td>0.312</td>
<td>0.365</td>
<td>0.375</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duct. Iron (Class 52)</td>
<td>0.280</td>
<td>0.290</td>
<td>0.310</td>
<td>0.330</td>
<td>0.350</td>
<td>0.370</td>
<td>0.390</td>
<td>0.400</td>
<td>0.410</td>
<td>0.420</td>
<td>0.440</td>
<td>0.470</td>
<td>0.530</td>
</tr>
</tbody>
</table>
STRAIGHT PIPE RECOMMENDATIONS

(X = diameter)

Reduced Pipe

Two Elbows In Plane

Two Elbows, Out Of Plane

Expanded Pipe

Spiral Flow

Propeller Meter

Swirling Flow

Partially Open Butterfly Valve
Caution: These flow sensors are not recommended for installation downstream of a boiler feedwater pump where installation fault may expose the flow sensor to boiler pressure and temperature. Maximum recommended temperature is 200°F.
**GROUNDING GUIDELINES**

For best results, use a good quality earth ground, such as metallic water piping, or a stake driven into the ground, to ensure a good connection to earth ground and good noise suppression.

If the flow sensor is installed in metallic piping, for optimum connection clamp wire to the piping a short distance to one side of the flow sensor using a hose type clamp. Connect the wire to the earth ground and to one of the housing screws. (For non-metallic piping, this step is not needed.)

**GENERAL ELECTRICAL GUIDELINES**

- Whenever possible, avoid running control cables in the same conduit with AC power.
- Use shielded cable, with one end grounded.
- Avoid routing flow sensor cables in close proximity to a variable frequency drive.
- Recommended power and output wiring is shielded 18-22 AWG control cable.
- Recommended voltage is 12-24 Vdc.
  
  **Note:** unregulated power supplies can vary from name-plate voltage by a considerable amount. When in doubt, use a regulated power supply.

**Power:** A 12 - 24 Vdc power supply capable of at least 250 mA current output is needed.

**Forward (and Reverse) Flow Output:** This open-collector isolated output does not supply power. It functions like a polarity-sensitive switch closure. This pulse is generated in the forward flow direction on the standard unit. (Reverse flow output is available as an option). **Note:** This output is limited to 6 mA at 30 Vdc maximum.

**FMG900 Series meters are usually unaffected by moderate levels of electrical noise. In some applications performance may be improved by taking the following steps:**

- Use shielded twisted pair cable (Belden 8723 or equivalent above ground or Alpha 35482 or equivalent burial).
- Clamp a ferrite bead (Steward 28A2029-OAO or equivalent) on meter signal/power wire within 3/4” of the meter strain relief (tape or tie wrap in place if necessary). See diagram above.
- **IMPORTANT -** Connect the cable shield ground wire to ground, ONLY at power supply end of cable.

**CONNECTION DIAGRAM**

![Connection Diagram](image)
**OPERATION & MAINTENANCE**

**Zero Adjustment.** When the FMG900 Series meter is powered up and there is no flow, there should be no output pulses (or, if connected to a display or controller, flow rate should read “0”). If there are pulses, it may be necessary to adjust the flow meter under no-flow conditions after it has been installed. **This should only be done if the indicated flow is low, near the lower cutoff.**

![Flow Sensor Diagram]

To perform the adjustment, after determining that there is a full pipe with no flow, short between the two pins marked “Zero Adjust”. A red LED light will come on for approximately 50 seconds and then go out. The zero adjustment is completed.

**Minimum Flow.** As with any other flow sensor, there is a rate below which the FMG900 Series sensor cannot read. Check the table below for the minimum flow rate detectable by the sensor for a given pipe size. Minimum flow is 0.28 ft/sec.

**Presence of Flow Indication.** To assist in troubleshooting, the “Status LED” has two blinking modes in normal operation. When there is no flow detectable by the meter (below minimum threshold) the LED blinks every 8.0 seconds. When there is detectable flow, the same indicator blinks every 3.0 seconds (Pulses are being output when indicator is blinking every 3 seconds).

**Filtering.** The software of the FMG900 Series filters out electrical noise and averages sudden variations in the flow to smooth the output. It takes a matter of seconds for the flow sensor to get up to full output when it is powered up or when flow begins.

**Electrode Coating.** Grease or other adhering, non-conductive materials can stop flow detection if the electrodes become heavily coated. To clean the electrodes, remove the sensor from the pipe and gently scrub the electrodes (three silver bumps) on the reading face of the flow sensor. A mild soap (dishwashing liquid for example) can be used to aid the cleaning process.

**Calibration (“K-Factor”).** In order to properly process pulses from the flow sensor, a number must be entered into the control to which the sensor is connected. This number, called the K-factor, is the number of pulses the sensor puts out per unit of fluid passing through the pipe. **Find the K-factor for your pipe size and type in the table on the following page and enter it into your display or controller.** These numbers are based on extensive testing, which has shown close agreement among different FMG900 sensors in the same installation. Typically, most K-factor error can be attributed to installation variables, such as depth setting and fitting configuration.

**CAUTION!** Never attempt to remove a flow sensor when there is pressure in the pipe unless it is specifically designed for hot tap installation and removal. Loosen the compression nut slowly to release any trapped pressure. If fluid sprays out when removing the sensor, stop turning and depressurize the pipe. Failure to do so could result in the sensor being thrown from the pipe, resulting in damage or serious injury.

**FLOW RATES (IN GALLONS PER MINUTE)**

<table>
<thead>
<tr>
<th>Feet Per Second</th>
<th>3”</th>
<th>4”</th>
<th>6”</th>
<th>8”</th>
<th>10”</th>
<th>12”</th>
<th>14”</th>
<th>16”</th>
<th>18”</th>
<th>20”</th>
<th>24”</th>
<th>30”</th>
<th>36”</th>
<th>48”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min 0.2</td>
<td>6</td>
<td>11</td>
<td>25</td>
<td>44</td>
<td>69</td>
<td>99</td>
<td>134</td>
<td>175</td>
<td>222</td>
<td>274</td>
<td>395</td>
<td>617</td>
<td>888</td>
<td>1580</td>
</tr>
<tr>
<td>Max 20.0</td>
<td>440</td>
<td>783</td>
<td>1,762</td>
<td>3,133</td>
<td>4,895</td>
<td>7,050</td>
<td>9,596</td>
<td>12,533</td>
<td>15,863</td>
<td>19,584</td>
<td>28,200</td>
<td>44,064</td>
<td>63,452</td>
<td>112,804</td>
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</tbody>
</table>
### FMG900 SERIES K-FACTORS FOR VARIOUS PIPE SIZES

<table>
<thead>
<tr>
<th>NOMINAL PIPE SIZE</th>
<th>3”</th>
<th>4”</th>
<th>6”</th>
<th>8”</th>
<th>10”</th>
<th>12”</th>
<th>14”</th>
<th>16”</th>
<th>18”</th>
<th>20”</th>
<th>24”</th>
<th>30”</th>
<th>36”</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVC/Steel Sch. 40</td>
<td>70.397</td>
<td>40.985</td>
<td>18.130</td>
<td>10.497</td>
<td>6.674</td>
<td>4.709</td>
<td>3.900</td>
<td>2.989</td>
<td>2.364</td>
<td>1.904</td>
<td>1.319</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PVC/Steel Sch. 80</td>
<td>78.748</td>
<td>45.360</td>
<td>20.084</td>
<td>11.495</td>
<td>7.322</td>
<td>5.184</td>
<td>4.297</td>
<td>3.281</td>
<td>2.588</td>
<td>2.094</td>
<td>1.451</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stainless Steel (10S)</td>
<td>62.385</td>
<td>36.626</td>
<td>16.510</td>
<td>9.642</td>
<td>6.173</td>
<td>4.373</td>
<td>3.620</td>
<td>2.756</td>
<td>2.169</td>
<td>1.762</td>
<td>1.223</td>
<td>0.784</td>
<td>0.576</td>
</tr>
<tr>
<td>Stainless Steel (40S)</td>
<td>70.397</td>
<td>40.985</td>
<td>18.130</td>
<td>10.497</td>
<td>6.674</td>
<td>4.661</td>
<td>3.827</td>
<td>2.893</td>
<td>2.263</td>
<td>1.819</td>
<td>1.249</td>
<td>0.791</td>
<td>0.580</td>
</tr>
<tr>
<td>Copper Tubing (Type L)</td>
<td>76.371</td>
<td>43.952</td>
<td>19.513</td>
<td>11.201</td>
<td>7.230</td>
<td>5.016</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Copper Tubing (Type K)</td>
<td>78.371</td>
<td>44.638</td>
<td>20.223</td>
<td>11.622</td>
<td>7.500</td>
<td>5.239</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brass Pipe</td>
<td>70.672</td>
<td>41.517</td>
<td>17.778</td>
<td>10.445</td>
<td>6.674</td>
<td>4.661</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duct. Iron (Class 52)</td>
<td>57.376</td>
<td>37.320</td>
<td>16.915</td>
<td>9.503</td>
<td>6.197</td>
<td>4.325</td>
<td>3.189</td>
<td>2.443</td>
<td>1.931</td>
<td>1.565</td>
<td>1.088</td>
<td>0.747</td>
<td>0.520</td>
</tr>
</tbody>
</table>

**Note:** These K-Factors are calculated using actual pipe diameters and wall thicknesses for each pipe type. They are based on the most current testing at the time of printing.
<table>
<thead>
<tr>
<th>Problem</th>
<th>Probable Cause</th>
<th>Try...</th>
</tr>
</thead>
<tbody>
<tr>
<td>No pulse output</td>
<td>Unit not grounded</td>
<td>Connect to earth ground</td>
</tr>
<tr>
<td></td>
<td>Below minimum flow cutoff</td>
<td>Check the Presence of Flow LED (see p. 12)</td>
</tr>
<tr>
<td></td>
<td>Flow reversed</td>
<td>Note flow direction arrow, reverse direction to meter</td>
</tr>
<tr>
<td></td>
<td>Output connections reversed</td>
<td>Change output connections</td>
</tr>
<tr>
<td></td>
<td>Pipe not full</td>
<td>Check plumbing</td>
</tr>
<tr>
<td></td>
<td>Excessive electrical noise</td>
<td>Check for proper electrical wiring</td>
</tr>
<tr>
<td></td>
<td>No power</td>
<td>Check for power across power input terminals</td>
</tr>
<tr>
<td></td>
<td>Power reversed</td>
<td>Reverse connections</td>
</tr>
<tr>
<td></td>
<td>Fluid conductivity &lt;20 microSiemens/cm</td>
<td>Select another flow meter</td>
</tr>
<tr>
<td>Output pulses incorrect</td>
<td>Missing or incorrect ground wire</td>
<td>Check for proper ground</td>
</tr>
<tr>
<td></td>
<td>Incorrect depth setting</td>
<td>Check depth setting from Dimension “C” table (page 4)</td>
</tr>
<tr>
<td></td>
<td>Fluid conductivity &lt;20 microSiemens/cm</td>
<td>Select another flow meter</td>
</tr>
<tr>
<td></td>
<td>Empty pipe</td>
<td>Check for full pipe or install meter in the vertical position</td>
</tr>
<tr>
<td></td>
<td>Not enough straight pipe</td>
<td>Check for air pockets or turbulence. Refer to installation, page 6</td>
</tr>
<tr>
<td></td>
<td>Excessive electrical noise</td>
<td>Check for proper electrical wiring</td>
</tr>
<tr>
<td>Jumpy reading</td>
<td>Rapidly changing conductivity (in chemical injection or fertigation applications)</td>
<td>Install chemical injection line downstream of magmeter (or far enough upstream to allow complete mixing of fluids before meter)</td>
</tr>
</tbody>
</table>
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The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR WARRANTY RETURNS, please have the following information available BEFORE contacting OMEGA:
1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR NON-WARRANTY REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:
1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.
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- Cartridge & Strip Heaters
- Immersion & Band Heaters
- Flexible Heaters
- Laboratory Heaters

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- Pumps & Tubing
- Air, Soil & Water Monitors
- Industrial Water & Wastewater Treatment
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