**DESCRIPTION**

ONICON’s FB-3500 series bi-directional insertion electromagnetic flow meters are suitable for measuring electrically conductive liquids in a wide variety of applications. Each FB-3500 provides a single analog output for flow rate, a high resolution frequency output to drive peripheral devices, two scalable pulse outputs for totalization, a contact closure output for flow direction and an empty pipe alarm signal. Optional remote displays and BTU measurement systems are also available.

**FEATURES**

**Exceptional Performance & Value** - FB-3500 series insertion style electromagnetic flow meters provide a degree of accuracy and reliability normally only found in expensive full bore devices. By combining this level of performance with the cost effective nature of the insertion style design, ONICON has produced a product of exceptional value.

**Excellent Long Term Reliability** - ONICON insertion style electromagnetic flow meters employ a low maintenance, non-moving parts technology to sense flow. State-of-the-art electronics and patented design features help maintain accuracy over time.

**Proprietary Design Advantage** - FB-3500 insertion electromagnetic flow meters utilize patented design features that significantly enhance performance. The dual-electrode design and continuous auto-zero function combine to improve accuracy and sensitivity — particularly at low flow rates.

**Simplified Hot Tap Insertion Design** - Standard on every insertion flow meter, this feature allows for insertion and removal by hand, without a system shutdown.

**APPLICATIONS**

- Primary/secondary decoupling loop (bypass)
- HVAC thermal storage tank
- Domestic water charge/discharge
- Bi-directional process flow

**CALIBRATION**

Every ONICON flow meter is wet calibrated in a flow laboratory against standards that are directly traceable to N.I.S.T. A certificate of calibration accompanies every meter.

**GENERAL SPECIFICATIONS**

**ACCURACY**

- ± 1.0% of reading from 2 to 20 ft/sec
- ± 0.02 ft/sec below 2 ft/sec

**FLOW RANGE**

- 0.1 ft/s to 20 ft/s (200:1 turndown)

**SENSING METHOD**

- Electromagnetic sensing (no moving parts)

**CONDUCTIVITY RANGE**

- 20 to 60,000 µSiemens/cm

**PIPE SIZE RANGE**

- 3” through 72” nominal diameter

**INPUT POWER**

- 20 – 28 VDC, 250mA @ 24 VDC
- 20 – 28 VAC 60 Hz, 6 VA

**LIQUID TEMPERATURE RANGE**

- 15° to 250° F

**AMBIENT TEMPERATURE RANGE**

- -20° to 150° F

**OPERATING PRESSURE**

- 400 PSI maximum

**PRESSURE DROP**

- Less than 0.1 psi at 12 ft/s velocity in 3” and larger pipes

**OUTPUT SIGNALS PROVIDED**

**Analog Output (Isolated)**

- Selectable: 4-20 mA, 0-10 V or 0-5 V

**Frequency Output**

- 0 – 15 Volt peak pulse, 0 – 500Hz

**Pulse/Contact Closure Outputs (four)**

- Isolated solid state dry contact
- Contact maximum ratings: 100 mA, 50 VDC

**Scalable Pulse Outputs (two)**

- Forward & Reverse Flow Totalization
- Pulse Duration: 0.5, 1, 2 or 6 seconds

**Directional Contact Output**

- Switch closed when flow is in direction of flow arrow on enclosure
- Latches at 0.2 ft/s
- Switches within 20 seconds of direction change

**Master Alarm Output**

- Switch closed indicates alarm condition

This product is covered by one or more of the following patents: 6,431,011 and 6,463,807.
**FB-3500 SPECIFICATIONS cont.**

**MATERIAL**
- Wetted metal components: 316 stainless steel
- Sensor head: Polypropylene

**ELECTRONICS ENCLOSURE**
- Weathertight NEMA 4 aluminum enclosure

**ELECTRICAL CONNECTIONS**
- 10' of PVC jacketed cable with ½” NPT conduit connection
- Dedicated earth wire required
- 6-wire minimum for power, analog output and flow direction output
- Additional wires required for pulse, frequency and alarm outputs

<table>
<thead>
<tr>
<th>Pipe Size (inches)</th>
<th>Flow Rate (GPM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>2.4 - 460</td>
</tr>
<tr>
<td>4</td>
<td>4 - 800</td>
</tr>
<tr>
<td>6</td>
<td>9 - 1,800</td>
</tr>
<tr>
<td>8</td>
<td>16 - 3,100</td>
</tr>
<tr>
<td>10</td>
<td>24 - 4,900</td>
</tr>
<tr>
<td>12</td>
<td>35 - 7,050</td>
</tr>
<tr>
<td>14</td>
<td>42 - 8,600</td>
</tr>
<tr>
<td>16</td>
<td>55 - 11,400</td>
</tr>
<tr>
<td>18</td>
<td>70 - 14,600</td>
</tr>
<tr>
<td>20</td>
<td>86 - 18,100</td>
</tr>
<tr>
<td>24</td>
<td>125 - 26,500</td>
</tr>
<tr>
<td>30</td>
<td>223 - 41,900</td>
</tr>
<tr>
<td>36</td>
<td>304 - 60,900</td>
</tr>
</tbody>
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<tr>
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<th>DESCRIPTION</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>RED (+)</td>
<td>Supply Voltage: 24 VDC, 250 mA or 24 VAC, 60 Hz, 6 VA</td>
<td>Connect to power supply (+): DC (+) or AC (line)</td>
</tr>
<tr>
<td>BLACK (-)</td>
<td>Isolated Supply Voltage Common</td>
<td>Connect to power supply (-): DC (-) or AC (neutral)</td>
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<td>GREEN/YELLOW</td>
<td>Earth ground connection</td>
<td>Required to operate the meter</td>
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<td>Reverse Flow Scalable Output Isolated Dry Contact</td>
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<td>GRAY/BLACK</td>
<td>Flow Direction Indicator Isolated Dry Contact</td>
<td>Contact closed when flow is in direction of arrow on meter</td>
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**DIAGNOSTIC SIGNALS**
- ORANGE Master Alarm Isolated Dry Contact | Dry contact closure signal indicating fault condition
- WHITE Flow Direction Indicator Isolated Dry Contact

**NOTE:** Specifications are subject to change without notice.

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**Typical Meter Installation**

(New construction or scheduled shutdown)

- Install in vertical or horizontal pipe
- For horizontal pipe position meter anywhere in upper 240˚

Customer provided conduit and adapters

Output signal(s) to control system

Onicon Display or BTU Meter (Optional)

1/2” FNPT conduit connection

Allow enough slack in the flexible conduit to permit the meter to be removed from the valve.

Insertion depth gage provided with each meter

1” Full port ball valve

1” Close nipple

1” Branch outlet

Minimum Hole Size = 1”

Must be centered

**FB-3500 Wiring Table**

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**ONICON’s FB-3500 Series**

**Insertion Electromagnetic Flow Meter combined with the System-10 BTU Meter form an energy measurement system with unsurpassed accuracy and reliability.**

**Minimum Hole Size = 1”**

Must be centered

**Typically 30˚ - 40˚ depending on pipe size and height of valve assembly.**

**CLEARANCE REQUIRED FOR INSTALLATION**

**FLOW**

1/4” for hot tap

Insertion depth gage provided with each meter

1” Full port ball valve

1” Close nipple

1” Branch outlet

Allow enough slack in the flexible conduit to permit the meter to be removed from the valve.

**Note:** Installation kits vary based on pipe material and application. For installations in pressurized (live) systems, use “Hot tap” 1/4 inch installation kit and drill hole using a 1 inch wet tap drill.

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