FT-3100
INLINE ELECTROMAGNETIC FLOW METER

ONICON’s FT-3000 series is a family of inline flow meters that provide accurate, reliable flow measurement for a variety of applications.

- Chilled Water
- Hot Water
- Domestic Water
- Condenser Water & Water/Glycol Solutions
- Process Application Water Flow
Faraday’s Law states that a voltage will be induced in a conductor (the conductive fluid) when it passes through a magnetic field (generated by the meter), and that voltage will be directly proportional to the velocity of the conductor (the fluid). This voltage is measured by electrodes on opposite sides of the flow tube and used to calculate the flow velocity.

DESCRIPTION

ONICON FT-3000 series inline electromagnetic flow meters are suitable for measuring electrically conductive liquids in a wide variety of applications. The FT-3100 provides analog and digital outputs for flow rate and programmable pulse outputs for flow totalization and/or alarms.

APPLICATIONS

- HVAC hydronic applications including chilled water, heating hot water and condenser water
- Bi-directional flow for primary/secondary bypass and thermal storage applications
- Domestic cold and hot water applications
- Clean process flow applications with conductivities greater than 5 µS/cm

FEATURES

Exceptional Performance & Accuracy – FT-3000 series inline meters deliver unmatched accuracy in installations with just three diameters of straight pipe upstream of the meter!

Easy to Install and Use - Every ONICON meter is individually wet calibrated and programmed for the application - saving start-up and commissioning time!

Excellent Long Term Reliability - ONICON electromagnetic flow meters have no moving parts and employ state-of-the-art electronics, ensuring years of accurate, trouble-free performance.

Redundant Outputs – The FT-3000 series inline meters can be ordered with an additional, redundant analog output. This optional feature can provide a cost-effective alternative in Mission Critical applications which require redundant flow measurements.

CALIBRATION

The FT-3000 series flow meter is wet calibrated in a flow laboratory against standards that are directly traceable to international standards. A certificate of calibration accompanies every meter.

For energy measurement applications, the FT-3100 flow meter can be specified together with an ONICON BTU Meter - forming a complete energy measurement system.
### FT-3100 Transmitter

| **PERFORMANCE** | **ACCURACY** | ±0.4% of reading from 3.3 to 33 ft/sec  
|                |             | ±0.75% of reading from 1.3 to 3.3 ft/sec  
|                |             | ±0.0075 ft/sec at flow rates less than 1 ft/sec  
| **MINIMUM CONDUCTIVITY** | 5 µS/cm |
| **INPUT POWER** | **AVAILABLE OPTIONS** | • Low Power, 24 VAC/DC, 50/60 Hz, 12 VA  
|                |             | • High Power, 120 - 240 VAC, 50/60 Hz, 12 VA  
| **I/O SIGNALS** | **AVAILABLE OPTIONS** | • Two (2) digital outputs, one (1) digital input, and one (1) analog output  
|                |             | • MODBUS RTU (RS485)  
| **ELECTRONICS ENCLOSURE** | **IP67 (NEMA 4X) enclosure with display** |
| **DISPLAY** | **16-character, 8-line, 128x64 graphic LCD with backlight** |
| **AMBIENT CONDITION** | Transmitter: 14°F to 140°F |
| **PROGRAMMING** | **AVAILABLE OPTIONS** | • Menu driven user interface via three (3) programming keys  
|                |             | • PC user interface via micro USB and downloadable software  
| **ELECTRICAL CONNECTIONS** | **INPUT POWER** | Removable terminal blocks for use with 14 - 22 gauge wire  
|                | **I/O SIGNALS** | Removable terminal blocks for use with 18 - 24 gauge wire  
|                | **COIL & ELECTRODES** | Removable terminal blocks for use with sensor cable provided  
| **APPROVAL** | CE |

### FT-3000 Series Flow Sensor

| **PERFORMANCE** | **SENSING METHOD** | Electromagnetic sensing (no moving parts) |
| **OPERATING CONDITIONS** | **FLUID TEMPERATURE RANGE** | See Liner Selection Table on next page |
|                | **FLUID PRESSURE RANGE** | See Liner Selection Table on next page |
| **FLOW SENSOR DESIGN** | **FLOW TUBE** | 304 SS |
|                | **ELECTRODES** | Qty: Three (3), round, 316 SS |
| **FLOW BODY** | **AVAILABLE OPTIONS*** | • Carbon Steel  
|                |             | • Polypropylene  
|                |             | • Stainless Steel  
| **FLOW LINER** | **AVAILABLE OPTIONS*** | • PTFE  
|                |             | • Ebonite  
|                |             | • Polypropylene  
| **PROCESS CONNECTIONS** | **AVAILABLE OPTIONS** | • Flanged connections ANSI Class 150 or ANSI Class 300  
|                |             | • Wafer mount  
|                |             | • Threaded (NPT) connections  
| **APPROVALS** | NSF  
|                | CE  
|                | 61  
|                | E97/23/CE PED Directive |

*SPECIFICATIONS subject to change without notice.  
**See model codification for additional information regarding option selections.  
***Selection based on application.
### LINER SELECTION TABLE

<table>
<thead>
<tr>
<th>Material</th>
<th>Line Size Flanged and Wafer</th>
<th>Grade</th>
<th>Color</th>
<th>Temperature Range</th>
<th>Pressure Range Based on Liner</th>
<th>Abrasion Resistance (Carbon Steel = 100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ebonite</td>
<td>8 - 48&quot; Food</td>
<td>Amber</td>
<td>32°F - 175°F</td>
<td>580 psi (1)</td>
<td>90 - 118</td>
<td></td>
</tr>
<tr>
<td>Polypropylene</td>
<td>1 - 6&quot; Food</td>
<td>Gray</td>
<td>32°F - 140°F</td>
<td>232 psi</td>
<td>122</td>
<td></td>
</tr>
<tr>
<td>PTFE</td>
<td>1 - 48&quot; Food</td>
<td>White</td>
<td>0°F - 266°F (3)</td>
<td>580 psi (1,2)</td>
<td>78</td>
<td></td>
</tr>
</tbody>
</table>

### Notes Description

1. Flanged meter pressure rating is the lesser of 580 psi or the flange rating.
2. Wafer style meters above 6" are limited to 232 psi.
3. Remote mount electronics option required for application temperature above 212°F.

### TYPICAL METER INSTALLATION

![Flow direction diagram]
### FLANGED AND WAFFER MODELS OPERATING RANGE

<table>
<thead>
<tr>
<th>PIPE SIZE (INCHES)</th>
<th>FLOW RATE (GPM) (0.1 ft/sec - 33 ft/sec)</th>
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<th>FLOW RATE (GPM) (0.1 ft/sec - 33 ft/sec)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.2 - 79</td>
<td>5</td>
<td>5.9 - 1,981</td>
<td>14</td>
<td>47 - 15,533</td>
</tr>
<tr>
<td>1½</td>
<td>0.6 - 203</td>
<td>6</td>
<td>8.5 - 2,853</td>
<td>16</td>
<td>61 - 20,288</td>
</tr>
<tr>
<td>2</td>
<td>0.9 - 317</td>
<td>8</td>
<td>15 - 5,072</td>
<td>18</td>
<td>77 - 25,678</td>
</tr>
<tr>
<td>2½</td>
<td>1.6 - 536</td>
<td>10</td>
<td>24 - 7,925</td>
<td>20</td>
<td>95 - 31,701</td>
</tr>
<tr>
<td>3</td>
<td>2.4 - 812</td>
<td>12</td>
<td>34 - 11,12</td>
<td>24</td>
<td>137 - 45,649</td>
</tr>
<tr>
<td>4</td>
<td>3.8 - 1,268</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### THREADED MODELS OPERATING RANGE

<table>
<thead>
<tr>
<th>PIPE SIZE (INCHES)</th>
<th>FLOW RATE (GPM) (0.1 ft/sec - 33 ft/sec)</th>
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</tr>
</thead>
<tbody>
<tr>
<td>¼</td>
<td>0.004 - 1.12</td>
<td>½</td>
<td>0.038 - 12.46</td>
<td>1</td>
<td>0.152 - 49.84</td>
</tr>
<tr>
<td>⅝</td>
<td>0.014 - 4.49</td>
<td>¾</td>
<td>0.085 - 28.03</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### METER ORDERING INFORMATION

**Meter Model Number Coding = FT-31GG-HIJKL-BCDE**

**FLOW SENSOR CONFIGURATION INFORMATION**

GG = Meter Size (inches)
- 01 = 1"
- 25 = 2½"
- 05 = 5"
- 10 = 10"
- 15 = 1½"
- 03 = 3"
- 06 = 6"
- nn = Meter Size, 12 - 24"
- 02 = 2"
- 04 = 4"
- 08 = 8"

H = Liner Material
- 1 = PTFE
- 2 = Polypropylene
- 3 = Ebonite

I = Process Connection
- 0 = Wafer connection
- 1 = ANSI 150 flanges
- 3 = ANSI 300 flanges
- A = NPT thread

JK = Body Material
- 11 = Carbon Steel w/ SS Electrodes
- 41 = 304 SS w/ SS Electrodes
- 51 = 316 SS w/ SS Electrodes
- 91 = Polypropylene w/ SS Electrodes

L = Electronics Enclosure Mounting Configuration
- 1 = Integral
- 2 = Remote

**TRANSMITTER CONFIGURATION INFORMATION**

BC = Outputs
- 10 = One (1) AO, two (2) DO and one (1) DI
- 11 = One (1) AO, two (2) DO and one (1) DI w/ MODBUS (RS485)

D = Electronics Enclosure
- 1 = IP67 (NEMA 4X) enclosoure w/ display

E = Input Power
- 1 = Low power, 24 VAC/VDC
- 2 = High power, 120 - 240 VAC