



**ONICON**  
Flow and Energy Measurement

# FT-3000 SERIES INLINE ELECTROMAGNETIC FLOW METER

The FT-3000 Series family of inline flow meters are designed to provide accurate and reliable flow measurements for a variety of challenging applications in the HVAC market.



- Chilled Water • Heating Hot Water • Domestic Water •
- Condenser Water & Water/Glycol Solutions • Process Application Water Flow •

## FT-3000 SERIES INLINE ELECTROMAGNETIC FLOW METER



*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-3000 series 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  $\mu\text{S}/\text{cm}$

### 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 operation.

**Multiple Analog Outputs** – The FT-3000 series inline meters can be ordered with an additional, redundant analog output for Mission Critical applications.

### CALIBRATION

All FT-3000 series flow meters are 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-3000 series flow meter can be specified together with an ONICON BTU Meter - forming a complete energy measurement system.*

## SPECIFICATIONS\*

<b>FT-3200 TRANSMITTER</b>		
PERFORMANCE	ACCURACY	±0.2% of reading from 1.6 to 33 ft/s ±0.0033 ft/s at flow rates < 1.6 ft/s
	MINIMUM CONDUCTIVITY	5 µS/cm
INPUT POWER**	AVAILABLE OPTIONS	<ul style="list-style-type: none"> <li>Low Power, 24 VAC/DC, 50/60 Hz, 12 VA</li> <li>High Power, 120 - 240 VAC, 50/60 Hz, 12 VA</li> </ul>
I/O SIGNALS**	AVAILABLE OPTIONS	<ul style="list-style-type: none"> <li>Two (2) digital outputs, one (1) digital input and one (1) analog output</li> <li>Two (2) digital outputs, one (1) digital input and two (2) analog outputs</li> <li>MODBUS RTU (RS485)</li> </ul>
ELECTRONICS ENCLOSURE**	IP67 (NEMA 4X) painted aluminum enclosure with display	
	AVAILABLE OPTIONS	<ul style="list-style-type: none"> <li>Integral mount</li> <li>Remote (wall) mount with kit, up to 325 ft in fluids with conductivity ≥ 200 µS/cm</li> </ul>
	DISPLAY	16-character, 8-line, 128x64 graphic backlit LCD
	AMBIENT CONDITIONS	Transmitter: -4°F to 140°F
PROGRAMMING	AVAILABLE OPTIONS	<ul style="list-style-type: none"> <li>Menu driven user interface via three (3) programming keys</li> <li>PC user interface via micro USB and downloadable software</li> </ul>
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
APPROVALS	CE	2014/30/EU EMC Directive 2014/35/EU LVD Directive

<b>FT-3100 TRANSMITTER</b>		
PERFORMANCE	ACCURACY	±0.4% of reading from 3.3 to 33 ft/s ±0.75% of reading from 1.3 to 3.3 ft/s ±0.0075 ft/s at flow rates less than 1 ft/s
	MINIMUM CONDUCTIVITY	5 µS/cm
INPUT POWER**	AVAILABLE OPTIONS	<ul style="list-style-type: none"> <li>Low Power, 24 VAC/DC, 50/60 Hz, 12 VA</li> <li>High Power, 120 - 240 VAC, 50/60 Hz, 12 VA</li> </ul>
I/O SIGNALS**	AVAILABLE OPTIONS	<ul style="list-style-type: none"> <li>Two (2) digital outputs, one (1) digital input, and one (1) analog output</li> <li>MODBUS RTU (RS485)</li> </ul>
ELECTRONICS ENCLOSURE**	IP67 (NEMA 4X) nylon enclosure with display	
	AVAILABLE OPTIONS	<ul style="list-style-type: none"> <li>Integral mount</li> <li>Remote (wall) mount with kit, up to 164 ft in fluids with conductivity ≥ 200 µS/cm</li> </ul>
	DISPLAY	16-character, 8-line, 128x64 graphic backlit LCD
	AMBIENT CONDITION	Transmitter: 14°F to 122°F
PROGRAMMING	AVAILABLE OPTIONS	<ul style="list-style-type: none"> <li>Menu driven user interface via three (3) programming keys</li> <li>PC user interface via micro USB and downloadable software</li> </ul>

\* SPECIFICATIONS subject to change without notice.

\*\* See model codification for additional information regarding option selections.



## SPECIFICATIONS CONTINUED\*

FT-3100 TRANSMITTER (CONT.)		
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	2014/30/EU EMC Directive 2014/35/EU LVD Directive

FT-3000 SERIES FLOW SENSOR		
PERFORMANCE	SENSING METHOD	Electromagnetic sensing (no moving parts)
OPERATING CONDITIONS	FLUID TEMPERATURE RANGE	See Liner Selection Table Below
	FLUID PRESSURE RANGE	See Liner Selection Table Below
FLOW SENSOR DESIGN**	FLOW TUBE	304 SS
	ELECTRODES	Qty: Three (3), round, 316 SS
FLOW BODY**	AVAILABLE OPTIONS***	<ul style="list-style-type: none"> <li>• Carbon Steel</li> <li>• Stainless Steel</li> <li>• Polypropylene</li> </ul>
FLOW LINER**	AVAILABLE OPTIONS***	<ul style="list-style-type: none"> <li>• PTFE</li> <li>• Ebonite</li> <li>• Polypropylene</li> </ul>
PROCESS CONNECTIONS**	AVAILABLE OPTIONS	<ul style="list-style-type: none"> <li>• Flanged connections ANSI Class 150 or ANSI Class 300</li> <li>• Wafer mount</li> <li>• Threaded (NPT) connections (Available for FT-3100 models only)</li> </ul>
APPROVALS	NSF CE	61 E97/23/CE PED Directive

\* SPECIFICATIONS subject to change without notice.

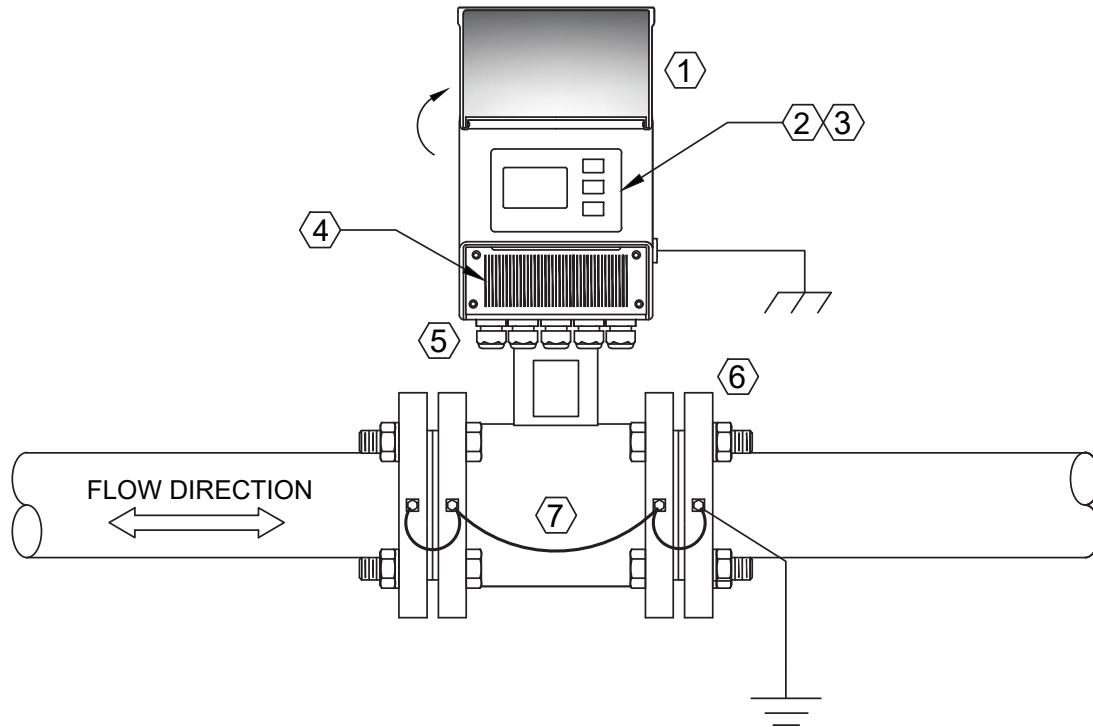
\*\* See model codification for additional information regarding option selections.

\*\*\* Selection based on application.

## LINER SELECTION TABLE

Material	Line Size Flanged and Wafer	Grade	Color	Temperature Range	Pressure Range Based on Liner	Abrasion Resistance (Carbon Steel = 100)
Ebonite	8 - 48"	Food	Amber	32°F - 175°F	580 psi (1)	90 - 118
Polypropylene	1 - 6"	Food	Gray	32°F - 140°F	232 psi	122
PTFE	1 - 48"	Food	White	0°F - 266°F (3)	580 psi (1,2)	78
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 INSTALLATION IN CONDUCTIVE PIPE



1. IP67 (NEMA 4X) enclosure with protection cover available in integral or remote mount version
2. 16-character, 8-line graphic backlit LCD display
3. Menu driven user interface via three (3) programming keys
4. Wiring connections via plugable terminal blocks located beneath the front access cover
5. Five (5) threaded conduit/ strain relief openings located at the bottom of the enclosure
6. Process connection available in flanged (ANSI Class 150 or ANSI Class 300), wafer or threaded models
7. Flange grounding kit for flanged or wafer versions

### FLANGED AND WAFER MODELS OPERATING RANGE

PIPE SIZE (inches)	FLOW RATE (GPM) (0.1 ft/s - 33 ft/s)	PIPE SIZE (inches)	FLOW RATE (GPM) (0.1 ft/s - 33 ft/s)	PIPE SIZE (inches)	FLOW RATE (GPM) (0.1 ft/s - 33 ft/s)
1	0.2 - 79	6	8.5 - 2,853	20	95 - 31,701
1½	0.6 - 203	8	15 - 5,072	24	137 - 45,649
2	0.9 - 317	10	24 - 7,925	30	210 - 69,185
2½	1.6 - 536	12	34 - 11,412	36	304 - 100,479
3	2.4 - 812	14	47-15,533	40	378 - 124,577
4	3.8 - 1,268	16	61 - 20,288	42	417 - 139,800
5	5.9 - 1,981	18	77 - 25,678	48	547 - 182,596

### THREADED MODELS OPERATING RANGE

(Available for FT-31XX models only)

PIPE SIZE (inches)	FLOW RATE (GPM) (0.1 ft/s - 33 ft/s)	PIPE SIZE (inches)	FLOW RATE (GPM) (0.1 ft/s - 33 ft/s)	PIPE SIZE (inches)	FLOW RATE (GPM) (0.1 ft/s - 33 ft/s)
¼	0.004 - 1.12	½	0.038 - 12.46	1	0.152 - 49.84
⅜	0.014 - 4.49	¾	0.085 - 28.03		

## METER ORDERING INFORMATION

### FT-3000 Meter Model Number Codification = FT-3AGG-HIJKL-BCDE-(SPC)

#### FLOW SENSOR CONFIGURATION INFORMATION

**A = Transmitter Series**

- 1 = Basic Transmitter (0.4% Accuracy)
- 2 = Advanced Transmitter (0.2% Accuracy)

**GG = Meter Size (inches)****Flanged and Wafer Models**

- |          |          |         |                                     |
|----------|----------|---------|-------------------------------------|
| 01 = 1"  | 25 = 2½" | 05 = 5" | 10 = 10"                            |
| 15 = 1½" | 03 = 3"  | 06 = 6" | nn = Meter Size, 12 - 24" (FT-31XX) |
| 02 = 2"  | 04 = 4"  | 08 = 8" | 12 - 48" (FT-32XX)                  |

**Threaded Models (FT-31XX Only)**

- |         |         |         |
|---------|---------|---------|
| AA = ¼" | AC = ½" | AE = 1" |
| AB = ⅜" | AD = ¾" |         |

**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 (FT-31XX only)

**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) (FT-31XX only)
- 21 = Two (2) AO, two (2) DO and one (1) DI w/ MODBUS (RS485) (FT-32XX only)

**D = Electronics Enclosure**

- 1 = Integral IP67 (NEMA 4X) nylon enclosure w/ display (FT-31XX only)
- 2 = Integral IP67 (NEMA 4X) painted Al enclosure w/ display (FT-32XX only)

**E = Input Power**

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

**SPC = Special Configurations**

- 101 = 4GB SD Memory, RTC (FT-32XX only)

