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DPF-520 Series

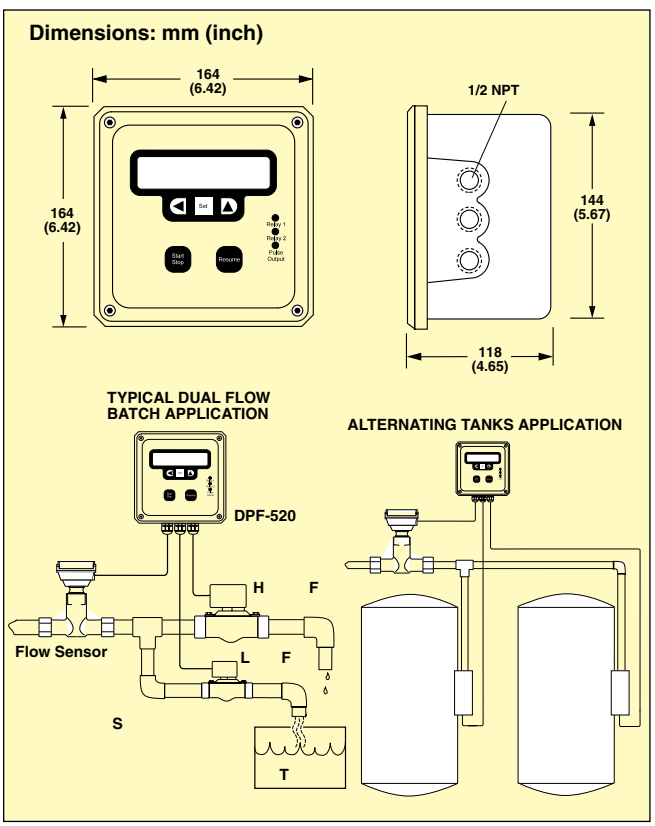
1 YEAR WARRANTY

- **Batch Control**
- **Regeneration Control**
- **High/Low Flow Rate Monitoring**
- **Water Usage Monitoring**
- **NEMA 4X (IP56)**

The DPF-520 Series is a batching flow processor with additional output controls. It is designed for use with OMEGA® flowmeters and flow sensors, as well as other manufactuer's products which have frequency output proportional to flow. In addition to batch functions, the DPF-520 Series indicates flow rate, and other data in large 9.66 mm (⅜") digits on an easily-read, backlit display. Units of measure are user selectable.

An analog output of 4 to 20 mA is available both in active and passive loop configuration, and in 0 to 5 Vdc or 0 to 10 Vdc outputs, and can be used in applications such as flow rate logging. Two programmable pulse scaled outputs are also standard, and can be used, for example, to provide proportional chemical feed with a pulse-responsive metering pump.

The housing is supplied with two brackets for wall-mount applications, or the top/bottom housings can be easily separated and reassembled for panel-mount.



DPF-520 shown smaller than actual size.

SPECIFICATIONS

Power: 115 Vac, 50/60 Hz @ 125 mA, 12 Vdc @ 750 mA or 10 to 16 Vdc (220 Vac optional)
Temperature: 0 to 55°C (32 to 130°F)
Enclosure: Precision cast aluminum, NEMA 4X (IP56), panel or wall mount configuration
Batch Outputs: Two form C (SPDT) relays, 115 Vac 6A maximum
Maximum Pulse Output: 100 mA at 60 Vac/Vdc, opto-isolated, open-collector
Memory Type: Non-volatile EEPROM with auto-backup
Sensor Power: 12 Vdc, 10 mA
Display: Totalizer = 8 digit; Rate = 5 digit, backlit
Units: Volume = Gallons, cubic feet, cubic meters, millions of gallons, milliliters, fluid ounces, pounds, liters; Time = Seconds, minutes, hours, days
Analog Output: 4 to 20 mA passive opto-isolated; 4 to 20 mA active; 0 to 5 Vdc, or 0 to 10 Vdc
Sensor Input: 1 to 1000 Hz, ESD protected, interfaces to current sinking sensor (NPN, TTL, contact closure) output
Setup Memory: Non-volatile EEPROM, auto-backup

To Order *Visit omega.com/dpf-520 for Pricing and Details*

Model No.	Description
DPF-521	Wall mount batch controller
DPF-521C	Wall mount batch controller with regeneration control
DPF-521R	Wall mount batch controller with rate alarm
DPF-521C-220V	Wall mount batch controller with regeneration control, 220 Vac
DPF-521R-220V	Wall mount batch controller with rate alarm control, 220 Vac
DPF-522	Wall mount usage monitor
DPF-522-220V	Wall mount usage monitor, 220 Vac

Comes complete with 2 mounting brackets and operator's manual.
***Ordering Examples: DPF-521R,** wall mount batch controller with rate alarm.*
***DPF-522,** wall mount usage monitor.*

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Rate and Total

Flow Meter Indicator

DPF140 Series

1 YEAR WARRANTY

DPF143W shown with DPF140-DC, shown smaller than actual size.

- **Simple Setup**
- **DC Powered (DPF143), Loop Powered (DPF144)**
- **Remote or Flow Sensor Mounted (with Adaptor)**
- **Rugged NEMA 4X (IP67) Plastic Housing**
- **Non-Volatile Memory**

The DPF140 Series of flow meters are micro controller based indicators with transmission and pulse outputs. These units are designed to compute and display flow rate and total. The DPF143 has one scaled pulse output and the DPF144 has two. In addition to the scaled pulse output, both models provide an alternative pulse pass-through output with galvanic isolation. The DPF143 is powered by an external DC power source. The DPF144 is a "two-wire" or "loop powered" device, meaning that it is powered by the 4 to 20 mA loop circuit itself.

Pulse and 4 to 20 mA analog outputs can be used to signal external devices, e.g. certain metering pumps and water treatment controls. Alternatively, one or more pulse outputs can be configured as alarm outputs. These flow meters can be password protected to prevent resetting the total or changing configuration settings.

The DPF140 Series meters are available in wall or panel mount configurations. Wall mounted versions can be converted from wall to meter mount with an adaptor plate. Check with OMEGA for compatible meters. Order the DPF144 only if a 4 to 20 mA output signal is a requirement, otherwise the DPF143 offers the most flexibility.

Specifications

Display: Rate 5-digit auto-ranging, total 8-digit

Units:

Rate Units: Gallons/second/minute/hour/day, liter/second/minute/hour/day, cubic feet/second/minute/hour/day, cubic meters/second/minute/hour/day, miner's inch, mega liters/day, million gallons/day, fluid oz/second/minute/hour/day, barrels (42 gallon)/second/minute/hour/day

Total Units: Gallon, gallon x 1000, liters, mega liter, cubic meter, acre feet, cubic feet, cubic feet x 1000, million gallon, miner's inch day, acre inch, fluid ounce, barrels (42 gallon)

OUTPUTS

Pulse Output 1 (All Models): Scaled pulse output, high alarm output or low alarm output (opto-isolated)

Type: Current sinking

Maximum Voltage: 45 Vdc (100 mA)

Maximum Frequency: 6.5 Hz

Pulse Width: 100 ms

Isolation: 300V

Pulse Output 2:

DPF143:

Type: Current sinking

Maximum Voltage: 45 Vdc (100 mA)

Maximum Frequency: 2000 Hz pulse width same as sensor input

Isolation: 300V

Configurable as Alarm: No

DPF144:

Type: Current sinking

Maximum Voltage: 45 Vdc (10 mA)

Maximum Frequency: 6.5 Hz

Pulse Width: 100 ms

Isolation: 300V

Configurable as Alarm: Yes (high or low)

Loop Power Output: DPF144 only

Set P Range: 0.1 to 99999.9 units/pulse

Input: 5V pulse or contact closure

Input Range: 0.752 to 2000 Hz

K-Factor Range: 0.001 to 999999.999

Flow Alarm Output Range: 0.1 to 99999.9

Operating Temperature: 0 to 55°C (-32 to 131°F)

Non-Operating Temperature: -40 to 75°C (-40 to 158°F)

Environmental: NEMA 4X (IP67)

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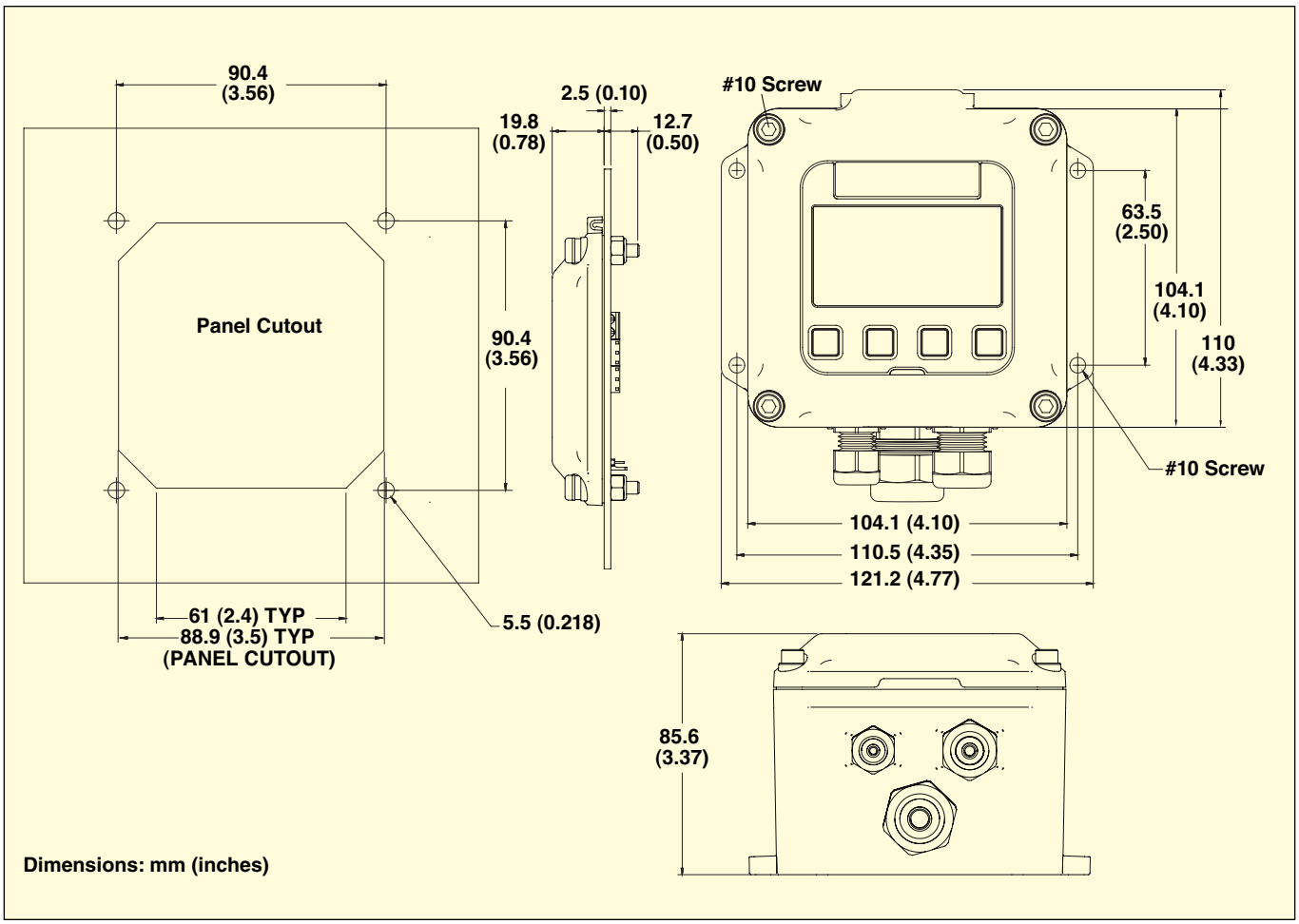

To Order	
Model No.	**Description**
DPF143W	DC powered indicator for rate and total, wall mount
DPF143P	DC powered indicator for rate and total, panel mount
DPF144W	Loop powered indicator for rate and total, wall mount
DPF144P	Loop powered indicator for rate and total, panel mount
Accessories	
DPF140-DC	Display cover (optional)
DPF140-W2M	Wall to meter adaptor kit (optional)

Comes complete with operator's manual.

Ordering Example: DPF143W. *DC powered indicator for rate and total with* ***DPF140-DC*** *display cover.*

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1/8 DIN 6-DIGIT RATE METER/TOTALIZERS

DPF701 Series

5 YEAR WARRANTY

DPF701 1/8 DIN, FP7001A flow sensor, and FP7010-GI fitting, shown smaller than actual size.

DP40-BB-YL yellow BUMPER BAND™ protective guard, sold separately. A gray BUMPER BAND guard is supplied with every unit.

- Measures Rate from 0.5 Hz to 30 kHz
- Totalizes Up or Down from -99,999 to 999,999 or Acts as Accumulating Stopwatch
- 6-Digit, 7-Segment LED, 14.2 mm H (0.56")

Signal Input Choices (Selectable by DIP Switch)

- TTL Compatible with Protection to 25V
- Low Level (25 mV rms)
- High Level Signals Protected to 115V
- NAMUR
- Open Collector PNP or NPN

Communications and Control

- RS232 Output Optional
- Optional Dual 5A Form C Relays
- Analog Output, Scalable, 4 to 20 mA, 0 to 20 mA, 0 to 10V (Optional)

BEZEL DESIGN IS A REGISTERED TRADEMARK

The DPF701 ratemeter/totalizer offers user programming via the 5 front-panel keys. Scale factor can be programmed from -99,999 to 999,999 (any decimal point, multiply or divide), while offset can be programmed from -99,999 to 999,999 (any decimal point).

Programs are stored in non-volatile memory, with three levels of program lockout for security. Optional features include Hi or Lo setpoints for control or alarm, plus RS232 communication. Fixed decimal point or autoranging is standard.

SPECIFICATIONS

Functions: Rate and totalize selected by menu
Display: 6-digit, 7-segment red LED display
Inputs
Type: Single input. TTL, CMOS, NPN open collector, contact closure and magnetic pickup compatible; selected by DIP switch. Non-isolated.
Level: Max 60V; minimum 25 mV rms
Frequency: 30 kHz maximum
Excitation: Regulated, 5.0, 8.2, or 12.4V selected by DIP switch, 100 mA maximum
Accuracy: ±0.5 LSD of total; 0.01% of the rate ±1.5 LSD
Setpoints: Two, optional
Alarm Outputs: Optional
Communication: RS232, analog output, optional
Rate Measurement Technique: 1/x
Gate Time: 0.30 sec
Decimal Point: Programmable or autoranging
Trigger Slope: Selectable by DIP switch
Leading Zeros: Blank
Power: 115 or 230 ±15% Vac
Dimensions: 48 H x 96 W x 152 mm D (1.9 x 3.8 x 6")
Panel Cutout: 45 H x 92 mm D (1.8 x 3.6")
Weight: 454 g (1 lb)

To Order

Model No.	Description
DPF701	115 Vac/7.5 to 13 Vdc powered
DPF702	230 Vac/7.5 to 13 Vdc powered
Option Boards (Field Installable)	
DPF700-A3	Analog output board
DPF700-R	Dual 5A relay board
DPF700-232	RS232 output board

Accessories

Model No.	Description
DP40-BB-(*)	1/8 DIN bumper band
DPP-5	1/8 DIN panel punch

***** *Specify color code:* ***GY*** *(gray),* ***YL*** *(yellow),* ***BK*** *(black),* ***BL*** *(blue),* ***GR*** *(green),* ***RD*** *(red),* ***OR*** *(orange),* ***VL*** *(purple) or* ***WH*** *(white).*

Comes complete with gray BUMPER BAND™ protective rubber guard and operator's manual.

Ordering Examples: DPF701*, plus* ***DPF700-A3,*** *analog output board.*
DPF702*, plus* ***DP40-BB-YL****, yellow BUMPER BAND.*
DP40-BB-YL *is a yellow protective guard for 1/8 DIN meters.*

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FC-21

2 YEAR WARRANTY

FC-21 shown smaller than actual size.

68 x 138 mm (2.67 x 5.43") cutout

FC-22

2 YEAR WARRANTY

FC-22-V shown smaller than actual size.

- **Custody Transfer with Audit Trail**
- **Liquid, Gas, Steam, and Heat Flow Equations**
- **Menu-Selectable Inputs/Outputs**
- **Isolated Pulse and Analog Outputs**
- **RS232 Communications with Windows Setup Software**

OMEGA's FC-21 and FC-22 flow computers are useful in a variety of flowmeter applications. The FC-21 is suitable for liquid batching, volumetric batching, and corrected-volume applications. The FC-22 is designed for liquid, gas, steam, and heat applications. Both models can store multiple flow equations.

These versatile instruments are programmable from the front panel. During setup, the user can assign inputs and outputs. For example, the isolated analog output can monitor the volume flow, corrected-volume flow, mass flow, temperature, pressure, or density. The RS232 serial port allows for data logging, transaction printing, or connection to a modem for remote meter reading.

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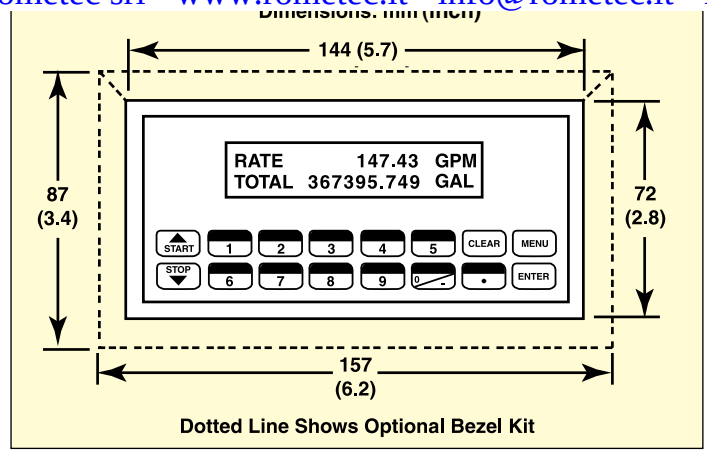
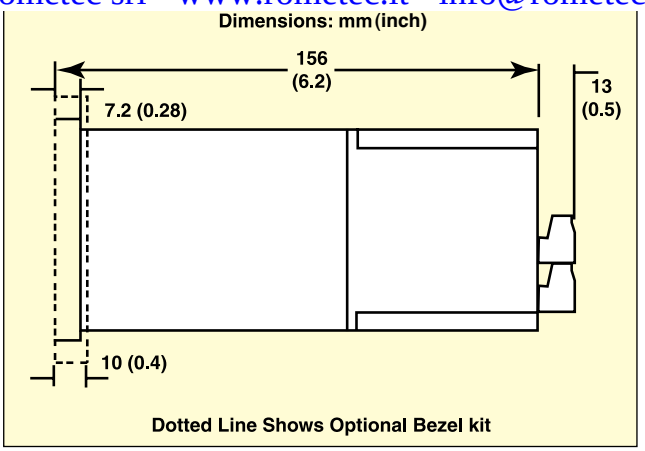


FC-21/22 Front Dimensions



FC-21/22 Side Dimensions

SPECIFICATIONS

Environmental

Operating Temperature: 0 to 50°C (32 to 122°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Relative Humidity: 0 to 95%, non-condensing
Display Type: Alphanumeric, 2 lines, 7.6 mm (0.3") characters, backlit LCD or VFD (specify at time of order)
Mounting: Panel, wall mount
Power Supply:
FC-21: 110, 220 Vac standard; 12 or 24 Vdc optional
FC-22: 85 to 275 Vac standard; 24 Vdc optional

Signal Inputs

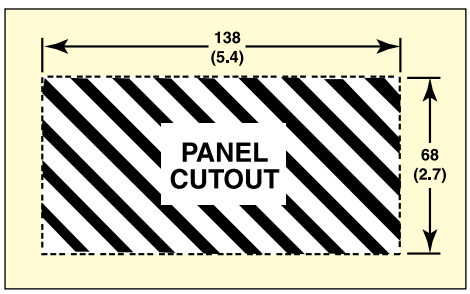
Pulse:
High-Level Pulse:
Low = 0 to 1 Vdc; high = 3 to 30 Vdc
Low-Level Pulse:
10 mV or 100 mV (magnetic pickup)
Frequency: Up to 20 kHz

Analog

Voltage: 0 to 10 Vdc, 0 to 5 Vdc, 1 to 5 Vdc (FC-21 only)
Current: 4 to 20 mA, 0 to 20 mA

Temperature Input

RTD: 100 Ω DIN RTD
Auxiliary/Compensation:
FC-21: Temperature, density
FC-22: 2 temperature, pressure, density
Excitation Voltage:
FC-21: Programmable—5 Vdc, 12 Vdc or 24 Vdc @ 100 mA
FC-22: Fixed @ 24 Vdc
Relays: Menu assignable for each relay; 2 SPDT relays rated 5 A, 240 Vac or 30 Vdc; Contact Flow Engineering for additional information
Isolated Output: Menu assignable
Analog: 4 to 20 mA; 1000 Ω maximum load
Pulse: Open collector; 24 Vdc (FC-22 only)



FC-21/22 Panel Cutout

OMEGACARE℠ Extended Warranty Program

OMEGACARE℠ extended warranty program is available for models shown on this page. Ask your sales representative for full details when placing an order. OMEGACARE℠ covers parts, labor and equivalent loaners.

To Order

Model No.	Description
FC-21	Multifunction flow computer for liquid applications
FC-22	Multifunction flow computer for liquid, gas, steam, and heat applications
FC-21-V	Multifunction flow computer with VFD display
FC-22-V	Multifunction flow computer with VFD display
FC-21-NEMA	Flow computer with NEMA 4 (IP65) wall mount
FC-22-NEMA	Flow computer with NEMA 4 (IP65) wall mount
FC-21-EXP	Flow computer factory mounted inside explosion-proof box (no button access)
FC-22-EXP	Flow computer factory mounted in explosion-proof box (no button access)

Options

Suffix	Description
-220VAC	220 Vac power option (optional for model FC-21, 85 to 275 Vac power standard on model FC-22)
-12VDC	12 Vdc power option (available for FC-21 only)
-24VDC	24 Vdc power option
-RS485	RS485 serial connector

Comes complete with operator's manual.
***Ordering Examples: FC-21,** multifunction flow computer for liquid applications.*
***OCW-3,** OMEGACARE℠ extends standard 2-year warranty to a total of 5 years.*
***FC-22**, multifunction flow computers for liquid, gas, steam and heat applications.*

M

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FD-400 Series

1 YEAR WARRANTY NIST CE

Standard

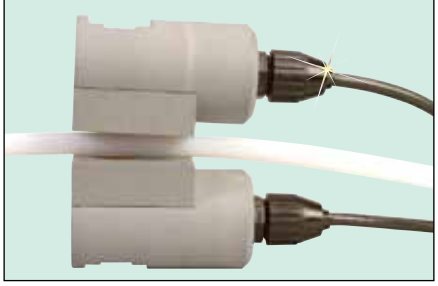
- Non-Intrusive, Clamp-On Transducer for Most Pipes from 6 to 3050 mm (⅓ to 120")
- Insertion Probe Transducer Also Available
- Wide Measuring Range of 0.05 to 9 mps (0.15 to 30 fps)
- Accuracy: ±2% of Calibrated Span
- Configuration and Total Stored in Non-Volatile Flash ROM
- NEMA 4X (IP66) Outdoor Enclosure
- Provisions for Up to 4 Meters in a Single Piping System
- NIST Certificate

FD-400, shown smaller than actual size.

The FD-400 Series ultrasonic doppler flowmeters measure the flow of liquids that contain sound reflectors, suspended solids, or gas bubbles larger than 100 microns. These sophisticated instruments automatically adjust filtering and gain settings to produce reliable readings in a wide range of liquid and reflector conditions.

The FD-400 flowmeter transmitts ultrasonic sound through the pipe wall or from the probe tip into the flowing liquid by using piezoelectric crystals contained in the transducer and probe tip. The sound is then reflected by sonic reflectors suspended in the liquid and recorded by the receiver. If the sonic reflectors are moving within the sound transmission path, sound waves will be reflected at a frequency shifted (Doppler frequency) from the transmitted frequency. The difference between the 2 frequencies is directly proportional to the speed of the sonic reflectors, resulting in a liquid flow rate that is converted to various user-defined units.

FD-400C-SML, shown smaller than actual size.



Configuration of the FD-400 is accomplished via the front-panel keypad. A 2-line backlit LCD displays rate and total in user-selected units. Power supply options include AC and DC. Optional outputs include 4 to 20 mA, relays, and rate pulse. Two transducer styles are available. The FD-400C clamp-on, non-intrusive transducer is recommended for most metal or plastic pipes. The FD-400C has a

FD-400C-STD, shown smaller than actual size.

NEMA 6P (IP68) rating and is available in a high-temperature version, “HT”. The user can place these clamp-on transducers up to 305 m (1000') from the display enclosure. The FD-400I insertion probe transducer should be used on piping systems that do not permit ultrasonic penetration. The FD-400I inserts into the pipe wall and comes into direct contact with the flowing liquid.

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SPECIFICATIONS

Measuring Principle:
Doppler ultrasonic
Flow Velocity Range:
0.05 to 9 mps (0.15 to 30 fps)
Accuracy:
±2% FS over calibrated span
Liquid Types: Liquids containing 100 ppm of useful sonic-suspended reflectors greater than 100 microns (see page E-4 for details)

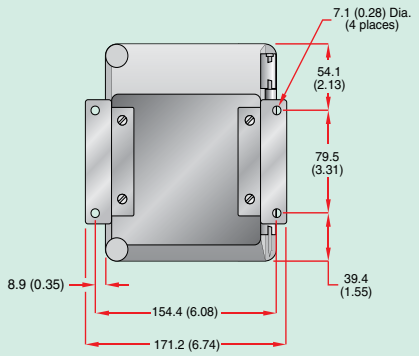
MONITOR

Enclosure: NEMA 4X (IP66), polycarbonate, stainless steel, brass, plated-steel mounting brackets
Dimensions: 178 H x 146 W x 99 mm D (7.00 x 5.75 x 3.88")
Power Supply: 115/230 Vac, 50/60 Hz ±15% @ 5 VA max; 12 to 28 Vdc @ 2.5 VA max
Display: 2-line x 8-character LCD; LED backlighting; top row, 7-segment 18 mm (0.7"); bottom row, 14-segment 9 mm (0.35"); 8-digit rate, 8-digit total (resettable)
Units: User configured—feet, gallons, ft^3, mil-gal, meters, liters, mil ft^3, m^3, mil-liters, acre-feet, oil barrels (42 gallon), liquor barrels (32.5 gallons), lb, kg
Rate:
Interval—second, minute, hour, day
Totalizer exponent: E^{-2} to E^{+6}
Response Time:
User selectable, 1 to 60 seconds
Outputs: 4 to 20 mA, 800 Ω max; internal or external power supply; 12-bit resolution; optically isolated
Dual Relay: Independently configured; form "C", 200 Vac @ 0.5 A resistive; rate alarm, totalizer pulse, error
Rate Pulse: 2 output types— 500 mVac [illegible] open collector 1 A at 100 V max
Multiple Meters: Synchronization provision included—used for multiple meter/single pipe system; up to 4 meters may be interconnected to 30 m (100') apart
Keypad: 4 pushbutton keys
Operating Temperature: General purpose, 40 to 85°C (40 to 185°F)

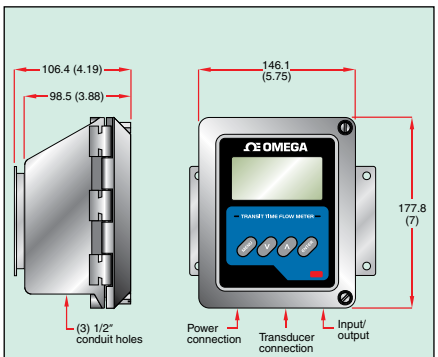
TRANSDUCERS

Type: Compression-mode ultrasonic, 625 kHz
Housing Material:
Standard Clamp-On: NEMA 6P (IP68), -40 to 100°C (-40 to 210°F), CPVC, Ultem®, nylon, PVC (cable jacket), aluminum (small pipe)
High-Temp Clamp-On: NEMA 4 (IP65), -40 to 200°C (-40 to 400°F), Vespel®, anodized aluminum, nickel-plated brass, PFA (cable jacket)
Doppler Probe: NEMA 6 (IP67) [illegible] nylon, PVC (cable jacket)
Optional Flexible Armored Conduit: Zinc-plated steel, PVC
Cable Length:
Standard Lengths:
6 m (20') standard

Wall Mount

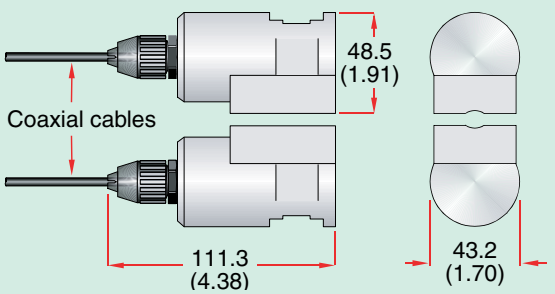


Dimensions: mm (in)

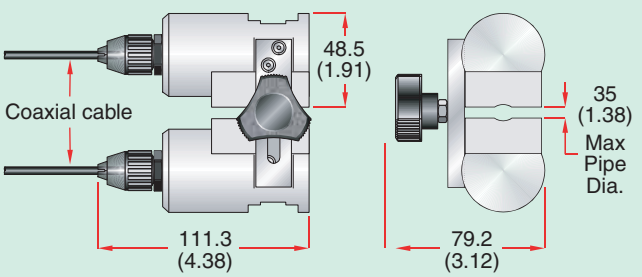


Dimensions: mm (in)

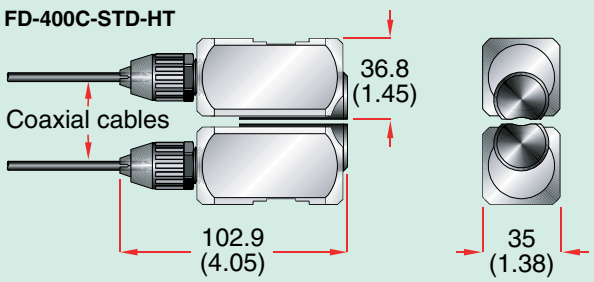
FD-400C-STD



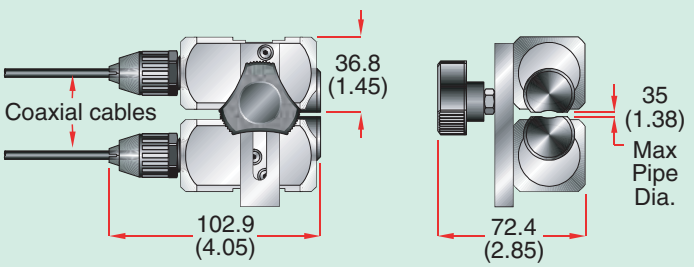
FD-400C-SML



FD-400C-STD-HT



FD-400C-SML-HT



Dimensions: mm (in)

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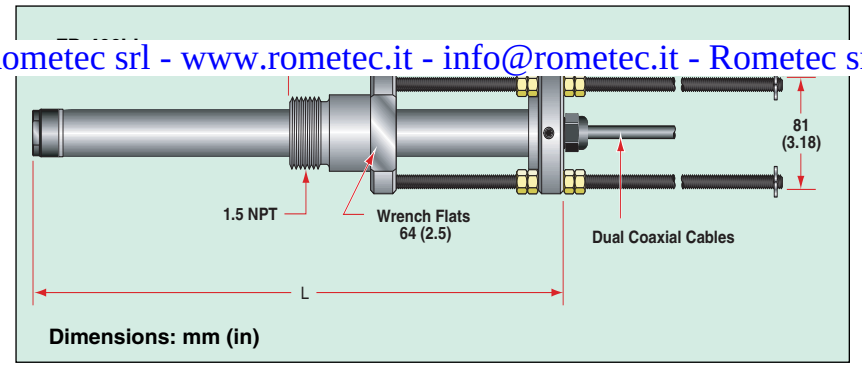

Dimensions: mm (in)

Model	L	C
FD-400I-8	241 (9.50)	287 (11.31)
FD400I-18	495 (19.50)	541 (21.31)
FD-400I-28	749 (29.50)	795 (31.31)
FD-400I-38	1003 (39.50)	1049 (41.31)
FD-400I-48	1257 (49.50)	1303 (51.31)

Rate Indicator/Totalizer (Transducer Sold Separately)

To Order *Visit omega.com/fd-400 for Pricing and Details*

Model No.	Description
FD-400	Ultrasonic rate and totalizer
FD-410	Rate and totalizer with 4 to 20 mA output
FD-411	Rate and totalizer with two 4 to 20 mA outputs
FD-412	Rate and totalizer with 4 to 20 mA and 2 relay outputs
FD-413	Rate and totalizer with 4 to 20 mA and pulse outputs
FD-420	Rate and totalizer with 2 relay outputs
FD-422	Rate and totalizer with 4 relay outputs
FD-423	Rate and totalizer with 2 relays and a pulse output
FD-430	Rate and totalizer with pulse output
FD-433	Rate and totalizer with 2 pulse outputs

Comes complete with wall mount bracket, NIST certificate and operator's manual.
*For units with 230 Vac power, add **"-230VAC"** to the model number, no extra charge.*
*For units with 24 Vdc power, add **"-24VDC"** to the model number, no extra charge.*
***Ordering Example: FD-400-230VAC**, ultrasonic rate and totalizer with 230 Vac power supply.*

Clamp-On Transducers and Accessories

Model No.	Description
FD-400C-STD	Standard-size clamp-on transducer set, 25 mm to 3 m (1 to 120")
FD-400C-SML	Small-pipe clamp-on transducer set, 6 to 25 mm (¼ to 1")
FD-400C-STD-HT	Standard-size clamp-on transducer set, 25 mm to 3 m (1 to 120")
FD-400C-SML-HT	Small-pipe clamp-on transducer set for up to 200°C (400°F), 6 to 25 mm (¼ to 1")

*For transducers with 50' cable, add **"-50FT"** to the model number for additional cost.*
*For transducers with 100' cable, add **"-100FT"** to the model number for additional cost.*
Armored cable and longer lengths available; consult Engineering.
***Ordering Example: FD-400C-STD-50FT,** standard-size clamp-on transducer set and 50' cable.*

Insertion-Style Transducers and Accessories

Model No.	Description
FD-400C-STD	Standard-size clamp-on transducer set, 25 mm to 3 m (1 to 120")
FD-400C-SML	Small-pipe clamp-on transducer set, 6 to 25 mm (¼ to 1")
FD-400C-STD-HT	Standard-size clamp-on transducer set, 25 mm to 3 m (1 to 120")
FD-400C-SML-HT	Small-pipe clamp-on transducer set for up to 200°C (400°F), 6 to 25 mm (¼ to 1")
FD-400I-8	Insertion transducer sensor 203 mm (8")
FD-400I-18	Insertion transducer sensor 457 mm (18")
FD-400I-28	Insertion transducer sensor 711 mm (28")
FD-400I-38	Insertion transducer sensor 965 mm (38")
FD-400I-48	Insertion transducer sensor 1.2 m (48")
FD-400I-CR-18	Insertion crank for FD-400I-18
FD-400I-CR-28	Insertion crank for FD-400I-28
FD-400I-CR-38	Insertion crank for FD-400I-38
FD-400I-CR-48	Insertion crank for FD-400I-48
FD-400I-BV	Bronze valve isolation kit 1½ NPT
FD-400I-SSV	Stainless steel valve isolation kit 1½ NPT

*For transducers with 15 m (50') cable, add **"-50FT"** to the model number for additional price..*
*For transducers with 130 m (100') cable, add **"-100FT"** to the model number for additional cost.*
Armored cable and longer lengths available; consult Engineering.

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ULTRASONIC FLOWMETERS

FD613 Series

1 YEAR WARRANTY NIST
Standard

- Non-Invasive Clamp-On Transducer
- For Liquids Containing Suspended Solids or Entrained Gases
- User-Selected Velocity Units (FPS or MPS)
- Measures Fluid Velocities from 0.3 to 30.0 FPS (0.10 to 9.00 MPS)
- 100:1 Turndown Ratio
- Pipe Sizes from 6.3 mm (0.25")
- CE Approval Optional
- Batteries Included
- NIST Certificate Standard

The FD613 Series flowmeter employs advanced trans-phase measuring technology, providing accurate and reliable flow velocity assessments in closed piping systems. The series uses a non-invasive clamp-on transducer that is placed on the outside of a pipe. Within seconds, the large 18 mm (0.7") LCD provides stable flow-rate readings in feet per second or meters per second. This product operates on metal or plastic pipes containing liquids with more than 100 ppm of 100 micron or larger suspended solids or entrained gases.

Principle of Operation

The FD613 Series flowmeter utilizes an advanced trans-phase measuring technique, providing accurate, non-invasive fluid velocity assessment without opening the pipe. The series uses two piezoelectric crystals contained within one transducer to transmit ultrasonic energy into the fluid stream and receive back energy reflected off discontinuities (suspended particles or entrained gases) within the moving liquid. Transformations that result from the energy reflections are processed and converted to a measurement of fluid velocity by the sophisticated software algorithm. The processor also controls all operations of the instrument from its ultra-efficient battery management circuitry to a proprietary FIR (finite impulse response) filtration program.

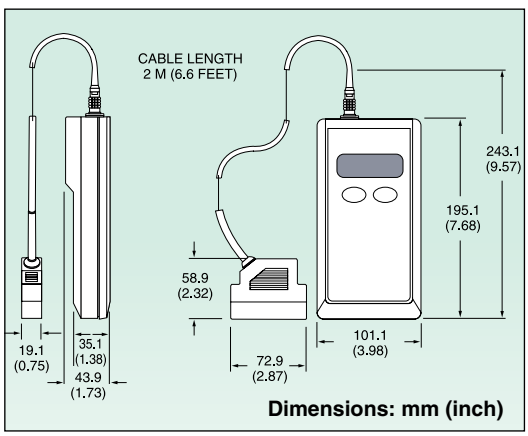
FD613-S2. FD613.

SPECIFICATIONS

Supply Voltage: Battery powered, non-rechargeable alkaline, four "AA" (included), providing over 30 hours of continuous operation
Flow Range: 0.30 to 30.00 FPS (0.10 to 9.00 MPS)
Display: Single line—four-digit LCD readout of velocity [18 mm (0.7") digits], signal strength, measuring units, and low battery indication
Temperature: -20 to 60°C (-28 to 140°F)
Enclosure Rating/Dimensions: NEMA 12X ABS plastic; 200 H x 100 W x 38 mm H (7.76 x 4 x 1.5")
Weight: 0.7 kg (1.5 lb)
Accuracy: ±2% FS

SENSOR SPECIFICATIONS

Transducer Material: Plated body; Ultem 1000 sensor material
Cable: 2 m (6.6') cable and connector
Temperature: -40 to 82°C (-40 to 180°F)
Humidity: 0 to 95% non-condensing
Mounting Method: Clamp-on style with Dow 111 coupling compound



Dimensions: mm (inch)

To Order

Model No.	Description
FD613	Handheld readout, sensor sold separately
FD614-CE	FD613 kit with CE approval w/sensor for pipes 1" dia. and larger
FD613 Sensors	
FD613-S1	Clamp-on sensor for ¼ to 1" diameter pipe (small pipe sensor has a two-piece clamp on head)
FD613-S2	Clamp-on sensor for pipes 1" diameter and larger
Accessories	
MN1500-4	Replacement Alkaline "AA" batteries (qty 4)

Comes complete with carrying case, silicone couplant, 4 "AA" batteries, NIST certificate and operator's manual.

***Ordering Examples: FD613,** flowmeter and **FD613-S1,** clamp-on sensor for ¼ to 1" pipe. **FD614-CE,** FD613 kit with CE approval.*

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FLOW FOR LIQUIDS

FDT-40 Series

1 YEAR WARRANTY

- **Bi-Directional Flow Measurement**
- **Rugged, Aluminum Enclosure**
- **Rate and Total Backlit Display**
- **4 to 20 mA and Dual Alarm Outputs**
- **USB Programming Port**
- **RS485 MODBUS® Network Connection**

FDT-40 and FDT-46-ANSI both shown smaller than actual size.

FDT-40 Series ultrasonic flow and energy meters clamp on to the outside of pipes and do not come in contact with the internal liquid. The technology has inherent advantages over alternate devices including: low-cost installation, no pressure head loss, no moving parts to maintain or replace, no fluid compatibility issue, and a large, bi-directional measuring range that ensures reliable readings even at very low and high flow rates. FDT-40 Series is available in a variety of configurations that permit the user to select a meter with features suitable to meet particular application requirements.

SPECIFICATIONS

System

Liquid Types: Most clean liquids or liquids containing small amounts of suspended solids or gas bubbles
Velocity Range: Bi-directional to greater than 40 FPS (12 MPS)
Flow Accuracy:
Larger Than 50 mm (2"): ±1% of reading or ±0.01 FPS (0.003 MPS), whichever is greater
25 to 50 mm (1 to 2"): ±1% of reading or ±0.04 FPS (0.012 MPS), whichever is greater
¾" (19 mm) and Smaller: ±1% of full scale
Sensitivity Flow: 0.001 FPS (0.0003 MPS)
Repeatability: 0.5% of reading

Transmitter

Power Requirements (AC): 95 to 264 Vac 47 to 63 Hz @ 17 VA maximum standard, 20 to 28 Vac 47 to 63 Hz @ 0.35 A maximum (**"-24VAC"** models), 10 to 28 Vdc @ 5 W maximum (**"-VDC"** models)
Protection: Auto resettable fuse, reverse polarity and transient suppression
Display: Two line LCD, LED backlit; top row 18 mm (0.7") height, 7-segment; bottom row 9 mm (0.35") height, 14-segment
Icons: RUN, PROGRAM, RELAY1, RELAY2
Flow Rate Indication: 8-digit positive, 7-digit negative maximum; auto decimal, lead zero blanking
Flow Totalizer: 8-digit positive, 7-digit negative maximum (re-set via keypad press, software, network command or momentary contact closure
Enclosure NEMA 4 (IP65) Construction: Powder-coated aluminum, polycarbonate, stainless steel, polyurethane, nickel-plated steel mounting brackets
Size (Electronic Enclosure Only): 152 W x 112 H x 56 mm D (6.0 x 4.4 x 2.2")
Conduit Holes: (2) ½ NPT female (1) ¾ NPT female
Temperature: -40 to 85°C (-40 to 185°F)
Configuration: Via optional keypad or PC running software (Note: not all configuration parameters are available from the keypad – i.e. flow and temperature calibration and advanced filter settings)
Engineering Units Flow Meter: Feet, gallons, cubic feet, million gallons, barrels (liquid and oil), acre-feet, lbs, meters, cubic meters, liters, million liters, kg
Inputs/Outputs USB 2.0: For connection of a PC running configuration utility
RS485: MODBUS RTU command set
4 to 20 mA: 12-bit, internal power, can span negative to positive flow/energy rates
0 to 1000 Hz: Open-collector, 12-bit, can span negative to positive rates; square-wave or turbine meter simulation outputs

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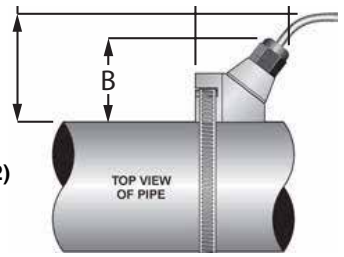
C (Min Clearance)



FDT-47, 48
Pipes larger than 50 (2)

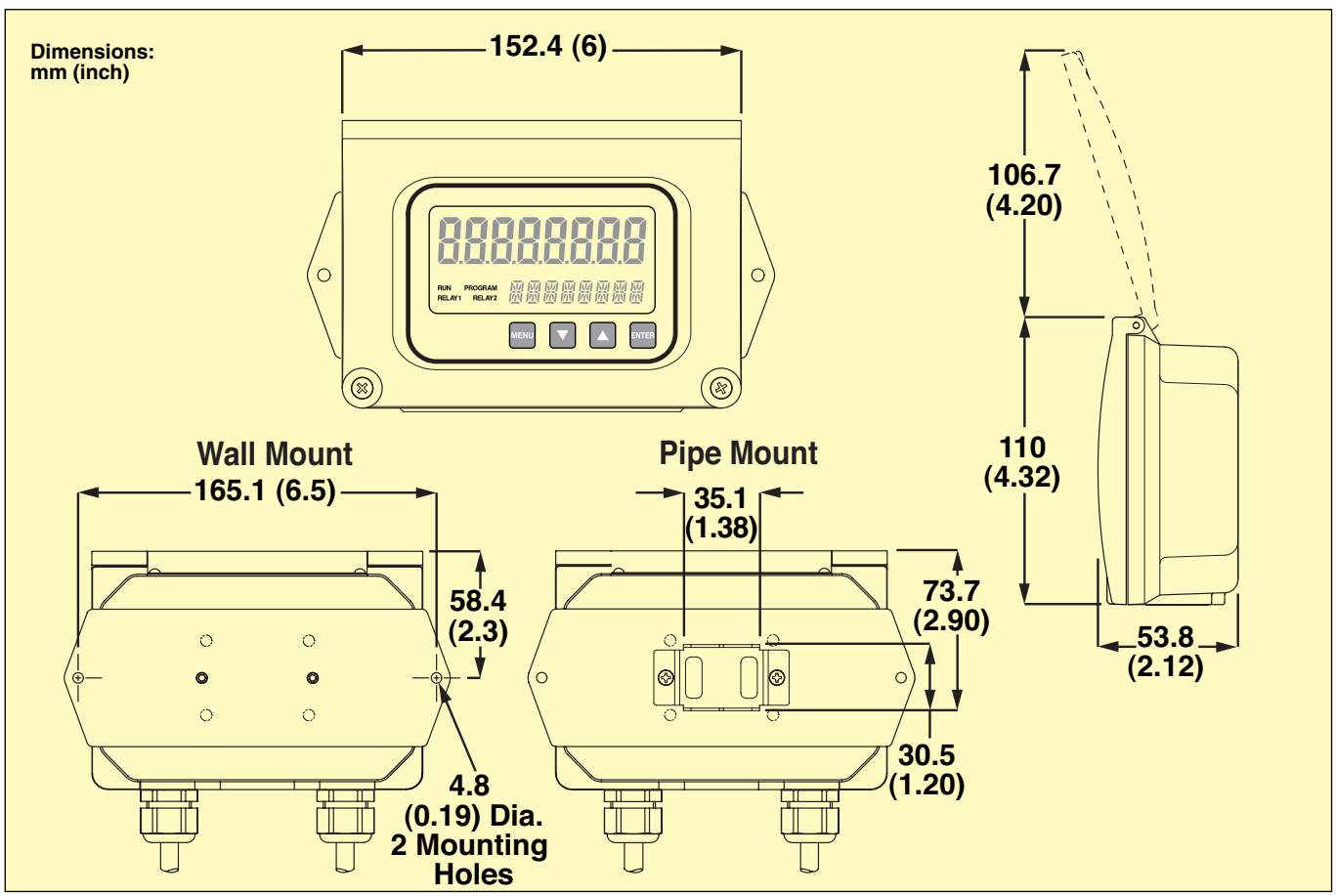
Dimensions: mm (inches)

Model No.	A	B	C
FDT-47 FDT-47-HT	74.9 (2.95)	69.8 (2.75)	76.2 (3)
FDT-48	86.4 (3.40)	74.7 (2.94)	81.3 (3.20)

Tranducer Dimensions: mm (inch)

Pipe Size	Pipe Material	A	B	C	D	Measuring Range
½"	ANSI/DN	62.5 (2.46)	59.9 (2.36)	67.6 (2.66)	21.3 (0.84)	2 to 38 GPM/8 to 144 LPM
	Copper	62.5 (2.46)	59.9 (2.36)	84.6 (3.33)	15.9 (0.63)	1.8 to 27 GPM/7 to 102 LPM
	Tubing	62.5 (2.46)	57.9 (2.28)	94.5 (3.72)	12.7 (0.50)	1.5 18 GPM/6 to 68 LPM
¾"	ANSI/DN	62.5 (2.46)	65.3 (2.57)	67.6 (2.66)	26.7 (1.05)	2.75 to 66 GPM/10 to 250 LPM
	Copper	62.5 (2.46)	63.5 (2.50)	90.4 (3.56)	22.2 (0.88)	2.5 to 54 GPM/10 to 204 LPM
	Tubing	62.5 (2.46)	63.5 (2.50)	90.4 (3.56)	19 (0.75)	2.5 to 45 GPM/10 to 170 LPM
1"	ANSI/DN	62.5 (2.46)	74.2 (2.92)	72.6 (2.86)	33.4 (1.32)	3.5 to 108 GPM/13 to 409 LPM
	Copper	62.5 (2.46)	72.9 (2.87)	96.5 (3.80)	28.6 (1.13)	3.5 to 95 GPM/13 to 320 LPM
	Tubing	62.5 (2.46)	69.9 (2.75)	96.5 (3.80)	25.4 (1)	3.5 to 85 GPM/13 to 320 LPM
1¼"	ANSI/DN	71 (2.80)	80.8 (3.18)	79.8 (3.14)	42.2 (1.66)	5 to 186 GPM/19 to 704 LPM
	Copper	62.5 (2.46)	76.2 (3)	102.6 (4.04)	43.9 (1.38)	4.5 to 152 GPM/17 to 575 LPM
	Tubing	62.5 (2.46)	76.2 (3)	102.6 (4.04)	31.8 (1.25)	4 to 136 GPM/15 to 514 LPM
1½"	ANSI/DN	76.7 (3.02)	86.9 (3.42)	84.6 (3.33)	48.3 (1.90)	6 to 250 GPM/23 to 946 LPM
	Copper	68.8 (2.71)	72.6 (2.86)	108.7 (4.28)	41.3 (1.63)	5 to 215 GPM/19 to 814 LPM
	Tubing	68.8 (2.71)	84.1 (3.31)	108.7 (4.28)	38.1 (1.5)	5 to 200 GPM/19 to 757 LPM
2"	ANSI/DN	94 (3.70)	86.9 (3.42)*	139.7 (5.50)	60.3 (2.375)*	8 to 420 GPM/30 to 1590 LPM
	Copper	94 (3.70)	85.9 (3.38)*	139.7 (5.50)	54 (2.125)*	8 to 375 GPM/30 to 1419 LPM
	Tubing	81.5 (3.21)	98 (3.85)	120.7 (4.75)	50.8 (2)	8 to 365 GPM/30 to 1381 LPM

** Varies due to u-bolt configuration.*



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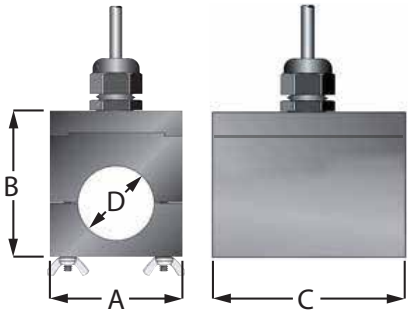
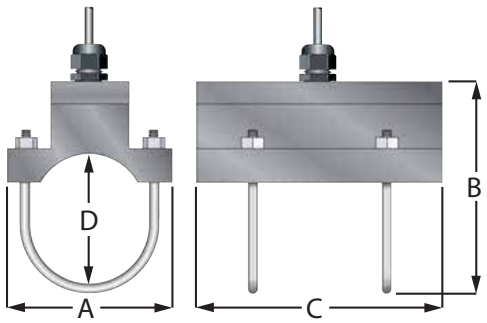
FDT-41 thru FDT-46 (except U-bolt)
Pipes/Tubing 12 to 50 mm (1/2 to 2")



FDT-46-ANSI, -CP U-bolt Connections
ANSI/DN and Copper 50 mm (2") Models



Two Alarm Outputs: Open-collector, configure as rate alarm, signal strength alarm or totalizer pulse

Transducers

Construction

Standard (FDT-41 thru 46): NEMA 6 (IP67), PVC, PEI, Nylon cord grip, PVC cable jacket
Temperature: -40 to 60°C (-40 to 140°F)
FDT-41 thru 46 with "-HT" option, FDT-47 and FDT-48: NEMA 6 (IP67), CPVC, PEI, Nylon cord grip, PVC cable jacket
Temperature: -40 to 90°C (-40 to 194°F)
FDT-47 "-HT": NEMA 6 (IP67), PTFE, polyimide, Nickel-plated brass cord grip, PFA cable jacket
Temperature: -40 to 176°C (-40 to 350°F)

Frequency:

FDT41 thru 46: 2 MHz
FDT-47: 1 MHz
FDT-48: 500 KHz

Cables: RG59 coaxial, 75 Ω or twin axial, 78 Ω (optional armored conduit)
Cable Length: Standard 6 m (20') 300 m (990') maximum in 3 m (10') increments

Software Utilities

Utilized to configure, calibrate and troubleshoot flowmeters. Connection via USB A/B cable; software is compatible with Windows 2000, Windows XP, Windows Vista® and Windows® 7

RS485 Network

All FDT-40 meters come equipped with RS485 drivers and utilize a MODBUS RTU command set (data can be returned in single-precision, double-precision, integer or floating point values). Up to 126 units products can be run on a single daisy-chain network and be individually queried for flow rate, positive flow accumulator, negative flow accumulator and signal strength. Flow accumulators can be cleared at discrete addresses or globally. The RS485 network is also compatible with direct to Excel, application.

To Order

Model No.	Desription
FDT-40	Flow meter display 95 to 264 Vac
FDT-40-VDC	Flow meter display 10 to 28 Vdc
FDT-40-24VAC	Flow meter display 24 Vac

Comes complete with operator's manual.

Transducers Accessories (Display Sold Separately)

Model No.	Description
FDT-41-ANSI-HT	Remote High Temperature transducer for ½" ANSI pipe
FDT-42-ANSI-HT	Remote High Temperature transducer for ¾" ANSI pipe
FDT-43-ANSI-HT	Remote High Temperature transducer for 1" ANSI pipe
FDT-44-ANSI-HT	Remote High Temperature transducer for 1¼" ANSI pipe
FDT-45-ANSI-HT	Remote High Temperature transducer for 1½" ANSI pipe
FDT-46-ANSI-HT	Remote High Temperature transducer for 2" ANSI pipe
FDT-41-CP-HT	Remote High Temperature transducer for ½" copper pipe
FDT-42-CP-HT	Remote High Temperature transducer for ¾" copper pipe
FDT-43-CP-HT	Remote High Temperature transducer for 1" copper pipe
FDT-44-CP-HT	Remote High Temperature transducer for 1¼" copper pipe
FDT-45-CP-HT	Remote High Temperature transducer for 1½" copper pipe
FDT-46-CP-HT	Remote High Temperature transducer for 2" copper pipe
FDT-41-TUBE-HT	Remote High Temperature transducer for ½" tubing
FDT-42-TUBE-HT	Remote High Temperature transducer for ¾" tubing
FDT-43-TUBE-HT	Remote High Temperature transducer for 1" tubing
FDT-44-TUBE-HT	Remote High Temperature transducer for 1¼" tubing
FDT-45-TUBE-HT	Remote High Temperature transducer for 1½" tubing
FDT-46-TUBE-HT	Remote High Temperature transducer for 2" tubing
FDT-47-HT	Remote High Temperature transducer for 2 to 24" pipe
FDT-48	Remote transducer for pipes over 24"
FDT-40-PC-CABLE	Optional USB PC programming cable
FDT-GREASE	Replacement acoustic couplant 150 g (5.3 oz)
FDT-HT-GREASE	High temperature acoustic couplant 56 g (2 oz)
FDT-NS-GREASE	Non-silicone acoustic couplant 79 g (2.8 oz)

Transducers come with mounting gel.
*For transducers with 30 m (100') cable add **"-100FT"** to the transducer model number for additional cost.*
***Ordering Example: FDT-40,** flowmeter display/electronics 95 to 264 Vac, and **FDT-42-ANSI** remote transducer for ¾" ANSI pipe.*

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In-Line Ultrasonic Flow Meter

NEW

FDT500 Series

1 YEAR WARRANTY | NIST | CE

Standard

- Displays Flow Rate and Total
- Extended Low Flow Range
- Virtually No Pressure Loss
- No Moving Parts
- NIST 3-Point Calibration Included
- Battery Powered
- USB/RS232 (Optional)
- Analog Output (Optional)
- Pressure Output (Optional)

FDT503 shown smaller than actual size.

The FDT500 Series comprises advanced-technology water flow meters. This series uses transit-time ultrasonic technology in which the signal is transmitted and received alternately between 2 flow sensors and the "time of flight" determines the flow rate. The battery-powered transmitter comes in the user's choice of an integrally mounted display or a remote-mount version. Applications include both commercial and consumable water measurement. Long-term stability and a wide measurement range make it possible not only to measure water consumption, but also to monitor systems for water leakage. Because the FDT500 Series has no moving parts, system pressure loss is minimal and filtration is not required. Display flow rate or total at the push of a button. Installation is aided by 150-lb ANSI flanges in sizes from 2 to 8" or 32 to 200 DN.

Specifications

Accuracy: ±2% of reading; ±5% below minimum transition rate
Fluid Temperature: 0 to 50°C (32 to 122°F) for INTEGRAL version, 0 to 90°C (31 to 190°F) for REMOTE version
Maximum Pressure: 230 psig
Enclosure: IP68
Electronic Housing: Aluminum alloy with plastic cover
Display: 7-segment, 8-digit, single-line LCD
Current Output (-A): 4 to 20 mA/DC current (requires 8 to 24 Vdc supply) (optional)
Open Collector Output: 5 to 30 Vdc, 1 mA maximum
Flange: ANSI 150# or DIN
Meter Body: Cast iron
Power Supply: Internal 3.6V battery (included), 6 to 8 year life

ANSI Size Rate Information							
ANSI Flange Size	2	2½	3	4	5	6	8
Overload Flow Rate [GPM]	130	220	350	530	880	1320	1585
Nominal Flow Rate [GPM]	65	110	175	265	440	660	1100
Transitional Flow Rate [GPM]	13	22	35	53	88	132	220
Minimum Flow Rate [GPM]	2	3.3	5.3	8	13.2	20	33
Pulse Output Constant [gal/pulse]	5	10	10	15	30	30	30

DIN Size Rate Information									
DIN Flange Size	32	40	50	65	80	100	125	150	200
Overload Flow Rate [m³/h]	12	20	30	50	80	120	200	300	360
Nominal Flow Rate [m³/h]	6	10	15	25	40	60	100	150	250
Transitional Flow Rate [m³/h]	0.48	0.8	3	5	8	12	20	30	50
Minimum Flow Rate [m³/h]	0.12	0.2	0.45	0.75	1.2	1.8	3	4.5	7.5
Pulse Output Constant [l/pulse]	10	25	25	50	50	100	100	100	100

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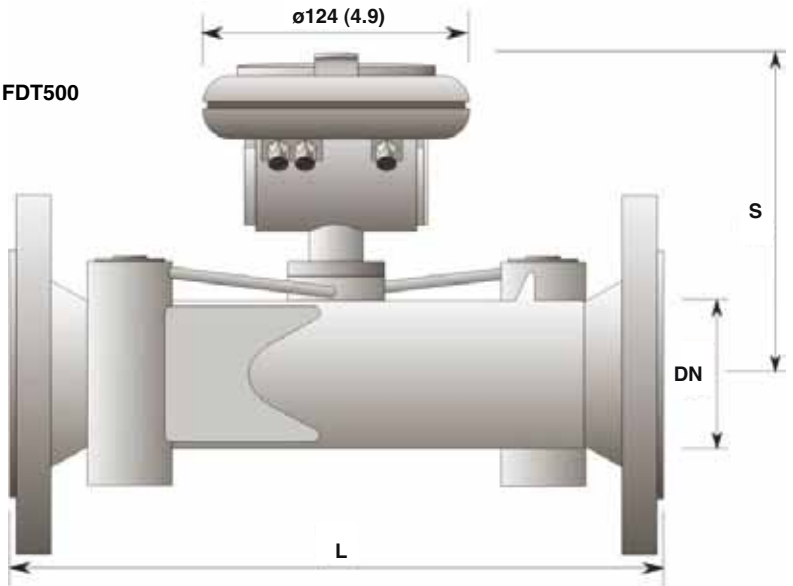
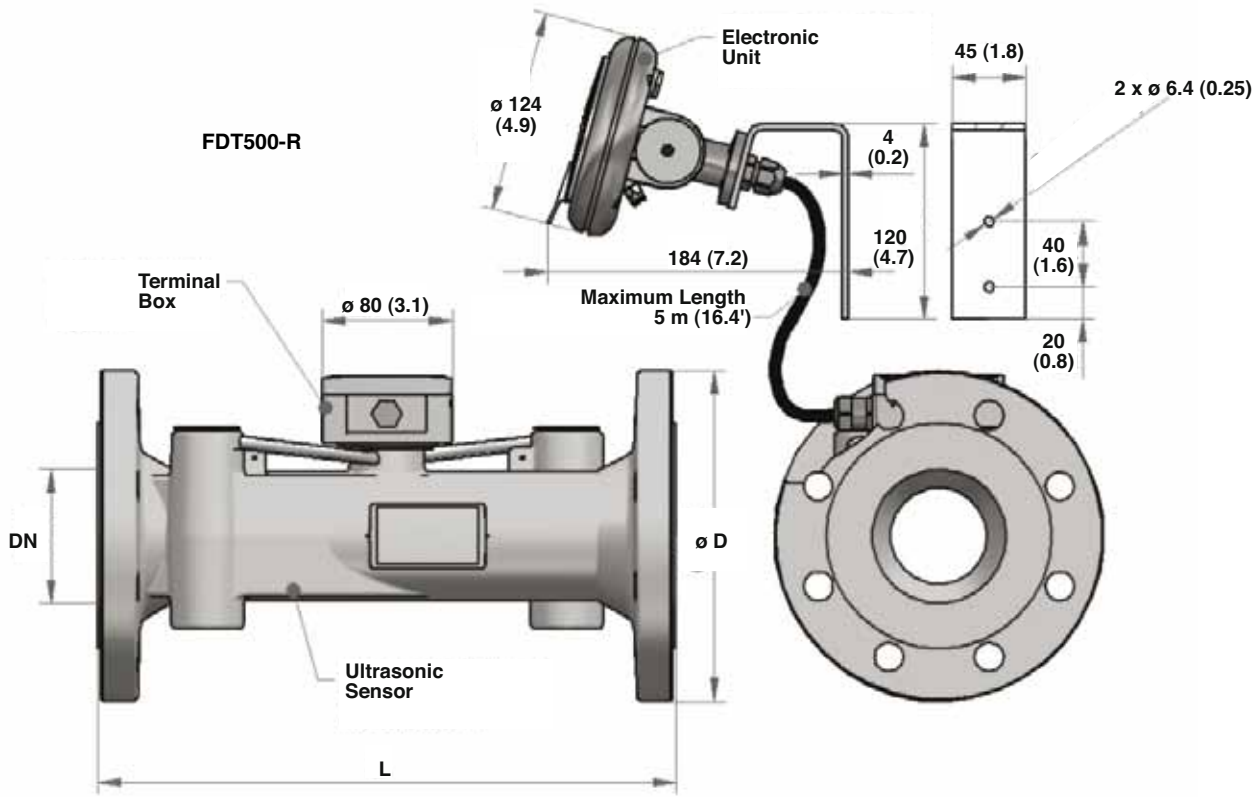
FDT500



mm (inch)
ø = diameter

FDT500-R



mm (inch)

Model No.	FDT501	FDT502	FDT503	FDT504	FDT505	FDT506	FDT507	FDT508	FDT509
DN (inch)	32 (NA)	40 (NA)	50 (2)	65 (2.5)	80 (3)	100 (4)	125 (5)	150 (6)	200 (8)
L mm (inch)	260 (10.2)	300 (11.8)	300 (11.8)	300 (11.8)	350 (13.8)	350 (13.8)	350 (13.8)	350 (13.8)	350 (13.8)
S mm (inch)	140 (5.5)	145 (5.7)	150 (5.9)	155 (6.1)	160 (6.3)	165 (6.5)	180 (7.1)	190 (7.5)	205 (8.1)
Weight kg (lb)	7 (15.4)	8 (17.6)	10 (22)	11 (24.2)	15 (33)	17.5 (38.6)	22.5 (49.6)	26 (57.3)	36.5 (80.4)
Ø D mm (inch)	140 (5.5)	150 (5.9)	165 (6.5)	185 (7.3)	200 (7.9)	220 (8.7)	250 (9.8)	285 (11.2)	340 (13.4)

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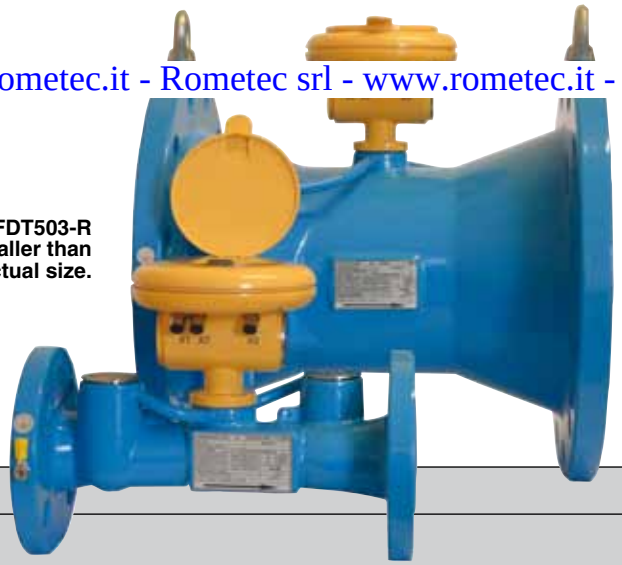

FDT503 and FDT503-R shown smaller than actual size.

To Order

Model No.	150# ANSI Flange Size cm (in)	Description
FDT503	5 (2)	Battery-powered ultrasonic flow meter
FDT504	6.3 (2.5)	Battery-powered ultrasonic flow meter
FDT505	7.6 (3)	Battery-powered ultrasonic flow meter
FDT506	10.2 (4)	Battery-powered ultrasonic flow meter
FDT507	12.7 (5)	Battery-powered ultrasonic flow meter
FDT508	15.2 (6)	Battery-powered ultrasonic flow meter
FDT509	20.3 (8)	Battery-powered ultrasonic flow meter
FDT503-R	5 (2)	Battery-powered ultrasonic flow meter with remote display
FDT504-R	6.3 (2.5)	Battery-powered ultrasonic flow meter with remote display
FDT505-R	7.6 (3)	Battery-powered ultrasonic flow meter with remote display
FDT506-R	10.2 (4)	Battery-powered ultrasonic flow meter with remote display
FDT507-R	12.7 (5)	Battery-powered ultrasonic flow meter with remote display
FDT508-R	15.2 (6)	Battery-powered ultrasonic flow meter with remote display
FDT509-R	20.3 (8)	Battery-powered ultrasonic flow meter with remote display
Model No.	**DIN Size**	**Description**
FDT501-DIN	32	Battery-powered ultrasonic flow meter
FDT502-DIN	40	Battery-powered ultrasonic flow meter
FDT503-DIN	50	Battery-powered ultrasonic flow meter
FDT504-DIN	65	Battery-powered ultrasonic flow meter
FDT505-DIN	80	Battery-powered ultrasonic flow meter
FDT506-DIN	100	Battery-powered ultrasonic flow meter
FDT507-DIN	125	Battery-powered ultrasonic flow meter
FDT508-DIN	150	Battery-powered ultrasonic flow meter
FDT509-DIN	200	Battery-powered ultrasonic flow meter
FDT501-R-DIN	32	Battery-powered ultrasonic flow meter with remote display
FDT502-R-DIN	40	Battery-powered ultrasonic flow meter with remote display
FDT503-R-DIN	50	Battery-powered ultrasonic flow meter with remote display
FDT504-R-DIN	65	Battery-powered ultrasonic flow meter with remote display
FDT505-R-DIN	80	Battery-powered ultrasonic flow meter with remote display
FDT506-R-DIN	100	Battery-powered ultrasonic flow meter with remote display
FDT507-R-DIN	125	Battery-powered ultrasonic flow meter with remote display
FDT508-R-DIN	150	Battery-powered ultrasonic flow meter with remote display
FDT509-R-DIN	200	Battery-powered ultrasonic flow meter with remote display

Accessory

Model No.	Description
FDT500-BAT	Replacement battery for the FDT500 Series

Comes complete with operator's manual, 3.6V battery, and NIST 3-point calibration.
*For a 4-point NIST calibration, add suffix **"-NIST4"** to model number for additional cost. For an 8-point NIST calibration, add suffix **"-NIST8"** to model number for additional cost.*

*For units with communications option add **"-OPT"** to the model number for additional cost.*

*For units with analog output add **"-A"** to model number for additional cost.*

*For units with fluid pressure output add **"-PS"** to model number for additional cost.*

***Ordering Examples: FDT504-R,** 2½" 150# ANSI flanged ultrasonic flow meter with remote display.*

***FDT506**, 4" 150# ANSI flanged ultrasonic flow meter with integral display.*

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Transit-Time Ultrasonic Flow Meter for Clean Liquids

FDT7025 shown actual size.

FDT7000 Series

1 YEAR WARRANTY

- **LCD Display**
- **4 to 20 mA Output [50 mm (2") Size and Smaller Only]**
- **RS485 Communications (Modbus®)**
- **For Most Clean Liquids**
- **Rate and Total**
- **Enclosure NEMA 3 (IP54)**
- **Easy Installation**

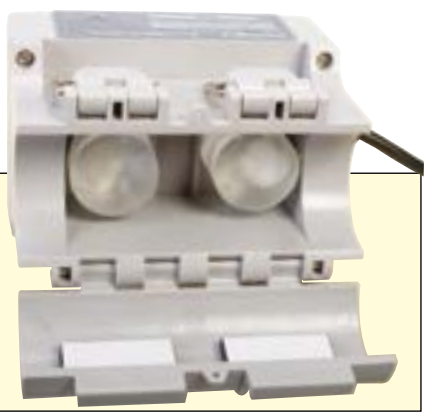
FDT7000 Series ultrasonic flow meter is known for easy installation with its snap-clamp on pipe transducer body sensors do not come in contact with the internal liquid. The technology has inherent advantages over alternate ultrasonic devices including: low-cost, easy installation, no pressure head loss, no moving parts to maintain or replace, no fluid compatibility issue, and a wide measuring range that ensures reliable readings from 0.3 to 19 feet/sec (0.1 to 6.0 m/sec). The series is designed to work on PVC, PP and UPVC pipe systems.

The flow meter is equipped with a ground referenced 4 to 20 mA output—the output shares a common ground with the power supply. The output transmits a continuous current output that is proportional to liquid flow rate. The output was scaled at the factory to ensure that the instrument or data acquisition system that is receiving the 4 to 20 mA signal responds properly, it must be spanned identically to the flow.

The 4 to 20 mA output is designed to source current across a loop resistance that is typically located within a data acquisition system or other receiving instrument. The maximum resistance that the flow can accommodate is directly related to the DC power source that is powering the flow meter and the 4 to 20 mA loop.

Specifications

Flow Range: 0.3 to 19 ft/s (0.1 to 6 m/s)
Accuracy: ±1.5% FS
Repeatability: 0.3%
Measuring Liquid: Clean water based
Pipe Material: PVC-U/PP-R
Protection Rate: NEMA 3 (IP54)
Power Supply: 10 to 36 Vdc, at 500 mA maximum
Output: 4 to 20 mA (zero to full scale) [50 mm (2") size and smaller only)
Communications: RS485 (Modbus)
Temperature Range:
Transmitter/Transducer: 0 to 50°C (32 to 122°F)
Humidity: Up to 99% RH non-condensing
Transmitter: ABS plastic enclosure
Power Supply Cable: 3 m (9.8') standard
Display: LCD display
Weight: 0.5 kg (1.10 lb)



FDT7025 back view.

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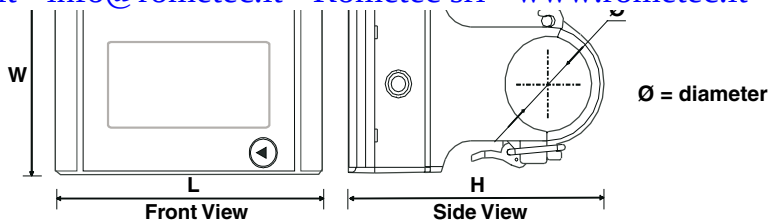
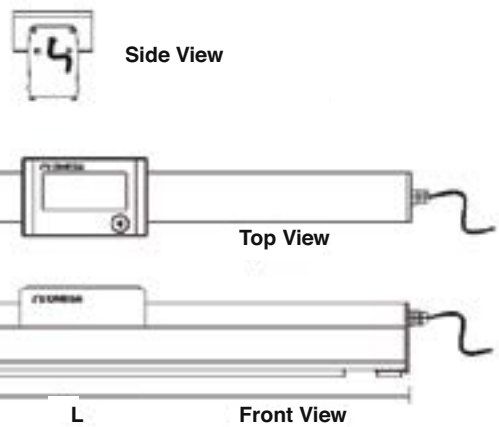


Dimensions: mm (inch)

Model No.	DIN Size	Pipe OD Ø	Pipe ID	L	W	H
FDT7020	20	20 (0.75)	13.8 to 17 (½)	100 (4)	63 (2.5)	88 (3.5)
FDT7025	25	25 (1)	18.8 to 22 (¾)	100 (4)	63 (2.5)	93 (3.6)
FDT7032	32	32 (1.25)	24.2 to 29 (1)	100 (4)	63 (2.5)	100 (4)
FDT7040	40	40 (1.5)	31 to 37 (1¼)	134 (5.3)	63 (2.5)	108 (4.3)
FDT7050	50	50 (2)	38 to 47 (1½)	134 (5.3)	63 (2.5)	118 (4.6)
FDT7063	63	63 (2.5)	48.5 to 59 (2)	134 (5.3)	63 (2.5)	131 (5.6)



Dimensions: mm (inch)

Model No.	W	w	H	h	L
FDT7065 to FDT7200	63 (2.5)	40 (1.5)	72 (2.8)	60 (2.4)	335 (13.2)
FDT7250 to FDT7300	63 (2.5)	40 (1.5)	72 (2.8)	60 (2.4)	525 (21)

To Order

Model No.	Pipe OD DIN (inch)	Description	Flow Range GPM (LPM)
FDT7020	20 (¾)	Snap-on transit-time ultrasonic flow meter	0.15 to 14.66 (5.6 to 55.49)
FDT7025	25 (1)	Snap-on transit-time ultrasonic flow meter	0.26 to 25.66 (9.8 to 97.13)
FDT7032	32 (1¼)	Snap-on transit-time ultrasonic flow meter	0.40 to 40.32 (15.3 to 152.6)
FDT7040	40 (1½)	Snap-on transit-time ultrasonic flow meter	0.70 to 69.6 (26.4 to 263.4)
FDT7050	50 (2)	Snap-on transit-time ultrasonic flow meter	1.10 to 109.98 (41.7 to 416.3)
FDT7063	63 (2½)	Snap-on transit-time ultrasonic flow meter	1.84 to 183.30 (69.4 to 693.8)
FDT7065	65 (2½)	V-Track transit-time ultrasonic flow meter	3 to 291 (11 to 1100)
FDT7080	80 (3)	V-Track transit-time ultrasonic flow meter	4 to 419 (15.8 to 1580)
FDT7100	100 (4)	V-Track transit-time ultrasonic flow meter	8 to 745 (28 to 2800)
FDT7150	150 (6)	V-Track transit-time ultrasonic flow meter	17 to 1676 (63 to 6300)
FDT7200	200 (8)	V-Track transit-time ultrasonic flow meter	30 to 2980 (112 to 11,200)
FDT7250	250 (10)	V-Track transit-time ultrasonic flow meter	47 to 4656 (175 to 17,500)
FDT7300	300 (12)	V-Track transit-time ultrasonic flow meter	67 to 6705 (254 to 25,400)

Comes complete with accoustic gel and operator's manual.

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SCREW GEAR FLOWMETER

For High Viscosity Liquids

NEW

FHG-1000 Series

1 YEAR WARRANTY

- Pulsation-Free Measurement
- Lowest Pressure Loss for High Viscosity
- Short Response Time
- Up to 1,000,000 Centistoke Viscosity
- High Accuracy and Wide Ranges

FHG-1000 shown smaller than actual size.

F

FHG-1000 flowmeters measure the flow rate based on the screw pump principle. A pair of rotors fitted precisely into the housing constitutes the measuring element. An integrated gear and non-contact signal pick-up system detects the rotations of the measuring element and converts them to digital pulses. Together with the housing walls, the rotor edges form closed measuring chambers in which the fluid is transported from the inlet to the outlet side. The fluid volume put through within one main rotor rotation is the rotation volume, which is divided by the sensing gear and digitized, processed and output in the sensor module.

Sensor System Explanation

The non-contact pick-up system consists of two GMR-bridges (sin/cos), which are located in a sensor unit in cartridge design. It detects the movement of the sensing gear and routes the sin/cos-signals to the preamplifier electronics. The preamplifier electronics digitize and amplify the sensor signals and multiply them by a high-resolution interpolator using adjustable settings. The square wave signals are bidirectional and can be utilized by any evaluating instrument as well as computers and PLC-controls. The resolution is selectable in steps from factor 1 to 128. In case of an 1-channel evaluation, a separate directional signal is available. An adjustable pulse filter can offset and suppress negative flows (e.g. generated by vibrations) while still in the device. The frequency of the output signals is proportional to the flow (volume flow) and depends on the respective flowmeter size. The frequency range is from 0 to 100 kHz. The preamplifier is protected against reverse polarity and incorrect connection. It is suitable for fluid temperatures of -30 to 120°C (-22 to 248°F) and is mounted directly on the flowmeter.

Flowmeter Selection

For the trouble-free, safe and reliable operation of the flowmeters, selecting the correct type and size is critical. Because of the wide variety of applications and flowmeter designs, the technical data in the specifications are of a general nature. Certain properties of the devices depend on type, size, and measurement range as well as the liquid to be measured. Please contact the OMEGA Flow Department for detailed information about the appropriate flowmeter for your particular application.

Electronics

A special sensor system detects any movement of the pair of rotors or of the liquid column. For this purpose, a precision gear connected to a shaft of the rotor pair is scanned by a special magneto-resistive sensor. The scanning sensor includes two GMR-bridges (sin/cos) and is housed in a removable stainless steel cartridge case together with a signal conditioning and amplifier unit. The downstream electronics unit features a high-resolution sin/cos-interpolator, which is adjustable with 10 different resolution factors. Furthermore, a programmable signal filter is available as well, which can offset unwanted negative pulse sequences up to an adjustable degree. In addition, a signal for a separate direction detection, e.g. in case of a 1-channel evaluation, is provided by the electronics. Optionally, this output can be used for the detection of excess flows and temperatures.

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SPECIFICATIONS

Frequency Range: 0 to 100 kHz, adjustable

Measurement Accuracy: ±0.5% of measured value with viscosity of > 21 cSt

Repeatability Accuracy: ±0.05% with same operating conditions

Materials

Gray Cast Iron Model: EN-GJS-400-15 (EN 1563)/16 Mn Cr 5

Stainless Steel Model: Stainless steel 1.4305/1.4112, others available upon request

Bearing Fluid: Dependent as anti-friction bearing or SSIC/ wolfram carbide friction bearing

Seal:

Standard: FPM

Optional: PTFE, NBR or EPDM

Fluid Temperature: -30 to 120°C (-22 to 248°F)

Installation Position: Any

Supply Voltage: 10 to 28 Vdc

Current Consumption: 65 mA at 24 Vdc unloaded

Delay: < 8 µs

Protection Class: IP65

Power Supply

Supply Voltage: u = 10 to 28 Vdc; reverse pole protection

Current Consumption: I_0 = 65 mA (at 24 Vdc); unloaded

Delay: t_V = 8 µs maximum (between scanning and measured value)

Signal Outputs

Output Signal Shape: Quadrature signals (A, B with 90° phase shift)

Directional Output: Positive high (24V), negative low (0.8 to 1V)

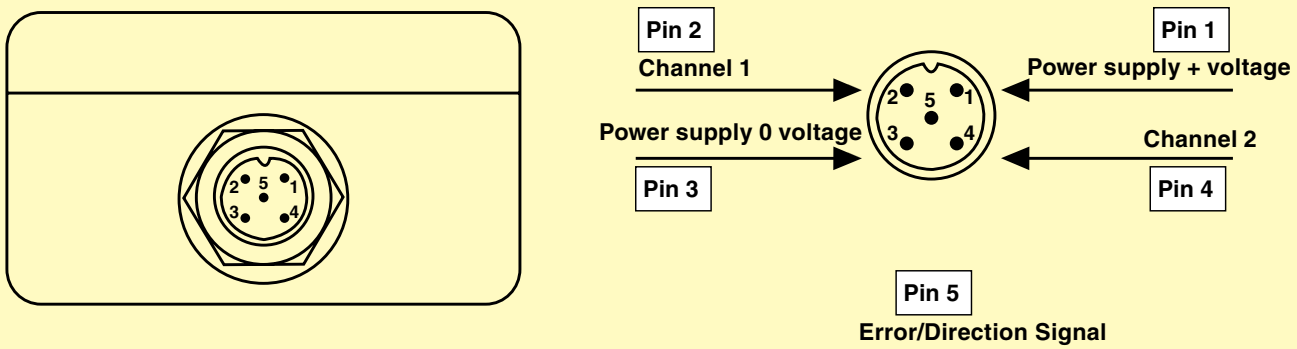
Error Output: Active high (24V), inactive low (0.8 to 1V)

Maximum Output Frequency: 100 kHz

Signal Voltage Output: V_{SS} = 9 to 27 Vdc (channel 1, channel 2, error/direction)

Signal Output: Current I_{out} = 300 mA maximum at 24 Vdc (channel 1, channel 2)

Pin Assignment



To Order

Model No.	Flow Range LPM (GPM)	Housing Material	Bearing Type	Flange Connection
FHG-1112	0.5 to 120 (0.13 to 32)	Cast iron	Ball	SAE Metric ¾" 6000 psi
FHG-1122	0.5 to 120 (0.13 to 32)	Cast iron	Hard metal	SAE Metric ¾" 6000 psi
FHG-1212	0.5 to 120 (0.13 to 32)	Stainless steel	Ball	SAE Metric ¾" 6000 psi
FHG-1222	0.5 to 120 (0.13 to 32)	Stainless steel	Hard metal	SAE Metric ¾" 6000 psi
FHG-1114	1 to 500 (0.26 to 132)	Cast iron	Ball	SAE Metric 1¼" 6000 psi
FHG-1124	1 to 500 (0.26 to 132)	Cast iron	Hard metal	SAE Metric 1¼" 6000 psi
FHG-1214	1 to 500 (0.26 to 132)	Stainless steel	Ball	SAE Metric 1¼" 6000 psi
FHG-1224	1 to 500 (0.26 to 132)	Stainless steel	Hard metal	SAE Metric 1¼" 6000 psi
FHG-1115	4 to 1000 (1 to 264)	Cast iron	Ball	SAE Metric 2" 6000 psi
FHG-1117	10 to 3000 (2.6 to 793)	Cast iron	Ball	SAE Metric 4" 490 psi
FHG-CABLE	Recommended connection cable 5 m (16.4') long, M12 5-pin shielded, meter plug to stripped leads			

Comes complete with operator's manual.

***Ordering Example: FHG-1112,** cast iron, ball bearing, SAE ¾ 6000 psi flanged screw gear meter with **FHG-CABLE,** 5 m (16.4') connection cable with M12 5-pin plug and stripped leads.*

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LIQUID FLOW

FL-10 Series

1 YEAR WARRANTY | NIST | RoHS

Optional

- Chemically Inert Wetted Components
- Removable Protective Shield
- Individually Leak Tested

Made entirely of PTFE, PFA, and PCTFE, the FL-10 flow meter is excellent for high-purity applications or use with corrosive liquids. Units are available with a standard valve to monitor and control flow or without a valve to just monitor flow. Flow meters are individually tested on a Mass Spectrometer Leak Detector and certified to a leak integrity rating of 1 X 10-7 sccs Helium or better.

SPECIFICATIONS

Scales: 0 to 10 markings
Accuracy: ±5% of full scale
Maximum Temperature: 121°C (250°F)
Maximum Pressure: 6.7 bar (100 psig)
Leak Integrity: Individually, leak tested and certified to a rating of 1 x 10-7 sccs of Helium

Materials of Construction

Tube Shields: Polycarbonate
Flow Tubes: PTFE PFA
Floats: PTFE
Wetted Parts: PTFE end fittings, PCTFE guide rods

Dimensions

Low Flow: 144 L x 32 mm OD (5 11/16 x 1 1/4")
High Flow: 267 L x 51 mm OD (10 1/2 x 2")

FL-10A-V, shown actual size.

To Order

Low Range				
Model No. with Valve	**Model No. No Valve**	**Max Flow mL/min**	**Max Flow GPH**	**Connections FNPT**
FL-10A-V	FL-10A	125	1.98	¼
FL-10B-V	FL-10B	250	3.96	¼
FL-10C-V	FL-10C	400	6.34	¼
FL-10D-V	FL-10D	500	7.92	¼
FL-10E-V	FL-10E	1000	15.85	¼
FL-10F-V	FL-10F	2000	31.69	⅜
FL-10G-V	FL-10G	2500	39.62	⅜
FL-10H-V	FL-10H	3000	47.54	⅜
FL-10J-V	FL-10J	5000	79.23	⅜
High Range		**L/min**	**GPM**	
FL-10K-V	FL-10K	13	3.43	½
FL-10L-V	FL-10L	20	5.28	½
FL-10M-V	FL-10M	30	7.93	¾
FL-10N-V	FL-10N	40	10.57	¾
FL-10P-V	FL-10P	45	11.89	¾

Comes complete with operator's manual.
*For oxygen cleaning add **"-02CLEAN"** to model number for additional cost.*
*For NIST calibration add suffix **"-NIST"** for additional cost.*
***Ordering Examples: FL-10E,** PTFE variable area flow meter with a maximum flow of 1000 mL/min and 15.85 GPH and ¼ FNPT connection.*
***FL-10K-V,** PTFE variable area flow meter with valve. maximum flow of 13 L/min and 3.43 GPM. ½ FNPT connection.*

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VARIABLE AREA FLOW METER KITS

FL-2500 Series

1 YEAR WARRANTY RoHS

- Easy-to-Read Dual English and Metric Scales
- Interchangeable Scales for 6 Common Gases and Water
- Meters are Offered With or Without Built-In Needle Valves
- Economical and Compact
- Easy Disassembly and Assembly for Cleaning

FL-2515 shown smaller than actual size.

FL-2514-V shown smaller than actual size.

The FL-2500 Series direct read variable area flow meter kits offer versatility at a low cost. Each kit includes seven interchangeable direct read scales for air, water, Argon, CO2, Helium, Nitrogen and Oxygen. These economical kits are ideal for laboratories, schools or processes that use multiple gases.

SPECIFICATIONS

Accuracy: ±5% of full scale reading
Maximum Temperature: 65°C (150°F)
Maximum Pressure: 6.9 bars (100 psig)
Meter Block: Clear machined acrylic
Float Materials: Black glass, stainless steel, tungsten carbide

O-Ring Seals: FKM with stainless fittings, Buna with brass fittings
Fittings: ⅛ NPT female connections, built-in needle valves and seal plugs, brass or stainless (model dependent)
Note: *NIST calibration is not available on direct read meters.*

To Order

Brass Fittings Model No.	SS Fittings Model No.	Air SLM (SCFH)	Water CCM (GPH)	Argon SLM (SCFH)	C02 SLM (SCFH)	Helium SLM (SCFH)	Nitrogen SLM (SCFH)	Oxygen SLM (SCFH)	Float
FL-2501	FL-2511	1.4 (2.8)	20 (0.3)	1.1 (2.25)	1.1 (2.5)	2 (4)	1.3 (2.75)	1.2 (2.5)	Glass
FL-2501-V	FL-2511-V	1.4 (2.8)	20 (0.3)	1.1 (2.25)	1.1 (2.5)	2 (4)	1.3 (2.75)	1.2 (2.5)	Glass
FL-2502	FL-2512	2.75 (5.5)	70 (1.1)	2.2 (5)	2.2 (5)	5.5 (11)	2.75 (5.5)	2.5 (5)	Stainless
FL-2502-V	FL-2512-V	2.75 (5.5)	70 (1.1)	2.2 (5)	2.2 (5)	5.5 (11)	2.75 (5.5)	2.5 (5)	Stainless
FL-2503	FL-2513	3.5 (7.0)	100 (1.5)	3 (6.5)	3 (6.5)	8 (17)	3.5 (7.5)	3.5 (7)	Carboloy
FL-2503-V	FL-2513-V	3.5 (7.0)	100 (1.5)	3 (6.5)	3 (6.5)	8 (17)	3.5 (7.5)	3.5 (7)	Carboloy
FL-2504	FL-2514	8.5 (18)	175 (2.75)	7 (15)	7 (15)	18 (40)	8 (16)	8 (16)	Glass
FL-2504-V	FL-2514-V	8.5 (18)	175 (2.75)	7 (15)	7 (15)	18 (40)	8 (16)	8 (16)	Glass
FL-2505	FL-2515	16 (32.5)	450 (6.5)	13 (26)	12 (25)	35 (70)	16 (32.5)	15 (30)	Stainless
FL-2505-V	FL-2515-V	16 (32.5)	450 (6.5)	13 (26)	12 (25)	35 (70)	16 (32.5)	15 (30)	Stainless
FL-2506	FL-2516	22 (45)	700 (11)	18 (37.5)	18 (37.5)	55 (110)	22 (45)	20 (42.5)	Carboloy
FL-2506-V	FL-2516-V	22 (45)	700 (11)	18 (37.5)	18 (37.5)	55 (110)	22 (45)	20 (42.5)	Carboloy
FL-2507	FL-2517	50 (100)	1400 (22)	40 (80)	35 (80)	110 (250)	45 (100)	45 (90)	Stainless
FL-2507-V	FL-2517-V	50 (100)	1400 (22)	40 (80)	35 (80)	110 (250)	45 (100)	45 (90)	Stainless

Comes complete with all 7 interchangeable direct reading dual scales (air scale comes installed, six other scales included separately) and operator's manual.

Ordering Examples: FL-2515-V, *acrylic variable area flow meter with valve and interchangeable scales for air, water, argon, CO_2, helium, nitrogen and oxygen.*

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IN-LINE FLOW METERS WITH LIMIT SWITCHES

CAPACITY: 0.2 to 30 GPM of Water, 0.1 to 30 GPM of Oil, 2 to 250 SCFM of Air

FL-6101B

1 YEAR WARRANTY | NIST | RoHS

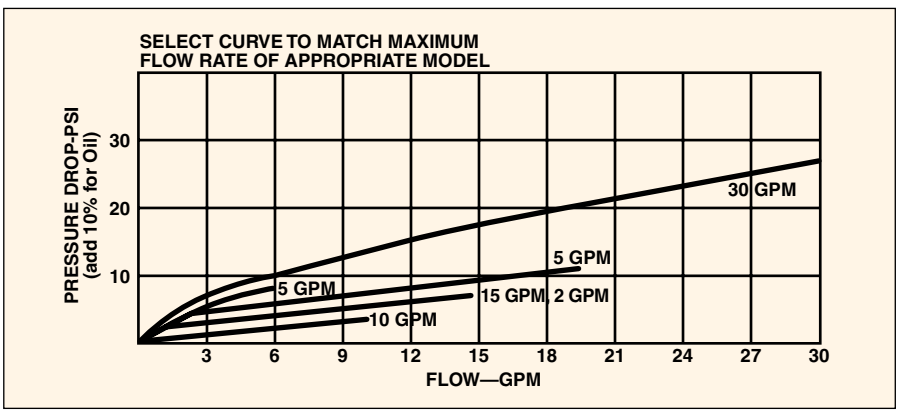
Optional

FL-6101B shown smaller than actual size.

FL-6304B shown smaller than actual size.

- ±2% Full Scale Accuracy
- ±1% Repeatability
- Direct Readings for Water, Oil, or Air
- Built-in Limit Switch for Alarm and Control
- Mounts in Any Direction
- Easy Setpoint Adjustment
- Splash-Proof Construction
- Compact Size
- ½ or ¾ FNPT Connections

OMEGA® in-line flow meters offer high accuracy flow rate indication for water, oil, or air and the ability to either control the flow rate or alarm on high or low flowrates. These units feature an SPDT switch that can be triggered at any point along the flow range.



SPECIFICATIONS

Switch: Micro SPDT 10A @ 250 Vac
Cable: 0.8 m (34") cable
Maximum Temperature and Pressure:
Water/Oil: 116°C (240°F)/3500 psi
Air: 116°C (240°F)/1000 psi
Dimensions (D x W x Lay Length):
½ NPT: 102 x 72 x 168 mm (4 x 2.82 x 6.6");
¾ NPT: 83 x 184 x 182 mm (3.3 x 7.3 x 7.2")
Wetted Parts:
Water Meters: C360 brass body, piston, and cone; T302 SS spring; ceramic magnet
Oil Meters: 2024-T351 anodized aluminum body, piston, and cone; T302 SS spring; ceramic magnet
Air Meters: 2024-T351 anodized aluminum body, piston, and cone; T302 SS spring; ceramic magnet
Enclosure: NEMA 12 (IP65)
Relay: 10A@250 Vac maximum; 0.5A@125 Vdc maximum

To Order

Model No.	Medium Sp. Gr.	Range	Connections	Pressure Drop (psid)
FL-6101B	Oil/0.876	0.1 to 1 GPM	½ NPT	1.2
FL-6102B	Oil/0.876	0.2 to 2 GPM	½ NPT	1.2
FL-6318B	Water/1.0	0.2 to 2 GPM	½ NPT	2
FL-6304B	Water/1.0	0.5 to 5 GPM	½ NPT	3
FL-6312B	Water/1.0	1 to 15 GPM	½ NPT	9
FL-6720B	Air/100 psi	3 to 25 SCFM	½ NPT	2
FL-7605B	Oil/0.876	0.5 to 5.0 GPM	¾ NPT	8
FL-7609B	Oil/0.876	1.0 to 10 GPM	¾ NPT	4
FL-7615B	Oil/0.876	2 to 20 GPM	¾ NPT	7
FL-7625B	Oil/0.876	3 to 30 GPM	¾ NPT	28
FL-7825B	Water/1.0	3 to 30 GPM	¾ NPT	24
FL-7940B	Air/100 psi	5 to 50 SCFM	¾ NPT	3
FL-7918B	Air/100 psi	25 to 250 SCFM	¾ NPT	25

*For 2 limit switches add **"-R2"** to part number for additional cost.*
***Ordering Examples: FL-6101B,** in-line flow meter with limit switch for oil, 0.1 to 1 GPM*
***FL-6318B,** in-line flow meter with limit switch for water, 0.2 to 2 GPM.*
*For 5-point NIST certificate add **"-NIST5"** to part number for additional cost.*

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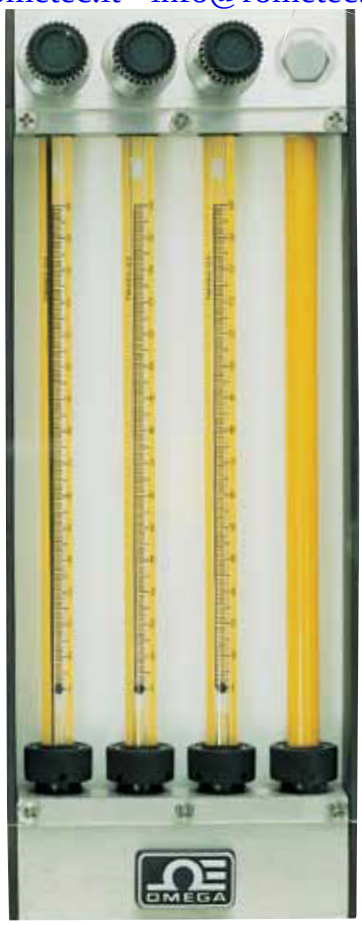
AREA FLOW METER

Back Pressure Compensated

FL-1GP Series

1 YEAR WARRANTY | NIST | RoHS

Optional



Shown smaller than actual size.

- ±2% Full Scale Accuracy
- Back Pressure Compensated for Accurate Blending—Up to 50 psi Only
- Blend Up to Three Gases
- Save on Cost of Custom Gas Mixtures
- Vary Concentrations with Operating System
- For Use with 150 mm Flow Tubes
- Bench Mount Tripod Base Optional
- Standard 6-Turn Valves or Precision 16-Turn Valves Available

To blend two or three gases in homogeneous infinitely variable concentrations, directly at the end use point, these variable area flow meter are unsurpassed in convenience and economy. Gas proportioning variable area flow meter pay for themselves in a short period of time since their use eliminates the need for expensive custom blended gas mixtures from outside sources. This series of variable area flow meter lend flexibility and economy to the efficient utilization of component gas cylinders and piped in supply lines. Another significant advantage in laboratory use is the freedom to reproducibly increase or decrease concentrations during the course of an experiment.

The flowrates of component gases are not affected by downstream pressures do not exceed or approach the input pressure.

SPECIFICATIONS

Accuracy: ±2% full scale, from 10% to 100% of scale
Repeatability: ±0.25% full scale
Maximum Pressure: 200 psig
Maximum Temperature: 250°F (180°F for water)
Flow Tube: Borosilicate glass
End Fittings: Black and anodized aluminum or 316 SS
Packing and O-Rings: Buna in aluminum models, FKM-A in 316 SS models
Side Panels: Black anodized aluminum
Connections: ⅛ FNPT

CUSTOM BUILT TO ORDER!

To Order		
For Two Tubes		
Model No.	**Valve Type**	**End Fittings**
FL-1GP-(*)-(*)	Standard	Aluminum
FL-2GP-(*)-(*)	Precision	Aluminum
FL-3GP-(*)-(*)	Standard	316 SS
FL-4GP-(*)-(*)	Precision	316 SS
For Three Tubes		
FL-5GP-(*)-(*)-(*)	Standard	Aluminum
FL-6GP-(*)-(*)-(*)	Precision	Aluminum
FL-7GP-(*)-(*)-(*)	Standard	316 SS
FL-8GP-(*)-(*)-(*)	Precision	316 SS

Comes complete with air correlation sheet for each tube and operator's manual.

** Select the desired 150 mm flow tube from those listed online. Delete the FLT-prefix and insert the remaining suffix from the flow tube into the model numbers above.*

*For NIST calibration, add suffix **"-NIST AIR"** or **"-NIST WATER"** to model number, for additional cost.*

***Ordering Example: FL-5GP-61G-41SA-03C** calls out a 3 tube gas proportioner with standard valves and aluminum end fittings with tubes **FLT-61G, FLT-41SA** and **FLT-03C** installed.*

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FL-2000 Series

1 YEAR WARRANTY · NIST · RoHS

Optional

- Easy-to-Read English or Metric Scales
- Water Ranges from 4 CCM to 20 GPM, Air Ranges from 40 CCM to 4000 LPM
- Threaded Brass Inserts for Quick Installation
- Easy Disassembly and Assembly for Maintenance
- Durable One-Piece Clear Acrylic Construction
- Stable, Easy-to-Read Float
- Superior Quality

APPLICATIONS

- Air Sampling Equipment
- Aquaculture
- Desalinization Equipment
- Gas Analyzers
- Medical Systems
- Photo Processing Equipment
- Water Treatment and Distribution Systems

FL-2013 Air, shown smaller than actual size.

FL-2066-NV Water, shown smaller than actual size.

The FL-2000 Series offers a wide variety of precision flowmeters for use in medical, industrial, chemical, and laboratory applications at an economical price. Units are available with or without valves.

SPECIFICATIONS

Accuracy:
Models FL-2001–FL-2025: ±5% F.S.
Models FL-2031–FL-2069: ±3% F.S.
Models FL-2071–FL-2128: ±2% F.S.
Float: Black glass stainless steel
Body: Clear acrylic
Seals: Buna "O" Rings with brass or PVC fittings FKM "O"-Rings with stainless steel fittings
Pressure: 100 psig max @ 21°C (70°F)
Temperature:
65°C (150°F) max @ 0 psig

Fittings: Brass std; stainless steel optional except for FL-2071 through FL-2128, which have 1 NPT PVC fittings only
Valves: Models FL-2001 through **FL-2069:** brass standard; stainless steel cartridge type (optional)
FL-2071 through FL-2128: Optional plastic in-line gate

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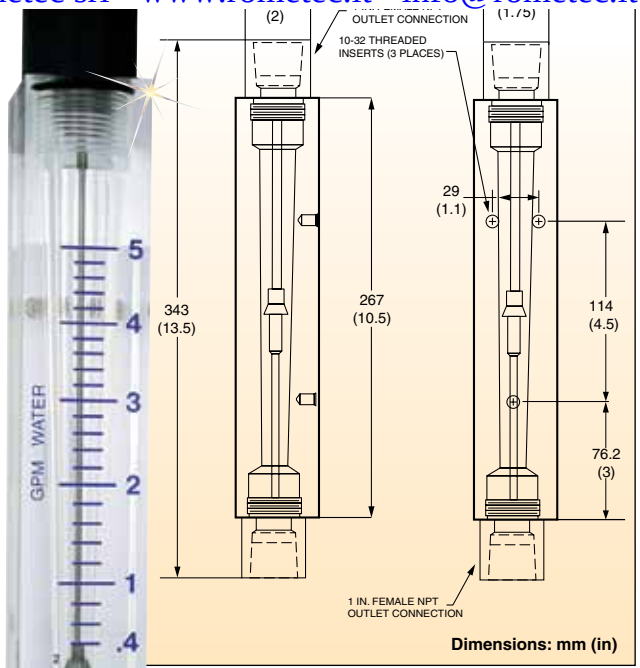
FL-2091 through FL-2128 Dimensions



FL-2097, shown smaller than actual size

FL-2091 through FL-2128 Dimension

Millimeters	343	50.8	267	25.4	28.6	44.5	114	76.2
Inches	13.5	2.0	10.5	1 FNPT	1.1	1.8	4.5	3.0

Accuracy: ±2% Full Scale In-Line

To Order	
Model No.	**Range SCFM of Air**
FL-2091	3 to 25
FL-2092	4 to 50
FL-2093	10 to 100
	Range LPM of Air
FL-2094	100 to 700
FL-2095	100 to 1400
FL-2096	400 to 4000
	Range GPM of Water
FL-2097	0.4 to 5
FL-2098	1 to 10
FL-2099	2 to 20
	Range LPM of Water
FL-2126	1 to 19
FL-2127	4 to 36
FL-2128	5 to 75

Units are standard without valves.

*To order with plastic integral gate valve, add suffix **"-V"** to model number for additional cost for FL-2090 Series, and FL-2120 Series.*

*For optional 10-point NIST certificate add suffix, **"-NIST"** to the model number, for additional cost and two weeks to the standard lead time.*

***Ordering Example: FL-2095,** flow meter, 100 to 1400 LPM Air*
***FL-2127-V,** flow meter, 4 to 36 LPM water, with valves.*

Accuracy: ±2% Full Scale Panel Mount

To Order	
Model No.	**Range SCFM of Air**
FL-2071	3 to 25
FL-2072	4 to 50
FL-2073	10 to 100
	Range LPM of Air
FL-2074	100 to 700
FL-2075	100 to 1400
FL-2076	400 to 3400
	Range GPM of Water
FL-2077	0.6 to 5
FL-2078	1 to 10
FL-2079	2 to 20
	Range LPM of Water
FL-2080	2 to 19
FL-2081	4 to 36
FL-2082	5 to 75

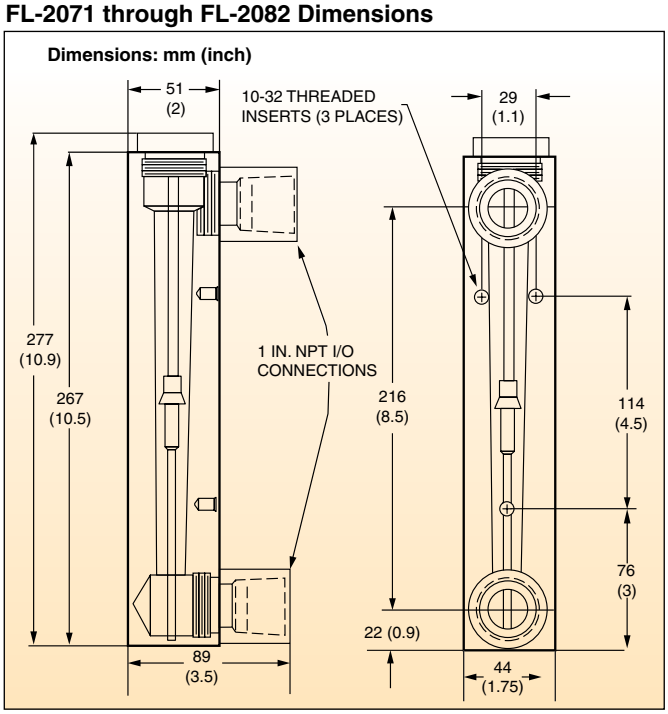
Units come complete with operator's manual.
Units are standard without valves.

*To order with plastic integral gate valve, add suffix **"-V"** to model number for additional cost.*

*For optional 10-point NIST certificate add suffix, **"-NIST"** to the model number for additional cost and two weeks to the standard lead time.*

***Ordering Examples: FL-2075,** flow meter valve, 100 to 1400 LPM air.*

FL-2071 through FL-2082 Dimensions



PANEL MOUNT								
Millimeters	273	267	50.8	25.4	216	22.2	114	76.2
Inches	10.9	10.5	2	1 FNPT	8.5	0.9	4.5	3

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FL-2060, Air, shown smaller than actual size.

FL-2066-NV, shown smaller than actual size.

Accuracy: ±3% Full Scale Panel Mount

To Order	
Model No.	**Range SCFM of Air**
FL-2060	0.5 to 5
FL-2061	1 to 10
FL-2062	4 to 20
	Range LPM of Air
FL-2063	14 to 140
FL-2064	30 to 300
FL-2065	100 to 560
	Range GPM of Water
FL-2066	0.25 to 2.5
FL-2067	0.4 to 5
	Range LPM of Water
FL-2068	1 to 10
FL-2069	2 to 20

Units come standard with brass valves and operator's manual.

Dual scales supplied std: SCFM/SCFH, GPM/GPH and LPM/LPH

*To order with stainless steel valve, add suffix **"-SS"** to model number for additional cost.*

*To order without a valve, add suffix **"-NV"** to model number and subtract from cost.*

*For optional 10-point NIST certificate add suffix, **"-NIST"** to the model number, for additional cost and two weeks to the standard lead time.*

***Ordering Examples: FL-2060**, flow meter with brass valve, 0.5 to 5 SCFM.*

***FL-2069-NV**, flow meter no valve 2 to 20 LPM*

To Order	
Model No.	**Range SCFM of Air**
FL-2031	0.4 to 5
FL-2032	1 to 10
FL-2033	2 to 20
FL-2034	4 to 40
FL-2035	10 to 100
FL-2036	14 to 150
FL-2037	20 to 200
	Range CCM of Air
FL-2038	100 to 1000
	Range LPM of Air
FL-2039	0.4 to 5
FL-2040	1 to 10
FL-2041	2 to 20
FL-2042	3 to 30
FL-2043	4 to 50
FL-2044	10 to 100
	Range CCM of Water
FL-2045	4 to 50
FL-2046	10 to 120
FL-2047	25 to 225
FL-2048	40 to 400
FL-2049	40 to 660
FL-2050	100 to 1500
FL-2051	200 to 3000
FL-2052	300 to 3700
	Range GPH of Water
FL-2053	1 to 10
FL-2054	2 to 25
FL-2055	4 to 50
FL-2056	6 to 60
	Range SCFM of Air
FL-2057	0.3 to 3

Units come standard with brass valves and operator's manual.

*To order with stainless steel valve, add suffix **"-SS"** to model number for additional cost.*

*To order without a valve, add suffix **"-NV"** to model number and subtract from cost.*

*For optional 10-point NIST certificate add suffix, **"-NIST"** to the model number, for additional cost and two weeks to the standard lead time.*

***Ordering Examples: FL-2036**, economical flow meter, with brass valve, 14 to 150 SCFH Air.*

***FL-2036-NV**, economical flow meter,without brass valve, 14 to 150 SCFH Air.*

FL-2091, Air, shown smaller than actual size.

FL-2053, Water, shown smaller than actual size.

FL-2041-NV, shown smaller than actual size.

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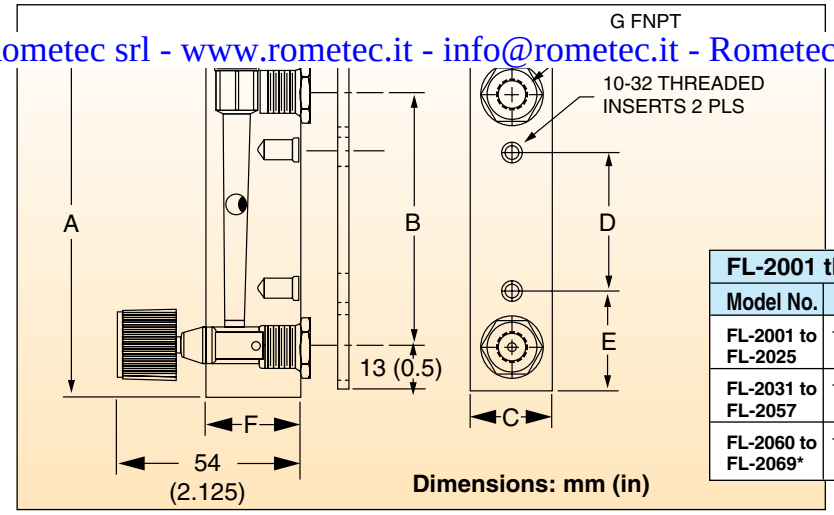

FL-2001 through FL-2069 Dimensions mm (inch)							
Model No.	A	B	C	D	E	F	G
FL-2001 to FL-2025	102.0 (4.0)	76.2 (3.0)	25.4 (1)	41.3 (1.6)	30.2 (1.2)	28.6 (1.1)	⅛
FL-2031 to FL-2057	165.0 (6.5)	140.0 (5.5)	34.9 (1.4)	88.9 (3.5)	38.1 (1.5)	28.6 (1.1)	⅛
FL-2060 to FL-2069*	168.0 (6.6)	140.0 (5.5)	28.6 (1.1)	88.9 (3.5)	38.1 (1.5)	34.9 (1.4)	¼

**All in this range do not include a ⅛" back plate*

Accuracy: ±5% Full Scale Panel Mount

To Order	
Model No.	**Range SCFH of Air**
FL-2001	0.1 to 1.0
FL-2002	0.2 to 2.0
FL-2003	0.4 to 5.0
FL-2004	0.5 to 10.0
FL-2005	2.0 to 20.0
FL-2006	3.0 to 30.0
FL-2007	4.0 to 50.0
FL-2008	10.0 to 100.0
FL-2009	20.0 to 200.0
	Range LPM of Air
FL-2010	0.04 to 0.5
FL-2011	0.1 to 1.0
FL-2012	0.2 to 2.5
FL-2013	0.4 to 5.0
FL-2014	1.0 to 10.0
FL-2015	2.0 to 25.0
FL-2016	6.0 to 50.0
FL-2017	10.0 to 100.0
	Range SCCM of Water
FL-2018	5 to 50
FL-2019	10 to 100
FL-2020	20 to 240
	Range GPH of Water
FL-2021	0.2 to 2.0
FL-2022	0.4 to 5.0
FL-2023	1.0 to 10.0
FL-2024	2.0 to 20.0
FL-2025	4.0 to 40.0

Units come standard with brass valves and operator's manual.
*To order with stainless steel valves, add suffix "**-SS**" to model number for additional cost.*
*To order without a valve, add suffix "**-NV**" to model number and subtract from cost.*
*For optional 10-point NIST certificate add suffix, "**-NIST**" to the model number, for additional cost and two weeks to the standard lead time.*
***Ordering Examples: FL-2005**, economical flow meter with brass valve, 2 to 20 SCFH air.*
***FL-2005-NV**, economical flow meter without valve, 2 to 20 SCFH air.*

FL-2021-NV, Water, shown larger than actual size.

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PNEUMATIC IN-LINE FLOWMETERS

Capacities: 5 to 1000 SCFM of Air

FL6760A

1 YEAR WARRANTY | NIST | RoHS

Optional

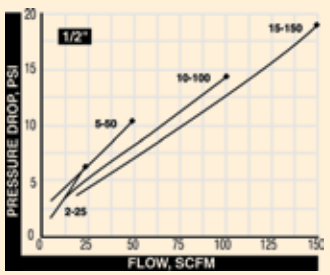
- ±2% FS Accuracy
- ±1% Repeatability
- 69 bar (1000 psig) Pressure Rating
- Calibrated to Read in SCFM @ 7 bar (100 psig)

This rugged direct-reading flowmeter monitors air flow rates to determine optimum performance, flow regulator settings, or pneumatic system performance. It is intended for use in mobile or industrial pneumatic systems as well as air power-operated hand tool systems.

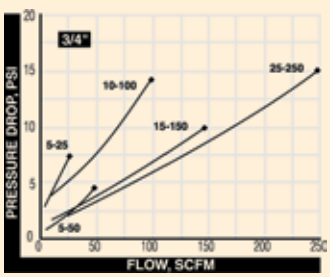
These flowmeters feature direct-reading scales for air flow and are available in a wide variety of flow ranges.

FL6715A shown smaller than actual size.

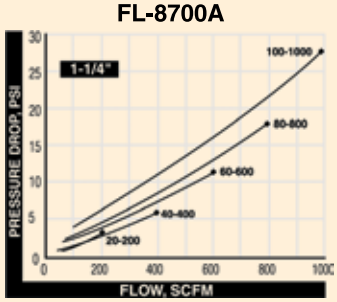
FL-6700A



FL-7700A



FL-8700A



Note: Calibrated with 140 SUS (32 cSt) hydraulic oil.

SPECIFICATIONS

Materials: Anodized aluminum body with dichromate sealed anodized aluminum cone and piston, 302 SS spring, and polyphenylene sulfide/ ceramic magnet

Size/Shipping Weight: ½"-0.57 kg (1.25 lb), ¾"-0.9 kg (2 lb), 1¼"-3.3 kg (7.3 lb)

Maximum Temperature: 116°C (240°F)

To Order

Model No.	SCFM@100 psig, 70°F	FNPT Port Size	Dimensions mm (inch)	Length mm (inch)
FL6760A	5 to 50	½	60.96 x 53.34 (2.4 x 2.1)	167.64 (6.6)
FL6711A	10 to 100			
FL6715A	15 to 150			
FL7750A	5 to 50	¾	73.66 x 63.5 (2.9 x 2.5)	182.88 (7.2)
FL7722A	25 to 250			
FL8745A	40 to 400	1¼	119.38 x 104.14 (4.7 x 4.1)	309.88 (12.2)
FL8760A	60 to 600			
FL8780A	80 to 800			
FL8710A	100 to 1000			

Comes complete with operator's manual.
*For units with BSPP threads add suffix "**-BSPP**" to model number, no additional cost.*
*For NIST traceable certificate add suffix "**-NIST**" to model number, for additional cost.*
***Ordering Examples: FL7722A**, air flowmeter, 25 to 250 SCFM.*

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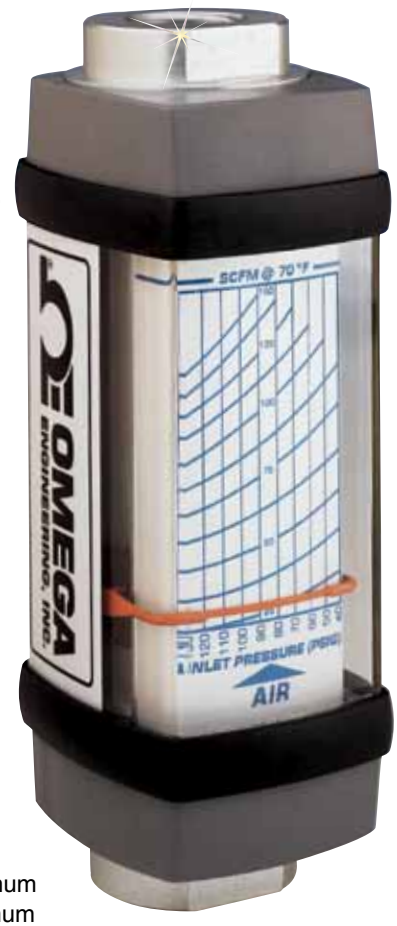
PNEUMATIC IN-LINE FLOWMETERS

With Multi-Pressure Flow Scales

FL6920 Series

1 YEAR WARRANTY | NIST | RoHS

Optional



FL7915A shown smaller than actual size.

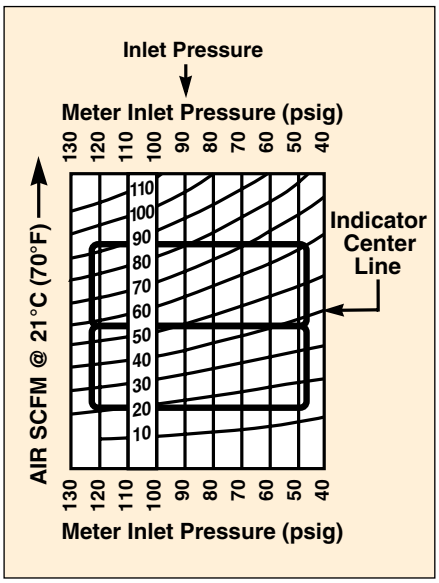
- **Easily Installs in Any Position**
- **Rugged Anodized Aluminum Body**
- **Multi-Pressure Flow Scale, 2.75 to 9 bar (40 to 130 psig)**
- **±2% FS Accuracy**
- **±1% Repeatability**
- **Easy to Use with Direct-Reading, Multi-Pressure Flow Scales**

OMEGA® multi-pressure pneumatic flowmeters feature a rugged anodized aluminum body design and easy installation. For air/compressed gas applications, these flowmeters include ranges from 0.5-5 SCFM to 100-1000 SCFM, at operating pressures up to 1000 psig.

Their multi-pressure scales [from 2.75 to 9 bar (40 to 130 psig)] mean accurate flow measurements can be made without the need for conversion calculations for pressure variations.

SPECIFICATIONS

Accuracy: ±2% FS
Repeatability: ±1%
Materials: Anodized aluminum body with dichromate sealed anodized aluminum cone and piston, 302 SS spring, and polyphenylene sulfide/ceramic magnet
Temperature Rating: 116°C (240°F) maximum
Pressure Rating: 69 bar (1000 psig) maximum



Convenient chart display allows user to correct for varying inlet pressures.

To Order

Model No.	Flow Range (SCFM)	Port Size	Dimensions: mm (inches) OD	Length	Weight
FL6920A	3 to 25	½	61 x 53 (2.4 x 2.1)	168 (6.6)	567 g (1.25 lb)
FL6960A	5 to 50				
FL6911A	10 to 100				
FL6915A	15 to 150				
FL7918A	3 to 25	¾	74 x 64 (2.9 x 2.5)	183 (7.2)	0.9 kg (2 lb)
FL7950A	5 to 50				
FL7990A	10 to 100				
FL7915A	15 to 150				
FL7922A	25 to 250				
FL8925A	20 to 200	1¼	119 x 104 (4.7 x 4.1)	310 (12.2)	3.3 kg (7.3 lb)
FL8945A	40 to 400				
FL8960A	60 to 600				
FL8980A	80 to 800				
FL8910A	100 to 1000				

Comes complete with operator's manual.
*For units with BSPP threads add suffix **"-BSPP"** to model number, no additional cost.*
*For NIST traceable certificate, add suffix **"-NIST"** to model number, for additional cost.*
***Ordering Examples: FL6920A,** multi-pressure in-line flowmeter, 3 to 25 SCFM.*
***FL7922A,** multi-pressure in-line flowmeter, 25 to 250 SCFM.*

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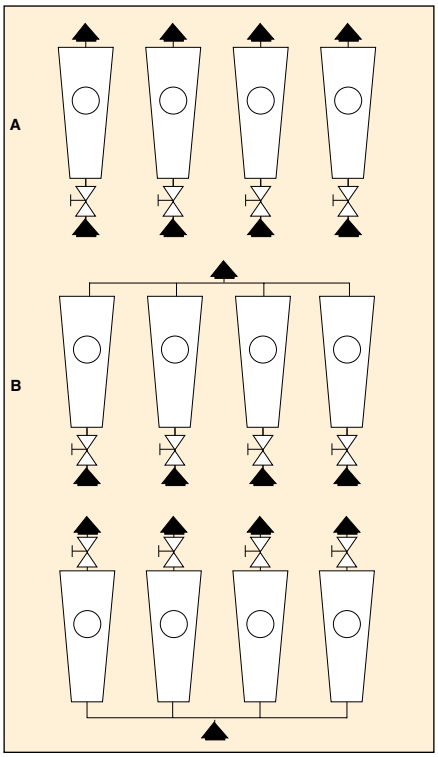
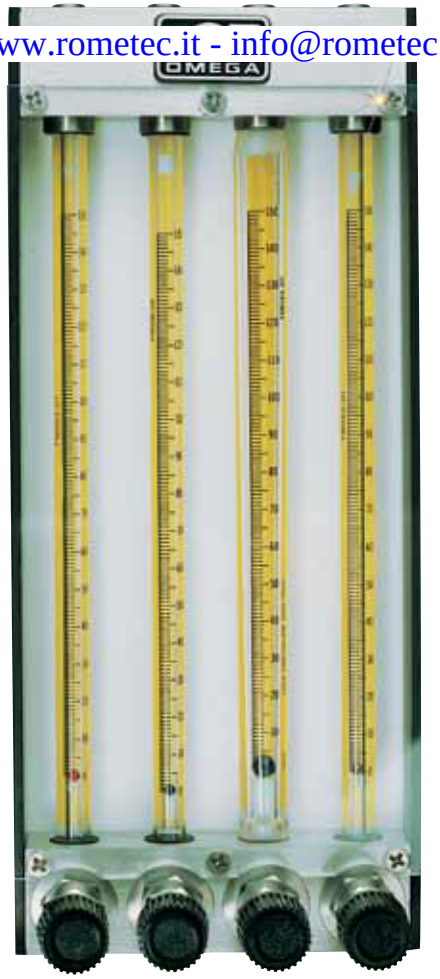
MULTIPLE TUBE VARIABLE AREA FLOW METER

FL-2AA Series

2 YEAR WARRANTY | NIST | RoHS

Optional





Shown smaller than actual size.

- **High Accuracy, ±2% Full Scale**
- **Variety of Flow Configurations**
- **Interchangeable 150 mm Flow Tubes**
- **Scales Designed to Minimize Parallax and Eye Fatigue**
- **Available with High Precision Valves**
- **Panel Locking Nuts Included**

CUSTOM BUILT TO ORDER!

OMEGA's multi-tube variable area flow meter are convenient for applications where up to six streams of liquids or gases are to be metered in individual channels. Flow pattern B represents multiple inlets manifolded into one outlet (see diagram). To obtain one inlet split off into multiple outlets, flow pattern B can be turned upside down and the flow tubes inverted in the field. The variable area flow meter end fittings can be supplied in aluminum or 316 SS. Precision metering valves with 16 turn non-rising stems are also available (consult Sales).

To Order

Model No.	Frame Flow Pattern	End Fittings
For Two Tubes – 249.25 H x 57.15 mm W (9.813 x 2.25")		
FL-2AA-(*)-(*)	A	Aluminum
FL-2SA-(*)-(*)	A	316 SS
FL-2AB-(*)-(*)	B	Aluminum
FL-2SB-(*)-(*)	B	316 SS
For Three Tubes – 249.25 H x 82.55 mm W (9.831 x 3.25")		
FL-3AA-(*)-(*)-(*)	A	Aluminum
FL-3SA-(*)-(*)-(*)	A	316 SS
FL-3AB-(*)-(*)-(*)	B	Aluminum
FL-3SB-(*)-(*)-(*)	B	316 SS
For Four Tubes – 249.25 H x 107.95 mm W (9.813 x 4.25")		
FL-4AA-(*)-(*)-(*)-(*)	A	Aluminum
FL-4SA-(*)-(*)-(*)-(*)	A	316 SS
FL-4AB-(*)-(*)-(*)-(*)	B	Aluminum
FL-4SB-(*)-(*)-(*)-(*)	B	316 SS

Comes complete with air and water correlation sheet for each tube.
Delivery time depends on configuration.

** Select the desired 150 mm flow tube from those listed on online. Delete the FLT-prefix and insert the remaining suffix from the flow tube into the model numbers above. Add the price of the flow tubes to the price of the frame.*

*For NIST calibration, add suffix **"-NIST AIR"** or suffix **"-NIST WATER"** to model number, for additional cost.*

***Ordering Example: FL-3SA-45G-61G-61C** calls out a three tube meter with 316 SS end fittings, independent inlets and outlets with the **FLT-45G, FLT-61G** and **FLT-61C** 150 mm flow tubes installed in the unit.*

SPECIFICATIONS

Repeatability: ±0.25% full scale
Maximum Pressure: 13.8 bar (200 psig)
Maximum Temperature: 121°C (250°F) 82°C (180°F) for water
Connections: ⅛ FNPT

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WITH PTFE VALVES

For Select Corrosive or Ultra-Pure Media

FL-3000/3100 Series

1 YEAR WARRANTY · NIST · RoHS

Optional

- **Excellent Chemical Compatibility for Use with Corrosive or Ultra-Pure Fluids**
- **High Accuracy: Up to ±2% FS**
- **Shield Magnifies Scale for Accurate Readings**

Lexan® shield acts as a magnifier to insure high accuracy reading with less eye fatique.

The FL-3000 and FL-3100 Series flow meters are designed for applications involving corrosive or ultra-pure fluids. The meters are equipped with built-in PTFE needle valves with Kel-F, borosilicate glass, sapphire, and Perflurorodastomer O-rings.

The special scale design, in which a vertical line runs up the length of the scale and intersects the horizontal scale divisions, reduces parallax and eye fatigue, thereby ensuring highly accurate readings. The front polycarbonate shield also acts as a magnifying glass.

SPECIFICATIONS

Accuracy: ±2% full scale (FL-3007SA and FL-31455A ±5% FS)
Repeatability: ±0.25% FS
Maximum Pressure: 6.7 bar (100 psig)
Maximum Temperature: 66°C (150°F)
Connections: ⅛ FNPT
Mounting:
Panel mount or optional tripod base
Height/Center to Center Port Distance: 65 mm (6.156"/5.156"); 150 mm (10.469"/9.469")

Accessories

PTFE Valves—1 psid @ 0.2 GPM (Fluid Contacts PTFE and Kel-F Only) for 200°F Up to 25 psig.

Model No.	Connections
FVLT102	⅛ FNPT
FLV-2	Glass hose nipples
FVLT104-SS	⅛" TFE compression

Tripods	Description
FLTR-1	For 1 variable area flow meter
FLTR-2	For 2 variable area flow meter

To Order

Model No.	Maximum Flow Rate* (cc/min) Air	Water*
65 mm		
FL-3007SA	8.30	0.251
FL-3035SA	72.3	0.98
FL-3013SA	159	3.00
FL-3010SA	299	4.7
FL-3051SA††	1399	33.3
FL-3092SA	1623	36.74
FL-3088SA	2704	61
FL-3096SA	8144	217
FL-3063SA	28,326	798
150 mm		
FL-3145SA	37	0.56
FL-3141SA	72	0.99
FL-3161SA	140	1.92
FL-3102SA	513	9.96
FL-3103SA	1092	26.1
FL-3104SA	3079	78
FL-3105SA	5000	126
FL-3139SA	11,887	315
FL-3140SA	29,364	829

** Minimum flow rate is 10% of maximum rate shown.*

Comes complete with operator's manual and correlation tables for air and water with instructions on back.

†† New flow rate values effective for purchases after January 1, 2013.

*For NIST calibration add suffix **"-NIST AIR"** to model number for additional cost or add suffix **"-NIST WATER"** to model number for additional cost.*

*For oxygen cleaning, add suffix **"-02CLEAN"** to model number for additional cost.*

***Ordering Examples: FL-3051SA,** variable area flow meter with range of 1399 cc/min air, 33.3 cc/min water.*

***FL-3102SA,** 150 mm flowtube variable area flow meter, with a*

FL-3145SA shown smaller than actual size.

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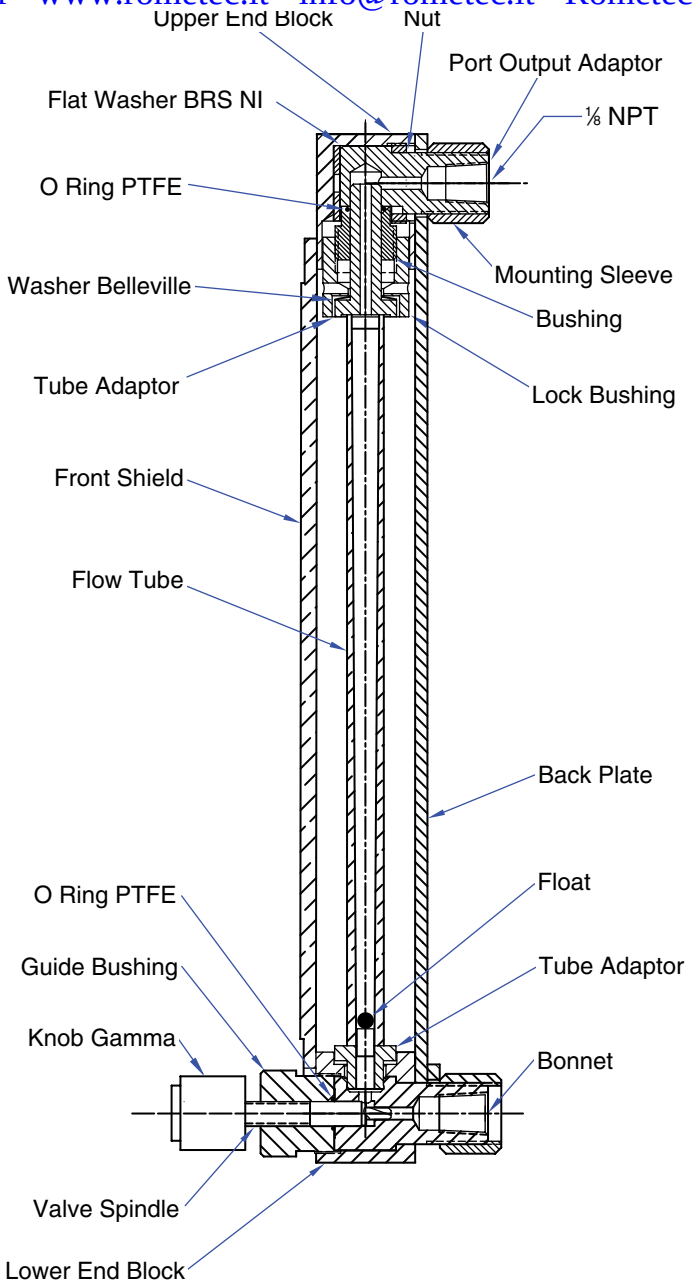
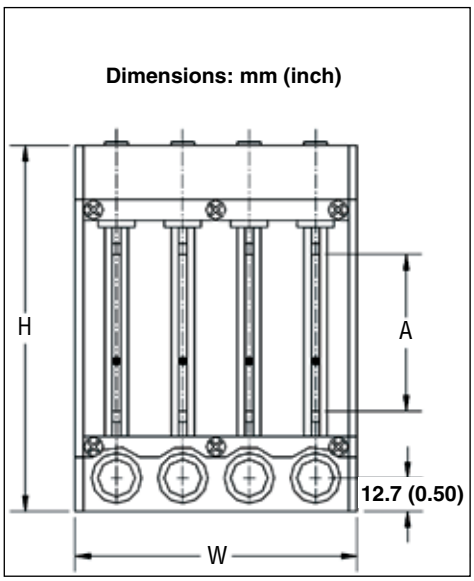
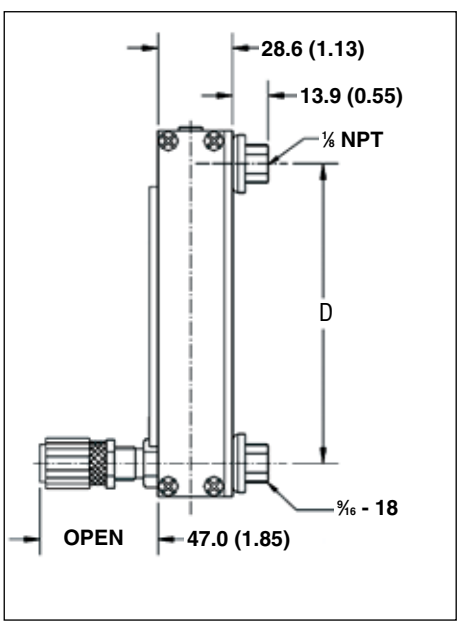


FL-3000

Front view



Side view



Dimensions: (inches)						
	All Meters		Width (W)			
Scale Length (A)	Height (H)	Center to Center (D)	Tube 1	Tube 2	Tube 3	Tube 4
65 mm	6.16	5.16	1.25	2.25	3.25	4.25
150 mm	10.46	9.47	1.25	2.25	3.25	4.25

Dimensions: (mm)						
	All Meters		Width (W)			
Scale Length (A)	Height (H)	Center to Center (D)	Tube 1	Tube 2	Tube 3	Tube 4
65 mm	156.4	131.0	31.75	57.5	82.55	107.95
150 mm	265.7	240.5	31.75	57.5	82.55	107.95

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VARIABLE AREA FLOW METER

Featuring Standard Industrial Dimensions and Superior Readability

FL-3207G

1 YEAR WARRANTY NIST
Optional

FL-3207G shown larger than actual size.

- **Up to ±2% FS Accuracy**
- **Non-Rotating Seal Spindle**
- **Easy-to-Read Scale Design**
- **Special Dimensions for Interchangeability**

The OMEGA® precision variable area variable area flow meter can measure flows of air, water, and gases, with up to ±2% FS accuracy (models ending in "07" or "45" have ±5% FS accuracy) and 0.25% FS repeatability. These units feature an easy-to-read millimeter scale and come with correlation charts for air and water. The scale is fused on the metering tube in 1 mm (3/32") increments, which enables a user to read the flow rate with the highest accuracy.

The scale design, in which a vertical line runs through the length of the scale and intersects the horizontal scale divisions, reduces parallax and eye fatigue, thus ensuring high-accuracy readings (see inset, next page). The front polycarbonate resin shield is also curved to act as a magnifying glass, which yields superior performance over other variable area flow meter with standard designs

Non-Rising Stem Needle Valve

The 150 mm size flowmeters are also available with a non-rising stem type needle valve for special applications. This 15-turn metering valve has superior flow-rate control, and is particularly suited to use in chromatography applications. The sliding tapered-needle mechanism virtually eliminates sticking or buildup due to foreign matter in the fluid stream, without variations or saw-toothing of the flow rate.

Shielded for Pressurized Systems

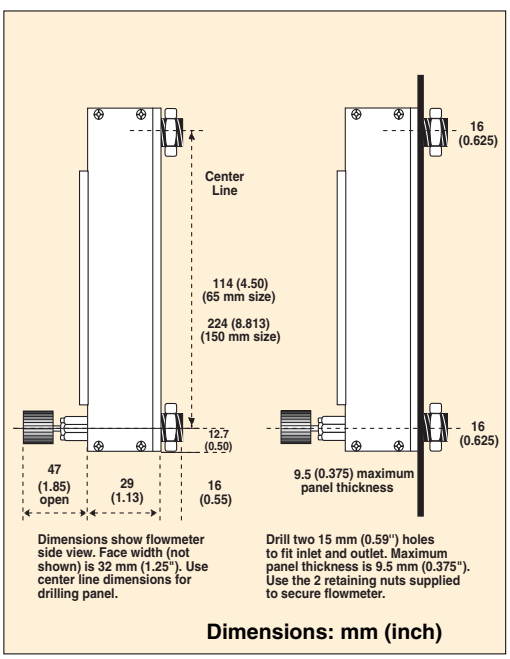
These variable area flow meter, with precisionbored borosilicate glass metering tubes, are fully shielded against breakage. A white opaque rear shield provides a background to aid in discerning the float position.

Panel Mounting Design

These variable area flow meter are equipped with horizontal ports and NPT threads for easy panel mounting. The ports have external threads and are equipped with panel retaining nuts. No additional mounting hardware is required. Simply drill 2 holes 131 mm (5.156") apart (center to center) for 65 mm units, 240 mm (9.469") apart (center to center) for 150 mm units. Each hole should be 16 mm (5/8") in diameter.

SPECIFICATIONS

Scales: 65 or 150 mm arbitrary scale
Accuracy: ±2% FS (*±5% FS)
Repeatability: ±¼% FS
Connections: ⅛ FNPT, horizontal
Flow Tube: Borosilicate glass
End Fittings: Anodized aluminum or 316 SS
Side Panels: Aluminum
Valve Orifice: Polyacetal for aluminum models, PCTFE for 316 SS models
O-Rings: Buna in aluminum models, FKM in 316 SS models
Packings: FKM
Float Stops: PTFE
Maximum Temperature: 250°F (180°F for water)
Maximum Pressure: 200 psig
Valve Orifice: Polyacetal for aluminum units. PCTFE for 316 SS



Dimensions: mm (inch)

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FL-3207G shown larger than actual size.

Polycarbonate resin shield acts as a magnifier to ensure high accuracy with less eye fatigue.

Variable area flow meter with 65 mm FlowTubes

Model No. Aluminum Frame	Model No. 316 SS Frame	Maximum Flow Rate† (cc/min)	
		Air	Water
FL-3207G*	FL-3307G*	5.77	0.07
FL-3207ST*	FL-3307ST*	16.77	0.28
FL-3207C*	FL-3307C*	32.99	0.62
FL-3235G	FL-3335G	48.7	0.59
FL-3235ST	FL-3335ST	214.5	2.38
FL-3213G	FL-3313G	104	1.75
FL-3213ST	FL-3313ST	298	5.78
FL-3210G	FL-3310G	202	2.64
FL-3210ST	FL-3310ST	522	12.0
FL-3210C	FL-3310C	818	20.8
FL-3251G††	FL-3351G††	1056	20.8
FL-3251ST††	FL-3351ST††	2125	58.7
FL-3292G	FL-3392G	1249	26.97
FL-3292ST	FL-3392ST	2520	70.67
FL-3292C	FL-3392C	3680	03.5
FL-3288G	FL-3388G	2040	39.7
FL-3288ST	FL-3388ST	3980	108.3
FL-3288C	FL-3388C	5739	169.8
FL-3265G	FL-3365G	2678	52.0
FL-3265ST	FL-3365ST	4922	150.0
FL-3296ST	FL-3396ST	12,058	364.0
FL-3217ST	FL-3317ST	24,680	745.0
FL-3263ST	3263ST	42,094	1261.0
FL-3263C	FL-3363C	58,500	1866.0

Variable area flow meter with 150 mm Flow Tubes[1]

Model No. Aluminum Frame	Model No. 316 SS Frame	Maximum Flow Rate† (cc/min)	
		Air	Water
FL-3445G*	FL-3545G*	18.6	0.196
FL-3445ST*	FL-3545ST*	61.8	0.956
FL-3445C*	FL-3545C*	110	1.92
FL-3441G	FL-3541G	48.5	0.53
FL-3441ST	FL-3541ST	141.5	2.45
FL-3461G	FL-3561G	92	0.85
FL-3461SA	FL-3561SA	140	1.92
FL-3461ST	FL-3561ST	263	4.7
FL-3461C	FL-3561C	454	8.5
FL-3402G	FL-3502G	374	5.5
FL-3402ST	FL-3502ST	814	20.4
FL-3402C	FL-3502C	1222	33.7
FL-3403G	FL-3503G	825	16.5
FL-3403ST	FL-3503ST	1682	46.0
FL-3404G	FL-3504G	2313	53.5
FL-3404ST	FL-3504ST	4562	130.4
FL-3405G	FL-3505G	3807	84.3
FL-3405ST	FL-3505ST	7590	216.6
FL-3439G	FL-3539G	8678	210.0
FL-3439ST	FL-3539ST	16,737	506.0
FL-3440G	FL-3540G	22,536	54.0
FL-3440ST	FL-3540ST	41,512	1288.0
FL-3440C	FL-3540C	59,494	1881.0
FL-3263C	FL-3363C	58,500	1866.0

Comes complete with correlation tables (one each for air and water) on the back of the instruction sheet.

***G** suffix denotes glass float, **ST** suffix denotes 316 SS float, **C** suffix denotes carboloy float, **SA** suffix denotes sapphire float. For units without valve, add suffix **"-NV"** to model number.*

[1]For 16 turn, high-resolution non-rising stem valve for 150 mm variable area flow meter, add suffix "-HRV" to model number, for additional cost.

***** Accuracy ±5% on these models.*

† Minimum flow rate is 10% of maximum.

†† New flow rates effective for purchase after January 1, 2013

*For NIST traceable certificate for air, add suffix **"-NISTAIR"** to model number, for additional cost. For water, add suffix **"-NISTWATER"** to model number, for additional cost.*

***Ordering Examples: FL-3403ST,** 150 mm flowtube in aluminum frame.*

***FL-34406-NV,** 150 mm flowtube in aluminum frame, no valve.*

***FL3502G-HRV,** 150 mm flowtube in 316 SS frame with high resolution valve.*

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OEM-STYLE ACRYLIC VARIABLE AREA FLOW METER

Capacities: Water: 6.5 GPH to 20 GPM
Air: 2 SCFH to 40 SCFM

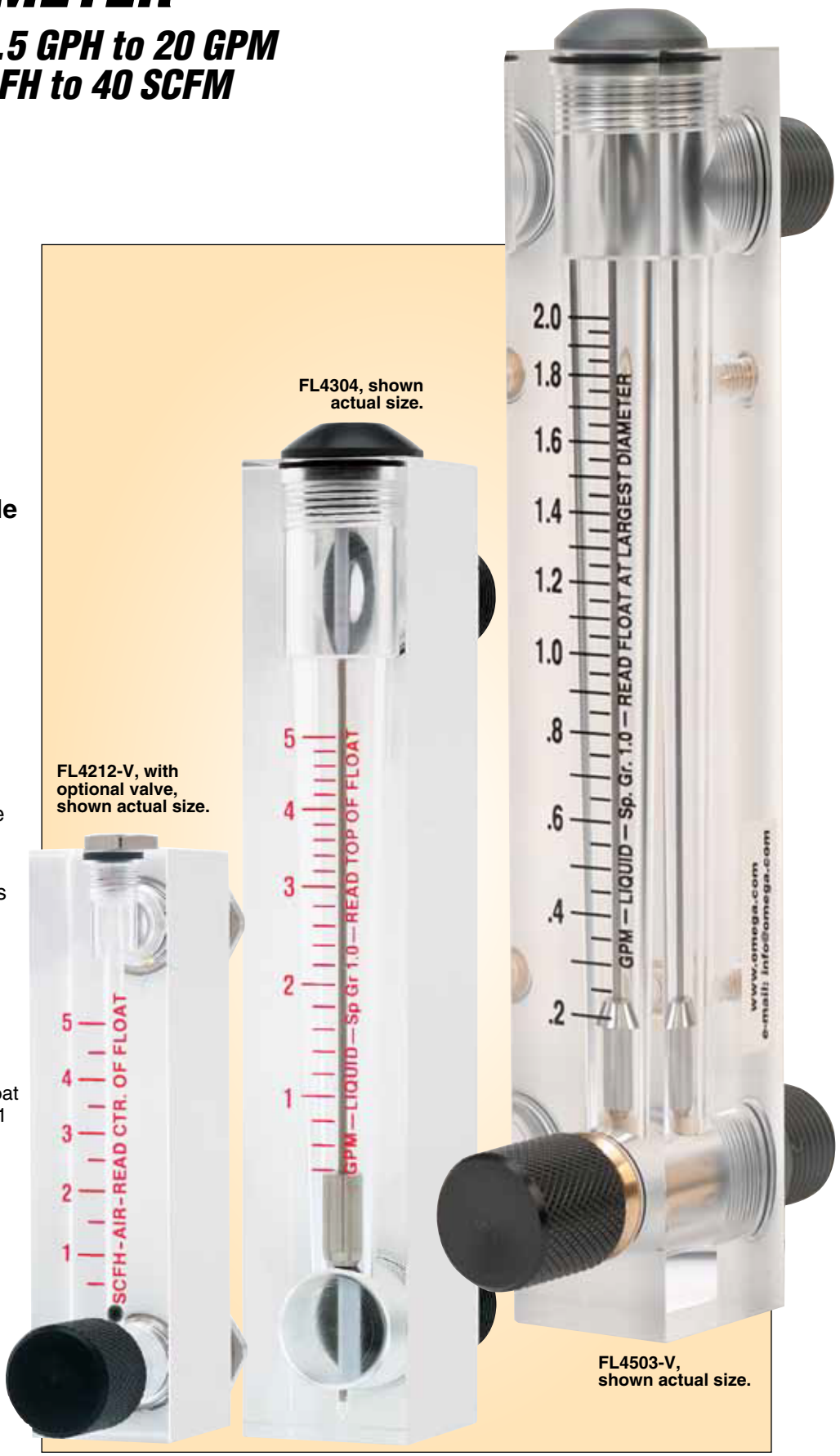
FL4000 Series

1 YEAR WARRANTY | NIST | RoHS

Optional

- 50, 75, 127, and 250 mm (1.97, 2.96, 5, and 9.85") Scale Lengths
- Floats are Rod-Guided in Most Models
- Metering Valves Available
- Rear Inserts Provided for Panel Mounting
- Direct-Reading Scales

FL4000 OEM-style variable area flow meter are precisely machined from solid acrylic blocks. They are available in 50, 75, 127, and 250 mm (1.97, 2.96, 5, and 9.85") scale lengths and have accuracies between 2 and 6%. Designed for front-panel mounting, the rear ports extend through the panel for easy hookup. Mounting threads are also provided. Units are available with and without valves.



SPECIFICATIONS

Construction: Acrylic tube, 316 SS float and guide rod (no guide rod for FL4211 through FL4215 air meters), PVC end fittings (brass on FL4200 Series), EPR O-rings, optional brass valve

Max Pressure/Temperature:

Water Ranges:
125 psig @ 21°C (70°F);
54°C (130°F) at 0 psig

Air Ranges:
100 psig @ 21°C (70°F);
38°C (100°F) @ 0 psig

Full Scale Accuracy/Repeatability:

FL4200: 6/2%
FL4300 and FL4400: 4/1%
FL4500: 3/1/2%
FL4600: 2/1/2%

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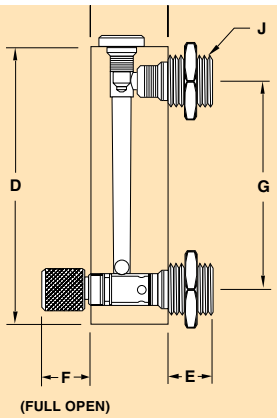
Dimensional



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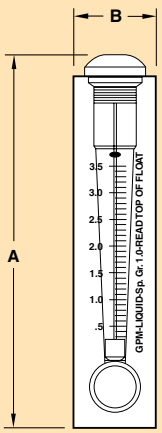

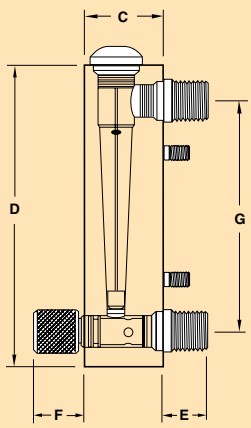

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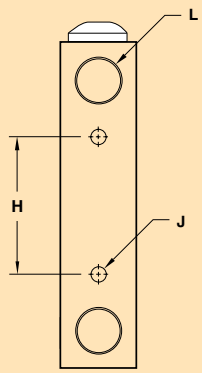

REAR VIEW

Connection: FL4200: ¼ FNPT; FL4300 and FL-4500: ¼ FNPT x ½ MNPT; FL4400: 1 MNPT; FL4600: ½ FNPT

Dimensions mm (inch)	FL4200	FL4300	FL4400	FL4500	FL4600
A	102 (4.0)	168 (6.6)	225 (8.9)	210 (8¼)	362 (14¼)
B	25 (1.0)	32 (1.3)	44 (1.8)	32 (1¼)	44 (1¾)
C	32 (1.3)	35 (1.4)	46 (1.9)	35 (1⅜)	46 (1 13/16)
D	105 (4.1)	173 (6.8)	232 (9.9)	213 (8⅜)	368 (14½)
E	13 (0.5)	25 (1.0)	32 (1.3)	25 (1)	19 (¾)
F	29 (1.1)	32 (1.3)	48 (1.9)	32 (1¼)	48 (1⅞)
G	76 (3.0)	127 (5.0)	165 (6.5)	164 (6 7/16)	311 (12¼)
H	—	76 (3.0)	102 (4.0)	100 (3 15/16)	222 (8¾)
L	17 (0.7)	25 (1.0)	35 (1.4)	25 (1)	32 (1¼)
J Mounting Thread Size*	†	¼ x 20	¼ x 20	¼ x 20	⅜ x 24

** Threaded stud.*

† FL4200 has ⅞" hex lock nuts around ports; requires ¾" holes to be drilled through the panel.

To Order

Water				Air	
Model No.	Range (Maximum)*	Pressure Drop, inH2O** No Valve	Valve	Model No.	Range (Maximum)*
FL4201	7 GPH	1**	1.3**	**FL4211**	2.6 SCFH
FL4202	12 GPH	15**	17**	**FL4212**	5.0 SCFH
FL4203	22 GPH	35**	51**	**FL4213**	10.0 SCFH
FL4204	44 GPH	149**	200**	**FL4214**	20.0 SCFH
FL4205	60 GPH	100**	250**	**FL4215**	30.0 SCFH
FL4301	1 GPM	18**	26**	**FL4216**	60.0 SCFH
FL4302	2.0 GPM	70**	125**	**FL4217**	100.0 SCFH
FL4303	3.5 GPM	200**	290**	**FL4218**	180.0 SCFH
FL4304	5 GPM	290**	440**	**FL4219**	4.0 SCFM
FL4401	10 GPM	53	220	**FL4411**	40.0 SCFM
FL4402	15 GPM	132	330	**FL4412**	62.0 SCFM
FL4403	20 GPM	200	400	—	—
FL4501	1 GPM	18	33	**FL4511**	4.0 SCFM
FL4502	100 GPH	45	75	**FL4512**	6.8 SCFM
FL4503	2 GPM	70	155	**FL4513**	8.0 SCFM
FL4504	5 GPM	240	400	**FL4514**	20.0 SCFM
FL4601	2 GPM	5	21	**FL4611**	8.5 SCFM
FL4602	3.5 GPM	13	50	**FL4612**	14.5 SCFM
FL4603	5 GPM	20	95	**FL4613**	20.0 SCFM
FL4604	10 GPM	110	270	**FL4614**	40.0 SCFM

Comes complete with operator's manual.

** Minimum flow rate = 10% of maximum flow rate listed.*

*** For water ranges. For air ranges, contact the Flow Department. For units with brass valve, add suffix "**-V**" to model number, additional cost for FL4200s, FL4300s, FL4400s, FL4500s and FL4600s.*

*For NIST calibration certificate, and "**-NIST 5PT**" to the model number for 5-point calibration, or "**-NIST 10PT**" for 10-point calibration for additional cost.*

***Ordering Examples: FL4303-V,** acrylic variable area flow meter, 3.5 GPM flow rate.*

***FL-4613**, acrylic variable area flow meter, 40 SCFM max flow.*

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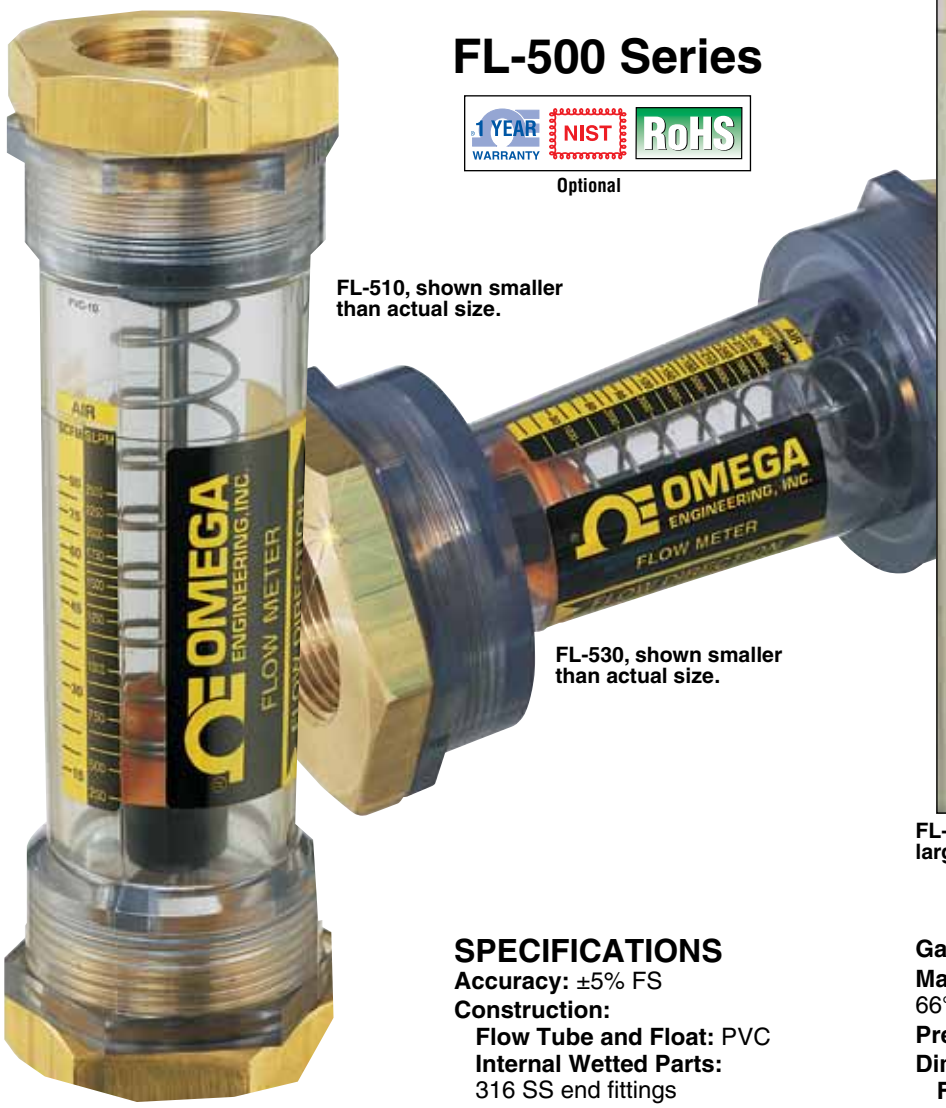
For Use with Water and Air

FL-500 Series

1 YEAR WARRANTY · NIST · RoHS

Optional



FL-510, shown smaller than actual size.

FL-530, shown smaller than actual size.

FL-510, shown larger than actual size.

- **Direct Reading in GPM, LPM, SCFM, and SLPM**
- **Scales for Air and Water**
- **Fluid is Always in View**
- **Mount in Any Position**
- **Easy to Clean and Maintain**
- **±5% FS Accuracy**

The FL-500 Series in-line flowmeters feature rugged construction, easy installation, and direct-reading flow rates for water and air at atmospheric and 90 psi pressures.

For added versatility, the FL-500 Series flowmeters can be ordered with electric proximity switches (order separately, see next page) to signal specific flow rates. Settings are easily adjustable with a screwdriver.

SPECIFICATIONS

Accuracy: ±5% FS
Construction:
Flow Tube and Float: PVC
Internal Wetted Parts:
316 SS end fittings
Brass, Female NPT Seals: FKM
Liquid Service: 200 psig @ 21°C (70°F)
Gas Service: 100 psig @ 21°C (70°F)
Maximum Temperature:
66°C (150°F) @ 25 psig
Pressure Drop: 4 psig FS
Dimensions: 177.8 mm (7") long
FL-505 through FL-515:
50.8 mm (2") Dia.
FL-530 through FL-550:
76.2 mm (3") Dia.

To Order

Model No.	Female NPT End Fittings (Brass)	Scales—Metric Equivalent Supplied Standard	
		Water LPM (GPM)	90 psi Air (SCFM)
FL-505	1 FNPT	2 to 20 (0.5 to 5)	5 to 50
FL-510	1 FNPT	4 to 38 (1 to 10)	15 to 90
FL-515	1 FNPT	6 to 55 (1.5 to 15)	15 to 135
FL-530	1½ FNPT	11 to 110 (3 to 30)	30 to 300
FL-540	1½ FNPT	15 to 150 (4 to 40)	40 to 400
FL-550	1½ FNPT	20 to 200 (5 to 50)	50 to 500

Comes complete with operator's manual.
*For polysulfone body and float, add suffix **"-PLSF"** to model number, consult Flow Engineering for price.*
*For NIST traceable certificate, for water only, add suffix **"-NIST"** to model number for additional cost.*
***Ordering Examples: FL-515,** 1 FNPT flowmeter, 15 GPM, 135 SCFM.*
***FL-550**, 1½ FNPT flowmeter. 50 GPM. 500 SCFM max.*

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FL50000A Series

1 YEAR WARRANTY NIST RoHS

Optional

- Direct-Reading Scales
- Solid One-Piece Acrylic Body
- GPM and LPM Scales
- Panel Mount

OMEGA® FL50000A Series flowmeters feature a rugged, one-piece acrylic body, stainless steel internal parts, rear inlet and outlet ports for panel mounting, and excellent accuracy. The stainless steel float guide helps reduce float oscillation and improve overall performance. Permanent screen-printed scales are positioned directly in front of the float for easy reading. For greater versatility and control, FL5000A Series meters may be ordered with an integral flow adjustment valve.

SPECIFICATIONS

Accuracy: ±5% of FS
Meter Body Construction: Machined acrylic
O-Ring Material: FKM
Float: 316 SS
Lock Nut: Polypropylene
Temperature Limits: 48°C (120°F) at 0 psi (¾ and 1 MNPT units) 93°C (200°F) at 0 psi (¼, ½ and ⅜ MNPT units)
Pressure Limits: 120 psi at 21°C (70°F) (¾ and 1 MNPT units) 250 psig at 21°C (70°F) (¼, ½ and ⅜ MNPT units)
Pressure Drop: 2 psi max
Adaptor: ¼ and 1" are PVC, all others are glass-filled polypropylene
Dimensions Without Valve (Center to Center x Overall Height x Width):
FL50001: 143 x 191 x 25 mm (5⅝ x 7¼ x 11/16")
FL50002 to FL50004: 165 x 227 x 32 mm (6½ x 8⅜ x 1 9/32")
FL50005: 165 x 229 x 38 mm (6½ x 9 x 1½")
FL50006 to FL50007: 203 x 276 x 44 mm (8 x 10⅝ x 1¾")

FL50004A shown smaller than actual size

To Order

Water Units				Air Units		
Model No.	Range GPM	Range LPM	Pressure Drop bar (psi)	Model No.	Ranges SCFM	Fittings MNPT
FL50001A	0.025 to 0.25	0.1 to 1	0.008 (0.12)	**FL50251A**	0.1 to 1.2	¼
FL50002A	0.1 to 1	0.4 to 4	0.02 (0.3)	**FL50252A**	0.5 to 4.5	⅜
FL50003A	0.2 to 2	0.75 to 7.5	0.02 (0.3)	**FL50253A**	1 to 7	⅜
FL50004A	0.5 to 5	2 to 20	0.1 (1.5)	**FL50254A**	2 to 20	½
FL50005A	1 to 10	4 to 40	0.1 (1.5)	**FL50255A**	4 to 45	¾
FL50007A	2 to 20	7.5 to 75	0.1 (1.5)	–	–	1

Comes complete with operator's manual.
*Add suffix "**-V**" to model number for adjustable CPVC valve, for additional cost.*
*For 5-point NIST calibration add suffix "**-NIST**" to model number, for additional cost.*
***Ordering Examples: FL50002A,** meter with 0.1 to 1.0 GPM, 0.4 to 4 LPM ranges.*
***FL-50251A,** 1 to 1.2 SCFM air-flow range.*

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IN-LINE FLOWMETERS FOR ULTRA-PURE WATER

FL-500UP Series

1 YEAR WARRANTY | NIST | RoHS

Optional

- Fluid is Always in Sight
- Direct-Reading English and Metric Scales
- Electro-Polished Version of Standard 316 SS Shaft and Spring Optionally Available
- PVDF End Fittings
- Polysulfone Body
- Perfluoroelastomer Seals
- Easily Mounted in Any Pipe Orientation

FL-505UP shown smaller than actual size.

The FL-500UP is a specialized meter for monitoring the flow rate of ultra-pure water to tools, on de-ionized water returns, and UPW returns. Also available are accessory switches for signaling specific flowrates. Each switch kit contains all the necessary hardware for quick and trouble-free mounting. Kits include a ring-shaped PTFE-coated ceramic magnet that fits around the float in the flowmeter, and a proximity switch mounted in a rugged housing that easily clamps to the body of the flowmeter. As the changing flow causes the float to move within the tube, the magnet moves with it, and its magnetic field trips the proximity switch at the predetermined flow rate. An adjustment screw allows for easy flow rate adjustment. Add 2 switches to indicate both high and low flow rate limits.

Note: *Switch activates over a 25% FS band; above and below this band, the relay deactivates.*

Caution:
Polysulfone should not be used in direct sunlight or any other significant sources of ultraviolet light.

SPECIFICATIONS

Accuracy: ±5% FS
Pressure Drop: 4 psi at full scale flow
Maximum Pressure: 150 psig @ 20°C (68°F)
Maximum Temperature: 65°C (150°F) @ 0 psig
Dimensions: 177.8 mm (7") long,
FL-505 through FL-515: 50.8 mm (2") Dia.
FL-530 through FL-550: 76.2 mm (3") Dia.

To Order

Model No.	Female NPT End Fittings	Dual Scales	
		GPM	LPM
FL-505UP	1	0.5 to 5	2 to 20
FL-510UP	1	1 to 10	4 to 38
FL-515UP	1	1.5 to 15	6 to 55
FL-520UP	1.5	2 to 20	8 to 75
FL-530UP	1.5	3 to 30	11 to 110
FL-540UP	1.5	4 to 40	15 to 150
FL-550UP	1.5	5 to 50	20 to 200

Accessory Switch Kits (Field Installable)

Model No.	For Sizes
FL-500-S1	FL-505, -510, -515
FL-500-S2	FL-520, -530, -540, -550

Switch ratings: 8 W, 100 Vdc/120 Vac [at 25°C (77°F)]
Comes complete with operator's manual.
*For NIST traceable certificate add suffix **"-NIST"** to model number for additional cost.*
*For optional electro-polished 316 SS shaft and spring, add suffix **"-EP"** to model number for additional cost.*
***Ordering Examples: FL-505UP**, 1" flowmeter, 0.5 to 5 GPM (2 to 20 LPM) range.*
***FL-550UP**, 1.5" flowmeter, 5 to 50 GPM (20 to 200 LPM) range.*

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FL-500WW Series

1 YEAR WARRANTY | NIST | RoHS

Optional

- Direct Flow Indication
- PVC Body and End Fittings
- Titanium Shaft and Spring
- Easily Mounted in Any Pipe Orientation

Typical Applications

- Aluminum Sulfate (Alum)—Clarification
- Chlorinated Water—Disinfection
- Ferric Chloride—Clarification
- Potassium Permanganate—Disinfection
- Sodium Bisulfite—Disinfection
- Sodium Hypochlorite (Bleach)—Disinfection
- Sodium Hydroxide—Neutralization
- Sulfur Dioxide (in Water)—Dechlorination
- Chlorine Dioxide—Disinfection

The FL-500WW Series provides flow rate indication for 1 to 5% dilute aqueous chemical solutions used in the treatment of water and wastewater.

Dimensions: 177.8 mm (7") long
FL-505 through FL-515: 50.8 mm (2") Dia.
FL-520 through FL-550: 76.2 mm (3") Dia.

FL-505WW, shown smaller than actual size.

To Order

Model No.	Female NPT End Fittings	Dual Scales	
		GPM	LPM
FL-505WW	1	0.5 to 5	2 to 20
FL-510WW	1	1 to 10	4 to 38
FL-515WW	1	1.5 to 15	6 to 55
FL-520WW	1.5	2 to 20	8 to 75
FL-530WW	1.5	3 to 30	11 to 110
FL-540WW	1.5	4 to 40	15 to 150
FL-550WW	1.5	5 to 50	20 to 200

SPECIFICATIONS

Fluid Temperature		Max Liquid Pressure	
°C	°F	psig	bar
21	70	200	13.79
38	100	100	6.90
52	125	75	5.17
65	150	50	3.45

Accessory Switch Kits (Field Installable)

Model No.	For Sizes
FL-500-S1	FL-505, FL-510, FL-515
FL-500-S2	FL-520, FL-530, FL-550

Switch ratings: 8 W, 100 Vdc/120 Vac.
Comes complete with operator's manual.
*For NIST traceable certificate add suffix **"-NIST"** to model number for additional cost.*
***Ordering Examples: FL-515WW,** 1" flowmeter, 1.5 to 15 GPM (6 to 55 LPM).*
***FL-530WW**. 1.5" flowmeter. 3 to 30 GPM (11 to 110 LPM).*

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FL601G Series

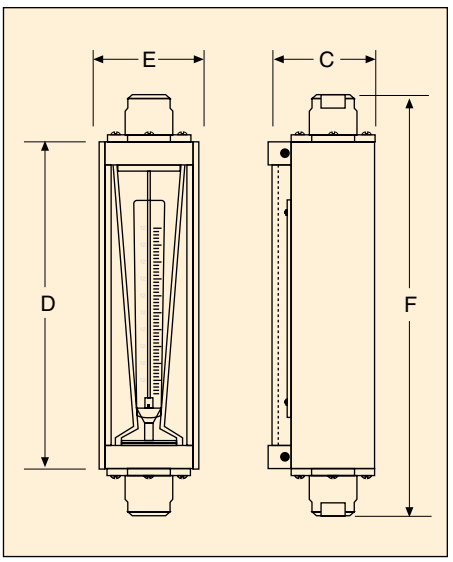
1 YEAR WARRANTY · NIST · RoHS

Optional

- Heavy-Duty 304 SS Frame, End Plates, and Shield Retainers
- Full 4.76 mm (3⁄16") Thick Polycarbonate Safety Shield
- 316 SS In-Line (Vertical) Fittings
- Detachable, Clear Polycarbonate Scale Plate
- Direct-Reading Scales (GPM Water or SCFM Air)
- Unique Float Stop Design Allows Internals to be Removed and Replaced Without Disturbing Tube or Shield
- Easy to Clean
- NIST-Traceable Calibration Available
- Vertical Mount Only

SPECIFICATIONS

Accuracy: ±3% Full Scale
Repeatability: ±1%
Scale: 127 mm (5")
Wetted Parts: 316 SS, borosilicate glass, EPR O-Rings
Maximum Temperature: 93°C (200°F)
Connections: FNPT



FL601G shown smaller than actual size.

Dimensions: mm (inch)

C	D	E	F	Connection Size
65 (2.6)	227 (8.9)	64 (2.5)	302 (11.9)	½ FNPT
98 (3.9)	271 (10.7)	86 (3.4)	343 (13.5)	1 FNPT
137 (5.4)	298 (11.8)	135 (5.3)	406 (16)	2 FNPT

To Order

Water Models				Air Models				
Model No.	Maximum GPM	ΔP inH2O	NPT	Model No.	Maximum SCFM	NPT	Maximum Pressure psig	Weight kg (lb)
FL601G	0.74	5	½	**FL610G**	3.0	½	250	4.5 (10)
FL602G	2.00	40	½	**FL611G**	8.2	½	250	4.5 (10)
FL603G	5.00	14	1	**FL612G**	21.5	1	200	4.5 (10)
FL604P	26.00	70	1	**FL613P**	90.0	1	200	4.5 (10)
FL605P	61.00	40	2	**FL614P**	250.0	2	125	7.7 (17)
FL606P	116.00	45	2	**FL615P**	245.0	2	125	7.7 (17)

Comes complete with operator's manual.
*"**G**" models have rib-guided floats; "**P**" models have pole-guided floats.*
Weights and maximum pressure shown are for both water and air models.
*For 5-point NIST calibration certificate add suffix "**-NIST 5PT**" to model number or suffix "**-NIST 10PT**" for 10-point calibration, for additional cost.*
***Ordering Examples: FL605P**, flowmeter for water with pole-guided float, 61 GPM max flow rate, 2 NPT fitting and 125 psi max pressure.*
***FL611G**, flowmeter for air, 8.2 SCFM maximum flow rate, ½ NPT fitting and 250 psig maximum pressure.*

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ECONOMICAL IN-LINE FLOWMETERS

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CAPACITIES: 0.2 to 15 GPM of Water, 0.2 to 15 GPM of Oil

FL-6000A Series

1 YEAR WARRANTY

RoHS

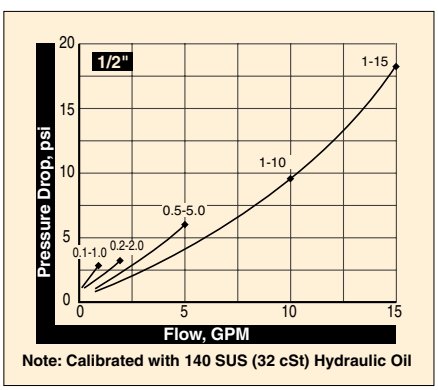
The FL-6000A Series of general purpose flowmeters is designed to provide economical, accurate flow rate indication for oil and water. These industrial flowmeters utilize a spring-and-piston type assembly, which enables them to be mounted in any position and gives immunity to changes in viscosity. FL-6000A meters can be used in severe environments at up to 241.3 bar (3500 psig) and 116°C (240°F).

FL-6105A, shown smaller than actual size.

- **±2% Full Scale Accuracy**
- **±1% Repeatability**
- **Direct Readings for Oil or Water**
- **Good Viscosity Stability**
- **Mounts in Any Position**
- **241.3 bar (3500 psig) Pressure Rating**
- **116°C (240°F) Temperature Range**
- **Vertical Connectors for In-Line Mounting**
- **For Clear and Opaque Fluids**

SPECIFICATIONS

Accuracy: ±2% FS
Repeatability: ±1%
Connection: ½ FNPT
Dimensions: 60.96 x 53.34 mm (2.4 x 2.1") for 116°C (240°F) units
Length: 168 mm (6.6") for all units
Maximum Pressure: 241.3 bar (3500 psig)
Maximum Temperature:
Standard: 116°C (240°F)
Optional: 204°C (400°F)
Shipping Weight:
Oil: 0.57 kg (1.25 lb)
Water: 1.18 kg (2.60 lb)
Wetted Parts: 302 SS (oil units) or 302 SS spring (water units), FKM O-rings, polyphenylene sulfide/ceramic magnetic. Oil units have aluminum body, water units have brass body.



Note: Calibrated with 140 SUS (32 cSt) Hydraulic Oil

Pressure Drop: Approximate pressure losses in meters using oil at low and normal temperatures. Add 10% to pressure for equal water flows.

To Order

Model No.	Flow Range LPM (GPM)	Medium/Specific Gravity
FL-6102A	0.8 to 7.5 (0.2 to 2)	Oil/0.876
FL-6105A	2 to 19 (0.5 to 5)	Oil/0.876
FL-6110A	3 to 37 (1.0 to 10)	Oil/0.876
FL-6115A	3 to 57 (1.0 to 15)	Oil/0.876
FL-6302ABR	0.8 to 7.5 (0.2 to 2.0)	Water/1.0
FL-6305ABR	2 to 19 (0.5 to 5)	Water/1.0
FL-6310ABR	3 to 37 (1.0 to 10)	Water/1.0
FL-6315ABR	3 to 57 (1.0 to 15)	Water/1.0

Comes complete with operator's manual.
*For units with BSPP threads add suffix "**-BSPP**" to model number, no additional charge.*
*For 204°C (400°F) units, add suffix "**-H**" to model number, for additional cost.*
***Ordering Examples: FL-6105A,** oil flowmeter, 5.0 GPM.*
***FL-6115A**, oil flowmeter 15 GPM.*

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CAPACITY: 0.2 to 15 GPM of Water

FL-6400A Series

1 YEAR WARRANTY RoHS

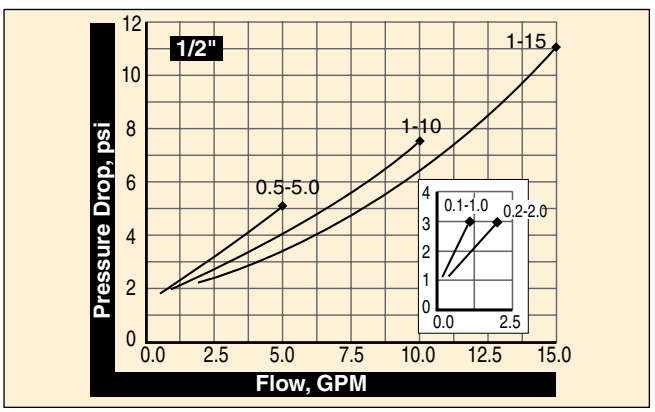
- ±2% Full Scale Accuracy
- Direct-Reading Scale for Water
- For Corrosive Fluids
- For High-Pressure Systems
- Mounts in Any Position
- Vertical Connections for In-Line Mounting
- ±1% Repeatability
- High Viscosity Immunity
- 116°C (240°F) Standard, 204°C (400°F) Optional

OMEGA® FL-6400A in-line flowmeters are designed for use with many caustic or corrosive fluids. These meters feature stainless steel construction, and because of the unique construction design, they can be mounted in any position. The FL-6400A flowmeters have direct-reading scales for water on the metering tube, and, due to the sharp-edged orifice float, variances in viscosity have only a minimal effect. FL-6400A flowmeters feature a unique spring-bound design flow rate indicator, which can be used with both clear and opaque liquids for maximum versatility. Correlation equations for use with other fluids are available in the user's manual

FL-6404A-316
shown actual size.

SPECIFICATIONS

Accuracy: ±2% FS
Repeatability: ±1%
Connections: ½ FNPT
Dimensions: 61.0 x 53.6 mm (2.4 x 2.11") for 116°C (240°F) units
Length: 168 mm (6.6") for all units
Maximum Pressure: 413.7 bar (6000 psig)
Maximum Temperature: 116°C (240°F)
Shipping Weight: 1.34 kg (2.95 lb)
Metering Tube: 316 SS
Float: 316 SS
Spring: 316 SS
Seals: FKM
Magnet: Polyphenylene sulfide/ceramic



To Order

Model No.	Range LPM (GPM)
FL-6402A-316	0.8 to 7.5 (0.2 to 2.0) water
FL-6404A-316	2 to 19 (0.5 to 5.0) water
FL-6412A-316	3 to 38 (1.0 to 10) water
FL-6416A-316	4 to 56 (1.0 to 15) water

Comes complete with operator's manual.
*For units with BSPP threads add suffix "**-BSPP**" to model number, no additional charge.*
*For 204°C (400°F) units add suffix "**-H**" to model number, for additional cost.*
***Ordering Examples: FL-6412A-316,** water flowmeter, 10 GPM.*
***FL-6402A-316-H**. 204°C (400°F) water flowmeter. 2 GPM.*

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OEM-STYLE ACRYLIC VARIABLE AREA FLOW METER

CAPACITIES: Water: 6.5 GPH to 20 GPM Air: 2 SCFH to 62 SCFM

FL7000 Series

1 YEAR WARRANTY · NIST · RoHS

Optional

- 50, 75, 100, 127, and 250 mm (1.97, 2.96, 3.94, 5, and 9.85") Scale Lengths
- Floats are Rod-Guided in Most Models
- Direct-Reading Scales

FL7000 OEM-style variable area flow meter are precisely machined from solid acrylic blocks. They are available in 50, 75, 100, 127, and 250 mm scale lengths (1.97, 2.96, 5, 3.94, and 9.85") and have accuracies between 2 and 6%.

Model No.	Dimensions mm (inch)							Connection Size
	A	B	C	D	E	F	G	
FL7200	121 (4.8)	25 (1.0)	29 (1.1)	89 (3.5)	38 (1.5)	—	25 (1.0)	¼ FNPT
FL7300	165 (6.5)	35 (1.4)	35 (1.4)	127 (5.0)	64 (2.5)	8 (0.9)	32 (1.3)	½ FNPT
FL7400	213 (8.4)	44 (1.8)	46 (1.8)	197 (7.8)	133 (5.3)	32 (1.3)	32 (1.3)	1 FNPT
FL7500	235 (9.3)	35 (1.4)	35 (1.4)	168 (6.6)	102 (4.0)	8 (0.9)	33 (1.3)	½ FNPT
FL7600	346 (13.6)	44 (1.8)	46 (1.8)	302 (11.9)	203 (8.0)	32 (1.3)	64 (2.5)	¾ FNPT

To Order

Water Model No.	Water Range	Air Model No.	Air Range	Pressure Drop (inH_2O)
FL7201	7.0 GPH	FL7211	2.6 SCFH	1.3
FL7202	12.0 GPH	FL7212	5.0 SCFH	2.2
FL7203	20.0 GPH	FL7213	10.0 SCFH	3.5
FL7204	50.0 GPH	FL7214	20.0 SCFH	7.0
FL7205	60.0 GPH	FL7215	30.0 SCFH	9.5
FL7206	75.0 GPH	FL7216	60.0 SCFH	11.8
—	—	FL7217	100.0 SCFH	—
—	—	FL7218	180.0 SCFH	—
—	—	FL7219	4.0 SCFM	—
FL7301	1.0 GPM	FL7311	4.0 SCFM	2.4
FL7302	2.0 GPM	FL7312	8.0 SCFM	4.6
FL7303	3.5 GPM	FL7313	14.5 SCFM	8.5
FL7304	5.0 GPM	FL7314	20.0 SCFM	12.2
FL7401	10.0 GPM	FL7411	40.0 SCFM	9.6
FL7402	15.0 GPM	FL7412	62.0 SCFM	17.3
FL7403	20.0 GPM	—	—	50.3
—	—	FL7511	4.0 SCFM	—
FL7503	2.0 GPM	FL7513	8.2 SCFM	4.8
FL7504	5.0 GPM	FL7514	20.0 SCFM	12.3
FL7601	2.0 GPM	FL7611	8.5 SCFM	2.7
FL7602	3.5 GPM	FL7612	14.5 SCFM	9.5
FL7603	5.0 GPM	FL7613	20.0 SCFM	31.4
FL7604	10.0 GPM	FL7614	40.0 SCFM	50.0

Comes complete with operator's manual.

** Minimum flow rate = 10% of maximum flow rate listed. ** For water units only.*

*For NIST calibration certificate add suffix "**-NIST 5PT**" for 5-point calibration, or suffix "**-NIST 10PT**" for 10-point calibration, for additional cost.*

***Ordering Examples: FL7302**, acrylic variable area flow meterfor water, 2 GPM range.*

***FL7313**, acrylic variable area flow meter for air, 14.5 SCFM range.*

FL7401 shown smaller than actual size.

FL7504 shown smaller than actual size.

SPECIFICATIONS

Construction: Acrylic tube, 316 SS float and guide rod (no guide rod for FL7211 through FL7215 air meters), PVC end fittings (brass on FL7200 series), EPR O-rings

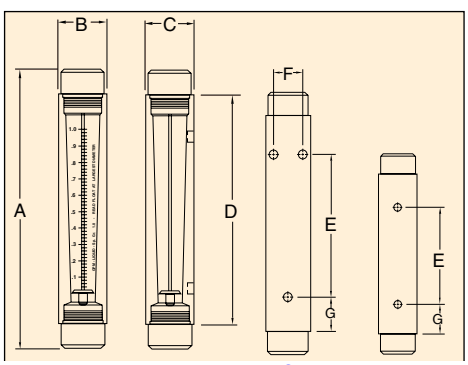
Shipping Weights: FL7200, 7300, 7500: 0.45 kg (1 lb); FL7400: 0.79 kg (1.75 lb); FL7600: 1.25 kg (2.75 lb)

Maximum Pressure/Temperature:

Water Ranges:
125 psig at 21°C (70°F);
54°C (130°F) at 0 psig

Air Ranges: 100 psig at 21°C (70°F);
38°C (100°F) @ 0 psig

Full Scale Accuracy/Repeatability:
FL7200: 6/2%; FL7300: 6/1%;
FL7400: 4/1%; FL7500: 3/½%;
FL7600: 2/½%



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ECONOMICAL IN-LINE FLOWMETERS

CAPACITIES: 0.2 to 30 GPM of Water, 0.2 to 30 GPM of Oil

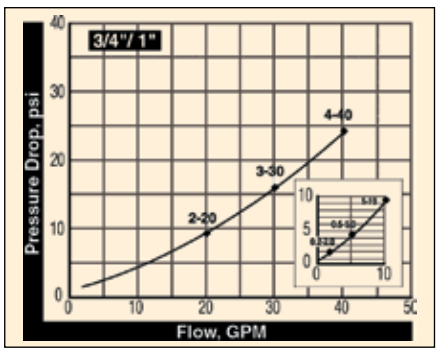
FL-7000A

1 YEAR WARRANTY RoHS

- ±2% Full Scale Accuracy
- ±1% Repeatability
- Mounts in Any Position
- Good Viscosity Stability
- Direct Readings for Oil and Water
- 241.3 bar (3500 psig) Pressure Rating
- Vertical Connectors for In-Line Mounting
- Temperature Rating: 116°C (240°F) Standard, 204°C (400°F) Optional
- For Clear and Opaque Fluids

FL-7105A, shown actual size. For cutaway drawing of this unit and for correlation equations for other fluids, visit us online

The FL-7000A Series of general purpose flowmeters is designed to provide economical, accurate flowrate indication for oil and water. These industrial flowmeters utilize a spring-and-piston type assembly that enables them to be mounted in any position and makes them immune to changes in viscosity. FL-7000A meters can be used in severe environments, at up to 241.3 bar (3500 psig) and 116°C (240°F).



Pressure Drop: Approximate pressure losses in flowmeters using oil at normal temperatures. Add 10% to pressure for equal water flows.

SPECIFICATIONS

Accuracy: ±2% FS
Repeatability: ±1%
Connections: ¾ FNPT
Dimensions: 72 x 63 mm (2.85 x 2.48") for 116°C (240°F) units
Length: 181.8 mm (7.16") for all units
Maximum Pressure: 241.3 bar (3500 psig)
Maximum Temperature: 116°C (240°F) standard, 204°C (400°F) at 124 bar (1800 psig) maximum, optional
Shipping Weight: 0.9 kg (2 lb) for oil, 1.8 kg (4 lb) for water meters
Viscosity Range: 44 to 400 SSU (±5%)
Wetted Parts: Polyphenylene sulfide/ ceramic magnet, FKM O-Rings; FL-7100 has aluminum body and 302 SS spring; FL-7300BR has brass body and 302 SS spring

To Order

Model No.	LPM (GPM)	Flow Range Medium/ Dpecific Gravity
FL-7102A	0.8 to 7.5 (0.2 to 2)	Oil/0.876
FL-7105A	2 to 19 (0.5 to 5)	Oil/0.876
FL-7110A	3 to 37 (1.0 to 10)	Oil/0.876
FL-7120A	7 to 74 (2.0 to 20)	Oil/0.876
FL-7130A	11 to 114 (3.0 to 30)	Oil/0.876
FL-7302ABR	0.8 to 7.5 (0.2 to 2)	Water/1.0
FL-7305ABR	2 to 19 (0.5 to 5)	Water/1.0
FL-7310ABR	3 to 37 (1.0 to 10)	Water/1.0
FL-7320ABR	7 to 74 (2.0 to 20)	Water/1.0
FL-7330ABR	11 to 114 (3.0 to 30)	Water/1.0

Comes complete with operator's manual.
*For units with BSPP threads add suffix "**-BSPP**" to model number, no additional charge.*
*For 204°C (400°F) units, add suffix "**-H**" to model number, for additional cost.*
***Ordering Examples: FL-7320ABR,** brass water flowmeter, 2 to 20 GPM flow range.*
***FL-7120A-H,** 204°C (400°F) oil flowmeter, 2 to 20 GPM flow rate.*

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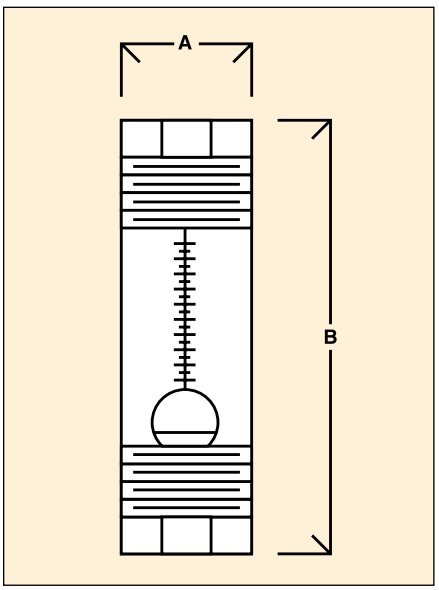
CAPACITY: 0.5 to 200 GPM of Water

FL-75 Series

1 YEAR WARRANTY NIST RoHS

Optional



- Direct-Reading Scales
- Shatter-Resistant Construction
- Easy-to-Read 127 mm (5") Scale
- Vertical Connections for Easy Installation

OMEGA® FL-75 flowmeters combine shatter-resistant, non-glass construction and laboratory precision accuracy.

SPECIFICATIONS

Accuracy Scale: 127 mm (5"), direct reading on tube
Metering Tubes: Acrylic
Floats: 316 SS
Float Stops: Polysulfone

Guide Rods: 316 SS
O-Rings: EPR
End Fittings: PVC
Maximum Temp: 130°
Maximum Pressure: 150 psi

To Order

Model No.	Range (GPM)	Press. Drop (inH_2O)	Accuracy (% FS)	Connections	Dimensions: mm (in) A	B
FL-75A	0.5 to 5	10	3/1	1 NPT	51 (2)	260 (10.3)
FL-75B	1 to 10	12	3/1	1 NPT	51 (2)	260 (10.3)
FL-75E	1.5 to 15	18	3/1	1 NPT	51 (2)	260 (10.3)
FL-75C	2 to 22	22	3/1	1 NPT	51 (2)	260 (10.3)
FL-75D	3 to 30.5	26	3/1	1 NPT	51 (2)	260 (10.3)
FL-75F	4 to 40	32	6/2	1½ NPT (male)	51 (2)	306 (12.1)
FL-75G	8 to 50	38	6/2	1½ NPT (male)	51 (2)	306 (12.1)
FL-75J	4 to 40	18	4/1	2 NPT	76 (3)	337 (13.3)
FL-75K	6 to 60	25	4/1	2 NPT	76 (3)	337 (13.3)
FL-75L	8 to 80	30	4/1	2 NPT	76 (3)	337 (13.3)
FL-75M	20 to 100	35	4/1	2 NPT	76 (3)	337 (13.3)
FL-75N	30 to 120	45	6/2	2 NPT	76 (3)	337 (13.3)
FL-75O	45 to 160	60	6/2	2 NPT	76 (3)	337 (13.3)
FL-75P	55 to 200	80	6/2	2 NPT	76 (3)	337 (13.3)

Comes complete with operator's manual.
*For 5-point NIST calibration certificate add suffix "**-NIST 5PT**" or suffix "**-NIST 10PT**" for 10-point calibration to model number, for additional cost.*
***Ordering Examples: FL-75K,** 2 NPT, 6 to 60 GPM rate industrial flowmeter.*
***FL-75A,** 1 NPT, 0.5 to 5 GPM industrial flowmeter.*

FL-75K shown smaller than actual size.

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CAPACITIES: 3 to 150 GPM of Water, 3 to 150 GPM of Oil

FL-8000 Series

1 YEAR WARRANTY RoHS

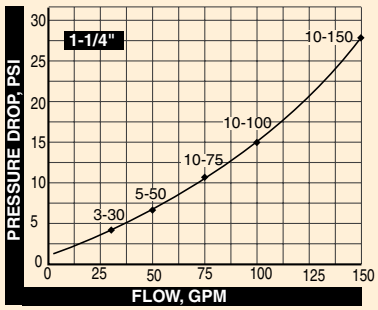
- ±2% Full Scale Accuracy
- ±1% Repeatability
- Mounts in Any Position
- Direct Reading for Oil and Water
- 241.3 bar (3500 psig) Pressure Rating
- Vertical Connections for In-Line Mounting
- High-Viscosity Immunity
- For Clear and Opaque Fluids
- 116°C (240°F) Standard, 204°C (400°F) Optional

The FL-8000A Series of general purpose flowmeters is designed to provide economical, accurate flow rate indication for oil and water. These industrial flowmeters utilize a spring-and-piston type assembly, which enables them to be mounted in any position and gives immunity to changes in viscosity. The FL-8000A meters can be used in severe environments, at up to 241.3 bar (3500 psig) and 116°C (240°F). Correlation equations for use with other fluids are available in the user's manual.

SPECIFICATIONS

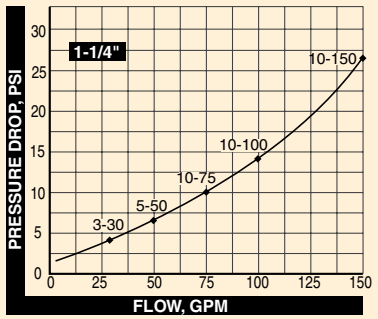
Accuracy: ±2% full scale
Repeatability: ±1%
Connections: 1¼ FNPT
Dimensions: 119 x 104 mm (4.7 x 4.1") for 116°C (240°F) units
Length: 310 mm (12 3/16") for all units
Maximum Pressure: 241.3 bar (3500 psig)
Maximum Temperature: 204°C (400°F) at 124 bar (1800 psig) maximum optional
Shipping Weight:
Oil: 3.3 kg (7.3 lb)
Water: 7.6 kg (16.8 lb)
Wetted Parts: Polyphenylene sulfide/ceramic magnet and FKM O-rings; FL-8100A has aluminum body and 302 SS spring; FL-8300AB has brass body and 302 SS spring

FL-8100A



Note: Calibrated with 140 SUS (32 cSt) Hydraulic Oil

FL-8300AB



Note: Calibrated with Water

FL-8302AB shown smaller than actual size.

Pressure Drop:
Approximate pressure losses in flowmeters using oil at normal temperatures. Add 10% to pressure for equal water flows.

To Order

Model No.	Flow Range (GPM)	Medium/Specific Gravity
FL-8103A	3 to 30	Oil/0.876
FL-8105A	5 to 50	Oil/0.876
FL-8107A	10 to 75	Oil/0.876
FL-8110A	10 to 100	Oil/0.876
FL-8115A	10 to 150	Oil/0.876
FL-8302AB	3 to 30	Water/1.0
FL-8305AB	5 to 50	Water/1.0
FL-8307AB	10 to 75	Water/1.0
FL-8309AB	10 to 100	Water/1.0
FL-8313AB	10 to 150	Water/1.0

Comes complete with operator's manual.
*For units with BSPP threads add suffix "**-BSPP**" to model number, no additional cost.*
*For 204°C (400°F) units add suffix "**-H**" to model number, for additional cost.*
***Ordering Examples: FL-8305AB**, water in-line flowmeter, 50 GPM.*
***FL-8107A-H**, 400°F oil flowmeter.*

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All Plastic variable area flow meter

FL-86 Series

1 YEAR WARRANTY · NIST · RoHS

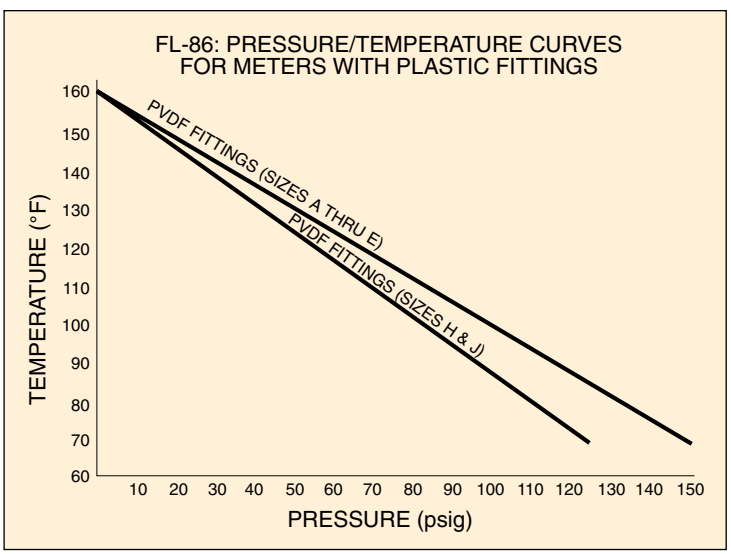
Optional

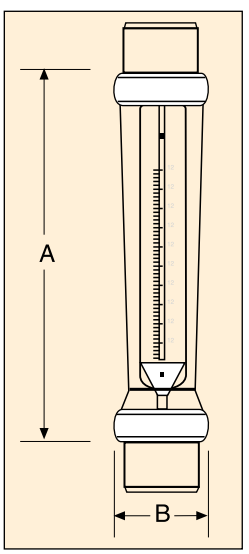
Caution: Polysulfone should not be used in direct sunlight or any other significant sources of ultraviolet light.

- NIST Calibration Available
- Union Ends to Simplify Installation and Maintenance
- Chemical- and Break-Resistant Metering Tube
- See-Through, Detachable Direct-Reading Scale (GPM Water)
- Vertical In-Line Connections

SPECIFICATIONS

Capacity: 0.5 to 100 GPM water (PTFE float)
Metering Tube Material: Polysulfone
Accuracy/Repeatability: ±6% full scale/±1%
Scale Length: 127 mm (5")
Float: PTFE
Fittings: PVDF
O-Rings: FKM (Perfluoroelastomer optional)
Guide Rod: Polysulfone





To Order

Model No.	Flow Range Water GPM	Connection Size (FNPT)	Dimensions: mm (inch) A	Dimensions: mm (inch) B
FL-86A	0.1 to 1	½	254 (10)	35 (1.4)
FL-86B	0.2 to 2.4	¾	254 (10)	44 (1.8)
FL-86C	0.5 to 5	¾	254 (10)	44 (1.8)
FL-86D	1 to 10	1	305 (12)	57 (2.3)
FL-86E	2 to 20	1	305 (12)	57 (2.3)
FL-86H	6 to 60	2	406 (16)	98 (3.9)
FL-86J	10 to 100	2	406 (16)	98 (3.9)

Comes complete with operator's manual.

*For 5-point NIST calibration certificate add suffix **"-NIST 5PT"** or **"-NIST 10PT"** for 10-point calibration to model number, for additional cost.*

***Ordering Examples: FL-86C,** variable area flow meter with 0.5 to 5 GPM range, 3/4 FNPT connection.*

***FL-86A,** variable area flow meter with 0.1 to 1 GPM range, 1/2 FNPT connection.*

FL-86B shown smaller than actual size.

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STAINLESS STEEL ENCLOSURES

Vertical or Horizontal

FL901G shown smaller than actual size.

FL901G Series

1 YEAR WARRANTY NIST

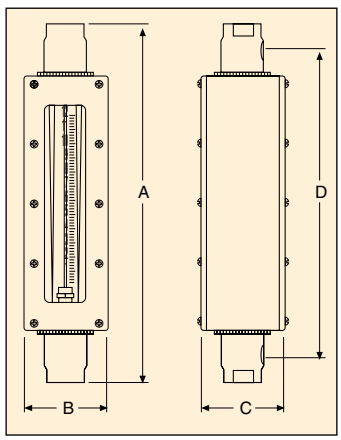
Optional

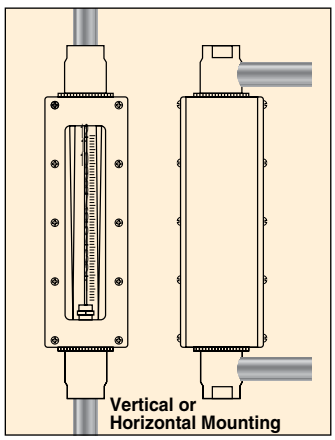
- Heavy-Duty 304 SS Case and Covers
- 316L SS Rotatable Fittings Feature Dual Ports for Vertical or Horizontal Mounting
- Unique Float Stop Design Allows Internals to be Removed and Replaced Without Disturbing Tube or Shield
- NIST Calibration Available
- Direct-Reading Scales (GPM Water or SCFM Air)
- Full 4.76 mm (3⁄16") Thick Polycarbonate Safety Shields
- Detachable, Clear Polycarbonate Scale Plate

SPECIFICATIONS

Accuracy: ±2% Full Scale
Repeatability: ±0.5%
Scale: 250 mm (10")
Scale Plate and Shield: Polycarbonate
Wetted Parts: 316L SS, EPR O-rings, borosilicate glass
Maximum Temperature: 93°C (200°F)
Turndown: 10:1

316 SS Rotatable Fittings





Dimensions: mm (inch)

A	B	C	D	Connection Size
508 (20)	79.4 (3.1)	79.4 (3.1)	445 (17.5)	½ FNPT
508 (20)	117 (4.6)	102 (4)	445 (17.5)	1 FNPT
635 (25)	146 (5.8)	156 (6.1)	521 (20.5)	2 FNPT

To Order

Water Models				Air Models			Maximum Pressure psig	Wt. kg (lb)
Model No.	Maximum GPM	ΔP inH₂O	NPT	Model No.	Maximum SCFM	FNPT		
FL901G	0.64	7	½	**FL910G**	2.7	½	300	9 (20)
FL902G	2.26	41	½	**FL911G**	10.2	½	300	9 (20)
FL903G	5.20	18	1	**FL912G**	22.0	1	250	9 (20)
FL904G	12.60	13	1	—	—	—	250	9 (20)
FL904P	34.50	110	1	**FL913P**	100.0	1	250	9 (20)
FL906P	34.00	24	1½	**FL915P**	102.0	1½	150	13.6 (30)
FL908P	132.00	60	2	**FL917P**	350.0	2	125	13.6 (30)

Comes complete with operator's manual.

*"**G**" models have rib-guided floats; "**P**" models have pole-guided floats. **FL917P** requires minimum 30 psi outlet pressure to keep float from becoming unstable. Weights shown are for both water and air models.*

*For 5-point NIST calibration certificate add suffix "**-NIST 5PT**" to model number or suffix "**-NIST 10PT**" for 10-point calibration, for additional cost.*

***Ordering Examples: FL906P,** flowmeter for water, pole-guided float, 34 GPM max flow rate, 1½ NPT fitting, 150 psi maximum pressure.*

***FL901G,** flowmeter for water, rib-guided float, 0.64 GPM max flow rate, 1½ NPT fitting, 300 psi maximum pressure.*

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EZ-VIEW FLOWMETERS

Capacities: 0.5 to 28 GPM of Water, 0.5 to 28 GPM of Oil

FL-9000 Series

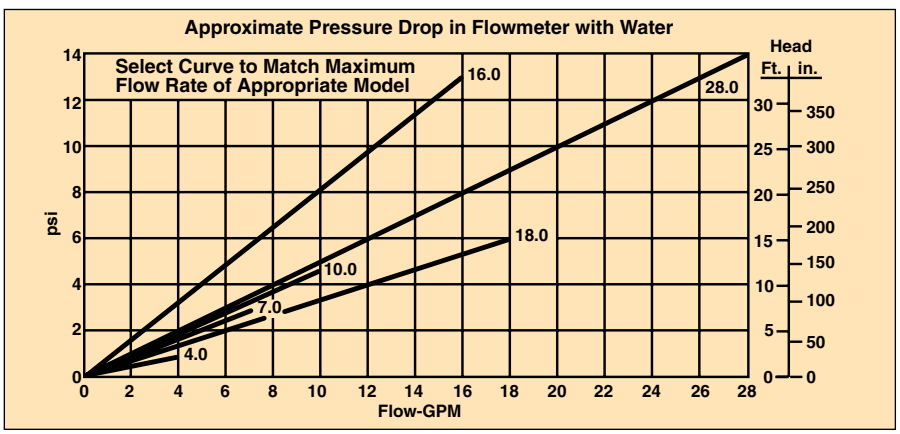
1 YEAR WARRANTY RoHS

- ±5% Full Scale Accuracy
- Direct Reading for Oil and Water
- NPT or Solder Fittings
- Polysulfone Construction
- Compact Size with Vertical Connections
- Large Easy-to-Read Scale
- Unique Spring Piston Mechanism

FL-9016 shown smaller than actual size.

FL-9207 shown smaller than actual size.

The OMEGA® FL-9000 EZ-View flowmeters provide accurate, in-line indication of oil or water flow rates at an economical cost. These meters utilize a spring and piston mechanism within a polysulfone metering tube. The EZ-View meters are designed to mount in any position with no straight pipe runs required.



SPECIFICATIONS

Accuracy: ±5% FS
Repeatability: ±1%
Material: Polysulfone, T300 series stainless steel spring, Buna flow indicator ring, Buna O-rings (on units with brass end fittings)
Dimension: 38.1 mm (1½") across flats;
FL-9200: 196.8 mm (7¾") L;
FL-9000 and 9100: 133 mm (5¼") L
Connection:
FL-9200: fits ¾" nominal (⅞" OD) or 1" nominal (1⅛" OD) type M copper tubing; **FL-9000** and **FL-9100:** 1 NPT male
Maximum Temperature: 121°C (250°F)
Maximum Pressure: 22.4 bar (325 psig)

To Order

Model No. NPT Fitting		Ranges (GPM)	Model No. Solder Fitting	Ranges-Water (GPM)
Water	Oil*		Water	
FL-9004	**FL-9104**	0.5 to 4	**FL-9204**	0.5 to 4
FL-9007	**FL-9107**	1.0 to 7	**FL-9207**	1.0 to 7
FL-9010	**FL-9110**	1.0 to 10	**FL-9210**	1.0 to 10
FL-9016	**FL-9116**	1.0 to 16	**FL-9216**	1.0 to 16
FL-9018	**FL-9118**	3.0 to 18	**FL-9218**	3.0 to 18
FL-9028	**FL-9128**	4.0 to 28	**FL-9228**	4.0 to 28z

***** *Specific Gravity = 0.376.*
***Ordering Examples: FL-9218**, EZ-View water flowmeter, 3.0 to 18 GPM.*
***FL-9004**, water flowmeter, 0.5 to 4 GPM.*

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EZ-VIEW FLOWMETERS

With Adjustable Flow Alarm

FL9000-AC Series

1 YEAR WARRANTY RoHS

The FL9000-AC Series flowmeters are ideal for a wide range of flow monitoring applications. These low-cost flowmeters will install in any position easily. Additional features include an adjustable flow alarm externally mounted on the flowmeter. The flow alarm will automatically open or close AC electrical circuits, activating warning lights, bells, pumps, or other process control equipment.

FL9416-AC shown actual size.

- **Easy to Install, in Any Position**
- **No Special Piping or Flow Straighteners Required**
- **Automatically Signals Alarm**
- **Accuracy ±5% FS**
- **Repeatability ±1%**
- **Direct Reading Scale**

SPECIFICATIONS

Wetted Parts: T300 series stainless steel spring, strontium ferrite magnet, Buna O-rings (for units with brass end fittings)
Maximum Pressure: 22.4 bar (325 psig)
Maximum Temperature: 121°C (250°F); relay rated to 70°C (158°F)
Maximum Particle Size: 74 microns
Alarm Relay: Latching relay circuit housed in a sealed polypropylene enclosure. Relay pulls in over 25% of span and drops out above and below that. Includes mating connector. Relay is field replaceable; rated 1 A @ 30 Vdc (-DC models), 0.5 @ 125 Vac (-AC models), resistive load
Setpoint: Adjustable 0 to 100% FS
Hex Fittings: 38.1 mm (1.5") flats

To Order

Media (Piston Type)	Flow Range (GPM)	Model No. ¾ and 1 Nominal Brass Sweat Fitting*	Length/ Weight	Model No. 1 Male NPT Polysulfone**	Length/ Weight	Model No. ¾ Male NPTF Brass	Length/ Weight
Oil (Std Piston)	0.5 to 4 1.0 to 7 1.0 to 10 1.0 to 16 3.0 to 18 4.0 to 28	NOT AVAILABLE	–	FL9104-AC FL9107-AC FL9110-AC FL9116-AC FL9118-AC FL9128-AC	133.3 mm (5.25") 0.09 kg (3.2 oz)	FL9504-AC FL9507-AC FL9510-AC FL9516-AC FL9518-AC FL9528-AC	209.5 mm (8.25") 0.41 kg (14.4oz)
Water (Std Piston)	0.5 to 4 1.0 to 7 1.0 to 10 1.0 to 16 3.0 to 18 4.0 to 28	FL9204-AC FL9207-AC FL9210-AC FL9216-AC FL9218-AC FL9228-AC	196.8 mm (7.75") 0.34 kg (12 oz)	FL9004-AC FL9007-AC FL9010-AC FL9016-AC FL9018-AC FL9028-AC	133.3 mm (5.25") 0.09 kg (3.2 oz)	FL9404-AC FL9407-AC FL9410-AC FL9416-AC FL9418-AC FL9428-AC	209.5 mm (8.25") 0.41 kg (14.4oz)

** Fits ¾" nominal (⅞" OD) and 1" nominal (1⅛" OD) type M copper tubing.*
*** Do not use pipe dope when mounting; use PTFE tape only.*
Comes complete with operator's manual.
*For units with DC rated relay, replace suffix **"-AC"** with suffix **"-DC"**, no additional cost.*
***Ordering Examples: FL9004-AC,** EZ-View water flowmeter, 0.5 to 4 GPM, polysulfone fitting.*
***FL9404-AC,** water flowmeter, 0.5 to 4 GPM, brass fitting.*

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FLCN-101

1 YEAR WARRANTY

- **Calls Immediate Attention to Alarm Conditions**
- **High Intensity Strobe Light Reduces Operator Error**
- **Adjustable Time Delay Relay**
- **Controls Pumps, Valves and Alarms**
- **LED Displays Switch, Sensor and Relay Status**

FLCN-101 shown larger than actual size.

OMEGA's flow alert calls attention to alarm conditions. For operator alert to low flow conditions, the flow alert offers an excellent solution to this problem. An amber lens distributes the high intensity strobe light in a pattern which calls immediate attention to alarm conditions. The visual alert combined with a controller makes it both cost effective and easy to install.

SPECIFICATIONS

Voltage Input: Selectable, 120 or 240 Vac, 50 to 60 Hz
Maximum Consumption: 5 watts
Lighting Element: High intensity lamp
Brightness: Greater than 50,000 CP
Relay Output: Isolated and sealed single pole double throw (SPDT) relay, Form C
Switching Mode: Selectable, NO or NC states
Maximum Relay Switching Voltage: 120 Vdc or 240 Vac
Maimum Switched Current: 10 amps
Time Delay: Adjustable from 0.15 to 60 seconds
Strobe Type: Xenotube
Strobe Flash: 1 per second
Maximum Temp. Rating: 70°C (158°F)
Sensor Voltage Supply: 13.5 Vdc @100 mA
Mounting Connection: ¾ NPT
Conduit Connection: ½ NPT
Enclosure Rating: NEMA-4X (IP65)
Enclosure Material: Polypropylene (PP), flame retardant
Dimensions: 7.1 D x 16.2 cm H (2.8 x 6.4") x ¾ NPT

To Order

Model No.	Description	Mat'l	Size
FLCN-101	Level alert single sensor controller	PP	2.8 x 6.4" x ¾ NPT

Comes complete with operator's manual.
***Ordering Example: FLCN-101**, level alert single sensor controller.*

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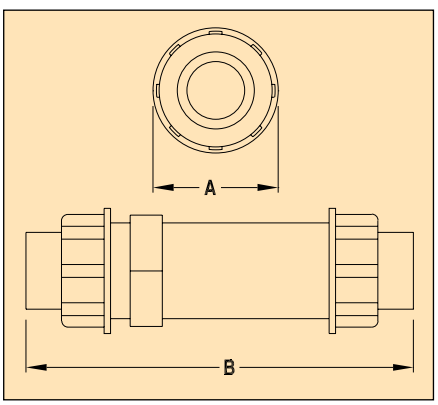
NEW

FLC Series

1 YEAR WARRANTY

- **Mounts in Any Direction**
- **Compact and Rugged**
- **Allows Visual Fluid Inspection**
- **Economical Design**
- **No Straight Pipe Required**

The FLC Series is the economical way to monitor municipal water flows, verify pump outlets and monitor fluid conditions. Piston design allows for horizontal, vertical or inverted installation and is a proven method for accurate, dependable flow rate indication. The compact design measures less than 203 mm (8") in length and 62 mm (2 7/16") in diameter. Designed with a transparent body, the FLC series allows the user to monitor fluid conditions and diagnose problems at a glance. High-contrast scale/indicator provides an easy to read measurement in both liters per minute and gallons per minute. The unit is available in multiple NPT port sizes to reduce the amount of adaptors required for installation.

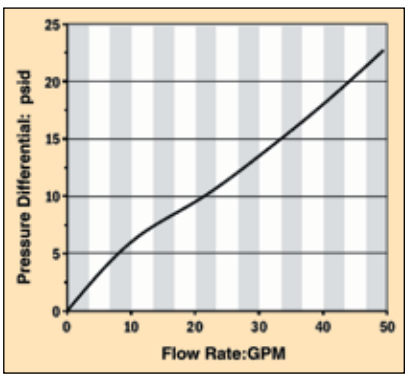


Mechanical Size Codes

DIM	½" Female mm (inch)	¾" Female mm (inch)	1" Female mm (inch)
A	62 (2 7/16)	62 (2 7/16)	62 (2 7/16)
B	182 (7 5/32)	182 (7 5/32)	182 (7 5/32)
Port Size	½ FNPT SAE #8	¾ FNPT SAE #12	1 FNPT SAE #16

SPECIFICATIONS

Accuracy: ±5% FS
Repeatability: ±1% FS
Materials of Construction:
End Ports: Polysulfone (oil meters), Brass (water meters)
Seals: Buna
Spring: Stainless Steel
Indicator: Polysulfone
Casing: Polycarbonate (water meters), polysulfone (oil meters)
Turn Down Ratio: 10:1
Maximum Pressure: 22.4 bar (325 psig)
Maximum Temperatures:
Water Meters: 93°C (200°F)
Oil Meters: 121°C (250°F)



FLC-W11 shown smaller than actual size.

FLC-H11 shown smaller than actual size.

To Order *Visit omega.com/flc_series for Pricing and Details*

Model No.	Range: LPM (GPM)	Description
FLC-W11	1.9 to 19 (0.5 to 5)	Water flow meter with polycarbonate body, ½ NPT brass connection
FLC-W12	3 to 37 (1 to 10)	Water flow meter with polycarbonate body, ½ NPT brass connection
FLC-W13	3 to 37 (1 to 10)	Water flow meter with polycarbonate body, ¾ NPT brass connection
FLC-W14	5 to 57 (1.5 to 15)	Water flow meter with polycarbonate body, ¾ NPT brass connection
FLC-W15	5 to 57 (1.5 to 15)	Water flow meter with polycarbonate body, 1 NPT brass connection
FLC-W16	11 to 114 (3 to 30)	Water meter with polycarbonate body, 1 NPT brass connection
FLC-H11	1.9 to 19 (0.5 to 5)	Hydraulic oil meter with polysulfone body and ½ NPT end connection
FLC-H12	3 to 37 (1 to 10)	Hydraulic oil meter with polysulfone body and ½ NPT end connection
FLC-H13	3 to 37 (1 to 10)	Hydraulic oil meter with polysulfone body and ¾ NPT end connection
FLC-H14	5 to 57 (1.5 to 15)	Hydraulic oil meter with polysulfone body and ¾ NPT end connection
FLC-H15	5 to 57 (1.5 to 15)	Hydraulic oil meter with polysulfone body and 1 NPT end connection
FLC-H16	11 to 114 (3 to 30)	Hydraulic oil meter with polysulfone body and 1 NPT end connection

Comes complete with operator's manual.
*For units with BSPP threads add **"-BSP"** to model number, no additional cost.*
***Ordering Examples: FLC-W14,** ¾ NPT water flow meter for 5 to 57 LPM (1.5 to 15 GPM), with a polycarbonate body.*
***FLC-H12,** ½ NPT hydraulic oil meter 3 to 37 LPM (1 to 10 GPM) with a polysulfone body.*

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AREA FLOW METER

FLD Series

1 YEAR WARRANTY RoHS

- **Direct Read variable area flow meter for Air, Water, N2, H2, CO2, Ar, He, and O2**
- **Rib-Guided or Fluted Metering Tubes Facilitate Stable, Accurate Readings**
- **Magnifier Lens in Front Shields to Enhance Reading Resolution**
- **Interchangeability of Flow Tubes and Floats**
- **Ease of Installation and Exchange of Flow Tube**
- **Simple Means of Panel Mounting**

FLDA3220ST, shown smaller than actual size.

FLDA3419G, shown smaller than actual size.

Designed for direct read flow rates, the FLD Series variable area flow meter is a precision instrument embodying the inherent simplicity, versatility and economy of the classical variable area flow meter. It is particularly suitable for metering carrier gases in chromatography, indicating and controlling gases in manufacturing processes, liquid and gas measurement in laboratories,pilot plants, flow and level indicating, etc. Shipped completely assembled, flow meters include standard mounting fittings in a choice of materials, side plates, thick protective magnifying front shield and back plate, built-in control valve, and flow tubes. Panel mounting style is convertible to bench mounting through the use of the optional acrylic tripod, FLTR-1. The tripod has a built-in spirit leveler and leveling screws.

Meters come with built-in 6 turn needle valves, high precision metering valves with “non-rising stems” 16 turn, or with no valves. The higher cost of the high resolution valves is justified whenever high sensitivity control and resolution are desirable—particularly in conjunction with metering tubes of very low flow rates. Generally, for gas metering it is recommended that valves are positioned at inlets (bottom) for liquids valves may be positioned either at inlets or outlets (top). For vacuum services, valves must be mounted at outlets. If unspecified at the time of ordering, meters will be shipped with valves mounted at the inlets.

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Aluminum Frame Air (65 mm) Model No.	316 SS Frame Air (65 mm) Model No.	Maximum Flow	Unit
FLDA3201C	FLDA3301C	2.2	scfh
FLDA3202G	FLDA3302G	6	scfh-
FLDA3203ST	FLDA3303ST	10	scfh
FLDA3204ST	FLDA3304ST	18	scfh
FLDA3205ST	FLDA3305ST	25	scfh
FLDA3206ST	FLDA3306ST	50	scfh
FLDA3207ST	FLDA3307ST	90	scfh
FLDA3208C	FLDA3308C	150	scfh
FLDA3209C	FLDA3309C	0.6	scfm
FLDA3210G	FLDA3310G	1	L/min
FLDA3211G	FLDA3311G	1.15	L/min
FLDA3212ST	FLDA3312ST	2	L/min
FLDA3213ST	FLDA3313ST	4	L/min
FLDA3214G	FLDA3314G	5	L/min
FLDA3215ST	FLDA3315ST	10	L/min
FLDA3216ST	FLDA3316ST	16	L/min
FLDA3217ST	FLDA3317ST	25	L/min
FLDA3218ST	FLDA3318ST	40	L/min
FLDA3219G	FLDA3319G	7	mL/min
FLDA3220ST	FLDA3320ST	50	mL/min
FLDA3221ST	FLDA3321ST	75	mL/min
FLDA3222G	FLDA3322G	100	mL/min
FLDA3223ST	FLDA3323ST	130	mL/min
FLDA3224C	FLDA3324C	250	mL/min
FLDA3225C	FLDA3325C	500	mL/min
FLDA3226G	FLDA3326G	1000	mL/min

Aluminum Frame Air (150 mm) Model No.	316 SS Frame Air (150 mm) Model No.	Maximum Flow	Unit
FLDA3401C	FLDA3501C	2.5	scfh
FLDA3402G	FLDA3502G	5	scfh
FLDA3403G	FLDA3503G	8.25	scfh
FLDA3404ST	FLDA3504ST	10	scfh
FLDA3405ST	FLDA3505ST	16.5	scfh
FLDA3406C	FLDA3506C	23	scfh
FLDA3407G	FLDA3507G	55	scfh
FLDA3408ST	FLDA3508ST	90	scfh
FLDA3409ST	FLDA3509ST	94	scfh
FLDA3410S	FLDA3510S	1	scfm
FLDA3411ST	FLDA3511ST	1.5	scfm
FLDA3412C	FLDA3512C	1.25	L/min
FLDA3413ST	FLDA3513ST	1.8	L/min
FLDA3414G	FLDA3514G	2.5	L/min
FLDA3415G	FLDA3515G	4	L/min
FLDA3416S	FLDA3516S	4.5	L/min
FLDA3417ST	FLDA3517ST	4.8	L/min
FLDA3418S	FLDA3518S	5	L/min
FLDA3419G	FLDA3519G	10	L/min
FLDA3420C	FLDA3520C	10	L/min
FLDA3421ST	FLDA3521ST	17	L/min
FLDA3422G	FLDA3522G	23	L/min
FLDA3425S	FLDA3525S	25	mL/min
FLDA3423ST	FLDA3523ST	42	L/min
FLDA3426S	FLDA3526S	52	mL/min
FLDA3424C	FLDA3524C	60	L/min
FLDA3427C	FLDA3527C	75	mL/min
FLDA3428ST	FLDA3528ST	100	mL/min
FLDA3429C	FLDA3529C	100	mL/min
FLDA3430ST	FLDA3530ST	150	mL/min
FLDA3431ST	FLDA3531ST	200	mL/min
FLDA3432G	FLDA3532G	300	mL/min
FLDA3433S	FLDA3533S	500	mL/min
FLDA3434G	FLDA3534G	800	mL/min

Argon (65 mm) 316 SS Frame		
Model No.	**Maximum Flow**	**Units**
FLDAR3301G	2.5	scfh
FLDAR3302ST	10	scfh
FLDAR3303ST	22	scfh
FLDAR3304G	50	scfh
FLDAR3305S	1000	mL/min
Argon (150 mm) 316 SS Frame		
Model No.	**Maximum Flow**	**Units**
FLDAR3501C	2	L/min
FLDAR3502ST	15	L/min
FLDAR3503S	25	L/min
FLDAR3504C	325	mL/min
FLDAR3505G	33	mL/min

Carbon Dioxide (65 mm) Stainless Steel		
Model No.	**Maximum Flow**	**Units**
FLDC3301G	1	L/min
FLDC3302G	6	L/min
FLDC3303ST	10	L/min
FLDC3304ST	35	L/min
FLDC3305ST	20	mL/min
FLDC3306G	55	mL/min
FLDC3307S	200	mL/min
Carbon Dioxide (150 mm) Stainless Steel		
Model No.	**Maximum Flow**	**Units**
FLDC3501G	100	mL/min
FLDC3502ST	300	mL/min
FLDC3503S	10	L/min

Ordering Examples: FLDA3212ST, *65 mm variable area flow meter, 6 turn valve, aluminum frame, 316 stainless steel float, range 2 LPM air.*
FLDC3303ST. *65 mm variable area flow meter, 6 turn valve, 316 stainless steel frame, 316 stainless steel float, range 10 LPM carbon dioxide.*

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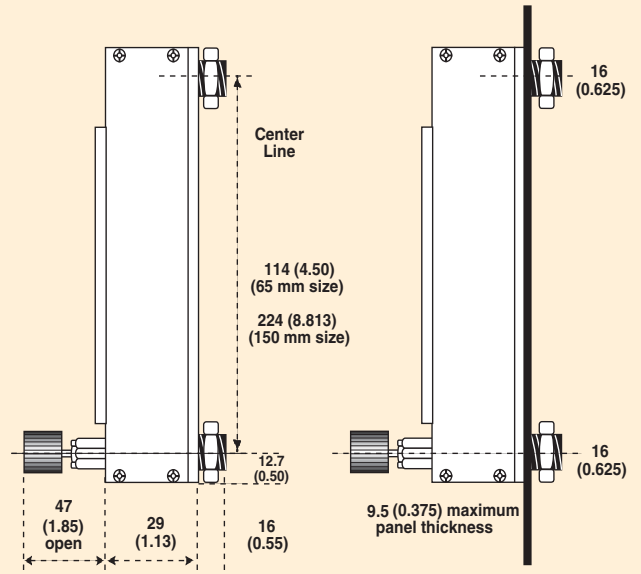
SPECIFICATIONS

Standard Accuracy: ±5% of full scale (FS)
Repeatability: ±0.25%
Useful Flow Range: 10:1 minimum
Maximum Operating Pressure: 200 psig/13.8 bars
Maximum Operating Temperature: 121°C (250°F)
Construction
Flow Tubes: Heavy walled borosilicate glass
Floats: Glass, red sapphire, 316 stainless steel, carboloy and tantalum
Choice of Mounting Fittings in Contact with Fluids: Aluminum, black anodized or 316 stainless steel
Side Panels: Aluminum, black anodized
Front Shield: Polycarbonate resin with longitudinal magnifier lens for enhanced reading resolution
Back Plate: ⅛" thick white acrylics
O-Rings and Packing: Buna O-rings in aluminum/brass model. FKM O-rings in stainless steel meters
Optional: Perfluoroelastomer and EPR
Connections: ⅛ NPT female inlet and outlet connections



Dimensions show flowmeter side view. Face width (not shown) is 32 mm (1.25"). Use center line dimensions for drilling panel.

Drill two 15 mm (0.59") holes to fit inlet and outlet. Maximum panel thickness is 9.5 mm (0.375"). Use the 2 retaining nuts supplied to secure flowmeter.

To Order

Aluminum Frame Water (65 mm) Model No.	316 SS Frame Water (65 mm) Model No.	Maximum Flow	Units
FLDW3201S	FLDW3301S	1	L/min
FLDW3202ST	FLDW3302ST	1.2	L/min
FLDW3203ST	FLDW3303ST	3	L/hr
FLDW3204G	FLDW3304G	0.5	mL/min
FLDW3205ST	FLDW3305ST	6	mL/min
FLDW3206G	FLDW3306G	25	mL/min
FLDW3207ST	FLDW3307ST	60	mL/min
FLDW3208ST	FLDW3308ST	115	mL/min
FLDW3209ST	FLDW3309ST	150	mL/min
FLDW3210G	FLDW3310G	250	mL/min
FLDW3211G	FLDW3311G	500	mL/min
FLDW3212ST	FLDW3312ST	750	mL/min
Aluminum Frame Water (150 mm) Model No.	**316 SS Frame Water (150 mm) Model No.**	**Maximum Flow**	**Units**
FLDW3401C	FLDW3501C	29	gph
FLDW3402S	FLDW3502S	0.22	gpm
FLDW3403C	FLDW3503C	0.45	gpm
FLDW3404ST	FLDW3504ST	1.2	L/min
FLDW3405T	FLDW3505T	2	L/min
FLDW3406S	FLDW3506S	1	mL/min
FLDW3407S	FLDW3507S	10	mL/min
FLDW3408ST	FLDW3508ST	20	mL/min
FLDW3409G	FLDW3509G	50	mL/min
FLDW3410G	FLDW3510G	60	mL/min
FLDW3411G	FLDW3511G	100	mL/min
FLDW3412C	FLDW3512C	200	mL/min
FLDW3413ST	FLDW3513ST	500	mL/min

Helium (65 mm) 316 SS Frame		
Model No.	**Maximum Flow**	**Units**
FLDHE3301S	65	mL/min
FLDHE3302G	120	mL/min
Helium (150 mm) 316 SS Frame		
Model No.	**Maximum Flow**	**Units**
FLDHE3501S	1.25	scfh
FLDHE3502C	5	L/min
FLDHE3503ST	40	L/min
FLDHE3504G	100	mL/min
FLDHE3505C	500	mL/min
FLDHE3506G	1500	mL/min
Hydrogen (65 mm) 316 SS Frame		
Model No.	**Maximum Flow**	**Units**
FLDH3301C	1.5	L/min
FLDH3302G	3.5	L/min
FLDH3303G	6	L/min
FLDH3304ST	42	L/min
FLDH3305G	35	mL/min
FLDH3306ST	100	mL/min
FLDH3307S	150	mL/min
FLDH3308G	600	mL/min
Hydrogen (150 mm) 316 SS Frame		
Model No.	Maximum Flow	Units
FLDH3501S	225	scfh
FLDH3502G	100	mL/min

Ordering Examples: FLDW3401C, *150 mm variable area flow meter, 6 turn valve aluminum frame, carboloy float, range 29 GPH water.*
FLDHE3504G, *150 mm variable area flow meter, 6 turn valve, 316 stainless steel frame, glass float, range 100 ml/min helium.*

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FLDA3419G, shown smaller than actual size.

To Order

Nitrogen (65 mm) 316 SS Frame		
Model No.	**Maximum Flow**	**Units**
FLDN3301ST	12	L/min
FLDN3302G	6	mL/min
FLDN3303ST	50	mL/min
FLDN3304S	60	mL/min
FLDN3305G	120	mL/min
FLDN3306S	200	mL/min
Nitrogen (150 mm) 316 SS Frame		
Model No.	**Maximum Flow**	**Units**
FLDN3501ST	1.6	scfm
FLDN3502G	2	L/min
FLDN3503G	100	mL/min
FLDN3504C	200	mL/min
FLDN3505C	300	mL/min
FLDN3506S	500	mL/min
Oxygen (65 mm) 316 SS Frame		
Model No.	**Maximum Flow**	**Units**
FLDO3301G	1	L/min
FLDO3302ST	4	L/min
FLDO3303ST	8	L/min
FLDO3304ST	15	L/min
FLDO3305G	50	mL/min
FLDO3306ST	300	mL/min
FLDO3307ST	500	mL/min
Oxygen (150 mm) 316 SS Frame		
Model No.	**Maximum Flow**	**Units**
FLDO3501S	1	L/min
FLDO3502S	5	L/min
FLDO3503C	10	L/min
FLDO3504ST	16.50	L/min
FLDO3505C	58	L/min
FLDO3506ST	250	mL/min
FLDO3507S	400	mL/min

Accessories

Model No.	Description
FLTR-1	Tripod for one variable area flow meter
FLTR-2	Tripod for two variable area flow meter
FLTR-3	Tripod for three variable area flow meter

Comes complete with operator's manual.

*"**G**" suffix denotes glass float, "**ST**" suffix denotes 316SS float, "**C**" suffix denotes carboloy float and "**SA**" denotes red sapphire float.*

*For units without valve, add suffix "**-NV**" to model number and subtract cost for aluminum; subtract cost for for 316SS.*

*For oxygen cleaning add "**-02CLEAN**" to model number for additional cost.*

***Note:** Minimum flow rate is 10% of the maximum rate shown. For 16 turn, high resolution non-rising stem valve for 150 mm variable area flow meter, add suffix "-HRV" to model number for additional cost.*

***NIST** traceable calibration not available.*

***Ordering Examples: FLDN3501ST**, 150 mm rvariable area flow meter, 6 turn valve stainless steel unit, with 316SS float, range of 1.6 scfm nitrogen.*

***FLDO3501S,** 150 mm variable area flow meter, 6 turn valve stainless steel unit with sapphire float range of 1 LPM oxygen.*

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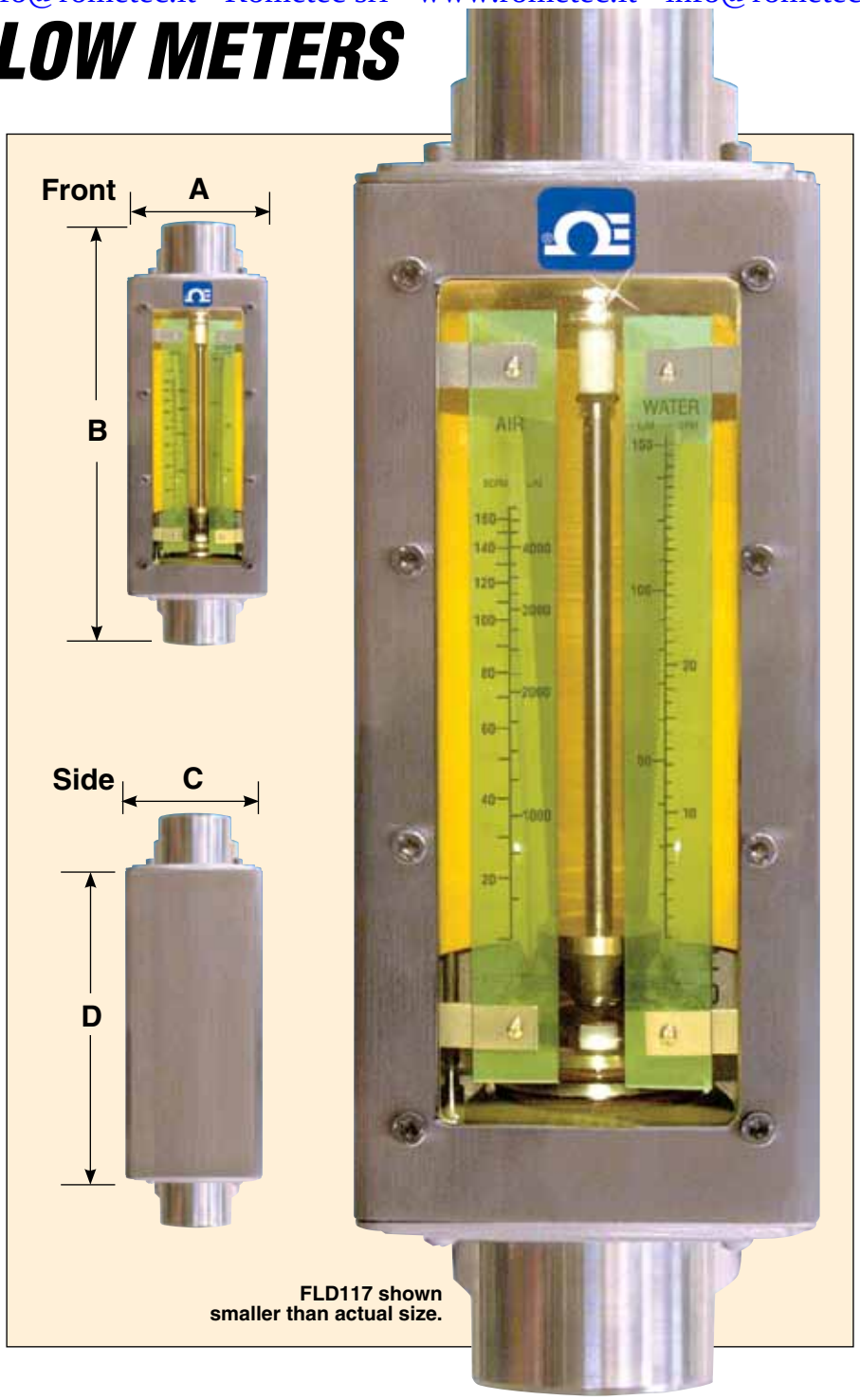
STAINLESS STEEL FRAME
INDUSTRIAL FLOW METERS

FLD100 Series

1 YEAR WARRANTY RoHS



FLD117 shown smaller than actual size.

- Heavy-Duty Stainless Steel
- Thick Polycarbonate Safety Shields
- Direct Reading Metric and English System Scales
- Unique Design Facilitates Ease of Maintenance Cleaning Processes
- Fluted Tubes on Tube Sizes 3 and 4 Tapered Tubes on Larger Sizes

The FLD100 Series heavy-duty flow meters are fully enclosed in a brushed stainless steel case. Ideal for industrial applications with flow rates up to 116 GPM and 250 SCFM. Used with industrial water and air service. Meters are graduated for direct reading of water and air. Flow meters come standard with FNPT end fittings for easy in-line installation or ANSI 150 flanges (-FL)

Tube Size	NPT (F)	Dimensions: mm (inch)			
		A	B*	C	D
3 and 4	½	51 (2)	242 (9.54)	57 (2.25)	204 (8.04)
5 and 6	1	89 (3.5)	348 (13.69)	95 (3.75)	267 (10.5)
8 and 9	2	127 (5)	396 (15.59)	133 (5.25)	293 (11.55)

** Without flange*

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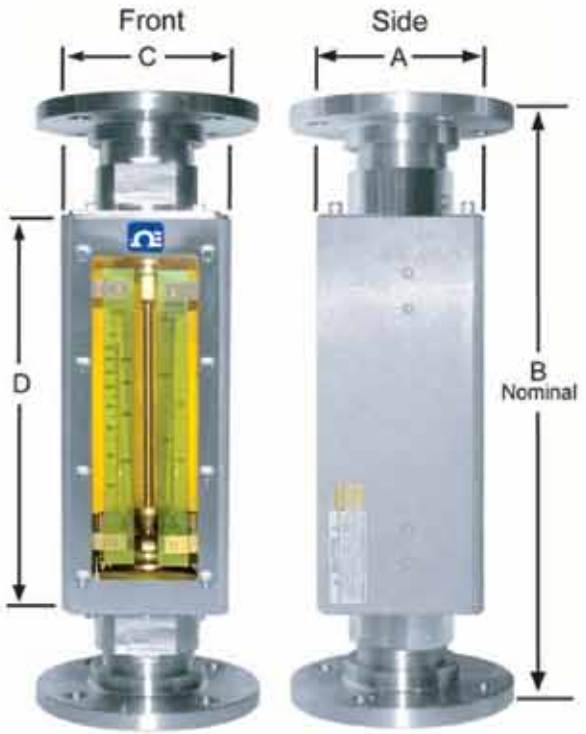
SPECIFICATIONS

Accuracy: ±3% of full scale
Minimum Flow Rate: Approximately 10% of maximum flow rate
Repeatability: ±0.5% of full scale
Maximum Pressure: [at 93°C (200°F)] 200 psi (tube sizes 3, 4, 5 and 6); 125 psi (tube sizes 8 and 9)
Maximum Operating Temperature: 93°C (200°F)
Wetted Parts: Include borosilicate glass flow tubes, FKM O-rings, and 316 SS fittings, guide rods, floats and float stops.
Optional O-rings: Buna or EPR



Tube Size	Dimensions: mm (inch)				
	Flange Size	A	B Nominal	C	D
3 and 4	19.05 (¾)	50.8 (2)	243.3 (9.58)	57.15 (2.25)	204.2 (8.04)
5 and 6	38.1 (1½)	88.9 (3.5)	359.4 (14.15)	95.25 (3.75)	266.7 (10.50)
8 and 9	63.5 (2½)	127 (5)	456.7 (17.98)	133.4 (5.25)	293.4 (11.55)

To Order

FPNT Mount Model No.	Flange Mount Model No.	Max Flow Rate					
		Water GPM	Air SCFM	Water L/min	Air L/min	Tube Size	Pressure Drop " H_2O
FLD101	**FLD101-FL**	0.25	1.2	0.95	35	3	< 2
FLD102	**FLD102-FL**	0.36	1.7	1.3	50	3	2
FLD103	**FLD103-FL**	0.76	3.3	3	90	3	5
FLD104	**FLD104-FL**	1.0	4.2	3.7	120	4	6
FLD105	**FLD105-FL**	1.5	6.5	5.6	180	4	8
FLD106	**FLD106-FL**	2.2	8.5	8.2	250	4	10
FLD107	**FLD107-FL**	3.8	16	14	475	5	10
FLD108	**FLD108-FL**	5.0	21.5	18	650	5	14
FLD109	**FLD109-FL**	6.0	25.5	20	725	6	5
FLD110	**FLD110-FL**	7.4	30	27.5	900	6	6
FLD111	**FLD111-FL**	9.6	40	35	1200	6	10
FLD112	**FLD112-FL**	11	47.5	40	1400	6	13
FLD113	**FLD113-FL**	14	62	50	1800	6	24
FLD114	**FLD114-FL**	20	90	75	2600	6	39
FLD115	**FLD115-FL**	22	90	83	2550	8	16
FLD116	**FLD116-FL**	26	—	98	—	6	70
FLD117	**FLD117-FL**	41	160	155	4531	9	5
FLD118	**FLD118-FL**	44	180	167	5098	8	30
FLD119	**FLD119-FL**	60	245	227	6938	9	16
FLD120	**FLD120-FL**	61	250	231	7080	8	40
FLD121	**FLD121-FL**	86	—	326	—	9	25
FLD122	**FLD122-FL**	116	—	439	—	9	45

Comes complete with operator's manual. NIST traceable calibration not available.
*For oxygen cleaning add suffix **"-02CLEAN"** to model number, for additional cost.*
***Ordering Examples: FLD106,** 2.2 GPM flow meter for water and air.*
***FLD120,** 61 GPM flow meter for water and air.*
***FLD116-FL.** 26 GPM flow meter for water with optional ANSI 150 flange.*

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Panel variable area flow meter

FLD1000/ FLD2000 Series

1 YEAR WARRANTY RoHS

- Rigid, Compact Construction
- Dual, Rotatable, Direct Reading Scales for Air and Water
- Graduations Reflect Both Metric and English Systems
- Vertical In-line or Panel Mount

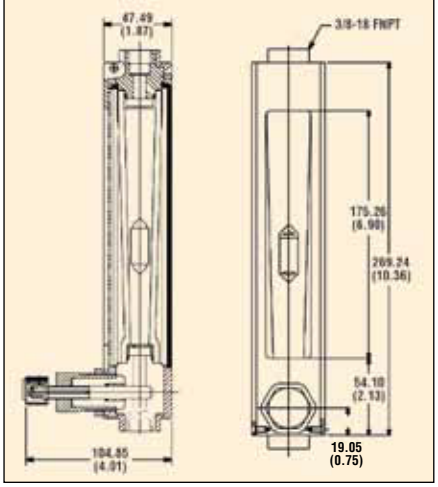
Incorporating traditional variable area precision glass technology, these rugged PTFE flow meters offer accurate and economical solutions to medium flow range measurements.

The FLD1000/FLD2000 variable area flow meter are designed with unique rotatable scales of dual air-water direct reading graduations showing SCFM and SLPM (air), as well as GPM and LPM (water) markings.

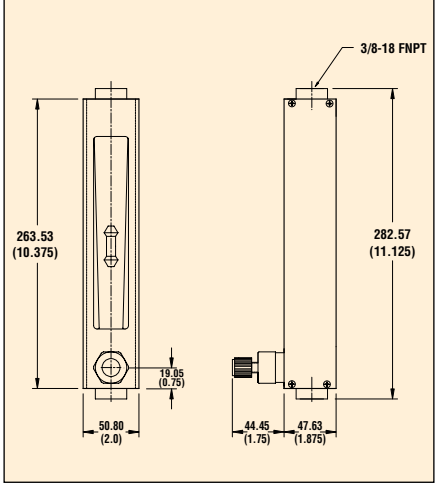
Flow meters are individually tested on a Mass Spectrometer Leak Detector and certified to a leak integrity rating of 1 x 10-7 SCCS Helium or better.

Dimensions: mm (inch)

PTFE Vertical In-Line FLD1200 Series



Vertical In-Line FLD1000/FLD1100 Series



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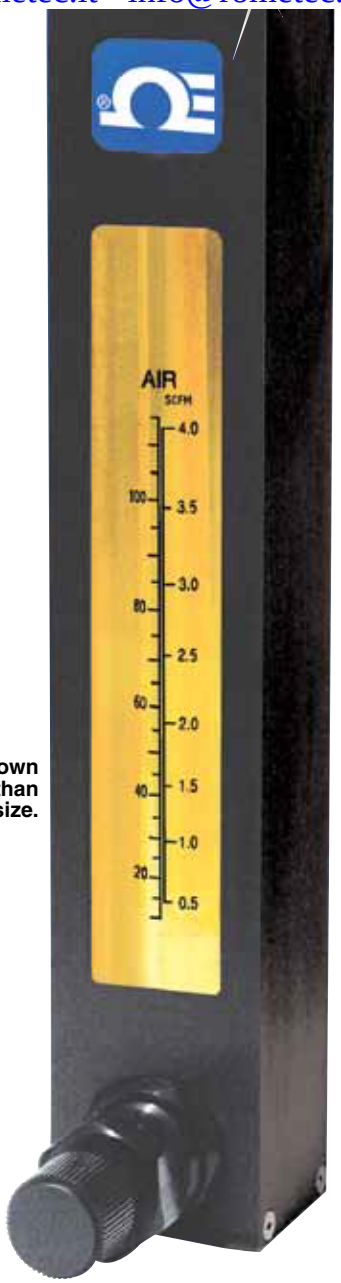
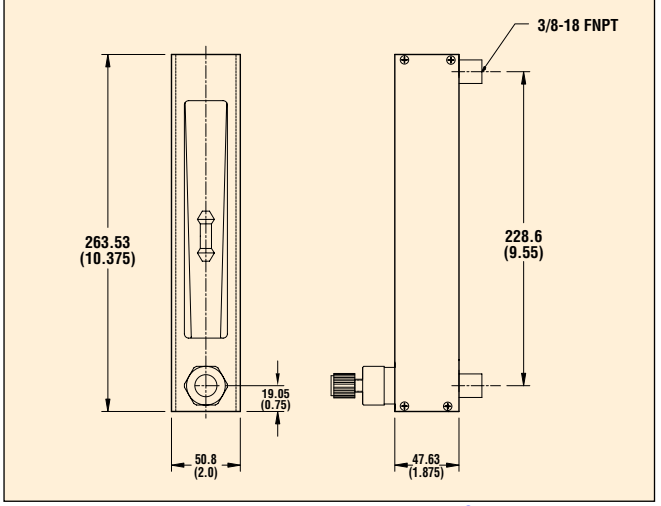
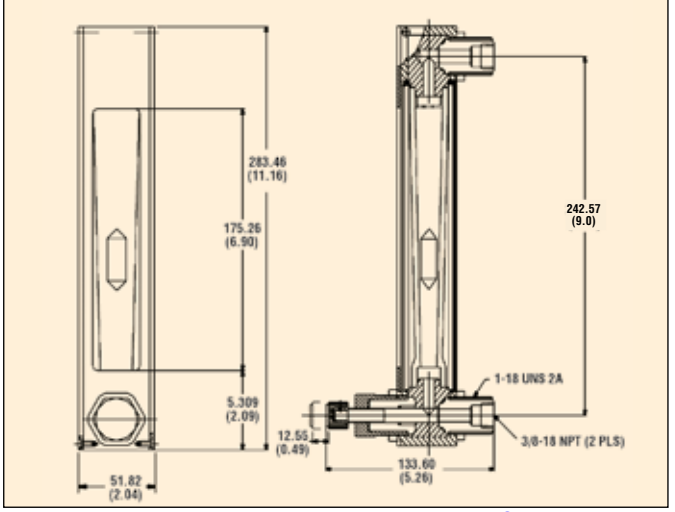


Panel Mount FLD2000/FLD2100 Series



PTFE Panel Mount FLD2200 Series



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SPECIFICATIONS

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Maximum Temperature: 65°C (150°F) or 121°C (250°F) for 316 SS or brass unit

Maximum Pressure:

Metal Body: 10.3 bar (150 psig) @ 93°C (200°F)

PTFE Body: 6.7 bar (100 psig) @ ambient temperature

Connections: ¾ NPT female in line or horizontal rear

Scales: Rotatable, direct reading air (SCFM-SLPM) and water (GPM-LPM). Scale length is 127 mm (5") nominal

Leak Integrity: Individually leak tested and certified

Flow Tubes: Heavy walled precision formed borosilicate glass

Floats: PTFE for PTFE3, 316 SS for 316 SS and brass units

Wetted Parts: PTFE, brass or 316 SS

Seals: PTFE; FKM for 316 SS and brass units

To Order

Vertical In-line					
Stainless Steel With Valve	Stainless Steel Without Valve	Maximum Flow			
		Air		Water	
Model No.	Model No.	SCFM	SLPM	GPM	LPM
FLD1001	FLD1001-NV	5	140	1.2	4
FLD1002	FLD1002-NV	10	280	2	8
FLD1003	FLD1003-NV	15	425	3	11.5
FLD1004	FLD1004-NV	20	575	4	15
FLD1005	FLD1005-NV	30	900	5	20
Brass With Valve	Brass Without Valve				
FLD1101	FLD1101-NV	5	140	1.2	4
FLD1102	FLD1102-NV	10	280	2	8
FLD1103	FLD1103-NV	15	425	3	11.5
FLD1104	FLD1104-NV	20	575	4	15
FLD1105	FLD1105-NV	30	900	5	20
PTFE With Valve	PTFE Without Valve				
FLD1201	FLD1201-NV	3.5	100	0.8	3
FLD1202	FLD1202-NV	7	200	1.5	5.75
FLD1203	FLD1203-NV	10.5	300	2.2	8.25
FLD1204	FLD1204-NV	14	400	2.9	11
FLD1205	FLD1205-NV	17.5	500	3.5	13.25
FLD1206	FLD1206-NV	22	625	4.1	16
Panel Mount					
Stainless Steel With Valve	Stainless Steel Without Valve	Air		Water	
		SCFM	SLPM	GPM	LPM
FLD2001	FLD2001-NV	5	140	1.2	4
FLD2002	FLD2002-NV	10	280	2	8
FLD2003	FLD2003-NV	15	425	3	11.5
FLD2004	FLD2004-NV	20	575	4	15
FLD2005	FLD2005-NV	30	900	5	20
Brass With Valve	Brass Without Valve				
FLD2101	FLD2101-NV	5	140	1.2	4
FLD2102	FLD2102-NV	10	280	2	8
FLD2103	FLD2103-NV	15	425	3	11.5
FLD2104	FLD2104-NV	20	575	4	15
FLD2105	FLD2105-NV	30	900	5	20
PTFE With Valve	PTFE Without Valve				
FLD2201	FLD2201-NV	3.5	100	0.8	3
FLD2202	FLD2202-NV	7	200	1.5	5.75
FLD2203	FLD2203-NV	10.5	300	2.2	8.25
FLD2204	FLD2204-NV	14	400	2.9	11
FLD2205	FLD2205-NV	17.5	500	3.5	13.25
FLD2206	FLD2206-NV	22	625	4.1	16

Comes with complete operator's manual.

*For oxygen cleaning add "**-O2CLEAN**" to model number for additional cost.*

***NIST** traceable calibration not available.*

***Ordering Examples: FLD2101,** direct read brass flow meter with valve.*

***FL1101** vertical in-line direct read brass flow meter with valve.*

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FLOW METERS

Both models shown actual size.

FLMG Series

1 YEAR WARRANTY

- **Suitable for Monitoring Most Pneumatic or Compressed Gas Systems**
- **Flow Rates from 1.2 to 900 SCFM (0.6 to 425 SLPS) @ 100 psi**
- **High Pressure to 600 psi—Brass or Aluminum; 1000 psi—Stainless Steel**
- **High Temperature to 116°C (240°F) Standard, 204 or 316°C (400 or 600°F) Optional**
- **Mounts in Any Position**
- **Relay Alarms and Analog Outputs Optional**
- **Dual Scale**

FLMG-14012AL

FLMG-38050BR

The FLMG flow meters feature rugged construction, easy installation, and direct-reading flow rates of air. The units are calibrated at 100 psi pressure, suitable for most compressed pneumatic applications.

The spring-and-piston type assembly enables these flow meters to be mounted in any position.

The FLMG models with optional analog output (-MA) are typically used to transmit a signal proportional to the flow rate to a process controller, a PLC, a recorder, or a panel-mount display. With the "-MA" option, the user can choose between reading a 0 to 2000 Hz square-wave pulse, a 0 to 5 Vdc analog signal, or a 2-wire 4 to 20 mA analog signal by connecting the appropriate pins.

SPECIFICATIONS

Measuring Accuracy: ±4% FS over the entire scale range
Repeatability: ±1% FS
Flow Measuring Range:
1.2 to 900 SCFM
Maximum Operating Pressure:
Aluminum and Brass Monitors: 40 bar (600 psig)
Stainless Steel Monitors: 70 bar (1000 psig) up to 116°C (240°F)
Maximum Operating Temperature:
Standard: 116°C (240°F)
"-HT" Option: 204°C (400°F)
"-UHT" Option: 316°C (600°F)
Pressure Differential:
Visit us online for graphs
Standard Calibration Fluids:
Air @ 21°C (70°F), 1.0 sg and 6.8 bar (100 psig)
Relay (Optional): 1 or 2 form "C" relays, rated 10 A, 125 or 250 Vac or ¼ A, 250 Vdc
Mechanical Life:
>10^6 cycles
Analog Output (Optional):
Supply voltage 12 to 35 Vdc, field selectable for 0 to 5 Vdc (100 W minimum load), 0 to 2000 Hz square-wave pulse or 4 to 20 mA
R_{max} = 50 (Vs - 12)
(V_s = supply voltage DC)

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Materials of Construction (Wetted Components)

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High-pressure casing, end ports and tapered shaft	Aluminum	Brass	304 SS
Seals	Buna (standard), EPR, FKM or Perfluoroelastomer	Buna (standard), EPR, FKM or Perfluoroelastomer	FKM with PTFE backup (standard), Buna, EPR or Perfluoroelastomer
Transfer magnet	PTFE-coated Alnico	PTFE-coated Alnico	PTFE-coated Alnico
Floating orifice disk	Stainless steel	Stainless steel	Stainless steel
All other internal parts	Stainless steel	Stainless steel	Stainless steel

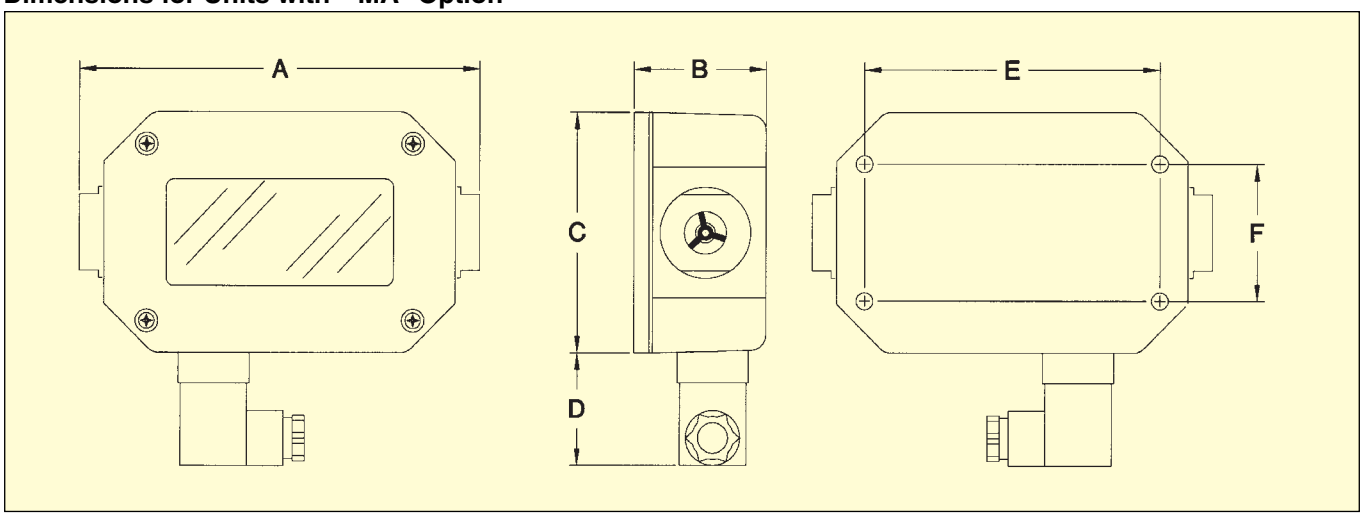
Materials of Construction (Non-Wetted Components)

Description	Aluminum	Brass	Stainless Steel
Window tube	Polycarbonate (standard), Pyrex®	Polycarbonate (standard), Pyrex®	Polycarbonate (standard) Pyrex®
Window seals	Buna (standard)	Buna (standard)	Buna (standard)

Port Sizes	¼ to 1½ FNPT
Installation Dimensions	¼ to ½" Port: 1⅞" OD x 6⁹⁄₁₆" length ¾ to 1" Port: 2⅜" OD x 7⁵⁄₃₂" length 1¼ to 1½" Port: 3½ OD x 10⅛" length

***Note**: Minimum flow rate = 10% of maximum.*

Dimensions for Units with "-MA" Option



DIM	¼ and ½" Ports	¾ and 1" Ports	1¼ and 1½" Ports	2" Ports*
A	167 mm (6⁹⁄₁₆")	182 mm (7⁵⁄₃₂")	258 mm (10⅛")	322 mm (12⅝")
B	56 mm (2³⁄₁₆")	75 mm (2¹⁵⁄₁₆")	97 mm (3¹³⁄₁₆")	97 mm (3¹³⁄₁₆")
C	101 mm (4")	114 mm (4½")	135 mm (5⁵⁄₁₆")	135 mm (5⁵⁄₁₆")
D	47 mm (1⅞")	47 mm (1⅞")	47 mm (1⅞")	47 mm (1⅞")
E	128 mm (4⅞")	127 mm (5")	172 mm (6¾")	172 mm (6¾")
F	57 mm (2¼")	73 mm (2⅞")	95 mm (3¾")	95 mm (3¾")

** For 2" port units consult sales.*

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Air Flow meters - ¼ to ½ NPT Sizes		
Model No.	**SCFM (SLPS)**	**Connection Size**
FLMG-14012(*)	3 to 12 (1.5 to 5.5)	¼ NPT
FLMG-14022(*)	4 to 23 (2 to 10.5)	¼ NPT
FLMG-14050(*)	5 to 50 (3 to 23)	¼ NPT
FLMG-14100(*)	10 to 100 (6 to 50)	¼ NPT
FLMG-38012(*)	3 to 12 (1.5 to 5.5)	⅜ NPT
FLMG-38022(*)	4 to 23 (2 to 10.5)	⅜ NPT
FLMG-38050(*)	5 to 50 (3 to 23)	⅜ NPT
FLMG-38100(*)	10 to 100 (6 to 50)	⅜ NPT
FLMG-12012(*)	3 to 12 (1.5 to 5.5)	½ NPT
FLMG-12022(*)	4 to 23 (2 to 10.5)	½ NPT
FLMG-12050(*)	5 to 50 (3 to 23)	½ NPT
FLMG-12100(*)	10 to 100 (6 to 50)	½ NPT
Air Flow meters - ¾ to 1 NPT Sizes		
FLMG-34050(*)	6 to 50 (3 to 23)	¾ NPT
FLMG-34100(*)	10 to 100 (6 to 50)	¾ NPT
FLMG-34150(*)	15 to 150 (10 to 70)	¾ NPT
FLMG-34260(*)	20 to 250 (10 to 120)	¾ NPT
FLMG-10050(*)	6 to 50 (3 to 23)	1 NPT
FLMG-10100(*)	10 to 100 (6 to 50)	1 NPT
FLMG-10150(*)	15 to 150 (10 to 70)	1 NPT
FLMG-10260(*)	30 to 330 (10 to 150)	1 NPT
Air Flow meters - 1¼ to 1½ NPT Sizes		
FLMG-1140450(*)	30 to 470 (10 to 210)	1¼ NPT
FLMG-1141000(*)	150 to 900 (75 to 425)	1¼ NPT
FLMG-1120450(*)	30 to 470 (10 to 210)	1½ NPT
FLMG-1121000(*)	150 to 900 (75 to 425)	1½ NPT

Comes complete with operator's manual.
***(*)** Specify **"AL"** for aluminum, **"BR"** for brass, or **"SS"** for stainless steel.*
*For units with BSPP threads add **"-BSPP"** to the model number for additional charge.*
***Ordering Examples: FLMG-10100BR-MA**, 1" brass air flow meter, 10 to 100 SCFM, 4 to 20 mA output.*
***FLMG-14012BR,** ¼ NPT brass air flow meter, 1.2 to 12 SCFM.*

Options

Order Suffix	Description
-HT	High temperatures, 204°C (400°F) maximum
-UHT	Ultra high temperatures, 316°C (600°F) maximum
-R1	Single SPDT relay, 10 A @ 220 Vac
-R2	Dual SPDT relays, 10 A @ 220 Vac
-MA	4 to 20 mA ouput (12 to 35 Vdc powered)
-BDF	Bidirectional flow (not available with 1½" size units, or with UHT, R1, R2, or MA options)

***Note:** Only one option may be ordered with each unit.*

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FLOW METERS

FLMW and FLMH Series

1 YEAR WARRANTY NIST

Optional

- **Direct-Reading Dual Scales**
- **Ranges from 0.1 to 150 GPM**
- **High Pressure: 3500 psi (Brass or Aluminum); 6000 psi (Stainless Steel)**
- **High Temperature: 116°C (240°F) Standard, 204 or 316°C (400 or 600°F) Optional**
- **Mounts in Any Position**
- **Relay Alarms and Analog Outputs Optional**

The FLMW and FLMH flow meters can be installed directly in the fluid line without flow straighteners or special piping.

The spring-and-piston type assembly enables these flow meters to be mounted in any position and protects them against changes in viscosity.

The FLMW or the FMLH Series with the optional analog output (-MA) are typically used to transmit a signal proportional to the flow rate to a process controller, a PLC, a recorder, or a panel-mount display. With the -MA options the user can choose between reading a 0 to 2000 Hz square-wave pulse, a 0 to 5 Vdc analog signal, or a 2-wire 4 to 20 mA analog signal by connecting the appropriate pins.

SPECIFICATIONS

Measuring Accuracy: ±2% FS over the entire scale range
Repeatability: ±1% FS
Flow Measuring Range:
0.4 to 550 LPM (0.1 to 150 GPM)
Max Operating Pressure:
Aluminum and Brass Monitors: 240 bar (3500 psig)
Stainless Steel Monitors: 410 bar (6000 psig) up to 116°C (240°F)
Max Operating Temperature:
116°C (240°F)

*[Note: For high temperature **("-HT", "-UHT"),** see chart on next page.]*

All models shown smaller than actual size.

FLMW-1205BR-MA
5 GPM oil meter with 4 to 20 mA output

FLMH-3810AL

FLMW-3405BR
5 GPM water meter

Standard Calibration Fluids:
Oil Monitors:
DTE 25 @ 43°C (110°F), 0.873 sg
Water Monitors:
Tap water @ 21°C (70°F), 1.0 sg
Maximum Particle Size:
76 microns
Relay (Optional): 1 or 2 form "C" relays, rated 10 A @125 or 250 Vac or 0.25 A @ 250 Vdc
Mechanical Life:
$>10^7$ cycles
Analog Output (Optional):
Supply voltage 12 to 35 Vdc, field selectable for 0 to 5 Vdc (100 W minimum load), 0 to 2000 Hz square-wave pulse or 4 to 20 mA $R_{max} = 50 (V_S-12)$. V_S = supply voltage DC

Materials of Construction (Wetted Components)

Description	Aluminum (Not for Water)	Brass	Stainless Steel
High-pressure casing, end ports and tapered shaft	Aluminum	Brass	304 SS
Seals	Buna (STD), EPR, FKM or Perfluoroelastomer	Buna (STD), EPR, FKM or Perfluoroelastomer	FKM with PTFE backup (STD) Buna, EPR or Perfluoroelastomer
Transfer magnet	PTFE-coated Alnico	PTFE-coated Alnico	PTFE-coated Alnico
Floating orifice disk	Stainless steel	Stainless steel	Stainless steel
All other internal parts	Stainless steel	Stainless steel	Stainless steel

Materials of Construction (Non-Wetted Components)

Description	Aluminum	Brass	Stainless Steel
Window tube	Polycarbonate (STD), Pyrex®	Polycarbonate (STD), Pyrex	Polycarbonate (STD), Pyrex
Window seals	Buna (STD)	Buna (STD)	Buna (STD)

Port Sizes	¼ to 1½ FNPT
Installation Dimensions	¼ and ½ Port: 1⅞ OD x 168 mm (6.6") length ¾ and 1.0 Port: 2⅜ OD x 183 mm (7.2") length 1¼ and 1½ Port: 3½ OD x 257 mm (10.1") length

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To Order

Model No.	Max Rate LPM (GPM)	NPT Conn Size
FLMH-1401(*)	4 (1)	¼
FLMH-1402(*)	8 (2)	¼
FLMH-1405(*)	19 (5)	¼
FLMH-1410(*)	37 (10)	¼
FLMH-1415(*)	58 (15)	¼
FLMH-3801(*)	4 (1)	⅜
FLMH-3802(*)	8 (2)	⅜
FLMH-3805(*)	19 (5)	⅜
FLMH-3810(*)	37 (10)	⅜
FLMH-3815(*)	58 (15)	⅜
FLMH-1201(*)	4 (1)	½
FLMH-1202(*)	8 (2)	½
FLMH-1205(*)	19 (5)	½
FLMH-1210(*)	37 (10)	½
FLMH-1215(*)	58 (15)	½

** Indicate material: **AL** = aluminum, **standard; BR** = brass, **SS** = stainless steel for additional cost.*

Model No.	Max Rate LPM (GPM)	NPT Conn Size
FLMH-3402(*)	8 (2)	¾
FLMH-3405(*)	19 (5)	¾
FLMH-3410(*)	37 (10)	¾
FLMH-3415(*)	58 (15)	¾
FLMH-3420(*)	74 (20)	¾
FLMH-3425(*)	100 (25)	¾
FLMH-3430(*)	115 (30)	¾
FLMH-3440(*)	150 (40)	¾
FLMH-1002(*)	8 (2)	1
FLMH-1005(*)	19 (5)	1
FLMH-1010(*)	37 (10)	1
FLMH-1015(*)	58 (15)	1
FLMH-1020(*)	74 (20)	1
FLMH-1025(*)	100 (25)	1
FLMH-1030(*)	115 (30)	1
FLMH-1040(*)	150 (40)	1

** Indicate material: **AL** = aluminum, **standard; BR** = brass, **SS** = stainless steel for additional cost*

Model No.	Max Rate LPM (GPM)	NPT Conn Size
FLMH-114025(*)	100 (25)	1¼
FLMH-114050(*)	185 (50)	1¼
FLMH-114075(*)	280 (75)	1¼
FLMH-114100(*)	370 (100)	1¼
FLMH-114150(*)	550 (150)	1¼
FLMH-112025(*)	100 (25)	1½
FLMH-112050(*)	185 (50)	1½
FLMH-112075(*)	280 (75)	1½
FLMH-112100(*)	370 (100)	1½
FLMH-112150(*)	550 (150)	1½

** Indicate material: **AL** = aluminum, **standard; BR** = brass, **SS** = stainless steel, for additional cost*

***Note**: Minimum flow rate = 10% of maximum.*

To Order

Model No.	Max Rate LPM (GPM)	NPT Conn Size
FLMW-1401(*)	4 (1)	¼
FLMW-1402(*)	8 (2)	¼
FLMW-1405(*)	19 (5)	¼
FLMW-1410(*)	37 (10)	¼
FLMW-3801(*)	4 (1)	⅜
FLMW-3802(*)	8 (2)	⅜
FLMW-3805(*)	19 (5)	⅜
FLMW-3810(*)	37 (10)	⅜
FLMW-3815(*)	58 (15)	⅜
FLMW-1201(*)	4 (1)	½
FLMW-1202(*)	8 (2)	½
FLMW-1205(*)	19 (5)	½
FLMW-1210(*)	37 (10)	½
FLMW-1215(*)	58 (15)	½

** Indicate material: **BR**=brass, **standard; SS**=stainless steel for additional cost.*

Model No.	Max Rate LPM (GPM)	NPT Conn Size
FLMW-3402(*)	4 (2)	¾
FLMW-3405(*)	19 (5)	¾
FLMW-3410(*)	37 (10)	¾
FLMW-3415(*)	58 (15)	¾
FLMW-3420(*)	74 (20)	¾
FLMW-3425(*)	100 (25)	¾
FLMW-3430(*)	115 (30)	¾
FLMW-3440(*)	150 (40)	¾
FLMW-1002(*)	4 (2)	1
FLMW-1005(*)	19 (5)	1
FLMW-1010(*)	37 (10)	1
FLMW-1015(*)	58 (15)	1
FLMW-1020(*)	74 (20)	1
FLMW-1025(*)	100 (25)	1
FLMW-1030(*)	115 (30)	1
FLMW-1040(*)	150 (40)	1

** Indicate material: **BR**=brass, **standard; SS**=stainless steel for additional cost.*

Model No.	Max Rate LPM (GPM)	NPT Conn Size
FLMW-114025(*)	100 (25)	1¼
FLMW-114050(*)	185 (50)	1¼
FLMW-114075(*)	280 (75)	1¼
FLMW-114100(*)	370 (100)	1¼
FLMW-114150(*)	550 (150)	1¼
FLMW-112025(*)	100 (25)	1½
FLMW-112050(*)	185 (50)	1½
FLMW-112075(*)	280 (75)	1½
FLMW-112100(*)	370 (100)	1½
FLMW-112150(*)	550 (150)	1½

** Indicate material: **BR**=brass, **standard; SS**=stainless steel for additional cost.*

Options

Order Suffix	Description
-HT	High temperatures, 204°C (400°F) max
-UHT	Ultra high temperatures, 315°C (600°F) max
-R1	Single SPDT relay, 10 A @ 220 Vac
-R2	Dual SPDT relays, 10 A @ 220 Vac
-MA	4 to 20 mA ouput (12 to 35 Vdc powered)
-BDF	Bi-directional flow (not available with 1½" size units, or with UHT, R1, R2, or MA options) ¼ to ½", ¾ to 1", 1¼" sizes for additional cost
-NIST	NIST traceable certificate

***Note:** Only one option may be ordered with each unit for additional cost. Options are available for additional cost.*
*For Bi-directional flow add **"-BDF"** to model number.*
*For BSPP threads add **"-BSPP"** to model number.*

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PRESSURE DROP GRAPHS

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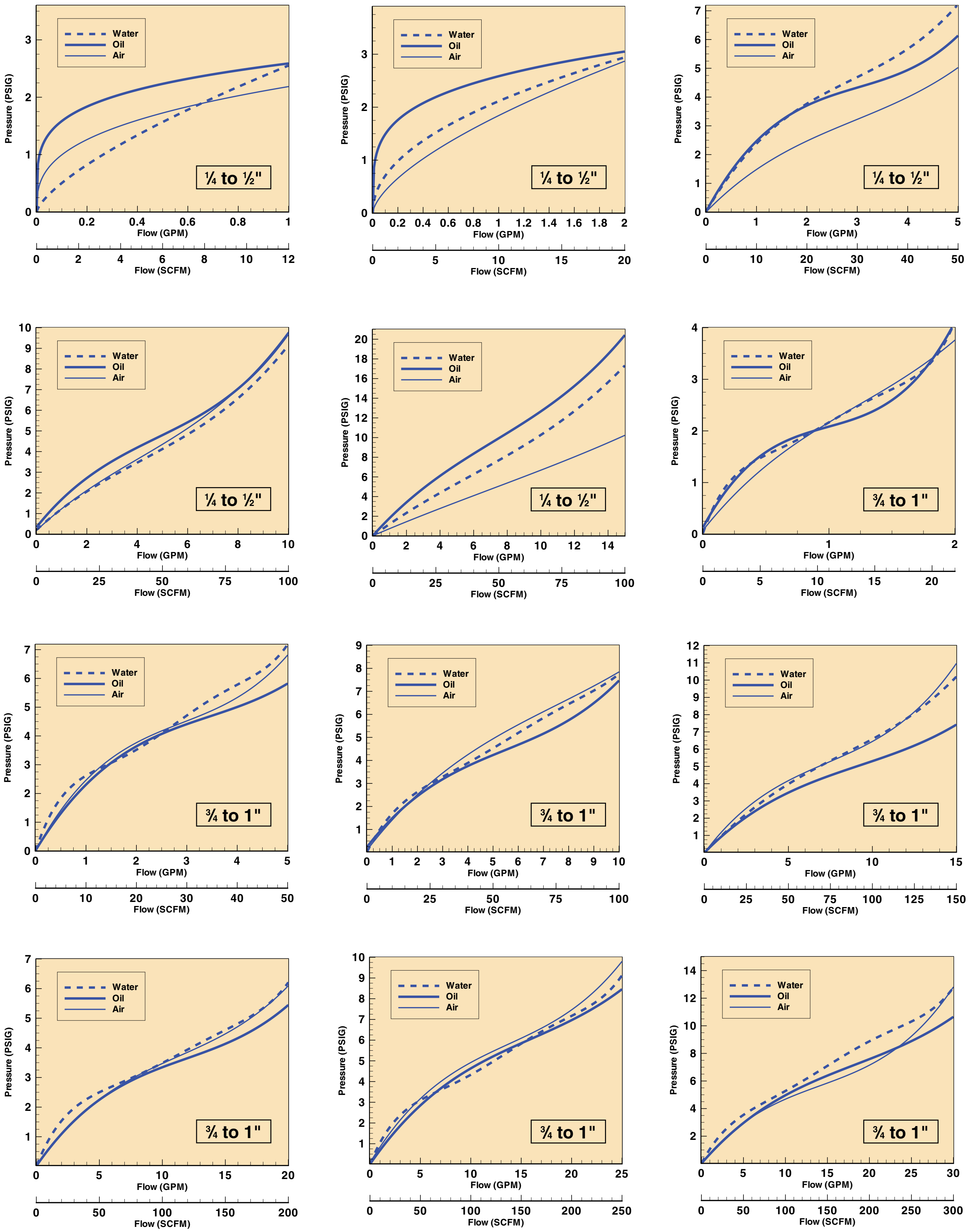
FLMG, FLMW, and FLMH



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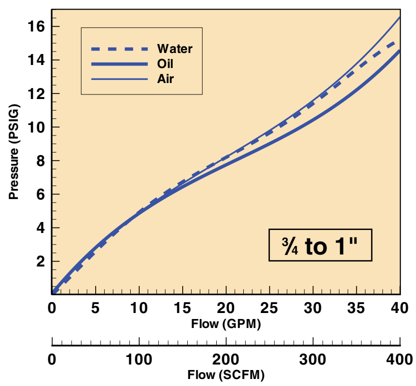
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Oil
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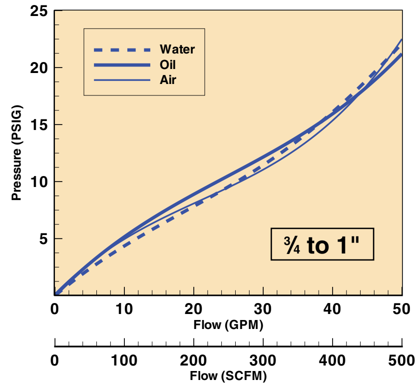
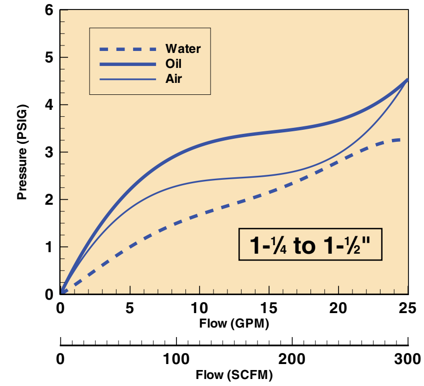
Pressure (PSIG)
Flow (GPM)
Flow (SCFM)


Water
Oil
Air
¾ to 1"
Pressure (PSIG)
Flow (GPM)
Flow (SCFM)


Water
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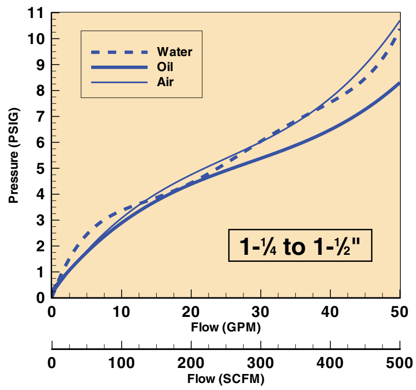
Air
1-¼ to 1-½"
Pressure (PSIG)
Flow (GPM)
Flow (SCFM)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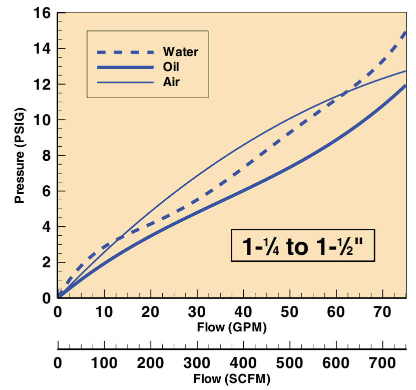
Pressure (PSIG)
Flow (GPM)
Flow (SCFM)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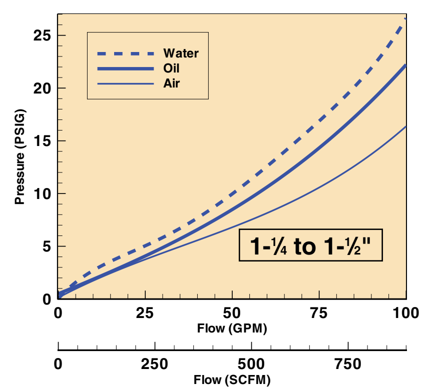
Pressure (PSIG)
Flow (GPM)
Flow (SCFM)


Water
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Air
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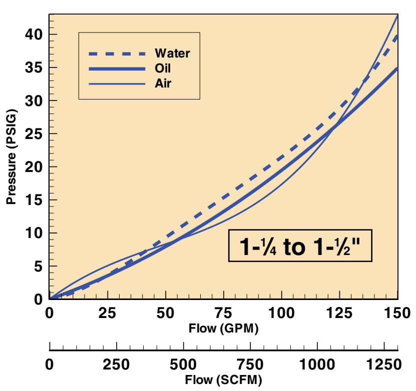
Pressure (PSIG)
Flow (GPM)
Flow (SCFM)


Water
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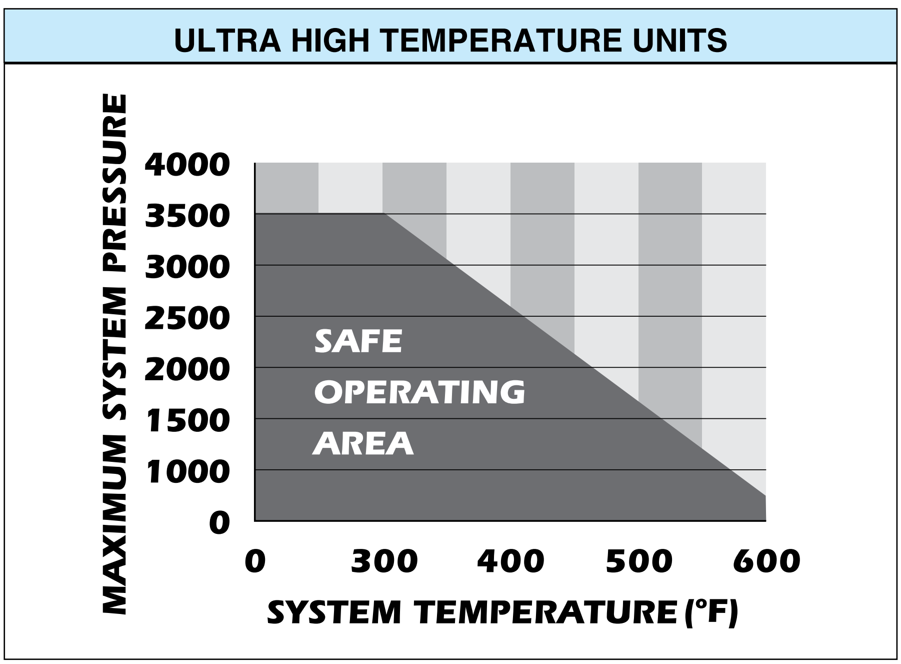
Air
1-¼ to 1-½"
Pressure (PSIG)
Flow (GPM)
Flow (SCFM)


ULTRA HIGH TEMPERATURE UNITS
MAXIMUM SYSTEM PRESSURE
4000
3500
3000
2500
2000
1500
1000
0
SAFE
OPERATING
AREA
0
300
400
500
600
SYSTEM TEMPERATURE (°F)

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CONTROL INFORMATION SYSTEMS

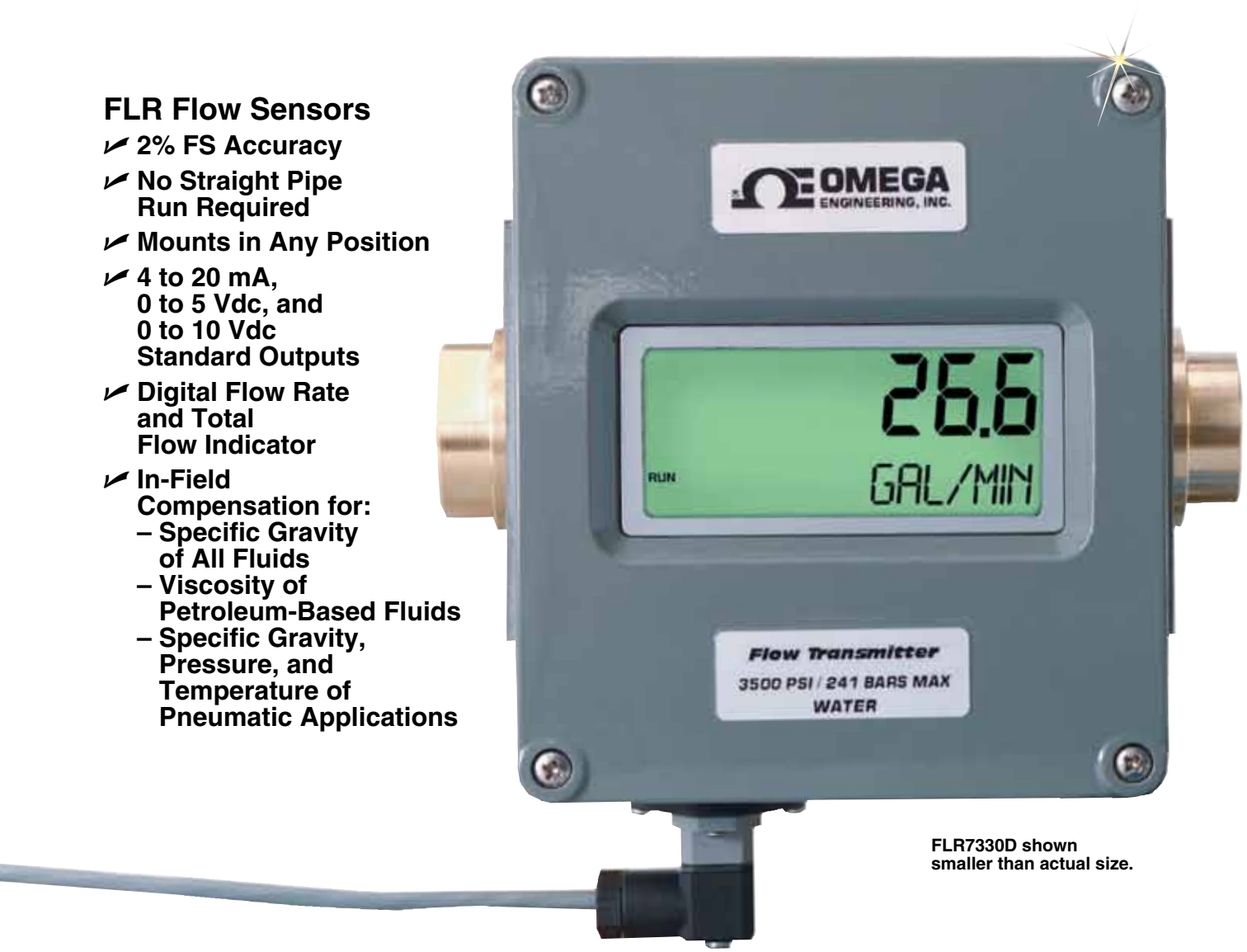
FLR Series

1 YEAR WARRANTY · NIST · CE · RoHS

Optional

FLR Flow Sensors

- 2% FS Accuracy
- No Straight Pipe Run Required
- Mounts in Any Position
- 4 to 20 mA, 0 to 5 Vdc, and 0 to 10 Vdc Standard Outputs
- Digital Flow Rate and Total Flow Indicator
- In-Field Compensation for:
  - Specific Gravity of All Fluids
  - Viscosity of Petroleum-Based Fluids
  - Specific Gravity, Pressure, and Temperature of Pneumatic Applications



FLR7330D shown smaller than actual size.

Rugged In-Line Flow Sensors

Available in 13 mm (½"), 19 mm (¾"), and 32 mm (1¼") sizes with anodized aluminum or brass. Comes with 4.5 m (15') of stripped end integral cable. In the field, integral cable can be extended up to 300 m (1000') with shielded copper cable. Units are securely protected in a sturdy cast aluminum enclosure, and are easy to install and mount in any position, vertical or horizontal. Capable of monitoring fluids to 150 GPM or pneumatic lines to 1000 SCFM.

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SPECIFICATIONS

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-29 to 116° C (-20 to 240° F)
Maximum Pressure: 3500 psig (liquids); 1000 psig (gases)
Power Requirement:
0 to 5 Vdc Output: 10 to 30 Vdc @ 0.75 W maximum
0 to 10 Vdc Output: 12 to 30 Vdc @ 0.75 W maximum
4 to 20 mA Output: Loop-powered, 30 Vdc maximum
Power Consumption: 25 mA maximum
Circuit Protection: Reverse polarity and current limit
Repeatability: ±0.5%
Non-Linearity: ±0.05%
Isolation: Inherently isolated from the piping system
Display: Fixed or toggle modes of operation for rate and totalizer display. 8-digit, 0.70" high numeric display for rate and total 8-digit 0.35" high alphanumeric display for units and setup
Response Time: 1.0 sec
Temperature Drift: 0.05% of span per °C maximum

Analog Outputs:
0 to 10 Vdc into 10KΩ minimum
User Connections: 15' pig-tail (standard)
Transmission Distance:
4 to 20 mA limited by cable resistance
0 to 5 Vdc 300 m (1000') maximum
0 to 10 Vdc 300 m (1000') maximum

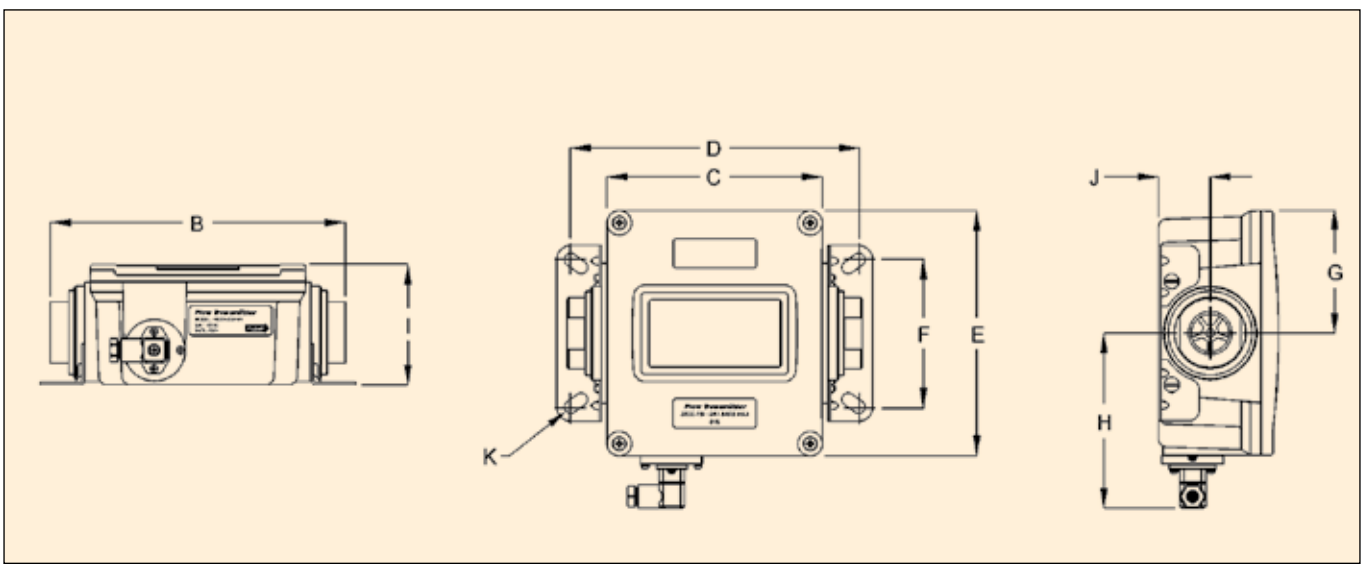
Enclosure:

Material: Anodized and epoxy powder-coated aluminum with polycarbonate lens
Seals: Silicone gasket between enclosure and lens/cover FKM O-rings between enclosure and flow meter body
Connection: 4-pin connection (standard)
Fasteners: T303 SS
Rating: NEMA 12 and 13 (IP52/54)
Materials:
2024 - T351 anodized aluminum body, piston and cone C360 brass body, piston and cone petroleum (oil) common parts

Spider Plate: T316 SS
Fasteners: T303 SS
Pressure Seals: FKM
Lens: Polycarbonate
Retaining Ring: SAE 1070/1090 carbon steel
Retaining Spring: SAE 1070/1090 carbon steel
Internal Magnet: PPS/ceramic
Enclosure Seal: Silicone gasket water-based, water, air common parts
Spider Plate: T316 SS
Spring: T302 SS
Fasteners: T303 SS
Pressure Seals: FKM
Lens: Polycarbonate
Retaining Ring: T316 SS
Retaining Spring: ST316 SS
Internal Magnet: PPS/ceramic
Enclosure Seal: Silicone gasket

Dimensions: mm (inch)

Nominal Port Size	B Length	C Length	D Length	E Width	F Width	G Width	H Width	I Depth	J Offset	K Hole Dia.
¼ (SAE 6)	168 (6.60)	134 (5.27)	163 (6.41)	152 (6.00)	82 (3.23)	76 (3.00)	107 (4.20)	75 (2.94)	38 (1.51)	8 (0.31)
½ (SAE 6)	168 (6.60)	134 (5.27)	163 (6.41)	152 (6.00)	82 (3.23)	76 (3.00)	107 (4.20)	75 (2.94)	38 (1.51)	8 (0.31)
¾ (SAE 6)	183 (7.20)	134 (5.27)	179 (7.04)	152 (6.00)	91 (3.60)	76 (3.00)	107 (4.20)	75 (2.94)	32 (1.27)	8 (0.31)
1 (SAE 6)	183 (7.20)	134 (5.27)	179 (7.04)	152 (6.00)	91 (3.60)	76 (3.00)	107 (4.20)	75 (2.94)	32 (1.27)	8 (0.31)
1¼ (SAE 6)	310 (12.20)	271 (10.68)	296 (11.65)	194 (7.63)	123 (4.84)	97 (3.82)	128 (5.02)	114 (4.50)	56 (2.20)	8 (0.31)
1½ (SAE 6)	310 (12.20)	271 (10.68)	296 (11.65)	194 (7.63)	123 (4.84)	97 (3.82)	128 (5.02)	114 (4.50)	56 (2.20)	8 (0.31)



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FLR6305D

FLR7130D

To Order

Model No.	Flow Range	Medium	NPT	Body
FLR6102D	0.2 to 2.0 GPM	Oil	½	Aluminum
FLR6105D	0.5 to 5.0 GPM	Oil	½	Aluminum
FLR6115D	1 to 15 GPM	Oil	½	Aluminum
FLR7120D	2 to 20 GPM	Oil	¾	Aluminum
FLR7130D	3 to 30 GPM	Oil	¾	Aluminum
FLR8140D	4 to 40 GPM	Oil	1	Aluminum
FLR8150D	5 to 50 GPM	Oil	1	Aluminum
FLR9175D	10 to 75 GPM	Oil	1¼	Aluminum
FLR9110D	10 to 100 GPM	Oil	1¼	Aluminum
FLR9115D	10 to 150 GPM	Oil	1¼	Aluminum
FLR6302D	0.2 to 2.0 GPM	Water	½	Brass
FLR6305D	0.5 to 5.0 GPM	Water	½	Brass
FLR6315D	1 to 15 GPM	Water	½	Brass
FLR7320D	2 to 20 GPM	Water	¾	Brass
FLR7330D	3 to 30 GPM	Water	¾	Brass
FLR8340D	4 to 40 GPM	Water	1	Brass
FLR8350D	5 to 50 GPM	Water	1	Brass
FLR9375D	10 to 75 GPM	Water	1¼	Brass
FLR9310D	10 to 100 GPM	Water	1¼	Brass
FLR9315D	10 to 150 GPM	Water	1¼	Brass
FLR6725D	2 to 25 SCFM	Air 100 psi	½	Aluminum
FLR6750D	5 to 50 SCFM	Air 100 psi	½	Aluminum
FLR7710D	10 to 100 SCFM	Air 100 psi	¾	Aluminum
FLR7715D	15 to 150 SCFM	Air 100 psi	¾	Aluminum
FLR8725D	25 to 250 SCFM	Air 100 psi	1	Aluminum
FLR9740D	25 to 400 SCFM	Air 100 psi	1¼	Aluminum
FLR9760D	50 to 600 SCFM	Air 100 psi	1¼	Aluminum
FLR9710D	100 to 1000 SCFM	Air 100 psi	1¼	Aluminum

Comes complete with operator's manual.
*For 5-point NIST certificate add **"-NIST5"** to model number for additional cost.*
*For British standard pipe thread parallel add **"-BSPP"** to model number, no additional cost.*
***Ordering Examples: FLR6105D,** flow transmitter, 0.5 to 5.0 GPM for oil, with analog output **FLR5101D,** flow transmitter, 0.1 to 1.0 GPM for oil with analog output.*

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For Liquid and Gas Applications

FLR1000 Series

1 YEAR WARRANTY · NIST · RoHS

Optional

FLR1001, shown actual size.

- **PPS or Brass Construction**
- **1% Accuracy for Liquids**
- **Up to 0.2% Repeatability**
- **0 to 5V Analog Output**
- **Available With or Without Display**

FLR1009ST-D, shown actual size.

FLR1000 Series flow sensors can measure extremely low flow rates from 20 mL/min to 5 L/min. These sensors are suitable for a wide variety of industrial, commercial, and laboratory flow applications. FLR1000 Series flow sensors operate on 12 Vdc power and are designed for incorporation into data acquisition systems that supply 12.5 Vdc to sensors and receive 0 to 5 Vdc linear signals in return. Because of their cost effectiveness, FLR1000 Series units may replace conventional glass tube and ball flowmeters in applications in which an electrical signal proportional to flow rate is desired.

The FLR1000 Series uses a Pelton-type turbine wheel to determine the flow rate of the gas. The rotation rate of the turbine wheel is linear over a wide dynamic range. The electro-optical system consists of a diode emitting energy in the infrared spectrum. Light energy is alternatively reflected and absorbed from "spokes" deposited on the small turbine wheel. This reflected light energy is detected by a photodiode. Thus, as the turbine wheel rotates in response to gas flow rate, electrical pulses are generated. Processing circuitry provides a DC voltage output proportional to the flow rate. For example, output signal is 1.0 Vdc at 20% of rated flow, 2.5 Vdc at 50% of rated flow, 4.0 Vdc at 80% of rated flow, and 5.0 Vdc at 100% of rated flow. Sensors can handle 20% above their rated flow without being damaged.

For liquid flow metering with integrated rate display, the FLR1000ST-D Series has been setting the pace. Their advanced Pelton-turbine design provides high turndown ratios, fast response, and repeatable accuracy. A 0 to 5 Vdc analog output is standard. Featuring a 3½-digit display of flow rate in engineering units, these flowmeters are perfect for any laboratory or test facility. For higher-pressure applications or where metal may be required, the FLR1000ST Series is the solution, see page F-89 for complete details.

Specifications (FLR1000 Series)

Accuracy: ±1% FS (liquids), ±3% (gases)
Display: 3½-digit LCD, 22 mm (⅞") H
Output Signal: 0 to 5 Vdc, adjustable ±20% (typical)
Power Requirement: 11.5 to 15 Vdc regulated, 30 mA (typical)
Standard Sensor Material: 40% glass filled polyphenelene sulfide, glass window, stainless steel bearing support; sapphire shaft and bearing; FKM rubber O-rings standard

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Pressure Rating: 40 psi at 20°C (68°F)
brass units using liquid services
Temperature Rating: 0 to 50°C (32 to 122°F)
Temperature Sensitivity: ±0.2%/°C
Linearity: ±3% FS
Repeatability: ±0.5% FS from 50 to 100% of rated maximum flow for gas; ±0.2% FS for liquid
Cable Assembly: 0.9 m (3') cable length

Dimensions:
(3 x 1.75 x 3.5")
Non-Display: 60 x 42 x 37 mm (2.35 x 1.65 x 1.25")
Pressure Sensitivity: ±0.07%/mm Hg (using air at 1 to 3 atm)
Mounting: Holes for #4 screw provided

FLR1010-D, shown smaller than actual size.

Options

Order Suffix	Description	Compatible Units
-BR	Brass body	Liquid: FLR1007-1013
-P	Pulse output	Liquid: FLR1007-1013
-BR-D	Brass body and display	Gas: FLR1001-1006, FLR1201 Liquid: FLR1007-1013
-BR-P	Brass body and pulse output	Liquid: FLR1007-1013

To Order

Model No. (No Display)	Model No. (Display)	Gas Flow Range	Maximum Pressure Drop (inches water)	Acetal Tube Fitting (inch)
FLR1001	**FLR1001-D**	20 to 100 mL/min	20	⅛
FLR1002	**FLR1002-D**	40 to 200 mL/min	8	⅛
FLR1003	**FLR1003-D**	100 to 500 mL/min	2	⅛
FLR1004	**FLR1004-D**	200 to 1000 mL/min	2	⅛
FLR1005	**FLR1005-D**	0.4 to 2.0 L/min	2	¼
FLR1006	**FLR1006-D**	1.0 to 5.0 L/min	2	¼
FLR1201	**FLR1201-D**	2.0 to 10.0 L/min	3	¼
FLR1202	**FLR1202-D**	4.0 to 20.0 L/min	3	⅜
FLR1203	**FLR1203-D**	10 to 50 L/min	3	⅜
FLR1204	**FLR1204-D**	20 to 100 L/min	3	½
FLR1205	**FLR1205-D**	40 to 200 L/min	5	½
FLR1206	**FLR1206-D**	100 to 500 L/min	20	½
Model No. (No Display)	**Model No. (Display)**	**Liquid Flow Range**	**Maximum Pressure Drop (psi)**	**Acetal Tube Fitting (inch)**
FLR1007	**FLR1007-D**	13 to 100 mL/min	10	⅛
FLR1008	**FLR1008-D**	20 to 200 mL/min	10	¼
FLR1009	**FLR1009-D**	50 to 500 mL/min	10	¼
FLR1010	**FLR1010-D**	100 to 1000 mL/min	6	¼
FLR1011	**FLR1011-D**	0.2 to 2.0 L/min	6	¼
FLR1012	**FLR1012-D**	0.5 to 5.0 L/min	6	⅜
FLR1013	**FLR1013-D**	1 to 10 L/min	10	⅜

Accessories

Model No.	Description
FLR1000-PW	115 Vac power supply
FLR1000-230PW	230 V power supply with European connector
FLR1000-C35	Replacement 0.9 m (3') cable

*For a 4-point NIST calibration for air, add suffix **"-NISTAIR"** to model number for additional cost.*
*For a 4-point NIST calibration for water add suffix **"-NISTWATER"** to model number, for additional cost, (FLR1007 calibrations are 3-points).*
Comes complete with 0.9 m (3') cable and operator's manual.
***Ordering Examples: FLR1012,** liquid flow sensor, 0.5 to 5.0 L/min range.*
***FLR1006-D,** gas flow sensor with display, 1.0 to 5.0 L/min range.*

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Stainless Steel Construction

FLR1000ST Series

1 YEAR WARRANTY · CE · NIST · RoHS

Optional†

FLR1009ST-D shown larger than actual size.

- **±1% Accuracy**
- **0.2% Repeatability**
- **Available with 0 to 5V, 4 to 20 mA, or Pulse Output**
- **Available With or Without Display**

Designed for applications where stainless steel may be required, the FLR1000ST Series flowmeters are rated to 500 psig. These units are available to cover flow ranges from 13 mL/min to 10 L/min. A 0 to 5 Vdc or 4 to 20 mA analog output is standard with all units; Voltage output models are also available with an additional pulse output, or with a 3½ digit LCD readout.

SPECIFICATIONS

Accuracy/Linearity: ±1% FS
Repeatability: ±0.2% FS
Pressure Rating:
34 bar (500 psig), maximum
Operating Ambient: 5 to 55°C (41 to 131°F)
Storage Ambient: 0 to 70°C (32 to 158°F)
Temperature Sensitivity: ≤ ±0.2% FS/°C
Wetted Parts: 316 SS, epoxy, Pyrex® glass, PPS, FKM O-rings, sapphire bearings
Filtration (Recommended):
25 microns or less
Analog Output: Linear 0 to 5 Vdc or 4 to 20 mA; non-isolated signal
Pipe Connections: 316 SS compression tube fittings, provided

Electrical Connections: 4-pin male connector for both power and signal; included with 0.9 m (3') cable
Power:
Voltage Output Models:
11.5 to 12.5 Vdc (0.4 W @ 12 Vdc)
Current Output Models:
18 to 24 Vdc (1.2 W @ 24 Vdc), 50 mA

To Order

Model No. (No Display) 0 to 5 V Output and Pulse	Model No. (No Display) 4 to 20 mA Output	Model No. (Display Model) 0 to 5 V Output	Maximum Liquid Flow Range	Pressure Drop (psi)	Tube Connection
FLR1007ST	**FLR1007ST-I**	**FLR1007ST-D**	13 to 100 mL/min	10	⅛"
FLR1008ST	**FLR1008ST-I**	**FLR1008ST-D**	20 to 200 mL/min	10	¼"
FLR1009ST	**FLR1009ST-I**	**FLR1009ST-D**	50 to 500 mL/min	10	¼"
FLR1010ST	**FLR1010ST-I**	**FLR1010ST-D**	100 to 1000 mL/min	6	¼"
FLR1011ST	**FLR1011ST-I**	**FLR1011ST-D**	0.2 to 2.0 L/min	10	¼"
FLR1012ST	**FLR1012ST-I**	**FLR1012ST-D**	0.4 to 5.0 L/min	10	⅜"
FLR1013ST	**FLR1013ST-I**	**FLR1013ST-D**	1 to 10 L/min	10	⅜"

Accessories

Model No.	Description
U12Y100	12 Vdc power supply for 0 to 5 Vdc output models
PSU-93	24 Vdc power supply for 4 to 20 mA output models
FLR1000-C	Replacement 0.9 m (3') cable

Comes complete with 0.9 m (3') cable and operator's manual.
*†For optional 4-point NIST calibration certificate add suffix **"-NISTWATER"** to model number, for additional cost (FLR1007ST Series calibrations are 3-points).*
***Ordering Examples: FLR1011ST,** 0 to 5V output and pulse, 0.2 to 2 L/min.*
***FLR1013ST-D,** display model with 0 to 5V output, 1 to 10 L/min.*

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FLR-1600A Series
FLV-4600A Series

1 YEAR WARRANTY · CE · NIST · RoHS

Standard

- **Response Time Up to 20 ms**
- **Turndown Ratio of 50:1**
- **Pushbutton Tare (with Display)**
- **±2% FS Accuracy**
- **NIST Traceability**

The OMEGA® FLR-1600A and FLV-4600A Series flowmeters and controllers use two of the best studied physical properties of liquids to measure flow: pressure and viscosity. Differential pressure measurement, across a laminar flow element, results in a flowmeter that is inherently linear.

OMEGA flow meters measure differential pressure within that laminar region to achieve a turndown of 50:1 typical and the accuracy is ±2.0% of full scale. It uses the same technology as the laminar gas mass flow and volumetric flow meters, FMA-1600A and FLV-1600A. There are no moving parts to wear out.

The FLR-1600A Series is a volumetric water flowmeter. The unique method of flow detection allows the meter to measure extremely low flow rates at an affordable price. The FLR-1600A Series was designed with deionized water in mind. These flowmeters are available in ranges of 500 microliters per minute full scale to 10 liters per minute full scale.

The FLR-1600A water meter provides data on the flow rate and temperature via the standard local display and the RS232 serial output. An optional gauge pressure sensor is available on the secondary output model **"-P"**.

The FLV-4600A Series water flow controller utilizes a proportional valve coupled to a flowmeter body creating a unique in-situ closed-loop flow controller system. Measurements are taken within the laminar region of the flow meter and the integral PID controller positions the valve according to the flow set points. The controllers can accept an RS232 or the 0 to 5V control input signal depending on what is preferred. Independent of the set point voltages, the controllers can be configured for single or dual output of the same or different voltages and/or different parameters such as temperature and flow. This is possible because of our laminar flowmeter design that incorporates solid-state differential and temperature sensors on the standard model to determine flow in an inherently linear system. An optional, absolute gauge pressure sensor is available on the **"-P"** secondary output models. The result is a fast responding linear flow meter with multiple outputs. All these parameters are simultaneously visible with our dynamic display that includes a push button operator interface. water flow controllers are available from 50 milliliters per minute full scale to 500 milliliters per minute full scale.

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SPECIFICATIONS

Repeatability: ±2% FS
Turndown Ratio: 50:1
Response Time:
FLR-1600A: 20 ms
FLV-4600A: 100 ms
Input Control Signal (FLV-4600A Units):
0 to 5 Vdc and RS232
Output Signal: 0 to 5 Vdc, RS232
Optional Input/Outputs:
4 to 20 mA, 0 to 10 Vdc
Operating Temperature:
10 to 50°C (50 to 122°F)
Zero Shift: 0.02%/ATM FS/°C
Span Shift: 0.02%/ATM FS/°C

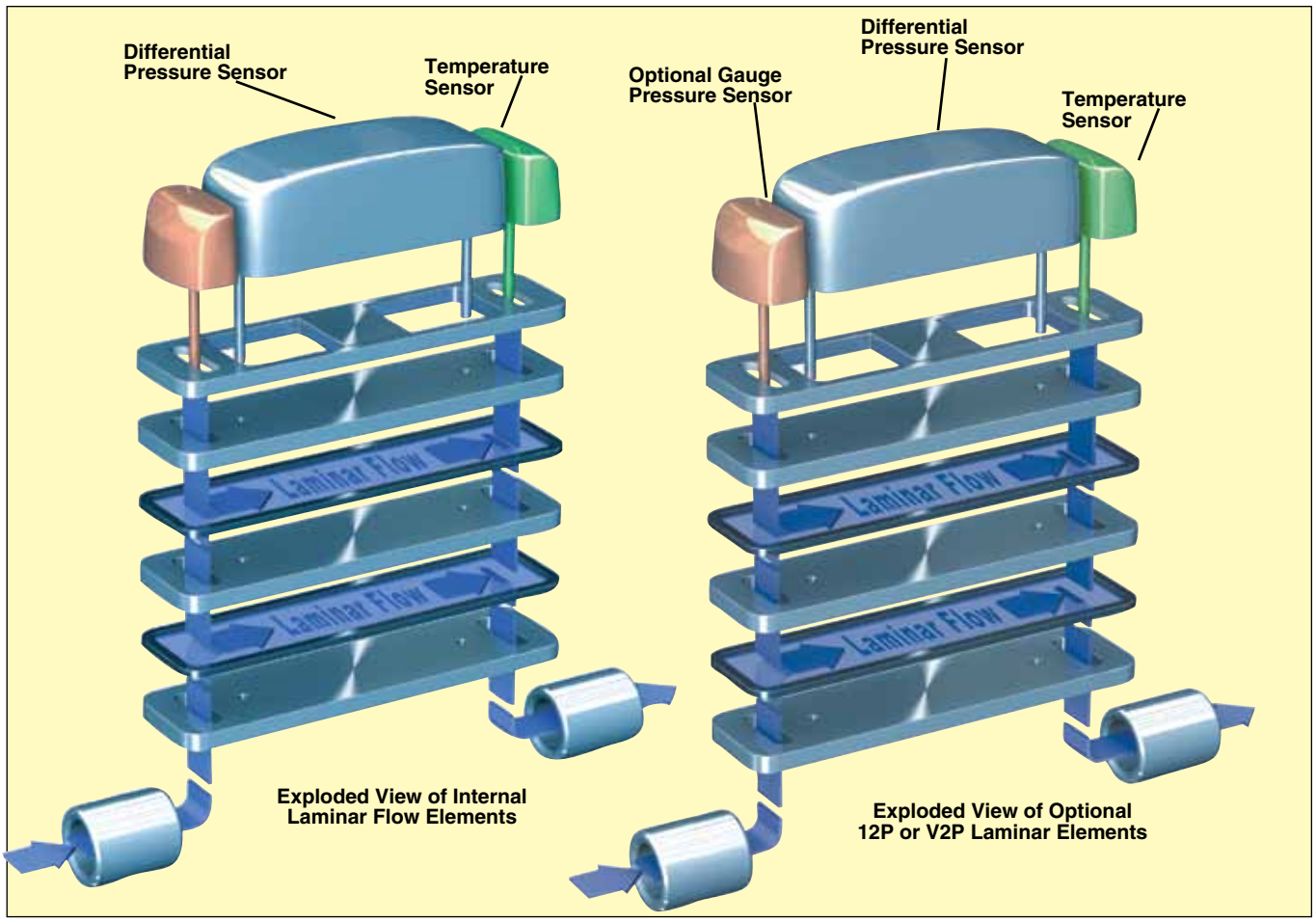
Excess Flow Rate:
Maximum Pressure:
Meters: 200 psig
Controllers: 150 psig
Minimum Pressure Drop: 0.4 psid
Supply Current (Typical):
FLR-1600A: 30 mA
FLV-4600A: 250 mA
Supply Voltage:
FLR-1600A: 7 to 30 Vdc, 0.035 A
FLV-4600A: 12 to 30 Vdc, 0.250 A
Note: *15 Vdc minimum for 4 to 20 mA output option.*
Electrical Connections:
8-pin circular mini DIN
Wetted Materials: 303, 302 and 316 SS, FKM, polythermide, silicone glass, silicone rubber; controllers also

FLV-4604A shown smaller than actual size.

Dimensions: mm (inch)

Flow Range (Full Scale)	Height	Length	Depth
FLR-1600A			
0.5 to 1 SCCM	112 (4.4)	60 (2.4)	27 (1.05)
2 to 500 SCCM	116 (4.6)	60 (2.4)	27 (1.05)
1 SLPM	116 (4.6)	60 (2.4)	27 (1.05)
2 SLPM	119 (4.7)	67 (2.6)	27 (1.05)
5 to 10 SLPM	129 (5.1)	102 (4.0)	41 (1.6)
FLV-4600A			
0 to 1 SCCM	112 (4.4)	85 (3.3)	27 (1.05)
5 to 500 SCCM	116 (4.6)	91 (3.6)	27 (1.05)
1 to 5 SLPM	145 (5.7)	194 (7.7)	57 (2.3)

Please allow approximately 44.5 mm (1.75") on top of unit for electrical cable connection.



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To Order

Water Flowmeter Model No.	4 to 20 mA Output Model No.	2, 4 to 20 mA Output** Model No.	2, 0 to 5V Output** Model No.	Connection	Maximum Flow
FLR-1601A	**FLR-1601A-I**	**FLR-1601A-I2**	**FLR-1601A-V2**	10 to 32 thread	0.001 to 0.5 CCM
FLR-1602A	**FLR-1602A-I**	**FLR-1602A-I2**	**FLR-1602A-V2**	10 to 32 thread	0.02 to 1 CCM
FLR-1614A	**FLR-1614A-I**	**FLR-1614A-I2**	**FLR-1614A-V2**	⅛ FNPT	0.04 to 2 CCM
FLR-1615A	**FLR-1615A-I**	**FLR-1615A-I2**	**FLR-1615A-V2**	⅛ FNPT	0.1 to 5 CCM
FLR-1603A	**FLR-1603A-I**	**FLR-1603A-I2**	**FLR-1603A-V2**	⅛ FNPT	0.2 to 10 CCM
FLR-1616A	**FLR-1616A-I**	**FLR-1616A-I2**	**FLR-1616A-V2**	⅛ FNPT	0.4 to 20 CCM
FLR-1604A	**FLR-1604A-I**	**FLR-1604A-I2**	**FLR-1604A-V2**	⅛ FNPT	1 to 50 CCM
FLR-1617A	**FLR-1617A-I**	**FLR-1617A-I2**	**FLR-1617A-V2**	⅛ FNPT	2 to 100 CCM
FLR-1618A	**FLR-1618A-I**	**FLR-1618A-I2**	**FLR-1618A-V2**	⅛ FNPT	4 to 200 CCM
FLR-1619A	**FLR-1619A-I**	**FLR-1619A-I2**	**FLR-1619A-V2**	⅛ FNPT	0 to 500 CCM
FLR-1620A	**FLR-1620A-I**	**FLR-1620A-I2**	**FLR-1620A-V2**	¼ FNPT	0.02 to 1 LPM
FLR-1605A	**FLR-1605A-I**	**FLR-1605A-I2**	**FLR-1605A-V2**	¼ FNPT	0.04 to 2 LPM
FLR-1606A	**FLR-1606A-I**	**FLR-1606A-I2**	**FLR-1606A-V2**	¼ FNPT	0.1 to 5 LPM
FLR-1607A	**FLR-1607A-I**	**FLR-1607A-I2**	**FLR-1607A-V2**	¼ FNPT	0.2 to 10 LPM
Water Flow Controller Min P = 5 Psig					
FLV-4604A	**FLV-4604A-I**	**FLV-4604A-I2**	**FLV-4604A-V2**	⅛ FNPT	1 to 50 CCM
FLV-4617A	**FLV-4617A-I**	**FLV-4617A-I2**	**FLV-4617A-V2**	⅛ FNPT	2 to 100 CCM
FLV-4618A	**FLV-4618A-I**	**FLV-4618A-I2**	**FLV-4618A-V2**	⅛ FNPT	4 to 200 CCM
FLV-4619A	**FLV-4619A-I**	**FLV-4619A-I2**	**FLV-4619A-V2**	⅛ FNPT	0 to 500 CCM
FLV-4620A	**FLV-4620A-I**	**FLV-4620A-I2**	**FLV-4620A-V2**	⅛ FNPT	0.02 to 1 LPM
FLV-4605A	**FLV-4605A-I**	**FLV-4605A-I2**	**FLV-4605A-V2**	¼ FNPT	0.04 to 2 LPM
FLV-4606A	**FLV-4606A-I**	**FLV-4606A-I2**	**FLV-4606A-V2**	¼ FNPT	0.1 to 5 LPM

Comes complete with 24 Vdc universal power supply, 1.8m (6') cable, 8-pin male mini-DIN connector, operator's manual, and NIST certificate.

*For a portable version of the FLR-1600A Series meters add suffix, **"-B"** to the model number, for additional cost. Portable versions have an integral battery compartment and come complete with 24 Vdc universal power supply, 1.8m (6') cable, 8-pin male mini-DIN connector, operator's manual, Nist certificate, and 9V battery installed. Option not available on versions where 4 to 20 mA is the chosen output.*

Units are calibrated to air @ 5 psig for 0 to 1 LPM, 15 psig for 2 to 10 LPM, 30 psig for 20 to 100 LPM, and 50 psig for 200 LPM and greater

Calibrations done at ambient 21°C (70°F) temperature only.

*To replace the standard RS232 communications with RS485, add suffix **"-RS485"** to the model number, for additional cost.*

*** Optional secondary output are scaled the same as the primary output scale. For an alternate temperature output scale, add suffix **"-T"** to the model number, no additional cost. For an alternate Pressure output scale, add suffix **"-P"** to the model number, for additional cost.*

***Note:** Models with secondary output for pressure include optional gauge pressure sensor.*

*For units scaled in CFH, add suffix **"-CFH"** to model number. Specify desired CFH range, no additional cost.*

*For totalizer option, add suffix **"-TOT"** to the model number, for additional cost. Please specify resolution.*

*This is a 6-digit counter. **Examples:** For totalizing in liters with 1/100 liter resolution, the max count would be 9999.99. For totalizing in liters with 1 liter resolution, the max count would be 999999.*

Accessories for FLR-1600A/FLV-4600A Series

Model No.	Description
FMA1600-C1	Replacement 8-pin male mini-DIN connector cable, single ended, 1.83 m (6')
FMA1600-C1-25FT	8-pin male mini DIN connector cable, single ended, 7.62 m (25')
FMA1600-C2	8-pin male mini DIN connector cable, double ended, 1.83 m (6')
FMA1600-C2-25FT	8-pin male mini DIN connector cable, double ended, 7.62 m (25')
FMA1600-C3	8-pin male mini DIN to DB9 female adaptor, 1.83 m (6')
FMA1600-CRA	8-pin male right-angle mini DIN cable, single ended, 7.83 m (6')
FMA1600-MDB	Multi-drop box
FMA1600-PSU	Univeral 100 to 240 Vac to 24 Vdc power supply adaptor
MN1604	Replacement 9V battery for the "-B" portable meters
FMA1600-BP	Battery cradle (not for use with "-B" versions)
FTNY-K210BN	Nylon body, tube ID 1⁄16 BAXB to 10 to 32 UNF connector
FTPP-K23ONP	Polypropylene body, tube ID ⅛ hose barb to 10-32 UNF connector

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INTEGRAL OR REMOTE SIGNAL CONDITIONER

NEW

FLSC-C1-LIQ

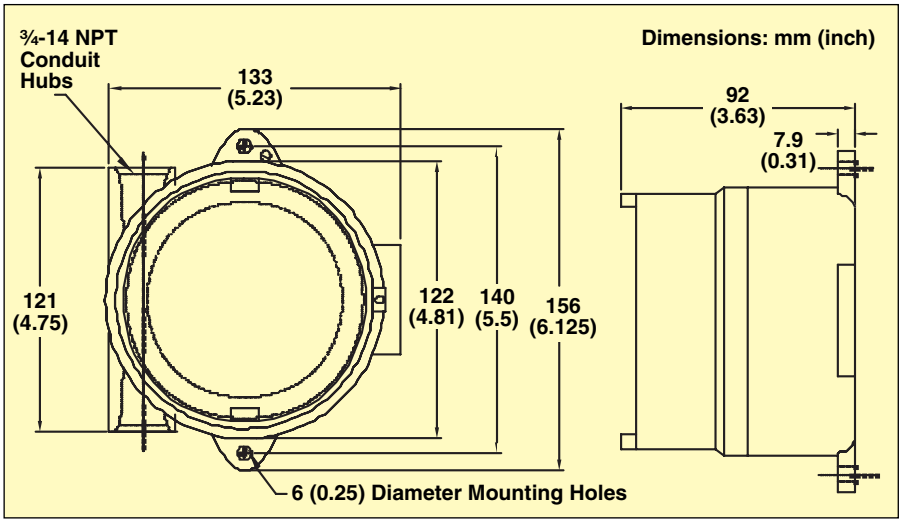
MADE IN USA · 1 YEAR WARRANTY · CE · Ex

- Loop Powered 4 to 20 mA
- Signal Linearization
- Factory Configuration Available
- Windows® Configuration Software*

FLSC-C1-LIQ shown smaller than actual size.

The FLSC-C1-LIQ is a microprocessor controlled 2-wire 4 to 20 mA transmitter. The FLSC-C1-LIQ converts a low level, frequency signal from a flow sensor into an analog 4 to 20 mA output. The output is proportional to the flow rate. The FLSC-C1-LIQ is designed for integral mounting to the FTB-100, FTB-200 and FTB-400 Series** liquid turbines.

*** Visit **omega.com/ftb100**, **omega.com/ftb200** or **omega.com/ftb400** for details.*



SPECIFICATIONS

Input Signal Type: Magnetic pickup
Input Frequency Range: 0.2 Hz to 4 KHz
Signal Level: 10 mV rms to 30 Vdc
Power Supply: Loop power 10 to 30 Vdc Reverse polarity protected
Loop Burden Voltage: 8.5V
Analog Output: 4 to 20 mA
24 mA overflow condition
Load Resistance: Maximum 650 Ω at 24 Vdc
Accuracy: ±0.02% of full scale
Temperature Drift: 40 ppm/degree C
Communications: RS232 port for configuration and diagnostics
Operating Temperature: -40 to 85°C (-40 to 185°F)
Humidity: 0 to 90% non-condensing
Enclosure: Extruded Aluminum Explosion-Proof ATEX enclosure
Regulatory: CE Compliant
Up to 20 point linearization
Windows® Configuration Software* (cable sold separately)

Enclosure meets Class I, Div 1 & 2, Groups A, B, C & D. Class 1, Zones 1 & 2, Groups IIB + H2 IIA. Class II, Div 1 & 2 Groups E, F & G. Class III. NEMA 3, 4, 7(B, C, D) 9(E, F, G). Cenelec EEx d IIC IP66, UL, CSA, FM Approved. ATEX Certified.

To Order ***Visit omega.com/flsc-c1-liq for Pricing and Details***

Model No.	Description
FLSC-C1-LIQ	Loop-powered signal conditioner, 4 to 20 mA, CE/ATEX
OM-CONV-USB	USB to RS232 converter
FLSC-C-CABLE	Molex to 9-pin “D” connector

Comes complete with operator’s manual and enclosure.
*** Available free at omega.com/ftp*
***Ordering Example: FLSC-C1-LIQ,** loop-powered turbine signal conditioner in ATEX enclosure with **FLSC-C-CABLE** Molex to 9-pin “D” connector.*

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FLOW SIGNAL CONDITIONERS

FLSC-45

1 YEAR WARRANTY

Low-Cost Model with Plastic Enclosure!

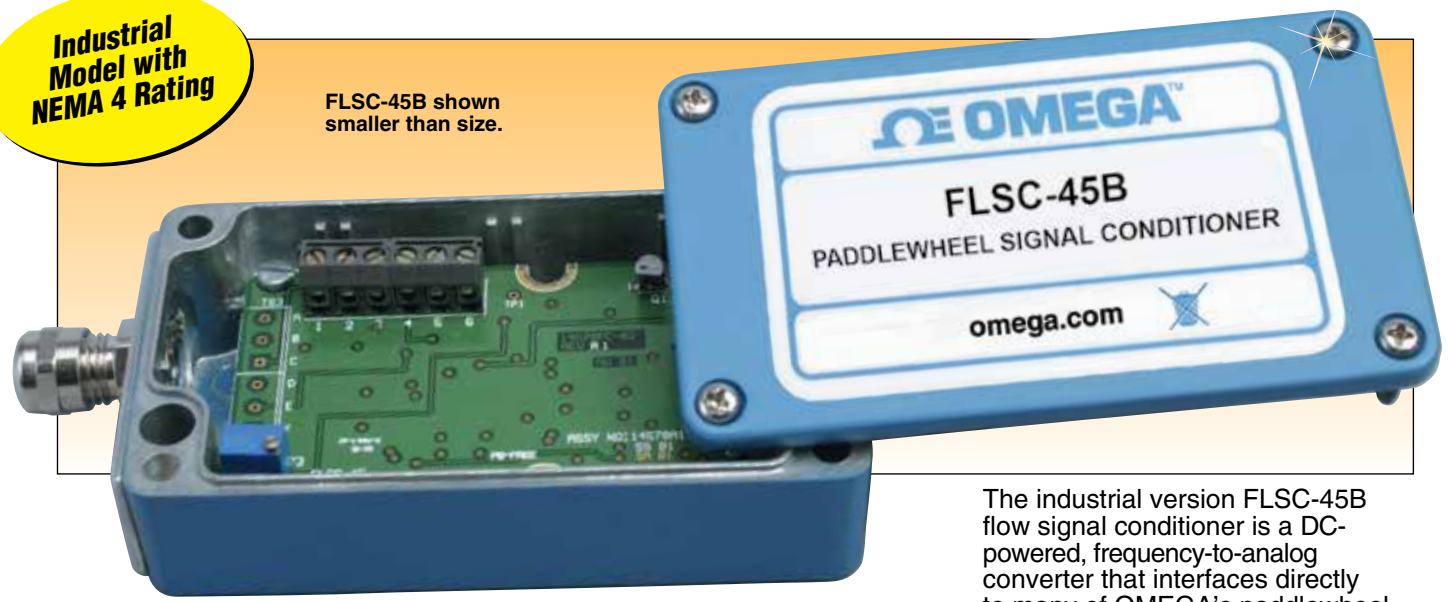
FLSC-45 shown smaller than actual size.

- ±0.15% FS Accuracy
- Low-Cost Economical Design
- Plastic Enclosure for Wall Mounting
- 4 to 20 mA or 1 to 5 Vdc Field-Selectable Output
- Operates on 15 to 32 Vdc

The FLSC-45 flow signal conditioner is a DC-powered, frequency-to-analog converter that interfaces directly to many of OMEGA's paddlewheel sensors to provide a linear scaled 4 to 20 mA or 1 to 5 Vdc field-selectable output across a dedicated flow range. The high-performance electronics will accept a low-level magnetic pickup signal from a paddlewheel or turbine meter without amplification. The industry-standard output interfaces directly with OMEGA's iSeries meters and controllers. The FLSC-45 features a plastic enclosure with a built-in mounting plate for wall mounting.

Industrial Model with NEMA 4 Rating

FLSC-45B shown smaller than size.



FLSC-45B

1 YEAR WARRANTY

- ±0.15% FS Accuracy
- Rugged, Die-Cast NEMA 4 (IP65) Aluminum Enclosure for Industrial Use
- 4 to 20 mA or 1 to 5 Vdc Field-Selectable Output
- Operates on 15 to 24 Vdc

The industrial version FLSC-45B flow signal conditioner is a DC-powered, frequency-to-analog converter that interfaces directly to many of OMEGA's paddlewheel sensors to provide a linear scaled 4 to 20 mA or 1 to 5 Vdc field-selectable output across a dedicated flow range. The high-performance electronics will accept a low-level magnetic pickup signal from a paddlewheel or turbine meter without amplification. The industry-standard output interfaces directly with OMEGA's iSeries meters and controllers. The FLSC-45B features a NEMA 4 (IP65) die-cast aluminum enclosure with built-in mounting holes.

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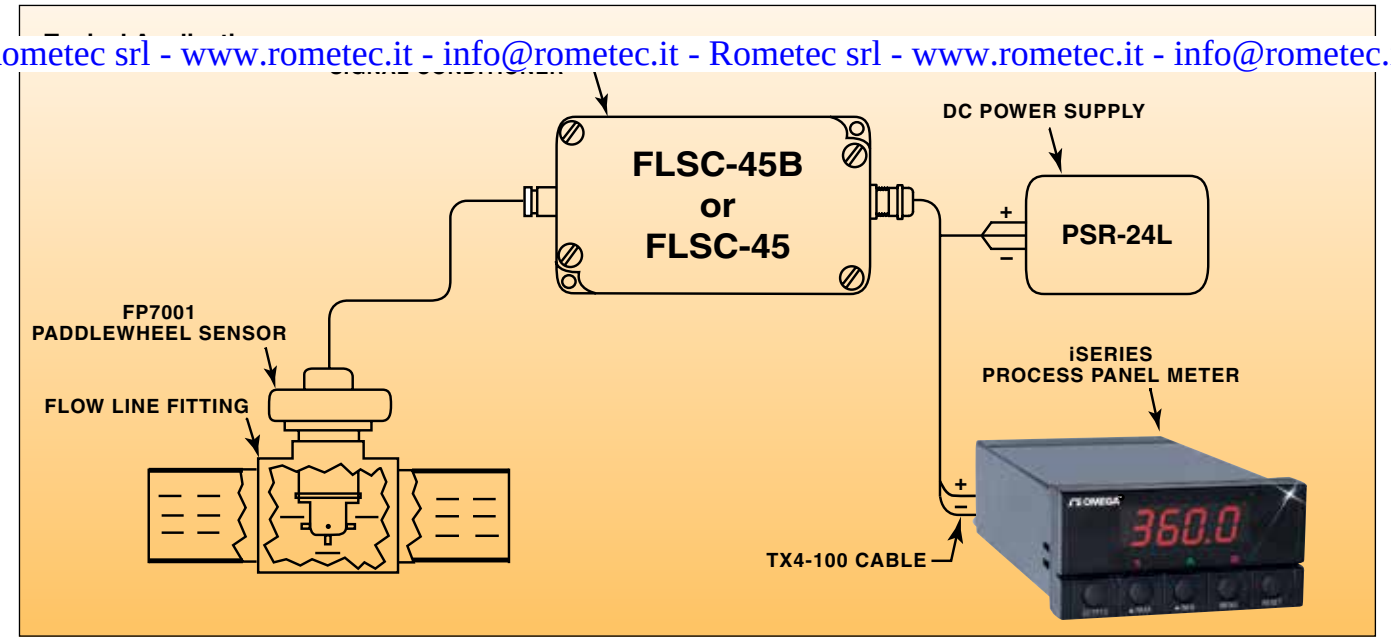

SPECIFICATIONS (FLSC-45)

Accuracy: ±0.15% FS
Repeatability: ±0.025%
Input: Sine wave 20 mV p-p min
Frequency Input Range to Achieve FS
Output: 65 to 7600 Hz
Power: 10 to 32 Vdc for 4 to 20 mA output or 15 to 32 Vdc for 1 to 5 Vdc output
Output: 3-wire (4 to 20 mA or 1 to 5 Vdc)
Response Time: 2 s fixed
Maximum Loop Resistance:
(V supply -10 V)/0.02 A = Ω
Operating Temperature: -20 to 60°C (-4 to 140°F)
Storage Temperature: -25 to 70°C (-12 to 158°F)
Enclosure: Polypropylene
Approvals: None
Dimensions: 61 H x 104 W x 25 mm D (2.4 x 4.1 x 1")
Weight: 96 g (3.3 oz)

SPECIFICATIONS (FLSC-45B)

Accuracy: ±0.15% FS
Repeatability: ±0.025%
Input: Sine wave 20 mV p-p min
Frequency Input Range to Achieve FS
Output: 65 to 7600 Hz
Power: 10 to 24 Vdc for 4 to 20 mA output or 15 to 24 Vdc for 1 to 5 Vdc output
Output: 3-wire (4 to 20 mA or 1 to 5 Vdc)
Response Time: 2 s fixed
Maximum Loop Resistance:
(V supply -10 V)/0.02 A = Ω
Operating Temperature: -20 to 60°C (-4 to 140°F)
Storage Temperature: -25 to 70°C (-12 to 158°F)
Enclosure: Die-cast, painted aluminum, NEMA 4 (IP65)
Approvals: None
Dimensions: 65 H x 116 W x 32 mm D (2.6 x 4.6 x 1.3")
Weight: 300 g (0.3 oz)

Recommended flow paddlewheel sensor, FP7001A.

To Order

Model No.	Description
FLSC-45	Signal conditioner
FLSC-45B	Signal conditioner, NEMA 4 enclosure

Recommended Paddlewheel Sensors

Model No	Description
FP7001A	Polypropylene body, 316 SS shaft for ¾ to 3" pipes
FP-5300	Polypropylene body, titanium shaft for ½ to 4" pipes
FP-5301	Polypropylene body, titanium shaft for 4 to 8" pipes

Complimentary Meters/Controllers

Model No.	Description
DPi8	Temperature/process monitor ⅛ DIN
CNi8	Temperature/process controller ⅛ DIN

Accessories

Model No.	Description
TX4-100	4-conductor shielded cable, 30 m (100')
PSR-24L	24 Vdc, 400 mA power supply

Comes complete with operator's manual.
***Ordering Example: FLSC-45B,** signal conditioner (NEMA 4), **PSR-24L,** 24 Vdc, 400 mA power supply.*

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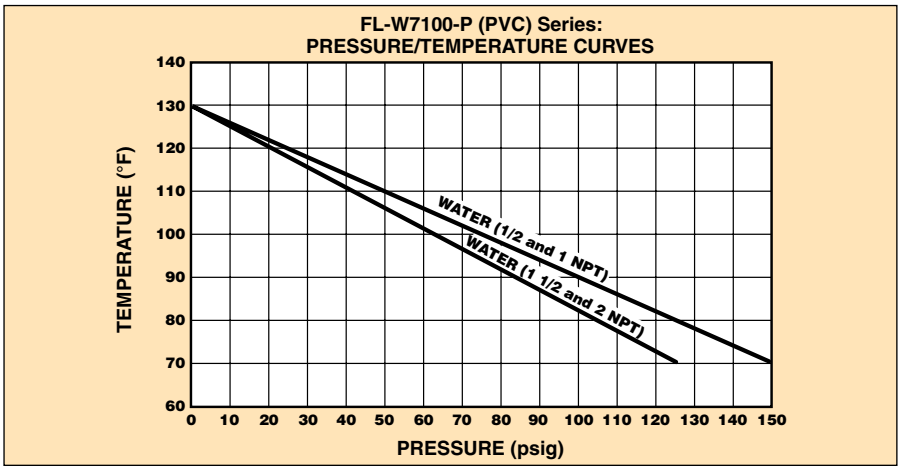
DISPLAY FLOWMETERS

FL-W7100 Series

1 YEAR WARRANTY RoHS



FL-W7114 shown smaller than actual size.

The FL-W7100 Series uses a basic variable-area flowmeter design: a float and tapered tube. As a result, these meters have longer, linear scales and good pointer stability. Both designs feature non-protruding float extensions and magnetically coupled indicators.

- ±3% FS Accuracy
- 120 mm (4.7") Scale Length
- Dual-Reading Scale
- Stainless Steel and PVC Models
- In-Line NPT Connections
- All 316 SS or PVC with Hastelloy® Internals

SPECIFICATIONS

Scale Length: 120 mm (4.7") (160° sweep) dual-reading scale, rate and %
Indicator: Powder-coated aluminum indicator housing with NEMA 4 (IP65) style, gasket-sealed acrylic cover
Range: 33.0 GPH to 152 GPM, water
Maximum Temperature
SS Model: 199°C (350°F)
PVC Model: See chart
Maximum Pressure:
SS Model: 1500 psi
PVC Model: See chart
Wetted Parts:
Body: All 316 SS or type 1, grade 1 PVC with Hastelloy C internals
O-Ring Seal: FKM
Display Dimensions: 127 mm H (5")
½ FNPT: 130 mm W (5.125")
1 FNPT: 133 mm W (5.25")
1½ FNPT: 143 mm W (5.625")
2 FNPT: 171 mm W (6.75")

To Order

Model No.	FNPT	Length mm (inch)	Maximum Flow
FL-W7106	½	279.4 (11)	33.0 GPH
FL-W7108	½	279.4 (11)	1.1 GPM
FL-W7110	½	279.4 (11)	2.0 GPM
FL-W7112	½	279.4 (11)	4.0 GPM
FL-W7114	½	279.4 (11)	6.0 GPM
FL-W7116	1	336.55 (13.25)	5.0 GPM
FL-W7118	1	336.55 (13.25)	10.0 GPM
FL-W7120	1	336.55 (13.25)	16.5 GPM
FL-W7122	1	336.55 (13.25)	25.0 GPM
FL-W7124	1½	352.425 (13.875)	35.0 GPM
FL-W7126	1½	352.425 (13.875)	60.0 GPM
FL-W7128	2	352.425 (13.875)	76.0 GPM
FL-W7130	2	352.425 (13.875)	100.0 GPM
FL-W7132	2	352.425 (13.875)	120.0 GPM
FL-W7134	2	352.425 (13.875)	152.0 GPM

Comes complete with operator's manual. NIST certificate not available.

*For PVC models, add suffix "**-P**" to model number, for additional cost. For model FL-W7106 to FL-W7114, FL-W7116 to FL-W7122, FL-W7124 to FL-W7126, FL-W7128 to FL-W7130; or FL-W7132 to FL-W7134, for additional cost.*

***Ordering Examples: FL-W7120,** 1" stainless steel flowmeter, 16.5 GPM.*
***FL-W7130,** 2" stainless steel flowmeter, 100 GPM.*

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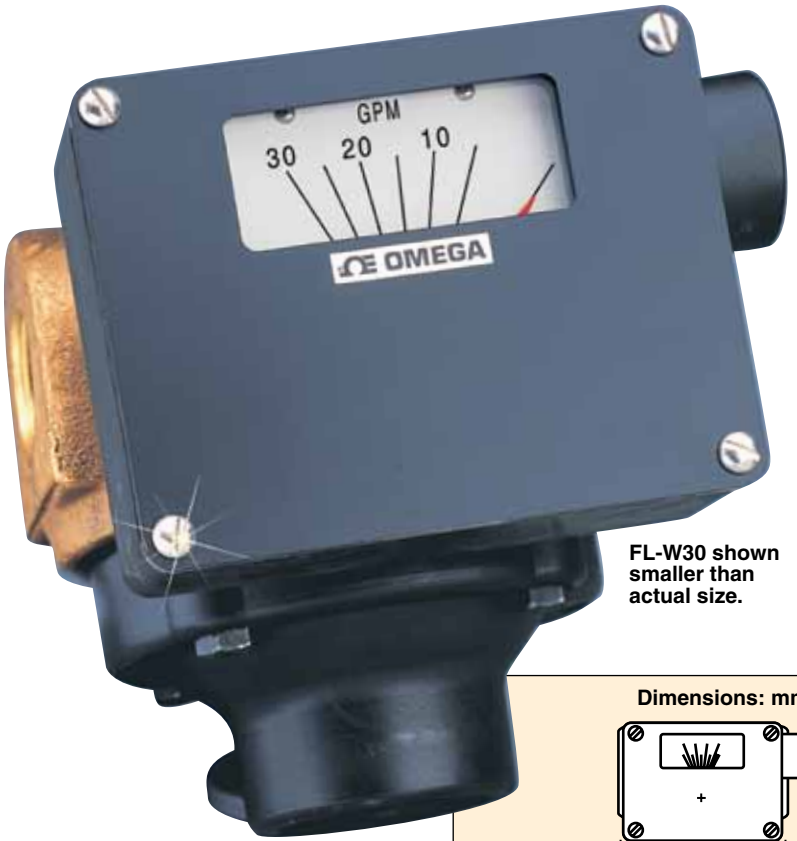
CAPACITY: 0.2 to 90 GPM of Water

FL-W Series

1 YEAR WARRANTY · CE · RoHS



FL-W30 shown smaller than actual size.

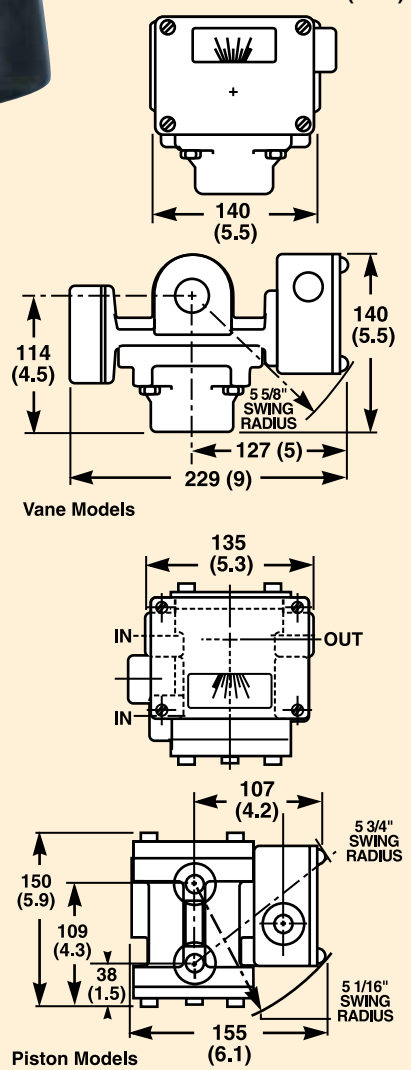
- ±5% Full Scale Accuracy
- ±1% Reading Repeatability
- Built-in Signal Switch
- Vane or Piston Construction
- Mounts in Any Position
- Brass Housing for Economy
- Non-Glass Construction
- 150 psig Pressure Rating for Piston Models
- 300 psig Pressure Rating for Vane Models
- 93°C (200°F) Temperature Rating

The FL-W Series of water flow monitors can be used with flows from 0.2 to 90 GPM. These flowmeters utilize the fluid's movement to actuate a swinging vane (or piston), which drives the scale pointer and triggers the signal switch.

SPECIFICATIONS

Signal Switch: 3-Wire SPDT, 15 A @ 125 Vac
Wetted Parts: 300 Series SS, and Polysulfone and Brass
Seals: EPR Brass (vane models) PTFE (piston models)
Pressure Drop: 2.2 psi (vane), 2 to 5 psi (piston)
Deadband: 7% of maximum flow

Dimensions: mm (inch)



To Order

Model No.	Flow Rate (GPM)	Readout Increments	FNPT Port Size	Design Type
FL-W01	0 to 1	0.2	¾	Piston
FL-W02	0 to 2	0.25	¾	Piston
FL-W05	0 to 5	1.0	¾	Piston
FL-W10	0 to 10	2.0	¾	Piston
FL-W15	0 to 15	3.0	¾	Piston
FL-W20	0 to 20	4.0	¾	Piston
FL-W30	0 to 30	5.0	1½	Vane
FL-W40	0 to 40	5.0	1½	Vane
FL-W50	0 to 50	10.0	1½	Vane
FL-W60	0 to 60	10.0	1½	Vane
FL-W70	0 to 70	10.0	2	Vane
FL-W80	10 to 80	10.0	2	Vane
FL-W90	20 to 90	10.0	2	Vane

Comes complete with operator's manual.
***Ordering Examples: FL-W60**, 1½ FNPT vane flowmeter, 0 to 60 GPM range.*
***FL-W20**, ¾ FNPT piston flowmeter, 0 to 20 GPM range.*

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GAS FLOW CONTROLLERS

For Clean Gases

FMA-LP2600A Series

1 YEAR WARRANTY · NIST · RoHS

- 130+ Gas Calibrations Including Pure and Mixed Gases
- Pressure, Temperature, and Mass Flow Simultaneously Displayed
- Easy-to-Use Pushbutton Interface
- NIST Traceability Standard
- Full Scale Ranges from 0.5 SCCM to 500 SLM
- Response Time of 50 to 100 ms Typical
- Turndown Ratio of 200:1
- Position Insensitive
- ±0.8% Reading Accuracy
- RS232 Standard
- Custom Live Gas Blend Programming
- Store Up to 20 User Defined Gas Blends

The FMA-LP2600A Series mass flow controllers use the principle of differential pressure within a laminar flow field to determine and control mass flow rate. A laminar flow element (LFE) inside the meter forces the gas into laminar (streamlined) flow. Inside this region, the Poiseuille equation dictates that the volumetric flow rate be linearly related to the pressure drop. A differential pressure sensor is used to measure the pressure drop along a fixed distance of the LFE. This, along with the viscosity of the gas, is used to accurately determine the volumetric flow rate. Separate absolute temperature and pressure sensors are incorporated and correct the volumetric flow rate to a set of standard conditions. This standardized flow rate is commonly called the mass flow rate and is reported in units such as standard cubic centimeters per minute (SCCM) or standard liters per minute (SLM).

The controller uses a true proportional valve coupled to the flow body to control flow using the integral PID loop controller. Standard units include a 0 to 5V output (4 to 20 mA optional) and RS232 communications. The gas-select feature and the setpoints can be adjusted from the front keypad or via RS232 communications. Volumetric flow, mass flow, absolute pressure, and temperature can all be viewed or recorded through the RS232 connection. It is also possible to multi-drop up to 26 units on the same serial connection to a distance of 46 m (150').

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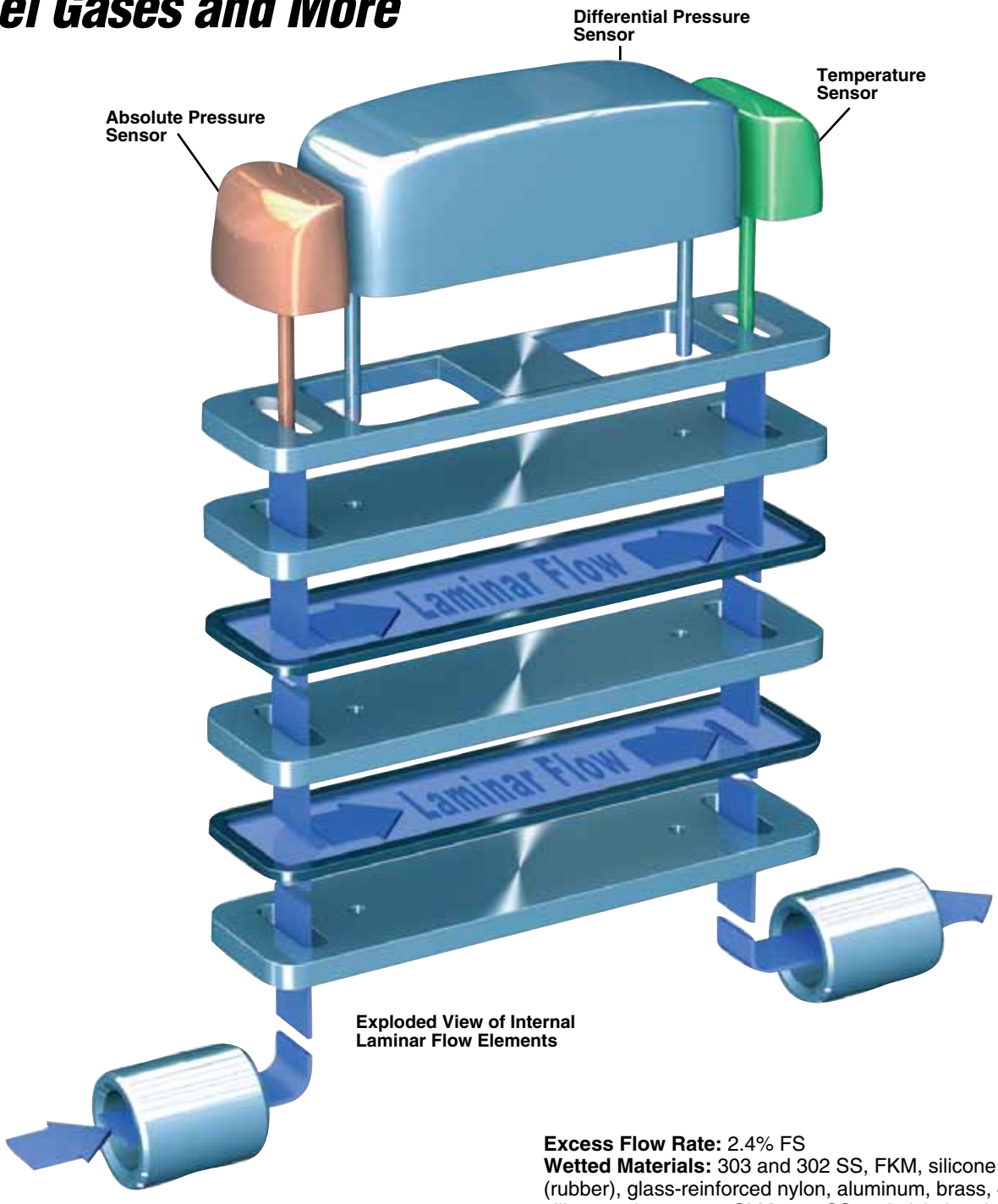
Chromatography, Welding, Lasers, Stack/Flue, Fuel Gases and More



Exploded View of Internal Laminar Flow Elements

SPECIFICATIONS

Accuracy: ±(0.8% of reading + 0.2% FS)
Repeatability: ±0.2% FS
Turndown Ratio: 200:1
Control Response Time: 100 ms
Input Control Signal: 0 to 5 Vdc, RS232
Output Signal: 0 to 5 Vdc, RS232
Optional Input/Outputs: 4 to 20 mA, 0 to 10 Vdc
Operating Temperature: -10 to 50°C (14 to 122°F)
Zero Shift: 0.02%/ATM FS/°C
Span Shift: 0.02%/ATM FS/°C
Humidity Range: 0 to 100% RH, non-condensing
Excess Flow Rate: 2.4% FS
Wetted Materials: 303 and 302 SS, FKM, silicone RTV (rubber), glass-reinforced nylon, aluminum, brass, 410 SS, silicone, glass; >250 SLM: 416 SS and nickel replace brass
Maximum Pressure: 50 psig
To Use in Volumetric Mode: Near atmosphere, 15 psig recommended maximum. Volumetric flow meters and controllers not certified for accuracy at mass flow rates above the rated flow range of the meter. They are designed for near atmospheric pressure conditions only. The recommended maximum operating pressure is 15 psig
Supply Current: 0.250 A for 20 SLM and under; 0.75 A for 50 SLM and above (typical)
Supply Voltage: 15 to 30 Vdc for units 2 SLM and smaller; 24 to 30 Vdc for units 5 SLM and larger
Electrical Connections: 8-pin circular mini DIN

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Dimensions: mm (inch)

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Flow Range	psid venting to 1 ATM	mm (inch)	mm (inch)	mm (inch)
0.5 to 2 SCCM	0.06	99 (3.9)	86 (3.4)	28 (1.1)
5 to 10 SCCM	0.08	99 (3.9)	86 (3.4)	28 (1.1)
20 SCCM	0.07	99 (3.9)	86 (3.4)	28 (1.1)
50 to 200 SCCM	0.07	104 (4.1)	91 (3.6)	28 (1.1)
500 SCCM	0.08	104 (4.1)	91 (3.6)	28 (1.1)
1 SLPM	0.1	104 (4.1)	91 (3.6)	28 (1.1)
2 SLPM	0.18	104 (4.1)	91 (3.6)	28 (1.1)
5 SLPM	0.1	140 (5.5)	196 (7.7)	58 (2.3)
10 SLPM	0.12	140 (5.5)	196 (7.7)	58 (2.3)
20 SLPM	0.26	140 (5.5)	196 (7.7)	58 (2.3)
40 SLPM	0.14	140 (5.5)	196 (7.7)	58 (2.3)
50 SLPM	0.17	140 (5.5)	185 (7.3)	58 (2.3)
100 SLPM	0.3	140 (5.5)	185 (7.3)	58 (2.3)
250 SLPM	0.69	140 (5.5)	185 (7.3)	58 (2.3)
500 SLPM	0.69	140 (5.5)	206 (8.1)	69 (2.7)

Please allow approximately 44.5 mm (1.75") on top of the unit for electrical cable connection.

To Order

Mass Flow Meter Model No.	4 to 20 mA Output Model No.	Two 4 to 20 mA Output Model No.	Two 0 to 5V Output Model No.	Connection	Maximum Flow
FMA-LP2601A	**FMA-LP2601A-I**	**FMA-LP2601A-I2**	**FMA-LP2601A-V2**	10 - 32 thread	0.5 SCCM
FMA-LP2602A	**FMA-LP2602A-I**	**FMA-LP2602A-I2**	**FMA-LP2602A-V2**	10 - 32 thread	1 SCCM
FMA-LP2614A	**FMA-LP2614A-I**	**FMA-LP2614A-I2**	**FMA-LP2614A-V2**	10 - 32 thread	2 SCCM
FMA-LP2615A	**FMA-LP2615A-I**	**FMA-LP2615A-I2**	**FMA-LP2615A-V2**	10 - 32 thread	5 SCCM
FMA-LP2603A	**FMA-LP2603A-I**	**FMA-LP2603A-I2**	**FMA-LP2603A-V2**	10 - 32 thread	10 SCCM
FMA-LP2616A	**FMA-LP2616A-I**	**FMA-LP2616A-I2**	**FMA-LP2616A-V2**	10 - 32 thread	20 SCCM
FMA-LP2604A	**FMA-LP2604A-I**	**FMA-LP2604A-I2**	**FMA-LP2604A-V2**	1/8 FNPT	50 SCCM
FMA-LP2617A	**FMA-LP2617A-I**	**FMA-LP2617A-I2**	**FMA-LP2617A-V2**	1/8 FNPT	100 SCCM
FMA-LP2618A	**FMA-LP2618A-I**	**FMA-LP2618A-I2**	**FMA-LP2618A-V2**	1/8 FNPT	200 SCCM
FMA-LP2619A	**FMA-LP2619A-I**	**FMA-LP2619A-I2**	**FMA-LP2619A-V2**	1/8 FNPT	500 SCCM
FMA-LP2620A	**FMA-LP2620A-I**	**FMA-LP2620A-I2**	**FMA-LP2620A-V2**	1/8 FNPT	1 SLM
FMA-LP2605A	**FMA-LP2605A-I**	**FMA-LP2605A-I2**	**FMA-LP2605A-V2**	1/8 FNPT	2 SLM
FMA-LP2606A	**FMA-LP2606A-I**	**FMA-LP2606A-I2**	**FMA-LP2606A-V2**	1/4 FNPT	5 SLM
FMA-LP2607A	**FMA-LP2607A-I**	**FMA-LP2607A-I2**	**FMA-LP2607A-V2**	1/4 FNPT	10 SLM
FMA-LP2608A	**FMA-LP2608A-I**	**FMA-LP2608A-I2**	**FMA-LP2608A-V2**	1/4 FNPT	20 SLM
FMA-LP2609A	**FMA-LP2609A-I**	**FMA-LP2609A-I2**	**FMA-LP2609A-V2**	3/4 FNPT	50 SLM
FMA-LP2610A	**FMA-LP2610A-I**	**FMA-LP2610A-I2**	**FMA-LP2610A-V2**	3/4 FNPT	100 SLM
FMA-LP2611A	**FMA-LP2611A-I**	**FMA-LP2611A-I2**	**FMA-LP2611A-V2**	3/4 FNPT	250 SLM
FMA-LP2612A	**FMA-LP2612A-I**	**FMA-LP2612A-I2**	**FMA-LP2612A-V2**	3/4 FNPT	500 SLM

Accessories for FMA-2600A Series

Model No.	Description
FMA1600-C1	Replacement 8-pin male mini DIN connector cable, single ended, 1.83 m (6')
FMA1600-C1-25FT	8-pin male mini DIN connector cable, single ended, 7.62 m (25')
FMA1600-C2	8-pin male mini DIN connector cable, double ended, 1.83 m (6')
FMA1600-C2-25FT	8-pin male mini DIN connector cable, double ended, 7.62 m (25')
FMA1600-C3	8-pin male mini DIN to DB9 female adaptor, 1.83 m (6')
FMA1600-CRA	8-pin male right-angle mini DIN cable, single ended, 1.83 m (6')
FMA1600-MDB	Multi-drop box
FMA1600-PSU	Universal 100 to 240 Vac to 24 Vdc power supply adaptor

Comes complete with 24 Vdc universal power supply, 1.8 m (6') cable, 8-pin male mini-DIN connector, operator's manual, and NIST certificate

Standard units are calibrated to air @ 5 psig for 0 to 1 LPM, 15 psig for 2 to 10 LPM, 30 psig for 20 to 100 LPM, and 50 psig for 200 LPM and greater.

*For custom calibrations, add **"-(*)"** to the model number, no additional cost. * Specify gas, and inlet/outlet or backpressure for custom calibrations*

Calibrations done at ambient 25°C (77°F) temperature only.

*To replace the standard RS232 communications with RS485, add suffix **"-RS485"** to the model number, for additional cost.*

*Standard input is 0 to 5 V, for optional 4 to 20 mA input add suffix **"-IN"** to the model number, no additional cost.*

*Standard output is 0 to 5 V, for optional 4 to 20 mA output, add suffix, **"-I"** to model number, for additional cost.*

*For two 4 to 20 mA output, add suffix **"-I2"** to model number, for additional cost.*

*For two 0 to 5 V output, add suffix **"V2"** to model number, for additional cost.*

***** Optional secondary output are scaled the same as the primary output scale. For an alternate output scale add suffix **"-T"** to the model number for temperature or **"-P"** for pressure, no additional cost.*

*For an integrated positive shut-off valve, add suffix **"-P"** to the model number, for additional cost. Models with the positive shut off valve have ¼" welded male VCR fittings. Available on models up to 20 SLM.*

*For units scaled in SCFH, add suffix **"-SCFH"** to model number. Please specify the desired range in SCFH, no additional cost.*

*For totalizer option, add suffix **"-TOT"** to the model number, for additional cost. Please specify resolution.*

This is a 6-digit counter. Examples: For totalizing in liters with 1/100 liter resolution, the max count would be 9999.99. For totalizing in liters with 1 liter resolution, the max count would be 999999.

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Meter and Calibration Kit

FMA-PC16 Series

5 YEAR WARRANTY | NIST | CE

Standard

- Ranges of 0 to 0.5 SCCM up to 0 to 1500 SLM
- <10 ms Response Time - Field Adjustable
- 30+ Gas Calibrations, Including Air, Ar, CH_4, CO, CO_2, Ethane, H_2, He, N_2, N_2O, Neon, O_2, Propane, Butane, Iso-Butane, Acetylene, Ethylene, Krypton, Xenon, and Sulfur Hexafluoride
- Pressure, Temperature and Volumetric and Mass Flow Simultaneously Displayed
- NIST 5-Point Certificate Included
- No Straight Runs of Pipe Required
- RS232 and USB Standard

FMA-PC16040509
shown closed.

FMA-PC16040509
shown smaller than actual size.

Omega's FMA-PC16 Series portable digital mass flow meters accurately and rapidly measure the mass flow rate, volumetric flow rate, pressure and temperature of process gases.

The FMA-PC16 couples the FMA-1600A Series meter with fittings and tubing to create a portable gas chromatography calibrator.

Omega's FMA-PC16 Series portable calibration units combine up to three FMA-1600A Series or FMA-LP1600A Series mass flow meters with totalizers and high-accuracy calibration inside a rugged industrial carrying case with its own power supply and battery. FMA-PC16 units include integrated push-connect fittings for each meter and flow software. At the heart of Omega's mass flow meters and calibrators is an internally compensated, laminar differential pressure measurement technology that yields linear results over a very wide flow range. This produces volumetric and mass flow data that is fully compensated for changes in pressure and temperature and corrected for the user's STP. All portable mass flow meters and calibrators come with NIST-traceable calibration sheets and excellent customer support, including technical phone support.

Omega's FMA-1600A Series and FMA-PC16 Series mass flow meters feature large integrated displays with touchpad accessible gas selection from 30 user-selectable gas calibrations and both analog and RS232 digital communications.

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Specifications

tare ±(0.8 % of reading + 0.2 % of full scale
High Accuracy: Calibration conditions after tare ±(0.4% of reading + 0.2% of full scale
High Accuracy: Option not available for units ranged under 5 SCCM or over 500 SLPM
Repeatability: ± 0.2% full scale
Zero Shift and Span Shift: 0.02% full scale/°Celsius/Atm
Operating Range /Turndown Ratio 0.5 to 100% Full Scale/200: 1 turndown
Maximum Measureable Flow Rate: 128% full scale
Typical Response Time: 10 ms (adjustable)
Warm-Up Time: <1 second
Mass Reference Conditions (STP): 25°C (77°F) and 14.696 psia (standard-others available on request)
Operating Temperature: -10 to 50°C (14 to 122°F)
Humidity Range: (Non-Condensing) 0 to 100%
Maximum Pressure: 145 psig [50 psig (-LP option)]
Ingress Protection: IP40
Wetted Materials: 303 and 302 stainless steel, FKM, Silicone RTV (Rubber), Glass Reinforced Nylon, Aluminum.
Note: *If your application demands a different material, please contact Omega. Do not subject FMA-LP1600A differential pressure sensor to upstream-downstream pressure differentials exceeding 15 psid.*
Programmed Gases: Acetylene, Air, Argon, Butane, Carbon Dioxide, Carbon Monoxide, Ethane, Ethylene, Helium,Hydrogen, Iso-Butane, Krypton, Methane, Neon, Nitrogen, Nitrous Oxide, Oxygen, Propane, Sulfur Hexafluoride, Xenon, A-25, A-75, A1025, C-2, C-8, C-10, C-25, C-75, P-5, Star29.
LCD Display: Monochrome with integrated touchpad simultaneously displays mass flow, volumetric flow, pressure and temperature.
Digital Output: RS232 Serial
Electrical Supply: Four “AA” batteries, 9 to 20 Vdc wall outlet adapter
Note*: The digital output signal communicates mass flow, volumetric flow, pressure and temperature.*
Weight: 5.4 to 9.1 kg (12 to 20 lb), depending on configuration
Case Dimensions: 406 L x 330 W x 178 mm D (16 x 13 x 7")
Process Connections: 1/8", 1/4", 3/8" or 1/2" push-connect style tubing fittings

Range (-LP option)	Pressure Drop at Full Scale (psid)*
Up to 2 SCCM	0.06
UP to 20 SCCM	0.07
Up to 50 SCCM	0.07
Up to 200 SCCM	0.06
Up to 500 SCCM	0.07
Up to 5 SLPM	0.07
Up to 10 SLPM	0.08
Up to 20 SLPM	0.25
Up to 40 SLPM	0.12
Up to 50 SLPM	0.14
Up to 100 SLPM	0.24
Up to 250 SLPM	0.6

**Venting to atmosphere*

Standard Full Scale Range	Pressure Drop at Full Scale (psid)*
Up to 1 SCCM	1
UP to 50 SCCM	1
Up to 20 SLPM	1
Up to 50 SLPM	2
Up to 100 SLPM	2.5
Up to 250 SLPM	2.1
Up to 500 SLPM	4
Up to 1000 SLPM	6
Up to 1500 SLPM	9

**Venting to atmosphere*

To Order

Model No.	Description	Full Scale Ranges Included in Kit		
FMA-PC16031908	Portable mass flow calibration kit	10 SCCM	500 SCCM	20 SLM
FMA-PC16040509	Portable mass flow calibration kit	50 SCCM	2 SLM	50 SLM
FMA-PC16190712	Portable mass flow calibration kit	500 SCCM	10 SLM	500 SLM

*Comes complete with 4 “AA” batteries, AC AC power adaptor, software, NIST 5-point calibration and operator’s manual. For units built with **FMA-LP1600A**, low pressure drop flow meters add “**-LP**” to the model number, for an additional charge.*
***Ordering Example: FMA-PC16040509**, portable mass flow calibration kit with one each: **FMA-1604A, FMA-1605A** and **FMA-1609A**. Additional combinations available, contact OMEGA flow engineering for details.*

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INDUSTRIAL AIR VELOCITY/ TEMPERATURE TRANSMITTER/INDICATOR

FMA1000 Series

1 YEAR WARRANTY NIST

Optional†

6 OD x 305 mm L (¼ x 12") sensor probe included with 4.5 m (15') cable

- Measures Air Velocities up to 50.8 m/sec (10,000 FPM)
- Measures Air Temperature up to 93°C (199°F)
- 1.5% Full Scale Accuracy (Velocity)
- 0.5% Full Scale Accuracy (Temperature)
- 3 Different Sensor Probe Configurations: Fixed Probe with Top or Right Angle Back Mount, or Remote Probe with 4.5 m (15') Cable
- Hot Wire Air Velocity Sensor Design
- 250 msec Response Time Programmable up to 2 Seconds
- Economical 6 OD x 305 mm L (¼ x 12") Insertion Probe Design
- Backlit LCD Displays Air Velocity and Air Temperature Simultaneously
- Air Velocity and Air Temperature can be Displayed in Different Engineering Units
- Monitors Maximum and Minimum Air Velocity and Temperature
- Dual Linear Analog Outputs for Air Velocity and Temperature
- High and Low Velocity Alarm Voltage Outputs
- USB PC Interface with Windows® Based PC Software
- NEMA 4X (IP65) Industrial Enclosure

FMA1000 units feature a large, easy to read, backlit LCD.

Shown smaller than actual size.

The FMA1000 Series industrial air velocity/ temperature transmitter/indicator measures and displays air velocity as well as air temperature in research and development labs, HVAC applications, and other manufacturing processes. The sensor design is based on three RTD elements, one measures air temperature and the other two measures air velocity by measuring the heat loss from the RTD sensor as it cools down by the air flow. The FMA1000 series offers many standard features such as display of air velocity and temperature, two analog outputs corresponding to air velocity and temperature, high and low voltage alarm outputs, PC serial interface, and Windows® based PC interface software. The FMA1000 displays the air velocity in different engineering units such as FPM, m/sec, miles/hour, and km/hour. The air temperature is displayed in °C or °F.

SPECIFICATIONS

Air Velocity Ranges: 0 to 500, 0 to 1000, 0 to 2000, 0 to 5000, 0 to 10,000 FPM
Air Temperature Range: -40 to 121°C (-40 to 250°F)
Accuracy:
Air Velocity: 1.5% full scale or 12 FPM whichever larger
Air Temperature: 0.5% full scale
Air Velocity/Temperature Probe: Stainless steel, 6 OD x 305 mm L (¼ OD x 12")
Air Velocity/Temperature Sensor: Three RTDs, 100 and 1000 Ω
Display: Backlit LCD, 32 x 51 mm (1.25 x 2")
Response Time: 250 msec up to 2 seconds
Analog Output (Air Velocity): 4 to 20 mA, 0 to 5 Vdc, or 0 to 10 Vdc
Analog Output (Air Temperature): 0 to 5 Vdc
Operating Ambient Temperature:
Sensor Probe: -40 to 93°C (-40 to 199°F)
Electronic Case: 0 to 50°C (32 to 122°F)
Alarms: High and low alarm voltage outputs, corresponding to air velocity
Power: 15 to 24 Vdc, 200 mA
Case Dimensions: 114 H x 89 W x 33 mm D (4.5 x 3.5 x 1.3")
Weight: 230 g (0.5 lb)

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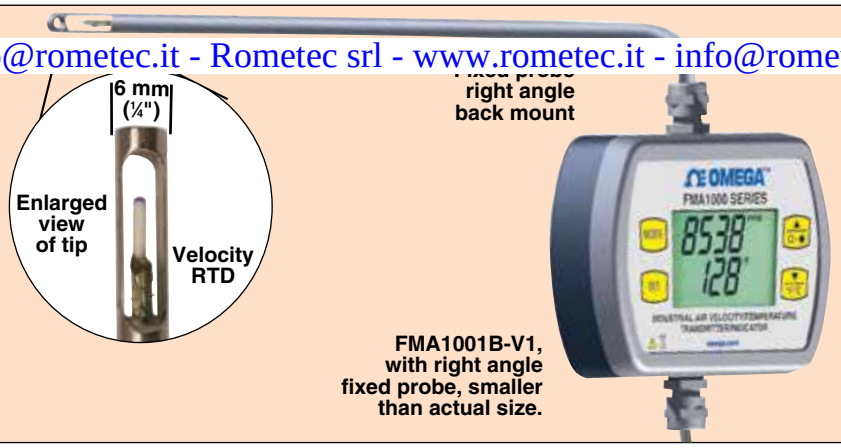
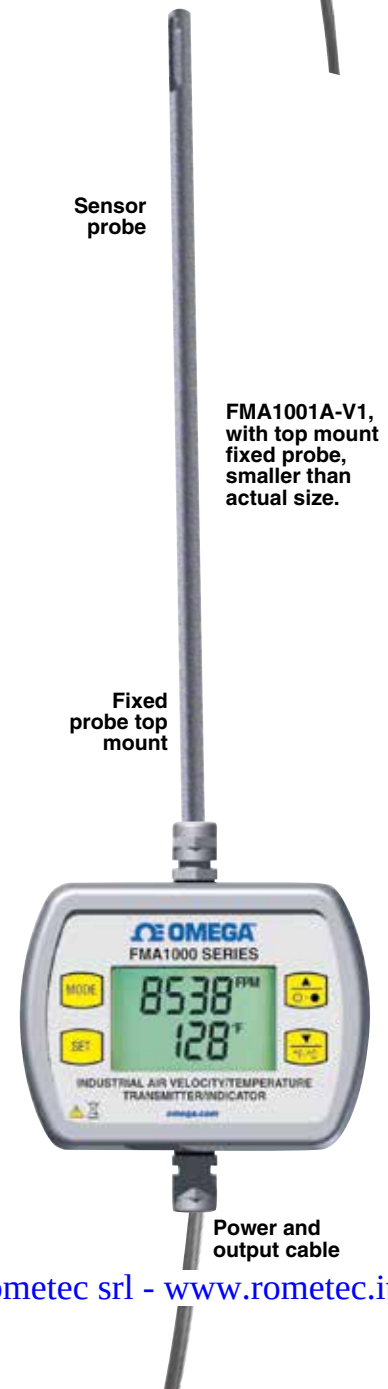
FMA1001R-V1, with remote sensor cable, smaller than actual size.

Power and output cable



FMA1001B-V1, with right angle fixed probe, smaller than actual size.

Sensor probe



FMA1001A-V1, with top mount fixed probe, smaller than actual size.

Fixed probe top mount

Power and output cable

To Order

Model No.	Range: m/sec (FPM)	Description
FMA1001A-*-**	0 to 5.08 (0 to 1000)	Air velocity/temperature transmitter, fixed probe top mount
FMA1002A-*-**	0 to 25.4 (0 to 5000)	
FMA1003A-*-**	0 to 50.8 (0 to 10,000)	
FMA1004A-*-**	0 to 2.54 (0 to 500)	
FMA1005A-*-**	0 to 10.16 (0 to 2000)	
FMA1001B-*-**	0 to 5.08 (0 to 1000)	Air velocity/temperature transmitter, fixed probe right angle back mount
FMA1002B-*-**	0 to 25.4 (0 to 5000)	
FMA1003B-*-**	0 to 50.8 (0 to 10,000)	
FMA1004B-*-**	0 to 2.54 (0 to 500)	
FMA1005B-*-**	0 to 10.16 (0 to 2000)	
FMA1001R-*-**	0 to 5.08 (0 to 1000)	Air velocity/temperature transmitter, remote probe
FMA1002R-*-**	0 to 25.4 (0 to 5000)	
FMA1003R-*-**	0 to 50.8 (0 to 10,000)	
FMA1004R-*-**	0 to 2.54 (0 to 500)	
FMA1005R-*-**	0 to 10.16 (0 to 2000)	

Accessories

Model No.	Description
CAL-3-FLOW†	NIST traceable 4-point calibration certificate
TX8-100	8 conductor shielded cable, PVC insulation, 30.5 m (100') spool
FPW-15	+15 Vdc power supply
PSR-24S	Regulated 24 Vdc @ 400 mA power supply, screw terminal
PSR-24L	Regulated 24 Vdc @ 400 mA power supply, stripped leads
SSLK-14-14	Compression fitting, ¼" tube OD, ¼ NPT
T-FER-1/4	¼" PTFE ferrules (10 pack) for use with SSLK-14-14 compression fitting

** Specify output type add suffix **"-MA"** for 4 to 20 mA, **"-V1"** for 0 to 5 Vdc, or **"-V2"** for 0 to 10 Vdc, no additional cost.*

*** For 95 mm (3.75") short probe add suffix **"-S"** to model number for additional cost.*

† Unit is NIST traceable up to 8500 FPM.

Comes complete with 305 mm (12") long sensor probe, power/output cable, Windows based PC interface software and cable, 4-point of certificate of compliance and operator's manual.

***Ordering Examples: FMA1002A-MA,** air velocity/temperature transmitter, 0 to 5000 FPM range, fixed probe top mount, 4 to 20 mA output (velocity), 0 to 5 Vdc output (temperature), and **CAL-3-FLOW**, NIST traceable 4-point calibration certificate.*

***FMA1001R-V1**, air velocity/temperature transmitter, 0 to 1000 FPM range remote probe with 4.5 m (15') cable, dual voltage outputs.*

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Gas Flow Controllers
For Clean Gases

FMA-2600A Series

1 YEAR WARRANTY | NIST | CE | RoHS

Standard

- 130+ Gas Calibrations Including Pure and Mixed Gases
- Pressure, Temperature, and Volumetric and Mass Flow Simultaneously Displayed
- Easy-to-Use Pushbutton Interface
- NIST Traceability Standard
- Full Scale Ranges from 0.5 SCCM to 3000 SLM
- Response Time of 50 to 100 ms Typical
- Turndown Ratio of 200:1
- Position Insensitive
- ±0.8% Reading Accuracy
- RS232 Standard
- Custom Live Gas Blend Programming
- Store Up to 20 User Defined Gas Blends

FMA-2601A shown smaller than actual size.

The FMA-2600A Series mass and volumetric flow controllers use the principle of differential pressure within a laminar flow field to determine and control mass flow rate. A laminar flow element (LFE) inside the meter forces the gas into laminar (streamlined) flow. Inside this region, the Poiseuille equation dictates that the volumetric flow rate be linearly related to the pressure drop. A differential pressure sensor is used to measure the pressure drop along a fixed distance of the LFE. This, along with the viscosity of the gas, is used to accurately determine the volumetric flow rate. Separate absolute temperature and pressure sensors are incorporated and correct the volumetric flow rate to a set of standard conditions. This standardized flow rate is commonly called the mass flow rate and is reported in units such as standard cubic feet per minute (SCFM) or standard liters per minute (SLM).

The controller uses a true proportional valve coupled to the flow body to control flow using the integral PID loop controller. Standard units include a 0 to 5 V output (4 to 20 mA optional) and RS232 communications. The gas-select feature and the setpoints can be adjusted from the front keypad or via RS232 communications. Volumetric flow, mass flow, absolute pressure, and temperature can all be viewed or recorded through the RS232 connection. It is also possible to multi-drop up to 26 units on the same serial connection to a distance of 46 m (150').

Specifications

Accuracy: ±(0.8% of reading + 0.2%FS)
Repeatability: ±0.2% FS
Turndown Ratio: 200:1
Control Response Time: 100 ms
Input Control Signal: 0 to 5 Vdc, RS232
Output Signal: 0 to 5 Vdc, RS232
Optional Input/Outputs: 4 to 20 mA, 0 to 10 Vdc
Operating Temperature: -10 to 50°C (14 to 122°F)
Zero Shift: 0.02%/ATM FS/°C
Span Shift: 0.02%/ATM FS/°C
Humidity Range: 0 to 100% RH, non-condensing
Excess Flow Rate: 2.4% FS
Wetted Materials: 303 and 302 SS, FKM, heat cured silicone RTV (rubber), glass-reinforced PPS, heat cured epoxy, aluminum, gold, silicone, glass; >250 SLM: 416 SS and nickel replace brass
Maximum Pressure: 145 psig
To Use in Volumetric Mode: Near atmosphere, 15 psig recommended maximum. Volumetric flow meters and controllers not certified for accuracy at mass flow rates above the rated flow range of the meter. They are designed for near atmospheric pressure conditions only. The recommended maximum operating pressure is 15 psig
Minimum Differential Pressure Required:
5 SLM and under: 5 psid; 10 to 250 SLM:
15 psid; 500 SLM: 5 psid; 1500 SLM: 10 psid
Supply Current: 0.250 A for 20 SLM and under; 0.75 A for 50 SLM and above (typical)
Supply Voltage: 12 to 30 Vdc for units 20 SLM and smaller; 24 to 30 Vdc for units 50 SLM and larger
Electrical Connections: 8-pin circular mini DIN

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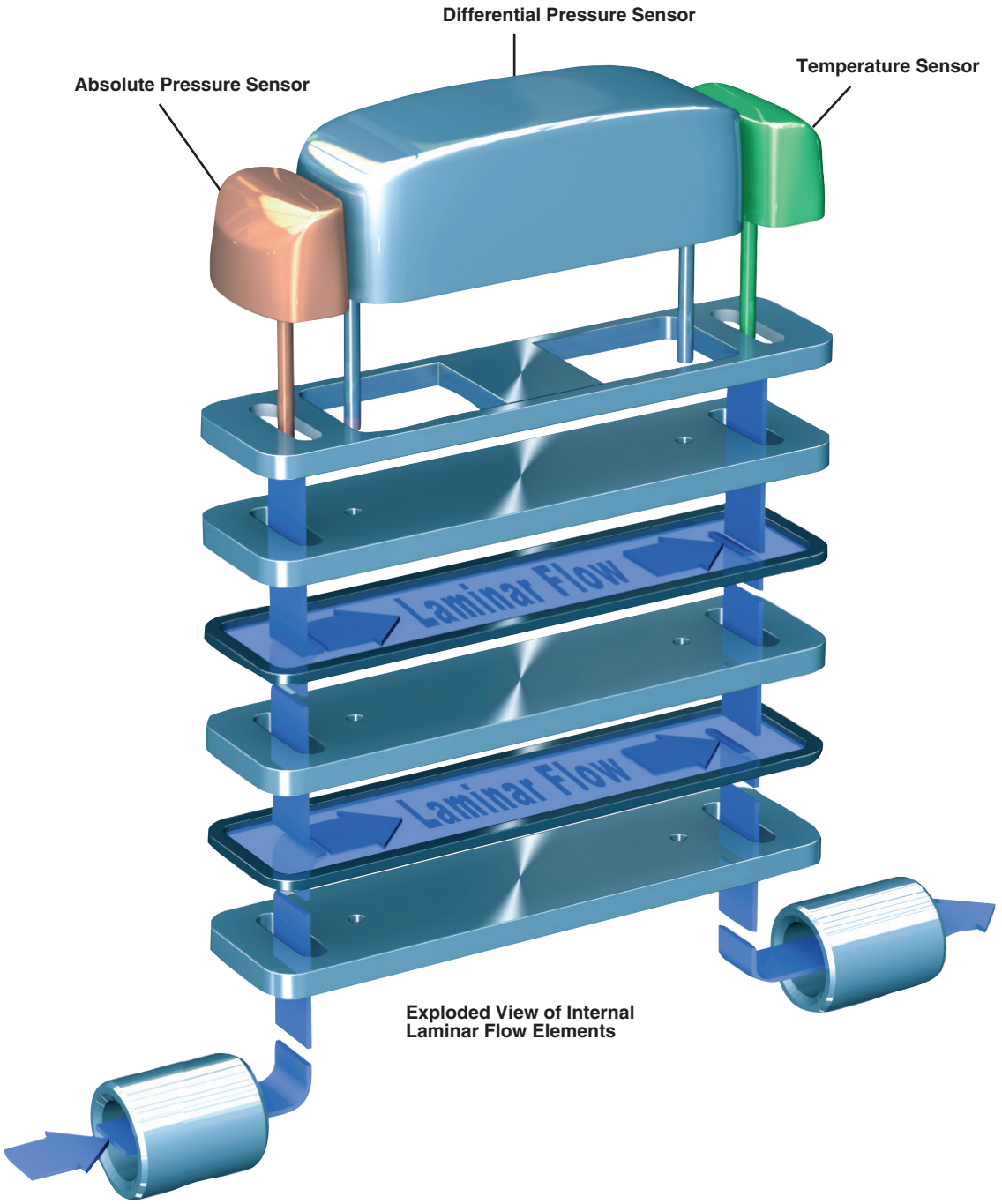
Program Custom Mixed Calibrations for Bioreactors, Chromatography, Welding, Lasers, Stack/Flue, Fuel Gases and More



Exploded View of Internal Laminar Flow Elements

Dimensions: mm (inch)

Flow Range	Height	Length	Depth
0.5 to 50 SCCM	99 (3.9)	86 (3.4)	27.9 (1.1)
100 SCCM to 20 SLM	104 (4.1)	89 (3.6)	27.9 (1.1)
50 to 100 SLM	112 (4.4)	163 (6.4)	58.4 (2.3)
250 SLM	140 (5.5)	196 (7.7)	58.4 (2.3)
500 to 1500 SLM	140 (5.5)	188 (7.4)	58.4 (2.3)

Please allow approximately 44.5 mm (1.75") on top of the unit for electrical cable connection.

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To Order

Mass Flow meter Model No.	4 to 20 mA Output Model No.	Two 4 to 20 mA Output Model No.	Two 0 to 5V Output Model No.	Connection	Maximum Flow
FMA-2601A	**FMA-2601A-I**	**FMA-2601A-I2**	**FMA-2601A-V2**	10 - 32 thread	0.5 SCCM
FMA-2602A	**FMA-2602A-I**	**FMA-2602A-I2**	**FMA-2602A-V2**	10 - 32 thread	1 SCCM
FMA-2614A	**FMA-2614A-I**	**FMA-2614A-I2**	**FMA-2614A-V2**	10 - 32 thread	2 SCCM
FMA-2615A	**FMA-2615A-I**	**FMA-2615A-I2**	**FMA-2615A-V2**	10 - 32 thread	5 SCCM
FMA-2603A	**FMA-2603A-I**	**FMA-2603A-I2**	**FMA-2603A-V2**	10 - 32 thread	10 SCCM
FMA-2616A	**FMA-2616A-I**	**FMA-2616A-I2**	**FMA-2616A-V2**	10 - 32 thread	20 SCCM
FMA-2604A	**FMA-2604A-I**	**FMA-2604A-I2**	**FMA-2604A-V2**	10 - 32 thread	50 SCCM
FMA-2617A	**FMA-2617A-I**	**FMA-2617A-I2**	**FMA-2617A-V2**	⅛ FNPT	100 SCCM
FMA-2618A	**FMA-2618A-I**	**FMA-2618A-I2**	**FMA-2618A-V2**	⅛ FNPT	200 SCCM
FMA-2619A	**FMA-2619A-I**	**FMA-2619A-I2**	**FMA-2619A-V2**	⅛ FNPT	500 SCCM
FMA-2620A	**FMA-2620A-I**	**FMA-2620A-I2**	**FMA-2620A-V2**	⅛ FNPT	1 SLM
FMA-2605A	**FMA-2605A-I**	**FMA-2605A-I2**	**FMA-2605A-V2**	⅛ FNPT	2 SLM
FMA-2606A	**FMA-2606A-I**	**FMA-2606A-I2**	**FMA-2606A-V2**	⅛ FNPT	5 SLM
FMA-2607A	**FMA-2607A-I**	**FMA-2607A-I2**	**FMA-2607A-V2**	⅛ FNPT	10 SLM
FMA-2608A	**FMA-2608A-I**	**FMA-2608A-I2**	**FMA-2608A-V2**	⅛ FNPT	20 SLM
FMA-2609A	**FMA-2609A-I**	**FMA-2609A-I2**	**FMA-2609A-V2**	¼ FNPT	50 SLM
FMA-2610A	**FMA-2610A-I**	**FMA-2610A-I2**	**FMA-2610A-V2**	¼ FNPT	100 SLM
FMA-2611A	**FMA-2611A-I**	**FMA-2611A-I2**	**FMA-2611A-V2**	½ FNPT	250 SLM
FMA-2612A	**FMA-2612A-I**	**FMA-2612A-I2**	**FMA-2612A-V2**	¾ FNPT	500 SLM
FMA-2613A	**FMA-2613A-I**	**FMA-2613A-I2**	**FMA-2613A-V2**	¾ FNPT	1000 SLM
FMA-2622A	**FMA-2622A-I**	**FMA-2622A-I2**	**FMA-2622A-V2**	¾ FNPT	2000 SLM
FMA-2623A	**FMA-2623A-I**	**FMA-2623A-I2**	**FMA-2623-V2**	1¼ FNPT	3000 SLM

Accessories for FMA-2600A Series

Model No.	Description
FMA1600-C1	Replacement 8-pin male mini DIN connector cable, single ended, 1.83 m (6')
FMA1600-C1-25FT	8-pin male mini DIN connector cable, single ended, 7.62 m (25')
FMA1600-C2	8-pin male mini DIN connector cable, double ended, 1.83 m (6')
FMA1600-C2-25FT	8-pin male mini DIN connector cable, double ended, 7.62 m (25')
FMA1600-C3	8-pin male mini DIN to DB9 female adaptor, 1.83 m (6')
FMA1600-CRA	8-pin male right-angle mini DIN cable, single ended, 1.83 m (6')
FMA1600-MDB	Multi-drop box
FMA1600-PSU	Universal 100 to 240 Vac to 24 Vdc power supply adaptor

Comes complete with 24 Vdc universal power supply, 1.8m (6') cable, 8-pin male mini-DIN connector, operator's manual, and NIST certificate
Standard units are calibrated to air @ 5 psig for 0 to 1 LPM, 15 psig for 2 to 10 LPM, 30 psig for 20 to 100 LPM, and 50 psig for 200 LPM and greater.
*For custom calibrations, add **"-(*)"** to the model number, no additional cost. * Specify gas, and inlet/outlet or backpressure for custom calibrations*
Calibrations done at ambient 25°C (77°F) temperature only.
*To replace the standard RS232 communications with RS485, add suffix **"-RS485"** to the model number, for additional cost.*
*Standard input is 0 to 5 V, for optional 4 to 20 mA input add suffix **"-IN"** to the model number, no additional cost.*
*Standard output is scaled to the mass flow rate. For volumetric flow rate as standard output add suffix **"-VOL"** to the model number, no additional cost. For **"-VOL"** controllers the control loop is set to volumetric as standard.*
*Standard output is 0 to 5 V, for optional 4 to 20 mA output, add suffix, **"-I"** to model number, for additional cost.*
*For two 4 to 20 mA output, add suffix **"-I2"** to model number, for additional cost.*
*For two 0 to 5 V output, add suffix **"V2"** to model number, for additional cost.*
***** Optional secondary output are scaled the same as the primary output scale. For an alternate output scale add suffix **"-T"** to the model number for temperature or **"-P"** for pressure, no additional cost.*
*For an integrated positive shut-off valve, add suffix **"-P"** to the model number, for additional cost. Models with the positive shut off valve have ¼" welded male VCR fittings. Available on models up to 20 SLM.*
*For units scaled in SCFH, add suffix **"-SCFH"** to model number. Please specify the desired range in SCFH, no additional cost.*
*For totalizer option, add suffix **"-TOT"** to the model number, for additional cost. Please specify resolution.*
This is a 6-digit counter. Examples: For totalizing in liters with 1/100 liter resolution, the max count would be 9999.99. For totalizing in liters with 1 liter resolution, the max count would be 999999.

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AND CONTROLLERS

For Clean Gases

FMA2800 Series

1 YEAR WARRANTY | NIST | CE | RoHS

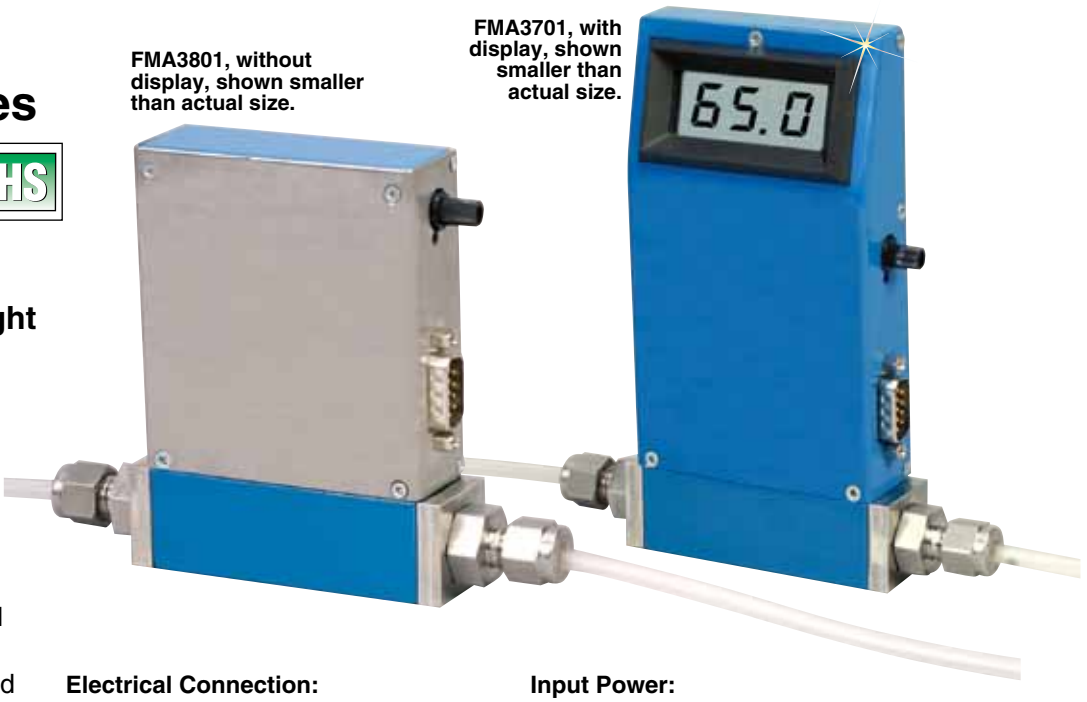
- Economical
- Compact and Lightweight
- Power Supply Included

The FMA2700/FMA2800 Series electronic mass flowmeters and FMA3700/FMA3800 mass flow controllers provide high performance and versatility. OMEGA's in-line series features a "flow-through" zero dead space design for quicker processing and lower contamination.

Available with onboard display and wall-mounted power supply, the in-line series is ideal for laboratory and test applications. Compact, lightweight, and economical, the FMA2700/FMA2800 Series electronic mass flowmeters and FMA3700/FMA3800 mass flow controllers are perfect for applications that require an all stainless steel construction.

FMA3801, without display, shown smaller than actual size.

FMA3701, with display, shown smaller than actual size.



SPECIFICATIONS

Accuracy: ±1% of full scale including linearity
Repeatability: ±0.15% full scale or better
Turndown Ratio: 100:1
Response Time: 5 seconds
Gas Ambient Temperature: 0 to 50°C (32 to 122°F)
Temperature Coefficient: 0.05% full scale per 1°C or better
Pressure Coefficient: 0.01% full scale per psi or better
Minimum Pressure Requirements:
Meters: 1 inch of H_2O
Controllers Up to 1 SLM: 1 psi
Controllers Greater Than 20 SLM: 20 psi
Differential Pressure for Mass Flow Controllers: <5 SLM, 5 to 50 psi standard; >5 SLM, 20 to 40 psi standard
Maximum Gas Pressure: 500 psig
Leak Integrity: 1 x 10^{-6} cc/min of He or better
Wetted Parts: 316 and 17-4 SS with FKM O-rings
Gas Connections: ¼" compression fitting
Electrical Connection: 9-pin sub-D connector
Control Signal: Integral or 0 to 5 Vdc
Control Valve: Electromagnetic, normally closed
Output Signal: Linear 0 to 5 Vdc, 1000 Ω min load, 4 to 20 mA, 500 Ω loop resistance
Input Power:
Meters: 24 Vdc @ 150 mA, 115 Vac, 220 Vac with AC adaptor
Controller: 24 Vdc @ 300 mA, 115 Vac, 220 Vac with AC adaptor
Dimensions: 152.4 H x 83.5 W x 25.4 mm D (6.00 x 3.29 x 1.00")
Weight: 1.57 kg (1.25 lb) with power supply

To Order

Mass Gas Flowmeters		Controller		
With Display Model No.	Without Display Model No.	With Display Model No.	Without Display Model No.	Max Flow
FMA2701	FMA2801	FMA3701	FMA3801	10 SCCM
FMA2702	FMA2802	FMA3702	FMA3802	20 SCCM
FMA2703	FMA2803	FMA3703	FMA3803	50 SCCM
FMA2704	FMA2804	FMA3704	FMA3804	100 SCCM
FMA2705	FMA2805	FMA3705	FMA3805	200 SCCM
FMA2706	FMA2806	FMA3706	FMA3806	500 SCCM
FMA2707	FMA2807	FMA3707	FMA3807	1 SLM
FMA2708	FMA2808	FMA3708	FMA3808	2 SLM
FMA2709	FMA2809	FMA3709	FMA3809	5 SLM
FMA2710	FMA2810	FMA3710	FMA3810	10 SLM
FMA2711	FMA2811	FMA3711	FMA3811	15 SLM
FMA2712	FMA2812	FMA3712	FMA3812	20 SLM

Accessories

Model No.	Description
FMA-200PWA	Replacement socket plug-in power supply for 90 to 260 Vac

Comes complete with operator's manual, 9-pin sub-D connector, power supply and 5-point NIST calibration.

*For 10-point NIST calibration certificate, add suffix **"-NIST10"** to model number for additional cost.*

***Ordering Examples: FMA2712,** 20 SLM max mass flowmeter.*
***FMA3704,** 100 SCCM max mass flow controller.*

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CONTROLLERS AND METERS

For Clean Gases

FMA3100 Series

1 YEAR WARRANTY | NIST | CE | RoHS

Optional

- For Flow Rates Up to 10 SLM
- 0 to 5 Vdc Linear Output
- Cost Effective

FMA3206 mass flow controller, shown actual size.

FMA3100 Series mass flow sensors represent a breakthrough in mass flow sensor technology. State-of-the-art electronics, a compact mechanical design, and mass production tooling concepts are combined into one high-performance, cost effective product. The gas flow sensor is suitable for many OEM applications. A 0 to 5 Vdc linear output is standard.

Using the basic FMA3100 thermal mass flow sensor, the FMA3200 mass flow controllers offer accurate, stable control of gas flows in a compact package. In power-off mode, the flow control valve is closed with a minimal leak rate. This cost-effective controller is ideal for many OEM applications, with a 0 to 5 Vdc linear output and a 0 to 5 Vdc control input.

The FMA3300s combine the features of the FMA3100 with an adjustable 3½ digit LCD digital display meter for viewing flow rate in engineering units (i.e., mL/min or L/min). These compact flowmeters have proved effective in many laboratory applications.

GENERAL SPECIFICATIONS

Output: 0 to 5 Vdc (2500 Ω minimum)
Input Setpoint Voltage (FMA3200 Only): 0 to 5 Vdc
Accuracy: ±1.5% FS*
Repeatability: ±0.5% FS
Response Time: 2 seconds (typical) to within ±2% of actual flow rate from 25 to 100% of full scale
Operating Ambient: 10 to 50°C (50 to 122°F), non-condensing atmosphere
Operating Pressure Range: To 150 psi maximum at 25°C (77°F)
Temperature Coefficient: ±0.2% per °C
Pressure Coefficient: ±0.02% per psi
Leak Integrity: $1x10^{-4}$ SCCS He maximum to outside environments
Input Power:
FMA3100 and FMA3300: 12 to 15 Vdc, 100 mA (1.5 W)
FMA3200: 12 to 15 Vdc, 250 mA (3.75 W)
Connections: ⅛" compression fittings, flow ranges up to 1 L/min; ¼" compression fitting for up to 5 L/min; ⅜" compression fitting for 10 L/min
Wetted Materials: Anodized aluminum, FKM O-rings, 304 and 316 SS, epoxy, acetal compression tube fittings standard
Turndown Ratio: 10:1
Gases: Most clean, dry gases (e.g., air, nitrogen, carbon dioxide, argon, hydrogen, helium, methane, oxygen)
Filtration: Requires 20-micron filter if gas contains any particulate matter

SPECIFICATIONS (FMA3200 Flow Controllers)

Differential Pressure: 15 to 40 psi
Valve Cycle Life: >1 million cycles; valve is normally closed
Control Range: 50:1
Remote Setpoint Voltage: 0 to 5 Vdc
Weight:
FMA3100: 199 g (0.44 lb)
FMA3300: 249 g (0.55 lb)
FMA3200: 386 g (0.85 lb)
Size Without Fittings (Approx.):
FMA3100: 47 L x 26 W x 90 mm H (1.87 x 1.03 x 3.55")
FMA3300: 47 L x 26 W x 127 mm H (1.87 x 1.03 x 5.0")
FMA3200: 81 L x 26 W x 97 mm H (3.17 x 1.03 x 3.80")

** Stated accuracy under general specifications valid for the following conditions:*

1. *Temperature between 18 and 25°C (64 and 77°F)*
2. *Warm-up time: at least 10 min*
3. *Power input voltage stable (12V ±0.1V) typical*
4. *Linearity: Add ±0.5% for ranges up to 500 SCCM, ±1.0% over 500 SCCM*
5. *Accuracy range: 10 to 100%*
6. *Line pressure of 1 to 30 psi for FMA3100 and FMA3300, and at factory-specified settings for FMA3200*
7. *Factory gas (specified) is used*

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FMA3303
flow sensor

Models shown smaller than actual size.

flow sensor

D

To Order

Flow Meters

Model No. Without Display	Model No. P With Display	Flow Rates**	Pressure Drop at Max Flow
FMA3101	**FMA3301**	0 to 20 SCCM	1" H_2O
FMA3102	**FMA3302**	0 to 50 SCCM	
FMA3103	**FMA3303**	0 to 100 SCCM	2" H_2O
FMA3104	**FMA3304**	0 to 200 SCCM	
FMA3105	**FMA3305**	0 to 500 SCCM	
FMA3106	**FMA3306**	0 to 1 SLM	3" H_2O
FMA3107	**FMA3307**	0 to 2 SLM	
FMA3108	**FMA3308**	0 to 5 SLM	
FMA3109	**FMA3309**	0 to 10 SLM	10" H_2O

Comes complete with operator's manual, and 0.6 m (24") signal/power cable (compatible only with power supplies below).
*For optional 4-point NIST calibration certificate add suffix **"-NISTAIR"** to model number for additional cost.*
***Ordering Example: FMA3307,** 0 to 2000 SCCM flow meter with display, and **FMA3115PW**, power supply/output cable.*

** Specify gas, inlet/outlet pressure and temperature.*
*** Flow ranges are based on dry air or nitrogen as a standard; other gases available (carbon dioxide, helium, argon, hydrogen, methane, oxygen) for an additional cost.*
*For optional 4-point NIST calibration certificate add suffix **"-NISTAIR"** to model number, for additional cost.*
***Ordering Example: FMA3203-(Helium, 20/0 psig, 70°F),** 0 to 100 SCCM flow controller, and **FMA3215PW**, power supply/output cable.*

Made to Order

Controller (Without a Display)		
Model No.	**Flow Rates** P**	**Pressure Drop at Max Flow**
FMA3202-(*)	0 to 50 SCCM	15 psi
FMA3203-(*)	0 to 100 SCCM	
FMA3204-(*)	0 to 500 SCCM	
FMA3205-(*)	0 to 5 SLM	
FMA3206-(*)	0 to 10 SLM	

Accessories

Flow Meters: FMA3100 and FMA3300 Series	
Model No.	**Description**
FMA3115PW	Power supply/output cable (0 to 5 Vdc), 115 Vac
FMA3230PW	Power supply/output cable (0 to 5 Vdc), 230 Vac
Controllers Only: FMA3200 Series	
FMA3215PW	Power supply/input/output cable (0 to 5 Vdc), 115 Vac
FMA3223PW	Power supply/input/output cable (0 to 5 Vdc), 230 Vac
Cable for FMA3100/3200/3300 Series	
FMA3000C	1 m (3') cable with mating connector and stripped ends for use with power supplies that have terminal connections

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FLOWMETERS AND CONTROLLERS
For Clean Gases

All units shown smaller than actual size.

FMA3309ST

FMA3409ST

FMA3204ST

FMA3103ST

FMA3100ST Series

1 YEAR WARRANTY · NIST · CE · RoHS

Optional

- **Stainless Steel Construction**
- **FMA3400ST Series can be Ordered to Work with Up to 3 Gases**

The FMA3100/3300ST Series will precisely measure flow rates of virtually any clean, dry gas as low as 0.4 to 20 SCCM or as high as 10 to 500 SLM, including hydrogen. Repeatable results are achieved by using a thermal mass flow sensor design. This proven design minimizes zero drift while maintaining fast response and linear outputs. Compression tube fittings provide fast gas connections and integrate well with existing tubing.

The FMA3200/3400ST Series flow controllers will precisely measure and control flow rates of virtually any clean, dry gas as low as 0.4 to 20 SCCM or as high as 0.2 to 10 SLM. The FMA3200/3400ST Series feature an integrated 3-digit display for flow-rate monitoring right on the unit. Electrical connections are made via the included 1 m (3') cable. Either a mating cable (FMA3000C) or power adaptor is required. See accessories below. The units are available with or without a display for a wide range of applications.

SPECIFICATIONS

Accuracy/Linearity: ±1.5% FS (10 to 100% of rated flow); ±3% FS (20 to 100% of rated flow) for second and third gas selection on FMA3400ST

Repeatability: ±0.25% FS

Power Requirements:

FMA3100ST: 12 to 15 Vdc @100 mA
FMA3300ST: 12 to 15 Vdc @150 mA
FMA3200ST: 12 to 15 Vdc @ 230 mA
FMA3400ST: 12 to 15 Vdc @ 250 mA

Pressure Rating: Overpressure limit is 10.2 bar (150 psig)

Operating Temperature: 0 to 55°C (32 to 131°F), non-condensing

Storage Temperature: 0 to 70°C (32 to 158°F)

Temperature Sensitivity: ±0.15% FS or less per °C

Wetted Materials: Stainless steel (303, 304, 316) and FKM O-rings

Recommended Filtration: 10 microns

Turndown Ratio: 50:1

Compatible Gases: Most clean, dry gases that are compatible with the wetted materials

Outputs: Analog voltage output 0 to 5 Vdc; voltage level is proportional to flow rate (zero Vdc at zero flow); load connected to output should not be less than 2500 Ω

Setpoint Input:

FMA3200ST: Analog voltage input, 0 to 5 Vdc; voltage level is proportional to flow rate (zero Vdc at zero flow); input load approx 2 MΩ

FMA3400ST: User-selectable internalor external

External: Analog voltage input, 0 to 5 Vdc; voltage level is proportional to flow rate (zero Vdc at zero flow); input load approx 2 MΩ

Internal: Front-panel adjustable with 2 trim pots, 1 coarse and 1 fine adjustment

Flow Connections: Stainless steel fittings

Electrical Connections: Integrated, 1 m (3'), 6-conductor cable, terminated with 6-pin male mini DIN connector (PS/2 style)

Dimensions:

FMA3100ST: 47.4 L x 26.2 W x 90.2 mm H (1.87 x 1.03 x 3.55")
FMA3300ST: 47.4 L x 26.2 W x 127.0 mm H (1.87 x 1.03 x 5.0")
FMA3200ST: 80.5 L x 26.2 W x 96.5 mm H (3.17 x 1.03 x 3.80")
FMA3400ST: 80.5 L x 26.2 W x 133.6 mm H (3.17 x 1.03 x 5.26")

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DPi8 ⅛ DIN temperature, process, and strain meters and PID controller, shown smaller than actual size.

To Order

Stainless Steel Mass Flowmeters

Model No. (No Display)	Model No. (Display)	Maximum Flow 50:1 Turndown	Maximum Pressure Drop	Tube Fitting
FMA3101ST	**FMA3301ST**	20 SCCM	1" H_2O	⅛"
FMA3102ST	**FMA3302ST**	50 SCCM	1" H_2O	⅛"
FMA3103ST	**FMA3303ST**	100 SCCM	2" H_2O	⅛"
FMA3104ST	**FMA3304ST**	200 SCCM	2" H_2O	⅛"
FMA3105ST	**FMA3305ST**	500 SCCM	2" H_2O	⅛"
FMA3106ST	**FMA3306ST**	1 SLM	3" H_2O	⅛"
FMA3107ST	**FMA3307ST**	2 SLM	3" H_2O	¼"
FMA3108ST	**FMA3308ST**	5 SLM	3" H_2O	¼"
FMA3109ST	**FMA3309ST**	10 SLM	5" H_2O	⅜"
FMA3110ST	**FMA3310ST**	20 SLM	6" H_2O	⅜"
FMA3111ST	**FMA3311ST**	50 SLM	6" H_2O	½"
FMA3112ST	**FMA3312ST**	100 SLM	6" H_2O	½"

Stainless Steel Controllers

Model No. (No Display)	Model No. (Display)	Max Flow 50:1 Turndown	Desired Differential Pressure (psi)	Tube Fitting
FMA3202ST	**FMA3402ST**	50 SCCM	15 to 40	⅛"
FMA3203ST	**FMA3403ST**	100 SCCM	15 to 40	⅛"
FMA3204ST	**FMA3404ST**	200 SCCM	15 to 40	⅛"
FMA3205ST	**FMA3405ST**	500 SCCM	15 to 40	⅛"
FMA3206ST	**FMA3406ST**	1000 SCCM	15 to 40	⅛"
FMA3207ST	**FMA3407ST**	2 SLM	15 to 40	¼"
FMA3208ST	**FMA3408ST**	5 SLM	15 to 45	¼"
FMA3209ST	**FMA3409ST**	10 SLM	15 to 45	⅜"

Accessories

Model No.	Model No.	Description
Flowmeters: FMA3100ST and FMA3300ST		
FMA3115PW (115 Vac)	**FMA3230PW (230 Vac)**	Power supply/output 0 to 5 Vdc
Controllers Only: FMA3200ST and FMA3400ST		
FMA3215PW	**FMA3223PW**	Power supply/input/output cable (0 to 5 Vdc)
Cable for All Units		
FMA3000C*	—	1 m (3') cable with mating connector and stripped ends

***** *For use with power supplies that have terminal connections.*

*For a NIST calibration certificate add suffix, **"-NISTAIR"** to model number, for additional cost.*

All units are calibrated for air at 20/0 psig unless specified

All calibrations are done at ambient temperature only (20°C/70°F)

Flow ranges are based on dry air or nitrogen as standard.

Other gasses available (carbon dioxide, helium, argon, hydrogen, methane, oxygen) for ranges up to 10 SLM, and ranges 20 to 100 SLM, for additional cost.

*To order FMA-3400ST Series up to 3 different gasses, additional cost per gas and specify FMA34**ST-1st Gas-2nd Gas-3rd Gas-in/out pressure*

****** *Specify flow controller; **Example: FMA3408ST-N2-H2-O2,** 20/0.*

Comes complete with operator's manual and 1 m (3') signal/power cable. Order power supply with mating connector separately.

***Ordering Examples: FMA3409ST,** 10 SLM mass flow controller with display, **FMA3215PW,** 115 Vac power supply.*

***FMA3103ST-N2-NIST,** 100 SCCM mass flowmeter NIST calibrated for Nitrogen and **FMA3215PW,** 115 Vac power supply.*

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FLOWMETERS AND TOTALIZERS

For Clean Gases

FMA-4100/4300 Series

1 YEAR WARRANTY · NIST · CE · RoHS

FMA-4303, shown smaller than actual size.

- **23 Selectable Engineering Units (Including User Defined)**
- **Programmable Totalizer**
- **High and Low Gas Flow Alarms**
- **Two Sets Programmable SPDT Relays with Latching Feature**
- **Selectable Analog 0 to 5 Vdc or 4 to 20 mA Outputs**
- **Internal Conversion Factors for Up to 32 Gases**
- **Digital Interface RS232 Standard**
- **Automatic Sensor Zero Offset Adjustment (Via Digital Interface or Local Push Button)**
- **Self-Diagnostic Tests**
- **Display Units Include Adjustable Back Lighting**

The FMA-4100/4300 Series flow rate can be displayed in 23 different volumetric flow or mass flow engineering units including a user specific selection. Flowmeters can be programmed remotely via RS232 or RS485 (optional). FMA-4100/4300 flowmeters support various functions including, programmable flow totalizer, high and low flow alarm, automatic zero adjustment, 2 relay outputs, jumper selectable 0 to 5 Vdc or 4 to 20 mA analog outputs, status LED diagnostic, storage of up to 10 different gas calibrations, internal or user-specific K-factors. Display models have local 2 lines x 16 characters LCD display with adjustable back light provides flow, total and diagnostic reading simultaneously. The digital RS232 or RS485 (optional) interface provides access to applicable internal data including, flow, CPU temperature, auto zero, totalizer and alarms settings, gas table, conversion factors and engineering units selection, dynamic response compensation and linearization table adjustment. The analog interface provides 0 to 5 Vdc or 4 to 20 mA (jumper selectable) outputs for flow reading.

The FMA-4100/4300 supports automatic sensor zero offset adjustment which can be activated locally via the maintenance push button or remotely via digital interface. The auto zero feature necessitates a condition of absolutely no flow through the meter during the adjustment process. Provisions are made to either start, read, or save the current auto zero value via digital commands. Digital totalizer commands include: set to zero, start at a preset flow, assign action to a preset value, start/stop totalizing and read. High and Low gas flow alarm limits can also be preprogrammed via digital interface. Alarm action can be assigned with preset delay interval (0 to 3600 seconds) to activate the contact closer (separate for high and low alarm). Latch mode control feature allows each relay to be latched on or follow the corresponding alarm status.

SPECIFICATIONS

Calibrations: Performed at standard conditions [101.4 kPa (14.7 psia) and 21.1°C (70°F)] unless otherwise requested or stated
Environmental (PER IEC 664): Installation Level II; Pollution Degree II
Flow Accuracy (Including Linearity): ±1% of FS at calibration temperature and pressure
Repeatability: ±0.15% of full scale
Flow Temperature Coefficient: 0.15% of full scale/°C or better

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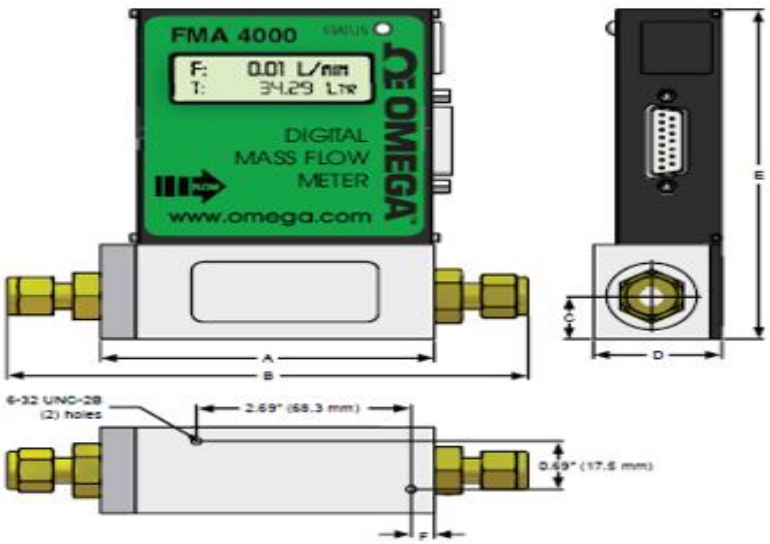
Flow Pressure Coefficient: 0.01% of
Turndown Ratio: 50:1
Flow Response Time: 600 ms time constant; approximately 2 seconds to within ±2% of set flow rate for 25 to 100% of full scale flow
Maximum Gas Pressure: 3447 kPa gauge (500 psig)
Maximum Pressure Drop:
Maximum Flow ≤10 SLM: 1.28 kPa (0.18 psi)
Maximum Flow >10 SLM: 27.58 kPa (4 psi)
Gas and Ambient Temperature: 5 to 50°C (41 to 122°F)
Relative Gas Humidity: Up to 70%
Leak Integrity: 1 x 10^{-9} SCCS He max to the outside environment
Attitude Sensitivity: Deviation of up to 1% from stated accuracy, after re-zeroing

Output Signals: Linear 0 to 5 Vdc (2000 Ω min load impedance), 4 to 20 mA (600 Ω max loop resistance). Max noise 20 mV peak to peak (for 0 to 5 Vdc output)
Relay: SPDT (30 Vdc, 1A)
Transducer Input Power: 11 to 26 Vdc, 100 mV max peak to peak output noise
Power Consumption: +12 Vdc (200 mA max); +24 Vdc (100 mA max); Circuit board has built-in polarity reversal protection, 300 mA resettable fuse provide power input protection
Wetted Materials:
Standard Aluminum Models: Anodized aluminum, brass, 316 stainless steel, FKM O-rings
Optional Stainless Steel Models: 316 stainless steel, FKM O-rings
Optional O-ring Materials: Buna, EPR (Ethylene Propylene), or perfluoroelastomer

Inlet and Outlet Connections:
Model FMA-4100/4300: Standard for units 60 SLM and larger 9.53 mm (⅜")
Optional: 3.18 or 9.53 mm (⅛ or ⅜") compression fittings
Display (FMA-4300 Models): Local 2 lines x 16 characters LCD with adjustable backlight (2-lines of text)
Calibration Options: Standard is one 10-points NIST traceable calibration. Optional, up to 9 additional calibrations may be ordered at additional charge. Contact OMEGA for additional information
CE Compliance: EMC compliance with 89/336/EEC as amended
Emission Standard: EN 55011:1991, Group 1
Class A Immunity Standard: EN 55082-1:1992



DIMENSIONS for FMA 4000 [INCH]							
MODEL RANGES	CONNECTION Compression Fitting (tube OD)	LCD AND NO LCD VERSIONS					
		A	B	C	D	E	F
5 mL-10 LPM	1/4"	3.09	5.11	0.50	1.13	4.99	0.16
20-50 LPM	1/4"	4.13	6.14	0.63	1.25	5.36	0.36
60-100 LPM	3/8"	4.13	6.25	0.63	1.25	5.36	0.36

DIMENSIONS for FMA 4000 [MM]							
MODEL RANGES	CONNECTION Compression Fitting (tube OD)	LCD AND NO LCD VERSIONS					
		A	B	C	D	E	F
5 mL-10 LPM	1/4"	78.6	129.7	12.7	28.6	126.6	4.0
20-50 LPM	1/4"	104.8	156.0	15.9	31.8	142.4	9.2

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To Order

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Model No.	Body	Integral Display	Inlet and Outlet Compression Fittings mm (inch)	Range
FMA-4102	Aluminum	-	6.35 (¼)	0 to 5 SCCM
FMA-4103	Aluminum	-	6.35 (¼)	0 to 10 SCCM
FMA-4104	Aluminum	-	6.35 (¼)	0 to 20 SCCM
FMA-4105	Aluminum	-	6.35 (¼)	0 to 50 SCCM
FMA-4106	Aluminum	-	6.35 (¼)	0 to 100 SCCM
FMA-4107	Aluminum	-	6.35 (¼)	0 to 200 SCCM
FMA-4108	Aluminum	-	6.35 (¼)	0 to 500 SCCM
FMA-4109	Aluminum	-	6.35 (¼)	0 to 1 SLM
FMA-4110	Aluminum	-	6.35 (¼)	0 to 2 SLM
FMA-4111	Aluminum	-	6.35 (¼)	0 to 5 SLM
FMA-4112	Aluminum	-	6.35 (¼)	0 to 10 SLM
FMA-4113	Aluminum	-	6.35 (¼)	0 to 20 SLM
FMA-4114	Aluminum	-	6.35 (¼)	0 to 30 SLM
FMA-4115	Aluminum	-	6.35 (¼)	0 to 40 SLM
FMA-4116	Aluminum	-	6.35 (¼)	0 to 50 SLM
FMA-4117	Aluminum	-	9.53 (⅜)	0 to 60 SLM
FMA-4118	Aluminum	-	9.53 (⅜)	0 to 80 SLM
FMA-4119	Aluminum	-	9.53 (⅜)	0 to 100 SLM
FMA-4302	Aluminum	Y	6.35 (¼)	0 to 5 SCCM
FMA-4303	Aluminum	Y	6.35 (¼)	0 to 10 SCCM
FMA-4304	Aluminum	Y	6.35 (¼)	0 to 20 SCCM
FMA-4305	Aluminum	Y	6.35 (¼)	0 to 50 SCCM
FMA-4306	Aluminum	Y	6.35 (¼)	0 to 100 SCCM
FMA-4307	Aluminum	Y	6.35 (¼)	0 to 200 SCCM
FMA-4308	Aluminum	Y	6.35 (¼)	0 to 500 SCCM
FMA-4309	Aluminum	Y	6.35 (¼)	0 to 1 SLM
FMA-4310	Aluminum	Y	6.35 (¼)	0 to 2 SLM
FMA-4311	Aluminum	Y	6.35 (¼)	0 to 5 SLM
FMA-4312	Aluminum	Y	6.35 (¼)	0 to 10 SLM
FMA-4313	Aluminum	Y	6.35 (¼)	0 to 20 SLM
FMA-4314	Aluminum	Y	6.35 (¼)	0 to 30 SLM
FMA-4315	Aluminum	Y	6.35 (¼)	0 to 40 SLM
FMA-4316	Aluminum	Y	6.35 (¼)	0 to 50 SLM
FMA-4317	Aluminum	Y	9.53 (⅜)	0 to 60 SLM
FMA-4318	Aluminum	Y	9.53 (⅜)	0 to 80 SLM
FMA-4319	Aluminum	Y	9.53 (⅜)	0 to 100 SLM

Accessories

Model No.	Description
FMA-4000PS-NA	Power supply 110 Vac, N American plug
FMA-4000PS-EU	Power supply 230 Vac, European plug
FMA-4000PS-UK	Power supply 240 Vac, U.K. plug
FMA-4000PS-AU	Power supply 240 Vac, Australian plug
FMA-4000PS-NA-A	Power supply 110 Vac, N American plug with analog wires
FMA-4000PS-EU-A	Power supply 230 Vac, European plug with analog wires
FMA-4000PS-UK-A	Power supply 240 Vac, U.K. plug with analog wires
FMA-4000PS-AU-A	Power supply 240 Vac, Australian plug with analog wires
FMA-4000C	15-pin D pre-wired 1.8 m (6') to PC, 0.9 m (3') to power supply

Comes complete with software CD (operator's manual included on CD), 15-pin D pre-wired 1.8 m (6') cable, and NIST certificate.
Power supplies sold separately. Power supplies also include cable.
*For models with stainless steel body, add suffix, **"-ST"** to model number, consult Flow Engineering for price.*
*To replace the RS232 communications with RS485, add suffix **"-RS485"** to model number, no additional cost.*
*For units with ⅛" compression fittings, add suffix **"-1/8"** to model number, no additional cost.*
*For units with ⅜" compression fittings, add suffix **"-3/8"** to model number, no additional cost.*
***Ordering Examples: FMA-4308,** aluminum flowmeter with display, 0 to 500 SCCM and **FMA-400PS-NA,** 110 vac plug-in power supply.*
***FMA-4102,** aluminum flowmeter without display, 0 to 5 SCCM.*

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FLOW CONTROLLERS

For Clean Gases With Optional Integral Display

FMA5400A Series

1 YEAR WARRANTY · CE · NIST · RoHS

Standard

FMA5512A, shown smaller than actual size.

FMA5402A-ST mass flow controller without display, 316 SS body, shown smaller than actual size.

- **NIST-Traceable Calibration**
- **Reads and Controls Gas Mass Flow Without Temperature or Pressure Compensation**
- **Available in Economical Aluminum or Corrosion-Resistant 316 SS**
- **Tiltable LCD for Easy Reading**

The FMA5400A/5500A Series electronic gas mass flow controllers can control the flow of a wide variety of gases from 10 SCCM up to 100 SLM. Utilizing heat transfer through a heated tube, the FMA5400A/5500A measures gas mass flow rate directly, without needing to compensate for variations in gas temperature or pressure (within stated limits). They are available in an economical aluminum/brass construction for typical gas flows and a 316 SS construction for applications that require more corrosion resistance. The FMA5400A Series without integral display is supplied with both an analog 0 to 5 Vdc and 4 to 20 mA output for remote monitoring; the FMA5500A Series features an integral 3½ digit display and an analog output. The display is tiltable over 90 degrees for viewing convenience and is calibrated to read out directly in SCCM or SLM for nitrogen (other gas calibrations available by special order).

The FMA5400A/5500A mass flow controllers feature a built-in electromagnetic valve for maintaining a constant flow rate regardless of variations in inlet or outlet pressures. The setpoint is controlled either locally via a potentiometer accessible through a window in the case or remotely via an analog 0 to 5 Vdc or 4 to 20 mA signal (field selectable).

The FMA5400A/5500A Series controllers require 12 to 26 Vdc power @ 800 mA maximum, which can be supplied by the FMA545PW wall plug-in socket power supply. The electronics are reverse-polarity protected and have a resettable fuse. Model number FMA545C (supplied separately) provides a mating 15-pin "D" connector with 2.4 m (8') of shielded cable for accessing the analog output signals and power input connections. The LCD for the FMA5500A Series is connected to the lower electronics via a modular plug. The LCD can be remotely located by purchasing an FMA18RC remote cable assembly–you must then build your own assembly for panel mounting the LCD.

SPECIFICATIONS

Accuracy: For units with full range less than 100 SLM ±1% FS, including linearity over 15 to 25°C (59 to 77°F) and 0.7 to 4.2 kg/cm² (10 to 60 psia). For units ≥ 100 SLM Full Range: ±1.5% FS, including linearity over 15 to 25°C (59 to 77°F) and 0.7 to 4.2 kg/cm² (10 to 60 psia) from 20 to 100% of range; ±3% FS from 0 to 20% of range.
Repeatability: ±0.5% of full scale
Temperature Coefficient: 0.15% FS/°C
Pressure Coefficient: 0.01% FS per psi (0.07 bar)
Maximum Pressure Drop: 50 psid

Response Time: 5 seconds to within ±2% of set flow rate over 25 to 100% FS
Maximum Gas Pressure: 35 kg/cm² gage (500 psig); 70 kg/cm² gage (1000 psig) for ranges up to 100 SLPM. 1.76 kg/cm (25 psig) optimum
Gas and Ambient Temperature: 5 to 50°C (41 to 122°F)
Leak Integrity: 1 x 10^{-7} cc/sec of helium max to outside environment
Materials in Fluid Contact:
Aluminum Models: Anodized aluminum, 316 SS, brass and FKM O-rings
Stainless Steel Models: 316 SS and FKM O-rings
Output Signal:
Linear 0 to 5 Vdc: 1000 Ω minimum load
4 to 20 mA: 50 to 500 Ω loop resistance, ±20 mV max noise
Transducer Power: 12 to 15 Vdc power @ 800 mA maximum (sizes 43, 44 and 45 ONLY)
Turndown Ratio: 40:1
Shipping Weight: 1.8 kg (4 lb)
Compliance: EN55011 class 1, class B; EN50082-1

SLM	psid
Up to 9	1.1
10 to 30	3.9
50	8
60 to 100	18.9

Altitude Sensitivity: With horizontal flow path, no shift in calibration up to +20 degree pitch
Gas Relative Humidity: 0 to 70% RH

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See instruction manual for dimensions

To Order				
Model No. Aluminum/Brass Body with Display	**Model No. Stainless Steel Body with Display**	**Model No. Aluminum/Brass Body without Display**	**Model No. Stainless Steel Body without Display**	**Maximum Flow Rate**
FMA5502A	**FMA5502A-ST**	**FMA5402A**	**FMA5402A-ST**	10 SCCM
FMA5504A	**FMA5504A-ST**	**FMA5404A**	**FMA5404A-ST**	20 SCCM
FMA5506A	**FMA5506A-ST**	**FMA5406A**	**FMA5406A-ST**	50 SCCM
FMA5508A	**FMA5508A-ST**	**FMA5408A**	**FMA5408A-ST**	100 SCCM
FMA5510A	**FMA5510A-ST**	**FMA5410A**	**FMA5410A-ST**	200 SCCM
FMA5512A	**FMA5512A-ST**	**FMA5412A**	**FMA5412A-ST**	500 SCCM
FMA5514A	**FMA5514A-ST**	**FMA5414A**	**FMA5414A-ST**	1 SLM
FMA5516A	**FMA5516A-ST**	**FMA5416A**	**FMA5416A-ST**	2 SLM
FMA5518A	**FMA5518A-ST**	**FMA5418A**	**FMA5418A-ST**	5 SLM
FMA5520A	**FMA5520A-ST**	**FMA5420A**	**FMA5420A-ST**	10 SLM
FMA5523A	**FMA5523A-ST**	**FMA5423A**	**FMA5423A-ST**	15 SLM
FMA5524A	**FMA5524A-ST**	**FMA5424A**	**FMA5424A-ST**	20 SLM
FMA5526A	**FMA5526A-ST**	**FMA5426A**	**FMA5426A-ST**	30 SLM
FMA5527A	**FMA5527A-ST**	**FMA5427A**	**FMA5427A-ST**	40 SLM
FMA5528A	**FMA5528A-ST**	**FMA5428A**	**FMA5428A-ST**	50 SLM
FMA5540A	**FMA5540A-ST**	**FMA5440A**	**FMA5440A-ST**	60 SLM
FMA5541A	**FMA5541A-ST**	**FMA5441A**	**FMA5441A-ST**	80 SLM
FMA5542A	**FMA5542A-ST**	**FMA5442A**	**FMA5442A-ST**	100 SLM
FMA5543	**FMA5543-ST**	**FMA5443**	**FMA5443-ST**	200 SLM
FMA5544	**FMA5544-ST**	**FMA5444**	**FMA5444-ST**	500 SLM
FMA5545	**FMA5545-ST**	**FMA5445**	**FMA5445-ST**	1000 SLM

Accessories

Model No.	Description
FMA545C	Female 15-pin D-connector, 2.4 m (8') of shielded cable
FMA545PW	Socket plug-in power supply for 100 to 240 Vac
FMA545PW-220VAC	Socket plug-in power supply for 220 Vac, European plug type
FMA18RC10	3.0 m (10') cable for remote LCD mounting
FMA18RC25	7.6 m (25') cable for remote LCD mounting

** Comes with ¼ FNPT connections instead of compression fittings.*

Comes complete with compression fittings, NIST certificate and operator's manual. Power supplies sold separately.

Flow ranges specified are for nitrogen or air at 20 psig inlet (up to 50 SLM) or 25 psig inlet 60 to 100 SLM units) and 0 psig outlet. When used with other gases, a multiplication factor is used to determine the flow rate, and the digital display must be rescaled in the field.

To request a custom calibration add the gas abbreviation and inlet pressure/outlet pressure as a suffix to the model number.

Calibration are done at ambient temperatures only, 20°C (70°F)

*For oxygen cleaned units, add suffix **"-C"** to model number for additional cost.*

***Ordering Examples: FMA5410A–ARGON**, 50/0 psig, 70°F calls for an AL/BR body flow controller without an integral display, calibrated for Argon at 50 psig inlet pressure, 0 psig outlet pressure, 70°F gas temperature, powered by 12 Vdc.*

***FMA5516A**, N_2 controller with display, and **FMA545PW**, power supply.*

FMA5512A, shown smaller than actual size.

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INDUSTRIAL AIR VELOCITY TRANSMITTER

With Built-In Relay

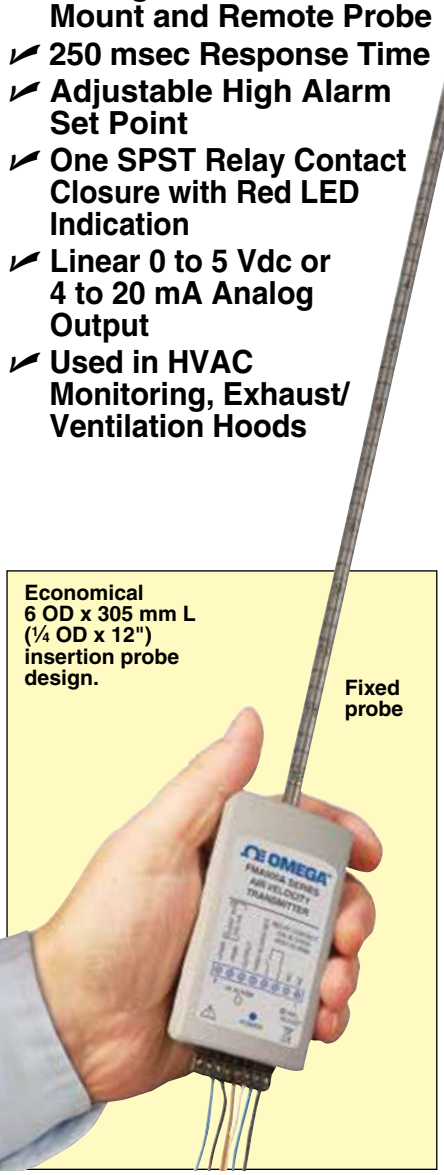
FMA900A Series

1 YEAR WARRANTY NIST

Optional

- Air Velocity Range Up to 10,000 FPM (50.8 m/sec)
- 2% Full Scale Accuracy
- Hot Wire Air Velocity Sensor Design
- Two Sensor Probe Configurations: Fixed Mount and Remote Probe
- 250 msec Response Time
- Adjustable High Alarm Set Point
- One SPST Relay Contact Closure with Red LED Indication
- Linear 0 to 5 Vdc or 4 to 20 mA Analog Output
- Used in HVAC Monitoring, Exhaust/ Ventilation Hoods

The FMA900A Series measures air velocity and provides an analog output proportional to the air flow, and one SPST relay contact closure for high alarm operation. The alarm set point is adjustable from 0 to 100% of the air flow range. The unit comes with one green power LED, and one red LED for alarm indication. The FMA900A Series are used in research and development labs, HVAC applications, exhaust/ ventilation hoods and other manufacturing processes. The sensor probe comes in two configurations, fixed mount 305 mm (12") probe and remote 305 mm (12") probe with 4.5 m (15') of shielded cable.



FMA901A-V1
shown actual size.

SPECIFICATIONS

Air Velocity Range: 0 to 200, 0 to 500, 0 to 1000, 0 to 2000, 0 to 5000, 0 to 10,000 FPM
Accuracy: 2% of FS or 15 FPM whichever larger
Air Velocity Probe: 6 OD x 305 mm L (¼ OD x 12") stainless steel, or remote probe
High Alarm Set Point: Adjustable from 0 to 100% of air flow range
Alarm Indication: Red LED on the back plate
Alarm Deadband: 5% of FS
Relay: One 12V SPST NO relay
Contact Rating: 10A @ 24 Vdc
Analog Output: 0 to 5 Vdc, 4 to 20 mA
Operating Ambient Temperature:
Sensor Probe: -40 to 93°C (-40 to 199°F)
Electronic Case: 0 to 50°C (32 to 122°F)
Power Indicator: Green LED
Power: 15 to 24 Vdc @ 200 mA
Dimensions: 89 H x 51 W x 32 mm D (3.5 x 2 x 1.25")
Weight: 160 g (5.6 oz)

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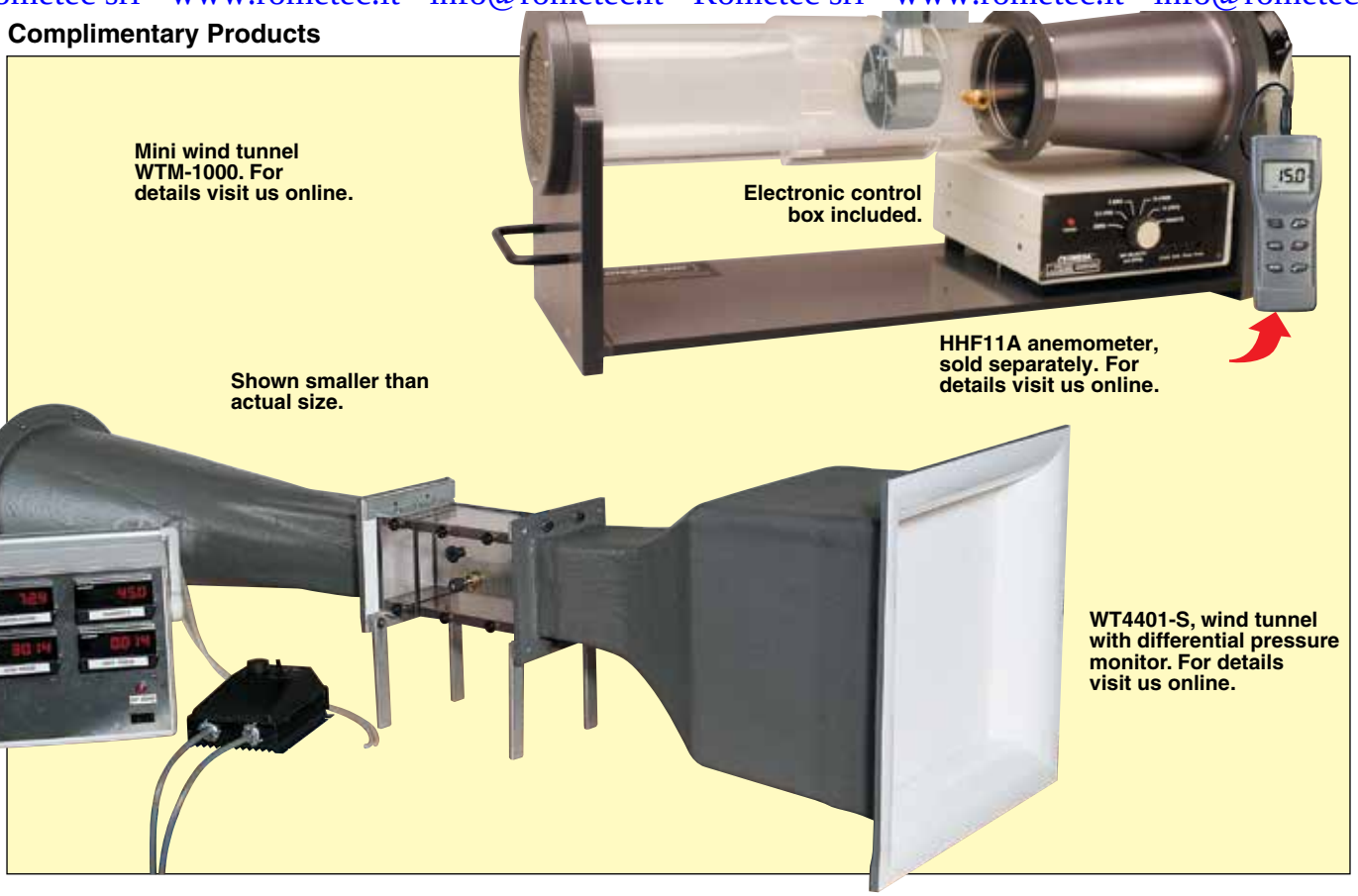
Complimentary Products



To Order

Model No.	Range FPM (m/sec)	Description
FMA900A-*-**	0 to 200 (0 to 1.02)	Air velocity transmitter, fixed probe
FMA900R-*-**	0 to 200 (0 to 1.02)	Air velocity transmitter, remote probe
FMA901A-*-**	0 to 500 (0 to 2.54)	Air velocity transmitter, fixed probe
FMA901R-*-**	0 to 500 (0 to 2.54)	Air velocity transmitter, remote probe
FMA902A-*-**	0 to 1000 (0 to 5.08)	Air velocity transmitter, fixed probe
FMA902R-*-**	0 to 1000 (0 to 5.08)	Air velocity transmitter, remote probe
FMA903A-*-**	0 to 2000 (0 to 10.16)	Air velocity transmitter, fixed probe
FMA903R-*-**	0 to 2000 (0 to 10.16)	Air velocity transmitter, remote probe
FMA904A-*-**	0 to 5000 (0 to 25.4)	Air velocity transmitter, fixed probe
FMA904R-*-**	0 to 5000 (0 to 25.4)	Air velocity transmitter, remote probe
FMA905A-*-**	0 to 10,000 (0 to 50.8)	Air velocity transmitter, fixed probe
FMA905R-*-**	0 to 10,000 (0 to 50.8)	Air velocity transmitter, remote probe

Accessories

Model No.	Description
CAL-3-FLOW	NIST traceable 4-point calibration certificate
TX8-100	8 conductor shielded cable, PVC insulation, 30.5 m (100') spool
PSR-24S	Regulated 24 Vdc @ 400 mA power supply, screw terminal
PSR-24L	Regulated 24 Vdc @ 400 mA power supply, stripped leads
SSLK-14-14	Compression fitting, ¼" tube OD, ¼ NPT
T-FER-1/4	¼" PTFE ferrules (10-pack) for use with SSLK-14-14 compression fitting

** Specify output type, add suffix **"-V1"** for 0 to 5 Vdc, or **"-MA"** for 4 to 20 mA, no additional cost.*
*** For 95 mm (3.75") short probe add suffix **"-S",** no additional cost.*
Unit is NIST traceable up to 8500 FPM
Comes complete with 305 mm (12") long sensor probe or remote probe, and operator's manual.
***Ordering Examples: FMA904R-V1,** air velocity transmitter with built-in relay, 0 to 5000 FPM, remote probe, 0 to 5 Vdc output.*
***FMA902A-MA**. air velocity transmitter with built-in relay, 0 to 1000 FPM, fixed probe, 4 to 20 mA output.*

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AND CONTROLLERS

For Clean Gases
With Optional Integral Display

FMA-A2000 Series

1 YEAR WARRANTY · NIST · CE · RoHS

Standard

- ±1% Accuracy
- Linear Analog Output
- Low Cost
- Thermal Technology
- For Flow Rates Up to 100 SLM
- Power Supply Included

FMA-A2417 with display, shown smaller than actual size.

FMA-A2117 without display, shown smaller than actual size.

The FMA-A2000 Series electronic mass flow meters/controllers provide high performance, versatility, and state-of-the-art design in one compact package. The FMA-A2000 uses capillary-type thermal technology to directly measure mass flow of gases. No temperature, pressure, or square root corrections are required. The FMA-A2300/2400 Series comes with an LCD display, and all models have linear 0 to 5 Vdc and 4 to 20 mA output.

The FMA-A2000 measures the mass flow rate of gases in 24 ranges from 0 to 100 SLM. For the complete listing, refer to the range table on page D-20. The FMA-A2000 Series is compatible with most non-corrosive gases. The user is advised to check the wetted materials against gas compatibility.

OMEGA's mass flow controllers use an internal electromagnetic proportional valve to control the mass flow rate. A command signal can be supplied either by the internal setpoint pot or by a 0 to 5 Vdc external source.

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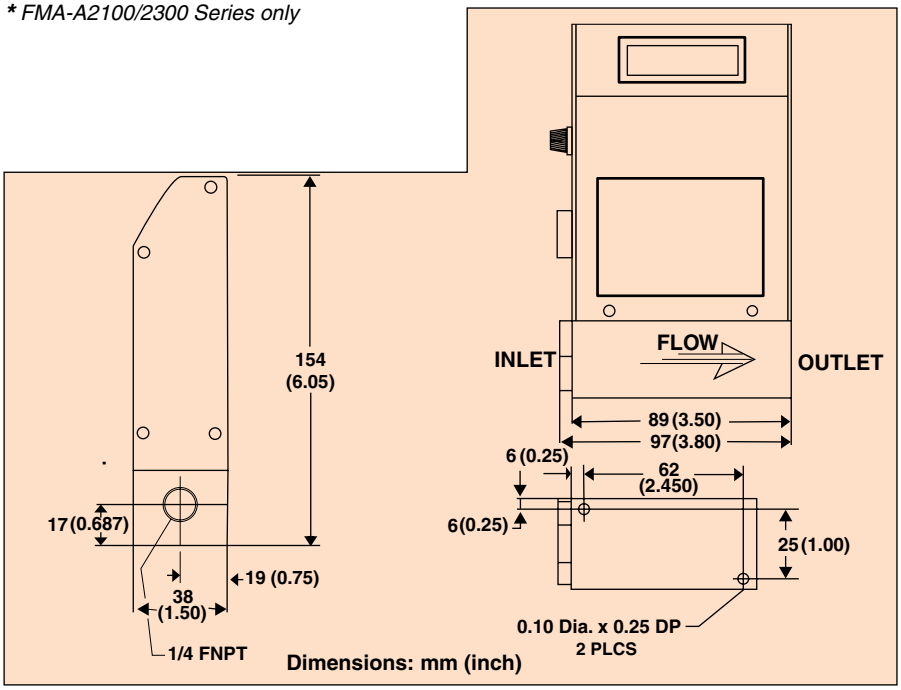
SPECIFICATIONS

Including linearity
Repeatability: ±0.15% full scale or better
Turndown Ratio: 100:1
Response Time: 5 seconds
Gas Ambient Temperature: 0 to 50°C (32 to 122°F)
Temperature Coefficient: 0.05% full scale per 1°C or better
Pressure Coefficient: 0.01% full scale per psi or better
Minimum Pressure Requirements:
Meters: 1 inch of H_2O
Controllers Up to 1 SLM: 1 psi
Controllers Greater than 20 SLM: 20 psi
Differential Pressure for Mass Flow Controllers:
<5 LPM, 5 to 50 psi standard
>5 LPM, 20 to 40 psi standard
Maximum Gas Pressure:
Polyacetal: 250 psig
316 SS: 500 psig
Leak Integrity:
1 x10^{-6} cc/min of He or better
Wetted Parts:
Standard: Polyacetal, FKM O-rings
Optional: 316 SS, FKM O-rings
Connections: ¼ FNPT standard; ¼" compression fitting for all stainless steel models
Input/Output Connection: 9-pin sub-D connector
Control Signal: 0 to 5 Vdc
Control Valve: Electromagnetic normally closed
Output Signal: Linear 0 to 5 Vdc, 1000 Ω min load, 4 to 20 mA, 500 Ω loop resistance
Mounting Threads:
316 SS Body: 6/32" thread
Polyacetal: Self tap #4/6 screw
Input Power:
Meters: 24 Vdc @ 150 mA, 115 Vac, 220 Vac with AC adaptor
Controller: 24 Vdc @ 300 mA, 115 Vac, 220 Vac with AC adaptor
Dimensions: See drawing
Weight: 1.25 kg (2.75 lb) with power supply

Range Table

00	0 to 10	06	0 to 1	14	0 to 35
01	0 to 20	07	0 to 2	15	0 to 40
02	0 to 50	08	0 to 5	16	0 to 45
03	0 to 100	09	0 to 10	17	0 to 50
04	0 to 200	10	0 to 15	18	0 to 55*
05	0 to 500	11	0 to 20	19	0 to 60*
—	—	12	0 to 25	20	0 to 65*
—	—	13	0 to 30	21	0 to 70*
—	—	—	—	22	0 to 75*
—	—	—	—	23	0 to100*

** FMA-A2100/2300 Series only*



To Order

Model No.	Description
FMA-A21(*)	Mass flow meter without display, ranges 0 to 10 SCCM to 0 to 100 SLM
FMA-A22(*)-SS-(**)	Mass flow controller without display, with control valve, ranges 0 to 10 SCCM to 0 to 50 SLM, 316 SS body
FMA-A23(*)	Mass flow meter with display, ranges 0 to 10 SCCM to 0 to 100 SLM
FMA-A24(*)-SS-(**)	Mass flow controller with display and control valve, ranges 0 to 10 SCCM to 0 to 50 SLM, 316 SS body

Compatible Meters; DPF50, DPF60, DPF300, DPF5500, DPF403. Visit us online for more details.

Accessories

Model No.	Description
FMA-200PWA	Replacement socket plug-in power supply for 90 to 260 Vac
SSLK-14-14	316 SS compression fitting ¼ NPT for ¼" OD tube

Comes complete with operator's manual, 9-pin sub-D connector, power supply and NIST calibration (5 data points).
**** Insert range code** from table at top of page to complete model number.*
*For optional 316 stainless steel body, add suffix "**-SS**" to model number for additional cost (¼" compression fittings standard). SS body standard on FMA-A22 and FMA-A24 controllers.*
***Note:** All controller flow ranges specified are for nitrogen or air at 20 psig; when used for other gases, a correlation factor is needed to determine the flow rate.*
******* Specify gas, inlet/outlet pressure, temperature.*
*For 10-point NIST calibration certificate, add suffix "**-NIST10**" to model number for additional cost.*
***Ordering Examples: FMA-A2316**, mass flow meter with display, calibrated for nitrogen at 20 psig inlet, room temperature for 0 to 45 SLM. ΔP: 5 to 20 psi.*
***FMA-A2102-SS**, 316 stainless steel body mass flowmeter without display, 0 to 50 SCCM.*

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Mass Flow, Density, Temperature and Volume Flow Meter

FMC-5000 Series

2 YEAR WARRANTY

- **15 to 150 mm (½ to 6") Sizes**
- **Mass Flow Rate, Volume, Density and Temperature Measurements**
- **Rugged Meters with No Moving Parts Results in Minimal Maintenance**
- **Accuracy Over a Wide Flow Range From a Single Meter Optimizes Plant Efficiency**
- **No Flow Conditioning or Straight Pipe Runs Required, Making Installation Simplified and Less Expensive**

FMC-5000 shown smaller than actual size.

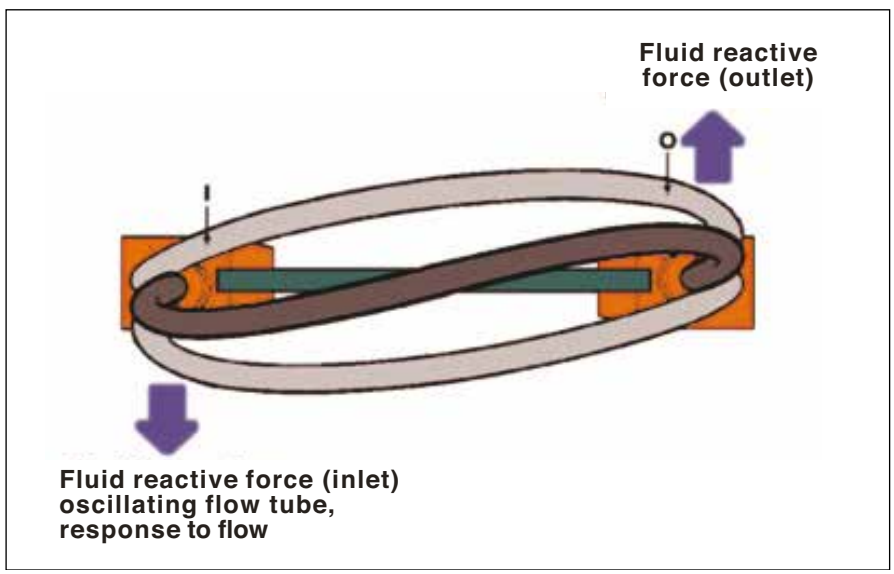
The FMC-5000 Coriolis Mass Flow Meter is designed according to the Coriolis Force Principle. It is widely used for flow measurements and custody transfer in many industries such as petroleum, petrochemical, chemical, pharmaceutical, pulp and paper, food and dairy, and more.

As an advanced flow and density measurement instrument, it is widely used in the measurement of liquids, gases and slurries, and garners a high reputation among customers around the globe. Coriolis meters are typically used in applications like batch control, blending, filling, dosing, custody transfer, process gas measurements, and more.

The FMC-5000 Series Coriolis Meter is designed according to the principle of Coriolis force. Under the alternating current effect, the electromagnetic coils mounted on the measuring tube will make two parallel measuring tubes vibrating at a certain fixed frequency. Whenever mass (either liquid or gas) flows through the measuring tubes, Coriolis force is generated, causing a “bending” or “deflection” in the top of the tubes.

This deflection is sensed as a phase shift between two electronic pick-ups mounted on the tubes. The degree of phase shift is directly proportional to the mass flow within the tubes.

The mass flow rate can be calculated by detecting the phase shift of the tubes. The temperature is also measured and used for compensation.



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Specifications

Flow Range: See charts below
Connection: ANSI, DIN, JIS, or sanitary flanges
Maximum Pressure: 16 bar (230 psi), [Optional: 25 bar (360 psi), 40 bar (580 psi) and 63 bar (913.7 psi)]
Body Material: 304 Stainless Steel
Measuring Tube Material: 316 L SS
Process Temperature Range:
- **Integrated Type:** -50 to 125ºC (-58 to 257ºF)
- **Remote Type (-R):** -50 to 200ºC (-58 to 392ºF)

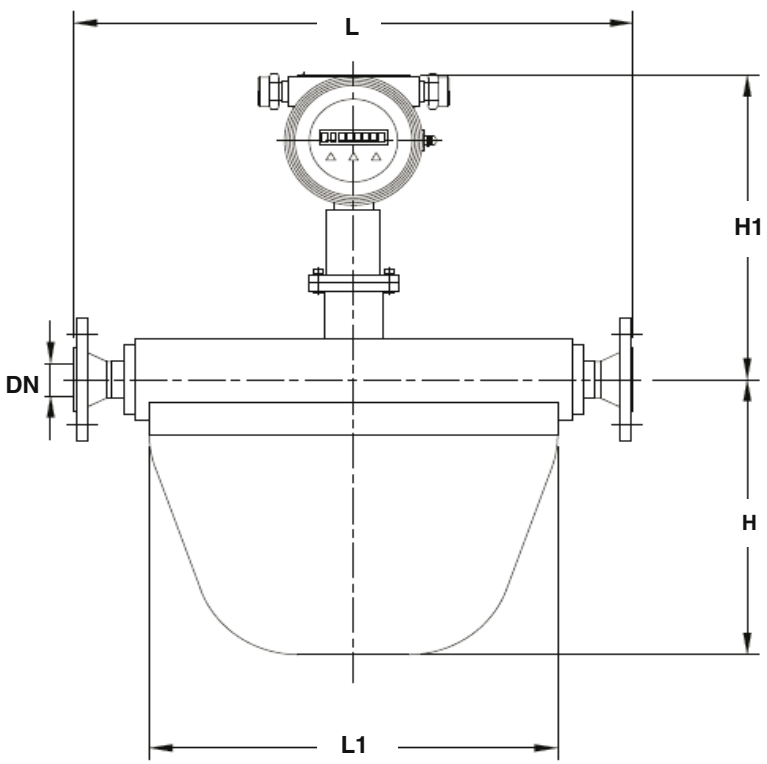
Ambient Temperature: -40 to 55ºC (-40 to 131ºF)
Working Humidity: (5 to 95%) RH at 25ºC (77ºF)
Electrical Connections: ½ NPT conduit

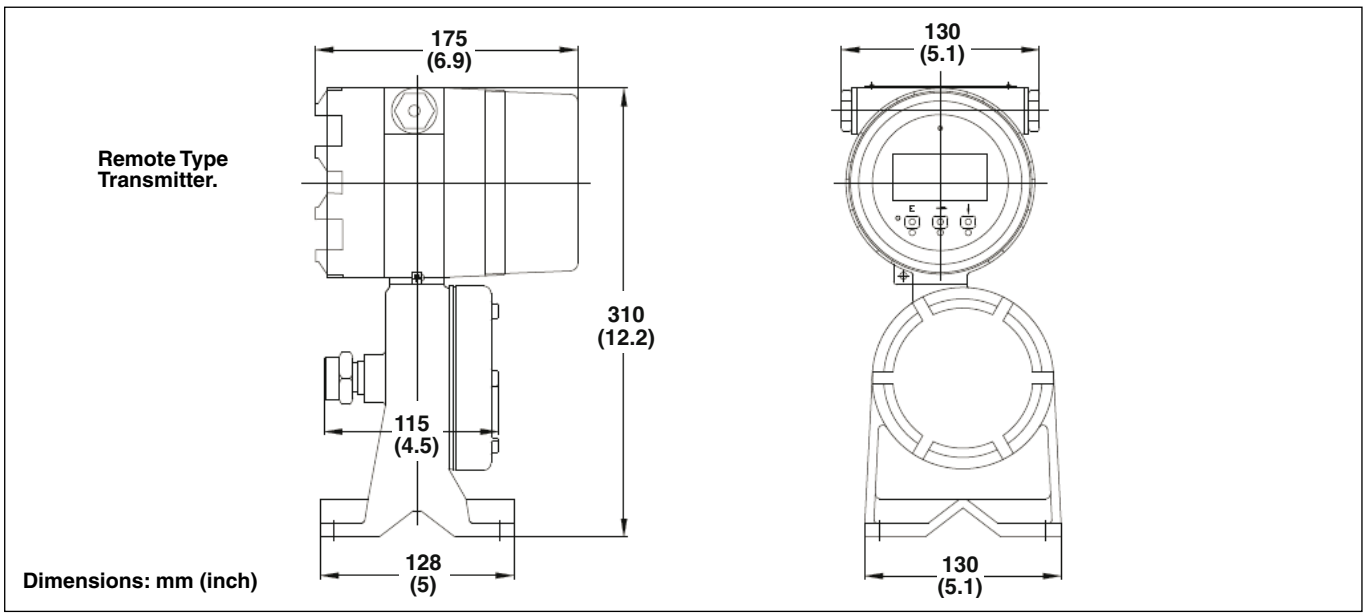
Flow Accuracy/Repeatability:
- **FMC-5100:** 0.1/0.05% (Liquid Only)
- **FMC-5200:** 0.2/0.1% (Liquid Only)
- **FMC-5500:** 0.5/0.25%

Density Measuring:
- **Range:** 0.2 to 3.0 g/cm^3
- **Error:** ± 0.002 g/cm^3
- **Repeatability:** 0.001 g/cm^3

Temperature Accuracy: ±1.0ºC
Protection: NEMA 4X (IP65)
Approvals: CE, RoHS (Pending)
Communications: RS485 (RTU Modbus®), HART® (-HART option)
Pulse Output: 0 to 10 kHz, ± 0.075% Full Scale
Current Output: 4 to 20 mA, 0.005% Full Scale
Power Supply: 18 to 36 Vdc, 85 to 265 Vac (-AC option), 15 W
Pressure Loss Curves: Available in operator's manual

Micro-Bend Type





Model	Size DN (ANSI)	Weight kg (lb)
FMC-5xx1	15 (½)	12 (26.5)
FMC-5xx2	25 (1)	15 (33.1)
FMC-5xx3	40 (1½)	25 (55.1)
FMC-5xx4	50 (2)	38 (83.8)
FMC-5xx5	80 (3)	78 (172)
FMC-5xx6	100 (4)	135 (297.6)
FMC-5xx7	150 (6)	265 (584.2)

Dimensions

Model	Size DN (ANSI)	L (<40Mpa), mm (inch)	L (>63Mpa), mm (inch)	L1, mm (inch)	H, mm (inch)	H1 (integral), mm (inch)	H1 (remote), mm (inch)
FMC-5xx1	15 (½)	400 (15.75)	414 (16.3)	280 (11.02)	184 (7.24)	298 (11.73)	213 (8.39)
FMC-5xx2	25 (1)	500 (19.68)	536 (21.1)	360 (14.17)	250 (9.84)	302 (11.89)	218 (8.58)
FMC-5xx3	40 (1½)	600 (23.62)	634 (24.96)	460 (18.11)	300 (11.81)	315 (12.40)	230 (9.06)
FMC-5xx4	50 (2)	800 (31.50)	828 (32.6)	640 (25.2)	410 (16.14)	325 (12.80)	240 (9.45)
FMC-5xx5	80 (3)	900 (35.43)	928 (36.54)	700 (27.56)	490 (19.29)	350 (13.78)	265 (10.43)
FMC-5xx6	100 (4)	1130 (44.49)	1156 (45.51)	860 (33.86)	660 (25.98)	370 (14.57)	285 (11.22)
FMC-5xx7	150 (6)	1410 (55.51)	1450 (57.09)	1200 (47.24)	900 (35.43)	400 (15.75)	316 (12.44)

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Liquid

To Order			
Model No.	Compact Liquid Coriolis Meters with 0.5% Accuracy		
	Mounting mm (inch)	Flow Range (kg/h)	Stability of Zero Point (kg/h)
FMC-5501LA	15 (½) ANSI	100 to 3000	0.3
FMC-5502LA	25 (1) ANSI	300 to 8000	0.8
FMC-5503LA	40 (1½) ANSI	1000 to 24,000	3
FMC-5504LA	50 (2) ANSI	2000 to 45,000	5
FMC-5505LA	80 (3) ANSI	2000 to 120,000	12
FMC-5506LA	100 (4) ANSI	6000 to 200,000	20
FMC-5507LA	150 (6) ANSI	10,000 to 500,000	50
Model No.	Compact Liquid Coriolis Meters with 0.2% Accuracy		
FMC-5201LA	15 (½) ANSI	150 to 3000	0.3
FMC-5202LA	25 (1) ANSI	400 to 8000	0.8
FMC-5203LA	40 (1½) ANSI	1200 to 24,000	3
FMC-5204LA	50 (2) ANSI	2500 to 45,000	5
FMC-5205LA	80 (3) ANSI	5500 to 120,000	12
FMC-5206LA	100 (4) ANSI	10,000 to 200,000	20
FMC-5207LA	150 (6) ANSI	25,000 to 500,000	50
Model No.	Compact Liquid Coriolis Meters with 0.1% Accuracy		
FMC-5101LA	15 (½) ANSI	200 to 3000	0.3
FMC-5102LA	25 (1) ANSI	600 to 8000	0.8
FMC-5103LA	40 (1½) ANSI	2400 to 24,000	3
FMC-5104LA	50 (2) ANSI	5000 to 45,000	5
FMC-5105LA	80 (3) ANSI	8000 to 120,000	12
FMC-5106LA	100 (4) ANSI	15,000 to 200,000	20
FMC-5107LA	150 (6) ANSI	50,000 to 500,000	50

Compressed Air/Gas

Model No.	Compact Air/Gas Coriolis Meters with 0.5% Accuracy		
	Mounting mm (inch)	Flow Range (kg/h)	Stability of Zero Point (kg/h)
FMC-5501GA	15 (½) ANSI	75 to 3000	0.12
FMC-5502GA	25 (1) ANSI	200 to 8000	0.32
FMC-5503GA	40 (1½) ANSI	800 to 32,000	1.2
FMC-5504GA	50 (2) ANSI	1250 to 50,000	2
FMC-5505GA	80 (3) ANSI	3500 to 140,000	6
FMC-5506GA	100 (4) ANSI	5000 to 200,000	8
FMC-5507GA	150 (6) ANSI	12,500 to 500,000	20

Air at STP

Model No.	Compact Air at STP Coriolis Meters with 0.5% Accuracy		
	Mounting mm (inch)	Flow Range (kg/h)	Stability of Zero Point (kg/h)
FMC-5501GA	15 (½) ANSI	62.5 to 2500.0	0.11
FMC-5502GA	25 (1) ANSI	166.7 to 6666.7	0.28
FMC-5503GA	40 (1½) ANSI	666.7 to 26,666.7	1
FMC-5504GA	50 (2) ANSI	1041.7 to 41,666.7	1.6
FMC-5505GA	80 (3) ANSI	2916.7 to 116,666.7	5
FMC-5506GA	100 (4) ANSI	4166.7 to 166,666.7	6.7
FMC-5507GA	150 (6) ANSI	10,416.7 to 416,666.7	18

Comes complete with operator's manual.

*For meters with other than ANSI flanges, change the "**A**" at the end of the model number to "**D**" for DIN flanges, "**J**" for JIS flanges or "**S**" for sanitary flanges (liquid only), no additional charge.*

*To replace the RS485 communications with HART communications add "**-HART**" to the model number, for an additional charge.*

*For units with remote mounted display/transmitter add "**-R**" to the model number, for an additional charge.*

***Ordering Example: FMC-5203LA-HART-R**, remote mount meter, 1½" ANSI flanges, 1000 to 24,000 kg/h, DC power and HART communications.*

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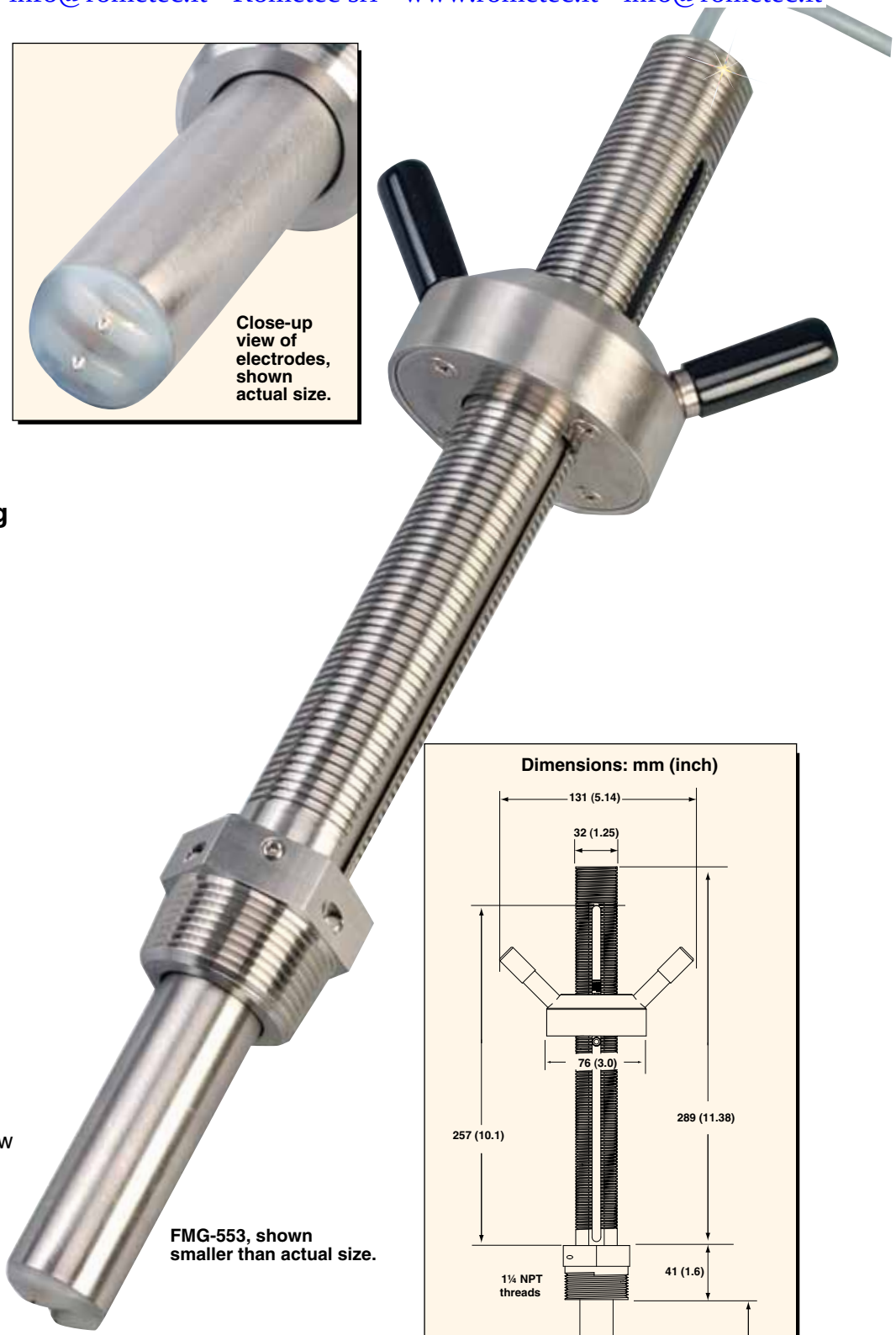
FMG-550 Series

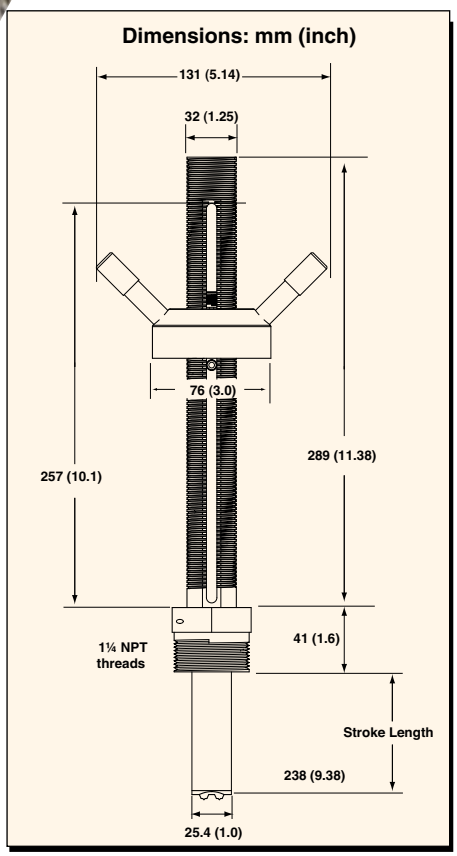
CE

Close-up view of electrodes, shown actual size.

- Hot-Tap Version for Installation and Service Without System Shutdown
- Diagnostic Features Using Colored LED Lights
- 1¼ NPT Threads
- Optional Detachable Waterproof Cable
- Output Choices of Frequency or 4 to 20 mA
- Bi-Directional Flow and Empty Pipe Detection
- No Moving Sensor Parts
- Adjustable Insertion for Pipe Sizes 50 mm (2") up to 1200 mm (48")
- Flow Rate Range 0.05 to 10 m/s (0.15 to 33 ft/s)
- Measurement in Dirty and High-Solid Content Liquids



FMG-553, shown smaller than actual size.



The FMG-550 Series magmeter flow sensors are heavy-duty, high-performance sensors in an adjustable, insertion configuration that can be used with a ball valve for hot-tap installations. This insertion-style flow sensor has no moving parts and is constructed of corrosion-resistant materials to provide long-term reliability with minimal maintenance costs. The FMG-550 Series is versatile and simple-to-install, delivering reliable flow measurement over a wide dynamic range. Pipe sizes range from 2 to 48". Omega's FMG-550 magmeters offer frequency or current outputs. The blind transmitter (4 to 20 mA output) is available for long distance signal transmission. The empty pipe detection features a zero flow output when the electrodes are not completely wetted. The frequency output is bi-directional while the 4 to 20 mA output can be set for uni- or bi-directional flow. The 4 to 20 mA output is factory spanned. Custom scaling available for additional cost. Consult Omega's Flow department for details.

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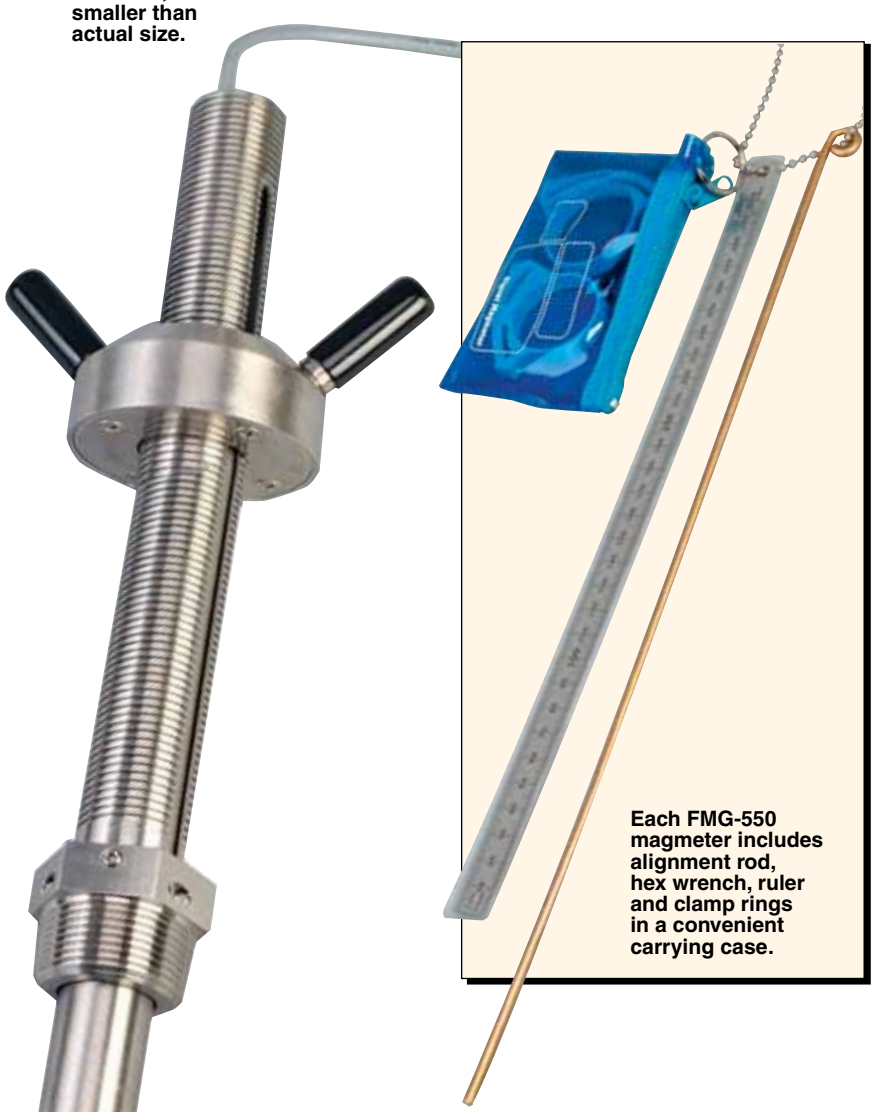
Wetted Materials: 316 L stainless steel body and electrodes, PVDF insulator, O-rings (FPM standard), 4-conductor shielded cable, PVC jacket (fixed cable models) or watertight rubber cable with connector on "**-SUB**" models
Power: 4 to 20 mA (24 Vdc nominal, 21.6 to 26.4 Vdc maximum, 22.1 mA maximum), frequency (5 to 24 Vdc nominal, 5 to 26.4 Vdc maximum, 15 mA maximum), reverse polarity and short circuit protected pipe size of DN50 to DN1200 (2 to 48")
Flow Range: 0.05 m/s (0.15 ft/s) minimum, 10 m/s (33 ft/s) maximum
Linearity: ±1% reading + 0.01 m/s (±1% reading + 0.033 ft/s)
Repeatability: ±0.5% of rdg @ 25°C
Minimum Conductivity: 20 µS/cm
Accuracy: <±2% of measured value in reference conditions where the fluid is water at ambient temperature, the appropriate upstream and downstream distances are observed, the sensor is inserted at the correct depth, and there is a fully developed flow profile which is in compliance to ISO 7145-1982 (BS 1042 section 2.2).
Electrical Current Output: 4 to 20 mA, programmable and reversible, loop
Accuracy: 32 µA maximum error (at 25°C @ 24 Vdc)
Temperature Drift: ±1 µA per °C maximum
Power Supply Rejection: ±1 µA per V
Isolation: Low voltage < 48 Vac/dc from electrodes and auxiliary power
Maximum Cable: 300 m (1000')
Maximum Loop Resistance: 300 Ω
Error Condition: 22.1 mA frequency output
Maximum Pull-up Voltage: 30 Vdc
Short-Circuit Protected: <30 V @ 0 Ω pull-up for 1 hour, reverse polarity protected to -40 V for 1 hour, over-voltage protected to 40 V for 1 hour
Maximum Current Sink: 50 mA, current limited

Temperature/Pressure Ratings

Storage Temperature: -15 to 70°C (5 to 158°F) in non-icing conditions
Operating Temperature Ambient: -15 to 70°C (5 to 158°F) in non-icing conditions
Media: -15 to 85°C (5 to 185°F)
Maximum Operating Pressure: 20.7 bar @ 25°C (300 psi @ 77°F)
Hot-Tap Installation Requirements:
Maximum Installation Pressure: 20.7 bar (300 psi)
Maximum Installation Temperature: 40°C (104°F) Hot-tap installation at temperatures that are greater than 40°C (104°F) or with hazardous liquids are not permitted with this product.
Connector: NEMA 6P (IP68)
EN 61326: Immunity and emissions for control equipment

smaller than actual size.



Each FMG-550 magmeter includes alignment rod, hex wrench, ruler and clamp rings in a convenient carrying case.

A large selection of iSeries process meters and controllers are available.

To Order

Model No.	Description
FMG-553	Magmeter 9.4" hot tap, frequency output
FMG-554	***Magmeter 9.4" hot tap, 4 to 20 mA output
FMG-550-S-CABLE	4 conductor, 22 AWG, water tight connector, 6 m (19.5')

Comes complete with operator's manual, alignment rod, hex wrench, clamp rings and ruler.
*For models with water-tight sensor connector for temporary submersion add **"-SUB"** to the model number, no additional charge.*
*** Custom scaling available for additional cost, consult Flow engineering for ordering details.*
***Ordering Examples: FMG-554,** insertion magmeter 7.3" protrusion, 4 to 20 mA output.*
***FMG-553,** insertion magmeter, frequency output with **FMG-550-S-CABLE,** 6 m (19.5') cable with water tight connector.*

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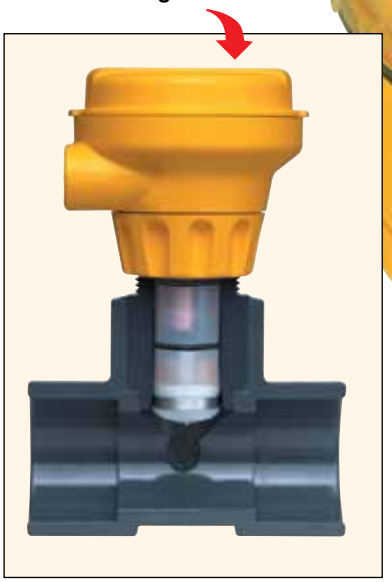
FMG3000 Series

1 YEAR WARRANTY

FMG3002-PP-D shown smaller than actual size.

FMG3002 shown smaller than actual size, with FP-5310M fitting.



- **For 0.5 to 8" Pipes**
- **No Moving Parts**
- **Flow-Rate Range: 0.05 to 5 m/s (0.15 to 16.4 ft/s)**
- **Accurate Measurement Even in Dirty Liquids**
- **Multi-Language Menu Display**
- **Blind 4 to 20 mA or Frequency Output Models with No Display Available**
- **No Pressure Drop**
- **Corrosion-Resistant Polypropylene**

The FMG3000 Series magmeters are insertion-style magnetic flow sensors with no moving parts. All models are constructed of corrosion-resistant materials to provide long-term reliability with minimal maintenance costs. When these magmeters are used with OMEGA's comprehensive line of installation fittings, sensor alignment and insertion depth are automatic. Fittings are required for installation. Please contact OMEGA for details.

These versatile, simple-to-install flow meters deliver accurate flow measurement over a wide dynamic range in pipe sizes ranging from 0.5 to 8", satisfying the requirements of many diverse applications. FMG3000 Series magmeters offer a variety of output options for use with OMEGA flow instrumentation that has a frequency or 4 to 20 mA output. Flow velocity measurement is compensated for temperature via an integrated temperature sensor.

SPECIFICATIONS

Performance

Linearity: ±1% rdg ±0.01 m/s (0.033 ft/s)
Repeatability: ±0.5% of rdg @ 25°C (77°F)
Minimum Conductivity: 20 µS/cm
Pipe Size Range: 0.5 to 8"
Flow Range: 0.05 to 5 m/s (0.15 to 16.4 ft/s)

Wetted Materials

Sensor Body/Electrodes and Grounding Ring:
PP: Polypropylene/316L SS
O-Rings: FPM (FKM) standard
Other Materials:
Case: PBT
Protection Rating: NEMA 4X (IP65)

Power Requirements

4 to 20 mA: 21.6 to 26.4 Vdc, 22.1 mA maximum
Frequency: 4.5 to 26.4 Vdc, 15 mA maximum, reverse polarity and short circuit protected

Output Specifications

Current Output (4 to 20 mA):
Loop Accuracy: 32 µA maximum error (25°C @ 24 Vdc)
Isolation: Low voltage <48 Vac/Vdc from electrodes and auxiliary power
Display (Optional):
Characters: 2 x 16
Window: Polyamide
SPDT Relay: 5 A @ 30 Vdc maximum, 5 A @ 250 AC maximum
Solid State Relay: 50 mA @ 30 Vdc, 50 mA @ 42 Vac
Maximum Cable: 300 m (1000')
Error Condition: 22.1 mA
Maximum Loop Resistance: 300 Ω

Frequency Output:
Maximum Pull-Up Voltage: 30 Vdc
Maximum Current Sink: 50 mA, current limited
Maximum Cable: 300 m (1000')

Environmental Requirements

Storage Temperature: -20 to 70°C (-4 to 158°F)
Relative Humidity: 0 to 95% (non-condensing)
Operating Temperature:
Ambient: -10 to 70°C (14 to 158°F)
Media: 0 to 85°C (32 to 185°F)
Max Operating Pressure: 10.3 bar @ 25°C (150 psi @ 77°F), 1.4 bar @ 85°C (20 psi @ 185°F)
Standards and Approvals: CE, NEMA 4X (IP65)

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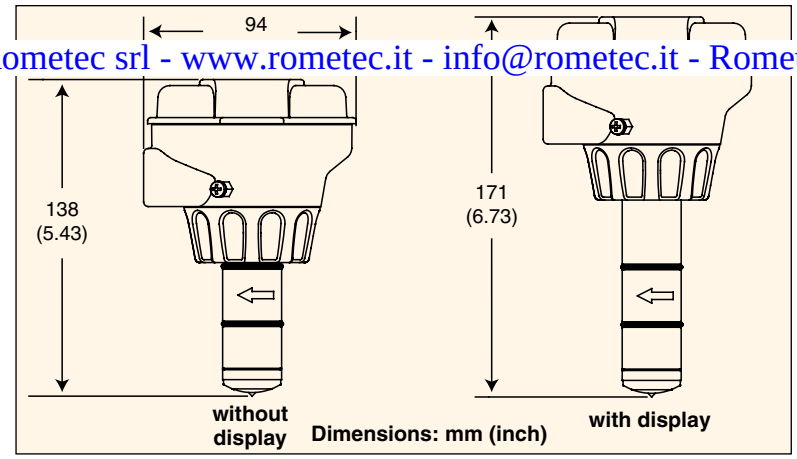
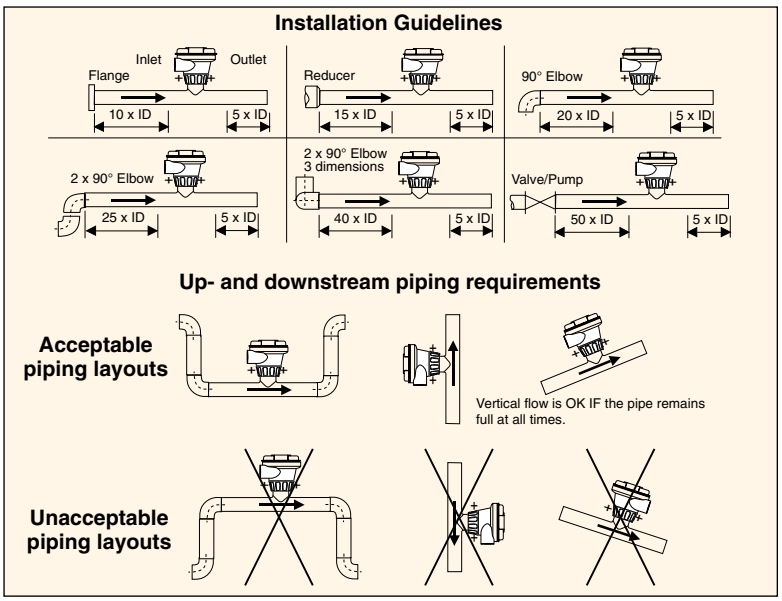
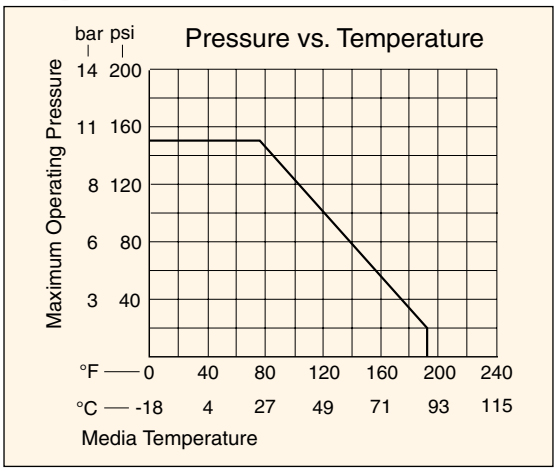


FMG3002-PP shown smaller than actual size.





To Order

Model No. (no display)	Model No. (display)	Wetted Materials	Pipe Size (inch)*	Output**
FMG3001-PP	**FMG3001-PP-D**	Polypropylene/316L SS	0.5 to 4	Frequency
FMG3002-PP	**FMG3002-PP-D**	Polypropylene/316L SS	0.5 to 4	4 to 20 mA
FMG3101-PP	**FMG3101-PP-D**	Polypropylene/316L SS	5 to 8	Frequency
FMG3102-PP	**FMG3102-PP-D**	Polypropylene/316L SS	5 to 8	4 to 20 mA

** For larger sizes consult engineering.*
*** Display units also include 3 relays: 2 SPDT and 1 solid state.*

Accessories

Model No.	Description
FPP-1220-0021	FPM O-ring
FPP-1224-0021	EPR (EPDM) O-ring
FPP-1228-0021	FFPM Perfluoroelastomer O-ring
CNi833	⅛ DIN controller with relay outputs, accepts 4 to 20 mA inputs
DPF701	⅛ DIN frequency input meter for rate and total

Comes complete with operator's manual.
***Ordering Examples: FMG3102-PP**, polypropylene/316L SS magmeter with 4 to 20 mA output, **FP-5360S**, 6" PVC saddle fitting.*

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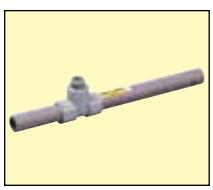
Fittings now supplied without plug.
Order model number FMK-31536-1 for polypropylene plug.

To Order

Pipe Mat'l	PVC 40 & 80	CPVC 80	†	Metric Size Only		Stainless 316
				PVDF†	Polypropylene†	
Pipe Size	**Model No.**	**Model No.**	**Pipe Size**	**Model No.**	**Model No.**	**Model No.**
½"	**FP-5305M**	**FP-5305CM**	15 mm	**FP-5105**	**FP-5105PO**	**FMG-5305**
¾"	**FP-5307M**	**FP-5307CM**	20 mm	**FP-5107**	**FP-5107PO**	**FMG-5307**
1"	**FP-5310M**	**FP-5310CM**	25 mm	**FP-5110**	**FP-5110PO**	**FMG-5310**
1¼"	**FP-5312M**	**FP-5312CM**	32 mm	**FP-5112**	**FP-5112PO**	**FMG-5312**
1½"	**FP-5315M**	**FP-5315CM**	40 mm	**FP-5115**	**FP-5115PO**	**FMG-5315**
2"	**FP-5320M** **FP-5320S***	**FP-5320CM**	50 mm	**FP-5120**	**FP-5120PO**	**FMG-5320**
2½"	**FP-5325S***	**N/A**	–	**N/A**	**N/A**	**FMG-5325***
3"	**FP-5330S***	**N/A**	–	**N/A**	**N/A**	**FMG-5330***
4"	**FP-5340S***	**N/A**	–	**N/A**	**N/A**	**FMG-5340***
5"	**N/A**	**N/A**	–	**N/A**	**N/A**	**FMG-5350***
6"	**FP-5360S***	**N/A**	–	**N/A**	**N/A**	**FMG-5360***
8"	**FP-5380S***	**N/A**	N/A	**N/A**	**N/A**	**FMG-5380***

** Models with weldolet or saddle fittings (shown in second row of pictures below).*
† Fittings of PVDF and POLYPROPYLENE are only available in metric sizes.






*All CPVC fittings have slip-on ends for schedule 80 pipe. PVDF and Polypropylene fittings larger than 2" line size are wafer style to slip between DIN standard PVDF or polypro flanges; for 2" line size and smaller, fittings have socket ends. All have FKM O-rings. PVC fittings up to 4" line size without "**S**" suffix have slip-on ends for schedule 40 or schedule 80 pipe; 6" line size and larger as well as fittings with "**S**" suffix are "cement-on" saddles.*

*Carbon steel and 316 stainless steel fittings for 2" line size and smaller are "tee" style; all larger 316SS fittings are Weldolet style. Galvanized iron fittings up to and including 2" line size without "**S**" suffix are "tee" style; all larger iron fittings and those with "**S**" suffix are double "strap-on" saddles.*

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Fittings now supplied without plug.
Order model number FMK-31536-1 for polypropylene plug.

To Order

Pipe Mat'l	Galvanized Iron	Carbon Steel	Copper/Bronze (Brass)
Pipe Size	**Model No.**	**Model No.**	**Model No.**
½"	**N/A**	**FP-5305CS**	**FP-5305CU**
¾"	**N/A**	**FP-5307CS**	**FP-5307CU**
1"	**FP-5310GI**	**FP-5310CS**	**FP-5310CU** **FP-5310BR**
1¼"	**FP-5312GI**	**FP-5312CS**	**FP-5312CU** **FP-5312BR**
1½"	**FP-5315GI**	**FP-5315CS**	**FP-5315CU** **FP-5315BR**
2"	**FP-5320GI** **FP-5320GIS***	**FP-5320CS**	**FP-5320CU** **FP-5320BR**
2½"	**FP-5325GI***	**FP-5325CS***	**FP-5325BR***
3"	**FP-5330GI***	**FP-5330CS***	**FP-5330BR***
4"	**FP-5340GI***	**FP-5340CS***	**FP-5340BR***
5"	**FP-5350GI***	**FP-5350CS***	**FP-5350BR***
6"	**FP-5360GI***	**FP-5360CS***	**FP-5360BR***
8"	**FP-5380GI***	**FP-5380CS***	**FP-5380BR***

***** *Models with weldolet or saddle-type fittings (pictured in bottom row).*

Please contact OMEGA for special fitting requirements not covered in this chart.






*All copper fittings "**CU**" suffix for copper and brass tubing have sweat-on end fittings; brass fittings 2 inches and smaller are NPT threaded tees; above 2", brass fittings are Brazelots.*

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FMG600 Series

1 YEAR WARRANTY

Optional

- **Virtually No Pressure Loss**
- **No Moving Parts**
- **ANSI 150# Flanges or Tri-Clover Sanitary Mount**
- **RS485 Standard**
- **Suitable for Pipes Up to 305 mm (12")**
- **High Accuracy**
- **4 to 20 mA and Frequency Outputs Standard**
- **NIST 3-Point Calibration Included**

FMG606, 51 mm (2") meter with 150# flanges shown smaller than actual size.

The FMG600 Series electromagnetic flow meters are designed for measurement of conductive liquids. With no moving parts and a PTFE lining, they can handle applications involving wastewater, pulp, food, and slurries. Standard outputs include analog, frequency, and RS485 communications. Optional sanitary tri-clamp mounting allows use of the FMG600 flow meters in applications not previously open to magmeters. Local- and remote-display models are available.

SPECIFICATIONS

Flange Sizes:
150# ANSI: 19 to 305 mm (¾ to 12")
Sanitary Tri-Clamp:
13 to 305 mm (½ to 12")
Maximum Pressure: 145 psi
Minimum Conductivity: 20 µS
Electrode Material: Hastelloy C4 (standard), tantalum (TGE optional)
Environmental Temperature:
-5 to 55°C (23 to 131°F)
Sensor Lining: PTFE
Electronics Housing:
Local or remote (optional)

Liquid Temperature:
0 to 50°C (32 to 122°F) STD,
0 to 150°C (32 to 302°F) with remote electronics
Empty Pipe Alarm: Available on 2" and larger sizes (-EPD option)
Accuracy: ±0.5% from 5 to 100% Qs, ±1% from 1 to 5% Qs
Range: 0.1 to 10 m/s (0.328 to 32.81 fps)
Outputs: Adjustable from 0.1 to 1000 gallons/pulse

Current:
4 to 20 mA with galvanic isolation
Frequency:
0 to 1000 Hz with galvanic isolation
Communications: RS485
Power: 24 Vdc, 115/230 Vac switchable (optional)
Consumption: 15 VA
Protection: IP67
Storage Temperature and Humidity:
-10 to 70°C (14 to 158°F) at maximum; relative humidity 70%

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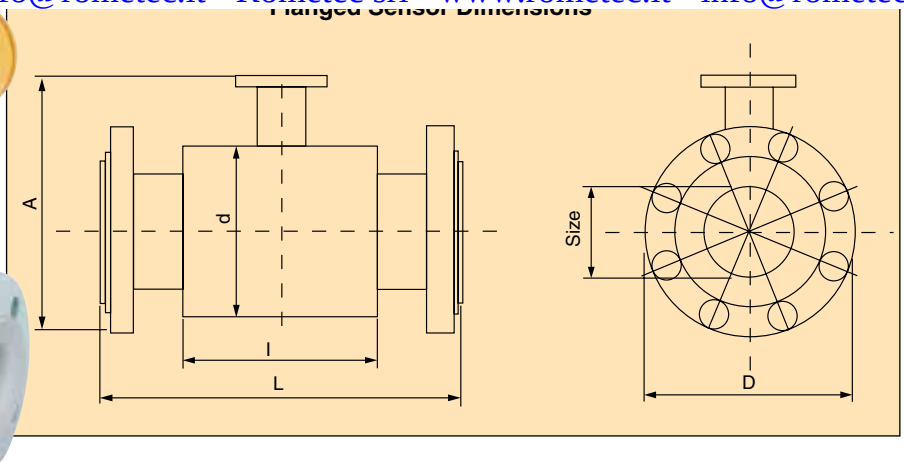
FMG605 shown smaller than actual size.

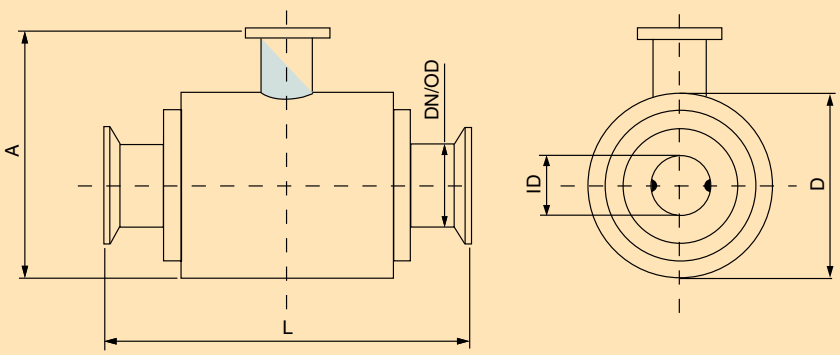


Flanged Sensor Dimensions

Nominal size mm (inch)	D mm (inch)	d mm (inch)	A mm (inch)	L mm (inch)	l mm (inch)	Weight kg (lb)
15 (½)	89 (3.5)	62 (2.4)	164 (6.5)	200 (7.9)	66 (2.6)	3.5 (7.7)
20 (¾)	99 (3.9)	62 (2.4)	170 (6.7)	200 (7.9)	66 (2.6)	3.5 (7.7)
25 (1)	108 (4.3)	72 (2.8)	180 (7.1)	200 (7.9)	96 (3.8)	3.5 (7.7)
32 (1¼)	117 (4.6)	82 (3.2)	199 (7.8)	200 (7.9)	96 (3.8)	6 (13.2)
40 (1½)	127 (5.0)	92 (3.6)	209 (8.2)	200 (7.9)	96 (3.8)	7 (15.4)
50 (2)	152 (6.0)	107 (4.2)	223 (8.8)	200 (7.9)	96 (3.8)	8 (17.6)
65 (2½)	178 (7.0)	127 (5.0)	244 (9.6)	200 (7.9)	96 (3.8)	10 (22.0)
80 (3)	191 (7.5)	142 (5.6)	260 (10.2)	200 (7.9)	96 (3.8)	12 (26.5)
100 (4)	229 (9.0)	162 (6.4)	280 (11.0)	250 (9.8)	96 (3.8)	16 (35.3)
125 (5)	254 (10.0)	192 (7.6)	310 (12.2)	250 (9.8)	126 (5.0)	21 (46.3)
150 (6)	279 (11.0)	218 (8.6)	340 (13.4)	300 (11.8)	126 (5.0)	28 (61.7)
200 (8)	343 (13.5)	274 (10.8)	398 (15.7)	350 (13.8)	211 (8.3)	35 (77.2)
250 (10)	406 (16.0)	370 (14.6)	480 (18.9)	450 (17.7)	211 (8.3)	43 (94.8)
300 (12)	483 (19.0)	420 (16.5)	535 (21.1)	500 (19.7)	320 (12.6)	55 (121.3)

FMG601-S shown smaller than actual size.

Tri-Clover Sanitary Sensor Dimensions



Tri-Clover Sanitary Sensor Dimensions

Nominal Size DN mm (inch)	ID mm (inch)	D mm (inch)	A mm (inch)	L mm (inch)	Weight kg (lb)
15 (1/2)	9.40 (0.37)	74 (2.90)	143 (5.6)	137 (5.4)	3.5 (1.6)
20 (3/4)	15.75 (0.62)	74 (2.90)	143 (5.6)	137 (5.4)	3.5 (1.6)
25 (1)	22.10 (0.87)	74 (2.90)	143 (5.6)	137 (5.4)	3.7 (1.7)
40 (11/2)	34.80 (1.37)	94(3.70)	163 (6.4)	137 (5.4)	4.8 (4.8)
50 (2)	47.50 (4.1)	104 (1.87)	173 (6.8)	137 (5.4)	N/A
65 (21/2)	60.20 (2.37)	129 (5.10)	199 (7.8)	192 (7.6)	N/A

Weights of the sensors are approximate.

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To Order

Model No.	Size: mm (inch)	Maximum GPM	Description
FMG601-S	15 (½)	11	SS sanitary mount magmeter with empty pipe detection
FMG601-S-R	15 (½)	11	SS Sanitary mount magmeter with empty pipe detection and remote display
FMG602	20 (¾)	52	150# ANSI flange magmeter with empty pipe detection
FMG602-R	20 (¾)	52	150# ANSI flange magmeter with empty pipe detection and remote display
FMG602-S	20 (¾)	31	SS sanitary mount magmeter with empty pipe detection
FMG602-S-R	20 (¾)	31	SS sanitary mount magmeter with empty pipe detection and remote display
FMG603	25 (1)	79	150# ANSI flange magmeter with empty pipe detection
FMG603-R	25 (1)	79	150# ANSI flange magmeter with empty pipe detection and remote display
FMG603-S	25 (1)	61	SS sanitary mount magmeter with empty pipe detection
FMG603-S-R	25 (1)	61	SS sanitary mount magmeter with empty pipe detection and remote display
FMG604	32 (1¼)	132	150# ANSI flange magmeter with empty pipe detection
FMG604-R	32 (1¼)	132	150# ANSI flange magmeter with empty pipe detection and remote display
FMG604-S	32 (1¼)	96	SS sanitary mount magmeter with empty pipe detection
FMG604-S-R	32 (1¼)	96	SS sanitary mount magmeter with empty pipe detection and remote display
FMG605	40 (1½)	198	150# ANSI flange magmeter with empty pipe detection
FMG605-R	40 (1½)	198	150# ANSI flange magmeter with empty pipe detection and remote display
FMG605-S	40 (1½)	151	SS sanitary mount magmeter with empty pipe detection
FMG605-S-R	40 (1½)	151	SS sanitary mount magmeter with empty pipe detection and remote display
FMG606	50 (2)	317	150# ANSI flange magmeter
FMG606-R	50 (2)	317	150# ANSI flange magmeter and remote display
FMG606-S	50 (2)	281	SS sanitary mount magmeter
FMG606-S-R	50 (2)	281	SS sanitary mount magmeter and remote display
FMG607	65 (2½)	528	150# ANSI flange magmeter
FMG607-R	65 (2½)	528	150# ANSI flange magmeter and remote display
FMG607-S	65 (2½)	451	SS sanitary mount magmeter
FMG607-S-R	65 (2½)	451	SS sanitary mount magmeter and remote display
FMG608	80 (3)	793	150# ANSI flange magmeter
FMG608-R	80 (3)	793	150# ANSI flange magmeter and remote display
FMG609	100 (4)	1233	150# ANSI flange magmeter
FMG609-R	100 (4)	1233	150# ANSI flange magmeter and remote display
FMG610	125 (5)	1893	150# ANSI flange magmeter
FMG610-R	125 (5)	1893	150# ANSI flange magmeter and remote display
FMG611	150 (6)	2862	150# ANSI flange magmeter
FMG611-R	150 (6)	2862	150# ANSI flange magmeter and remote display
FMG612	200 (8)	5063	150# ANSI flange magmeter
FMG612-R	200 (8)	5063	150# ANSI flange magmeter and remote display
FMG613	250 (10)	7925	150# ANSI flange magmeter
FMG613-R	250 (10)	7925	150# ANSI flange magmeter and remote display
FMG614	300 (12)	11,100	150# ANSI flange magmeter
FMG614-R	300 (12)	11,100	150# ANSI flange magmeter and remote display

Optional Equipment:
*For units with switchable 115/230 Vac power, add "**-VAC**" to the model number and consult sales for cost.*
*For empty pipe detection on units 2" and larger, add "**-EPD**" to the model number, for additional cost.*
*For units with a batching option, add "**-B**" to the model number, for additional cost.*
*For units with tantalum electrodes, add "**-TE**" to the model number, for additional cost.*
*If a third tantalum grounding electrode is needed, add "**-TGE**" to the model number, for additional cost.*
*If a third hastelloy grounding electrode is needed, add "**-HGE**" to the model number, for additional cost.*
*For a 4-point NIST calibration, add "**-NIST4**" to the model number, for additional cost.*
*For a 10-point NIST calibration, add "**-NIST10**" to the model number, for additional cost.*

Comes complete with operator's manual and 3-point NIST calibration certificate.

***Ordering Examples: FMG606-R-EPD,** 2", 150# flange mount magmeter with remote electronics and empty pipe detection.*
***FMG605-NIST4,** 150# flange mount magmeter with optional 4-point NIST calibration.*

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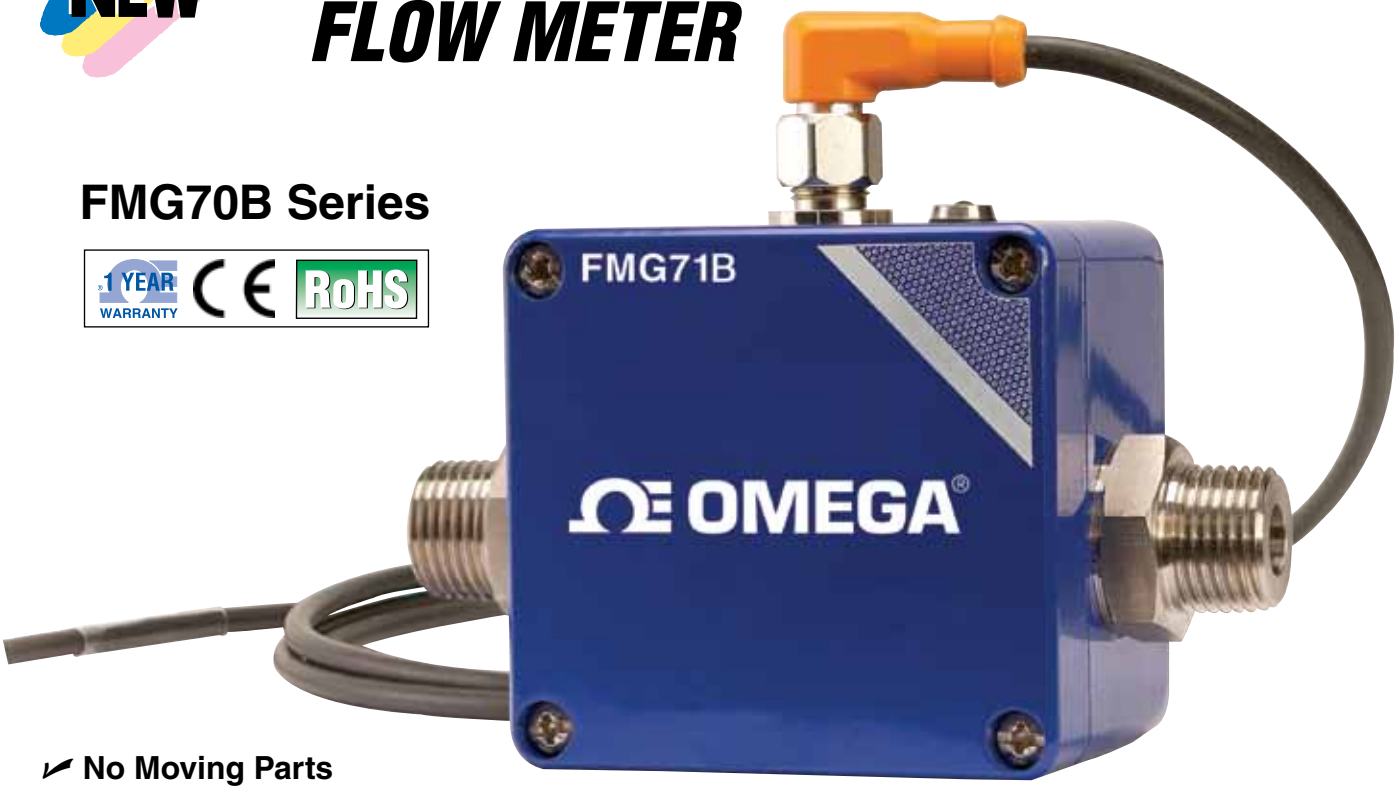
NEW

ELECTROMAGNETIC LOW FLOW METER

FMG70B Series



FMG71B shown actual size.

- **No Moving Parts**
- **No Flow Obstructions**
- **Maintenance-Free**
- **Fast Response Time (< 500 ms)**
- **Minimal Straight Pipe Requirements**

The FMG70B Series from OMEGA is a trio of extremely compact, low cost, inductive magnetic flow sensors. This product line allows a unique and highly reliable measuring technique to be introduced into areas of process control previously considered not possible.

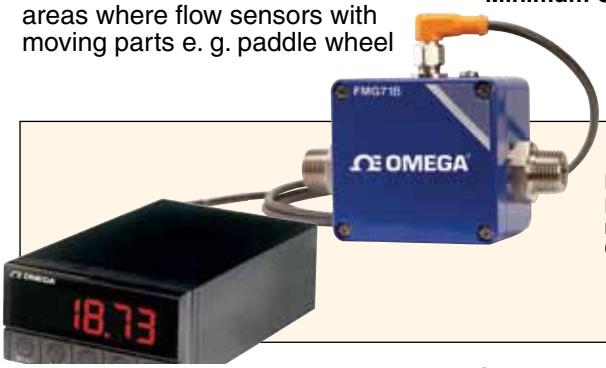
Changes of temperature, density, viscosity, concentration or electrical conductivity (minimum conductivity of 50 µs/cm) of the fluid do not affect the output signal.

FMG70B series can be used in areas where flow sensors with moving parts e. g. paddle wheel sensors, cannot be applied due to contamination/particulate in the media. The sensor is intended for continuously measuring of flow rates or for dosing/batching of electrically conductive liquids (minimum conductivity 50 S/cm). The output signal frequency (or current) is proportional to the flow. Two options are available for output signals, frequency or analog (-A models).

SPECIFICATIONS

Materials of Construction

Electrodes and Process Connection: Stainless steel 316 TI
Measuring Pipe: PEEK-GF30
Gasket: EPDM
Housing: Cast Aluminum
Accuracy: ±1.5% of reading ±0.3% range
Repeatability: 1%
Minimum Conductivity: 50 µs/cm



FMG71B shown with DPF701 ⅛ DIN 6-digit rate meter/totalizer. Visit OMEGA to order.

Maximum Liquid Temperature: 90ºC (194°F)
Ambient Temperature: 5 to 70ºC (41 to 158°F)
Maximum Pressure: 16 bar (232 psi)
Flow Indication: LED green, flow proportional blinking
Frequency: Square wave signal NPN, internal pull-up resistor 2 kΩ pulse duty ratio 50:50
Signal Current Maximum: 20 mA, current limited
Response Time: <500 mS
Electrical Connection: Plug connector M12 x 1
Power Supply: 24 Vdc ±10%
Current Consumption: Maximum 150 mA
Electrical Protection: Measures short-circuit proof (up to 30V) and polarity protection (up to -30V)
Protection Class: NEMA 4X (IP65)
Flow Range:
- **FMG71B:** 0.5 to 30 LPM (0.13 to 7.93 GPM)
- **FMG72B:** 1 to 60 LPM (0.26 to 15.85 GPM)
- **FMG73B:** 5 to 250 LPM (1.32 to 66 GPM)

Analog Output Signal ("-A" Models)
4 to 20 mA (0 to Full Scale):
- **Current Limitation:** 26 mA approx.
- **Maximum Load:** 250 Ω to GND

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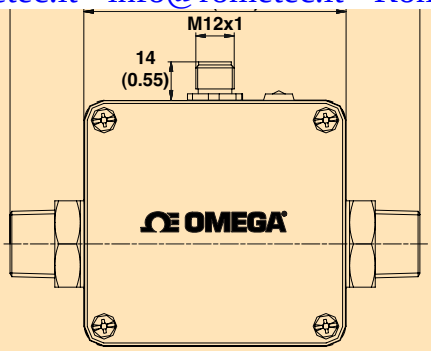
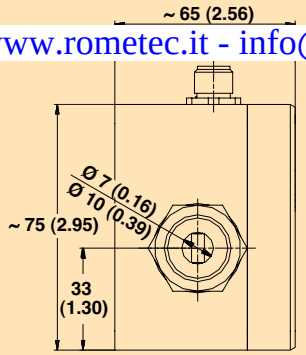
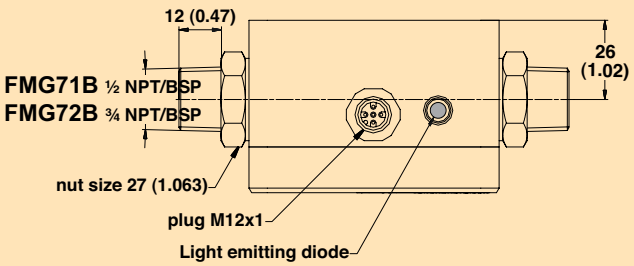
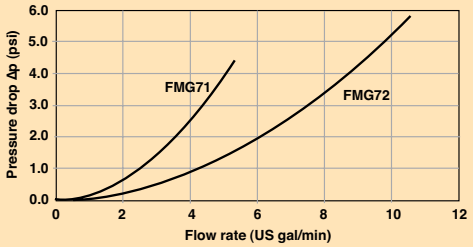
FMG71B
FMG72B



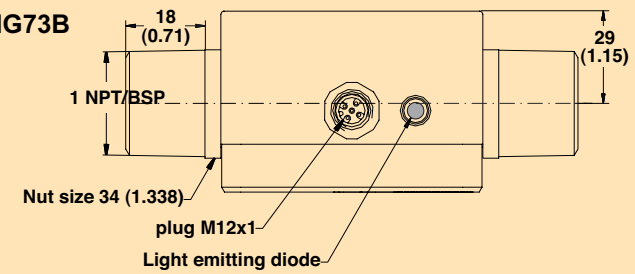


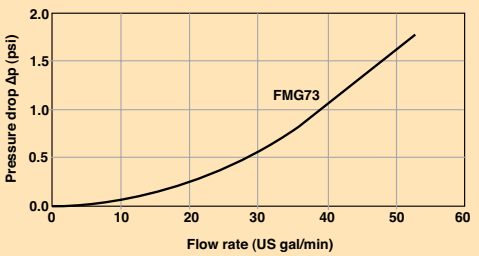
Dimensions: mm (inch)
Ø = diameter

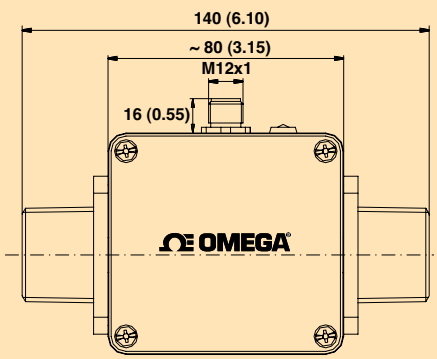


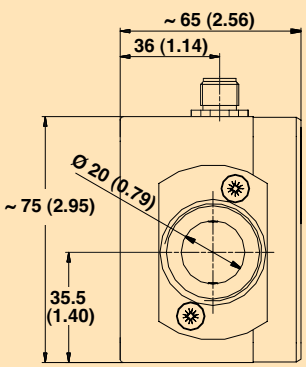


FMG73B









To Order

Model No.	Model No.	Output	NPT/BSP	Sensor I.D.
FMG71B	**FMG71B-BSP**	NPN frequency 3785 pulses/gal	½	¼
FMG72B	**FMG72B-BSP**	NPN frequency 1893 pulses/gal	½	⅜
FMG73B	**FMG73B-BSP**	NPN frequency 757 pulses/gal	1	¾
FMG71B-A	**FMG71B-A-BSP**	4 to 20 mA,	½	¼
FMG72B-A	**FMG72B-A-BSP**	4 to 20 mA,	½	⅜
FMG73B-A	**FMG73B-A-BSP**	4 to 20 mA,	1	¾

Comes complete with operator's manual.

***Ordering Examples: FMG72B** flow senor with frequency output, **DPF701** digital panel meter, and **M12C-PVC-4-R-F-5,** 5 m (16.4') cable. Visit OMEGA to order panel meter.*

***FMG71B-A** flow sensor with analog output, **DPF64** digital rate meter, and **M12C-PVC-4-R-F-5,** 5 m (16.4') meter cable. Visit OMEGA to order rate meter.*

Accessories

Model No.	Description
M12C-PVC-4-R-F-5	5 m (16.4') cable with right angle M12 x stripped leads
M12C-PVC-4-R-F-10	10 m (32.8') cable with right angle M12 x stripped leads
PSU-93	Unregulated power supply

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ELECTROMAGNETIC FLOW METER

FMG800 Series

1 YEAR WARRANTY

- No Moving Parts
- Minimal Straight Pipe Required
- Battery or DC Powered
- Built-In Rate and Total Indicator
- Corrosion Resistant
- Pulse Output (FMG810 Only)
- US Gallons Factory Programmed (Other Engineering Units Available)

All shown smaller than actual size.

The FMG800 Series is a full-bore, plastic-bodied electromagnetic flow meter designed for flow and usage monitoring applications in 1, 2 and 3 inch pipe. The polypropylene flow tube offers corrosion resistance to a wide range of chemicals and fertilizers. It is light weight and easy to install or remove from the pipe for inspection*.

With no moving parts, the magmeter permits unobstructed flow, minimizing flow disturbances and straight pipe requirements. The FMG800 Series can be used in piping configurations where there is little space between the meter and an elbow or valve. The FMG800 Series is resistant to wear from sand and debris found in ground or surface water. Since there are no bearings or propeller to wear out, maintenance and repair costs are kept to a minimum and it tolerates high flows without damage.

A hinged polyethylene cover is included that protects from dust and UV rays, while permitting easy access to the flow rate and total display. Flow rate and total can be displayed in a variety of units, factory programmed.

The FMG800 Series is used for tracking flow rate and total flow in usage monitoring applications including wells, industrial wastewater, heap leach mining discharge, cooling tower deduct, turf, landscape, and other water reclamation applications. In the event of DC power loss, or when changing batteries, the FMG800 will retain internal settings and flow total.

The FMG810 Series is externally powered via a 5-pin connector cable which also provides pulse output for use with a variety of OMEGA displays and controls for remote reading, data logging, pulse-to-analog conversion, and telemetry applications.

The FMG800 Series is a battery-operated unit for use when pulse output is not required. The batteries are user replaceable with an approximate 1 to 2 year life depending on usage.

*****_Includes OMEGA NPT fitting kit on 2 and 3" models._

SPECIFICATIONS

Pipe Size: 1, 2 or 3" full port
Fittings: 1 NPTF, 2 or 3" flange clamps with 2 or 3 NPTF fitting kit
Pressure: 150 psi or 10.3 bar working pressure @ 21°C (70°F)
Operating Temperature Range: -12 to 54°C (10 to 130°F), -40 to 80°C (-40 to 176°F) non-operating
Accuracy:
±1% of reading (between 10% and 100% of maximum flow)
±3% of reading (between cutoff and 10% of maximum flow)
Flow Range Minimum:
1": 2.3 GPM (0.145 LPS)
2": 6 GPM (0.38 LPS)
3": 14 GPM (0.88 LPS)
Flow Range Maximum:
1": 110 GPM (6.94 LPS)
2": 300 GPM (18.9 LPS)
3": 670 GPM (42.3 LPS)
Materials Body: Glass-filled polypropylene
Electrodes: 316 stainless steel
Electronics Housing: Die-cast aluminum, powder-coated
Display Cover: Polyethylene
Display Digits: Rate-6, Total-8
Units Rate: Gallons/Minute, Cubic Feet/Second, Acre-Feet, Acre-Inch, Gallons, Gallons x 1000, Cubic Feet/Minute, Liters/Second
Units Total: Cubic Feet, Liters, Mega-liters, Cubic Meters, Liters/Minute, Cubic Meters/Minute

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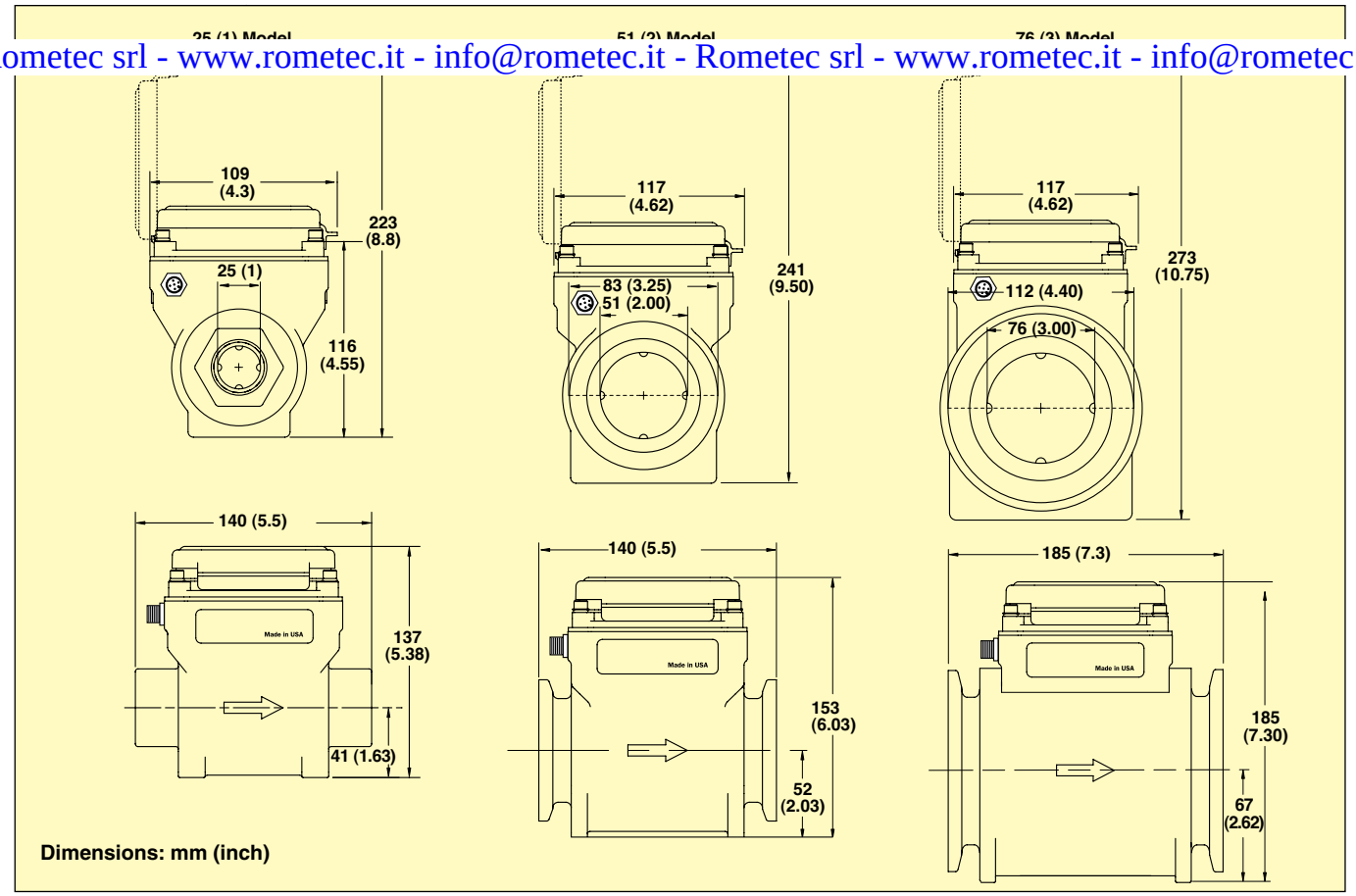

Alternate Programming Unit Suffixes

Rate	Total							
	Acre-feet	Acre-inch	Gallons	Gallonsx1000	Feet^3	Liters	Megaliters	Meters^3
Gallons/Min	-GMAF	-GMAI	(standard)	-GMKG	-GMCF	-	-	-
Feet^3/Sec	-CFSAF	-CFSAI	-CFSG	-CFSKG	-CFSCF	-	-	-
Feet^3/Min	-CFMAF	-CFMAI	-CFMG	-CFMKG	-CFMCF	-	-	-
Liters/Sec	-	-	-	-	-	-LSL	-LSML	-LSCM
Liters/Min	-	-	-	-	-	-LML	-LMML	-LMCM
Meters^3/Min	-	-	-	-	-	-CMML	-CMMML	-CMMCM
Meters^3/Hour	-	-	-	-	-	-CMHML	-CMHML	-CMHCM

Power:

FMG800: 6 each "AA" alkaline cells (included), replaceable. Estimated life is 1 to 2 years depending on usage

FMG810: 10 to 30 Vdc @ 60 mA maximum (15 mA average)

NOTE: Using an unregulated power supply >18 Vdc may damage the meter due to AC line input voltage fluctuation

Pulse Output (FMG810 Only):

Signal: Current sinking pulse, opto-isolated, 32 Vdc maximum at 10 mA maximum

Standard Pulse Rate: 1 unit/pulse out, pulse width of 10 ms depending on unit selection

High Frequency (-HF): Pulse width 1.1 ms, minimum/maximum frequency, 3 to 150 hz

Pulse/Unit: 1" = 80, 2" = 30, 3" = 13

Empty Pipe Detection: Hardware/ software, conductivity-based

Conductivity: >20 micro Siemens/cm

Environmental: NEMA 4X standard

Electrical Connection (FMG810 Only):

To Order

Model No.	Description
FMG801	1" battery powered magmeter
FMG802*	2" battery powered magmeter
FMG803*	3" battery powered magmeter
FMG811	1" DC powered magmeter
FMG812*	2" DC powered magmeter
FMG813*	3" DC powered magmeter
FMG811-HF	1" DC powered magmeter high frequency out
FMG812-HF*	2" DC powered magmeter high frequency out
FMG813-HF*	3" DC powered magmeter high frequency out

** Includes NPT fitting kit.*

For displays programmed in other engineering units use suffix chart above.

Accessories

Model No.	Description
FTB700-T	Remote 4 to 20 mA transmitter for wall mount
FTB700-D	Remote rate and total display for wall mount
FMG-800-CABLE	Replacement 6 m (20') cable

Comes complete with operator's manual. All 2 and 3" models include NPT fitting kit. All battery powered units include 6 "AA" alkaline batteries. All DC powered units include 6 m (20') cable

***Ordering Example: FMG811,** 1" DC powered magmeter.*

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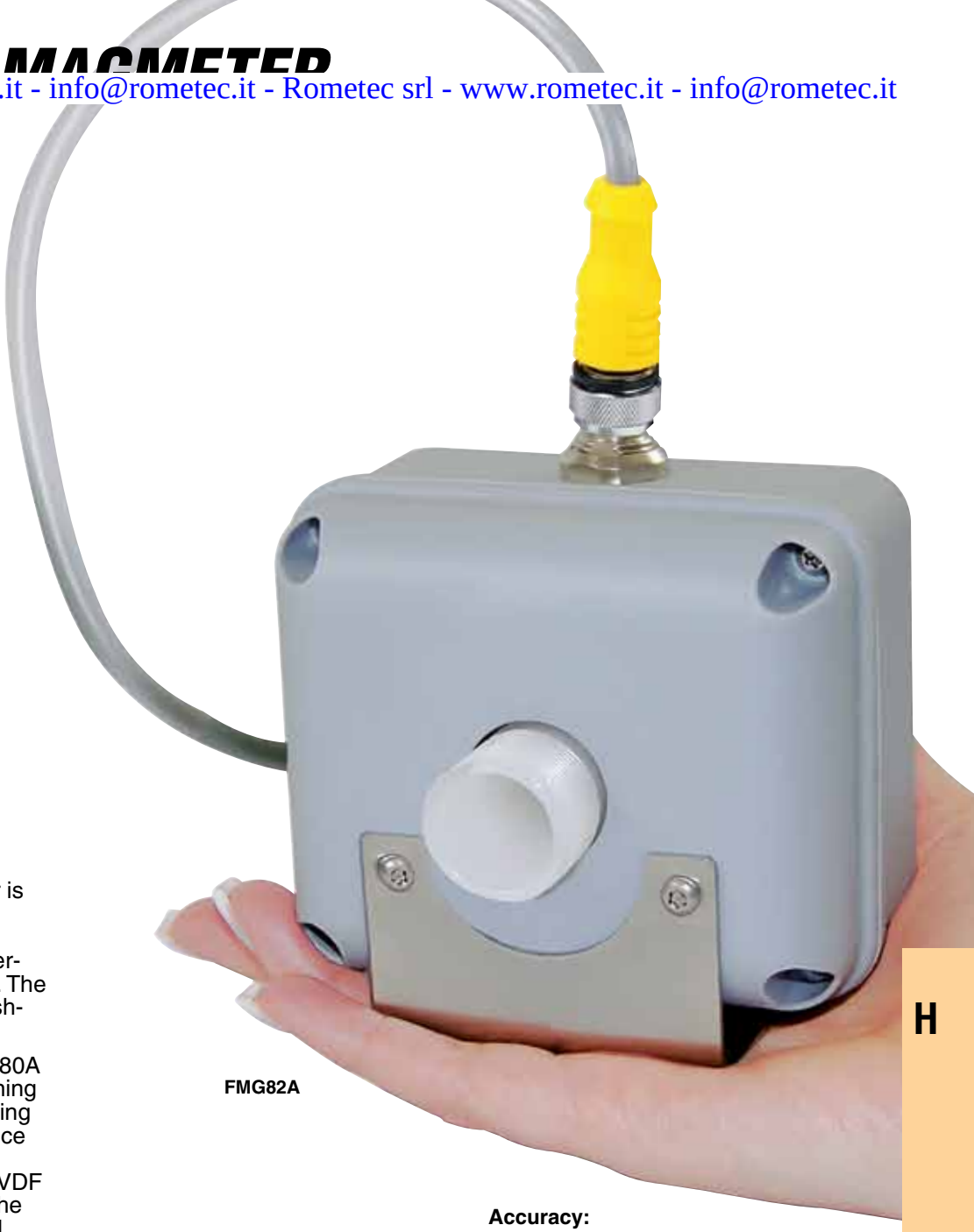
FMG80A Series

1 YEAR WARRANTY

- **No Moving Parts**
- **Requires No Straight Pipe**
- **Pulse and/or 4 to 20 mA Output**
- **Chemical and Corrosion Resistant**
- **Insensitive to Fluid Density and Fluid Viscosity Changes**
- **NEMA 4X (IP66)**



FMG82A

The FMG80A Series magmeter is designed for low-flow chemical injection or difficult-to-meter applications with pulsating metering pumps in ¼ to ¾" pipe/tube. The housing is made of sturdy splash-proof HDPE plastic.

With no moving parts, the FMG80A Series can handle fluids containing particulate matter without clogging or jamming, keeping maintenance at a minimum. With no metallic parts (100% PVDF body and PVDF carbon fiber-filled electrodes), the meter is corrosion-resistant and compatible with a wide range of chemicals. Accuracy is maintained with conductive fluids (>20 micro Siemens) of varying viscosities and densities.

The FMG80A Series meter is compact enough to fit most pump/injection systems. With zero straight pipe required after an elbow, it can be easily mounted in tight spaces. The mounting bracket adds stability. The FMG80A Series meter has opto-coupled current sinking or current sourcing pulse as well as a 4 to 20 mA output that can be connected to many OMEGA® panel meters, controllers and data loggers; outputs and power are provided through a 6 m (19.7') cable with 8-pin female circular connector.

SPECIFICATIONS

Pipe Sizes: ¼, ⅜, ½, and ¾"
Fittings: Fittings with two NPT threaded adaptors (included)
Materials Body: PVDF
Electrodes: PVDF carbon fiber-filled
Ground: PVDF carbon fiber-filled
Housing: HDPE with glass fiber
Fittings: PVDF
Adaptors (NPT): PVDF or polypropylene
Temperature:
- **Ambient:** -18 to 54ºC (0 to 130ºF)
- **Fluid:** 0 to 93ºC (32 to 200ºF)

Pressure: 150 psi
Flow Range:
- **FMG81A, FMG82A:** 3 GPM max (0.03 GPM cut off)
- **FMG83A, FMG84A:** 20 GPM max (0.2 GPM cut off)

Accuracy:
- **FMG81A, FMG82A:** ±1%, ±0.002 GPM of reading across rated range
- **FMG83A, FMG84A:** ±1%, ±0.005 GPM of reading across rated range

Output Signal: Optocoupled current sinking or current sourcing pulse output; 30 Vdc, 5 mA max, 4 to 20 mA current loop; 7 Vdc plus load voltage drop min; 50 Vdc max
- **FMG81A, FMG82A:** 1000 pulses/liter (3785 pulses/gallon)
- **FMG83A, FMG84A:** 500 pulses/liter (1892 pulses/gallon)

Power: 10 to 15 Vdc, 150 mA (linear power supply recommended)
Fluid Conductivity: >20 microSiemens
Environmental: NEMA 4X (IP66)
Cable Length: 6 m (19.7'), cable with 8-pin female circular connector

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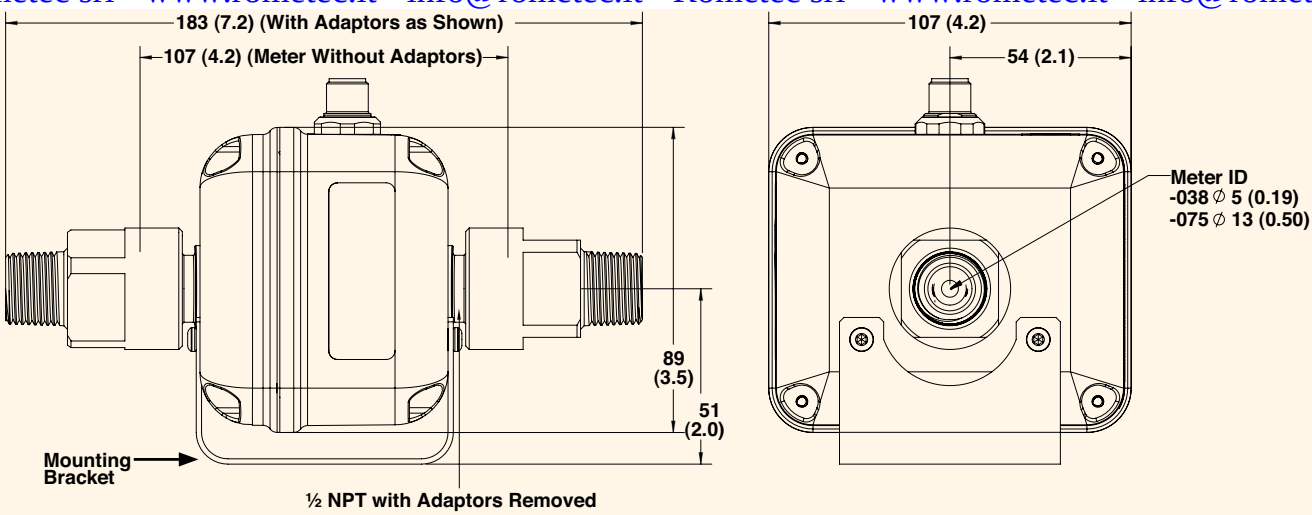
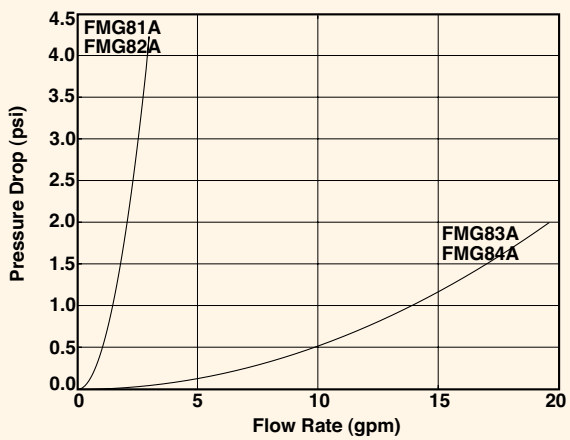
Dimensions: mm (inch)



Pressure Drop Curve



To Order

Model No.	Description
FMG81A	Magmeter ¼ NPT, 3 GPM
FMG82A	Magmeter ⅜ NPT, 3 GPM
FMG83A	Magmeter ½ NPT, 20 GPM
FMG84A	Magmeter ¾ NPT, 20 GPM

Accessories

Model No.	Description
FMG80-CABLE	Replacement 6 m (19.7') cable with 8-pin female circular connector
FMG81A-ADAPTERKIT	Replacement fitting for FMG81A, 2 per kit
FMG82A-ADAPTERKIT	Replacement fitting for FMG82A, 2 per kit
FMG83A-ADAPTERKIT	Replacement fitting for FMG83A, 2 per kit
FMG84A-ADAPTERKIT	Replacement fitting for FMG84A, 2 per kit
DPF701	Panel mounted flow rate or total display
U12Y100	12 Vdc power supply

Comes complete with operator's manual, mounting bracket and 6 m (19.7') cable with 8-pin female circular connector.

***Ordering Examples: FMG81A** magmeter ¼ NPT, 3 GPM and **DPF701** ⅛ DIN digital panel meter. For technical information on DPF701 visit OMEGA.*

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INSERTION MAGNETIC FLOWMETER

FMG900 Series

1 YEAR WARRANTY

- Durable
- Adjustable Depth
- Hot-Tap Available
- Brass or Stainless Steel
- Immersibility Available
- Reverse Flow Output Available
- 3 to 48" Diameter Pipes

FMG903 for 76 to 254 mm (3 to 10") pipe, shown smaller than actual size.

FMG907 for 76 to 254 mm (3 to 10") pipe with hot tap insertion, shown smaller than actual size.

The complete lack of moving parts of this insertion flow sensor is the source of its reliability. There is no rotor to stop turning in dirty water and there are no bearings to wear out. Brass and stainless steel models withstand a variety of temperature, pressure, and chemical conditions. Reverse flow output and immersibility are optional. 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, control or converted to 4 to 20 mA with the FTB700-T shown below (optional). A modular system of electronics can be attached directly to the flow sensor or remotely mounted. The FMG900 series can provide full indication of rate and total with the (optional) FTB700-D or just a 4 to 20 mA output with the (optional) FTB700-T blind transmitter. The adaptor fitting of the standard unit is a male NPT, and can be directly threaded into ordinary saddles or threaded weld fittings. The hot tap versions include an isolation valve, allowing hot-tap installation, or installation and removal under pressure. Hot tap units include the appropriate installation valve.

SPECIFICATIONS

Power: 12 to 24 Vdc, 250 mA
Flow Range: 0.28 to 20 ft/second (0.08 to 6.09 m/second)

Connection Size

Standard Units: 1½ NPT male, hot tap models, 2 NPT male
Ambient Temperature: -17 to 72°C (0 to 160°F)
Fluid Temperature: 0 to 93°C (32 to 200°F)
Maximum Pressure: 13.8 bar (200 psi)
Minimum Conductivity: 20 microSiemens/cm
Shaft and Fitting: 316 SS or brass (depending on model)
Electrodes: Hastelloy®
Electrode Cap: PVDF
Housing: Cast powder-coated aluminum
Valve: Bronze or SS (depending on model)
O-Ring: EPDM
Accuracy: ±1% of full scale
Output: Square wave pulse, opto isolated, 550 Hz @ 20 ft/second 6 mA maximum, 30 Vdc forward flow standard (reverse flow optional)
Empty Pipe: Defaults to zero flow

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RATE AND TOTAL DISPLAY
FOR THE FMG900 SERIES

FTB700-D Series

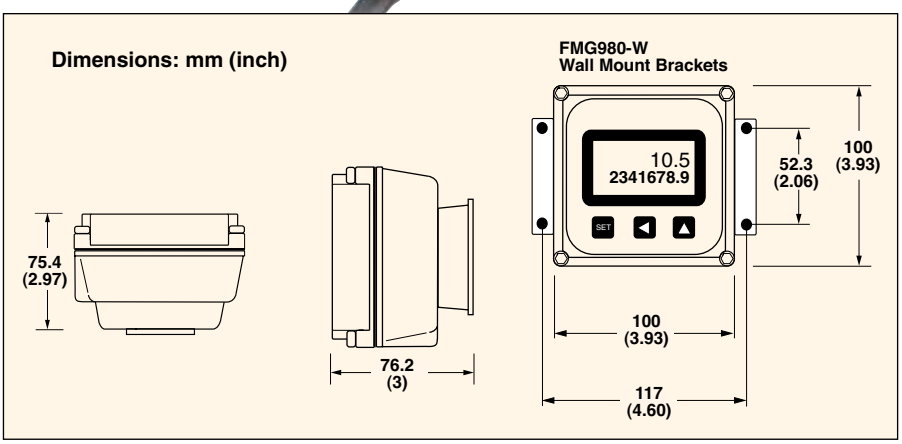
FTB700-D and FTB700D-WMB, see accessory chart on next page, shown smaller than actual size.

- **Simple Setup**
- **Loop Powered**
- **Remote or Flow Sensor Mounted Indicator**
- **Rugged Metallic Housing**
- **Non-volatile Memory**

The FTB700-D Series flow displays are microcontroller-based indicator/ transmitters that display flow rate and total and provide output signals. The FTB700-D is powered by external DC voltage and has both pulse and 4 to 20 mA analog outputs. When the FTB700-D is being used in the 4 to 20 mA mode, it is a "two-wire" or "loop-powered" device, meaning that the 4 to 20 mA output signal doubles as its power supply.

The addition of a dual-relay output board (-R2) allows for certain applications requiring contact output isolation (e.g., certain metering pumps and water treatment controls). Dual solid state relays provide exactly the same pulse output as the standard unit, and each can signal one external device.

The FTB700-D can be mounted on the meter (-M) or remotely wall mounted with the brackets provided (FTB700D-W). Housings for the "-W" and "-M" models are rugged cast aluminum, potted and gasketed for maximum environmental protection. A membrane keypad allows settings to be changed without removing the cover. (Password protection, a standard feature, can be used to prevent settings from being changed.)



SPECIFICATIONS

Power: 12 to 30 Vdc, (4 to 20 mA)
Display Rate: 6-digit autorange, ½" character height
Total: 8-digit, 5⁄16" character height
Outputs Current Sinking Pulse: Scaled pulse output (0.1 second duration 6.1 Hz maximum) (or high alarm output or low alarm output). Sensor pass-through pulse output (unscaled)
Analog: 4 to 20 mA
Pulse Output Range: 0.1 - 9999999.9 units/pulse
Input: 5V pulse or contact closure
Input Range: 1.0 - 1,500 pulses/second
K-Factor Range: 0.001 - 99999.999
Flow Alarm Output Range: 0.01 - 999999.99
Operating Temperature: -30 to 65˚C (-22 to 148˚F)
Environmental: NEMA 4X, (IP66)
Regulatory: CE

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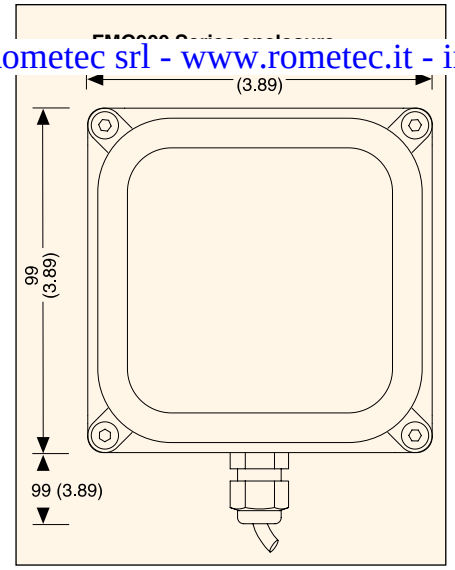
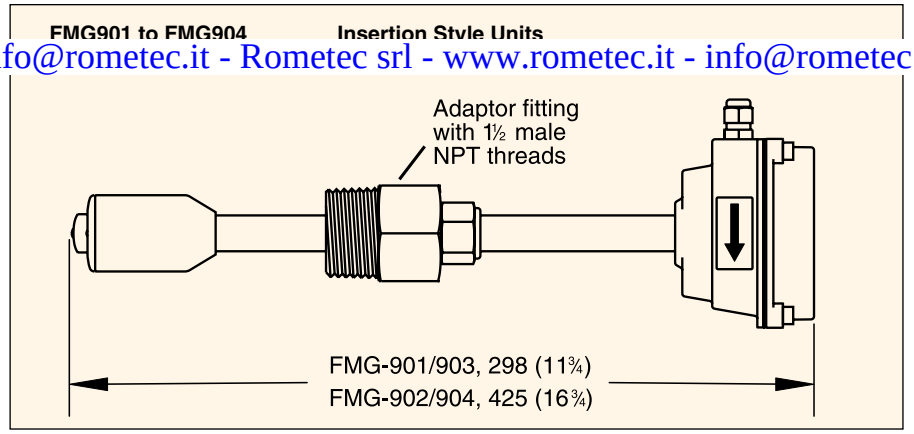
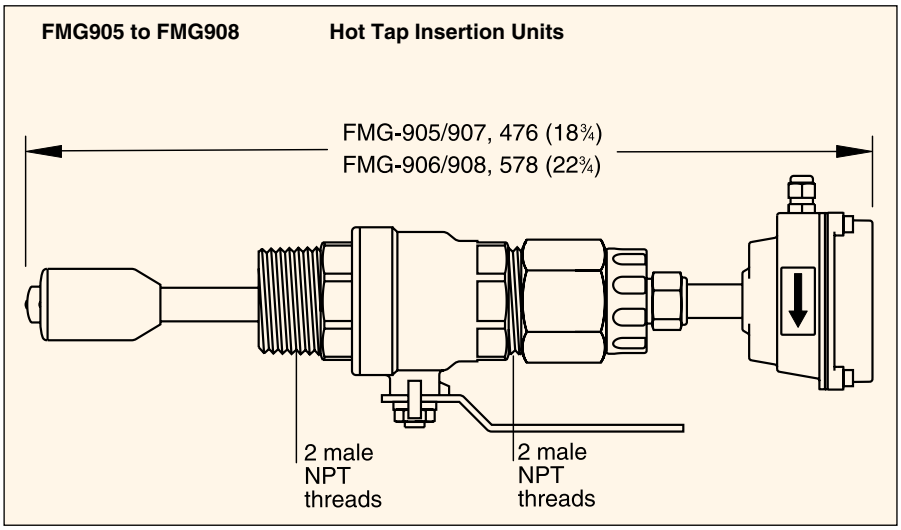




Dimensions: mm (inch)

Flow Range LPM (GPM)		
Pipe Size	**Min Flow**	**Max Flow**
3	23 (6)	1666 (440)
4	42 (11)	2964 (783)
6	95 (25)	6670 (1762)
8	167 (44)	11,860 (3133)
10	261 (69)	18,530 (4895)
12	375 (99)	26,687 (7050)
14	507 (134)	36,325 (9596)
16	662 (175)	47,443 (12,533)
18	840 (222)	60,050 (15,863)
20	1037 (274)	74,134 (19,584)
24	1495 (395)	160,749 (28,200)
30	2336 (617)	166,800 (44,064)
36	3361 (888)	240,192 (63,452)



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To Order

Model No.	Description
FMG901	Brass insertion style magmeter, 76 to 254 mm (3 to 10") pipe
FMG902	Brass insertion style magmeter, 254 to 1219 mm (10 to 48") pipe
FMG903	SS insertion style magmeter, 76 to 254 mm (3 to 10") pipe
FMG904	SS insertion style magmeter, 254 to 1219 mm (10 to 48") pipe
FMG905	Brass insertion style magmeter, hot tap, 76 to 254 mm (3 to 10") pipe
FMG906	Brass insertion style magmeter, hot tap, 254 to 1219 mm (10 to 48") pipe
FMG907	SS insertion style magmeter, hot tap, 76 to 254 mm (3 to 10") pipe
FMG908	SS insertion style magmeter, hot tap, 254 to 1219 mm (10 to 48") pipe

Accessories

Model No.	Description
FTB700-T	Blind 4 to 20 mA transmitter
FTB700D-WMB	Wall mount bracket for FTB700-D
FTB700-D	Remote rate and total display with 4 to 20 mA output
PSU-93	24 Vdc power supply, 200 mA
TX4-100	4 conductor hook-up wire, 30 m (100')

Comes complete with operator's manual.
*For reverse flow option add a **"-RF"** to the model number for additional cost.*
***Ordering Examples: FMG901,** brass insertion style magmeter, **PSU-93,** power supply and **TX4-100,** multi conductor wire.*
***FMG903,** 316SS insertion style magmeter, **PSU-93,** power supply and **TX4-100,** multi conductor wire.*

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INSERTION ELECTROMAGNETIC FLOWMETER

FMG980 Series

1 YEAR WARRANTY

- No Moving Parts
- Durable
- Easy to Install
- Easy to Maintain

FMG981-B

FMG981-P

FMG981-S

All models shown smaller than actual size.

FMG980 Series insertion electromagnetic flowmeters are designed for use with conductive liquids in 25 to 305 mm (1 to 12") pipe. A choice of materials (stainless steel, brass, and PVC) allows the meter to adapt to a range of temperature, pressure, and corrosive environments.

The FMG980 is highly suitable for difficult applications with changing viscosities and pulsating flows, such as air-driven diaphragm pumps. With no moving parts, these meters can be used in “dirty” applications where debris would foul a mechanical meter. Like all magmeters, when used in chemical injection applications, these meters should be installed upstream of the chemical line (or far enough downstream to allow complete mixing of fluids before the meter).

Designed for modularity and versatility, the FMG980 Series has a current-sinking pulse output that can be combined with a transmitter or indicator. For analog output and display of rate and total, an FMG980 display can be used. Blind analog output is provided by the FMG-1000-MAW.

FMG980 Series fixed depth insertion meters require special fittings for installation.

SPECIFICATIONS

Pipe Sizes: 25 to 305 mm (1 to 12")
Materials Mechanical: 316 SS/ Brass/PVC
Electrodes: Hastelloy®
Housing: Cast powder-coated aluminum
Electrode Cap: PVDF
O-Ring: EPDM (FKM optional)
Power Full Power: 12 to 25 Vdc, 250 mA
Low Power: 12 to 25 Vdc, 40 mA average with 250 mA peaks
Flow Rate: 0.28 to 20 ft/sec (0.08 to 6.09 m/sec)
Temperature Ambient: -17 to 72°C (0 to 160°F)

Fluid Temperature:
Brass/SS: 0 to 93°C (32 to 200°F)
PVC: 0 to 55°C (32 to 130°F) @ 0 psi
Pressure:
Brass/SS: 13.8 bar (200 psi)
PVC: 10 bar (150 psi) @ 75°F
Minimum Conductivity: 20 microSiemens/cm
Calibration Accuracy: ±1% of full scale
Output: Square wave pulse, opto isolated, 550 Hz @ 20 ft/sec
Empty Pipe Detection: Defaults to zero flow
Regulatory: CE mark (stainless steel, brass and standard power only)

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RATE AND TOTAL DISPLAY
FOR THE FMG980 SERIES

FMG980 Display

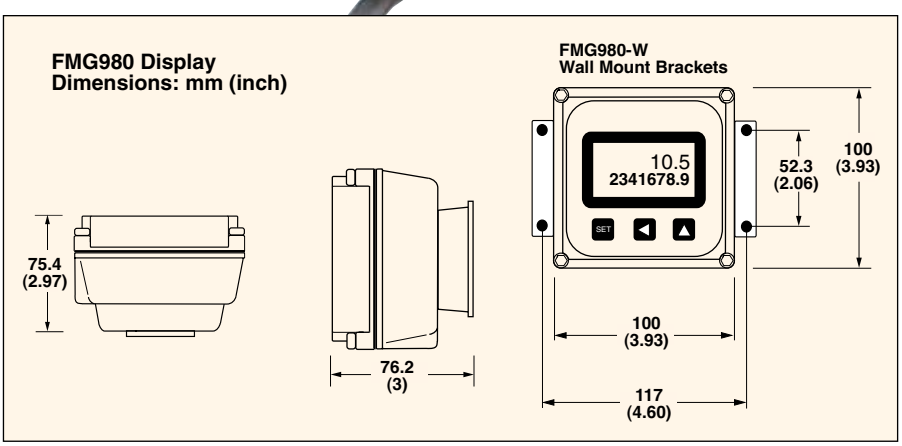
FMG980-W display. To order see accessory chart on last page, shown smaller than actual size.

- **Simple Setup**
- **Loop Powered**
- **Remote or Flow Sensor Mounted Indicator**
- **Rugged Metallic Housing**
- **Non-Volatile Memory**

The FMG980 Series flow displays are microcontroller-based indicator/transmitters that display flow rate and total and provide output signals. The FMG980 is powered by external DC voltage and has both pulse and 4 to 20 mA analog outputs. When the FMG980 is being used in the 4 to 20 mA mode, it is a “two-wire” or “loop-powered” device, meaning that the 4 to 20 mA output signal doubles as its power supply.

The addition of a dual-relay output board (-R2) allows for certain applications requiring contact output isolation (e.g., certain metering pumps and water treatment controls). Dual solid state relays provide exactly the same pulse output as the standard unit, and each can signal one external device.

The FMG900 can be mounted on the meter (-M) or remotely wall mounted with the brackets provided (FMG900-W). Housings for the “-W” and “-M” models are rugged cast aluminum, potted and gasketed for maximum environmental protection. A membrane keypad allows settings to be changed without removing the cover. (Password protection, a standard feature, can be used to prevent settings from being changed).



SPECIFICATIONS

Power: 12 to 30 Vdc (4 to 20 mA)
Display Rate: 6-digit autorange, ½" character height
Total: 8-digit, 5⁄16" character height
Outputs Current Sinking Pulse: Scaled pulse output (0.1 second duration 6.1 Hz maximum) (or high alarm output or low alarm output). Sensor pass-through pulse output (unscaled)
Analog: 4 to 20 mA
Pulse Output Range: 0.1 to 9999999.9 units/pulse
Input: 5V pulse or contact closure
Input Range: 1.0 to 1500 pulses/second
K-Factor Range: 0.001 to 99999.999
Flow Alarm Output Range: 0.01 to 999999.99
Operating Temperature: -30 to 65ºC (-22 to 148ºF)
Environmental: NEMA 4X (IP66)
Regulatory: CE

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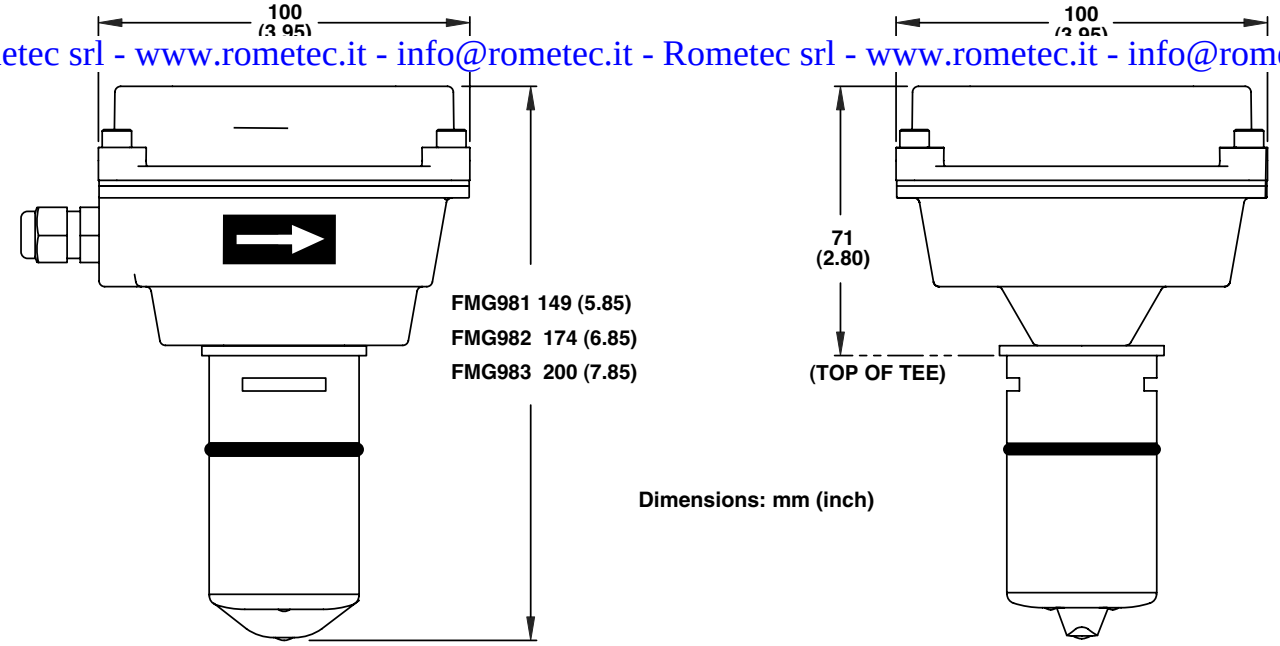
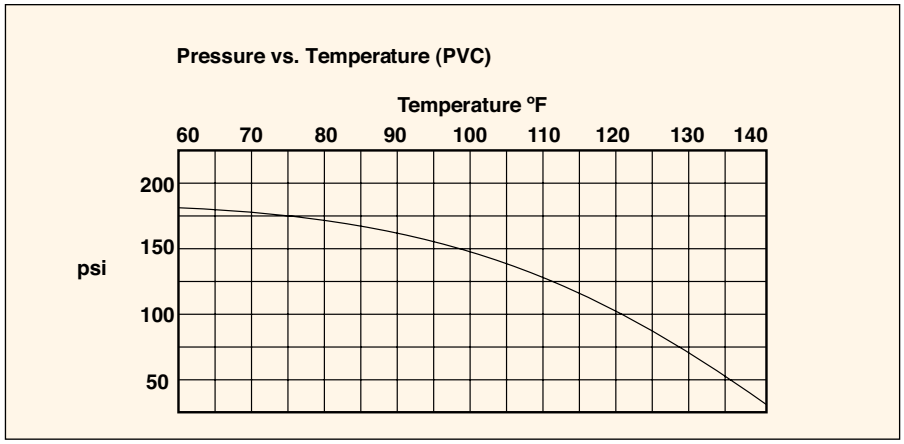
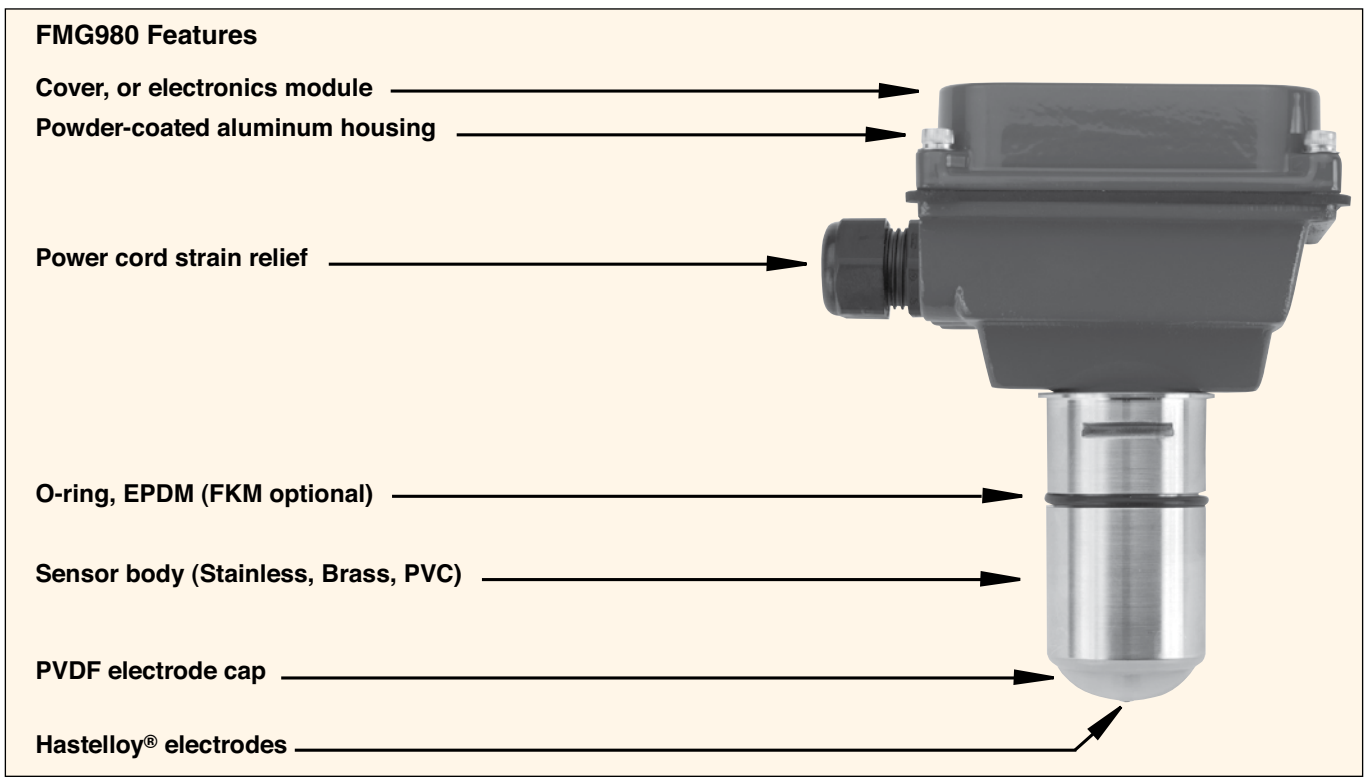


Dimensions: mm (inch)

Flow Range LPM (GPM)		
Pipe Size	Minimum Flow	Maximum Flow
1	2.6 (0.69)	185 (49)
1.5	5.7 (1.5)	416 (110)
2	10 (2.7)	742 (196)
3	23 (6.2)	1666 (440)
4	42 (11)	2964 (783)
6	95 (25)	6662 (1760)
8	163 (43)	11,848 (3130)
10	251 (68)	18,549 (4900)
12	375 (99)	26,687 (7050)



FMG980 Features



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Size inch	Bronze Sweat	Bronze NPT	Bronze Saddle	Brass Weld/ Braze	PVC Tee	PVC Saddle
1	**FP981-1BRS**	**FP981-1BRT**	N/A	N/A	**FP981-1PVC**	N/A
1.5	**FP981-15BRS**	**FP981-15BRT**	N/A	N/A	**FP981-15PVC**	N/A
2	**FP981-2BRS**	**FP981-2BRT**	N/A	N/A	**FP981-2PVC**	N/A
3	**FP981-3BRS**	**FP981-3BRT**	**FP981-3BRSF**	**FP981-3BRW**	N/A	**FP981-3PVCS**
4	**FP981-4BRS**	**FP981-4BRT**	N/A	N/A	N/A	N/A
4	N/A	**FP982-4BRT**	**FP982-4BRSF**	**FP982-4BRW**	N/A	**FP982-4PVCS**
6	N/A	N/A	N/A	**FP982-6BRW**	N/A	**FP982-6PVCS**
8	N/A	N/A	N/A	**FP982-8BRW**	N/A	**FP982-8PVCS**
10	N/A	N/A	N/A	**FP982-10BRW**	N/A	N/A
12	N/A	N/A	N/A	**FP983-12BRW**	N/A	N/A

Size inch	Stainless Tee	Stainless Weld	Carbon Steel Tee	Carbon Steel Weld	Ductile Iron Saddle
1	**FP981-1S**	N/A	**FP981-1C**	N/A	N/A
1.5	**FP981-15S**	N/A	**FP981-15C**	N/A	N/A
2	**FP981-2S**	N/A	**FP981-2C**	N/A	N/A
3	N/A	**FP981-3SW**	N/A	**FP981-3CW**	**FP981-3DS**
4	N/A	**FP982-4SW**	N/A	**FP982-4CW**	**FP982-4DS**
6	N/A	**FP982-6SW**	N/A	**FP982-6CW**	**FP982-6DS**
8	N/A	**FP982-8SW**	N/A	**FP982-8CW**	**FP982-8DS**
10	N/A	**FP982-10SW**	N/A	**FP982-10CW**	**FP982-10DS**
12	N/A	**FP983-12SW**	N/A	**FP983-12CW**	**FP983-12DS**

Installation fittings sold separately		
Model No.	**Model No.***	**Description**
FMG981-B	**FMG981M-B**	Brass electromagnetic insertion sensor, for 1 to 3" fittings
FMG981-P	**FMG981M-P**	PVC electromagnetic insertion sensor, for 1 to 3" fittings
FMG981-S	**FMG981M-S**	316 SS electromagnetic insertion sensor, for 1 to 3" fittings
FMG982-B	**FMG982M-B**	Brass electromagnetic insertion sensor, for 4 to 10" fittings
FMG982-P	**FMG982M-P**	PVC electromagnetic insertion sensor, for 4 to 10" fittings
FMG982-S	**FMG982M-S**	316 SS electromagnetic insertion sensor, for 4 to 10" fittings
FMG983-B	**FMG983M-B**	Brass electromagnetic insertion sensor, for 12" fittings
FMG983-P	**FMG983M-P**	PVC electromagnetic insertion sensor, for 12" fittings
FMG983-S	**FMG983M-S**	316 SS electromagnetic insertion sensor, for 12" fittings

** Model numbers with sensor mounted display.*

Accessories

Model No.	Description
FMG980-W	Rate and total indicator for wall mounting
FMG980-BCAP	Brass fitting cap
FMG980-PCAP	PVC fitting cap
FMG980-SCAP	316 SS fitting cap

Comes complete with operator's manual.

Ordering Examples: FMG981-P, *PVC magmeter for 1 to 3" pipe,* ***FP981-15PVC,*** *1½" PVC installation tee and* ***FMG980W*** *wall mounted rate and total display.*

FP982M-B. *brass magmeter for 4 to 10" pipe and* ***FP982-4BRW.*** *4" brass tee.*

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DIGITAL PLASTIC PADDLEWHEEL FLOWMETERS

NEW

FP1400 Series

1 YEAR WARRANTY

- Polypropylene or PVDF Models
- 29 Engineering Units (Including User Defined)
- Two Programmable Totalizers
- Programmable Alarms
- Isolated Analog 0 to 5 Vdc or 4 to 20 mA
- RS232 Communications Standard
- Local Key Pad and 2 x 16 Characters LCD Display
- Free Communication Software with Data Logging Capability

FP1408 shown larger than actual size.

F

FP1400 Series flowmeters support various functions including; two independently programmable flow totalizers, user programmable low, high or range flow and temperature alarm, two sets of user programmable optically isolated outputs, self diagnostic alarm, and flow pulse output. The flow rate can be displayed in 29 different volumetric or mass flow engineering units. Flowmeter parameters and functions can be programmed locally via optional key pad and LCD or remotely via the RS232/RS485 interface. Local 2 x 16 LCD readout with adjustable backlight provides flow rate, temperature, total volume reading in currently selected engineering units, diagnostic events indication and feature a password protected access to the process parameters to ensure against tampering or resetting.

Liquid flowing through the unit causes the paddlewheel to spin. As the magnets embedded in the paddle spin past the sensor, electrical pulses are produced in which frequency is proportional to the flow rate. The number of pulses per desired time interval and the K-factor (number of pulses/gal) make it is possible to calculate the flow rate and volume passing through the unit. On board CPU and signal conditioner circuitry perform accurate flow and total computation, digital communication and analog 0 to 5 Vdc or 4 to 20 mA output signals. Non-volatile memory stores all hardware specific and user programmable variables, including flow linearization table.

SPECIFICATIONS

Viscosity: 1 cSt (water) can be used for liquids up to 50 cSt with field calibration (max flow range may be affected)
Flow Accuracy (Including Linearity): ±1% of FS
Repeatability: ±0.25% of FS
Temperature Measurement Range: 60°C (140°F)
Temperature Accuracy (Including Linearity): ±0.5°C
Flow Response Time: Approx 1 sec (above 10% of full scale flow), approx 2 seconds (below 10% of full scale flow)
Maximum Pressure: 10 bar (150 psig)
Maximum Pressure Drop: @ 15 psi for sized units @ 20 psi all other sizes
Ambient Temperature: -10 to 60°C (14 to 140°F)
Output Signals:
Linear 0 to 5 Vdc (3000 Ω minimum load impedance); linear 4 to 20 mA (500 Ω maximum loop resistance). Maximum noise 20 mV peak to peak (for 0 to 5 Vdc output)
Flow Pulse Output: 3.3 Vdc amplitude (3000 Ω min load impedance)
Optically Isolated Outputs: UCE 40 Vdc, ICE 150 mA
Power: 11 to 26 Vdc, 100 mV maximum peak to peak output noise
Consumption: +12 Vdc (150 mA maximum); +24 Vdc (100 mA maximum); circuit board have built-in polarity reversal protection, 300 mA resettable fuse provide power input protection
Communications: RS232 standard, RS485 (optional)

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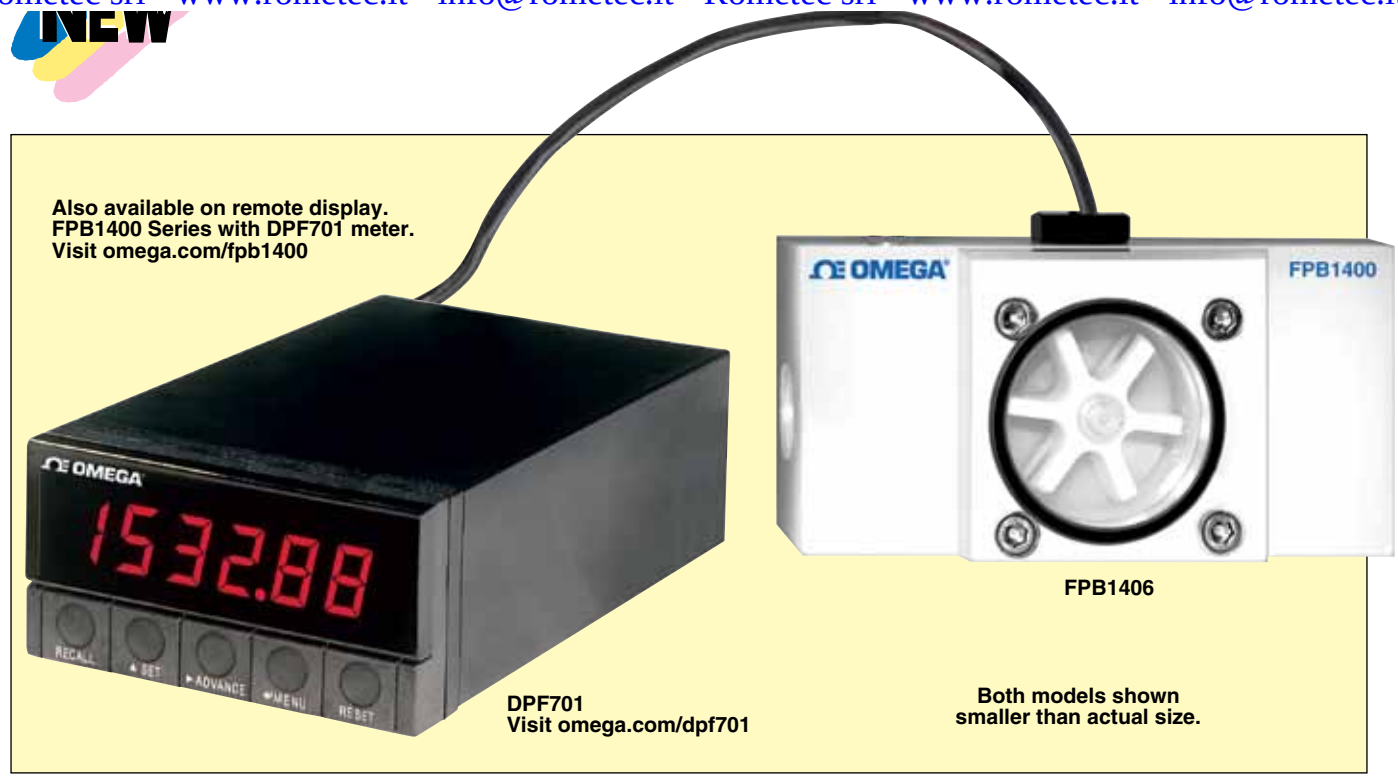

Electrical Connections: Built-in female 12-pin M16, NEMA 4X (IP67) connector. To be mated with 12-pin M16 male EMI shielded NEMA 4X (IP67) connector (sold separately)
Display: Optional local 2 x 16 characters LCD with adjustable backlight (2 lines of text)
Keypad: Optional 4 pushbutton key pad
CE Compliant: EMC Compliance with 89/336/EEC as amended. Emission Standard: EN 55011:1991, Group 1, Class A Immunity Standard: EN 55082-1:1992

Wetted Materials
Polypropylene Models
Body: Polypropylene
LID: Acrylic
Paddlewheel: PVDF
Shaft: Nickel tungsten carbide
Bearings: Sapphire jewels
O-Rings: EPDM
RTD: 316 SS casing

PVDF Models
Body: PVDF
LID: PVDF
Paddle Wheel: PVDF
Shaft: Zirconia ceramic
Bearings: Sapphire jewels
O-RINGS: PTFE
RTD: 316 SS casing

To Order

Model No.	Description	Model No. with RTD	Ports NPT	Maximum Pressure Drop bar (psi)	Range GPM
FP1402	Polypropylene flowmeter, with display	**FP1402-RTD**	⅜	1 (15)	0.5 to 5
FP1404	Polypropylene flowmeter, with display	**FP1404-RTD**	½	1.4 (20)	1 to 10
FP1406	Polypropylene flowmeter, with display	**FP1406-RTD**	¾	1.4 (20)	2 to 20
FP1408	Polypropylene flowmeter, with display	**FP1408-RTD**	1	1.4 (20)	3.5 to 35
FP1412	PVDF flowmeter, with display	**FP1412-RTD**	⅜	1 (15)	0.5 to 5
FP1414	PVDF flowmeter, with display	**FP1414-RTD**	½	1.4 (20)	1 to 10
FP1416	PVDF flowmeter, with display	**FP1416-RTD**	¾	1.4 (20)	2 to 20
FP1418	PVDF flowmeter, with display	**FP1418-RTD**	1	1.4 (20)	3.5 to 35
Accessories					
DPF701	⅛ DIN digital display, 115 Vac 7.5 to 13 Vdc powered				
FP1400-CABLE	12-pin 2 m (6') cable				

Comes complete with operator's manual.
*For units with RS485 communications in place of RS232 add suffix **"-485"** to the model number, no additional charge.*
***Ordering Example: FP1404,** polypropylene flowmeter with display 1 to 10 GPM range, ½ NPT connections.*

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Blue-White®

Engineering and Technical Data

F-1000

Digital Paddlewheel Flow Meter

Features

> High accuracy digital paddlewheel technology
> 3/8”, 1/2”, 3/4”, 1”, 1-1/2”, and 2” male pipe threads
> Tamper proof factory programming
> Easy to read 6 digit LCD display, up to 4 decimal places
> Very low pressure drop
> Total reset function can be disabled

NEMA 4X

Highlights

Flow range
.4 - 200 GPM
1 - 27,000 LPM

Pressures
300 PSI
(20.7 bar)

Pressure drop
8 PSI
(varies per model)

Full Scale Accuracy
+/- 2%

Power supply
Battery operated

Warranty
1 Year

Available Models


Molded Fittings


Saddle Mount Fittings


PVC Fittings


Stainless Steel Tee Fittings

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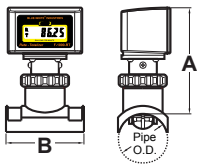
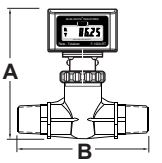
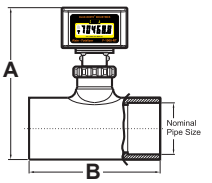
Engineering Specifications

Maximum Working Pressure	300 PSI (20.7 bar) @ 70 °F (21 °C)
Maximum Fluid Temperature	200 °F (93.3 °C) @ 0 PSI (all PVDF saddles and SS Tee fittings)
	140 °F (60 °C) @ 0 PSI (all PVC saddles and PVC Tee fittings)
	NOTE: Temperature rating of F-1000 only. Actual pipe rating may vary
Maximum Ambient Temperature	14 °F to 110 °F/ -10 °C to 43 °C
Maximum Pressure Drop	8 PSI (varies per model)
Full scale Accuracy	+/- 2%
Power Requirement	2 AAA batteries (included)
Approximate Shipping Weight	2 lb. (.91 kg)
Enclosure	NEMA 4X (IP56)
RoHS Compliant	Yes

Dimensions







	Saddle Fittings	
Pipe Size	**A**	**B**
1.5”(50mm)	4-5/16”	3-3/16”
2”(63mm)	4-5/16”	3-3/16”
2.5”(75mm)	4-5/16”	3-3/16”
3”(90mm)	4-5/16”	3-3/16”
4”(110mm)	4-5/16”	3-3/16”
6”(160mm)	4-1/4”	3-3/16”
8”(200mm)	4-1/4”	3-3/16”
10”(250mm)	4-1/4”	4-1/2”
12”(315mm)	4-1/4”	4-1/2”

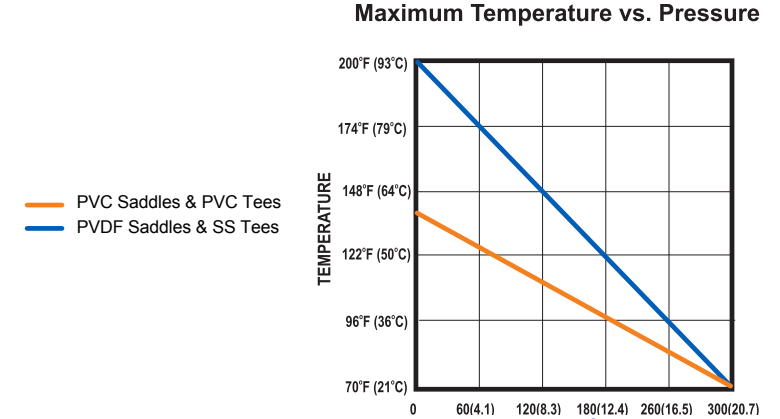
	Molded Fittings	
Pipe Size	**A**	**B**
3/8”	5-3/8”	4-3/4”
1/2”	5-3/8”	5-1/8”
3/4”	5-5/8”	5-1/4”
1”	5-5/8”	5-5/8”
1-1/2”	6-1/8”	6-1/2”
2”	6-3/8”	6-3/4”

	316 SS Tee		PVC Tee	
Model	**A**	**B**	**A**	**B**
RB-100	5-1/2”	3”	4”	6”
RB-150	6-1/4”	3-13/16”	4-1/2”	6-5/8”
RB-200	6-3/4”	4-7/16”	4-3/4”	7-1/8”

Performance

NOTE: All tests performed after approximately 30 minutes tube break-in period.

Maximum Temperature vs. Pressure



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Materials of Construction

Saddle material:	PVDF (1-1/2", 2", 3", 50mm, 63mm, 90mm sizes)
	PVC (all other sizes)
Pipe fitting:	Polypropylene (options: PVDF)
Sensor, paddlewheel, axle:	PVDF
Sensor O-ring seals:	Viton (optional EP)
Enclosure:	ABS

Ordering Information

Molded In-Line Pipe Fittings

Pipe Size	GPM Range	Max. PSI Drop	Model Number	
			Polypropylene	PVDF
3/8"	.8 to 8	2.3	375M1	375F1
3/8"	.4 to 4	8.7	375M2	375F2
1/2"	2 to 20	3.5	50M1	50F1
1/2"	.5 to 5	6.9	50M2	50F2
3/4"	3 to 30	1.9	75M1	75F1
3/4"	.8 to 8	2.3	75M2	75F2
1"	5 to 50	1.6	10M1	10F1
1"	2 to 20	3.5	10M2	10F2
1-1/2"	4 to 40	1.8	15M1	15F1
1-1/2"	6 to 60	1.0	15M2	15F2
1-1/2"	10 to 100	0.9	15M3	15F3
2"	4 to 40	1.8	20M1	20F1
2"	6 to 60	1.0	20M2	20F2
2"	10 to 100	0.9	20M3	20F3
2"	20 to 200	1.0	20M4	20F4

TEE Pipe Fittings

Pipe Size	GPM Range	316 SS Tee Material	Socket Weld PVC Tee	
			Material	Model Number
1"	6 to 60	316 SS	PVC	10AT
1-1/2"	15 to 150	316 SS	PVC	15AT
2"	30 to 300	316 SS	PVC	20AT
3"	60 to 600		PVC	30AT

Saddle Mount Pipe Fittings

Pipe Size IPS	GPM Range	Material	Model Number	
			Schedule 40	Schedule 80
1-1/2"	15 to 150	PVDF	15K4	15K8
2"	30 to 300	PVDF	20K4	20K8
2-1/2"	40 to 400	PVC	25A4	25A8
3"	60 to 600	PVDF	30K4	30K8
4"	100 to 1000	PVC	40A4	40A8
6"	250 to 2500	PVC	60A4	60A8
8"	400 to 4000	PVC	80A4	80A8
10"	600 to 6000	PVC	100A4	100A8
12"	800 to 8000	PVC	120A4	120A8

DIN 8062	LPM	Material	Metric PN10	Metric PN16
50mm	70 to 700	PVDF	05K0	05K6
63mm	110 to 1100	PVDF	06K0	06K6
75mm	150 to 1500	PVC	08A0	08A6
90mm	230 to 2300	PVDF	09K0	09K6
110mm	350 to 3500	PVC	11A0	11A6
160mm	720 to 7200	PVC	16A0	16A6
200mm	1150 to 11500	PVC	20A0	20A6
250mm	1700 to 17000	PVC	25A0	
315mm	2700 to 27000	PVC	31A0	

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Model Number Matrix

RB	-	375	S4	-	GPM	1	-	E	Sample Model Number

Variations

RB = Rate Only Model Number
TB = Total Only Model Number
RT = Rate and Total Model Number

Pipe Sizes M/NPT

Imperial Pipe Sizes	Metric Pipe Sizes
375 = 3/8" IPS	**050** = 50mm
500 = 1/2" IPS	**063** = 63mm
750 = 3/4" IPS	**075** = 75mm
100 = 1" IPS	**090** = 90mm
150 = 1-1/2" IPS	**110** = 110mm
200 = 2" IPS	**160** = 160mm
250 = 2-1/2" IPS	**200** = 200mm
300 = 3" IPS	**250** = 250mm
400 = 4" IPS	**315** = 315mm
600 = 6" IPS	
800 = 8" IPS	
1000 = 10" IPS	
1200 = 12" IPS	

Pipe Fitting Type

S4 = SADDLE, SCH40 (I.P.S.) PVC or IRON pipe	**MB** = INLINE INJECTION MOLDED PP BRITISH M/BSPT
1-1/2", 2", 3" PVDF	3/8", 1/2", 3/4", 1" M/BSPT, polypropylene 0.00
2-1/2", 4", 6", 8", 10", 12" PVC	1-1/2" M/BSPT, polypropylene
S8 = SADDLE, SCH80 (I.P.S.) PVC pipe	2" M/BSPT, polypropylene
1-1/2", 2", 3" PVDF	**FI** = INLINE INJECTION MOLDED PVDF AMERICAN M/NPT
2-1/2", 4", 6", 8", 10", 12" PVC	3/8", 1/2", 3/4", 1" M/NPT, PVDF
P0 = SADDLE, PN10 METRIC (DIN 8062) pipe	1-1/2" M/NPT, PVDF
50mm, 63mm, 90mm PVDF	2" M/NPT, PVDF
75, 110, 160, 200, 250, and 315mm PVC	**FB** = INLINE INJECTION MOLDED PVDF BRITISH M/BSPT
P6 = SADDLE, PN16 METRIC (DIN 8062) pipe	3/8", 1/2", 3/4", 1" M/BSPT, PVDF
50mm, 63mm, 90mm PVDF	1-1/2" M/BSPT, PVDF
75, 110, 160, and 200 PVC	2" M/BSPT, PVDF
MI = INLINE INJECTION MOLDED PP AMERICAN M/NPT	**AT** = INLINE INJECTION MOLDED TEE PVC SLIP/SOCKET
3/8", 1/2", 3/4", 1" M/NPT, polypropylene	1", 1-1/2", 2", 3"
1-1/2" M/NPT, polypropylene	**ST** = INLINE TEE 316 SS AMERICAN F/NPT
2" M/NPT, polypropylene	1" F/NPT
	1-1/2" F/NPT
	2" F/NPT

Option

E = EP O-rings
K = Kalrez O-rings
P = No pipe fitting
(not applicable with 1", 1.5", 2" SS Tee models)

Calibration Range

1 = Range 1 (see pipe fitting detail)
2 = Range 2 (see pipe fitting detail)
3 = Range 3 (see pipe fitting detail)
4 = Range 4 (see pipe fitting detail)
5 = Range 5 (see pipe fitting detail)
6 = Range 6 (see pipe fitting detail)

Calibration Units

GPM = U.S. Gallons per minute
GPH = U.S. Gallons per hour
GPD = U.S. Gallons per day
OZM = U.S. Ounces per minute
CFM = Cubic Feet per minute
AFD = Acre Feet per day
LPM = Liters per minute
LPH = Liters per hour
LPD = Liters per day
M3H = Cubic Meters per hour
IGM = Imperial Gallons per minute
IGH = imperial Gallons per hour

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HIGH PERFORMANCE FLOW SENSORS

FP-2541

1 YEAR WARRANTY

- Rugged 316 Stainless Steel Construction
- Flow Rates as Low as 0.3 fps
- Installs in a Variety of Pipe Sizes
- No Magnets in Process Fluid
- Hot-Tap Version Removable Without Shutdown
- Uses Standard Pipe Connections

The FP-2541 and FP-3-1500 Series offer the added strength and corrosion resistance of stainless steel for applications requiring low velocity measurement. Unique internal circuitry eliminates the need for magnets in the process fluid, enabling lower flow measurement while maintaining the advantages of insertion-type sensor design. The sensor's unique rotor/bearing design offers low flow measuring capability with increased reliability.

SPECIFICATIONS

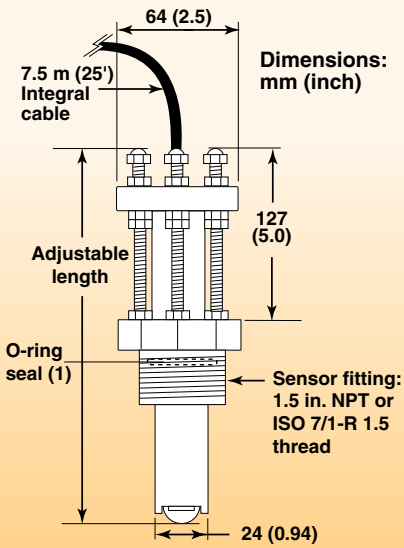
Output Signal: Open collector, sinking
Output Frequency: 15 Hz per fps
Operating Range: 0.3 to 20 fps
Pressure/Temperature: With standard FKM O-rings: 250 psi @ 82°C (180°F)
Power Requirements: 5 to 24 Vdc
Pipe Size Range:
FP-2541: 1.5 to 24"
FP-3-1500-2B: 1.5 to 36"
Repeatability: ±0.5% of full range
Linearity: ±1% of full range

MATERIALS

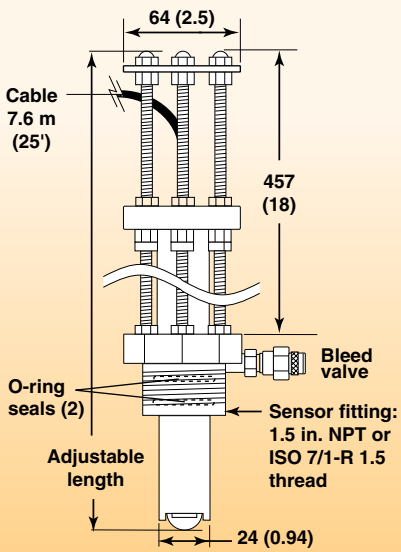
Sensor Fitting: 316SS
O-rings: FKM
Rotor: CD4MCu
Rotor Bearings: PEEK™
Cable Type: Twisted pair with foil shield
Cable Length: 7.6 m (25')
305 m (1000') maximum

FP-2541 flow sensor shown with 152 mm (6") installation ruler, included.

High Performance Flow Sensor



FP-3-1500-2B Hot-Tap



Dimensions: mm (inch)

Compatible Meters: DPF700, FPM-5500, FPM-9020A

To Order

Model No.	Description
FP-2541	High performance flow sensor with 1.5 NPT thread

Accessories

Model No.	Description
FP-3-1500-302	Hot-tap installation tool
FP-3-1500-2B	Hot-tap flow sensor with 1.5 NPT thread
FP-3-2540-321	Replacement rotor and pin for units with serial numbers with "A"

Comes complete with 152 mm (6") installation ruler and operator's manual.
***Ordering Examples: FP-2541**, high performance flow sensor with 1.5 NPT thread.*

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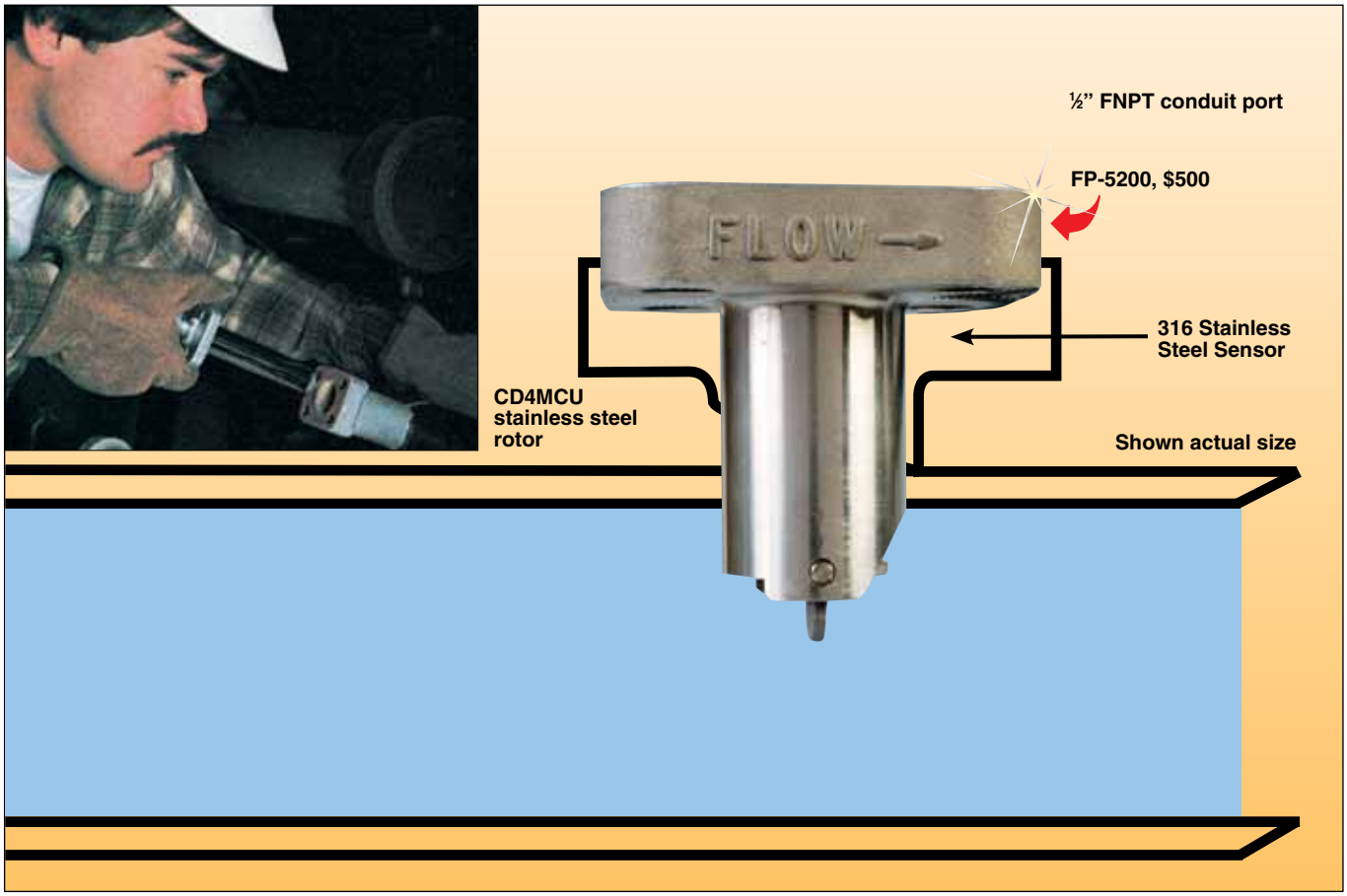

FP-5200 Series

2 YEAR WARRANTY

Use the Metal Flow Sensor for Monitoring or Controlling Flow in:

- **Secondary Oil Recovery**
- **Boiler Water Feed Lines**
- **Turbine Steam Condensate**
- **Energy Management Systems, HVAC**

ACCURACY THAT PAYS OFF

In the FP-5200 sensor housing, a magnet is surrounded by a coil, creating a magnetic field. As the liquid flow causes the rotor to spin, each blade passing this coil concentrates the lines of magnetic force, producing a repeatable AC sine wave output. The FP-5200 also features OMEGA's patented "open-cell" rotor, for increased linearity at ±1% over the full dynamic range of 1.6 to 20 fps, with negligible head loss.

COMPATIBLE, VERSATILE INTERFACING

The FP-5200 is completely compatible with FPM Series powered flow indicators, controllers, and totalizers, to give increased flexibility in system design. It also interfaces easily with digital computers and with a variety of other external equipment.

FP-5200 FLOW SENSOR

When you're looking for the added strength of an all-metal flow sensor, make it the FP-5200. It permits the high degree of accuracy and reliability you demand, without added cost. Compare it to traditional metal flowmeters, where the price increases dramatically with pipe size. In contrast, you can install the FP-5200 insertion flow sensor in pipe sizes ranging from ½ to 12" without a lot of additional cost, because the sensor price increases only slightly for larger pipe sizes. Furthermore, it's accurate to ±1% of full scale.

Installation is easy. Use the FP-5200 locally, or in a remote area up to 100 feet from the meter or controller without signal amplification. It needs no external power or battery. Just one operator, simple tools, an FP-5200 Flow Sensor, a few minutes . . . and you're on-line.

Additionally, the all-stainless-steel flow sensor accurately measures a wide variety of fluids, even under high pressure and temperature conditions [pressures up to 1500 psi, temperatures up to150°C (300°F)].

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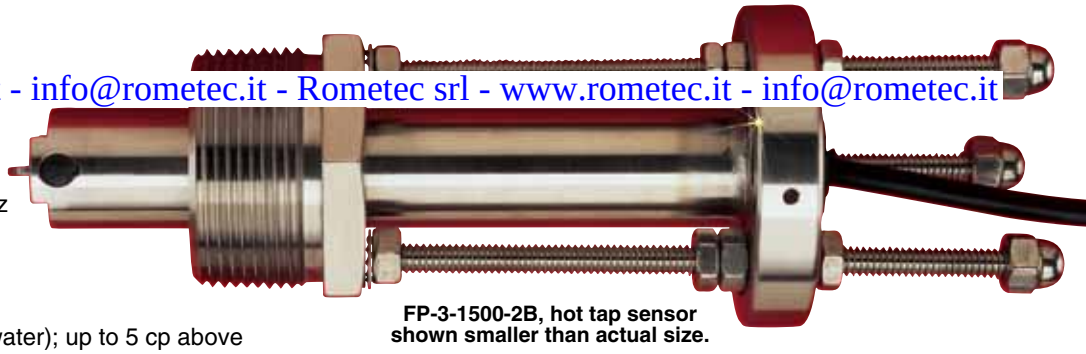
SPECIFICATIONS

Output Frequency: 12 Hz per ft/sec, 80 mV peak-to-peak per fps nominal
Flow Rate Range: 1.6 fps to 20 fps
Output Amplitude: 5 to 8 mV/P-P/Hz
Source Impedance: 10 kΩ
Accuracy: ±0.2 fps
Linearity: ±1% of full range
Repeatability: ±0.5% of full range
Maximum Viscosity: 1 centipoise (water); up to 5 cp above 5 fps velocity
Materials: Rotor: CD4MCU SS; Rotor Housing: 316 SS; Rotor Shaft: Tungsten Carbide; Transducer Body: 347 SS; Top Flange: 316 SS; Cap: 316 SS
Rotor Bearing: Fluoroloy B (PTFE-based fluoroplastic)
Cable Length: 7.5 m (25'), can be extended up to 30 m (100') with copper wire
Maximum % Solids: 10%, with particulate size not exceeding 5 mm cross section or length
Weight: 0.9 kg (2 lb)



FP-3-1500-2B, hot tap sensor shown smaller than actual size.

METAL HOT-TAP FLOW SENSOR

The metal hot-tap sensor allows the user easy sensor installation and removal without shutting down the process stream. Compatible with Mueller drill assemblies, this new hot-tap sensor can be quickly installed into pipe sizes from 1½ to 24". This hot-tap assembly is compatible with any 1½ NPT female pipe fitting such as weldolets and saddles. Installation fitting not supplied.

Metal Flow Sensors

To Order

Model No.	Pipe Fitting Size/Style	Sensor Length mm (inch)	[Minimum -46°C (-50°F)] Maximum Temperature °C (°F)	Maximum Pressure
FP-5200	½"-1" mini-tap	38.4 (1.512)	149 (300)	1500 psi
FP-5201	1¼"-12" mini-tap	63.5 (2.50)	149 (300)	1500 psi
FP-5202	2"-12" saddle	114.3 (4.50)	149 (150)	300 psi

Comes complete with operator's manual
***Ordering Example: FP-5200** paddle wheel sensor, **FP-5205**, fitting.*
*See Page F-40 for **FP-5200** Fittings. Complete replacement rotor/paddlewheel kit for FP-5200 series: **FP-52509.***
*Cap kit with gasket and bolts: **FP52628.** Gasket only: **FP-52618.***

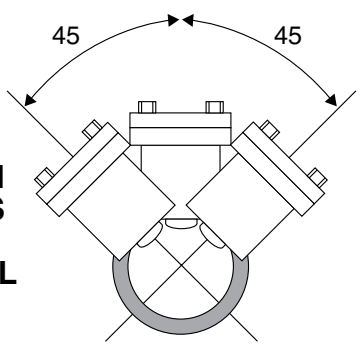
SPECIFICATIONS

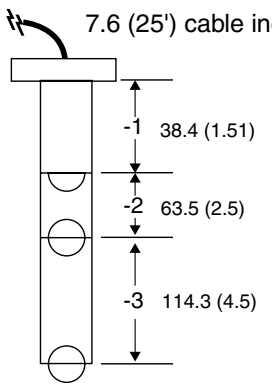
Flow Range: 0.3 to 20 fps
Wetted Parts: 316 and CD4MCU stainless steel; FKM and PEEK
Power Input: 5 to 24 Vdc @ 10 mA maximum
Maximum Pressure/Temperature: 82°C (180°F) up to 250 psig

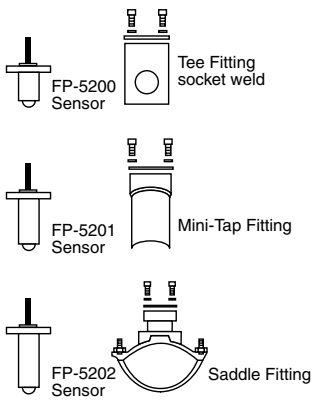
Model No.	Description
FP-3-1500-2B	1½" MNPT sensor

Comes complete with operator's manual.
***Ordering Example: FP-3-1500-2B**, hot tap sensor.*

Installation Dimensions: mm (inch)

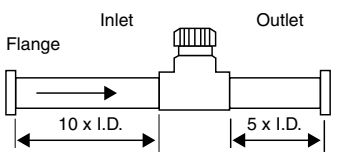


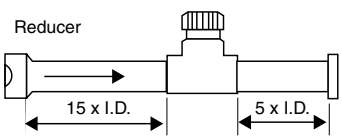


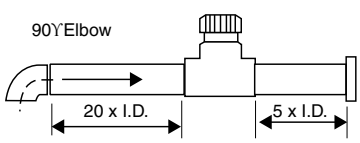


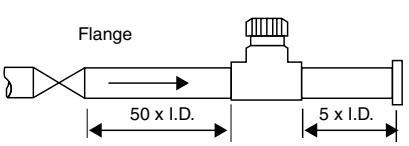
INSTALLATION SUGGESTIONS FOR PADDLEWHEEL SENSORS

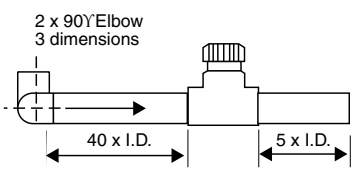
For maximum linearity and accuracy, the sensor should be located in a straight run of pipe upstream and downstream of the sensor. Major obstructions such as pumps or throttle valves require longer straight runs.

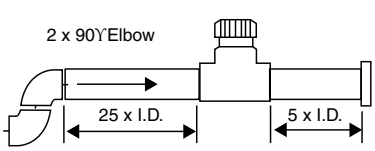












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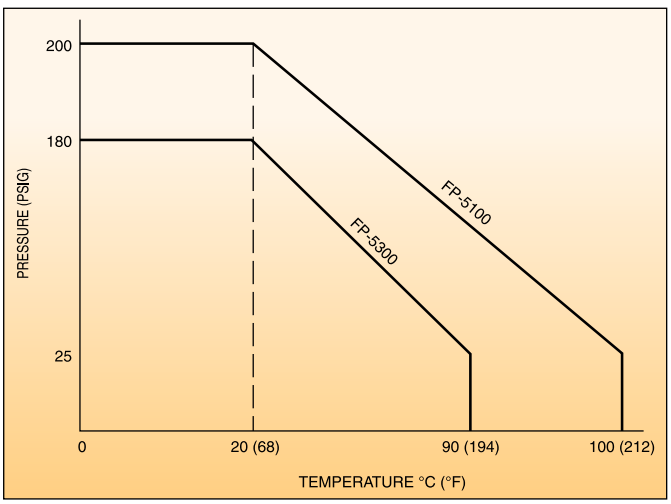
PRESSURE/TEMPERATURE CHARTS

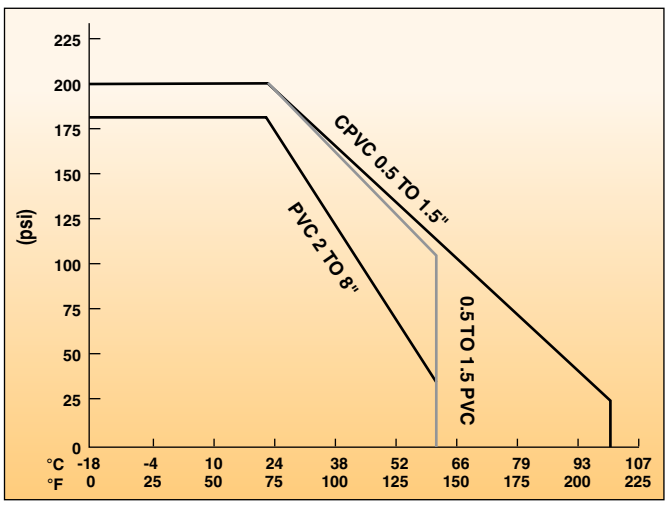
For FP-5100, FP-5200, FP-5300 and FP-8500 Series Sensors and Associated Fittings

NOTE: All pressure/temperature ratings listed are for water under non-shock conditions with no pressure cycling. Various chemicals and cycling pressures up and down can weaken plastics. Fittings must be installed so that the fitting does not carry the weight of the piping and does not suffer from thermal expansion stresses. Water hammer, fluid surges, and cavitation must always be avoided. If the end user elects to thread the plastic fittings with socket ends, the pressure rating will be substantially decreased.

FP-5100, FP-5300 and FP-8500 Series Sensors Pressure/Temperature Ratings

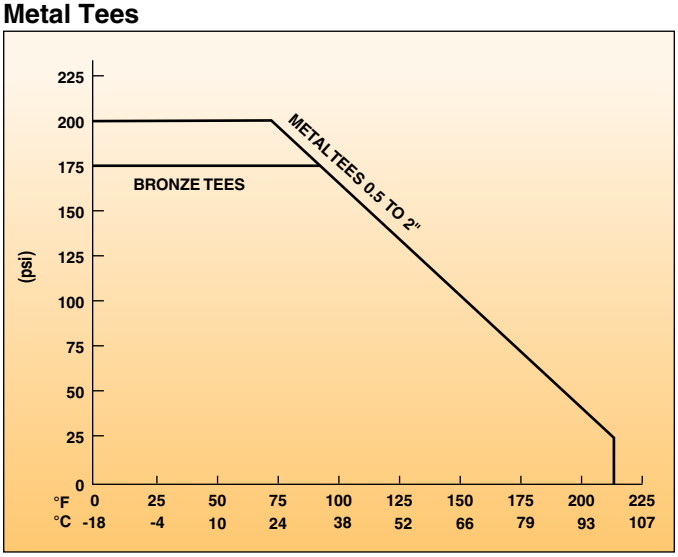


PVC and CPVC Tees and Saddles

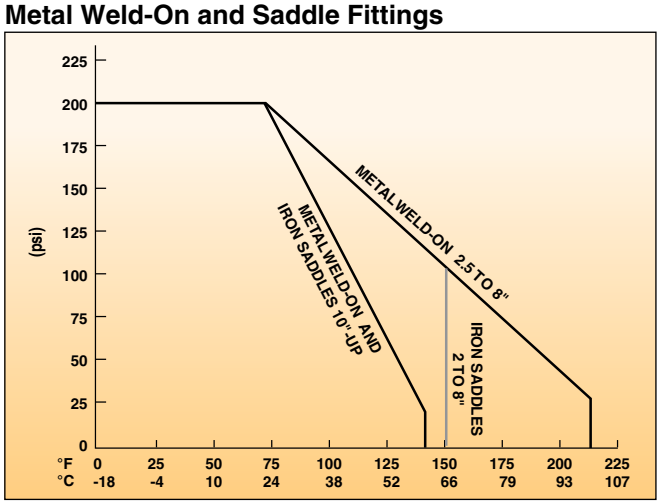


WARNING: THE ABOVE PRESSURE/TEMPERATURE CURVES ARE SPECIFICALLY FOR THE FP-5100. FP-5300, AND FP-8500 SENSORS. DURING SYSTEM DESIGN, THE SPECIFICATIONS OF ALL COMPONENTS MUST BE CONSIDERED. IN A METAL PIPING SYSTEM, A PLASTIC SENSOR WILL REDUCE THE SYSTEM SPEC. ON THE OTHER HAND, IF USING A PVDF SENSOR IN A PVC PIPING SYSTEM, THE FITTING WILL REDUCE THE SYSTEM SPEC.

Metal Tees



Metal Weld-On and Saddle Fittings



These ratings are for PVC and PVDF fittings. For all metal fittings 10" and larger, a PVC insert is used; for 8" and below, a PVDF insert is used. Use the appropriate curve to determine the maximum pressure rating of these fittings.

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For Low Flow Water Applications

FP-5061 shown larger than actual size.

FP-5060 Series

1 YEAR WARRANTY

- **Measures Flow Rates as Low as 0.03 GPM, 0.11 LPM**
- **Splash-Proof**
- **All Plastic Construction**

The FP-5060 Series micro-flow sensors are constructed of polyphenylene sulfide and have high material strength. The series offers two flow ranges, starting at 0.03 GPM, for clean process liquids, regardless of fluid color. These sensors can be connected to flexible tubing or rigid pipe and use standard hardware for mounting. Having only one moving part reduces their operating cost and maintenance requirements.

SPECIFICATIONS

Output Signal: Open collector NPN transistor, 10 mA maximum sink
Cable Length: 7.5 m (25')
Mounting: Horizontal surface ±30°
Linearity: ±1% of full range
Repeatability: 0.5% of full range
Maximum Viscosity: 20 cP
Pressure/Temperature: 0 to 80°C (32 to 176°F) @ 80 psi maximum
Wetted Materials:

- Sensor base, cover and rotor shaft: glass-filled polyphenylene sulfide
- Rotor: PEEK™, natural, unfilled
- Rotor O-ring: FKM
- Cover O-ring: FKM

Maximum Pressure Drop: 25 psi @ maximum flow
Power Requirements: 5 to 24 Vdc @ 10 mA maximum
Dimensions: 100 L x 81 W x 36 mm H (3.96 x 3.2 x 1.42")
Weight: 250 g (9.6 oz)

To Order

Model No.	Port Type	Flow Range LPM (GPM)
FP-5061	¼ NPT	0.11 to 2.6 (0.03 to 0.7)
FP-5062	ISO 7/1-R¼	0.11 to 2.6 (0.03 to 0.7)
FP-5063	¼ NPT	1.13 to 12.11 (0.3 to 3.2)

Accessories

Model No.	Flow Range
DPF701	Rate or total panel meter, Visit omega.com/ for more details

Comes complete with operator's manual, and 7.5 m (25') of cable.
***Ordering Examples: FP-5063,** micro-flow sensor, 0.3 to 3.2 GPM.*
***FP-5061,** micro-flow sensor, 0.03 to 0.7 GPM, and **DPF701,** meter.*

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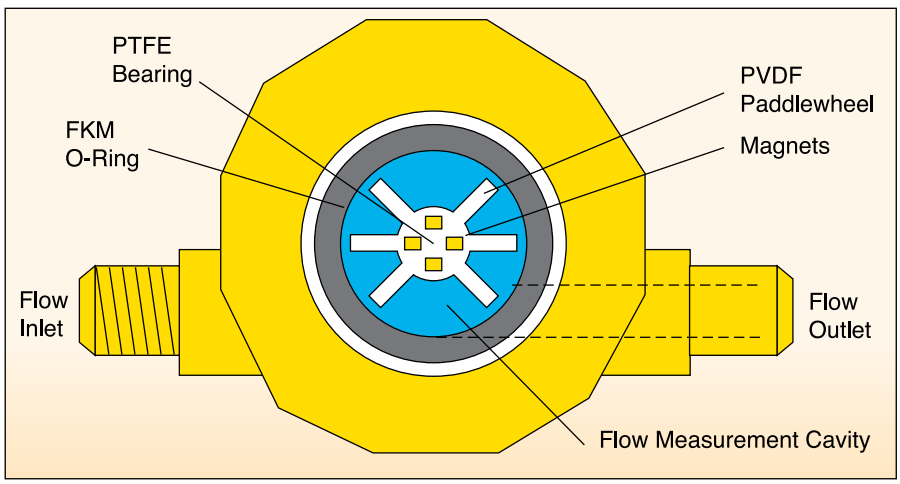
FP-5070

2 YEAR WARRANTY

- **New Higher Resolution Design**
- **Accurate Low Flow Measurements to 500 ml/min**
- **Easily interfaced, Open Collector Output**
- **Wide Temperature Range -30 to 120°C (-22 to 248°F)**

FP-5072-PV shown larger than actual size.

The OMEGA® FP-5070 Mini-Flow sensor is ideal for precision low flow monitoring. The FP-5070 is available in four flow range configurations, covering a very wide range of flows. This allows for easy selection of the range that best fits your application. Typical applications include pilot plant installations, monitoring of critical flows in laboratories, fluid dispensing, bottling lines, and medical flow applications. Other successful applications include monitoring liquid ingredient additions, such as food dyes, in the food processing industry.



SPECIFICATIONS

Accuracy: ±2% of flowrate
Linearity: ±0.25% of flowrate
Reproducibility: ±0.25% of flowrate
Pressure Rating:
80 psig @ -30°C (-22°F);
45 psig @ 120°C (248°F)
Temperature Range:
-30 to 120°C (-22 to 248°F)
Viscosity Range: 0.2 to 20.0 cSt
Power: 5 to 24 Vdc @ 10 mA maximum, 3-wire
Wetted Materials: PVDF, PTFE and FKM
Pressure Drop: 10 psid @ 50% flow, 26 psid @ 100% flow
Signal Output:
5 Volt, open collector pulse
Fluid Connections: ¼ FNPT
Cable Length: 7.5 m (25'), resistor required 10 kΩ recommended
Dimensions: 95 lay length x 66 H x 68 mm W (3.74 x 2.6 x 2.68")
Shipping Weight: 0.4 kg (0.8 lb)

To Order

Model No.	Range (mL/min)	Range (GPM)	Nominal K Factor (pulses/mL)
FP-5072-PV	400 to 2800	0.150 to 0.740	1.502
FP-5073-PV	700 to 4200	0.185 to 1.110	0.874
FP-5074-PV	1300 to 6000	0.343 to 1.585	0.612
FP-5076-PV	3200 to 12000	0.845 to 3.170	0.330

Accessory

Model No.	Description
DPF701	Rate or total panel meter

Comes complete with operator's manual and 7.5 m (25') of cable.
***Ordering Examples: FP-5074-PV**, mini-flow sensor up to 6000 mL/min.*
***FP-5076-PV**, mini-flow sensor up to 12000 mL/min, and **DPF701**, meter.*

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PVDF FLOW SENSOR

FP-5100 Series

2 YEAR WARRANTY

For maintaining critical product purity or for safe transport of highly corrosive acids, you can depend on OMEGA's all-PVDF flow monitoring systems. Known for its superior heat-resistance and thermal stability, PVDF is quickly becoming the preferred piping material in many ultra-pure water and acid transport applications. Using no dyes or stabilizers, OMEGA offers the only "pure" PVDF flow-monitoring system. Available for installation in pipe sizes ranging from ½ to 8", this system is easy both to install and maintain.

FOR ULTRA-PURE CONFIDENCE

Combine OMEGA's PVDF flow monitoring system with your existing PVDF pipe—including SYGEF, PVDF, and SUPER PROLINE. This all-PVDF system completely eliminates the possibility of contaminated fluid product, making it perfect for measuring D.I. water in cosmetic, food, and pharmaceutical production. In addition, processes utilizing D.I. water in the semiconductor industry can be monitored with total confidence.

FOR SAFE ACID TRANSPORT

When pumping hydrofluoric acid to wafer etching tanks...processing sulfuric acid through water treatment skid for regeneration... or transporting harsh solvents, OMEGA's PVDF flow monitoring systems provide rugged, corrosion-resistant construction.

EASY INSTALLATION

PVDF Sensor installation Tee fittings allow direct compatibility with SYGEF piping, joined by the fusion using special electro heating elements. The socket fusion process combines simple handling with high operational safety and reliability. When used in PVDF or SUPER PROLINE piping systems, a flange connection is recommended.

ALSO AVAILABLE: DURABLE POLYPROPYLENE

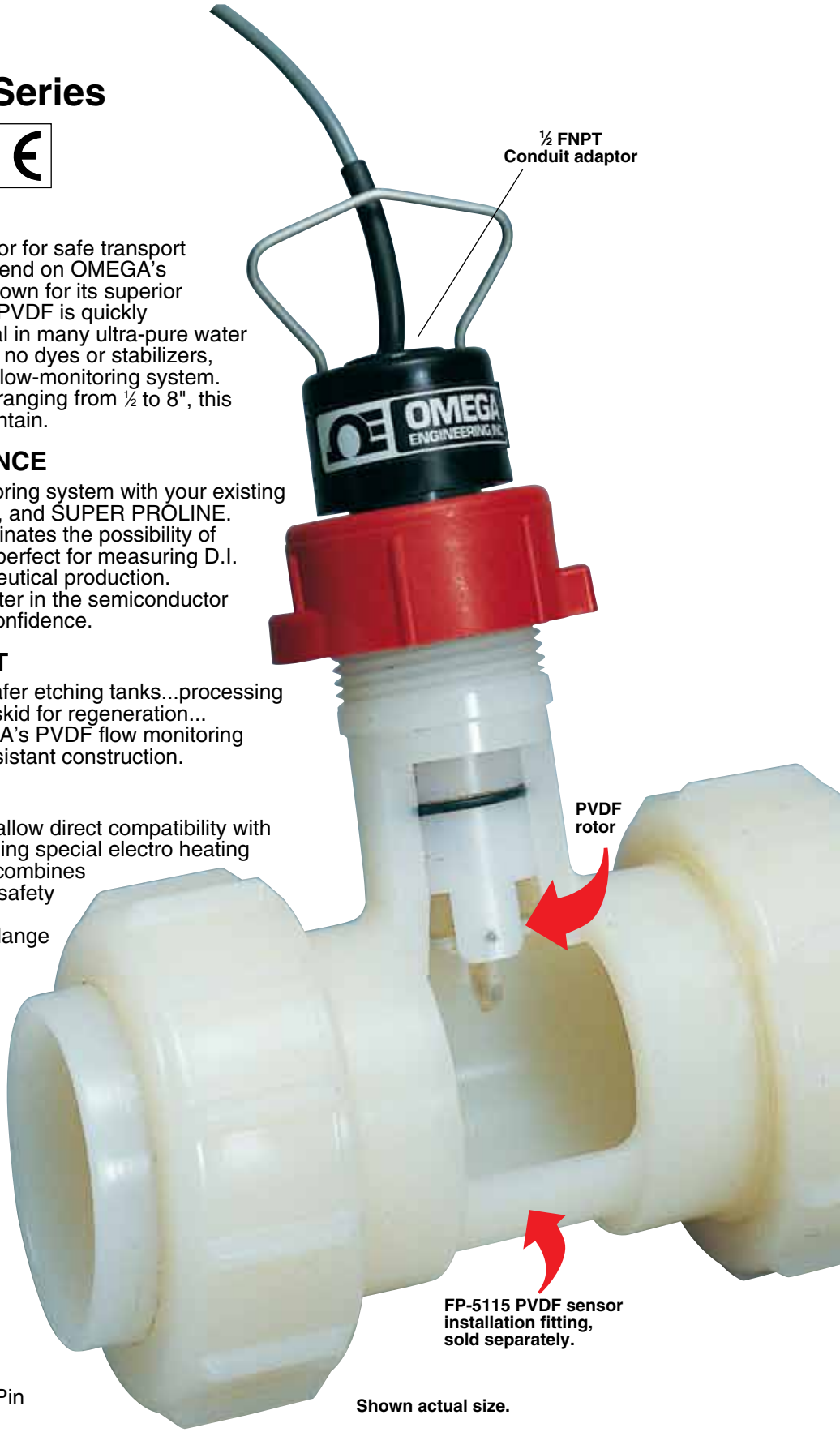
(SEE FP-5300 SERIES)

OMEGA also offers sensors and fittings constructed of durable polypropylene. This lightweight material is strong enough for a wide range of fluid applications, and polypro is rugged for longer wear, which saves you money by reducing replacement and servicing costs.

Replacement Rotor/Paddlewheel Model **FMK-1538-2**

Replacement Hastelloy-C Rotor Pin Model **FMK-1546-2**

Replacement PVDF Rotor and Rotor Pin Model **FMK-51545-1**



Shown actual size.

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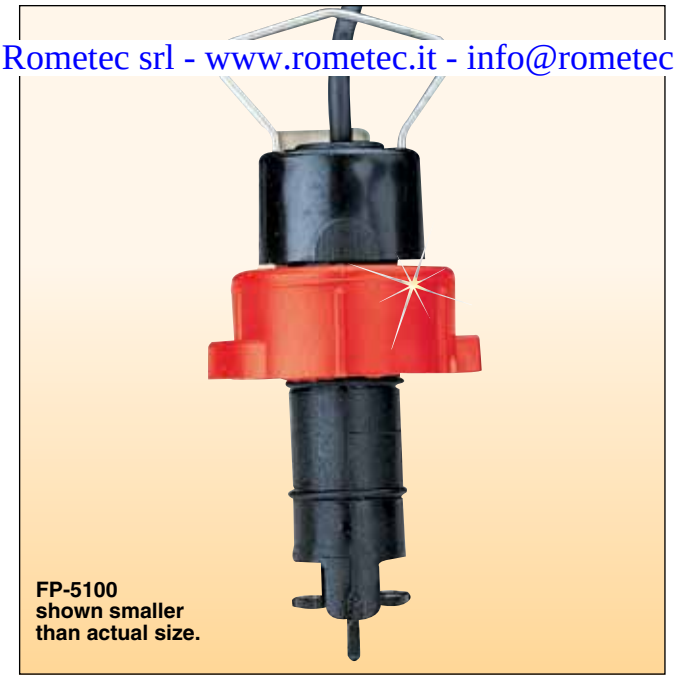
OMEGA's PVDF Flow Sensor includes the same design features as our standard FP-5300 Sensor, with a ±0.2 fps accuracy and ±0.5 fps repeatability.



FP-5100 shown smaller than actual size.

SPECIFICATIONS

Electrical: Same as Model FP-5300
Maximum Viscosity: 1 centipoise (water); up to 5 cp above 5 fps velocity
Materials:
Transducer Housing: PVDF
O-Rings: FKM
Shaft: Hastelloy C (PVDF optional)
Rotor: PVDF
Tee Fitting: PVDF
Cable: 7.5 m (25') twisted pair, foil shielded with drain wire

PVDF Flow Sensors

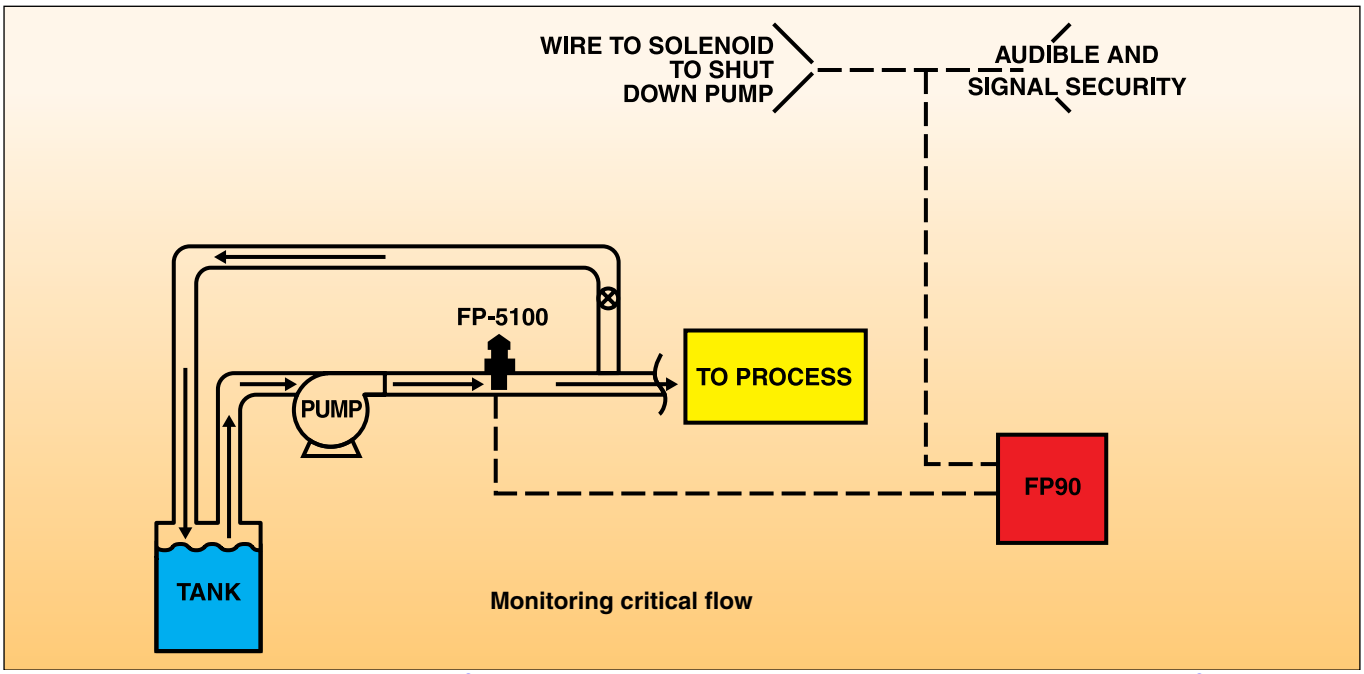
To Order

Description	Model No.	Housing Material	Shaft Material	Pipe Size (in)	Weight g (oz)	Sensor Length mm (inch)
Paddlewheel Sensor	**FP-5100**	PVDF	Hastelloy C	½ to 4	341 (12)	89 (3.5)
	FP-5101	PVDF	Hastelloy C	5 to 8	341 (12)	127 (5.0)

Comes complete with operator's manual.
***Ordering Example: FP-5100**, PVDF/Hastelloy C paddlewheel sensor.*

PVDF Sensor Installation Fittings *(available in mm size only)*

Pipe Size	Model No.	Pipe Size	Model No.
15 mm	**FP-5105**	32 mm	**FP-5112**
20 mm	**FP-5107**	40 mm	**FP-5115**
25 mm	**FP-5110**	50 mm	**FP-5120**



Monitoring critical flow

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PRESSURE/TEMPERATURE CHARTS

For FP-5100, FP-5300 and FP-8500 Series Sensors and Associated Fittings

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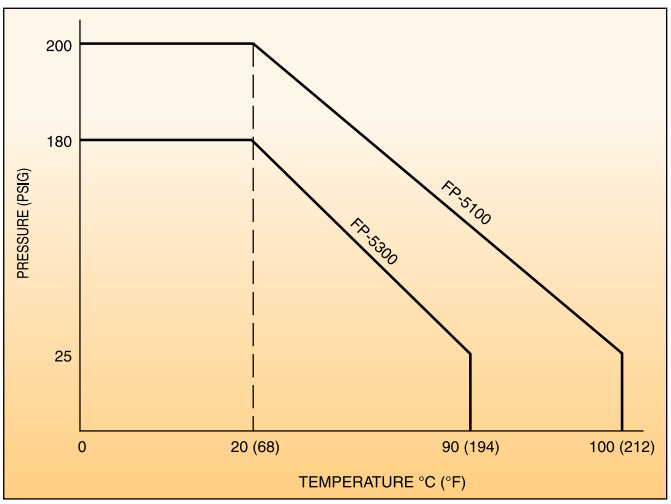
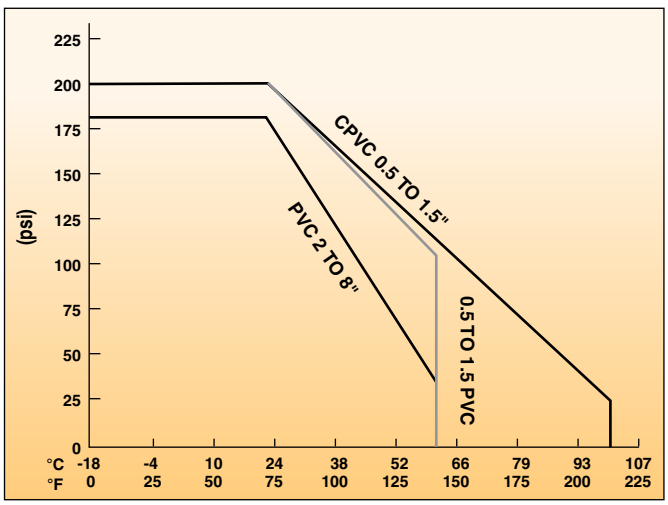
FP-5100, FP-5300 and FP-8500 Series Sensors Pressure/Temperature Ratings



PVC and CPVC Tees and Saddles



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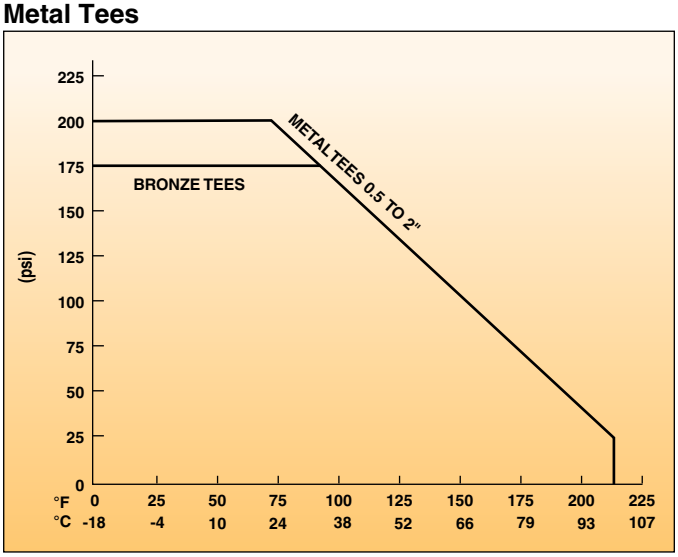
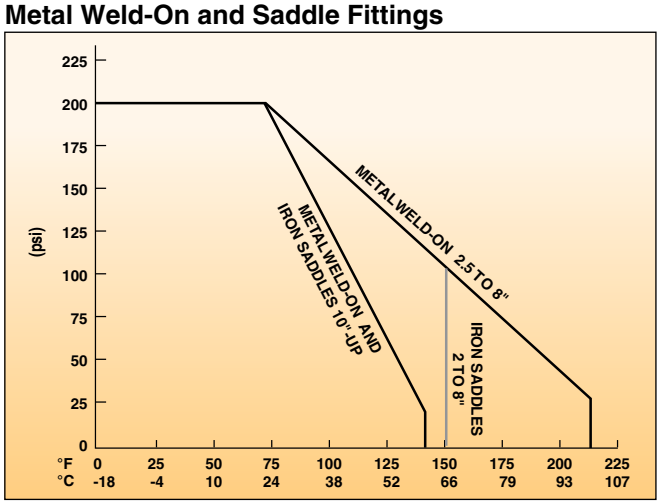
Metal Tees



Metal Weld-On and Saddle Fittings



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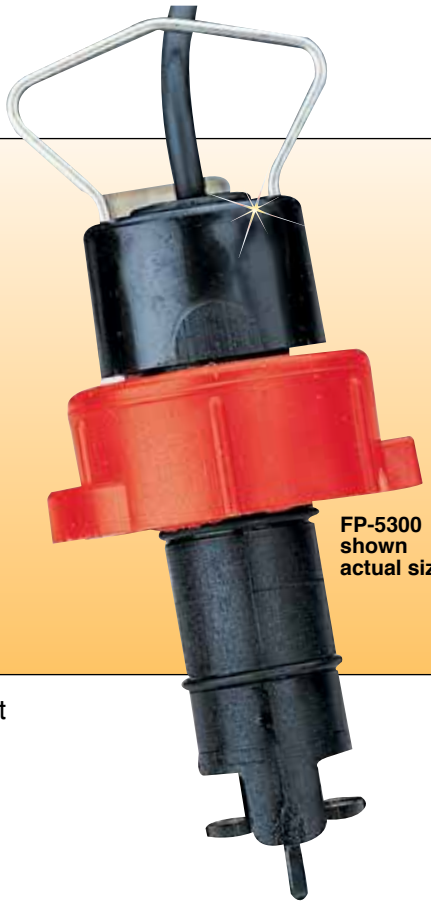
THE FLOW SENSOR THAT MAKES SHORT WORK OF YOUR FLOW MEASUREMENTS

Paddlewheel Flow Sensors

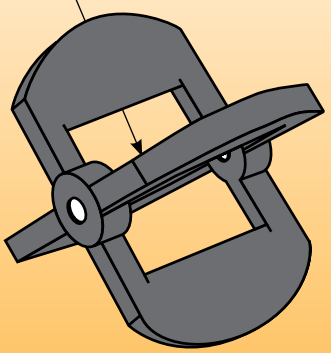
FP-5300 Series

2 YEAR WARRANTY



FP-5300 shown actual size.

Patented "flow-through" rotor design ensures accurate, linear output to ±1%.



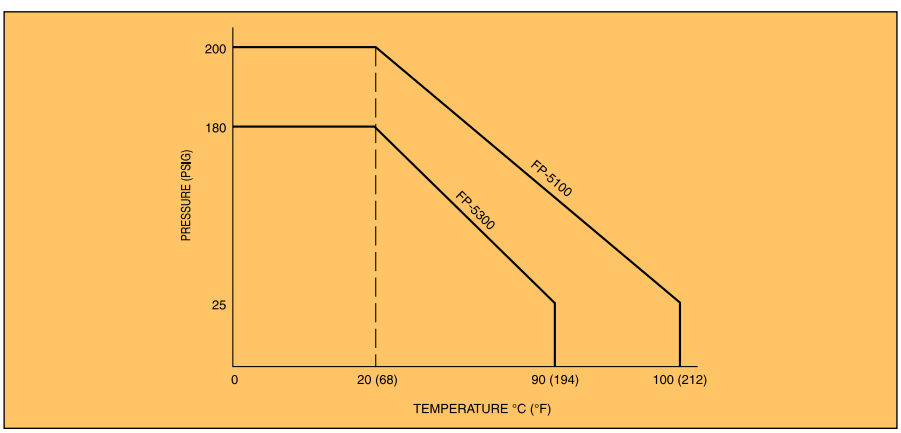
Streamline your flow measurement operation with the FP-5300 Series flow sensor. Using this compact flow sensor, a matched sensor installation fitting, an OMEGA™ flow meter or controller, and ordinary handtools, you can assemble a complete flow monitoring or controlling system in minutes. Accurate to ±0.2 fps, with repeatability at ±0.1 fps, this insertion sensor operates on a simple electromechanical principle, proven in thousands of liquid flow applications worldwide. It all adds up to precision, dependability, and convenience–basic advantages that are quickly surpassing its in-line competition.

A TIMESAVER YOU CAN BANK ON

Convert your maintenance hours into minutes with the FP-5300. Should a sensor, rotor, or O-ring need to be replaced, it takes only seconds. Reduce your system downtime substantially with a stand-alone FP-5300 sensor, or simply add a Wet Tap Assembly and eliminate downtime completely. Combined with the FP-5300 during initial installation, the Wet Tap allows sensor removal without system shut-down. Optional local or remote capability lets you place your meter up to 200 feet away without signal amplification, and you can install the FP-5300 in pipe sizes ranging from ½ inch to 36 inches without a lot of additional cost, because the price of the FP-5300 increases only slightly for larger pipe sizes.

RUGGED CONSTRUCTION FOR LONG WEAR

Available in a choice of chemically resistant, non-contaminating housing materials, the FP-5300 stands up to the harshest environments. The glass-filled polypropylene housing version is lightweight but strong, which makes it ideal for handling a wide range of liquids, including corrosive fluids in chemical processing. For processes involving acids and solvents, the PVDF (polyvinylidene fluoride) housing version is a tough fluorocarbon that is highly resistant to more severe fluids. (Visit us online for more information on OMEGA's all-PVDF flow monitoring systems.)



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Flow Measurement Simple and Accurate

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electromechanical principle based on measuring the rate and volume of flow in your pipe. Four permanent magnets, imbedded in the rotor blades, spin past a coil in the sensor body. As the fluid flow causes the rotor to move, a sine wave signal is produced, directly proportional to the flowrate. The patented “open cell” feature of the rotor ensures a linear, repeatable output, up to 23 fps, with accuracy of ±0.2 fps. The result is minimal head loss and no cavitation.

COMMON SPECIFICATIONS

Accuracy: ±1% full scale
Output Signal: 1 V p-p/fps
Output Frequency: 6 Hz/fps nominal
Flow Rate Range: 1 to 20 fps
Source Impedance: 8 KΩ
Maximum Pressure:
FP-5300 Series: 180 psig maximum @ 20°C (68°F)
FP-5100 Series: 200 psig maximum @ 20°C (68°F)
Minimum Temperature: 0°C (32°F)
Maximum Temperature: See chart on previous page for complete temperature and pressure rating
Pressure Drop: Equal to 2.5 m (8') of straight pipe
Material: Transducer Housing: glass-filled polypropylene; O-Rings: FKM; Shaft: Titanium (PVDF opt.); Rotor: PVDF
Maximum % Solids: 1% of fluid volume, non-abrasive, nonmagnetic, <100 micron diameter and length standard
Cable Length: 7.5 m (25')
Max Viscosity: 1 centipoise (water); up to 5 cp above 5 fps velocity

Paddlewheel Flow Sensors

To Order						
Model No.	**Housing Material**	**Shaft Material**	**Pipe Size (inch)**	**Weight g (oz)**	**Sensor Length mm (inch)**	**Compatible Meters†**
FP-5300	Polypro	Titanium	1⁄2 to 4	341 (12)	89 (3.50)	DPF701, DPF402, DPU91
FP-5301	Polypro	Titanium	5 to 8	341 (12)	127 (5.00)	
FP-5302	Polypro	Titanium	10 or larger	454 (16)	197 (7.75)	
FP-5100	PVDF	Hastelloy C	1⁄2 to 4	341 (12)	89 (3.50)	
FP-5101	PVDF	Hastelloy C	5 to 8	341 (12)	127 (5.00)	

Visit us online for the complete selection of available compatible meters.

Wet Tap Assembly*

Model No.	Wet Tap Valve Assembly Material	Sensor Housing Material	Shaft Material	Pipe Size (inch)	Weight kg (lb)	Sensor Length mm (inch)	Wet Tap Max Operating Temperature/Pressure
FP-3193	PVC	Polypro	Titanium	½ to 4	2.4 (5.25)	298 (11.75)	100 psig @ 20°C (68°F); 60°C (140°F) @ 25 psig
FP-3194	PVC	Polypro	Titanium	5 to 8	2.4 (5.25)	330 (13.00)	
FP-3195	PVC	Polypro	Titanium	10 and up	2.4 (5.25)	406 (16.00)	

***Pipe installation fitting not included. Visit us online for required fittings.*
Comes complete with operators manual.
***Ordering Examples: FP-5300**, paddlewheel sensor, plus **FP-5310M**, 1" PVC fitting.*
***FP-5301** sensor, plus **FP-5350GI**, 5" Galvanized Iron saddle fitting.*

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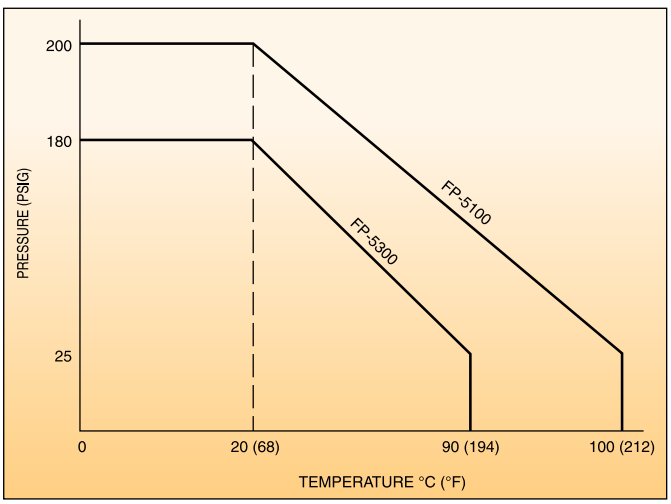
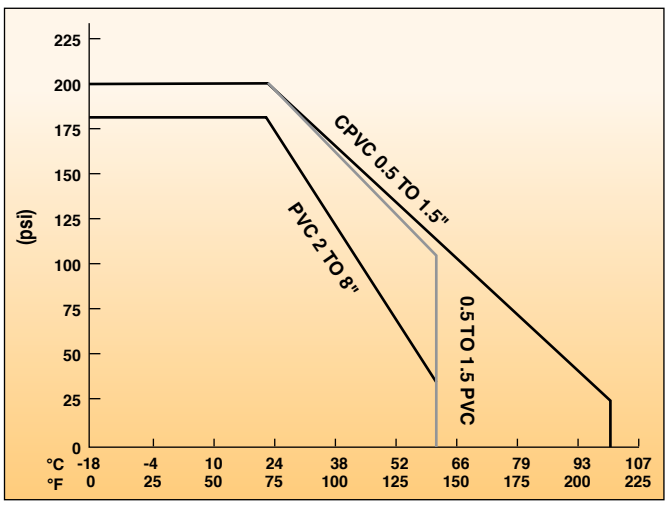
PRESSURE/TEMPERATURE CHARTS
For FP-5100, FP-5200, FP-5300 and FP-8500 Series Sensors and Associated Fittings

NOTE: All pressure/temperature ratings listed are for water under non-shock conditions with no pressure cycling. Various chemicals and cycling pressures up and down can weaken plastics. Fittings must be installed so that the fitting does not carry the weight of the piping and does not suffer from thermal expansion stresses. Water hammer, fluid surges, and cavitation must always be avoided. If the end user elects to thread the plastic fittings with socket ends, the pressure rating will be substantially decreased.

FP-5100, FP-5300 and FP-8500 Series Sensors Pressure/Temperature Ratings

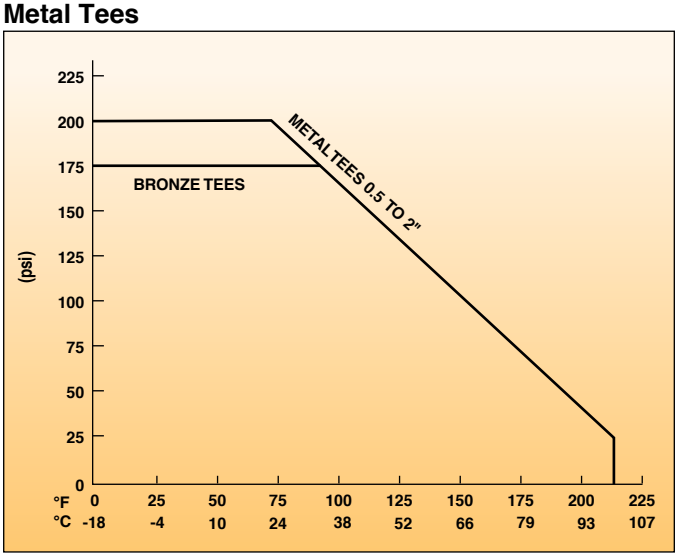


PVC and CPVC Tees and Saddles

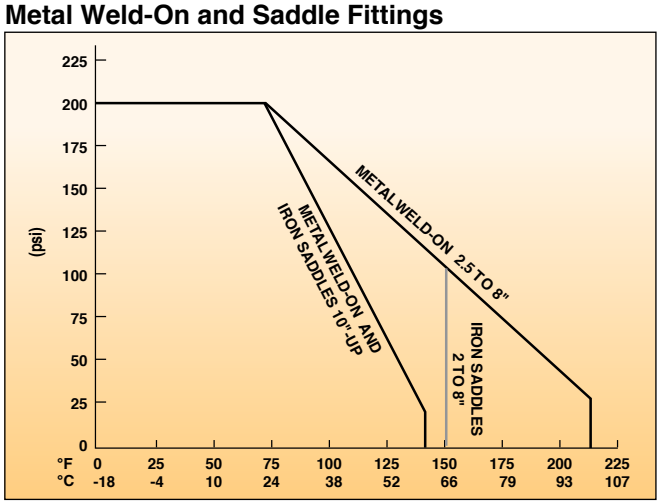


WARNING: THE ABOVE PRESSURE/TEMPERATURE CURVES ARE SPECIFICALLY FOR THE FP-5100. FP-5300, AND FP-8500 SENSORS. DURING SYSTEM DESIGN, THE SPECIFICATIONS OF ALL COMPONENTS MUST BE CONSIDERED. IN A METAL PIPING SYSTEM, A PLASTIC SENSOR WILL REDUCE THE SYSTEM SPEC. ON THE OTHER HAND, IF USING A PVDF SENSOR IN A PVC PIPING SYSTEM, THE FITTING WILL REDUCE THE SYSTEM SPEC.

Metal Tees



Metal Weld-On and Saddle Fittings



These ratings are for PVC and PVDF fittings. For all metal fittings 10" and larger, a PVC insert is used; for 8" and below, a PVDF insert is used. Use the appropriate curve to determine the maximum pressure rating of these fittings.

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FP-5600 and FP8500A Series

1 YEAR WARRANTY

- High Resolution
- Low Power
- Flow Rates As Low As 0.3 fps
- Open Collector Output
- Very Low Pressure Drop

The FP-5600 and FP8500A Series low flow sensors are high resolution, low power devices ideal for measuring flow in piping systems with extremely low velocities. Utilizing insertion paddlewheel technology, these sensors are easy to install and maintain. They incorporate state-of-the-art, advanced Hall-effect design, allowing them to operate with a wide range of voltages and current supplies. The sensors have a wide flow range and reverse polarity protection. The insertion design easily adapts to a wide range of applications.

SPECIFICATIONS

Output Signal: Open collector, sinking
Output Frequency:
15 Hz per fps nominal
Operating Range: 0.3 to 20 fps
Pressure/Temperature:
PP sensor housing: 180 psi @ 20°C (68°F), 25 psi @ 85°C (185°F)
PVDF sensor housing: 200 psi @ 20°C (68°F), 25 psi @ 85°C (185°F)
Power Requirements: 3.3 to 24 Vdc
<1.5 mA @ 3.3V to 6 Vdc,
<20 mA @ 6V to 24 Vdc
Pipe Size Range: 0.5 to 24"
Repeatability: ±0.5% of full range
Linearity: ±1% of full range
Materials: Refer to ordering information for material options available
O-rings: FKM
Cable Type: Twisted pair, foil shield with drain wire
Cable Length: 7.6 m (25')
[300 m (1000') maximum]

Standard Mount Sensors (Threaded Cap)

To Order				
Model No.	**Housing Material**	**Shaft Material**	**Rotor**	**Pipe Size (")**
FP-5600	Polypropylene	Titanium	Black PVDF	0.5 to 4
FP-5601	Polypropylene	Titanium	Black PVDF	5 to 8
FP-5602	Polypropylene	Titanium	Black PVDF	10 or larger
FP-5603	Natural PVDF	Hastelloy C	Natural PVDF	0.5 to 4

Integral Sensor (Use with DPU91 Transmitter and FP90IM Integral Mounting Kit)

Model No.	Housing Material	Shaft Material	Rotor	Pipe Size (")
FP8501A	Polypropylene	Titanium	Black PVDF	0.5 to 4
FP8502A	Polypropylene	Titanium	Black PVDF	5 to 8
FP8503A	Natural PVDF	Hastelloy C	Natural PVDF	0.5 to 4

Comes complete with operator's manual

***Ordering Examples: FP-5600**, low velocity paddlewheel sensor with polypropylene housing, titanium shaft and black PVDF rotor for 2" pipe.*

***FP-5603**, low velocity paddlewheel sensor with PVDF housing, Hastelloy C shaft and PVDF rotor.*

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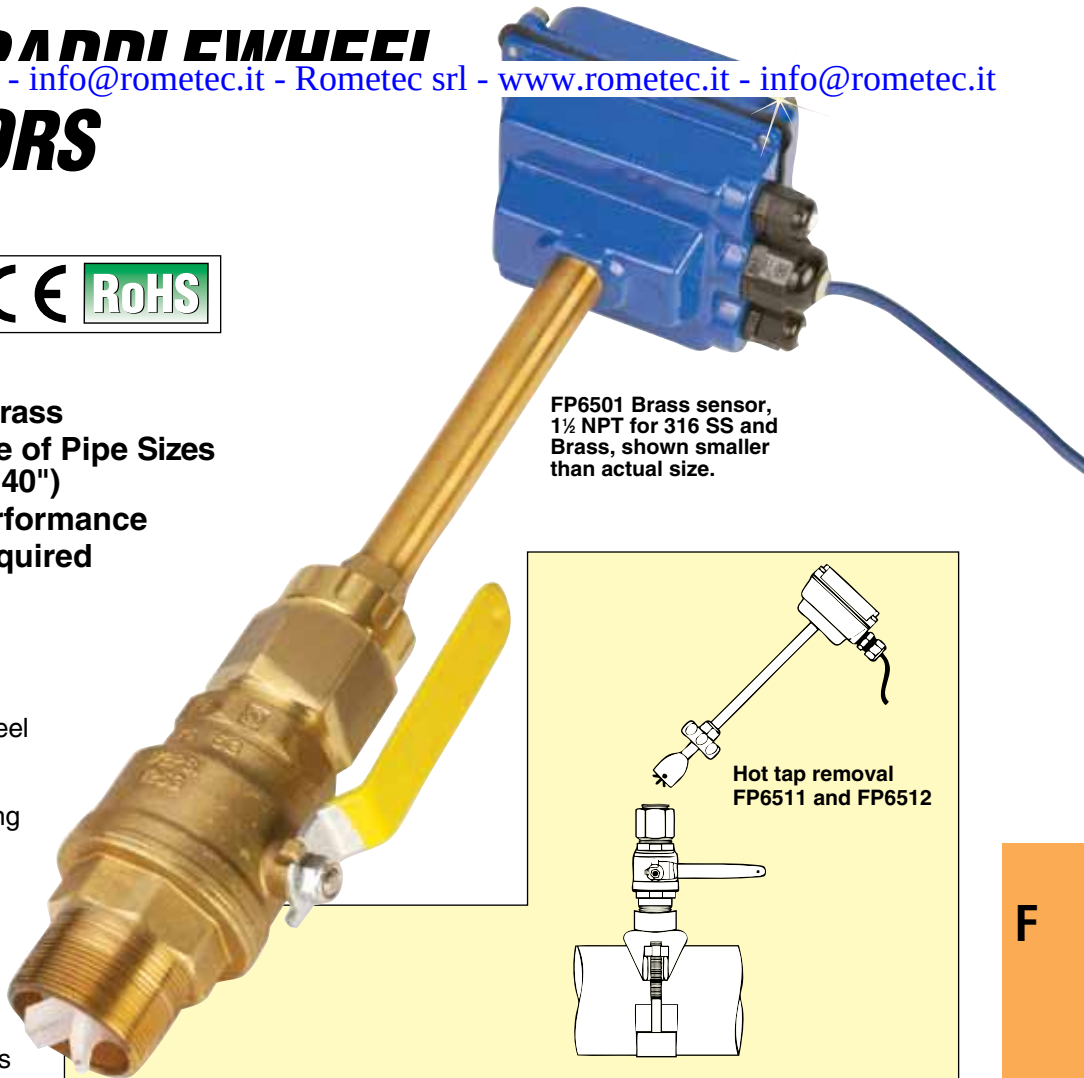
FLOW SENSORS

FP6500 Series

1 YEAR WARRANTY CE RoHS

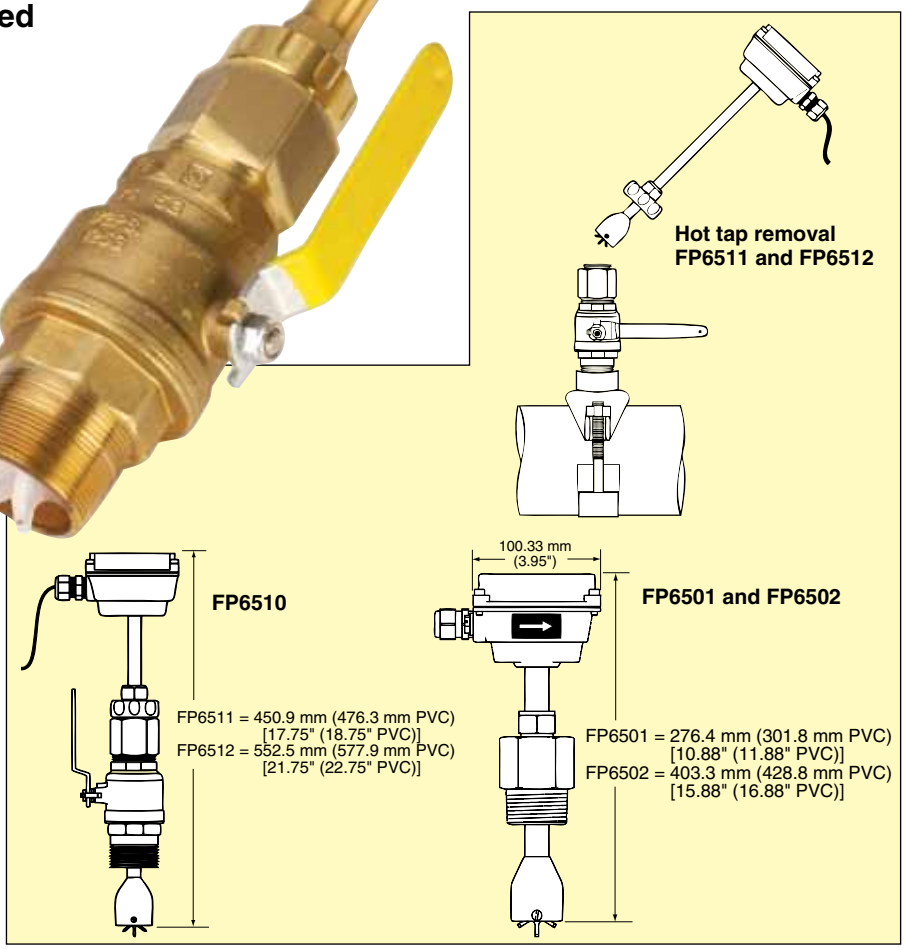
- **Available in 316 SS or Brass**
- **Installs in a Wide Range of Pipe Sizes From 7.6 to 102 cm (3 to 40")**
- **Excellent Low-Flow Performance**
- **Special Fittings Not Required**



FP6501 Brass sensor, 1½ NPT for 316 SS and Brass, shown smaller than actual size.

Ruby bearings and a non-drag pick-off give these adjustable insertion flow sensors the widest flow range of any of the paddlewheel types. A Hall-effect device detects the passage of miniature magnets in the six rotor blades. The resulting square-wave signal can be sent hundreds of feet without a transmitter, over unshield cable. This signal can be connected directly to many PLCs and other controls without additional electronics.

A depth adjustment system allows two basic sizes to cover pipe sizes from 7.6 to 102 cm (3 to 40").



SPECIFICATIONS

Materials
Probe Body: Brass or Type 316 SS
Rotor: PVDF
Shaft: Tungsten Carbide
Bearings: Ruby ring, ruby end stone, set in PVDF bearing holder
Power: 5 to 24 Vdc, 1.5 mA
Signal: Square wave, 11 Hz/fps (approx.), current sinking output, 20 mA maximum, NPN (Hall Effect)
Cable: #22 AWG 3-conductor, 5.5 m (18') standard; 610 m (2000') max
Accuracy: ±1.5% of full range
Range: 0.3 to 30 fps
Maximum Working Pressure: 14 bar (200 psi) at 24°C (75°F)
Maximum Temperature: 93°C (200°F) at 0 psig
Shipping Weight:
FP6501: 1.8 kg (4 lb)
FP6502: 2.3 kg (5 lb)
Pipe Size Range:
FP6501/11: 7.6 to 30.5 cm (3 to 12")
FP6502/12: 30.5 to 102 cm (12 to 40")
Fitting Size:
FP6501/FP6502: 1½ NPT
FP6511/FP6512: 2 NPT

To Order

Model No.	Fitting Size	Description
FP6501	1½ NPT	Brass sensor, 7.6 to 30.5 cm (3 to 12")
FP6501-SS	1½ NPT	316 SS sensor, 7.6 to 30.5 cm (3 to 12")
FP6502	1½ NPT	Brass sensor, 30.5 to 102 cm (12 to 40")
FP6502-SS	1½ NPT	316 SS sensor, 30.5 to 102 cm (12 to 40")
FP6511	2 NPT	Brass sensor, bronze ball valve, 7.6 to 30.5 cm (3 to 12")
FP6511-SS	2 NPT	316 SS sensor, bronze ball valve, 7.6 to 30.5 cm (3 to 12")
FP6512	2 NPT	Brass sensor, bronze ball valve, 30.5 to 102 cm (12 to 40")
FP6512-SS	2 NPT	316 SS sensor, bronze ball valve, 30.5 to 102 cm (12 to 40")
FP-15827-K	—	Repair kit (bearing, assembly and rotor), PVDF

Comes complete with 5.5 m (18') cable and operator's manual.
***Ordering Examples: FP6501,** 1½ NPT brass sensor for 5 to 30 cm pipe.*
***FP6502-SS,** 1½ NPT for 30 to 100 cm pipe, 316 SS sensor.*

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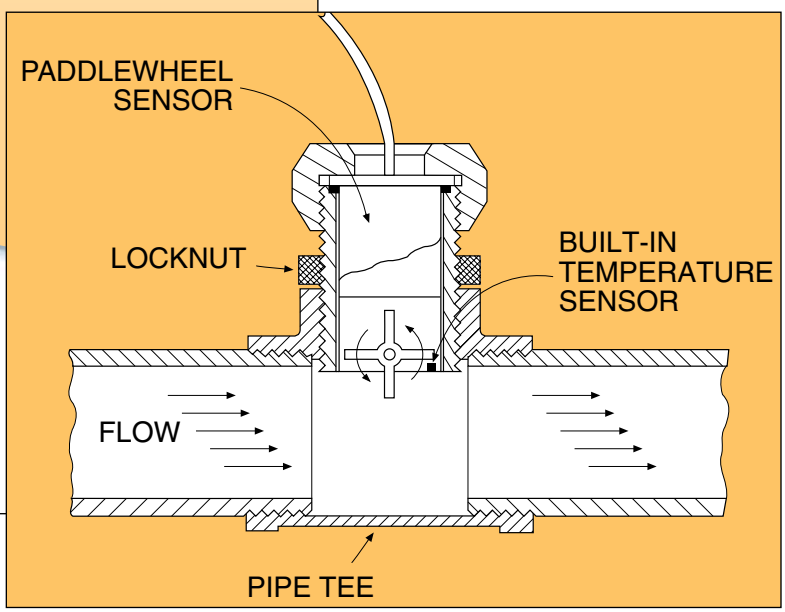
PADDLEWHEEL FLOW AND TEMPERATURE SENSOR

FP7001A, with FP7010, installation fitting, shown smaller than actual size.

FP7001A

2 YEAR WARRANTY

- Measures Both Flow and Temperature Simultaneously
- Very Economical
- Wide Chemical Compatibility
- High Level Pulse Output for Flow—No Amplifier Needed
- 10mV/°C Analog Temperature Output



The OMEGA® FP7001A paddlewheel flow and temperature sensor is ideal for accurate monitoring of typical industrial water flows, hard-to-handle corrosive aqueous solutions, and high purity fluids (see "Wetted Materials" for details). The FP7001A utilizes a paddlewheel-like rotor whose motion is converted into a high-level square wave pulse output by an open collector Hall effect sensor. Pulse amplitudes from 5 to 18 V are possible, depending on input power. The FPW-15 120 Vac converter plugs directly into a wall socket and outputs a regulated 15 Vdc at 400 mA.

The DPF700 Series panel meter supplies power for the flow sensor and provides rate indication, or totalization and batch control (when ordered with the dual relay option). When ordered with the analog output option, the DPF700 can be used to interface the FP7001A flow signal to such items as strip chart recorders, dataloggers, and computer interfaces.

The system consists of the flow sensor, an installing fitting, and the electronics. The PVC tee fittings are supplied with a PVC locking nut, and the galvanized iron tee fittings are supplied with a brass locking nut to provide secure metal-to-metal mounting to the threaded brass insert.

The FP7001A is not compatible with FP-5300 or FMG-5300 Series installation fittings. When powered by the FPW-5 five Vdc wall socket converter, the FP7001A has a TTL level pulse output which can be used with a variety of pulse input flow indicators, signal conditioners and controllers. It is not compatible with the FPM 5500/5740.

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DPF700 Series compatible indicators, for flowrate, total or batch control, (sold separately); iSeries Indicators for temperature measurement (sold separately).

MEASURES BOTH FLOW & TEMPERATURE!

FP7001A, with FP7010-GI shown smaller than actual size.

Available with PVC or galvanized iron fittings. Please see required installation fittings table below.

SPECIFICATIONS

Accuracy: ±2% of full scale
Repeatability: ±1% of full scale
Power: 5 to 18 Vdc @ 10 mA maximum
Wetted Materials: FP7001A sensor: polypropylene body, PVDF paddle, FKM O-ring, 316SS shaft. Galvanized iron tee includes brass insert and locking nut. PVC tee has PVC insert and locking nut.
Fluid Temperature/Pressure Range: Do not exceed the maximum ratings of your piping. Depending on the material of the fitting, the operating temperature/pressure may be limited by your piping and not by the sensor. For all PVC tee fittings, do not exceed 150 psig @ 27°C (80°F), 100 psig @ 38°C (100°F), 60 psig @ 49°C (120°F) 30 psig @ 60°C (140°F), due to the insert in the tee.
FP7001A sensor: 0 to 26°C (32 to 80°F) up to 150 psig; max. pressure decreases 1.1 psig per each 0.56°C (1°F) above 27°C (80°F) for a maximum temperature of 93°C (200°F) at 18 psig maximum
Frequency Output: Nominal 1 Hz/fps. amplitude of open collector pulse = Vdc input power
Cable Length: 2.4 m (8')
Weight:
FP7001A: 0.2 kg (½ lb)
Maximum Viscosity: 5 cps

Temperature Sensor Specifications

Range: 2 to 150°C (36 to 302°F)
Accuracy: ±1°C
Output: 10 mV/°C
Power: 5 to 18 Vdc

To purchase a complete system, order:

1) Flow Sensor
2) Installation Fitting
3) Electronics

Ordering Example:
FP7001A sensor (polypropylene body/316SS shaft), **FP7012** PVC installation fitting, and **DPF701** panel meter.

To Order

Model No.	Description
FP7001A	Polypropylene body/316SS shaft with temp sensor
FLSC-100	Transmitter module for FP7001A
FPW-15	15 Vdc power supply

Required Installation Fittings (Includes Locking Nut)

PVC, Schedule 40			Galvanized Iron Tee			
Model No.	Lay Length meters (inch)	K Factor	Model No.	Pipe Size NPT	K Factor	Range (GPM)
FP7007	0.53 (21)	108.78	**FP7007-GI**	¾	159.85	2 to 30
FP7010	0.66 (26)	70.53	**FP7010-GI**	1	82.94	3 to 50
FP7012	0.79 (31.25)	41.16	**FP7012-GI**	1¼	48.81	5 to 90
FP7015	0.95 (37.5)	29.46	**FP7015-GI**	1½	35.52	7 to 125
FP7020	1.27 (50)	15.52	**FP7020-GI**	2	20.62	11 to 205
FP7025	1.59 (62.5)	11.40	**FP7025-GI**	2½	12.44	15 to 285
FP7030	1.91 (75)	6.64	**FP7030-GI**	3	7.22	25 to 460

Each transmitter/fitting system comes factory calibrated with operator's manual.
***Note:** Your transmitter and fitting must be ordered as a system; see examples below.*
***Ordering Examples: FP7001A** plus **FP7007**, paddlewheel sensor and 2 to 30 GPM fitting.*
***FP7001A** plus **FP7010-GI**, sensor with 3 to 50 iron tee GPM fitting.*

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PADDLEWHEEL FLOW AND TEMPERATURE SENSOR TRANSMITTER SYSTEM

FP7002 Series

1 YEAR WARRANTY

- Measures Both Flow and Temperature
- Wide Chemical Compatibility
- 4 to 20 mA or 1 to 5 Vdc Field-Selectable Output
- NEMA 4 (IP65) Housing
- Compact Industrial Design Includes Both Paddlewheel Flow Sensor/Transmitter and Temperature Sensor/Transmitter in One Assembly
- Factory Calibrated—Easy to Install

The FP7002 Series is a combination paddlewheel flow and temperature sensor with integral signal conditioner/ transmitter in a rugged NEMA-4 aluminum housing.

Omega's FP7002 Series is ideal for applications that require a remote long-distance flow and temperature sensor. When ordered with an FP7000 Series installation fitting, the sensor/transmitter is factory calibrated to match the flow rate of the fitting selected. For example, if the user orders an FP7002 sensor/transmitter with an FP7010 PVC fitting, the analog output of the transmitter will be factory calibrated to give 20 mA output at the max flow rate of 50 GPM and 4 mA out at 0 GPM. The user can also convert an analog output to a 1 to 5 Vdc output without recalibrating the system.

The FP7002 also features an independent temperature sensor/ transmitter with an industry-standard 2-wire, 4 to 20 mA loop output scaled over a 0 to 100°C (32 to 212°F) temperature range.

SYS/FP7002A/FP7010-GI system includes an FP7002A flow/temperature sensor with FP7010-GI fitting, calibrated for 3 to 50 GPM flow.

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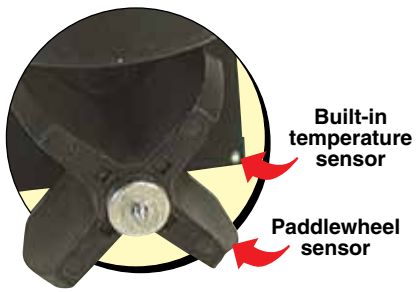
Provides Two Independent Analog Outputs For Flow and Temperature Measurement

CONNECT AN FP7002 TRANSMITTER TO OMEGA'S iSeries METERS WITH EMBEDDED INTERNET AND MONITOR A PROCESS FROM ANYWHERE VIA THE INTERNET!



SYS/FP7002/FP7007 system includes an FP7002 flow/temperature sensor with FP7007 fitting, calibrated for 2 to 30 GPM flow.

MEASURES FLOW!

Program a DPi8-EI to accept the 4 to 20 mA signal from the FP7002 and to display the flow rate in the engineering units of your choice.

MEASURES TEMPERATURE!

Program a DPi8-EI to accept the 4 to 20 mA signal from the FP7002 and to display the temperature in the engineering units of your choice.

DPi8-EI indicator shown. Visit us online for complete details.

PADDLEWHEEL OUTPUT SPECIFICATIONS

Accuracy: ±2% FS
Repeatability: ±1% FS
Power: 12 to 18 Vdc @ 50 mA maximum
Output: 3-wire, 4 to 20 mA (1 to 5 Vdc with external 250 Ω resistor)
Maximum Loop Resistance:
Ω = (V supply–12V)/0.02 A
FP7002 Wetted Materials:
Sensor Body: Polypropylene
O-Ring: FKM
Paddle: PVDF
Locking Nut: PVC
FP7002A Wetted Materials:
Sensor Body: Polypropylene
O-Ring: FKM
Paddle: PVDF
Locking Nut: Brass
Fluid Temperature/Pressure Range:
Do not exceed maximum ratings of the piping. Depending on the material of the fitting, the operating temperature/pressure may be limited by the piping and not by the sensor. For all PVC tee fittings, do not exceed 150 psig @ 27°C (80°F), 100 psig @ 38°C (100°F), 60 psig @ 49°C (120°F) or 30 psig @ 60°C (140°F), owing to the insert in the tee. FP7000 sensor:
0 to 26°C (32 to 80°F) up to 150 psig; max pressure decreases 1.1 psig per each 0.56°C (1°F) above 27°C (80°F) for a max temperature of 93°C (200°F) at 18 psig maximum
Weight:
FP7002: 0.3 kg (0.75 lb)
FP7002A: 0.4 kg (1 lb)
Max Viscosity: 5 cps

TEMPERATURE OUTPUT SPECIFICATIONS

Temperature Range:
0 to 100°C (32 to 212°F)
Accuracy: ±1.7°C (3.1°F)
Power: 12 to 18 Vdc @ 30 mA
Output: 2-wire, 4 to 20 mA
(1 to 5 Vdc with external 250 Ω resistor)
Maximum Loop Resistance:
Ω = (V supply – 12V)/0.02 A

To Order

Model No.	Description
FP7002	Paddlewheel flow and temperature sensor/transmitter for PVC fittings (includes PVC locking nut)
FP7002A	Paddlewheel flow and temperature sensor/transmitter for galvanized iron fittings (includes brass locking nut)

Required Installation Fittings

PVC, Schedule 40*		Galvanized Iron Tee		
Model No.	**Lay Length meter (inch)**	**Model No.**	**Pipe Size (NPT)**	**Range (GPM)**
FP7007	0.53 (21)	**FP7007-GI**	¾	2 to 30
FP7010	0.66 (26)	**FP7010-GI**	1	3 to 50
FP7012	0.79 (31.3)	**FP7012-GI**	1¼	5 to 90
FP7015	0.95 (37.5)	**FP7015-GI**	1½	7 to 125
FP7020	1.27 (50)	**FP7020-GI**	2	11 to 205
FP7025	1.59 (62.5)	**FP7025-GI**	2½	15 to 285
FP7030	1.91 (75)	**FP7030-GI**	3	25 to 460

*****All PVC fittings include 36" of PVC pipe on the flow inlet and 12" of PVC pipe on the flow outlet.*

Accessories

Model No.	Description
PSS-12	12V single-output power supply
TX4-100	4-conductor shielded cable, 30 meter (100')

Each transmitter/fitting system comes factory calibrated with operator's manual.
***Note:** Your transmitter and fitting must be ordered as a system; see examples below.*
Ordering Examples: FP7002** sensor/transmitter with the **FP7007** PVC fitting—use model number **SYS/FP7002/FP7007.
***SYS/FP7002A/FP7007-GI.** sensor/transmitter with ¾" galvanized fitting.*

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FPB100 Series

MADE IN USA · 1 YEAR WARRANTY · CE

- **4 to 20 mA, Switch, or Pulse Divider Output**
- **Low Flow Capabilities from 0.1m/s (0.3 ft/s)**
- **Polypropylene or PVDF Material**
- **Installs into Pipe Sizes DN 15 to DN 200 (0.5 to 8")**
- **Built-In User Interface for On-Site Configuration**
- **Low Power and High Resolution**

The OMEGA® FPB100 Series flow sensor is the next generation in fluid measurement technology. This new sensor is an improvement on what is already an industry standard. It has the added functionality of various output options including flow switch, multi-functional pulse divider or 4 to 20 mA. Additionally, it offers low flow, low power and high resolution and can be configured onsite directly through the built-in user interface. Installation is simple because the OMEGA FPB100 Series utilizes the same fittings as the popular OMEGA FP5000 and FP8500 Series paddlewheel sensors and fits into pipe sizes ranging from DN15 to DN200 (0.5 to 8”). Available in polypropylene and PVDF, it is ideal for a variety of applications including chemical processing, water and wastewater monitoring and scrubber control.

FPB111 shown smaller than actual size.

SPECIFICATIONS

General

Input Frequency Range: 1 to 1000 Hz
Operating Range: 0.1 m/s to 6 m/s (0.3 ft/s to 20 ft/s)
Linearity: ±1% of max range at 25°C (77°F)
Repeatability: ±0.5% of max range at 25°C (77°F)
System Response: 100 ms update rate nominal

Wetted Materials

Sensor Body: Polypropylene or PVDF (depending on model)
O-Ring: FPM
Rotor Pin:
Titanium: Polypropylene models
PVDF: PVDF models
Rotor:
Black PVDF: Polypropylene models
Natural PVDF: PVDF models

Electrical

Pulse, Flow Switch
With Dry-Contact Relay: 24 Vdc nominal (21.6 Vdc min to 26.4 Vdc max) 30 mA max current
With Solid-State Relay: 5 to 24 Vdc nominal (5.0 Vdc min to 26.4 Vdc max) 30 mA max current
4 to 20 mA: 12 Vdc to 32 Vdc nominal (10.8 Vdc min to 35.2 Vdc max) 21 mA max current
Reverse Polarity and Short Circuit Protection: Up to 40V, 1 hour
Over-Voltage Protection: >40 Vdc over 1 hour

Output Specifications

Signal Averaging: Programmable 0 to 100 seconds
Sensitivity Response: Programmable 0 to 9 scale

Pulse Divider/Total Pulse Output

Pulse Divider Setting: 1.0000 to 99999
Maximum Pulse Rate: 300 Hz
Maximum Pulse Width: 50 ms

Flow Switch Output

Relay Modes: Low, high
Time Delay: 0.0 to 6400.0 seconds
Hysteresis: Adjustable in engineering units

Relay Specifications

Mechanical SPDT: 5 A at 30 Vdc, 5 A @ 250 Vac
Solid-State Relay: 100 mA at 40 Vdc, 70 mA @ 33 Vac

Current Output (Passive 4 to 20 mA)

Loop Accuracy: ±32 µA (at 25°C at 24 Vdc)
Loop Resolution: 5 µA
Temp. Drift: ±1 µA per °C max
Power Supply Rejection: ±1 µA per V
Max Cable: 300 m (1000’)
Maximum Loop Resistance: 600 Ω @ 24 Vdc 1K Ω @ 32 Vdc

Max Temperature/ Pressure Rating

Storage Temperature: -10 to 75°C (14 to 167°F)
Operating Temperature: 0 to 65°C (32 to 149°F)
Relative Humidity: 0 to 90% RH, non-condensing

Flow Sensor

PP: 12.5 bar @ 20°C, 1.7 bar @ 85°C (180 psi @ 68°F, 25 psi @185°F)
PVDF: 14 bar @ 20°C, 1.7 bar @ 85°C (200 psi @ 68°F, 25 psi @ 185°F)
Operating Temperature:
PP: -18 to 85°C (0 to 185°F)
PVDF: -18 to 85°C (0 to 185°F)
Standards and Approvals: NEMA 4X (IP65) enclosure; CE approval

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FP-5310M

FP-5312CM

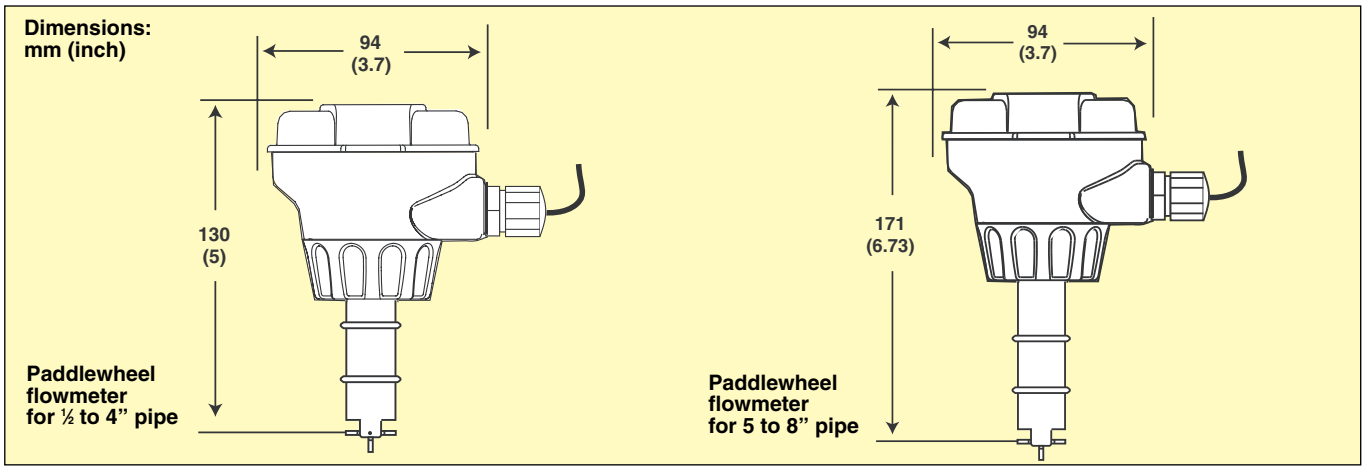
shown smaller
than actual size

FMG-5310

FP-5320GI

FP-5307CU

See omega.com/fp_fittings for complete list of installation fittings.



To Order *Visit omega.com/fpb100 for Pricing and Details*

Model No.	Material	Pipe Size, mm (inch)	Range
FPB111	Polypropylene	12.7 to 102 (½ to 4)	pulse divider, SPDT relay
FPB112	Polypropylene	127 to 203 (5 to 8)	pulse divider, SPDT relay
FPB113	PVDF	12.7 to 102 (½ to 4)	pulse divider, SPDT relay
FPB121	Polypropylene	12.7 to 102 (½ to 4)	pulse divider, SSR
FPB122	Polypropylene	127 to 203 (5 to 8)	pulse divider, SSR
FPB123	PVDF	12.7 to 102 (½ to 4)	pulse divider, SSR
FPB131	Polypropylene	12.7 to 102 (½ to 4)	switch, SPDT relay
FPB132	Polypropylene	127 to 203 (5 to 8)	switch, SPDT relay
FPB141	Polypropylene	12.7 to 102 (½ to 4)	switch, SSR
FPB142	Polypropylene	127 to 203 (5 to 8)	switch, SSR
FPB151	Polypropylene	12.7 to 102 (½ to 4)	4 to 20 mA
FPB152	Polypropylene	127 to 203 (5 to 8)	4 to 20 mA
FPB153	PVDF	12.7 to 102 (½ to 4)	4 to 20 mA

Accessories

Model No.	Description
FP-5310M	1" PVC SCH 40 installation fitting; see omega.com/fp_fittings for additional fittings available
PSU-93	24 Vdc power supply
TX4-100	4-conductor shielded cable, 30 m (100')

Comes complete with operator's manual. Installation fittings sold separately.

Ordering Examples: ***FPB111,*** *flow sensor with pulse divider output, with* ***FP-5310M,*** *1" PVC installation fitting,* ***PSU-93,*** *24 Vdc power supply, and* ***TX4-100,*** *multi-conductor hook-up wire.*

FPB131, *sensor with switch, SPDT, mechanical relay,* ***FP-5320GI*** *galvanized iron fitting,* ***PSU-93*** *power supply.*

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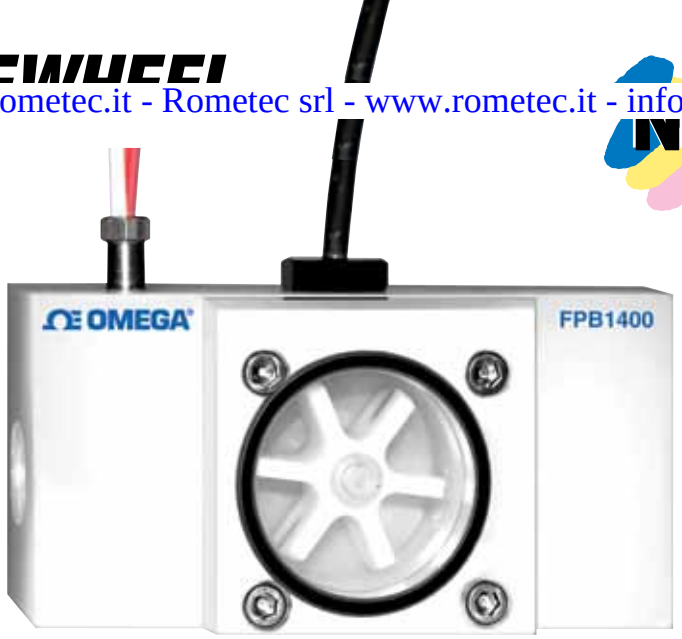
PLASTIC PADDLEWHEEL FLOWMETERS

NEW

FPB1400 Series

1 YEAR WARRANTY

- Easy to Install and Operate
- Mounts in Any Direction
- Only One Moving Part
- Visual Flow Indication
- Female NPT Ports
- Polypropylene or PVDF Models



FPB1406-RTD shown smaller than actual size.

Fluid flowing through the FPB1400 causes the paddlewheel to spin. As the magnets embedded in the paddle spin past the sensor, electrical pulses are produced in which frequency is proportional to the flow rate. The number of pulses per desired time interval and the K-factor (number of pulses/gallon) make it is easy to calculate the flow rate and volume passing through the unit.

SPECIFICATIONS

Accuracy: ±1% FS
Maximum Temperature: 60°C (140°F)
Maximum Pressure: 10 bar (150 psig)
Power: 5 to 24 Vdc @ 2 mA
Output Signal: NPN open collector (load 30 mA maximum)
Body Dimensions:
56 H x 108 L x 53 mm D
(2.2 x 4.25 x 2.2")
Cable: Flow 1.8 m (6'), RTD 0.3 m (1') (-RTD models)
RTD: Platinum 0.00385 TCR, meets EN 60751, Class B (-RTD models)
Maximum Pressure Drop: 15 psi on size 2 units 20 psi on all other sizes
Viscosity: Calibrated 1 cSt, up to 50 cSt with field calibration
Response Time: At 1 sec 10 to 90% of full scale, at 2 sec below 10% of full scale

Wetted Materials

Polypropylene Models
Body: Polypropylene
LID: Acrylic
Paddlewheel: PVDF
Shaft: Nickel tungsten carbide
Bearings: Sapphire jewels
O-Rings: EPDM
RTD: 316 SS casing

PVDF Models
Body: PVDF
LID: PVDF
Paddlewheel: PVDF
Shaft: Zirconia ceramic
Bearings: Sapphire jewels
O-Rings: PTFE
RTD: 316 SS casing (-RTD models)

DPF701 smaller than actual size.
Visit omega.com/dpf701

F

To Order *Visit omega.com/fpb1400 for Pricing and Details*

Model No.	Description	Model No. with RTD	Ports NPT	Maximum Difference Pressure bar (psi)	Range GPM
FPB1402	Polypropylene flowmeter	**FPB1402-RTD**	⅜	1 (15)	0.5 to 5
FPB1404	Polypropylene flowmeter	**FPB1404-RTD**	½	1.4 (20)	1 to 10
FPB1406	Polypropylene flowmeter	**FPB1406-RTD**	¾	1.4 (20)	2 to 20
FPB1408	Polypropylene flowmeter	**FPB1408-RTD**	1	1.4 (20)	3.5 to 35
FPB1412	PVDF flowmeter	**FPB1412-RTD**	⅜	1 (15)	0.5 to 5
FPB1414	PVDF flowmeter	**FPB1414-RTD**	½	1.4 (20)	1 to 10
FPB1416	PVDF flowmeter	**FPB1416-RTD**	¾	1.4 (20)	2 to 20
FPB1418	PVDF flowmeter	**FPB1418-RTD**	1	1.4 (20)	3.5 to 35
Accessory					
DPF701	⅛ DIN digital display, 115 Vac 7.5 to 13 Vdc powered				

Comes complete with operator's manual.
***Ordering Example: FPB1408,** polypropylene flowmeter with **DPF701,** digital display meter.*
***FPB1406-RTD,** polypropylene flowmeter with RTD temperature sensor and **DPF701,** digital display meter.*

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FLOW METERS

FPD2000 Series

1 YEAR WARRANTY RoHS

- ±0.5% Rdg Accuracy
- Aluminum, 303 or 316 SS Bodies
- Pressure Rating Up to 345 bar (5000 psi)
- Pulse or mA Outputs Available
- Bi-Directional Flow Capabilities
- Economical Cost

FPD2004-A shown smaller than actual size.

The FPD2000 Series represents a positive displacement meter that is affordable and accurate. One primary feature is the ability to maintain consistent accuracy despite changing viscosity conditions. This reliability, coupled with a large turndown range, offers an affordable replacement for older turbine technology. The meter's solid construction and excellent dynamic response are well suited to the measurement of oil, grease, fuel, solvents, polyurethanes, brake fluid, skydrol as well as other nonabrasive lubricating fluids. Since there is no need for straight run piping upstream or downstream of the flowmeter, the FPD2000 flow meters are simple to use and to install. The meters produce good resolution and high accuracy at low flow rates. Flow may be bi-directional, such as for cylinder position measurements, without damage to internal parts.

SPECIFICATIONS

Accuracy: ±0.5% over 10:1 turndown with 30cP fluid
Repeatability: ±0.1%
Max Fluid Temperature:
Aluminum Body: Meter 85°C (185°F)
Stainless Body: Meter 204°C (400°F)
Pressure Maximum: 345 bar (5000 psi)
Wetted Materials
Body:
FPD2000 Series: Aluminum
FPD2010 Series: 303 SS
FPD2020 Series: 316 SS
Gear: Stainless steel
O-Ring: PTFE, FKM (optional)
Bearings: Stainless steel

Outputs

Temperature Range (Electronics): Standard Aluminum and SS versions -40 to 85°C (-40 to 185°F)
Square Wave: (Basic unit)
Supply Voltage: +10 to 28 Vdc
Supply Current: 8 mA @ 12 Vdc,12 mA @ 24 Vdc
Duty Signal: 50% ±15%
Minimum Signal: 0.5 Hz
Frequency: Flow dependent, up to 2000 Hz
Driving Capacity: 50 mA max resistive load
Output Impedance: 40 Ω - analog switch and self-resetting fuse

Analog Output (-A Models)

Supply Voltage: 10 to 30 Vdc
Output: 4 to 20 mA
Input: 0.25 Hz to 5 kHz
Amplitude: 1 to 40 Vp-p
Update Time: 1/F + 25 msec
Linearity: ±0.01% rdg

Model No.	Pulses/Liter (Pulses/Gallon)	Body Dia cm (inch)	*Body Height cm (inch)	Filtration (microns)
FPD20X1	14,000 (53,000)	7.6 (3)	8.6 (3.4)	30
FPD20X2	4200 (15,900)	8.4 (3.3)	8.6 (3.4)	30
FPD20X3	1700 (6600)	8.4 (3.3)	8.6 (3.4)	30
FPD20X4	470 (1800)	12.4 (4.9)	13.8 (5.45)	30
FPD20X5	420 (1600)	21.3 (8.4)	17 (6.7)	200

** On analog output models (FPD2XXX-A) add 12 cm (4.8") to the body height to obtain overall height.*

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than actual size.

DPF701 shown smaller than actual size.

To Order

Model No.	NPT	Range LPM (GPM)	Description
FPD2001	¼	0.01 to 3 (0.003 to 0.8)	Aluminum gear meter with pulse output
FPD2002	¼	0.04 to 7.5 (0.01 to 2)	Aluminum gear meter with pulse output
FPD2003	½	0.11 to 26.4 (0.03 to 7)	Aluminum gear meter with pulse output
FPD2004	¾	0.19 to 75 (0.05 to 20)	Aluminum gear meter with pulse output
FPD2005	1¼	1.9 to 227 (0.5 to 60)	Aluminum gear meter with pulse output
FPD2001-A	¼	0.01 to 3 (0.003 to 0.8)	Aluminum gear meter with 4 to 20 mA output
FPD2002-A	¼	0.04 to 7.5 (0.01 to 2)	Aluminum gear meter with 4 to 20 mA output
FPD2003-A	½	0.11 to 26.4 (0.03 to 7)	Aluminum gear meter with 4 to 20 mA output
FPD2004-A	¾	0.19 to 75 (0.05 to 20)	Aluminum gear meter with 4 to 20 mA output
FPD2005-A	1¼	1.9 to 227 (0.5 to 60)	Aluminum gear meter with 4 to 20 mA output
FPD2011	¼	0.01 to 3 (0.003 to 0.8)	303 SS gear meter with pulse output
FPD2012	¼	0.04 to 7.5 (0.01 to 2)	303 SS gear meter with pulse output
FPD2013	½	0.11 to 26.4 (0.03 to 7)	303 SS gear meter with pulse output
FPD2014	¾	0.19 to 75 (0.05 to 20)	303 SS gear meter with pulse output
FPD2015	1¼	1.9 to 227 (0.5 to 60)	303 SS gear meter with pulse output
FPD2011-A	¼	0.01 to 3 (0.003 to 0.8)	303 SS gear meter with 4 to 20 mA output
FPD2012-A	¼	0.04 to 7.5 (0.01 to 2)	303 SS gear meter with 4 to 20 mA output
FPD2013-A	½	0.11 to 26.4 (0.03 to 7)	303 SS gear meter with 4 to 20 mA output
FPD2014-A	¾	0.19 to 75 (0.05 to 20)	303 SS gear meter with 4 to 20 mA output
FPD2015-A	1¼	1.9 to 227 (0.5 to 60)	303 SS gear meter with 4 to 20 mA output
FPD2021	¼	0.01 to 3 (0.003 to 0.8)	316 SS gear meter with pulse output
FPD2022	¼	0.04 to 7.5 (0.01 to 2)	316 SS gear meter with pulse output
FPD2023	½	0.11 to 26.4 (0.03 to 7)	316 SS gear meter with pulse output
FPD2024	¾	0.19 to 75 (0.05 to 20)	316 SS gear meter with pulse output
FPD2021-A	¼	0.01 to 3 (0.003 to 0.8)	316 SS gear meter with 4 to 20 mA output
FPD2022-A	¼	0.04 to 7.5 (0.01 to 2)	316 SS gear meter with 4 to 20 mA output
FPD2023-A	½	0.11 to 26.4 (0.03 to 7)	316 SS gear meter with 4 to 20 mA output
FPD2024-A	¾	0.19 to 75 (0.05 to 20)	316 SS gear meter with 4 to 20 mA output

Accessories

Model No.	Description
DPF701	Pulse input 6-digit panel meter for rate or total
FPD2000-CONNECTOR	Replacement 6-pin connector for the FPD2000 pulse output models
FPD2000A-CONNECTOR	Replacement 3-pin connector for the FPD2000-A 4 to 20 mA output models

Comes complete with operator's manual, K-factor certificate, and connector. Certificate does not include points and is not a NIST certificate. FPD2000, pulse output models, come with the 6-pin FPD2000-CONNECTOR.

FPD2000-A, 4 to 20 mA output models, come with the FPD2000A-CONNECTOR.

*For High Temperature option on stainless steel models, add suffix **"-HT"** to model number, for additional cost.*

***Ordering Examples: FPD2003,** aluminum gear meter with pulse output, ½ NPT connections, 0.03 to 7 GPM range and **DPF701** digital ⅛ DIN panel meter with red LED display.*

***FPD2012-A**, 303 SS gear meter with 4 to 20 mA output, ¼ NPT, 0.01 to 2 GPM range.*

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FLOW METER FOR FUELS AND OILS

FPD3000 Series

1 YEAR WARRANTY

- **Aluminum Body**
- **FKM Seals**
- **Temperatures up to 80ºC (176ºF)**
- **NPT or BSP Threads**
- **DIN, JIS or ANSI Connection (Available on 1" and Larger Sizes)**

FPD3005-D-A

Both models shown smaller than actual size.

FPD3003

The FPD3000 Series positive displacement flow meters are affordable and accurate. One primary feature is the ability to maintain consistent accuracy despite changing viscosity conditions. The meter's solid construction and excellent dynamic response are well suited to the measurement of fuels and oils as well as other non-abrasive lubricating fluids. Since there is no need for straight run piping upstream or downstream of the flow meter, the FPD3000 flow meters are simple to use and to install. The meter has good resolution and high accuracy at low flow rates.

SPECIFICATIONS

Accuracy: ±0.5% of reading
Repeatability: ±0.03%
Fitting Type:
- **NPT:** Female
- **BSP:** "-BSP" option
- **DIN:** "-DIN" option
- **JIS:** "-JIS" option
- **ANSI:** "-ANSI" option

Hall-Effect Sensor Power: 4.5 to 24 Vdc (7.5 mA)
Reed Sensor Power: 30 Vdc (500 mA)
Output Options:
- **Pulse Output:** Standard
- **4 to 20 mA Transmitter:** **"-D-A"** option; no output on battery powered **"-D"** model

Display: 7-digit/12 mm (0.47") upper, 7-digit/7 mm (0.28") lower all **"-D"** options
- **Rate:** User defined
- **Total:** Resettable
- **Acc-Total:** Non-resettable

Minimum Viscosity: 1cPs
Maximum Viscosity: 1000 cPs standard
Maximum Pressure: See chart on page 3
Strainer Size: See chart on next page
Mounting: Shafts must be in a horizontal plane
Electrical Connections: 2 x 12 mm (0.08 x 0.47"), fittings included **"-D-A"** option
Cable Length: 1 m (3') stripped ends non-display models
Mounting: Pipe
Power: 4 to 20 mA, **"-D-A"** models 18 to 30 Vdc display, **"-D"** models 3 Vdc lithium battery (included)
Liquid Temperature: -40 to 80°C (-40 to 176°F)
Materials
- **Body:** Aluminum
- **Enclosure:** Polypropylene
- **Seals:** FKM
- **Fasteners:** Stainless steel
- **Cable Insulation:** PVC

Enclosure: NEMA 6 (IP67)

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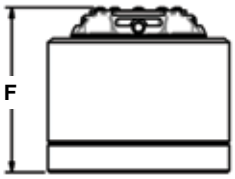
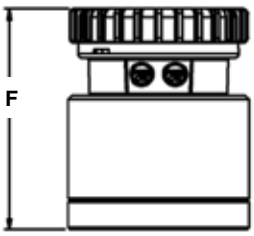


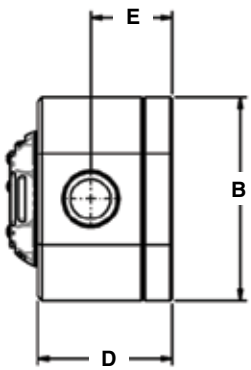
Standard

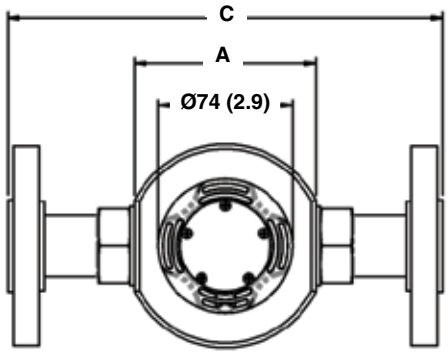


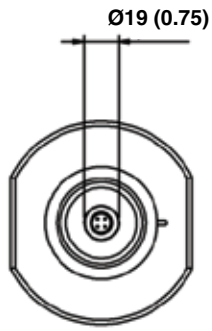
Display (-D options)

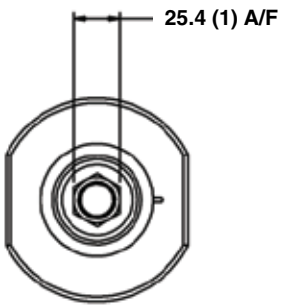
Pulsar and Display Height, F

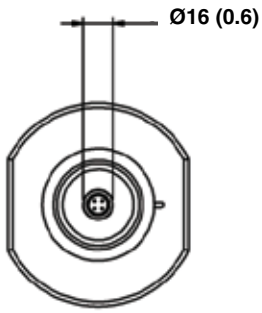
Model No.	mm (inch)		Recommended Strainer
	Standard	-D options	
FPD3002	59 (2.3)	90 (3.5)	200 mesh (74 um)
FPD3003	59 (2.3)	90 (3.5)	200 mesh (74 um)
FPD3004	66 (2.6)	97 (3.8)	60 mesh (250 um)
FPD3034	79 (3.1)	110 (4.3)	60 mesh (250 um)
FPD3005	92 (3.6)	123 (4.8)	60 mesh (250 um)
FPD3006	120 (4.7)	151 (5.9)	60 mesh (250 um)
FPD3007	141 (5.5)	172 (6.7)	60 mesh (250 um)
FPD3008	See operator's manual for Dimensional drawings		
FPD3009	See operator's manual for Dimensional drawings		

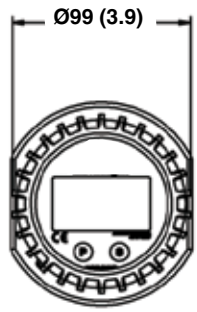












Ø = Diameter

Model No.	Meter and Flange, Dimensions: mm (inch)					
	Port Size	A	B	C*	D	E
FPD3002	¼"	71 (2.8)	74 (2.9)	N/A	42 (1.7)	25 (1)
FPD3003	¼"	71 (2.8)	74 (2.9)	N/A	42 (1.7)	24 (0.9)
FPD3004	½"	81 (3.2)	87 (3.4)	N/A	49 (1.9)	28 (1.1)
FPD3034	¾"	100 (3.9)	112 (4.4)	N/A	62 (2.4)	37 (1.5)
FPD3005	1"	100 (3.9)	112 (4.4)	240 (9.4)	75 (3)	45 (1.8)
FPD3006	1½"	120 (4.7)	137 (5.4)	240 (9.4)	103 (4.1)	61 (2.4)
FPD3007	2"	140 (5.5)	163 (6.4)	264 (10.4)	124 (4.9)	72 (2.8)
FPD3008	See operator's manual for Dimensional drawings					
FPD3009	See operator's manual for Dimensional drawings					

* *Flanges*

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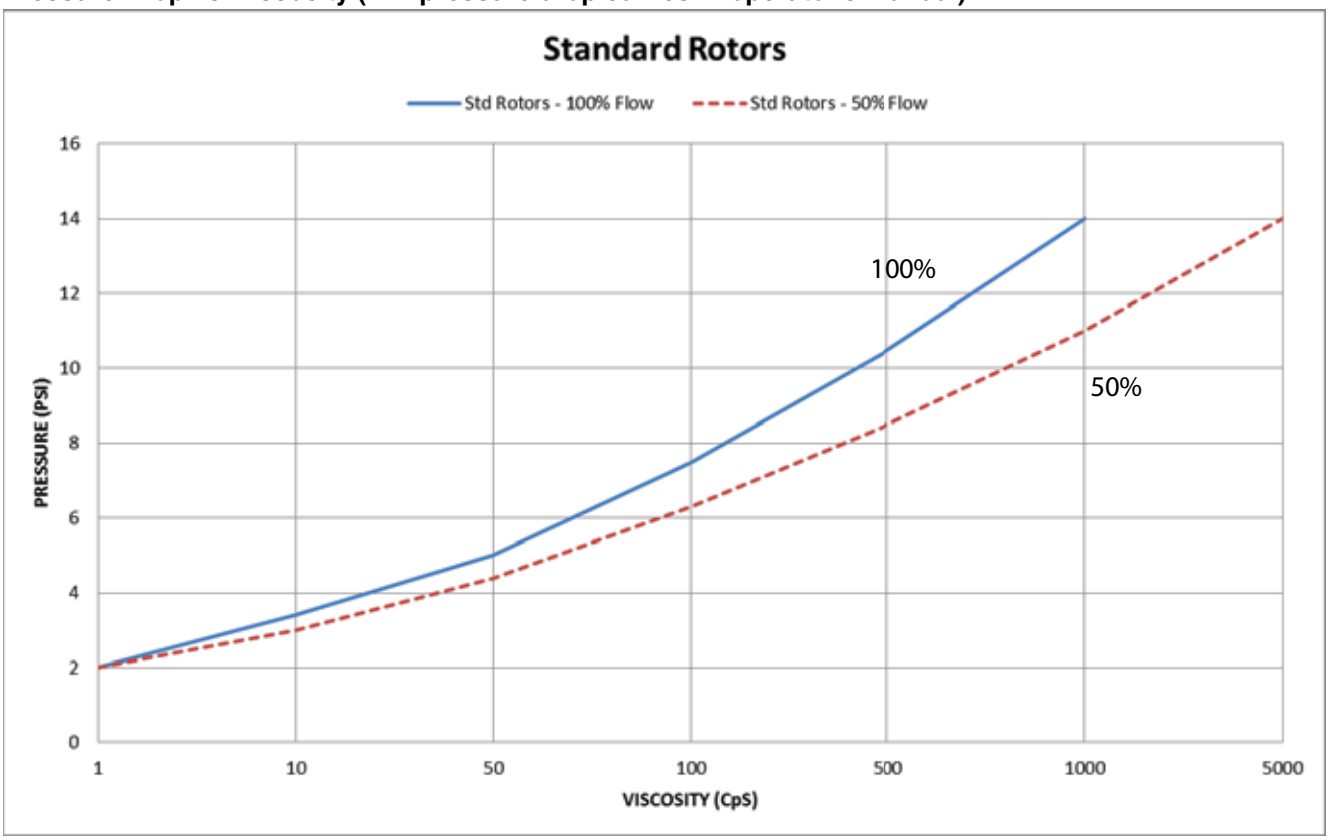
Pressure Drop vs. Viscosity (-HV pressure drop curves in operator's manual)



To Order

Model No.	Port Size	Flow Range		Maximum Pressure psi (Kpa)
		< 5 cPs	> 5 cPs	
FPD3002	¼"	2 to 100 LPH (0.5 to 26 GPH)	0.5 to 100 LPH (0.13 to 26 GPH)	1000 (6895)
FPD3003	¼"	25 to 500 LPH (6.6 to 132 GPH)	15 to 500 LPH (4 to 132 GPH)	1000 (6895)
FPD3004	½"	3 to 25 LPM (0.8 to 6.6 GPM)	2 to 30 LPM (0.5 to 8 GPM)	2000 (13790)
FPD3034	¾"	8 to 70 LPM (2 to 18.5 GPM)	3 to 80 LPM (0.8 to 21 GPM)	2000 (13790)
FPD3005	1"	10 to 100 LPM (2.6 to 26 GPM)	6 to 120 LPM (1.6 to 32 GPM)	2000 (13790)
FPD3006	1½"	15 to 235 LPM (4 to 62 GPM)	10 to 250 LPM (2.6 to 66 GPM)	1200 (8274)
FPD3007	2"	15 to 500 LPM (4 to 130 GPM)	16 to 500 LPM (4 to 130 GPM)	1000 (6895)
FPD3008	3"	60 to 600 LPM (15.8 to 158 GPM)	20 to 733 LPM (5.3 to 193 GPM)	175 (1206)
FPD3009	4"	220 to 1000 LPM (58.1 to 264 GPM)	120 to 1200 LPM (31.7 to 317 GPM)	175 (1206)

Comes complete with lithium battery and operator's manual.
*For units with a battery powered digital display add **"-D"** to the model number, for an additional charge.*
*For units with a DC powered digital display and 4 to 20 mA output add **"-D-A"** to the model number, for an additional charge.*
*For units with BSP connections add **"-BSP"** to the model number, no additional charge.*
*For units with DIN flanges add **"-DIN"** to the model number, for an additional charge (1" and larger only).*
*For units with JIS flanges add **"-JIS"** to the model number, for an additional charge (1" and larger only).*
*For units with ANSI flanges add **"-ANSI"** to the model number, for an additional charge (1" and larger only).*
*For units with high viscosity rotors add **"-HV"** to the model number, for an additional charge.*

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FLOW METER FOR CORROSIVE LIQUIDS

NEW

FPD3100 Series

1 YEAR WARRANTY

- PPS Body
- Temperatures up to 80ºC (176ºF)
- NPT or BSP Threads

FPD3105D-A

The FPD3100 Series positive displacement flow meters are affordable and accurate. One primary feature is the ability to maintain consistent accuracy despite changing viscosity conditions. The meter's solid construction and excellent dynamic response are well suited to the measurement of many corrosives as well as other non-abrasive fluids. Since there is no need for straight run piping upstream or downstream of the flow meter, the FPD3100 flow meters are simple to use and to install. The meter has good resolution and high accuracy at low flow rates.

Both models shown smaller than actual size.

FPD3105

F

SPECIFICATIONS

Accuracy: ±0.5% of reading
Repeatability: ±0.03%
Fitting Type:
NPT: Female
BSP: "-BSP" option
Hall-Effect Sensor Power: 4.5 to 24 Vdc (7.5 mA)
Reed Sensor Power: 30 Vdc (500 mA)
Output Options:
Pulse Output: Standard NPN
4 to 20 mA Transmitter:
"-D-A" option; no output on battery powered **"-D"** model
Display: 7-digit/12 mm (0.47") upper, 7-digit/7 mm (0.28") lower all **"-D"** options
Rate: User defined
Total: Resettable
Accumulated-Total: Non-resettable
Minimum Viscosity: 1cPs
Maximum Viscosity: 1000 cPs standard
Maximum Pressure: See chart on next page
Strainer Size: See ordering chart on next page
Mounting: Shafts must be in a horizontal plane
Electrical Connections: 2 x 12 mm (0.08 x 0.47"), fittings included **"-D-A"** option
Cable Length: 1 m (3') stripped ends, non-display models
Mounting: Pipe
Power: 4 to 20 mA, **"-D-A"** models 18 to 30 Vdc display, **"-D"** models 3 Vdc lithium battery (included)
Liquid Temperature: -40 to 80°C (-40 to 176°F), -20 to 60ºC (-4 to 140ºF) for display models
Materials
Body and Rotors: PPS
Seals: FKM, FEP (FPD3105)
Fasteners: Stainless steel
Cable Insulation: PVC
Shaft: Hastelloy C
Enclosure: NEMA 6 (IP67)

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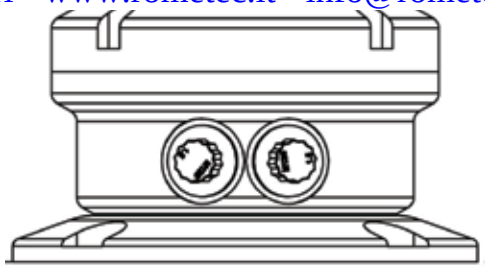
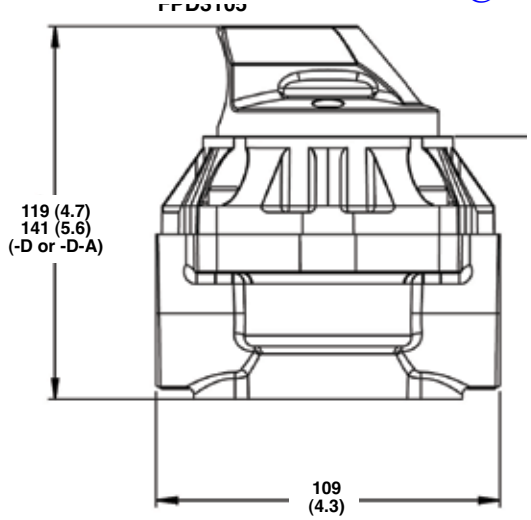
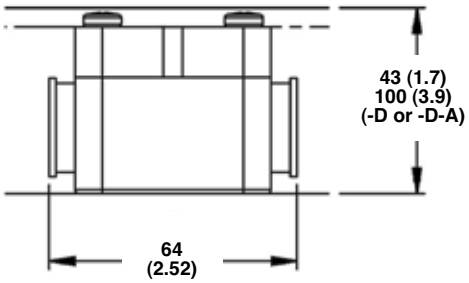
Dimensions:
mm (inch)

Display Module (-D or -D-A)

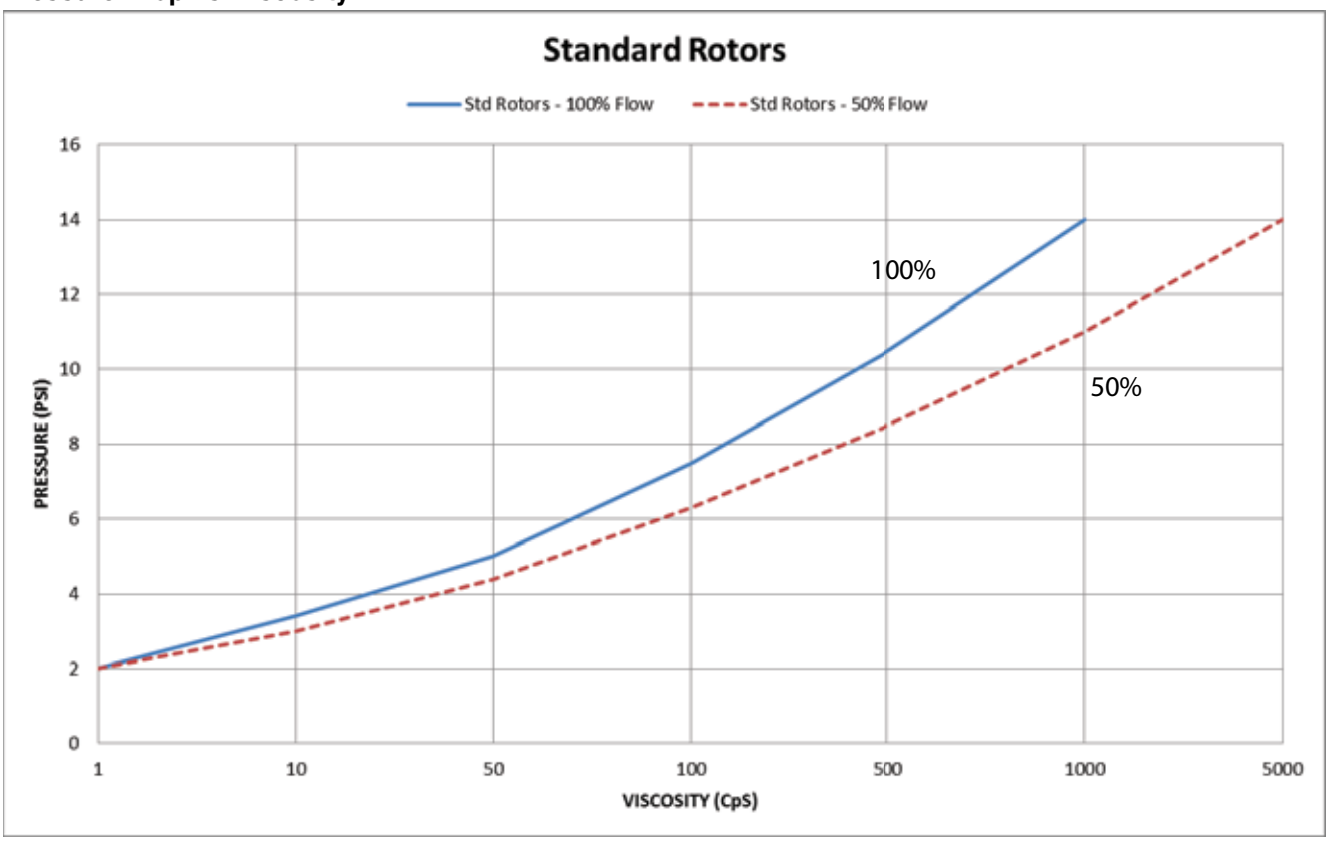




FPD3102 and FPD3103



Pressure Drop vs. Viscosity



F

To Order

Model No.	Port Size	Flow Range		Maximum Pressure psi (Kpa)
		< 5 cPs	> 5 cPs	
FPD3102	¼"	2 to 100 LPH (0.5 to 26 GPH)	0.5 to 100 LPH (0.13 to 26 GPH)	75 (500)
FPD3103	¼"	25 to 500 LPH (6.6 to 132 GPH)	15 to 500 LPH (4 to 132 GPH)	75 (500)
FPD3105	1"	3 to 25 LPM (2.6 to 26 GPM)	2 to 30 LPM (1.6 to 36 GPM)	150 (1000)

Comes complete with lithium battery (-D) and operator's manual.
*For units with a battery powered digital display add **"-D"** to the model number, for an additional charge.*
*For units with a DC powered digital display and 4 to 20 mA output add **"-D-A"** to the model number, for an additional charge.*
*For units with BSP connections add **"-BSP"** to the model number, no additional charge.*

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FLOW METER FOR INDUSTRIAL PROCESSES

FPD3200 Series

1 YEAR WARRANTY

- Stainless Steel Body
- FEP Seals
- PPS Rotors
- Temperatures up to 80ºC (176ºF)
- NPT or BSP Threads
- DIN, JIS or ANSI Connection (Available on 1" and Larger Sizes)

FPD3206-D-A

Both models shown smaller than actual size.

FPD3202

The FPD3200 Series positive displacement flow meters are affordable and accurate. One primary feature is the ability to maintain consistent accuracy despite changing viscosity conditions. The meter's solid construction and excellent dynamic response are well suited to measurement for many industrial as well as other non-abrasive lubricating fluids. Since there is no need for straight run piping upstream or downstream of the flow meter, the FPD3200 flow meters are simple to use and to install. The meter has good resolution and high accuracy at low flow rates.

SPECIFICATIONS

Accuracy: ±0.5% of reading
Repeatability: ±0.03%
Fitting Type:
- **NPT:** Female
- **BSP:** "-BSP" option
- **DIN:** "-DIN" option
- **JIS:** "-JIS" option
- **ANSI:** "-ANSI" option

Hall-Effect Sensor Power: 4.5 to 24 Vdc (7.5 mA)
Reed Sensor Power: 30 Vdc (500 mA)
Output Options:
- **Pulse Output:** Standard
- **4 to 20 mA Transmitter:** **"-D-A"** option; no output on battery powered **"-D"** model

Display: 7-digit/12 mm (0.47") upper, 7-digit/7 mm (0.28") lower all **"-D"** options
- **Rate:** User defined
- **Total:** Resettable
- **Accumulated-Total:** Non-resettable

Minimum Viscosity: 1 cPs
Maximum Viscosity: 1000 cPs standard
Maximum Pressure: See chart on page 3
Strainer Size: See chart on next page
Mounting: Shafts must be in a horizontal plane
Electrical Connections: 2 x 12 mm (0.08 x 0.47"), fittings included **"-D-A"** option
Cable Length: 1 m (3') stripped ends, non-display models

Mounting: Pipe
Power: 4 to 20 mA, **"-D-A"** models 18 to 30 Vdc display, **"-D"** models 3 Vdc lithium battery (included)
Liquid Temperature: -40 to 80°C (-40 to 176°F)
Materials
- **Body:** Stainless steel
- **Enclosure:** Polypropylene
- **Seals:** FEP
- **Rotors:** PPS
- **Fasteners:** Stainless steel
- **Cable Insulation:** PVC

Enclosure: NEMA 6 (IP67)

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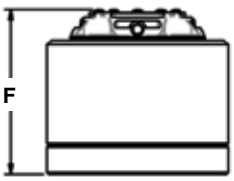
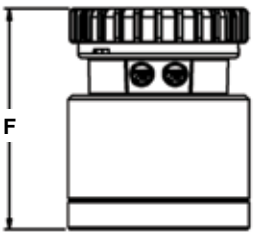


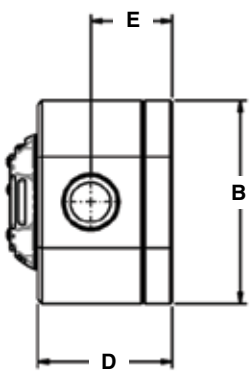
Standard

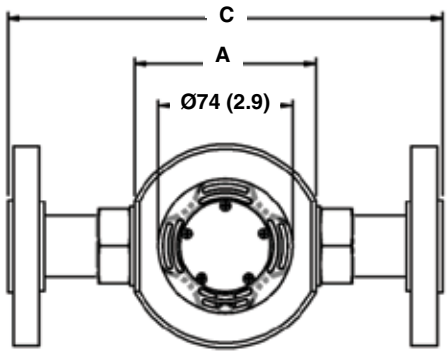


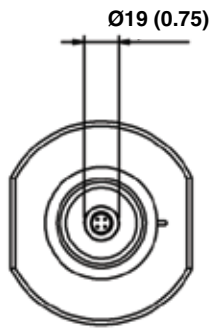
Display (-D options)

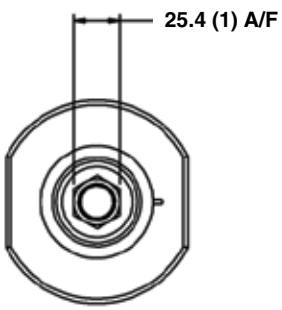
Pulsar and Display Height, F

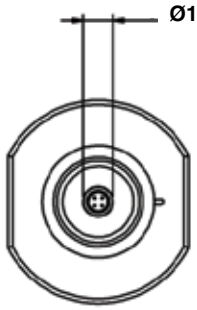
Model No.	Dimensions: mm (inch)		Recommended Strainer
	Standard	-D options	
FPD3202	59 (2.3)	90 (3.5)	200 mesh (74 um)
FPD3203	59 (2.3)	90 (3.5)	200 mesh (74 um)
FPD3204	66 (2.6)	97 (3.8)	60 mesh (250 um)
FPD3234	79 (3.1)	110 (4.3)	60 mesh (250 um)
FPD3205	92 (3.6)	123 (4.8)	60 mesh (250 um)
FPD3206	120 (4.7)	151 (5.9)	60 mesh (250 um)
FPD3207	141 (5.5)	172 (6.7)	60 mesh (250 um)

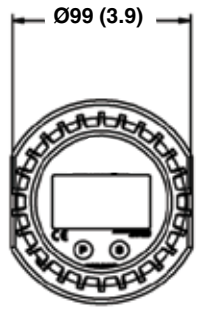












Ø = Diameter

Model No.	Meter and Flange, Dimensions: mm (inch)					
	Port Size	A	B	C*	D	E
FPD3202	¼"	71 (2.8)	74 (2.9)	N/A	42 (1.7)	25 (1)
FPD3203	¼"	71 (2.8)	74 (2.9)	N/A	42 (1.7)	24 (0.9)
FPD3204	½"	81 (3.2)	87 (3.4)	N/A	49 (1.9)	28 (1.1)
FPD3234	¾"	100 (3.9)	112 (4.4)	N/A	62 (2.4)	37 (1.5)
FPD3205	1"	100 (3.9)	112 (4.4)	240 (9.4)	75 (3)	45 (1.8)
FPD3206	1½"	120 (4.7)	137 (5.4)	240 (9.4)	103 (4.1)	61 (2.4)
FPD3207	2"	140 (5.5)	163 (6.4)	264 (10.4)	124 (4.9)	72 (2.8)

* *Flanges.*

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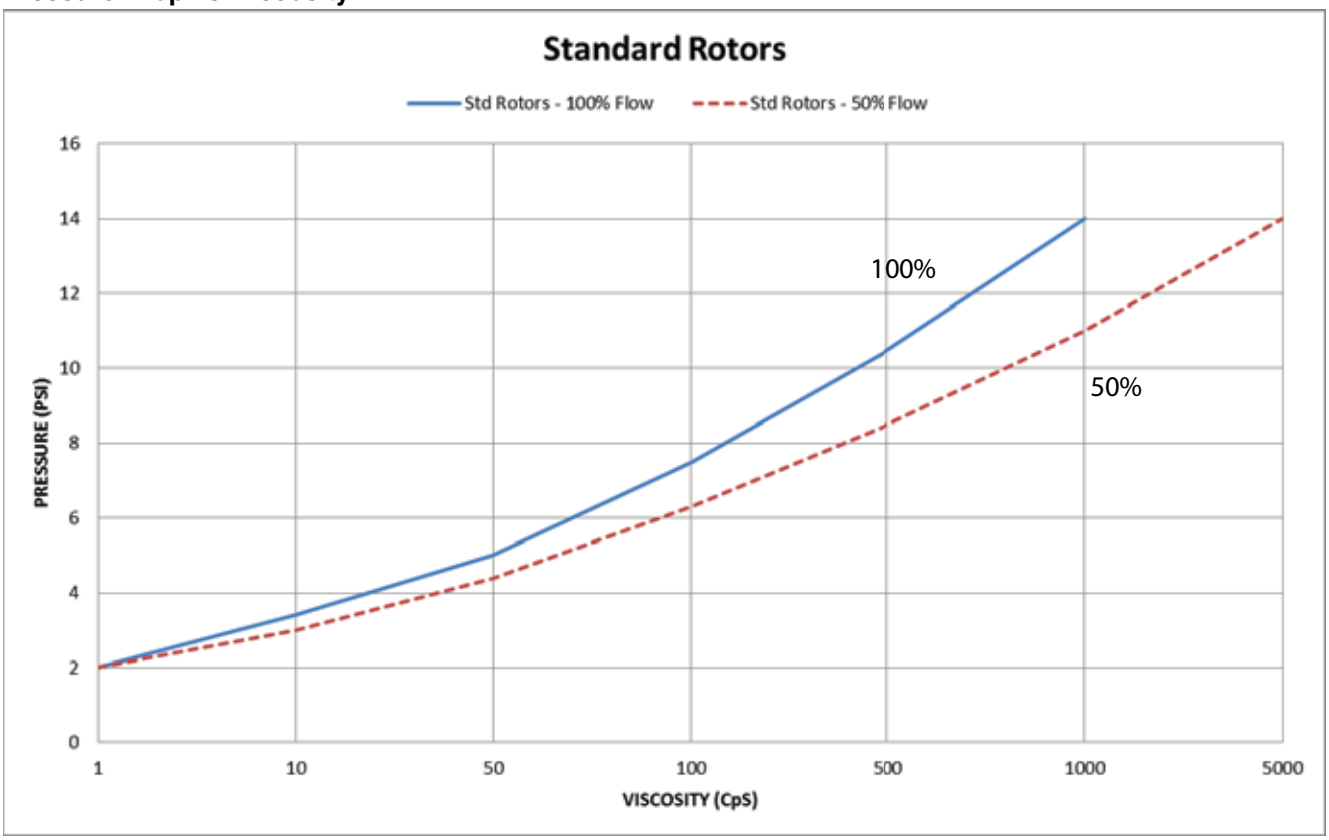
Pressure Drop vs. Viscosity



To Order				
Model No.	Port Size	Flow Range		Maximum Pressure psi (Kpa)
		< 5 cPs	> 5 cPs	
FPD3202	¼"	2 to 100 LPH (0.5 to 26 GPH)	0.5 to 100 LPH (1.3 to 26 GPH)	1000 (6895)
FPD3203	¼"	25 to 500 LPH (6.6 to 132 GPH)	15 to 500 LPH (4 to 132 GPH)	1001 (6895)
FPD3204	½"	3 to 25 LPM (0.8 to 6.6 GPM)	2 to 30 LPM (0.5 to 8 GPM)	2000 (13790)
FPD3234	¾"	8 to 70 LPM (2 to 18.5 GPM)	3 to 80 LPM (0.8 to 21 GPM)	2001 (13790)
FPD3205	1"	10 to 100 LPM (2.6 to 26 GPM)	6 to 120 LPM (1.6 to 32 GPM)	2002 (13790)
FPD3206	1½"	15 to 235 LPM (4 to 62 GPM)	10 to 250 LPM (2.6 to 66 GPM)	1200 (8274)
FPD3207	2"	15 to 500 LPM (4 to 130 GPM)	16 to 500 LPM (4 to 130 GPM)	1001 (6895)

Comes complete with lithium battery and operator's manual.
*For units with a battery powered digital display add **"-D"** to the model number, for an additional charge.*
*For units with a DC powered digital display and 4 to 20 mA output add **"-D-A"** to the model number, for an additional charge.*
*For units with BSP connections add **"-BSP"** to the model number, no additional charge.*
*For units with DIN flanges add **"-DIN"** to the model number, for an additional charge (1" and larger only).*
*For units with JIS flanges add **"-JIS"** to the model number, for an additional charge (1" and larger only).*
*For units with ANSI flanges add **"-ANSI"** to the model number, for an additional charge (1" and larger only).*

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FLOW METER FOR SOLVENTS

FPD3300 Series

- Aluminum Body
- FEP Seals
- Stainless Steel Rotors
- Temperatures up to 80ºC (176ºF)
- NPT or BSP Threads
- DIN, JIS or ANSI Connection (Available on 1" and Larger Sizes)

FPD3305D-A

Both models shown smaller than actual size.

FPD3303

The FPD3300 Series positive displacement flow meters are affordable and accurate. One primary feature is the ability to maintain consistent accuracy despite changing viscosity conditions. The meter's solid construction and excellent dynamic response are well suited to the measurement of many solvents as well as other non-abrasive lubricating fluids. Since there is no need for straight run piping upstream or downstream of the flow meter, the FPD3300 flow meters are simple to use and to install. The meter has good resolution and high accuracy at low flow rates.

SPECIFICATIONS

Accuracy: ±0.5% of reading
Repeatability: ±0.03%
Fitting Type:
- **NPT:** Female
- **BSP:** "-BSP" option
- **DIN:** "-DIN" option
- **JIS:** "-JIS" option
- **ANSI:** "-ANSI" option

Hall-Effect Sensor Power: 4.5 to 24 Vdc (7.5 mA)
Reed Sensor Power: 30 Vdc (500 mA)
Output Options:
- **Pulse Output:** Standard
- **4 to 20 mA Transmitter:** **"-D-A"** option; no output on battery powered **"-D"** model

Display: 7-digit/12 mm (0.47") upper, 7-digit/7 mm (0.28") lower all, **"-D"** options
- **Rate:** User defined
- **Total:** Resettable
- **Accumulated-Total:** Non-resettable

Minimum Viscosity: 1 cPs
Maximum Viscosity: 1000 cPs standard
Maximum Pressure: See chart on page 3
Strainer Size: See chart on next page
Mounting: Shafts must be in a horizontal plane
Electrical Connections: 2 x 12 mm (0.08 x 0.47"), fittings included **"-D-A"** option
Cable Length: 1 m (3') stripped ends non-display models

Mounting: Pipe
Power: 4 to 20 mA, **"-D-A"** models 18 to 30 Vdc display, **"-D"** models 3 Vdc lithium battery (included)
Liquid Temperature: -40 to 80°C (-40 to 176°F)
Materials
- **Body:** Stainless steel
- **Enclosure:** Polypropylene
- **Seals:** FEP
- **Rotors:** Stainless steel
- **Fasteners:** Stainless steel
- **Cable Insulation:** PVC

Enclosure: NEMA 6 (IP67)

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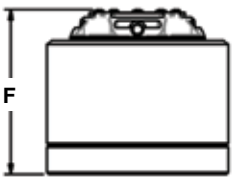
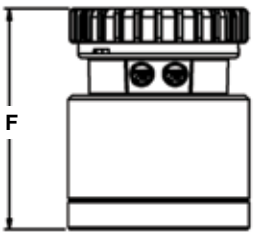


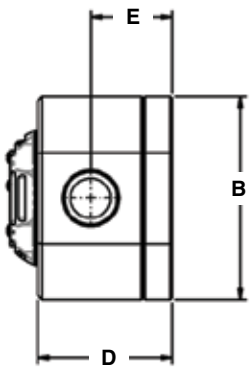
Standard

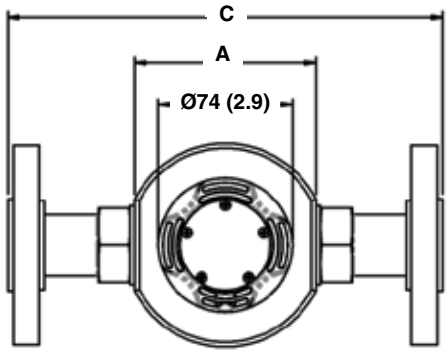


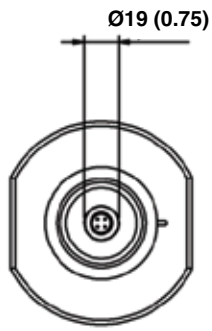
Display (-D options)

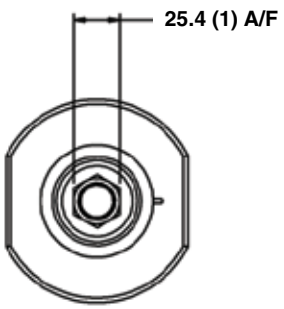
Pulsar and Display Height, F

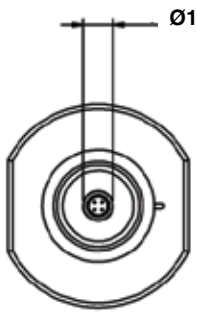
Model No.	Dimensions: mm (inch)		Recommended Strainer
	Standard	-D options	
FPD3302	59 (2.3)	90 (3.5)	200 mesh (74 um)
FPD3303	59 (2.3)	90 (3.5)	200 mesh (74 um)
FPD3304	66 (2.6)	97 (3.8)	60 mesh (250 um)
FPD3334	79 (3.1)	110 (4.3)	60 mesh (250 um)
FPD3305	92 (3.6)	123 (4.8)	60 mesh (250 um)
FPD3306	120 (4.7)	151 (5.9)	60 mesh (250 um)
FPD3307	141 (5.5)	172 (6.7)	60 mesh (250 um)
FPD3308	See operator's manual for dimensional drawings		
FPD3309	See operator's manual for dimensional drawings		

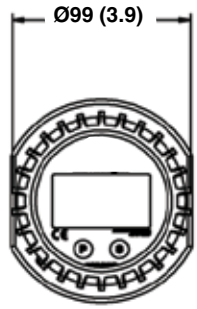












Ø = Diameter

Model No.	Meter and Flange, Dimensions: mm (inch)					
	Port Size	A	B	C*	D	E
FPD3302	¼"	71 (2.8)	74 (2.9)	N/A	42 (1.7)	25 (1)
FPD3303	¼"	71 (2.8)	74 (2.9)	N/A	42 (1.7)	24 (0.9)
FPD3304	½"	81 (3.2)	87 (3.4)	N/A	49 (1.9)	28 (1.1)
FPD3334	¾"	100 (3.9)	112 (4.4)	N/A	62 (2.4)	37 (1.5)
FPD3305	1"	100 (3.9)	112 (4.4)	240 (9.4)	75 (3)	45 (1.8)
FPD3306	1½"	120 (4.7)	137 (5.4)	240 (9.4)	103 (4.1)	61 (2.4)
FPD3307	2"	140 (5.5)	163 (6.4)	264 (10.4)	124 (4.9)	72 (2.8)
FPD3308	See operator's manual for dimensional drawings					
FPD3309	See operator's manual for dimensional drawings					

* *Flanges*

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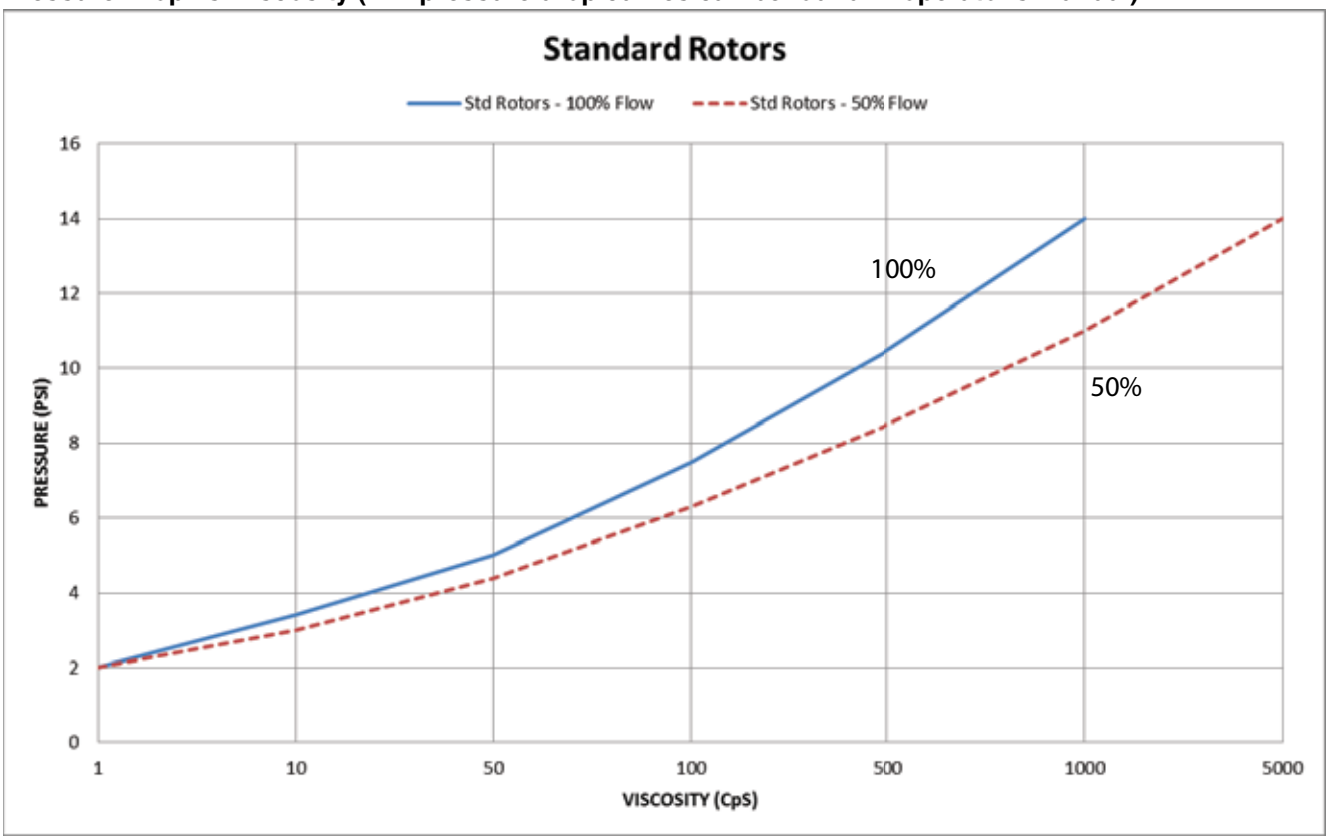
Pressure Drop vs. Viscosity (-HV pressure drop curves can be found in operator's manual)



To Order

Model No.	Port Size	Flow Range		Maximum Pressure psi (Kpa)
		< 5 cPs	> 5 cPs	
FPD3302	¼"	2 to 100 LPH (0.5 to 26 GPH)	0.5 to 100 LPH (0.13 to 26 GPH)	1000 (6895)
FPD3303	¼"	25 to 500 LPH (6.6 to 132 GPH)	15 to 500 LPH (4 to 132 GPH)	1001 (6895)
FPD3304	½"	3 to 25 LPM (0.8 to 6.6 GPM)	2 to 30 LPM (0.5 to 8 GPM)	2000 (13790)
FPD3334	¾"	8 to 70 LPM (2 to 18.5 GPM)	3 to 80 LPM (0.8 to 21 GPM)	2001 (13790)
FPD3305	1"	10 to 100 LPM (2.6 to 26 GPM)	6 to 120 LPM (1.6 to 32 GPM)	2002 (13790)
FPD3306	1½"	15 to 235 LPM (4 to 62 GPM)	10 to 250 LPM (2.6 to 66 GPM)	1200 (8274)
FPD3307	2"	15 to 500 LPM (4 to 130 GPM)	16 to 500 LPM (4 to 130 GPM)	1001 (6895)
FPD3308	3"	60 to 600 LPM (15.8 to 158 GPM)	20 to 733 LPM (5.3 to 193 GPM)	175 (1206)

Comes complete with lithium battery and operator's manual.
*For units with a battery powered digital display add **"-D"** to the model number, for an additional charge.*
*For units with a DC powered digital display and 4 to 20 mA output add **"-D-A"** to the model number, for an additional charge.*
*For units with BSP connections add **"-BSP"** to the model number, no additional charge.*
*For units with DIN flanges add **"-DIN"** to the model number, for an additional charge (1" and larger only).*
*For units with JIS flanges add **"-JIS"** to the model number, for an additional charge (1" and larger only).*
*For units with ANSI flanges add **"-ANSI"** to the model number, for an additional charge (1" and larger only).*
*For units with high viscosity rotors add **"-HV"** to the model number, for an additional charge.*

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FLOW METERS

FPD4000 Series

- ±0.5% Rdg Accuracy
- Aluminum, 303 or 316 SS Bodies
- Pressure Rating Up to 345 bar (5000 psi)
- Pulse or mA Outputs Available
- Bi-Directional Flow Capabilities
- Economical Cost

FPD4012 shown smaller than actual size.

The FPD4000 Series represents a positive displacement meter that is affordable and accurate. One primary feature is the ability to maintain consistent accuracy despite changing viscosity conditions. This reliability, coupled with a large turndown range, offers an affordable replacement for older turbine technology. The meter's solid construction and excellent dynamic response are well suited to the measurement of oil, grease, fuel, solvents, polyurethanes, brake fluid, skydrol as well as other nonabrasive lubricating fluids. Since there is no need for straight run piping upstream or downstream of the flowmeter, the FPD4000 flow meters are simple to use and to install. The meters produce good
resolution and high accuracy at low flow rates. Flow may be bi-directional, such as for cylinder position measurements, without damage to internal parts.

SPECIFICATIONS

Accuracy: ±0.5% over 10:1 turndown with 30cP fluid
Repeatability: ±0.1%
Max Fluid Temperature:
Aluminum Body: Meter 85°C (185°F)
Stainless Body: Meter 204°C (400°F)
Pressure Maximum: 413 bar (6000 psi)
Wetted Materials
Body:
FPD4000 Series: Aluminum
FPD4010 Series: 303 SS
FPD4020 Series: 316 SS
Gear: Stainless steel
O-Ring: PTFE, FKM (optional)
Bearings: Stainless steel

Outputs

Temperature Range (Electronics): Standard Aluminum and SS versions -40 to 85°C (-40 to 185°F) (-HT) up to 149°C (300°F).
Square Wave: (Basic unit)
Supply Voltage: +10 to 28 Vdc
Supply Current: 8 mA @ 12 Vdc,12 mA @ 24 Vdc
Duty Signal: 50% ±15%
Minimum Signal: 0.5 Hz
Frequency: Flow dependent, up to 2000 Hz
Driving Capacity: 50 mA max resistive load
Output Impedance: 40 Ω - analog switch and self-resetting fuse

Analog Output (-A Models)

Supply Voltage: 10 to 30 Vdc
Output: 4 to 20 mA
Input: 0.25 Hz to 5 kHz
Amplitude: 1 to 40 Vp-p
Update Time: 1/F + 25 msec
Linearity: ±0.01% rdg

Model No.	Pulses/Liter (Pulses/Gallon)	Body Dia cm (inch)	*Body Height cm (inch)	Filtration (microns)
FPD40X1	14,000 (53,000)	7.6 (3)	8.6 (3.4)	30
FPD40X2	4200 (15,900)	8.4 (3.3)	8.6 (3.4)	30
FPD40X3	1700 (6600)	8.4 (3.3)	8.6 (3.4)	30
FPD40X4	470 (1800)	12.4 (4.9)	13.8 (5.45)	30
FPD40X5	420 (1600)	21.3 (8.4)	17 (6.7)	200

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DPF75 shown smaller than actual size.

To Order

Model No.	NPT	Range LPM (GPM)	Description
FPD4001	¼	0.01 to 3 (0.003 to 0.8)	Aluminum gear meter with pulse output
FPD4002	¼	0.04 to 7.5 (0.01 to 2)	Aluminum gear meter with pulse output
FPD4003	½	0.11 to 26.4 (0.03 to 7)	Aluminum gear meter with pulse output
FPD4004	¾	0.19 to 75 (0.05 to 20)	Aluminum gear meter with pulse output
FPD4005	1¼	1.9 to 227 (0.5 to 60)	Aluminum gear meter with pulse output
FPD4001-A	¼	0.01 to 3 (0.003 to 0.8)	Aluminum gear meter with 4 to 20 mA output
FPD4002-A	¼	0.04 to 7.5 (0.01 to 2)	Aluminum gear meter with 4 to 20 mA output
FPD4003-A	½	0.11 to 26.4 (0.03 to 7)	Aluminum gear meter with 4 to 20 mA output
FPD4004-A	¾	0.19 to 75 (0.05 to 20)	Aluminum gear meter with 4 to 20 mA output
FPD4005-A	1¼	1.9 to 227 (0.5 to 60)	Aluminum gear meter with 4 to 20 mA output
FPD4011	¼	0.01 to 3 (0.003 to 0.8)	303 SS gear meter with pulse output
FPD4012	¼	0.04 to 7.5 (0.01 to 2)	303 SS gear meter with pulse output
FPD4013	½	0.11 to 26.4 (0.03 to 7)	303 SS gear meter with pulse output
FPD4014	¾	0.19 to 75 (0.05 to 20)	303 SS gear meter with pulse output
FPD4015	1¼	1.9 to 227 (0.5 to 60)	303 SS gear meter with pulse output
FPD4011-A	¼	0.01 to 3 (0.003 to 0.8)	303 SS gear meter with 4 to 20 mA output
FPD4012-A	¼	0.04 to 7.5 (0.01 to 2)	303 SS gear meter with 4 to 20 mA output
FPD4013-A	½	0.11 to 26.4 (0.03 to 7)	303 SS gear meter with 4 to 20 mA output
FPD4014-A	¾	0.19 to 75 (0.05 to 20)	303 SS gear meter with 4 to 20 mA output
FPD4015-A	1¼	1.9 to 227 (0.5 to 60)	303 SS gear meter with 4 to 20 mA output
FPD4021	¼	0.01 to 3 (0.003 to 0.8)	316 SS gear meter with pulse output
FPD4022	¼	0.04 to 7.5 (0.01 to 2)	316 SS gear meter with pulse output
FPD4023	½	0.11 to 26.4 (0.03 to 7)	316 SS gear meter with pulse output
FPD4024	¾	0.19 to 75 (0.05 to 20)	316 SS gear meter with pulse output
FPD4021-A	¼	0.01 to 3 (0.003 to 0.8)	316 SS gear meter with 4 to 20 mA output
FPD4022-A	¼	0.04 to 7.5 (0.01 to 2)	316 SS gear meter with 4 to 20 mA output
FPD4023-A	½	0.11 to 26.4 (0.03 to 7)	316 SS gear meter with 4 to 20 mA output
FPD4024-A	¾	0.19 to 75 (0.05 to 20)	316 SS gear meter with 4 to 20 mA output

Accessories

Model No.	Description
DPF75	Pulse input 6-digit panel meter for rate or total

*Comes complete with operator's manual, K-factor certificate, and connector. Certificate does not include points and is not a NIST certificate. For High Temperature option on stainless steel models, add suffix **"-HT"** to model number, for additional cost.*

***Ordering Examples:** **FPD4003,** aluminum gear meter with pulse output, ½ NPT connections, 0.03 to 7 GPM range and **DPF701** digital ⅛ DIN panel meter with red LED display.*

***FPD4012-A,** 303 SS gear meter with 4 to 20 mA output, ¼ NPT, 0.01 to 2 GPM range.*

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OVAL GEAR TOTALIZER FOR VISCOUS LIQUIDS

FPDM3000 Series

1 YEAR WARRANTY CE RoHS

FPDM3004 shown smaller than actual size.

- **Aluminum or Stainless Body**
- **Higher Temperatures up to 120°C (248°F) ("-HT" Option)**
- **NPT or BSP Threads**
- **DIN, JIS or ANSI Connections (1" and Larger Sizes)**

The FPDM3000 Series positive displacement oval gear flow meters are affordable and accurate. One primary feature is the ability to maintain consistent accuracy despite changing viscosity conditions. The meter's solid construction and excellent dynamic response are well suited to the measurement of many viscous fluids. Three choices of wetted material combinations are available for compatibility with a large variety of liquids. Since there is no need for straight run piping upstream or downstream of the flow meter, the FPDM3000 flow meters are simple to use and to install. The meter has good resolution and high accuracy at low flow rates.

SPECIFICATIONS

Accuracy: ±1% of reading
Repeatability: ±0.03%
Fitting Type
- **NPT:** Female
- **BSP:** "-BSP" option
- **DIN:** "-DIN" option
- **JIS:** "-JIS" option
- **ANSI:** "-ANSI" option

Total: Resettable
Accumulated-Total: Non-resettable
Minimum Viscosity: 1cPs
Maximum Viscosity: 1000 cPs standard
Strainer Size: 200 mesh (74µ)
Mounting: Shafts must be in a horizontal plane
Mounting: Pipe
Liquid Temperature: -40 to 80°C (-40 to 176°F); -40 to 120°C (-40 to 248°F) ("-HT" option)
Maximum Pressure: 3400 kPa (500 psi)

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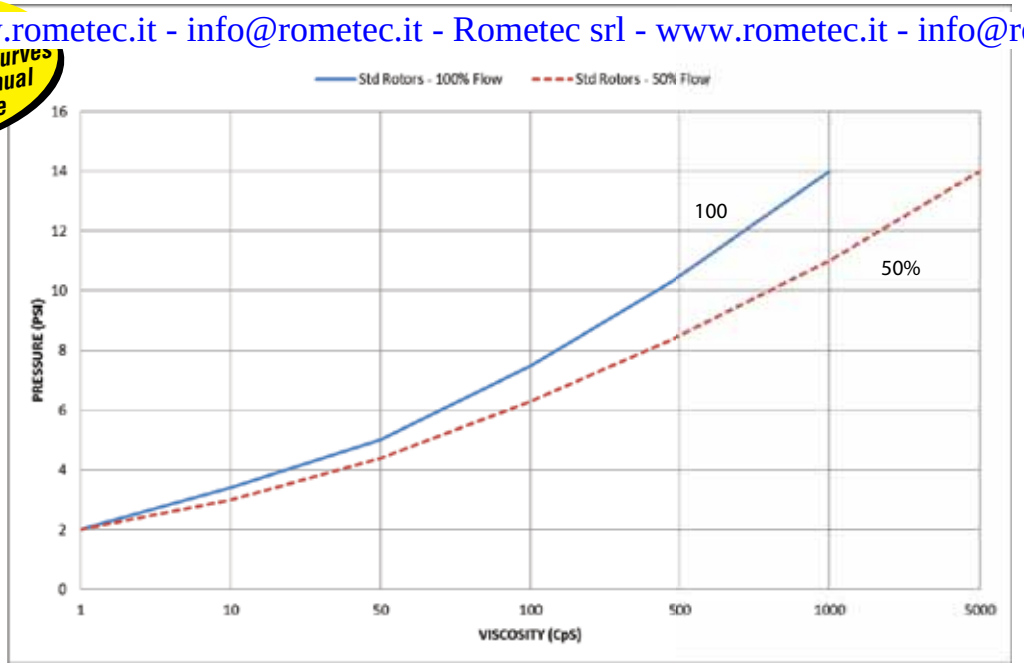
Drawings, Web
(-HV) Pressure Drop Curves
See Operator's Manual
Available Online



Wetted Parts

Part	FPDM3000	FPDM3200	FPDM3300
Meter Body	Aluminum	Stainless Steel 316	Aluminum
Rotor Shafts	Stainless Steel 316	Stainless Steel 316	Stainless Steel 316
Rotors-Standard	Polyphenylene Sulfide	Polyphenylene Sulfide	Stainless Steel 316
Rotors-High Temperature	—	Stainless Steel 316	—
Rotors-High Viscosity	—	Stainless Steel 316	Stainless Steel 316
Rotor Brushes	—	Carbon	Carbon
Meter Cap	Aluminum	Stainless Steel 316	Aluminum
Gear Assembly	Stainless Steel 316-Acetal	Stainless Steel 316-Acetal	Stainless Steel 316-Acetal
Cover Plate	Stainless Steel 316	Stainless Steel 316	Stainless Steel 316
Output Gear-Shaft Assembly	Stainless Steel 316-FKM-Acetal	Stainless Steel 316-FKM-Acetal	Stainless Steel 316-FKM-Acetal
O-Rings	FKM	FEP/PTFE Encapsulated	FEP/PTFE Encapsulated

To Order

Model No.	Port Size	Flow Range	
		<5cPs	>5cPs
FPDM3004	½"	3 to 25 LPM (0.8 to 6.6 GPM)	2 to 30 LPM (0.5 to 8 GPM)
FPDM3204	½"	3 to 25 LPM (0.8 to 6.6 GPM)	2 to 30 LPM (0.5 to 8 GPM)
FPDM3005	1"	10 to 100 LPM (2.6 to 26 GPM)	6 to 120 LPM (1.6 to 32 GPM)
FPDM3205	1"	10 to 100 LPM (2.6 to 26 GPM)	6 to 120 LPM (1.6 to 32 GPM)
FPDM3305	1"	10 to 100 LPM (2.6 to 26 GPM)	6 to 120 LPM (1.6 to 32 GPM)
FPDM3006	1½"	15 to 235 LPM (4 to 62 GPM)	10 to 250 LPM (2.6 to 66 GPM)
FPDM3206	1½"	15 to 235 LPM (4 to 62 GPM)	10 to 250 LPM (2.6 to 66 GPM)
FPDM3306	1½"	15 to 235 LPM (4 to 62 GPM)	10 to 250 LPM (2.6 to 66 GPM)
FPDM3007	2"	15 to 500 LPM (4 to 130 GPM)	16 to 500 LPM (4 to 130 GPM)
FPDM3207	2"	15 to 500 LPM (4 to 130 GPM)	16 to 500 LPM (4 to 130 GPM)
FPDM3307	2"	15 to 500 LPM (4 to 130 GPM)	16 to 500 LPM (4 to 130 GPM)

*For units with BSP connections add **"-BSP"** to the model number no additional charge.*
*For units with DIN flanges add **"-DIN"** to the model number for an additional charge.*
*For units with JIS flanges add **"-JIS"** to the model number for an additional charge.*
*For units with ANSI flanges add **"-ANSI"** to the model number for an additional charge.*
*For units that totalize in liters add **"-L"** to the model number, no additional cost.*
*For FPDM3200/FPDM3300 units with high viscosity rotors add **"-HV"** to the model number for an additional charge.*
*For FPDM3200 units made for higher temperatures add **"-HT"** to the model number for an additional charge.*

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BATTERY POWERED FLOW INDICATOR AND TOTALIZER

FPM-5750 Series

1 YEAR WARRANTY

- Store Three Totalizer Values
- Long-Lasting Lithium Batteries (Included)
- Panel or Field Mount Models Available
- No-Flow Indicator
- Large Digital Display with Averaging
- Simple Push-Button Operation
- User Selectable Access Code Prevents Unwanted Changes
- Auto-Calibration

FPM-5750-P shown smaller than actual size.

The FPM-5750 is a battery operated flow indicator and totalizer. The large digital display indicates flow rate and totalized flow volume simultaneously. One of the three totalizers is resettable from the front panel or a remote location, while the second resettable totalizer can only be reset by entering a user-selectable security code. Meanwhile, the third is a permanent non-resettable totalizer. Our intuitive software design and four button keypad provide for simple operation while setting screen displays and programming the system. Calibration can be easily performed by entering the Auto-Cal feature and entering a value to match an external reference. Screen displays can be modified to suit the user's needs; along with the flow rate, any of the three totalizers can be selected as the displayed totalizer. Users can quickly scroll through the totalizers simply by pressing any key on the keypad. A display averaging feature is included for applications where the flow in the pipe fluctuates. For applications where flow stops and starts due to production needs, a no-flow indicator will display the hours of non-flow. This product is very similar to the FP90 Series transmitter and requires flow sensors and fittings to be purchased separately.

SPECIFICATIONS

Input Freq. Range: 0 to 400 Hz (sinewave)
Accuracy: ±0.5% of reading
Display: LCD type
4-Digit Upper Line: Flow rate
8-Digit Lower Line: Volume totalizer count, resettable and permanent
Averaging: 0 to 120 seconds
Contrast: Automatic
Low Battery Indication: Battery symbol appears on LCD display
8-Digit Resettable Totalizers:
Stored Until User Resets: Continues to be stored even after batteries are removed
8-Digit Permanent: Kept permanently, even when batteries are removed
Enclosure: PBT resin
Keypad Material: Sealed 4-key silicon rubber
Panel Case Gasket: Neoprene®
Window: Polyurethane coated polycarbonate
Battery: Two "AA" 3.6V Lithium thionyl chloride (included)
Battery Life: 4 years nominal ≤50°C (122°F)
Enclosure Rating: NEMA 4X (IP65) front
Operating Temperature: -10 to 65°C (14 to 149°F)
Storage Temperature: -40 to 100°C (-40 to 212°F)
Relative Humidity: 0 to 95% non-condensing
Shipping Weight: 0.5 kg (1.1 lb)
Dimensions: For panel version, cutout must be 92 x 92 mm² (3.62 x 3.62")
Compatible Sensors: FP-5300/5100, FP-5200, and FP-6000, and FP-5600

To Order

Model No.	Description
FPM-5750	Indicator/totalizer field mount, FP90UM kit required, (sold separately)
FPM-5750-P	Indicator/totalizer panel mount

Accessories

Model No.	Description
FP90UM	Universal mounting kit for remote wall or pipe mount
FP-5300	Standard paddle wheel for ½ to 4" pipe
FP-5310M	1" PVC pipe fitting

Comes complete with operator's manual and 2 "AA" 3.6V batteries.

***Ordering Examples: FPM-5750-P,** panel mount indicator, **FP-5300,** flow sensor, **FP-5310M,** 1" PVC fitting.*

***FPM-5750,** field mount indicator, **FP-5100,** flow sensor, **FP90UM,** universal mount kit, **FP-5310M,** 1" PVC fitting.*

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INDICATION, REMOTE SENSING AND FLOW ALARM

FPR100 Series

1 YEAR WARRANTY

- **Low Cost**
- **Pulse or Alarm Output Optional**
- **For Flows from 0.1 to 30.0 GPM**
- **Flow Switch Rotor Cannot Seize in "ON" State**
- **Integral Mounting Holes Standard**

FPR131 sensor, shown with DPF701 ratemeter.

The rugged, low-cost FPR100 Series sensors feature a one-piece composite rotor, sturdy unibody construction, ceramic shafts, and superior sealing. The FPR110 sensors, with bright orange spinning rotors, provide visual indication of flow only. The FPR120 Series features visual indication and an adjustable 0.5 A @ 110 Vac SPDT mechanical flow switch. The FPR130 Series has visual indication and a square-wave pulse output for use with remote ratemeters/totalizers, such as the DPF700 Series meters.

For panel mounting, all polypropylene units come with mounting ears that accept #8 self-tapping screws; all brass units come with mounting holes that accept #8-32 UNC-2B screws. For all FPR100 sensors, incoming flow can be directed to either port; a minimum of 8 inches of straight inlet pipe is required. Filtration of 150 microns is recommended.

SPECIFICATIONS

Wetted Parts: Brass or hydrolytically stable glass-reinforced polypropylene body; ceramic rotor pin; nylon composite rotor; polysulfone lens; and Buna O-ring with polypropylene body, FKM O-ring with brass or Stainless Steel body

Max Pressure:

Polypropylene: 100 psig at 70ºF, 40 psig at (180°F)

Brass or Stainless Steel: 200 psig at 70ºF, 100 psig at 212ºF

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FPR131

Both models shown larger than actual size.

Max Liquid Temperature:
Brass: -29 to 100ºC (-20 to 212°F)
Polypropylene: -29 to 82°C (-20 to 180°F)
Max Pressure Drop: 11 psid
Max Ambient Electronics Temperature: 65.6°C (150°F)
Max Liquid Viscosity: 200 SSU
FPR120 Power: 12 Vdc, 24 Vdc, or 110 Vac (per model number)

FPR130 Pulse Output:
Pulse amplitude = DC power input
FPR130 Pulse Output Range:
15 Hz at lowest flow rate of both ranges; 225 Hz at highest flow rate of both ranges
FPR120, FPR130 Repeatability:
2% of rate
FPR130 Power:
4.5 to 24 Vdc at 70 mA maximum.0

FPR120 SPDT Switch Rating (Resistive):
0.5 A at 110 Vac; 1 A at 24 Vdc
FPR120 Setpoint Deadband: 15% of rate
Weight:
PP Body: FPR110, 340 g (12 oz); FPR120, 454 g (1 lb); FPR130, 397 g (14 oz)
Brass Body: FPR110, 680 g (1.5 lb), FPR-120, 907 g (2 lb)

F

To Order

Model No.	Body Material	Port Size NPT	Input Power	Low Range*	Flow Ranges (GPM) Std. Range
Sensor with Visual Indication Only					
FPR111	Polypropylene	0.25	—	0.1 to 1	0.5 to 5
FPR112	Polypropylene	0.50	—	1.5 to 12	4.0 to 20
FPR113	Brass	0.25	—	0.1 to 1	0.5 to 5
FPR114	Brass	0.50	—	1.5 to 12	4.0 to 20
FPR115	Brass	0.75	—	—	5.0 to 30
Sensor with Visual Indication and Flow Switch					
FPR122	Polypropylene	0.25	24 Vdc	0.1 to 1.0	0.5 to 5
FPR123			110 Vac		
FPR125		0.50	24 Vdc	1.5 to 12.0	4.0 to 20
FPR126			110 Vac		
Sensor with Visual Indication and Pulse Output			**K Factor Low - High**	**Accuracy (% of Full Scale)**	
FPR131†	Polypropylene	0.25	10,900 - 2196	0.1 to 1 (±7%)	0.5 to 5 (±7%)
FPR132†	Polypropylene	0.50	959 - 611	1.5 to 12 (±7%)	4 to 20 (±15%)
FPR133†	Brass	0.25	10,900 - 2196	0.1 to 1 (±7%)	0.5 to 5 (±7%)
FPR134†	Brass	0.50	959 - 611	1.5 to 12 (±7%)	4 to 20 (±15%)
FPR135†	Brass	0.75	385	—	5 to 30 (±10%)
FPR136	Brass	1.00	180	—	8 to 60 (±15%)
FPR133-SS	Stainless Steel	0.25	10,900 - 2196	0.1 to 1 (±7%)	0.5 to 5 (±7%)
FPR134-SS	Stainless Steel	0.50	959 - 611	1.5 to 12 (±7%)	4 to 20 (±15%)
FPR135-SS	Stainless Steel	0.75	385	—	5 to 30 (±15%)
FPR136-SS	Stainless Steel	1.00	180	—	8 to 60 (±15%)

Comes complete with operator's manual.
*For units with BSPP threads add **"-BSP"** to model number, for additional cost.*
** With use of low flow adaptor (included).*
† Pull-down resistor required.
***Ordering Example: FPR125,** flow sensor with visual indication and flow switch, polypropylene body, 0.50 NPT port size, 1.5 to 12 GPM low range, 4 to 20 GPM standard range, powered by 12 Vdc.*
***FPR133,** flow sensor with visual indication and pulse output, brass body, 0.25 NPT port size, 0.1 to 1 GPM low range, 0.5 to 5 standard range.*

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LIQUID FLOW TRANSMITTERS
With Available Visual Indication

FPR205-PC, shown smaller than actual size.

FPR200 Series

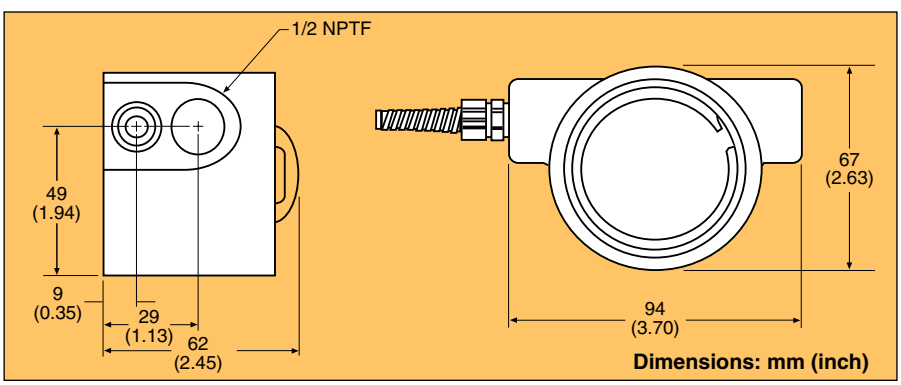
1 YEAR WARRANTY

- **2% FS Accuracy**
- **0.5 to 50 GPM Range**
- **Visual Indication of Flow Pulse**
- **Simple Design**
- **4 to 20 mA, Pulse or Relay Output**
- **Reverse Polarity Protection**

The FPR-200 Series flow-rate sensor integrates rugged tangential turbine technology with a precision digital-to-analog conversion circuit hermetically encapsulated within the body of the sensor. This flow sensor is ideal for measuring flow rates in cooling circuits, HVAC systems, and batching operations.

SPECIFICATIONS

Accuracy: 2% FS
Repeatability: 0.5% FS
Temperature Range:
Stainless Steel Body: -7 to 107°C (20 to 225°F)
Polypropylene Body: -7 to 65°C (20 to 150°F)
Analog Output: 4 to 20 mA
Power Supply: 12 to 35 Vdc
Load Driving Capacity: 1150 Ω max
Response Time: 2 s to 90% (step change in flow rate)
Electrical Connection: 3 m (10') cable
Pulse Dry-Contact Output (-PS Models)
Maximum Voltage: 5 to 24 Vdc
Maximum Current: 10 mA ac/dc
Maximum Power: 0.25 W
Relay Output: Form C (SPDT), rated 5A@120/240 Vac
Wetted Parts for 316 SS Bodies
Casing: 316 SS
Cover: Stainless steel or clear polycarbonate
Seal: Buna, EPR or FKM (optional)
Turbine: Acetal copolymer
Bearing: PEEK™
Shaft: Stainless steelNon-Wetted Parts for 316 SS Bodies
Encapsulant: Epoxy
Strain Relief: Nylon
Lock Ring: Stainless steel
Wire Insulation: High-temperature PVC
Max Viscosity: 5 cps wetted parts for polypropylene bodies
Sensor Body: Glass-filled polypropylene
Cover: Clear polycarbonate
Seal: Buna
Turbine: Acetal copolymer
Bearing: PEEK
Shaft: Stainless steel
Non-Wetted Parts for Polypropylene Bodies
Encapsulant: Epoxy
Strain Relief: Nylon
Lock Ring: Glass-filled polypropylene
Wire Insulation: High-temperature PVC



Dimensions: mm (inch)

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FPR204P-PC, shown smaller than actual size.

To Order

316 SS Sensor Transmitter

Model No.	Connection NPT	Body Material/ Output	Visual Indicator	Max Pressure (PSIG)	Range LPM	Range GPM
FPR204-PC-PS	½	316 SS/ pulse dry contact	Y	200	1.9 to 18.9	0.5 to 5.0
FPR204-PS			blind	500		
FPR204P-PC*		Polypropylene/ 4 to 20 mA	Y	150		
FPR204P-PC-PS		Polypropylene/ pulse dry contact	Y	150		
FPR205*		316 SS/ 4 to 20 mA	blind	500	5.7 to 56.8	1.5 to 15.0
FPR205-PC*			Y	200		
FPR205-PC-PS		316 SS/ pulse dry contact	Y	200		
FPR205-PS			blind	500		
FPR205P-PC*		Polypropylene/ 4 to 20 mA	Y	150		
FPR205P-PC-PS		Polypropylene/ pulse dry contact	Y	150		
FPR203-PC-PS	¾	316 SS/ pulse dry contact	Y	200	11.4 to 113.6	3.0 to 30.0
FPR203-PS			blind	500		
FPR206*		316 SS/ 4 to 20 mA	blind	500	18.9 to 189.3	5.0 to 50.0
FPR206-PC*			Y	200		
FPR206-PC-PS		316 SS/ pulse dry contact	Y	200		
FPR206-PS			blind	500		
FPR207*	1	316 SS/ 4 to 20 mA	blind	500		
FPR207-PC*			Y	200		
FPR207-PS		316 SS/ pulse dry contact	blind	500		
Flow Switches with Relays						
FSW204-PC **FSW204**	½	316 SS/Relay	Y blind	200 500	1.9 to 18.9	0.5 to 5.0
FSW204P-PC		Polypropylene/Relays	Y	150		
FSW205-PC		316 SS/Relay	Y	200	5.7 to 56.8	1.5 to 15.0
FSW205			blind	500		
FSW205P-PC		Polypropylene/Relays	Y	150		
FSW203-PC	¾	316 SS/Relay	Y	200	11.4 to 113.6	3.0 to 30.0
FSW203			blind	500		
FSW207-PC	1		Y	200	18.9 to 189.3	5.0 to 50.0
FSW207			blind	500		

Comes complete with 3 m (10') cable and operator's manual.
*For units with EPR seals, add suffix **"-EPR"** to model number, no extra charge.*
*For units with FKM seals, add suffix **"-FKM"** to model number, for additional cost.*
*To replace the 4 to 20 mA output with 0 to 5 Vdc output add **"-5V"** to model number, for additional cost.*
***Ordering Examples: FPR205**, blind flow transmitter.*
***FPR205-PC-FKM**, blind flow transmitter with clear cover and FKM seals.*

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LOW FLOW POLYPROPYLENE AND TFE LIQUID FLOWMETERS

FPR300 Series

- **Impeller Design With Only One Moving Part**
- **Field Replaceable Sensor**
- **Excellent Low-Flow Performance**
- **Versatile Square-Wave Signal**

FPR301 with translucent cover, shown smaller than actual size.

FPR311 with opaque cover.

The FPR300 Series comprises versatile impeller flowmeters in ⅜ to 1" nominal pipe size that employ jewel bearings for very low minimum flows. The 6 to 24 Vdc pulse output of these meters is compatible with many different types of control, including a full range of OMEGA® rate displays and controls. The FPR300 Series body material is polypropylene, with transparent acrylic covers for visual flow indication. Polypropylene covers are available as an option. The FPR310 Series has TFE housing, TFE cover (not visual), PVDF rotor, and a ceramic shaft.

O-Ring:
FPR300 Series: EPDM
FPR310 Series: FKM
Dimensions: 56 H x 104 L x 53 mm D (2.2 x 4.1 x 2.1")
Cable: 5.5 m (18')
Max Pressure Drop:
FPR301, FPR311: 15 psi
FPR302, FPR312: 20 psi
FPR303, FPR313: 20 psi
FPR304, FPR314: 20 psi

SPECIFICATIONS

Accuracy: 1% FS
Max Temperature: 70°C (160°F)
Max Pressure: 10 bar (150 psi)
Power: 6 to 24 Vdc @ 2 mA
Output: NPN open collector
MATERIALS
Body:
FPR300 Series: Polypropylene
FPR310 Series: TFE
Cover:
FPR300 Series: Acrylic, polypropylene (sold separately)
FPR310 Series: TFE
Rotor: PVDF
Shaft:
FPR300 Series: Nickel tungsten carbide
FPR310 Series: zirconia ceramic, silicon
Bearings: Ruby

To Order

Polypropylene (Translucent)	TFE Opaque/Non-Visual		Nominal K Factors (pulses/gallon)
Model No.	Model No.	Connection/Range	
FPR301	FPR311	⅜ NPT, 0.07 to 5 GPM	1200 to 1380
FPR302	FPR312	½ NPT, 0.1 to 10 GPM	600 to 680
FPR303	FPR313	¾ NPT, 0.2 to 20 GPM	375 to 460
FPR304	FPR314	1 NPT, 0.5 to 40 GPM	215 to 270

Accessories

Model No.	Description
FPR300-SENSOR	Replacement sensor with 5.5 m (18') cable
FPR300-V	Replacement FKM O-ring, for FPR310 units
FPR300-E	Replacement EPDM O-ring, for FPR300 units
FPR300-PCOVER	Polypropylene cover
DPF701	Rate or total panel meter

Comes complete with operator's manual and 5.5 m (18') cable.
Ordering Examples: FPR302, *½ NPT polypropylene, 0.1 to 10 GPM.*
FPR314, *1 NPT TFE. 0.5 to 40 GPM.*

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Economical Pitot Tube Flow Sensors

FPT-3000 Series

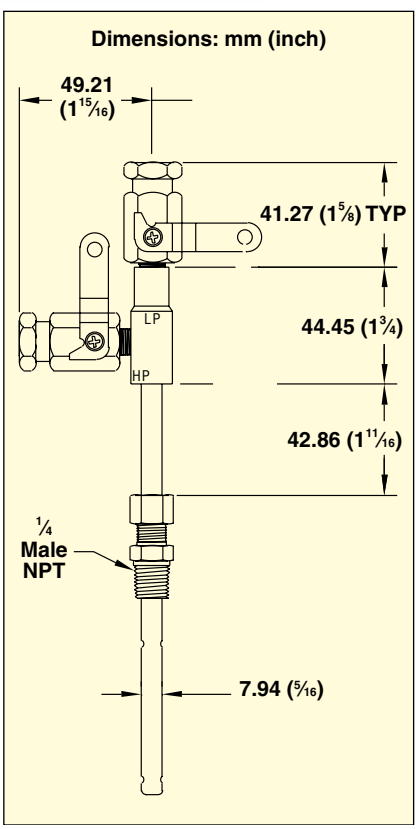
FPT-3025 shown smaller than actual size.

- **Includes Shut-Off Valves on Both Pressure Connections**
- **Low Pressure Drop**
- **Low Maintenance**
- **Rugged Construction Yields, Non-Clogging, Stable Design**

Applications

- **Remediation**
- **Natural, Flare, Flue, Stack Gas**
- **Boiler Feed-Water**
- **Cooling Water**
- **Superheated, Saturated, or Geothermal Steam**
- **Combustion or Compressed Air**
- **Oil Flow Monitoring**

The FPT-3000 averaging flow sensors are designed to be inserted in the pipeline through a compression fitting and are available for pipe sizes from 2.5 to 25.4 cm (1 to 10"). All models include convenient and quick-acting quarter-turn ball valves to isolate the sensor for zeroing with ⅛ female NPT valve assembly process connections.



The FPT-3000 Series in-line flow sensors are two averaging pitot tubes for compatible gases and liquids. They provide accurate and convenient flow rate sensing for a schedule 40 pipe, when purchased with a suitable differential pressure gage with appropriate range. Extremely reliable, proven technology, pitot tubes, have been used in flow measurement for years. Multiple sensing point measurement and built-in averaging capability eliminates the need for "traversing" the flowing stream with single point velocity pressure measurement which saves time.

Specifications

Accuracy: ±2%
Materials of Construction:
Valves: Brass with TFE seats and BUNA-N O-Rings
Head and Sensor Tube: 304 SS
Compression Fitting: ¼ NPT Brass
Valve Connections: ⅛ female NPT
Maximum Pressure: 13.7 bar (200 psig)
Maximum Temperature: 93.3°C (200°F)

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Gage Range (in w.c.)	Media @ 70°F	Full Range Flows by Pipe Size (Approximate)									
		1"	1¼"	1½"	2"	2½"	3"	4"	6"	8"	10"
2	Water (gpm)	4.8	8.3	11.5	20.5	30	49	86	205	350	560
2	Air @ 14.7 psia (scfm)	19	33	42	65	113	183	330	760	1340	2130
2	Air @ 100 psig (scfm)	50	90.5	120	210	325	510	920	2050	3600	6000
5	Water (gpm)	7.7	14	18	34	47	78	138	320	560	890
5	Air @ 14.7 psia (scfm)	30	51	66	118	178	289	510	1200	2150	3400
5	Air @ 100 psig (scfm)	83	142	190	340	610	820	1600	3300	5700	10,000
10	Water (gpm)	11	19	25.5	45.5	67	110	195	450	800	1260
10	Air @ 14.7 psia (scfm)	41	72	93	163	250	410	725	1690	3040	4860
10	Air @ 100 psig (scfm)	120	205	275	470	740	1100	2000	4600	8100	15,000
25	Water (gpm)	18	32	40.5	72	108	173	310	720	1250	2000
25	Air @ 14.7 psia (scfm)	63	112	155	255	390	640	1130	2630	4860	7700
25	Air @ 100 psig (scfm)	185	325	430	760	1200	1800	3300	7200	13,000	22,000
50	Water (gpm)	25	44	57.5	100	152	247	435	1000	1800	—
50	Air @ 14.7 psia (scfm)	90	161	205	360	560	900	1600	3700	6400	—
50	Air @ 100 psig (scfm)	260	460	620	1050	1700	2600	4600	10,000	18,500	—
100	Water (gpm)	36.5	62	82	142	220	350	620	1500	—	—
100	Air @ 14.7 psia (scfm)	135	230	300	505	800	1290	2290	5000	—	—
100	Air @ 100 psig (scfm)	370	660	870	1500	2300	3600	6500	15,000	—	—

How to Order:
Determine the pipe size into which the flow sensor will be mounted and select the corresponding size from the ordering table below. For non-critical water and air flow monitoring applications, the chart above can be utilized for selecting a differential pressure gage for use with the sensor. Simply locate the maximum flow rate for the media being measured under the appropriate pipe size and read the differential pressure range in inches of water column to the left. The FPT-3000 sensor is supplied with installation and operating instructions. It also includes complete flow conversion information for the three media conditions; water, air at STP, and air at 100 psig (shown in the chart above). This information enables the user to create a complete differential pressure to flow rate conversion table for the sensor and differential pressure gage employed.

To Order

Model No.	Pipe Size	Description	Weight kg (lb)
FPT-3010	1"	Averaging pitot tube flow sensor	0.34 (0.75)
FPT-3012	1¼"	Averaging pitot tube flow sensor	0.34 (0.75)
FPT-3015	1½"	Averaging pitot tube flow sensor	0.34 (0.75)
FPT-3020	2"	Averaging pitot tube flow sensor	0.34 (0.75)
FPT-3025	2½"	Averaging pitot tube flow sensor	0.34 (0.75)
FPT-3030	3"	Averaging pitot tube flow sensor	0.34 (0.75)
FPT-3040	4"	Averaging pitot tube flow sensor	0.36 (0.80)
FPT-3060	6"	Averaging pitot tube flow sensor	0.36 (0.80)
FPT-3080	8"	Averaging pitot tube flow sensor	0.38 (0.85)
FPT-3100	10"	Averaging pitot tube flow sensor	0.32 (0.70)

Comes complete with shut-off valves on both pressure ports, compression fitting to mount, and operator's manual.

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ECONOMICAL AIR FLOW SWITCH

FST1000 Series

1 YEAR WARRANTY

- Air Velocity Range up to 10,000 FPM (50.8 m/sec)
- 250 msec Response Time
- 2% Full Scale Accuracy
- Two Sensor Probe Configurations (Fixed and Remote)
- Hot Wire Air Velocity Sensor Design
- Adjustable High and Low Alarm Set-Points
- Two SPST Relay Contact Closures with Red LED Indicators
- Used in HVAC Monitoring, Exhaust/Ventilation Hoods

The FST1000 Series measures air velocity and provides two SPST relay contact closures corresponding to high and low alarm set points. The alarm set points are adjustable from 0 to 100% of the air flow range. The unit comes with a green power LED, and two red LEDs for high and low alarm indications. They can be used in research and development labs, HVAC applications, exhaust/ ventilation hoods and other manufacturing processes. The sensor design is based on RTD elements; the air velocity is measured by the heat loss from the RTD sensor as it cools down by the air flow. The sensor probe comes in two configurations, fixed mount and remote probe.

Measuring air flow and providing relay output in a ventilation hood.

SPECIFICATIONS

Air Velocity Range: 0 to 5000, 0 to 10,000 FPM
Accuracy: 2% FS (air velocity)
Air Velocity Probe: ¼" OD stainless steel, 305 mm L (12"), or remote probe with 4.6 m (15') of shield cable
High and Low Alarm Set Point: Adjustable from 0 to 100% of air flow range
Alarm Indication: Red LEDs on the back plate
Alarm Deadband: 5% of FS
Built-In Relays: Two 12V SPST NO relays (high and low)
Contact Rating: 10A @ 24 Vdc, 10A @ 250 Vac
Operating Ambient Temperature:
Sensor Probe: -40 to 93°C (-40 to 199°F)
Electronic Case: 0 to 50°C (32 to 122°F)
Power Indicator: Green LED
Power: 15 to 24 Vdc @ 200 mA
Dimensions: 89 H x 51 W x 31.8 mm D (3.5 x 2 x 1.25")
Weight: 160 g (5.6 oz)

To Order

Model No.	Range FPM (m/sec)	Description
F ST1001A(*)	0 to 5000 (0 to 25.4)	Air velocity switch, 2 relay outputs, fixed probe
FST1001R(*)	0 to 5000 (0 to 25.4)	Air velocity switch, 2 relay outputs, remote probe
FST1002A(*)	0 to 10,000 (0 to 50.8)	Air velocity switch, 2 relay outputs, fixed probe
FST1002R(*)	0 to 10,000 (0 to 50.8)	Air velocity switch, 2 relay outputs, remote probe

Accessories

Model No.	Description
TX8-100	8 conductor shielded cable, PVC insulation, 30.5 m (100') spool
PSR-24S	Regulated 24 Vdc @ 400 mA power supply, screw terminal
PSR-24L	Regulated 24 Vdc @ 400 mA power supply, stripped leads
SSLK-14-14	Compression fitting
T-FER-1/4	¼" PTFE ferrules (10 pack) for use with SSLK-14-14 compression fitting

Comes complete with 305 mm (12") long sensor probe (or remote probe), and operator's manual.
***(*)** For 95 mm (3.75") short probe, add suffix **"-S"**, no additional charge.*
***Ordering Example: FST1001A**, air velocity switch, 0 to 5000 FPM range, 2 relay outputs, and fixed probe.*

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FLOW SWITCHES FOR LIQUIDS

FST-200 Series

1 YEAR WARRANTY CE RoHS

- **High Reliability—No Moving Parts**
- **Very Low Flow Detection–Down to 0.04 FPS Liquids**
- **Use in ⅛ to 12" Pipe or Tubing**
- **SPST Relay Standard**
- **Excellent for Pump and Valve Monitoring of Critical Flows**

OMEGA® FST-200 Series flow switches use thermal dispersion technology to create a very accurate and economical method of sensing flow. Monitor fluids from 0.4 to 1.2 specific gravity, 1 to 300 cp, and pulsating flow from 10 to 100 pulses per minute. The sensors incorporate two temperature probes, one of which is heated. The flow of liquid reduces the temperature of the heated probe, decreasing the temperature differential with the non-heated probe. OMEGA's LVCN Series of controllers can easily be interfaced to perform a variety of control functions.

SPECIFICATIONS

Range: 0.04 to 3 fps (liquids)
Accuracy: ±5% of setpoint at constant temperature and flowrate
Response Time: 10 sec after initial 30 sec warm up
Setpoint Drift With Fluid Temperature: 0.5% per °C
Voltage Input: 12 to 36 Vdc @ 70 mA
Contact Output Mode: Selectable, NO or NC states
Fluid Temperature: 0 to 60°C (32 to 140°F)
Maximum Fluid Pressure: PP or PVDF: 150 psi @ 25°C (77°F) derated @ 1.667 psi per °C above 25°C (77°F)
Wetted Materials: PP and PVDF
Cable Specifications: 3 m (10')
Maximum Cable Length: 305 m (1000')
Dimensions: 76.2 or 114.3 L x 26.7 mm diameter (3.0 or 4.5 x 1.05")

To Order

Model No.	Description	Material	Size	Use With Pipe Size
FST-211-SPST	Thermal dispersion flow switch	PP/ PVDF	3.0 x ¾ NPT	¾ to 1½"
FST-212-SPST	Thermal dispersion flow switch	PVDF	3.0 x ¾ NPT	¾ to 1½"
FST-221-SPST	Thermal dispersion flow switch	PP/ PVDF	4.5 x ¾ NPT	2 to 12"
FST-222-SPST	Thermal dispersion flow switch	PVDF	4.5 x ¾ NPT	2 to 12"

Flow Switch Fittings For Use with 76 mm (3") Sensor Only (Also For Pulsating Flow Applications)

Model No.	Wetted Material	Range (GPM)	Use With Pipe/Tube ID
FT-51	PP	0.05 to 1.53	⅛ to ½"
FT-52	PVDF	0.05 to 1.53	⅛ to ½"

Comes complete with operator's manual.
*Two extended cable lengths available: for 7.62 m (25') add suffix **"-25"** for PP/PVDF, or PVDF; for 15.24 m (50') add suffix **"-50"** for PP/PVDF or PVDF, for additional cost.*
***Note:** Sizes above ½" fit into ¾ NPT fitting adaptor.*
***Ordering Examples: FST-211-SPST,** flow switch, 3.0 x ¾ NPT size, plus **FT-51,** fitting.*
***FST-221-SPST**, flow switch, 4.5 x ¾ NPT.*

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FLOW SWITCH WITH COMPACT RELAY CONTROLLER

FST-211-R

1 YEAR WARRANTY CE RoHS

- **Offered in Liquid and Gas Configurations**
- **All-Plastic Construction with PP or PVDF Materials for Corrosive Environments**
- **Invert Switch Provides Simple NO or NC Relay Operation**
- **LED Indicators for Fluid, Relay, and Power Status**
- **0 to 60 Second Time Delay Dampens Out Relay Chatter**
- **Fail-Safe Controller Provides Direct Actuation of Pumps, Valves, and Blowers**

Application

This switch package offers a complete solution for flow or no-flow switching in pipes or ducting up to 0.3 m (12"). The compact relay controller reliably actuates valves, pumps, or blowers rated up to ½ hp. Common applications include low-flow pump or process protection. To complete the instrumentation package, simply select the switch configuration in accordance with the liquid or gas used in your application.

FST-211-R shown smaller than actual size.

LIQUID APPLICATION VARIABLES

	Variable	Yes	No
Liquid	Clean	✓	
	Slurry	✓	
	Bubbles		✓
	Coating		✓
	Non-Coating	✓	
	Low Viscosity	✓	
	Med. Viscosity	✓	
	High Viscosity		✓
	Low Temperature	✓	
	Med. Temperature		✓
	High Temperature		✓
	Δ Temperature		✓
	Low Velocity	✓	
	High Velocity		✓

GAS APPLICATION VARIABLES

	Variable	Yes	No
Gas	Low Temperature	✓	
	Med. Temperature	✓	
	High Temperature		✓
	Δ Temperature		✓
	Coating		✓
	Non-Coating	✓	
	Low Velocity	✓	
	High Velocity		✓

SPECIFICATIONS

Relay Controller
Supply Voltage: 120/240 Vac 50/60 Hz
Consumption: 0.25 A
Relay Type: (1) SPDT
Relay Current: 10 A, 250 Vac, ½ hp
Relay Mode: NO or NC selectable
Time Delay: 0 to 60 s
Temp Range: -40 to 70°C (-40 to 158°F)
Enclosure Rating: NEMA 4X (IP66)
Enclosure Material:
Polypropylene (UL 94VO)
Enclosure Rotation: 300° swivel base
Conduit Connection: ½ NPT

Sensor
Range: 0.04 to 3 ft/s (liquids)
Accuracy: ±5% of setpoint at constant temperature and flow rate
Response Time: 10 s (approx.)
Setpoint Drift with Fluid Temperature: 0.5%/°C
Fluid Temperature: 60°C (140°F)
Maximum Fluid Pressure: PP or PVDF: 150 psi @ 25°C (77°F) derated @ 1.7 psi/°C above 25°C (77°F)
Process Connection: ¾ MNPT
Dimensions: 208 L x 71 mm Dia (8.2 x 2.8")

To Order

Model No.	Description	Material	Wetted Pipe Size
FST-211-R	Liquid flow switch with relay	PP/PVDF	¾ to 1½"
FST-212-R	Liquid flow switch with relay	PVDF	¾ to 1½"
FST-221-R	Liquid flow switch with relay	PP/PVDF	2 to 12"
FST-222-R	Liquid flow switch with relay	PVDF	2 to 12"
FST-321-R	Gas flow switch with relay	PP/PVDF	¾ to 1½"
FST-322-R	Gas flow switch with relay	PVDF	¾ to 1½"
FST-323-R	Gas flow switch with relay	PP/PVDF	2 to 12"
FST-324-R	Gas flow switch with relay	PVDF	2 to 12"
Flow Switch Fittings, Use with 3" Sensor Only (⅛ - ½" Pipe and Tubing)			
FT-51	Use with 0.05 to 1.53 GPM range	PP	⅛ to ½"
FT-52	Use with 0.10 to 6.53 GPM range	PVDF	⅛ to ½"

Comes complete with operator's manual.
Ordering Examples: FST-211-R, *CE-approved polypropylene liquid flow switch with relay.*
FST-321-R, *PP/PVDF gas flow switch.*

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SWITCHES FOR USE WITH GASES

FST-320 Series

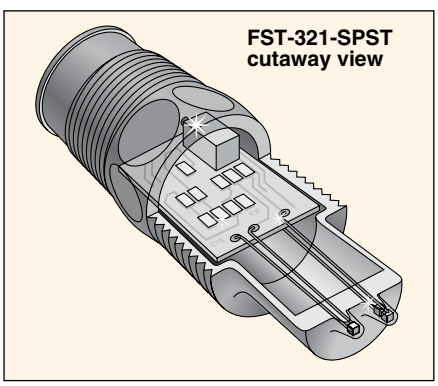
1 YEAR WARRANTY

- Measure Mass Flow of Gases
- High Reliability, No Moving Parts
- Effectively Monitor Critical Gas Flows
- May Be Used in Small Piping or Large Ducts
- Standard with SPST Relay

OMEGA's FST-320 Series thermal dispersion flow switches, especially designed for use with gases, sense changes in the heat transfer characteristics of the gases. Flow velocities from 1 to 90 fps are effectively monitored. The flow switch incorporates a standard SPST Relay switch output for control flexibility. OMEGA® controllers can easily be interfaced to perform a variety of control functions. The FST-320 family of sensors can be easily installed in line sizes ranging from ¾ to 12".

SPECIFICATIONS

Range: 1 to 90 fps
Accuracy: ±5% of setpoint at constant temperature and flow rate
Response Time (Approx.): 10 sec, after initial 30 sec warm up
Set Point Drift with Fluid Temperature: 0.5% per °C
Voltage Input: 12 to 36 Vdc @ 70 mA
Contact Output: Selectable, NO or NC states
Fluid Temp. Rating: 0 to 60°C (32 to 140°F)
Maximum Fluid Pressure: PP: 150 psi @ 25°C (77°F) derated @ 1.667 psi per °C above 25°C (77°F)
Contact Materials: Polypropylene (PP) with PVDF
Cable Length: 3 m (10')
Maximum Cable Run: 305 m (1000')
Dimensions: 76.2 or 114.3 x 26.7 mm (3.0 or 4.5 x 1.05"), ¾ NPT



To Order

Model No.	Material	Size	Use with Pipe Size
FST-321-SPST	PP/PVDF	3" x ¾ NPT	¾ to 1½"
FST-322-SPST	PVDF	3" x ¾ NPT	¾ to 1½"
FST-323-SPST	PP/PVDF	4.5" x ¾ NPT	2 to 12"
FST-324-SPST	PVDF	4.5" x ¾ NPT	2 to 12"

Comes complete with operator's manual.
*Two extended cable lengths available: for 7.62 m (25') add suffix **"-25"** for additional cost PP/PVDF, or PVDF; for 15.24 m (50') add suffix **"-50"** for additional cost, for PP/PVDF or for PVDF.*
***Ordering Examples: FST-321-SPST**, polypropylene flow switch.*
***FST-323-SPST**, polypropylene flowswitch, 4.5 x ¾ NPT.*

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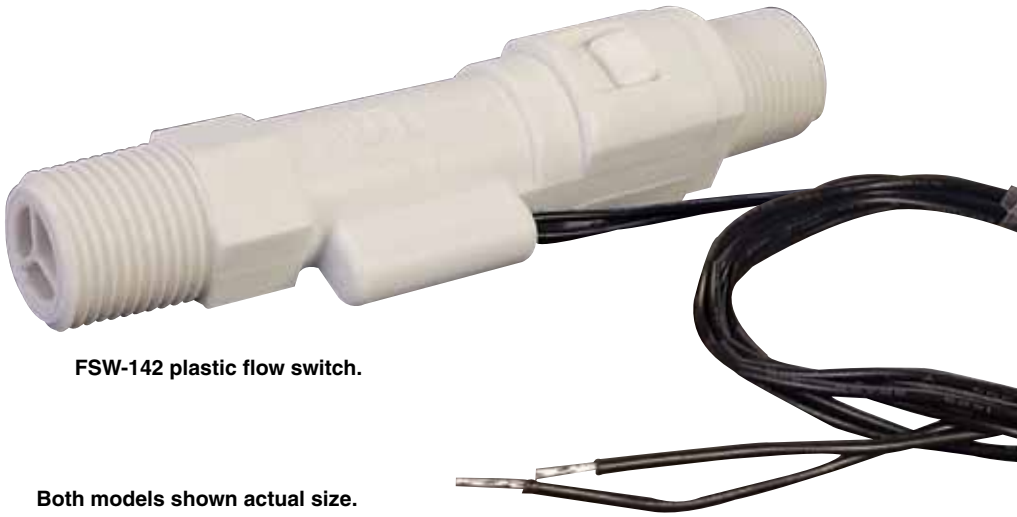
INDUSTRIAL STRENGTH IN-LINE PLASTIC FLOW SWITCH

NEW

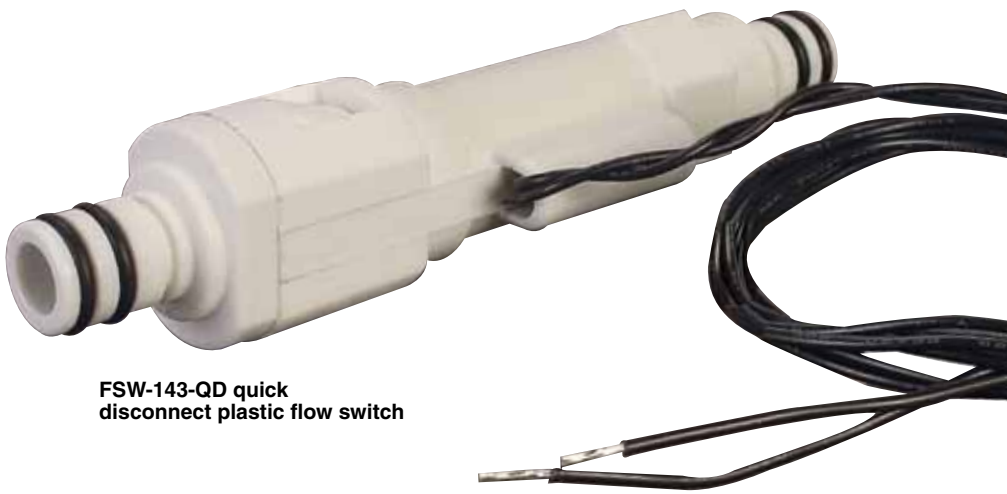
FSW-140 Series

1 YEAR WARRANTY



FSW-142 plastic flow switch.

Both models shown actual size.



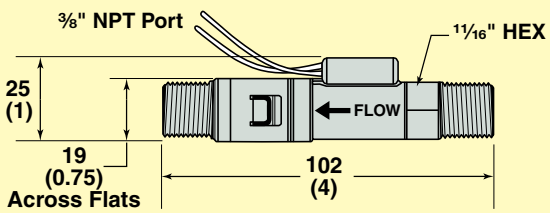
FSW-143-QD quick disconnect plastic flow switch

- **Preset Switch Points, 0.07 to 2.00 GPM**
- **⅜ NPT Male or ¼" Quick Disconnect**
- **Chemical Resistant Polypropylene**
- **For Low Viscosity Liquids**

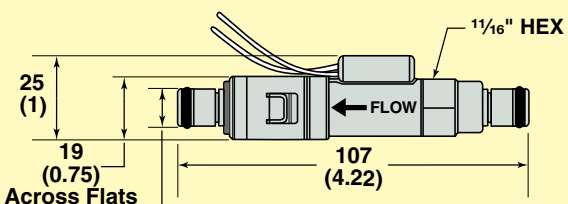
The FSW-140 Series rugged inline flow switches offer superior performance. Their fixed set-point and simple design make it a dependable switch. This series is an ideal choice for coolant applications requiring reliable flow detection in HVAC, semiconductor, welding, medical and other industries. The ¼" quick disconnect units have a host of snap-on mating adaptors available to fit most piping requirements.

SPECIFICATIONS

Wetted Materials:
Housing: Glass reinforced polypropylene
Piston: PPS composite
Spring: 316 stainless steel
O-Ring: Fluorocarbon
Operating Pressure:
8.6 bar (125 psi) @ 21°C (70°F)
3.4 bar (50 psi) @ 100°C (212°F)
Operating Temperature: -18 to 100°C (0 to 212°F)
Set Point Accuracy: 20% of set point
Set Point Differential: 20% maximum
Switch: SPST, 10VA, normally open at no flow
Electrical Termination: 610 mm (24") polymeric leads, 22 AWG
Filtration: 100 micron



¼" Quick Disconnect Male Adaptor
See next page for adaptor model numbers.



Dimension: mm (inch)

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NEW

Both models shown actual size.

FT-PLC170-04

FT-PLC100-04

SPECIFICATIONS

Thermoplastic Quick Couplings

Working Pressure:
Vacuum to 120 psi (8.3 bar)

Operating Temperature:
-40 to 82°C (-40 to 180°F) continuous

Materials:

Bodies and Valves: Acetal

Internal Spring: 316 Stainless Steel

External Springs, Pin, Latch:

Stainless Steel Seals:
Buna, others available

Color: Natural white, others available

Tubing Sizes: ¼ thru ⅜" ID, ¼ and ⅜" OD
6 x 4 mm thru 12 x 8 mm (OD x ID)

To Order *Visit omega.com/ft-plc_14 for Pricing and Details*

PIPE THREAD

⅝" Hex

MALE THREAD	STRAIGHT THRU MODEL NO.	SHUTOFF MODEL NO.	LENGTH
¼ NPT	**FT-PLC100-04**	**FT-PLCD100-04**	1.15"
⅜ NPT	**FT-PLC100-06**	**FT-PLCD100-06**	1.15"
¼ BSPT	**FT-PLC100-04BS**	**FT-PLCD100-04BS**	1.15"
⅜ BSPT	**FT-PLC100-06BS**	**FT-PLCD100-06BS**	1.15"

IN LINE, Streamline Design

Ferruless Polytube Fitting††

TUBING SIZE OD x ID	METRIC EQ mm	STRAIGHT THRU MODEL NO.	SHUTOFF MODEL NO.	LENGTH
¼ x 0.170"	6 x 4.3	**FT-PLC130-04**	**FT-PLCD130-04**	1.82"
— —	8 x 6	**FT-PLC130-M8**	**FT-PLCD130-M8**	1.95"
⅜ x 0.250"	9.5 x 6	**FT-PLC130-06**	**FT-PLCD130-06**	1.95"
— —	10 x 8	**FT-PLC130-M10**	**FT-PLCD130-M10**	1.95"

Hose Barb

¼" ID	6.4 ID	**FT-PLC170-04**	**FT-PLCD170-04**	1.95"
5⁄16" ID	7.9 ID	**FT-PLC170-05**	**FT-PLCD170-05**	1.95"
⅜" ID	9.5 ID	**FT-PLC170-06**	**FT-PLCD170-06**	1.95"

Acetal and chrome-plated brass coupling halves interchange.

*† Visit **omega.com/rohs** to determine specific RoHS compliance.*

†† PTF fittings are designed for semi-rigid tubing, i.e. polyethylene, nylon etc. and polyurethane tubing.

To Order *Visit omega.com/fsw-140 for Pricing and Details*

Model No.	Description	Quick Disconnect Model No.	Description
FSW-141	Set point = 0.07 GPM ⅜ NPT	**FSW-141-QD**	Set point = 0.07 GPM quick disconnect*
FSW-142	Set point = 0.15 GPM ⅜ NPT	**FSW-142-QD**	Set point = 0.15 GPM quick disconnect*
FSW-143	Set point = 0.25 GPM ⅜ NPT	**FSW-143-QD**	Set point = 0.25 GPM quick disconnect*
FSW-144	Set point = 0.5 GPM ⅜ NPT	**FSW-144-QD**	Set point = 0.5 GPM quick disconnect*
FSW-145	Set point = 1.0 GPM ⅜ NPT	**FSW-145-QD**	Set point = 1.0 GPM quick disconnect*
FSW-146	Set point = 1.5 GPM ⅜ NPT	**FSW-146-QD**	Set point = 1.5 GPM quick disconnect*
FSW-147	Set point = 2.0 GPM ⅜ NPT	**FSW-147-QD**	Set point = 2.0 GPM quick disconnect*

** Fittings sold separately, see chart above.*

Comes complete with operator's manual

***Ordering Examples: FSW-143,** 0.25 GPM, plastic flow switch with ⅜ NPT connections.*

***FSW-146-QD,** 1.5 GPM plastic flow switch with quick disconnect, two **FT-PLC170-04,** ¼" ID hose barb/quick disconnect fittings.*

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Paddle Flow Switch

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FSW-160

2 YEAR WARRANTY

FSW-160 shown larger than actual size.

- **Multiple Quick-Change Paddles**
- **EPDM Seal**
- **Field Adjustable Set Points**
- **Direct Replacement for Most Paddle-Type Flow Switches**
- **High Flow Sensitivity**
- **Stainless Steel Paddles and Shaft**
- **NEMA 1 (IP10) Enclosure**

The OMEGA® FSW-160 is the newest heavy-duty line of flow switches. The switch is used to signal, start, or stop electronically operated equipment when flow or no-flow conditions occur.

OMEGA's elastomeric sealing system is superior to the metal bellows that are subject to metal fatigue and corrosion. This seal system has been field-proven for over a decade. The FSW-160 can be used in pipes 1 inch and larger, with set-points as low as 4 GPM (15.2 LPM) to over 500 GPM (1893 LPM) in larger pipe sizes. The FSW160 uses a 15A SPDT micro switch that can control a ½ horsepower motor.

Specifications

Hysteresis (Δ Flow Rate to Activate/ Deactivate Switch)
10% at upper end of flow range
30% at lower end of flow range

Differential Pressure Drops Across Unit Under Normal Operating Conditions:
1 to 3" pipe, less than 1 psi
4 to 48" pipe, negligible

Working Line Pressure:
200 psig maximum [proof tested to 1200 psig at 21°C (70˚F)]

Working Temperature: 121°C (250˚F) maximum continuous

Wetted Materials:
Body and Lid: Brass
Shaft: 304 stainless steel
Paddle: 316 stainless steel
Seal: EPDM

Electrical Switch Characteristics
SPDT 15 A, ½ hp at 125 or 250 Vac
0.5 A at 125 Vdc (tungsten lamp)
0.25 A @ 250 Vdc (tungsten lamp)

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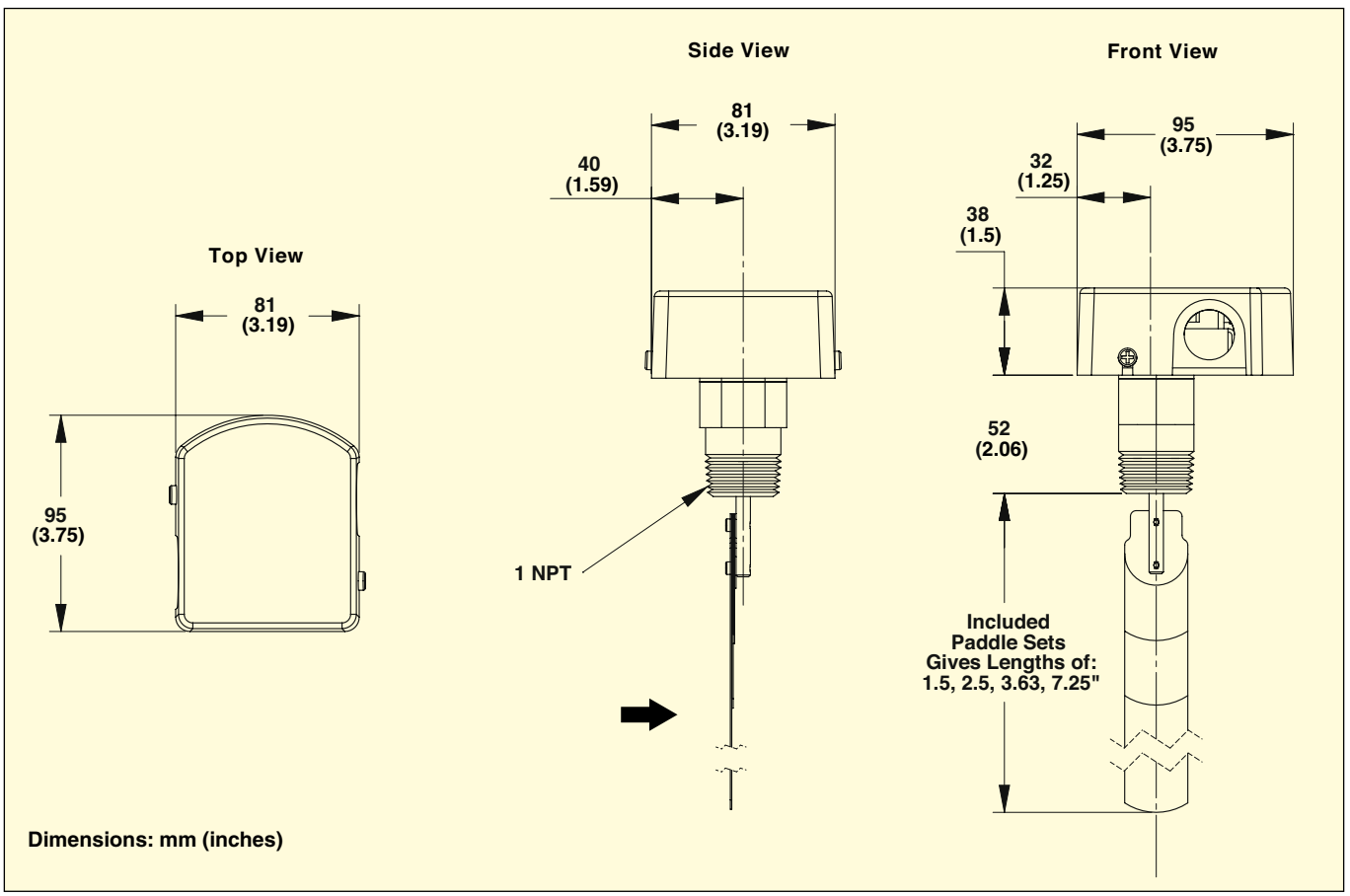
Model Selection Chart

Flow Range [Water Calibrated at 21°C (70°F)]				
	Switchpoint Range (GPM)			
	Minimum Adjustment		Maximum Adjustment	
Pipe Size	On	Off	On	Off
1	4	2	8	7
1½	7	5	13	11
2	12	7	27	26
2½	18	12	35	32
3	27	19	52	49
4	63	50	123	120
5	125	100	238	232
6	190	158	350	338



To Order	
Model No.	**Description**
FSW-160	Paddle flow switch brass 1 NPT, adjustable set-point

Comes complete with operator's manual.

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LIQUID FLOW SWITCH

FSW-25

1 YEAR WARRANTY

- **Aluminum Alloy NEMA4 (IP65) Head**
- **Easy to Install**
- **Less than 3 psig Pressure Drop**

The FSW-25 flow switch is activated by the force of liquid which moves the paddle detecting the flow of the liquid in the pipe. In static liquid or no liquid situations, the spring pushes the paddle back to the no-flow condition. The reed switch is normally open.

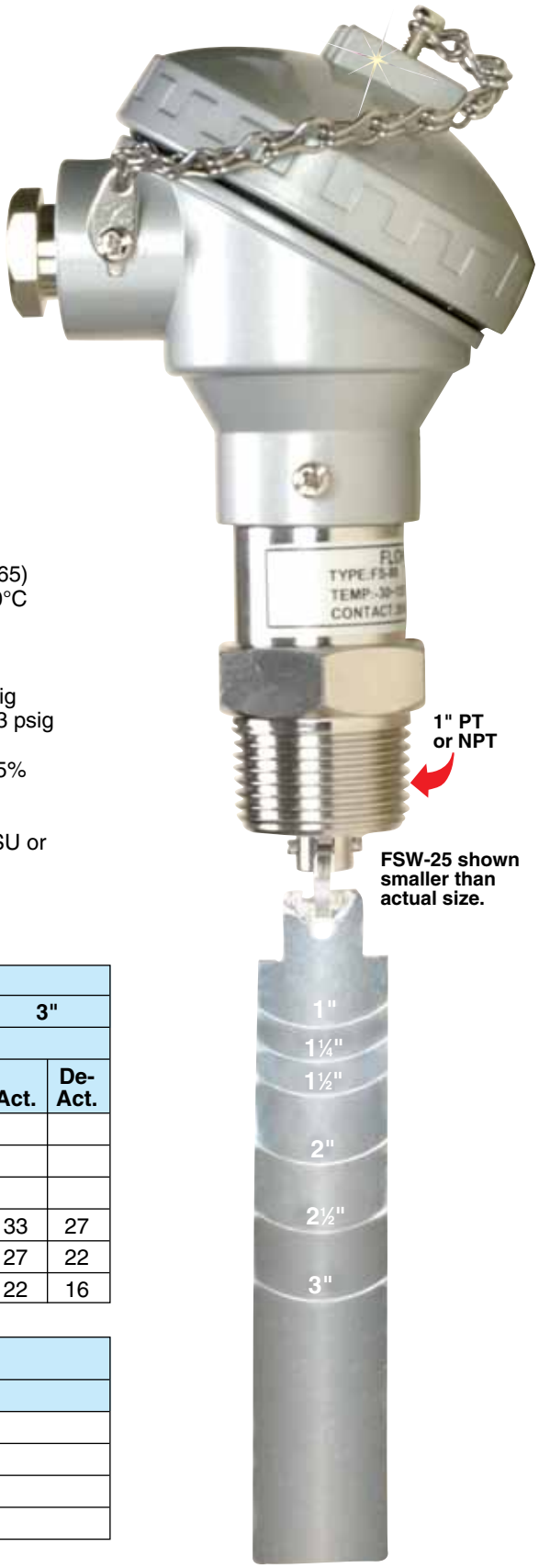
As flow occurs and the paddle is raised at an upward angle of 20 to 30 degrees (or more), the paddle will push the magnet upward to actuate the reed switch which then closes the circuit.

The length of the paddle can be adjusted to the diameter of the pipe. 1" trim size can only be used with metal pipes.

The installation is simple. Cut the paddle to desired pipe size. No smaller than 1" pipes for metal pipes. The FSW-25 is not recommended to be used in 1 plastic pipe (1¼ is the minimum for plastic pipes). Before installing the unit to a tee pipe, be sure to apply tape seal to the screw then tighten up. The FLOW mark on the screw hexagon must be parallel to the pipe and the ground.

SPECIFICATIONS

Housing Material:
Aluminum Alloy, NEMA 4 (IP65)
Operation Temp.: -30 to 150°C (30 to 300°F)
Paddle Material: SUS304 (Similar to 304 SS)
Operation Pressure: 355 psig
Pressure Drop Allowance: 3 psig
Set Point Tolerance: ± 25%
Repeatability Tolerance: ± 5%
Contact Capacity:
30 Watts/200 Vdc, SPDT
Maximum Viscosity: 200 SSU or 43 centistokes



FSW-25 shown smaller than actual size.

Standard Actuation and De-Actuation Setpoints

Pipe Line Size												
	1"		1¼"		1½"		2"		2½"		3"	
Approximate Actuation and De-Actuation Flow Rates–GPM Water												
Paddle Length	Act.	De-Act.	Act.	De-Act.	Act.	De-Act.	Act.	De-Act.	Act.	De-Act.	Act.	De-Act.
1	5	4	8.5	6.5	12	9	17	15				
1¼			6.5	4.5	9	7	15	12	23	20		
1½					14	10	23	16	32	25		
2							18	12	24	17	33	27
2½									20	13	27	22
3											22	16

To Order	
Model No.	**Description**
FSW-25	Paddle flow switch with head and 1" PT threads
FSW-25-NPT	Paddle flow switch with head and 1 NPT threads
70A-1	Audible alarm
SSRL240AC10	10 Amp solid state relay

Comes complete with operator's manual.
***Ordering Example: FSW-25**, flow switch.*

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From 0.12 to 70 GPM
Non-Magnetic–Ideal for Rusty Water

FSW-32A

- Rugged Industrial Design
- Switch Point Adjustable Without Removing Unit from Line
- 15 A SPDT Switch Directly Controls Pump
- Easy Screw Terminal Wiring—No Soldering
- NPT Threaded to Pipe Directly In-Line

FSW-30A shown with orifices (6 included), slightly smaller than actual size.

The FSW-30A flow switch is supplied with 6 orifices to provide 6 overlapping flow ranges from 0.12 to 8.0 GPM for water. The FSW-31A is supplied with 3 different drag discs to provide 3 overlapping ranges from 6 to 70 GPM for water. The orifices and drag discs can be changed while the switch is in-line, but not while operating. The FSW-32A operates over the range of 4 to 8 GPM for water.

SPECIFICATIONS

Relay Switch: SPDT 15 A @ 125 or 250 Vac; 10,000,000 operations median
Sensitivity (% flow change required to activate switch): 5% at upper end of flow range, 25% at lower end of flow range
Maximum Temperature/Pressure: 300 psig @ 82°C (180°F)
Minimum Temperature: 4°C (40°F)
Wetted Parts: Red brass, 316 SS, phosphor bronze, Noryl EPDM (and PVC for Models FSW-31A, 32A). Other materials of construction: Brass body, Noryl cover, stainless steel and plastic hardware
Pressure Drop: FSW-30A: 1 to 5 psi; FSW-31A, FSW-32A (4 to 8 GPM range): 2 to 15 psi; all other ranges less than 2 psi
Electrical Cable Fitting: Water resistant for cable diameter 0.250" ±0.025"
Option "D" (dual SPDT relays): Nominal Differential Flow Between the Two Relay Actuation Points: 5%
Dimension: 1.43 H x 125.5 mm W (5.63 x 4.94")
Weight: 1.59 kg (3.5 lb)

To Order

Model No.	Flow Range, GPM	FNPT Connections
FSW-30A	0.12 to 8	½
FSW-31A	6 to 70	1
FSW-32A	4 to 8	1

Comes complete with operator's manual and orifices.
*For flow switches supplied with 2 SPDT relays for DPDT action add suffix **"-D"** to model number, for additional cost.*

***Ordering Examples: FSW-30A-D**, flow switch with flow range of 0.12 to 8.0 GPM (water) and 2 SPDT relays.*

***FSW-31A**, 1" flow switch for 6 to 70 GPM (water).*

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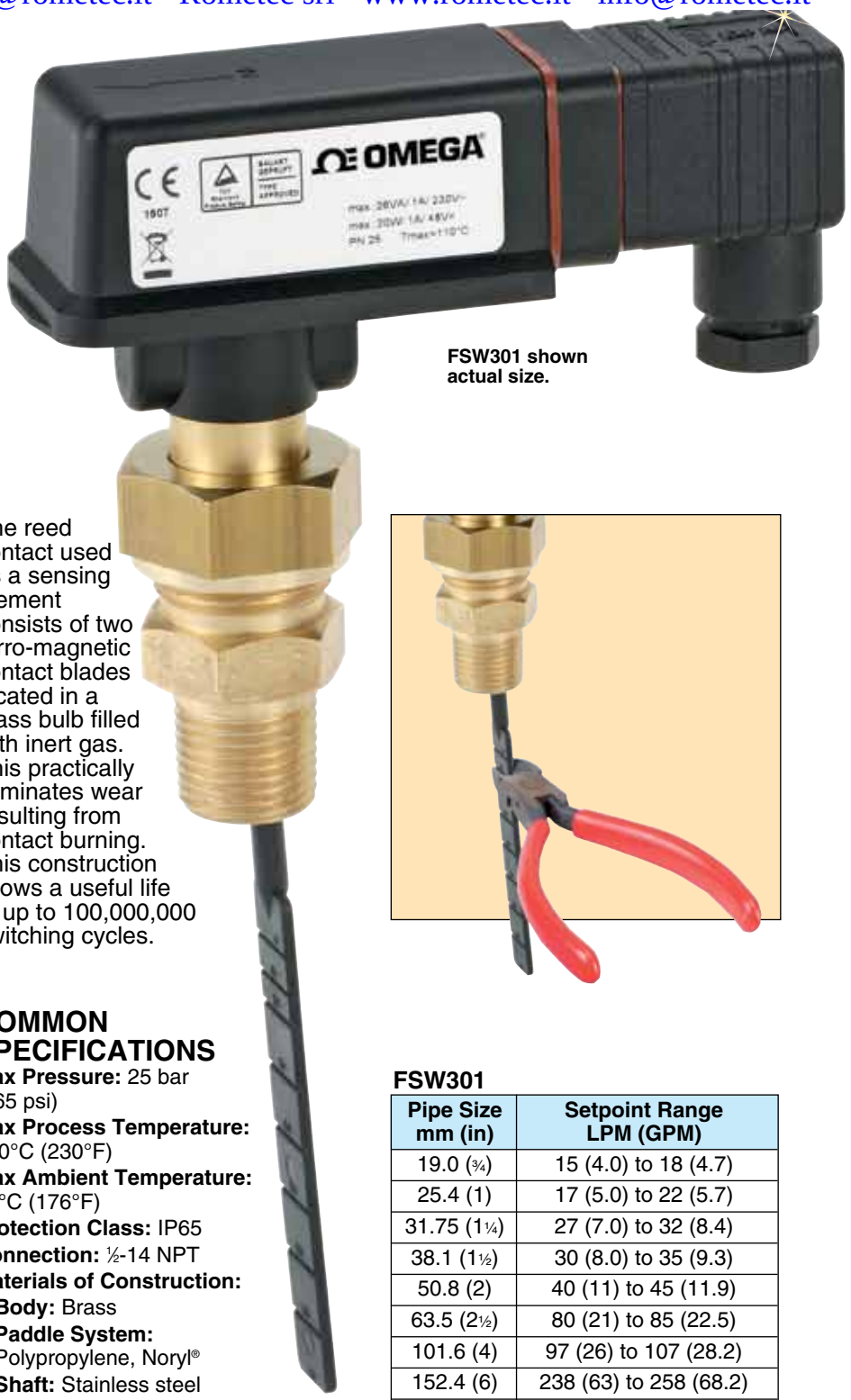
FSW300 Series

1 YEAR WARRANTY

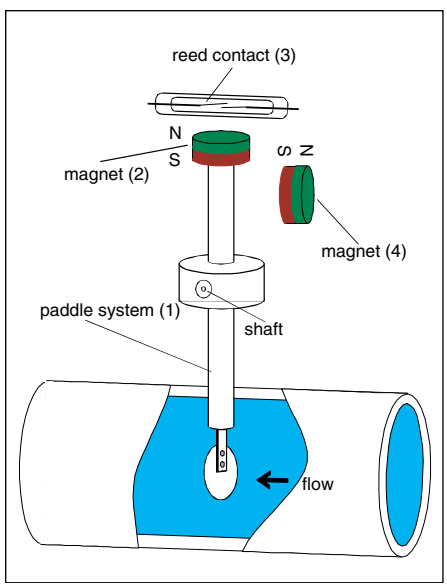
- Adjustable Switch Point
- Low Pressure Drop
- Economical
- Field Installation for ½ to 8" Pipes
- Instant Response
- High Repeatability



FSW301 shown actual size.

The FSW301 flow switch comprises a paddle system (1) with a permanent magnet attached (2). Above that magnet is a reed contact (3), located outside the flow of fluid. A second magnet with opposing poles (4) creates the force necessary to reset the switch back to the no flow position.

When the monitored flow pushes the paddle and changes the position of the magnet (2) in relation to the reed contact (3) it activates the contact. As soon as the flow is interrupted, the paddle moves back to its starting position, which returns the reed contact to the initial position. The force necessary to push the magnet back is provided by the two magnets repelling each other. Using magnetic force instead of the usual leaf spring means the switch is considerably more stable in the long term and much less sensitive to pressure peaks.



The reed contact used as a sensing element consists of two ferro-magnetic contact blades located in a glass bulb filled with inert gas. This practically eliminates wear resulting from contact burning. This construction allows a useful life of up to 100,000,000 switching cycles.

COMMON SPECIFICATIONS

Max Pressure: 25 bar (365 psi)
Max Process Temperature: 110°C (230°F)
Max Ambient Temperature: 80°C (176°F)
Protection Class: IP65
Connection: ½-14 NPT
Materials of Construction:
Body: Brass
Paddle System: Polypropylene, Noryl®
Shaft: Stainless steel

FSW301

Pipe Size mm (in)	Setpoint Range LPM (GPM)
19.0 (¾)	15 (4.0) to 18 (4.7)
25.4 (1)	17 (5.0) to 22 (5.7)
31.75 (1¼)	27 (7.0) to 32 (8.4)
38.1 (1½)	30 (8.0) to 35 (9.3)
50.8 (2)	40 (11) to 45 (11.9)
63.5 (2½)	80 (21) to 85 (22.5)
101.6 (4)	97 (26) to 107 (28.2)
152.4 (6)	238 (63) to 258 (68.2)
203.2 (8)	485 (128) to 500 (132)

Insertion Type Switch

To Order

Model No.	Description
FSW301	Flow switch, insertion style, ½ male NPT
70A-2	Fast pulse tone audible alarm

Comes complete with operator's manual.
***Ordering Example: FSW301,** insertion style flow switch and **70A-2,** fast pulse tone alarm.*

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FSW301

Max Switching Current: 1 A
Max Switching Voltage: 230 Vac, 48 Vdc
Maximum Rating: 26 VA, 20 W
Set Point Tolerance: ±15%
Plug Connector: DIN 43650 form A/ISO 4400 cable socket with terminal screws, suitable for outer cable diameter 4.57 to 6.85 mm (0.18 to 0.27")
Dimensions (Excluding Paddle or Tee): 114 x 38 x 89 mm (4.5 x 1.5 x 3.5")

SPECIFICATIONS FSW302, 303, 304

Max Pressure: 25 bar (362 psi)
Max Process Temperature: 110°C (230°F)
Max Ambient Temperature: 80°C (176°F)
Material of Construction: Brass body, pipe section and paddle system

FSW304 shown smaller than actual size.

To Order

Model No.	Description	Setpoint Range LPM (GPM)
FSW302	Flow switch, inline ½", brass tee	3.4 to 4.2 (0.9 to 1.1)
FSW303	Flow switch, inline ¾", brass tee	6.8 to 9.1 (1.8 to 2.4)
FSW304	Flow switch, inline 1", brass tee	13.2 to 16.7 (3.5 to 4.4)

Comes complete with operator's manual.
***Ordering Example: FSW303,** inline flow switch, ¾" brass NPT connection, **70A-2,** audible alarm.*

FSW307 shown smaller than actual size.

SPECIFICATIONS FSW305, 306, 307

Max Pressure: 10 bar (145 psi)
Max Process Temperature: 60°C (140°F)
Max Ambient Temperature: 60°C (140°F)
Materials of Construction:
Pipe Section: PVC
Body: Polypropylene, Noryl®
Paddle System: Polypropylene, Noryl

To Order

Model No.	Description	Setpoint Range LPM (GPM)
FSW305	Flow switch inline ½" PVC tee	4.9 to 6.8 (1.3 to 1.8)
FSW306	Flow switch inline ¾" PVC tee	9.5 to 12.1 (2.5 to 3.2)
FSW307	Flow switch inline 1" PVC tee	10.6 to 14.8 (2.8 to 3.9)

Comes complete with operator's manual.
***Ordering Example: FSW305,** inline flow switch, ½" PVC tee connection, **70A-2,** audible alarm.*

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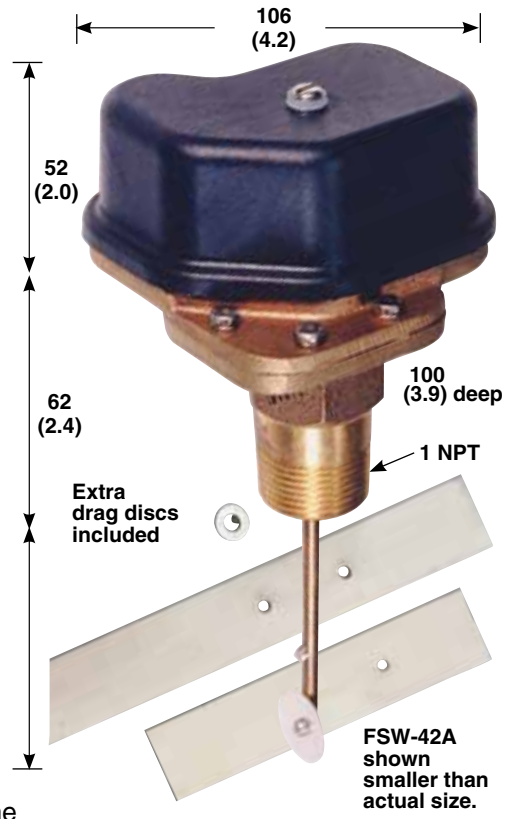
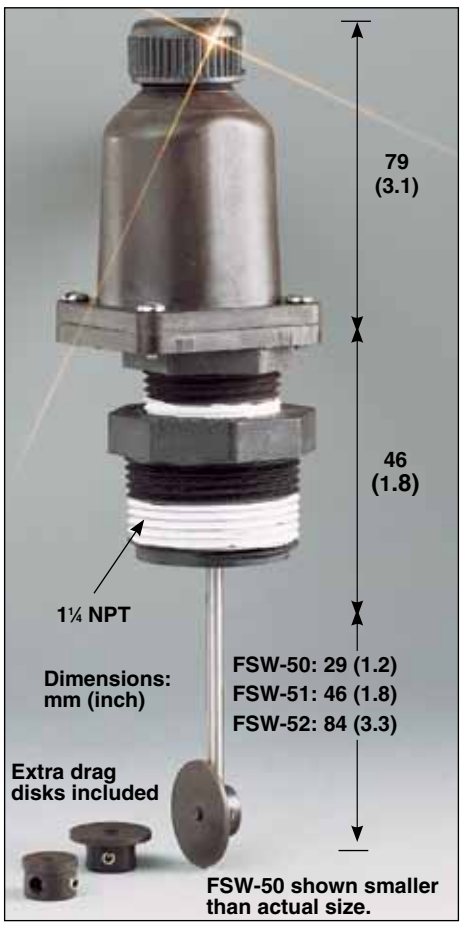
From 2 to 15 ft/s

FSW-40A/ FSW-50 Series

- **Rugged Industrial Design**
- **Switch Point Adjustable While Unit is Operating**
- **15 A SPDT Switch Directly Controls Pump**
- **Mounts in Any Position**



Dimensions: mm (inch)
FSW-40A/41A: 38 (1.5)
FSW-42A: 89 (3.5)
FSW-43A: 140 (5.5)



The FSW-40A and FSW-50 Series flow switches feature 15 A SPDT switches and an internal screw adjustment for in-line monitoring of switch points. Multiple drag disks provide incremental switch point adjustment. Their non-magnetic design makes these switches ideal for applications in which rust is a problem. The FSW-40A Series has a brass and stainless steel construction, while the FSW-50 Series comes in a plastic/316 SS construction.

The FSW-40A Series is ideal for machine-cutting oils and for sewage applications in which large objects are not caught on the drag disks. Installation "T" fittings are recommended for installing switches for 2" pipe size and below. For other pipe sizes, a "tee" fitting or weld coupling can be used.

SPECIFICATIONS

Relay Switch: SPDT 15 A @ 125 or 250 Vac; 10,000,000 operations median
Nominal Sensitivity (% Flow Change to Activate Switch):
10% @ upper end of range;
30% @ lower end of range
Pressure Drop: 1 to 3" pipe, less than 1 psi; 4" and above, negligible
Maximum Pressure/Temperature:
FSW-40A Series: 300 psig @ 82°C (180°F)
FSW-50 Series: 100 psig @ 93°C (200°F)
Minimum Temperature: 4°C (40°F)

Wetted Parts:
FSW-40 Series: Red brass, 316 SS, phosphor bronze and EPDM and cork rubber (other materials are brass body, Noryl® cover, 316 SS hardware)
FSW-50 Series: Polyphenylene sulfide, 316 SS, FKM; also available with polyphenylene sulfide, Hastelloy C and FKM construction

Electrical Cable Fitting:
Water resistant for cable diameters 0.250 ±0.025"
Weight:
FSW-40A Series: 1.59 kg (3.5 lb)
FSW-50 Series: 179 g (6 oz)

To Order

Model No.	No. of Extra Disks Included	For Pipe Sizes	Switch Point Adjustment Range (fps)	
			Low	High
FSW-40A	1	1"	2.0 to 6.0	5.0 to 15.0
FSW-41A	2	1½ to 2½"	2.0 to 6.0	5.0 to 15.0
FSW-42A	3	3 to 10"	2.0 to 6.0	5.0 to 15.0
FSW-43A	3	10 to 48"	2.0 to 6.0	5.0 to 15.0
FSW-50	1	1"	3.3 to 5.3	7.4 to 11.5
FSW-51	1	1½ to 2½"	2.7 to 5.4	5.4 to 10.8
FSW-52	1	3 to 10"	2.0 to 4.0	4.0 to 8.0

Comes complete with operator's manual.

*For FSW-40A series with 316 SS, FKM and PTFE special construction, add suffix "**-SS**" to model number, for additional cost. For FSW-50 series with polyphenylene sulfide Hastelloy C and FKM special construction, add suffix "**-HST**" to model number, for additional cost.*

***Ordering Examples: FSW-40A-SS,** FSW-40A flow switch with special 316 SS, FKM and PTFE construction.*

***FSW-52.** flow switch for 3 to 10" pipe.*

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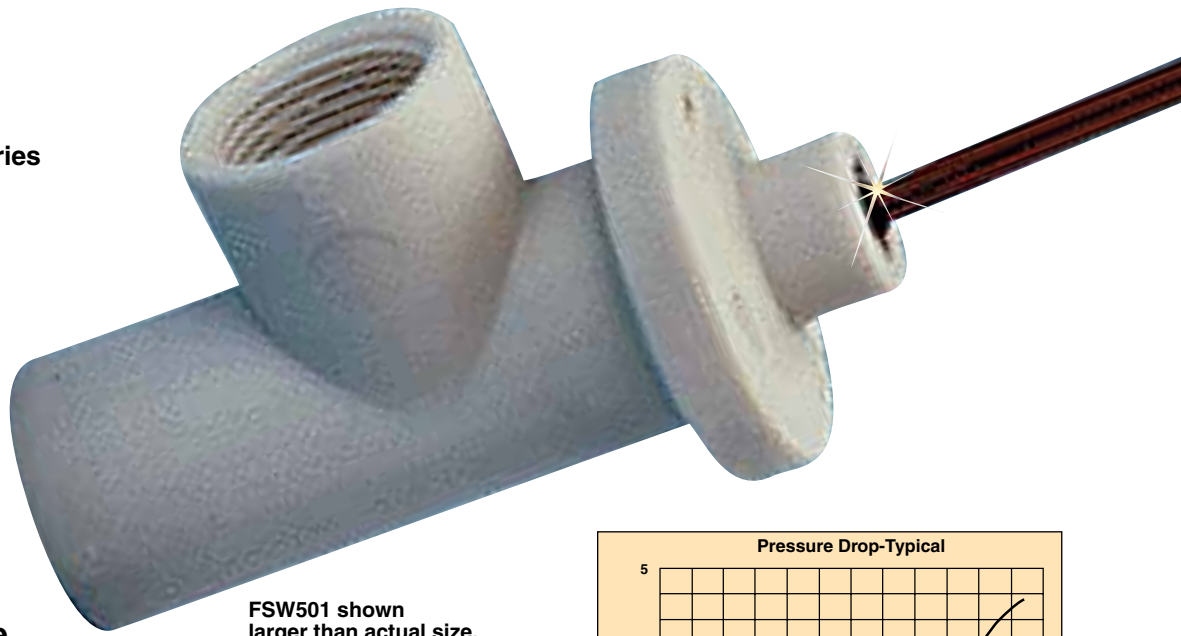
LOW COST FLOW SWITCHES FOR THREADED PLASTIC PIPING

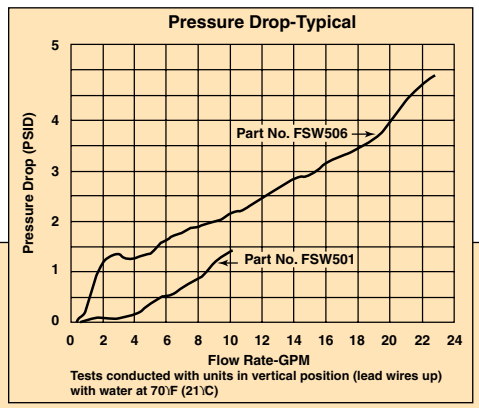
FSW500 Series

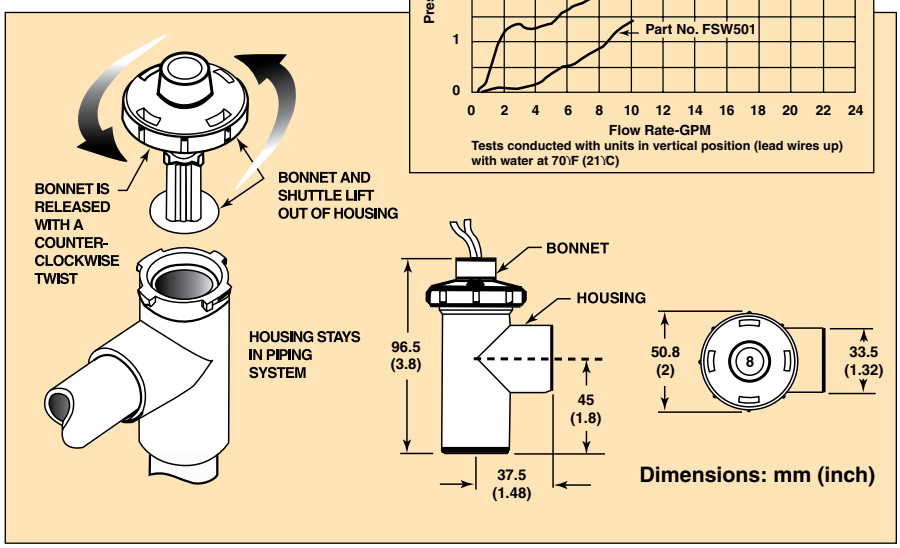
1 YEAR WARRANTY



FSW501 shown larger than actual size.

- **Flow Switch Setpoints: 0.25 to 5.0 GPM**
- **¾ NPT Ports**
- **Non-Adjustable Setpoint**





The FSW500 offers low-cost flow monitoring with a variety of switch actuation points and low pressure drop. With their polypropylene or stainless steel wetted parts, these switches are suitable for a wide range of chemical and temperature requirements. The FSW500 is ideal for cooling of equipment such as welders and lasers. A J-box version with a 5 A relay is also available.

SPECIFICATIONS

Wetted Materials

Housing, Bonnet, Shuttle, Shuttle Cap: Polypropylene, hydrolytically stable
O-Ring: FKM
Spring: 316 SS
Retaining Clip: PH 15-7 Mo SS
Operating Pressure, Maximum: 100 psig @ 21°C (70°F)
50 psig @ 82°C (180°F)
Operating Temperature, Maximum: 100°C (212°F)
Setpoint Accuracy: ±20%
Setpoint Differential: ±20% maximum
Switch: SPST, NO pilot duty 20 VA, 120 to 240 Vac or Vdc
J-Box with 5 A Relay: 120 Vac, 50/60 Hz
Contacts: 5 A to 240 Vac resistive
⅓ hp to 120 Vac, 5 A to 28 Vdc resistive
Inlet/Outlet Ports: ¾ FNPT
Electric Termination Pilot: 22 AWG, 0.6 mm (2") zip cord lead wires
J-Box: 1.8 mm (6') cable

To Order

Model No.	Switch Actuation Setpoint (GPM)	Description
FSW501	0.25	Pilot duty 20 VA switch
FSW502	0.50	Pilot duty 20 VA switch
FSW503	1.00	Pilot duty 20 VA switch
FSW504	2.00	Pilot duty 20 VA switch
FSW505	2.50	Pilot duty 20 VA switch
FSW506	5.00	Pilot duty 20 VA switch
FSW511	0.25	J-box with 5 A relay
FSW512	0.50	J-box with 5 A relay

Ordering Examples: FSW501, *20 VA switch.*
FSW511*. J-box with 5 A relay.*

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FSW-6000/ 7000 Series

1 YEAR WARRANTY RoHS

FSW-6212 shown smaller than actual size.

- **Simple to Install and Low Cost**
- **No Moving Parts-Maintenance Free Reliability**
- **Optimal Temperature Compensation—Unaffected by Temperature Gradient**
- **Can Operate in Temperatures up to 120°C (248°F) with Sanitary Option**
- **300 Bar (4300 psi) Maximum Working Pressure**
- **Chain of 8 LEDs-Integrated Flow Rate/ Setpoint Indication**
- **Can Be Used as a Level Switch**

The FSW-6000/7000 Series are thermal flow switch monitors designed to monitor flow status and also used to detect level of liquids, air and gas. A chain of 8 LEDs gives the user a visual indication of the flow rate. In addition, there is also a dichromatic LED, which shows the switch point status of the unit. The sensing element and connection of the FSW-6000/7000 Series are made with 316 SS and can be coated with ECTFE/ETFE as an option. The standard enclosure is glass-filled nylon and is also available in an aluminum enclosure for hazardous environments. The FSW-6000/7000 Series can be made with a great variety of process connections such as threaded, flange, or sanitary.

The FSW-6000/7000 Series line of thermal flow switch monitors is based on the principle of thermal dispersion. A typical configuration uses two platinum Resistance Temperature Detectors (RTDs) set within the tip of the sensor. One RTD is heated a few degrees above the temperature of the medium and the other RTD is used as a reference, sensing the actual process temperature. The second RTD also monitors the temperature of the medium, as any changes in temperature must be compensated for in the first RTD. As the process medium flows over the tip of the sensor it disperses some of the heat from the first RTD. The temperature change between the two RTD's signals the probe's electronics and the switch changes state once the setpoint has reached.

The FSW-6000/7000 Series may be installed in a pipe or tank using the thread or connection provided. Use only the hexagon when tightening to achieve a seal, do not use the body. The body should be rotated after tightening to leave the cable gland in suitable orientation.

The FSW-6000/7000 Series is not affected by its fixing position so it may be installed at any angle around the pipe. However, it is recommended that with horizontal pipe runs the sensor should be installed on the side, into the middle of the pipe. In vertical pipes, the FSW-6000/7000 Series should be installed when there is flow in an upward direction against gravity. Care should be taken when installing the sensor that the probe extends clear of the pipe's internal wall and is fully immersed into the flow. In pipes with smaller diameters, some care should also be taken so that the sensor is not screwed too far into the line.

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SPECIFICATIONS

Repeatability: ±1% of setpoint
Power Supply:
FSW-6000: 85 to 240 Vac (50/60 Hz)
FSW-7000: 24 Vdc ±10%

Temperature Range:

Process: -20 to 80°C (-4 to176°F [sanitary option to 120°C (248°F) for CIP]
Operating: -20 to 60°C (-4 to140°F)
Maximum Pressure: 300 bar (4351 psi)
Protection Class: NEMA 4 (IP65)
Wetted Materials: 316 SS

Enclosure Material: Glass filled nylon standard or aluminum die cast option
Process Connection:
½ to 1½ NPT, Tri-Grip™, or flange (others available, consult Flow Engineering Department)
Output: 250 Vac SPDT 5 A relay
Switch Point Adjustment: Potentiometer

Bargraph:

Green LED: Flow rate above setpoint
Yellow LED: Flow is at above setpoint
Red LED: Flow is below setpoint

Switch Point Status:

Red LED: No flow

Green LED: Flow
Response Time: 1 to 10 seconds
Maximum Start up Delay: 12 seconds
Switching Range:
3 cm/s to 3 m/s (0.09 to 9.84 ft/sec) (liquid), 5 cm/sec to 15 m/sec (0.16 to 49 ft/sec) (gas)

Dimensions:

Nylon Head: 88 Dia x 80 mm H (3.5 x 2.5" H)
Aluminum Head: 88 Dia x 108 mm H (3.5 x 4.25")
Insertion Length: 1⅜, 2 and 3" standard, for other lengths consult Flow Engineering
Weight: Approx 680 g (1.5 lb)

To Order

Model No.	Description	Process Connection	Enclosure	Insertion Length
FSW-6212	Thermal dispersion flow switch, 85 to 240 Vac power	¾ NPT	Glass filled nylon, ½ NPT conduit, cable gland, and 2 m (6.5') cable	51 mm (2") for 1 to 4" pipe
FSW-7112	Thermal dispersion flow switch, 24 Vdc power	½ NPT	Glass filled nylon, ½ NPT conduit, cable gland, and 2 m (6.5') cable	51 mm (2") for 1 to 4" pipe
FSW-7111	Thermal dispersion flow switch, 24 Vdc power	½ NPT	Glass filled nylon, ½ NPT conduit, cable gland, and 2 m (6.5') cable	35 mm (1⅜") for ½ to 1" pipe

Accessories

Model No.	Description
70A-1	Continuous tone alarm
TX4-100	4-conductor wire, 30.5 m (100') spool
U24Y175	24 Vdc power supply

Build to Order Models

Model No.	Description
FSW-6(*)(**)(***)	Flow switch, 85 to 240 Vac power; specify connection (*), enclosure (**) and insertion length (***)
FSW-7(*)(**)(***)	Flow switch, 24 Vdc power; specify connection (*), enclosure (**) and insertion length (***)

Options

Ordering Suffix	Description
Process Connection (*)	
1	½ NPT thread
2	¾ NPT thread
3	1 NPT thread
5	1.5" Tri-Grip™
6	2" ANSI flange, 15016 316 SS
Enclosure (**)	
1	Glass filled nylon with ½ NPT conduit, cable gland, and 2 m (6.5') cable
2	Aluminum die cast with ½ NPT conduit
3	Aluminum die cast with cable gland
Insertion Length (***)	
1	35 mm (1⅜")
2	50 mm (2")
3	75 mm (3")

Comes complete with operator's manual.
*To order ECTFE/ETFE element coating, add suffix **"-ETFE"** to model number for additional cost.*
***Ordering Examples: FSW-6212,** flow switch, 85 to 240 Vac power, ¾ NPT fitting, glass filled nylon, 51 mm (2") insertion length, and **70A-1,** alarm.*
***FSW-7113,** flow switch, 24 Vdc power, ½ NPT fitting, glass filled nylon, 75 mm (3") insertion length.*

FSW-6000 flow switches are available with 1.5" Tri-Grip™ (Tri-Clamp® compatible) connection for sanitary applications.

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AIR FLOW MONITOR

FSW800B Series

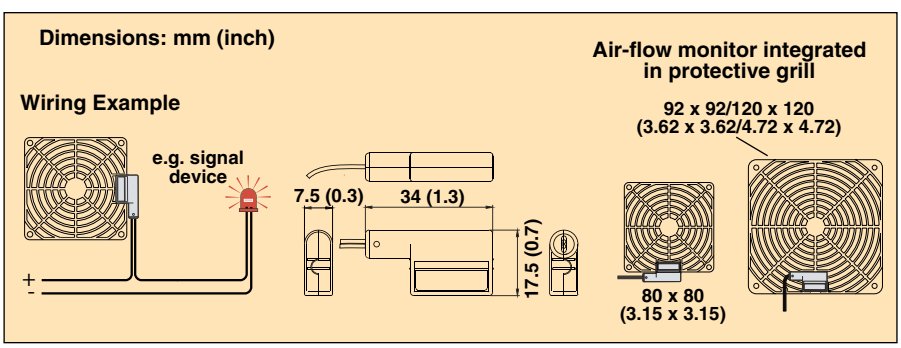
- Reliable Mechanical Switch Contact
- Small Size
- Economical
- Easily Installs Via Clip or Clamp
- Versatile Fields of Application

FSW801B shown larger than actual size.

Connection: 2 x single strand AWG 26, length 500 mm (20"), tip of stranded wire stripped/tinned 5 mm (0.20")
Mounting: Attachment clamp and/or clip, or integrated in protective grill
Housing: Plastic, black
Dimensions: 34 x 17.5 x 7.5 mm (1.3 x 0.7 x 0.3")

Mounting Position: Air-flow monitor opening perpendicular to air flow
Operating Temperature: -20 to 50°C (-4 to 122°F)
Storage Temperature: -20 to 80°C (-4 to 176°F)
Protection Type: NEMA 1 (IP 20)

The FSW800B Series air-flow monitor provides a simple but reliable alternative to indicate positive or negative air flow of fans. When properly installed and connected in series with an optical (i.e. LED) or audible signaling device, a bi-directional switch will activate an electrical contact if the air flow of the fan falls below 8.2 ft/s, thus either turning the signaling device on or off.



SPECIFICATIONS

Contact Type: Reed/magnet contact
NC (Normally Closed): Contact open with air flow
NO (Normally Open): Contact closed with air flow
Switching Threshold of Air Flow Speed: >8.2 ft/s (2.5 m/s)
Hysteresis: 3.3 ft/s (1 m/s)—fixed
Contact Resistance Incl. Wire: 370 m (1214')
Service Life: >100,000 cycles
Maximum Switching Capacity: 10 W (resistive load)
Maximum Switching Voltage: NC, AC/DC 240 V/NO, DC 60V
Maximum Switching Current: NC, DC 500 mA/NO. DC 170 mA

To Order

Model No.	Description	Weight
FSW801B	Air-flow switch, NC with mounting clip and clamp	6 g (0.2 oz)
FSW802B	Air-flow monitor, NO with mounting clip and clamp	6 g (0.2 oz)
FSW803B	Air-flow monitor, NC with 80 x 80 mm (3.15") finger guard	20 g (0.7 oz)
FSW804B	Air-flow monitor, NO with 80 x 80 mm (3.15") finger guard	20 g (0.7 oz)
FSW807B	Air-flow monitor, NC with 120 x 120 mm (4.72") finger guard	31 g (1.1 oz)
FSW808B	Air-flow monitor, NO with 120 x 120 mm (4.72") finger guard	31 g (1.1 oz)

Comes complete with operator's manual.
***Ordering Example: FSW803B,** air-flow monitor, NC with 80 x 80 mm finger guard.*

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FSW-9000 Series

1 YEAR WARRANTY RoHS

- **High Reliability— No Moving Parts**
- **4 to 20 mA, PNP/NPN (Transistor), or Relay Output**
- **Excellent Low Flow Sensitivity**

FSW-9212 shown smaller than actual size.

The FSW-9000 Series is a flow switch monitor that measures the velocity of the flow. It is ideal for use in measurement and control liquid applications. The FSW-9000 Series provides two output options: a 4 to 20 mA analog output and a PNP/NPN output. For the 4 to 20 mA output, the electronics module converts the signal from the probe to a 4 to 20 mA analog output, which can be used to indicate flow rate. For the PNP/NPN output, the measured flow rate is compared to the setpoint value selected by the user and the switch changes state once the setpoint value has been achieved.

The FSW-9000 Series microprocessor based electronics and unique self-calibration program gives the flow switch superior temperature compensation, a fast response time (adjustable from 3 to 10 seconds) and increased long term switch point stability. Even in the event of a power failure, the calibration program will store values for maximum and minimum flows for up to 10 years.

A chain of 8 LEDs gives the user a visual indication of the flow rate as well as setpoint status, and one di-chromatic LED indicates switch point status. In addition, if there is a problem with the unit, the 8 LEDs will flash continuously providing troubleshooting information.

The conical shape of the sensor's tip means that the probe can be installed at almost any angle in the pipe and that if the probe is misaligned, accuracy will not be affected. The sensing element and connection of the FSW-9000 Series are made with 316 SS and the standard enclosure is glass-filled nylon. The FSW-9000 Series can be made with a great variety of process connections such as threaded, flange, or sanitary and is also available in an aluminum enclosure for hazardous environments. Intrinsic safety barriers required for explosion proof areas.

Measuring Ranges for FSW-9000 Series

The FSW-9000 Series nominal measuring range is 0.04 to 2.0 m/s. The switch can be set to trip at any value in this range. To calculate the velocity for your application, use the following simple formula:

$$V = \frac{1.27 \times Q}{D^2}$$

Q = Flow rate in meters per second

D = Pipe internal diameter in meters

V = Fluid velocity in meters per second

Please note that the 4 to 20 mA option is scaled over 0 to 2.0 m/s

The FSW-90-R is very similar to the FSW-9212 Series with one main difference: The sensor is separate from the electronics and it does not have an enclosed housing. This gives the FSW-90-R Series the ability to be installed in very small pipes and be remotely controlled by the FSCN-91 relay. The FSW-90-R Series is the ideal solution when there is not a lot of space to install even a compact unit or when there is a need for a mounted relay. In addition, the conical shape of the sensor's tip allows the probe to be installed at almost any angle in the pipe, and if it is misaligned, accuracy will not be affected. The FSW-90-R is made with 316 SS. FSCN-91 relay can operate with DC or AC supply voltage and provides an analog 4 to 20 mA and SPDT output. The FSCN-91 enclosure is made with ABS and can be mounted on a DIN rail or by using 2 fixing screws.

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SPECIFICATIONS

Repeatability: ±1% of setpoint
Power Supply: FSW-90-R: 85 to 240 Vac, 50/60 Hz or 24 Vdc ±10%; FSW-9000: 24 Vdc ±10%
Temperature Range:
Process: -20 to 80°C (-4 to176°F) (Sanitary option to 284°F for CIP)
Operating: -20 to 60°C (-4 to140°F)
Maximum Pressure: 300 bar (4351 psi)
Protection Class: NEMA-4 (IP65)
Wetted Materials: 316 Stainless Steel
Enclosure Material: Glass filled nylon standard; aluminum head optional
Process Connection: ½ to 1½ NPT, Tri-Grip™ (Tri-Clamp® compatible), or flange

Output: FSW-90-R + FSCN-90: relay (SPDT) and 4 to 20 mA; FSW-9000: 4 to 20 mA
Switch Point Adjustment: Potentiometer
Bargraph: 8 LED
Switch Point Status:
Red LED: No flow
Green LED: Flow
Response Time: 3 to 10 sec nominal
Maximum Start-Up Delay: 12 seconds
Switching Range: 0.04 m/s to 2 m/s (water)
Dimensions:
Nylon Head: 89 H x 64 mm D (3.5 x 2.5")
Aluminum Head: 89 H x 108 mm D (3.5 x 4.25")

Probe Diameter: 16 mm (0.625")
Insertion Length: 1⅜, 2 and 3" standard; for other lengths consult Flow Engineering
Weight: Approx. 680 g (1.5 lb)

To Order

Model No.	Description	Process Connection	Enclosure	Insertion Legth
FSW-9212	Complete transmitter	¾ NPT	Glass filled nylon, ½ NPT conduit, cable gland, and 2 m (6.5') cable	51 mm (2")
FSW-91-R	Flow sensor (FSCN-90 electronics sold separately)	½ NPT	None	51 mm (2")
FSCN-91	FSW-91-R electronics, 24 Vdc power			
FSCN-92	FSW-91-R electronics, 85 to 240 Vac power			

Accessories

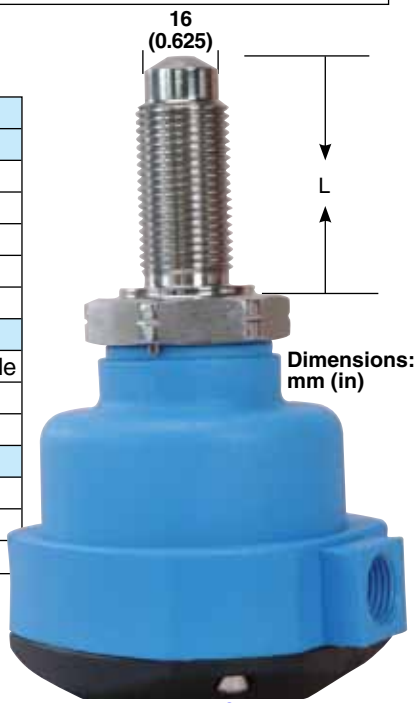
Model No.	Description
70A-1	Continuous tone alarm
TX4-100	4 conductor wire, 30.5 m (100') spool
U24Y175	24 Vdc power supply

Build to Order Models

Model No.	Description
FSW-9(*)(**)(***)	Complete transmitter, specify connection (*), enclosure (**) and insertion length (***)
FSW-9(*)-R	Flow sensor, specify connection (*); (FSCN-90 electronics sold separately)

Options

Ordering Suffix	Description
Process Connection (*)	
1	½ NPT thread
2	¾ NPT thread
3	1 NPT thread
5	1.5" Tri-Grip™ (inches only)
6	2" ANSI flange, 15016 316 SS
Enclosure (**)	
1	Glass filled nylon with ½ NPT conduit, cable gland, and 2 m (6.5') cable
2	Aluminum die cast with ½ NPT conduit
3	Aluminum die cast with cable gland
Insertion Length (***)	
1	35 mm (1⅜")
2	50 mm (2")
3	75 mm (3")



Comes complete with operator's manual.
*To order ECTFE/ETFE element coating add suffix **"-ETFE"** to model number, for additional cost.*
***Ordering Examples: FSW-9212**, Vac powered switch, and **70A-1**, alarm.*
***FSW-9123,** transmitter with ½ NPT thread, aluminum die cast enclosure with ½ NPT conduit, 75 mm (3") insertion length.*

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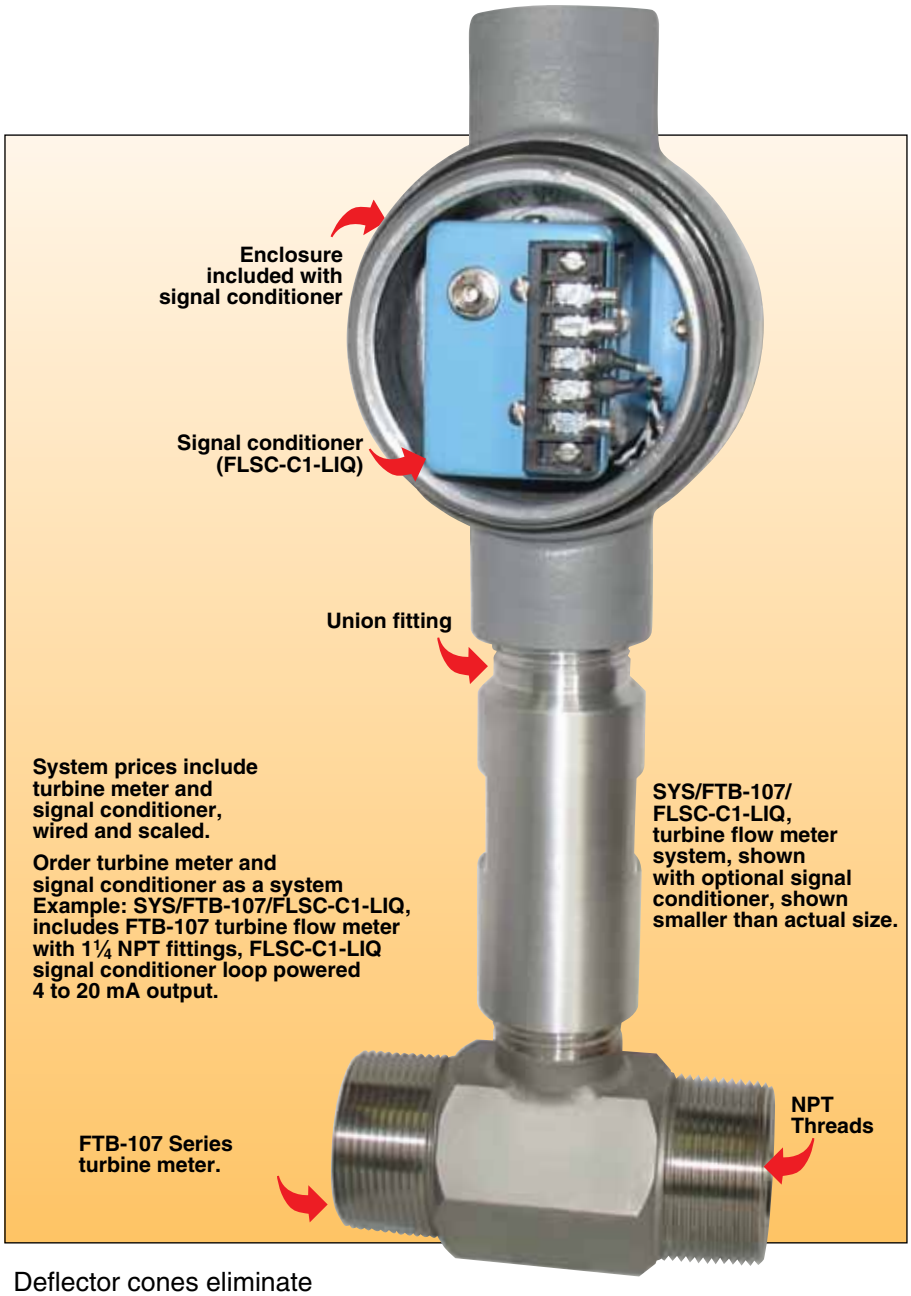
Stand Alone or Complete Systems with Signal Conditioning

FTB-100 Series

1 YEAR WARRANTY · NIST · RoHS

Standard

- ±0.5% of Reading Accuracy
- Ball Bearing Design for Economy
- Non-Metallic Bearing Retainers for Long Life
- Replacement Bearings Field Installable Without Loss of Calibration
- Disassembles Quickly for Easy Maintenance
- Deflector Cones Stabilize Low Mass Rotor for Increased Bearing Life
- 4 to 20 mA, 0 to 5V, and Scaled Frequency Outputs Available



The FTB-100 Series of turbine meters have a shielded ball bearing design for high-accuracy performance (±0.5% of reading, not full scale) at an economical cost. The non-metallic bearing retainers minimize friction, thereby allowing these meters to be used with clean fluids that have poor lubricating properties (*i.e.*, water). Ball bearings also give the widest linear flow range, particularly in larger turbines. Bearing replacement and clean-up are fast and easy, since all internal parts are easily accessible by removing a single nut.

These turbine flow meters have a low mass rotor design which allows rapid dynamic response, so they can be used in pulsating flow applications.

Deflector cones eliminate downstream thrust on the rotor and allow hydrodynamic positioning of the rotor between the cones. This provides wider rangeability and longer bearing life than conventional turbine flow meters. Integral flow-straightening tubes minimize the effects of upstream turbulence.

FTB-100 Turbine Meters are available with integral signal conditioners which provide scaled and unscaled frequencies, 4 to 20 mA, or 0 to 5 volt outputs

Units without integral signal conditioners are supplied with mating connector for two-wire hook-up.

SPECIFICATIONS

Accuracy: ±0.5% of reading
Repeatability: ±0.1% of reading
Maximum Temperature Range: -268 to 232°C (-450 to 450°F)
Maximum Intermittent Overrange: 150% of maximum range
Minimum Output Amplitude: 30 mV Peak-to-Peak unscaled pulse
Materials of Construction:
- **Body:** 304 stainless steel
- **Rotor:** 17-4 PH steel
- **Bearings:** Ceramic

Minimum straight pipe requirements: 10 pipe diameters upstream, 5 downstream

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Complete The System

SIGNAL CONDITIONERS
4 to 20 mA, amplified pulse, or 0 to 5 Vdc.

SELECT 1 OR 2

1 **DISPLAY, ALARM, CONTROL DPF60**
Pulse output and voltage or current output.

2 **DISPLAY, TOTALIZE, AND BATCH CONTROL**
Scaled pulse or current output DPF701.

NIST Calibration for Other Viscosity Liquids*

Meter Size	Viscosity Range	
	0.6 to 99 cSt	100 to 299 cSt
FTB-101 thru 106 ½ thru 1"	Additional cost	
FTB-107 thru 109 1¼ thru 2"		
FTB-110 thru 111 2½ thru 3"		

** Standard NIST calibration is for water (viscosity = 1 cSt)*

F

To Order

Turbine Meter Only Model No.†	Linear Flow Range for Water LPM (GPM)	MNPT End Fittings	Maximum Operating Pressure (psig)	Maximum Pressure Drop (psid)	Length mm (inch)	Nominal K-Factor (Pulses/Gallon)	Weight kg (lb)
FTB-101	1.32 to 13.2 (0.35 to 3.5)	½	5000	3.0	62 (2.45)	13,000	0.4 (1)
FTB-102	2.84 to 28.4 (0.75 to 7.5)	½	5000	5.0	62 (2.45)	10,000	0.4 (1)
FTB-103	4.73 to 36.0 (1.25 to 9.5)	½	5000	5.2	62 (2.45)	6000	0.4 (1)
FTB-104	6.62 to 61 (1.75 to 16)	¾	5000	3.0	70 (2.75)	4100	0.4 (1)
FTB-105	9.5 to 110 (2.5 to 29)	¾	4250	5.0	83 (3.25)	2200	0.4 (1)
FTB-106	15 to 227 (4 to 60)	1	3850	5.1	89 (3.50)	640	0.9 (2)
FTB-107	23 to 352 (6 to 93)	1¼	3850	4.3	99 (3.88)	410	0.9 (2)
FTB-108	30 to 492 (8 to 130)	1½	3000	3.0	111 (4.38)	230	1.4 (3)
FTB-109	57 to 852 (15 to 225)	2	2500	3.3	121 (4.75)	120	1.8 (4)
FTB-110	95 to 1514 (25 to 400)	2½	2250	4.0	154 (6.06)	62	2.3 (5)
FTB-111	151 to 2460 (40 to 650)	3	2000	4.0	191 (7.50)	55	3.2 (7)

Comes complete with operator's manual and 10-point NIST calibration certificate for water.

***Ordering Examples: FTB-101,** ½ NPT turbine meter with standard NIST calibration for 1 cSt viscosity.*

***FTB-106,** 1 NPT turbine meter with NIST calibration for 5 cSt viscosity liquid.*

† Complete systems with signal conditioner available, consult sales.

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SIGNAL CONDITIONER

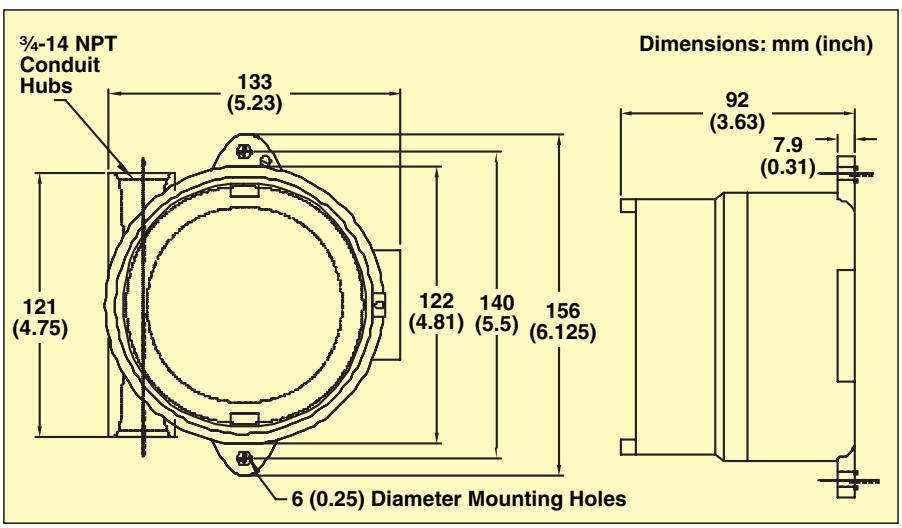
FLSC-C1-LIQ

- Loop Powered 4 to 20 mA
- Signal Linearization
- Factory Configuration Available
- Windows® Configuration Software*

FLSC-C1-LIQ shown smaller than actual size.

The FLSC-C1-LIQ is a microprocessor controlled 2-wire 4 to 20 mA transmitter. The FLSC-C1-LIQ converts a low level, frequency signal from a flow sensor into an analog 4 to 20 mA output. The output is proportional to the flow rate. The FLSC-C1-LIQ is designed for integral mounting to the FTB-100, FTB-200 and FTB-400 Series** liquid turbines.

*** Visit OMEGA for details.*



Enclosure meets Class I, Div 1 & 2, Groups A, B, C & D. Class 1, Zones 1 & 2, Groups IIB + H2 IIA. Class II, Div 1 & 2 Groups E, F & G. Class III. NEMA 3, 4, 7(B, C, D) 9(E, F, G). Cenelec EEx d IIC IP66, UL, CSA, FM Approved. ATEX Certified.

SPECIFICATIONS

Input Signal Type: Magnetic pickup
Input Frequency Range: 0.2 Hz to 4 KHz
Signal Level: 10 mV rms to 30 Vdc
Power Supply: Loop power 10 to 30 Vdc Reverse polarity protected
Loop Burden Voltage: 8.5V
Analog Output: 4 to 20 mA
24 mA overflow condition
Load Resistance: Maximum 650 Ω at 24 Vdc
Accuracy: ±0.02% of full scale
Temperature Drift: 40 ppm/degree C
Communications: RS232 port for configuration and diagnostics
Operating Temperature: -40 to 85°C (-40 to 185°F)
Humidity: 0 to 90% non-condensing
Enclosure: Extruded Aluminum Explosion-Proof ATEX enclosure
Regulatory: CE Compliant
Up to 20 point linearization
Windows Configuration Software* (cable sold separately)

To Order

Model No.	Description
FLSC-C1-LIQ	Loop-powered signal conditioner, 4 to 20 mA, CE/ATEX
OM-CONV-USB	USB to RS232 converter
FLSC-C-CABLE	Molex to 9-pin “D” connector

Comes complete with operator’s manual and enclosure.
*** Available free at omega.com/ftp*
***Ordering Example: FLSC-C1-LIQ,** loop-powered turbine signal conditioner in ATEX enclosure with **FLSC-C-CABLE** Molex to 9-pin “D” connector.*

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SIGNAL CONDITIONER

FLSC-C3-LIQ

1 YEAR WARRANTY

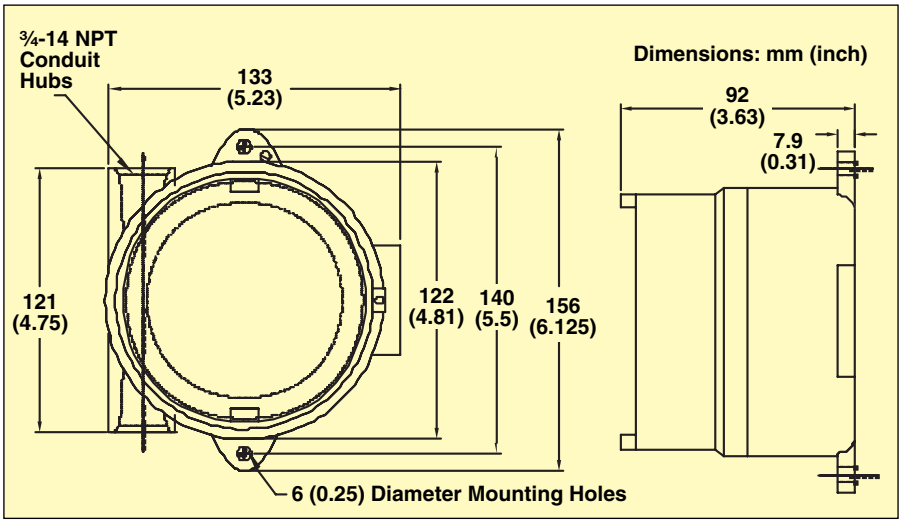
- DC or AC Powered
- Pulse and Analog Outputs
- High or Low Alarms (Optional)
- 20 Point Linearization
- Factory Configuration Available
- Windows® Configuration Software*

FLSC-C3-LIQ shown smaller than actual size.

The FLSC-C3-LIQ is a DC powered, microprocessor controlled transmitter. It outputs a pulse scaled per unit of flow, and analog signal proportional to flow rate.

The FLSC-C3-LIQ-AL can be configured with high or low alarms. The FLSC-C3-LIQ is designed for integral mounting to the FTB-100, FTB-200 and FTB-400 Series** liquid turbines.

*** Visit OMEGA for details.*



Enclosure meets Class I, Div 1 & 2, Groups A, B, C & D. Class 1, Zones 1 & 2, Groups IIB + H2IIA. Class II, Div 1 & 2 Groups E, F & G. Class III. NEMA 3, 4 7(B, C, D) 9(E, F, G). Cenelec EEx d IIC IP66, UL, CSA, FM Approved. ATEX Certified.

SPECIFICATIONS

Input Signal Type: Magnetic pickup, MCP pickup, contact closure, pulse
Input Frequency Range: 0.2 Hz to 4 KHz
Signal Level: 10 mV rms to 30 Vdc
Power Supply: 13 to 30 Vdc reverse polarity protection
Analog Output: 4 to 20 mA, 1 to 5V 24 mA overflow condition
Load Resistance: Maximum 650 Ω at 24 Vdc
Accuracy: ±0.02% of full scale
Temperature Drift: 40 ppm/degree C
Pulse Output: 0 to 5V, 0 to 10V, open collector, AC square. Internal pull up 10 kΩ. Recommended minimum load resistance 50 kΩ
Pulse Scaling: Divide by 1, 10 or 100 per flow unit
Hi/Lo Alarm (-AL Model) Optional: Relay (2A, 30 Vdc), 0 to 5V, open collector (0.5A, 30V)
Communications: RS232 port for configuration and diagnostics
Operating Temperature: -40 to 85°C (-40 to 185°F)
Humidity: 0 to 90% non-condensing
Enclosure: Extruded aluminum explosion-proof ATEX
Regulatory: CE Compliant up to 20 point linearization Windows Configuration Software* (cable sold separately)

To Order

Model No.	Description
FLSC-C3-LIQ	DC powered signal conditioner 4 to 20 mA, CE ATEX
FLSC-C3-AL-LIQ	DC powered signal conditioner 4 to 20 mA, alarm CE ATEX
OM-CONV-USB	USB to RS232 converter
FLSC-C-CABLE	Molex to 9-pin "D" connector

Comes complete with operator's manual and enclosure.
*** Available free at omega.com/ftp*
***Ordering Example: FLSC-C3-LIQ,** DC powered turbine signal conditioner with **FLSC-C-CABLE** Molex to 9-pin "D" connector.*

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ECONOMICAL LIQUID TURBINE FLOW METERS

FTB-1300 Series

1 YEAR WARRANTY NIST

Optional

- ±1% of Actual Flow Accuracy
- Pressure Rating Up to 345 bar (5000 psi)
- Stainless Steel Construction with Tungsten Carbide Bearing
- Easy Maintenance Design

FTB-1302, 1.1 to 11 LPM flow meter, shown smaller than actual size.

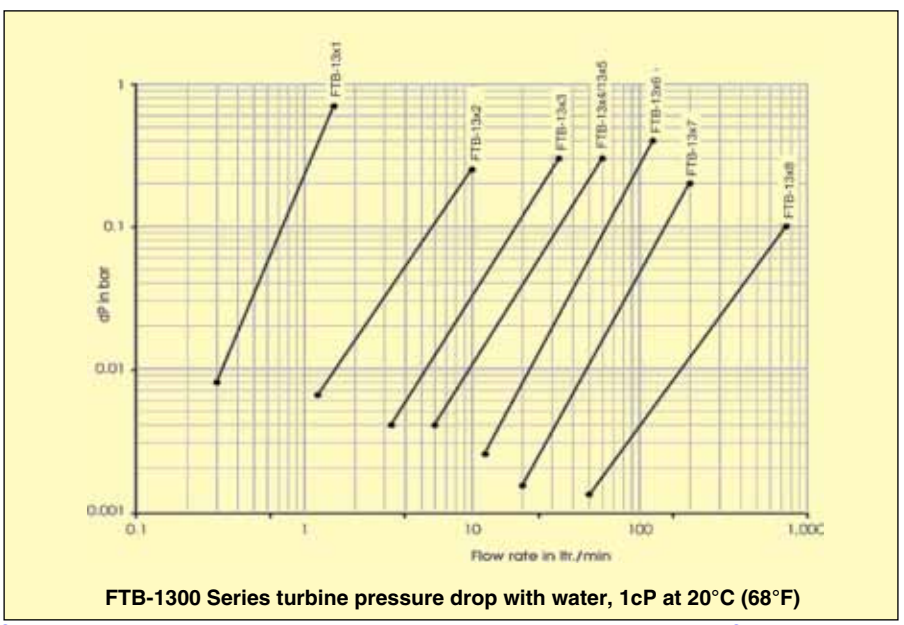
The FTB-1300 Series of turbine flow meters are designed for industrial and laboratory measurement of water, solvents and other low viscosity fluids. The FTB-1300 Series turbine flow meters feature a 316 stainless steel body and a tungsten carbide bearing. They offer good accuracy and reliability with very little pressure drop. The standard turbine flow meters feature threaded end connections.

The FTB-1300 series of turbine flow meters is designed with a wear resistant rotor assembly to provide trouble free operation and a long service life. Fluid moving through the flow meter causes the rotor to turn at a speed proportional to the flow rate, and as the rotor blades cut through the magnetic field of the pickup, an electronic pulse is generated. The pulse train is used to represent the actual flow or total amount of fluid passing through the flow meter. The number of electronic pulses generated per unit volume is known as a K-factor. The value is constant over each flow meter's operating range, and is unique to each meter.

Outputs

Square Wave (FTB-1300 Models):
Supply Voltage: 10 to 28 Vdc
Supply Current: 8 mA @ 12 Vdc, 12 mA @ 24 Vdc
Duty Signal: 50% ±15%
Minimum Signal: 0.5 Hz
Frequency Output: Flow dependent, up to 2000 Hz
Driving Capacity: 50 mA Max resistive load
Output Impedance: ~ 40 Ω, analog switch and self-resetting fuse
Temperature Range: -40 to 85°C (-40 to 185°F)
Cable Length: 60 cm (24")

Current (FTB-1310 Models):
Supply Voltage: 10 to 30 Vdc
Input: 0.25 Hz to 5 KHz
Update Time: 1/F + 25 msec
Amplitude: 1V p-p to 40V p-p
Linearity: ±0.01% of reading
Output: 4 to 20 mA
Enclosure Certifications: NEC Class I Groups C, D; Class II Groups E, F, G (FTB-1310 Series)
Temperature Range: -40 to 85°C (-40 to 185°F)



FTB-1300 Series turbine pressure drop with water, 1cP at 20°C (68°F)

SPECIFICATIONS

Accuracy: ±1% reading
Pressure Max: 345 bar (5000 psi)
Wetted Materials: Stainless Steel (316L, 303 and 1.4122) and carbide with nickel binder (be sure that the operating fluid is compatible with these materials)

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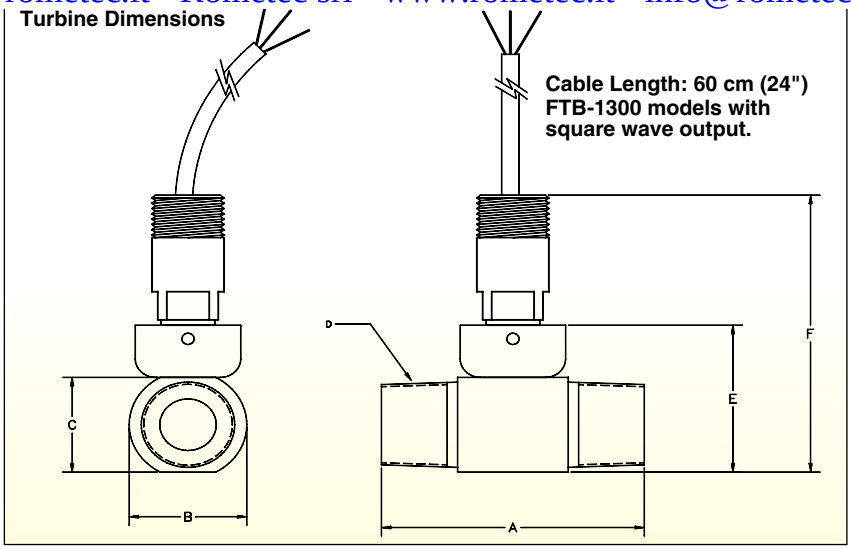
FTB-1313, with 4 to 20 mA transmitter (standard) on FTB-1310 Series. Shown smaller than actual size.



Turbine Dimensions: mm (inch)

Model No.	A	B	C	D	E*	F
FTB-13X1	76.2 (3)	34.29 (1.35)	30.48 (1.20)	½ NPT	55.88 (2.20)	97.79 (3.85)
FTB-13X2	76.2 (3)	34.29 (1.35)	30.48 (1.20)	½ NPT	55.88 (2.20)	97.79 (3.85)
FTB-13X3	76.2 (3)	34.29 (1.35)	30.48 (1.20)	½ NPT	57.15 (2.25)	100.33 (3.95)
FTB-13X4	76.2 (3)	34.29 (1.35)	30.48 (1.20)	½ NPT	57.15 (2.25)	101.6 (4)
FTB-13X5	76.2 (3)	39.37 (1.55)	35.56 (1.40)	1 NPT	62.23 (2.45)	104.14 (4.10)
FTB-13X6	76.2 (3)	39.37 (1.55)	35.56 (1.40)	1 NPT	64.77 (2.55)	107.95 (4.25)
FTB-13X7	76.2 (3)	54.61 (2.15)	49.53 (1.95)	1½ NPT	76.2 (3)	116.84 (4.60)
FTB-13X8	101.6 (4)	68.58 (2.70)	64.77 (2.55)	2 NPT	91.44 (3.60)	133.35 (5.25)

***** *4 to 20 mA output adds 168 mm (6.6") to the E dimensions for protection head.*

To Order

Model No.	Fittings NPT	Range LPM	GPM	Pulses Per Gallon	Output and Description
FTB-1301	½	0.3 to 1.5	0.08 to 0.4	125,000	Amplified square wave, 60 cm (24") cable
FTB-1302	½	1.1 to 11	0.3 to 3	48,000	
FTB-1303	½	3.4 to 34	0.9 to 9	15,000	
FTB-1304	½	6 to 60	1.6 to 16	10,500	
FTB-1305	1	6 to 60	1.6 to 16	10,500	
FTB-1306	1	11 to 121	3 to 32	1450	
FTB-1306A	1	11 to 121	3 to 32	2900	
FTB-1307	1½	19 to 200	5 to 53	800	
FTB-1308	2	49 to 757	13 to 200	100	
FTB-1311	½	0.3 to 1.5	0.08 to 0.4	4 to 20 mA industrial head electronics enclosure (**FTB-1310-CONNECTOR** recommended)	
FTB-1312	½	1.1 to 11	0.3 to 3		
FTB-1313	½	3.4 to 34	0.9 to 9		
FTB-1314	½	6 to 60	1.6 to 16		
FTB-1315	1	6 to 60	1.6 to 16		
FTB-1316A	1	11 to 121	3 to 32		
FTB-1317	1½	19 to 200	5 to 53		
FTB-1318	2	49 to 757	13 to 200		

Accessories

Model No.	Description
FTB-1310 CONNECTOR	Recommended for use with FTB-1311 through FTB-1318
DPF701	6-digit rate or total display

Comes complete with operator's manual and certificate. Certificate has no points and is not NIST.

*For a 5-point NIST certificate, add suffix **"-NIST"** to model number, for additional cost.*

***Ordering Examples: FTB-1301,** ½ male NPT turbine, 0.3 to 1.5 LPM (0.08 to 0.4 GPM) range with square wave frequency output and **DPF701,** ⅛ DIN digital panel LED display.*

***FTB-1313.** stainless turbine with linear 4 to 20 mA output. ½ NPT connections and a range of 3.4 to 34 LPM (0.9 to 9 GPM).*

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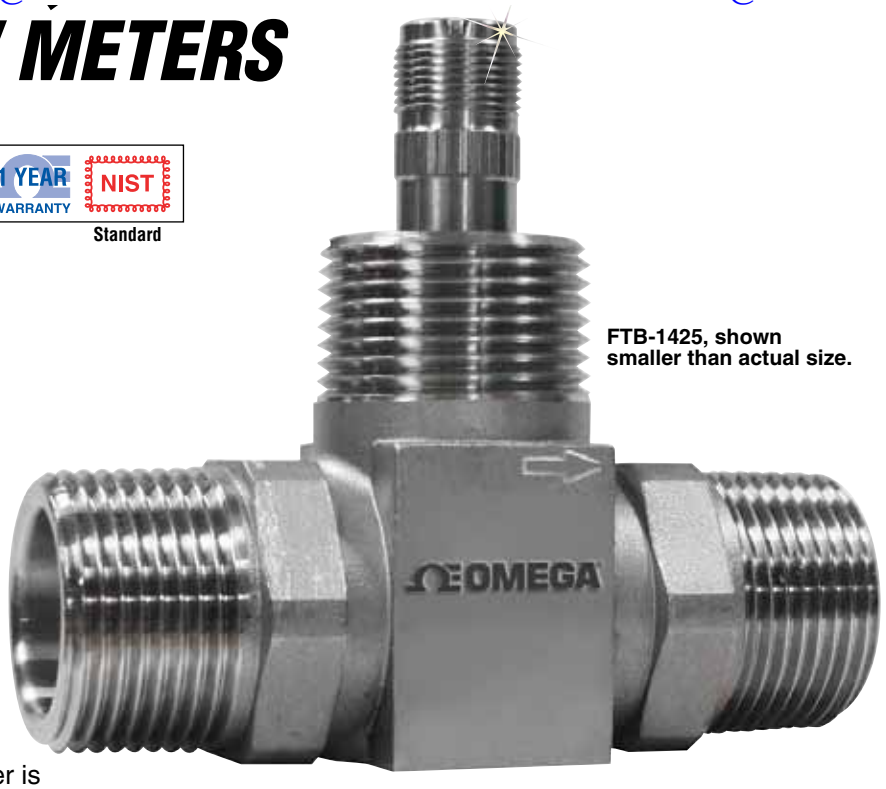
ECONOMICAL LIQUID TURBINE FLOW METERS

FTB-1400 Series

1 YEAR WARRANTY NIST Standard

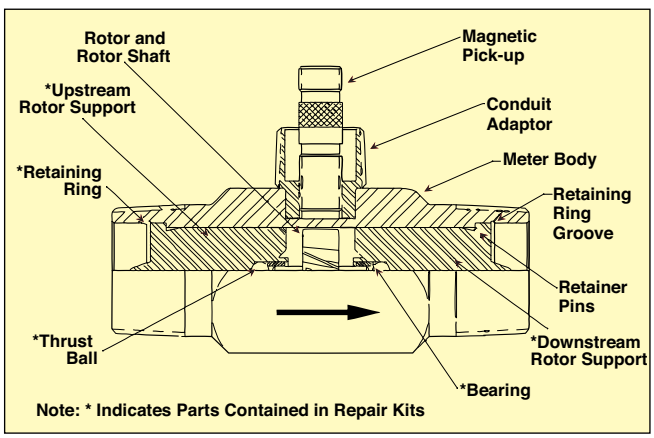
- **Cost-Effective Solution for Turbine Flowmeter Applications**
- **Rugged 316 Stainless Steel Construction Offers Long Service Life in Severe Operating Environments**
- **Accurate and Repeatable Flow Measurement**
- **Installation in Pipe Sizes from ½ to 2"**
- **NIST Calibration**



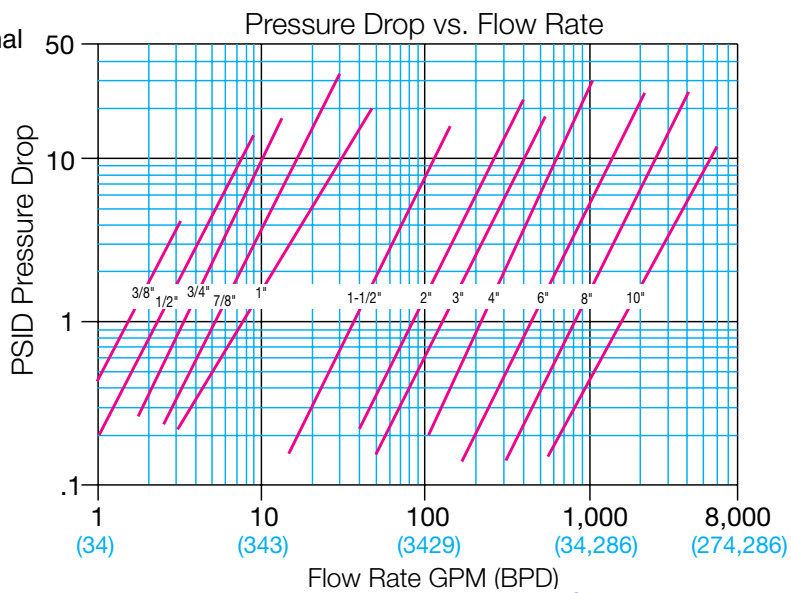
FTB-1425, shown smaller than actual size.

The OMEGA® FTB-1400 turbine flowmeter is designed to meet the demands of the most rigorous flow measurement applications. Originally developed for the secondary oil recovery market, the FTB-1400 is an ideal meter for liquid flow measurement on or off the oilfield. The meter features a 316 Stainless Steel housing and rotor support, CD4MCU Stainless Steel rotor, and abrasion-resistant tungsten carbide rotor shaft and journal bearings. These materials help the meter to maintain accuracy and mechanical integrity when measuring the corrosive and abrasive fluids found in many industries.

Fluid entering the meter first passes through an inlet flow straightener that reduces its turbulent flow pattern. Fluid then passes through the turbine, causing the turbine to rotate at a speed proportional to fluid velocity. As each turbine blade passes through the magnetic field generated by the meters magnetic pick-up, an AC voltage pulse is generated. These pulses provide an output frequency that is proportional to volumetric flow.



Note: * Indicates Parts Contained in Repair Kits



SPECIFICATIONS

Accuracy: ±1% of reading for 1" and larger, ±1% of reading over the upper 70% of the measuring range for ½" meters
Repeatability: ±0.1%
Magnetic Pickup: 30 mV/P-P
Materials of Construction
Body: 316 Stainless Steel
Rotor: CD4MCU Stainless Steel
Rotor Support: 316 Stainless Steel
Rotor Shaft: Tungsten carbide
Turndown Ratio: 10:1
Calibration: Water (NIST traceable calibration)
Pressure Rating: 5000 psi (maximum)
Turbine Temperature: -101 to 177°C (-150 to 350°F); -101 to 232°C (-150 to 450°F) (with **"-HT"** option)
End Connections: NPT, BSPP optional

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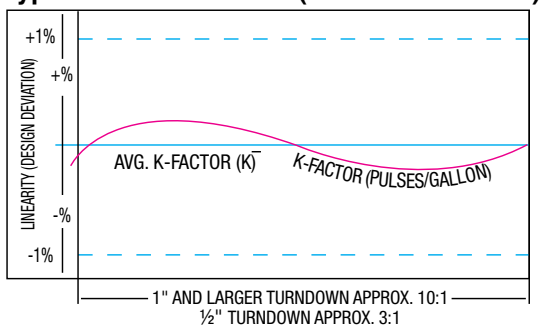
K-Factor

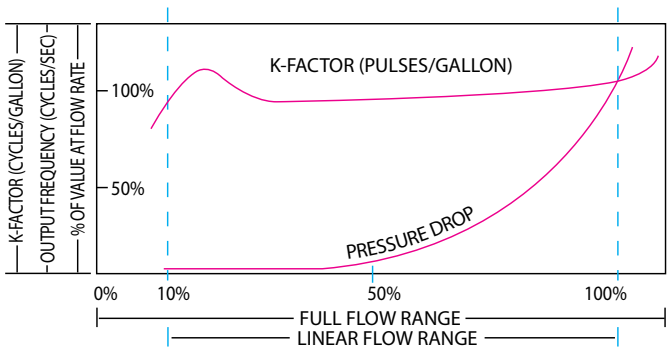
The K-Factor represents the number of output pulses transmitted per gallon of fluid passing through the turbine meter. Each turbine has a unique K-Factor. However, turbine meters are not functionally consistent throughout the full flow range of the meter.

There are several forms of "friction" inherent in turbine meters that retard the rotational movement of the turbine rotor. These frictional forces include: magnetic drag, created by electromagnetic force of pickup transducers; mechanical drag, due to bearing friction; and viscous drag, produced by flowing fluid. See charts on right.

As flow increases, the frictional forces are minimized and the free-wheeling motion of the turbine rotor becomes more linear (proportional to flow). The K-Factor becomes relatively constant and linear throughout the balance of the linear flow range. This is approximately a 10:1 turndown ratio from the maximum flow rate down to the minimum flow rate.

Typical K-Factor Curve (Pulses Per Gallon)





To Order

Model No.	End Connection	BORE	Range				Lay Length mm (inch)
			LPM	GPM	Barrels/Day	K-Factor Pul/Gal	
FTB-1411	1/2 NPT	3/8"	2.3 to 11.3	0.6 to 3	20 to 100	18,000	76 (3)
FTB-1412	1/2 NPT	1/2"	2.8 to 28	0.75 to 7.5	25 to 250	13,000	76 (3)
FTB-1413	1/2 NPT	3/4"	7.6 to 56.7	2 to 15	68 to 515	3300	76 (3)
FTB-1421	1 NPT	3/8"	2.3 to 11.3	0.6 to 3	20 to 100	18,000	76 (3)
FTB-1422	1 NPT	1/2"	2.8 to 28	0.75 to 7.5	25 to 250	13,000	76 (3)
FTB-1423	1 NPT	3/4"	7.6 to 56.7	2 to 15	68 to 515	3300	76 (3)
FTB-1424	1 NPT	7/8"	11.3 to 113	3 to 30	100 to 1000	3100	101 (4)
FTB-1425	1 NPT	1"	18.9 to 189	5 to 50	170 to 1700	870	101 (4)
FTB-1431	11/2 NPT	1-1/2"	56.8 to 681	15 to 180	515 to 6000	330	152 (6)
FTB-1441	2 NPT	2" Low	56.8 to 681	15 to 180	515 to 6000	330	152 (6)

Accessories

Model No.	Description
FTB-1400-CABLE	3 m (10') cable assembly with 2-pin connector (required for remote display)
FTB-1400-90CABLE	3 m (10') cable assembly with 2-pin 90° connector (required for remote display)
FTB-1400-MP	Replacement standard magnetic pick-up

Comes complete with operator's manual and 5 point NIST calibration certificate for water. Cable with connector sold separately. Cable/connector are required for operation.
*For units with high temp magnetic pulse output, add suffix **"-HT"** to model number, consult Flow Engineering for price (not available on **"-AMP"** models).*
*For units with amplified pulse output, add suffix **"-AMP"** to model number consult Flow Engineering for price (not available on **"-HT"** models).*
*For units with BSPP threads, add suffix **"BSP"** to model number for additional cost.*
***Ordering Examples: FTB-1424,** 1 NPT stainless turbine.*
***FTB-1411,** ½ NPT stainless turbine and **DPF701,** digital panel meter for rate of total display, **FTB-1400-CABLE,** 3 m (10') cable assembly with 2-pin connector. For details on DPF701 meter, visit **omega.com/dpf700** for details.*

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ECONOMICAL LIQUID TURBINE FLOW METERS

FTB-1500 Series

1 YEAR WARRANTY NIST

Optional

- ±1% of Actual Flow Accuracy
- Pressure Rating Up to 345 bar (5000 psi)
- Stainless Steel Construction with Tungsten Carbide Bearing
- Easy Maintenance Design

FTB-1502, 1.1 to 11 LPM flow meter, shown smaller than actual size.

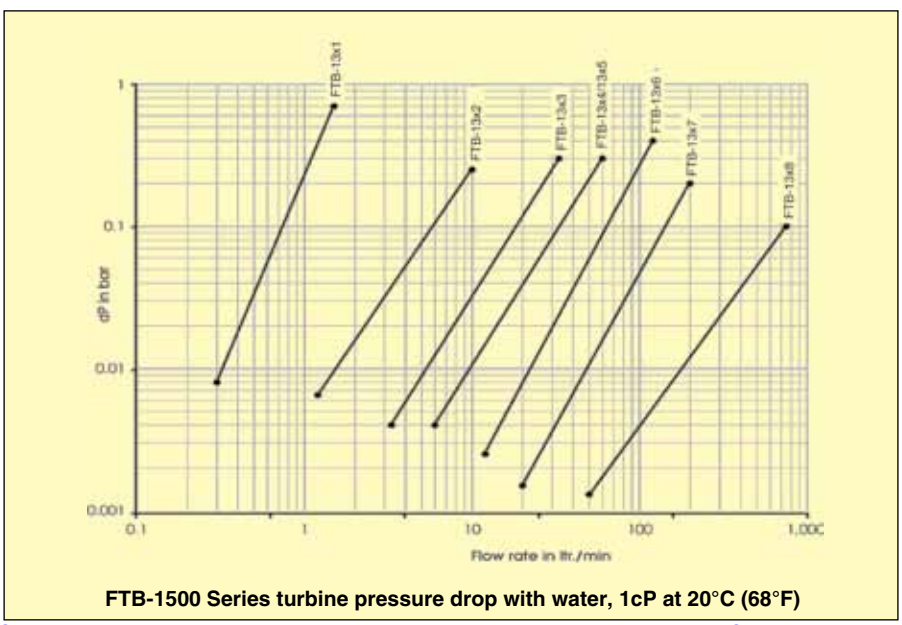
The FTB-1500 Series of turbine flow meters are designed for industrial and laboratory measurement of water, solvents and other low viscosity fluids. The FTB-1300 Series turbine flow meters feature a 316 stainless steel body and a tungsten carbide bearing. They offer good accuracy and reliability with very little pressure drop. The standard turbine flow meters feature threaded end connections.

The FTB-1500 series of turbine flow meters is designed with a wear resistant rotor assembly to provide trouble free operation and a long service life. Fluid moving through the flow meter causes the rotor to turn at a speed proportional to the flow rate, and as the rotor blades cut through the magnetic field of the pickup, an electronic pulse is generated. The pulse train is used to represent the actual flow or total amount of fluid passing through the flow meter. The number of electronic pulses generated per unit volume is known as a K-factor. The value is constant over each flow meter's operating range, and is unique to each meter.

Outputs

Square Wave (FTB-1500 Models):
Supply Voltage: 10 to 28 Vdc
Supply Current: 8 mA @ 12 Vdc, 12 mA @ 24 Vdc
Duty Signal: 50% ±15%
Minimum Signal: 0.5 Hz
Frequency Output: Flow dependent, up to 2000 Hz
Driving Capacity: 50 mA Max resistive load
Output Impedance: ~ 40 Ω, analog switch and self-resetting fuse
Temperature Range: -40 to 85°C (-40 to 185°F)
Cable Length: 60 cm (24")

Current (FTB-1510 Models):
Supply Voltage: 10 to 30 Vdc
Input: 0.25 Hz to 5 KHz
Update Time: 1/F + 25 msec
Amplitude: 1V p-p to 40V p-p
Linearity: ±0.01% of reading
Output: 4 to 20 mA
Enclosure Certifications: NEC Class I Groups C, D; Class II Groups E, F, G (FTB-1310 Series)
Temperature Range: -40 to 85°C (-40 to 185°F)
Electrical Connection: 5 pin M12 (mating connector included)



FTB-1500 Series turbine pressure drop with water, 1cP at 20°C (68°F)

SPECIFICATIONS

Accuracy: ±1% reading
Pressure Max: 345 bar (5000 psi)
Wetted Materials: Stainless Steel (316L, 303 and 1.4122) and carbide with nickel binder (be sure that the operating fluid is compatible with

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Turbine Dimensions: mm (inch)

Model No.	A	B	C	D
FTB-13X1	76.2 (3)	34.29 (1.35)	30.48 (1.20)	½ NPT
FTB-13X2	76.2 (3)	34.29 (1.35)	30.48 (1.20)	½ NPT
FTB-13X3	76.2 (3)	34.29 (1.35)	30.48 (1.20)	½ NPT
FTB-13X4	76.2 (3)	34.29 (1.35)	30.48 (1.20)	½ NPT
FTB-13X5	76.2 (3)	39.37 (1.55)	35.56 (1.40)	1 NPT
FTB-13X6	76.2 (3)	39.37 (1.55)	35.56 (1.40)	1 NPT
FTB-13X7	76.2 (3)	54.61 (2.15)	49.53 (1.95)	1½ NPT
FTB-13X8	101.6 (4)	68.58 (2.70)	64.77 (2.55)	2 NPT

To Order

Model No.	Fittings NPT	Range LPM	GPM	Pulses Per Gallon	Output and Description
FTB-1501	½	0.3 to 1.5	0.08 to 0.4	125,000	Amplified square wave, 5 pin m12 connection
FTB-1502	½	1.1 to 11	0.3 to 3	48,000	
FTB-1503	½	3.4 to 34	0.9 to 9	15,000	
FTB-1504	½	6 to 60	1.6 to 16	10,500	
FTB-1505	1	6 to 60	1.6 to 16	10,500	
FTB-1506	1	11 to 121	3 to 32	1450	
FTB-1506A	1	11 to 121	3 to 32	2900	
FTB-1507	1½	19 to 200	5 to 53	800	
FTB-1508	2	49 to 757	13 to 200	100	
FTB-1511	½	0.3 to 1.5	0.08 to 0.4	4 to 20 mA industrial head electronics enclosure **M12 CONNECTOR** recommend (mating connector included)	
FTB-1512	½	1.1 to 11	0.3 to 3		
FTB-1513	½	3.4 to 34	0.9 to 9		
FTB-1514	½	6 to 60	1.6 to 16		
FTB-1515	1	6 to 60	1.6 to 16		
FTB-1515A	1	11 to 121	3 to 32		
FTB-1517	1½	19 to 200	5 to 53		
FTB-1518	2	49 to 757	13 to 200		

Accessories

Model No.	Description
DPF701	6-digit rate or total display

Comes complete with operator's manual and certificate. Certificate has no points and is not NIST.
*For a 5-point NIST certificate, add suffix **"-NIST"** to model number, for additional cost.*
***Ordering Examples: FTB-1501,** ½ male NPT turbine, 0.3 to 1.5 LPM (0.08 to 0.4 GPM) range with square wave frequency output and **DPF701,** ⅛ DIN digital panel LED display.*
***FTB-1313,** stainless turbine with linear 4 to 20 mA output, ½ NPT connections and a range of 3.4 to 34 LPM (0.9 to 9 GPM).*

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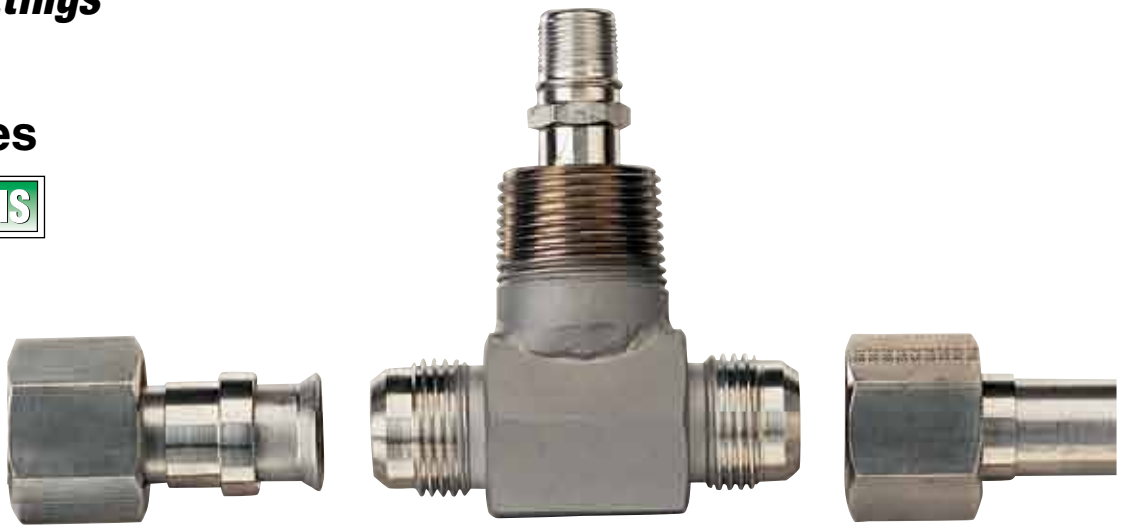
TURBINE FLOWMETERS

With 37° Flare Fittings

FTB-200 Series



FTB-201, turbine only. Mating 2-wire connector included (not shown) Shown smaller than actual size.

- **±0.5% of Reading Accuracy**
- **Ball Bearing Design for Economy**
- **Deflector Cones Stabilize Low Mass Rotor for Increased Bearing Life**

OMEGA's FTB-200 Series turbine meters have male flared-end fittings for easy connections. They are built to meet the performance requirements of MS33656, though they do not carry a military specification. These units come with a mating 2-wire connector and can be supplied with the integrally mounted signal conditioner to provide 4 to 20 mA, 0 to 5V, and factored pulse outputs.

Proper application of a turbine flowmeter requires that there be a suitable piping section both downstream and upstream of the meter if it is to achieve optimum accuracy. Whereas an inlet straight pipe run of 10 pipe diameters and an outlet straight pipe run of 5 pipe diameters provide the necessary flow conditioning in general, some applications require an upstream flow straightener. Such applications include custody transfer. A flow straightener consists of a section of piping which contains a suitably dimensioned and positioned thin walled tube cluster to eliminate fluid swirl. (See drawing on next page: Typical turbine meter installation).

Installation kits with the required up and downstream straight pipe lengths for proper turbine operation are available. Installation kits for turbine meters with 37° flare end fittings consist of two lengths of stainless steel tubing cut to a length appropriate for the upstream and downstream straight pipe runs and flared at one end. Mating sleeves and nuts are included. The kits can be conveniently butt-welded into the piping system. Flow straightening sections may be provided with the installation kit. Kits are available in tubing sizes from ½ to 2½".
See accessories chart on next page.

These turbine meters are intended for clean fluid service only; where there is any doubt concerning possible particulate impurities in the process fluid, strainers are recommended. A strainer/filter may be required to reduce the potential hazard of fouling or damage that can be caused by foreign matter. Pipe rouge, the extremely fine rust which develops on the inside of some piping, is a serious problem for turbine meters, due to the difficulty in filtering out these particles.

Consult the OMEGA Flow Engineering Department for applications that may entail pipe rouge. Minimum requirements for the FTB-200 Series turbine meters are, see chart below.

In addition, when using these units for fluids with viscosities other than 1 centistoke special calibrations and universal viscosity curves are available—consult OMEGA'S Flow Engineering Department.

SPECIFICATIONS

Accuracy: ±0.5% of reading
Repeatability: ±0.1% of reading
Temperature Range:
-268 to 232°C (-450 to 450°F)
Maximum Intermittent Overrange:
150% of maximum range
Materials of Construction:
Body: 304 SS
Rotor: 17-4 PH SS
Bearings: 440C SS
Installation Kits: 340 SS,
1.7 mm (0.065") thick
Electrical: Two-wire connector included
Maximum Pressure Drop:
0.34 bar (5 psi)

Meter Size	Mesh Size	Maximum Particle Size (inches)
¼ to ½"	100	0.0055
⅝ to 1¼"	70	0.008
1½ to 2½"	40	0.015

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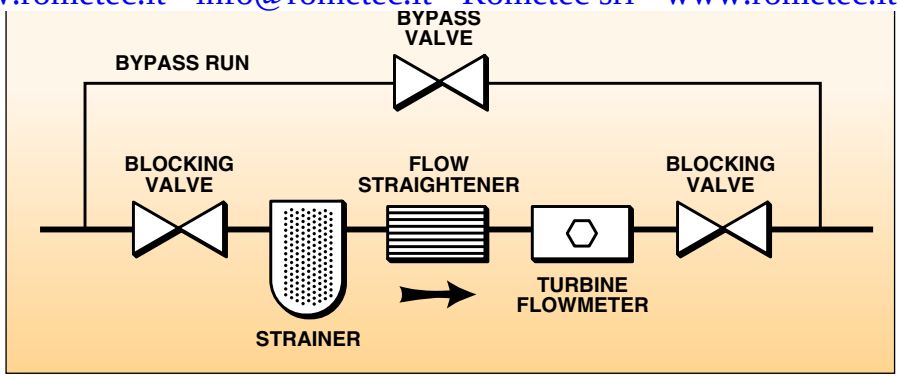
Typical turbine meter installation



To Order

Model No.	37° Flare Fitting	Linear Range Water (GPM)	Maximum Operating Pressure (psi)	Length mm (inch)	Nominal K Factors	Weight kg (lb)
FTB-201	¾-16 UNF-3A	0.35-3.5	5000	62 (2.45)	13,000	0.4 (1)
FTB-202	¾-16 UNF-3A	0.75-7.5	5000	62 (2.45)	10,000	0.4 (1)
FTB-203	¾-16 UNF-3A	1.25-9.5	5000	62 (2.45)	6000	0.4 (1)
FTB-204	⅞-14 UNF-3A	1.75-16	5000	70 (2.75)	4100	0.4 (1)
FTB-205	1 1/16-12 UNF-3A	2.5-29	5000	83 (3.25)	2200	0.4 (1)
FTB-206	1 5/16-12 UNF-3A	4-60	3500	89 (3.50)	640	0.9 (2)
FTB-207	1⅝-12 UNF-3A	6-93	3000	99 (3.88)	410	0.9 (2)
FTB-208	1⅞-12 UNF-3A	8-130	2250	111 (4.38)	230	1.4 (3)
FTB-209	2½-12 UNF-3A	15-225	1750	121 (4.75)	120	1.8 (4)

FTB-200 Series turbine with signal conditioner scaled and installed, choose system part number from the list below and replace the asterisk with the required signal conditioner part number from the list below.

Turbine System Model No.	Signal Conditioner Model No.	Signal Conditioner Description
SYS/FTB-201/(*)	—	—
SYS/FTB-202/(*)	**FLSC-34**	4 to 20 mA and Unscaled Pulse*
SYS/FTB-203/(*)	**FLSC-35B**	0 to 5 Vdc and Unscaled Pulse*
SYS/FTB-204/(*)	**FLSC-51B**	Scaled Squarewave Pulse (50 ms duration)*
SYS/FTB-205/(*)	**FLSC-C1-LIQ**	Loop powered signal conditioner, 4 to 20 mA*
SYS/FTB-206/(*)	**FLSC-C3-LIQ**	DC powered signal conditioner, 4 to 20 mA*
SYS/FTB-207/(*)	**FLSC-C3-AL-LIQ**	DC powered signal conditioner, 4 to 20 mA with alarm*
SYS/FTB-208/(*)	—	—
SYS/FTB-209/(*)	—	—

Comes complete with 10-point NIST calibration certificate for 1 cSt (for water) and operator's manual.
NIST certification is for turbine meters, signal conditioners do not come with a NIST traceable certificate.
** For details on the signal conditioners, visit us online.*
***Ordering Examples: SYS/FTB-202/FLSC-C1-LIQ,** scaled and assembled system includes 0.75 to 7.5 GPM range turbine flow meter and loop powered signal conditioner with 4 to 20 mA output.*
***SYS/FTB-206/FLSC-C3-AL-LIQ,** scaled and assembled system includes 4 to 60 GPM range turbine flowmeter and DC powered signal conditioner with 4 to 20 mA output and alarm.*

Accessories

Model No.	Description	Inlet Length mm (inch)	Outlet Length mm (inch)
FTB-K3	**Flare kit (2 pieces) for FTB-201, 202, 203**	254 (10")	127 (5")
FTB-K4	**Flare kit (2 pieces) for FTB-204**	254 (10")	127 (5")
FTB-K5	**Flare kit (2 pieces) for FTB-205**	254 (10")	127 (5")
FTB-K6	**Flare kit (2 pieces) for FTB-206**	254 (10")	127 (5")
FTB-K7	**Flare kit (2 pieces) for FTB-207**	356 (14")	152 (6")
FTB-K8	**Flare kit (2 pieces) for FTB-208**	432 (17")	203 (8")
FTB-K9	**Flare kit (2 pieces) for FTB-209**	533 (21")	229 (9")

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ECONOMICAL FLOW RATE SENSORS

FTB2000 Series

1 YEAR WARRANTY

- Low Cost
- High Accuracy (±3% of Reading)
- Measures Low Liquid Flow Rates of 0.13 to 7.9 GPM
- FDA-Approved Materials
- Lightweight Plastic Design Permits Mounting in Any Position

Both shown larger than actual size.

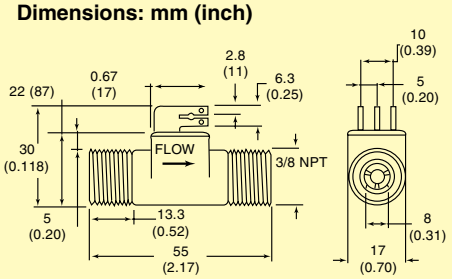
FTB2001-C

FTB2001

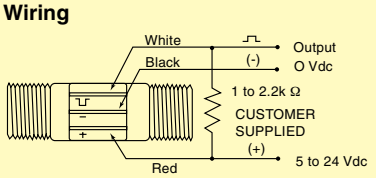
DPF700 Series compatible meter, shown smaller than actual size.

The FTB2000 Series hall-effect turbine flow rate sensors are ideal for OEM applications involving low-flow liquid monitoring. The low cost, coupled with ½% repeatability, makes it suitable for replacing dispensing timer systems. Unlike traditional timing systems, turbine technology is not influenced by changes in system pressure caused by aging filters. The sensor's standard power and output specifications make it easy to retrofit to existing controllers.

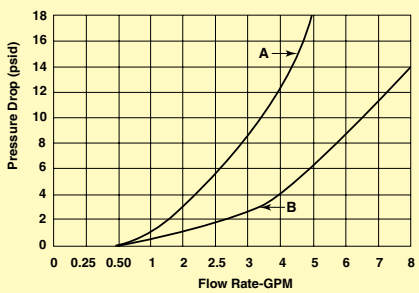
Dimensions: mm (inch)



Wiring



Pressure Drop—Typical



Tests conducted with water at 20°C (68°F)

A) All Others B) FTB2004, FTB2005

SPECIFICATIONS

Wetted Materials

Body: Nylon 12
Turbine: Nylon 12 composite
Accuracy: ±3% of reading
Repeatability: 0.5% FS
Bearings: PTFE/15% graphite
Operating Pressure: 200 psig
Operating Temperature: -20 to 100°C (-4 to 212°F)
Viscosity: 32 to 81 SSU (0.8 to 16 centistokes)
Filter: <50 microns
Input Power: 5 to 24 Vdc @ 8 mA
Output: NPN sinking open collector @ 50 mA maximum (1 to 2.2 kΩ pull-up resistor required) (Hz output)
Electrical Connection: Spade terminals 2.8/6.3 x 0.8 mm (0.110/0.248 x 0.031")
Inlet/Outlet Ports: ⅜ MNPT
Cable: 1 m (3') (-C models)

To Order

⅜ NPT		Flow Range		Pulses per		Frequency Output
Model No.	Model No.	GPM	LPM	Gallon	Liter	
FTB2001	FTB2001-C	0.13 to 1.3	0.5 to 5	26200	6900	58 to 575 Hz
FTB2002	FTB2002-C	0.26 to 2.7	1 to 10	12500	3300	55 to 550 Hz
FTB2003	FTB2003-C	0.13 to 2.0	0.5 to 7.5	17400	4600	38 to 575 Hz
FTB2004	FTB2004-C	0.26 to 4.0	1 to 15	8300	2200	37 to 550 Hz
FTB2005	FTB2005-C	0.26 to 6.6	1 to 25	3800	1000	16.7 to 416 Hz
FTB2006	FTB2006-C	0.53 to 9.2	2 to 35	2840	750	25 to 437 Hz

Accessories (For units without integral cable)

Model No.	Description
FTB173941	Mating connector with 0.9 m (3'), 3-conductor, PVC pigtail leads
FTB173942	Mating connector with 3 m (10'), 3-conductor, PVC pigtail leads

Comes complete with operator's manual.

***Ordering Example: FTB2002,** turbine meter, plus **FTB173942,** mating connector with 3 m (10') cable.*

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FTB3001

- Patented Toothless Oval Gear Design
- High Accuracy
- Compact Design
- High-Resolution Electronic Output
- Temperatures to 176°C (350°F)
- Pressure Rated to 3000 psig
- Multiple Bearing Options
- 316 Stainless Steel Construction
- No Special Gears Needed for High Viscosity
- Linearity Unaffected by Viscosity Changes
- 1 MNPT End Fitting
- 150 or 300# Flange Fittings Available

FTB3002 shown smaller than actual size.

The oval-shaped smooth gears in the FTB-3000 Series are used to displace a precise volume of fluid, which is passed through the measurement chamber during each revolution. The toothless design, working with the fluid being measured, provides a complete viscous seal within the measuring chamber. This sealing effect provides for greater flow measurement accuracy.

The displacement of the fluid is translated via a magnetic or Hall effect pick-up into a pulse output that is proportional to the flow.

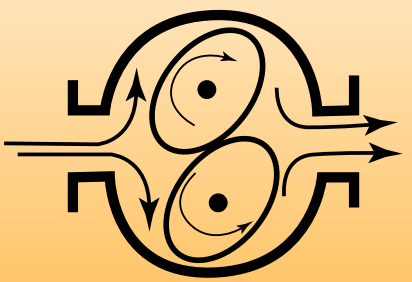
The unique design of the FTB-3000 oval gear meter incorporates two smooth (toothless) oval gears positioned 90 degrees out of phase. The measurement gears are held together by two timing gears. The standard meter contains no seal between the measurement chamber and the timing chamber. The timing gears have a pitch diameter equal to the outside diameter of the measurement gears. The flow through the meter measurement chamber follows the path of least resistance. Therefore, no liquid passes through the center cavity between the measurement gears.

The fluid is displaced from the inlet to the outlet via the area between the smooth oval gear and the inner diameter of the meter housing.

Conventional oval gears have teeth that mesh. One of the advantages of smooth oval gears is that the viscous flow does not get trapped or squeezed between the gears. Typically, oval gears need to have cuts made in the teeth to allow high viscosity fluids to pass. These cuts result in a decrease in accuracy.

Toothless Gears

As shown below, the oval-shaped toothless gears sweep out a precisely known volume of fluid passing through the measurement chamber during each rotation.



To Order

Model No.	Flow Rate	Sensor
FTB3001	2 to 25 GPM	Magnetic pick-up
FTB3002	0.02 to 25 GPM	Hall effect, 6 to 24 Vdc

Accessories

Model No.	Description
U24Y101	24 Vdc power supply

Comes complete with operator's manual and 10-point NIST calibration certificate.
To order with flange fittings, consult Flow Engineering.
***Ordering Examples: FTB3002,** hall effect sensor.*
***FTB3001,** magnetic pick-up sensor.*

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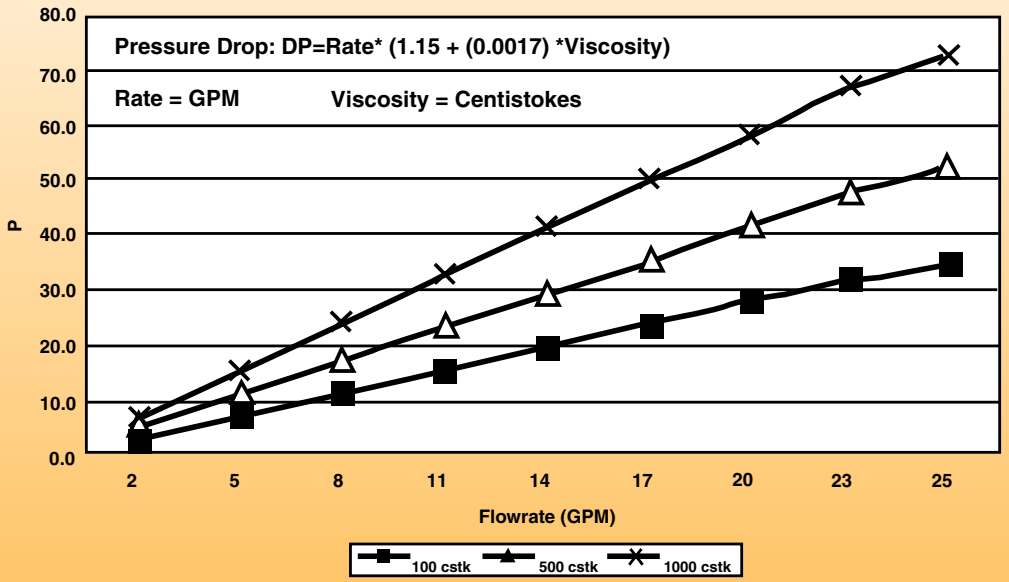
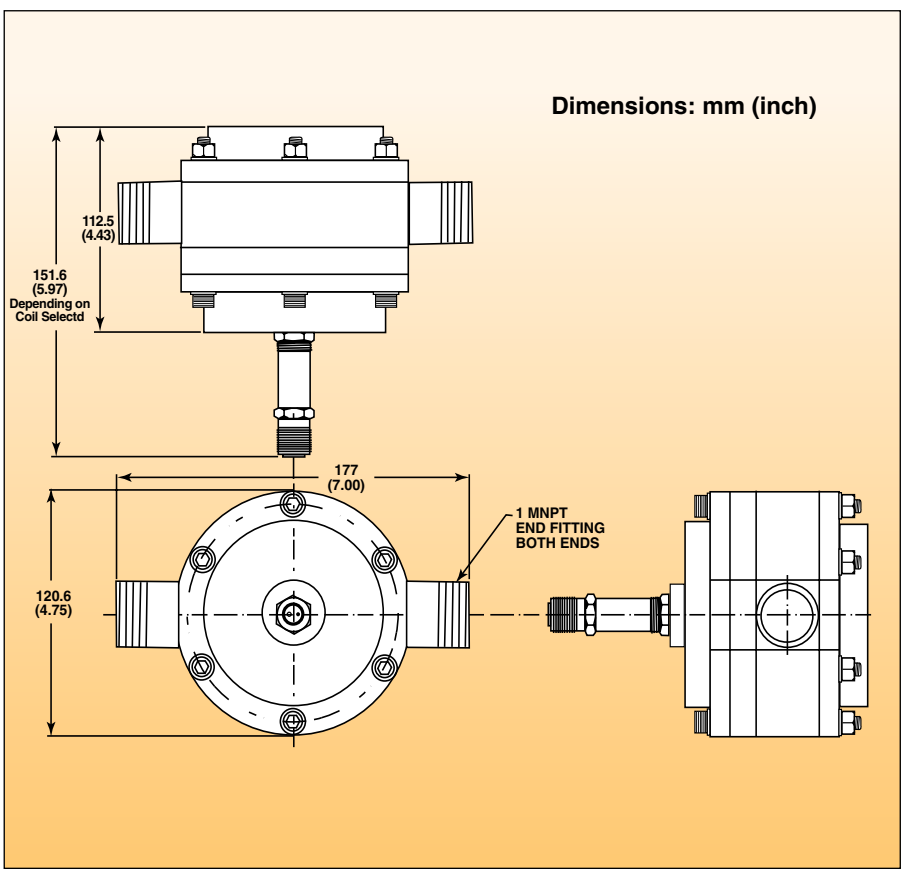
FOR HIGH VISCOSITY FLUIDS GREATER THAN 100 CENTISTOKES

Test Results from Independent Lab



SPECIFICATIONS

Service Fluid: Clean liquids, maximum particle size 3.175 mm (0.125")
Accuracy: ±0.25% of reading
Viscosity: 100 cSt or greater
Repeatability: ±0.05%
Operating Temperature:
FTB3001: -240 to 176°C (-400 to 350°F)
FTB3002: -40 to 150°C (-40 to 302°F)
Operating Pressure: 3000 psig standard
Wetted Parts: 316 SS body and gears with PEEK™ gear seats
Bearings: Shielded, self-lubricating 440 SS ball bearings
Connections: 1 MNPT
Pick Up Coil: Magnetic type or Hall Effect (6 to 24 Vdc power)
Calibration: Ten-point calibration traceable to NIST @ 100 centistokes
Weight: 7.53 kg (16.6 lb)



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FTB300 Series

1 YEAR WARRANTY RoHS

- NEMA 4X (IP56) Enclosure
- For Clean Liquids

FTB321D shown smaller than actual size.

The FTB300 Series of digital paddle wheels are an economical choice for low flow rate applications. They use Infra-red light beam technology. Available connections include ⅛ FNPT, ¼ FNPT and ⅜" OD tube fittings. Six available flow ranges as low as 30 mL/min to 7000 mL/min. Models without a display have a 5 Vdc current sinking pulse output.

All units include an open collector alarm output.

Units have a PVDF chemical resistant lens.The enclosure is weather resistant Valox® PBT and is rated NEMA 4X (IP56).

F

SPECIFICATIONS

Maximum Working Pressure:

PVDF Lens
150 psig (10 bar) @ 21°C (70°F)

Maximum Fluid Temperature:

PVDF Lens Tubing Connectors:
93°C (200°F) at 0 psi

Accuracy: ±6% FS
Power: 120 Vac (transformer prewired)
Sensor Type: Infrared light beam
Alarm Output: Open collector 30 Vdc maximum
Enclosure: NEMA 4X (IP56)
Shipping Wt: 0.45 kg (1 lb)

Materials of Construction
Body, Paddle, Axle Material: PVDF
Connector Material

Tubing Connectors: PVDF
Viewing Lens Material Opaque Chemical Resistant: PVDF

O-Ring Seals: FKM (EPDM optional)
Compression Seal to Pump: PVC

Sensor Only
Models: 5 Vdc digital square wave (2-wire)
Output: 3-wire shielded cable, 1.8 m (6')

To Order

Sensor Model No. (no display)			Range	
⅛ FNPT	¼ FNPT	⅜" OD Tube	L/min	GPH
FTB311	FTB321	FTB331	0.03 to 0.3	0.48 to 4.7
FTB312	FTB322	FTB332	0.1 to 1	1.6 to 15.8
FTB313	FTB323	FTB333	0.2 to 2	3.2 to 31.7
FTB314	FTB324	FTB334	0.3 to 3	4.8 to 48
FTB315	FTB325	FTB335	0.5 to 5	7.9 to 79
FTB316	FTB326	FTB336	0.7 to 7	11.1 to 111

Comes complete with inlet strainer and operator's manual.

*For EPDM O-rings add suffix **"-EPDM"** to model number, no additional charge.*
*For European style power supply (220V50Hz) add suffix, **"-EU"** to model number, for additional cost.*
*For US 230V 60 Hz power supply, add suffix **"-230V"** to model number, for additional cost.*
***Ordering Examples: FTB323D,** micro-flow meter, 0.2 to 2 L/min range, ¼ FNPT connections. **FTB331D,** micro-flow meter, 0.03 to 0.3 L/min range, ⅜" OD tube connections.*

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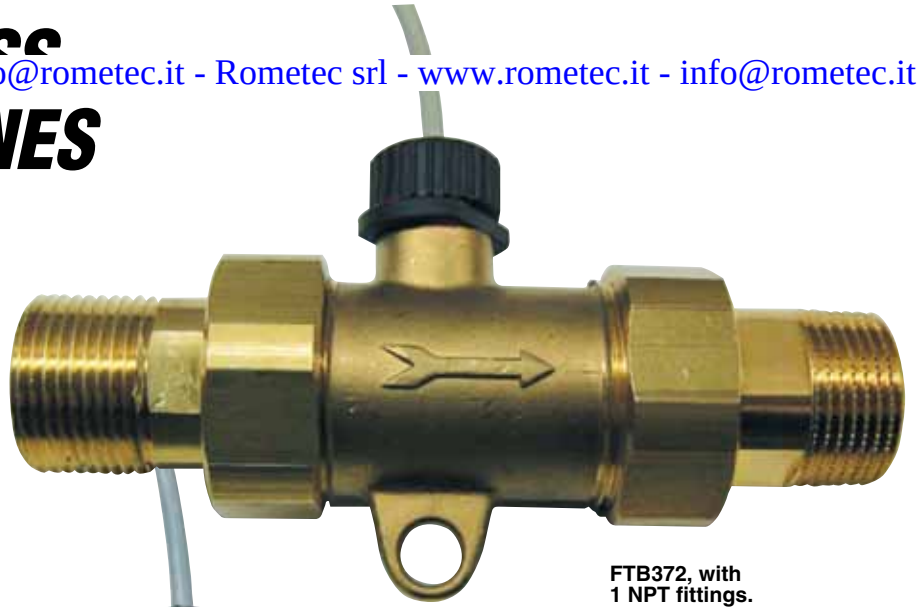
DURABLE BRASS WATER TURBINES

FTB370 Series

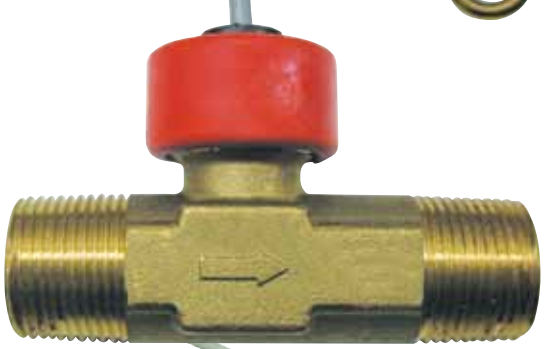
1 YEAR WARRANTY

- Compact Design
- Wide Turn Down Ratio
- High Quality Sapphire Bearing
- Fixed Pulse Rate
- NEMA 3 (IP54)
- Economical
- Uniform Bearing Load Design Minimizes Bearing Wear



FTB372, with 1 NPT fittings.

All models shown smaller than actual size.



FTB371, with ¾ NPT fittings.

FTB373, with 1½ NPT fittings.

The FTB370 Series flow turbines are designed for flow rate measurement of water and many water based liquids. They are compact in design and have a wide measuring range. The liquid flowing into the FTB370 series is divided by guiding blades into four split streams. The uniform loading of the bearings from four sides causes the forces to cancel themselves out and wear gets reduced to a minimum. The extremely hard bearing materials also ensure an extraordinary life expectancy.

SPECIFICATIONS

Accuracy: ±3% of reading
Repeatability: ±0.5%
Output: NPN open collector (hall effect)
K-Factor [Pulses/Liter (Gallon)]:
FTB371: 869 (3289)
FTB372: 68 (258)
FTB373: 27 (102)
Maximum Temperature:
85°C (185°F) [at 0.689 bar (10 psi)]
Maximum Pressure:
9.997 bar (145 psi) [at 29.4°C (85°F)]
Power Supply:
5 to 24 Vdc (20 mA maximum)
Cable: 1.5 m (5'), integral
Protection: NEMA 3 (IP54)
Maximum Particle Size:
0.508 mm (0.02")
Wetted Materials
Brass Body: CW602N
Sensor Housing: Polypropylene Noryl®, GFN1630V
Magnets: Recona 28 nickel-plated
Rotor: Polypropylene Noryl®, GFN1520V
O-Ring: EPDM
Bearings: Sapphire/PA
Shaft:
FTB371: Arcap AP1D
FTB372: 316 SS
FTB373: SS904L

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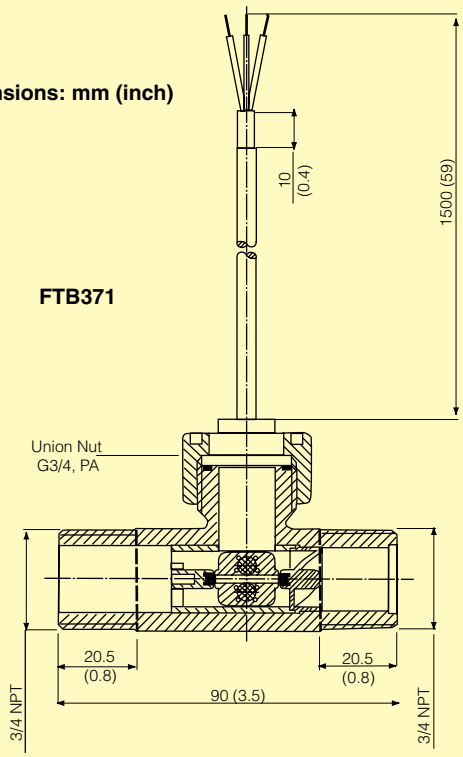
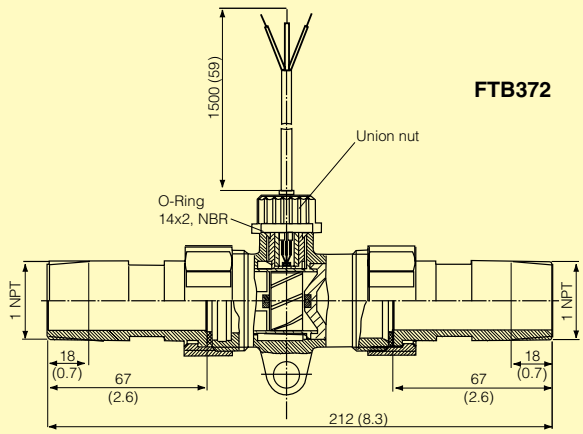
DPF700 Series shown smaller than actual size.

Dimensions: mm (inch)

FTB371

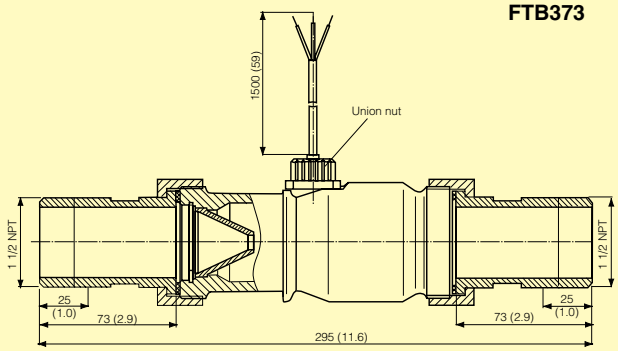


FTB372



Dimensions: mm (inch)

FTB373



Dimensions/Range

Model No.	Fittings NPT	Length mm (inch)	Diameter mm (inch)	Height mm (inch)	Range LPM (GPM)
FTB371	¾	90 (3.5)	38 (1.5)	58 (2.3)	1.9 to 39.4 (0.5 to 10.4)
FTB372	1	203 (8.0)	51 (2.0)	89 (3.5)	4.2 to 158 (1.1 to 41.6)
FTB373	1½	292 (11.5)	76 (3.0)	89 (3.5)	50 to 416 (13.2 to 110)

To Order

Model No.	Description	K-Factor PPG (PPL)	Maximum Flow LPM (GPM)	Pressure Dropout Maximum Flow BAR (PSI)
FTB371	¾ NPT brass water turbine	3289 (869)	39.4 (10.4)	2.2 (32)
FTB372	1 NPT brass water turbine	258 (68)	158 (41.6)	0.45 (6.5)
FTB373	1½ NPT brass water turbine	102 (27)	416 (110)	1.8 (26)

Accessories

Model No.	Description
DPF701	6-digit rate or total display

Comes complete with operator's manual and 1.5 m (5') cable.

Ordering Example: FTB371, *¾ NPT brass water turbine,* ***DPF701,*** *6-digit rate or total display.*

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With Local Digital Display

NEW

FTB380 Series

1 YEAR WARRANTY · CE · FM APPROVED · RoHS

FTB383

- **Indicates Both Rate and Total**
- **Up to 1.5% Reading Accuracy**
- **6-Digit Display**
- **Signal Output Capabilities**
- **Reads GPM or LPM (Field Selectable)**
- **Battery Operated (Included)**

FTB380 Series turbine meters with microprocessor-based electronics offers a durable, compact, high-precision fuel measurement device, with total and rate indication. Information is clearly displayed on a large 6-digit liquid crystal display with only 2-point floating decimal for totals from 0.01 to 999,999. All operations are easily performed with only 2 buttons.

The basic unit and display are powered by 2 lithium batteries, providing up to 4000 hours of use. Automatic "on" and "off" extend battery life. Manual "on" allows view of the display on demand. Cumulative total, batch total, and rate of flow are standard. A single-point field calibration curve can be stored in memory.

The turbine meter can also be ordered without display electronics. A special pulse output model (FLSC790-P-ND) must be ordered to obtain an open collector current sinking output operated on 9 to 35 Vdc. The output is a square wave pulse with a 3-wire connection.

Accessories for Turbine Meters with the Display

The FLSC790-90D is a 90° mounting adaptor designed to allow displays to be mounted 90° from the standard position.

SPECIFICATIONS

Accuracy:
A109GMA025NA1: ±5% rdg
A109GMA100NA1 , A109GMA200NA2 : ±1.5% rdg
Repeatability:
A109GMA025NA1: ±1%
A109GMA100NA1 , A109GMA200NA2: ±0.2%

Pressure Rating: 300 psig (21 bar)
With Remote Electronics Kit: -40 to 121°C (-40 to 250°F)
Temperature Range (Without Remote Electronics): -10 to 60°C (14 to 140°F)
Viscosity: Rated accuracy for fuels or fluids with viscosity of (1 cSt); meters with display can be used for fluids up to 100 cSt with field calibration
Wetted Components:
Housing: Aluminum
Journal Bearings: Ceramic (96% alumina)
Shaft: Tungsten carbide
Rotor and Supports: Nylon
Retaining Rings: 316 SS
Display: 6-digit LCD indicates flow rate, batch and cumulative total
Battery Life: 4000 hours
FM Approvals: Turbine meters with display and no accessories are FM approved for Class 1, Div. 1 hazardous environments

Note: *Other outputs and accessories are not designed for hazardous environments.*

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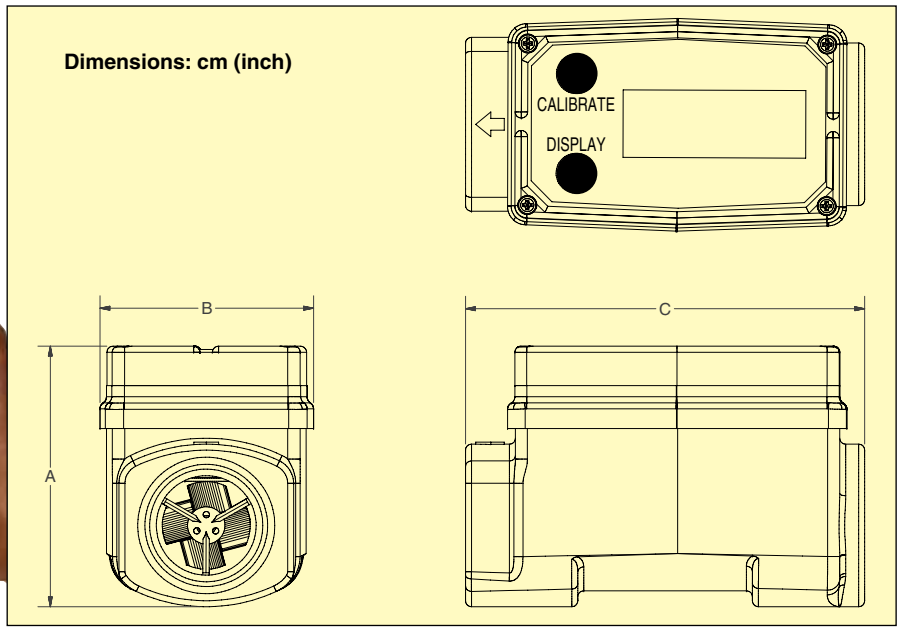
FTB385



Dimensions

Models	FTB381, FTB383	FTB385
Size	1"	2"
A = Height*	6.3 cm (2.5")	11.4 cm (4.25")
B = Width	5.1 cm (2.0")	7.6 cm (3.0")
C = Length	10.1 cm (4.0")	15.2 cm (6.0")

** Height includes 1.8 cm (0.7") for the computer electronics.*

To Order *Visit omega.com/ftb380 for Pricing and Details*

Model No.	Description	Range GPM (LPM)	FNPT Size	Typical K-Factor Pul/Gal	Recommended Strainer Size	Shipping Weight kg (lb)
A109GMA0 -25NA1	Aluminum turbine low flow with display	0.3 to 3 (1 to 11)	1*	2200	55 mesh	0.61 (1.35)
A109GMA10 -0NA1	Aluminum turbine mid-range with display	3 to 50 (11 to 190)	1*	730	28 mesh	0.61 (1.35)
A109GMA2 -00NA2	Aluminum turbine high flow with display	30 to 300 (114 to 1135)	2	72	28 mesh	1.36 (3.0)
A1XXXXA0 -25NB1	Aluminum turbine low flow, no display	0.3 to 3 (1 to 11)	1*	2200	55 mesh	0.61 (1.35)
A1XXXXA -100NB1	Aluminum turbine mid-range, no display	3 to 50 (11 to 190)	1*	730	28 mesh	0.61 (1.35)
A1XXXXA -200NB2	Aluminum turbine high flow, no display	30 to 300 (114 to 1135)	2	72	28 mesh	1.36 (3.0)

** For units with BSPP threads add "**-BSPP**" to model number, no additional cost.*

Field Installable Options and Accessories

Model No.	Description
FLSC790-P-ND	Pulse output for models without displays ("-ND" suffix); open collector output
FLSC790-90D	90° display mounting adaptor

Comes complete with operator's manual.
***Ordering Examples: A109GMA025NA1,** 1 FNPT aluminum turbine for 0.3 to 3 GPM.*
***A1XXXXA100NB1,** 1 FNPT aluminum turbine for 3 to 50 GPM.*

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FTB-400A Series

- Compliant with the ASME Bioprocessing Equipment Standard BPE-2019
- Sizes Available, from 1/4 to 3"
- Flow Rates from 0.35 to 650 GPM
- Suitable For Cleaning Out Of Place (COP).

The Omega FTB400-Series Sanitary Design Turbine Flowmeter is designed and manufactured to be compliant with the ASME Bioprocessing Equipment Standard BPE-2019 for measurement of process liquids where high sanitary standards are required. ASME-BPE-2019 is the leading Standard on how to design and build equipment used in the production of biopharmaceuticals. This series includes 11 sizes, ¼" to 3" with standard Tri-Clamp™ fittings, covering flow rates for 0.35 to 650 GPM.

FTB-406A, shown smaller than actual size.

Use the FTB-400A Series turbine flow meter with the DPF701 Series flow indicator.

SPECIFICATIONS

Accuracy & Linearity:
±0.5% of reading or better
Repeatability:
±0.1% of reading or better
Temperature Range:
-268 to 232°C (-450 to 450°F)
Signal Output:
10 mV rms or greater into a 10 kΩ load at minimum flowrate

Materials of Construction: 316 SS except as noted below:
Rotor: 17-4 PH SS
Retaining Rings: 15-7 MO PH SS
Bearings: Hard carbon composite

For compatible meters; DPF701, DPF402, DPF70 with FLSC-AMP, DPF10, FC20, 21, 22, visit OMEGA

To Order

Model No.	Tri-Grip™ Size (inch)	Flow meter Size (inch)	Linear Flow Range (US GPM)	Length mm (inch)	Nominal K-Factor (pulses/gal)	Weight kg (lb)
FTB-401A	1½	¼	0.35 to 3.5	90 (3.56)	15000	1.4 (3)
FTB-402A	1½	⅜	0.75 to 7.5	90 (3.56)	8900	1.4 (3)
FTB-403A	1½	½	1.25 to 9.5	90 (3.56)	5800	1.4 (3)
FTB-404A	1½	⅝	1.75 to 16	90 (3.56)	5200	1.4 (3)
FTB-405A	1½	¾	2.5 to 29	83 (3.25)	2200	1.4 (3)
FTB-406A	1½	1	4 to 60	90 (3.56)	840	1.4 (3)
FTB-407A	1½	1¼	6 to 93	117 (4.59)	400	2.3 (5)
FTB-408A	1½	1½	8 to 130	117 (4.59)	230	2.7 (6)
FTB-409A	2	2	15 to 225	154 (6.06)	120	3.2 (7)
FTB-410A	3	2½	25 to 400	254 (10.00)	95	3.6 (8)
FTB-411A	4	3	40 to 650	254 (10.00)	45	4.5 (10)

Comes complete with operator's manual and 10 point NIST calibration certificate.
***Ordering Examples: FTB-406A,** 1" flow meter with 1½" clamp size, 4 to 60 GPM flow rate.*
***FTB-402A.** ⅜" flow meter. with 1½" clamp size. 0.75 to 7.5 GPM flow rate.*

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For Water Totalization

FTB-4105A

1 YEAR WARRANTY CE

For remote rate indication for units with high-frequency pulse output.

FTB-4105A shown smaller than actual size.

- **For Water Flows from 0.13 to 132 GPM**
- **Scaled Pulse Output Available for Remote Totalization**
- **For Hot or Cold Water Applications**
- **Up to ±1.5% of Reading Accuracy**

Designed for water billing applications, OMEGA's FTB-4100A flowmeters are highly accurate and feature tamper-resistant, non-resettable totalizers. The large faces are easy to read.

Optional reed relay scaled pulse outputs allow for remote totalization [1.8 m (6') of cable included]. The pulse output option is factory installed and must be requested at the time of order.

All FTB flowmeters feature built-in strainers and trickle flow indication and come with locking nuts and coupling pieces.

SPECIFICATIONS

Accuracy: From 10% of continuous to maximum flow: ±1.5% of reading; below 10% of continuous flow: ±2% of reading
Power for Pulse Output: 6 to 16 Vdc
Maximum Temp: 90°C (200°F)
Maximum Pressure: 150 psi
Pulse Outputs (Reed Relay):
FTB-4100A-P Series: 1 gal/pulse (for remote totalization only)
Maximum Reading (Gallons): 10 million for ½ and ¾"; 100 million for 1, 1¼, and 1½"
Wetted Parts: Brass body, stainless steel polyimide (fiberglass), polypropylene, EPDM O-ring
Installation Requirements: 10 pipe diameters upstream, 5 downstream
Mounting: Horizontal mounting required for 1, 1¼, and 1½" models; vertical mounting for ½ and ¾" sizes only
Compatible Meter: DPF70

To Order

Model No.	Flow Rate (GPM) Min	Cont.	Max	Conn. MNPT	Body Length mm (inch)	NPT Length mm (inch)	Height mm (inch)	Width mm (inch)	Press. Drop*	Weight kg (lb)	Max Temp °C (°F)
FTB-4105A	0.13	6.6	13	½	110 (4.33)	60 (2.36)	70 (2.75)	70 (2.75)	3.6	0.5 (1.1)	93 (200)
FTB-4105A-P	0.13	6.6	13	½	110 (4.33)	60 (2.36)	70 (2.75)	70 (2.75)	3.6	0.5 (1.1)	93 (200)
FTB-4107A	0.22	11	20	¾	130 (5.12)	63 (2.48)	77 (3.03)	70 (2.75)	3.6	0.6 (1.4)	93 (200)
FTB-4107A-P	0.22	11	20	¾	130 (5.12)	63 (2.48)	77 (3.03)	70 (2.75)	3.6	0.6 (1.4)	93 (200)
FTB-4110A	0.5	26.4	50.0	1	260 (10.24)	67 (2.64)	140 (5.51)	92 (3.62)	3.6	2.5 (5.5)	93 (200)
FTB-4110A-P	0.5	26.4	50.0	1	260 (10.24)	67 (2.64)	140 (5.51)	92 (3.62)	3.6	2.5 (5.5)	93 (200)
FTB-4112A	0.5	26.4	50.0	1¼	260 (10.24)	73 (2.87)	140 (5.51)	92 (3.62)	3.6	2.5 (5.5)	93 (200)
FTB-4112A-P	0.5	26.4	50.0	1¼	260 (10.24)	73 (2.87)	140 (5.51)	92 (3.62)	3.6	2.5 (5.5)	93 (200)
FTB-4115A	0.8	44.0	90.0	1½	300 (11.81)	73 (2.87)	140 (5.51)	120 (4.72)	3.6	5.4 (12.0)	93 (200)
FTB-4115A-P	0.8	44.0	90.0	1½	300 (11.81)	73 (2.87)	140 (5.51)	120 (4.72)	3.6	5.4 (12.0)	93 (200)
FTB-4120A	1.3	66.0	132.0	2	270 (10.63)	ANSI 150# Flange	226 (8.90)	155 (6.10)	2.9	12.4 (27.0)	90 (194)
FTB-4120A-P	1.3	66.0	132.0	2	270 (10.63)		226 (8.90)	155 (6.10)	2.9	12.4 (27.0)	90 (194)

*Models with suffix "**P**" are for reed relay pulse output, for remote totalization only. ½ to 1½" have NPT connections; the 2" meters have flanged connections.*

** Pressure loss is at continuous flow rate. ** Consult Flow Engineering Department.*

Comes with complete operator's manual.

***Ordering Examples: FTB-4105A-P**, pulse output meter with minimum flow rate of 0.13 GPM and maximum flow rate of 13.0 GPM, maximum water temperature 90°C (200°F).*

***FTB-4115A**, pulse output meter with minimum flow rate of 0.8 GPM and maximum flow rate of 90.0 GPM, maximum water temperature 93°C (200°F).*

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FTB4705 shown smaller than actual size.


FTB4805 shown smaller than actual size.

FTB4700 Series

1 YEAR WARRANTY CE RoHS

- **Square-Wave Output**
- **One Moving Part**
- **Rugged, Nickel-Plated Brass Body or 316 SS**

The FTB4700 Series comprises plated brass meters that are ideal for water applications, with ranges from 0.2 to 18 GPM. The FTB4800 covers a wide flow range and is housed in a rugged stainless steel package. Single-jet simplicity, combined with high-quality jewel bearings, results in long life and relatively high tolerance to harsh fluids. Typical applications include chemical batching, proportional chemical injection, fertilizer injection, proportioning of spray chemicals, and general flow rate monitoring.

The FTB4700 is available with ½ and ¾" threads, with union-type meter couplings. The FTB4800 is available with ½, ¾ and 1" threads. A square-wave output makes these meters ideal for many OEM control applications. This signal interfaces easily with programmable logic controllers and computer input boards. The FTB4700 or FTB4800 Series meters can be combined with the DPF701-A panel flow meter for reading flow rate or total flow, with 4 to 20 mA output.

SPECIFICATIONS

Accuracy: ±1% FS
Maximum Temperature:
FTB4700: 85°C (185°F)
FTB4800: 93°C (200°F)
Maximum Pressure:
FTB4700: 12 bar (175 psi)
FTB4800: 35 bar (500 psi)
Output: Squarewave
Power:
FTB4700: 5 to 30 Vdc
FTB4800: 6 to 24 Vdc
Maximum Current: 20 mA

Cable:
FTB4700: #22 AWG 3-conductor, 3.7 m (12')
FTB4800: #22 AWG 3-conductor, 5.5 m (18')
Maximum Cable Run: 610 m (2000')
Maximum Pressure Drop: 15 psig

Dimensions: mm (inch)

Model No.	Overall Length	Height	Width
FTB4705	254 (10.0)	40 (1.56)	69 (2.7)
FTB4707	259 (10.2)	40 (1.56)	69 (2.7)
FTB4805	104 (4.1)	51 (2.0)	51 (2.0)
FTB4807	104 (4.1)	51 (2.0)	51 (2.0)
FTB4810	127 (5.0)	51 (2.0)	51 (2.0)

Materials

	FTB4700	FTB4800
Body	Nickel-plated brass	316 SS
Rotor Chamber	Brass	Rotor cover: 316 SS
Rotor	Thermoplastic	PVDF
Shaft	Tungsten carbide	Nickel-bonded tungsten carbide
Bearings	Water cooled thermoplastic	Ruby ring and ball
O-Ring	–	TFE-coated FKM

To Order

Model No.	K Factor (Pulses/Gal)	Description
FTB4705	550	½ MNPT, 0.2 to 10 GPM
FTB4707	330	¾ MNPT, 0.2 to 18 GPM
FTB4805	535	½ FNPT, 0.1 to 10 GPM, 316 SS body
FTB4807	390	¾ FNPT, 0.2 to 15 GPM, 316 SS body
FTB4810	220	1 FNPT, 0.5 to 25 GPM, 316 SS body

Accessories

Model No.	Description
DPF701	⅛" DIN panel meter, visit **omega.com/dpf700** for more details

FTB4700 Series comes complete with 3.7 m (12') cable with 2 NPT couplings and operator's manual. FTB4800 Series comes complete with 5.5 m (18') sensor cable and operator's manual.

***Ordering Examples: FTB4705,** 0.2 to 10 GPM.*
***FTB4807.** 0.2 to 15 GPM. **DPF701.** panel meter.*

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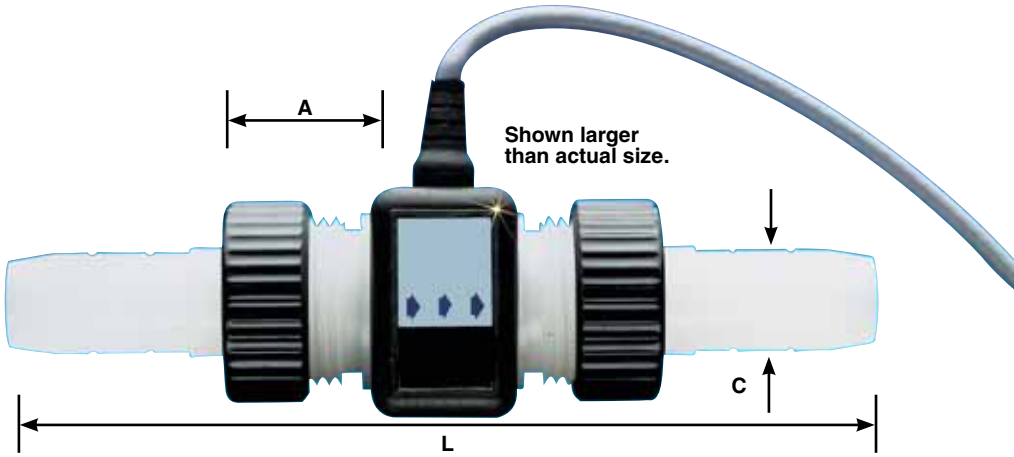
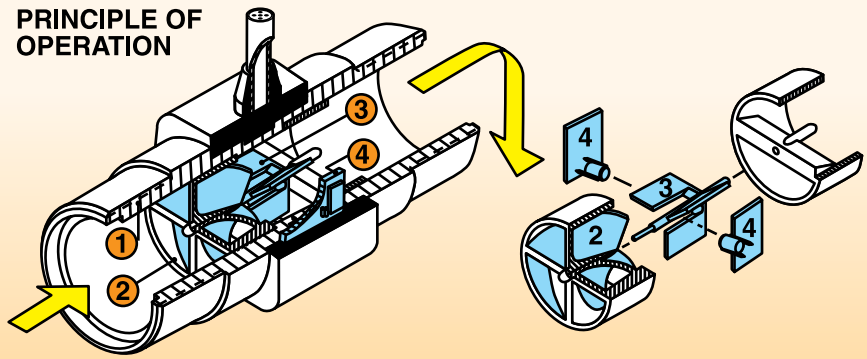
FTB600B Series

1 YEAR WARRANTY RoHS

- ±1% of Reading Accuracy
- Six Flow Ranges, from 0.1 to 120 LPM
- No Flow Straightening Needed
- Turn Down Up to 30:1
- Easily Mounts in Any Position
- Hose Barb or Threaded Connections



Please refer to ordering chart below for specific unit dimensions.



Principle of Operation
1 Fluid first passes through helical nozzle
2 This causes the flow to spiral, rotating in a helical pattern
3 The spiraling fluid hits the flat blade rotor, causing it to spin
4 An infrared, electro-optical transmitter and receiver provide a square wave electronic output signal

Principle of Operation

The OMEGA® FTB600B Series Flowmeters feature an infrared, electro-optical transmitter and receiver molded into the flowmeter's body, along with two miniature circuit boards to provide voltage stabilization and automatic IR output level control. The FTB600B automatically compensates IR light intensity for varying fluid opacity levels to ensure a strong square wave output signal. The flowmeter is suitable for clear, transparent and translucent fluids which must transmit infrared light. (Note: Not suitable for use with red liquids). The design of the FTB600B inherently bleeds off entrained gas, thereby improving overall accuracy. This flowmeter can be easily mounted into any position for greater system design flexibility, also saving time and installation costs. A strainer is included in models FTB602B through FTB606B.

SPECIFICATIONS

Accuracy: ±1% of reading
Repeatability: ±0.1% of reading
Viscosity Range: 1 to 15 cSt
Working Pressure: 150 psig at 79°C (175°F)
Maximum Pressure Drop @ Maximum Flow: @30 psi on all units (6.5 psi on FTB601)
Ambient Temperature: -40 to 85°C (-40 to 185°F)
Wetted Parts: PVDF (polyvinyldene fluoride) FKM O-rings (O-rings are not wetted on NPT units)
Power Supply: 8 to 24 Vdc, 6 to 33 mA
Output Signal: Square wave pulse
Cable Length: 0.9 m (3')

To Order

Model No.	Flow Range (LPM)	Dimensions mm (inch)			K Factor	"-T" Option	
		A	L	C	Pulses/ Liter	NPT Size	Length mm (")
FTB601B	0.1 to 2	9 (0.35)	96 (3.8)	6.9 (0.27)	36000	¼	39 (1.5)
FTB602B	0.3 to 9	12 (0.47)	112 (4.4)	9 (0.35)	8000	½	47 (1.85)
FTB603B	0.5 to 15	12 (0.47)	116 (4.6)	12 (0.47)	3200	½	47 (1.85)
FTB604B	1 to 30	16 (0.63)	136 (5.4)	16 (0.63)	1200	¾	63 (2.48)
FTB605B	2.5 to 75	16.5 (0.65)	182 (7.2)	19.5 (0.77)	450	1¼	80 (3.15)
FTB606B	4 to 120	16.5 (0.65)	183 (7.2)	24.5 (0.96)	225	1¼	80 (3.15)

Comes complete with 0.9 m (3') cable, and operator's manual.
*For NPT Threads add suffix **"-T"** to model number, no additional charge.*
***Ordering Examples: FTB602B**, flowmeter with 0.3 to 9 LPM range.*
***FTB605B-T,** flowmeter with 2.5 to 75 LPM range, 1¼ NPT fittings.*

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ECONOMICAL PVC TURBINE FLOWMETERS WITH LOCAL DIGITAL DISPLAY

TM Series

MADE IN USA — 1 YEAR WARRANTY

- **Indicates Both Rate and Total**
- **3% Reading Accuracy**
- **6-Digit Display**
- **Reads GPM or LPM**
- **Battery Operated (Included)**

TM Series turbine meters with microprocessor-based electronics offers a durable, compact, high-precision fluid measurement device, with total and rate indication. Information is clearly displayed on a large 6-digit liquid crystal display with only 2-point floating decimal for totals from 0.01 to 999,999. All operations are easily performed with only 2 buttons. The basic unit and display are powered by 2 lithium batteries, providing up to 5 years of use. Cumulative total, batch total, and rate of flow are standard. A single-point field calibration curve can be stored in memory.

TM05NQ9GMA

TM07NQ9GMA

TM40NQ9GME

All models shown smaller than actual size.

TM30FQ9GME

TM20NQ9GMB

SPECIFICATIONS

Accuracy: ±3% rdg
Extended Low Flow Range Accuracy: ±5.0% rdg (display models only)
Repeatability: ±0.1%
Pressure Rating: 150 psig (10.3 bar)
Max Pressure: 225 psi **Temperatures:**
Operational: 0 to 60°C (32 to 140°F)
Storage: -40 to 70°C (-40 to158°F)
Viscosity: Rated accuracy for fluids with viscosity of water (1 centistoke); meters with display can be used for fluids up to 100 centistokes with field calibration
Pulse Output (Option): Open collector sinking, 9 to 35 Vdc
Wetted Components:

Housing: PVC
Journal Bearings: Ceramic (96% alumina)
Shaft: Tungsten carbide
Rotor and Supports: PVDF
Retaining Rings: 316 SS

Display: 6-digit LCD, flow rate, batch and cumulative total

Power: Two 3V lithium batteries
Battery Life: 5 years

To Order *Visit omega.com/TM series for Pricing and Details*

Model Number	Description	Flowrate GPM (LPM)	Weight kg (lb)
TM05NQ9GMA	½" Sch. 80 NPT turbine	1 to 10 (3.8 to 38)	0.8 (0.36)
TM07NQ9GMA	¾" Sch. 80 NPT turbine	2 to 20 (7.6 to 76)	0.88 (0.39)
TM10NQ9GMA	1" Sch. 80 NPT turbine	5 to 50 (19 to 190)	1.0 (0.45)
TM15NQ9GMB	1½" Sch. 80 NPT turbine	10 to 100 (38 to 380)	1.4 (0.63)
TM20NQ9GMB	2" Sch. 80 NPT turbine	20 to 200 (76 to 760)	1.68 (0.76)
TM30NQ9GMD	3" Sch. 80 NPT turbine	40 to 400 (151 to 1514)	1.77 (3.9)
TM30FQ9GME	3" Sch. 80 flanged turbine	40 to 400 (151 to 1514)	2.63 (5.8)
TM40NQ9GME	4" Sch. 80 NPT turbine	60 to 600 (227 to 2271)	2.77 (6.1)
TM40FQ9GME	4" Sch. 80 flanged turbine	60 to 600 (227 to 2271)	4.17 (9.2)

Comes complete with two 3V lithium batteries and operator's manual.
*For units with pulse output module in place of display add suffix **"-P"** to model number, no additional cost.*
***Ordering Examples: TM05NPOXXC ,** ½ NPT mount turbine 1 to 10 GPM, pulse module.*
***TM07NQ9GMA ,** ¾ NPT mount turbine, 2 to 20 GPM.*

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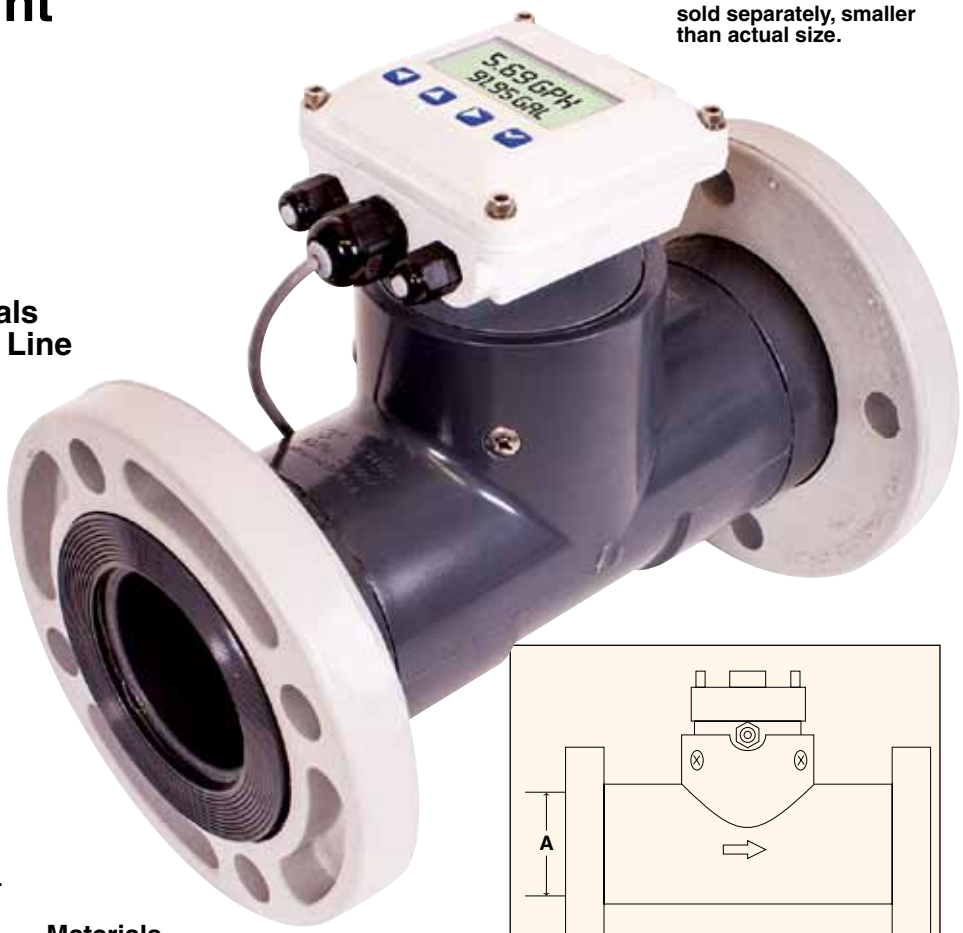
PVC Flange Mount

FTB700 Series

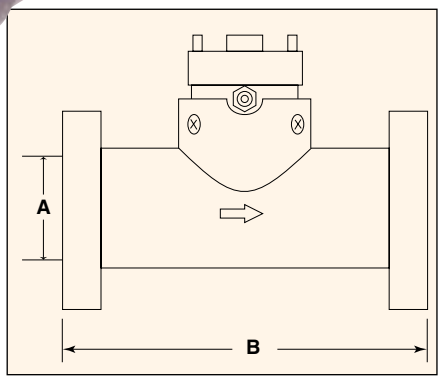
1 YEAR WARRANTY CE RoHS

- **High-Accuracy Machined Turbine Internals Removable with Meter in Line**
- **Standard Meter Bodies are Flanged**



FTB730, shown with DPF143P and DPF140-W2M sold separately, smaller than actual size.

OMEGA® FTB700 Series turbine meters have a unique system of precisely-machined helical rotors and high-quality jewel bearings. The rotor is the only moving part. Small magnets on the rotor hub are electronically detected by a solid state Hall-effect sensor outside the wetted area. The turbine rotor uses journal-type sapphire and ruby bearings for minimum friction and maximum life. These bearings are ideal for long life in water and water-based fluids, and they have exceptional low-flow characteristics. The entire rotor assembly (rotor, hubs, bearings, rotor strut) can be removed from the meter as a single unit without removing the meter from the pipe.



Specifications

Maximum Working Pressure: 150 psi PVC

Maximum Temperature:
PVC: 49°C (120°F)

Accuracy: ±1% FS

Signal: Squarewave pulse

Power: 6 to 24 Vdc

Materials

Meter Body: PVC

Flanges: Van Stone with steel backing flange

Turbine Rotor: PVDF

Rotor Shafts: Zirconia ceramic

Bearings: Sapphire journal, ruby ball

FTB700-T (Optional Blind Transmitter)

Output: 4 to 20 mA

Loop Power: 12 to 26 Vdc (isolated)

Accuracy: ±1%

Response Time: 3 sec, 95% FS

Temperature/Pressure for PVC Body

Operating Temp °C (°F)	Maximum Operating Pressure bar (psi)
24 (75)	10 (150)
38 (100)	9 (124)
49 (120)	5 (75)
54 (130)	3 (50)

To Order

Model No. PVC	Flow GPM	Pulses/Gal	Pipe Size "A" mm (inch)	Length "B" mm (inch)
FTB720	2 to 150	60	51 (2)	254 (10)
FTB730	3 to 400	10	76 (3)	305 (12)
FTB740	6 to 600	5	102 (4)	356 (14)
FTB760	12 to 1200	2	152 (6)	457 (18)

Accessories

Model No.	Description
FTB700-T	Blind 4 to 20 mA transmitter
PSU-93	24 Vdc power supply

Comes complete with 5.5 m (18') cable and operator's manual.

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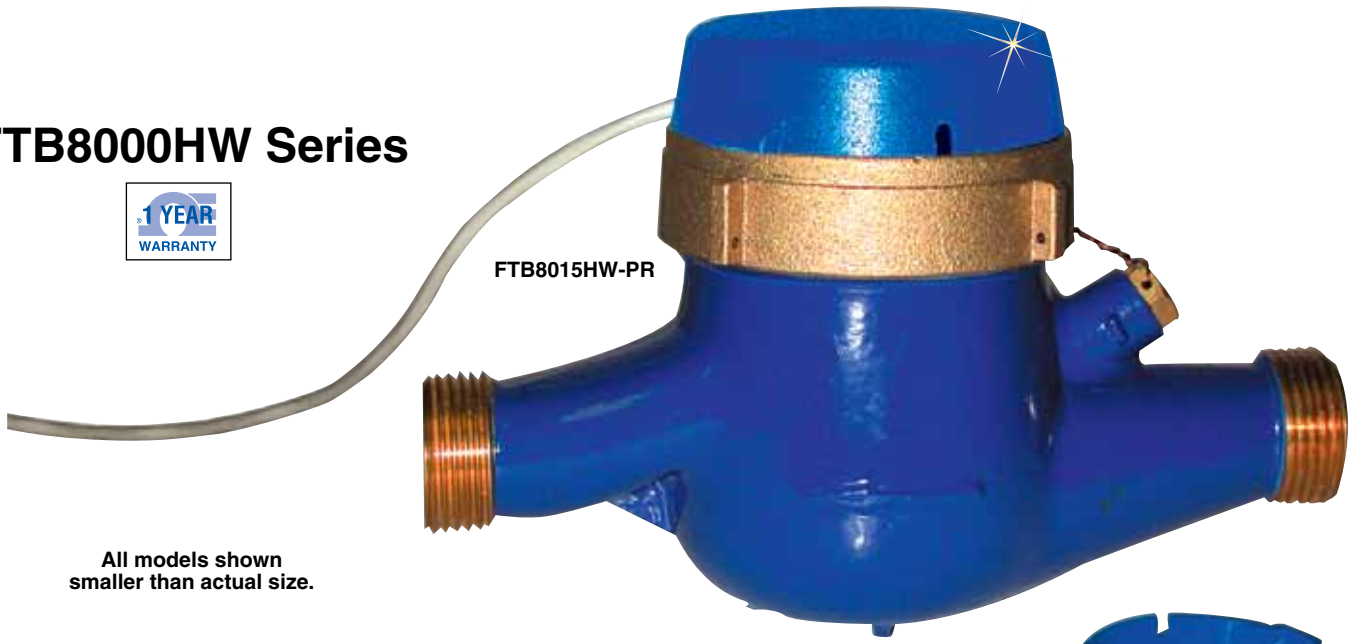
HOT WATER METERS FOR TOTALIZATION AND RATE INDICATION WITH PULSE OUTPUT

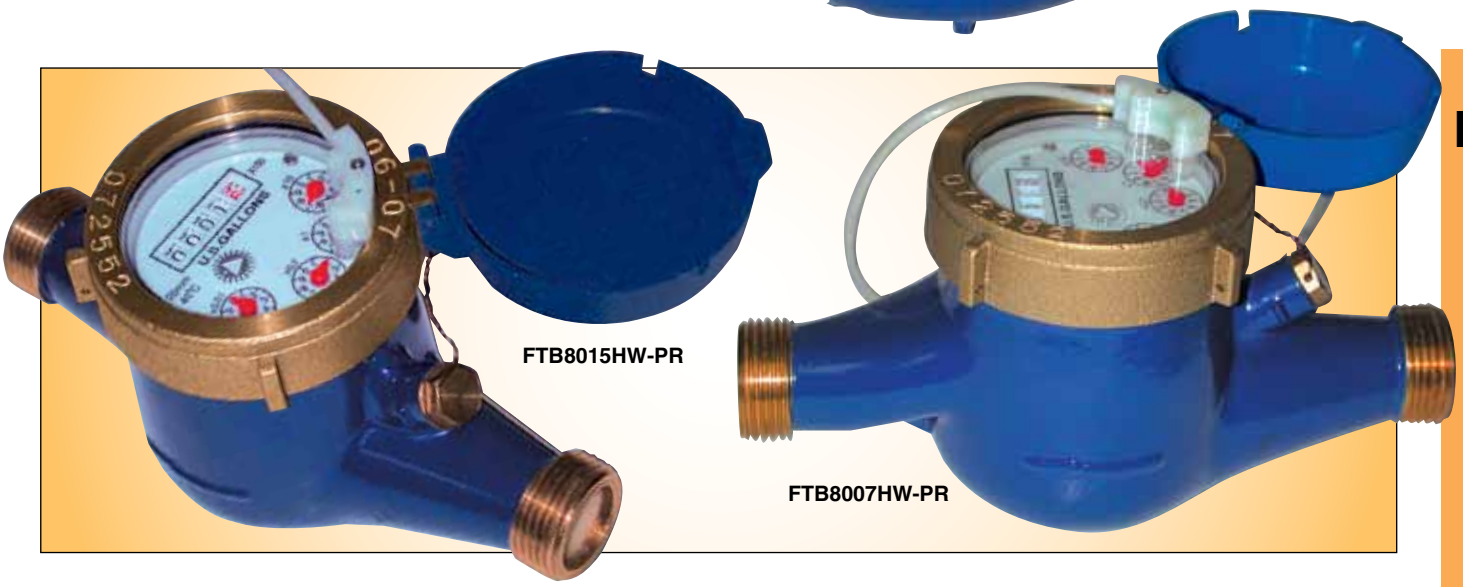
FTB8000HW Series

1 YEAR WARRANTY



FTB8015HW-PR

All models shown smaller than actual size.



FTB8015HW-PR

FTB8007HW-PR

F

- **Flow Rates from 0.22 to 132 GPM**
- **150 psi Maximum Operating Pressure**
- **90°C (194°F) Maximum Operating Temperature**
- **Field-Adjustable Pulse Output (Optional)**

The FTB8000HW Series meters use the multi-jet principle, which has been an internationally accepted standard for many years. This type of meter is known for its wide range, simplicity, and accuracy in low-quality water. The impeller is centered in a ring of jets, with inlet jets on one level and outlet jets on another. A gear train drives the register totalizer dials. For pulse output, one of the dials is replaced by a gear, which turns a magnet that is detected by an encapsulated sensor threaded into the outside of the lens. Pulse rate is determined by the gear and the dial on which the gear is placed. Changing the pulse rate requires no special tools and can be done in the field.

Mechanically, all FTB8000HW meters are the same. The difference between the -PR, -PT, and standard models is in the sensor. -PR model meters use a solid state, long-lasting Hall-effect sensor, which requires power. -PT model meters use a 2-wire reed switch. They provide a dry-contact closure and do not require power. Basic FTB8000HW meters totalize only and do not have an output. Never install water meters above or over areas where leakage would cause damage.

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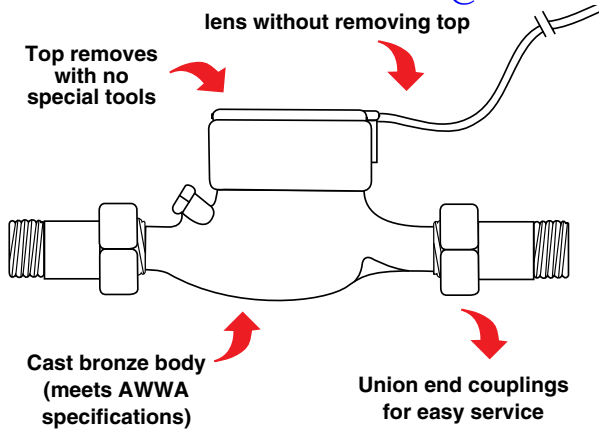
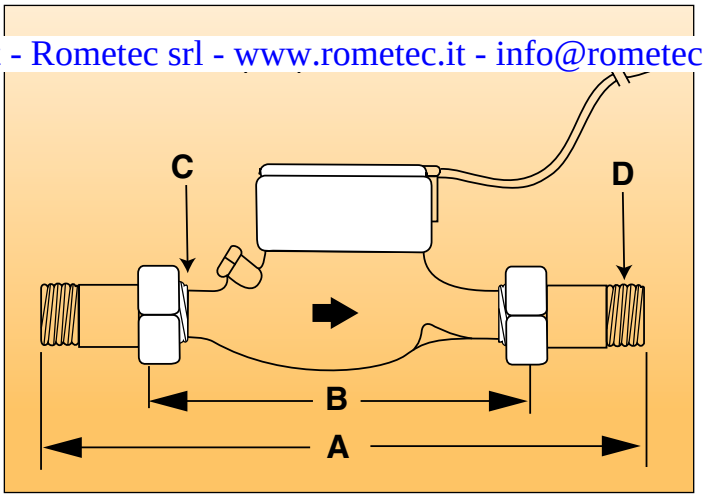
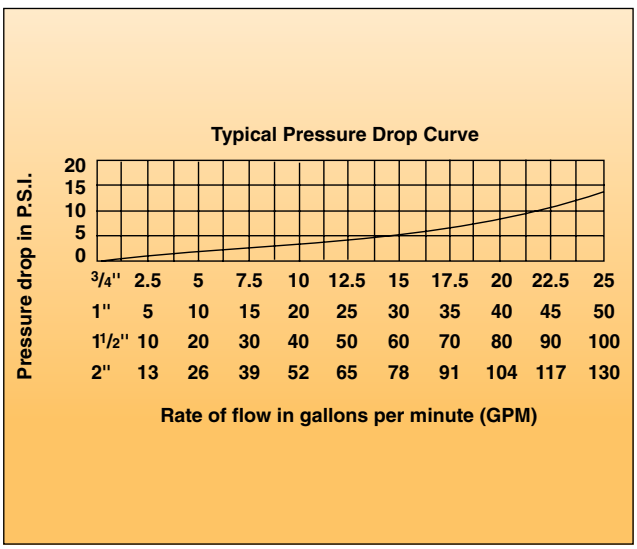




NPT Size	¾	1	1½	2
A (Body)	19 (7½)	26 (10¼)	30 (11¾)	30 (11¾)
B (w/Couplings)	32 (12⅝)	40 (15⅝)	45 (17⅝)	45 (17⅝)
C (IPS Thread)	1	1¼	2	2½
D (NPT Thread)	¾	1	1½	2



NPT Size	¾	1	1½	2
	20*	—	—	—
Pulses per	10	—	—	—
Gallon	2*	2*	2*	2*
	1	1	1	1
	1	1	1	1
	5*	5*	5*	5*
Gallons per	10	10	10	10
Pulse	50*	50*	50*	50*
	100	100	100	100

** These pulse rates are only available on units with the "**-PT**" option.*

SPECIFICATIONS

Materials:
Body: Cast bronze
Internals: Engineered thermoplastic
Magnet: Permanent ceramic
Maximum Temperature: 90°C (194°F)
Maximum Operating Pressure: 150 psi
Accuracy: 1.5% of reading
Sensor:
-PR: Hall-effect device
-PT: Reed switch
Maximum Current: 20 mA
Maximum Voltage:
-PR: 24 Vdc
-PT: 24 Vdc or Vac
Sensor Power (-PR): Minimum 6 mA at 12 Vdc
Cable Length: 3.7 m (12') standard, 610 m (2000') maximum
Flow Rates (GPM):

NPT Size	¾	1	1½	2
Minimum	0.22	0.44	0.88	1.98
Maximum	22	52	88	132

To Order

Model No.	NPT Size	Flow Range (GPM)	Pulses per Gallon (Default Setting)
FTB8007HW	¾	0.22 to 22	None, total only
FTB8010HW	1	0.44 to 52	None, total only
FTB8015HW	1½	0.88 to 88	None, total only
FTB8020HW	2	1.98 to 132	None, total only
FTB8007HW-PT	¾	0.22 to 22	20
FTB8010HW-PT	1	0.44 to 52	1
FTB8015HW-PT	1½	0.88 to 88	1
FTB8020HW-PT	2	1.98 to 132	1
FTB8007HW-PR	¾	0.22 to 22	1
FTB8010HW-PR	1	0.44 to 52	1
FTB8015HW-PR	1½	0.88 to 88	1
FTB8020HW-PR	2	1.98 to 132	1

Comes complete with MNPT couplings, 3.7 m (12') cable and operator's manual.
***Ordering Examples: FTB8015HW-PR**, 88 GPM max flow rate water meter with adjustable pulse output set to 1 pulse per gallon with hall effect sensor.*
***FTB8010HW-PR,** 52 GPM max with adjustable pulse output set to 1 pulse per gallon with hall effect sensor.*

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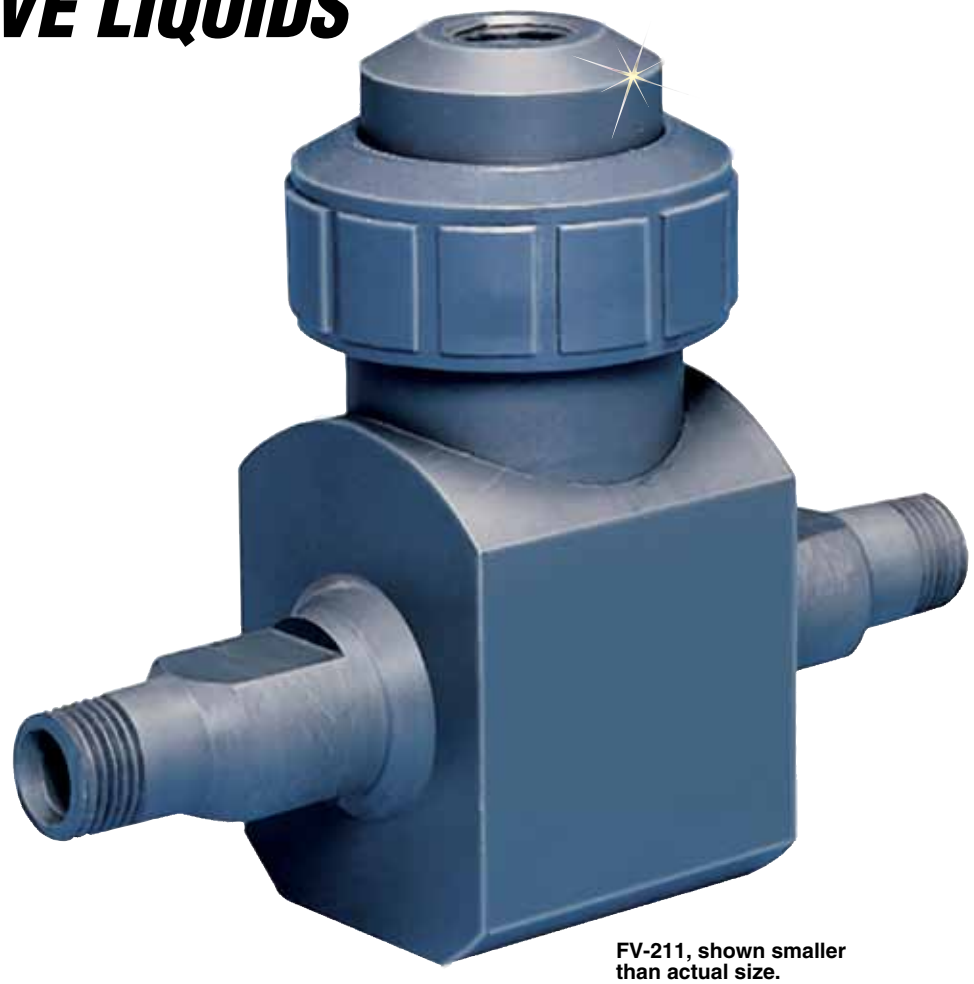
ALL PLASTIC VORTEX FLOWMETER FOR CORROSIVE LIQUIDS

FV-200 Series

1 YEAR WARRANTY NIST
Standard

- **No Moving Parts**
- **Corrosion Resistant**
- **6 to 51 mm (¼ to 2") Sizes**
- **High Temperature [95°C (203°F)] Models Available**
- **NIST Certificate**



FV-211, shown smaller than actual size.

The FV-200 Series meter utilizes vortex-shedding technology to provide a repeatable flow measurement accurate to 1% of full scale. The meter has no moving parts, and any potential for fluid contamination is eliminated by the meter's corrosion-resistant all plastic construction. The meter includes a compact 2-wire (4 to 20 mA) or 3-wire pulse transmitter (optional), contained within a conveniently replaceable plug-in electronics module. All electronics are housed in a corrosion-resistant enclosure. Unlike meters containing metal or moving parts, the FV-200 is perfect for aggressive or easily contaminated fluids. Applications range from ultra-pure water to highly corrosive chemicals and slurries

Operation of the FV-200 vortex flowmeter is based on the vortex shedding principle. As fluid moves around a body, vortices (eddies) are formed and move downstream. They form alternately, from one side to the other, causing pressure fluctuations. These are sensed by a piezoelectric crystal in the sensor tube, and are converted to a 4 to 20 mA, or pulse signal. The frequency of the vortices is directly proportional to the flow rate. This results in extremely accurate and repeatable measurements using no moving parts.

Another advantage of utilizing a FV-200 vortex flowmeter is that there are no gaskets or elastomers in the meter. Therefore, one need only be concerned with the thermoplastic material used in body construction. In a thermoplastic piping system, the material chosen for the flowmeter should match that of the pipe wherever possible.

Many factors may affect the capability of a meter to measure the flow of specific fluids accurately. Different solutions have varying effects on meters. For instance, heavy particle suspension will wear down internal parts on some meters or cause sensing inaccuracies for non-obtrusive metering systems. For vortex flowmeters, high viscosities tend to dampen the formation of vortices and reduce the effective range. Particles and internal bubbles do not usually affect vortex meters. Slurries containing grit can wear down the bluff body over a period of time. Also, long fibers can catch and build up on the bluff, decreasing accuracy. Standard factory calibration is for tap water at 32 SSU (1 CST) viscosity and ambient temperature. Viscosity above 1 CST will raise the minimum readable flow rate, reducing rangeability. The effect is linear to viscosity. No adjustments are required for specific gravities up to 2.0. Liquids with high specific gravities will adversely affect the permissible amount and duration of over range flow.

SPECIFICATIONS

Measured: Liquids
Connection: ¼ to 2 NPT thread
Wetted Material: PVC, CPVC or PVDF depending on model number
Turndown Ratio: 12.1 (except ¼" meter size; 8.1)
Accuracy: ±1% of full scale, 4 to 20 mA or ±2% of full scale, frequency pulse (**"-P"** option)
Repeatability: ±0.25% actual flow
Output Signal: 4 to 20 mA or frequency pulse (source-sink driver; 1A source/ 1.5A sink; typical output resistance 10 Ω)
Power Supply: 13 to 30 Vdc
Enclosure: NEMA 4X (IP 66)
Response Time: 2 seconds minimum, step change in flow

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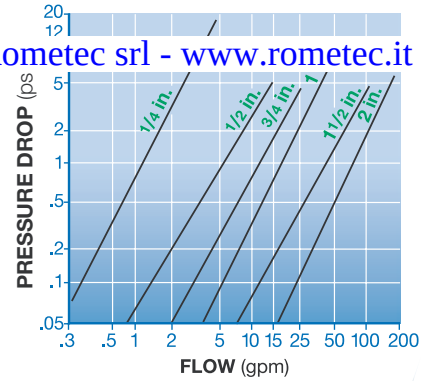
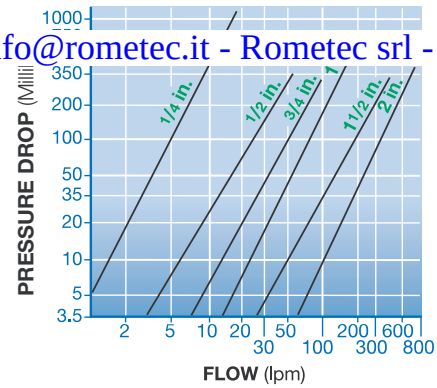


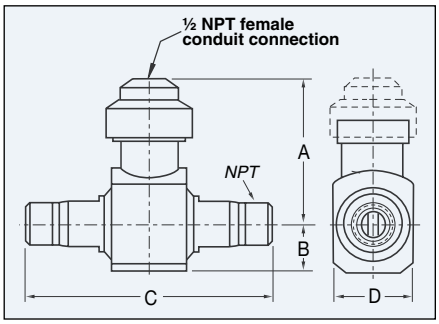


Pressure—Temperature Ratings

Fluid Temperature	Operating Pressure bar (PSIG)	
°C (°F)	PVC	CPVC
95 (203)*	NR	1.6 (24)
66 (150)	NR	4.3 (63)
38 (100)	6.4 (93)	8.3 (120)
21 (70)	10.3 (150)	10.3 (150)

(-HT) models only

DPi32, shown smaller than actual size.



Dimensions: mm (inch)

Size, NPT	A	B	C	D
¼	97 (3.81)	45 (1.75)	133 (5.25)	64 (2.50)
½	97 (3.81)	45 (1.75)	181 (7.13)	64 (2.50)
¾	97 (3.81)	45 (1.75)	194 (7.63)	64 (2.50)
1	100 (3.92)	45 (1.75)	204 (8.03)	64 (2.50)
1½	99 (3.90)	51 (2.00)	213 (8.37)	64 (2.50)
2	109 (4.31)	51 (2.00)	213 (8.37)	64 (2.50)

To Order

Model No.	Connection, NPT Size	Construction	Minimum Flow LPM (GPM)	Maximum Flow LPM (GPM)
FV-221	¼	CPVC*	2.3 (0.6)	18.9 (5)
FV-222	½	CPVC*	4.7 (1.3)	56.8 (15)
FV-223	¾	CPVC*	7.9 (2.1)	94.6 (25)
FV-224	1	CPVC*	15.8 (4.2)	189.3 (50)
FV-225	1½	CPVC*	31.5 (8.3)	378.5 (100)
FV-226	2	CPVC*	63.1 (16.7)	757.1 (200)
FV-231	¼	PVDF*	2.3 (0.6)	18.9 (5)
FV-232	½	PVDF*	4.7 (1.3)	56.8 (15)
FV-233	¾	PVDF*	7.9 (2.1)	94.6 (25)
FV-234	1	PVDF*	15.8 (4.2)	189.3 (50)
FV-235	1½	PVDF*	31.5 (8.3)	378.5 (100)
FV-236	2	PVDF*	63.1 (16.7)	757.1 (200)

Accessory

Model No.	Description
PSU-93	Unregulated 24 Vdc power supply

Comes complete with 5 point NIST certificate and operator's manual.
*For units with a pulse output add a **"-P"** to the model number, no additional charge.*
***** For high temperature CPVC or PVDF add suffix **"-HT"** to model number, for additional cost.*
***Ordering Examples: FV-213,** ¾ NPT, PVC vortex flowmeter and **DPi32,** 1/32 DIN digital display.*
***FV-226-P,** 2 NPT, CPVC vortex with pulse output.*
***FV-231-P-HT,** ¼ NPT, PVC vortex with pulse output and high temperature option.*

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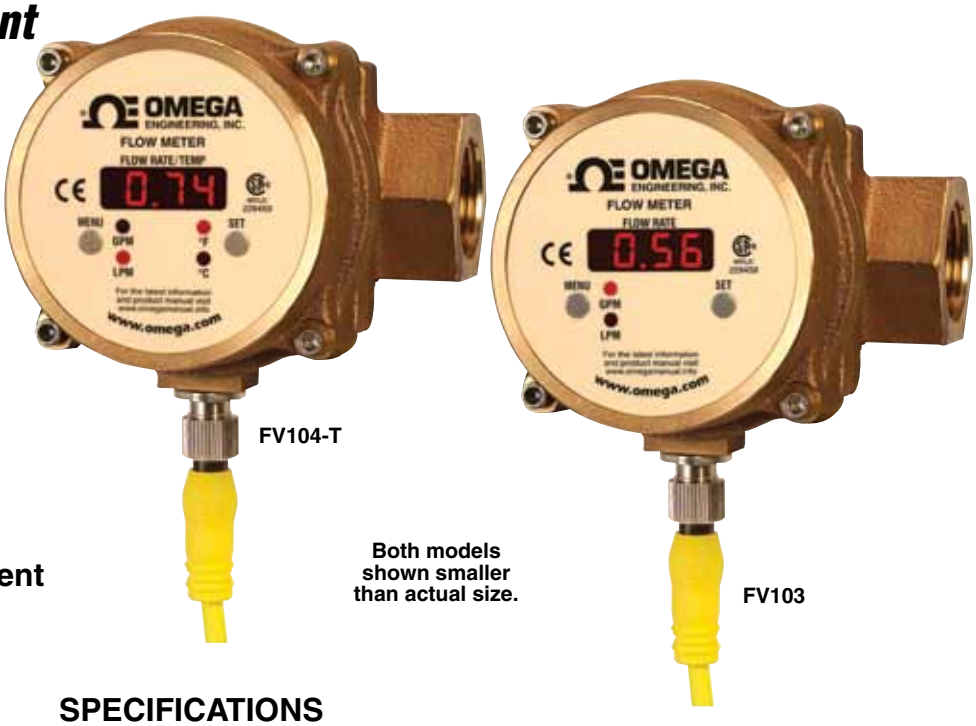
TEMPERATURE TRANSMITTER

For Water and Coolant

FV101 Series

1 YEAR WARRANTY



FV104-T

Both models shown smaller than actual size.

FV103

- **No Moving Parts to Jam**
- **¼ FNPT to 4" Line Sizes**
- **LED Display**
- **4 to 20 mA Output**
- **SSR Alarm**
- **Temperature Measurement Units Feature Separate 4 to 20 mA Output and SSR Alarm**

The FV101 Series comprises in-line flowmeters that use the vortex shedding measuring principle. The fluid strikes a bluff body, imparting alternating vortices downstream of the bluff. This creates a pressure on a sensor body containing a piezoelectric crystal. The frequency of the sensor is proportional to the velocity of the fluid and is amplified and converted to a 4 to 20 mA output signal. Vortex technology yields a meter with no moving parts to hang up or wear. The meter has a bright 7.62 mm (0.3") high LED display of flow in either liters or gallons. It can measure flow in any direction, and the display can be rotated 180° for viewing convenience. The FV101 Series can be used with non-viscous, clean, or dirty waterlike liquids that are compatible with brass, PVDF, and FKM. Measured fluids should not contain long fibers or a high level of abrasive solids. These meters are ideal for cooling loops using water or 50% glycols, and for water-soluble machine coolant (up to 10%). These applications are found in most process industries, including rubber, steel, fabrication, manufacturing, refining, paper, chemical, food, petrochemical, and power. Do not use on flammable liquids or on gases such as air.

SPECIFICATIONS

Flow
- **Accuracy:** ±2% FS
- **Repeatability:** ±0.25% FS
- **Alarm Deadband:** 5% FS
- **Response Time:** User selectable from 0.9 to 7.5 seconds
- **Max Flow:** Over range occasionally up to 125% of capacity

Temperature
- **Accuracy:** ±1% FS
- **Response Time:** 1.8 s to 63% of flow
- **Alarm Deadband:** 2%

Display: 3-digit, 7.62 mm (0.3") high numeric LED that flashes below setpoint

Maximum Operating Pressure:
- **2" and Smaller:** 20 bar (300 psig)
- **3 and 4":** 13 bar (200 psig)

Operating Temperature: 2 to 99°C (35 to 210°F)

Enclosure Rating:
- **IP65:** Type 1, 3, 4, 12, and 13

Analog Output: 4 to 20 mA (600 Ω @ 24 Vdc)

Electrical Connection:
- **FV100 Units (Flow Only):** 5-pin micro male connector,
- **FV100-T Units (Flow/Temperature):** 8-pin male micro connector

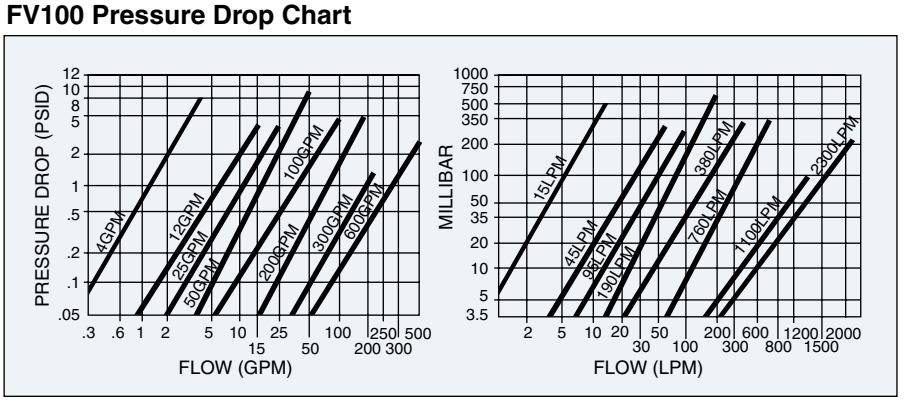
Alarm Output: SPST SSR, NO or NC operation, selectable; dual alarms for flow/temperature units
- **FV101 and 102:** 250 mA @ 30 Vdc up to 85°C (185°F)
- **FV103 thru 108:** 125 mA @ 30 Vdc up to 85°C (185°F) reduced current rating at higher temperatures

Power: 10 to 30 Vdc @ 80 mA

Wetted Parts: Brass, PVDF and FKM seals; 316 SS bodies available for special order on ¼ and ½" sizes, contact Flow Engineering for details.

Installation: 10 pipe diameters upstream and 5 downstream recommended

FV100 Pressure Drop Chart



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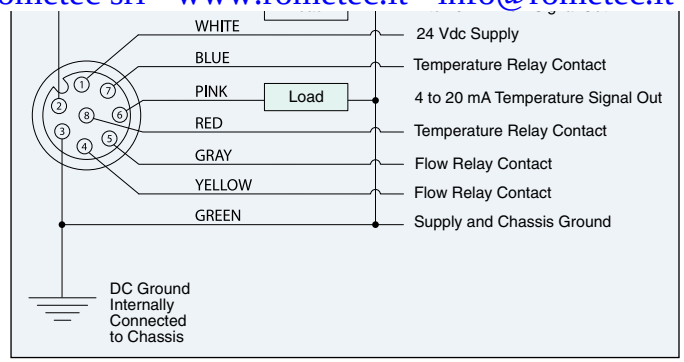
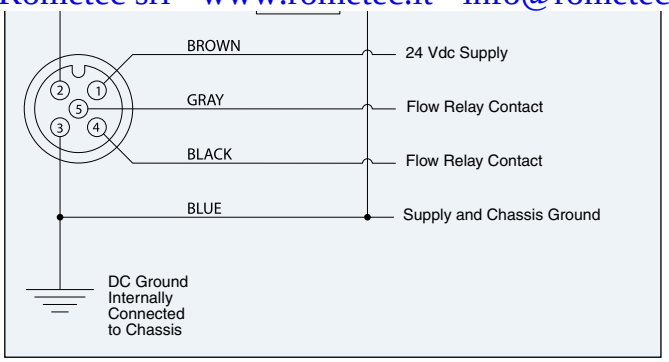
Wiring for FV100-T Series

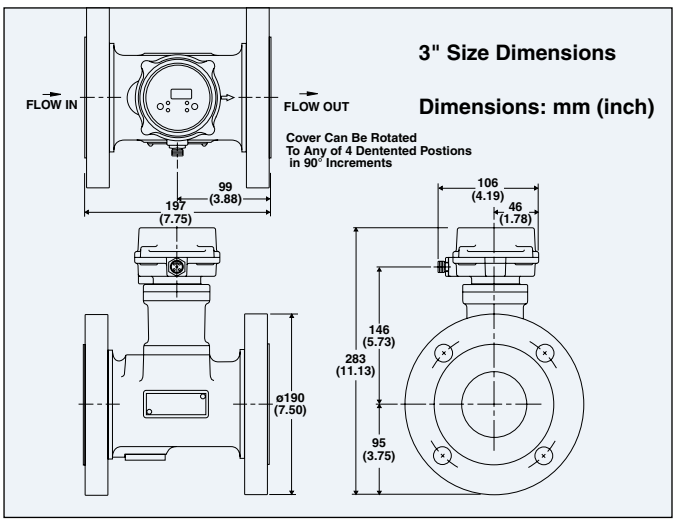


Wiring for FV100 Series



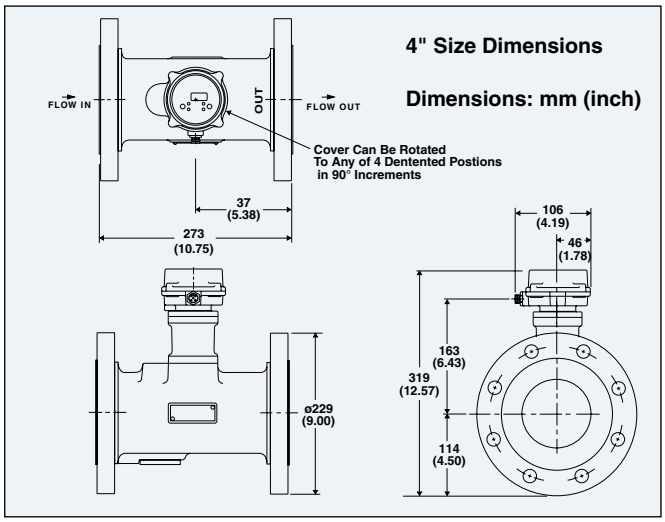
3" Size Dimensions

Dimensions: mm (inch)



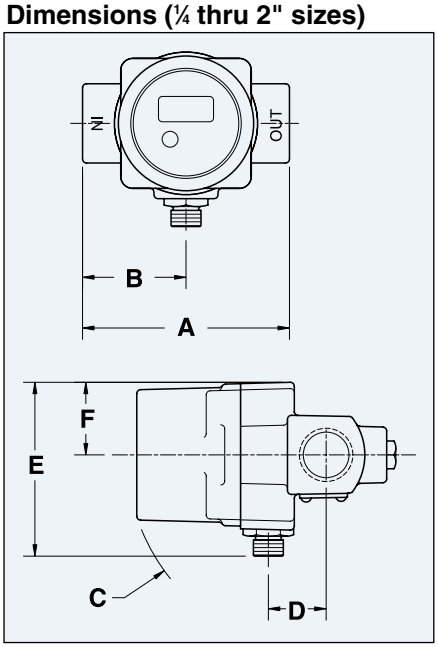
4" Size Dimensions

Dimensions: mm (inch)



Ø = diameter

Dimensions (¼ thru 2" sizes)



Size (inch)	mm (inch)					
	A	B	C	D	E	F
¼, ½	82 (3.25)	41 (1.62)	80 (3.13)	23 (0.91)	69 (2.74)	29 (1.15)
¾, 1	115 (4.54)	58 (2.27)	103 (4.04)	53 (2.08)	106 (4.19)	45 (1.78)
1½, 2	173 (6.82)	87 (3.41)	120 (4.71)	71 (2.80)	106 (4.19)	45 (1.78)

To Order

Flowmeter Model No.	Flowmeter/ Temperature Transmitter Model No.	Connection	Flow Range (GPM) Min	Flow Range (GPM) Max	Pressure Drop psid Max	Weight kg (lb)
FV101	—	¼ FNPT	0.4	4	9.2	1.3 (2.8)
FV102	—	½ FNPT	1.2	12	3.6	1.2 (2.6)
FV103	**FV103-T**	¾ FNPT	2.5	25	3.6	2.9 (6.3)
FV104	**FV104-T**	1 FNPT	5	50	9.5	2.7 (5.9)
FV105	**FV105-T**	1½ FNPT	10	100	4.8	5.9 (13)
FV106	**FV106-T**	2 FNPT	20	200	4.9	4.8 (10.5)
FV107	**FV107-T**	3" ANSI RF	30	300	1.3	19 (42)
FV108	**FV108-T**	4" ANSI RF	60	600	1.3	25 (55)

Accessories

Model No.	Description
FV100-C1	Replacement 1 m (3') cable for FV100 Series
FV100-C3	3 m (9.8') cable for FV100 Series
FV100-C10	10 m (32.8') cable for FV100 Series
FV100-CT2	Replacement 2 m (6.5') cable FV100-T Series
FV100-CT5	5 m (16.4') cable for FV100-T Series
FV100-CT10	10 m (32.8') cable for FV100-T Series
PSR-24L	24 Vdc regulated power supply

Comes complete with operator's manual and 1 m (3') cable.

Ordering Examples: FV101, *¼ FNPT vortex meter, 0.4 to 4 GPM.*

FV104, *1 FNPT 5 to 50 GPM meter.*

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HOT WIRE ANEMOMETER
WITH REAL TIME DATA LOGGER

HHF-SD1

1 YEAR WARRANTY

- Slim Probe, Ideal for Grilles and Diffusers
- Type K or J Thermocouple Input
- Real Time SD Memory Card Data Logger
- LCD with Green Light Backlighting
- Velocity and Air Temperature Measurements
- RS232/USB Interface (Optional Cable)

The OMEGA® HHF-SD1 combination hot wire and standard thermistor anemometer with SD card data logger has multiple features that make it suitable to use in such applications as environmental testing, balancing of fans/motors/blowers, air conveyors, clean rooms, and flow hoods. What sets the HHF-SD1 apart from other hot wire anemometers is that it incorporates a real-time SD card data logger.

The HHF-SD1 measures velocity, and air temperature, and has an input socket that accepts a Type J or K thermocouple that can be used as a highly accurate thermometer. The integrated hot wire and standard thermistors provide fast and accurate readings-even at low velocities. The HHF-SD1 is innovative and easy to operate. Download data from the SD card into an Excel® spreadsheet without the need for special software.

Free Thermocouple Included!

This model includes a free 1 m (40") Type K insulated beaded wire thermocouple with subminiature connector and wire spool caddy. **Order a Spare!**
Model No. SC-GG-K-30-36

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HHF-SD1 comes complete with hard carrying case, Type K thermocouple, telescoping probe, SD card, and operator's manul.

SPECIFICATIONS

Display: 52 x 38 mm (2.05 x 1.5") LCD with green backlight (on/off)
Measurement Units:
Velocity: m/s, km/h, ft/min, knots, mile/hr
Temperature: °C or °F
Sensor Construction: Glass bead thermistor
Sampling Time:
Auto: 1 to 3600 seconds
Manual: Push the data logger button once; will save data one time
Memory Card: SD memory card
Temperature Compensation: Automatic
Display Update: At 1 second
Data Output (RS232/USB): With optional cable/software
Operating Temperature: 0 to 50°C (32 to 122°F)
Operating Humidity: Less than 85% RH
Power: 6 "AAA" alkaline or heavy-duty batteries (included), or 9V power adaptor (optional)
Current Draw: 15 mA DC (without SD card or backlight), 36 mA (all functions)
Weight: 515 g (1.13 lb)
Dimensions:
Instrument: 203 L x 76 W x 38 mm D (8 x 3 x 1.50")
Probe: 12 mm (0.47") diameter, 280 to 940 mm (11 to 37") length
Air Temperature Measuring Range: 0 to 50°C (32 to 122°F)
Resolution: 0.1°C (0.1°F)
Accuracy: ± 0.8°C (1.5°F)

Measurement	Range	Resolution	Accuracy (Reading)
m/s	0.2 to 5 m/s	0.01 m/s	±(5% + a) reading or ±(1% + a) full scale whichever is greater
	5.1 to 20 m/s	0.1 m/s	
km/h	0.70 to 18 km/h	0.01 km/h	
	18 to 72 km/h	0.1 km/h	
mile/h (mph)	0.50 to 11.20 mph	0.01 mph	
	11.2 to 44.7 mph	0.1 mph	
knot	0.40 to 9.70 knot	0.01 knot	
	9.7 to 38.8 knot	0.1 knot	
ft/min	40 to 3940 ft/min	1 ft/min	
(a = 0.1 m/s, 0.3 km/h, 0.2 mile/h, 0.2 knot, 20 ft/min)			

Note: *m/s = meters per second, km/h = kilometers per hour, ft/min = feet per minute, mile/h = miles per hour, knot = nautical miles per hour (international knot)*

Type K/J Thermometer (Sensor Sold Separately)

Sensor	Resolution	Range	Accuracy
K	0.1°C	-50 to 1300°C	±(0.4% + 0.5°C)
		-50.1 to -100°C	±(0.4% + 1°C)
	0.1°F	-58 to 2372°F	±(0.4% + 1°F)
		-58.1 to -148°F	±(0.4% + 1.8°F)
J	0.1°C	-50 to 1200°C	±(0.4% + 0.5°C)
		-50.1 to -100°C	±(0.4% + 1°C)
	0.1°F	-58 to 2192°F	±(0.4% + 1°F)
		-58.1 to -148°F	±(0.4% + 1.8°F)

To Order

Model No.	Description
HHF-SD1	Data logging airflow meter with SD card–hot wire type

Accessories

Model No.	Description
HHF-SD1-RP	Replacement hot wire probe
SW-U101-WIN	Software for data logging from meters, with USB and RS232 cables
HC-SD	Replacement hard carrying case
SC-SD	Soft carrying case
ADAPTER-SD	AC adaptor
USB-SD	Spare USB cable (SW-U101-WIN software required)
RS232-SD	Spare RS232 cable (SW-U101-WIN software required)
2GB-SD	Spare 2 GB SD memory card

Comes complete with telescoping probe, 2 GB SD card, Type K thermocouple, hard carrying case, 6 "AAA" batteries and operator's manual.
Ordering Example: HHF-SD1 *data logging airflow meter with SD card, and* ***ADAPTER-SD*** *AC adaptor.*

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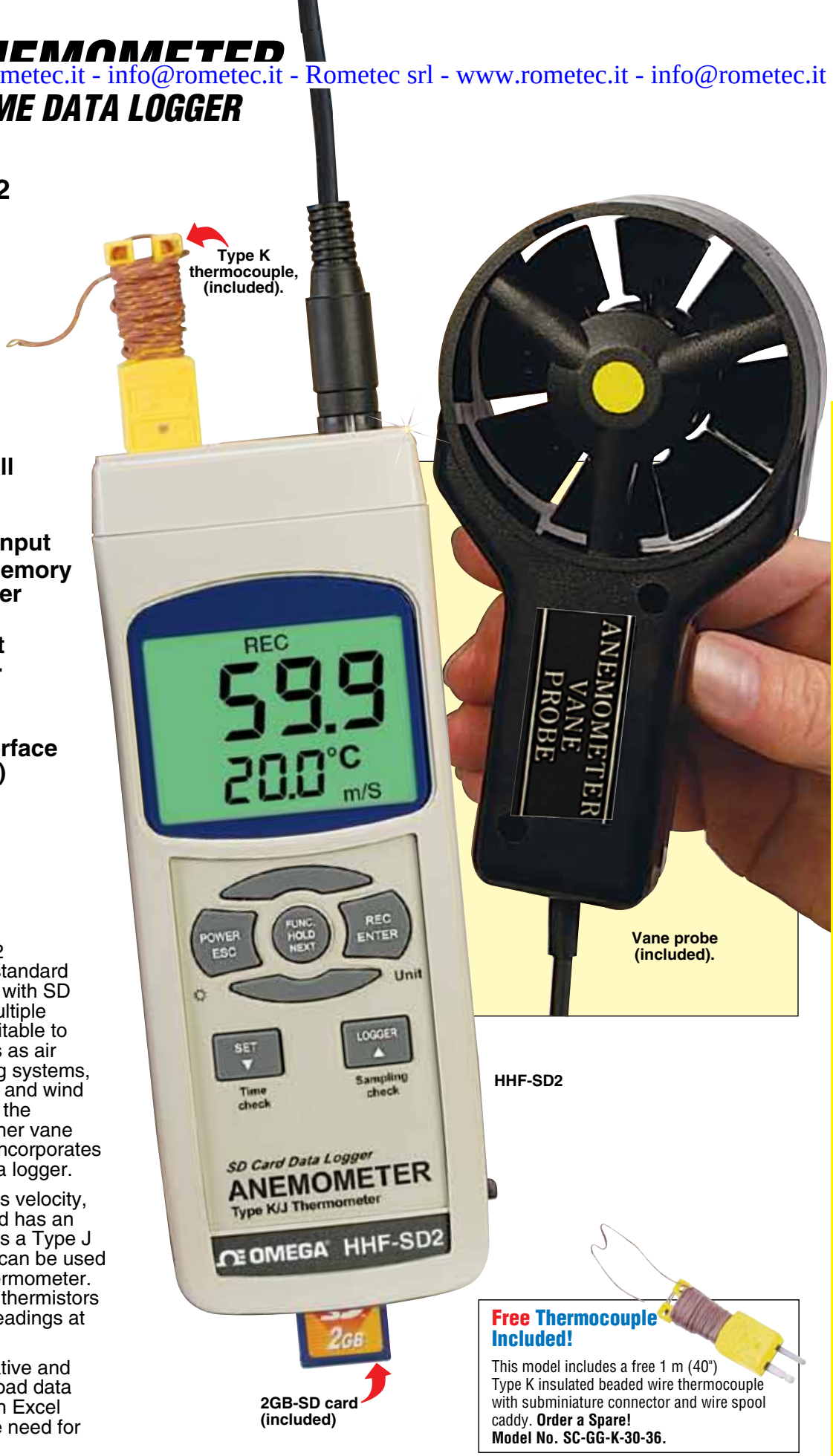
VANE ANEMOMETER WITH REAL TIME DATA LOGGER

HHF-SD2

1 YEAR WARRANTY

- Low Friction Ball Bearing Vane
- Type K or J Thermocouple Input
- Real Time SD Memory Card Data Logger
- LCD with Green Backlight
- Velocity and Air Temperature Measurements
- RS232/USB Interface (Optional Cable)



HHF-SD2

The OMEGA® HHF-SD2 combination vane and standard thermistor anemometer with SD card data logger has multiple features that make it suitable to use in such applications as air conditioning and heating systems, measuring air velocities and wind temperature. What sets the HHF-SD2 apart from other vane anemometers is that it incorporates a real-time SD card data logger.

The HHF-SD2 measures velocity, and air temperature, and has an input socket that accepts a Type J or K thermocouple that can be used as a highly accurate thermometer. The vane and standard thermistors provide high accurate readings at high velocities.

The HHF-SD2 is innovative and easy to operate. Download data from the SD card into an Excel spreadsheet without the need for special software.

Free Thermocouple Included!

This model includes a free 1 m (40") Type K insulated beaded wire thermocouple with subminiature connector and wire spool caddy. **Order a Spare! Model No. SC-GG-K-30-36.**

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HHF-SD2 comes complete with hard carrying case, Type K thermocouple, vane probe, 2 GB SD card, and operator's manual.

SPECIFICATIONS

Display: 52 x 38 mm (2.05 x 1.50") LCD with green backlight (on/off)
Measurement Units:
Velocity: m/s, km/h, ft/min, knots, mile/hr
Temperature: ºC or ºF
Sampling Time:
Auto: 1 to 3600 seconds
Manual: Push the data logger button once, will save data one time
Memory Card: SD memory card (with optional SD card)
Temperature Compensation: Automatic
Display Update: At 1 second
Data Output:
RS232: With optional cable/software
USB: With optional cable/software
Operating Temperature: 0 to 50ºC (32 to 122ºF)
Operating Humidity: Less than 85% RH
Power: 6 "AAA" alkaline or heavy-duty batteries (included), or 9V power adaptor (optional)
Current Draw: 15 mA DC (without SD card or backlight), 36 mA (all functions)
Weight: 515 g (1.13 lb)
Dimensions:
Instrument: 203 L x 76 W x 38 mm D (8 x 3 x 1.50")
Probe: 72 mm dia (2.83")
Air Temperature:
Measuring Range: 0 to 50ºC (32 to 122ºF)
Resolution: 0.1ºC (0.1ºF)
Accuracy: ±0.8ºC (1.5ºF)

Measurement	Range	Resolution	Accuracy (Reading)
m/s	0.4 to 25.0 m/s	0.1 m/s	±(2% + 0.2 m/s)
km/h	1.4 to 90.0 km/h	0.1 km/h	±(2% + 0.8 km/s)
mph	0.9 to 55.9 mph	0.1 mph	±(2% + 0.4 mph)
knot	0.8 to 45.6 knot	0.1 knot	±(2% + 0.4 knots)
ft/min	70 to 4921 ft/min	1 ft/min	±(2% + 40 fpm)

Note: *m/s = meters per second, km/h = kilometers per hour, ft/min = feet per minute, mile/h = miles per hour, knot = nautical miles per hour (international knot)*

Type K/J Thermometer (Sensor Sold Separately)

Sensor	Resolution	Range	Accuracy
K	0.1ºC	-50 to 1300ºC	±(0.4% + 0.5ºC)
		-50.1 to -100ºC	±(0.4% + 1ºC)
	0.1ºF	-58 to 2372ºF	±(0.4% + 1ºF)
		-58.1 to -148ºF	±(0.4% + 1.8ºF)
J	0.1ºC	-50 to 1200ºC	±(0.4% + 0.5ºC)
		-50.1 to -100ºC	±(0.4% + 1ºC)
	0.1ºF	-58 to 2192ºF	±(0.4% + 1ºF)
		-58.1 to -148ºF	±(0.4% + 1.8ºF)

To Order

Model No.	Description
HHF-SD2	Data logging vane anemometer with SD card

Accessories

Model No.	Description
HHF-SD1-RP	Replacement hot wire probe
SW-U101-WIN	Software for data logging from meters, with USB and RS232 cables
HC-SD	Replacement hard carrying case
SC-SD	Soft carrying case
ADAPTER-SD	AC adaptor
USB-SD	Spare USB cable (SW-U101-WIN software required)
RS232-SD	Spare RS232 cable (SW-U101-WIN software required)
2GB-SD	Spare 2 GB SD memory card

Comes complete with vane probe, hard carrying case, 2 GB SD card, Type K thermocouple, 6 "AAA" batteries and operator's manual.
Ordering Example: HHF-SD2. *data logging vane anemometer with SD card. and* ***USB-SD.*** *USB cable.*

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VELOCITY/ TEMPERATURE METER WITH WIRELESS OPTION

HHF1000 Series

1 YEAR WARRANTY NIST

Optional

- Measures Air Velocities up to 5000 FPM (25.4m/sec)
- Measures Air Temperature up to 93°C (199°F)
- 1.5% Full Scale Accuracy (Velocity)
- 0.5% Full Scale Accuracy (Temperature)
- Two Sensor Probe Configurations—Fixed Probe and Remote Telescopic Probe
- Hot Wire Air Velocity Sensor Design
- Economical 6 OD x 305 mm L (¼ x 12") Insertion Probe Design
- Backlit LCD Displays Air Velocity and Air Temperature Simultaneously
- Air Velocity and Air Temperature Can be Displayed in Different Engineering Units
- Volume Air Flow Calculation
- Wireless PC Interface Available

The HHF1000 Series handheld air velocity/temperature meter measures and displays air velocity and air temperature in research and development labs, HVAC applications, and other manufacturing processes. The sensor design is based on three RTD elements, one measures air temperature and the other two measures air velocity due to the heat loss from the RTD sensor as it cools down by the air flow. The sensor probe is offered in two configurations, fixed probe and remote telescopic probe.

The HHF1000 series offers many standard features such as high and low alarm indication, USB PC serial interface with a Windows® based data logging software, adjustable display response time, volume air flow readout, and atmospheric pressure compensation. The HHF1000 displays the air velocity in different Engineering Units such as FPM, m/sec, Miles/Hour, and Km/hour. The air temperature is displayed in °F and °C.

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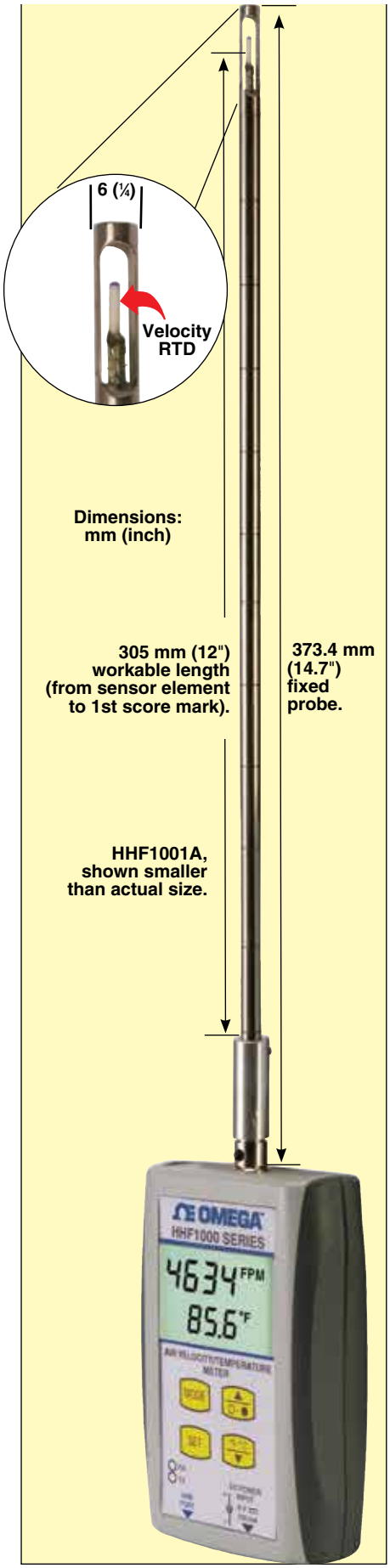

SPECIFICATIONS

Air Velocity Range: 0 to 5000 FPM (0 to 25 m/sec)
Air Temperature Range: -40 to 93°C (-40 to 199°F)
Accuracy: 1.5% full scale (air velocity), 0.5% full scale (air temperature)
Air Velocity/Temperature Probe:
- **Fixed Probe:** ¼" OD stainless steel, 305 mm (12") long (workable length)
- **Remote Telescopic Probe:** Adjustable from 305 x 914 mm L (12 to 36")

Air Velocity/Temperature Sensor: Three RTDs, one 100 Ω and two 1000 Ω
Display: Backlit LCD, 32 x 51 mm (1.25 x 2")
Operating Ambient Temperature:
- **Sensor Probe:** -40 to 93°C (-40 to 199°F)
- **Electronic Case:** 0 to 50°C (32 to 122°F)

Power: 9V Lithium battery (included) or 9 Vdc adaptor
Battery Life: 40 hours, continuous operation
Dimensions (Case): 121.4 L x 77.7 W x 33.2 mm D (4.78 x 3.06 x 1.31")
Dimensions (Probe):
- **Fixed Probe:** 6 x 305 mm (0.25 OD x 12" L)
- **Remote Telescopic Probe:** Adjustable from 305 to 914 mm L (12 to 36")

Weight: 300 g (0.66 lb)

Measuring air flow from an air conditioning duct.

Wireless PC Interface
RF Transmitter Carrier: ISM 2.4 GHz, direct sequence spread spectrum, license free world wide
RF Power Output: 10 dBm (10 mW)
RF Range:
- **Indoor/Urban:** Up to 40 m (130')
- **Outdoor/Line of Sight:** Up to 120 m (400')

To Order

Model No.	Range FPM (m/sec)	Description
HHF1001A*	0 to 5000 (0 to 25.4)	Air velocity/temperature meter, fixed probe
HHF1001R*	0 to 5000 (0 to 25.4)	Air velocity/temperature meter, remote telescopic probe
HHF1001A-W*	0 to 5000 (0 to 25.4)	Air velocity/temperature meter, fixed probe, wireless
HHF1001R-W*	0 to 5000 (0 to 25.5)	Air velocity/temperature meter, remote telescopic probe, wireless

Accessories

Model No.	Description
UWTC-REC1	48 channel wireless receiver
UNIV-AC-100/240	Universal 9 Vdc adaptor, 100 to 240 Vac input
SSLK-14-14	Compression fitting
T-FER-1/4	¼" PTFE ferrules (10 pack) for use with SSLK-14 -14 compression fitting

Comes complete with 305 mm (12") long sensor probe (or remote telescopic probe), 9V lithium battery, USB cable, Windows based data logging software, and operator's manual.

***Note:** UWTC-REC1 wireless receiver is required for wireless PC interface. Because of transmission frequency regulations, this product may only be used in the United States, Canada and Europe.*

** Add **"-CAL-3" f**or NIST traceable 4-point calibration certificate and additional cost to the price.*

***Ordering Examples: HHF1001A-W,** wireless air velocity/temperature meter, 0 to 5000 FPM range, fixed probe, and **UWTC-REC1** wireless receiver.*

***HHF1001A-CAL-3**, air velocity/temperature meter with NIST traceable 4-point calibration certificate.*

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AIR VELOCITY METER

With CFM/BTU/Dew Point/Wet Bulb/Temp/Humidity

HHF11A

1 YEAR WARRANTY NIST RoHS

Optional

- **Measures Temperature, Dew Point, Relative Humidity, Wet Bulb, Air Velocity, Air Volume, Capacity**
- **Lightweight, Easy-to-Maneuver Measurement Vane**
- **Single-Point Averaging**
- **°C/°F Selectable**
- **Auto Power-Off after 10 Minutes of Inactivity**
- **Jumbo Display**
- **Ball-Bearing Fan**
- **Optional Software**

HHF11A shown smaller than actual size.

The HHF11A anemometer can measure air flow, humidity, dew point, wet bulb, air volume, and capacity. The built-in microprocessor ensures high accuracy. It can also track the maximum and minimum values along with current readings, displaying the flow rate in the user's choice of meters per second or cubic feet per minute.

With its low-friction, ball-bearing, mounted-wheel design, the HHF11A is accurate at both high and low air velocity. The impeller is accurate to 5% and can measure the slightest breeze (0.3 m/s). Other features include single-point averaging of air volume and capacity, °C/°F selection, and auto shut-off after 10 minutes of non-use.

Measurement	Range	Resolution	Accuracy
Air Velocity	0.3 to 35 m/s (1 to 114 ft/s)	0.1	±5%
Air Volume	0 to 99,999 m^3/min (0 to 99,999 ft^3/min)	0.1	±5%
Capacity	0 to 99,999 BTU/h (0 to 99,999 kW)	0.1	±3%
Temperature	-20 to 60°C (-4 to140°F)	0.1°C/°F	±0.6°C (1°F)
Humidity	0 to 100%	0.1%	±3% from 10 to 90% ±5% above 90%
Dew Point	-68 to 70°C (-90 to 158°F)	0.1°C/°F	±3% from 10 to 90% ±5% above 90%
Wet Bulb	-22 to 70°C (-7.6 to 158°F)	0.1°C/°F	±3% from 10 to 90% ±5% above 90%

SPECIFICATIONS

Maximum Reading: 99,999
Cable Length: 50 cm extends to 1.5 m (20" extends to approx. 5')
Vane Diameter: 74 mm (2.9")
Vane Size (H x W x D): 164 x 74 x 40 mm (6.45 x 2.9 x 1.57")
Unit Size (H x W x D): 157 x 62 x 28 mm (6.18 x 2.44 x 1.1")
Display Size (H x W): 34 x 47 mm (1.3 x 1.85")
Digit Height: 18 mm (0.7")
Display: High-contrast 5-digit display
Power: 4 "AAA" batteries (included)
Weight: 263 g (9.28 oz) without batteries
Response Time: 1 second
Operating Current: 5 to 8 mA
Operating Temperature: 0 to 50°C (32 to 122°F)
Operating Humidity: Less then 90% RH

To Order

Model No.	Description
HHF11A	Air-flow meter
HHF11A-VANE	Replacement vane
HHF91-SW	Software and RS232 cable
CAL-3-FLOW	NIST-traceable 4-point calibration certificate
MN2400-12	Package of 12 replacement "AAA" batteries

Comes complete with operator's manual, hard carrying case and 4 "AAA" batteries.
***Ordering Example: HHF11A,** 5-digit air-flow meter.*

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HANDHELD ROTATING VANE ANEMOMETER

HHF141

1 YEAR WARRANTY | CE | NIST | RoHS

No Points Standard

- **High Accuracy (±1.0% of Reading)**
- **Rugged Metal Probe and Vane**
- **Ultra Low Sensitivity Down to 0.2 m/s (40 fpm)**
- **Measure Airflow from -20 to 100°C (-4 to 212°F)**
- **Minimum and Maximum Velocity Capture**
- **Analog Voltage Output and Communication Options**
- **NIST Calibration Included**

The OMEGA® HHF141 rotating vane anemometer is a high-quality instrument providing highly accurate air velocity measurements in harsh environments via a user-friendly and intuitive interface. Applications include manufacturing, laboratory, computer rooms, environmental control, flow hood monitoring, and other applications where precise air measurement is required.

SPECIFICATIONS

Ranges:
HHF141A: 25 mm (1") probe, 300 to 6800 FPM (1.5 to 35.00 MPS)
HHF141B: 70 mm (2¾") probe, 40 to 7800 FPM (0.2 to 40.00 MPS)
Accuracy: ±1.0% of reading ±1-digit
Resolution: 1 FPM or 0.01 MPS
Display: 12.7 mm (0.5") LCD, 4-digits, with LED backlight
Operating Temperature:
Instrument: 0 to 50°C (32 to 125°F)
Probe: -20 to 100°C (-4 to 212°F)
Power Supply: 3 "AA" alkaline batteries (included)
Battery Life: Approximately 150 hours
Dimensions:
Instrument: 165 x 83 x 38 mm (6.5 x 3.25 x 1.5")
HHF140A: 25 mm (1") diameter head
HHF140B: 70 mm (2.75") diameter head
Cable: 1.5 m (5')
Outputs (Optional): USB or 0 to 5 Vdc

To Order

Model No.	Description
HHF141A	Handheld anemometer kit with 25 mm (1") diagram probe
HHF141B	Handheld anemometer kit with 70 mm (2¾) diagram probe

Accessories

Model No.	Description
HHF140B-RP	Replacement 70 mm (2¾") vane probe
HHF140A-RP	Replacement 25 mm (1") vane probe and 1.5 m (5') cable
HHF140B-CABLE	Replacement 1.5 m (5') connector cable
HHF140-USB-CABLE	Replacement USB cable
HHF140-V-CABLE	Replacement analog output cable
MN1500-4	Package of 4 "AA" replacement batteries

Comes complete with vane probe [25 or 70 mm (1 or 2¾") depending on model], 3 extension rods (flexible, straight and with handle), 1.5 m (5') cable, 3 "AA" alkaline batteries, hard carrying case, NIST calibration certificate and operator's manual.

*For units with a protective boot and splash proof seals add suffix "**-PB**" to model number, for additional cost.*

*For units with USB communications add suffix "**-USB**" to model number, for additional cost.*

*For units with a 0 to 5 Vdc voltage output add suffix "**-V**" to model number, for additional cost.*

***Ordering Examples: HHF141B-USB**, anemometer with 70 mm (2¾") vane and USB communications.*

***HHF141A-V**, anemometer with 25 mm (1") vane and a voltage output.*

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HANDHELD ROTATING VANE ANEMOMETER WITH VOLUME CALCULATION

1 YEAR WARRANTY | CE | NIST | RoHS

3 Points

HHF142

- Enter, Store, and Recall Up to 10 Duct Sizes
- High Accuracy (±1.0% of Reading)
- Low Speed Sensitivity
- Wide Temperature Range from -20 to 100°C (-4 to 212°F)
- Minimum and Maximum Capture
- Analog Voltage Output and Communication Options
- NIST Calibration Included

The OMEGA® HHF142 rotating vane anemometer is a high-quality instrument providing accurate air velocity and volume flow measurements in harsh environments. The user can easily enter the size of the duct opening and the HHF142 automatically calculates the volume flow rate from the duct. The duct size is automatically stored in memory on turn-off and up to 10 unique duct sizes can be stored and recalled for frequent use.

SPECIFICATIONS

Ranges:
HHF142A: 1.5 to 35.00 MPS (300 to 6800 FPM)
HHF142B: 0.25 to 36.60 MPS (50 to 7800 FPM)
Calculated Air Volume Flow: 0.0 to 9999 CFM (0.0 to 9999 CMH)
Accuracy: ±1.0% of reading ±1-digit
Resolution: 1 FPM or 0.01 MPS
Display: 12.7 mm (0.5") LCD, 4-digits, with LED backlight
Operating Temp:
Instrument: 0 to 50°C (32 to 125°F)
Probe: -20 to 100°C (-4 to 212°F)
Power Supply: 3 "AA" alkaline batteries (included)
Battery Life: Approximately 150 hours
Dimensions:
Instrument: 165 x 83 x 38 mm (6.5 x 3.25 x 1.5")
HHF142A: 25 mm (1") diameter
HHF142B: 70 mm (2.75") diameter
Cable: 1.5 m (5')
Outputs (Optional): USB or 0 to 5 Vdc

To Order *Visit omega.com/hhf142 for Pricing and Details*

Model No.	Description
HHF142A	Handheld anemometer with 25 mm (1") dia probe
HHF142B	Handheld anemometer with 70 mm (2¾") dia probe

Accessories

Model No.	Description
HHF140B-RP	Replacement 70 mm (2¾") vane probe
HHF140A-RP	Replacement 25 mm (1") vane probe and 1.5 m (5') cable
HHF140B-CABLE	Replacement 1.5 m (5') connector cable
HHF140-USB-CABLE	Replacement USB cable
HHF140-V-CABLE	Analog output cable
MN1500-4	Package of 4 "AA" replacement batteries

Comes complete with vane probe [25 or 70 mm (1 or 2¾") depending on model], 3 extension rods (flexible, straight and with handle), 1.5 m (5') cable, 3 "AA" alkaline batteries, hard carrying case, NIST calibration certificate and operator's manual.

*For units with a protective boot and splash proof seals add suffix "**-PB**" to model number, for additional cost.*

*For units with USB communications add suffix "**-USB**" to model number, for additional cost.*

*For units with a 0 to 5 Vdc voltage output add suffix "**-V**" to model number, for additional cost.*

***Ordering Examples: HHF142B-PB**, anemometer with 70 mm (2¾") vane with a protective boot and splash proof seals.*

***HHF142A**, anemometer with 25 mm (1") vane.*

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HANDHELD ROTATING VANE THERMO-ANEMOMETER

HHF143 Series

1 YEAR WARRANTY · NIST · RoHS

No Points Standard

- **High Accuracy (±1.0% of Reading)**
- **Low Speed Sensitivity**
- **Wide Temperature Range -20 to 100°C (-4 to 212°F)**
- **Temperature Measurement Standard**
- **Minimum and Maximum Recall**
- **Analog Voltage Output and Communication Options**
- **NIST Calibration Included**

The OMEGA® HHF143 rotating vane anemometer series are high-quality instruments providing highly accurate air velocity and temperature measurements in harsh environments via a user-friendly and intuitive interface. Applications include indoor air quality, process control, flow hood monitoring, and many other applications where precise air flow and temperature measurement is required.

SPECIFICATIONS

Ranges:
HHF143B: 0.2 to 40.00 MPS (40 to 7800 FPM)
HHF143A: 1.5 to 35.00 MPS (300 to 6800 FPM)
Temperature (Using Either Air Velocity Probe Head): -20 to 100°C (-4 to 212°F)
Accuracy
Air Velocity: ±1.0% of reading ±1-digit
Temperature: ±(0.3°C + 0.2% of reading in °C)
Temperature Accuracy Examples: ±0.3°C @ 20°C (±0.5°F @ 68°F)
Resolution
Air Velocity: 0.01 MPS or 1 FPM
Temperature: 0.1°C or °F
Display: 12.7 mm (0.5") LCD, 4-digits, with LED backlight

Operating Temp:
Instrument: 0 to 50°C (32 to 125°F)
Air Probe: -20 to 100°C (-4 to 212°F)
Power Supply: 3 "AA" alkaline batteries (included)
Battery Life: Approximately 150 hours

Dimensions:
Instrument: 165 x 83 x 38 mm (6.5 x 3.25 x 1.5")
HHF143A: 25 mm (1") diameter
HHF143B: 70 mm (2.75") diameter
Cable: 1.5 m (5')

To Order

Model No.	Description
HHF143A	Handheld thermo-anemometer 25 mm (1") dia probe
HHF143B	Handheld thermo-anemometer 70 mm (2¾") dia probe

Accessories

Model No.	Description
HHF140B-RP-T	Replacement 70 mm (2¾") vane probe with temp sensor
HHF140A-RP-T	Replacement 25 mm (1") vane probe with temp sensor and 1.5 m (5') cable
MN1500-4	Package of 4 "AA" replacement batteries

Comes complete with vane probe [25 or 70 mm (1 or 2¾") depending on model], 3 extension rods (flexible, straight and with handle), 1.5 m (5') cable, 3 "AA" alkaline batteries, hard carrying case, NIST calibration certificate and operator's manual.

*For units with a protective boot add suffix "**-PB**" to model number, for additional cost.*

*For units with USB communications add suffix "**-USB**" to model number, for additional cost.*

*For units with a 0 to 5 Vdc voltage output add suffix "**-V**" to model number, for additional cost.*

***Ordering Example: HHF143B**, thermo-anemometer with 70 mm (2¾") vane.*

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HYGRO-THERMO ANEMOMETER

HHF144 Series

1 YEAR WARRANTY · NIST · RoHS

No Points Standard

- Measure from 5.0 to 95% RH
- Measure Airflow in Environments from -20 to 100°C (-4 to 212°F)
- Temp Measurements in Humidity Sensor Standard
- Minimum and Maximum Air Speed and Temp
- Analog Voltage Output and Communication Options
- NIST Calibration Included

The OMEGA® HHF144 rotating vane hygro-thermometer anemometer is a high quality instrument providing highly accurate humidity, air velocity, and temperature measurements in harsh environments via a user-friendly and intuitive interface. Applications include manufacturing, laboratory, computer rooms, environmental control, flow hood monitoring, and other applications where precise air measurement is required.

SPECIFICATIONS

Ranges:
HHF144B: 0.2 to 40.00 MPS (40 to 7800 FPM)
HHF144A: 1.5 to 35.00 MPS (300 to 6800 FPM)
Relative Humidity: 5.0 to 95% RH
Temperature (Using Standard Combination Temp/Humidity Probe): -20 to 80°C (-4 to 176°F)
Temperature (Using Optional Separate Temperature Probe): -95 to 200°C (-139 to 392°F)
Accuracy
Air Velocity: ±1.0% of reading ±1-digit
Temperature: ±(0.3°C + 0.2% of reading in °C)
Temperature Accuracy Examples: ±0.3°C @ 20°C (±0.5°F @ 68°F)
Relative Humidity: ±2.0% RH
Resolution
Air Velocity: 1 FPM or 0.01 MPS
Temperature: 0.1°F or °C (1°F below -99.9°F)
Relative Humidity: 0.1% RH
Response Time
Relative Humidity: Up to 90% of change in measured value in 15 seconds
Temperature: Approx. 60 sec in still air; Approx. 10 sec in moving air streams
Display: 12.7 mm (0.5") LCD, 4-digits, with LED backlight
Operating Temp
Instrument: 0 to 50°C (32 to 125°F)
Air Probe: -20 to 100°C (-4 to 212°F)
Temp/Humidity Probe: -20 to 80°C (-4 to 176°F)
Power Supply: 3 "AA" alkaline batteries (included)
Battery Life: Approximately 150 hours
Dimensions:
Instrument: 165 x 83 x 38 mm (6.5 x 3.25 x 1.5")
HHF144A: 25 mm (1") diameter
HHF144B: 70 mm (2.75") diameter
RH/Temp Probe: 152 x 25 mm (6 x 1") diameter

To Order

Model No.	Description
HHF144A	Handheld hygro-thermo anemometer with 25 mm (1") dia. probe
HHF144B	Handheld hygro-thermo anemometer with 70 mm (2¾") dia. probe

Accessories

Model No.	Description
HHF140B-RP	Replacement 70 mm (2¾") vane probe
HHF140A-RP	Replacement 25 mm (1") vane probe and 1.5 m (5') cable
HHF144-HP	Replacement temperature/humidity probe
MN1500-4	4 "AA" replacement batteries

Comes complete with vane probe [25 or 70 mm (1 or 2¾") depending on model], 3 extension rods (flexible, straight and with handle), 1.5 m (5') cable, 3 "AA" alkaline batteries, hard carrying case, NIST calibration certificate and operator's manual.

*For units with a protective boot add suffix "**-PB**" to model number, for additional cost.*
*For units with USB communications add suffix "**-USB**" to model number, for additional cost.*
*For units with a voltage output add suffix "**-V**" to model number, for additional cost.*

***Ordering Examples: HHF144B-USB**, anemometer with 70 mm (2¾") vane, temperature input and USB communications.*

***HHF144A-V**, anemometer with 25 mm (1") vane and a voltage output.*

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HHF803

1 YEAR WARRANTY

- **Large LCD Reads Air Velocity and Temperature Simultaneously**
- **Records Min. and Max. Reading with Recall**
- **Data Hold Function**
- **Auto Power Off**
- **RS232 Serial Interface**

HHF803, metal vane anemometer shown smaller than actual size.

Hard carrying case, operators manual and 9 Vdc battery included.

SPECIFICATIONS

Display: 51 x 32 mm LCD
Measurement: m/s, km/h, ft/min, knots, miles/h, Temperature in °C or °F, and Data Hold
Sensor Structure:
Air Velocity: Vane with low friction ball bearing design
Temperature: Precision thermistor
Memory: Minimum and Maximum with Recall
Power Off: Auto shut off or manual button
Sampling Time: 0.8 seconds
Data Output: RS232
Operating Temperature: 0 to 50°C (32 to 122°F)
Operating Humidity: <80% RH
Power Supply: 9 Vdc heavy duty battery (included)
Power Current: Approx. 8.3 mA DC
Overload Indication: "----"
Dimensions:
Instrument: 200 x 68 x 30 mm (7.9 x 2.7 x 1.2")
Probe: 72 mm (2.83") diameter
Weight: Approx 220 g (0.5 lb)

The HHF803 is an economical solution for any air flow application, such as, air conditioning and heating systems, wind speeds, balancing, and environmental testing. The portable HHF803 provides fast, accurate readings with digital readability and the convenience of a remote probe.The combination of low friction vane anemometer and standard thermistor delivers rapid and precise measurements. The microprocessor circuit assures the maximum possible accuracy and provides special functions and features.

Measurement	Range	Resolution	Accuracy
m/s	0.8 to 40 m/s	0.1 m/s	±(2% + 1 digit)
km/h	2.8 to 144 km/h	0.1 km/h	±(2% + 1 digit)
ft/min	160 to 4930 ft/min	1 ft/min	±(2% + 20 ft/min)
miles/h	1.8 to 89.4 mph	0.1 mph	±(2% + 1 digit)
knots	1.6 to 78.1 knots	0.1 knots	±(2% + 1 digit)
Temp. °C	0 to 60°C	0.1°C	0.8°C
Temp. °F	32 to 140°F	0.1°F	1.5°F

To Order

Model No.	Description
HHF803	Metal vane anemometer
SWCABLE	Software and cable
HHF803-RP	Replacement probe for HHF803

Comes complete with operator's manual, hard carrying case and 9V battery.
***Ordering Example: HHF803**, metal vane anemometer.*

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Wind Speed Data Logger
Part of the NOMAD® Family

OM-CP-WIND101A-KIT Series

5 YEAR WARRANTY

- **Durable Housing for Logger**
- **3-Cup Anemometer**
- **0 to 100 MPH (0 to 160 KPH) Range**
- **0.085 MPH Resolution at a 10 Second Sampling Rate**
- **±2.5% Calibrated Accuracy over 10 to 100 MPH (16 to 160 KPH) Range**
- **10 Year Battery Life**
- **1 Second Reading Rate**
- **Multiple Start/Stop Function**
- **Ultra High Speed Download**
- **500,000 Reading Storage Capacity**
- **Battery Life Indicator**
- **Optional Password Protection**
- **Field Upgradeable**

OM-CP-WIND101A-KIT, shown smaller than actual size.

The OM-CP-WIND101A is a complete system to accurately measure and record wind speed. This low cost wind speed recording system comes complete with a data logger, weatherproof enclosure, a three-cup anemometer and all the necessary cabling to quickly get up-and-running.

The logger can record up to 500,000 readings and the storage medium is non-volatile, solid state memory, providing maximum data security even if the battery becomes discharged. The small size of these devices allows them to fit almost anywhere.

The device can be started and stopped directly from a computer using our user-friendly software. Data retrieval is simple. Simply plug it into an available USB port and our user-friendly software does the rest.

The software converts a PC into a real-time strip chart recorder. Data can be printed in graphical and tabular format or exported to a text or Microsoft Excel® file. The storage medium is non-volatile solid state memory, providing maximum data security even if the battery becomes discharged.

Specifications

Measurement Range:
0 to 100 mph (0 to 45 m/s)
Resolution: 0.085 mph at 10 second reading interval
Accuracy: ±2.0 mph from 0 to 10 mph; ±2.5% of reading from >10 to 100 mph
Starting Threshold: 1.75 mph
Reading Rate: 1 reading every second to 1 every 24 hours
Memory: 500,000 readings; software configurable memory wrap 250,000 readings in multiple start/stop
Memory Wrap Around: Yes
Start Modes: Immediate start, delay start up to 18 months, multiple pushbutton start/stop
Stop Modes:
Manual through software, timed (specific date and time)
Multiple Start/Stop Mode:
Start and stop the device multiple times without having to download data or communicate with a PC

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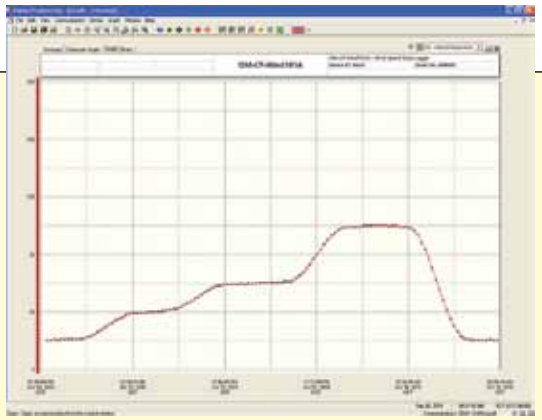
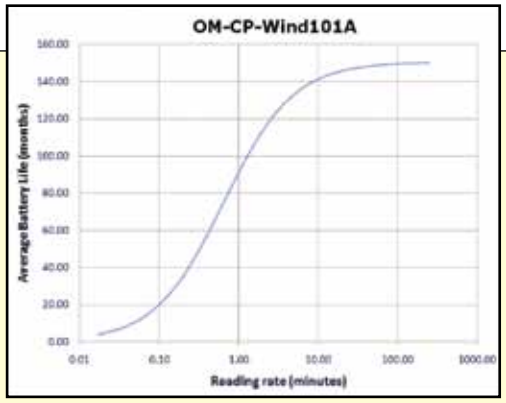


OM-CP-IFC200, Windows® software displays data in graphical or tabular format.



Average battery life vs. reading rate of OM-CP-WIND101A recording in a 25°C environment.

Multiple Start/Stop Mode Activation:

To Start the Device: Press and hold the pushbutton for 5 seconds, the green LED will flash during this time; the device has started logging

To Stop the Device: Press and hold the pushbutton for 5 seconds, the red LED will flash during this time. The device has stopped logging.

Real Time Recording: The device may be used with PC to monitor and record data in real-time

LED Functionality:

Green LED Blinks: 10 second rate to indicate logging; 15 second rate to indicate delay start

Red LED Blinks: 10 second rate to indicate low battery and/or full memory; 1 second rate to indicate an alarm condition

Password Protection: An optional password may be programmed into the device to restrict access to configuration options. Data may be read out without the password

Engineering Units: MPH, KPH, M/S, KNOTS (software selectable)

Battery Type: 3.6V lithium battery (included); user replaceable

Battery Life: 10 years typical, dependent upon frequency and duty cycle

Time Accuracy: ±1 minute/ month at 20°C (68°F), stand alone data logging

Computer Interface: USB (interface cable required); 115,200 baud

Software: XP SP3/Vista/7 and 8 (32- and 64-bit)

Anemometer Operating Environment: -55 to 60°C (-67 to 150°F); 0 to 100%RH

Operating Environment: -20 to 60°C (-4 to 150°F), 0 to 100% RH non-condensing

IP Rating: IP65

Anemometer Dimensions: 54 H x 192 mm D (2.1 x 7.5")

Dimensions:

Data Logger: 74 H x 148 W x 39 mm D (2.9 x 5.8 x 1.5")

Enclosure: 93 H x 62 W x 24 mm D (3.7 x 2.5 x 0.9")

Weight: 513 g (18.1 oz)

Material: ABS plastic

To Order

Model No.	Description
OM-CP-WIND101A-KIT	Wind speed recording system. Includes 3-cup anemometer with sensor connection cable 7.6 m (25'), data recorder, weatherproof enclosure and the OM-CP-IFC200 package which includes the Windows software and 1.8 m (6') USB interface cable
OM-CP-WIND101A-KIT-50	Wind speed recording system. Includes 3-cup anemometer with sensor connection cable 15 m (50'), data recorder, weatherproof enclosure and the OM-CP-IFC200 package which includes the Windows software and 1.8 m (6') USB interface cable
OM-CP-WIND101A-KIT-100	Wind speed recording system. Includes 3-cup anemometer with sensor connection cable 30.5 m (100'), data recorder, weatherproof enclosure and the OM-CP-IFC200 package which includes the Windows software and 1.8 m (6') USB interface cable
OM-CP-WIND101A-KIT-150	Wind speed recording system. Includes 3-cup anemometer with sensor connection cable 46 m (150'), data recorder, weatherproof enclosure and the OM-CP-IFC200 package which includes the Windows software and 1.8 m (6') USB interface cable
OM-CP-BAT105	Replacement 3.6V lithium battery
OM-CP-WATERBOX101A	Replacement weatherproof NEMA 4 (IP65) enclosure for data logger
OM-CP-WATERBOX101A-KIT	Maintenance kit for OM-CP-WATERBOX101A

Comes complete with 3.6V lithium battery and OM-CP-IFC200 package which includes the Windows software, operator's manual and 1.8 m (6') USB interface cable.

***Ordering Example: OM-CP-WIND101A-KIT,** wind speed recording system.*

To Order, Call 1-800-DAS-TEEE or Shop Online at omega.com℠

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PSU-93

1 YEAR WARRANTY

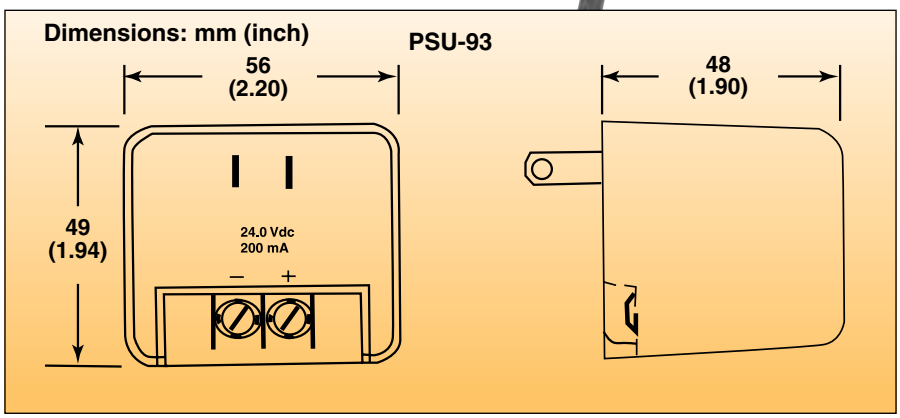
SPECIFICATIONS

Input Voltage: 120V ±10%, 60 Hz
Output Voltage: 16 to 23 Vdc (see table)
Output Voltage Connection: Screw terminals, up to 16 AWG, #6 to 32 screws
Ambient Operating Temperature: 0 to 50°C (32 to 122°F)
Dimensions: 55.9 W x 49.3 H x 48.3 mm D (2.20 x 1.94 x 1.90")
Weight: 198 g (7 oz)

PSU-93 plug-in power supply provides an unregulated 16 to 23V supply for electronic equipment.

Input		105 Vac	120 Vac	130 Vac
Output (mA)		Output Vdc	Output Vdc	Output Vdc
No Load	0	20.0	23.0	25.0
	50	17.8	20.5	22.0
	100	16.5	19.5	21.0
	200	15.0	17.5	19.0
Full Load	300	13.5	16.0	17.0

PSU-93 shown smaller than actual size.

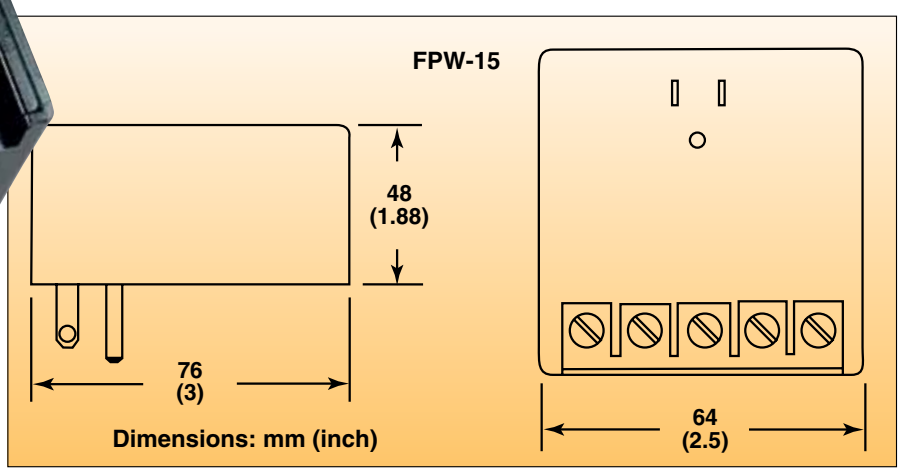


FPW-15

1 YEAR WARRANTY

FPW-15 shown smaller than actual size.

The FPW-15 is a regulated 15 Vdc supply for electronic equipment.



SPECIFICATIONS

Input Voltage: 120 V ±10%, 60 Hz
Output Voltage: 15 Vdc at 400 mA
Output Voltage Connection: Screw terminals, #6, up to 16 AWG
Ambient Operating Temperature: 0 to 50°C (32 to 122°F)
Dimensions: 63.5 W x 76.2 H x 47.6 mm D (2.5 x 3 x 1⅞")

To Order

Model No.	Description
PSU-93	24 Vdc, 200 mA
FPW-15	15 Vdc, 400 mA

***Ordering Examples: PSU-93**, 24 Vdc power supply.*
***FPW-15**, 15 Vdc power supply.*

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GAS TURBINE AND TRANSMITTER SYSTEMS
WITH ATEX ENCLOSURES

NEW

SYS/FTBG-100 Series

MADE IN USA | 1 YEAR WARRANTY | NIST | CE | Ex

Standard

- Outstanding Accuracy
- Hybrid Ceramic Bearings for Superior Life
- DC or AC (Optional) Power
- Pulse and Analog Output
- Optional Hi and Lo Alarms
- Factory Configured
- Windows® Configuration Software (Included)

SYS/FTBG-101/FLSC-C3, shown smaller than actual size.

F

OMEGA's high accuracy Gas Turbine Series measures the volumetric flow of gas through a pipeline. Gas flowing through the meter turns the turbine rotor at an angular velocity which is proportional to the velocity of the gas being measured. As the turbine rotor turns, the rotor blades pass a non-intrusive pickup coil that generates an electrical signal, referred to as a pulse. Each pulse represents a specific volume of gas (i.e. ACF/AM3). The totalization of these pulses results in the total volumetric flow. The total volume can be converted to mass flow total (SCF or NM3) using reference conditions and base density, or by applying various correction techniques. Standard calibrations for these gas turbine systems are performed at a reference density of 0.1 lb/Ft³. A 10-point calibration certificate (traceable to NIST or other recognized national laboratory) is supplied with each meter. Standard calibration includes a calculated K-factor for gas that is derived from a 10-point NIST calibration for water. Calibrations at customer's actual operating densities can be performed with special order.

OMEGA's gas turbine flowmeters offer high accuracy measurement of gases for a wide variety of applications, including fiscal measurement, plant cost allocation, energy consumption/conservation, etc. These gas turbine systems are suitable for all non-corrosive gases such as natural gas, air and nitrogen. Special versions of this series are available for use on corrosive gases, such as "off-gas" and feature NACE- MR175 trim and self-lubricated ceramic ball bearings. Contact OMEGA for further details.

An OMEGA® gas turbine flowmeter should be chosen so that it is operated within its most accurate range. The capacity of a turbine flowmeter is based on the actual volumetric flow rate and is expressed as actual cubic feet (ACF) or actual cubic meters (AM3). The lower limit of operation is a function of the gas density and velocity.

SPECIFICATIONS (TURBINE)

Over-range: 150% of maximum flow (intermittently)
Turn Down Range: Dependent on gas density at user's operating conditions
Linearity: ±1% of reading typical
Repeatability: ±0.25% over tabulated repeatable range
Available Temperature Range: -157 to 149°C (-250 to 300°F) continuous
End Fittings (Standard): NPT
Bearing Styles: Self-lubricating, ceramic hybrid ball bearings
Materials: 316/316L dual rated stainless steel with 17.4 pH rotor

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FLSC-C3, shown smaller than actual size.

Specifications (Signal Conditioner)

Input Signal Type: MCP pickup
Input Frequency Range: 0.2 Hz to 4 KHz
Signal Level: 10 mV rms to 30 Vdc
Power Supply: 13 to 30 Vdc standard, 100 to 240 Vac (-AC) (optional), reverse polarity protection
Analog Output: 4 to 20 mA, 1 to 5V, 24 mA overflow condition (dip switch selectable)
Load Resistance: Maximum 650 Ω @ 24 Vdc
Accuracy: ±0.02% of full scale
Temperature Drift: 40 ppm/°C
Pulse Output: 0 to 5V
Recommended Minimum Load Resistance: 50 KΩ
Pulse Scaling: Divide by 1,10,100 per flow unit of measure
Hi/Lo Alarm (Optional): Relay (2A, 30 Vdc), 0 to 5V, open collector (0.5A, 30V)
Communications: RS232 port for configuration and diagnostics
Linearization: Up to 20 points
Operating Temperature: -40 to 85°C (-40 to 185°F)
Humidity: 0 to 90% non-condensing
Enclosure: Extruded aluminum explosion-proof ATEX
Port: ¾-14 NPT
Regulatory: CE compliant

To Order *Visit omega.com/sys_ftbg-100 for Pricing and Details*

Model Number	Description	Meter Size	NPT	Blade Angle	Nat Gas 2 to 3 psi @ 0.05lb/FT³ Range ACFM	Nat Gas 2 to 3 psi @ 0.05lb/FT³ Pressure Drop (PSID)	Air 35 to 40 psi @ 0.25lb/FT³ Range ACFM	Air 35 to 40 psi @ 0.25lb/FT³ Pressure Drop (PSID)	Maximum Pressure
SYS/FTBG-101/FLSC-C3	Gas turbine	¼	½	30°	0.3 to 1.6	0.1	0.13 to 1.6	0.5	6000 psi
SYS/FTBG-102/FLSC-C3	Gas turbine	¼	½	15°	0.65 to 3.5	0.02	0.35 to 3.5	0.1	
SYS/FTBG-103/FLSC-C3	Gas turbine	⅜	½	30°	0.6 to 2.3	0.1	0.27 to 2.3	0.5	
SYS/FTBG-104/FLSC-C3	Gas turbine	⅜	½	15°	1.3 to 5	0.02	0.6 to 5	0.1	
SYS/FTBG-105/FLSC-C3	Gas turbine	⅝	¾	30°	1 to 4.4	0.1	0.45 to 4.4	0.5	4400 psi
SYS/FTBG-106/FLSC-C3	Gas turbine	⅝	¾	15°	2.17 to 9.5	0.025	1 to 10	0.125	
SYS/FTBG-107/FLSC-C3	Gas turbine	¾	¾	30°	1.2 to 9.2	0.1	0.54 to 9.2	0.5	
SYS/FTBG-108/FLSC-C3	Gas turbine	¾	¾	15°	2.6 to 20	0.02	1.2 to 20	0.1	
SYS/FTBG-109/FLSC-C3	Gas turbine	1	1	30°	1.6 to 20	0.2	0.72 to 20	1	3850 psi
SYS/FTBG-110/FLSC-C3	Gas turbine	1	1	15°	3.5 to 43	0.04	1.6 to 43	0.2	
SYS/FTBG-111/FLSC-C3	Gas turbine	1½	1½	30°	3.5 to 55.5	0.15	1.6 to 55.6	0.75	3500 psi
SYS/FTBG-112/FLSC-C3	Gas turbine	1½	1½	15°	7.6 to 120	0.035	3.5 to 120	0.175	
SYS/FTBG-113/FLSC-C3	Gas turbine	2	2	30°	7 to 93	0.3	3.1 to 93	1.5	3000 psi
SYS/FTBG-114/FLSC-C3	Gas turbine	2	2	15°	15 to 200	0.0625	7 to 200	0.3125	
SYS/FTBG-115/FLSC-C3	Gas turbine	3	3	30°	15 to 363	0.4	6.7 to 363	2	1500 psi
SYS/FTBG-116/FLSC-C3	Gas turbine	3	3	15°	35 to 600	0.1	15 to 600	0.5	

Systems come complete with turbine, signal conditioner and operator's manual.
*For units with 100 to 240 Vac power add **"-VAC"** to model number, for additional cost, not available with alarm option.*
*For units with optional high/low alarm relay add **"-AL"** to the model number, for additional cost.*

Signal Conditioners/Accessories

Model Number	Range	Description
FLSC-C3	4 to 20 mA CE	Replacement signal conditioner† only for gas turbine system
FLSC-C3-AL	4 to 20 mA and alarm CE	Replacement signal conditioner† with alarm only for gas turbine system
OM-CONV-USB	—	USB to RS232 converter
FLSC-C-CABLE	—	9-pin D connector to transmitter Molex

*† Replacement signal conditioners require the purchase of FLSC-C-CABLE to enable them to be programmed in the field. Required software available free at **omega.com/ftp.***
***Ordering Example: SYS/FTBG-107/FLSC-C3,** ¾" gas turbine with 4 to 20 mA signal conditioner.*

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With Dry Contact Alarm or Analog Outputs

WMS Series

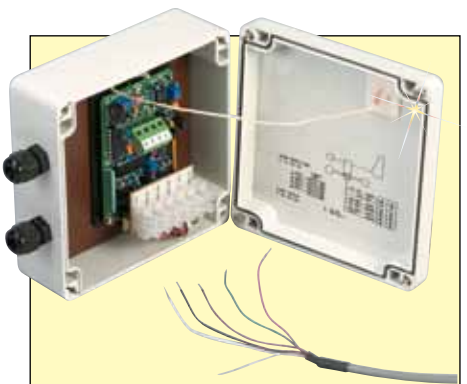
1 YEAR WARRANTY

WMS-21, dual setpoint wind station shown smaller than actual size.

WMS-23, wind speed and direction sensor module shown smaller than actual size.

The WMS-21 dual setpoint wind alarm is a microprocessor-based wind alarm system. It features an audible alarm and controls two relays whenever wind speed reaches either of two independent setpoints. An LCD displays the current and wind speeds.

The WMS-23S monitors wind speed, converting 0 to 100 mph wind velocity to a proportional 4 to 20 mA signal for use by process controllers or monitoring systems. The WMS-23 monitors wind speed and direction, with a second 4 to 20 mA signal corresponding to 0 to 360°. The three cup anemometer (and wind vane) is constructed of UV resistant ABS plastic and anodized aluminum, while the electronics are housed in a gasketed wall mount NEMA enclosure.



WMS-23, electronics. Complete unit includes, sensor module and electronics. Shown smaller than actual size.

SPECIFICATIONS

WMS-21

Transducer: Sealed magnetic switch
Range: 0 to 100 mph
Resolution: 0.1 mph
Threshold Speed: 1 mph
Accuracy: 1 mph or ± 3% which ever is larger
Alarm ON and/or OFF Delay: 0 to 99 sec, adjustable
Indicators: LEDs for alarm point 1 and 2; 2 line x 16 character LCD, 3 x 8 mm (0.12 x 0.31") size
Operating Temperature: -20 to 50°C (-4 to 122°F)
Power: 12 Vac or dc; 50 mA maximum
Alarms: Contacts rated 3A at 24 Vdc/115 Vac, SPDT
Anemometer Cable Length: 12 m (40'), included
Dimensions, Anemometer: 114 H x 216 W mm (4.5 x 8.5")
Dimensions, Electronics Enclosure: 120 H x 198 W x 89 mm D (4.7 x 7.8 x 3.5")
Mounting: 27 mm (1.062") OD pipe (¾" IPS)

WMS-23/WMS-23S (Wind Speed)

Speed Threshold: 0.8 mph
Transducer Type: Reed switch
Measurement Range: 0 to 100 mph
Accuracy: 1 mph or ± 3%
Output: 4 to 20 mA, proportioned to 0 to 100 mph
Dimensions, Anemometer: 114 H x 216 mm W (4.5 x 8.5")

WMS-23 (Wind Direction)

Azimuth Accuracy: ± 3°
Range: 0 to 360°
Potentiometer Gap: 5°
Threshold: 1.2 mph
Bearings: Bushing
Outputs: Dual 4 to 20 mA loops, proportioned to 0 to 100 mph and to 0 to 360°
Dimensions, Anemometer/vane: 305 H x 254 mm W (12 x 10")

COMMON SPECIFICATIONS

WMS-23 and WMS-23S

Current Loop Accuracy: ± 1% full scale
Power: 8 to 30 Vdc
Circuit Time Constant: 1 sec
Temperature Range: -40 to 40°C (-40 to 104°F)
Dimensions, Electronics Enclosure: 120 x 120 x 57 mm D (4.7 x 4.7 x 2.25")
Cable: 12 m (40') included

To Order

Model No.	Description
WMS-21	Dual setpoint wind station
WMS-23S	Wind speed monitor 4 to 20 mA output
WMS-23	Wind speed/direction monitor, dual 4 to 20 mA outputs
WMS-EC-40	12 m (40') extension cable

Comes complete with sensor cable and operator's manual.
Ordering Example: WMS-23, *wind speed/direction wind station with dual 4 to 20 mA outputs and cable, and* ***WMS-EC-40,*** *12 m (40') extra extension cable.*

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Modular Weather Stations

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WMS-25 Series

1 YEAR WARRANTY

- **Desktop, NEMA, and Portable Models**
- **8 Analog and 3 Digital Channel Inputs**
- **Resolution: 12-Bit A/D Converter on 4 Channels, 10-Bit on Other Channels**
- **Adjustable Logging Interval 10 to 60,000 Seconds**
- **16 Character x 2 Line Backlit LCD Screen Display**
- **Real-Time Clock is Used to Time-Stamp each Measurement, Battery Backed, and Accurate to Within 10 Minutes Per Year**
- **Serial Port: RS232 9-Pin Connector, Selectable Baud Rate, Real-Time Data Output to PC (Using Hyperterminal or Optional Graphic Software)**
- **512MB SD Memory Card and USB Card Reader Included**

WMS-25 shown smaller than actual size.

The WMS-25 Modular Weather Stations are meteorological systems designed to be a “user friendly” solution for data storage and real-time monitoring of weather conditions.

The standard sensor package includes 6 weather parameters: wind speed and direction, temperature and relative humidity, barometric pressure, and precipitation (additional optional sensors can be added), a 1.5 m (5') tripod and vertical mast for sensor mounting, and a data logger with LCD display.

No computer is required for setup and viewing data. A simple menu interface using the LCD display and three front panel buttons makes setup easy. Data is recorded directly to a Secure Digital (SD™) card, providing convenient data downloads and storage for many months of data. The data logger is compatible with standard SD cards up to 2GB. Logging at 1 minute intervals, a 2GB card will store over 5 years of data. A new file is created and saved to the card each day.

Using the recorded data is simple. The SD card is inserted into a card reader attached to the USB port on your computer (Windows, Macintosh, and Linux) and will then show up as a drive. To view and graph the data, click on the file corresponding to the day of interest. Microsoft Excel, OpenOffice.org, or any spreadsheet program can be used to view, graph, and analyze your data.

View graph, and analyze your recorded data. Laptop not included.

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Specifications

Power: 10 to 30 Vdc at 20 mA
Display: 16 characters x 2 line backlit LCD
Logging Interval: Programmable 10 to 60,000 seconds
Wind Speed
- **Range:** 0 to 125 mph (0 to 57 m/s)
- **Resolution:** > 0.1 mph
- **Accuracy:** ± 1 mph
- **Starting Threshold:** 0.8 mph
- **Time Constant:** 2 seconds

Wind Direction
- **Range:** 0 to 360°
- **Resolution:** > 1°C
- **Accuracy:** ±3°
- **Starting Threshold:** Standard 1.2 mph

Temperature
- **Range:** -40 to 60°C (-40 to 140°F)
- **Resolution:** > 0.1° F
- **Accuracy:** ±0.5°C (±1°F) typical
- **Response Time:** 50 seconds

Relative Humidity
- **Range:** 3% to 100% non-condensing
- **Accuracy:** ±3% typical
- **Response Time:** 25 seconds

Barometric Pressure
- **Range:** 500 to 1100 mb typical (14.7 to 32.5 inHg)
- **Operating Temperature:** -40 to 60°C (-40 to 140°F)
- **Resolution:** ±0.3 mb or ±0.01 inHg
- **Altitude Offset (For Sea Level Correction):** User adjustable in logger

Rain Gauge
- **Resolution:** 0.01"/tip 8" diameter (20.5 cm) collector meets NWS specifications
- **Switch:** Dry reed switch
- **Output:** < 0.1 sec switch closure
- **Accuracy:** ±2% at < 2" per hour

Note: *For weight and dimensions, see operator's manual at OMEGA.*

To Order

Model No.	Description	Included Models
WMS-25	Weather station with indoor enclosure, with temperature and humidity	WMS-25-DL, WMS-25-WSD, WMS-25-BP, WMS-25-TH, WMS-25-RG and WMS-25-TP5
WMS-25-NEMA	Weather station with NEMA-4X enclosure, with temperature and humidity	WMS-25-NEMA-DL, WMS-25-WSD, WMS-25-BP, WMS-25-TH, WMS-25-RG and WMS-25-TP5
WMS-25-P	Portable weather station, with temperature	WMS-25-P-DL, WMS-25-WSD, WMS-25-AT and WMS-25-TP3
WMS-25-PRH	Portable weather station, with temperature and humidity	WMS-25-P-DL, WMS-25-WSD, WMS-25-TH and WMS-25-TP3
Accessories		
WMS-25-SP	Solar panel, 10 watt with regulator (use with WMS-25-NEMA)	
WMS-25-SR	Solar radiation sensor	
WMS-25-GS	Graphical display software	
WMS-25-BP	Barometric pressure sensor (use with WMS-25P, WMS-25-PRH)	
WMS-25-SRG	Small rain gauge, 0.02" tip, 7.6 m (25') cable (use with WMS-25-P, WMS-25-PRH)	
WMS-25-TWS	Soil/water temperature sensor	
Replacement Parts		
WMS-25-P-DL	Data logger only, in carrying case	
WMS-25-DL	Data logger in desktop enclosure	
WMS-25-NEMA-DL	Data logger in NEMA 4X (IP67) enclosure	
WMS-25-RG	8" rain gauge, 0.01" tip, 18.2 m (60') cable	
WMS-25-AT	Air temperature sensor, 12.2 m (40') cable	
WMS-25-TH	Temperature/humidity sensor with radiation shield, 12.2 m (40') cable	
WMS-25-RS	Radiation shield	
WMS-25-TP5	1.5 m (5') tripod with 1.5 m (5') mast	
WMS-25-TP3	0.91 m (3') tripod with 1.8 m (6') mast	
WMS-25-WSD	Wind speed and direction sensor	
WMS-25-MC	Spare 512MB memory card	
WMS-25-MCR	Memory card reader	

Comes complete with 512MB SD card, USB card reader and operator's manual.
Ordering Example: WMS-25-P, *portable weather station with* ***WMS-25-MC,*** *spare 512MB memory card.*

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LABORATORY-GRADE BENCHTOP CLOSED LOOP WIND TUNNEL

WT-3067

1 YEAR WARRANTY RoHS

NEW

WT-3067 shown smaller than actual size.

- Quick Access Panel
- Sensor Ports (6)
- Control Flow and Temperatures While Viewing Data and Monitoring Events
- Very Low Turbulence Intensity

Applications

- High Temperature Testing
- Heat Sink Characterization
- Sensor Calibration
- Component Testing
- Aerodynamic and Pressure Drop Measurement
- Multiple PCB Testing

The WT-3067 is a research-quality closed loop wind tunnel that provides a convenient, accurate system for thermally characterizing PCBs and individual components at controlled temperatures from ambient to 85°C (185°F).

The WT-3067 wind tunnel produces air flows up to 7 m/s (1378 ft/min). With customization, it can generate flows up to 50 m/s (10,000 ft/min) using orifice plates (available custom). The clear polycarbonate test section lets the user view the test specimen and allows for flow visualization.

Wind tunnel controller (included). Shown smaller than actual size.

Unlike open loop wind tunnels, the WT-3067 recirculates internal air. This allows the system heater to rapidly warm the air to a specific temperature. The testing of boards and components in hot air is a requirement in some NEBS and other standards. The precise controls and temperature range of the WT-3067 wind tunnel allow its use for testing heat sink performance and for calibrating air and temperature sensors.

The complete wind tunnel fits on most lab benches and is powered from standard AC outlets. It has a smaller footprint than traditional, closed loop wind tunnels or environmental test chambers.

The WT-3067 is provided with a controller for controlling the flow and temperature in the wind tunnel. The controller comes with a graphical user interface to automate the wind tunnel operation.

The WT-3067 test section can be accessed from the top door for mounting and repositioning of boards, components and sensors. Internal rail guides provide an easy mechanism to install test specimens of different sizes (e.g. PCB, heat sink).

Instrument ports (6) are provided in the side walls of the test section for placing temperature and velocity sensors such as thermocouples, pitot tubes and hot-wire anemometers. Sensors to measure the flow parameters are also available from OMEGA®.

Software screen shot

SPECIFICATIONS

Wind Tunnel:
143.6 L x 49.3 W x 67.7 cm H
(56.5 x 19.4 x 26.6")
Test Section: 41.8 L x 22.5 W x 8.9 cm H
(16.4 x 8.9 x 3.5")
Number of Sensor Ports: 6
Flow Range: 0 to 7 m/s
(0 to 1200 ft/min)
Flow Uniformity: ±1%
Flow Accuracy: ±2%
Temperature Range:
Up to 85°C (185°F)
Temperature Accuracy: ±1°C
Weight: 70.7 kg (156 lb)
Main AC Voltage: 220 Vac
Main AC Fuse: 20 Amps
Minimum Support Table Size:
115 L x 50 cm W (45.2 x 19.7")

To Order

Model No.	Description
WT-3067	Laboratory-grade benchtop closed loop wind tunnel

Comes complete with wind tunnel controller, and thumb drive (software and manual on thumb drive).

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WT-3106 and WT-3107

1 YEAR WARRANTY RoHS

NEW

- Quick Access Panel
- Sensor Ports (18)
- Change Flow Rates by Controlling the (5) Fans On/Off
- Operate Vertically or Horizontally
- Flow Visualization Through the All Plexiglas® Test Section

Applications

- Component Temperature Testing: Evaluate the Effects of Air Flow on an Individual or Multiple Component's Temperature and PCB Response and Reliability
- Heat Sink Characterization of Natural or Forced Convection
- Sensor Calibration with Optional Calibrated Sensors
- Multiple PCB Testing: Test Actual or Simulated PCBs for Thermal and Flow Distribution*

** Visit omega.com for the TVS-1000 Series temperature/velocity profiling packages.*

The WT-3106 and WT-3107 are research quality wind tunnels designed for PCB and component level testing. It is used in air flow characterization and flow visualization, thermal resistance measurements, and generation of P-Q curves.

The wind tunnels can be used to characterize different heat sink sizes for natural and forced convection cooling. Two heat sinks can be tested side by side to determine their thermal performance in the same environment. Actual or simulated PCBs can be tested for thermal flow distribution and pressure drop characterization.

The WT-3106 and WT-3107 produce uniform air flows of up to 6 m/s (1200 ft/min). Air is drawn into the tunnel with up to 5 variable DC fans mounted at the exhaust section of the tunnel. These fans are mounted on a tray and can be easily replaced with another tray to accommodate larger or smaller fans.

An internal flow management system, with honeycombs and screens, breaks up turbulence and provides uniform and homogeneous flow in the test section.

The WT-3106 and WT-3107 can be operated both vertically and horizontally and features a Plexiglas® test section for ease of flow visualization. Rail guides are provided so the unit position can be adjusted.

WT-3106 shown smaller than actual size.

The WT-3106 and WT-3107 include 18 sensor ports in front and on the sides of the test section for inserting a variety of probes, such as thermocouples, pitot tubes, velocity measuring sensors, etc. The flexibility of the movable plate and housing provides users with a high degree of latitude to design and build their own setup to suit their needs. A switch box is provided with the unit so individual fans can be turned on and off. Sensors to measure the flow parameters are also available by OMEGA as optional accessories.

Specifications

Wind Tunnel:
WT-3106: 195.3 L x 101.6 W x 84.8 cm D (76.9 x 40 x 33.4")
WT-3107: 197.7 L x 101.6 W x 77.2 cm D (77.8 x 40 x 30.4")
Test Section:
WT-3106: 60.9 L x 60.9 W x 15.2 cm D (24 x 24 x 6")
WT-3107: 60.9 L x 60.9 W x 17.8 cm D (24 x 24 x 7")
Number of Sensor Ports: 18
Flow Range:
WT-3106: 0 to 6 m/s (0 to 1200 ft/min)
WT-3107: 0 to 5.5 m/s (0 to 1100 ft/min)
Flow Uniformity: ±1%
Weight:
WT-3106: 72 kg (159 lb)
WT-3107: 70 kg (155 lb)
Power Supply Requirements: 24 Vdc at 5.5 Amps
(Power supply provided by customer)

To Order

Model No.	Description
WT-3106	Research quality wind tunnel, 0 to 1200 ft/min
WT-3107	Research quality wind tunnel, 0 to 1100 ft/min

Comes complete with (18) sensor ports, fan switch box and operator's manual.

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RESEARCH QUALITY WIND TUNNEL

NEW

WT-3200

1 YEAR WARRANTY RoHS

- Quick Access Chamber
- Measure Pressure, Velocity and Temperature Through (6) Sensor Ports
- Change Flow Rates by Controlling (4) Fans On/Off
- Operate Vertically or Horizontally
- Flow Visualization Through the All Plexiglas® Test Section

Laptop not included

WT-3200 and TVS-1008 (sold seperately) shown smaller than actual size.

Applications

- Component Temperature Testing: Evaluate the Effects of Air Flow on an Individual or Multiple Component's Temperature and PCB Response and Reliability
- Heat Sink Characterization: Natural or Forced Convection
- Sensor Calibration with Calibrated Flow Sensor (Sold Separately)
- Multiple PCB Testing: Test Actual or Simulated PCBs for Thermal and Flow Distribution*

**Visit omega.com for theTVS-1000 series temperature/ velocity profile packages.*

The WT-3200 is a unique, fully controllable wind tunnel for thermal and air flow testing of multiple PCBs. The test chamber has a 2-D converging nozzle with a multi-point measurement area for sensor placement upstream of the test section. The test section is equipped with card guides to allow insertion of actual or simulated PCBs from the side panel.

The WT-3200 wind tunnel can be used to characterize different heat sink sizes for natural and forced convection cooling. Two heat sinks can be tested side by side to determine their thermal performance in the same environment. Actual or simulated PCBs can be tested for thermal flow distribution and pressure drop characterization.

The chamber can accommodate up to 6 PCBs with 13 mm (0.5") card-to-card spacing or 3 PCBs with 25 mm (1") card-to-card spacing.

TVS-1008 fan control box, shown smaller than actual size

The test section is made of clear polycarbonate material to accommodate smoke flow visualization. The chamber has its own stand for placement of instruments. The WT-3200 is placed on castors for ease of transportation. Rail guides are provided so the unit position can be adjusted. A switch box is provided with the unit so individual fans can be turned on or off.

The WT-3200 can be fitted with different fan trays to accommodate a broad air flow range. Sensors to measure the flow parameters are also availabled by OMEGA as optional accessories.

SPECIFICATIONS

Wind Tunnel: 214.5 L x 114.3 W x 91.3 cm D (84.4 x 45 x 35.9")
Test Section: 60.9 L x 46.9 W x 7.6 cm D (24 x 18.5 x 3")
Number of Sensor Ports: 18
Flow Range: 0 to 10 m/s (0 to 2000 ft/min)
Flow Uniformity: ±1%
Weight: 74 kg (164 lb)
Power Supply Requirements: 24 Vdc at 4.3 Amps (Power supply provided by customer)

To Order

Model No.	Description
WT-3200	Research quality wind tunnel

Comes complete with (18) sensor ports, fan control box and operator's manual.

Ordering Example: WT-3200, *research quality wind tunnel.*

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OMEGA'S LABORATORY-GRADE BENCHTOP WIND TUNNEL

- **Precise Motor Control for Adjusting Flowrates**
- **NIST Calibration Supplied with Each Wind Tunnel**
- **Highly Accurate to 1% of Reading**
- **Large 101.6 x 101.6 mm (4 x 4") Test Chamber**
- **Highly Stable Delta Pressure Sensor and Readout Included with Each Wind Tunnel**
- **Fully Instrumented**
- **Optional Environmental Monitoring Package of Temp, Humidity, Barometric Pressure and Delta P Available**

OMEGA's state-of-the-art wind tunnel is designed to give a highly uniform flow rate over a 152 mm (6") test section. A powerful 12 amp motor with variable speed from 0 to 10,000 RPM is adjustable to give a particular flowrate by a precise motor control unit. Each wind tunnel is supplied with an NIST traceable certificate.

The uniform flowrate is determined by monitoring a highly repeatable differential pressure sensor which has been calibrated to each individual wind tunnel as a system. Each wind tunnel is supplied with two restrictive plates for achieving optimum low flowrates. The established differential pressure measurements versus flowrates are listed from 25 to 9000 FPM. Calibration sheets are included, which makes calibrating different flow sensors simple.

The differential pressure measurement used to establish known flowrates will be affected by barometric pressure and temperature conditions during testing. Depending on the probe being calibrated, humidity may also be a factor.

OMEGA's deluxe wind tunnel package is an environmental monitoring system that measures barometric pressure, room temperature, humidity and differential pressure. By monitoring room conditions, standard differential pressures can be converted to actual differential pressure readings to ensure accurate flowrates.

For testing different probes, a ½ NPT connection is available. An assortment of compression fittings is provided to help mount the probe under calibration.

SPECIFICATIONS

Wind Tunnel

Accuracy: 1% rdg
(2% rdg with restrictive plates)

Flow Rates: 25 to 9000 fpm
(0.15 to 45 m/s)

Noise: 95 dBA maximum

Size: 1.5 m L x 431.8 mm H (5' x 17")

Motor

Power: 120 Vac

Current: 12 amps

Speed: 10,000 RPM

Motor Control Box

Power: 120 Vac

Speed Adjustment: 10 turn pot.

Internal Adjustment: Minimum, Maximum, acceleration and current limit

Size: 140 W x 184 L x 89 mm H
(5.53 x 7.25 x 3.5")

Weight: Wind tunnel: 22.5 kg (49.5 lb);
Standard elec. 3.2 kg (7 lb);
Deluxe elec. 7 kg (15.3 lb)

Monitoring Systems

Standard Package:
PX657 127 mm (5") H_2O differential pressure sensor and DP41-S-A meter with analog output in benchtop case

The WT4401-S Wind Tunnel Comes with:

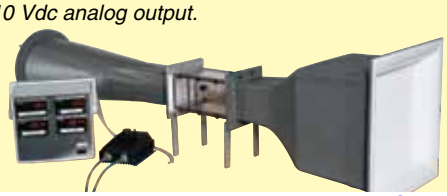
- **Wind Tunnel**
- **Electronics Box***
- **Two Restrictive Plates**
- **Motor Controller**
- **Two 0.6 m (5') Lengths of Silicone Tubing**
- **One Package of Brass Compression Fittings with PTFE Ferrules (Sizes ⅛, 3⁄16, ¼, and ⅜")**
- **Six Calibration Report Sheets (3 in Metric Units, 3 in English Units)**
- **Complete Operator's Manuals for: DP41-S Indicator; Motor; Controller and Wind Tunnel**

WT4401-D (Deluxe System) Includes All the Accessories for The WT4401-S Plus:

- **Operator's Manuals for all Included Instrumentaion and Sensors**
- **Calibration Sheet for the Barometer**

** The **WT4401-S** comes with standard electronics box. The **WT4401-D** comes with deluxe electronics box.*

***Note:** All meters used in either the standard or deluxe electronics package have a 10 Vdc analog output.*



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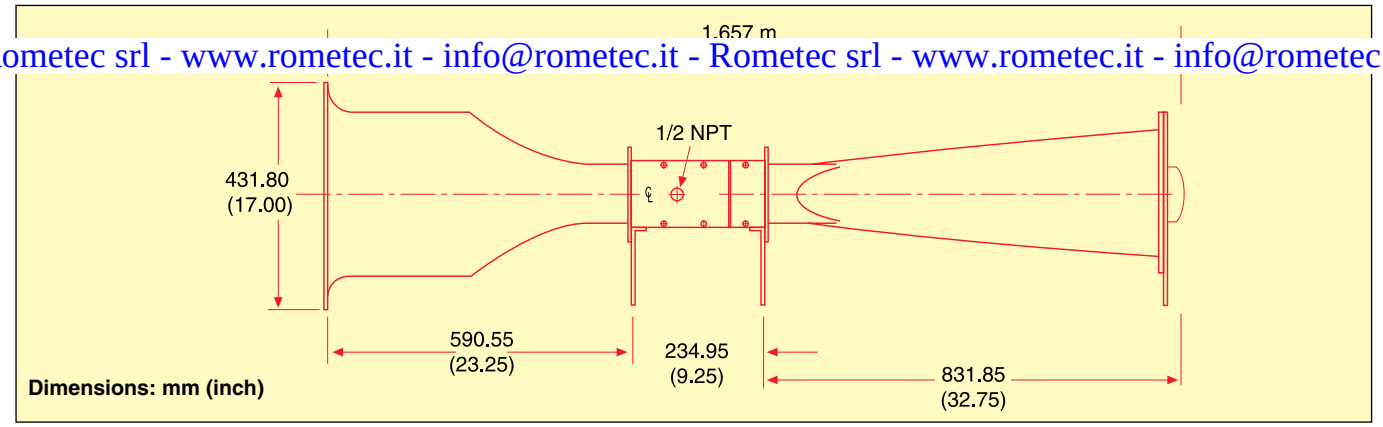

Dimensions: mm (inch)

Deluxe Package:

Same differential system as standard model, plus HX97-A temperature and humidity sensor, PX02C1-16A5T barometric sensor, PSS-D15B power supply, three DP25-E panel meters, and one DP41B-S panel meter. All equipment is enclosed in a heavy duty, air cooled, benchtop metal case. All 4 meters have 0 to 10 Vdc analog outputs.

WT4401 front baffle

Wind tunnels come complete with ⅛, 3/16, ¼ and ⅜" brass compression fittings with PTFE ferrules, two 1.52 m (5') lengths of silicone tubing, operator's manual with NIST calibration data and pressure sensor with benchtop meter.

The intake air flow passage to this precise wind tunnel is a fiberglass-constructed baffle. The honeycomb baffle design insures constant and evenly distributed air intake. The design minimizes turbulent air flow created by movement in front of the intake. The rear portion of the intake baffle has a profile design that keeps the stream uniform, while decreasing the area to a 101.6 x 101.6 mm (4 x 4") cross- section.

WT4401 rear

The test chamber is 101.6 x 101.6 x 152 mm (4 x 4 x 6") and is constructed of clear, thick-wall plastic for easy viewing. In back of this test section, the motor pulls the air through the wind tunnel. The motor and intake profiles utilize fiberglass construction, which minimizes airflow distortion.

A deluxe monitoring package keeps track of ambient conditions as well as the precise differential pressure measurement. The monitoring sensors and instruments are all packaged inside a single powerful housing. Each sensor has an analog output for use with a strip chart recorder or computer data logging system. Humidity, temperature and barometric sensors are enclosed in the benchtop case for monitoring atmospheric conditions which can influence the exact air speed.

The differential pressure cell is connected to the wind tunnel via silicone tubing. The entrance and test chambers' pressures are monitored, which determines true air speed.

Standard and Deluxe Packages Establish Flowrates from 25 to 9000 FPM

Wind Tunnel Configuration	Flow Ranges	
	FPM	M/S
No restrictive plates	1000 to 9000 FPM	5.0 to 45 M/S
Restrictive plate A	250 to 1250 FPM	1.25 to 6.3 M/S
Restrictive plate B	25 to 350 FPM	0.15 to 1.77 M/S

To Order

Model No.	Description
WT4401-S	Wind tunnel with differential pressure monitor
WT4401-D	Wind tunnel deluxe package (barometric pressure, temperature, humidity and differential pressure monitoring system)
WT4401-S-CAL	Re-calibration, standard wind tunnel
WT4401-D-CAL	Re-calibration, deluxe wind tunnel
TVS-1004	Velocity and temperature measurement system (4 sensors)
HHF42	Hot wire anemometer
FMA-902A-V1	General purpose air velocity transducer, 0 to 1000 FPM (0 to 5 V output)
SA1-K	Type K self adhesive thermocouples with stripped ends (5-pack)
SA1-RTD-B	100Ω self adhesive RTD temperature sensors with stripped ends (3-pack)
SA2C-K	Type K, curved surface, molded silicon self adhesive thermocouple
SA2F-K	Type K, flat surface, molded silicon self adhesive thermocouple
ML4C-143-10	Non-reversible OMEGALABEL® temperature monitors with temperature ratings of 143, 149, 154, and 160°C (10-pack)

Comes complete with wind tunnel and everything you need to calibrate probes quickly. Visit omega.com for the complete listing of all accessories included.

*For 220 Vac, add suffix "**-220V**" to model number, no additional charge.*

***Ordering Examples: WT4401-D,** deluxe wind tunnel package, **SA2C-K** Type K molded silicon self adhesive thermocouple, and **FMA-902A-V1**, air velocity transducer.*

***WT4401,** standard wind tunnel package with **HHF42** hotwire anemometer.*

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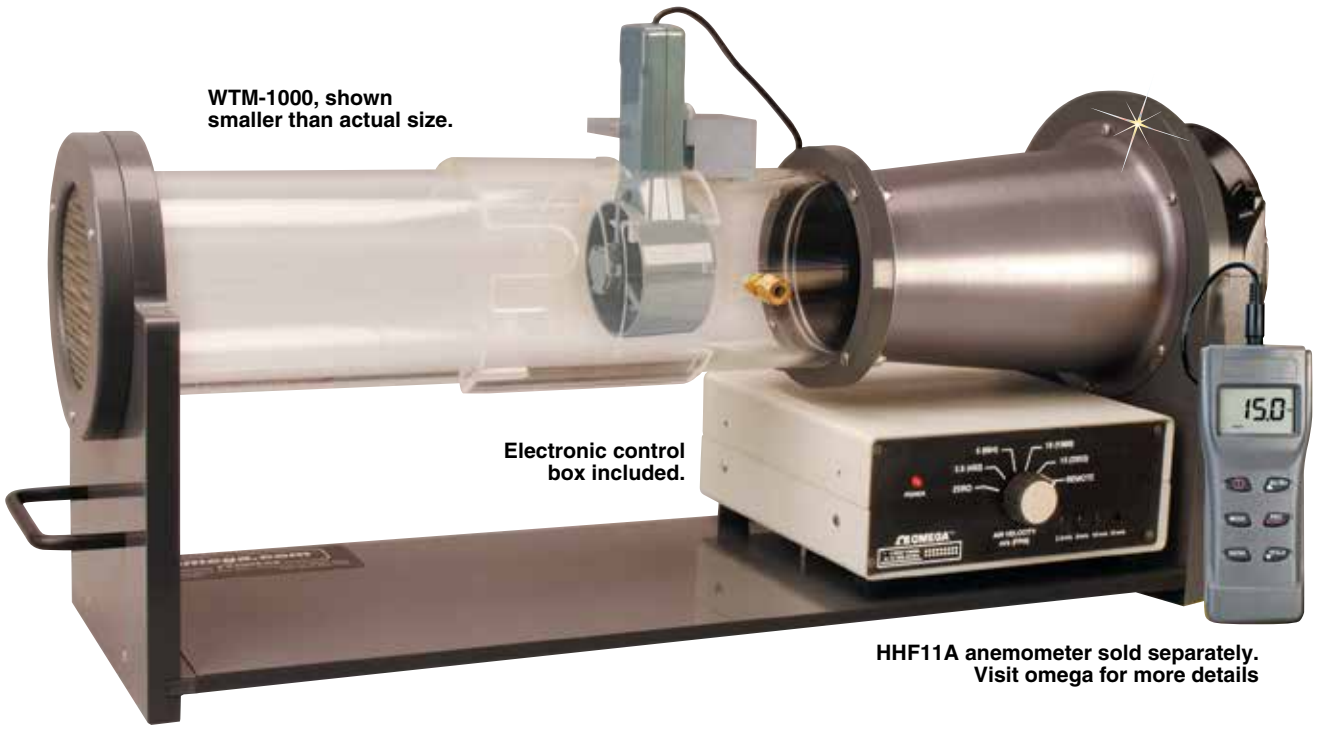
LABORATORY GRADE BENCHTOP MINI WIND TUNNEL



WTM-1000

1 YEAR WARRANTY · NIST · UKCA · CE

Standard

- 10 cm (4") Diameter Internal Test Chamber
- 4 Selectable Air Speeds:
  2.5 m/s (492 fpm)
  5.0 m/s (984 fpm)
  10 m/s (1969 fpm)
  15 m/s (2953 fpm)
- Accuracy of 1% of Setting or 0.1 m/s, Whichever is Larger
- Remote Option for Variable Air Speed
- Accommodates Either Hot-Wire or Vane-Type Anemometers
- NIST Calibration Certificate Supplied
- Operates from 90 to 250 Vac Line Power

The WTM-1000 mini wind tunnel from OMEGA™ gives a highly uniform flow rate at 4 selectable fixed air speeds, yet it costs less than competitive brands. The fixed air speeds range from 2.5 m/s (492 fpm) to 15 m/s (2953 fpm). With the remote option, the user can control and vary the wind tunnel air speed externally by connecting a potentiometer. The internal 10 cm (4") diameter test chamber is large enough to accommodate either hot-wire or vane-type anemometers. The unit is powered by 90 to 250 Vac. Each WTM-1000 comes with an NIST calibration certificate for the 4 fixed air speeds.

SPECIFICATIONS

Accuracy: ±1% of setting or ±0.1 m/s, whichever is larger
Test Chamber: 10 cm (4") diameter
Flow Rates: 2.5 m/s (492 fpm), 5.0 m/s (984 fpm), 10 m/s (1969 fpm), 15 m/s (2953 fpm)
Remote Option: Use an external 5K, 10-turn potentiometer to vary air speed
DC Motor: 24 Vdc @ 1.1 A (26 W)
Power: 90 to 250 Vac @ 50/60 Hz
Operating Temperature: 5 to 45°C (41 to 113°F)
Operating Relative Humidity: 80% RH max without condensation
Size: 68.5 L x 20.3 W x 29.2 cm H (27 x 8 x 11.5")
Weight: 8.2 kg (18 lb)

To Order	
Model No.	Description
WTM-1000	Laboratory-grade mini wind tunnel
WTM-1000-DM	MINI WIND TUNNEL - DENMARK
WTM-1000-EU	MINI WIND TUNNEL-EUROPE(EXCL IT, DM, UK)
WTM-1000-IT	MINI WIND TUNNEL- ITALY
WTM-1000-UK	MINI WIND TUNNEL - UK & IRELAND

Accessory

Model No.	Description
WTM-1000-CAL	NIST recalibration

Comes complete with operator's manual and NIST certificate of calibration wind tunnel, NIST certificate.

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