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FLC Series

Clear In-Line Flowmeters



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Servicing North America:

U.S.A.: One Omega Drive, Box 4047
Stamford, CT 06907-0047
Tel: (203) 359-1660
FAX: (203) 359-7700
e-mail: info@omega.com

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Mexico: En Espanol: (001) 203-359-7803
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Servicing Europe:

Czech Republic: Frystatska 184, 733 01 Karvina, Czech Republic
Tel: +420 (0)59 6311899
FAX: +420 (0)59 6311114
Toll Free: 0800-1-66342
e-mail: info@omegashop.cz

Germany/Austria: Daimlerstrasse 26, D-75392 Deckenpfronn, Germany
Tel: +49 (0)7056 9398-0
FAX: +49 (0)7056 9398-29
Toll Free in Germany: 0800 639 7678
e-mail: info@omega.de

United Kingdom: One Omega Drive, River Bend Technology Centre
Northbank, Irlam, Manchester
M44 5BD United Kingdom
Tel: +44 (0)161 777 6611
FAX: +44 (0)161 777 6622
Toll Free in United Kingdom: 0800-488-488
e-mail: sales@omega.co.uk

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The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

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1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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FLOWMETERS



FLC Series – Clear In-Line Flowmeters

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Materials of Construction (Wetted Components)

	FLC-W Series	FLC-H Series
End Ports	Polysulphone	Polysulphone
Seals	Buna-N	Buna-N
Spring	Stainless Steel	Stainless Steel
Indicator and Casing	Polycarbonate	Polysulphone

Performance

Measuring accuracy:	±5% of full-scale
Repeatability:	±1% of full-scale
Flow Measuring Range:	1-30 GPM (5-110 LPM)
Turn Down Ratio (All Ranges:)	10:1
Maximum operating pressure:	325 PSIG (22.4 bar)
Maximum operating temperature:	FLC-W Series: 200°F (93°C) FLC-H Series: 250°F (121°C)
Pressure Differential:	See graph on right.
Filtration requirements:	74 Micron (200 U.S. mesh) min.

Mechanical Dimensions

DIM	½" Male	¾" Male	1" Male
A	2-7/16" (62mm)	2-7/16" (62mm)	2-7/16" (62mm)
B	7-11/16" (195mm)	8-1/32" (204mm)	8-3/32" (206mm)
Port Size	NPTF ½", SAE #8	NPTF ¾", SAE #12	NPTF 1", SAE #16
DIM	½" Female	¾" Female	1" Female
A	2-7/16" (62mm)	2-7/16" (62mm)	2-7/16" (62mm)
B	7-5/32" (182mm)	7-9/16" (192mm)	7-9/16" (192mm)
Port Size	NPTF ½", SAE #8	NPTF ¾", SAE #12	NPTF 1", SAE #16

Stabilized Contamination

The goal of filtration is to create effective protection from system contamination. Proper filtration stabilizes contamination to allow fluid components to function properly. A fluid system is considered stabilized when, "contamination in" equals "contamination out". Proper filtration must reduce initial contamination to a stabilized level within an acceptable time period. The system should be stabilized in time to prevent premature wear or damage to meter components.

Contamination Sources

Fresh Fluid

When fresh fluid is stored in holding tanks, it may be contaminated with scale or metal flakes from inside the tank. To prevent this type of contamination, be sure to filter fresh fluid before adding to the system.

New Machinery Contamination

When building new machines, a certain amount of built-in contamination is unavoidable. Typical built-in contamination consists of dust, dirt, chips, fiber, and sand, flushing solutions, moisture, weld splatters and pipe sealants. Flushing the system before operation can reduce contamination, but cannot eliminate it totally.

Unless the system is flushed at a high velocity, some contamination will not be dislodged until the system is in operation. System contamination can cause fluid component malfunction.

Environmental Contamination

When performing routine maintenance, the system's fluid is commonly exposed to environmental contamination. Exercise caution during routine maintenance to prevent this type of contamination. Be sure to change breather filter and systems air filter regularly.

Self-Generation Contamination

Self-generated contamination is a product of wear, cavitation, fluid breakdown and corrosion. Systems that are carefully flushed, maintained, and have fresh fluid added, mainly have self-generated contamination. In this case, proper filtration can prevent fluid component malfunction.

Reading the Meter

Notice the black reference line which runs 360° around the metering poppet. This reference line moves under the scale in direct relation to the movement of the poppet. When fluid is flowing, the flow rate through the meter is read by lining up the black reference line with the closest rate line on the flow scale.

Specific Gravity or Density Effect

Standard meters are calibrated for either WATER with a specific gravity of 1.0 or OIL with a specific gravity of .873. The floating disk meter is affected by fluid density as are most other similar type meters.

Omega's meters have less of this effect because of the sharpness of the floating orifice disks being used. The indicated flow reading will read high for heavier fluids and low for lighter fluids. A corrective factor can be applied to the standard scale or a special scale can be added at a slight additional cost. When measuring fluids with other specific gravities, the basic equations below can be used to develop corrected readings.

For WATER Meters use: $\sqrt{1.0/\text{Specific Gravity}} \times \text{scale reading}$

For OIL Meters use: $\sqrt{.873/\text{Specific Gravity}} \times \text{scale reading}$

CONTAMINATION AND FILTRATION

Recommended Filtration

The manufacturer recommends system filtration of at least 74 micron filter or a 200 mesh screen. It has been found that if inadequate filtration has caused meter failure, it will normally fail in the open position. Some systems may require a magnetic filter. IMPORTANT: Meter damage caused by excessive contamination is not covered under warranty.

Basic Application Information

The flow meter can be installed directly in the fluid line without flow straighteners or special piping. The meter is used to measure the flow rate of most liquids which do not contain particles greater than 74 micron.

- 1) The casing and union retainers are made of either Polycarbonate or Polysulphone materials permitting use with a variety of media. Use of mild detergent to clean the meter body is encouraged to prevent damaging the label or associated components.
- 2) The meter may be mounted in the most convenient location, in any orientation to allow easy access for reading and maintenance.
- 3) The Meters should NOT be mounted near hot pipes or equipment which can cause damage to the pressure vessel.
- 4) The Meters should not be mounted in a manner such that piping misalignment or other system components can exert force or produce a bending moment on the pressure vessel.
- 5) To retain accuracy and repeatability, internal moving parts are closely toleranced and require filtration of at least 74 micron or a 200 mesh screen.

Basic Installation Information

The meters are mounted in-line and are direct reading. The meters can be mounted in a vertical or horizontal position as long as the fluid is flowing in the direction of the arrow on the flow scale. No straight pipe is required before or after the meter. In fact, 90° elbows can be installed on both ends without any noticeable flow variation. When installing a meter, apply "Teflon Tape" on pipe threads. DO NOT apply pipe dope or Teflon paste. If tape is used, be sure to leave 1/8" (3 mm) of pipe thread exposed on end of pipe. Position filter in front of meter and in a location that allows easy access for routine maintenance. Refer to "Warnings and Precautionary Areas" for additional information.

INSTALLATION DOS AND DON'TS

To obtain satisfactory operation from the flow meter, the following points should be considered:

DO:

- install a pressure gauge near the inlet of the meter
- place throttling valves at the outlet of the meter
- use pipe sealer on the connections
- install solenoid valves at meter outlet (as far downstream as possible)
- mount in any orientation: vertical, horizontal or upside down

DO NOT:

- place restrictions between the meter's pressure gauge meter inlet
- use in systems where reverse flow is possible
- place meter in non-aligned piping
- over-flow the meter by more than 150% of maximum reading
- operate at pressures and temperatures greater than specified

Warning and Precautionary Areas

- 1) The meters are designed to operate in systems that flow in only one direction: the direction of the arrow on the flow scale. Attempting operation in the reverse direction may cause damage to the meter or other system components.
- 2) The pressure vessel and its associated components are made of Polycarbonate on the FLC-W meters. Polycarbonate can be safely cleaned with soap and water. However, many other cleaning agents can damage Polycarbonate, causing discoloration or crazing.
- 3) When installing onto threaded pipe, caution should be taken not to over tighten the pipe connections or introduce torque on the main body of the meter. The meter main body may rupture if over-tightened.
- 4) Meter should not be used in systems where the assembled piping is not supported. Externally applied piping forces may cause the meter to rupture or malfunction.
- 5) Operating Temperature: In standard meters, several components have a maximum temperature rating (see specifications).

- 6) Operating Pressure: All meters are tested at a burst pressure three times that of operating pressure. Meters should not be used over the operating pressure rating.
- 7) Teflon tape: Caution should be used when using Teflon tape on pipe thread joints. Leave at least 1/8" (3mm) of pipe thread exposed from end of pipe when applying tape.

OPERATION

Operating Principles

Omega has developed a line of unique flow meters which combine the simplicity of a sharp-edged orifice disk and a variable area flow meter. See **Figure 1** "Flow Meter Cross Section" below. The meters are tubular, with all internal wetted parts sealed within the body casing (5). Running through the center of the body casing is a tapered center shaft which is centered in the bore. Encircling the shaft is a sharp-edged, floating metering poppet (6). The metering poppet is held in the "no flow" position by the biased return spring (4). As the flow moves through the meter it creates a pressure differential across the floating orifice disk, forcing the disk and transfer magnet against the return spring. As flow increases, the pressure differential across the metering poppet increases, forcing poppet to move along the tapered center shaft. As flow decreases, the biased return spring forces the poppet down the tapered center shaft, returning to the "no flow" position.

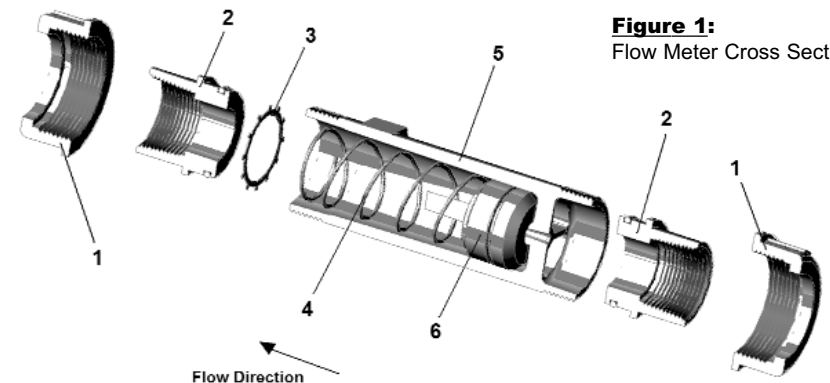


Figure 1:
Flow Meter Cross Section