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FL500 Series

In-Line Flowmeters and Switch Kits



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Operator's Manual

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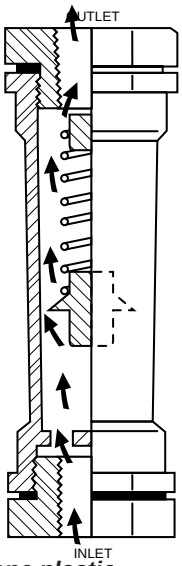
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WARNING: These products are not designed for use in, and should not be used for, patient connected applications.

OMEGA ENGINEERING, INC.

FL-500 Series In-Line Flowmeters and Switch Kits

HOW IT WORKS

Fluid enters at end marked “IN” and forces the piston to move with it, against spring pressure, enough to pass given flow around piston periphery. The knife edge of the piston is visible through the transparent housing; its position under the printed scale gives the flow rate.



Flow tube is PVC or polysulphone plastic

FLUID Temp.		Max. Pressure			
		Liquid		Air	
(°F)	(°C)	PSIG	kPa	PSIG	kPa
PVC					
70	21	200	1379	100	690
100	38	100	690	50	345
125	52	75	517	35	241
150	65	50	345	25	172
POLYSULPHONE					
230	110	250	1724	125	862

(Minimum temperature: -20 °F.)

SELECTION TABLE

Each of the models carries scales for all media shown

Model No.	Maximum Flow Rates Water	Air 90 PSI
FL-505	5 gpm	50 scfm
	20 lpm	1400 slpm
FL-510	10 gpm	90 scfm
	38 lpm	2500 slpm
FL-515	15 gpm	135 scfm
	55 lpm	3900 slpm
FL-530	30 gpm	300 scfm
	110 lpm	8000 slpm
FL-540	40 gpm	400 scfm
	150 lpm	11000 slpm
FL-550	50 gpm	500 scfm
	200 lpm	14000 slpm

Installation

Inlet and outlet ends are marked on the flow meter body, and an arrow on the printed scale indicates flow direction. Insite flow meters can be mounted in any convenient orientation (vertical, horizontal or anything in-between) without affecting performance. The end fittings are connected to the plastic body with O-ring sealed straight threads and don't need to be highly torqued to prevent leakage. These fittings accept pipe with tapered threads (NPT). Teflon tape should be used on the pipe threads and standard torques applied, to make leak-free connections. Put your wrench only on the end fitting when piping on. **Do not apply wrenches on the plastic body alone when connecting to pipe.**

Many users find that a disconnect fitting, installed upstream of the flow meter, makes for easier removal of the flow meter, for cleaning internals. Control valves should be installed downstream of the flow meters.

Two scales are provided. One for liquid and one for air/nitrogen gasses. Air/nitrogen gas meters are calibrated in SCFM. The air/nitrogen scale is calibrated at 90 PSI pressure and 70°F temperature. If the flow meter is used with air at pressures and/or temperatures that differ from the above, correction factors can be applied to a 90-psi air scale readings to get correct SCFM values. See Tables.

High pressure air vented to atmosphere through the Insite flow meter may result in erratic readings. When used to measure high pressure air, it is recommended that a vent valve be installed downstream of the flow meter.

Correction factors when monitoring air flow at other than 90 PSI at 70°F

TABLE 1 PRESSURE

PSIG	10	20	30	40	50	60	70	80	90	100
Factor	.49	.58	.65	.72	.79	.84	.90	.95	1.00	1.05

TABLE 2 TEMPERATURE

Temp°F	30	50	70	90	120	150
Factor	1.04	1.02	1.00	0.98	0.96	0.93

When operating at a pressure other than 90 PSIG multiply the applicable factor to the SCFM reading on the tube for corrected SCFM reading.

Maintenance

Normally, the only servicing required is a periodic cleaning of the tube and three internal parts. Use wrenches on the end fittings to remove the flow meter from the line. **Do not apply wrenches to the plastic body alone when breaking pipe connections.**

With the flow meter out of the line, completely remove the end fitting from the outlet end of the tube. Use a bent wire of other hook to grab the plastic shaft, piston and spring and remove from tube. Inspect all parts for damage. The interior of the tube can be swabbed out, and the parts wiped off, with a soft dry cloth. If dirt or residue cannot be removed with a dry cloth, use water and a mild non-abrasive soap. **DO NOT USE SOLVENT OF ANY KIND.** Replace any worn or damaged parts.

When reassembling the flow meter, be sure the piston is installed as shown in the drawing. Don’t put in upside down. Inspect O-rings for damage and replace if necessary.

For Electric Signalling

Model FL-505, FL-510, and FL-515 flow meters can be equipped with one or two electric switches so that any flow rate within the range of the meter can be made to trigger a signal (or signals). Switch settings are easily adjusted. They are supplied in kit form for installation in the field. Order No. FL-500-RI.



Model FL-530, FL-540 and FL-550 require switch kit #FL-500-R2.

Each switch kit consists of a ring shaped ceramic magnet that fits around the flow meter piston, and a proximity switch in a housing that clamps to the body of the flow meter. As the magnet moves with the piston, its field trips the proximity switch. An adjustment screw changes the actuation point by moving the switch.

8 Watts @ 120 VAC/100 VDC. DO NOT EXCEED 300 MILLIAMPS BELOW 26 VAC/26VDC. Switch has three wires: Black for normally open, blue for normally closed, and white for common.

NOTE: Switch has a 25% of full scale operating band. Within the band, the switch activates. Above and below the band, the switch deactivates. Thus, one switch can be used as a deviation alarm.

SWITCH INSTALLATION

Step 1. Install the magnet. You must disassemble the flow meter to do this. Follow instructions found under the heading “Maintenance” on page 3. Remove piston from the shaft and **place the magnet between piston and spring. Be sure that the piston is installed as in the drawing, and the spring is seated on the magnet and piston.** Insert into tube and replace outlet end fittings.
Step 2. Install the foam gasket. It has an adhesive on one side, covered with a protective paper. Peel off and press the gasket firmly into place on the switch housing.

Step 3. Install the switch housing on the flow meter body.

(A) If you are installing only one switch, push the capscrews through the switch housing tabs, and thread them into the half-collars, as shown. Use the washers provided. The nuts may be discarded.

(B) If you are installing two switches, match up the tabs on the two switch housings and push the capscrews through both collar tabs. Put the nuts on the threaded ends of the capscrews and tighten. Use the washers provided. (The half-collars and extra magnet may be discarded.)

NOTE: There is no “wrong orientation” of the switch housing. If you are installing two switch housings, they can both be oriented the same way, as in the photo, or one “up” and the other “down”. Install to suit your needs in wiring and switch adjustment.

SETTING THE SWITCH POINTS

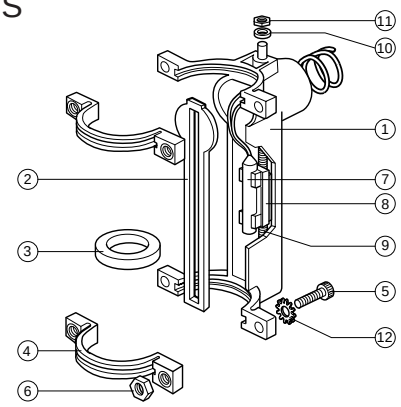
With flow meter installed:
Simply adjust the amount of flow to move the piston to the level on the indicator where a switch signal is desired, then turn the switch adjustment screw until switch actuates. (Switch moves toward the adjustment screw head as you turn it clockwise. Use an ohmmeter to determine actuation.) Repeat for second switch, if you are using two switches.

With flow meter NOT installed:
Simulate flow by pushing the eraser-end of a pencil (or a similar tool) through the inlet end of the tube, contacting the float, and moving it against the spring pressure until the knife edge of the float is at the desired reading on the scale. (If your unit has a 1/2 in. pipe fitting, remove it to gain better access.) Then, turn the switch adjustment screw till the switch actuates. (Switch moves toward the adjustment screw head as you turn it clockwise. Use an ohmmeter to determine actuation.) Repeat for a second switch, if you are using two switches.

When connecting the switch wires, leave enough lead length (as a pigtail) to allow full travel of the switch.

SWITCH PARTS DESCRIPTION

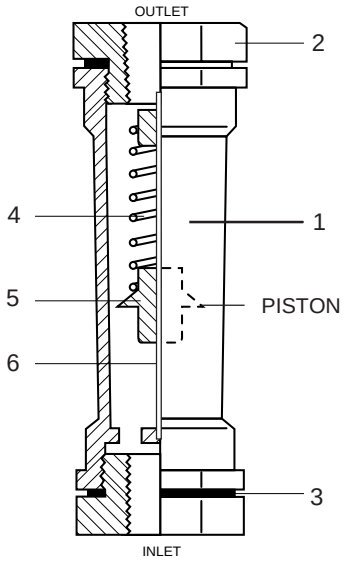
1. Housing
2. Gasket
3. Magnet
4. Half-collars (2)
5. Capscrews (4)
6. Capscrew nuts (4)
7. Switch
8. Switch carrier
9. Adjustment screw
10. O-ring (2)
11. Retainer clip
12. Lockwashers (4)



FL-500 SERIES SWITCH REPLACEMENT PARTS

MAGNET (ONLY) Part # 1122	SWITCH (ONLY) Part # 1127
	

Replacement Parts



DESCRIPTION		1" PORT MODELS FL-505 FL-510 FL-515 PART NO. PVC	Polysulphone	1 1/2 " PORT MODELS FL-530 FL-540 FL-550 PART NO. PVC	Polysulphone
1. Flow tube					
Max reading, GPM scale:	5	1158-AS	1119-AS		
	10	1159-AS	1116-AS		
When ordering replacement flow tubes verify correct material of construction marked clearly on the old scale.	15	1160-AS	1117-AS		
	20			1147-AS	1173-AS
	30			1148-AS	1174-AS
	40			1149-AS	1175-AS
	50			1150-AS	1176-AS
2. End Fittings (2 req'd)					
Aluminum		1194-8		1196-12	
Brass (Std.)		1193-8		1195-12	
316 St. Steel		1188-8		476-12	
PVC		1191-8		477-12	
3. O-rings (2 req'd)					
Viton (brown)		1112		396	
4. Spring (316 S.S.)		1115		1115	
5. Piston (PVC)		1105		1105	
6. Shaft (316 S.S) and Guide (PVC)		1103		1139	

DIMENSIONS
Models FL-505 thru FL-515 are 7 inches long, 2 inches across the wrench flats.
Models FL-530 thru FL-550 are 7 inches long, 3 inches across the wrench flats.

OMEGA ENGINEERING, INC.
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MADE IN USA

WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA Warranty adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit should malfunction, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of being damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components which wear are not warranted, including but not limited to contact points, fuses, and triacs.

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RETURN REQUESTS / INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

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. P.O. 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.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

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

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