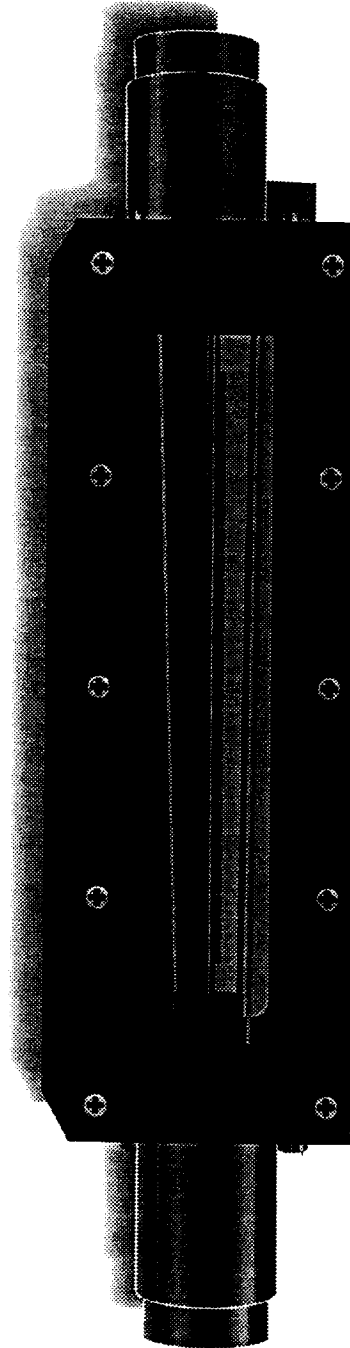


® FL900 Series

® Heavy Duty Flowmeters



Operator's Manual

Unpacking

Remove the Packing List and verify that you have received all equipment, including the following (quantities in parentheses):

- FL900 Series Heavy Duty Flowmeter (1)
- Extractor Tool (1)
- Operator's Manual (1)

If you have any questions about the shipment, please call the OMEGA Customer Service Department.

When you receive the shipment, inspect the container and equipment for signs of damage. Note any evidence of rough handling in transit. Immediately report any damage to the shipping agent.

NOTE

The carrier will not honor damage claims unless all shipping material is saved for inspection. After examining and removing contents, save packing material and carton in the event reshipment is necessary.

Available Models (G suffix — ribbed-guided floats; P suffix — pole-guided floats)

	Model	Max. GPM	Max. SCFM	ΔP in H ₂ O	NPT	Max Pressure PSIG	Weight (lb)	Overall Length
Water Models	FL901G	0.64	-	7	1/2"	300	20	20"
	FL902G	2.25	-	41	1/2"	300	20	20"
	FL903G	5.20	-	18	1"	250	20	20"
	FL904G	12.60	-	13	1"	250	20	20"
	FL904P	34.50	-	110	1"	250	20	20"
	FL906G	10.00	-	6	1-1/2"	150	30	25"
	FL906P	33.60	-	24	1-1/2"	150	30	25"
	FL908G	65.00	-	30	2"	125	30	25"
	FL908P	132.00	-	60	2"	125	30	25"
Air Models	FL910G	-	2.7	-	1/2"	300	20	20"
	FL911G	-	10.2	-	1/2"	300	20	20"
	FL912G	-	20.8	-	1"	250	20	20"
	FL913P	-	98.5	-	1/2"	250	20	20"
	FL915G	-	41.0	-	1-1/2"	150	30	25"
	FL915P	-	101.5	-	1-1/2"	150	30	25"
	FL917G	-	59.0	-	2"	125	30	25"
	FL917P	-	350.0	-	2"	125	30	25"

Installations

This is important information. Read carefully before beginning work.

1. Make sure your pressure, temperature, fluid and other requirements are compatible with the meter.
2. Select a suitable location for installation to prevent excess stress on the meter which may result from:
 - a. Misaligned pipe.
 - b. The weight of related plumbing.
 - c. "Water Hammer" which is most likely to occur when flow is suddenly stopped as with quick closing solenoid operated valves. (If necessary, a surge chamber should be installed. This will also be useful in pressure start-up situations.)
 - d. Thermal expansion of liquid in a stagnated or valve isolated system. (If necessary, install valving which will allow the meter to be drained when not in use.)
 - e. Instantaneous pressurization which will stress the meter and could result in tube failure.

NOTE

In closed thermal transfer or cooling systems, install the meter in the cool side of the line to minimize meter expansion and contraction and possible fluid leaks at the threaded connections.

3. Handle the meter carefully during installation.
 - a. Use an appropriate amount of Teflon tape on external pipe threads before making connections. Do not use paste or stick type thread sealing products.
4. Install the meter vertically with the inlet port at the bottom. No piping runs are required.
5. Connections:
 - a. Fittings are fully rotatable.
 - b. Flowmeters with stainless fittings have dual ports (vertical and horizontal). It is recommended that horizontal fittings be used whenever practical. This will allow float stops and float (or float and guide assembly) to be easily removed from the tube for in-place cleaning (see Figure 1).
 - c. Flowmeters with plastic fittings have vertical ports only.
 - d. Flowmeters used in liquid service above 100 GPM should be plumbed vertically (2" NPT). This will create less restriction and provide optimum meter operation.

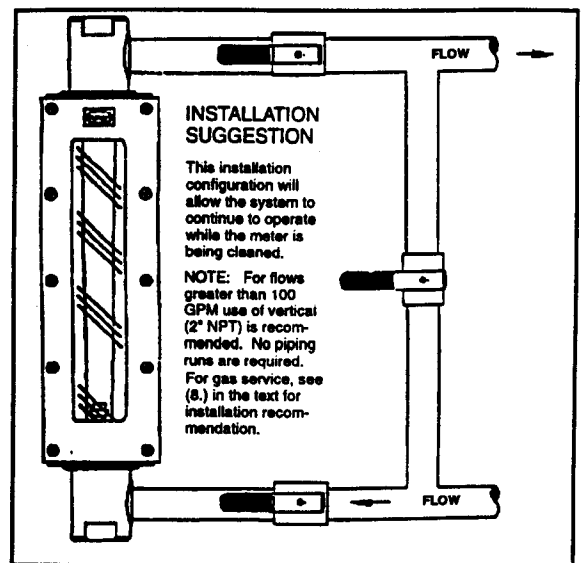


Figure 1. Installation Diagram

6. Flowmeters with stainless steel fittings will support several feet of pipe as long as significant vibration or stress resulting from misaligned pipe are not factors.
7. Flowmeters with plastic fittings must be installed so that fittings are not made to support any part of the associated plumbing. Clamps mounted to a bulkhead or panel can be used to hold the meter securely at both ends.
8. Flowmeters used in gas service should have suitable valves plumbed in at the inlet and outlet of the meter. These valves should be no more than 1-1/2 pipe diameters from the meter ports. The valve at the outlet should be used to create back pressure as required to prevent float bounce. It should be set initially and then left alone. The inlet valve should be used for throttling purposes. Depending on the installation, valves may not be essential, but they are most useful in many installations. Remember to get a correct reading of flow in gas service. It is important to know the pressure right at the outlet of the meter (before the valve).

Cleaning

1. If the tube is plain taper (has a pole-guided float) thread the extractor tool onto the threaded guide extension in the outlet fitting. Remove the float stop retainers, and carefully withdraw the float and guide assembly from the tube. The tube is now fully accessible for cleaning with a bottle brush and an appropriate mild soap solution*. (It is normally not necessary to remove the inlet float stops when tubes have pole-guided floats.) The guide and float assembly may be cleaned with the same fluid. (This unit is not meant to be disassembled.) To reassemble, carefully guide the float assembly back into the tube.** Line up the dimples on the float stop with threaded holes, insert and thread the float stop retainers into the fitting. Tighten them down. Disengage the extractor tool. Remove and replace the Teflon tape on the plugs. Replace plugs in end fittings.
2. If the tube is ribbed (i.e. fluted or beaded), remove the bottom plug. Thread the extractor tool onto the float stop assembly. Remove the inlet float stop retainer screws and gently pull the float stop from the fitting cavity. Use care. The float will follow the stop out of the cavity. Then remove the top float stop in the same fashion. The tube is now ready for in place cleaning (as indicated above). When refitting the float and stop assembly make certain the float is not damaged by the threads on the side port of the fitting. Use caution as the float enters the tube. The tube will be easily damaged if a cocked float is forced against the glass tube. When the float and inlet stop are reinserted in the meter rotate the extractor tool to line up the float stop dimples and the threaded float stop retainer holes. Reinsert the retainer screws and tighten. Disengage the extractor tool. Repeat this last step on the outlet float stop assembly. Change the Teflon tape on the plugs and reinstall.

* Do not use cleaning agents that will damage float, tube or O-rings.

** When installing float/guide assembly make certain that the end of the guide fully engages the inlet float stop before retainer screws are replaced.

CAUTION

- FL900 Series flowmeters have O-ring seals. Use with incompatible fluids will cause O-rings to swell which may cause glass tubes to fail.
- Glass tube flowmeters should not be used with strong or hot alkalis, fluorines, hydrofluoric acid, steam or water above 200°F (93°C). Flowmeters can be used in air service up to 220°F (104°C).
- Extra caution must be exercised when flowmeters are used in high pressure gas cylinder applications. Pressure regulators should be installed at the cylinder and at the inlet of the meter.
- Serious property damage and great personal injury could occur as the result of a meter misused or used in an unsuitable application

WARNING

Pressure and temperature ratings are based on a study of the engineering data for particular materials used in construction and on the design of individual models. This information is supplemented by destructive test results. Flowmeters with stainless enclosures must never be operated without shields securely in place. Flowmeters exposed to difficult environments such as those created by certain chemicals, excessive vibration or other stress inducing factors could fail at or below the suggested maximums. Never operate flowmeters above pressure and temperature maximums. It is strongly recommended that all meter installations utilize an appropriate pressure relief valve and/or rupture disc. The pressure settings and locations of these devices should be such that flowmeters cannot be overpressurized. Meter failure could result in damage to equipment and serious personal injury. Always use suitable safety gear, including OSHA approved eye protection when working around flowmeters in service. We may pass along chemical compatibility information that has been published by the manufactures of raw materials used in our products; however this information should not be construed as a recommendation made by OMEGA Engineering, Inc. for a specific application.

These flowmeters are not specifically recommended for service other than water or air. The user must determine flowmeter suitability for use with other fluids.

Specifications

Accuracy:	±2% of full scale
Repeatability:	±1%
Scale:	250mm (10")
Wetted Parts:	316 Stainless Steel, EPR O-rings; borosilicate glass
Maximum Temperature:	200°F (93°C)
Connections:	FNPT



WARRANTY

OMEGA warrants this unit to be free of defects in materials and workmanship and to give satisfactory service 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. However, 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 or which are damaged by misuse are not warranted. These include contact points, fuses, and triacs.

OMEGA is glad to offer suggestions on the use of its various products. Nevertheless, OMEGA only warrants that the parts manufactured by it will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

Every precaution for accuracy has been taken in the preparation of this manual; however, OMEGA ENGINEERING, INC. neither assumes responsibility for any omissions or errors that may appear nor assumes liability for any damages that result from the use of the products in accordance with the information contained in the manual.

SPECIAL CONDITION: Should this equipment be used in or with any nuclear installation or activity, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the equipment in such a manner.



Servicing USA and Canada: Call OMEGA Toll Free

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RETURN REQUESTS / INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA ENGINEERING 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.

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 OR CALIBRATION, consult OMEGA for current repair/calibration charges. Have the following information available BEFORE contacting OMEGA:

1. P.O. number to cover the COST of the repair/calibration.
2. Model and serial number of 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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