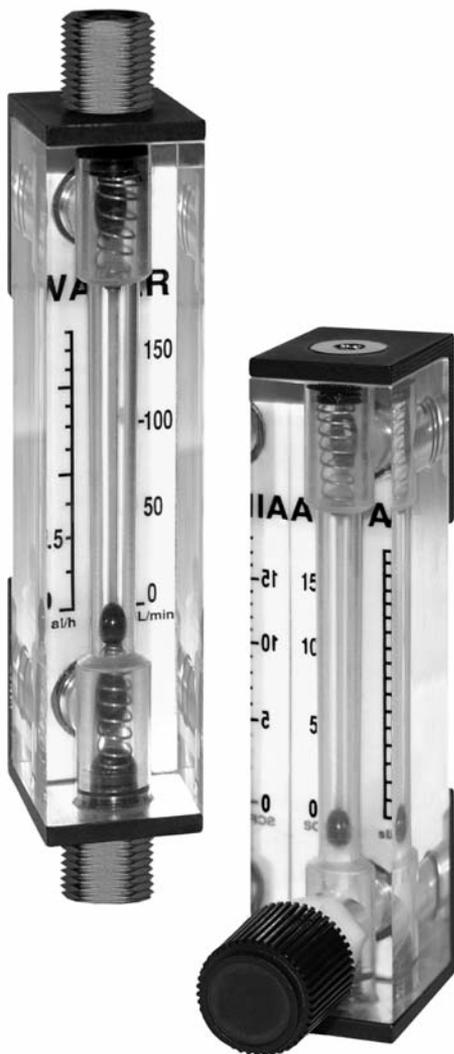


CE



User's Guide



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It is the policy of OMEGA to comply with all worldwide safety and EMC/EMI regulations that apply. OMEGA is constantly pursuing certification of its products to the European New Approach Directives. OMEGA will add the CE mark to every appropriate device upon certification.

The information contained in this document is believed to be correct, but OMEGA Engineering, Inc. accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.

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

INSTALLATION AND OPERATING INSTRUCTIONS FOR FL-2500 ACRYLIC FLOW METERS

Unpacking the FL-2500 Acrylic Flow Meter

INSPECT PACKAGE FOR EXTERNAL DAMAGE Your FL-2500 Acrylic Flow Meter was carefully packed in a sturdy cardboard carton, with anti-static cushioning materials to withstand shipping shock. Upon receipt, inspect the package for possible external damage. In case of external damage to the package contact the shipping company immediately.

UNPACK THE FL-2500 ACRYLIC FLOW METER Open the carton carefully from the top and inspect for any sign of concealed shipping damage. In addition to contacting the shipping carrier please forward a copy of any damage report to Omega®.

When unpacking the instrument please make sure that you have all the items indicated on the Packing List. Please report any shortages promptly.

Specifications

ACCURACY: $\pm 5\%$ of full scale reading.

FLOAT MATERIALS: Glass (black colored), 316 Stainless Steel (silver colored), Tungsten Carbide (Carboloy- silver colored).

FITTINGS: Brass or 316 Stainless Steel.

O-RINGS: FKM is standard, Buna, EPR are optionally available.

VALVES: Built-in needle valves are available.

MAXIMUM SERVICE TEMPERATURE: 65 °C (150 °F).

MAXIMUM SERVICE PRESSURE: 700 kPA (100 psig).

SCALES: Direct reading dual scales mounted interchangeably at rear of flow meter block. Each scale has both metric and English system units displayed. Scales are mounted by means of locating holes between the rear of the acrylic block and the yellow colored backing plate. Customers can easily exchange scales for different fluids, and flow rates. Kit comes with seven interchangeable direct reading dual scales: Air (air scale comes installed), Water, Argon, CO₂, Helium, Nitrogen, and Oxygen.

FLOAT READINGS: At center of ball shaped floats.

Installation

MOUNTING: Flow meters are shipped ready for panel (rear) mounting, and are easily convertible to partial or full "in-line" configurations (see diagram). To convert, exchange Plug Seals (3) and Female Adaptors (9) correspondingly using a 5/32" hex wrench and a 1/2" open box wrench. Panel or "in-line" mounting is through 11/16" diameter holes, using hex nuts supplied.

THE FOLLOWING CONFIGURATIONS ARE POSSIBLE:

- 1) Panel Mounting, using hex nuts at rear of meter.
- 2) Full In-line Mounting (not available for meters with valve options.)
- 3) Partial In-line Mountings, i.e. inlet at bottom, outlet at top rear, or inlet at bottom rear and outlet at top center.

To Exchange Scales: Select Option A, B, or C

A. NO VALVE OPTION (Styles 2, 4, 14)

- 1) Using a 1/2 open box wrench or 5/16" hex wrench remove rear fittings (Female Adaptor (9) for the panel mounting option or Plug Seal (3) for the in-line mounting option).
- 2) Remove Back Plate (2) and Scale (7) by sliding both to either side.
- 3) Holding the desired scale align its holes with those in the Back Plate. Slide both behind the bracket (5).
- 4) Insert but do not completely tighten fittings.
- 5) Recheck Back Plate (2) alignment.
- 6) Tighten fittings.

B. VALVE OPTION (Styles 2,4)

- 1) Using a 1/2 open box wrench remove top Female Adaptor (9).
- 2) Loosen Valve Cartridge (11) allowing the lower female (12) to be unscrewed.
Do not remove Cartridge from the meter.
- 3) Remove Back Plate (2) and Scale (7) by sliding both to either side.
- 4) Holding the desired scale align its holes with those in the Back Plate. Slide both behind the bracket (5).
- 5) Insert but do not completely tighten top Female Adaptor (9).
- 6) Insert but do not completely tighten lower Female Adaptor (12) (it has an extra orifice and O-ring on it), while keeping Valve Cartridge (11) in place.
- 7) Screw Valve Cartridge (11) into lower Female Adaptor (12).
- 8) Recheck Back Plate (2) alignment.
- 9) Tighten both Female Adaptors (9), (12).
- 10) Tighten Valve Cartridge (11). **Do not over tighten it.**

C. VALVE OPTION (Style 14)

- 1) Use a 1/16" hex wrench to loosen 2 set screws on Knob (15).
- 2) Using a 1/2" open box wrench, remove Valve Cartridge (13) and top Female Adaptor (9).
- 3) Remove Back Plate (2) and Scale (7) by sliding them to either side.
- 4) Holding the desired scale align its holes with those in the Back Plate slide them behind Brackets (5).
- 5) Insert but do not completely tighten top Female Adaptor (9).
- 6) Insert but do not completely tighten Valve cartridge (13).
- 7) Recheck Back Plate (2) alignment.
- 8) Tighten Female Adaptor (9) and Valve cartridge (13).
- 9) Secure Knob, tighten its set screws.

Cleaning: Disassembly, Re-Assembly

From time to time you may need to clean the meter. Clean with mild soap solution. Dry out with air or inert gas. Disassembly and reassembly has to be done in a clean environment.

Disassembly

First, follow the common steps, then select Option A, B, or C, based on the block style.

- 1) Unscrew top Plug Seal (3) using a 5/32" hex wrench and remove Bumping spring (8).
- 2) Flip the meter over and let the spherical float fall out on to a clean surface. The float should be handled with appropriate tweezers. **Do not touch it with fingers.** Store the float in a clean bag or box, free of grease.

A. NO VALVE OPTION (Styles 2, 4, 14)

Unscrew top Plug Seal (3) using a 5/32" hex wrench and remove Bumping Spring (8).

B. VALVE OPTION (Styles 2,4)

Unscrew Valve Cartridge (11) using a 1/2" open box wrench. Unscrew bottom Plug Seal (3) using a 5/32" hex wrench and remove Bumping Spring (8).

C. VALVE OPTION (Style 14)

Use a 1/16" hex wrench to loosen 2 set screws on Knob (15). Remove Valve Cartridge (13) using a 1/2" open box wrench. Unscrew bottom Plug Seal (3); push out the plastic y-shape float stop toward the wide bore using an appropriate non-metal stick.

Re-assembly: Select Option A, B, or C

A. NO VALVE OPTION (Styles 2, 4, 14)

Install Bumping Spring (8) in the bottom cavity; secure it by screwing in Plug Seal (3) until it is flush with Bracket (5). **Proceed to steps 1-3.**

B. VALVE OPTION (Styles 2,4)

Install Bumping Spring (8) in the bottom cavity; while squeezing the spring with appropriate flat stick insert Valve Cartridge (11), tighten it. Screw in bottom Plug Seal (3) until it is flush with Bracket (5). **Proceed to steps 1-3.**

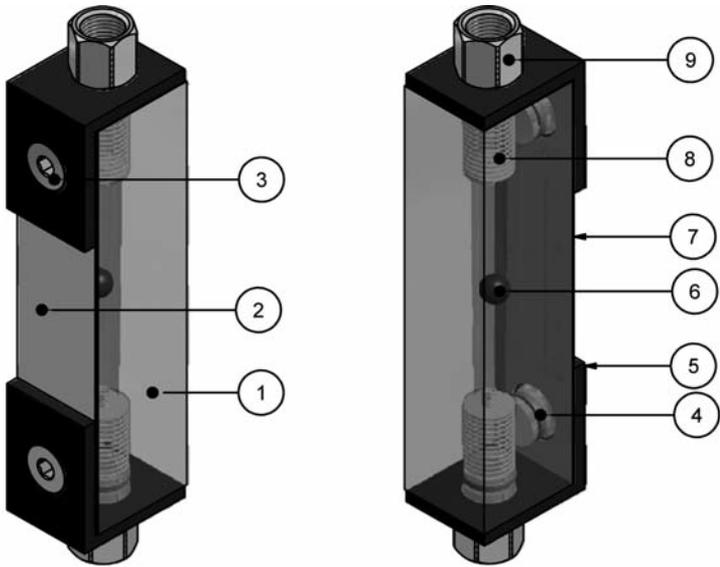
C. VALVE OPTION (Style 14)

Insert the plastic Y-shape Float Stop (14) from the wide bore using an appropriate non-metal stick; push the stop all the way down the bore. Screw in Valve Cartridge (13), and reinstall Knob (15). Screw in bottom Plug Seal (3) until it is flush with Bracket (5).

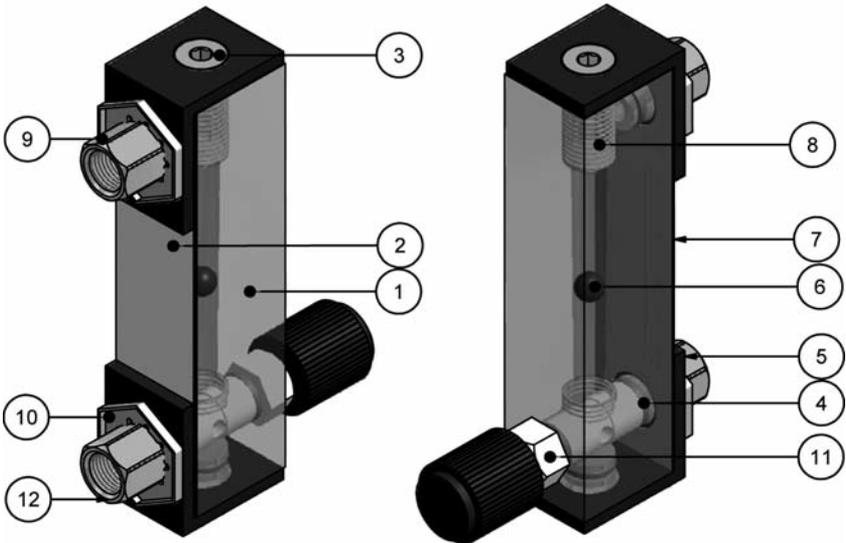
Proceed to steps 1-3.

- STEPS:**
1. Insert Float (6),
 2. Insert Bumping Spring (8) into the top cavity; secure it by screwing in Plug Seal (3) until it is flush with Bracket (5).
 3. Shake the meter making sure the ball is floating free without restrictions.

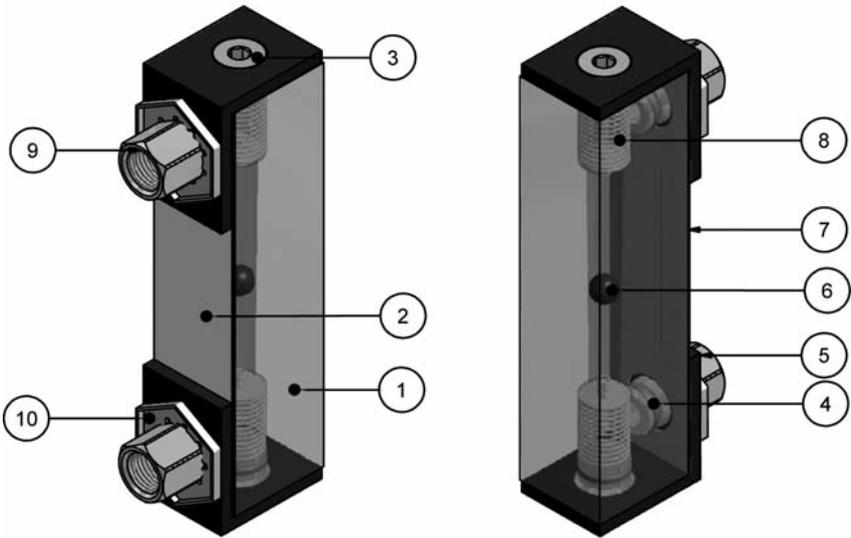
In-Line Version (Styles 2, 4, 14)



Valve Option Version (Styles 2, 4)



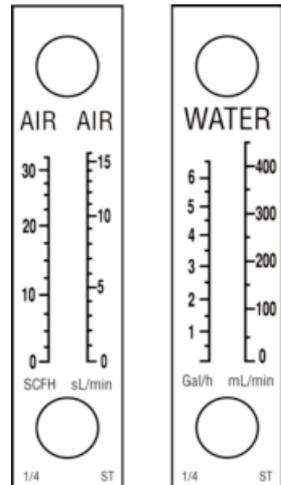
Panel Mount Version (Styles 2, 4, 14)



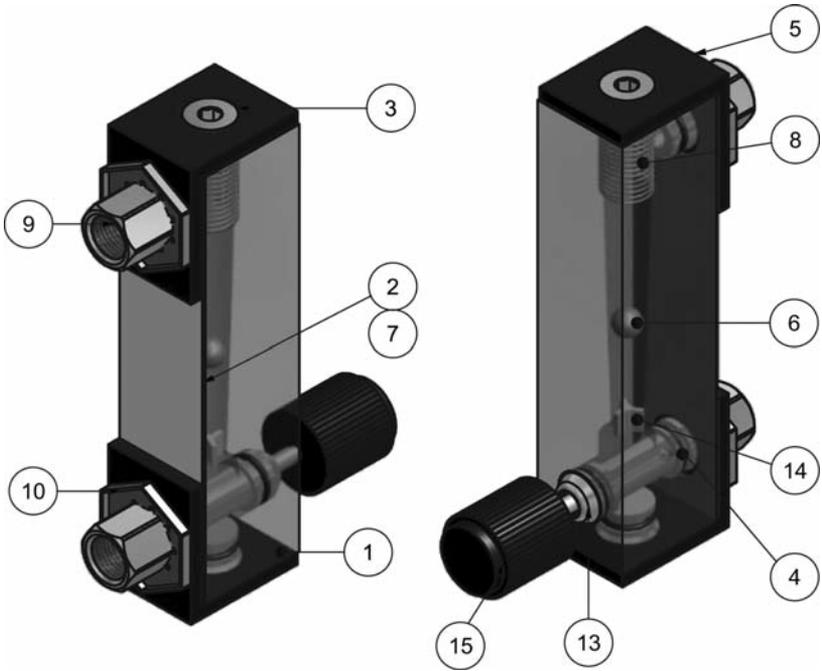
PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL
1	1	Block	Acrylic
2	1	Back Plate, yellow	Polyethylene
3	2	Seal Plug	Brass or 316 Stainless Steel
4	4	O-ring	FKM
5	2	Bracket	Structural aluminum
6	1	Float	Glass or 316 Stainless Steel or Carboly
7	1	Scale	Film
8	2	Bumping Spring	316 Stainless Steel
9	1 or 2	Female Adaptor	Brass or 316 Stainless Steel
10	2	Pal Nut	Steel
11	1	Valve Cartridge	Wetted parts: PVDF or Polyoxymethylene, 316 Stainless Steel, FKM O-ring.
12	1	Female Adaptor for Valve Cartridge	Brass or 316 Stainless Steel

TYPICAL SCALES

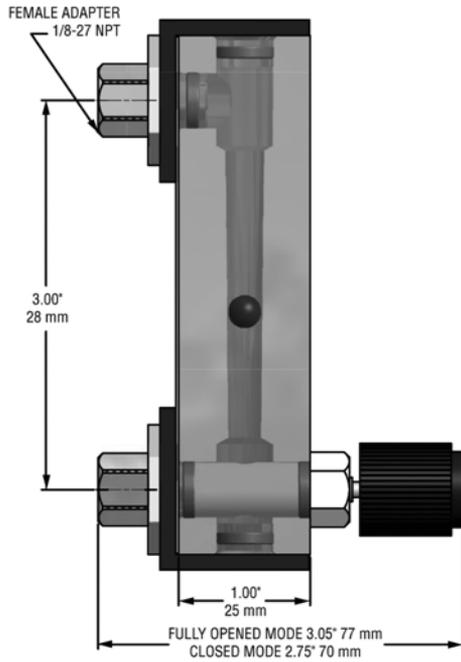
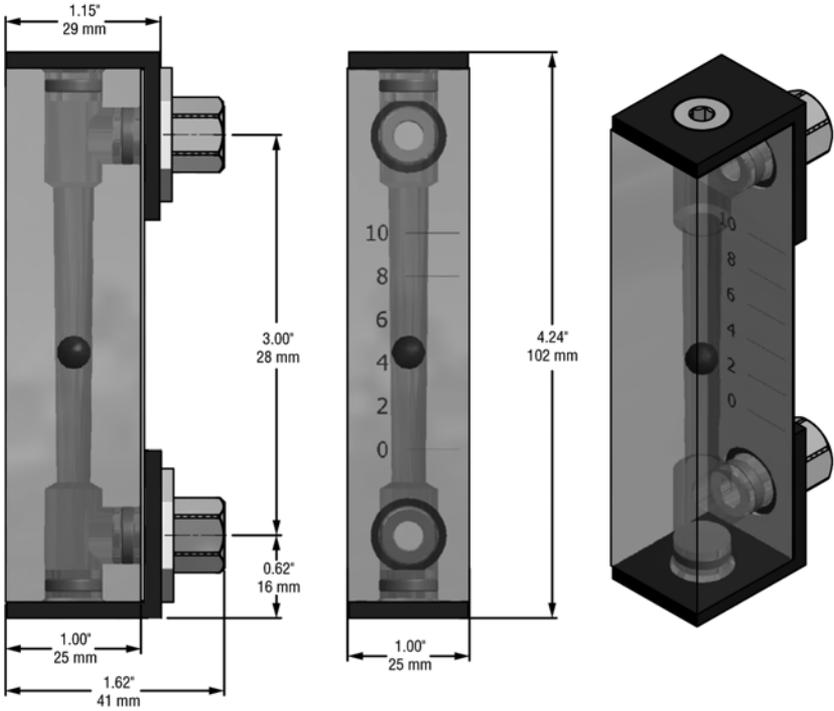


Valve Option (Styles 14)



PARTS LIST (For valve option/style 14 only)			
ITEM	QTY	DESCRIPTION	MATERIAL
1	1	Block, style 14	Acrylic
2	1	Back Plate, yellow	Polyethelene
3	2	Seal Plug	Brass or 316 stainless steel
4	3	O-ring	FKM
5	2	Bracket	Structural aluminum
6	1	Float	316 Stainless Steel
7	1	Scale	Film
8	1	Bumping Spring	316 Stainless Steel
9	1	Female Adapter	Brass or 316 Stainless Steel
10	2	Pal Nut	Steel
13	1	Valve Cartridge	Wetted Parts: PFVD or brass, Stainless Steel, FKM O-Rings
14	1		TFE
15	1		Plastic, Steel

DIMENSIONAL DRAWINGS





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's 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 malfunctions, 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 having been 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.

OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only 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, EXPRESS 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.

CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY/DISCLAIMER language, and, additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

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. 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.

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

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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