



**SERIES FL-5300, FL-5400, FL-5500, FL-5600  
GLASS TUBE FLOWMETERS**



**M3233 / 0505**

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**INSTALLATION & OPERATION INSTRUCTIONS OF FL-5000 SERIES  
FOR 65MM AND 150MM GLASS TUBE FLOWMETER**

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Standard glass tube flowmeters are available in various ranges and configurations. The meters have 65 millimeter and 150 millimeter reference scales, and are supplied with flow curves for air and water. At your request, flow curves for other gases and liquids can be supplied.

#### UNPACKING

Precautions have been taken to prevent any damage from occurring during shipment. However, if the meter is received damaged, *report it to the carrier immediately*. Verify that you have the model and flow range that you require.

#### MILLIMETER REFERENCE SCALES

To ensure accurate flowrate readings on all flowmeters with millimeter reference scales, the following should be verified: the tube part number and revision level printed on the top of the tube (for example, 1G04 R4) should correspond with the tube number and revision level on the Flow Curve Data Sheet. The gas or liquid flowing through the meter and the float material should also match the specification on the Flow Curve Data Sheet.

#### ACHIEVING ACCURATE FLOWRATES

To obtain an accurate flowrate, the float must be read from the center of the ball. Additionally, the flowmeter should be installed in a manner, which minimizes both external vibrations and internal flow variations. Special care should be taken so that the connections to the meter's inlet and outlet fittings do not overly restrict the liquid or gas flow being metered. This could result in a reduced flow volume, preventing the meter from reaching its maximum flowrate. Furthermore, internal pressures could be affected, which can cause inaccurate flow readings. Prior to use, any air/gas trapped in the meter should be slowly purged and the meter should be checked for leaks.

#### INSTALLATION

The flowmeter is capable of being panel mounted. In order to mount the meter on a panel, two clearance holes must be drilled. (Refer to Figure 1 for the correct locations of the 19/32" diameter clearance holes.) The meter is secured to the panel using the pal nuts, which are supplied with the meter. The meter is supplied with 1/8-27 FNPT non-rotating fittings. When installing the fittings the meter, place the appropriate size wrench on the hex to prevent the inlet and outlet fittings from rotating. (Use pipe thread sealant or Teflon® tape to achieve a positive seal.) **When installing the 1/8-27 MNPT fittings into the meter, torque to 60 in-lbs. maximum.** Failure to hold the inlet/outlet fittings or over-torquing the fittings could cause serious damage to the fittings or the meter backplate.

#### CLEANING

Occasional cleaning may be required if dirt appears in the flow tube or if float movement becomes restricted. The tube assembly can be removed from the meter frame for cleaning or replacement of parts without removing the meter from the process line. The tube and float should be cleaned with a mild liquid detergent and a soft brush or swab. All pieces should be rinsed/flushed with clean water, and dried thoroughly with clean dry air or nitrogen.

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#### CAUTION

THIS FLOWMETER IS DESIGNED FOR USE WITH NON-HAZARDOUS FLUIDS AT PRESSURES UP TO 200 PSI (13.8 BAR) AND TEMPERATURES UP TO 200 °F (93 °C). DO NOT USE HAZARDOUS FLUIDS AND DO NOT EXCEED TEMPERATURE OR PRESSURE LIMITS. USE WITH HAZARDOUS FLUIDS OR EXCEEDING THE PRESSURE AND TEMPERATURE LIMITS MAY CAUSE FAILURE WHICH COULD RESULT IN INJURY.

M-3233 / 0505

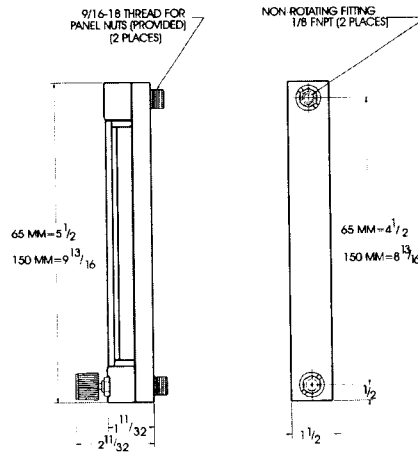
**DISASSEMBLY**

If the meter is to be disassembled for any reason, be sure to first bleed off any pressure in the meter. With a 5/32" Allen wrench, turn the jackscrew counter-clockwise until it reaches a stop. Gently remove the tube assembly from the meter frame. Remove the lens caps and shield. Remove the top float stop and the float from the top of the tube. Next, remove the bottom float stop from the bottom of the tube. To remove a control valve, turn counter-clockwise with a 1/2" wrench.

**RE-ASSEMBLY**

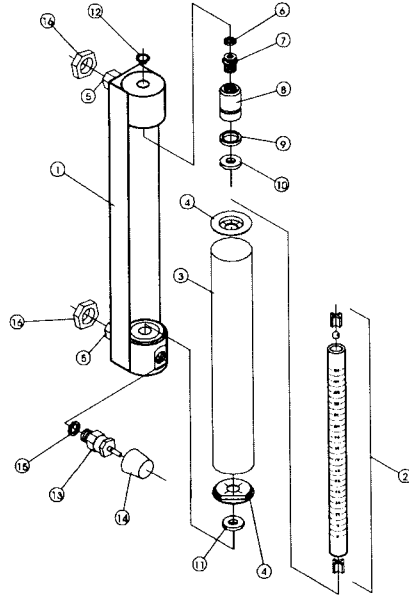
Check to make sure that all parts are clean and dry. Install the bottom float stop into the bottom of the flow tube. Install the ball float and the top float stop from the top of the tube. Install the bottom lens caps on the tube. Insert the tube in the lens shield and install the top lens cap. Check the top and bottom gaskets and replace, if necessary. Carefully slide the tube assembly back into the meter, making sure that it is properly aligned with the scale facing forward. Tighten the jackscrew by turning clockwise until the gaskets make contact with the tube. **Carefully torque to 1-1/4 in-lbs. to achieve a positive seal. Do not over-tighten.** To replace a control valve, turn clockwise with a 1/2" open-end wrench. Close the valve and slowly pressurize the meter. Check for leaks before resuming operation. If you have any questions regarding installation, maintenance or use of this flowmeter, please call Omega Customer Service

| SPECIFICATIONS             |   |
|----------------------------|---|
| ACCURACY:                  | ± 5% Full Scale – 65 mm<br>± 3% Full Scale – 150 mm   |
| FLOATS:                    | Black Glass Ball Float<br>Sapphire Ball Float<br>Stainless Steel Ball Float<br>Tungsten Carbide Float<br>Tantalum Float |
| FRAME BACKPLATE:           | Anodized Aluminum   |
| END BLOCKS AND ELASTOMERS: | Aluminum with Buna-N<br>Brass with Buna-N<br>Stainless Steel with Viton®  |
| FITTINGS:                  | 1/4-27 FNPT Fittings  |
| GLASS TUBE:                | Precision Formed Borosilicate   |
| MAX. TEMP.:                | 200°F (93 °C)   |
| MAX. PRESSURE:             | 200 PSI (13.8 Bar)  |



CONTINUED PRODUCT IMPROVEMENT MAY RESULT IN SPECIFICATION REVISIONS  
WHEN ORDERING PARTS PLEASE INCLUDE PART DESCRIPTION, ITEM NUMBER AND TYPE OF MATERIAL REQUIRED.

| Number | Description       |
|--------|-------------------|
| 1      | Frame Assembly    |
| 2      | Tube Assembly     |
| 3      | Lens              |
| 4      | Lens End Cap(s)   |
| 5      | Fitting           |
| 6      | Jack Screw O-ring |
| 7      | Jack Screw        |
| 8      | Jack Plug         |
| 9      | Jack Plug O-ring  |
| 10     | Top Gasket        |
| 11     | Bottom Gasket     |
| 12     | Retaining Clip    |
| 13     | Optional Valve    |
| 14     | Valve Knob        |
| 15     | Valve O-ring      |
| 16     | Panel Nuts        |





OMEGAnet® Online Service  
omega.com

Internet e-mail  
info@omega.com

**Servicing North America:**

**U.S.A.:** One Omega Drive, Box 4047  
Stamford, CT 06905-0047  
Tel: (203) 354-1600 FAX: (203) 354-7500  
e-mail: info@omega.com

**Canada:** 875 Baggot  
Laval (Québec) H7L 5A1, Canada  
Tel: (514) 856-6028 FAX: (514) 856-6586  
e-mail: info@omega.ca

**For immediate technical or application assistance:**

**U.S.A. and Canada:** Sales Service: 1-800-826-3427 / 1-800-TC-OMEGA  
Customer Service: 1-800-622-2378 / 1-800-622-REPAIR  
Engineering Service: 1-800-822-6426 / 1-800-USA-OMEGA

**Mexico:** In Spanish: (011) 203-354-7503 e-mail: sparis@omega.com  
TAX: (001) 203-354-7807 info@omega.com.mx

**Servicing Europe:**

**Benelux:** Postbus 8034, 1180 LA Amsterdam, The Netherlands  
Tel: +31 (0)20 3472121 FAX: +31 (0)20 6434643  
Toll Free in Benelux: 080 0693344  
e-mail: sales@omeganl.nl

**Czech Republic:** Fryská 184, 73301 Karlova, Czech Republic  
Tel: +42 (0)59 6311699 FAX: +42 (0)59 6311114  
Toll Free: 0800 666342 e-mail: info@omegasb.cz

**France:** 11, rue Jacques Cartier, 75209 Paris Cedex 07, France  
Tel: +33 (0)1 41 37 26 00 FAX: +33 (0)1 41 97 54 27  
Toll Free in France: 09 9 466 342  
e-mail: sales@omega.fr

**Germany/Austria:** Diemstrasse 28, D-73392 Deckelhofen, Germany  
Tel: +49 (0)706 939843 FAX: +49 (0)706 939829  
Toll Free in Germany: 800 6397628  
e-mail: info@omega.de

**United Kingdom:** One Omega Drive, River Bend Technology Centre,  
Nobchank, Irtham, Alchester  
SO502 2GJ, United Kingdom  
Tel: +44 (0)161 777 6611 FAX: +44 (0)161 777 6622  
Toll Free in United Kingdom: 0800 488488  
e-mail: sales@omega.co.uk

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

**OMEGA**

**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 in which wear is not warranted, include but are 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 the company 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.

**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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