

1 YEAR
WARRANTY



User's Guide

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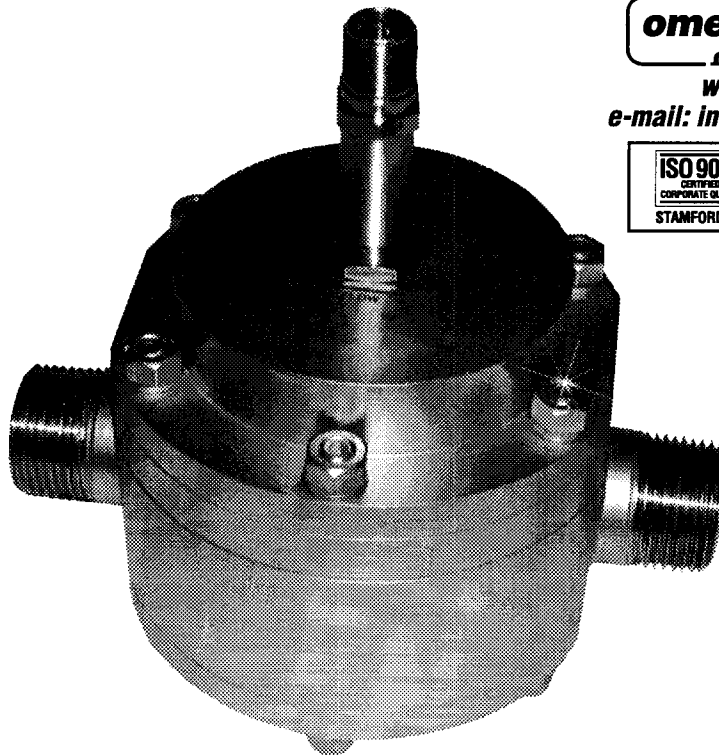
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FTB3000 Series Positive Displacement Meters



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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, human applications.

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1. Introduction

The FTB3000 series of positive displacement meters incorporates smooth oval rotors in their design. The oval rotor principle has proven to be a reliable and highly accurate method of measuring flow. Along with the smooth oval rotors, exceptional repeatability and high accuracy over a wide range of viscosities and flow rates are features of the FTB3000 series flow meter design.

The low pressure drop and high pressure rating means the FTB3000 series flow meter is suitable for both gravity and pump (in line) applications.

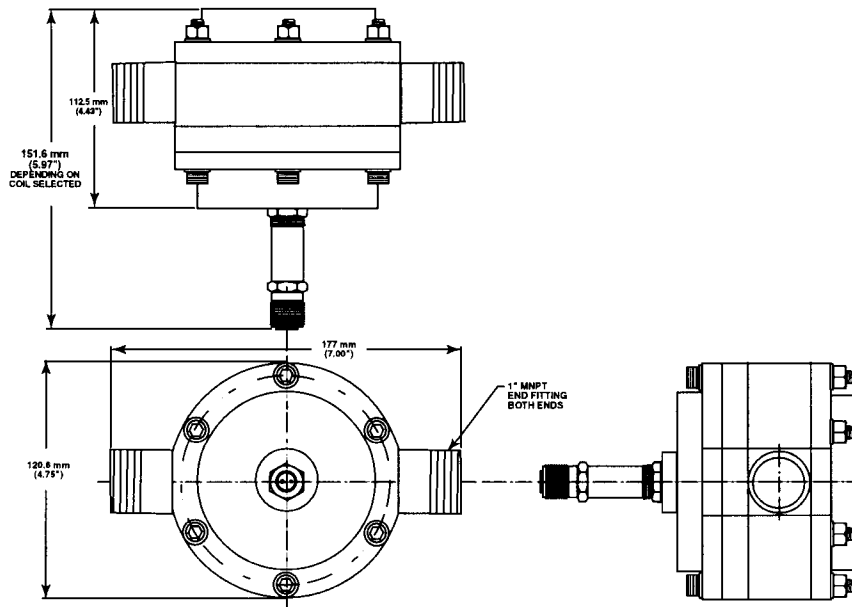
Please take a few minutes to read through this manual before installing and operating your meter. If you have any problems with the meter, refer to the maintenance and troubleshooting sections of this manual.

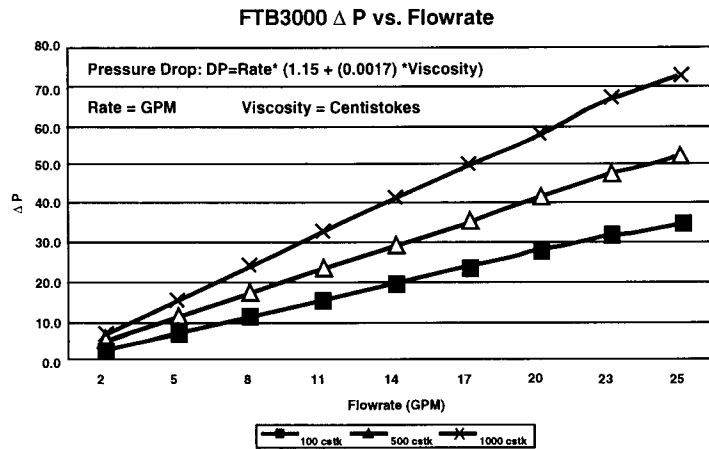
If you need further assistance, contact Omega's customer service department by telephone or fax for advice.

2. Specifications

Service Fluid:	Clean liquids, max particle size .125"
Accuracy:	±0.25% of reading
Viscosity:	100 cstk or greater
Repeatability:	±0.05%
Flow Range:	.02 to 25 gpm (Hall Effect)
Linear Flow Range:	2 to 25 gpm with mag coil
Linearity:	±.25% of reading over linear range
Operating Temperature:	mag pick-up -268 to 232°C (-450 to 450°F); Hall Effect -40 to 150°C (-40 to 302°F)

- Operating Pressure:** 3000 psig standard
- Wetted Parts:** 316 SS body and gears with peek gear seats
- Bearings:** shielded, self-lubricating 440SS ball bearings
- Connections:** 1" MNPT STD, flange opt.
Pick Up Coil: magnetic type or Hall Effect (6 to 24 Vdc power)
- Calibration:** Ten-point calibration traceable to Nist @ 100 Centistokes
- Weight:** 7.53 kg (16.6 lb)
- K-factor:** @460 pulses per gallon
actual number printed on unit



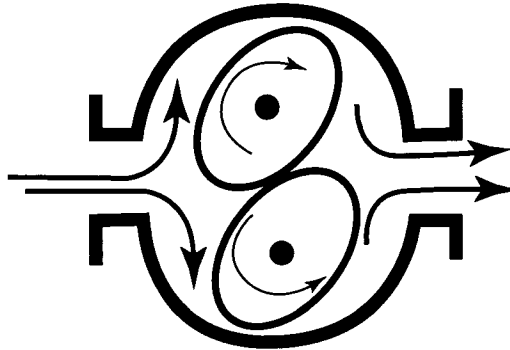


3. Operation

3.1 Principle

The FTB3000 series of positive displacement meters use a pair of smooth oval rotors to provide a reliable and highly accurate measurement of flow. The smooth oval rotors displace a precise volume of fluid which is passed through the measurement chamber during each revolution. The smooth oval rotor design along with the viscosity of the fluid provides a complete viscous seal within the measurement chamber.

The unique patented design of Omega's Oval Gear meter incorporates two smooth oval rotors 90 degrees out of phase. The phase relationship of the rotors is



maintained by two oval timing gears which are out of the flow path. The oval timing gears have a pitch diameter equal to the outside diameter of the smooth oval rotors.

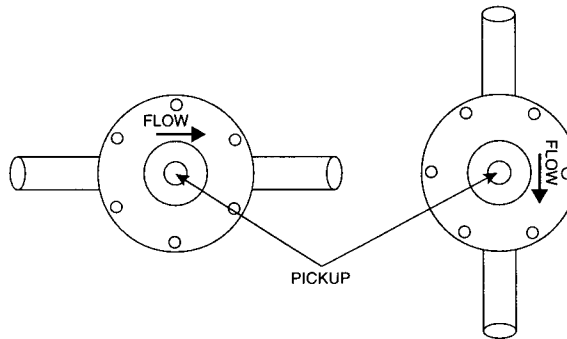
The flow through the meter measurement chamber follows the path of least resistance. Therefore no liquid passes through the center cavity between the rotors. The fluid is displaced from the inlet to the outlet via the area between the smooth oval rotors and the inner diameter of the meter housing.

3.2 Precautions

- Before use, confirm the fluid to be used is compatible with the meter and make certain that the operating conditions conform to the meter specifications.
- To prevent damage to the meter slowly fill the system with fluid (this will prevent damage that may be caused by air purge).
- Keep the flowmeter within the meter ratings.
- Remove meter from piping, replacing with a short pipe, when cleaning the piping system by flushing. Costly damage to the meter may result if the assembly is cleaned by flushing with the meter installed.

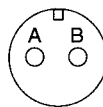
4. Installation

- Use thread sealant on all pipe threads.
- Install the meter carefully to avoid pipe strains.
- The meter must be installed on the discharge side of the pump.
- In tank-head operation, the head of the fluid must be higher than the pressure loss of the meter.
- The flow direction must conform to the arrow mark on the meter body.
- The meter must be installed in the correct orientation (see figure below).



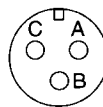
- Connect appropriate connector from pick-up from DCS or electronics.

Pickup Connections



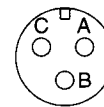
**Standard
MAG**

A - Signal (+)
B - Common (-)



**Redi-Pulse
(Open Collector)**

A - 8-30 Vdc (+)
B - Common (-)
C - Pulse Output



**Hall Effect
(Open Collector)**

A - 3.5-24 Vdc (+)
B - Common (-)
C - Pulse Output

5. Maintenance

5.1 General

The FTB3000 series flowmeters do not require routine maintenance and do not contain any field serviceable or replacement parts.

5.2 Trouble Shooting

Refer to the following troubleshooting guide for assistance with possible meter malfunctions:

TROUBLE	CAUSE	REMEDY
Fluid will not flow through the meter	<ul style="list-style-type: none"> • Meter installed with incorrect orientation. • Line to meter blocked. • Insufficient differential pressure. 	<p>Re-orientate the meter.</p> <p>Clear line to meter.</p> <p>Increase upstream pressure.</p>
Reduced flow through the meter	<ul style="list-style-type: none"> • Line to meter partially blocked. • Insufficient differential pressure. 	<p>Clear line to meter.</p> <p>Increase upstream pressure.</p>
Meter readings inaccurate	<ul style="list-style-type: none"> • Fluid flowrate is too low. • Fluid viscosity too low. • Air in fluid. • Meter drag due to incorrect installation. 	<p>See "Specifications" for min and max flowrates.</p> <p>Check fluid specifications.</p> <p>Bleed air from system.</p> <p>Re-adjust meter installation.</p>
Meter not giving signal	<ul style="list-style-type: none"> • Faulty pickup sensor. 	<p>Replace pickup sensor.</p>

Due to precision alignment of the FTB3000 Series Flowmeter internals, field repairs are not recommended. Should the meter require internal repairs, call OMEGA's Customer Service Department to return the unit.

Notes:



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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