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## **FTB500 Series** **Low Flowrate Meters**



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The information contained in this document is believed to be correct, but OMEGA 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

We are proud that you have selected an Omega Low Flowrate Meter, the finest precision flow transducer on the market.

The Omega FTB500 Series of Low Flowrate Meters are designed to meet the need for a high quality low flow measurement device for service in low to moderate viscosity clean liquids and for gas applications.

The information in this manual is provided to assist in the proper installation, use, and maintenance of your instrument.

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 your local Omega Representative or contact the Omega customer service department by telephone, fax, or email for advice.

## 2 Operation

### 2.1 Principle

The Omega FTB500 Series of Low Flowrate Meters has been developed to meet the need for a low flow measurement device for use with low to moderate viscosity clean liquids and for gas measurement applications.

The Omega FTB500 Series of Low Flowrate Meters is a family of low flow rate measurement devices whose design is based on a Pelton Wheel-like rotor. The measured fluid is directed tangentially through a velocity nozzle against the rotor causing it to spin. The pickup coil senses the spinning motion of the rotor through the housing and converts it into a pulsing electrical signal. Summation of the pulsing electrical signal relates directly to the total flow, while the frequency is related to the flow rate.

### 2.2 Precautions

- ◆ Do not drop the meter. Dropping the meter may result in damage to the meter housing and/or internals.
- ◆ Do not operate the meter at flowrates greater than the maximum flowrate marked on the meter. Operating at flowrates greater than the maximum flowrate may over-spin the meter. Over-spinning may result in damage to the meter.

**CAUTION:** *Avoid over-spinning the meter. Over-spinning the meter may result in damage to the meter internals and lead to meter failure.*

### 3 Installation

Upon receipt of the flowmeter carefully inspected it, checking for any indications of damage which may have occurred during shipment. Inspect all packing material carefully for parts or components which may have been packed with the shipment. Refer to the packing list/invoice for a detailed list of items included in the shipment.

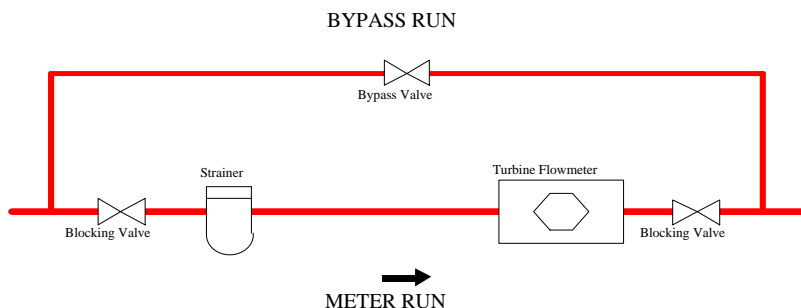
#### 3.1 General Piping

The Omega FTB500 Series of Low Flowrate Meters is capable of sensing fluid flow in one direction only. The meter housing is marked by a flow direction arrow to indicate the direction of flow through the meter. The meter must be installed in the piping in the correct orientation to ensure the most accurate and reliable operation. Care should be taken in the proper selection of the mating fittings. Size, type of material, and pressure rating should be the same as the flowmeter supplied.

When it is expected that flow will be intermittent, the meter should not be mounted at a low point in the piping system. Solids which settle or congeal in the meter may affect meter performance.

In order to achieve optimum electrical signal output from the flowmeter, due consideration must be given to its isolation from ambient electrical interference such as nearby motors, transformers, and solenoids.

A typical flowmeter installation is shown below:



Blocking and Bypass valves should be installed if it is necessary to do preventive maintenance on the flowmeter without shutting down the flow system. The Bypass valve can be opened before the Blocking valves are closed allowing the flow to continue while removing the turbine flowmeter for service.

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**IMPORTANT:** *All flow lines should be purged prior to installing the meter. To prevent possible damage to the meter, install the meter **ONLY** in flow lines that are clean and free of debris.*

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Upon initial start-up of the system a spool piece should be installed in place of the flowmeter so that purging of the system can be performed to remove all particle debris which could cause damage to the meter internals. In applications where meter flushing is required after meter service, care should be taken as to not over-spin the meter, as severe meter damage may occur.

**CAUTION:** *Avoid over-spinning the meter. Over-spinning the meter may result in damage to the meter internals and lead to meter failure.*

### 3.2 Strainers/Filters

The Omega FTB500 Series of Low Flowrate Meters is designed for use in a clean fluid service. However, the service fluid may carry some particulate material which would need to be removed before reaching the flowmeter. Under these conditions a strainer/filter may be required to reduce the potential hazard of fouling or damage that may be caused by foreign matter.

METER SIZE	MESH SIZE	PARTICLE SIZE (Maximum)
¼" to ½"	100	.0055
⅝" to 1¼"	70	.008
1½" to 3"	40	.015

If a strainer/filter is required in the system, it should be located upstream of the flowmeter taking care that the proper minimum distance is kept between the strainer and flowmeter.

### 3.3 Installation Kits

Installation kits for the Omega FTB500 Series of Low Flowrate Meters consist of two lengths of appropriate tubing cut to a length appropriate for the upstream and downstream straight pipe run with appropriate end fittings.

## 4 Maintenance

### 4.1 General

Preventive maintenance for the Omega FTB500 Series of Low Flowrate Meters consists of a thorough general inspection. Remove the meter from the service line and take to a clean work area. Use the following procedures and exploded component views to remove, inspect, and reinsert the flowmeter internals.

### 4.2 Disassembly

1. Hold the meter securely using a vise. Meter orientation should be such that the threaded plug is facing up. Use extreme care not to damage the meter housing or piping connections when placing in the vise.
2. Using a large-blade screwdriver, turn the plug counterclockwise to remove.
3. To remove the shaft assembly, carefully thread a 10-32 screw into the hole provided in insert. Thread the screw into the insert until it bottoms out (finger tight only).
4. Turn the housing over and slowly and carefully pull the shaft assembly and internals out of the housing. Take care not to damage the shaft, rotor, and/or bearings.
5. Remove and discard the gasket/seal.

### 4.3 Inspection & Repair

1. Examine the flowmeter internals for signs of corrosion or fouling by foreign materials.
2. Examine the shaft, rotor, and bearings for signs of wear and/or damage.
3. If wear or damage is present, replace with new parts.

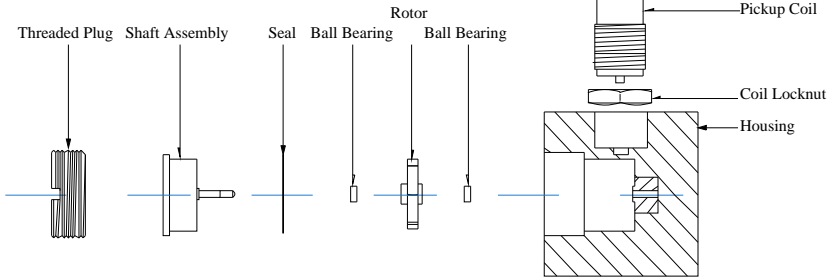
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**NOTE:** *Clean all of the internals in an approved cleaning solution.*

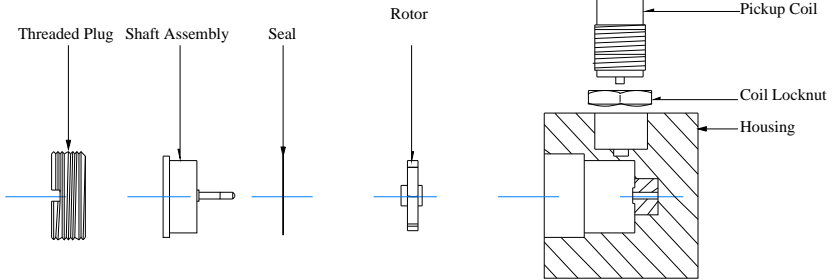
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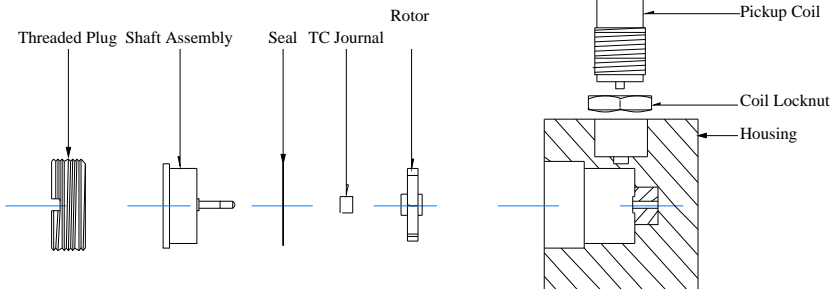
**Exploded View:  
BB - Ball Bearing Models**



**Exploded View:  
C – Hard Carbon Bearing Models**



**Exploded View:  
TC - Tungsten Carbide Sleeve Models**



## 4.4 Assembly

1. Install any new parts.
2. Guide the rotor and bearing assembly onto the shaft. Make sure the rotor is installed with the cup side of the Pelton wheel facing the “IN” side of the housing.
3. Place a new gasket on the insert. Always use a new gasket.
4. Place the shaft assembly insert, gasket, and rotor assembly back into housing by inverting the housing to keep gasket and rotor assembly in place.
5. Install the threaded plug and tighten to 50 ft-lb.

## 4.5 Pickup Coil Testing

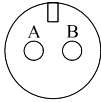
Testing the MAG and MCP (RF) coils consists of measuring the resistance with an ohmmeter. Resistance measurements are to be made when there is no flow through the meter or with the coil removed from the meter housing.

1. Measure the resistance between pin A and pin B. The resistance should be approximately as listed in the following table of some common coils.
2. The resistance from any pin to the case should be greater than 1 Mohm.

<b>COIL</b>	<b>DC RESISTANCE</b> (Ohms)
MC2PAHT	15.0 ±10%
MCP3A	11.5 ±10%
PC13-74G	1800 ±10%
PC13-74S	1850 ±15%
PC24-45G	1350 ±10%
PC24-45S	1850 ±15%
PC28-13G	120 ±20%
PC28-14G	180 ±20%

If either resistance measurement fails, replace the pickup coil. Firmly seat the new coil in the flowmeter and tighten the locking nut.

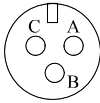
### Pickup Connections



MAG

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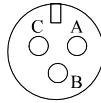
A - Signal (+)  
B - Common (-)



MCP (RF)

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A - Signal (+)  
B - Common (-)  
C - N/C



RediPulse

---

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

## 4.6 Troubleshooting

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

<b>TROUBLE</b>	<b>CAUSE</b>	<b>REMEDY</b>
Fluid will not flow through the meter	<ul style="list-style-type: none"><li>▪ Meter clogged.</li><li>▪ Line to meter blocked.</li></ul>	Clear meter. Clear line to meter.
Reduced flow through the meter	<ul style="list-style-type: none"><li>▪ Meter partially clogged.</li><li>▪ Line to meter partially blocked.</li></ul>	Clear meter. Clear line to meter.
Meter readings inaccurate	<ul style="list-style-type: none"><li>▪ Fluid flowrate is not within meter flow range.</li><li>▪ Meter drag due to worn or damaged parts.</li></ul>	See "Specifications" for min and max flowrates.  Replace worn or damaged parts.
Meter not giving pulse signal	<ul style="list-style-type: none"><li>▪ Faulty pickup coil.</li><li>▪ Meter internals not turning due to worn or damaged parts.</li></ul>	Replace pickup coil. Replace worn or damaged parts.

## 4.7 Spare Parts

The following table contains the suggested spare parts for the Omega FTB500 Series of Low Flowrate Meters:

<b>Item No.</b>	<b>Qty</b>	<b>Part Description</b>
1	1	Pickup Coil
1	1	Seal/Gasket
1	1	Rotor Assembly
1	1	Bearings
1	1	Shaft Assembly

Specific meter parts are dependent upon the meter size and model, always have the complete meter model number or serial number available when consulting the factory.



## 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.

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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. 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.

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