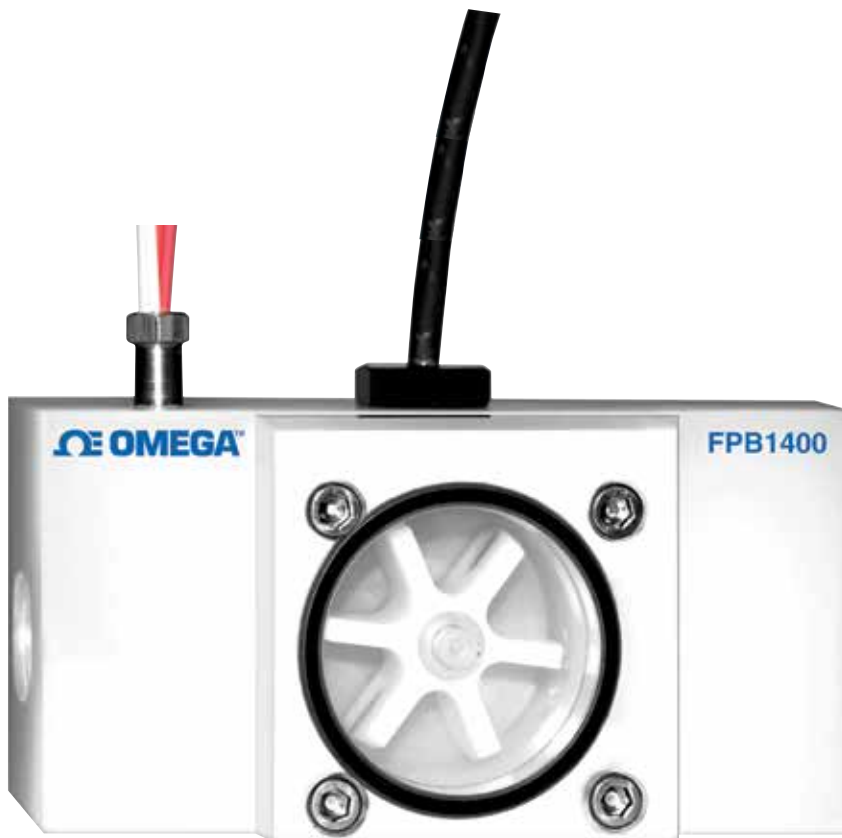


1 YEAR
WARRANTY



Ω OMEGA™ User's Guide



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FPB 1400 Paddle Wheel Meter



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*The selection of materials of construction, is the responsibility of the customer.
The company accepts no liability.*

1. UNPACKING THE FPB1400

1.1 Inspect Package for External Damage

Your 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.

Remove the Packing List and verify that you have received all equipment. If you have any questions about the shipment, please call the Omega™ Customer Service Department at 1-800-622-2378 or (203) 359-1660. Your FPB1400 Paddle Wheel 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.

1.2 Unpack the Paddle Wheel 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™ directly. When unpacking the instrument please make sure that you have all the items indicated on the Packing List. Please report any shortages promptly.

1.3 Returning Merchandise for Repair

Please contact an Omega™ customer service representative and request a Return Authorization Number (AR). It is mandatory that any equipment returned for servicing be purged and neutralized of any dangerous contents including but not limited to toxic, bacterially infectious, corrosive or radioactive substances. No work shall be performed on a returned product unless the customer submits a fully executed, signed SAFETY CERTIFICATE. Safety form can be obtained from Omega™ Customer Service.

2. FPB1400 PADDLE WHEEL METERS

2.1 Principles of Operation

FPB1400 liquid flow meters consist of a meter body that is installed in-line in a conduit system. Inside, between the inlet and the outlet connections is a rotary wheel with permanent magnets embedded at 180 degrees in paddles.

Fluid flowing through the meter causes the paddle to spin. A magnetic sensor picks up the frequency of pulses, and the readings are proportional to the liquid flow taking place. The number of pulses per unit time interval and a K-factor (pulses/unit of flow) facilitate determining the volumetric rate of flow through the meter.

3. SPECIFICATIONS

| WETTED MATERIALS | | |
|------------------|-------------------------|------------------|
| | POLYPROPYLENE UNITS | PVDF UNITS |
| BODY | Polypropylene | PVDF |
| LID | Acrylic | PVDF |
| PADDLE WHEEL | PVDF | PVDF |
| SHAFT | Nickel Tungsten Carbide | Zirconia Ceramic |
| BEARINGS | Sapphire Jewels | Sapphire Jewels |
| O-RINGS | EPDM | PTFE |

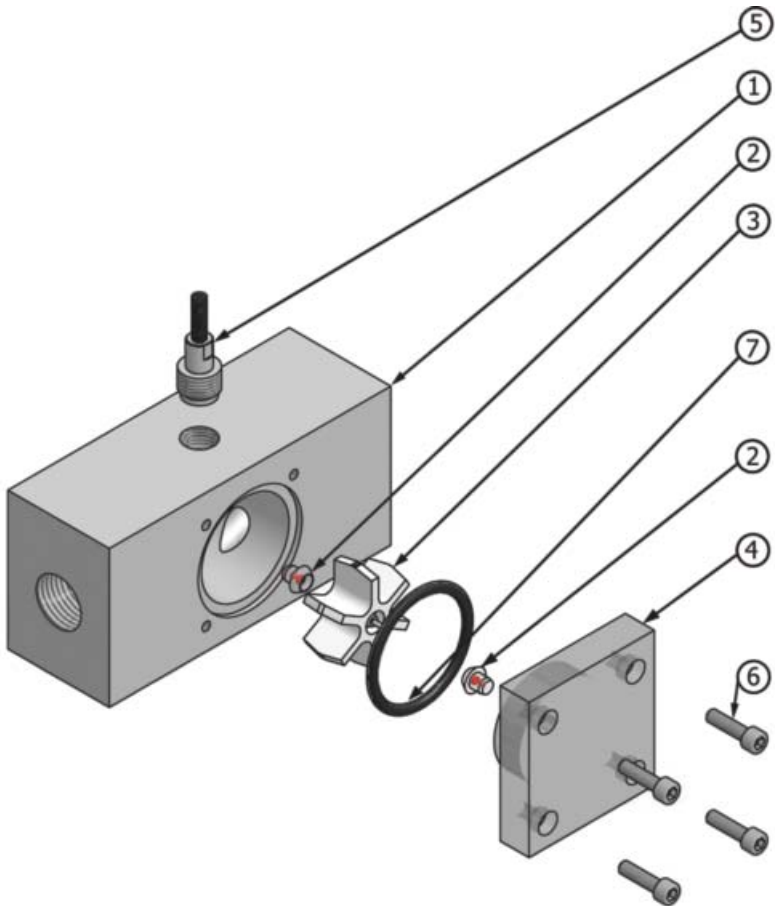
| SPECIFICATIONS | |
|-----------------|--|
| ACCURACY | ±1% FS. |
| MAX TEMPERATURE | 60 °C (140 °F). |
| MAX PRESSURE | 10 bar (150 psi). |
| POWER | 5 to 24 Vdc @ 2 mA. |
| OUTPUT SIGNAL | NPN open collector (load 30 mA max). |
| DIMENSIONS | 56H x 108L x 53D mm (2.2 x 4.25 x 2.2"). |
| CABLE | Flow signal 1.8 m (6') or optional 3.7m (12'). |

| FLOW RATE FOR FPB1400 | | | | | |
|-----------------------|----------------------------|---------|-------------------------------|-------------------|-----|
| METER SIZES | Flow Rate H ₂ O | | Inlet/Outlet Ports Female NPT | Max Pressure Drop | |
| | [L/min] | Gal/min | | Bar | PSI |
| FPB1402 / 1412 | 0.15-18.9 | 0.04-5 | 3/8" | 1 | 15 |
| FPB1404 / 1414 | 0.3-37.6 | 0.08-10 | 1/2" | 1.4 | 20 |
| FPB1406 / 1416 | 0.6-64.4 | 0.15-17 | 3/4" | 1.4 | 20 |
| FPB1408 / 1418 | 1.3-132.5 | 0.35-35 | 1" | 1.4 | 20 |

| PADDLE WHEEL MODEL NUMBERS | |
|----------------------------|---------|
| POLYPROPYLENE | PVDF |
| FPB1402 | FPB1412 |
| FPB1404 | FPB1414 |
| FPB1406 | FPB1416 |
| FPB1408 | FPB1418 |

4. PARTS

| PARTS LIST | | | |
|------------|----------------------------|-----------------------------------|----------------------------|
| | PARTS | FPB1400 MATERIALS | FPB1400 MATERIALS |
| 1 | LOWER BLOCK | POLYPROPYLENE | PVDF |
| 2 | JEWEL BEARING (2 required) | PVDF SAPPHIRE | |
| 3 | PADDLE WHEEL | PVDF & NICKEL TUNGSTEN CARBIDE | PVDF & ZIRCONIA CERAMIC |
| 4 | LID | ACRYLIC | PVDF |
| 5 | SENSOR | NOT WETTED PART | |
| 6 | SCREW 8-32 (4 required) | STAINLESS STEEL | |
| 7 | O-RING | EPDM | PTFE |



5. INSTALLATION

NPT female inlet and outlet port sizes are shown in the table in the flow rate on the preceding page.

It is necessary to include an upstream straight pipe of at least five times the inside diameter of the line.

Installation horizontally or vertically is acceptable.

The magnetic sensor requires 5-24 VDC power (30 mA max. load).

FLOW SENSOR CONNECTION CONFIGURATION:

RED - 5-26 VDC power (+)
BLACK - POWER (-), COMMON
GREEN - SENSOR NPN OPEN COLLECTOR OUTPUT

“pull-up” resistor is necessary for PLC input with current sourcing. Recommended value: 2.2 K Ohm for 24 VDC input.

FPB1400 meters supplied with (four wire) RTD options are connected using the stainless steel temperature sensor adapter supplied.

6. MAINTENANCE

6.1 Sensors

In rare instances, due to electrical damage, the pulse sensor needs to be replaced by unscrewing it and installing a replacement (hand tight).

The RTD /adapter subassembly is replaceable using a wrench.

6.2 Paddle Wheel Disassembly

Bearings are highly susceptible to careless disassembly and reassembly practices. The nickel Tungsten Shaft of the Wheel is supported at each end by sapphire bearings to minimize friction and facilitate very low flow rate measurements.

The Wheel may be uninstalled by holding the Lid in place, and removing the four mounting screws, very carefully to prevent damaging the sapphire Bearings at each end of the Shaft. If the Bearings are shattered, they need to be replaced.

Reassembly is made ensuring that the Shaft ends are inserted gently into the sapphire Bearings. Check to see if the wheel is free to spin before the Lid Bearing is installed. While holding the Lid in place, blow into the meter to verify that the Wheel is free to spin. Finally the Lid is reinstalled using the four mounting screws.



CAUTION: Never use compressed air or gases to test the meter, as this would damage the Bearings.

Notes:

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 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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