FPR300/310 SERIES
Low-Flow Meter
OMEGAnet® Online Service
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It is the policy of OMEGA Engineering, Inc. 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 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.
GENERAL INFORMATION, FEATURES, SPECIFICATIONS

These versatile impeller flowmeters are available in 3/8", 1/2", 3/4", and 1" nominal pipe sizes with female NPT threads (SAE optional). They employ jewel bearings to allow for very low minimum flow rates and superior life.

With a body material of polypropylene, the **FPR300** is an economical choice for metering water or low corrosion fluids. The lens cover is available in a choice of materials: acrylic for visual flow indication of low-corrosive fluids; polypropylene when more corrosion resistance is needed. The standard rotor assembly is PVDF with tungsten carbide shaft (ceramic shaft optional). The O-ring is EPDM.

The **FPR310** offers greater chemical resistance with a PTFE body and cover, PTFE-coated FKM O-ring, and standard PVDF/ceramic rotor assembly (ceramic shaft optional).

The pulse output of these meters is compatible with many different types of controls. For metering pump pacing or interfacing with lowspeed counters, a pulse divider is recommended.

**FLOW RANGE**

<table>
<thead>
<tr>
<th>Model #</th>
<th>*K-Factor (Pulses/Gal)</th>
<th>Gal/Min</th>
<th>Liter/Min</th>
</tr>
</thead>
<tbody>
<tr>
<td>FPR300/311</td>
<td>1417</td>
<td>0.07-5</td>
<td>0.27-18.9</td>
</tr>
<tr>
<td>FPR302/312</td>
<td>658</td>
<td>0.1-10</td>
<td>0.38-37.9</td>
</tr>
<tr>
<td>FPR303/313</td>
<td>468</td>
<td>0.2-20</td>
<td>0.75-75</td>
</tr>
<tr>
<td>FPR304/314</td>
<td>254</td>
<td>0.5-40</td>
<td>1.9-150</td>
</tr>
</tbody>
</table>

*Specifications subject to change

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor Cable</td>
<td>18 feet standard (Maximum cable run 2000 ft.)</td>
<td>18 feet standard (Maximum cable run 2000 ft.)</td>
</tr>
<tr>
<td>Materials Body</td>
<td>Polypropylene</td>
<td>PTFE</td>
</tr>
<tr>
<td>Rotor</td>
<td>PVDF</td>
<td>PVDF</td>
</tr>
<tr>
<td>Shaft</td>
<td>Nickel tungsten carbide (zirconia ceramic optional)</td>
<td>Zirconia ceramic (silicon carbide optional)</td>
</tr>
<tr>
<td>O-Ring</td>
<td>EPDM (PTFE-coated FKM optional)</td>
<td>PTFE-coated FKM (EPDM optional)</td>
</tr>
<tr>
<td>Bearings</td>
<td>Ruby ring and ball</td>
<td>Ruby ring and ball</td>
</tr>
<tr>
<td>Cover</td>
<td>Acrylic (Polypro optional)</td>
<td>PTFE</td>
</tr>
<tr>
<td>Maximum Temperature</td>
<td>160˚ F (70˚ C)</td>
<td>160˚ F (70˚ C)</td>
</tr>
<tr>
<td>Maximum Pressure</td>
<td>150 PSI (10 bar)</td>
<td>150 PSI (10 bar)</td>
</tr>
<tr>
<td>Accuracy</td>
<td>±1% of full scale</td>
<td>±1% of full scale</td>
</tr>
<tr>
<td>Power</td>
<td>5-24 Vdc, 2 mA min</td>
<td>5-24 Vdc, 2 mA min</td>
</tr>
<tr>
<td>Outputs</td>
<td>Current sinking pulse, 6-24 Vdc</td>
<td>Current sinking pulse, 6-24 Vdc</td>
</tr>
<tr>
<td>Regulatory</td>
<td>Mark (Standard Power Only)</td>
<td>Mark (Standard Power Only)</td>
</tr>
</tbody>
</table>

*Specifications subject to change
INSTALLATION, CONNECTIONS

INSTALLATION

Piping Requirements. Standard fittings are female NPT. If the piping connected to the meter is metallic, care should be taken not to overtighten. Straight pipe of at least five diameters upstream of the meter is recommended. Vertical, horizontal, or inverted (lens down) installations are all acceptable.

Connections to Other Control Devices. It is often desirable to connect an FPR flow sensor to a PLC or industrial computer board, and the sensors are well suited for this. Typically it can be connected directly, or with a single resistor added. The pickup sensors are current sinking (NPN) GMR devices that require 5-24 Volts DC and 2 mA current. They can connect directly to a PLC or computer board (See Fig. 1) if:

1. The sensor power supply on the PLC is 5 - 24 Vdc (24 Vdc is typical).
2. The sensor power supply can provide at least 2 mA (100 mA is typical).
3. The sensor input on the PLC can accept a current sinking device.
4. The PLC frequency response > flow meter output frequency.

If the PLC input only accepts current sourcing devices, a pull-up resistor must be added (See Fig. 2). Typically, on a 24 Vdc input a 2.2 K Ohm resistor will be effective.

Figure 1
Input Designed for Current Sinking (NPN) Devices

Figure 2
Input Designed for Current Sourcing (PNP) Devices

Warning: This meter has low-friction bearings. Do not at any time test operation of the meter with compressed air. Doing so will subject it to rotational speeds many times those for which it was designed, and will certainly damage the rotor, shaft, and/or bearings.

Since the three-wire pickup sensors are solid state, they do not exhibit switch bounce and can be used at relatively high frequencies.

K-Factor. The meter is factory calibrated. The K-factor is found on the label on the meter body and must be input into the control/display for accurate reading.
**REPAIR**

**Rotor Replacement.** There is only one moving part to this meter. The bearings are made of ruby, which rarely wears out or needs replacement unless they have been physically damaged by severe shock. The shaft is integrally molded into the rotor, and shaft and rotor are replaced as one part. (You may wish to replace the bearings, using the bearing removal tool, while the meter is disassembled for rotor replacement). To replace the rotor, disconnect the meter and remove the four screws that hold the cover in place. Lift the cover and remove the rotor (see parts diagram below).

When putting in the new rotor, be sure that the ends of the shaft are in both bearings before tightening the cover. The rotor can be easily dropped into the bottom bearing. Starting the shaft into the upper bearing requires a bit of care. It is easier if the rotor is spinning, which can be done by lightly blowing into a port. When the upper bearing plate drops into place, hold it down and check for free spinning (by blowing lightly) before replacing the cover. Check that the O-ring is in its seat on the bearing plate before replacing the cover. Replace the cover, insert the four cap screws and tighten.

**Parts Listing**

<table>
<thead>
<tr>
<th>Parts Listing</th>
<th>FPR300</th>
<th>FPR310</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Body</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-038</td>
<td>16471</td>
<td>25104</td>
</tr>
<tr>
<td>-080</td>
<td>16472</td>
<td>25103</td>
</tr>
<tr>
<td>-075</td>
<td>16473</td>
<td>25102</td>
</tr>
<tr>
<td>-100</td>
<td>16474</td>
<td>25101</td>
</tr>
<tr>
<td>2 Flow Direction Label</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>19036</td>
<td>19036</td>
</tr>
<tr>
<td>3 Bearing Assembly (2 required)</td>
<td>16772</td>
<td>16772</td>
</tr>
<tr>
<td>Bearing Removal Tool (not shown)</td>
<td>26108</td>
<td>26108</td>
</tr>
<tr>
<td>4 Rotor with Shaft</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PVDF/ceramic (2 magnet)</td>
<td>11127</td>
<td>11127</td>
</tr>
<tr>
<td>PVDF/carbide (2 magnet)</td>
<td>11129</td>
<td>11129</td>
</tr>
<tr>
<td>PVDF/ceramic (6 magnet, high res)</td>
<td>11132</td>
<td>11132</td>
</tr>
<tr>
<td>PVDF/carbide (6 magnet, high res)</td>
<td>11130</td>
<td>11130</td>
</tr>
<tr>
<td>5 O-Ring</td>
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<td></td>
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<tr>
<td>EPDM</td>
<td>25081</td>
<td></td>
</tr>
<tr>
<td>PTFE-coated FKM</td>
<td></td>
<td>31403</td>
</tr>
<tr>
<td>6 Cover</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polypro</td>
<td>16018</td>
<td>31007</td>
</tr>
<tr>
<td>Acrylic</td>
<td>16022</td>
<td>31006</td>
</tr>
<tr>
<td>PTFE</td>
<td>26174</td>
<td>31005</td>
</tr>
<tr>
<td>7 Cover Screws (4 required)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hexscrew</td>
<td>25370</td>
<td></td>
</tr>
<tr>
<td>Screw (use with hexnut 07705)</td>
<td></td>
<td>07685</td>
</tr>
<tr>
<td>Hexnut (use with screw 07685)</td>
<td></td>
<td>07705</td>
</tr>
<tr>
<td>8 Sensor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard</td>
<td>26310</td>
<td>26310</td>
</tr>
<tr>
<td>Micropower</td>
<td>29953</td>
<td>29953</td>
</tr>
</tbody>
</table>

**Sensor Replacement.** The sensor ordinarily does not need replacement unless it is electrically damaged. If replacement is necessary, unthread the sensor by hand. Thread the replacement sensor in and tighten by hand.

Reconnect the sensor according to the diagram below.

---

BLACK) Power (-)
WHITE Signal
RED) Power (+) 6-24 Vdc
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.

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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