



# User's Guide



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**FPD1001 thru FPD1003,  
FPD1102 and FPD1103,  
FPD1201 thru FPD1203 (includes -R Option)  
SERIES LOW FLOW  
Positive Displacement Flowmeters**



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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.

## To the owner:

Please take a few minutes to read through the manual before installing and operating your meter. Always retain this manual for future reference. If you have any problems with the meter, refer to the Maintenance and Troubleshooting sections of the manual.

This manual contains connection and operating instructions for the OMEGA FPD Series meters. This includes the following models:

FPD1001	FPD1202-IP
FPD1201	FPD1003
FPD1201-IP	FPD1203
FPD1002	FPD1103
FPD1202	FPD1203-IP
FPD1102	

Part breakdowns for each model are located at the back of this manual. For models with displays and/or 4-20 mA output, an additional instruction manual is provided.

The flowmeter has incorporated the oval rotor principal into its design. This has proven to be a reliable and highly accurate method of measuring flow. Exceptional repeatability and high accuracy over a wide range of fluid viscosities and flowrates are features of the oval rotor design. With low pressure drop and high pressure rating, oval rotor flowmeters are suitable for both gravity and pump (in-line) applications.

## OPERATION



**Please read this information carefully before use!**

Before use, confirm the fluid to be used is compatible with the meter. Refer to Industry fluid compatibility charts or consult your local representative for advice.

To prevent damage from dirt or foreign matter it is recommended that a Y or basket type 200 mesh strainer be installed as close as possible to the inlet side of the meter. Contact your local representative for advice.

**NOTE:** To prevent damage to the meter, slowly fill the system with fluid (this will prevent damage caused by air purge). Failure to do this could damage the meter.

To reduce pressure build up, turn off the pump at the end of each day.

## INSTALLATION

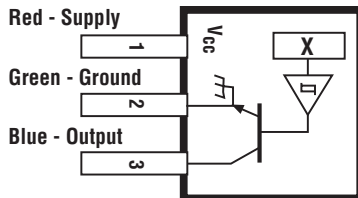
1. Use thread sealant on all pipe threads.
2. Ensure the meter is installed so that rotor shafts are always in a horizontal plane. Flow is bi-directional.
3. OMEGA recommends use of flexible connections.
4. Extreme care must be taken when installing the meter. Pipe strain or overtightening the meter connections can cause meter damage.

## PULSER DETAILS

### Hall Effect Sensor Specifications:

- 4.5V to 24V (4.6 ~ 9 mA) operation needs only an unregulated supply.
- Open collector 25 mA output NPN compatible with digital logic.
- Reverse battery protection.

**Figure 1**



*Hall Effect Sensor Wiring Details*

### Reed Relay Specifications:

- Two wire SPST N/O.
- Switching voltage: 150 VDC; Maximum current: 0.25 AMPS.
- Rating 3 watts.

## MAINTENANCE

### Disassembly:

1. Ensure the fluid supply to the meter has been disconnected, and the line pressure has been released before disassembly.
2. Remove four (4) screws and remove the meter body cover.
3. Remove O-ring and inspect. Replace O-ring if damaged.
4. Remove rotors, clean and inspect. Replace rotors if damaged.

### Reassembly:

1. Place rotors into the meter body. The rotors should be at 90 degrees to each other.

NOTE: The rotor with magnets must be placed in the body on the same side as the groove on the body. (Refer to diagram.)

2. Lightly rotate the rotors by hand. (They must rotate freely.)
3. Install O-ring.
4. Replace the meter cap.

NOTE: The groove on the cover must line up with the groove on the meter body. (Refer to diagram.)

5. Replace the four screws.



**!!! CAUTION !**

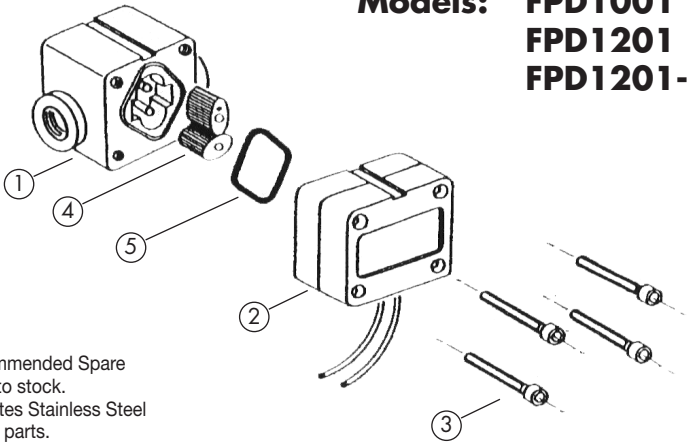
Care must be taken not to overtighten the screws, or damage may occur.

## TROUBLESHOOTING

Symptom	Probable Cause	Corrective Action
FLUID WILL NOT FLOW THROUGH THE METER	<ol style="list-style-type: none"> <li>1. Foreign matter blocking rotors</li> <li>2. Line strainer blocked</li> <li>3. Damaged rotors</li> <li>4. Meter connections over-tightened</li> </ol>	<p>Dismantle meter, clean rotors. Strainer must be fitted in-line.</p> <p>Clean strainer.</p> <p>Replace rotors. Strainer must be fitted in-line.</p> <p>Re-adjust connections.</p>
REDUCED FLOW THROUGH THE METER	<ol style="list-style-type: none"> <li>1. Line strainer partially blocked</li> <li>2. Fluid is too viscous</li> </ol>	<p>Clean strainer.</p> <p>Maximum viscosity 1000 centipoise.</p>
METER READING INACCURATE	<ol style="list-style-type: none"> <li>1. Fluid flowrate is too low or too high</li> <li>2. Air in fluid</li> <li>3. Excess wear caused by incorrect installation</li> </ol>	<p>See specifications for minimum and maximum flowrates.</p> <p>Bleed air from system.</p> <p>Check meter body and rotors.</p>
METER NOT GIVING A PULSE SIGNAL	<ol style="list-style-type: none"> <li>1. Faulty Hall Effect sensor or Reed Switch</li> <li>2. Faulty magnet</li> <li>3. Rotors installed in wrong position</li> </ol>	<p>Replace meter cap.</p> <p>Replace rotors.</p> <p>Refer to correct rotor positioning and assembly instructions.</p>

## DISPLAY PARTS LISTING

**Models: FPD1001  
FPD1201  
FPD1201-IP**



u = Recommended Spare  
Parts to stock.

**Bold Text** = Indicates Stainless Steel  
model parts.

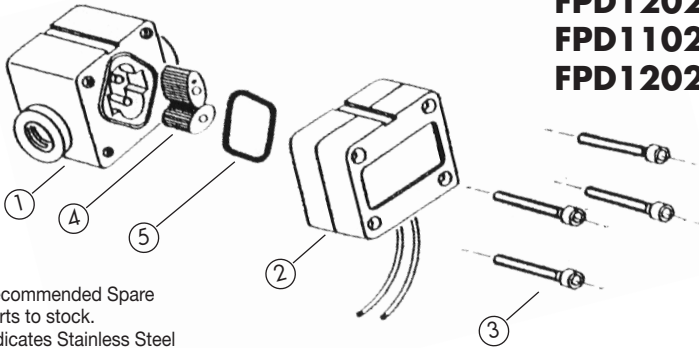
Item No.	Qty.	Rec. Parts	Part or Set (Order from this column only)	Part Description
<b>1</b>	<b>1</b>		<b>MS600NS</b>	<b>Meter Body Assy. NPT Stainless Steel</b>
1	1		MS605NS	Meter Body Assy. NPT Aluminum
2	1	u	MS3R-S	Meter Cap Hall Effect Sensor Aluminum
<b>2</b>	<b>1</b>	<b>u</b>	<b>MS3S-S</b>	<b>Meter Cap Hall Effect Sensor Stainless Steel</b>
2	1	u	MS3R-SR	Meter Cap Reed Switch Aluminum
<b>2</b>	<b>1</b>	<b>u</b>	<b>MS3S-SR</b>	<b>Meter Cap Reed Switch Stainless Steel</b>
3	4		MS98s	Screws, Aluminum
<b>3</b>	<b>4</b>		<b>MS113s</b>	<b>Screws, Stainless Steel</b>
<b>3</b>	<b>4</b>	<b>u</b>	<b>MS277</b>	<b>Screws, Stainless Steel - IP</b>
4	2	u	MS601S	Rotor Set Stainless Steel
5	1	u	BS029V	O-Ring (Viton)
5	1	u	BS029TE	O-Ring (Kalrez)

## SPECIFICATIONS

	Stainless Steel Models	Aluminum Models
<b>Flow Ranges (LPH or GPH)</b>		
Above 5 centipoise	0.5 to 50 / 0.132 to 13.2	0.5 to 50 / 0.132 to 13.2
Below 5 centipoise	2 to 50 / 0.528 to 13.2	2 to 50 / 0.528 to 13.2
<b>Accuracy of Reading</b>	± 1%	± 1%
<b>Maximum Viscosity</b>	1000 Centipoise	1000 Centipoise
<b>Max. Operating Pressure</b>	1000 kPa/ 150 PSI / 10 Bar 5500 kPa/ 800 PSI / 55 Bar (S.S. - I.P. Models)	500 kPa/ 75 PSI / 5 Bar
<b>Max. Operating Temperature</b>	120°C / 248°F	80°C / 176°F
<b>Pulse Type</b>	Hall Effect Sensor / Reed Switch	Hall Effect Sensor / Reed Switch
<b>Pulses per Litre/Gallons</b>	1547 / 5855.4	1547 / 5855.4
<b>Dimensions</b>		
Width x Height	50 x 50mm / 1.97" x 1.97"	50 x 50mm / 1.97" x 1.97"
Port Face to Face	67 mm / 2.63"	60 mm / 2.36"
<b>Weight</b>	602 g / 21.23 oz.	308 g / 10.86 oz.
<b>Wetted Components</b>	316 SS, Sapphire	6061 Alum., 316 SS, Sapphire

## DISPLAY PARTS LISTING

**Models: FPD1002  
FPD1202  
FPD1102  
FPD1202-IP**



u = Recommended Spare  
Parts to stock.

**Bold Text** = Indicates Stainless Steel  
model parts.

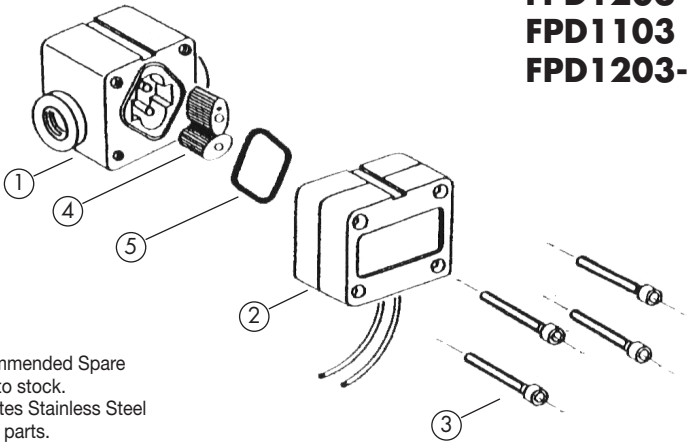
Item No.	Qty.	Rec. Parts	Part or Set (Order from this column only)	Part Description
1	1		MS1R-2S	Meter Body Assy. NPT
<b>1</b>	<b>1</b>		<b>MS1S-2S</b>	<b>Meter Body Assy. NPT Stainless Steel</b>
1	1		MS1AL-2S	Meter Body Assy. NPT Aluminum
2	1	u	MS3R-S	Meter Cap Hall Effect Sensor
<b>2</b>	<b>1</b>	<b>u</b>	<b>MS3S-S</b>	<b>Meter Cap Hall Effect Sensor Stainless Steel</b>
2	1	u	MS3R-SR	Meter Cap Reed Switch Aluminum
<b>2</b>	<b>1</b>	<b>u</b>	<b>MS3S-SR</b>	<b>Meter Cap Reed Switch Stainless Steel</b>
3	4		MS98s	Screws, Aluminum
<b>3</b>	<b>4</b>		<b>MS113s</b>	<b>Screws, Stainless Steel</b>
3	4		MS277	Screws, Stainless Steel - IP
4	2	u	MS6s	Rotor Set
<b>4</b>	<b>2</b>	<b>u</b>	<b>MS6-1s</b>	<b>Rotor Set Stainless Steel</b>
5	1	u	BS029V	O-Ring (Viton)
5	1	u	BS029TE	O-Ring (Kalrez)

## SPECIFICATIONS

	Stainless Steel & Ryton Models	Aluminum Models
<b>Flow Ranges (LPH or GPH)</b> Above 5 centipoise Below 5 centipoise	2 to 100 / 0.53 to 26.4 5 to 100 / 1.32 to 26.4	2 to 100 / 0.53 to 26.4 3 to 100 / 0.8 to 26.4
<b>Accuracy of Reading</b>	± 1%	± 1%
<b>Maximum Viscosity</b>	1000 Centipoise	1000 Centipoise
<b>Max. Operating Pressure</b>	500 kPa/ 75 PSI / 5 Bar (Ryton) 5500 kPa/ 800 PSI / 55 Bar (S.S. - I.P. Models)	500 kPa/ 75 PSI / 5 Bar (Ryton)
<b>Max. Operating Temperature</b>	80°C / 176°F (Ryton) 120°C / 240°F (SS)	80°C / 176°F
<b>Pulse Type</b>	Hall Effect Sensor / Reed Switch	Hall Effect Sensor / Reed Switch
<b>Pulses per Litre/Gallons</b>	1000 / 3785	1000 / 3785
<b>Dimensions</b> Width x Height Port Face to Face	50 x 50mm / 1.97" x 1.97" 65 mm / 2.58"	50 x 50mm / 1.97" x 1.97" 60 mm / 2.36"
<b>Weight</b>	240 g / 8.5 oz. (Ryton) 600 g / 21.2 oz. (SS)	310 g / 11 oz.
<b>Wetted Components</b>	316 SS, Zirconia Bush (SS) Ryton, 316 SS, Zirconia Bush	6061 Alum., 316 SS, Ryton Zirconia Bush

# DISPLAY PARTS LISTING

**Models: FPD1003  
 FPD1203  
 FPD1103  
 FPD1203-IP**



u = Recommended Spare  
 Parts to stock.

**Bold Text** = Indicates Stainless Steel  
 model parts.

Item No.	Qty.	Rec. Parts	Part or Set (Order from this column only)	Part Description
1	1		MS2R-2S	Meter Body Assy. NPT
<b>1</b>	<b>1</b>		<b>MS2S-2S</b>	<b>Meter Body Assy. NPT Stainless Steel</b>
1	1		MS2AL-2S	Meter Body Assy. NPT Aluminum
2	1	u	MS3R-S	Meter Cap Hall Effect Sensor
<b>2</b>	<b>1</b>	<b>u</b>	<b>MS3S-S</b>	<b>Meter Cap Hall Effect Sensor Stainless Steel</b>
2	1	u	MS3R-SR	Meter Cap Reed Switch (Ryton & Aluminum)
<b>2</b>	<b>1</b>	<b>u</b>	<b>MS3S-SR</b>	<b>Meter Cap Reed Switch Stainless Steel</b>
3	4		MS98s	Screws, (Ryton & Aluminum)
<b>3</b>	<b>4</b>		<b>MS113s</b>	<b>Screws, Stainless Steel</b>
3	4		MS277	Screws, Stainless Steel - IP
<b>4</b>	<b>2</b>	<b>u</b>	<b>MS7-1Es</b>	<b>Rotor SS Hall (Set)</b>
<b>4</b>	<b>2</b>	<b>u</b>	<b>MS7-1HEs</b>	<b>Rotor SS High Viscosity Hall (Set)</b>
<b>4</b>	<b>2</b>	<b>u</b>	<b>MS7-1Rs</b>	<b>Rotor SS Reed (Set)</b>
<b>4</b>	<b>2</b>	<b>u</b>	<b>MS7-1HRs</b>	<b>Rotor SS Reed High Viscosity (Set)</b>
4	2	u	MS7Rs	Rotor PPS Reed (Set)
4	2	u	MS7Es	Rotor PPS Hall (Set)
5	1	u	BS029V	O-Ring (Viton)
5	1	u	BS029TE	O-Ring (Kalrez)



## SPECIFICATIONS

	Stainless Steel & Ryton Models	Aluminum Models
<b>Flow Ranges (LPH or GPH)</b>		
<b>Above 5 centipoise</b>	15 to 500 / 4 to 132	15 to 500 / 4 to 132
<b>Below 5 centipoise</b>	25 to 500 / 6 to 132	25 to 500 / 6 to 132
<b>Accuracy of Reading</b>	± 1%	± 1%
<b>Maximum Viscosity</b>	1000 Centipoise	1000 Centipoise
<b>Max. Operating Pressure</b>	500 kPa/ 75 PSI / 5 Bar (Ryton) 1000 kPa/150 PSI/10 Bar (SS) 5500 kPa/ 800 PSI / 55 Bar (S.S. - I.P. Models)	500 kPa/ 75 PSI / 5 Bar (Ryton)
<b>Max. Operating Temperature</b>	80°C / 176°F (Ryton) 120°C / 240°F (SS)	80°C / 176°F
<b>Pulse Type</b>	Hall Effect Sensor / Reed Switch	Hall Effect Sensor / Reed Switch
<b>Pulses per Litre/Gallons</b>	400 / 1514	400 / 1514
<b>Dimensions</b>		
<b>Width x Height</b>	50 x 50mm / 1.97" x 1.97"	50 x 50mm / 1.97" x 1.97"
<b>Port Face to Face</b>	65 mm / 2.58"	60 mm / 2.36"
<b>Weight</b>	240 g / 8.5 oz. (Ryton) 600 g / 21.2 oz. (SS)	320 g / 12 oz.
<b>Wetted Components</b>	316 SS, Zirconia Bush (SS) Ryton, 316 SS, Zirconia Bush	6061 Alum., 316 SS, Ryton Zirconia Bush



## 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.

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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