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POSITIVE DISPLACEMENT FLOWMETERS

M7 HP SERIES INSTRUCTION MANUAL

TO THE OWNER

Please take a few minutes to read through this 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 trouble shooting sections of this manual.

This manual contains connection and operating instructions for meters. If you need further assistance, contact your local representative or distributor for advice.

This Flow Meter 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 flow rates are features of the oval rotor design. With low pressure drop and high pressure rating oval rotor flow meters are suitable for both gravity and pump (in line) applications.

Flow meter body and rotors are manufactured Aluminium and PPS respectively.

IMPORTANT INFORMATION



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.

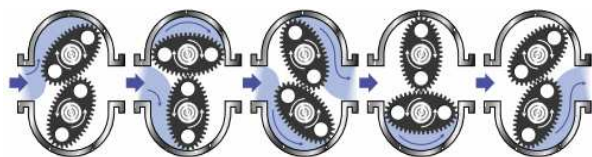
To prevent damage from dirt or foreign matter it is recommended that a Y or Basket type 60 mesh strainer be installed as close as possible to the inlet side of the meter. Contact your local representative for advice.

Note: To prevent damage caused by air purge slowly fill the meter with fluid. Failure to do this could damage the meter. To reduce pressure build up turn off the pump at the end of each day.

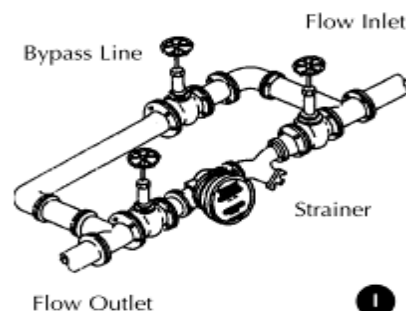


OPERATING PRINCIPLE

When fluid passes through the meter the rotors turn, as shown below. The magnets which are located in the rotors will pass across the pulser Circuit board (containing either Reed switches or Hall Effect sensors). A signal is generated which is then sent by the Pulse Circuit Board (PCB) to the relevant LC display or receiving instrument.



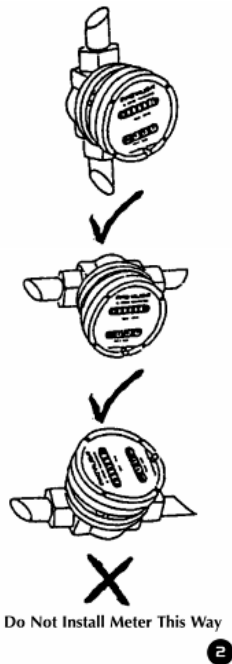
INSTALLATION



1) It is recommended that when setting up pipe work for meter installations a bypass line be included in the design. This provides the facility for a meter to be removed for maintenance without interrupting production. (See Fig.1)

2) Use thread sealant on all pipe threads.

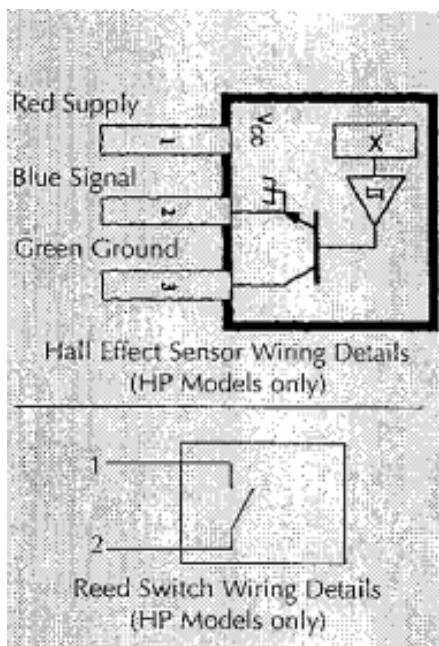
3) The meter can be installed in any orientation as long as the meter shafts are in a horizontal plane. (Refer to Fig.2 for correct installation) The flow is bi-directional.



4) The use of flexible connections is recommended.

5) Extreme care must be taken when installing the meter. Pipe strain or over tightening meter.

PULSER DETAILS



Hall Effect Sensor Specifications

1 - 4.5V to 24V (4.6 ~ 9mA) operation needs only an unregulated supply.

1 - Open collector 25mA output NPN (Current Sink) compatible with digital logic.

1 - Reverse battery protection.

1 - Temperature -40 degrees C/-40 degrees F ~ 150 degrees C/300 degrees F.

Reed Relay Specifications

1 - Two wire SPST N/O.

1 - Max. switching voltage 175VDC
Max. current 0.25Amps.

1 - Rating 5 watts.

1 - Temperature -20 degrees C/-4 degrees F ~ 70 degrees C/158 degrees F.

MAINTENANCE

Disassembly

1. Ensure the fluid supply to the meter has been disconnected, and the line pressure has been released before disassembly.

2. Remove two (2) screws (Item 8) and remove the pulser cap (Item 7).

3. Remove the gasket (Item 6).

4. Remove twelve (12) screws (Item 5) and remove the meter cap (Item 4).

5. Remove o-ring (Item 2) and inspect (replace o-ring if damaged).

6. Remove rotors (Item 7), clean and inspect (replace rotors if damaged).

7. **Note: Hall Effect or Reed switches cannot be removed from the meter cap.**

Reassembly

1. Place rotors (Item 3) into the meter body. The rotors should be at 90dgr to each other.

2. Lightly rotate the rotors (Item 3) by hand (they must rotate freely).

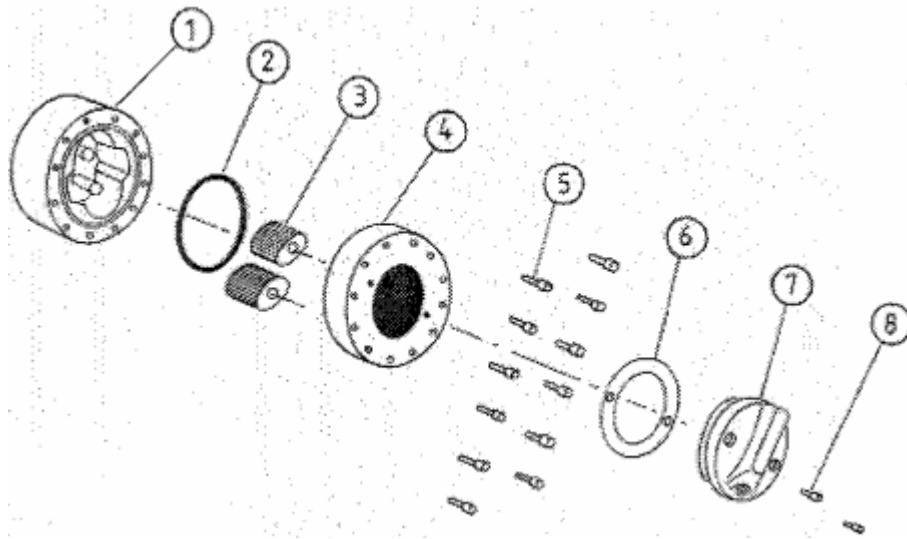
3. Install o-ring (Item 2).

4. Replace the meter cap (Item 4) and tighten the 12 screws (Item 2) uniformly to 35Nm (25 Ft. lbs).

5. Replace the gasket (Item 6).

5. Replace the pulser cap (Item 7) and tighten the 2 screws (Item 8).

DISPLAY PARTS LISTING

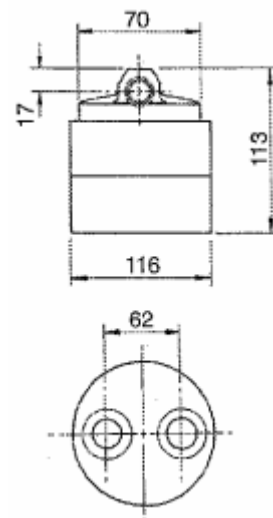


Item No.	No. Off.	Rec. Parts	Part or Set (Order from this column only)	Part Description
1	1		MS650BS	Meter Body Assy. (BSP)
1	1		MS650NS	Meter Body Assy. (NPT)
2	1	◆	BS235S	O-ring (NBR)
2	1	◆	BS235ES	O-ring (EPM)
2	1	◆	BS235VS	O-ring (Viton)
3	2	◆	MS370S	Rotor Set PPS
4	1		MS651S	Meter Cap & Hall Effect assembly*
4	1		MS651RS	Meter Cap & Reed Switch assembly*
5	12	◆	MS311S	Bolt set
6	1	◆	MS340S	Pulser Cap Gasket
7	1		MS406RS	Pulser Cap (16mm Conduit)
7	1		MS406R-NS	Pulser Cap (1/2" NPT)
8	2		MS347S	Pulser Cap Screws

*Reed switch & Hall effect are unavailable without meter cap.

METER SPECIFICATION

Meter Type	Pulse
Flow Ranges (L/hour or US Gal./hour)	
Above 5 centipoise	3 to 80 / 0.8 to 21
Below 5 centipoise	8 to 70 / 2 to 18.5
Accuracy of Reading	+/- 0.5%
Maximum Viscosity	1000 Centipoise
Maximum Operating Pressure	25000 kpa/ 3,625 psi/ 250 Bar
Max. Operating Temperature Hall Effect	120°C / 248°F
Max. Operating Temperature Reed	70°C / 158°F
Pulse Type	Hall Effect Sensor / Reed Switch
Pulses per Litre/US Gallons	52 / 197
Port Size	3/4" BSP PL / 3/4" NPT
Weight	2.5 Kg / 88 oz



TROUBLE SHOOTING

TROUBLE SHOOTING GUIDE		
TROUBLE	CAUSE	REMEDY
Fluid will not flow through the meter	A) Foreign matter blocking rotors B) Line strainer blocked C) Damaged rotors D) Meter connections over tightened	A) Dismantle meter, clean rotors (Strainer must be fitted in line. B) Clean strainer C) Replace rotors (Strainer must be fitted in line) D) Re-adjust connections
Reduced flow through the meter	A) Line strainer partially blocked B) Fluid is too viscous	A) Clean strainer B) Maximum viscosity 1000 centipoise
Meter reading inaccurate	A) Fluid flowrate is too low or too high B) Air in fluid C) Excess wear caused by incorrect installation	A) See specifications for min. and max. flowrates B) Bleed air from system C) Check meter for damage, Install correctly
Meter not giving a pulse signal	A) Faulty hall effect sensor or reed switch B) Faulty magnet	A) Replace meter cap for reed switch models, replace PCB for Hall effect models B) Replace rotors

WARRANTY

Macnaught Pty Ltd warrants that the Products will be free from any defects caused by faulty material or workmanship for a period of Twenty Four (24) months from the date of sale of the Products to the end user (the 'Warranty Period') PROVIDED THAT, during the Warranty Period:

1. Macnaught receives notice setting out full details of any defect in any product and details of the time and place of purchase of the Product: and
2. the end user, at its own cost returns the Product to the nearest authorised Macnaught Service Centre.

Macnaught shall, as its option repair or replace and Product found defective by its inspection or refund the price paid by the end user for that Product.

Macnaught liability and the end user's rights under this warranty shall be limited to such repair, replacement or refund and, in particular, shall not extend to any direct, special, indirect or consequential damage or losses of any nature.

Note:

This warranty does not form part of, nor does it constitute, a contract between Macnaught and the end user. It is additional to any warranty given by the seller of the Products and does not exclude, limit, restrict or modify the rights and remedies conferred upon the end user, or the liabilities imposed on the seller, by any statute or other laws in respect of the sale of the Product.



Macnaught Pty Ltd
 PO Box 90 Arncliffe NSW 2205 Australia
 Telephone (02) 9567 0401
 Facsimile (02) 9597 7773
 Email: sales@macnaught.com.au
 Web: www.macnaught.com.au