

MS345HP
0109
0003



# POSITIVE DISPLACEMENT FLOWMETERS

## M4HP 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 the meters. If you need further assistance, contact your local representative or distributor for advice.

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

Flowmeters and rotors are manufactured in 316 Stainless Steel or Aluminium 6061-T6.



**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.**

### 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.**

#### Note:

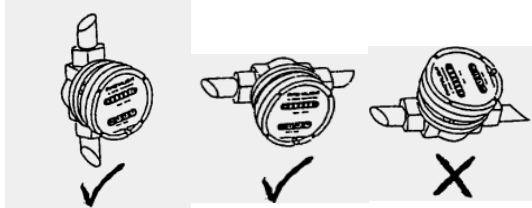
**To prevent damage to the meter slowly fill the system with fluid (this will prevent damage caused by air purge).**

**Failure to do this could damage the meter.**

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

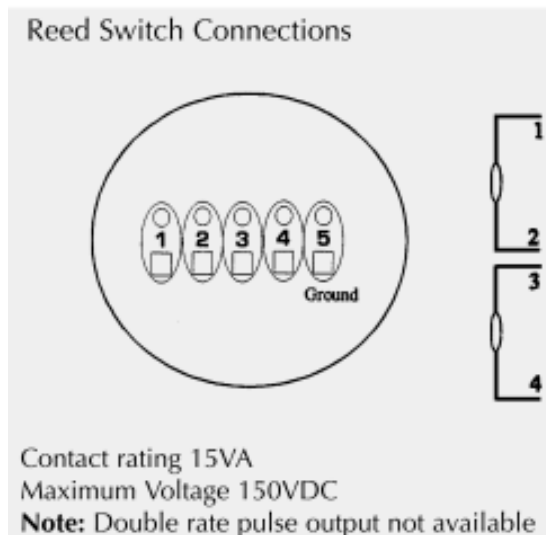
## INSTALLATION

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. The use of flexible connections is recommended.
4. Extreme care must be taken when installing the meter. Pipe strain or over tightening meter connections can cause meter damage.



Do not install meter this way

## PULSER DETAILS



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 -40dgr C/-40dgr F ~ 150 dgr C/300dgr F.

4. Remove eight (8) screws (Item 2) and remove the meter cap (Item 6).
5. Remove o-ring (Item 8) and inspect (replace o-ring if damaged).
6. Remove rotors (Item 7), clean and inspect (replace rotors if damaged).
7. **Note: Reed switch PCB's cannot be removed.**

## Reassembly

1. Place rotors (Item 7) into the meter body. The rotors should be at 90dgr to each other.
2. Lightly rotate the rotors (Item 7) by hand (they must rotate freely).
3. Install o-ring (Item 8).
4. Replace the meter cap (Item 6) and tighten the 8 screws (Item 2) uniformly to 35Nm (25 Ft.lbs).
5. Replace the pulser cap (Item 3) and tighten the 4 screws (Item 4).

Reed / Hall Effect		Hall Effect	
Reed Switch	1 ○	HE Supply +5 - 24vdc	
Reed Switch	2 ○	HE 1 Signal Output	
HE Common 0V	3 ○	HE Common 0V	
HE Signal Output	4 ○	HE 2 Signal Output	
HE Supply +5 - 24vdc	5 ○	(Ground to meter body)	

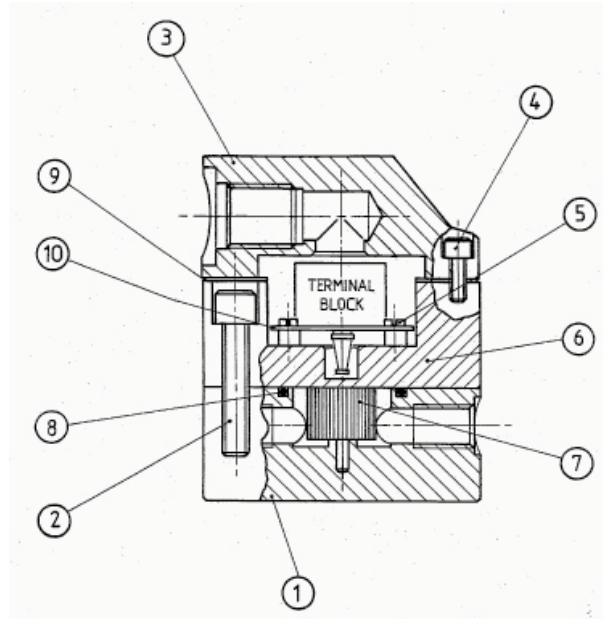
Notes:  
Current Draw 4.6mA  
Output NPN Open Collector 1K Resistor provided on PCB  
With L.C Displays, reed switch must be used.

## MAINTENANCE

### Disassembly

1. Ensure the fluid supply to the meter has been disconnected, and the line pressure has been released before disassembly.
3. Remove the gasket (Item 9).
2. Remove four (4) screws (Item 4) and remove the pulser cap (Item 3).

## DISPLAY PARTS LISTING



<u>Item No.</u>	<u>Quantity</u>	<u>Rec. Parts</u>	<u>Part No. or Part Set</u>	<u>Part Description</u>
1	1		MS681BS	Meter Body BSP (Stainless Steel)
1	1		MS681NS	Meter Body NPT (Stainless Steel)
1	1		MS608BS	Meter Body BSP (Aluminium)
1	1		MS608NS	Meter Body NPT (Aluminium)
2	8	#	MS683S	Bolt Set - Socket Head Cap Screws
3	1		MS339	Pulser Cap 16mm Conduit (St/St)
3	1		MS339N	Pulser Cap 1/2" NPT Conduit ( St/St)
3	3		MS296	Pulser Cap 16mm Conduit (Aluminium)
3	3		MS296N	Pulser Cap 1/2" NPT Conduit (Aluminium)
4	2	#	MS347S	Bolt Set - Socket Head Cap Screw
5	2		MS111S	Screw Set—Slotted Cheese Head
6	1		MS609S	Meter Cap (Aluminium)
6	1		MS682S	Meter Cap (Stainless Steel)
7	2	#	MS342-1S	Rotor Set (Stainless Steel)
7	2	#	MS342S	Rotor Set (PPS)
8	1	#	BS145VS	Viton O'ring
8	1	#	BS145ES	EPDM O'ring
8	1	#	BS145S	Nitrile O'ring
8	1	#	BS145TES	FEP O'ring
9	1	#	MS340S	Gasket (Pulser Cap)
10	1		MS344-RS	Reed Switch PCB
10	1		MS344-HES	Hall Effect PCB
10	1		MS344-R/HES	Reed/Hall Combo PCB

## Meter Specifications

Meter Type	Pulse (optional LCD)
Flow Ranges (Litres per Minute / US Gallons per Minute)	
Above 5 cPs	2 ~ 30 / 0.5 ~ 8
Below 5 cPs	3 ~ 25 / 0.8 ~ 6.6
Accuracy (of reading)	better than +/- 0.5%
Maximum Viscosity	1,000 cPs (Standard Rotors) To 1,000,000 with Hi Viscosity rotor Option, consult factory
<b>Maximum Operating Pressure</b>	
Stainless Steel Model	20,000 kPa / 2,900 PSI / 200 BAR
Aluminium Model	10,000 kPa / 1,450 PSI / 200 BAR
Maximum Operating Temperature	120°C / 248 °F
Pulse Type	Hall Hall / Reed Reed / Hall Reed
Pulses per Litre/US Gallon	112 / 424
Meter Dimensions	100mm Dia. / 4" Dia. Body 95mm / 3.75" (Port Face to Face)
Threaded Connection	1/2" BSPP / NPT

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

## macnaught warranty

- Macnaught Pty Ltd ("Macnaught") warrants that all products manufactured by Macnaught and/or supplied by Macnaught under the "Macnaught" brand, excluding M-Series positive displacement meters ("Meters") and components subject to wear, will be free from any defects caused by faulty materials or workmanship ("Warranty") for a period of 5 years from the date of purchase of the product.
  - For products (excluding Meters) which carry the "Macnaught design" endorsement, an additional Warranty period of 5 years applies to all mechanical components (excluding electronic and electrical components), giving a total Warranty period of 10 years.
  - For Meters, the Warranty period is 24 months from the date of purchase of the product.
  - For components contained in all products which are usually subject to wear from normal operation of the products (such as o-rings, seals, springs, hoses and batteries), the Warranty period is 12 months from the date of purchase of the relevant product.
  - For products and components which are not manufactured by Macnaught and are supplied by Macnaught under a brand name other than "Macnaught", the Warranty period is the longer of 12 months from the date of purchase of the relevant product and the period of the manufacturer's warranty.
  - The warranties contained in clauses 1, 2, 3, 4 and 5 above are conditional on the purchaser, during the relevant Warranty period:
    - delivering to Macnaught a detailed notice setting out full details of any defect in any product and details of the date and place of purchase (together with copies of purchase receipts and/or other supporting documents), and
    - at the purchaser's own cost, returning the defective product to the nearest authorised Macnaught service centre.
  - Subject to compliance by the purchaser with clause 6, Macnaught shall, at its option, repair or replace any product or component found defective by its inspection by reason of faulty materials or workmanship of Macnaught.
  - This Warranty does not cover the failure of products, parts or components which, in the sole judgment of the Macnaught, arises other than from faulty materials or workmanship of Macnaught, including misuse, abrasion, corrosion, negligence, accident, substitution of non-Macnaught parts, unauthorised modification, improper use, storage or handling, faulty installation or tampering by the purchaser or any third party.
  - If Macnaught's inspection discloses no defect in material or workmanship, repair or replacement and return (at Macnaught's sole option) will be made at customary charges, which will be advised to the purchaser.
  - Macnaught's liability and the purchaser's rights under this Warranty shall be limited to the repair or replacement of defective products or components and particular, shall not extend to any direct, special, indirect or consequential damage or losses of any other warranties.
  - The foregoing Warranty supersedes, voids and is in lieu of any other warranties.
- This Warranty does not form part of, nor does it constitute, a contract between Macnaught and the end-user or purchaser. It is additional to any warranty given by the seller of the products. This Warranty does not exclude, limit, restrict or modify the non-excludable rights or remedies conferred upon the end-user or purchaser, or the non-excludable duties or liabilities imposed on the seller or Macnaught, by Part V, Division 2, 2A, and Part VA of the Trade Act 1974 (Commonwealth) or other rights conferred on the end-user or purchaser or duties or liabilities imposed upon Macnaught.



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