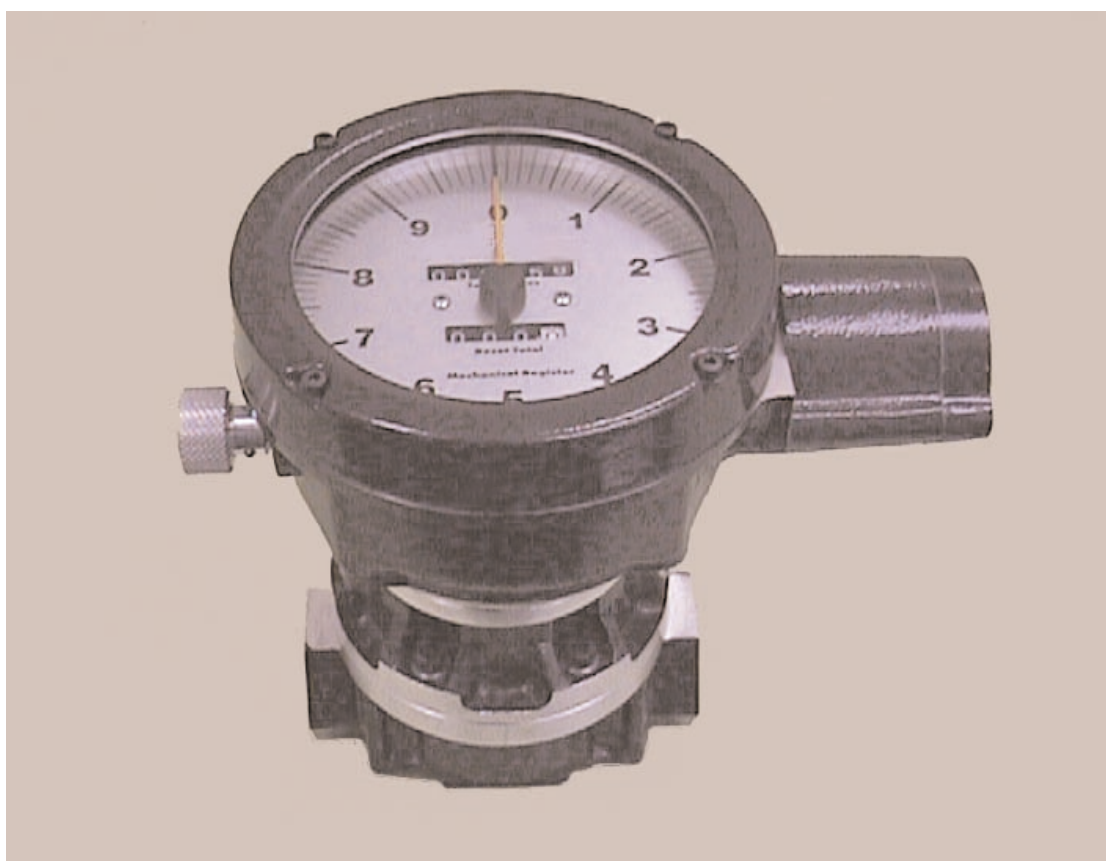


Analogue Register Supplement

MS548
0805
0004

Mechanical Meters

(Models with & without Encoder)



Important Information



**PLEASE READ THIS INFORMATION
CAREFULLY BEFORE USE!**

Ensure that the fluid supply to the

meter is isolated and disconnected,
and the line pressure is released before
disassembly.

To prevent damage to the meter slowly
fill the system with fluid (this will

prevent damage caused by air purge).

Note: Failure to do this could damage
the meter. For pump applications, turn
off the pump at the end of each day.

Service Instructions

Removal of Register Assembly

Ensure that the fluid supply to the meter is disconnected, and the line pressure is released before disassembly. Refer to the exploded parts diagram Figure 1 and 2 on pages 3 and 4, respectively for item numbers.

- 1] Remove the four screws (Item 27) located under the register housing.
- 2] Remove the register assembly from

the meter.

- 3] Check the Gasket (Item 24) for damage, replace if necessary.

Reassembly

- 1] Clean all components before reassembly.
- 2] Install the Gasket (Item 24)
- 3] Align the drive dog on the Register assembly with the mating dog on the meter body/cap assembly.

- 4] Position the Register Assembly, in the preferred orientation, then fit and tighten the 4 screws (Item 27).

- 5] Test the Register by turning the rotors with a finger or by applying low air pressure (No more than a good breath) to one end of the meter, before re-installing meter to the line.

Dismantling Register Assembly WITHOUT Rotary Encoder

Refer to Figure 1 unless otherwise stated

- 1] Undo the four screws (Item 1) and remove the clamp ring (Item 2)
- 2] Remove the glass cover (Item 4) and inspect the seal (Item 3) for damage, replace if necessary.
- 3] Carefully remove the plastic pointer (Item 5) so as not to damage the

stem which is a push fit onto the needle shaft (Item 11, refer Figure 2).

- 4] Undo the register face screws (Item 6) and remove the register face.
- 5] Undo the screws (Item 8) and remove register mechanism tilting slightly so as to clear the reset arm (Item 18) and shaft collar (Item 20).
- 6] To remove the reset arm undo grub screw (Item 23) and remove the

reset knob (Item 21). Slide the reset arm from the housing being careful not to loose or damage the o-ring (Item 22). Inspect o-ring for damage, Replace o-ring if necessary.

- 7] Assembly is the reverse of the above procedure.

Dismantling Register Assembly WITH Rotary encoder

Refer to Figure 1 unless otherwise stated.

- 1] Follow steps 1, 2, 3 and 4 above.
- 2] Undo grub screw (Item 14) to enable the shaft coupling (Item 12) to be withdrawn from encoder shaft

(Refer Item 16, Figure 2).

- 3] Undo two socket head cap screws (Item 9) and slide encoder housing away from register housing. If it is necessary to remove the encoder coupling (Item 12) from the encoder, record the distance the coupling is from the face of the

encoder so it can be replaced in the same position. This is important to prevent overloading of the encoder bevel drive gears.

- 4] Follow steps 5 and 6 above to complete disassembly.
- 5] Assembly is the reverse of the above.

Dismantle Counter wheel assembly

Refer to Figure 2 unless otherwise stated

- 1] Dismantle the Register assembly as previously detailed.
- 2] Undo the 4 screws (Item 1).
- 3] Undo the two countersunk screws (Item 17) and remove the register display mechanism assembly (Item

3) and encoder shaft (Item 16) complete with bearing block (Item 15), bevel gear (Item 18) and spur gear (Item 13). Do not attempt to remove this gear from the shaft.

- 4] Further disassembly is done by removing the remaining grub screws (Item 14, 19 & 21), and withdrawing the shafts (Items 6 & 11).

- 5] Assembly is the reverse of the above procedure.

Refer to the standard Mechanical register instruction sheet for further advise on gearbox, output shaft and seal related maintenance issues.

Register Parts Listing

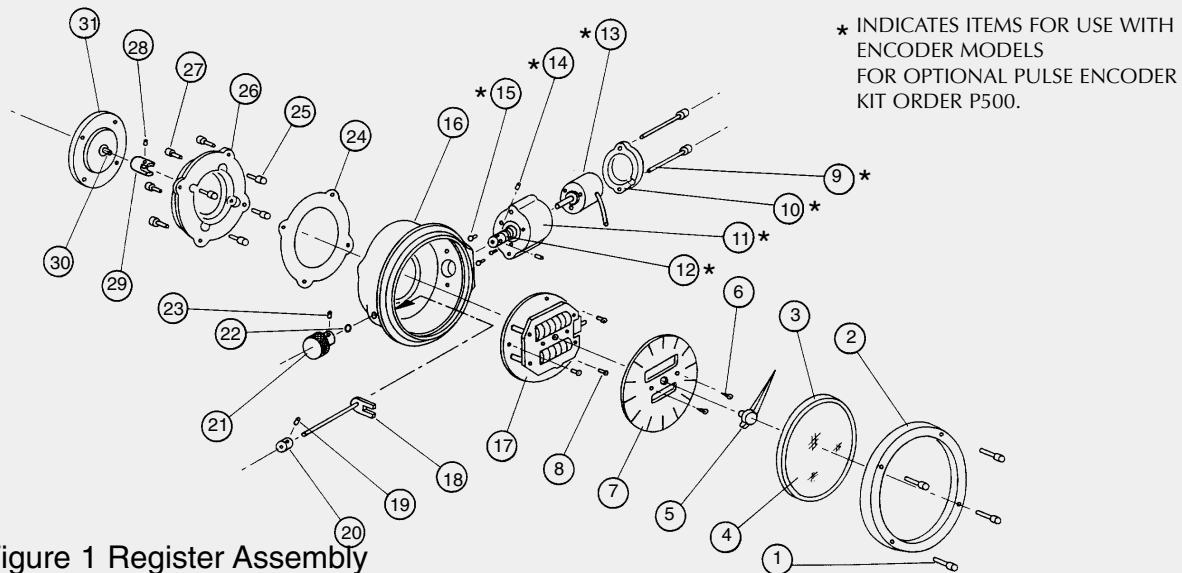


Figure 1 Register Assembly

Complete assembly order MS435s (Litre) MS435Us (USG)

Item No.	No. Off.	Rec. Parts	Part or Set (Order from this column only)	Part Description
1	4	MS444		Clamp Ring Screws
2	1	MS443	MS443s	Clamp Ring
3	1	MS446		Seal
4	1	MS445	MS445s	Glass Face
5	1	MS448	MS448s	Pointer
6	2	MS439		Screw
7	1	MS447	MS447s	Fascia Litres
7	1	MS447U	MS447Us includes item 6	Fascia US Gallons
8	3	MS464	MS464s	Screw
9*	2	MS442	MS442s	Cap Screw (Encoder model only)
9	2	MS115	MS492s	Cap Screw (Without Encoder)
10*	1	MS441	MS441s includes 2 x item 9*	Cover (Encoder model only)
10	1	MS441-B	MS441-Bs incl 2 x item 9 + BS120	Cover (Without Encoder, also requires 1 x BS120 o-ring)
11*	1	MS440	MS440s includes items 9* + 10*	Encoder Housing (Encoder model only)
12*	1	MS494		Encoder coupling (Encoder model only)
13*	1	MS407		Encoder (1000 pulse per rev) (encoder model only)
14*	4	MS151		Grub Screw (Encoder model only)
15*	3	MS437	MS407s	Screw (Encoder model only)
16	1	MS435	MS435Hs	Register Housing
17	1	MS143	MS143s includes item 8	Register Mechanism Assembly (Refer Figure 2)
18	1	MS463L		Reset Arm
19	1	MS146		Grub Screw
20	1	MS450	MS463Ls	Shaft Collar
21	1	MS451		Reset knob
22	1	BS008		O ring (Nitrile)
23	1	MS146	MS451s	Grub Screw
24	1	MS107	MS107s	Gasket
25	4	MS514		Bolt
26	1	MS326		Register Adapter
27	4	MS465	MS326s	Bolt
28	1	MS146		Grub Screw
29	1	MS246		Drive Dog
30	1	MS309	MS246s	Output Shaft (long)
31	1	MS327	MS327s	Cover Plate (Aluminium)
31	1	MS327-1	MS327-1s	Cover Plate (Stainless Steel)

Refer mechanical meter instruction sheet

Counter Parts Listing

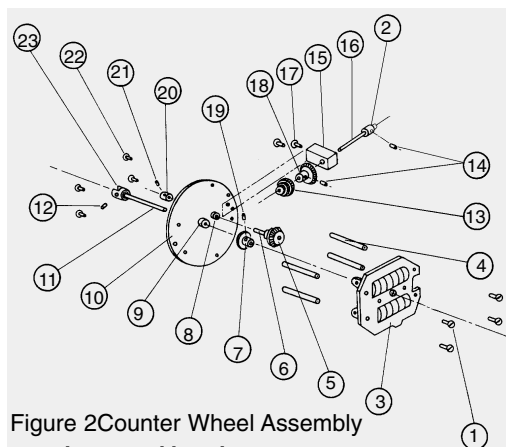


Figure 2 Counter Wheel Assembly

Complete assembly order MS143s

Note: Only available as a complete register assembly, order MS143s. Spare part includes items 18, 19 & 20 from figure 1.

Item No.	No. Off	Part No.	Part Description
1	4	MS438	Screw
2	1	MS704	Encoder Connector
3	1	MS702A	Register Display Mechanism
4	4	MS453	Spacer
5	1	MS462	Bevel Compound Gear
6	1	MS308	Output Shaft (short)
7	1	MS460	Gear
8	1	MS458	Bush - Idler Shaft
9	1	MS457	Bush - Needle Shaft (Bottom)
10	1	MS436	Register Chassis
11	1	MS452	Needle Shaft
12	1	MS146	Grub Screw
13	1	HG219	Spur Gear
14	2	MS146	Grub screw
15	1	MS455	Encoder Shaft Housing
16	1	MS456	Encoder Shaft
17	2	MS437	Cap Screw
18	1	MS461	Bevel Gear
19	1	MS146	Grub Screw
20	1	MS459	Idler Shaft Gear
21	1	MS146	Grub Screw
22	4	MS437	Cap Screw
23	1	MS409	Drive Dog

Encoder Wiring



PLEASE READ THIS INFORMATION CAREFULLY BEFORE USE!

The encoder (Item 13, refer Figure 1) is an Optical Incremental shaft Encoder. It has a 1000 pulses per revolution resolution output. The output is an open collector with 3 phases (A, B and Z) that can function on a 5 to 12 Volts

DC power supply.

Optical encoders are delicate instruments and should be treated with care. Shock loads and incorrect electrical connection will lead to Encoder damage.

To avoid electrical interference use

quality shielded cable to connect the encoder to the recording instrument, ensure the cable shield is grounded, as shown in wiring diagram below. To avoid damage to the encoder observe the electrical specifications, wiring table & wiring diagram shown below.

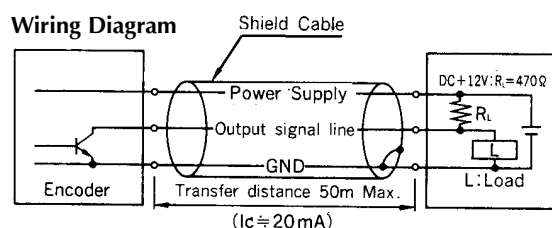
Electrical Specifications

Resolution	1000 pulses per rev.
Power Supply	DC5V -5% ~ DC12V +5%
Current Consumption	50mA Maximum
Output Form (Open Collector)	
Max. Allowable Output Voltage	40V
Maximum Sink Current	30 mA
Maximum Response Frequency	200 kHz
Operating Temperature range	-10°C ~ +70°C
Encoder Protection	IP50
Maximum signal transfer distance	50 Metres

Wiring Table

Lead Colour	Function
Red	DC + 5 ~ 12V
Black	GND
Yellow	Z channel output
White	GND
Blue	A channel output
Green	B channel output
Brown	-
Orange	-

Wiring Diagram



Note: The voltage waveform shown on the right can be obtained by loading RL as shown above.

Output Phase Shift

