

# MM MiniMag – Electromagnetic Flowmeter

## 10, 15, 20, 25 & 50mm Sizes

### FEATURES:

- Very compact and light weight design, in sizes:
  - 10mm ¼" connection (4mm bore)
  - 15mm ½" connection (8mm bore)
  - 20mm ¾" connection (12mm bore)
  - 25mm 1" connection (15mm bore)
  - 50mm 2" connection (40mm bore)
- Flowrange @ ±2% accuracy: to 3/25/50/100/300 Litres/minute
- Repeatability of rate: <0.2%
- Measures liquids of conductivity > 20µS/cm
- Process range to 70°C
- Display shows non-resettable Total in Litres (millilitres for MM10) or Flowrate in Litres/min (millilitres/minute for MM10).
- NPN Pulse Output
- 4-20mA output, endpoints programmable in 0.1 Litres/min increments.
- Robust construction for industrial use to IP67.
- Stainless Steel Body, PEEK liner, SS316 electrodes with integrated grounding electrodes.
- Fast and easy installation or removal with BSP male threaded end connections.
- No moving parts. Obstruction less bore. Virtually maintenance free.
- Suitable with a wide range of conductive liquids from 20µS/cm. Accuracy unaffected by varying viscosity or specific gravity.
- 19–30 VDC powered (standard), optionally with 12–24 VDC converter.



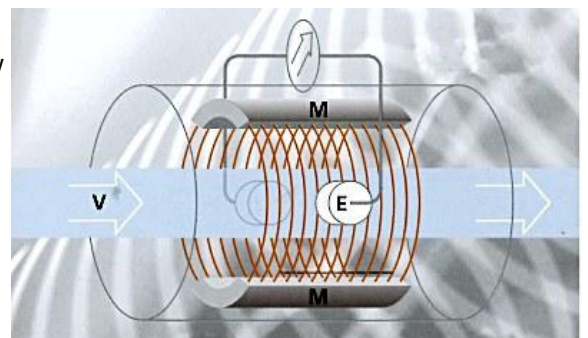
### INTRODUCTION:

The MiniMag is a low-cost Electromagnetic Flowmeter, suitable for flowrate and totaliser metering and batching. Liquids with an electrical conductivity of at least 20µS/cm can be measured. The converter/processor is inbuilt on the flowmeter sensor primary. These two elements form a very compact package.

With no moving parts and an obstruction-free bore, this type of flowmeter is ideal for measuring a wide range of conductive liquids (that are chemically aggressive, or dirty) up to a temperature of 70 °C, with minimal head losses and virtually no ongoing maintenance. MiniMag is ideal for measurement of water or water based liquids including admixtures, and providing flowrate or total display for applications such as shot creting and for process batching/monitoring applications. The MiniMag can be used in conjunction with a remote ManuFlo FRT-303 Indicator or Batch Controller, or can be connected to 3<sup>rd</sup> party PLCs via the onboard 4-20mA or pulse output.

### PRINCIPLE OF OPERATION:

The operation of electromagnetic flow meters is based on Faraday's Law of Induction. A voltage is induced in a conductor as it moves through a magnetic field. This principle is applied in the MiniMag design. The voltage induced in the flowing liquid is measured at two electrodes, and is proportional to the average flow velocity. The microprocessor then scales this signal voltage to read in digital units.



## TECHNICAL DATA:

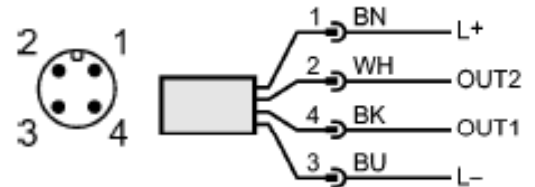
<b>Accuracy:</b>	± 2% of range	<b>Housing &amp; Electrodes:</b>	Stainless Steel 316 (EDPM seal)
<b>Repeatability:</b>	± 0.2% of rate	<b>Liner Material:</b>	PEEK (polyether-etherketone)
<b>Protection class:</b>	IP67	<b>Supply Power:</b>	19 - 30 VDC (120mA @ 24 VDC) Optional converter pack: 12 - 24 VDC.
<b>Liquid Temp.:</b>	-10 °C to 70 °C	<b>Pulse Output / Width:</b>	NPN open collector / 0.05 to 2 secs.
<b>Ambient Temp.</b>	-25 °C to 50 °C	<b>Current Output:</b>	4 to 20 mA; ≤ 500 Ω (range scaleable)
<b>Liquid Conductivity:</b>	≥ 20µS/cm	<b>Max. Pressure:</b>	1600 kPa (18 kPa loss @ 25 Litres/min)
<b>Liquid Viscosity:</b>	< 70mm/s @ 40°C	<b>Display 4-digit LED:</b>	<b>Total non-reset in Litres or m<sup>3</sup></b> (MM10 mL) <b>Flowrate</b> - L/min; (MM10 mL/minute), resolution to 0.05 L/min.
<b>Approvals:</b>	IEC 1000	<b>Damping Programmable:</b>	0.0 to 5.0 sec (for pulsating flows)

## VARIOUS MODELS:

Order Code:	MM10	MM15	MM20	MM25	MM50
<b>Connection Size:</b>	10mm	15mm	20mm	25mm	50mm
<b>Actual Bore Size:</b>	4mm	8mm	12mm	15mm	40mm
<b>Thread G BSP M</b>	1/4"	1/2"	3/4"	1"	2"
<b>Flow Range Litres/minute</b>	0.005 - 3	0.1 - 25	0.2 - 50	0.3 - 100	5 - 300
<b>Pulse output (Pulses/Litre)</b>	1000	100	100	100	10

## ELECTRICAL CONNECTIONS: (Via M12 4-pin screwed socket and plug connector. 5-metre bare lead.)

Pin designations	All models
Power Connection : Positive = +	Pin 1, Brown (BN)
: Negative = --	Pin 3, Blue (BU)
Pulse output NPN optocoupler = P	<b>Pin 4, Black (BK)</b>
Current output 4 – 20 mA = I	<b>Pin 2, White (WH)</b>



## INSTALLATION:

- The flowmeter should not be installed in the vicinity of strong electromagnetic fields.
- It is essential that the flowmeter tube is always completely filled with liquid. Partial filling results in meas. errors.
- Must have at least 5x diameter of straight pipe before (upstream of) flowmeter, and 2x diameter of straight pipe after (downstream of) flowmeter. The pipe bore diameter should be the same as the flowmeter itself.
- Valves or other shutoff devices should be installed downstream from the flowmeter. I.D.
- Can be installed in horizontal or vertical orientation.
- When installed in a horizontal pipeline, the imaginary line between the two electrodes should be horizontal if at all possible to prevent air bubbles from affecting the flow signal which is measured at the electrodes.

## DIMENSIONS:

