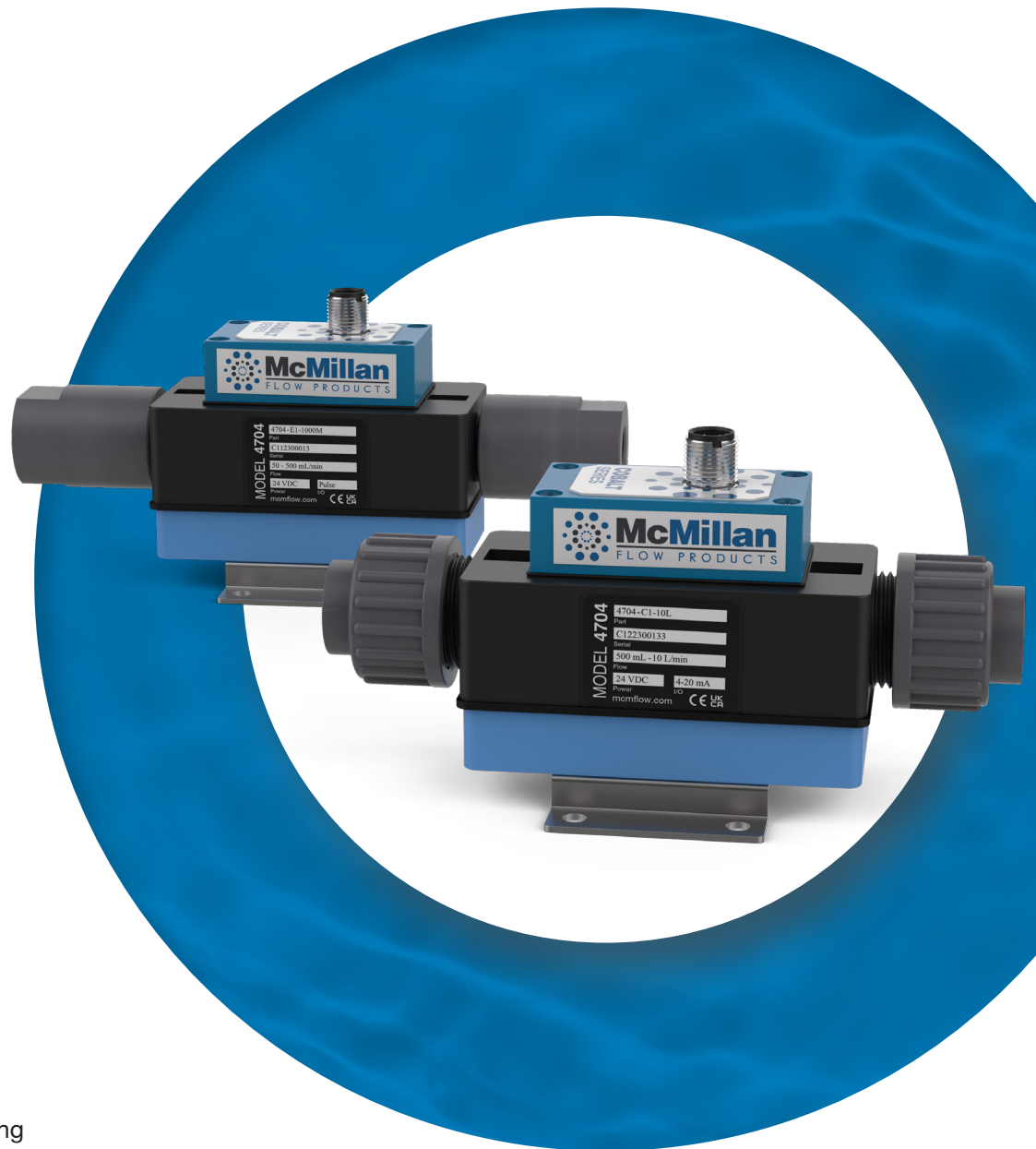


ELECTROMAGNETIC FLOW METERS FOR CONDUCTIVE LIQUID APPLICATIONS

COBALT Series
Electromagnetic Flow Meter



APPLICATION IDEAS

- Water treatment monitoring
- Industrial process control
- Commercial HVAC optimizing
- Chemical injection and dosing

Product Description

McMillan Flow Products introduces the COBALT Series: Electromagnetic flow meters for use with conductive liquids. These compact meters excel in measuring flow rates from as low as 10 mL/min up to 16 L/min across a wide range of mediums. The COBALT series flow meter has the capability to operate independently of liquid properties such as density, viscosity, and temperature. It is offered in both PPS and PVDF plastics. This offers versatility and cost savings to customers across a wider variety of applications.

The absence of moving parts in the COBALT series sensor technology offers enhanced long-term reliability, reduced maintenance, and consistent uninterrupted operation. Packaged in a compact design, the COBALT series electromagnetic flow meter is a space-efficient and cost-effective solution that enables easy integration into equipment while minimizing installation complexity.

Principle of Operation

The McMillan COBALT Series electromagnetic flow meter utilizes the principles of Faraday's Law of magnetic induction. First, a magnetic field is generated inside of the flow path. A pair of electrodes are positioned perpendicular to this field (as shown in Figure 1). As electrically conductive liquids is passed through the magnetic field, its charged particles are separated (as shown with the blue and red flow paths), allowing for a distinct signal to be generated by the electrodes.

This electrically induced signal is proportional to the liquid's current velocity. An accurate flow rate can be calculated using this signal along with the cross-sectional dimensions of the meters flow path.

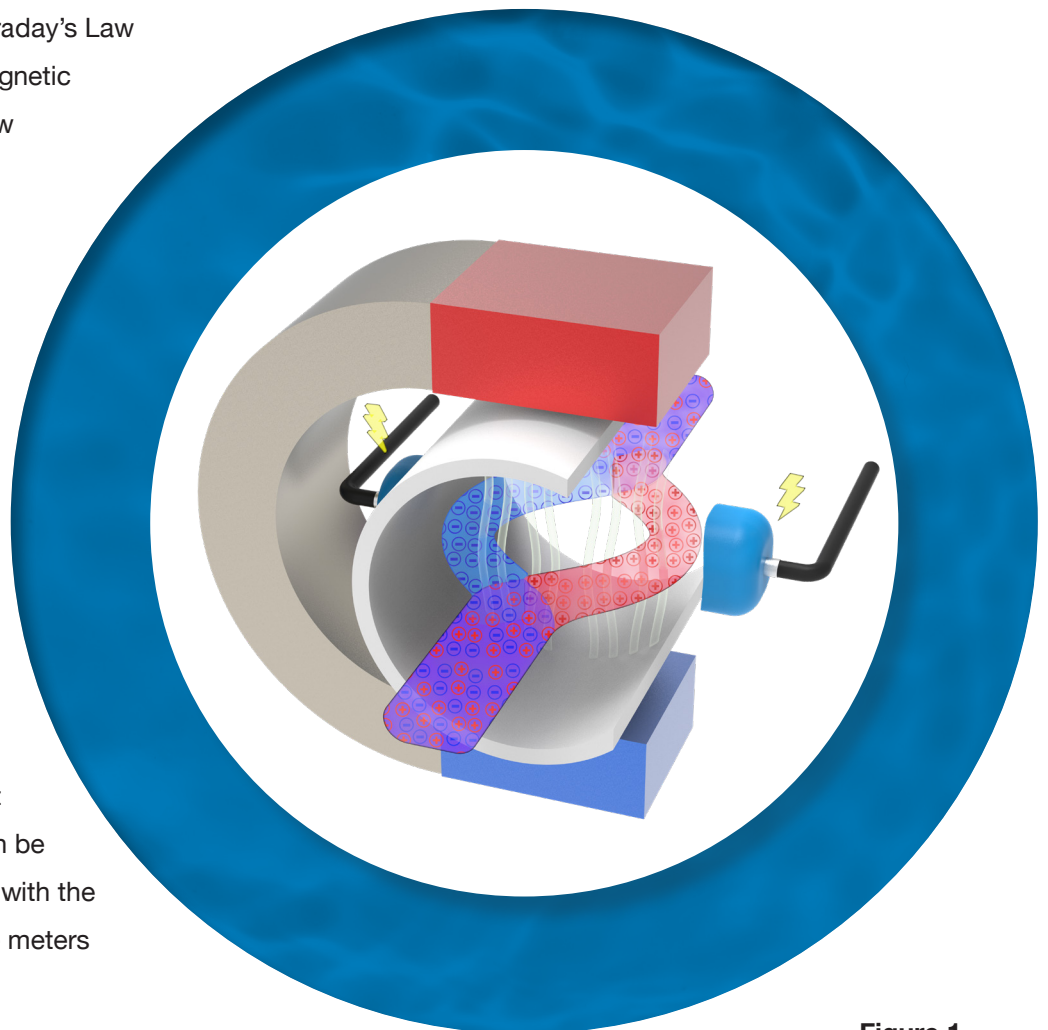


Figure 1
Illustration of sensor technology

Features

FLOW RANGES

The COBALT flow meter can support ranges as low as 10 – 500 mL/min and as high as 1 – 16 L/min.

SIGNAL OUTPUTS

Options for frequency pulse or analog 4-20 mA are available.

ELECTRICAL CONNECTIONS

Units come standard with a 4-Pin Micro DC (M12) connection. Optional mating cables with various lengths are available.

ACCURACY / FLUID CONDUCTIVITY

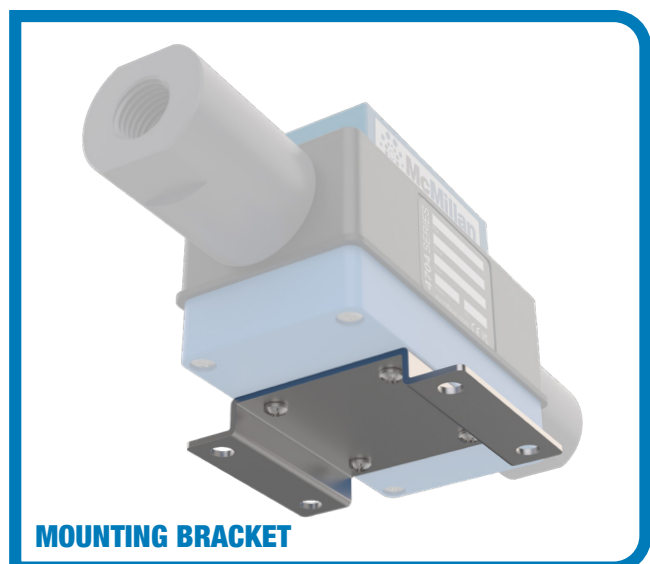
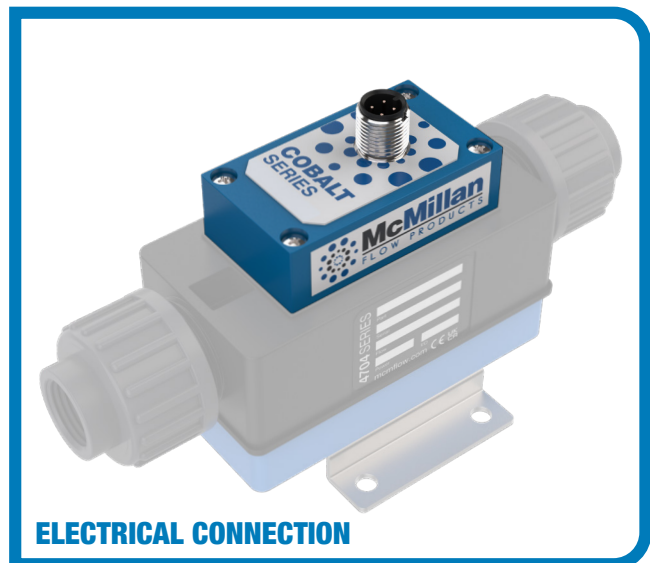
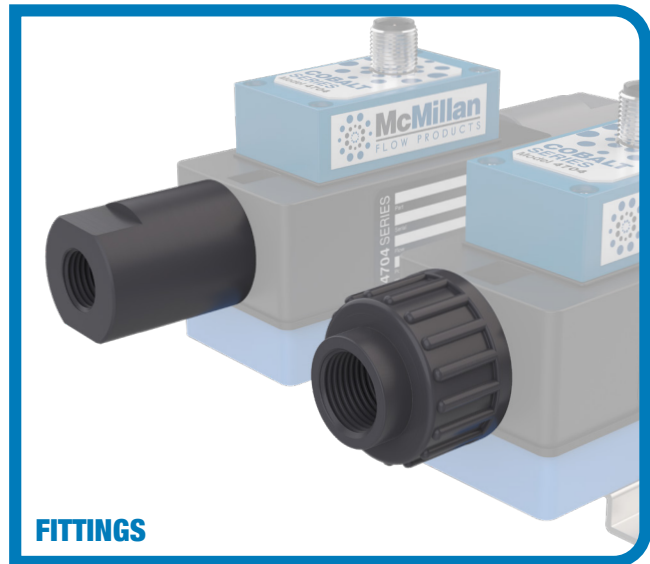
The COBALT's accuracy is $\pm 2\%$ of full scale with $\pm 1\%$ full scale repeatability. Minimum of 30 $\mu\text{S/cm}$ for 3L | 10L | 16L units is required. Minimum of 200 $\mu\text{S/cm}$ for 500M | 1L units is required.

FLUID CONNECTIONS

500M | 1L | 3L units come with 1/4" FNPT connections. 10L | 16L units come with 3/8" FNPT connections. Options for various tube connections in several materials are available.

INTEGRATED MOUNTING

All units feature an integrated mounting bracket.



Specifications

Except where noted, all specifications apply to operation at 25 °C

COBALT Series		
	MODEL 4704	MODEL 4764
Accuracy	± 2.0% of full scale	
Repeatability	± 1.0% of full scale	
Electrical Conductivity	Minimum of 30 µS/cm for 3L 10L 16L units is required Minimum of 200 µS/cm for 500M 1L units is required	
Straight Run	Inlet = 3x pipe diameters Outlet = 2x pipe diameters	
Media Temperature	-4 to 140 °F [-20 to 60 °C]	
Ambient Temperature	14 to 140 °F [-10 to 60 °C]	
Max. Pressure	145 psig [10 barg]	
Max. Pressure Loss	3.7 psig [0.26 barg] at full scale	
Max Media Viscosity	20 cSt	
Wetted Parts	PPS	PVDF
Electrodes	316L Stainless Steel	Hastelloy® C-4
Seal	FKM	FFKM
Response Time	1 second	
Protection	IP65	

Electrical Information

4-20 mA (Option C1)	
Output	4-20 mA, 3-wire
Max. Load	500 ohms
Power Supply	24 VDC ± 20%
Power Consumption	80 mA
Electrical Connection	Plug M12 x 1

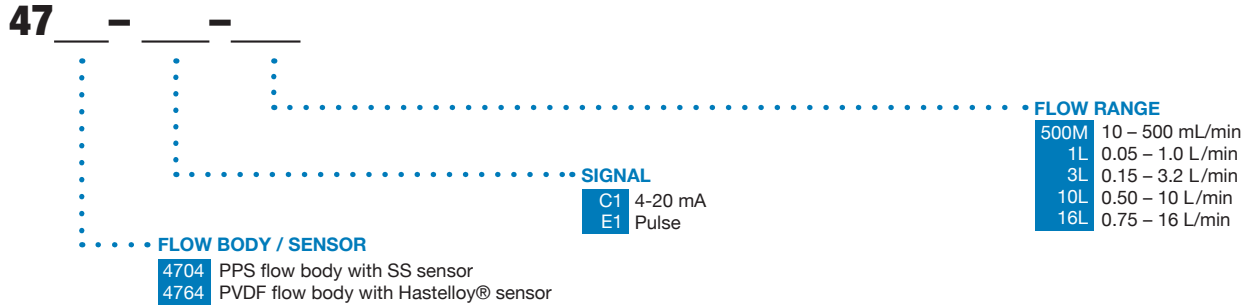
Pulse (Option E1)	
Pulse Output	PNP, Open Collector, max. 200 mA 500 Hz at full scale
Power Supply	24 VDC ± 20%
Power Consumption	60 mA
Electrical Connection	Plug M12 x 1



Ordering Information

Form part number as follows:

(Flow Body/Sensor) - (Signal) - (Flow Range)



EXAMPLES

4704-C1-1L would provide a PPS flow body with SS sensor for liquids, would have a 4-20 mA signal with no display, and would be calibrated to have a flow range of 0.05 – 1.0 L/min.

4764-E1-16L would provide a PVDF flow body with Hastelloy sensor for liquids, would have a pulse signal, and would be calibrated to have a max flow rate of 0.75 – 16 L/min.

OPTIONAL FITTING SETS

All fitting sets supplied in pairs.

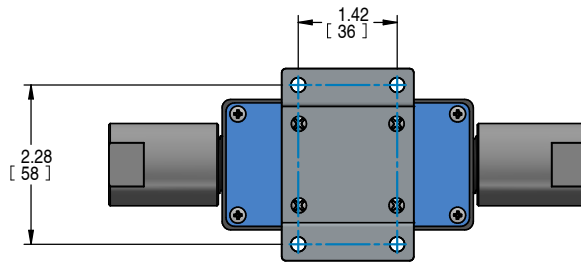
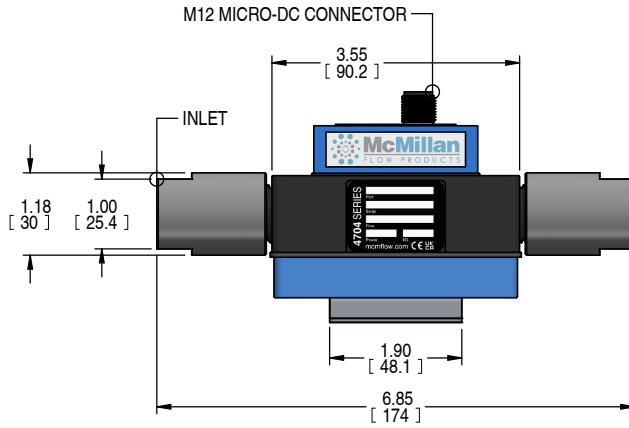
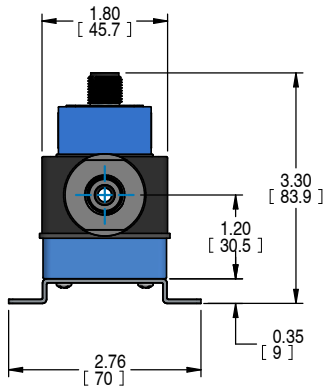
RANGES 500M 1L 3L	
CODE	FITTING DESCRIPTION
9860-2-T4	PFA 1/4" tube fittings with 1/4" MNPT threads
9860-2-T6	PFA 3/8" tube fittings with 1/4" MNPT threads
9863-2-T4	316L SS 1/4" tube fittings with 1/4" MNPT threads
9863-2-T6	316L SS 3/8" tube fittings with 1/4" MNPT threads
9864-2-T4	Acetal 1/4" tube fittings with 1/4" MNPT threads
9864-2-T6	Acetal 3/8" tube fittings with 1/4" MNPT threads
9866-2-T4	PVDF 1/4" tube fittings with 1/4" MNPT threads
9866-2-T6	PVDF 3/8" tube fittings with 1/4" MNPT threads

RANGES 10L 16L	
CODE	FITTING DESCRIPTION
9860-3-T6	PFA 3/8" tube fittings with 3/8" MNPT threads
9863-3-T7	PFA 1/2" tube fittings with 3/8" MNPT threads
9863-3-T4	316L SS 3/8" tube fittings with 3/8" MNPT threads
9863-3-T6	316L SS 5/8" tube fittings with 3/8" MNPT threads
9864-3-T6	Acetal 3/8" tube fittings with 3/8" MNPT threads
9864-3-T7	Acetal 1/2" tube fittings with 3/8" MNPT threads
9864-3-T8	Acetal 5/8" tube fittings with 3/8" MNPT threads
9866-3-T6	PVDF 3/8" tube fittings with 3/8" MNPT threads
9866-3-T7	PVDF 1/2" tube fittings with 3/8" MNPT threads

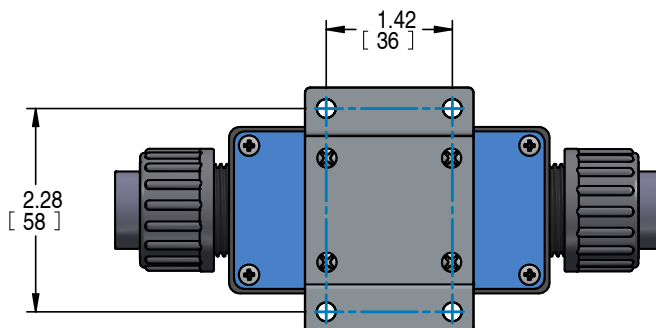
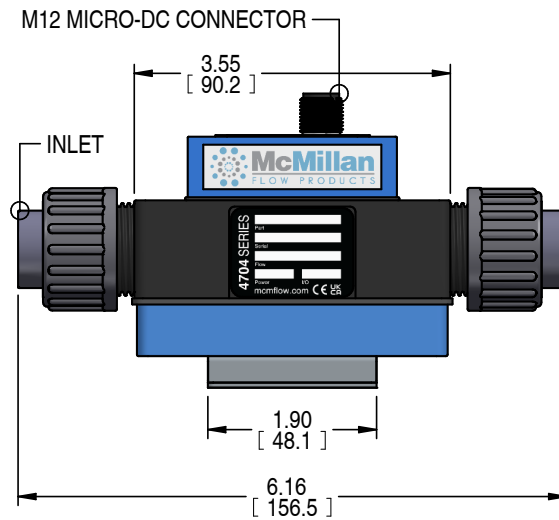
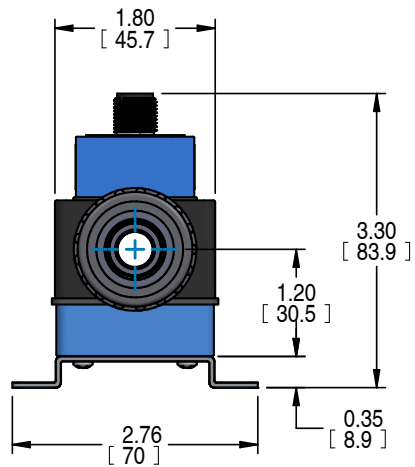
Dimensions

Basic unit configurations are shown. Contact factory or an authorized representative for dimensions of units not shown. All dimensions shown in inches [mm] unless otherwise noted.

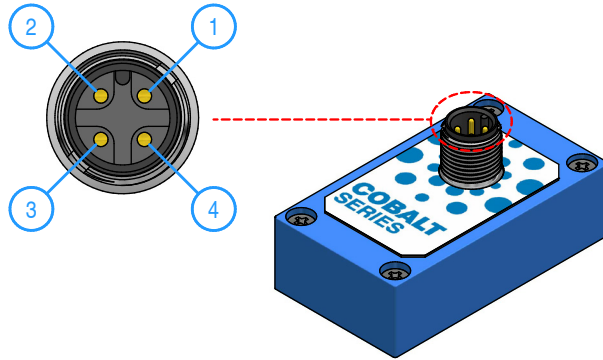
RANGES 500M | 1L | 3L:



RANGES 10L | 16L:



Wiring Diagram



PIN	FUNCTION
1	+ Voltage
2	not connected
3	GND
4	Signal Out

Optional Accessories

CODE	DESCRIPTION
9971-4-2M	Cable with M12 female connector, 4-conductor, 6.6 ft [2m]

Related Products



10X Series Flow Sensors

Microturbine flow sensors
for liquids and gases



IRIDIUM Flow Controllers

Modular flow controller platform
for liquid applications



OSMIUM Flow Switch

Thermal flow switch
for liquid applications



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