

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 15 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 liquid 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.

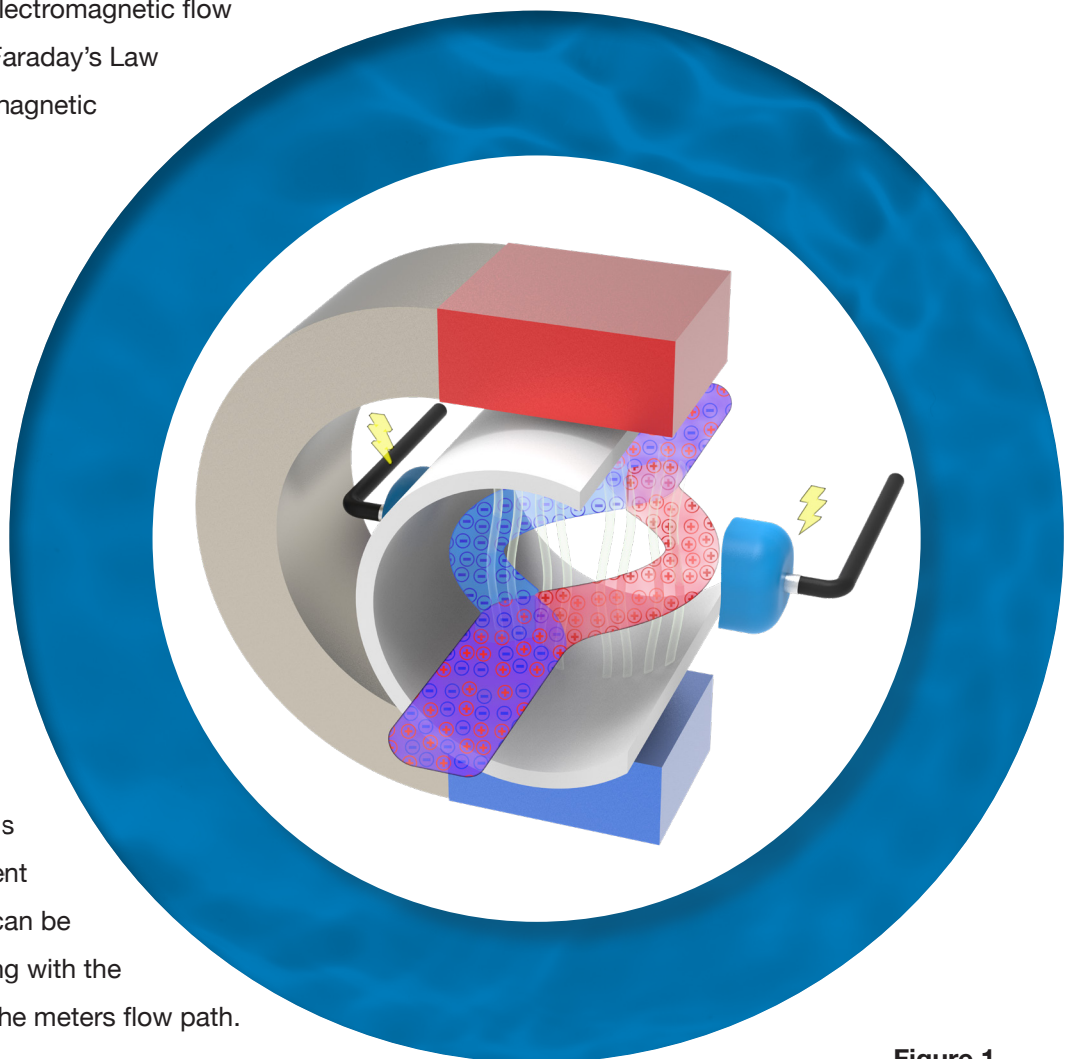


Figure 1
Illustration of sensor technology

Features

FLOW RANGES

The COBALT flow meter can support ranges as low as 10 – 500 mL/min and as high as 1 – 15 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

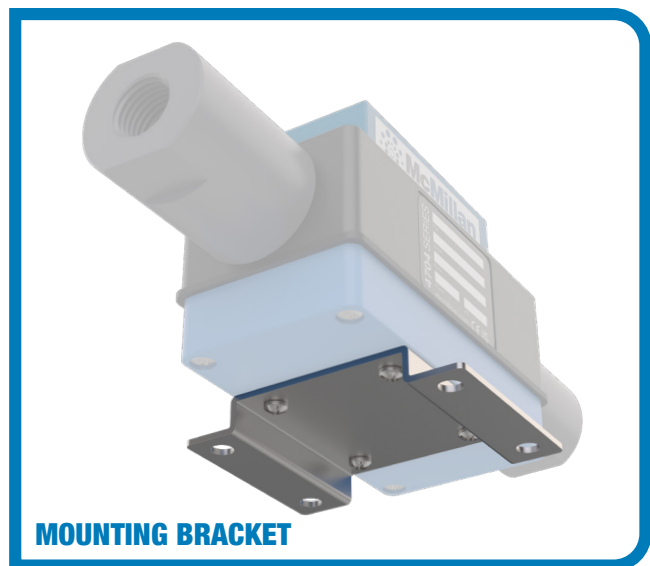
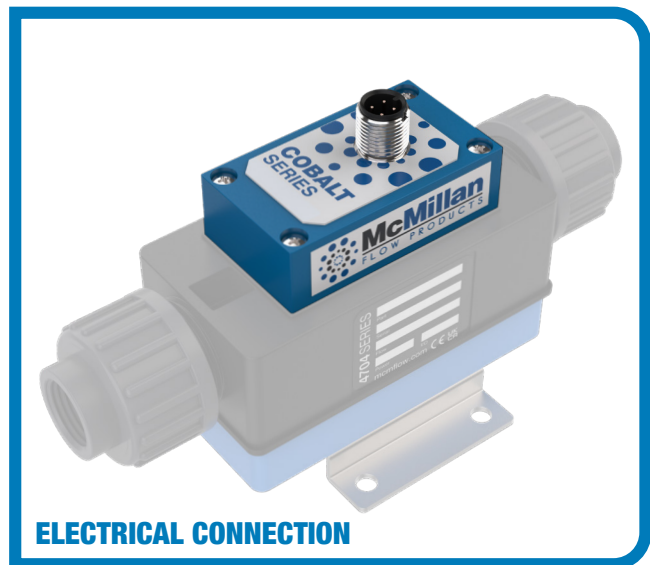
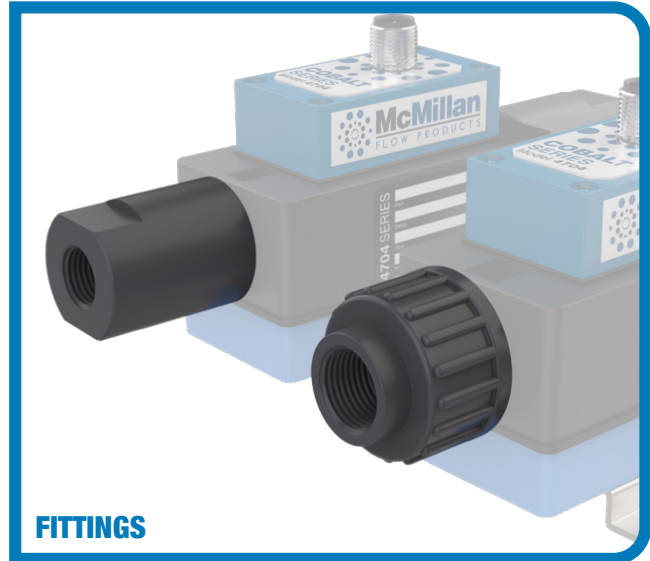
The COBALT's accuracy is $\pm 2\%$ of full scale with $\pm 1\%$ full scale repeatability. Minimum of 30 $\mu\text{S}/\text{cm}$ for 3L | 10L | 15L units is required. Minimum of 200 $\mu\text{S}/\text{cm}$ for 500M | 1000M units is required.

FLUID CONNECTIONS

500M | 1000M | 3L units come with 1/4" FNPT connections. 10L | 15L 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 15L units is required Minimum of 200 µS/cm for 500M 1000M 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 psi [10 bar] | |
| Max. Pressure Loss | 3.7 psi [0.26 bar] 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

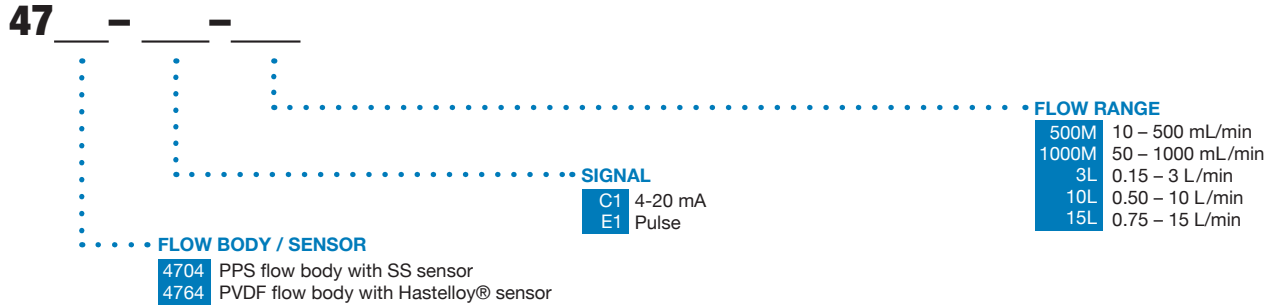
| 4-20 mA (Option C1) | |
|-----------------------|-----------------|
| Output | 4-20 mA, 3-wire |
| Max. Load | 500 Ω |
| Power Supply | 24 VDC ± 20% |
| Power Consumption | 80 mA |
| Electrical Connection | Plug M12 x 1 |

| 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-C1-1000M 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 50 – 1000 mL/min.

4764-E1-15L 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 – 15 L/min.

OPTIONAL FITTING SETS

All fitting sets supplied in pairs.

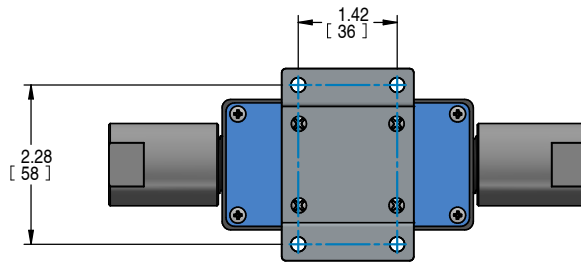
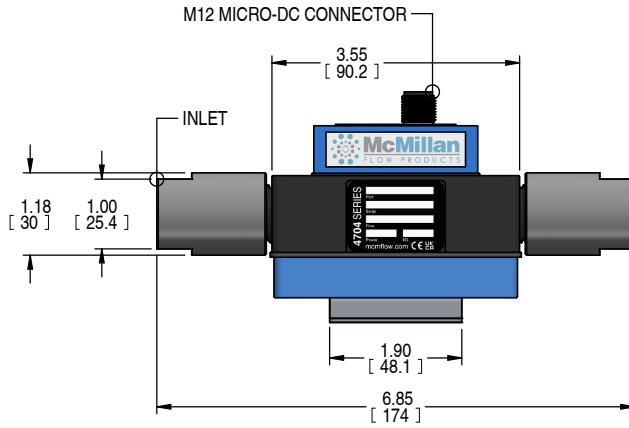
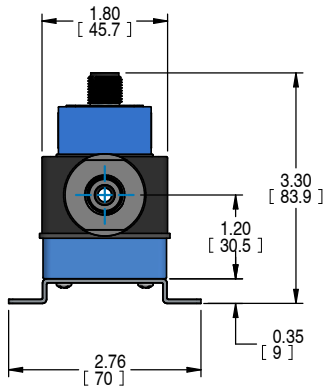
| RANGES 500M 1000M 3L | |
|--------------------------|---|
| CODE | FITTING DESCRIPTION |
| 9860-2-T4 | PFA 1/4" tube fittings with 1/4" MNPT threads |
| 9860-2-T6 | PFA 3/8" tube fittings with 1/4" MNPT threads |
| 9863-2-T7 | PFA 1/2" tube fittings with 1/4" MNPT threads |
| 9863-2-T4 | 316L SS 1/4" 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 |
| 9864-2-T7 | Acetal 1/2" 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 |
| 9866-2-T7 | PVDF 1/2" tube fittings with 1/4" MNPT threads |

| RANGES 10L 15L | |
|------------------|---|
| 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 |

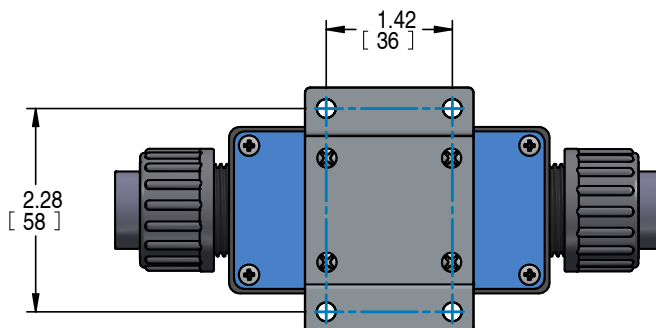
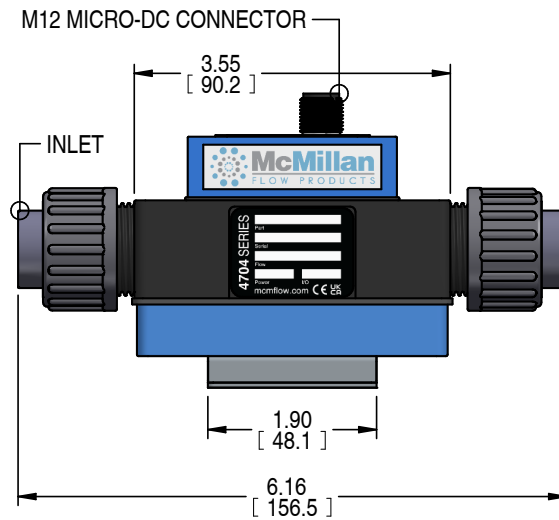
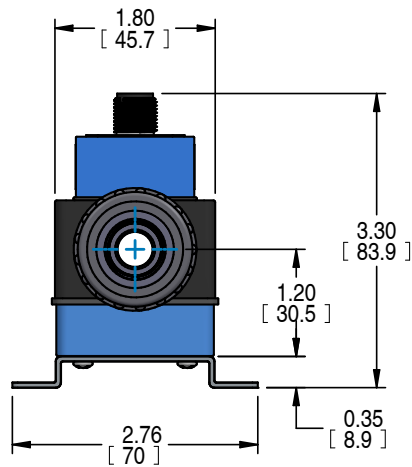
Dimensions

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.

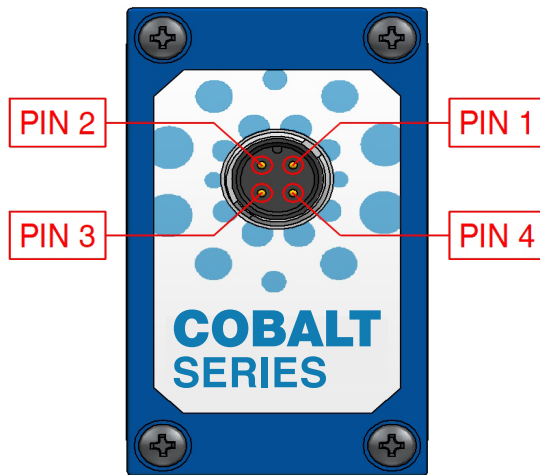
RANGES 500M | 1000M | 3L:



RANGES 10L | 15L:



Wiring Diagram



| PIN POSITION | 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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Website: www.mcmflow.com

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