

## OVERVIEW

The M-Series® M-5000 amplifier is used with the Badger Meter battery-powered electromagnetic flow meters, which can operate independent of a power line. The M-5000 is ideal for industrial and commercial applications for measuring well water, wastewater, reclaimed water, chemicals, pharmaceuticals, and bi-directional flow applications that have minimal electrical conductivity. Thanks to sophisticated, processor-based signal conversion, the M-5000 can achieve an accuracy of  $\pm 0.5\%$  and a flow range better than 300:1.

The M-5000 amplifier can be integrally mounted to the detector, or if necessary, mounted remotely, if necessary. Housed in a NEMA 4X (IP66) enclosure, the amplifier targets a variety of applications and is well suited for the diverse water and wastewater treatment industry.

## OPERATION

The M-5000 amplifier amplifies and converts analog detector signals into digital information through a series of sophisticated software algorithms. After separating signals from electrical noise, the signals are used to display flow rate and totalization. In addition, the processor controls zero-flow stability, frequency outputs, serial communications, and other parameters.

The two-line, 15-character LCD simultaneously indicates flow rate, forward and reverse totalizers, and diagnostic messages. The display guides the user through simple programming routines with English terminology.

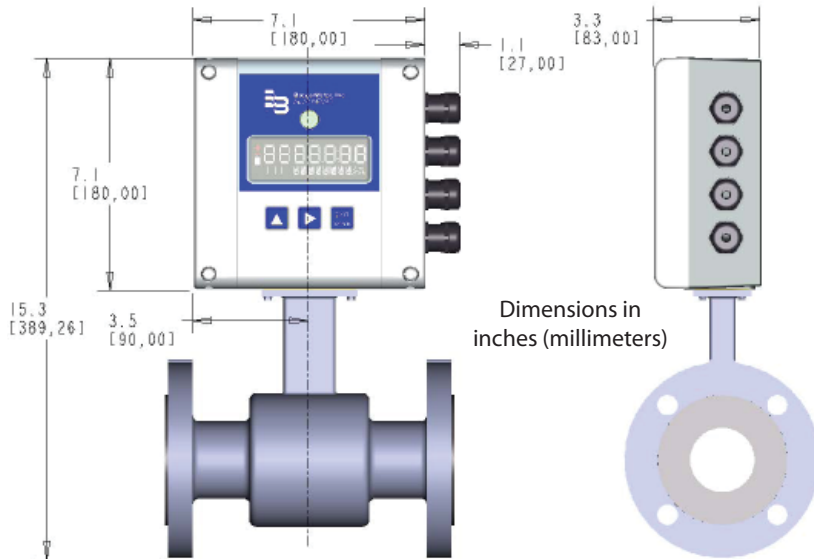
## APPLICATION

The M-5000 amplifier detects and conditions the electromagnetic detector's flow-related data. The unit is ideal for applications without power line access, where flow is continuous, and when indication of rate and totalization are required. The unit provides pulse signals that can be transmitted to dedicated PLCs and other specialized instruments.



## FEATURES

- Battery powered
- Low-power digital microcontroller (16 Bit)
- Large two-line, 15-character display
- Simple programming procedure
- Digital and infrared outputs
- NEMA 4X (IP66) enclosure
- Meter mount or remote wall mount
- Bi-directional flow sensing/totalization
- Automatic zero-point stability
- Better than  $\pm 0.1\%$  repeatability
- Measures fluids with as low as 20 micro siemens/cm conductivity
- Empty pipe detection
- Modbus RTU via RS232, IRDA
- Non-volatile programming
- Data logger



## SPECIFICATIONS

Power Supply	Internal lithium batteries 3.6 volt
Battery Life	10 years
Accuracy	± 0.50% of rate for velocities greater than 1.64 ft/s (0.50 m/s) ± 0.008 ft/s (± 0.0025 m/s) for velocities less than 1.64 ft/s (0.50 m/s)
Sampling Rate	Programmable from 1 to 63 seconds
Repeatability	±0.1%
Flow Range	0.328 to 32.8 ft/s (.03 to 10ms)
Minimum Fluid Conductivity	≥ 20 micro siemens/cm
Processing	Low power microcontroller (16 bit)
Flow Direction	Uni-directional or bi-directional. Two separate programmable totalizers for uni-directional measurement.
Outputs (4 digital)	Galvanically isolated open collector, 30 VDC maximum, 20mA each, maximum output frequency at 100 Hz
Outputs	High/low flow alarm (0-100% of flow), error alarm, empty pipe alarm, flow direction

Empty Pipe Detection	Field-tunable for optimum performance based on specific application
Pulse Width	Programmable 5 to 500ms
Min-Max Flow Alarm	Programmable outputs 0 to 100% of flow
Units of Measure	Gallons, ounces, MGD, liters, cubic meters, cubic feet, imperial gallon, barrel, hectoliter, acre feet
Galvanic Separation	Functional 50 volts
Low Flow Cut-Off	Programmable 0 to 10% of maximum flow
Liquid Crystal Display	Two lines x 15 characters (7-top + 8-bottom)
Programming	Three external buttons
Housing	NEMA 4X (IP66), cast aluminum, powder-coated paint
Mounting	Detector-mount or remote wall mount (bracket supplied)
Cable Connection	Four 1/2-inch NPT Cord Grip
Ambient Temperature	-4° F to 140° F (-20° C to 60° C)
Serial Communication	RS232 Modbus RTU, IRDA

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