Badger Meter

M-Series® M2000

Electromagnetic Flow Meter Amplifier

DESCRIPTION

The innovative design of the Badger Meter M-Series® model M2000 amplifier represents the next generation of electromagnetic (mag) flow meter signal processing. The M2000 incorporates the latest developments in microprocessor signal conditioning. The advanced design of the M2000 meter allows for an accuracy of ±0.25 percent with a flow range of 300:1.

The M2000 amplifier can be integrally mounted to the detector or can be remote-mounted, if necessary. The amplifier targets a variety of applications and is well suited for the diverse water and wastewater treatment industry.

OPERATION

The M2000 amplifier receives the detector's analog signal, amplifies that signal and converts it into digital information. At the processor level, the signal is analyzed through a series of sophisticated software algorithms. After separating the signal from electrical noise, it is converted into both analog and digital signals that are used to display rate of flow and totalization.

In addition, the processor controls zero-flow stability, analog and frequency outputs, serial communications and a variety of other parameters. The large LCD display indicates rate of flow, forward and reverse totalizers and diagnostic messages. The display also serves to guide the user in simple terms through the user-friendly programmable routines.

Programmable parameters of the amplifier include, but are not limited to: calibration factors, totalizer resets, unit of measure, analog and pulse output scaling, flow-alarm functions, language selection, low-flow cutoff, noise dampening factor and excitation frequency selection.
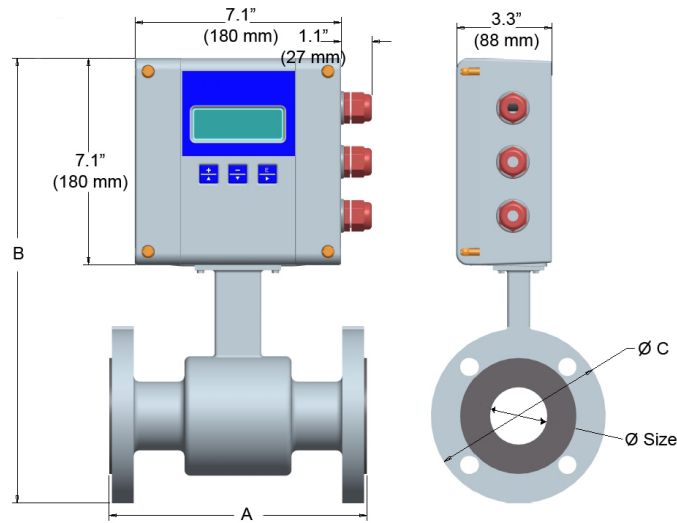
APPLICATION

The M2000 amplifier's main function is to detect and condition flow information from the electromagnetic detector. The unit is ideally suited for measuring dynamic, non-continuous flow. In applications where a minimum and/or maximum flow rate must be tracked and monitored, the unit provides pulse signals that can be fed to dedicated batch controllers, PLCs and other more specialized instrumentation.

FEATURES

- Digital signal processor (32 bit)
- User-friendly programming procedure
- Better than ±0.1% repeatability
- Empty pipe detection
- Power loss totalization
- Modbus RTU via RS232
- Non-volatile programming memory
- Rotating cover
- Enhanced security options
- CSA certified

Product Data Sheet

SPECIFICATIONS

AC Power Supply	85…265V AC
Typical Power	20V A or 15 W
Max. Power	26V A or 20 W
Optional DC Supply	10…36V DC
Typical Power	10 W
Max. Power	14 W
Accuracy	± 0.2 percent of rate for velocities greater than 1.64 ft/s (0.50 m/s), ± 0.0032 ft/s (± 1 mm/s) for velocities less than 1.64 ft/s (0.50 m/s)
Repeatability	± 0.1 percent
Flow Range	0.10…39.4 ft/s (0.03…12 m/s)
Fluid Conductivity	Minimum 5.0 micromhos/cm
Flow Direction	Unidirectional or bidirectional two separate totalizers (programmable)
Totalization	Programmable/resettable
Unidirectional	T1, T2
Bidirectional	T+ (Fwd), T- (Rev), Tn (Net)
Minimum Fluid Conductivity	5.0 micromhos/cm
Processing	32-bit DSP
Analog Output	4…20 mA, 0…20 mA, 0…10 mA, 2…10 mA (programmable and scalable). Voltage sourced 24V DC isolated. Maximum loop resistance < 800 ohms
Digital Outputs	Four total, configurable 24V DC sourcing active output (up to 2),100 mA total, 50 mA each; sinking open collector output (up to four), 30V DC max, 100 mA each; AC solid-state relay (up to 2), 48V AC, 500 mA max.
Pulse Outputs	Scalable up to 10 kHz, passive open collector up to 10 kHz, active switched 24V DC. Up to two outputs (forward and reverse). Pulse width programmable from 1…1000 ms or 50 percent duty cycle.

Frequency Output	Scalable up to 10 kHz, open collector up to 1 kHz, solid-state relay
Misc Outputs	High/low flow alarm (0…100 percent of flow), error alarm, empty pipe alarm, flow direction, preset batch alarm, 24V DC supply, ADE
Noise Dampening	Programmable 0…30 seconds.
Empty Pipe Detection	Field tunable for optimum performance based on specific application
Excitation Frequency	1 Hz, 3.75 Hz, 7.5 Hz or 15 Hz (factory optimized to pipe diameter)
Digital Input	Max. 30V DC (programmable – positive zero return, external totalizer reset or preset batch start)
Units of Measure	Ounce, pound, liter, US gallon, imperial gallon, barrel, hectoliter, megagallon, cubic meter, cubic feet, acre feet
Galvanic Separation	250 V
Low Flow Cutoff	Programmable 0…10 percent of max. flow
LCD Display	4 x 20 character display with backlight
Programming	3-button, external manual or remotely
Housing	Cast aluminum, powder-coated paint
Housing Rating	NEMA 4X (IP66)
Mounting	Meter mount or remote wall mount (bracket supplied)
Cable Connection	1/2-inch NPT Cord Grip (3)
Ambient Temperature	– 4…140° F (–20…60° C)
Communication	RS232/RS485 Modbus RTU, HART, Profibus DP
Logging	Power loss totalization
Relative Humidity	Up to 90 percent non-condensing
Locations	Indoor and outdoor
Token Features	Data Logging (Blue token) Store/Restore (Red token) Firmware Upgrade (Black token)

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