

M-Series® M2000

Electromagnetic Flow Meter

DESCRIPTION

The Badger Meter M-Series[®] M2000 is the result of years of research and field use of electromagnetic flow meter technology. Based on Faraday's law of induction, these meters can measure almost any liquid, slurry or paste that has minimum electrical conductivity.

Designed, developed and manufactured under strict quality standards, the M-Series meter features sophisticated, processor-based signal conversion with accuracies of ± 0.25 percent. The wide selection of liner and electrode materials helps ensure maximum compatibility and minimum maintenance over a long operating period.

OPERATION

The flow meter is a stainless steel tube lined with a non-conductive material. Outside the tube, two DC powered electromagnetic coils are positioned opposing each other. Perpendicular to these coils, two electrodes are inserted into the flow tube. Energized coils create a magnetic field across the whole diameter of the pipe.

As a conductive fluid flows through the magnetic field, a voltage is induced across the electrodes. This voltage is proportional to the average flow velocity of the fluid and is measured by the two electrodes. 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.

With no moving parts in the flow stream, there is no pressure lost. Also, accuracy is not affected by temperature, pressure, viscosity or density and there is practically no maintenance required.

ELECTRODES

When looking from the end of the meter into the inside bore, the two measuring electrodes are positioned at three o'clock and nine o'clock. M2000 mag meters have an "empty pipe detection" feature. This is accomplished with a third electrode positioned in the meter between twelve o'clock and one o'clock.

If this electrode is not covered by fluid for a minimum five-second duration, the meter will display an "empty pipe detection" condition, send out an error message, if desired, and stop measuring to maintain accuracy. When the electrode again becomes covered with fluid, the error message will disappear and the meter will continue measuring.

As an option to using grounding rings, a grounding electrode (fourth electrode) can be built into the meter during manufacturing to assure proper grounding. The position of this electrode is at five o'clock.



APPLICATION

The M2000 amplifier can be integrally mounted to the detector or can be remote-mounted, if necessary and has many advantages over other conventional technologies. The meter targets a variety of applications and is well suited for the diverse water and wastewater treatment industry. The M2000 meter can accurately measure fluid flow—whether the fluid is water or a highly corrosive liquid, very viscous, contains a moderate amount of solids, or requires special handling. Today, magnetic meters are successfully used in industries including food and beverage, pharmaceutical, water and wastewater, and chemical

FEATURES

- Available in sizes 0.25...54" (6...1350 mm)
- Pulsed DC magnetic field for zero point stability
- Integral and remote signal converter availability
- Corrosion resistant liners for long life
- Measurement largely independent of flow profile
- User friendly programming procedure
- Empty pipe detection
- Power loss totalization
- Digital signal processor (32-bit)
- Non-volatile programming memory
- Rotating cover
- Calibrated in state-of-the-art facilities
- NSF listed
- CSA certified

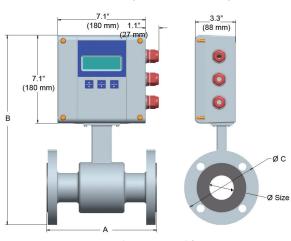


MAG-DS-01047-EN-06 (January 2015)

Product Data Sheet

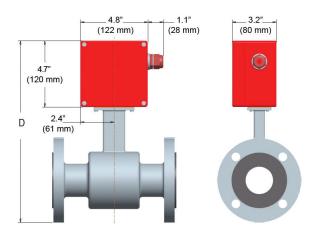
SPECIFICATIONS

Flow Range 0.0.034 M/s 0.0012 m/s Accuracy 0.2.0 Spectrach of the for valocities grater than 1.64 f/s (0.50 m/s) Repetability 0.0% Analeg Output 0.0% Analeg Output 0.0% Analeg Output 0.0% Analeg Output 0.0% Second Digital Output 0.0% A.0.0.00 A.0.0.00 Accurd Digital Output Digital Output Controllat.com/spectral Disk Output Digital Output Digital Output Scalable 2VIC Scalable 2VIC Scalable controllation of acat/A scalable cold Disk Output Digital Output Floguency Output Scalable 2VIC Scalable zon oth Acat/A scalable cold Disk Output Digital Output Scalable up to 10 MHz, passic Oetpot Condicator up to 10 MHz, solid state relay (or Digital Disk Output Disk Disk Disk Output Disk Disk Disk Output Disk Disk Disk Disk Disk Disk Disk Disk												
a 0.000 ft/s (a 1 mm/s) for velocities (ses than 1.64 ft/s (0.50 m/s) Repeatability a 0.1% Power Supply Cheman Dip Power Supply (SL 3.547 AC, Typical Power. 10W, Astimum Power: 14W Analog Output A.2 om 0, 0, 20 mA, 0, 10 mA, 2 10 mA (programmable and scalable) Voltage Succed 24W DC isolated. Maximum loop restance < 800 Anns. Digital Output Digital Output Scalable 24W DC isolated. Maximum loop restance < 800 Anns. Digital Output Scalable 24W DC isolated. Xasile state relay top 21, 46W AC, 500 mM max. Digital Input Max 33V DC (mognambale - positize current, outpannel top 21, 46W AC, 500 mM max. Digital Input Scalable top 10 MHz, open collector up to 14Hz, solid-state relay on 21, 46W AC, 500 mM max. Posessing Scalable up to 10 MHz, passive open collector up to 10 MHZ active state hash state relay on 20, 46W AC, 500 mM, max. Posessing Scalable up to 10 MHz, passive open collector up to 10 MHZ active submt data programmable - 20 State active submt data programmable active submt data programmable - 20 State acti	Flow Range	0.1039.4 ft/s (0.0312 m/s)										
Power Supply AC Power Supply: 85353 /AC. Typical Power: 20/A or 15% /Maximum Power: 20/A or 20W Optional DC Power Supply: 0369 /DC. Typical Power: 10% Maximum Power: 14W Analog Output A20 m.A. 020 m.A. 210 mA (programmable and scalable) Valtage sourced 24/ DC Isolated. Maximum Isoop restance < 800 ohms.	Accuracy											
Optional DC Foxeer Supply: 1036V DC: Typical Power: 10W/ Meanimum Power: 10W Analog Output 420 m A, 020 m A, J.:.00 m A; 2007, M.:.20 m A; 2007, M.:.2000 m A teath, A: Sol M A each, X: sinking open collector output (up to 20, MAV AC, Sol m A max Digital Output Four trait, configurable 24V DC: solated. Maximum loop resistance < 800 ohms. Digital Input Mas 30V DC (programmable – positive zero return, external totalizer reset or preset batch start) Frequency Output Sclable up to 10 KHz, appen collector up to 1 KHz, solid-stare relay (up to 2), 48V AC, Sol m A max Misc Output High/low Kow alam (0100% of flow), error alam, empty pipe alam, flow direction, preset batch alam, 24V DC supply, ADE Communication R5223 Modulos RIU, HARS, Porfibus DP require separate daughterboards Palse Width Sclable up to 10 KHz, passive open collector up to 10 KHz, assive open collector up to 10 KHz, passive open collector up to 10 KHz, assive open collector up to 10 K	Repeatability	± 0.1%										
Voltage sourced 24V DC isolated. Maximum loop resistance < 800 ohms. Digital Output Four told. configurable 24V DC isourchs giche volupt (up to 2) nom kotal. 50 m k sich sinking open collector output (up to four). 30V DC max, 100 m k each: AC solid-state relay (up to 2), 40V AC, 500 m k max Digital Input Max 30V DC (programmable – positive zero return, external totalizer reset or preset batch start) Frequency Output Scalable up to 10 kHz, open collector up to 14Kz, oslid-state relay Misc Output 24V DC Supply, ADC 24V DC Supply, ADC 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 11000 msr 50% duty cycle. Processing 32-bit DSP Empty Pipe Detection Field tunable for optimum performance based on specific application Rotication Frequency 1 Hz, 37.5 Hz, 75 Hz or 15 Hz (factory optimized to pipe diameter) Noise Dampening Programmable 030 seconds Low Flow Cut-Off Programmable 030 seconds Fluid Conductivity Minimum 5.0 micromhox/cm Fluid Temperature -4140°F (-2060°C) Vith Meter-Monted Amplifier; FPA, PTFE & Halar 302° F (150°C) With Meter-Monted Amplifier; FPA, PTFE & Halar 302° F (150°C) With Meter-Monted Amplifier; FPA, PTFE & Halar 302° F (150°	Power Supply											
Instruction output (up to four), 300 UC max, 100 mA ach; AC Solid-state relay (up to 2), 44X, 500 mA max Digital Input Max 300 UC (programmable – positive zero return, external totalizer reset or preset batch start) Ferquency Output Scalable up to 10 KHz, open collector up to 11 KHz, solid-state relay Misc Output Hilgh/ow/flow alam (0100% of flow), error alarm, empty pipe alarm, flow direction, preset batch alarm, 24V DC supple, ADE Communication RS232 Modbus RTU; RS483 Modbus RTU, HART, Profibus DP require separate daughterboards Pulse Width 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 11000 ms 7 50% duty cycle. Processing 32-bit DSP Empty Pipe Detection Field tunable for optimum performance based on specific application Low Flow Cut-Off Programmable 0 30 seconds Low Flow Cut-Off Programmable 0 30 seconds Fluid Temperature With Meant Amplifier: FPA, PTFE & Halar 302" F (150" C) With Meant Amplifier: FPA, PTFE & Halar 302" F (150" C) With Meant Amplifier: FPA, PTFE & Halar 302" F (150" C) Relative Humidity Up to 50 percent non-condensing Fluid Conductivity Minimum 5.0 micromhos/cm Fluid Temperature -41	Analog Output											
Frequency Output Scalable up to 10 kHz, open collector up to 1 kHz, solid-state relay Misc Output High/Jow flow alarm (0100% of flow), error alarm, empty pipe alarm, flow direction, preset batch alarm, 2VH OC supply, ADE Communication RS232 Modbus RTU; RS485 Modbus RTU, HART, Profibus DP require separate daughterboards Pulse Width 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 11000 ms or 50% duty cycle. Processing 32-bit DSP Empty Pige Detection Field tunable for optimum performance based on specific application Excitation Frequency 1Hz, 3.75 Hz, 7.5 Hz or 15 Hz (factory optimized to pipe diameter) Noise Dampening Programmable 030 seconds Develop Eluid Conductivity Minimum 5.0 micromhos/cm Filuid Conductivity Minimum 5.0 micromhos/cm Fluid Temperature With Meere-Mounted Amplifier: PKP, PTFE & Halar 202" F (150" C) Mise of Programmable 00 y galon, imperial gallon, barrel, hectoliter, mega gallon, cubic meter, cubic feet, acre feet Display 4 x 20 character display with backlight Programmable / Programmable/ Programming Three-button, external manual or remote Amplifier Housing Cast aluminum, powder-coated paint Display	Digital Output											
Misc Output High/low flow alarm (0100% of flow), error alarm, empty pipe alarm, flow direction, preset batch alarm, 24V DC supply, ADE Communication R522 Modbus RTU; R548 Modbus RTU, HART, Profibus DP require separate daughterboards Pulse Width Scalable up to 10 HK, passive open collector up to 10 HX, a ctive switched 24V OC. Up to two outputs (forward and reverse). Pulse width programmable from 11000 ms or 50% duty cycle. Processing 32-bit DSP 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) Noise Dampening Programmable 0 10% of maximum flow Galvanic Separation 250V Fluid Temperature With Remote Amplifier: PFA, PTFE & Halar 302° F (150° C) With Remote Amplifier: PFA, PTFE & Halar 302° F (150° C) With Meter-Mounted Amplifier: Ruber 178° F, (80° C), PFA, PTFE & Halar 212° F (100° C) Ambient Temperature With Remote Amplifier: Ruber 178° F, (80° C), PFA, PTFE & Halar 212° F (100° C) Miter Humidity Up to 90 percent non-condensing Flow Direction Uniticetional two separate totalizers (programmable) Units of Measure Ounce, pound, liter, US aglion, imperial gallon, barrel, hectoliter, mega gallon, cubic meter, cubic feet, acre feet	Digital Input	Max 30V DC (programmable – positive zero return, external totalizer reset or preset batch start)										
24 ² DC supply, ADE Communication R5232 Modbus RTU, R5485 Modbus RTU, HART, Profibus DP require separate daughterboards Pulse Width 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% duty cycle. Processing 32-bit DSP Empty Pipe Detection Field tunable for optimum performance based on specific application Eaxitation Frequency 1 Hz, 3.75 Hz, 7.5 Hz or 15 Hz (factory optimized to pipe diameter) Noise Dampening Programmable 010% of maximum flow Galvanic Separation 250V Fluid Conductivity Minimum 5.0 micromhos/cm Fluid Temperature With Remote Amplifier PFA, PTFE & Halar 302° F (150° C). With Meret-Mounted Amplifier. Rubber 178° F. (80° C). PFA, PTFE & Halar 212° F (100° C) Relative Humidity Up to 90 percent non-condensing Flow Direction Unidirectional two separate totalizers (programmable) Totalization Programmable (50 MC). Programming Casto aluminum, powder-coated paint Display 4 x 20 character display with backlight Programming Three-button, external mananual or remote Amplifier Housing Cast al	Frequency Output	Scalable up to 10 kHz, open collector up to 1 kHz, solid-state relay										
Pulse Width 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 11000 ms of S0% duty cycle. Processing 32-bit DSP 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) Noise Dampening Programmable 0 10% of maximum flow Galvanic Separation 250V Fluid Conductivity Minimum 5.0 micromhos/cm Fluid Temperature With Remote Amplifier: PKA, PTEE & Halar 302°: F (150° C) With Merence Amplifier: PKA, PTEE & Halar 302°: F (150° C) With Remote Amplifier: Rubber 178°, F(80° C), PFA, PTEE & Halar 212° F (100° C) Ambient Temperature - 4 140° F (-20 60° C) Relative Humidity Up to 90 percent non-condensing Flow Direction Unidirectional to bidirectional two separate totalizers (programmable) Outce, pound, Itter, US gallon, imperial gallon, barel, hectoliter, mega gallon, cubic meter, cubic feet, acre feet Display 4 x 20 character display with backlight Programming Proe-button, external manual or remote Amplifier Housing Cast aluminum, powder-coated galnt Detector Housing Castaluminum, powder-coate	Misc Output											
Interface Processing S2-bit DSP Processing 22-bit DSP Processing	Communication	RS232 Modbus RTU; RS485 Modbus RTU, HART, Profibus DP require separate daughterboards										
Empty Pipe Detection Field tunable for optimum performance based on specific application Excitation Frequency 1 Hz, 3.75 Hz, 75 Hz or 15 Hz (factory optimized to pipe diameter) Noise Dampening Programmable 030 seconds Low Flow Cut-Off Programmable 010% of maximum flow Galvanic Separation 250V Fluid Conductivity Minimum 5.0 micromhos/cm Fluid Temperature With Remote Amplifier: PFA, PTFE & Halar 302° F (150° C) Ambient Temperature -4140° F (-2060° C) Relative Humidity Up to 90 percent non-condensing Flow Direction Undirectional or bidirectional two separate totalizers (programmable) Totalization Programmable/resettable Units of Measure Ounce, pound, liter, US gallon, imperial gallon, barrel, hectoliter, mega gallon, cubic meter, cubic feet, acre feet Display 4 x 20 character display with backlight Programming Three-button, external manual or remote Amplifier Housing Cast aluminum, powder-coated paint Detector Housing Catandard: ANIS B16.5 Class 150 RF cast steel; Optional: 300 lb cast steel, 316 stainless steel Hanges Standard: ANIS B16.5 Class 150 RF cast steel; Optional: 300 lb cast steel, 316 stainless steel	Pulse Width											
Excitation Frequency 1 Hz, 3.75 Hz, 7.5 Hz or 15 Hz (factory optimized to pipe diameter) Noise Dampening Programmable 030 seconds Low Flow Cut-Off Programmable 010% of maximum flow Galvanic Separation 250V Fluid Conductivity Minimum 5.0 micromhos/cm Fluid Temperature With Remote Amplifier: PA, PTFE & Halar 302° F (150° C) Relative Humidity Up to 90 percent non-condensing Flow Direction Unidirectional or bidirectional two separate totalizers (programmable) Totalization Programmable/resettable Units of Measure Ounce, pound, liter, US gallon, imperial gallon, barrel, hectoliter, mega gallon, cubic meter, cubic feet, acre feet Display 4 x 20 character display with backlight Programming Three-button, external manual or remote Amplifier Housing Cast aluminum, powder-coated paint Detector Housing Carbon steel welded Pipe Spool Material 316 stainless steel Hanges Standard: ANSI B16.5 Class 150 RF cast steel; Optional: 300 Ib cast steel, 316 stainless steel Liner Material PFA up to 3/4°, PTEF 1/224°, soft and hard rubber from 154°, Halar' from 1440° Electrode Materials Standard: Alloy C; Optional: 316 stainless steel; Optional: 300 Ib cas	Processing	32-bit DSP										
Noise Dampening Programmable 030 seconds Low Flow Cut-Off Programmable 010% of maximum flow Galvanic Separation 250V Fluid Conductivity Minimum 5.0 micromhos/cm Fluid Temperature With Remote Amplifier: PEA, PTFE & Halar 302° F (150° C) With Meter-Mounted Amplifier: Rubber 178° F, (80° C), PFA, PTFE & Halar 212° F (100° C) Ambient Temperature -4140° F (-2060° C) Relative Humidity Up to 90 percent non-condensing Flow Direction Unidirectional or bidirectional two separate totalizers (programmable) Totalization Programmable/resettable Units of Measure Ounce, pound, liter, US gallon, imperial gallon, barrel, hectoliter, mega gallon, cubic meter, cubic feet, acre feet Display 4 x 20 character display with backlight Programming Three-button, external manual or remote Amplifier Housing Cast aluminum, powder-coated paint Detector Housing Carbon steel welded Pipe Spool Material 316 stainless steel Flanges Standard: ANSI B16. Class 150 RF cast steel; Optional: 300 lb cast steel, 316 stainless steel Liner Material PFA up to 3/8'; PTFE 1/224'; soft and hard rubber from 154'', Halar'' from 1440''	Empty Pipe Detection											
Low Flow Cut-OffProgrammable 010% of maximum flowGalvanic Separation250VFluid ConductivityMinimum 5.0 micromhos/cmFluid TemperatureWith Remote Amplifier: PFA, PTFE & Halar 302° F (150° C) With Meter-Mounted Amplifier: Rubber 178° F, (80° C), PFA, PTFE & Halar 212° F (100° C)Ambient Temperature- 4 140° F (-20 60° C)Relative HumidityUp to 90 percent non-condensingFlow DirectionUnidirectional or bidirectional two separate totalizers (programmable)TotalizationProgrammable/resettableUnits of MeasureOunce, pound, liter, US gallon, imperial gallon, barrel, hectoliter, mega gallon, cubic meter, cubic feet, acre feetDisplay4 x 20 character display with backlightProgrammingThree-button, external manual or remoteAmplifier HousingCast aluminum, powder-coated paintDetector HousingCarbon steel weldedPipe Spool Material316 stainless steelFlangesStandard: ANSI B16.5 Class 150 RF cast steel; Optional: 300 lb cast steel, 316 stainless steelLiner MaterialPFA up to 3/8°, PTFE 1/224°, soft and hard rubber from 154°, Halar* from 1440°Lectrode MaterialsStandard: Alloy C; Optional: 316 stainless steel, gold/platinum plated, tantalum, platinum/rhodiumMountingMeter mount or remote wall mount (bracket supplied)LocationsIndoor and outdoorMeter Enclosure ClassificationNEMA 4X (IP66); Optional: Stubmersible NEMA 6P (IP67), remote amplifier requiredJunction Box Enclosure ProtectionForremote amplifier option: powder-coated die-cast aluminum, NEMA 4 (IP66) <t< th=""><th>Excitation Frequency</th><th></th></t<>	Excitation Frequency											
Galvanic Separation 250V Fluid Conductivity Minimum 5.0 micromhos/cm Fluid Temperature With Remote Amplifier: PFA, PTFE & Halar 302° F (150° C) Ambient Temperature - 4140° F (-2060° C) Relative Humidity Up to 90 percent non-condensing Flow Direction Unidirectional or bidirectional two separate totalizers (programmable) Totalization Programmable/resettable Units of Measure Ounce, pound, liter, US gallon, imperial gallon, barrel, hectoliter, mega gallon, cubic meter, cubic feet, acre feet Display 4 x 20 character display with backlight Programming Three-button, external manual or remote Amplifier Housing Cast aluminum, powder-coated paint Detector Housing Carbon steel velded Pipe Spool Material 316 stainless steel Flanges Standard: ANSI B16.5 Class 150 RF cast steel; Optional: 300 lb cast steel, 316 stainless steel Liner Material PFA up to 3/8', PTFE 1/224'', soft and hard rubber from 154'', Halar'' from 1440'' Electore Materials Standard: AlNSI B16.5 Class 150 RF cast steel; Optional: 300 lb cast steel, 316 stainless steel Liner Material PFA up to 3/8', PTFE 1/224'', soft and hard rubber from 154'', Halar'' from 1440'' Electore Materials <th>Noise Dampening</th> <th></th>	Noise Dampening											
Fluid Conductivity Minimum 5.0 micromhos/cm Fluid Temperature With Remote Amplifier: PFA, PTFE & Halar 302° F (150° C) Ambient Temperature - 4140° F (-2060° C) Relative Humidity Up to 90 percent non-condensing Flow Direction Unidirectional two separate totalizers (programmable) Totalization Programmable/resettable Units of Measure Ounce, pound, liter, US gallon, imperial gallon, barrel, hectoliter, mega gallon, cubic meter, cubic feet, acre feet Display 4 x 20 character display with backlight Programming Three-button, external manual or remote Amplifier Housing Cast aluminum, powder-coated paint Detector Housing Carbon stell velded Pipe Spool Material 316 stainless steel Flanges Standard: ANIS 18.6.5 Class 150 RF cast steel; Optional: 300 lb cast steel, 316 stainless steel Inerviral PFA up to 3/8°; PTFE 1/224°; soft and hard rubber from 154°; Halar* from 1440° Electrode Material NEMA 4X (IP66); Optional: 316 stainless steel, gold/platinum plated, tantalum, platinum/rhodium Mounting Meter mount or remote wall mount (bracket supplied) Locations Indoor and outdoor Meter Enclosure Classification NEMA 4X (IP66); Optional: Submersible NEMA	Low Flow Cut-Off	Programmable 010% of maximum flow										
Fluid Temperature With Remote Amplifier: PFA, PTFE & Halar 302° F (150° C) With Meter-Mounted Amplifier: Rubber 178° F, (80° C), PFA, PTFE & Halar 212° F (100° C) Ambient Temperature -4140° F (-2060° C) Relative Humidity Up to 90 percent non-condensing Flow Direction Unidirectional or bidirectional two separate totalizers (programmable) Totalization Programmable/resettable Units of Measure Ounce, pound, liter, US gallon, imperial gallon, barrel, hectoliter, mega gallon, cubic meter, cubic feet, acre feet Display 4 x 20 character display with backlight Programming Three-button, external manual or remote Amplifier Housing Cast aluminum, powder-coated paint Detector Housing Carbon steel Welded Pipe Spool Material 316 stainless steel Flanges Standard: ANSI B16.5 Class 150 RF cast steel; Optional: 300 lb cast steel, 316 stainless steel Liner Material PFA up to 3/8°, PTFE 1/224°, soft and hard rubber from 154°, Halar* from 1440° Electrode Materials Standard: ANSI B16.5 Class 150 RF cast steel; Optional: 300 lb cast steel, 316 stainless steel Liner Material PFA up to 3/8°, PTFE 1/224°, soft and hard rubber from 154°, Halar* from 1440° Electrode Materials Indoor and outdoor Mounting <t< th=""><th>· · ·</th><th></th></t<>	· · ·											
IndexWith Meter-Mounted Amplifier: Rubber 178° F, (80° C), PFA, PTFE & Halar 212° F (100° C)Ambient Temperature-4140° F (-2060° C)Relative HumidityUp to 90 percent non-condensingFlow DirectionUnidirectional two separate totalizers (programmable)TotalizationProgrammable/resettableUnits of MeasureOunce, pound, liter, US gallon, imperial gallon, barrel, hectoliter, mega gallon, cubic meter, cubic feet, acre feetDisplay4 x 20 character display with backlightProgrammingThree-button, external manual or remoteAmplifier HousingCasta aluminum, powder-coated paintDetector HousingCarbon steel weldedFlangesStandard: ANSI B16.5 Class 150 RF cast steel; Optional: 300 lb cast steel, 316 stainless steelLiner MaterialPFA up to 3/8°, PTFE 1/224°, soft and hard rubber from 154°, Halar* from 1440°Electrode MaterialsStandard: Alloy C; Optional: 316 stainless steel, gold/platinum plated, tantalum, platinum/rhodiumMountingMeter mount or remote wall mount (bracket supplied)LocationsIndoor and outdoorMeter Enclosure ClassificationNEMA 4X (IP66); Optional: Submersible NEMA 6P (IP67), remote amplifier requiredJunction Box Enclosure ProtectionFor ermote amplifier option: powder-coated die-cast aluminum, NEMA 4 (IP66)Cable Entries1/2" NPT cord grip (3)Optional Stainless SteelMeter Size Thickness (of one ring) 0.135° 1254*Optional Stainless SteelMedes with hard rubber liner, 4"size and up; PTFE liner, all sizes												
Relative HumidityUp to 90 percent non-condensingFlow DirectionUnidirectional or bidirectional two separate totalizers (programmable)TotalizationProgrammable/resettableUnits of MeasureOunce, pound, liter, US gallon, imperial gallon, barrel, hectoliter, mega gallon, cubic meter, cubic feet, acre feetDisplay4 x 20 character display with backlightProgrammingThree-button, external manual or remoteAmplifier HousingCast aluminum, powder-coated paintDetector HousingCarbon steel weldedPipe Spool Material316 stainless steelFlangesStandard: ANSI B16.5 Class 150 RF cast steel; Optional: 300 lb cast steel, 316 stainless steelLiner MaterialPFA up to 3/8°, PTFE 1/224°, soft and hard rubber from 154°, Halar* from 1440°Betectorde MaterialsStandard: Alloy C; Optional: 316 stainless steel, gold/platinum plated, tantalum, platinum/rhodiumMountingMeter mount or remote wall mount (bracket supplied)LocationsIndoor and outdoorMeter Enclosure ClassificationNEMA 4X (IP66); Optional: Submersible NEMA 6P (IP67), remote amplifier requiredJunction Box Enclosure ProtectionFor remote amplifier option: powder-coated die-cast aluminum, NEMA 4 (IP66)Cable Entries1/2" NPT cord grip (3)Optional Stainless SteelMeter SizeTheresThickness (of one ring) 0, 135° 1254*Optional Stainless MedelModels with hard rubber liner, 4"size and up; PTFE liner, all sizes	Fluid Temperature											
Flow Direction Unidirectional or bidirectional two separate totalizers (programmable) Totalization Programmable/resettable Units of Measure Ounce, pound, liter, US gallon, imperial gallon, barrel, hectoliter, mega gallon, cubic meter, cubic feet, acre feet Display 4 x 20 character display with backlight Programming Three-button, external manual or remote Amplifier Housing Cast aluminum, powder-coated paint Detector Housing Carbon steel welded Pipe Spool Material 316 stainless steel Flanges Standard: ANSI B16.5 Class 150 RF cast steel; Optional: 300 lb cast steel, 316 stainless steel Liner Material PFA up to 3/8", PTFE 1/224", soft and hard rubber from 154", Halar* from 1440" Electrode Materials Standard: Alloy C; Optional: 316 stainless steel, gold/platinum plated, tantalum, platinum/rhodium Mounting Meter mount or remote wall mount (bracket supplied) Locations Indoor and outdoor Meter Enclosure Classification NEMA 4X (IP66); Optional: Submersible NEMA 6P (IP67), remote amplifier required Junction Box Enclosure Protection For remote amplifier option: powder-coated die-cast aluminum, NEMA 4 (IP66) Cable Entries 1/2" NPT cord grip (3) Optional Stainless Steel Up through 10" 0.135"	•	- 4140° F (-2060° C)										
TotalizationProgrammable/resettableUnits of MeasureOunce, pound, liter, US gallon, imperial gallon, barrel, hectoliter, mega gallon, cubic meter, cubic feet, acre feetDisplay4 x 20 character display with backlightProgrammingThree-button, external manual or remoteAmplifier HousingCast aluminum, powder-coated paintDetector HousingCarbon steel weldedPipe Spool Material316 stainless steelFlangesStandard: ANSI B16.5 Class 150 RF cast steel; Optional: 300 lb cast steel, 316 stainless steelLiner MaterialPFA up to 3/8°, PTFE 1/224°, soft and hard rubber from 154°, Halar* from 1440°Electrode MaterialsStandard: Alloy C; Optional: 316 stainless steel, gold/platinum plated, tantalum, platinum/rhodiumMountingMeter mount or remote wall mount (bracket supplied)LocationsIndoor and outdoorMeter Enclosure ProtectionFor menote amplifier option: powder-coated die-cast aluminum, NEMA 4 (IP66)Cable Entries1/2" NPT cord grip (3)Optional Stainless SteelMeter Size Up through 10° 0.135° 1254°MSF ListedModels with hard rubber liner, 4"size and up; PTFE liner, all sizes												
Units of MeasureOunce, pound, liter, US gallon, imperial gallon, barrel, hectoliter, mega gallon, cubic meter, cubic feet, acre feetDisplay4 x 20 character display with backlightProgrammingThree-button, external manual or remoteAmplifier HousingCast aluminum, powder-coated paintDetector HousingCarbon steel weldedPipe Spool Material316 stainless steelFlangesStandard: ANSI B16.5 Class 150 RF cast steel; Optional: 300 lb cast steel, 316 stainless steelLiner MaterialPFA up to 3/8°, PTFE 1/224°, soft and hard rubber from 154°, Halar® from 1440°Electrode MaterialsStandard: AINSI B16.5 Optional: 316 stainless steel, gold/platinum plated, tantalum, platinum/rhodiumMountingMeter mount or remote wall mount (bracket supplied)LocationsIndoor and outdoorMeter Enclosure ClassificationNEMA 4X (IP66); Optional: Submersible NEMA 6P (IP67), remote amplifier requiredJunction Box Enclosure ProtectionFor remote amplifier option: powder-coated die-cast aluminum, NEMA 4 (IP66)Cable Entries1/2" NPT cord grip (3)Optional Stainless SteelMeter Size Up through 10"Optional Stainless SteelMeter Size Up through 10"Models with hard rubber liner, 4"size and up; PTFE liner, all sizes	Flow Direction											
Display 4 x 20 character display with backlight Programming Three-button, external manual or remote Amplifier Housing Cast aluminum, powder-coated paint Detector Housing Carbon steel welded Pipe Spool Material 316 stainless steel Flanges Standard: ANSI B16.5 Class 150 RF cast steel; Optional: 300 lb cast steel, 316 stainless steel Liner Material PFA up to 3/8", PTFE 1/224", soft and hard rubber from 154", Halar* from 1440" Electrode Materials Standard: Alloy C; Optional: 316 stainless steel, gold/platinum plated, tantalum, platinum/rhodium Mounting Meter mount or remote wall mount (bracket supplied) Locations Indoor and outdoor Meter Enclosure Classification NEMA 4X (IP66); Optional: Submersible NEMA 6P (IP67), remote amplifier required Junction Box Enclosure Protection For remote amplifier option: powder-coated die-cast aluminum, NEMA 4 (IP66) Cable Entries 1/2" NPT cord grip (3) Optional Stainless Steel Grounding Rings Meter Size Up through 10" NSF Listed Models with hard rubber liner, 4"size and up; PTFE liner, all sizes												
ProgrammingThree-button, external manual or remoteAmplifier HousingCast aluminum, powder-coated paintDetector HousingCarbon steel weldedPipe Spool Material316 stainless steelFlangesStandard: ANSI B16.5 Class 150 RF cast steel; Optional: 300 lb cast steel, 316 stainless steelLiner MaterialPFA up to 3/8", PTFE 1/224", soft and hard rubber from 154", Halar" from 1440"Electrode MaterialsStandard: Alloy C; Optional: 316 stainless steel, gold/platinum plated, tantalum, platinum/rhodiumMountingMeter mount or remote wall mount (bracket supplied)LocationsIndoor and outdoorMeter Enclosure ClassificationNEMA 4X (IP66); Optional: Submersible NEMA 6P (IP67), remote amplifier requiredJunction Box Enclosure ProtectionFor remote amplifier option: powder-coated die-cast aluminum, NEMA 4 (IP66)Cable Entries1/2" NPT cord grip (3)Optional Stainless Steel Grounding RingsMeter Size Up through 10"O.135" 0.135" 0.135"NSF ListedModels with hard rubber liner, 4"size and up; PTFE liner, all sizes	Units of Measure											
Amplifier HousingCast aluminum, powder-coated paintDetector HousingCarbon steel weldedPipe Spool Material316 stainless steelFlangesStandard: ANSI B16.5 Class 150 RF cast steel; Optional: 300 lb cast steel, 316 stainless steelLiner MaterialPFA up to 3/8", PTFE 1/224", soft and hard rubber from 154", Halar® from 1440"Electrode MaterialsStandard: Alloy C; Optional: 316 stainless steel, gold/platinum plated, tantalum, platinum/rhodiumMountingMeter mount or remote wall mount (bracket supplied)LocationsIndoor and outdoorMeter Enclosure ClassificationNEMA 4X (IP66); Optional: Submersible NEMA 6P (IP67), remote amplifier requiredJunction Box Enclosure ProtectionFor remote amplifier option: powder-coated die-cast aluminum, NEMA 4 (IP66)Cable Entries1/2" NPT cord grip (3)Optional Stainless SteelMeter Size Up through 10"Grounding RingsMeter Size Up through 10"NSF ListedModels with hard rubber liner, 4"size and up; PTFE liner, all sizes												
Detector Housing Carbon steel welded Pipe Spool Material 316 stainless steel Flanges Standard: ANSI B16.5 Class 150 RF cast steel; Optional: 300 lb cast steel, 316 stainless steel Liner Material PFA up to 3/8", PTFE 1/224", soft and hard rubber from 154", Halar [®] from 1440" Electrode Materials Standard: Alloy C; Optional: 316 stainless steel, gold/platinum plated, tantalum, platinum/rhodium Mounting Meter mount or remote wall mount (bracket supplied) Locations Indoor and outdoor Meter Enclosure Classification NEMA 4X (IP66); Optional: Submersible NEMA 6P (IP67), remote amplifier required Junction Box Enclosure Protection For remote amplifier option: powder-coated die-cast aluminum, NEMA 4 (IP66) Cable Entries 1/2" NPT cord grip (3) Optional Stainless Steel Grounding Rings Meter Size 1254" Models with hard rubber liner, 4"size and up; PTFE liner, all sizes												
Pipe Spool Material 316 stainless steel Flanges Standard: ANSI B16.5 Class 150 RF cast steel; Optional: 300 lb cast steel, 316 stainless steel Liner Material PFA up to 3/8", PTFE 1/224", soft and hard rubber from 154", Halar® from 1440" Electrode Materials Standard: Alloy C; Optional: 316 stainless steel, gold/platinum plated, tantalum, platinum/rhodium Mounting Meter mount or remote wall mount (bracket supplied) Locations Indoor and outdoor Meter Enclosure Classification NEMA 4X (IP66); Optional: Submersible NEMA 6P (IP67), remote amplifier required Junction Box Enclosure Protection For remote amplifier option: powder-coated die-cast aluminum, NEMA 4 (IP66) Cable Entries 1/2" NPT cord grip (3) Optional Stainless Steel Meter Size Thickness (of one ring) Up through 10" 0.135" 1254" 0.187" NSF Listed Models with hard rubber liner, 4"size and up; PTFE liner, all sizes												
Flanges Standard: ANSI B16.5 Class 150 RF cast steel; Optional: 300 lb cast steel, 316 stainless steel Liner Material PFA up to 3/8", PTFE 1/224", soft and hard rubber from 154", Halar® from 1440" Electrode Materials Standard: Alloy C; Optional: 316 stainless steel, gold/platinum plated, tantalum, platinum/rhodium Mounting Meter mount or remote wall mount (bracket supplied) Locations Indoor and outdoor Meter Enclosure Classification NEMA 4X (IP66); Optional: Submersible NEMA 6P (IP67), remote amplifier required Junction Box Enclosure Protection For remote amplifier option: powder-coated die-cast aluminum, NEMA 4 (IP66) Cable Entries 1/2" NPT cord grip (3) Optional Stainless Steel Meter Size Thickness (of one ring) Up through 10" 0.135" 1254" 0.187" NSF Listed Models with hard rubber liner, 4"size and up; PTFE liner, all sizes	-											
Liner MaterialPFA up to 3/8", PTFE 1/224", soft and hard rubber from 154", Halar® from 1440"Electrode MaterialsStandard: Alloy C; Optional: 316 stainless steel, gold/platinum plated, tantalum, platinum/rhodiumMountingMeter mount or remote wall mount (bracket supplied)LocationsIndoor and outdoorMeter Enclosure ClassificationNEMA 4X (IP66); Optional: Submersible NEMA 6P (IP67), remote amplifier requiredJunction Box Enclosure ProtectionFor remote amplifier option: powder-coated die-cast aluminum, NEMA 4 (IP66)Cable Entries1/2" NPT cord grip (3)Optional Stainless Steel Grounding RingsMeter Size Up through 10" 1254"NSF ListedModels with hard rubber liner, 4"size and up; PTFE liner, all sizes												
Electrode Materials Standard: Alloy C; Optional: 316 stainless steel, gold/platinum plated, tantalum, platinum/rhodium Mounting Meter mount or remote wall mount (bracket supplied) Locations Indoor and outdoor Meter Enclosure Classification NEMA 4X (IP66); Optional: Submersible NEMA 6P (IP67), remote amplifier required Junction Box Enclosure Protection For remote amplifier option: powder-coated die-cast aluminum, NEMA 4 (IP66) Cable Entries 1/2" NPT cord grip (3) Optional Stainless Steel Grounding Rings Meter Size 1254" Thickness (of one ring) 0.135" 0.187" NSF Listed Models with hard rubber liner, 4"size and up; PTFE liner, all sizes												
Mounting Meter mount or remote wall mount (bracket supplied) Locations Indoor and outdoor Meter Enclosure Classification NEMA 4X (IP66); Optional: Submersible NEMA 6P (IP67), remote amplifier required Junction Box Enclosure Protection For remote amplifier option: powder-coated die-cast aluminum, NEMA 4 (IP66) Cable Entries 1/2" NPT cord grip (3) Optional Stainless Steel Grounding Rings Meter Size Thickness (of one ring) Up through 10" 0.135" NSF Listed Models with hard rubber liner, 4"size and up; PTFE liner, all sizes												
Locations Indoor and outdoor Meter Enclosure Classification NEMA 4X (IP66); Optional: Submersible NEMA 6P (IP67), remote amplifier required Junction Box Enclosure Protection For remote amplifier option: powder-coated die-cast aluminum, NEMA 4 (IP66) Cable Entries 1/2" NPT cord grip (3) Optional Stainless Steel Grounding Rings Meter Size Thickness (of one ring) Up through 10" 0.135" NSF Listed Models with hard rubber liner, 4"size and up; PTFE liner, all sizes												
Meter Enclosure Classification NEMA 4X (IP66); Optional: Submersible NEMA 6P (IP67), remote amplifier required Junction Box Enclosure Protection For remote amplifier option: powder-coated die-cast aluminum, NEMA 4 (IP66) Cable Entries 1/2" NPT cord grip (3) Optional Stainless Steel Grounding Rings Meter Size Up through 10" Thickness (of one ring) 0.135" NSF Listed Models with hard rubber liner, 4"size and up; PTFE liner, all sizes												
Junction Box Enclosure Protection For remote amplifier option: powder-coated die-cast aluminum, NEMA 4 (IP66) Cable Entries 1/2" NPT cord grip (3) Optional Stainless Steel Grounding Rings Meter Size Up through 10" 1254" Thickness (of one ring) 0.135" 1254" NSF Listed Models with hard rubber liner, 4"size and up; PTFE liner, all sizes												
Cable Entries 1/2" NPT cord grip (3) Optional Stainless Steel Grounding Rings Meter Size Up through 10" Thickness (of one ring) Up through 10" 0.135" 1254" 0.187" NSF Listed Models with hard rubber liner, 4"size and up; PTFE liner, all sizes												
Optional Stainless Steel Grounding Rings Meter Size Up through 10" 1254" Thickness (of one ring) 0.135" 0.187" NSF Listed Models with hard rubber liner, 4"size and up; PTFE liner, all sizes												
	Optional Stainless Steel	Meter Size Thickness (of one ring) Up through 10" 0.135"										
Token Features Data Logging (Blue token); Store/Restore (Red token); Firmware Upgrade (Black token)	NSF Listed	Models with hard rubber liner, 4"size and up; PTFE liner, all sizes										
	Token Features	Data Logging (Blue token); Store/Restore (Red token); Firmware Upgrade (Black token)										



DIMENSIONS IN INCHES (MILLIMETERS)

Meter with M2000 Amplifier



Meter with Junction Box for Remote M2000 Amplifier

Size		A		В		с		D		Est. Weight with M2000		Flow Range			
												LPM		GPM	
inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	lb	kg	min	max	min	max
1/4	6	6.7	170	14.0	356	3.5	89	11.4	288	10	4.5	0.05	20	0.01	5
5/16	8	6.7	170	14.0	356	3.5	89	11.4	288	10	4.5	0.09	36	0.02	10
3/8	10	6.7	170	14.0	356	3.5	89	11.4	288	10	4.5	0.14	57	0.04	15
1/2	15	6.7	170	14.0	356	3.5	89	11.4	288	10	4.5	0.32	127	0.08	34
3/4	20	6.7	170	14.2	361	3.9	99	11.5	293	13	5.5	0.46	183	0.12	48
1	25	8.9	225	14.4	366	4.3	108	11.7	298	18	8.0	0.79	318	0.21	84
1-1/4	32	8.9	225	15.2	386	4.6	117	12.5	318	20	9.0	1.5	594	0.39	157
1-1/2	40	8.9	225	15.4	390	5.0	127	12.7	322	21	9.5	2.1	834	0.55	220
2	50	8.9	225	15.9	403	6.0	152	13.2	335	26	11.5	3.6	1431	0.94	378
2-1/2	65	11.0	280	17.1	434	7.0	178	14.4	366	52	23.5	6.2	2471	1.63	653
3	80	11.0	280	17.3	440	7.5	191	14.7	372	54	24.5	8.4	3344	2.21	883
4	100	11.0	280	18.4	466	9.0	229	15.7	398	56	25.5	12	4997	3.30	1320
5	125	15.8	400	19.6	498	10.0	254	16.9	430	58	26.0	20	8008	5.29	2115
6	150	15.8	400	20.6	524	11.0	279	17.9	456	60	27.0	30	11890	7.85	3141
8	200	15.8	400	22.5	572	13.5	343	20.4	518	86	39.0	59	23765	15.69	6278
10	250	19.7	500	26.8	681	16.0	406	24.1	613	178	81.0	95	37934	25.05	10021
12	300	19.7	500	28.9	734	19.0	483	26.2	666	207	94.0	127	50894	33.61	13445
14	350	19.7	500	30.8	782	21.0	533	28.2	716	258	117	173	69272	45.75	18300
16	400	23.6	590	33.7	856	23.5	597	31.0	788	306	139	226	90477	59.75	23902
18	450	23.6	590	35.0	890	25.0	635	32.4	822	400	181	286	114511	75.63	30250
20	500	23.6	590	38.2	969	27.5	699	35.5	901	493	224	353	141371	93.37	37346
22	550	23.6	590	39.6	1005	29.5	749	36.9	937	523	237	428	171059	112.97	45189
24	600	23.6	590	42.2	1071	32.0	813	39.5	1003	552	251	509	203574	134.45	53779
28	700	23.6	590	46.2	1173	36.5	927	44.0	1118	648	294	693	277089	183.00	73199
30	750	31.5	800	48.3	1228	39.0	984	45.7	1161	702	319	795	318087	210.07	84030
32	800	31.5	800	52.2	1325	41.4	1015	49.5	1257	768	349	905	361912	239.02	95607
36	900	31.5	800	55.3	1405	46.0	1168	54.1	1374	848	385	1145	458045	302.51	121003
40	1000	31.5	800	60.0	1525	50.2	1230	57.4	1457	922	419	1414	565487	373.46	149386
42	1050	36.0	914	66.0	1675	53.0	1346	63.4	1610	1198	499	1559	623449	411.74	164698
48	1200	39.4	1000	69.9	1775	59.4	1455	67.2	1707	1208	549	2036	814301	537.79	215116
54	1350	39.4	1000	75.4	1915	66.2	1681	73.0	1927	1854	619	2576	1030599	680.64	272255

Control. Manage. Optimize.

M-SERIES is a registered trademark of Badger Meter, Inc. Other trademarks appearing in this document are the property of their respective entities. Due to continuous research, product improvements and enhancements, Badger Meter reserves the right to change product or system specifications without notice, except to the extent an outstanding contractual obligation exists. © 2015 Badger Meter, Inc. All rights reserved.

www.badgermeter.com

The Americas | Badger Meter | 4545 West Brown Deer Rd | PO Box 245036 | Milwaukee, WI 53224-9536 | 800-876-3837 | 414-355-0400 México | Badger Meter de las Americas, S.A. de C.V. | Pedro Luis Ogazón N°32 | Esq. Angelina N°24 | Colonia Guadalupe Inn | CP 01050 | México, DF | México | +52-55-5662-0882 Europe, Middle East and Africa | Badger Meter Europa GmbH | Nurtinger Str 76 | 72639 Neuffen | Germany | +49-7025-9208-0 Europe, Middle East Branch Office | Badger Meter Europa | PO Box 341442 | Dubai Silicon Oasis, Head Quarter Building, Wing C, Office #C209 | Dubai / UAE | +971-4-371 2503 Czech Republic | Badger Meter Czech Republic s.r.o. | Maříkova 2082/26 | 621 00 Brno, Czech Republic | +420-5-41420411

Slovakia | Badger Meter Slovakia s.r.o. | Racianska 109/B | 831 02 Bratislava, Slovakia | +421-2-44 63 83 01 Asia Pacific | Badger Meter | 80 Marine Parade Rd | 21-06 Parkway Parade | Singapore 449269 | +65-63464836 China | Badger Meter | 7-1202 | 99 Hangzhong Road | Minhang District | Shanghai | China 201101 | +86-21-5763 5412