Proteus Industries Inc.

PRODUCT DATA SHEET

8000EMR Series

EMI- and RFI-Resistant Liquid Flow Meters

Exceptional protection against high levels of EMI, RFI, and shock/vibration

- Exceptional noise immunity for harsh environments, such as RF power supplies or industrial equipment.
- Flow ranges from 1.9 to 227 LPM (0.5 to 60 GPM)
- Liquid temperatures from -40 to 90 °C can be monitored at up to 30 °C ambient temperature
- Equipped with dry well for optional bayonet-type thermocouple (user-supplied)
- Accuracy of 3% of flow range
- Compatible with many advanced heat-transfer fluids
- Enhanced accuracy and stability from digital signal processing
- Standard 0–10 VDC or 0–5 VDC, and 4–20 mA outputs
- On-board relay for redundant interlock, with user-specified, factory-programed trip point.
- Optional custom calibration available to account for viscosity effects of fluid and temperature
- NEMA 4X / IP66 design with stainless steel flow body, faceplate, and SAE fittings ensures reliable performance in wet environments

8000EMR Series flow meters were designed for use in harsh environments with high levels of electromagnetic or radio-frequency interference. The superior immunity has been laboratory-tested up to an RF power of 10 V/m to 10 GHz. The effective design indicates that the flow meters can withstand up to 1181 GHz, satisfying all aspects of the IEC 61000-4-3 industry standard.

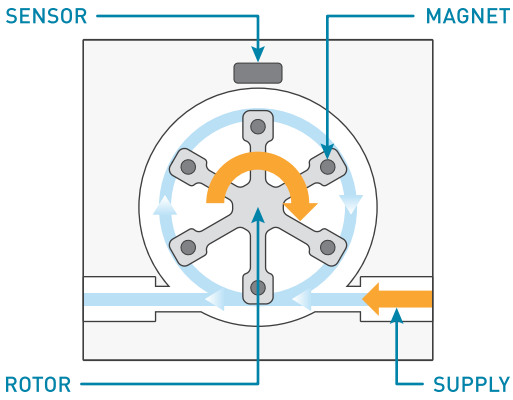
AT A GLANCE

Noise Immunity	Better than IEC 61000-4-3
Flow Ranges	1.9 to 227 LPM 0.5 to 60 GPM
Fluid Temperatures	-40 to 90 °C -40 to 194 °F
Operating Pressure Limit	1724 kPa 250 psi
Flow Output Formats	0–10 VDC OR 0–5 VDC 4–20 mA
Temperature Measurement	Dry well for user-supplied bayonet thermocouple

How It Works

As liquid flows through the flow sensor cavity, it causes the rotor to spin. Magnets embedded in the rotor switch a Hall-Effect sensors mounted in the sensor body. The rotational frequency of the rotor is measured by a microcomputer, and scaling factors entered into flash memory allow the volumetric flow rate to be calculated. Flow rate information is output as 0–10 VDC and 4–20 mA. (Factory-set 0–5 VDC output is also available.)

A built-in relay is programmed to change state when the measured flow rate falls below preset alarm value. The alarm trip point value is factory-set to ensure accuracy and prevent unwanted tampering. The default value is 25% of the upper flow limit; a customized trip point setting may be requested at the time of order.



Wide Temperature Range and Accurate Flow Calibration

8000EMR Series flow meters are constructed of stainless steel and are capable of measuring fluids at temperatures from -40 to 90 °C (-40 to 194 °F). Proteus' expert calibration capabilities allow us to deliver instruments with fluid- and temperature-specific calibrations to ensure accuracy in your most critical processes. Contact our flow experts for assistance in identifying the optimum solution for your most demanding applications!

Performance Characteristics

Flow Output[1]	Voltage: 0–10 VDC (default) or 0–5 VDC • Current: 4–20 mA
Fluid Temperatures[2,3]	-40 to 90 °C / -40 to 194 °F
Operating Pressure Limit	1378 kPa / 200 psi
Burst Pressure (5:1)	6894 kPa / 1000 psi
Pressure Drop	Less than 69 kPa / 10 psi at maximum flow rate
Accuracy	± 3% of full scale
Linearity	± 1.5% of full scale from 0.1 to 1.0 × full scale
Repeatability	± 1% of full scale from 0.1 to 1.0 × full scale
Hysteresis	5% of full scale
Input Power Voltage	+24 VDC ± 10%
Input Power Consumption	< 1 W
Relay Contacts Maximum Current	1 A at 48 VDC
Voltage Output Maximum Sourcing Current	15 mA at 2 VDC output
Maximum Loop Resistance	900 Ω at 24 VDC
Wetted Materials	Flow body: Cast 316 stainless steel; Rotor: PPS Rotor shaft: 316 stainless steel; O-rings: EPDM
Enclosure Protection	NEMA 4X • IP66
Temperature Measurement Capability	Dry well (for use with user-supplied bayonet-type thermocouple)
Cable Connection	M12 male 8-pin connector (for use with user-supplied cable)

[1] Voltage output is factory-set and is not user-selectable. In overflow conditions, output signal will hold at maximum value (no overflow interlock).

[2] In low-temperature applications, dewing or frosting may occur in uncontrolled ambient humidity environments with fluid temperatures below dew point. Please contact Proteus for more information.

[3] In high-temperature applications, 90 °C (194 °F) is the maximum fluid temperature that can be sustained with the flow meter electronics cooled by ambient air temperature up to 30 °C (86 °F). Please contact Proteus for more information.

Flow Ranges, Connections, and Model Numbers

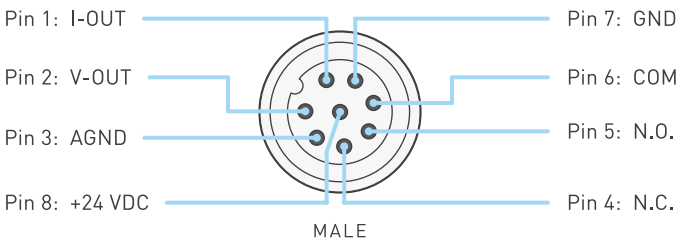
FLOW RANGE*		FLUID CONNECTIONS	STANDARD MODEL NUMBER
LPM	GPM		
1.9 – 9.5	0.5 – 2.5	9/16-18 SAE	08006EMRSA2
3.0 – 38	0.8 – 10	3/4-16 SAE	08008EMRSA10
19 – 227	5.0 – 60	1 5/16-12 SAE	08016EMRSA60

*Listed flow ranges are for water at 25 °C / 77 °F.

When selecting a flow meter for your application, your nominal flow rate should be around 50–60% of the upper flow limit of the meter. Customization is available to achieve flow ranges beyond those shown. For assistance with selecting the 8000EMR Series product that is best suited to your process, please contact Proteus Applications Support.

Wiring

» M12 Cable Connection



» Grounding

Grounding is critical to any application that requires electrical noise immunity. 8000EMR Series meters utilize two ground references, one for power and one for signal. Neither ground is connected to the stainless-steel body, nor to each other, ensuring that noise propagation does not travel through the grounding system.

Compliance and Certifications

» Applicable Directives

2004/108/EC (EMC) (as amended)
2011/65/EU (RoHS) (as amended)
2012/19/EU (WEEE)
1907/2006/EC (REACH)

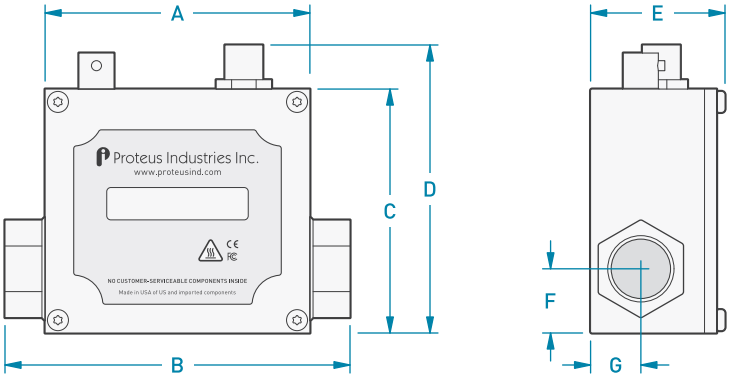
» Electromagnetic Compatibility

EN 61326-1: 2013 (Electrical Equipment)
EN 61000-4-3 Radiated RF Immunity testing to 10 GHz @ 10 V/m
FCC Part 15 Subpart B Class A
ICES-003 Class A
VCCI V-3 (2015-04) Class A
AS/NZS CISPR 11:2011

Dimensions and Drawings

Dimensions for standard 8000EMR Series products are shown in the table below.

Solid models are accessible on the Proteus Industries website at www.proteusind.com/8000EMR.



MODEL NUMBER	A	B	C	D	E	F	G
08006EMRSA2	83.8 mm 3.30 in	109.2 mm 4.30 in	77.2 mm 3.04 in	92.6 mm 3.64 in	41.8 mm 1.64 in	20.3 mm 0.80 in	15.9 mm 0.63 in
08008EMRSA10	83.8 mm 3.30 in	109.2 mm 4.30 in	77.2 mm 3.04 in	92.6 mm 3.64 in	41.8 mm 1.64 in	20.3 mm 0.80 in	15.9 mm 0.63 in
08016EMRSA60	83.8 mm 3.30 in	126.8 mm 5.00 in	77.2 mm 3.04 in	92.6 mm 3.64 in	60.2 mm 2.37 in	24.9 mm 0.98 in	22.0 mm 0.87 in

Proteus: Customization Experts

Bring us your specifications and let us create a flow management solution to meet your exact requirements. Materials can be modified or improved for compatibility with your fluid; flow ranges can be matched to large connections; adaptations can be implemented for high and low temperatures; and multiple devices can be integrated in cost-effective manifold assemblies for liquid distribution, measurement, and control.

When your new product goes to production, fittings will be properly positioned, entire units and sub-assemblies will be certified leak-tight, all electrical connections will be tested end-to-end, and the system's calibration will be certified to the specified accuracy. Our lean manufacturing processes and ISO 9001-certified procedures will ensure that your instruments will arrive at your location ready for use, the first time and every time.

Let us put our knowledge base to work on solving your most demanding flow measurement challenges! Contact Proteus Applications Support to discuss your requirements for a customized solution.

Need More Information?

» Visit our website — An 8000EMR Series setup guide containing installation and operating instructions is accessible at www.proteusind.com/8000EMR.

» Contact us — Our flow management experts will be pleased to answer your questions! Email us at tech@proteusind.com or call us at (650) 964-4163.

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