

# User's Guide



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## **FMG80 SERIES**

### **Low-Flow Magmeter**



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It is the policy of OMEGA Engineering, Inc. to comply with all worldwide safety and EMC/EMI regulations that apply. OMEGA is constantly pursuing certification of its products to the European New Approach Directives. OMEGA will add the CE mark to every appropriate device upon certification.

The information contained in this document is believed to be correct, but OMEGA accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.

**WARNING:** These products are not designed for use in, and should not be used for, human applications.

## GENERAL INFORMATION, FEATURES and SPECIFICATIONS

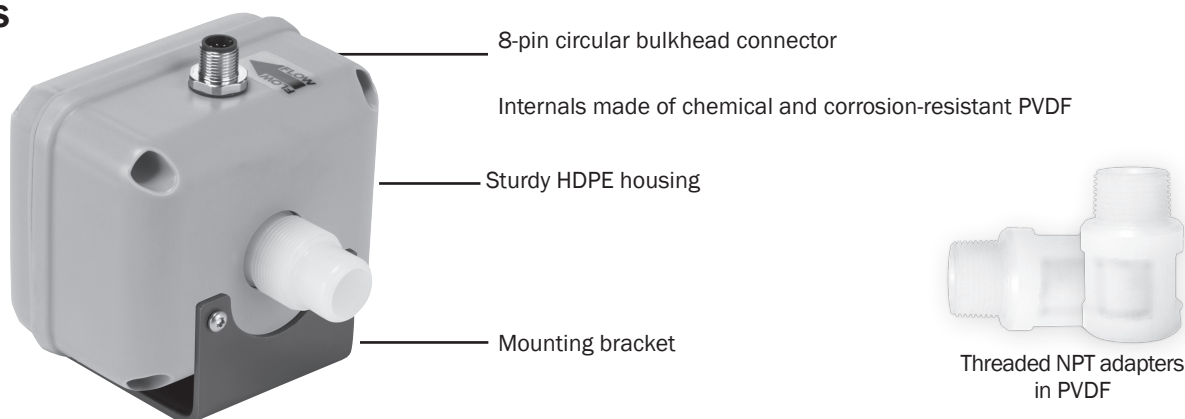
The **FMG80 magmeter** is designed for low-flow chemical injection or difficult-to-meter applications with pulsating metering pumps in 3/4" to 1/4" pipe/tube. The housing is made of sturdy splashproof HDPE plastic.

With no moving parts, the FMG80 can handle fluids containing particulate matter without clogging or jamming, keeping maintenance at a minimum. With no metallic parts (100% PVDF body and PVDF carbon fiber-filled electrodes), the meter is corrosion-resistant and compatible with a wide range of chemicals. Accuracy is maintained with conductive fluids (>20 microSiemens) of varying viscosities and densities.

The FMG80 meter is compact enough to fit most pump/injection systems. With zero straight pipe required after an elbow, it can be easily mounted in tight spaces. The mounting bracket adds stability.

The FMG80 meter has optocoupled current sinking or current sourcing pulse output that can be connected to many Omega rate/total displays or batch processors, as well as a 4-20 mA loop for powering analog devices. Outputs and power are provided through a cable with 8-pin female circular connector.

### FEATURES



### SPECIFICATIONS\*

<b>Pipe Size</b>		3/4", 1/2", 3/8", 1/4"
<b>Fittings</b>		NPT threaded adapters
<b>Materials</b>	<b>Body</b>	PVDF
	<b>Electrodes</b>	PVDF carbon fiber-filled
	<b>Ground</b>	PVDF carbon fiber-filled
	<b>Housing</b>	HDPE with glass fiber
	<b>Fittings (FlareTek)</b>	PVDF
	<b>Adapters (for NPT)</b>	PVDF
	<b>O-Rings (for NPT)</b>	EPDM or optional FKM
<b>Temperature</b>	<b>Ambient</b>	0° to 130° F (-18° to 54° C)
	<b>Fluid</b>	32° to 200° F (0° to 93° C)
<b>Pressure</b>		150 psi
<b>Flow Range</b>	<b>FMG83, FMG84</b>	20 GPM Max. (0.2 GPM cut off)
	<b>FMG81, FMG82</b>	3 GPM Max. (0.03 GPM cut off)
<b>Accuracy</b>	<b>FMG83, FMG84</b>	+/- 1%, +/- 0.005 GPM of reading across rated range
	<b>FMG81, FMG82</b>	+/- 1%, +/- 0.002 GPM of reading across rated range
<b>Output Signal</b>		Optocoupled current sinking or current sourcing pulse output: 30 Vdc, 5 mA max 4-20 mA current loop: 7 Vdc plus load voltage drop min; 50 Vdc max
	<b>FMG83, FMG84</b>	FMG83, FMG84: 500 pulses/liter (1892 pulses/gallon),
	<b>FMG81, FMG82</b>	FMG81, FMG82: 1,000 pulses/liter (3785 pulses/gallon).
<b>Power</b>		10-15 Vdc, 150 mA (linear power supply recommended)
<b>Conductivity</b>		>20 microSiemens
<b>Empty Pipe Detection</b>		Hardware/software, conductivity-based
<b>Environmental</b>		NEMA 4X standard; IP 66 Splashproof standard

\*Specifications subject to change • Please consult our website for current data ([www.omega.com](http://www.omega.com)).

INSTALLATION and CONNECTIONS

INSTALLATION

**Positioning.** The FMG80 can be mounted vertically or horizontally. It is important to choose a position that will ensure full pipe. (Under certain conditions of empty or partially-full pipe the meter may give a pulse out when there is no flow.) With a zero straight pipe requirement after an elbow, the FMG80 meter can be installed in tight spaces.

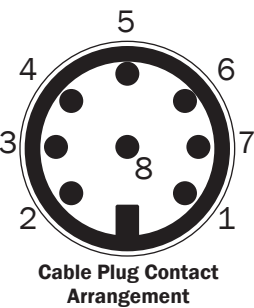
**Mounting.** The FMG80 may be supported by its piping connections IF the piping is rigid. The meter and pipe must be perfectly aligned with no flexion at the fittings to prevent damage to the meter and leakage. It is highly recommended to use the mounting bracket provided. The mounting bracket uses two #8 screws on a 1.5" center.

**Piping.** Metal pipe, metal tube, or plastic tubing can be used with the meter. NPT adapters should be hand-tightened onto the fittings to avoid damage to internal O-ring seals. Thoroughly clean the pipe threads and nose and apply Teflon tape to adapter threads. Hold fittings/adapters with a wrench while tightening the pipe to prevent damage to the meter.

**Power Supply.** A 12 Vdc linear, regulated power supply with an output current of at least 0.25A is recommended. If a switching power supply must be used, consult Omega for approved manufacturer's model numbers.

CONNECTIONS

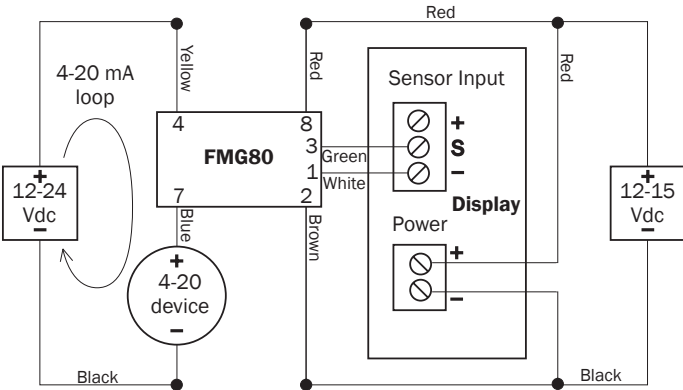
Power and signal connections are provided through the 8-pin male bulkhead connector on the meter housing. See the Pin Assignment and Connections diagrams below. If using an Omega cable, the wire colors in the table below will be accurate; if using cable from another source, use the pin assignments as your wiring guide.



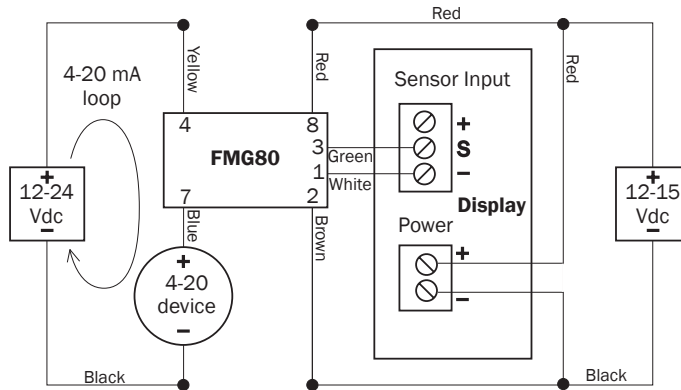
Pin#	Function	Color
1	Pulse (-)	White
2	Ground	Brown
3	Pulse (+)	Green
4	4-20 (+)	Yellow
5	Not Used	Grey
6	Not Used	Pink
7	4-20 (-)	Blue
8	Power (+)	Red

In addition, it is necessary for proper operation to ground the unit to a good quality earth ground. Assure negative power supply is grounded to earth and to the entire electrical/mechanical system. If metal piping is used, jumper inlet and outlet pipes together and connect to ground for best results in metering accuracy.

Dual Power Supply with Loop Isolation



4-20 mA Device and FMG80 with Single Power Supply



OPERATION and TROUBLESHOOTING

OPERATION

The meter will output one pulse when powered up. The newly-installed meter takes from a few seconds to a minute for the signal to stabilize at startup, especially if it has been dry. In normal operation, keep the meter filled with fluid and powered on to prevent this delay. When the meter is mounted properly, an empty pipe detection feature will normally detect absence of liquid in the pipe and register zero flow.

The 4-20 mA signal outputs 4 mA at zero flow and 20 mA at 20 gallons/minute flow or 3 gallons per minute, depending on model. The pulse signal is a 50% duty cycle pulse set at FMG83, FMG84: 500 pulses/liter (1892 pulses/gallon), FMG81, FMG82: 1,000 pulses/liter (3785 pulses/gallon).

TROUBLESHOOTING

Problem	Probable Causes	Try...
No output	Reversed flow direction	Reverse flow connections
	Empty pipe	Check piping conditions
	Flow rate below minimum	Select a different flowmeter
	Loose or incorrect wiring	Check electrical connections
	Fluid conductivity too low	Select a different flowmeter
	Electrical noise	Relocate meter or reduce noise
Flow rate incorrect	Fluid conductivity too low	Select another flowmeter
	Empty pipe	Check piping conditions
	Electrical noise	Relocate meter or reduce noise

**Notes:**



## WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

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## RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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