

# EM 101

## LOW-FLOW MAGNETIC FLOW METER INSTRUCTIONS

EM 101-025

EM 101-038

EM 101-050



### GENERAL INFORMATION

The EM101 is a small plastic-bodied electromagnetic flow meter, in nominal maximum flow rates of 1, 3, and 8 gpm. Capable of measuring the pulsating flows from air and solenoid-driven metering pumps, the meter is primarily designed for electrically-conductive chemicals. In addition to measuring and displaying flow rate and total flow, this unit has a variety of outputs. For continuous transmission of a flow signal, there is a 4-20 mA, and 0-5 Volt signal, and a frequency signal proportional to flow. In addition, there are relay alarm outputs for low and high flow with user-set flow levels.



### SPECIFICATIONS

MATERIALS	
Wetted Materials -	<ul style="list-style-type: none"><li>• Body: Kynar™ PVDF</li><li>• Electrodes: Platinum coated titanium</li><li>• Internal Seals: Viton™</li></ul>
Housings -	<ul style="list-style-type: none"><li>• Primary Element: Fusion coated aluminum</li><li>• Control / Display: Polycarbonate</li></ul>
POWER	
	<ul style="list-style-type: none"><li>• 115 VAC, 60 Hz, optional 220 VAC/50Hz</li></ul>
ACCURACY	
	<ul style="list-style-type: none"><li>• +/-1% of reading, above 10% of full scale</li><li>• +/-3% of reading, below 10% of full scale</li></ul>
MAXIMUM FLUID TEMPERATURE	
	<ul style="list-style-type: none"><li>• 185° F</li></ul>
MAXIMUM PRESSURE	
	<ul style="list-style-type: none"><li>• 150 PSI (@ 75° F)</li></ul>
MINIMUM CONDUCTIVITY	
	<ul style="list-style-type: none"><li>• 20 micro Siemens</li></ul>
OUTPUTS	
	<ul style="list-style-type: none"><li>• 4-20 mA, 0-5 Volts (both isolated)</li><li>• Frequency to 9999 pulses per gallon, Isolated 10 mH, 30 VDC</li><li>• High alarm, low alarm relay, Isolated (100 mA, 110 VAC/VDC)</li></ul>


### FLOW RANGE

SIZE	NOMINAL FULL SCALE			MIN. FOR 1% ACCURACY			LOW FLOW CUTOFF		
	L/MIN.	GAL./MIN.	GAL./HR.	L/MIN.	GAL./MIN.	GAL./HR.	L/MIN.	GAL./MIN.	GAL./HR.
-025	3.8	1	60	.38	0.1	6	.04	.009	.54
-038	11	3	180	1.1	.3	18	0.1	.025	1.5
-050	30	8	480	3.0	.8	48	.25	.065	3.9

## INSTALLATION

### MOUNTING

Mount the control housing to a secure surface with screws or bolts. To gain access to the mounting holes, remove the front cover. The mounting holes are directly under the front cover screws. The primary element is supplied with a foot bracket, which can be attached to a secure surface. Alternatively, the unit can be supported by the piping and the foot bracket can be removed.



**CAUTION:** Although this meter has an empty pipe detection function, under certain conditions of empty or partially-full pipe the meter may read a flow when there is none. If this is a hazardous condition, mount the meter in such a way as to ensure the meter will always be full of liquid.

### CONNECTIONS

The unit ships with the coil activation and signal leads already connected to the control housing. To connect output signal or alarm relay leads, remove the front cover. See the "Connections" diagram. Power connection uses a standard power cord. If conduit connection is required, remove the cord and strain relief and use the strain relief hole for a conduit connector.

### GROUNDING

*Important:* For proper operation, one or both of the ground lugs must be well connected to a good quality earth ground. (The ground lugs also retain the foot bracket). See the Grounding diagram on page 4. All magmeters come with a 12 feet ground wire attached.

## OPERATION

### DISPLAY

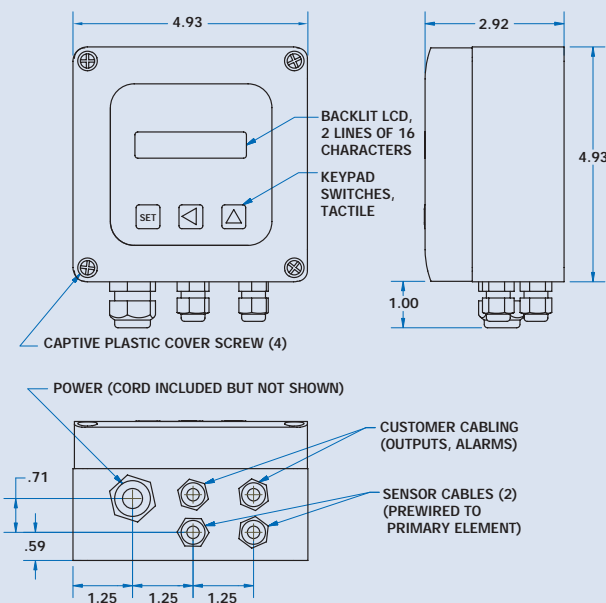
The flow rate is displayed in the time and volume units which have been selected (liters/min, for example). The cumulative total flow is displayed in the chosen units, up to eight digits. It then resets to zero and begins again.

### OUTPUTS

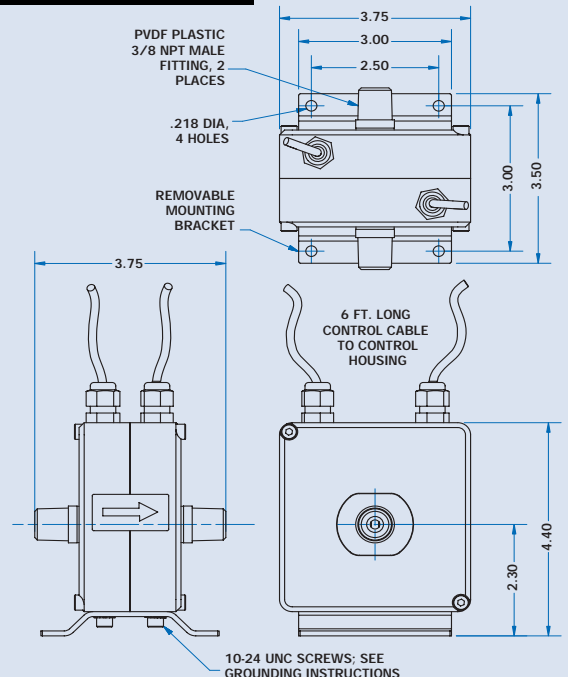
The analog output which has been chosen varies continuously with the flow. If the output is too "jumpy" (changes too frequently), it can be damped either by increasing the averaging time (see the "Fast Analog Output" setting) or by selecting "Disabled" under Fast Analog Output and increasing the amount of damping using the Low Pass Filter setting. The pulse output will produce a 50% duty cycle pulse at the volume intervals for which it is set - one pulse per liter, for example. Note that since each pulse consists of equal times on and off, if the interval between pulses is large the pulse may remain in the "on" condition for several seconds. The relay alarm output will only energize if the flow goes above (high) or below (low) the flow alarm setting. The alarm relay will remain energized until the flow exceeds the setpoint by .25% (hysteresis).

## MOUNTING PATTERN

### CONTROL HOUSING



### PRIMARY ELEMENT



## DISPLAYS

## SETTING

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EM101

[ This is the power-up display.

WAIT 2 SECONDS

Rate  
Tot

[ Rate/total display (shows two seconds after power-up), Press **SET** to begin programming

**SET**

Volume Units G

[ Use the **▲** key to choose the volume unit: milliliters (mL) liters (L) or gallons (G)

**SET**

Time Units M

[ Use the **▲** key to choose the time base for rate: per second (S) per minute (M) per hour (H) per day (D)

**SET**

Tot Dec Point  
Format 0.0

[ Use the **▲** key to choose number of decimal places: 0, 0.0, 0.00

**SET**

An. Output Type

[ Leave "Analog Output Type" unchanged unless you intend to use the 0-5 V output. Standard setting is for 4-20 mA. Consult factory for 0-5 V output.

**SET**

Fast An. Output

[ Leave "Fast Analog Output" unchanged unless you have a demanding closed-loop application. Standard setting is "disabled". If you enable this output, use the **▲** key to select a response time, 50 to 1000 millisecond. This will control how rapidly the analog output tracks flow.

**SET**

Rate For Analog  
Output:

[ Use the **◀** and **▲** key to set the percentage of full scale at which peak analog output (20 mA or 5 V) occurs. On a max 10 gpm meter, 60% would be 6 gpm, for instance.

**SET**

Rate For High  
Alarm:

[ Use the **◀** and **▲** key to set the percent of full scale at which the high flow alarm will energize. On a 10 gpm meter, 90% would equal 9 gpm, for instance.

**SET**

Rate For Low  
Alarm:

[ Use the **◀** and **▲** key to set the percent of full scale at which the low flow alarm will energize. On a 10 gpm meter, 10% would equal 1 gpm, for instance.

**SET**

Pulse Output

[ Use the **◀** and **▲** key to set the number of pulses (0000 to 9999) per unit. If you have selected liters, it will be pulses per liter, etc.

**SET**

Low Pass Digital  
Filter:

[ This setting controls the smooth/responsive tradeoff of the display. Increasing the time makes the display more smooth, but slower to respond to change. Use the **▲** to set. When using the meter with pulsing flows, it may be necessary to increase the time. Choice: 1, 2, 5, 10, 20 seconds.

**SET**

Totalizer Reset

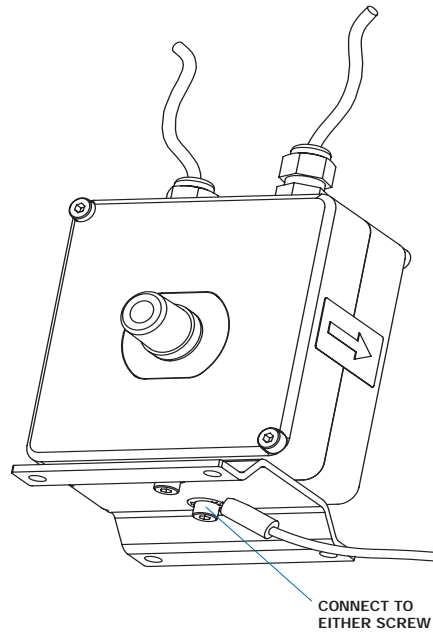
[ Use the **▲** key if you wish to enable the totalizer reset. It will switch between "Enabled" and "Disabled". If the reset is enabled, every time the **▲** key is pressed (during normal operation) the totalizer will reset to zero.

**SET**

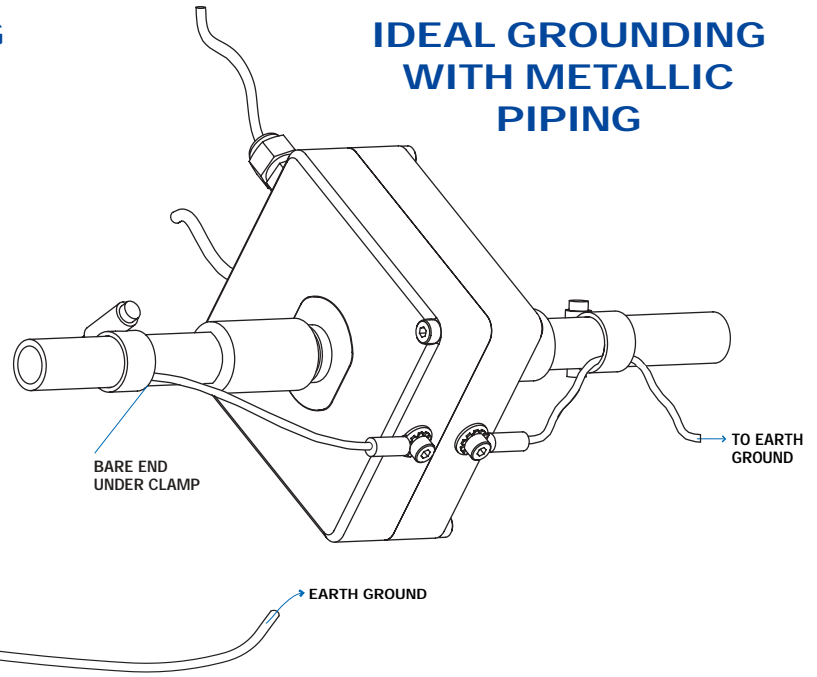
SeaMetrics Inc.  
EM101

[ Settings finished. Wait five seconds to return to normal operations

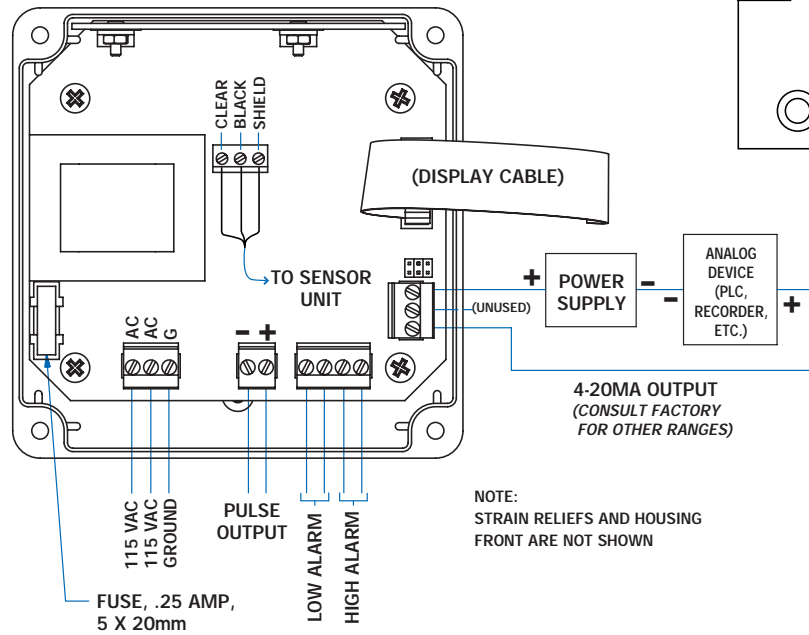
## STANDARD GROUNDING



## IDEAL GROUNDING WITH METALLIC PIPING



## CONNECTIONS



## DISPLAY BOARD

