Product Data Sheet
PDS-626
2021-03-09

TigermagEP

Obstructionless Electromagnetic Flowmeter

Description

The TigermagEP is a microprocessor based electromagnetic flowmeter designed to measure the flow of conductive liquids in full pipes. The sensor and transmitter are integral and enclosed in a NEMA 7 explosion-proof housing. The sensor housing is made of steel.

A wide variety of liner and electrodes are available to tailor the meter to operate in many processes.

The Tigermag's nonvolatile EEPROM memory and circuitry eliminates the need for a microprocessor backup battery. It is not necessary to reprogram if the electronic module is replaced or exchanged with electronics from another size flowmeter.

Certified Accuracy

Each FM626 is 'wet-flow' calibrated in Sparling's Primary Flow Lab traceable to the National Institute of Standards and Technology (NIST).

Principle of Operation

Sparling magnetic flowmeters are based on Faraday's Law which states that the voltage induced in a conductor moving through a magnetic field is proportional to the velocity of that conductor. Accuracy is minimally affected by changes in temperature, pressure, viscosity, or conductivity.

Applications

The Model FM626's high signal frequency makes it ideally suited to applications with high levels of inherent noise including: Process Chemicals, Heavy Slurries, Polymers, Acids, Alkalies, Sewage, Cooling Water. Nearly any conductive liquid can be measured.

Features

- Sampling frequency up to 100Hz for accurate measurement of fluids with high levels of inherent noise.
- Forward, reverse and net totalization
- Programmable high and low flow alarms
- Nonvolatile EEPROM Memory
- Universal electronics module compatability
- 2-Line, 16 character backlit display
- Programming made easy with Mag-Command™
- Low Flow Cutoff
- NEMA 4X/NEMA 7 explosion proof enclosure
- Accidental Submergence (NEMA 6/IP67), Permanent Submergence (NEMA 6P/IP68) and Direct Burial Sensors available
- Approvals Include: FM, CSA and NSF 61
- Rotatable Modular Display
- Empty pipe detection
- PZR - Positive Zero Return
- Standard 0.5% Accuracy
- Sizes available from 0.1" - 8"

Installation

The meter must be mounted at a point in the line which is always full of process liquid under flowing conditions.

A minimum of three diameters of straight pipe length are required from the center of the meter to normal obstructions to obtain specified accuracies.

The meter can be installed between the following flanges: ANSI 150 or 300#, AWWA, DIN, PN 10 or 16, JIS or British Standard.

Easy To Read Backlit Rotatable Display

The 16 character, 2-line backlit Totalizer display is rotatable 360° in 90° increments ensuring easy reading in any orientation.

Nonvolatile EEPROM Memory

A backup battery is not required and there is no need to reprogram if the electronics module is replaced or exchanged. Meter identification (tube ID, serial number, K, offeset, etc.) is stored on an EEPROM chip independent of transmitter electronics. The EEPROM chip has lifetime data retention.

Empty pipe detection

The Sparling TigermagEP is designed to detect absence or inadequate volume of process fluid in the pipe and will hold the output signal to 4mA or zero. This feature does not require any hard wiring as it is a software selection. One of the most important values of this feature is that it prevents false totalization possible with other meters under partially filled pipe conditions

Ease of Communications

The TigermagEP is programmable with Mag-Command, Modbus or Hart Protocol. 4-20mA, RS-232 or RS-485 outputs give you flexibility when interfacing with your distrubuted control system.

Hi-Z Circuitry

The Sparling TigermagEP provides superior performance in liquids which tend to deposit nonconductive coatings. Hi-Z circuitry produces a high input impedance to the transmitter's preamplifier ($1x10^{12}$ Ohms). The impedance of the coating is negligible as compared to the impedance of the receiving instrument. The voltage drop across the electrode coating is also negligible eliminating the need for electrode cleaners.

Diagnostics

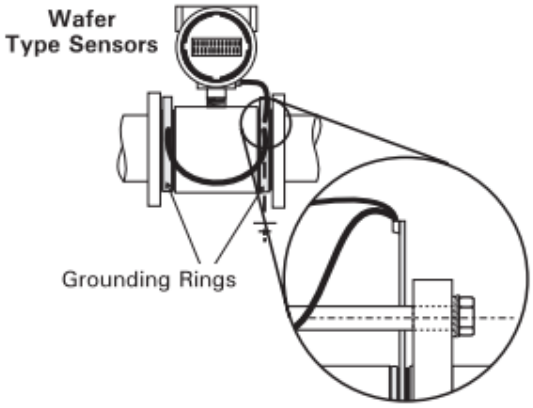
The TigermagEP's unique diagnostic functions eliminate the need for a technician to carry test equipment or open the housing. Current ramp, complete coil check and true front-end input simulator may be activated in Mag-Command without opening the enclosure. This is especially important in hazardous areas and aggressive plant environments.

Two flow alarms

Fault alarms can be configured with alarm set points between 0-99% of flow for each alarm. Open collector output turns on above programmed set point.

Grounding

The use of grounding rings is recommended to ensure accuracy. Grounding rings are required if adjacent piping is lined or nonconductive. Pump noise or excessive RF should be minimized to achieve highest accuracy.



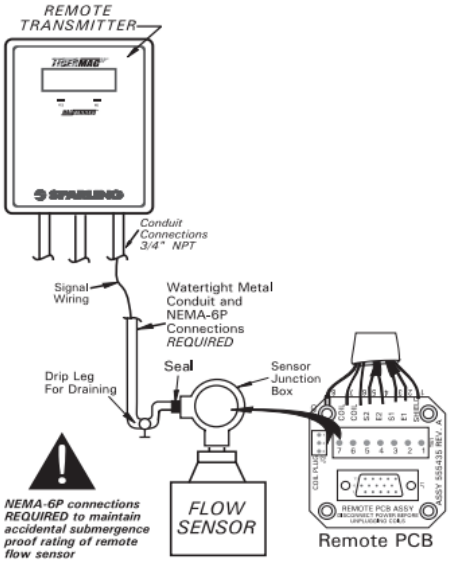
PZR - Positive Zero Return

An electronic circuit is activated by an external contact closure when lines go empty or when a pump or valve is shut down, indicating to the meter that it should drive the output signal to 4mA or 0.

Remote Mounted Transmitter

Remote mounting of the transmitter is required when pipe vibration is excessive, when flooding is possible or where high termperature conditions exist (over 100°F).

The TigermagEP remote transmitter is housed in a NEMA-4X enclosure and features a larger sized (8mm) 16 digit 2-line backlit display. All power, coil, and elctrode connections are made within the transmitter enclosure and junction box. The meter is programmed using Mag-Command. Hall-effect switches which are energized from outside the enclosure. The enclosure can be wall mounted. An optional bracket for pipe mounting is available.

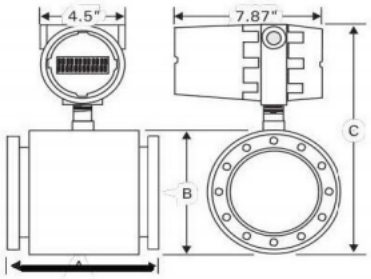


Flow Rates & Dimensions

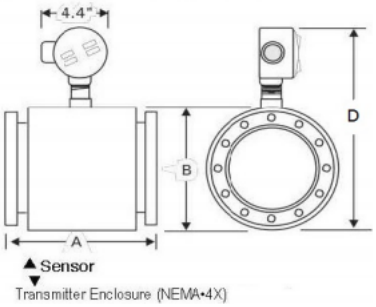
Meter Size (in)	Mating Flange (in)	Dimensions (in)				Flow Rates (GPM)					
						Ceramic			Poly/FEP/HR		
		A	B	C	D	1 fps	3 fps	33 fps	1 fps	3 fps	33 fps
0.100	0.500	4.00	2.31	8.97	5.26	0.038	0.115	1.26	*	*	*
0.250	0.500	4.00	2.31	8.97	5.26	0.213	0.639	7.03	0.153	0.459	5.05
0.375	0.500	4.00	2.31	8.97	5.26	*	*	*	0.342	1.03	11.3
0.500	0.500	4.00	2.31	8.97	5.26	0.487	1.46	16.1	0.568	1.71	18.8
1.00	1.00	4.00	2.92	9.60	5.87	1.61	4.84	53.2	2.02	6.07	66.7
1.50	1.50	4.00	3.62	10.2	6.57	4.39	13.2	145	5.29	15.9	174
2.00	2.00	4.00	4.12	10.9	7.07	6.99	21.0	231	9.18	27.5	303
2.50	2.50	6.00	4.62	11.4	10.0	*	*	*	13.1	39.2	431
3.00	3.00	6.00	5.70	12.0	8.65	20.6	61.7	679	20.1	60.4	664
4.00	4.00	6.00	6.60	13.2	9.55	35.3	106	1170	35.8	107	1180
6.00	6.00	8.00	8.76	15.5	14.3	*	*	*	88.1	264	2910
8.00	8.00	8.00	10.9	17.5	16.5	*	*	*	157	470	5170

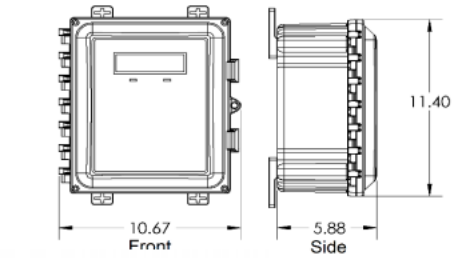
Allow 0.125" to 0.25" for lining thickness/Dimensions C & D ±0.125"

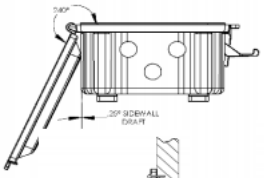
Integral Mount Transmitter

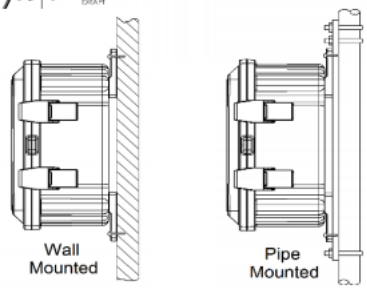


Remote Mount Transmitter









Note: Remote enclosure shown for meters shipped after July '16
Please call factory for dimensions shipped July '16 and before

How to Order a TigermagEP

Table 1: Base Model Number

Table 2: Size
AA - 0.1" **OA** - 0.25" **OB** - 0.375" **OD** - 0.5" **OF** - 1" **OG** - 1.5"
02 - 2" **OH** - 2.5" **03** - 3" **04** - 4" **06** - 6" **08** - 8"

Table 3: Liner Material
1 - Hard Rubber (1-8")
5 - Polyurethane (2-8")
6 - Ceramic[1] (0.1-4")
8 - FEP (0.25-8")
A - Polyurethane for potable water (2-8")

Table 4: Electrode Material
1 - 316 SS **2** - Hastelloy C **3** - 316 SS BN
4 - Titanium **5** - Tantalum **6** - Fused Pt: Ceramic Liners
7 - Platinum: Other Liners **8** - Zirconium **9** - Monel
0 - Tungsten Carbide **B** - HastC BN **D** - Titanium BN
E - Tantalum BN **G** - Platinum BN **H** - Zirconium BN
I - Monel BN

Table 5: Mounting Bolts
0 - Carbon Steel, Zn Plated
1 - None Required
2 - Stainless Steel (304)

Table 6: Transmitter
F - Integral NEMA 4X encl.
G - Integral NEMA 4X encl. Battery Operated
0 - Integral NEMA 7 encl.
1 - Remote NEMA 7 encl. encl., 15ft Cable
2 - Remote NEMA 7 encl. encl., 15ft Cable, Perm. Sub
3 - Remote NEMA 7 encl. encl., 15ft Cable, Acc. Sub
4 - Remote NEMA 7 encl. encl., 15ft Cable, Direct Burial
5 - Remote NEMA 4X encl. encl., 15ft Cable
6 - Remote NEMA 4X encl. encl., 15ft Cable, Acc. Sub
7 - Remote NEMA 4X encl. encl., 15ft Cable, Direct Burial
8 - Remote NEMA 4X encl. encl., 15ft Cable, Perm. Sub

Table 7: Power[3]
0 - 77-265 VAC **1** - 12-60 VDC

Table 8: Options
HART, Modbus, RS485, RS232
High Temperature Coils (Req Over 266°F)
Hot Tap Removable Electrodes (4"+)
Removable Electrodes (4"+)
Add Cable (15ft - 300ft)
Relay for Fault and Flow Alarms

Model	Size	Liner	Electrode	Mounting	Transmitter	Power
	AA	6	1	0	F	0

1. Ceramic Liner not available in the following sizes: 0.375" or 2.5"

3. FM approval is up to 120V

Standard Specifications

Accuracy:	0.1" - 0.25": ±1% of flow (1fps - 33fps) 0.5" - 8": ±0.5% of flow (1fps - 33fps)
Temp Effect	±0.025% FS/°C
Full Scale Ranges:	From 0fps - 3fps to 0fps - 33fps
Repeatability:	±0.1% of full scale
Electrodes:	316 SS Standard (others available)
Liner:	Hard Rubber, Polyurethane, Ceramic, FEP/PTFE, Polyurethane- liner for potable water certified to NSF61
Outputs:	1) Isolated analog 4mA - 20mA DC into 800 Ohms 2) Scaled Pulse 24VDC with selectable 12.5/25/50/100 ms on time, max.freq. 60Hz 3) 0Hz - 1000Hz Freq., for 0%-100% of flow rate, 15VDC 4) Two flow alarms 5) Fault, with open collector 6) RS232 communication 7) Flow direction with open collector 8) Positive Zero Return (PZR) for external relay contacts. Outputs 2 and 3 can be open collector if required. 9) HART Protocol Available 10) Modbus Protocol Available
Mag-Command™:	Selection and change of meter parameters by magnetic probe without opening the enclosure.
Display:	2-Line, 16 Digit alphanumeric backlit display (rate and total). Modular, rotatable 360° in 90° increments
Min Velocity[1]:	0.3fps
Power Requirements:	77-265VAC/12-60VDC
Power Consumption:	Less than 20 W
Enclosures:	Cast alumnium epoxy coated. Integral NEMA 7 encl. or Remote NEMA 4X encl.
Sensor Housing:	Fabricated steel, epoxy coated
Preamp Impedance:	$1x10^{12}$ Ohms minimum
Amb. Temp:	-20°F - 140°F (-29°C - 60°C) Display darkens over 158°F (70°C)
End Connections:	150# or 300#
Sensor Tube:	304 Stainless Steel
Process Temp:	**Integral Mount:** • Hard Rubber, Neoprene, Polyurethane, Food Grade Polyurethane: -40°F - 180°F • TEF, Ceramic: -40°F - 212°F **Remote Mount (opt):** • TEF, Ceramic: -40°F - 266°F **High Temperature Coils (opt):** • TEF: -40°F - 300°F • Ceramic: -40°F - 420°F
Selectable Damping:	0-99 seconds
Minimum Conductivity:	5 µsiemens
Low Flow Cutoff:	Selectable 0-9% of full scale

[1] *Minimum Velocity is the lowest velocity the meter will show a reading. Accuracy, however, is subject to the limits above.*

Model FM626 Specification available on request