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IOG
Industrial Oval Gear Flow Meters

Industrial OG meter series IOG®

Inline and flanged oval gear meter

Features

- Compact size
- High accuracy and repeatability
- Factory calibrated
- Flow ranges from 0,04 -700 l/min
- Flexibility of installation options (vertical or horizontal installation)
- Low pressure drop
- Minimum number of wearable parts for long product life and easy field servicing
- Wide range of instrumentation available for control system interfacing
- Optional lay length adjustment
- ATEX approval

Description

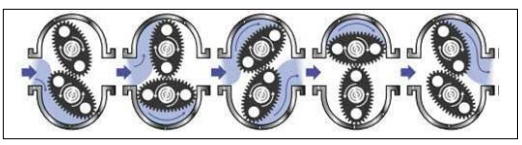
The industrial OG meter is a modular flow meter design, economical yet highly accurate and rugged. Due to the rugged nature of this particular flow measurement technology, the industrial OG meter can be used in a number of applications where conventional meters are not acceptable.

Applications

Whether the liquid being measured is very viscous or highly corrosive, the oval gear meter can handle it. The industrial oval gear is designed for a variety of chemical applications including petroleum based fluids, water solutions, and any other liquid compatible with the materials of construction.

Operation principle

Fluid enters the inlet port and then passes through the metering chamber. Inside the chamber, fluid forces the internal gears to rotate before exiting through the outlet port. Each rotation of the gears displaces a specific volume of fluid. As the gears rotate, a magnet on each end of the gear pass a reed switch in the top-mounted register's circuit board. The reed switches send pulses to the micro-processor in the register to change the LED display segments. The oval gear meter can be used in conjunction with a variety of industrial registers.



Port size	Housing material	NPT/BSP bar	ANSI 150# (bar)	ANSI 300# (bar)	DIN (bar)
1/4"	PVDF	16	–	–	–
	Stainless	100			
	Aluminum	65			
1/2"	Stainless	210	20	n/a	16 bar
	Aluminum	140			
3/4"	PVDF	16	20	55	16 bar
	Stainless	210			
	Aluminum	140		n/a	
1"	Stainless	210	20	55	16 bar
	Aluminum	140		n/a	
1" HF	PVDF	16	20	55	16 bar
	Stainless	210			
	Aluminum	140		n/a	
1 1/2"	Stainless	210	20	55	16 bar
	Aluminum	105		n/a	
2"	Stainless	105	20	55	16 bar
	Aluminum	70		n/a	
3"	Stainless	70	20	55	16 bar
	Aluminum	55		n/a	

Technical data

Housing & connection by size		
Sizes	1/4'', 1/2", 3/4", 1", 1"HF, 1 ½", 2" and 3"	
Aluminum	NPT, BSP, 150#, PN16	
Stainless	NPT, BSP, 150#, 300#, PN16	
PVDF	BSP, NPT	
Operating temperature	**Housing**	**Oval gears**
Stainless steel	-30 °C to +120 °C (-22 °F to +240 °F)	-30 °C to +120 °C
Plastic (PPS/LCP)	-30 °C to +80 °C (-22 °F to +176 °F)	-30 °C to +80 °C
Aluminum	-30 °C to +120 °C (-22 °F to +240 °F)	
PVDF	-10 °C to +60 °C	
Storage temperature for all units	-55 °C / +125 °C	
Viscosity		
Max 1000 mPas with standard rotors / 500.000 mPas* with high viscosity rotors		

Flow range

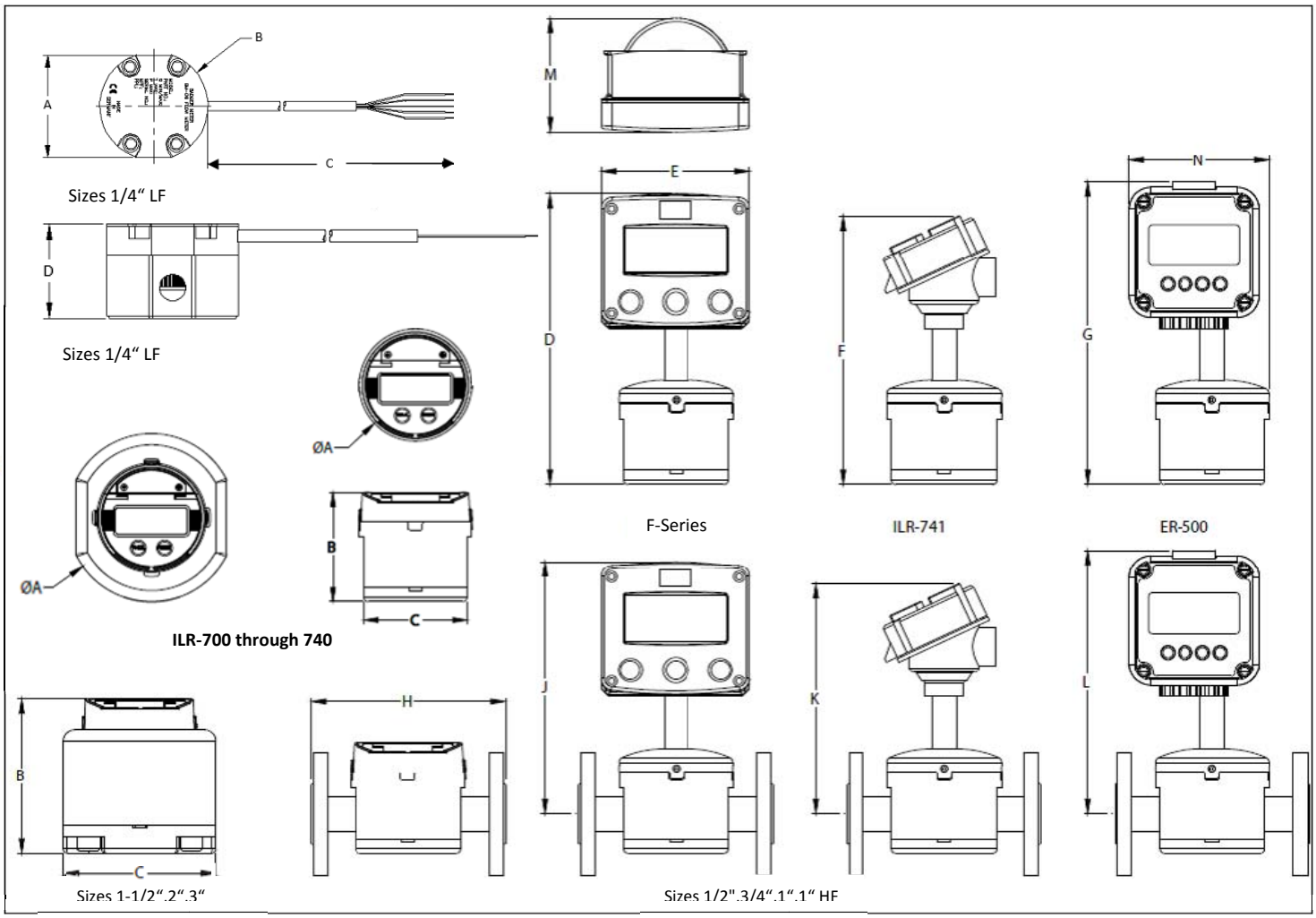
Port size	l/min	GPM	Fluid viscosity	Accuracy (%)	Accuracy PVDF (%)	Repeatability (%)
1/4'' LF	0,04 – 1,6	0,01 – 0,4	>5.0 cP	±1.0	±1,5	±0.03
	0,09 – 1,6	0,02 – 0,4	<5.0 cP	±1.5	±2,5	±0.03
1/4''	0.25 – 8.3	0.067 – 2.2	>5.0 cP	±1.0	±1,5	±0.03
	0.44 – 8.3	0.11 – 2.2	<5.0 cP	±1.5	±2,5	±0.03
1/2"	1 – 30	0.25 – 8.0	>5.0 cP	±0.5	-	±0.03
	2 – 25	0.5 – 6.6	<5.0 cP	±1,5	-	±0.03
3/4"	2 – 60	0.5 – 16	>5.0 cP	±0.5	±1,5	±0.03
	4.5 – 53	1.2 – 14	<5.0 cP	±1,5	±2,5	±0.03
1"	2.3 – 68	0.6 – 18	>5.0 cP	±0.5	±1,5	±0.03
	5.3 – 60	1.4 - 16	<5.0 cP	±1,5	±2,5	±0.03
1" HF	5.7 – 170	1.5 – 45	>5.0 cP	±0.5	-	±0.03
	9.5 - 150	2.6 - 40	<5.0 cP	±1.5	-	±0.03
	5.7 – 120	1.5 – 31	>5.0 cP	-	±1,5	±0.03
	9.5 – 120	2.6 – 31	<5.0 cP	-	±2,5	±0.03
1 ½"	9.5 – 245	2.5 – 65	>5.0 cP	±0.5	-	±0.03
	15 – 227	4.0 – 60	<5.0 cP	±1,5	-	±0.03
2"	15 – 380	4.0 – 100	>5.0 cP	±0.5	-	±0.03
	23– 380	6.0 – 100	<5.0 cP	±1.0	-	±0.03
3"	20 – 700	5.0 – 185	>5.0 cP	±0.5	-	±0.03
	38 – 700	10 - 185	<5.0 cP	±1,0	-	±0.03

Material of construction

Port size	Housing	Cover	Spindle	Gears	Bearings	Magnet	O-Ring	Bolts
1/4''	316 SS	316 SS	316 SS	316 SS	H370	Neodymium Au plated	Viton	316 SS
	606 Al	6061 Al		PPS				
1/2"	316 SS	316 SS		316 SS	Graphalloy	Alnico		
	6061 Al	6061 Al		LCP				
3/4"	316 SS	316 SS		316 SS	Graphalloy	Alnico		
	6061 Al	6061 Al		LCP				
1"	316 SS	316 SS		316 SS	Graphalloy	Alnico	Aflas	
	6061 Al	6061 Al		LCP				
1" HF	316 SS	316 SS		316 SS	H370 Graphit	Neodymium Ni plated	EPDM	
	6061 Al	6061 Al		PPS				
1 ½"	316 SS	316 SS		316 SS	H370 Graphit	Neodymium Ni plated	Kalrez	
	6061 Al	6061 Al		PPS				
2"	316 SS	316 SS		316 SS	H370 Graphit	Neodymium Ni plated		
	6061 Al	6061 Al		PPS				
3"	316 SS	316 SS		316 SS	H370 Graphit	Neodymium Ni plated		
	6061 Al	6061 Al		PPS				

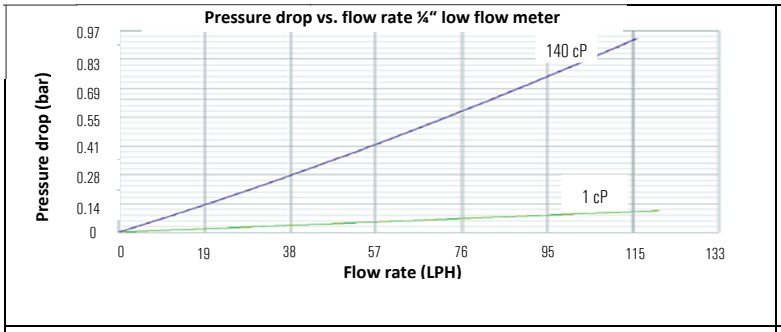
NOTE: All PVDF devices are supplied with Hastelloy-C axes and gold-plated magnets.
More bearing axles and sealing proxy materials on request

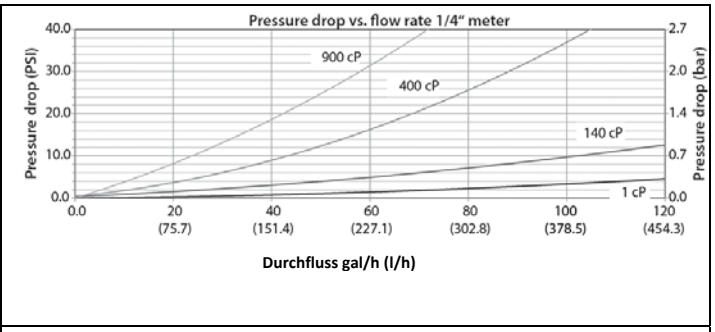
Dimensions

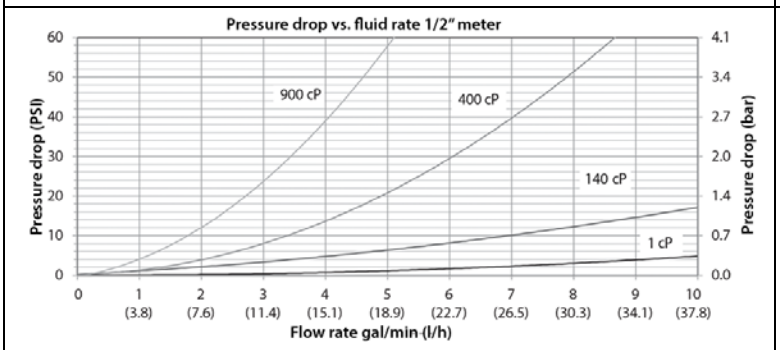


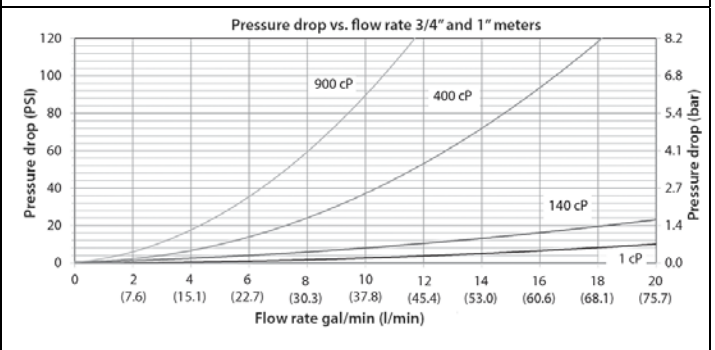
Port sizes inch (mm)

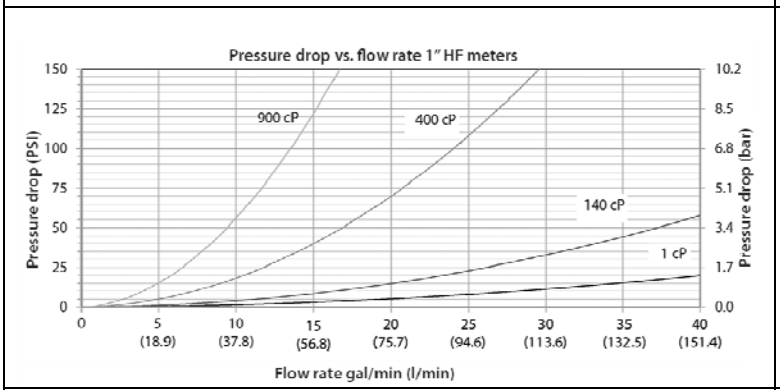
Port size	A	B	C	D	E	F	G	H	J	K	L	M	N
1/4" LF	2.05" (52 mm)	2.17" (55 mm)	118" (3000 mm)	1.54" (39 mm)	–	–	–	–	–	–	–	–	–
1/4"	2.17" (55 mm)	1.54" (39 mm)	2.05" (52mm)	–	–	–	–	–	–	–	–	–	–
1/2"	3.94" (100 mm)	3.44" (87.5 mm)	3.62" (92 mm)	9.70" (246.4 mm)	5.12" (130 mm)	8.93" (227 mm)	10.10" (257 mm)	6.69" (170 mm)	8.45" (214.6 mm)	7.68" (195.1 mm)	8.89" (225.8 mm)	3.94" (100.2 mm)	4.84" (122.9 mm)
3/4"	3.94" (100 mm)	3.84" (98 mm)	3.62" (92 mm)	10.10" (257 mm)	5.12" (130 mm)	9.33" (237 mm)	10.50" (267 mm)	6.69" (170 mm)	8.70" (221 mm)	7.93" (202 mm)	9.14" (232 mm)	3.94" (100 mm)	4.84" (123 mm)
1"	3.94" (100 mm)	3.84" (98 mm)	3.62" (92 mm)	10.10" (257 mm)	5.12" (130 mm)	9.33" (237 mm)	10.50" (267 mm)	6.69" (170 mm)	8.70" (221 mm)	7.93" (202 mm)	9.14" (232 mm)	3.94" (100 mm)	4.84" (123 mm)
1" HF	3.94" (100 mm)	3.89" (99 mm)	3.62" (92 mm)	10.15" (258 mm)	5.12" (130 mm)	9.38" (238 mm)	10.55" (268 mm)	6.69" (170 mm)	8.60" (218 mm)	7.83" (199 mm)	9.04" (230 mm)	3.94" (100 mm)	4.84" (123 mm)
1-1/2"	5.51" (140 mm)	4.93" (125 mm)	4.92" (125 mm)	11.15" (283 mm)	5.12" (130 mm)	10.38" (268 mm)	11.51" (293 mm)	8.35" (212 mm)	8.90" (226 mm)	8.13" (207 mm)	9.31" (237 mm)	N/A	N/A
2"	5.91" (150 mm)	5.34" (136 mm)	5.28" (134 mm)	11.60" (295 mm)	5.12" (130 mm)	10.83" (275 mm)	11.96" (304 mm)	10.39" (264 mm)	9.16" (233 mm)	8.39" (213 mm)	9.57" (243 mm)	N/A	N/A
3"	8.27" (210 mm)	6.35" (162 mm)	7.09" (180 mm)	12.57" (320 mm)	5.12" (130 mm)	11.80" (300 mm)	12.93" (329 mm)	13.54" (344 mm)	9.58" (244 mm)	8.81" (224 mm)	9.99" (254 mm)	N/A	N/A

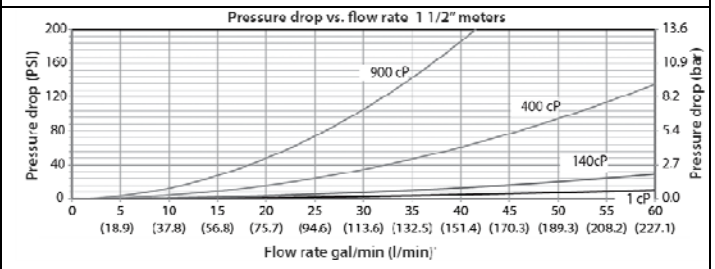


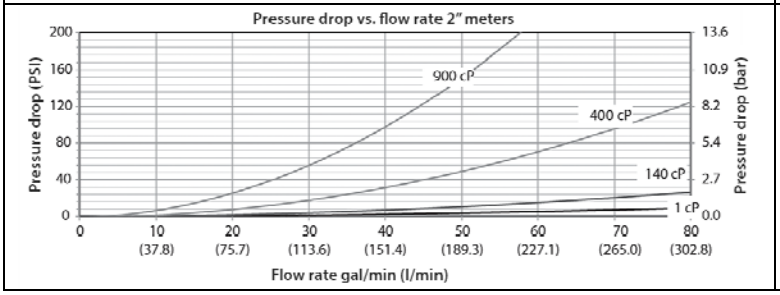


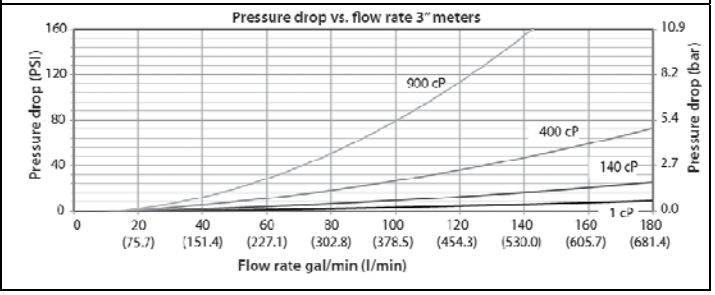












Industrial line registers

Type ILR 700, 701, 710, 720, 730, 740, 750

Features

- Large six digit LCD display
- Display in liters, pints, quarts or gallons, freely programmable
- 11 digits, non-resettable lifetime totalizer and 6 digits, resettable totalizer
- ILR series: -20 °C to +80 °C (-4 °F to +140 °F)
- Replaceable long life battery
- Calibration factor saved in non-volatile memory
- 9 point linearization (ILR 750, ILR 701). Test medium is water – please contact your sales representative for calibrations with other liquids
- Scalable pulse output (ILR 710, ILR 750)
- 4-20 mA output (ILR 730, ILR 750)
- Protection class IP67

Description

The electronic register module contains a microprocessor board powered by a lithium battery. It can be programmed to batch in liters, pints, quarts, or gallons and will totalize in liters or gallons. A calibration factor and unit of measure are programmed during factory test. Unlike mechanical registers, these units can be electronically recalibrated in the field when necessary. A 6-digit LC display, accurate to three decimal places, shows the exact amount of fluid that has passed through the meter. The entire register module is protected from normal wear and tear by a rugged, shock resistant housing.

Operation

Industrial oval gear meter has magnets on the gears that cause the reed switches to send pulses to the register as they rotate.
The register is in a sleep mode until it detects these pulses caused by fluid going through the meter. The microprocessor in the register then measures the flow and will display either the batch totalization or the flow rate of the fluid going through the meter on the 6-digit display.
The registers batch totalizer is a 6-digit display with three places of resolution after the decimal point. If the total dispensed exceeds 999.999 then the display will shift and only 2 digits will be displayed after the decimal point, 9999.99 and will continue to shift to the maximum value of 999999. After reaching 999999 the batch totalizer will rollover to 0.000. The batch totalizer is reset to zero when the reset button is depressed.

The register also has a resettable totalizer that requires that the total and reset button both be depressed to reset (hold the "Total" button, then press the "Reset" button to reset this totalizer while resettable totalize is displayed). This would be used for multiple batch totalization purposes.

The register´s life time totalizer is 11 digits and will either be in gallons or liters based on the unit of measure selected. Pushing and holding the total button while the life time totalizer is displayed will display the full 11-digit life time totalizer value.

Register model	Register features
ILR 700 standard register	• Flow rate or totalizer display selectable in the programming menu • Selectable unit of measure
ILR 710 single pulse output	• Scalable pulse output • Ability to set pulse output length
ILR 720 dual pulse output	• Quadrature pulse output – can be used externally to detect direction of flow • External reset input
ILR 730 analog output	• Analog 4-20mA output representing the flow rate of the meter • Minimum and maximum values can be set for analog output
ILR 701	• 9 point linearization
ILR 750 pulse output + 4-20mA output	• Scalable pulse output • Ability to set pulse output length • Analog 4-20mA output representing the flow rate of the meter • Minimum and maximum values can be set for analog output • 9 point linearization
Note: The ILR 710, 720 and 730 all have the standard features of the ILR 700.	
ILR 740 transmitter	Transmitter (reed switch)

Reed and Hall Board

Features

- One reed or hall board for all meter sizes (1/2″- 3″)
- Meter size can be selected on the cicuit board

Description

Using the reed or hall board, unscaled pulses can be transmitted from the meter to an evaluation instrument like a SPS or a flow computer. The size of the meter can be selected by the slide switch on the circuit board, so all meter sizes ½″ - 3″ are covered with only one circuit board.
Further slide switches on the hall board enable various settings, as pulse doubling, pull-up resistance or signal invertion.
As well both outputs can be used with only one or two separated power supplies.

F-series (F012, F018, F110, F131)

Models

F012 Display with external power supply or battery powered.

F018 Alarm or pulse output, analog output with HART communication

F110 Pulse output, analog output, optional RS232/RS485

F131 Bach controller with pulse output, analog output, 2 batching outputs, optional RS232/RS485

Input features

With the F-series the following signals types can be processed

- Flow-measurement: Turbine sine wave (coil) pick-ups, reed switches, hall-effect sensors and other active or passive NPN / PNP pulse signals, NAMUR sensors and 2 or 3 wire (0)4 - 20mA or 0 - 10V DC.
- Temperature measurement: 2, 3 or 4 wire PT100 (PRTD) elements, thermocouple as well as 2 or 3 wire (0)4 - 20mA or 0 - 10V DC signals.

Linearization of the input signal, data filter functions and square root calculation are all available to process the input signals.

Output features

Related to the functionality of the selected model, the following output features are available:

- Analog output proportional to the flow rate. The active, passive or isolated (0)4 - 20mA or 0 - 10V DC analog output can also be used to control actuators with the PI(D) controllers.
- Transistor or relay outputs for high and low alarms, scaled pulse output, flow-direction as well as the control of valves / relays in batch and level control applications.
- The RS232, RS485 or TTL interface makes it possible to communicate remotely, even with the battery-powered unit.

All software parameters can be monitored and modified in addition to the usual transfer of data using the ModBus® protocol.

Options for hazardous area installation

The F1-series can be supplied with certified intrinsically safe To ATEX and IECEx.
The basic F0-series have got the following certifications with an ambient temperature of -40 °C to +70 °C (-40 °F to +158 °F).

- The ATEX markings for gas and dust applications are:
  II 1 G Ex ia IIC T4
  II 1 D Ex iaD 20 IP 65/67 T 100 °C.

Flow monitor ER-500

Features

- Compact size.
- High accuracy and repeatability (0,05 %)
- Flexibility of installation options.
- Robust alarm parameters provide faster warning when something changes in the process or pipeline.
- Advanced connectivity options allow you to connect meters to your network for remote monitoring and process automation capabilities.
- Flexible power options include battery and 4-20mA loop power, providing a number of benefits including: The ability to install in remote location and be up and running immediately.
- Maintains readings and settings in the event of a power loss, and prolong the life of the batteries for up to 6 years.
- An updated display and enhanced totalization options provide more flow information at your fingertips, including display of rate and total at the same time and standard, batch and grand totals.

Input

Frequency range	1 to 3500 Hz
Frequency accuracy	±0,1 %
Over voltage protection	28V DC

Outputs

Analog:	4-20mA

Totalizing pulse

Opto-isolated (ISO) open collector transistor, non-isolated open drain FET.

Status alarms

Open collector transistor, adjustable flow rate with programmable dead band and phase.

ModBus®

ModBus® RTU over RS485, 127 addressable units / 2-wire network, 9600 baud, long integer and single precision IEEE754 formats; retrieve: flow rate, job totalizer, grand totalizer, alarm status and battery level; write: reset job totalizer, reset grand totalizer

Protection class

NEMA 4X/IP 66

More information you get in the data sheet “Flow monitor ER-500”.

Model	Size	Housing	Oval gears	Display	Connection	O-ring	Calibration	High viscosity version*
	1" HF	SS **S**	SS **S**	ILR XXX	BSP **1**	Viton **V**	Liter **L**	HV
	1 ½"	Aluminum **A**	PPS **R**	Fluid FXXX	NPT **2**	Aflas **A**	Gallon **G**	
	2"	PVDF **K**		Reed	Flange ANSI 150lbs **3**	Kalrez **K**		
	3"			Hall	Flange DIN PN16 **4**	EPDM **J**		
				ER500	Tri-Clamp **5**			
					Flange ANSI 300lbs **6**			
IND OG	1" HF	S	S	ILR 700	1	V	L	HV

Model	Size	Housing	Oval gear	Display	Connection	O-ring	Calibration	High viscosity version*
	½"	SS **S**	SS **S**	ILRXXX	BSP **1**	Viton **V**	Liter **L**	HV
	¾"	Aluminum **A**	Vectra **Vec**	Fluid FXXX	NPT **2**	Aflas **A**	Gallon **G**	
	1"	PVDF **K**		Reed	Flange ANSI 150lbs **3**	Kalrez **K**		
				Hall	Flange DIN PN16 **5**	EPDM **J**		
				ER500	Tri-clamp **6**			
					Flange ANSI 300lbs **8**			
IND OG	½"	S	S	ILR700	1	V	L	HV

Model	Housing	Oval gears	Display	Connection	O-ring	Calibration	Flow	High viscosity version*
	SS **S**	SS **S**	Reed / Hall	BSP **1**	Viton **V**	Liter **L**	Low Flow **LF**	HV
	Aluminum **A**	PPS **R**	ILR701T	NPT **2**	Aflas **A**	Gallon **G**	Standard **SF**	
	PVDF **K**		ILT750T		Kalrez **K**			
			Fluid FXXX		EPDM **J**			
			ER500					
IND OG ¼"	S	S	Reed/Hall	1	V	L	LF	HV
All ¼" meters are furnished with each 1 reed switch and 1 hall signal inverter in the cover. All displays (ILRXXX or FXXX) are supplied as remote version.								

* Oval gears in high viscosity version are used at fluid viscosity over 1.000mPas.