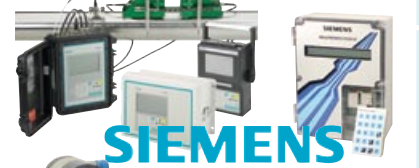
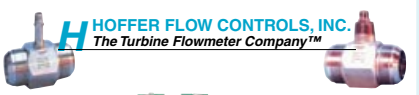
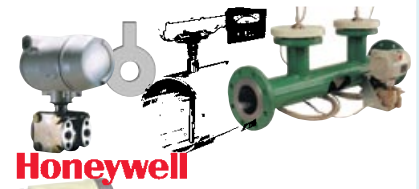


When you need mechanical flow instruments or the most precise non-contacting flow sensors and monitoring systems, look to Lesman. Whatever the media or application, we can help you. When you're not sure what instrument works best, you can use our collection of application datasheets. Fill in your process information, fax it to Lesman, and we'll put your process through an engineering review with our manufacturer partners to come up with the exact instrumentation to meet your needs.



	Prices Start at	See Page
<b>Coriolis Flow</b>		
Honeywell VersaFlow Coriolis Mass Flowmeters	Call	268
Siemens SITRANS FC Coriolis Mass Flowmeters	Call	274
<b>Differential Pressure and Multivariable Mass Flow</b>		
Honeywell SMV3000 Smart Mass Flowmeter	\$2743.00	267
Pitot Tubes, Venturi Tubes, and Bluff Body Flowmeters	Call	266
Orifice Plates and Orifice Flange Unions	Call	266
<b>Electromagnetic Flow</b>		
Honeywell VersaFlow Electromagnetic Flowmeters	Call	268
Kobold Insertion Magnetic Flowmeter	\$2381.00	259
Siemens SITRANS FM Magnetic Flowmeters	Call	270
<b>Mechanical Flow</b>		
GEMS Flowmeters and Switches	\$49.00	258
Kobold Flow Switches	\$79.00	256
Kobold Temperature Compensated Switches and Transmitters	\$329.00	259
RCM Direct Reading Flowmeters for Liquids, Air, or Gas	\$445.00	260
<b>Thermal Mass Flow</b>		
Kobold All Stainless Thermal Flow Switch	\$320.00	259
Thermal Instrument Company Inline and Insertion Mass Flowmeters	Call	265
<b>Turbine Flow</b>		
Hoffer Flow Controls Turbine Flowmeters for Gas and Liquid Service	\$800.00	262
<b>Ultrasonics for Pipes and Open Channel Flow</b>		
Siemens F US Clamp-On Ultrasonic Flowmeters	\$1850.00	276
Siemens OCM-III Open Channel Flow Monitor	\$1784.00	280
<b>Vortex Flow</b>		
Honeywell VersaFlow Vortex Flowmeters	Call	269



Viscosity table for common substances, page 485.

Prices in this catalog are current at the publication date, and are subject to change without notice. Due to manufacturer agreements, some products may not be available in all Lesman markets or geographic areas.

# Flowmeters, Switches and Visual Flow Indicators



## Polysulfone Paddle Flow Switch

**Switch:** Hermetically sealed, magnetically actuated contact; 15VA max., 0.5A max., 250V max. capacity  
**Pressure:** 145 PSI max.; 1.45 PSI max. drop  
**Adjustment Accuracy:** ±20%  
**Switch Repeatability:** ±3%  
**Maximum Temperature:** 225° F  
**Material:** NEMA 4 Polysulfone, stainless steel, ceramic magnet  
**Connections:** Thread: 1" NPT; Electric: DIN 43650 plug



Pipe Bore	Cutoff mark "L" Approx.	Switch Point (GPM Water)	
		Turn-On	Turn-off
1"	0.9"	9.5	5.0
1 1/4"	1.1"	9.5	5.0
1 1/2"	1.4"	14.5	9.5
2"	2.0"	19.0	9.5
2 1/2"	2.4"	24.0	14.5
3"	2.9"	28.5	19.0

### Model Selection Guide *Please allow 3-4 weeks for delivery.*

Switch Type	Catalog Number	Price
Normally Open, SPST, 15VA Max.	PPS-3106	\$115.00
Normally Closed, SPST, 15VA Max.	PPS-3105	115.00

## BVO Series Flowmeter/Switch for Water-Like Liquids

**Accuracy:** ±12% full scale; **Repeatability:** ±2% FS  
**Temperature:** -10° to 212° F  
**Pressure:** 145 PSIG max.  
**Flow Direction:** Vertical, up  
**Switch Characteristics:** N/O switch: 240 VAC/200 VDC max., 1.5 Amp AC/1.0 Amp DC max., 50 VA, 50 W max. power, 4-8 mm float travel hysteresis. SPDT switch: 240 VAC max., 0.8 Amp AC max., 30 VA max. power, 4-8 mm float travel hysteresis.



### Model Selection Guide

Body	Water Range	Fitting Size	Pressure Loss @ Max. Flow	Catalog Number	Price
Brass	0.1 to 1.0 GPM	1/4" NPT	0.9 PSIG	BVO-6102	\$254.00
Brass	1.0 to 5.0 GPM	1/2" NPT	1.1 PSIG	BVO-6116	254.00
304 SS	0.1 to 1.0 GPM	1/4" NPT	0.9 PSIG	BVO-6202	486.00
304 SS	1.0 to 5.0 GPM	1/2" NPT	1.1 PSIG	BVO-6216	486.00
Optional SPDT Contact				Suffix -U	0.00

## All Metal Paddle Flow Switch

**Flow Speed:** 12 ft/sec max., adjustable flow ranges  
**Contact:** Reed switch SPST, N/O or N/C; 50VA, 50 watt, 250V, 1.5A max ratings  
**Pressure:** 1450 PSI max.  
**Temperature:** 230° F max.  
**Materials:** Housing: NEMA 4, Glass-reinforced Polyamid; Paddle, Leaf Spring, Beam: SS; Locking Plate, Screws: Brass; O-Ring: Buna-N



### Model Selection Guide *Please allow 3-4 weeks for delivery.*

	Switch ON GPM H <sub>2</sub> O	Switch OFF GPM H <sub>2</sub> O	NPT Conn.	Catalog Number	Price
Brass paddle flow switch, 5' PVC cable	0.9 - 1.3	0.6 - 1.2	1/4"	PSR-5105	\$79.00
	1.3 - 2.1	1.0 - 2.0	1/2"	PSR-5115	79.00
	3.0 - 4.0	2.2 - 3.0	3/4"	PSR-5120	79.00
	3.2 - 5.0	2.4 - 4.5	1"	PSR-5125	88.00
	4.9 - 8.5	3.8 - 7.8	1-1/4"	PSR-5132	106.00
	9.2 - 15.0	7.9 - 14.3	1-1/2"	PSR-5140	116.00

*Call for stainless steel bodies or larger pipe sizes.*

## NEMA 4 Paddle Flow Switch

**Contact:** Reed-switch SPST, adjustable, N/O or N/C; 60 VA, 60 watt, 250 V, 2A max. rating  
**Materials:** Paddle, leaf spring, beam: SS; Clamp plate, screws: Brass; Contact housing: NEMA 4, Glass-reinforced polyamid; O-Ring: Buna-N; Cable: PVC; 5 ft. std. length  
**Operating Conditions:** Temperature: 230°F max.; Pressure: Brass: 1,450 PSI max.; SS: 3,600 PSIG max.; Flow speed: 12 ft/sec. max.



### Model Selection Guide *Please allow 3-4 weeks for delivery.*

	Increasing GPM H <sub>2</sub> O	Decreasing GPM H <sub>2</sub> O	Pipe Size	Catalog Number	Price
Brass paddle flow switch, 5' PVC cable	13 - 16	11 - 15	2"	PS-5152	\$79.00
	41 - 48	38 - 44	3"		
	57 - 70	53 - 66	4"		
	147 - 159	137 - 156	6"	PS-5114	79.00
	24 - 30	19 - 27	4"		
	53 - 75	44 - 62	6"		
	101 - 141	88 - 123	8"		
Spare SPDT Contact Option				-U	33.00

*Also available in stainless steel. Call for pricing.*



## Insertion Paddle/Bellows Flow Switch for Liquids

- Position-Independent Installation
- Max. Pressure 160 PSI/450 PSI, Media Temperatures to 250°F

Kobold FPS paddle bellows flow switches are used wherever reliable control for minimum or maximum liquid flow is required. The flowing medium exerts a force on the paddle to actuate a micro switch. The instrument internals are separated from the process by the bellows, making the FPS an excellent choice for dirty media.

### Model Selection Guide *Please allow 3-4 weeks for delivery.*

De-Actuating GPM H <sub>2</sub> O	Actuating GPM H <sub>2</sub> O	Pipe Size	Catalog Number	Price	Catalog Number	Price
2.6-8.8	4.4-9.3	1"	FPS-5100 (Brass)	\$440.00	FPS-5200 (SS)	\$596.00
3.5-12.3	5.7-13.2	1.25"				
4.8-16.3	7.5-17.6	1.5"				
9.7-25.1	13.7-26.9	2"				
11.9-28.6	17.6-30.2	2.5"				
18.9-47.1	27.3-50.2	3"				
50.2-122.0	64.7-127.7	4"				
100.8-234.7	125.1-244.8	5"				
158.1-360.0	189.8-385.0	6"				
319.7-729.6	374.7-759.5	8"				

Pressure Transmitters

Anderson Greenwood Instrument Valves

Level Measurement Instruments

Flow Measurement Instruments

Solids Flow and Motion

Actuator Motors and Pneumatic Drives



## What's the Right Flow Technology for Your Process?

Need help figuring out which flow measurement instrumentation to use in your process? Start with the reference charts below. Find your media type to help narrow down your choices. Then, take a look at the comparative specifications in the chart at the right. Depending on your application, there may be more than one technology for you.

**Key**  
▲ Excellent: Recommended.  
◆ Fair: Works, but depends on the application.  
▼ Poor: Do not use.

Technology	Media Type	Clean Liquid	Dirty Liquid	Viscous Liquid	Corrosives	Slurries	Clean Gas	Dirty Gas	Steam	Cryogenics
Coriolis Flowmeter		▲	▲	▲	▲	▲	◆	◆	◆	◆
DP Mass Flowmeter		▲	▲	▲	◆	◆	▲	▲	▲	▼
DP Orifice Plate		▲	◆	◆	▲	▼	▲	▲	▲	▲
DP Pitot Tube		▲	▼	▼	◆	▲	◆	▲	▲	▲
DP Wedge		▲	▲	▲	▲	▲	▲	▲	▲	▼
DP Venturi		▲	▲	◆	◆	▼	◆	◆	▲	▼
Fluidic Oscillatory		▲	◆	▲	◆	▲	▼	▼	▲	▲
Magnetic Flowmeter		▲	▲	▲	▲	▲	▼	▼	▼	▼
Paddlewheel		▲	▼	◆	◆	▲	◆	◆	▼	▼
Positive Displacement		▲	▲	▲	◆	▼	▲	▲	▼	◆
Rotameter		▲	▼	▲	◆	▼	▲	▼	◆	▼
Thermal Dispersion		▲	◆	◆	◆	◆	▲	▲	▼	◆
Turbine Flowmeter		▲	▼	◆	◆	▼	▲	◆	▲	◆
V-Notch		▲	◆	▼	◆	◆	▼	▼	▼	▼
Vortex Flowmeter		▲	◆	◆	◆	▼	▲	◆	▲	▼
Weir		▲	◆	▼	◆	◆	▼	▼	▼	▼

**Key**  
H High  
M Medium  
L Low

Technology/Spec.	Turndown Ratio	Sizes	Accuracy (%FS)	Repeatability (%)	Upstream Pipe Diam.	Permanent PSI Drop	Relative Cost
Coriolis Flowmeter	25:1	0.1-6"	0.15%	0.1%	0	L	H
DP Mass Flowmeter	40:1	—	0.1%	0.1%	—	—	H
DP Orifice Plate	4:1	>1"	1%	0.1%	10-30	H	L
DP Pitot Tube	4:1	0.5-72"	0.75%	0.1%	10	L	L
DP Venturi	10:1	0.5-72"	1%	0.1%	10	M	L
DP Wedge	10:1	0.5-30"	3%	0.5%	12	H	H
Fluidic Oscillatory	15:1	1-3"	1.5%	0.2%	10	L	H
Magnetic Flowmeter	10:1	>0.1"	0.5%	0.2%	5	L	M
Paddlewheel	3:1	0.1-1.5"	2.5%	1%	0	H	L
Positive Displacement	20:1	0.5-6"	1%	0.3%	0	H	M
Rotameter	5:1	0.2-3"	4-8%	2%	0	M	L
Thermal Dispersion	100:1	0.2-72"	0.5%	0.2%	10	L	H
Turbine Flowmeter	10:1	>0.25"	0.5%	0.1%	10-20	H	H
V-Notch	300:1	—	2-5%	2%	4H	0	L
Vortex Flowmeter	H	>1"	1%	0.2%	20-30	M	L
Weir	300:1	—	2-5%	2%	4H	0	L

Viscosity table for common substances, page 485.

## DAA Series Self-Cleaning Paddle Visual Flow Indicator



With a simple twist of the sight glass, wipers clean the DAA's visible area to allow unobstructed view of the rotor. Contaminants are simply washed away by the medium flow.

Cleaning can be repeated as often as needed — no fuss, no downtime.

### Specifications

**Operating Conditions:** Temperature: 210°F max; Pressure: 230 PSIG max

**Materials:** Body: Nickel-plated brass or 303 stainless steel

### Model Selection Guide

Water 1 cSt	Flow Req'd. to Start Rotation (GPM Water)		Max. Flow GPM Water	NPT	Length	Pressure Drop 6.5'/Sec	Catalog Number	Price
	Oil 40 cSt	114 or 150 cSt						
DAA Paddle Visual Flow Indicator with Rotor, Brass Body								
0.11	0.53	0.79	2.11	0.25"	2.76"	0.29 PSI	DAA-5108	\$174.00
0.16	0.53	0.79	3.17	0.375"	2.76"	0.29 PSI	DAA-5110	200.00
0.26	0.79	0.92	6.34	0.5"	3.35"	0.44 PSI	DAA-5115	227.00
0.26	0.79	0.92	12.15	0.75"	3.74"	2.32 PSI	DAA-5120	261.00
0.42	0.79	0.92	17.44	1"	4.13"	4.06 PSI	DAA-5125	277.00
0.79	1.06	1.32	29.06	1.25"	4.72"	3.63 PSI	DAA-5132	345.00
1.06	1.32	1.32	42.27	1.5"	5.12"	4.21 PSI	DAA-5140	388.00

## SV Series Float-Type Flowmeters and Switches for Liquids and Gases



**Accuracy:** ±4% full scale

**Temperature:** 240°F max.; with PP or PVDF float: 160°F max.

**Pressure:** 145 PSI max.

**Mounting:** Vertical, flow up

**Materials:** Body, Fittings, Nozzle: Brass or stainless steel; Float: Brass or Polypropylene; Measuring Tube: Duran 50; Seals: Buna-N; Housing: NEMA 4, Aluminum anodized; Plastic electrical housing

**Reed Contact:** Std. N/O 50VA max.; Special SPDT 30VA max.

### Model Selection Guide

Please allow 3-4 weeks for delivery.

Range Water (GPM)	Standard Connect. (NPT)	Max. Pressure Drop	Float Material	Flowmeter Only Catalog No.	Price	Flowmeter and N/O Contact Switch Catalog No.	Price
Brass Connection and Wetted Parts							
0.05 - 0.35	1/4"	0.58 PSI	Polypro	SV-5101	\$241.00	SV-6101	\$285.00
0.5 - 2.7	1/2"	0.58 PSI	Polypro	SV-5106	241.00	SV-6106	285.00
1 - 5	1/2"	1.02 PSI	Brass	SV-5107	241.00	SV-6107	285.00
0.5 - 8	3/4"	1.16 PSI	Polypro	SV-5109	389.00	SV-6109	433.00
1 - 11	3/4"	1.45 PSI	Brass	SV-5110	389.00	SV-6110	433.00
2.5 - 20	1"	4.35 PSI	Brass	SV-5112	409.00	SV-6112	451.00
No-Charge Options				SCFM Air Range		Add Suffix -L	\$0.00
				Special SPDT Contact		Add Suffix -U	0.00
				Larger NPT Connection (+1/4")		Add Suffix -B	0.00

# Gems Flowmeters and Switches

## RotorFlow® Flow Indicators

RFI is Gems' RotorFlow® at its most basic form—a bright orange rotor turning with fluid flow. Either port can be used for incoming flow.

**Body:** Polypropylene, brass, or 316 stainless steel

**Other wetted materials:** Orange molded Nylon rotor, ceramic rotor pin, polysulfone lens, glass-reinforced polypropylene low flow adapter



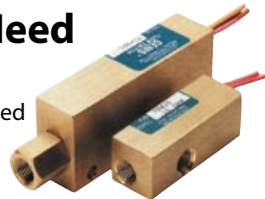
### Model Selection Guide

Port Size	Flow Ranges (GPM)		Pressure Max.	Operating Temp. °F	Catalog Number	Price
	Low*	High				
RotorFlow® RFI Flow Indicator, Polypropylene Body						
0.25"	0.1 to 1.0	0.5 to 5.0	100 PSI	180° Max.	155420	\$49.00
0.50"	1.5 to 12.0	4.0 to 20.0	100 PSI	180° Max.	155480	49.00
RotorFlow® RFI Flow Indicator, Brass Body						
0.25"	0.1 to 1.0	0.5 to 5.0	200 PSI	212° Max.	142541	132.00
0.50"	1.5 to 12.0	4.0 to 20.0	200 PSI	212° Max.	142542	132.00
0.75"	—	5.0 to 30.0	200 PSI	212° Max.	180392	132.00
RotorFlow® RFI Flow Indicator, 316 Stainless Steel Body						
9/16"	0.1 to 1.0	0.5 to 5.0	200 PSI	212° Max.	174596	162.00
0.50"	1.5 to 12.0	4.0 to 20.0	200 PSI	212° Max.	173138	162.00
0.75"	—	5.0 to 30.0	200 PSI	212° Max.	181682	183.00

**Looking for other Gems flow switches or indicators? Need a different material or port size? Call Lesman!**

## Precision Instruments Need Precise Switches!

FS-925 switches use hermetically sealed reed contact SPDT switches, set for normally open or normally closed operation and ±10% accuracy. These rugged switches are made with brass housings and stainless steel and Viton® internal parts. Call for stainless housing models.



### Model Selection Guide

Housing Material	Switch Setpoint	Max Pressure	Max Temperature	Catalog Number	Price
Brass	0.10 GPM	1000 PSIG	200° F	26914	\$188.00
Brass	0.25 GPM	1000 PSIG	200° F	26915	188.00
Brass	0.50 GPM	1000 PSIG	200° F	26916	188.00

## Infinite Flow Setpoint Adjustment Between 0.5 and 20 GPM

**Switch:** SPST, 20 VA  
**Temperature Range:** -20° to 225°F  
**Pressure:** 1000 PSIG max. (2500 proof)

### Model Selection Guide

Series	NPT Connection	Catalog Number	Price
FS-10798	1/2"	25363	\$401.00



## General Purpose Switch for Plastic Piping

These Gems switches have a noncorrosive, clear PVC housing for broad chemical compatibility, and are ideal for flow/no-flow detection.

**Materials:** PVC, Epoxy, and Buna-N  
**Switch:** SPST, 20 VA, N.O. at no-flow



### Model Selection Guide

Connect Size	Actuation on Increasing Flow	Pressure Max.	Operating Temp (°F)	Catalog Number	Price
1/2" NPT*	0.5 GPM ± 20%	120 PSIG	120°	135805	\$81.00
3/4" IPS	0.5 GPM ± 20%	@ 100°F; 75		135810	81.00
1" IPS	2.0 GPM ± 20%	PSIG @ 120°F		135815	81.00

\* 3/4" IPS model with 1/2 NPT port installed.

## Rugged Flow Switches Deliver Accurate, Reliable Service

FS-200 adjustable flow switches provide accurate flow detection with 1% repeatability. Bronze and Teflon® construction delivers long life in water and oil.

Fixed setpoint units provide the same durable performance as the adjustable versions—and they handle fluid temperatures to 300° F. They also share the same external dimensions and offer generous flow paths for low pressure drop.



**Operating Pressure:** 400 PSIG @ 100°F  
**Operating Temperature:** -20° to 200°F  
**Switch:** SPDT, 20 VA

*Flow setpoints are calibrated using water at 70° F on increasing flow with unit in a horizontal position (leadwires up).*

### Model Selection Guide

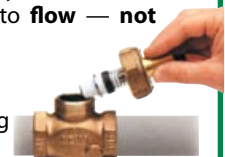
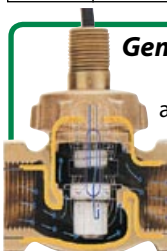
Series	Port Size	Setpoint	Catalog Number	Price
FS-200	1" NPT	Adjustable: 1.0 to 6.0 GPM	26615	\$197.00
FS-200	1" NPT	Adjustable: 5.0 to 15.0 GPM	26616	197.00
FS-200	1" NPT	Adjustable: 2.0 to 8.0 GPM	27838	197.00
FS-200	1" NPT	Fixed: 0.5 GPM	27051	191.00
FS-200	1" NPT	Fixed: 1.0 GPM	27052	191.00
FS-200	1" NPT	Fixed: 2.0 GPM	27053	191.00
FS-200	1" NPT	Fixed: 3.0 GPM	27054	191.00
FS-200	1.25" NPT	Fixed: 4.0 GPM	27069	344.00
FS-200	1.5" NPT	Fixed: 1.5 GPM	27085	422.00

## Gems Shuttle Switches Rise to the Occasion!

Fluid, flowing through the switch housing, displaces a spring-loaded, calibrated shuttle, which is metered relative to a fixed orifice. When flow rate reaches the calibrated setpoint, the shuttle moves up to the stem, actuating the hermetically sealed reed switch. Flow switches respond only to **flow** — **not pressure!**

### Occasional Cleanout is a Snap!

Remove the bonnet easily without disturbing the inline body.



# Temperature-Compensated Flow Switches and Transmitters

## KAL-K Flow Switch/Trend Indicator for Liquids and Oils

### Features

- No moveable parts
- Minimal pressure loss
- Simple media adjustment
- Temperature compensation and switch point stability
- Unaffected by viscosity changes — even for the smallest flow velocities!
- IP65 enclosure — insensitive to dirt
- Designed for minimal pipe intrusion



### Specifications

**Measuring Range:** Water: 0.05 to 2 m/sec.; Oils: 0.1 to 4 m/sec. approx.

**Operating Conditions:** Pressure: 1450 PSIG max; Temperature: -10°–185° F

**Switching:** Adjustment: By potentiometer; Selectable output: NPN or PNP, open collector; Current: 400 mA max.; Voltage: 24 VDC max.; Status indicator: Bi-colored LED

**Power:** Supply voltage: 24 VDC ±10%; Current draw: 300 mA max.

**Materials:** Wetted parts: 304 or 316-Ti stainless steel; Housing: NEMA 4 Nylon standard, NEMA 7 AI optional

**Fittings:** 1/2" or 3/4" NPT or 1-1/2" Tri-Clamp®.

**Flow Trend Indicator:** Eight red LEDs

### Approximate Switch Point (GPM) per Pipe Diameter

Nominal ID	Water Range	Nominal ID	Water Range	Nominal ID	Water Range
1/2"	0.3 – 5.0	2"	3.1 – 55	8"	50 – 900
3/4"	0.5 – 8.9	2-1/2"	4.4 – 80	10"	78 – 1400
1"	0.8 – 14	3"	7.9 – 140	12"	110 – 2000
1-1/4"	1.1 – 20	4"	12 – 220	16"	200 – 3600
1-1/2"	2.0 – 35	6"	28 – 500	20"	310 – 5600

### Model Selection Guide

Description	Catalog Number	Price
KAL-K Flow Switch for Liquids, 24 VDC Power		
304 SS Wetted Parts, 1/2" NPT	KAL-4215	\$329.00
316-Ti SS Wetted Parts, 1/2" NPT	KAL-4315	371.00
316-Ti SS Wetted Parts, 3/4" NPT	KAL-4320	381.00
316-Ti SS Wetted Parts, 3A Sanitary		
	KAL-4340-S	456.00
KAL-K Flow Switch, 110 VAC Power, SPST Dry Contact Output for Liquids		
304 SS Wetted Parts, 1/2" NPT	KAL-4215-P03R	488.00
316-Ti SS Wetted Parts, 1/2" NPT	KAL-4315-P03R	530.00
316-Ti SS Wetted Parts, 3/4" NPT	KAL-4320-P03R	540.00
Options		
Fast Response (2.8-6 Sec.)	-F	0.00
Quick Disconnect Plug (24 VDC)	-M12	83.00



### Looking for a compact flow switch for non-viscous liquids?

Kobold's KAL-D is a compact all-stainless steel calorimetric thermal flow switch for use in small spaces and 1/4" NPT fittings. It has a switching range from 0.15 to 6.6 feet per second, works in pressures to 580 PSIG, and temperatures to 176°F. It can even be used in Clean-in-Place applications with short-term temperature limits of 250°F.

**KAL-D prices start at \$320.00.**



### Need a flowmeter for conductive liquids?

Kobold's PME insertion magnetic inductive flowmeter comes standard with a 4-20 mA transmitter and adjustable relay. The stainless steel switch can be inserted into pipes from 1" to 12" in diameter, and works in pressures to 230 PSIG and temperatures to 212°F.

The PME can be provided with weld sleeves for carbon steel, stainless steel or PVC pipes. **Prices start at \$2381.00**

## KAL-L Temperature Compensated Air Flow Switch

### Features

- No moving parts
- Negligible pressure loss
- Temperature compensation to minimize switching errors
- Adjustable response time



Kobold's KAL-L flow switch allows rapid detection of flow rate changes in non-hazardous gases. The analog electronic design ensures fast reaction times.

Through use of two RTDs — one to sense flow and the other to detect ambient temperature — the switch can compensate for thermal changes in its surroundings. This smart behavior minimizes switching errors caused by weather or other random environmental temperature changes.

KAL-L's insertion style design accommodates almost any conceivable pipe size. All you need to know to get started with the KAL-L is the flow velocity of your system.

### Specifications

**Measuring Range:** 3.3 to 66 feet per second, at 68°F and 14.5 PSIA (restricted span for other pressure and temperature conditions)

**Switch:** One SPDT, 250 VAC max, 4 Amp max current, 1000 VA max power

**Switchpoint:** Adjustable potentiometer

**Accuracy:** ±10% flow rate; **Repeatability:** —1% flow rate

**Display:** Eight red LEDs indicate flow trend, LED for switch status

**Response Time:** 1-60 seconds adjustable

**Operating Conditions:** Pressure: 120 PSIG max.; Process temperature: -10° to 250°F; Ambient temperature: 15° to 140°F

**Materials:** NEMA 4 Nylon housing, nickel-plated brass wetted parts

**Power Supply:** 24 VDC/VAC, -15%/+10%

**Fittings:** 1/2" NPT, two-bolt flange, or smooth shank

### Model Selection Guide

Description	Catalog Number	Price
KAL-L Flow Switch for Air, 24 VDC	KAL-8115	\$466.00
	KAL-8115FL	497.00
Options		
Conduit Hub Connection	-C	15.00
Quick Disconnect Plug	-M12	83.00

# Direct Reading Flowmeters



### Features

- For horizontal or vertical pipes
- Rangeability 6:1
- Flow rates up to 500 GPM or 4000 SCFM
- Rugged metal construction
- Accuracy ±3% of full scale
- Low pressure drop



Shown with 4-20 mA loop-powered two-wire indicator. Displays 4-1/2 digits for flow rate, 8 digits for totalization. Includes scaled, open collector output for remote totalizer, and square root extraction for use with W3 solid-state strain gauge.

**Ordering this product?**  
Please specify gas media, pressure, and temperature.

### Specifications

- Accuracy:** ±3% of full scale
- Mounting:** Horizontal (standard), with flow going to the right. For other flow direction configurations, call Lesman.
- Temperature:** 212°F max., 350°F max. optional
- Pressure:** 180 PSIG max., 400 PSIG max. optional
- Housing:** Diecast aluminum
- Crystal:** Glass or polycarbonate plastic

- Body:** Bronze, Monel, 316 stainless steel
- Gear Movement:** Bronze or stainless steel
- Seals:** Buna-N, Viton, Ethylene Propylene, or Teflon™
- Relay Options:** High/Low alarms
- Output Options:** 4-20 mA, 0-1000 Hz frequency. Call Lesman for price and availability.
- Display Options:** Digital display with 4 1/2 digits for flow rate, 8 digits for totalization.

### Model Selection Guide for Liquids

Standard mounting is horizontal, (R) designates flow going to the right. For other directions, call Lesman.

Flow Rate	Connection NPT	Material					
		Bronze		Monel		Stainless Steel	
		Catalog No.	Price	Catalog No.	Price	Catalog No.	Price
0.5 - 4.0 GPM	1/4"	1/4-71-R-04	\$445.00	1/4-72-R-04	\$1150.00	1/4-73-R-04	\$855.00
0.5 - 4.0 GPM	1/2"	1/2-71-R-04	445.00	1/2-72-R-04	1150.00	1/2-73-R-04	855.00
0.5 - 6.0 GPM	1/2"	1/2-71-R-06	445.00	1/2-72-R-06	1150.00	1/2-73-R-06	855.00
1.5 - 10 GPM	1/2"	1/2-71-R-10	445.00	1/2-72-R-10	1150.00	1/2-73-R-10	855.00
0.5 - 6.0 GPM	3/4"	3/4-71-R-06	505.00	3/4-72-R-06	1250.00	3/4-73-R-06	960.00
1.5 - 10 GPM	3/4"	3/4-71-R-10	505.00	3/4-72-R-10	1250.00	3/4-73-R-10	960.00
3.0 - 20 GPM	3/4"	3/4-71-R-20	505.00	3/4-72-R-20	1250.00	3/4-73-R-20	960.00
3.0 - 20 GPM	1"	1-71-R-20	530.00	1-72-R-20	1430.00	1-73-R-20	1115.00
5.0 - 40 GPM	1"	1-71-R-40	530.00	1-72-R-40	1430.00	1-73-R-40	1115.00
5.0 - 40 GPM	1-1/2"	1.5-71-R-40	600.00	1.5-72-R-40	1590.00	1.5-73-R-40	1260.00
15 - 100 GPM	1-1/2"	1.5-71-R-100	600.00	1.5-72-R-100	1590.00	1.5-73-R-100	1260.00
15 - 100 GPM	2"	2-71-R-100	695.00	2-72-R-100	1745.00	2-73-R-100	1350.00
<b>For Low Flow Applications</b>							
0.5 - 6 GPH	1/2"	1/2-71-R-06-ES	555.00	1/2-72-R-06-ES	1260.00	1/2-73-R-06-ES	965.00
3.0 - 20 GPH	1/2"	1/2-71-R-20-ES	555.00	1/2-72-R-20-ES	1260.00	1/2-73-R-20-ES	965.00
5.0 - 60 GPH	1/2"	1/2-71-R-60-ES	555.00	1/2-72-R-60-ES	1260.00	1/2-73-R-60-ES	965.00
15 - 100 GPH	1/2"	1/2-71-R-100-ES	555.00	1/2-72-R-100-ES	1260.00	1/2-73-R-100-ES	965.00
<b>Options:</b>	Calibrated for a specific gravity other than water					— C	\$85.00
Add as suffix to catalog number	400 PSIG working pressure maximum					— H	240.00
	350°F maximum temperature rating					— T	195.00
	Calibrated for high viscosity liquids (5 - 500 centipoise)					— V	85.00
	Two setpoint relays (high/low alarm) (Requires 24 VDC power.)					— X	350.00
	Gasketed Meter Case - NEMA 4X					— D	50.00

### Model Selection Guide for Air or Gas

Standard mounting is horizontal, (R) designates flow going to the right. For other configurations, call Lesman.

Flow Rate	NPT Connection	Material					
		Bronze		Monel		Stainless Steel	
		Catalog No.	Price	Catalog No.	Price	Catalog No.	Price
1.5 - 10 SCFM	1/4"	1/4-71-R-10-I	\$530.00	1/4-72-R-10-I	\$1235.00	1/4-73-R-10-I	\$940.00
4.0 - 30 SCFM	1/4"	1/4-71-R-30-I	530.00	1/4-72-R-30-I	1235.00	1/4-73-R-30-I	940.00
1.5 - 10 SCFM	1/2"	1/2-71-R-10-I	530.00	1/2-72-R-10-I	1235.00	1/2-73-R-10-I	940.00
4.0 - 30 SCFM	1/2"	1/2-71-R-30-I	530.00	1/2-72-R-30-I	1235.00	1/2-73-R-30-I	940.00
5.0 - 60 SCFM	1/2"	1/2-71-R-60-I	530.00	1/2-72-R-60-I	1235.00	1/2-73-R-60-I	940.00
5.0 - 60 SCFM	3/4"	3/4-71-R-60-I	590.00	3/4-72-R-60-I	1335.00	3/4-73-R-60-I	1045.00
15 - 100 SCFM	3/4"	3/4-71-R-100-I	590.00	3/4-72-R-100-I	1335.00	3/4-73-R-100-I	1045.00
30 - 200 SCFM	3/4"	3/4-71-R-200-I	590.00	3/4-72-R-200-I	1335.00	3/4-73-R-200-I	1045.00
30 - 200 SCFM	1"	1-71-R-200-I	615.00	1-72-R-200-I	1515.00	1-73-R-200-I	1200.00
50 - 600 SCFM	1-1/2"	1.5-71-R-600-I	685.00	1.5-72-R-600-I	1675.00	1.5-73-R-600-I	1345.00
50 - 600 SCFM	2"	2-71-R-600-I	780.00	2-72-R-600-I	1830.00	2-73-R-600-I	1435.00
150 - 1000 SCFM	2"	2-71-R-1000-I	780.00	2-72-R-1000-I	1830.00	2-73-R-1000-I	1435.00
400 - 3000 SCFM	3"	3-71-R-3000-I	960.00	3-72-R-3000-I	2595.00	3-73-R-3000-I	1485.00
<b>For Low Flow Applications</b>							
5.0 - 40 SCFH	1/2"	1/2-71-R-40-IES	640.00	1/2-72-R-40-IES	1345.00	1/2-73-R-40-IES	1050.00
15 - 100 SCFH	1/2"	1/2-71-R-100-IES	640.00	1/2-72-R-100-IES	1345.00	1/2-73-R-100-IES	1050.00
30 - 200 SCFH	1/2"	1/2-71-R-200-IES	640.00	1/2-72-R-200-IES	1345.00	1/2-73-R-200-IES	1050.00
50 - 400 SCFH	1/2"	1/2-71-R-400-IES	640.00	1/2-72-R-400-IES	1345.00	1/2-73-R-400-IES	1050.00
<b>Options:</b>	<b>Add as suffix to catalog number</b>					— X	350.00
	Two setpoint relays (high/low alarm) (Requires 24 VDC power.)						

**Note:** Minimum pressure of 10 PSI is required to operate these units.

Pressure Transmitters

Anderson Greenwood Instrument Valves

Level Measurement Instruments

Flow Measurement Instruments

Solids Flow and Motion

Actuator Motors and Pneumatic Drives



# Direct Reading Flowmeter for Liquid and Gas

## Features

- Accuracy  $\pm 3\%$  full scale
- Repeatability 1% full scale
- Rangeability 6:1
- Flow rates up to 3,000 GPM liquid or 20,000 SCFM gas
- Low pressure drop
- For horizontal and vertical pipes
- Rugged metal construction
- Compact design
- Optional alarms and output signals

Shown with 4-20 mA loop-powered two-wire indicator. Displays 4-1/2 digits for flow rate, 8 digits for totalization. Includes scaled, open collector output for remote totalizer, and square root extraction for use with W3 solid-state strain gauge.

The RCM Series 8000 Flo-Gage® is designed for larger pipe sizes and mounts between adjoining flanges. The meter fits between all standard 150# and 300# ANSI flanges, as well as DIN PN10 and PN16, JIS, and AS.

Install the Flo-Gage just as you would install an orifice plate, with flat gaskets and bolts (order separately). For more information, see the following pages on RCM differential pressure, direct-reading flowmeters.

## Specifications

**Mounting:** Horizontal (standard), with flow going to the right. Other configurations available.

**Operating Conditions:** Temperature: 212°F max. standard, 350°F optional; Pressure: 180 PSIG max. standard, 400 PSIG optional

**Materials:** Housing: Super ABS; Body: Bronze, Monel, or 316 SS; Movement: Bronze or SS; Seals: Buna-N, Viton, Ethylene Propylene, or Teflon™; Crystal: Super ABS

**Options:** Relay: High/Low alarms; Output: 4-20 mA, 0-1000 Hz frequency. Optional Digital Display.



## Model Selection Guide

Standard mount is horizontal, with flow to the right (R). Call for other configurations.

Range GPM Liquid	Fittings Flange Size	Material						Options and Price Adders		
		Bronze		Monel		Stainless Steel		Hi/Low Alarm -X	4-20 mA Output -W	0-1000 Hz Output -Y
		Catalog No.	Price	Catalog No.	Price	Catalog No.	Price			
0.3 - 2.0	1/2"	1/2-81-R-02	\$445.00	1/2-82-R-02	\$1150.00	1/2-83-R-02	\$855.00	\$350.00	\$600.00	\$600.00
0.4 - 3.0	1/2"	1/2-81-R-03	445.00	1/2-82-R-03	1150.00	1/2-83-R-03	855.00	350.00	600.00	600.00
0.5 - 4.0	1/2"	1/2-81-R-04	445.00	1/2-82-R-04	1150.00	1/2-83-R-04	855.00	350.00	600.00	600.00
0.5 - 6.0	1/2"	1/2-81-R-06	445.00	1/2-82-R-06	1150.00	1/2-83-R-06	855.00	350.00	600.00	600.00
1.5 - 10	1/2"	1/2-81-R-10	445.00	1/2-82-R-10	1150.00	1/2-83-R-10	855.00	350.00	600.00	600.00
0.5 - 6.0	3/4"	3/4-81-R-06	505.00	3/4-82-R-06	1150.00	3/4-83-R-06	960.00	350.00	600.00	600.00
1.5 - 10	3/4"	3/4-81-R-10	505.00	3/4-82-R-10	1150.00	3/4-83-R-10	960.00	350.00	600.00	600.00
2.0 - 15	3/4"	3/4-81-R-15	505.00	3/4-82-R-15	1150.00	3/4-83-R-15	960.00	350.00	600.00	600.00
3.0 - 20	3/4"	3/4-81-R-20	505.00	3/4-82-R-20	1150.00	3/4-83-R-20	960.00	350.00	600.00	600.00
2.0 - 15	1"	1-81-R-15	530.00	1-82-R-15	1430.00	1-83-R-15	1115.00	350.00	600.00	600.00
3.0 - 20	1"	1-81-R-20	530.00	1-82-R-20	1430.00	1-83-R-20	1115.00	350.00	600.00	600.00
5.0 - 40	1"	1-81-R-40	530.00	1-82-R-40	1430.00	1-83-R-40	1115.00	350.00	600.00	600.00
4.0 - 30	1-1/2"	1.5-81-R-30	600.00	1.5-82-R-30	1590.00	1.5-83-R-30	1260.00	350.00	600.00	600.00
5.0 - 40	1-1/2"	1.5-81-R-40	600.00	1.5-82-R-40	1590.00	1.5-83-R-40	1260.00	350.00	600.00	600.00
5.0 - 60	1-1/2"	1.5-81-R-60	600.00	1.5-82-R-60	1590.00	1.5-83-R-60	1260.00	350.00	600.00	600.00
15 - 100	1-1/2"	1.5-81-R-100	600.00	1.5-82-R-100	1590.00	1.5-83-R-100	1260.00	350.00	600.00	600.00
5.0 - 40	2"	2-81-R-40	695.00	2-82-R-40	1745.00	2-83-R-40	1350.00	350.00	600.00	600.00
5.0 - 60	2"	2-81-R-60	695.00	2-82-R-60	1745.00	2-83-R-60	1350.00	350.00	600.00	600.00
15 - 100	2"	2-81-R-100	695.00	2-82-R-100	1745.00	2-83-R-100	1350.00	350.00	600.00	600.00
20 - 150	2"	2-81-R-150	695.00	2-82-R-150	1745.00	2-83-R-150	1350.00	350.00	600.00	600.00
30 - 200	2"	2-81-R-200	695.00	2-82-R-200	1745.00	2-83-R-200	1350.00	350.00	600.00	600.00
30 - 200	3"	3-81-R-200	875.00	3-82-R-200	2510.00	3-83-R-200	1400.00	350.00	600.00	600.00
40 - 300	3"	3-81-R-300	875.00	3-82-R-300	2510.00	3-83-R-300	1400.00	350.00	600.00	600.00
50 - 400	3"	3-81-R-400	875.00	3-82-R-400	2510.00	3-83-R-400	1400.00	350.00	600.00	600.00
60 - 500	3"	3-81-R-500	875.00	3-82-R-500	2510.00	3-83-R-500	1400.00	350.00	600.00	600.00
40 - 300	4"	4-81-R-300	950.00	N/A	—	4-83-R-300	1445.00	350.00	600.00	600.00
50 - 400	4"	4-81-R-400	950.00	N/A	—	4-83-R-400	1445.00	350.00	600.00	600.00
50 - 600	4"	4-81-R-600	950.00	N/A	—	4-83-R-600	1445.00	350.00	600.00	600.00
100 - 800	4"	4-81-R-800	950.00	N/A	—	4-83-R-800	1445.00	350.00	600.00	600.00
50 - 600	6"	6-81-R-600	1145.00	N/A	—	6-83-R-600	1665.00	350.00	600.00	600.00
100 - 800	6"	6-81-R-800	1145.00	N/A	—	6-83-R-800	1665.00	350.00	600.00	600.00
150 - 1000	6"	6-81-R-1000	1145.00	N/A	—	6-83-R-1000	1665.00	350.00	600.00	600.00
300 - 2000	6"	6-81-R-2000	1145.00	N/A	—	6-83-R-2000	1665.00	350.00	600.00	600.00
50 - 600	8"	8-81-R-600	1575.00	N/A	—	8-83-R-600	2060.00	350.00	600.00	600.00
150 - 1000	8"	8-81-R-1000	1575.00	N/A	—	8-83-R-1000	2060.00	350.00	600.00	600.00
300 - 2000	8"	8-81-R-2000	1575.00	N/A	—	8-83-R-2000	2060.00	350.00	600.00	600.00
400 - 3000	8"	8-81-R-3000	1575.00	N/A	—	8-83-R-3000	2060.00	350.00	600.00	600.00

**Note:** For Gases — Add Suffix I and \$85.00. Specify Gas, Pressure and Temperature.

## Turbine Flowmeters for Gas and Liquid Service



**5-year warranty — longest for any turbine flowmeter! Only from Hoffer.**

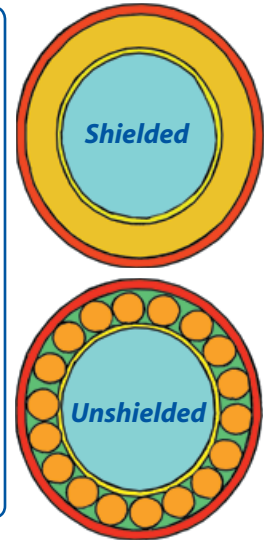
Meter with Rate Indicator/Totalizer

**HOFFER FLOW CONTROLS, INC.**  
The Turbine Flowmeter Company™

**Need help with turbine flowmeters? Fill out the Hoffer Flow Controls application datasheet from [www.Lesman.com/datasheets](http://www.Lesman.com/datasheets) and fax it back to Lesman.**

### The Facts on Ball Bearings

- ✓ Offer a sturdy, low drag arrangement
- ✓ Meters with ball bearings have wide rangeability and excellent linearity
- ✓ Replacement is easy, and there's no need for recalibration
- ✓ Dual bearings provide greater stability and longer life
- ✓ Available only in 440C stainless steel
- ✓ Provide excellent service in fluids such as fuel oil, vegetable oils, hydraulic oils, and cryogenics
- ✓ Not suitable for extended service in acids or fluids carrying particulate matter



### Shielded, Ceramic Ball Bearings for Longer Life! Used Exclusively by Hoffer

A molydisulfide lubricating agent is impregnated in bearing race. Bearings do not rely on process fluid for lubrication. The shielded bearing race protects the bearings against fouling from fine particulate in process liquid or gas.

This bearing type provides excellent service in dry fluids that offer little natural lubricity, such as cryogenic liquids.

Entrained air in process line on startup will not cause bearings to seize or fail (provided flow rates are within rated capacity of the flowmeter). Open race ball bearings used by other turbine flowmeter manufacturers can fail from air spinning on startup.

Hoffer's shielded ball bearings support a wide operating temperature range (-450° to 450°F).

Other turbine flowmeter manufacturers provide shielded, self-lubricating ball bearings. But, it is important to note that these ball bearings have a shield on one side of the bearing race only. These partially shielded ball bearings are susceptible to fouling from small particulate in the fluid stream.

## Low Cost Industrial STAR Series for Liquid Flow Measurement

**Call for pricing!**



### Features

- Simple construction allows for rugged and dependable service at low cost
- Off-the-shelf delivery; Companion electronics available in 10 to 15 days
- Outstanding accuracy at low cost, without compromise in design

Hoffer offers a full line of precision turbines for liquid and gas, mini-flowmeters for low-flow liquid and gas applications, and profile insertion flowmeters for liquids and gases.

Spare parts are available for the STAR Series to facilitate field repairs.

### Specifications

- Flowmeter Size:** 1/4" to 3" diameter
- Repeatable Flow Range:** 0.25 to 800 GPM
- Accuracy and Linearity:** ±1.0% reading or better
- Repeatability:** ±0.1% reading or better
- Temperature:** -450° to 350°F with UB bearing; -450° to 450°F with C bearing
- Signal Output:** 10 MVRMS or greater with 10KΩ load at minimum flow rate
- Materials:** 316 stainless steel; Rotor: 17.4 PH stainless steel; Bearings: 440C stainless steel or hard carbon composite

**For product pricing and part numbers, call Lesman.**

Pressure Transmitters  
Anderson Greenwood Instrument Valves  
Level Measurement Instruments  
Flow Measurement Instruments  
Solids Flow and Motion  
Actuator Motors and Pneumatic Drives

## Turbine Flowmeters

### HO Series for Gas Service

#### Features

- Radio frequency (RF or MCP) pickup coils provide wide rangeability
- Four blade angles available (15°, 20°, 25°, and 30°) per flowmeter size for optimum performance
- Shielded, self-lubricating ball bearings provide extended life



Hoffer turbine flowmeters offer high accuracy measurement of the volumetric flow of gases over wide ranges and can be used as the flow transducer in many gas measurement applications. The flowmeters measure the actual volume displacement flowing in a line (ACF or ACFM). You can use a Hoffer gas flow computer to measure flow in CFM (SCF or SCFM) and pounds per hour.

The design of the gas meters minimizes drag effects, which results in wide ranges and long-term accuracy. All meters are equipped with special self-lubricating, long-life ball bearings and low-drag, magnetic, modulated carrier or Redi-Pulse pickups.

The HO Series of gas turbine flowmeters is available with standard flanged, 37° flared, NPT, or special end fittings. Flared and flanged end connections are best suited due to the even transition at the connection. Hazardous and weatherproof coil enclosures are available.

#### Specifications

**Flowmeter Size:** 1/2" x 1/4" to 12" diameter

**Linear Range:** 0.15 to 12,000 ACFM

**Overrange:** 150% of maximum flow (intermittently)

**Linearity:** ±1% reading

**Repeatability:** ±0.25% over usable range

**Temperature:** -450° to 350°F, to 400°F intermittent heat

**Bearings:** Ceramic hybrid ball bearings only

**Materials:** 316 SS. Other materials available for corrosive applications.

**End Fittings:** MS flared and flanged styles recommended

### HO Series for Liquid Service

#### Features

- Low cost
- Outstanding accuracy
- Provides wide flow ranges (10:1 to 100:1 turndown ranges available)
- Wide variety of process connections and construction materials
- Operates over wide range of temperatures and pressures



The wide range of construction options of Hoffer's HO Series of turbine flowmeters lets you select the best combination of useful range, corrosion resistance, and operation life for your application.

The options also permit integral mounting of explosion-proof enclosures containing terminal blocks or signal conditioners/converters. Pickups are available in high output, low drag, modulated carrier, and Redi-Pulse styles.

#### Specifications

**Size:** 1/4" to 12" diameter

**Linear Range:** 0.35 to 12,000 GPM

**Overrange:** 150% of maximum flow (intermittently)

**Linearity:** ±0.5% reading (±0.25% typical) over tabulated linear flow range

**Repeatability:** ±0.1% (±0.05% typical) over tabulated repeatable range

**Pressure Drop:** 4 to 5 PSI at maximum linear flow rate at one CSTK

**Turndown:** 10:1 to 100:1

**Temperature:** -450° to 450°F; High temperature option to 850°F

**End Fittings:** NPT, MS flared, and flanged; Others available

**Bearings:** Ceramic hybrid ball bearings; Sleeve bearings in tungsten carbide; Teflon and hard carbon composite available

**Materials:** 316 SS. Other materials available for corrosive applications.

**For product pricing and model numbers, fill out the Hoffer Flow Controls application datasheet from [www.Lesman.com/datasheets](http://www.Lesman.com/datasheets) and fax it back to Lesman.**

### Sanitary Turbine Flowmeter



- Meets 3A Sanitary Standard #28-02 for measuring process liquids
- Suitable for steam cleaning
- Complete line of installation kits to adapt to most line sizes

**For product pricing and model numbers, call Lesman.**

#### Specifications

**Turbine Size:** 1/4" to 3"

**Tri-Clamp Size:** 1-1/2" to 4"

**Linear Flow Ranges:** 0.35 to 650 GPM

**Accuracy and Linearity:** ±0.5% reading or better

**Repeatability:** ±0.1% reading or better

**Temperature:** -450° to 450°F, process fluid with standard coil; -450° to 850°F, process fluid with high-temperature coil; 1000°F intermittently

**Signal Output:** 10 MVRMS or greater with 10KΩ load at min. flow rate

**Materials:** 316 SS; Rotor: 17.4 PH stainless steel; Retaining rings: 15.7 MO PH stainless steel when required; Bearings: Tungsten carbide or hard carbon composite



# Turbine Flowmeters for Liquid Service

## Lo-Co Series

### Features

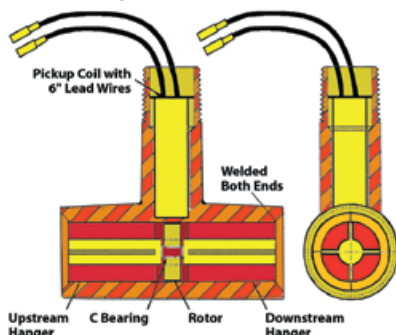
- Rugged, industrial meter with all stainless steel construction
- Hard carbon composite sleeve bearing for compatibility with almost all corrosive fluids and noncorrosive liquids
- Works well on water flow applications, including deionized, demineralized, and potable water
- Available with a PET signal conditioner/converter

Hoffer Lo-Co series flowmeters are ideal if you are working with a limited budget. They're a perfect fit for liquid utility and OEM applications. These flowmeters provide you with the most economical solution and feature all stainless steel construction and precision machined components.

The Lo-Co Series is available in nine line sizes and can be interfaced with Hoffer's complete line of electronics, including signal conditioners, converters, rate indicators/totalizers, and flow computers.

### Inside the Lo-Co

The Lo-Co Series flowmeter has a simple, three-piece internal construction that uses two hangers (flow straighteners) and a rotor assembly with a hard carbon composite sleeve bearing press fit into the hub of the rotor. The rotor assembly rides on and is supported by a shaft included with the downstream hanger. The flow straightening sections are tack welded into place for added durability in abrasive flow applications.



### Specifications

- Flowmeter Size:** 1/4" to 2" diameter
- Flow Range:** 0.45 to 225 GPM normal; 0.35 to 275 GPM extended
- Accuracy:** ±1.0%; **Repeatability:** ±0.1% reading
- Temperature:** -150° to 250°F
- Turndown:** 10 MVRMS or greater with 10KΩ load at minimum flow rate
- End Fittings:** NPT and screw-on flanges
- Riser:** 3/8" NPTM; explosion-proof
- Materials:** All 316 SS with 17.4 PH rotor; **Bearings:** Hard carbon composite; **Coil:** Magnetic pickup coil with pigtail leads, approx. 6" lead length with crimped, insulated disconnects
- Mounting:** Horizontal, vertical (flow up or down)

### Model Selection Guide

All Lo-Co series models shown have male NPT process connections, hard carbon sleeve bearing, Mag coil M-L3/8X1.52 pickup coil, PET-2 riser and 4-20 mA 3-wire analog output mounted in ELBY enclosure (Class I, Div 1 and 2, Groups B-D, Class II, Div 1 and 2, Groups E-G, Class III).

**For flanged versions and special options, call Lesman at 800-953-7626.**

Process Connection	Turbine Flowmeter	Flow Rate (GPM)		Analog Output	Model Number	Price
		Min	Max			
1/2"	1/4"	0.45	4.5	4-20 mA, 3-wire	LC 1/2 x 1/4-0.45-4.5-C-1M/XB-2-NPT	\$800.00
1/2"	3/8"	0.8	8.0	4-20 mA, 3-wire	LC 1/2 x 3/8-0.8-8.0-C-1M/XB-2-NPT	800.00
1/2"	1/2"	1.5	10	4-20 mA, 3-wire	LC 1/2 x 1/2-1.5-10-C-1M/XB-2-NPT	800.00
1/2"	5/8"	1.7	17	4-20 mA, 3-wire	LC 1/2 x 5/8-1.7-17-C-1M/XB-2-NPT	800.00
3/4"	3/4"	3	30	4-20 mA, 3-wire	LC 3/4 x 3/4-3-30-C-1M/XB-2-NPT	800.00
1"	1"	6	60	4-20 mA, 3-wire	LC 1 x 1 -6-60-C-1M/XB-2-NPT	800.00
1-1/4"	1-1/4"	10	100	4-20 mA, 3-wire	LC 1-1/4 x 1-1/4 -10-100-C-1M/XB-2-NPT	800.00
1-1/2"	1-1/2"	13	130	4-20 mA, 3-wire	LC 1-1/2 x 1-1/2 -13-130-C-1M/XB-2-NPT	800.00
2"	2"	15	225	4-20 mA, 3-wire	LC 2 x 2 -15-220-C-1M/XB-2-NPT	800.00

Want to find the right turbine flowmeter? Fill out the Hoffer application datasheet from [www.Lesman.com/datasheets](http://www.Lesman.com/datasheets) and fax it back to Lesman at 630-595-2386.



## PET Signal Conditioners/Converters

### Preamp Signal Conditioner

The PET Series mag-preamp converts low-level sinusoidal signals into stable square wave pulses. The conditioner is built to fit a compact ELBY-type explosion-proof enclosure.

- Supply Voltage:** 7.5-30 VDC regulated, 12-30 VDC regulated
- Supply Current:** ≤3 mA (0-5V), ≤12 mA (0-10V), ≤20 mA (OC), ≤5 mA
- Output Signal:** R load >20kΩ; 0-10V; 0-5V; Open collector, NPN
- Frequency:** 5 Hz to 10 kHz
- Input Sensitivity:** 12 mVpp
- Distance Pickoff/Preamp:** 500 feet maximum

### Digital to Analog Converter

The PET Series converter receives frequency input and converts it to a proportional 4-20 mA or 0-10V analog output. It is designed to fit a compact ELBY-type explosion-proof enclosure. Zero and span adjustments make it easy to calibrate to almost any measuring range.

- Supply Voltage:** 9-30 VDC
- Supply Current:** <4 mA
- Input Protection:** 100 VAC, reversed leads
- Output Protection:** Short to 0 VDC, common or signal out continuous
- Frequency Input:** High: 1100 Hz to 10 kHz; Low: 75 Hz to 1200 Hz
- Linearity:** 0.5% maximum, 0.15% typical

Pressure Transmitters

Anderson Greenwood Instrument Valves

Level Measurement Instruments

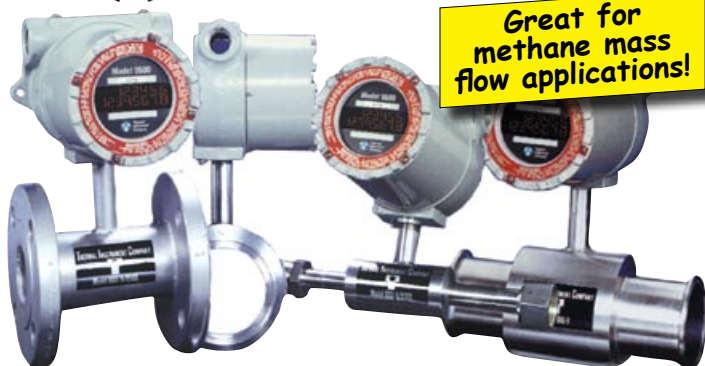
Flow Measurement Instruments

Solids Flow and Motion

Actuator Motors and Pneumatic Drives



## Thermal Dispersion Mass Flowmeters



Great for methane mass flow applications!

### Model 600-9 Inline Design

The Model 600-9 thermal mass flowmeter provides reliable, accurate flow measurement with no obstructions to the actual flow path. It handles liquids, slurries, gases, and homogeneous solids through a wide range of flow rate, temperature, pressure, viscosity, abrasiveness, or chemical compositions.

The 600-9's sensor is built into the meter's outer surface and is completely protected from adverse process conditions. The spool matches the actual flow pipe in dimensions and construction material, and is impervious to fluid, as is the rest of the line.

System electronics include the flow analyzer, temperature compensator, and signal conditioner to provide a linear output directly proportional to mass flow. An optional output provides continuous temperature measurement.

### Specifications

**Accuracy:** Better of  $\pm 1\%$  full scale or 4% reading; **Repeatability:** Better than 0.2% reading; **Linearity:** 0.5%

**Temperature Limits:**  $-20^{\circ}$  to  $350^{\circ}\text{F}$ ; **Calibrated Temperature Range:**  $\pm 50^{\circ}\text{F}$

**Pressure Limits:** 0 to 1200 PSI (Max. pressure ratings depend on pipe size.)

**Pressure Range:** *Liquids:* Unlimited; *Gases:* 20 atmospheres

**Response Time:** *Liquids:* Less than 1/2 second; *Gases:* 1 to 2 seconds typical, 4 to 8 seconds worst case

**Pressure Drop:** Negligible, completely unobstructed flow path

**Viscosity:** Up to 5000 cps

**Flow Rate:** (Volumetric flow units for gases should be expressed in standard or normal units.) *Liquids:* 0.003 grams/min minimum full scale; *Gases:* 2 SLPM minimum full scale. Maximum determined by pipe capacity.

**Flow Range:** 10:1 (100:1, 1000:1, multiple ranges available)

**Flow Element:** Meets NEMA 4, 7, and 9 explosion-proof requirements. *Electrical connection:* 1/2"; *Construction:* 316 SS standard (316 SS, 304 SS Hastelloy®, Monel, Inconel®, tantalum, titanium, gold, platinum, nickel, Carpenter 20®, glass); *Connections:* Flanged, Swagelok®, NPT, VCR, VCO, Tri-Clamp, concentric reducer, flared, sanitary, high pressure fittings, wafer, barbed, welded, others; *Coatings:* Teflon®, tungsten, carbide, HMF®

**Remote Flow Transmitter:** *Model 9200:* Panel or wall mount; *Model 926A:* NEMA 4 JIC type; *Model 926B:* NEMA 4, 7, and 9 explosion-proof. Others available upon request

**Outputs:** Standard 4-20 mA DC isolated/1000 $\Omega$  max. load (0-10V DC, 0-5V DC, 10-50 mA DC, pulse output)

**Options:** Digital flow indication, 8-digit LED totalizer, batch counter, hi/lo alarm setpoints, bidirectional flow, temperature output, multiple ranges

Call or visit our website for more information.

Need help with thermal dispersion mass flowmeters? Fill out the Thermal Instruments application datasheet from [www.Lesman.com/datasheets](http://www.Lesman.com/datasheets) and fax it back to Lesman.

### Model 62-9 Insertion Design



The Thermal Model 62-9 flow probe is designed to measure the flow rates of gases, liquids, or slurries in stacks, irregularly shaped lines, and process ducts. Unlike other probe flowmeters, the 62-9 has no apertures that can become clogged with particles or distorted by heat. The sensing element is located on the probe's inside leading edge and has no contact with the flow stream.

The 62-9 can be made of pipe or tubing using any metal compatible with the flow stream of a given application. It can also be built with extra length, so it can be inserted through a gate valve and packing gland. This will allow easy insertion and removal while the pipe is in use.

The thermal probe's electrical connections can be made either in a gasketed-type conduit or an explosion-proof conduit. For applications over  $350^{\circ}\text{F}$ , the sensors are made of platinum embedded in a ceramic matrix, securely bonded to the pipe's inside diameter. An additional temperature sensor can also be installed, as well as independent circuitry to provide fluid temperature readout signals.

### Specifications

**Flow Range:** 10:1 (100:1, 1000:1, multiple ranges available)

**Flow Limits:** (Volumetric flow units for gases should be expressed in standard or normal units.) *Liquids:* 0.02 FPS to 20 FPS FS; *Gases:* 40 SFPM to 15000 SFPM FS. Maximum determined by pipe capacity.

**Accuracy:** Better of  $\pm 0.5\%$  full scale or 2% reading. Calibrated by weight or volume (0.5% FS). **Repeatability:** Better than 0.2% reading; **Linearity:** 0.5%

**Temperature Limits:**  $-20^{\circ}$  to  $1100^{\circ}\text{F}$ ; **Calibrated Temperature Range:**  $\pm 50^{\circ}\text{F}$

**Pressure Limits:** 0 to 60000 depending on size PSI

**Response Time:** *Liquids:* Less than 1/2 second; *Gases:* 1 to 2 seconds typical, 4 to 8 seconds worst case

**Viscosity:** Up to 5000 cps

**Flow Element:** Meets NEMA 4, 7, and 9 explosion-proof standards. *Construction:* 316 SS standard; *Connections:* Flanged, Swagelok®, NPT sanitary Tri-Clamp, hot tapping, retractable, saddle mount; *Coatings:* Teflon®, HMF®, Nedox®

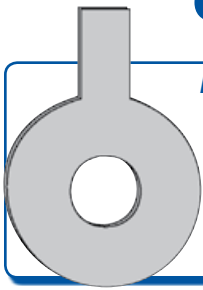
**Remote Flow Transmitter:** *Model 9200:* Panel mount or NEMA 4 box; *Model 926A:* NEMA 4 JIC; *Model 926B:* NEMA 4, 7, and 9 explosion-proof

**Pipe Size:** 1" minimum

**Outputs:** Standard 4-20 mA DC isolated/1000 $\Omega$  max. load (0-10V DC, 0-5V DC, 10-50 mA DC, pulse output)

**Options:** Digital flow indication, 8-digit LED totalizer, batch counter, hi/lo alarm setpoints, bidirectional flow, temperature output, multiple ranges, flow profile, multipoint, averaging

# Orifice Plates, Flange Unions, and Pitot Tubes



**Please allow 10 days for delivery.**

If you need your order faster, just let us know. In most cases, we can arrange for overnight or second-day shipping. Or, we'll work with you to arrange delivery by local messenger service. Same-day shipping is available for a small premium.

## Paddle-Type Orifice Plates

### Build a Paddle Type Orifice Plate Part Number

Pipe Size	Flange Rating	Full Face Flange?	Plate Thickness	Plate Material	Bore Style	Weep Hole?
----	--	--	01	--	C	-
See Chart Below	See Chart Below	Yes=FF No=Blank	1/8"	304SS=04 316SS=16	Concentric	Drain or Vent=W No=Blank

What bore size do you need? \_\_\_\_\_  
*Not sure what bore size you need? We can calculate it for you. (\$35 flat fee.)*  
 If you need a drain or vent, specify Pipe Schedule or ID: \_\_\_\_\_

## Raised Face Weld Neck Orifice Flange Unions

All raised face flange unions are made of A105 carbon steel and include nuts, bolts, and 1/16" gasket.

### Build a Raised Face Weld Neck Orifice Flange Part Number

Pipe Size	Flange Rating	Material Grade	Face Style	Flange Style	Pipe Schedule	Hardware
----	--	CS	R	WN	40	C
See Chart Below	300#=03 600#=06 (No 150#)	A105 Carbon Steel	Raised Face	Weld Neck	Schedule 40	Complete with Nuts, Bolts, and Gaskets

### Pipe Size and Flange Rating Options

**(1) Select Your Pipe Size**

Pipe Size	Code	Pipe Size	Code	Pipe Size	Code
0.5"	0050	3"	0300	14"	1400
0.75"	0750	4"	0400	16"	1600
1"	0100	5"	0500	18"	1800
1.25"	0125	6"	0600	20"	2000
1.5"	0150	8"	0800	24"	2400
2"	0200	10"	1000	30"	3000
2.5"	0250	12"	1200	36"	3600

**(2) Specify the Flange Rating**

Flange	Code	Flange	Code	Flange	Code
150#	01	300#	03	600#	06

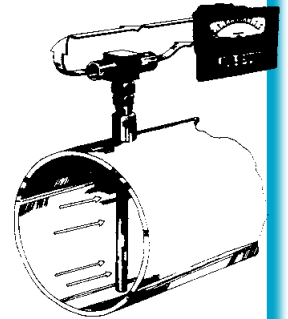
**Call, fax, or e-mail your completed part number to Lesman for a quote on price and delivery. Prices are valid for two weeks from the quote date.**

## Other Flow Elements Available from Lesman

### Pitot Tubes

Inline sensors for measuring flow in pipe lines from 1/2" to 3" nominal size. Uses two averaging probes of equal area to sense differential pressure loss while providing minimum permanent pressure loss.

Probe or insert-type sensors for measuring flow in pipelines from 3" to 24", using equal area double averaging pitot tubes for low permanent pressure loss.



### Venturi Flow Elements

#### Herschel Type

Classic style Venturi tube designed in accordance with ASME or ISO standards and offers a constant degree of accuracy and high repeatability.



#### Venturi-Nozzle Type

Design uses the classical ASME and ISO standards for highest accuracy, predictability, and repeatability. Flow conditioning generated by unique hydraulic shape provides a stable signal in a wide range of flows.



#### Low-Loss Design (Short-Form)

Design provides proven field performance in a variety of applications. Low installation cost due to short laying length, reduced operating costs, and a wide range of sizes and materials add up to the right choice for your needs.

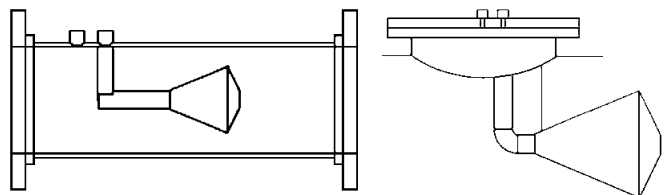


### Bluff Body Differential Pressure Flowmeters

The bluff body flowmeter is the only differential pressure flowmeter that fully conditions the flow prior to measurement. It's ideal for lines with limited straight piping. This flowmeter provides repeatable accuracy up to ±0.5% flow rate, even under the most difficult flow conditions, and over a wide range of Reynolds numbers.

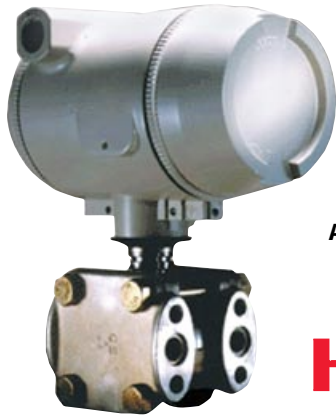
Because this meter can accurately measure disturbed flow, it doesn't require the upstream or downstream straight pipe runs of many other flowmeters; so, it can fit where other flowmeters can't because of limited space or weight requirements.

**Left:** Precision flow tube, **Right:** Insertion weld-on saddle.



**Need help finding the flow element you need? Fill out the application datasheet from [www.Lesman.com/datasheets](http://www.Lesman.com/datasheets) and send it to Lesman for engineering review.**

# Smart Multivariable Flowmeter for Gas and Steam



**Ranges**  
**Differential Pressure:**  
 ±400" H<sub>2</sub>O (±1000 mbar)  
**Absolute Pressure:** 0 to 750 PSIA  
 (0 to 52000 mbar)  
**Process Temperature:** -328° to  
 842° F (-200° to 450° C)

# Honeywell

## Features

- Single sensor measures absolute and differential pressure from one pipe intrusion
- Calculations for volumetric or mass flow rate, linear or square root output conformity for differential pressure, and engineering units display for PV, flow rates
- Improves efficiency in commissioning, start-up, and on-going maintenance through local and remote interface with SmartLine Configuration Toolkit and host system

## Condensed Specifications

**Temperature:** -40° to 200°F; *Meter Body:* -40° to 257°F  
**Pressure:** 1" H<sub>2</sub>O Abs for 2 hrs @ 158°F min.; *Overpressure:* 3000 PSI  
**Two-Wire Output:** 4–20 mA or digital (DE protocol)  
**RFI Protection (Std.):** Negligible effect (20–1000 MHz @ 30V/meter)  
**Materials:** *Process Interface:* 316L SS, Hastelloy C-276, Monel, Tantalum diaphragms; 316 SS, Carbon Steel, Monel, Hastelloy process heads; Teflon, Viton head gaskets; Carbon Steel, A286 SS (NACE) bolting; *Mounting Bracket:* Carbon Steel; *Electronics Housing:* Low Copper Aluminum  
**Hazardous Conditions:** Housing meets NEMA 4 (watertight) and NEMA 7 (explosion-proof); FM, CSA, ATEX approval available.

## Differential Pressure Measurement

**Upper Range Limit (URL):** 400" H<sub>2</sub>O (1000 mbar)  
**Turndown Ratio:** ±400:1  
**Minimum Span:** 20" H<sub>2</sub>O square root; 1" H<sub>2</sub>O linear  
**Zero Elevation/Suppression:** No limit (min. span) within ±100% URL.  
**Accuracy:** *Analog Mode:* Greater of ±0.10% calibrated span or URV; *Digital Mode:* Lesser of ±0.075% calibrated span or ±0.15% reading.

## Absolute Pressure Measurement

**Upper Range Limit (URL):** 750 PSIA; *Minimum Span:* 5 PSIA  
**Turndown Ratio:** 150:1  
**Accuracy:** *Analog Mode:* Greater of ±0.10% calibrated span or URV; *Digital Mode:* Lesser of ±0.075% calibrated span or ±0.15% reading.

## Temperature Measurement

**Range (Pt100Ω RTD):** -328° to 1562° F operating; 1.08°F accuracy  
**Adjustment Range:** Limit to zero/span within range.  
**Accuracy (Reference):** *Analog Mode:* Digital accuracy + Output D/A accuracy; *Digital Mode:* Digital accuracy; **(Output D/A):** ±0.025% of span  
**Thermocouple Burnout:** User-selectable detection: ON = up- or down-scale failsafe action, critical status message for any open lead.

View full specifications online at [Lesman.com](http://Lesman.com)



**Looking for differential pressure transmitters for your flow applications? See pages 177 and 182-183.**

## Ordering Instructions

Make one selection from each table section below. Check any restriction letters or notes (E.g.:N3) to be sure the unit is available. A finished catalog number looks like this: SMA110-E1A-00000-S2,MB,F1C3-XXXX

## Model Selection Guide

Description		Catalog Number	Availability			Price
Differential Pressure Range		Pressure Range				
0"-1" / 25" H <sub>2</sub> O		0-100 PSIA	SMA110	↓		\$2743.00
0"-1" / 400" H <sub>2</sub> O		0-750 PSIA	SMA125	↓		2683.00
0"-1" / 400" H <sub>2</sub> O		0-3000 PSIG	SMG170	↓		2743.00
Material	Process Head	Vent/Drain Valve, Plug	Barrier Diaphragm			
	Carbon Steel	316 SS	316L SS	A	• • •	0.00
	316 SS	316 SS	316L SS	E	• • •	77.00
	Hastelloy C	Hastelloy C	Hastelloy C	J	v v	1561.00
	Monel	Monel	Monel	L	v	797.00
Fill Fluid	Silicone		_ 1 _	• • •		0.00
	CTFE		_ 2 _	• • •		57.00
Process Head	1/4" NPT		_ _ A	• • •		0.00
	1/2" NPT with Adapter (1/4" NPT Head)		_ _ H	t t t		0.00
No Selection			00000	• • •		0.00
None			00	• • •		0.00
Analog Meter (0-100 Even, 0-10 Sq. Root.)			ME	• • •		171.00
Viton Head Gaskets (1/2" Gaskets Special)			VT	• • •		0.00
Mounting Bracket — Carbon Steel			MB	• • •		19.00
Mounting Bracket — Stainless Steel			SB	• • •		73.00
Flat Mounting Bracket — Carbon Steel			FB	• • •		20.00
Lightning Protection			LP	• • •		64.00
Stainless Steel Customer Wired-On Tag (4 Lines, 28 Char/Line, User-Supplied Info.)			TG	• • •		10.00
Multivariable Transmitter Configuration			MC	• • •		86.00
Write Protection			WP	• • •		20.00
Clean for Oxygen/Chlorine Service, Certificate			OX	j j j		211.00
FM	Approval Type	Location/Class				
	Explosion Proof	CI I, Div 1, Gr A-D	1C	• • •	• • •	0.00
	Dust Ignition Proof Suitable for Non-Incendive Intrinsically Safe	CI II, III, Div 1, Gr E-G CI III, Div 1 CI I, Div 2, Gr A-D CI I, II, III, Div 1, Gr A-G				
	Explosion Proof	CI I, Div 1, Gr B-D	1J	• • •	• • •	0.00
	Dust Ignition Proof Suitable for Non-Incendive Intrinsically Safe	CI II, III, Div 1, Gr E-G CI III, Div 1 CI I, Div 2, Gr A-D CI I, II, III, Div 1, Gr A-G				

## Restrictions

- b Select only one option from this group.
- j Available only on units with CTFE fill ( \_ 2 \_ in Fill Fluid).
- t Available only with 1/2" NPT adapter flange (Options S2, T2, or V2).
- v Includes side vent drain at no added cost.
- w Available only with 316SS process heads. Not available with side vent/drain (SV).

**See page 187 for Honeywell SCT3000 smart configuration toolkit.**

**Add a three-valve manifold to your transmitter! See page 182. For 100Ω RTDs, see page 115.**

Pressure Transmitters  
Anderson Greenwood Instrument Valves  
Level Measurement Instruments  
Flow Measurement Instruments  
Solids Flow and Motion  
Actuator Motors and Pneumatic Drives

# Honeywell VersaFlow — Flowmeters for Any Application



## Electromagnetic Flowmeter

- Conductivity down to 1 uS/cm
- Temperatures to 356°F (180°C)
- Available sizes 0.1" to 80" (DN 2.5-3000)
- Stainless steel flow tube spool with carbon steel or stainless steel flanges
- Standard liner materials: PTFE, PFA, ETFE, hard rubber, and polyurethane
- Electrodes available in 316 stainless steel, Hastelloy C, platinum, titanium, tantalum, carbon, PTFE, and Cermet
- Signal converters available in wall mount, rack mount, compact, and field-ready housings
- Signal converter offers local display, infrared interface, HART communications, four isolated outputs
- Diagnostics to standards better than requested by NAMUR 2650: 100% flow sensor and converter check, 100% process/application check, 100% linearity/calibration check
- Accuracy to  $\pm 0.15\%$  measured value
- Suitable for all conductive applications
- Measures flow in any application, from clean liquids to slurries and pastes with high solids content
- Abrasion-, chemical-, and vacuum-resistant

VersaFlow magnetic flowmeter is suitable for a variety of measuring tasks and applications, including rapidly changing media, pH jumps, large amounts of solids, or pulsating flow. It delivers significant cost savings during planning, procurement, installation, and training.

VersaFlow is wired exactly like a traditional magmeter, but no earth connection to the liquid is required. This reduces the high costs involved with purchasing exotic metal grounding rings or electrodes.

A new virtual reference grounding eliminates the need for grounding electrodes or rings, reducing installation costs and potential leak points. It provides complete isolation with opto-couplers of the flow converter's input amplifier and coil power circuits. The measurement circuit "floats" at liquid's potential, sensing only the induced voltage caused by the velocity of the conductive liquid flowing through the sensor.

A calibrated flow simulator is available for magmeters to troubleshoot converter and other system indicators and controls. It replaces the flow sensor in the system and simulates no-flow and up to five flow rates to troubleshoot flow output issues.

Visit [www.Lesman.com](http://www.Lesman.com) for complete specifications.



## Coriolis Mass Flowmeter

- Innovative twin measuring tube sensors with optimized flow divider for minimal pressure loss
- For applications up to 266°F (130°C)
- Measures from 0.3 to 430,000 kg/h flow
- Pressure-resistant jacket to 1450 PSI (100 bar)
- Excellent zero stability
- Available with hygienic process connections for food and pharmaceutical applications
- Rapid signal processing, even with product and temperature changes or sudden changes in density
- Modular electronics concept and data redundancy – sensor and plug-and-play electronics are easy to replace
- Viscous or shear-sensitive products
- Products requiring low flow velocities, products with entrained solids or gas, or products in homogeneous mixtures
- Flow and purity measurement, density, temperature, and concentration measurement

VersaFlow coriolis measures mass flow, density, volume, temperature, mass, or volume concentration and solids content with a single device. It's the only Coriolis sensor for mass flow in its class with secondary pressure containment standard. It offers a high degree of accuracy, even for problematic applications. All meters consist of a sensor and a converter. The converter is mounted integral to the sensor or remotely via a field-mount kit, a wall-mount housing, or a 19" rack-mount module.

### Condensed Specifications

**Flow Rate:** 0–240 to 0–15800 lbs/min, depending on sensor model

**Accuracy:** *Liquid:*  $\pm 0.15\%$  actual measured flow rate; *Gas:*  $\pm 0.5\%$  actual measured flow rate

**Density Measuring Range:** 25-155 Lbs/Ft<sup>3</sup> (400-2500 Kg/m<sup>3</sup>)

**Temperature Measuring Range:** -40° to 302°F (-40° to 150°C); *Accuracy:*  $\pm 1.8^\circ\text{F}$  (1°C)

**Materials:** Sensors available in Stainless steel, Titanium, Hastelloy, or Tantalum, aluminum or stainless steel housings

**Approvals:** FM, CSA, ATEX, 3A (depending on model selected)

Visit [www.Lesman.com](http://www.Lesman.com) for complete specifications.

See our viscosity table for common substances, page 485.



## Vortex Flowmeter

- Works with conductive or non-conductive liquids, industrial compressed gases
- Sensors with 0.5" to 12" flanges or 0.5" to 4" sandwich sizes
- Two-wire device with integrated pressure and temperature compensation, plus compensation for saturated steam
- Non-wearing, fully welded stainless steel construction with high corrosion, pressure, and temperature resistance
- Optimal process reliability: Intelligent stable readings, free of external signal processing
- Maintenance-free sensor design
- Current, pulse, and HART communications outputs

For superheated and saturated steam measurement, steam boiler monitoring, compressor output monitoring, measuring consumption in compressed air systems, measuring consumption of industrial gases, SIP and CIP processes in the food, beverage, and pharmaceutical industries

VersaFlow 100 is the only vortex flowmeter with integrated pressure and temperature compensation in two-wire technology, providing maximum performance at the lowest installed cost. VersaFlow provides reliable measurement of operating, standard volumetric, and mass flow of conductive and non-conductive liquids, gases, and vapors, even with fluctuating pressures and temperatures.

### Condensed Specifications

**Measuring Principle:** Karman vortex street

**Measured Value:** *Primary:* Number of separated vortices; *Secondary:* Operating and standard volumetric flow or mass flow

**Accuracy:** Reynolds numbers ( $Re$ )  $\geq 20000$ :  $\pm 0.75\%$  for liquids,  $Re \geq 20000$ :  $\pm 1\%$  for gases or vapors;  $10000 < Re < 20000$ :  $\pm 2\%$  for liquids, gases, or vapors; *Repeatability:*  $\pm 0.1\%$ ; *Stability:*  $\pm 0.1\%$  over 1 year

**Process Medium Viscosity:**  $< 10$  cP

**Outputs:** *Current:* 4-20 mA; *Pulse:* Pulse frequency 0.5 Hz; *Communications:* HART® protocol

**Approvals:** FM: Class 1, Div 1; ATEX: II 2G EEx d ia [ia] IIC T6

Visit [www.Lesman.com](http://www.Lesman.com) for complete specifications.

To select a Honeywell VersaFlow system for your application, complete the datasheet from [www.Lesman.com/datasheets](http://www.Lesman.com/datasheets) and send it to Lesman for engineering review.

# Honeywell

## VersaFlow Vortex for Monitoring Steam Production and Transfer

### Cost of a steam leak

There are two costs associated with the production of steam. The first is the gas feed to the boiler. The other is in monitoring the efficiency of the lines transporting the steam.

The major concern, once a line is designed, is the integrity of the pipeline and how much steam is being lost to leakage.

By placing a vortex meter at the discharge of the boiler and taking advantage of the integral temperature measurement, you can accurately measure the generated steam. If you have a flow meter on the gas feed line, you can monitor boiler efficiency by comparing gas use to pounds of steam produced.

Then, by placing another vortex meter at a designated spot further downstream of the boiler, you can make the measurement again and compare the flow rate of the steam to what's coming off the boiler. Any reduction in flow not accounted for by any usage points in between can be attributed to leakage.

As you can see in the table, even a small leak can cost thousands of dollars per year, not including the additional cost it takes to manufacture more steam to compensate for the loss. Left unchecked, a 1/2" leak can cost upwards of \$50,000 per year.

### Cost of steam leaks, given 100 PSI steam flow, at \$5.00 per 1000 pounds.

Size of Leak	Steam Loss per Month (Lbs)	Total Cost per Month	Annual Cost
1/8"	52,500	\$262.50	\$3,150.00
3/16"	117,000	\$585.00	\$7,020.00
1/4"	210,000	\$1,050.00	\$12,600.00
5/16"	325,000	\$1,625.00	\$19,500.00
3/8"	470,000	\$2,350.00	\$28,200.00
7/16"	637,000	\$3,185.00	\$38,220.00
1/2"	835,000	\$4,175.00	\$50,100.00

One pound of 100 PSI steam contains about 1,200 BTUs. 1 MCF of natural gas contains 1 million BTUs.

If the steam is produced at 85% efficiency, the input energy is 1411 BTUs per pound. ( $1200/0.85 = 1411$ ) So, 1000 pounds of steam requires 1.4 million BTUs to produce it. The cost to produce 1000 pounds of steam from natural gas is  $1.4 \times \text{cost/MCF}$ . So, when natural gas costs \$7/MCF, the cost of 1000 pounds of steam is \$9.80.

Further, by using the vortex meter's local display or the HART® protocol, you can track temperature and see any extraordinary heat loss from where you measured at the boiler. Heat loss means energy costs, so tracking this variable can be critical.

Honeywell's VersaFlow vortex meter is the only meter of its type that offers integral temperature compensation standard, and integral pressure compensation as an option. These features improve accuracy and significantly reduce energy costs. VersaFlow can also be used for:

- Burner consumption measurement
- Controlling compressor capacity, consumption measurement in compressed air networks
- SIP and CIP processes in the food, beverage, and pharmaceutical industries
- Measuring industrial gases (natural gas, oxygen, nitrogen, hydrogen, and argon)
- Conductive and non-conductive liquids

# SITRANS FM MAGFLO Electromagnetic Flowmeters



MAGFLO flowmeters make it easier for you to manage flow. Whether it's installation, managing operations, or verifying continuous accuracy, our customers rely on Siemens MAGFLO to improve their processes.

## Greater Flexibility and Expandability

- One transmitter/converter electronics box fits all sensor tubes
- Choice of integral mount, remote pipe or wall mount, explosion-proof, or 19" rack mount electronics styles available
- Ready for your plant data network! Universal communications slot on each converter
- Communication modules to fit HART®, Modbus RTU, Profibus PA/DP, and more. Add-on modules allow future upgrades without investing in a new flowmeter

## Easier to Operate

- Mag 5100W doesn't require grounding rings
- Robust construction and materials: PTFE, PFA, Ceramic, and NOVALAK liners; AISI 316 Ti stainless steel, Hastelloy C, Titanium, Tantalum, and Platinum electrodes
- Only Siemens offers NOVALAK, a revolutionary liner material with a smooth, hard, non-porous finish that provides the highest level of protection against corrosion, abrasion, high pressure and temperature, and vacuum conditions. It has the chemical resistance you expect from PTFE with the mechanical strength and stability of steel.
- Uniform user interface for all MAGFLO products

## Easier to Commission

- Pushbuttons on transmitter electronics make setup easy for technicians and contractors
- SensorPROM holds identity of each flowmeter: Calibration data, magnetic properties, user setup, and programming.
- SensorPROM module enables instant measurement at power-up

## Easier to Service

- Transmitter replacement requires no programming
- SensorPROM automatically updates all settings after initialization

## Advanced Diagnostics of Application and Metering

- Identification in clear text and error log
- Error categories: Function, warning, permanent, and fatal
- Transmitter self-check including outputs and accuracy
- Sensor check function
- Overflow
- Empty pipe, partial filling, low conductivity, electrode fouling
- System verification with MAGFLO Verificator

## Flexible Transmitter Electronics

Choose between Mag 5000 ( $\pm 0.5\%$  accuracy) and Mag 6000 ( $\pm 0.25\%$  accuracy) for high performance, easy operation, and reduced maintenance. Mag 5000 is a robust solution for all-around applications. Mag 6000 is for the more demanding applications where higher accuracy and greater functionality are required.

The Mag 6000i (Industry) transmitter is designed for the special demands in the process industry. The robust, full-metal housing provides superb protection, even in the harshest industrial environments. Full input and output functionality is provided, even in the ATEX EEx d version.



Individual calibration and fingerprint (magnetic property) data are pre-programmed at the factory and stored in the MAGFLO's SensorPROM module. Setup data is added during configuration. This unique combination ensures a cost-effective, easy, and error-free installation.

Plug and play communication modules make your MAGFLO compatible with your plant network protocol. Changing communications standards or moving the MAGFLO to a different network? Just swap out the communications module. No need to buy a new magmeter.

## Sensor Tube Designs for Every Industry

**Mag 5100W:** A sensor for all water and wastewater applications. With its coned design, increased low-flow accuracy is achieved, making it especially useful for leak detection. It can be made suitable for direct burial and constant flooding. Mag 5100W complies with drinking water and custody transfer approvals.



**Mag 1100:** The flangeless wafer design that meets all flange standards. The Mag 1100 is used in all industries where the corrosion-resistant stainless steel housing and highly resistant liner and electrodes fit even the most extreme process media. Mag 1100s are available with FM and ATEX approvals for installations in hazardous areas.

Its obstruction-free performance minimizes the risk of deposits. And, it's unaffected by the suspended solids, viscosity, and temperatures typically found in pharmaceutical processes. The Mag 1100 is suitable for CIP and SIP cleaning, and withstands the high pressures of hose-down.

**Mag 1100 Food:** Specially designed for the food and beverage industry, Mag 1100F offers unique and flexible process connections. Mag 1100F was the first to pass EHEDG hygienic test and meets all sanitary standards. Its performance is unaffected by suspended solids, viscosity, and temperature changes.



The Mag 1100F features an AISI 316 stainless steel enclosure with an IP67/NEMA 4X rating that is upgradable to IP68/NEMA 6P. It's delivered with your choice of flange adapter, with metal-to-metal design, and no grounding connection required.

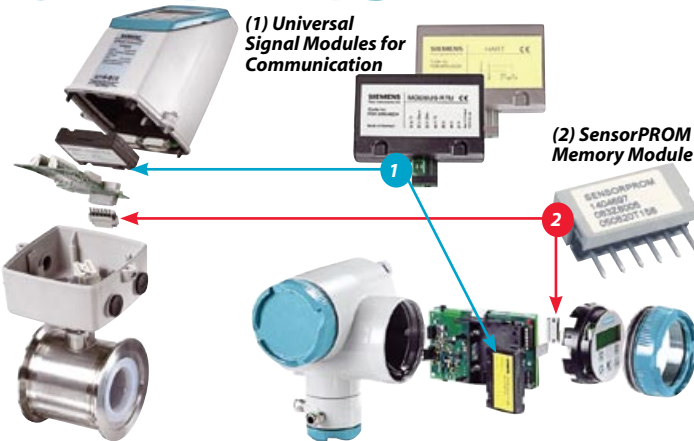


**Siemens has Tri-Clover and Tri-Clamp adapters in stock, ready for quick assembly and shipment!**

Pressure Transmitters  
Anderson Greenwood Instrument Valves  
Level Measurement Instruments  
Flow Measurement Instruments  
Solids Flow and Motion  
Actuator Motors and Pneumatic Drives



# SIEMENS



(1) Universal Signal Modules for Communication

(2) SensorPROM Memory Module

Plug and Play communication modules and swappable SensorPROM memory module make replacing electronics quick and painless!



**Mag 3100:** This flexible and comprehensive sensor program offers a wide range of sizes, to fit a wide variety of general industry applications. Liners and measuring electrodes capable of withstanding the most extreme processes are available. All welded construction provides a ruggedness that suits the toughest environments.

**Mag 8000W:** An affordable battery-powered solution that gives you the flexibility to install a reliable water meter virtually anywhere, without sacrificing accuracy or performance. The Mag 8000W delivers best-in-class performance for monitoring your drinking water supply. It's optimized for leakage detection and accurate billing.



The Mag 8000W features a datalogger with selectable log interval up to 26 months, an infrared (IrDA) port for onsite downloads, power management with selectable battery alarm levels, a self-check feature with automated data backup, and three totalizers, one with user reset.

## Transmag 2: For Heavy-Duty Applications

Thanks to its pulsed AC system, the Transmag 2 is capable of measuring where conventional DC field technology fails, including applications with high concentrations of pulp stock, heavy slurries, or slurries with magnetic particles.



Magnetic particles in the media boost the magnetic field in the flowmeter and cause bad readings. To overcome this, the Transmag 2 is designed with a second compensating coil circuit. The alternating field technology generates a much stronger magnetic field within the sensor, to measure more reliability and with greater precision — even when the media has a high concentration of solids.



There's a solution to every abrasive media application, and the choice of construction material is crucial to protect the flowmeter. Besides inlet protection rings, Siemens offers a wide range of liner and electrode materials — especially the soft LINATEX rubber and NOVALAK liner, which have proven themselves in these harsh environments.

**Need help finding the right magmeter?**  
Fill out the Siemens application datasheet from [www.Lesman.com/datasheets](http://www.Lesman.com/datasheets) and fax it back to Lesman for engineering review.

## Why Do So Many Engineers Choose MAGFLO?

- Mag 5100W doesn't need grounding rings.
- One transmitter fits all sensor tubes, so one universal spare covers all applications.
- Easy transmitter configuration with the keypad — contractors and technicians love them!
- Owners can schedule on-site verification service from Siemens, or do their own verification with a MAGFLO Verificator unit.
- SensorPROM makes replacement server a quick swap-out.
- With the universal communication modules, it's easy to get data onto the plant network.
- They can produce a traceable record of reliability, with calibration data and verification test results.

## In-Situ Verification

Using the MAGFLO Verificator, Siemens offers in-situ verification for documenting continuous accuracy for critical process applications — especially crucial when your application is required to meet ISO 9001, ISO 4001 or other quality management programs.

Through in-depth analysis, Siemens has identified the parameters that influence the accuracy of a flowmeter operating in the real world. These parameters are checked using a patented verification technique for MAGFLO flowmeters.

In-situ verification requires no interruption of flow, no opening of pipes, and no disconnection of cabling. The Verificator can run a full installation test of the transmitter, sensor, and cabling — all in less than 15 minutes!

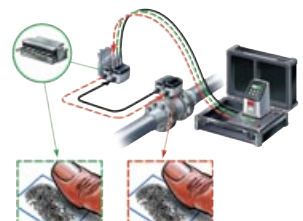
**Transmitter Test:** The transmitter test is a flow simulation test that checks the whole electronic system from signal input to output. Using the magnetic field energy, the Verificator simulates a flow signal to the transmitter input. By measuring transmitter output, the Verificator calculates its accuracy against factory-defined values.

**Flowmeter Insulation Test:** This "cross-talk" test of the entire flowmeter ensures that the sensor flow signal is unaffected by external influences. In this test, the Verificator generates a high voltage disturbance within the coil circuit, and then looks for any cross-talk induced in the flow signal circuit. By generating dynamic disturbances close to the flow signal, the flowmeter is tested for noise immunity to a maximum level.

**Sensor Magnetism Test:** This "boost" test of the magnetic field coil ensures that the electromagnetic signal meets the original settings. In the boost test, the Verificator changes the magnetic field pattern and uses high voltage to get quick stable magnetic conditions. Then, it compares the current sensor magnetism to the factory "fingerprint" determined during initial calibration, and stored in SensorPROM.

An authorized, signed certificate documents the verification, and includes test results with pass/fail approval, installation specifications, flowmeter specification and configuration, and Verificator specification with calibration date (to ensure traceability to national and international standards.)

Call for Verificator Service!



# SITRANS FM MAGFLO Electromagnetic Flowmeters



### MAGFLO Transmitter Electronics

- UL Approved FM Class 1, Div 2
- Rated NEMA 4X and NEMA 6
- Choice of 115–230 VAC or 12–24 VAC/VDC Power
- 3-Line, 20-Character Backlit Display
- Can be Ordered Blind (No Local Digital Display)

### MAGFLO Mag 5000

- ±0.5% Accuracy with All Sensors
- 1 Current, 1 Digital, 1 Relay Output Standard
- Available with HART® Communication
- Only Available for Sensors 1/2" to 48"

### MAGFLO Mag 6000

- ±0.25% Accuracy with Selected Sensors
- Advanced Batch Control Functions
- Add-On Plug-In Communication Modules
- Required for Use with Sensors Larger than 56"
- Optional Design: Mag 6000i Industrial Enclosure

**Step 1:** Choose your electronics by accuracy, power, and mounting style. Add connecting cables and any accessories you need. **Step 2:** Choose your flow sensor by size and liner material. Issue your order to Siemens Industry Inc, c/o Lesman Instrument Company.

### Model Selection Guide

Description	Catalog Number	Price	Description	Catalog Number	Price
<b>Mag 5000 Transmitters; Max. Measuring Error: 0.5% of Flow Rate</b>			<b>Interconnect Cables (Price per foot, two lengths required per installation)</b>		
Field Mount, 115-230 VAC	7ME6910-1AA10-1AA0	\$1184.00	Standard Interconnect Cable	FDK:001STCAB **	\$2.00
Field Mount, 11-30 VDC 11-24 VAC	7ME6910-1AA30-1AA0	1184.00	Special Interconnect Cable (for Empty Pipe)	FDK:001SPCAB **	3.00
Field Mount, No Display, 115-230 VAC	7ME6910-1AA10-0AA0	982.00	** Choose two standard or one standard and one special cables. Both are PVC jacket, three-conductor plus overall braided shield.		
Field Mount, HART®, 115-230 VAC	7ME6910-1AA10-1BA0	1368.00	<b>Plug-In Communications Modules for Mag 6000 Electronics</b>		
Rack Mount, 115-230 VAC	7ME6910-2CA10-1AA0	1368.00	Mag6000 HART Communication Module	FDK:085U0226	195.00
<b>Mag 6000 Transmitters; Max. Measuring Error: 0.25% of Flow Rate</b>			Mag 6000i HART Communication Module	FDK:085U0321	199.00
Field Mount, 115-230 VAC	7ME6920-1AA10-1AA0	1395.00	Mag 6000 Modbus RTU/RS485 Module	FDK:085U0234	195.00
Field Mount, 11-30 VDC 11-24 VAC	7ME6920-1AA30-1AA0	1395.00	Mag 6000 DeviceNet Module	FDK:085U0229	393.00
Rack Mount, IP20/NEMA 2, 115-230 VAC	7ME6920-2CA10-1AA0	1594.00	Mag 6000 Profibus PA Module	FDK:085U0236	400.00
IP66/NEMA 4 ABS Plastic Enclosure, 115-230 VAC	7ME6920-2EA10-1AA0	1613.00	Mag 6000 Profibus DP Module	FDK:085U0237	400.00
IP66/NEMA 4 ABS Plastic Enclosure, with Cleaning Unit, 115-230 VAC	7ME6920-2PA10-1AA0	2828.00	Mag 6000 Foundation Fieldbus Module	FDK:A5E02054250	400.00
<b>Mag 6000i Transmitter; Max. Measuring Error: 0.25% of Flow Rate</b>			<b>Spare Parts and Accessories</b>		
Remote Mount IP67/NEMA 4X			Mag 5000/Mag 6000 Sensorprom 2KB	FDK:083U7500	58.00
Aluminum Enclosure 10-220 VDC/AC	7ME6930-2BA20-1AA2	1843.00	Mag 5000/Mag 6000 Display Unit	FDK:085U1039	148.00
<b>Mounting Kits and Hardware</b>			Sun Shield for Remote-Mt Polyamide Covers	FDK:LP-SUN02GP	230.00
Wall Mount Junction Box IP67/NEMA 4X/6	FDK:085U1053	207.00	Sun Shield for Integral Polyamide Covers	FDK:LP-SUN03GP	230.00
Submersible Kit for Terminal Box, for IP68, 10m w.g. Rating	FDK:085U0220	128.00	<b>MAGFLO Verificator</b>		
21TE Panel Mount Kit for 19" Insert IP65/NEMA4 Enclosure in ABS Plastic	FDK:083F5030	350.00	MAGFLO Verificator (With Software and Adapter for IP67/Rack-Mount Models)		
21TE Back Panel Mount Kit for 19" Insert IP20/NEMA 2 Enclosure in Aluminum	FDK:083F5032	159.00		FDK:083F5061	16325.00
Polyamide Terminal Box with Lid for Field-Mount MAGFLO Sensors	FDK:085U1052	194.00	<b>Great for Drinking Water Applications</b>		
Spare Polyamide Lid for Terminal Box for Field-Mount MAGFLO Sensors	FDK:085U1003	40.00	<b>Flow Sensor Body Mag 8000W (Drinking Water) 0.5% Accuracy, Battery-Powered Magmeter with Standard Mag5100W Sensor, Integral Transmitter, and Integral Battery Pack (2 D-Cells). Qmax=Volume Unit</b>		
Connection Plate for 19" Rack Mount	FDK:083F4117	144.00	2" 277 GPM	7ME6810-2YJ31-2AA1	\$2653.00
Connection Plate for 19" Rack Mount Transmitter with Cleaning Kit	FDK:083F4123	438.00	2.5" 440 GPM	7ME6810-3FJ31-2AA1	2664.00
Connection Plate for Wall Mount Transmitter	FDK:083F4121	199.00	3" 704 GPM	7ME6810-3MJ31-2AA1	2675.00
Brass Adapters, PG13.5 Male to 1/2" NPTF	FDK:A6X30005543	15.00	4" 1100 GPM	7ME6810-3TJ31-2AA1	2720.00
			5" 1761 GPM	7ME6810-4BJ31-2AA1	2908.00
			6" 2769 GPM	7ME6810-4HJ31-2AA1	3079.00
			8" 4389 GPM	7ME6810-4PJ31-2AA1	3368.00
			10" 7044 GPM	7ME6810-4VJ31-2AA1	3802.00
			12" 11007 GPM	7ME6810-5DJ31-2AA1	4857.00

**Battery Powered!**



2" 277 GPM	7ME6810-2YJ31-2AA1	\$2653.00
2.5" 440 GPM	7ME6810-3FJ31-2AA1	2664.00
3" 704 GPM	7ME6810-3MJ31-2AA1	2675.00
4" 1100 GPM	7ME6810-3TJ31-2AA1	2720.00
5" 1761 GPM	7ME6810-4BJ31-2AA1	2908.00
6" 2769 GPM	7ME6810-4HJ31-2AA1	3079.00
8" 4389 GPM	7ME6810-4PJ31-2AA1	3368.00
10" 7044 GPM	7ME6810-4VJ31-2AA1	3802.00
12" 11007 GPM	7ME6810-5DJ31-2AA1	4857.00

Pressure Transmitters  
Anderson Greenwood Instrument Valves  
Level Measurement Instruments  
Flow Measurement Instruments  
Solids Flow and Motion  
Actuator Motors and Pneumatic Drives

**Sensors for General Industrial Applications**

**Flow Sensor Body Mag3100: Neoprene Liner, 316SS Electrodes, ANSI Class 150 Carbon Steel Flanges, Carbon Steel Housing**



1"	7ME6310-2DJ11-1AA2	\$1295.00
1.5"	7ME6310-2RJ11-1AA2	1355.00
2"	7ME6310-2YJ11-1AA2	1437.00
2.5"	7ME6310-3FJ11-1AA2	2435.00
3"	7ME6310-3MJ11-1AA2	4243.00
4"	7ME6310-3TJ11-1AA2	1394.00
6"	7ME6310-4HJ11-1AA2	1439.00
8"	7ME6310-4PJ11-1AA2	1485.00
10"	7ME6310-4VJ11-1AA2	2180.00
12"	7ME6310-5DJ11-1AA2	4478.00

**Flow Sensor Body Mag3100: PTFE Liner, Hastelloy C-276 Electrodes, ANSI Class 150 Carbon Steel Flanges, Carbon Steel Housing**



0.5"	7ME6310-1VJ13-2AA2	\$1278.00
1"	7ME6310-2DJ13-2AA2	1338.00
1.5"	7ME6310-2RJ13-2AA2	1375.00
2"	7ME6310-2YJ13-2AA2	1952.00
2.5"	7ME6310-3FJ13-2AA2	3010.00
3"	7ME6310-3MJ13-2AA2	1542.00
4"	7ME6310-3TJ13-2AA2	1420.00
6"	7ME6310-4HJ13-2AA2	1462.00
8"	7ME6310-4PJ13-2AA2	1565.00
10"	7ME6310-4VJ13-2AA2	3260.00
12"	7ME6310-5DJ13-2AA2	6363.00
14"	7ME6310-5KJ13-2AA2	7290.00
16"	7ME6310-5RJ13-2AA2	8818.00

**Sensors for Food, Beverage, and Pharmaceutical Use**

**Flow Sensor Body Mag1100: PFA Liner, Hastelloy-C Electrodes, Includes EPDM Gaskets, SS Studs and Nuts**



3/8" DN10	7ME6110-1RA10-1AA0	\$1212.00
1/2" DN15	7ME6110-1VA10-1AA0	1212.00
1" DN25	7ME6110-2DA10-1AA0	1695.00
1.5" DN40	7ME6110-2RA10-1AA0	1937.00
2" DN50	7ME6110-2YA10-1AA0	1332.00
2.5" DN65	7ME6110-3FA10-1AA0	1332.00
3" DN80	7ME6110-3MA10-1AA0	1823.00
4" DN100	7ME6110-3TA10-1AA0	2053.00

**Flow Sensor Body Mag1100: Ceramic Liner, Platinum Electrodes, EPDM Gaskets, SS Studs and Nuts**

0.078" DN2	7ME6110-1DA20-2AA0	\$1388.00
1/8" DN3	7ME6110-1HA20-2AA0	1388.00
1/4" DN6	7ME6110-1MA20-2AA0	1212.00
3/8" DN10	7ME6110-1RA20-2AA0	1212.00
1/2" DN15	7ME6110-1VA20-2AA0	1453.00
1" DN25	7ME6110-2DA20-2AA0	1814.00
1.5" DN40	7ME6110-2RA20-2AA0	2452.00
2" DN50	7ME6110-2YA20-2AA0	1332.00
2.5" DN65	7ME6110-3FA20-2AA0	1577.00
3" DN80	7ME6110-3MA20-2AA0	1935.00
4" DN100	7ME6110-3TA20-2AA0	2523.00

**Flow Sensor Body Mag1100 Food: PFA Liner, Hastelloy-C Electrodes. Select Tri-Clover® or Tri-Clamp® Sanitary Adapter Below**



3/8" DN10	7ME6140-1RA10-1AA0	\$1332.00
1/2" DN15	7ME6140-1VA10-1AA0	1332.00
1" DN25	7ME6140-2DA10-1AA0	1332.00
1.5" DN40	7ME6140-2RA10-1AA0	1577.00
2" DN50	7ME6140-2YA10-1AA0	1823.00
2.5" DN65	7ME6140-3FA10-1AA0	1935.00
3" DN80	7ME6140-3MA10-1AA0	2048.00
4" DN100	7ME6140-3TA10-1AA0	2428.00

**Tri-Clover® Sanitary Weld-In Adapter: Includes 2 Clamp Fittings, 2 Clamps, and 2 EPDM Gaskets**

3/8" (1/2" Tri-Clover)	FDK:083G2276	\$217.00
1/2" (3/4" Tri-Clover)	FDK:083G2277	217.00
1"	FDK:083G2279	259.00
1.5"	FDK:083G2281	303.00
2"	FDK:083G2282	324.00
2.5"	FDK:083G2283	363.00
3"	FDK:083G2284	438.00
4"	FDK:083G2285	513.00

**For Water and Wastewater Applications**

**Flow Sensor Body Mag 5100W: Nitrile Rubber Liner, Hastelloy C Electrodes, ANSI Class 150 Carbon Steel Flanges (\*2" to 10" Conned Design)**



1"	7ME6520-2DJ13-2AA2	\$960.00
1.5"	7ME6520-2RJ13-2AA2	973.00
2" *	7ME6520-2YJ13-2AA2	1003.00
2.5" *	7ME6520-3FJ13-2AA2	1015.00
3" *	7ME6520-3MJ13-2AA2	1027.00
4" *	7ME6520-3TJ13-2AA2	1070.00
5" *	7ME6520-4BJ13-2AA2	1258.00
6" *	7ME6520-4HJ13-2AA2	1429.00
8" *	7ME6520-4PJ13-2AA2	1718.00
10" *	7ME6520-4VJ13-2AA2	2152.00
12"	7ME6520-5DJ13-2AA2	3207.00
14"	7ME6520-5KJ13-2AA2	4443.00
16"	7ME6520-5RJ13-2AA2	4972.00
18"	7ME6520-5YJ13-2AA2	5524.00
20"	7ME6520-6FJ13-2AA2	6138.00
24"	7ME6520-6PJ13-2AA2	6820.00
28"	7ME6520-6YL13-2AA2	9693.00
30"	7ME6520-7DL13-2AA2	11703.00

**Flow Sensor Body Mag 5100W: Nitrile Rubber Liner, Hastelloy C Electrodes, AWWA C-207 Class D Carbon Steel Flange**

36"	7ME6520-7ML13-2AA2	14154.00
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**Ideal for Applications with High Concentration of Suspended Solids (Pulp and Paper, Cement, Mining)**

**TransMag2 Electronics: Patented Pulsed AC Magnetic Flowmeter for High Suspended Solids. IP67/NEMA 4X Enclosure, Max. Measuring Error 0,50% Rate, 100-230 VAC Power; 1 Current, 1 Digital, 1 Relay (or 1 DI) Outputs**

4-20 mA with HART Protocol	7ME5034-0AA11-2AA0	\$2176.00
Profibus PA Protocol	7ME5034-1AA11-1AA0	2683.00
Mounting Bracket (Add Suffix to Model Number)	-A02	87.00

**Flow Sensor Body 911/E for TransMag 2: PTFE Liner, Hastelloy C4 Electrode, Remote Design, 1/2" NPT Screwed Gland, IP67/NEMA 5 Protection, ANSI Flanges**



1"	7ME5323-0CC20-2BB0	\$2456.00
1.25"	7ME5323-0DC20-2BB0	2547.00
1.5"	7ME5323-0EC20-2BB0	2579.00
2"	7ME5323-0FC20-2BB0	2754.00
2.5"	7ME5323-0GC20-2BB0	3124.00
3"	7ME5323-0HC20-2BB0	3172.00
4"	7ME5323-0JC20-2BB0	3341.00
5"	7ME5323-0KC20-2BB0	3634.00
6"	7ME5323-0LC20-2BB0	3706.00
8"	7ME5323-0MC20-2BB0	5106.00
10"	7ME5323-0NC20-2BB0	6261.00
12"	7ME5323-0PC20-2BB0	7208.00
14"	7ME5323-0QC20-2BB0	8292.00
16"	7ME5323-0RC20-2BB0	9101.00

Visit [www.Lesman.com](http://www.Lesman.com) for more information on Siemens' complete line of SITRANS flowmeters.

Pressure Transmitters  
Anderson Greenwood Instrument Valves  
Level Measurement Instruments  
Flow Measurement Instruments  
Solids Flow and Motion  
Actuator Motors and Pneumatic Drives

# SITRANS FC Coriolis Mass Flowmeters

## Why do so many engineers choose SITRANS FC MASSFLO flowmeters?

- High accuracy — 0.10% of mass — and repeatability to ensure maximum quality and reduced waste
- Multiparameter measurement for mass flow rate, volumetric flow rate, density, fraction flow, and temperature
- Measurements are unaffected by changes in pressure or temperature
- Maintenance free — no moving parts!
- Each flowmeter is factory calibrated before shipment
- Fully user-configurable, with add-on and swappable communications modules for HART®, Profibus, and more — and SensorPROM flow memory unit



## In Flow Monitoring, Every Second Counts!

Traditional coriolis flowmeters are notorious for needing a lot of maintenance and recalibration. So it's easy to see how this technology can be a burden. This is where Siemens SITRANS FC MASSFLO flowmeters prove their value, every minute of every day.

They offer:

- More uptime, with commissioning and installation in a matter of a few minutes
- Less downtime, just plug and play to add communication modules or to replace electronics components
- Longer life of problem-free performance
- In-line measurement for pressures up to 5,945 psig (410 bar)
- Robust and failsafe sensor design
- Excellent resistance to corrosive and highly aggressive media

MASSFLO combines a dedicated intelligent mass flow processor with the latest ASIC chip technology, to deliver the fastest step response of any flowmeter available today. The ASIC-design chip makes highly accurate flow, density, temperature, volume, weight, and multi-task measurements much easier and more reliable to perform — with just one instrument.

MASSFLO also boasts a 100:1 dynamic measurement area without compromising quality. Its signal-transfer function uses DFT (discrete fourier transfer), combined with the ASIC chip for a fully digital signal conversion and signal filtering. The result? A time resolution better than 0.35 ns.

## MASSFLO Means Accuracy within 0.1%

MASSFLO offers an accuracy rate to meet or exceed the most demanding tolerance targets, thanks to the incorporation of field-tested coriolis technology. With coriolis technology and noise immunity protection, MASSFLO delivers spectacular 0.1% accuracy — up to 50% better accuracy than conventional flowmeters.

## State of the Art Flowmeter Technology

Coriolis flowmeters measure mass flow directly, so they're unaffected by changes in fluid density, pressure, viscosity, and temperature.

The pipe is vibrated at its resonant frequency by an electromechanical driver. The motion at any point on the tube represents a sine wave, and when flow moves through the pipe, the pipe will twist proportionally to the mass flow rate. This is referred to as the "Coriolis Effect".

The resonant frequency of the tube corresponds to the fluid density,

so that can be measured accurately as well. Temperature measured with a Pt1000Ω sensor makes this a true multiparameter device.

## SensorPROM Module the Key to Quick Calibration

Just turn on the power, and the actual flow shows immediately in the local display. Siemens' unique SensorPROM memory unit calibrates and programs the MASSFLO meter automatically. It provides:

- Factory pre-programming with calibration data, pipe size, sensor type and output settings
- Automatic storage and memory of any values or settings changed in the field
- Automatic re-programming of any new electronics module with full information of calibration and configuration data
- Transmitter electronics replacement in less than five minutes!



Siemens' SITRANS FC MASSFLO meters are the only flowmeters on the market that are fully user-configurable, both in hardware and software. The intelligent plug-in communication module platform lets you retrofit the protocol you need — HART®, Profibus, etc. — at any time. Once installed, the module is automatically detected and programmed to factory settings through the SensorPROM memory unit.

## Costs Less to Buy, Less to Own

You might think that with all its features and benefits, the MASSFLO would be expensive to own. It's not. With MASSFLO, you'll invest far less time and effort on repairs and calibration.

When your MASSFLO flowmeter does need calibration, it's easy to conduct, and easily traceable. And, with the SensorPROM and plug and play communications modules, you'll see drastically reduced downtimes for electronics replacement or upgrades.

Visit our website for full specifications on Siemens SITRANS FC MASSFLO coriolis flow sensors and electronics.

Go to [www.Lesman.com](http://www.Lesman.com) and search for "SITRANS FC"



Pressure Transmitters

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Solids Flow and Motion

Actuator Motors and Pneumatic Drives

**Need help choosing a coriolis mass flowmeter? Not sure coriolis is right for your application? Fill out the application datasheet from [www.Lesman.com/datasheets](http://www.Lesman.com/datasheets) and fax it back to Lesman.**

Siemens offers a complete line of highly accurate coriolis mass flowmeters for a variety of industries and critical process applications.

Thanks to their accuracy, SITRANS FC coriolis meters deliver precise information about fluids or gas passing through a pipe for dosing, product blending, determining billing or cost, and many other applications.

FC MASSFLO provides reliable measurements of the lowest flows. Application examples include:

- Testing fuel nozzles
- Refrigerant charging of hermetically sealed compressors
- Metering of flavors and additives in the food and beverage industries
- Highly exact measurements of pharmaceutical products
- Measuring essential oils and fragrances in the cosmetic industry
- Highly accurate gas measurements

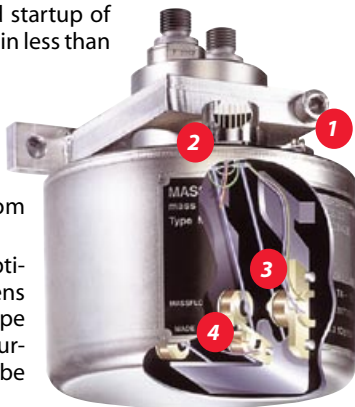


### SITRANS FC MASSFLO Mass 2100 Di 1.5

In many industries, like food and beverage and pharmaceuticals, accurate recipe control means everything. The MASS 2100 1.5 has demonstrated superior performance in numerous applications and field trials relating to accuracy and turndown ratio.

It's the preferred meter for research and development and mini-plant applications for liquid or gas measurement, when measuring small quantities is important.

- 1 The meter is installed with a single quick-release clamp fitting and a single multi-plug connector — fast and cost-effective
- 2 Plug and play — installation and startup of the mass flowmeter is completed in less than 10 minutes
- 3 Maximum durability — in combination with the balanced pipe loops, the center block concept ensures reliable long-term stability, eliminating influences from process conditions altogether
- 4 Single-pipe design — ensures optimal hygiene and safety. All Siemens FC sensors consist of a single pipe with no welded joints, thereby ensuring that steam or CIP cleaning can be completed with confidence.



### Flow Sensor Quick Specification

One-Pipe Systems (MASS 2100, 316L Stainless Steel or Hastelloy C22 Pipe)

Model	DI 1.5	DI 3	DI 6	DI 15	DI 25	DI 40
Sensor Size	1/16"	1/8"	1/4"	1/2"	1"	1.5"
Range (kg/hr)	65	250	1,000	5,600	25,000	52,000
Range (lbs/hr)	140	550	2,200	12,340	55,100	114,600

Two-Pipe Systems (MASS MC1, 316L Stainless Steel or Hastelloy C22 Pipe)

Model	DN 50	DN 65	DN 80	DN 100	DN 150
Sensor Size	2"	2.5"	3"	4"	5"
Range (kg/hr)	42,600	87,000	113,400	192,000	510,000
Range (lbs/hr)	93,900	191,800	250,000	423,300	1,124,000



### Reliable performance delivers dependable results!

Exact recipe control is an indispensable requirement in the pharmaceutical, food, and beverage industries, requiring reliable multiparameter measurement, uniform inline mixing, and adaptive batching.

Exceptional features of the FC 6000 Ex d include:

- Adaptive batching control — enables extremely accurate and stable batching under all operating conditions
- Multiparameter process information for mass flow, volume flow, density, temperature, and fraction flow — all standard functions
- Accurate dosing of additives and ingredients — measuring from few grams to several tons per hour

The SITRANS FC 6000 Ex d is a perfect fit to meet the exacting demands of the chemical industry as well.

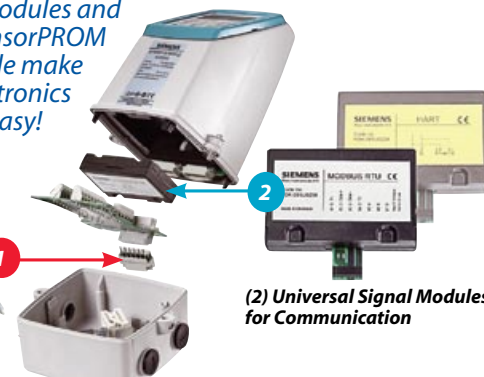
- Safe and robust sensor design allows for maximum pressure loads up to 5945 psig (410 bar)
- Rugged housing ensures optimal operations cost management
- The integral keypad and display offer optimal functionality and programming flexibility in hazardous environments.
- Add-on modules can be retrofit directly onto existing flowmeters, providing communications capabilities and other functions to meet current and future demands
- SensorPROM technology enables factory pre-programming of calibration data, and storage of user measurements and settings. The automatic reprogramming of replacement signal converters can be completed in less than five minutes!

Plug and Play communication modules and easy-to-swap SensorPROM memory module make replacing electronics quick and easy!

(1) SensorPROM Memory Module









(2) Universal Signal Modules for Communication



# SITRANS F US Clamp-On Ultrasonic Flowmeters



## Comparing SITRANS F US Clamp-On Flowmeter Configurations

Model	 <b>SITRANS FUS1020 Basic</b>	 <b>SITRANS FUS1010 Standard</b>	 <b>SITRANS FUP1010 Portable</b>	 <b>FUE1010 Energy Industry Applications</b>	 <b>FUH1010 Hydrocarbon Industry Applications</b>	 <b>FUG1010 Gas Industry Applications</b>
Replaces...	<b>Controlotron 1020</b>	<b>Controlotron 1010N, 1010X, 1010WX</b>	<b>Controlotron 1010P, 1010WP</b>	<b>Controlotron 1010EN, 1010EP</b>	<b>Controlotron 1010DV, 1010V, 1010B</b>	<b>Controlotron 1010GC</b>
Flow Range	±40 ft/sec (±12 m/s) bidirectional					
Flow Sensitivity	0.001 ft/sec (0.0003 m/sec) flow rate independent	0.001 ft/sec (0.0003 m/sec) flow			0.001 ft/sec (0.003 m/sec) flow rate independent	
Pipe Sizes	0.25" to 360" (DN 6.4 to DN 9140)					1" to 60" (DN 25 to DN 152)
Optional Inputs	None	Two 4–20 mA DC, Two 0–10 VDC, Two 4-Wire 1kΩ RTD		Two 4–20 mA DC, Two 0–10 VDC, Two 4-Wire 1000Ω RTD, Totalizer commands (clear/hold)	Four 4–20 mA user selectable, Two 4-Wire 1000Ω RTD	Two 4–20 mA, Two 4-Wire 1000Ω RTD
Outputs	4–20 mA DC 1x for single channel 1x 0–5 kHz pulse rate, digital isolated RS232	Two 4–20 mA DC (1kΩ at 30 VDC), Two 0–10 VDC (5kΩ min.), Four SPDT relays for status alarms, Two 0–5 kHz frequency, RS232			Two 4–20 mA DC (1kΩ at 30 VDC), Two 0–10 VDC (5kΩ min.), Four 0–5 kHz pulse rate (None for NEMA 7/IP65 version), RS232	Two 4–20 mA DC programmable standard, Two 0–10 VDC, Four 0–5 kHz, RS232
Accuracy	1–2% actual volume reading (Higher accuracy is dependent on pipe condition)	±0.5–1.0% flow for velocities >1 ft/sec (0.3 m/sec) ±0.005–0.01 ft/sec (±0.0015–0.003 m/sec) for velocities <1 ft/sec (0.3 m/sec)	±0.5–2.0% flow for velocities >1 ft/sec (0.3 m/sec) ±0.005–0.01 ft/sec (±0.0015–0.003 m/sec) for velocities <1 ft/sec (0.3 m/sec)	±0.5–1.0% flow for velocities >1 ft/sec (0.3 m/sec) ±0.005–0.01 ft/sec (±0.0015–0.003 m/sec) for velocities <1 ft/sec (0.3 m/sec)	0.5–1.0% flow, calibratable to 0.15–0.3% of flow, 0.05 of API number (interface detector)	Out of box 1–2%, calibratable to 0.5% ±0.005–0.01 ft/sec (±0.0015–0.003 m/sec) for velocities <1 ft/sec (0.3 m/sec)
Batch Repeatability	±0.15–1.0% flow 0.05–0.1% actual volume reading for 5–100 ft/sec (1.5–30 m/sec) velocities, pipe condition dependent	±0.15% flow for velocities >1 ft/sec (0.3 m/sec) ±0.0015 ft/sec (0.0005 m/sec) for velocities <1 ft/sec (0.3 m/sec)			0.05% (depending on model) ±0.10–0.2% flow for velocities >1 ft/sec (0.3 m/sec)	±0.15% flow for velocities >1 ft/sec (0.3 m/sec) ±0.0015 ft/sec (0.0005 m/sec) for velocities <1 ft/sec (0.3 m/sec)
Data Refresh	5 Hz				5 Hz (80 Hz output optional)	
Enclosure Ratings	NEMA 4/IP65	NEMA 4X/IP65, NEMA 7/IP65, NEMA 7/IP66	IP67	NEMA 4X/IP65, NEMA 1/IP40	NEMA 4X/IP65, NEMA 7/IP65, NEMA 7/IP66	
Liquid Temperatures	-40° to 250° (-40° to 120°C) standard; -40° to 450°F (-40° to 230°C) optional					-40° to 140°F (-40° to 60°C) Call for higher temps.
Power Supply	90–240 VAC, 50/60 Hz 30 VA or 9–36 VDC, 12W		100–240 VAC, 50/60 Hz, 30 VA, 9–36 VDC, 12W	90–240 VAC, 50/60 Hz, 30 VA, 9–36 VDC, 12W 100–240 VAC, 50/60 Hz, 9–36 VDC, 10W Internal NiCad battery (4 hour)	90–240 VAC, 50/60 Hz, 30 VA, 9–36 VDC, 12W 90–240 VAC, 50/60 Hz, 15 VA or 9–36 VDC, 10W	
Approvals	UL, ULc, CE	FM, CSA, ATEX, CCOE, INMETRO, GoST	UL, ULc, CE	FM, CSA, CE (fixed) UL, ULc, CE (portable)	FM, CSA, ATEX, INMETRO, GoST	
Prices Start at	\$1850.00	\$3392.00	\$4518.00	\$4130.00	\$6681.00	\$8041.00

Pressure Transmitters

Anderson Greenwood Instrument Valves

Level Measurement Instruments

Flow Measurement Instruments

Solids Flow and Motion

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# SIEMENS



**Engineering specifications and more available online.**

**Learn more about Siemens SITRANS F US  
Clamp-On Ultrasonic Flowmeters by visiting  
[www.Lesman.com/get/SICF.php](http://www.Lesman.com/get/SICF.php)**

## **Don't guess how much money's flowing through your pipe. Clamp-on and know!**

- Measure practically any liquid and gas
- Performance unaffected by viscosity, flow rate, pipe size, solids and aeration content
- High accuracy and repeatability through automatic temperature compensation and zero drift correction
- Install on pipe sizes up to DN9140 (360")

With no moving parts to wear or foul, no need to cut the pipe for installation, and high accuracy WideBeam ultrasonic flow measurement technology, you have nothing to lose.

Siemens' clamp-on ultrasonic flow technology offers several advantages over other flow measurement methods. Transducers mount quickly and easily on the outside of the pipe, so they're ideal for retrofit applications or anywhere corrosive, toxic or high pressure liquids and gases rule out the option of cutting the pipe.

### **The Transducer is Key**

Transducers for Siemens ultrasonic clamp-on flowmeters are available with Doppler and WideBeam transit time measurement technologies, so there's a solution to work in practically any installation.

Doppler operation is suggested for liquids with extensive suspended solids or aeration, and offers up to 2% flow accuracy. WideBeam transit time operation is the preferred mode for relatively homogeneous liquids. Accuracy is up to 0.5% of the flow.

The patented WideBeam technology increases measurement precision by reducing the sensitivity to any change in the medium type or physical properties. The signal-to-noise ratio is optimized by using the resonant frequency of the pipe wall to transmit the sound signal into the media, with the wall acting as a waveguide. This method produces a focused, coherent signal that makes the technology particularly valuable for hydrocarbon and gas applications.

For added flexibility, flowmeters are available that allow switching between Doppler and WideBeam to quickly adapt to varying conditions without changing meters.



Since the accuracy of a clamp-on ultrasonic flowmeter depends on choosing the right transducer, this is a crucial step in the meter configuration. Siemens offers four types of transducers: universal, universal high temperature, high precision and Doppler. Before deciding on the most appropriate transducer, consider these factors: pipe thickness, diameter and material, liquid/gas type, and amount of aeration.

By evaluating all of these aspects before choosing your final configuration, you are sure that your meter will work exactly the way you want it, right from day one. With flexible configuration options combined with permanent and portable versions, finding exactly what you need has become a lot easier.

Customize your flowmeter by choosing necessary transducers, number of channels and enclosures, or select a complete pre-configured system available for HVAC, power, and hydrocarbon industries.

As a crucial accessory, the clamp-on program also includes an easy-to-use, stand-alone digital ultrasonic pipe wall thickness gauge. Since even the smallest pipe thickness miscalculations can have an impact on accuracy, this high precision gauge is an indispensable flow measurement tool.



### **SITRANS FUS1010: Versatility and Flexibility**

Ultrasonic flowmeters can be used within a wide variety of applications and industries, so they're quickly becoming the metering technology of choice. The versatile SITRANS FUS1010 illustrates this perfectly.

It offers numerous advantages in application adaptability that cannot be matched by any other single flow measurement technology: zero pressure drop, insensitivity to outside noise, high turn-down ratio, interface software, and WideBeam and Doppler modes.

The SITRANS FUS1010 is available in single, dual channel/beam, and four channel configurations plus your choice of three enclosures: NEMA 4X/IP65 wall mount, NEMA 7/IP65 compact, and NEMA 7/IP66 wall mount.

To accommodate more basic applications, the low cost SITRANS FUS1020 comes with WideBeam and as single and dual channel versions, allowing either one or two measurement points.



### **SITRANS FUP1010 Portable Flowmeter for Check Metering and Survey Applications**

For applications that don't need constant flow monitoring or pipes where operators need to check the flow against a known or expected value, Siemens offers portable clamp-on ultrasonic flowmeters.

The SITRANS FUP1010 is available with a waterproof IP67 enclosure that makes it ideal for outdoor use. The rugged, impact resistant plastic case simply enables it to withstand rough treatment that would damage most other meters.

SITRANS FUP1010 operates on AC or DC power. It has an internal battery that provides 4 hours of operation and can be recharged in 1.5 hours.



# SITRANS F US Clamp-On Ultrasonic Flowmeters



With the dual channel version, switching between WideBeam and Doppler operation for quick adaptation to varying conditions can take place without changing meters. This makes it suitable for any liquid; even those with high aeration or suspended solids. Using the meter's internal datalogger, process history can be recorded and stored or downloaded to a PC or laptop.

## Check Metering Kits

If you need a portable meter that needs to be moved often as part of a flow survey or flow check measurement, pre-configured check metering kits are the ideal solution. They can be used for checking the performance and accuracy of any type and brand of flow or energy meter.



Kits come in rugged, weatherproof rolling cases with telescoping handles. The case holds all the equipment — cables, multiple transducers and the ultrasonic flow computer; no need to order extra parts.

Clamp-on ultrasonic check metering kits are available for water and wastewater, oil and gas, and energy industry applications.

## Water and Wastewater Application Solutions

Ultrasonic WideBeam transit time and Doppler flowmeters are engineered to measure a wide range of flow applications found in the municipal water and wastewater industries.

They can be mounted on any pipe size and material, and range from simple single meter installations to full flow metering or leak detection systems in large distribution and collections systems plants.

Single, dual or four channel configurations facilitate the installation on a very wide range of applications. Dual channel meters can be set up on two separate applications and can also provide math functions between the two channels. The same applies for the four channel meter, which can monitor four lines and also has math and multipath functions.

## SITRANS FUH1010 for Hydrocarbon Industry Applications

Siemens SITRANS FUH1010 meters are specifically designed to address the needs of the hydrocarbon industry in applications where traditional meters cannot perform.

- Continuous operation with highly aerated liquids
- Flow measurement under a wide range of viscosities
- Easy and quick installation with zero process down time
- High performance under less than ideal flow profile conditions

SITRANS FUH1010 flowmeters are ideal for crude oil, refined petroleum or liquefied gas applications. They are available in single, dual, three or four beam versions and use WideBeam technology for maximum accuracy.

Clamp-on flowmeters for the hydrocarbon industry are available in three different versions. The temperature- and pressure-compensated SITRANS FUH1010 interface detector offers extremely precise interface, crude oil and multiproduct identification. It is ideal for scraper "pig" and density indication. The system provides outputs for API number, density,

**Rent a Portable Flowmeter!**  
Siemens portable clamp-on ultrasonic flowmeters are available for rent for survey metering applications. Call for details.



and specific gravity at base temperature and pressure at both reference and current operating conditions.

The SITRANS FUH1010 for accurate standard volume/mass flow measurement is required for high end application such as varying viscosity liquids and multi-product pipelines. It's also ideal for line balance applications that require normalized volume or mass output.

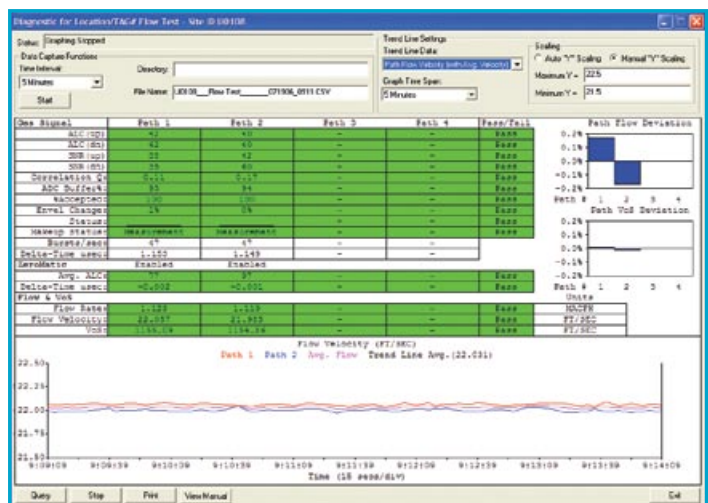
Outputs are available for density and API. For even more precise density compensation, analog inputs from densitometers, temperature sensors, viscometers and pressure transmitters can be used.

## SITRANS FUE1010 for Energy and Power Applications

The rugged, high precision SITRANS FUE1010 flowmeter is ideally suited for thermal energy and power applications, and large pipe sizes.

Key applications include high precision revenue grade sub-metering of thermal energy production, chilled or hot water HVAC installations, measurement of ammonia and glycol mixtures, and energy efficiency monitoring of HVAC equipment and nuclear power plants.

As a stand-alone energy meter, the FUE1010 can be used as a remote communication module. Inputs from other data sources are transferred into the built-in data logger, making it easy to time-stamp all data and download it for billing, efficiency and operation analysis.



# SIEMENS

Compare SITRANS F US flowmeter models on page 276.



FUP1010 portable clamp-on flowmeter, IP67 weatherproof, battery powered. Includes RTD mounting hardware and cable, pipe mounting kit and spacer bars for each transducer. Call for high temperature transducers.



FUS1020 basic clamp-on flowmeter, NEMA 4/IP65. Includes one 4–20 mA output per channel and 1 pulse output (single channel model only). Transducer includes pipe mounting kit. Unit is UL, cUL, and CE approved standard.

## Model Selection Guide

Issue all orders to: Siemens Industry Inc, c/o Lesman Instrument Company

Description		Catalog Number	Price
FUP1010 Portable Clamp-On Flowmeter		7ME3510-	\$4518.00
Channels/Beams	Single Channel	1CA__	0.00
	Dual Channel/Dual Beam	2CA__	907.00
Temp. Sensors	None	___0_	0.00
	1X Std Clamp-On RTD, 50' Cable	___7_	717.00
	2X Std Clamp-On RTD, 50' Cable	___8_	1434.00
Battery Charger	None	___0-	0.00
	External 4-Hr Battery, US Plug [Note b]	___9-	560.00
Channel 1 Transducer	No Transducer	0A__	0.00
	A2 Universal, 3" Track Mount	0B__	1396.00
	B3 Universal, 5" Track Mount	0C__	1396.00
	C3 Universal, 13" Mounting Frame	0D__	1730.00
	D3 Universal, 24" Mounting Frame	0E__	1730.00
	E2 Universal, 48" Mounting Frame	0F__	2197.00
	A1H High Precision, 3" Track Mount	0G__	1560.00
	A2H High Precision, 3" Track Mount	0H__	1560.00
	A3H High Precision, 3" Track Mount	0J__	1560.00
	B1H High Precision, 5" Track Mount	0K__	1560.00
	B2H High Precision, 5" Track Mount	0L__	1560.00
	C1H High Precision, 24" Mounting Frame	0M__	2051.00
	C2H High Precision, 24" Mounting Frame	0N__	2051.00
	D1H High Precision, 48" Mounting Frame	0P__	2225.00
	D2H High Precision, 48" Mounting Frame	0Q__	2400.00
D4H High Precision, 48" Mounting Frame	0R__	2686.00	
Doppler, Chain Kit to 12"	0S__	890.00	
Channel 2 Transducer	No Transducer	__A0	0.00
	A2 Universal, 3" Track Mount	__B0	1396.00
	B3 Universal, 5" Track Mount	__C0	1396.00
	C3 Universal, 13" Mounting Frame	__D0	1730.00
	D3 Universal, 24" Mounting Frame	__E0	1730.00
	E2 Universal, 48" Mounting Frame	__F0	2197.00
	A1H High Precision, 3" Track Mount	__G0	1560.00
	A2H High Precision, 3" Track Mount	__H0	1560.00
	A3H High Precision, 3" Track Mount	__J0	1560.00
	B1H High Precision, 5" Track Mount	__K0	1560.00
	B2H High Precision, 5" Track Mount	__L0	1560.00
	C1H High Precision, 24" Mounting Frame	__M0	2051.00
	C2H High Precision, 24" Mounting Frame	__N0	2051.00
	D1H High Precision, 48" Mounting Frame	__P0	2225.00
	D2H High Precision, 48" Mounting Frame	__Q0	2400.00
D4H High Precision, 48" Mounting Frame	__R0	2686.00	
Doppler, Chain Kit to 12"	__S0	890.00	

Note B: Include code M1B after completed model number to specify external battery with US plug.

**To order a SITRANS F US clamp-on ultrasonic flowmeter, complete the application datasheet from [www.Lesman.com/datasheets](http://www.Lesman.com/datasheets) and send it to Lesman for engineering review. Please issue all orders to Siemens Industry Inc, c/o Lesman Instrument Company.**

## Model Selection Guide

Issue all orders to: Siemens Industry Inc, c/o Lesman Instrument Company

Description		Catalog Number	Price
FUS1020 Basic Clamp-On Flowmeter, NEMA 4/IP65		7ME3570-	\$1850.00
Channels/Beams	Single Channel	1_____	0.00
	Dual Channel/Dual Beam	2_____	570.00
Display Options	None, Blind Display	_AA00-	0.00
	Digital Display	_EA00-	320.00
Channel 1 Transducer	No Transducer	0A_0	0.00
	A2 Universal, 3" Track Mount	0B_0	1307.00
	B3 Universal, 5" Track Mount	0C_0	1307.00
	C3 Universal, 13" Mounting Frame	0D_0	1425.00
	D3 Universal, 24" Mounting Frame	0E_0	1425.00
	E2 Universal, 48" Mounting Frame	0F_0	1873.00
	A1H High Precision, 3" Track Mount	0G_0	960.00
	A2H High Precision, 3" Track Mount	0H_0	960.00
	A3H High Precision, 3" Track Mount	0J_0	960.00
	B1H High Precision, 5" Track Mount	0K_0	960.00
	B2H High Precision, 5" Track Mount	0L_0	960.00
	C1H High Precision, 24" Mounting Frame	0M_0	960.00
	C2H High Precision, 24" Mounting Frame	0N_0	960.00
	D1H High Precision, 48" Mounting Frame	0P_0	1101.00
	D2H High Precision, 48" Mounting Frame	0Q_0	1101.00
High Temperature (to 230°C) Transducer	0Z_0	0.00	
Channel 2 Transducer	No Transducer	0A_0	0.00
	A2 Universal, 3" Track Mount	0B_0	1307.00
	B3 Universal, 5" Track Mount	0C_0	1307.00
	C3 Universal, 13" Mounting Frame	0D_0	1425.00
	D3 Universal, 24" Mounting Frame	0E_0	1425.00
	E2 Universal, 48" Mounting Frame	0F_0	1873.00
	A1H High Precision, 3" Track Mount	0G_0	960.00
	A2H High Precision, 3" Track Mount	0H_0	960.00
	A3H High Precision, 3" Track Mount	0J_0	960.00
	B1H High Precision, 5" Track Mount	0K_0	960.00
	B2H High Precision, 5" Track Mount	0L_0	960.00
	C1H High Precision, 24" Mounting Frame	0M_0	960.00
	C2H High Precision, 24" Mounting Frame	0N_0	960.00
	D1H High Precision, 48" Mounting Frame	0P_0	1101.00
	D2H High Precision, 48" Mounting Frame	0Q_0	1101.00
High Temperature (to 230°C) Transducer	0Z_0	0.00	
Options			
High Temp Transducer, Size 2, 30–200 mm Diam.		-Z,P1A	4350.00
High Temp Transducer, Size 3, 150–610 mm Diam.		-Z,P1B	4529.00
High Temp Transducer, Size 4, 400–1200 mm Diam.		-Z,P1C	5222.00
Transducer Cable Termination Kit for 1 Cable Pair		-Z,T01	54.00
PVC Jacket Transducer Cable (Standard)	20 Ft (6m) Cable Length	K01	94.00
	50 Ft (15m) Cable Length	K02	104.00
	100 Ft (30m) Cable Length	K03	186.00
	150 Ft (46m) Cable Length	K04	310.00
	200 Ft (61m) Cable Length	K05	350.00
	300 Ft (91m) Cable Length	K06	515.00
Teflon Jacket Transducer Cable (High Temp)	20 Ft (6m) Cable Length	K21	198.00
	50 Ft (15m) Cable Length	K22	320.00
	100 Ft (30m) Cable Length	K23	443.00
	150 Ft (46m) Cable Length	K24	767.00
	200 Ft (61m) Cable Length	K25	836.00
	300 Ft (91m) Cable Length	K26	1181.00

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# OCM-III Open Channel Flow Monitor



- High accuracy on non-standard weirs and flumes
- Simple programming
- BS 3680 calculations for exceptional accuracy in measuring flow
- 1 to 24 months data log
- Communicate by infrared handheld, RS232 port, or 4-20 mA output
- AC/DC operation — automatically switches to battery for uninterrupted power
- Flow Reporter software for remote monitoring and configuration (15-day expiring demo available at [www.Lesman.com](http://www.Lesman.com))



Search [www.lesman.com](http://www.lesman.com) for OCM-III

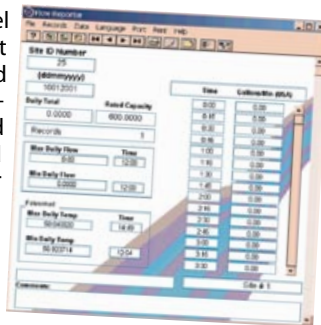
Siemens' OCM-III masters applications ranging from simple open channel monitoring to complete system studies. This noncontacting unit meets the requirements of the most stringent applications.

In addition to its use on wastewater, monitoring flow rates in sewage works, the OCM-III monitors industrial discharges, providing data for rainfall/storm water studies, inflow/filtration studies, and sewer system evaluations. And, the OCM-III can be used as a data logger, providing an analog output with any level measurement device.

The OCM-III contains a programmable cubic spine *Head vs. Flow* curve (up to 16 points) to ensure high accuracies. Instead of drawing a straight line between setpoints, the OCM-III calculates a curve to more accurately define the flow rate, which means that you can install the OCM-III in nonstandard weirs and flumes.

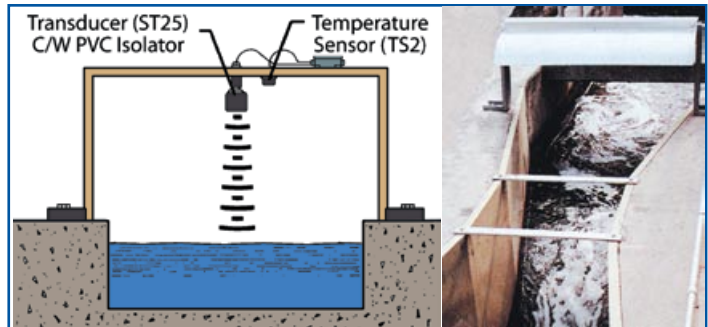
You can adjust the logging rate from once per minute to once a day, to capture the average flow rates. The log records min/max temperatures and flow rates, times, and daily totals. In case of a rapid change in flow, variable rate logging lets you program the unit to log more often, providing a detailed profile of the flow change event. To save data log space, OCM-III will automatically log less frequently under steady conditions.

Remote monitoring of open channel flow is now easier and more efficient with Flow Reporter, a Windows®-based configuration software and data extractor. Flow Reporter lets you monitor and troubleshoot flow readings quickly and easily from a remote location, using your desktop PC and a modem kit. You can also use it in the field with a laptop.



The external modem kit contains an industrial modem, power supply, connection cables, and a detailed instruction manual. The manual describes how to configure the modem and each compatible product, saving time and frustration in trying to determine the correct modem settings. The kit can be mounted using screws or a DIN rail. All components can stand up to the industrial environment.

**Need CPVC flanges for transducers and temperature sensors? Call Lesman!**



A Siemens ultrasonic transducer above the primary device emits a pulse that strikes the liquid target and is reflected back as an echo. The transmit/return times are converted to digital indications of head, flow rate, and totalized flow.

## Specifications

**Display:** Two-line alphanumeric LCD type with LED backlighting

**Accuracy:** ±1 mm/M, calculated error less than 0.02%

**Operating Temperature:** 14° to 122°F (-10° to 50°C) *Temperature compensation:* 0.1°C resolution, ±0.2°C linearity

**Outputs:** 3 relay outputs, SPDT contacts rated 8A/250 VAC, function programmable; Current outputs isolated 0-20 or 4-20 mA into 1000Ω max.

**Data Logging:** Fixed rates, selected variable (1, 5, 15, 30, 60 minutes or 24 hours); *Contents:* Site ID number, date and time of record, flow rate entries, daily flow total, max and min flow rates, and temperature with times of occurrence; *Format:* ASCII or database manager (spreadsheet compatible)

**Communications:** User interface via infrared keypad programmer; RS232-compatible serial port/bipolar ±20 mA current loop port for programming or extraction of program data or data log; RS232 port capable of periodic output to serial printer, 7 selectable baud rates from 300 to 19,200

**Software:** Included; Siemens Utilities Software COM1 or COM2; or 3.5" PC floppy disk; Flow Reporter

**Memory Protection:** Dual backup systems, superior capacitor, and Ultralife lithium power cell

**Enclosure:** Polycarbonate, CSA enclosure, Type 4 IP65

**Power Supply:** 115-230 VAC ±15%, 50/60 Hz @ 16VA max., 9-30 VDC @ 8W max. 3.5@ min.

**Separation:** Up to 600 feet between transducer and electronics

**Transducer Range:** 10 ft. *Blanking:* Adjustable to 10 ft.

**Approvals:** Transducers and temperature sensor approved for use with Siemens transceivers for CE, CSA, FM Class I, Groups A-D; Class II, Groups F,G

Issue all orders to: **Siemens Industry Inc, c/o Lesman Instrument Company**

## Model Selection Guide

Description	Catalog Number	Price	
OCM III Ultrasonic Transceiver	7ML1002-0AA05	\$1784.00	
XRS-5 Ultrasonic Transducer, 5M Cable	7ML1106-1AA20-0A	440.00	
XRS-5 Ultrasonic Transducer, 10M Cable	7ML1106-1BA20-0A	463.00	
XRS-5 Ultrasonic Transducer, 30M Cable	7ML1106-1CA20-0A	497.00	
Temperature Sensor	TS-2, 1M Cable TS-2, 10M Cable	7ML1812-1AA1 7ML1812-3AA1	147.00 168.00
Removable Handheld Programmer	7ML1830-2AA	125.00	
Stainless Steel Tag	7ML1930-1AC	41.00	
Flow Reporter Kit	7ML1930-1AL	397.00	
Flow Reporter Software License	7ML1930-1AK	397.00	
OCM III Lid Overlay	7ML1830-1KV	58.00	
OCM III Instruction Manual	7ML1998-5AB01	16.00	

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