

# FLO-GAGE

7000 / 8000 Series

## Flow Switches for Liquids / Gases (HAZ LOC) (-1S2-IS, -2S2-IS, -1S2-IS-LED or -2S2-IS-LED Options)

### Features and Benefits

- Expanded 3.5" (90mm) 270° analog dial for reading at a glance
- CSA / KEMA Approved for Hazardous Location
- Measures 6:1 range with  $\pm 3\%$  F.S. accuracy
- Dial and case factory configured for quick installation – but easily field re-configured if needed
- Liquid flow ranges from 4 GPH (15 l/h) in 1/2" flow meter to 3000 GPM (12000 l/m) in 8" flow meter.
- Gas flow ranges from 40 SCFH (1 Nm<sup>3</sup>/h) in 1/2" flow meter to 20,000 SCFM (600Nm<sup>3</sup>/m) in 8" flow meter.

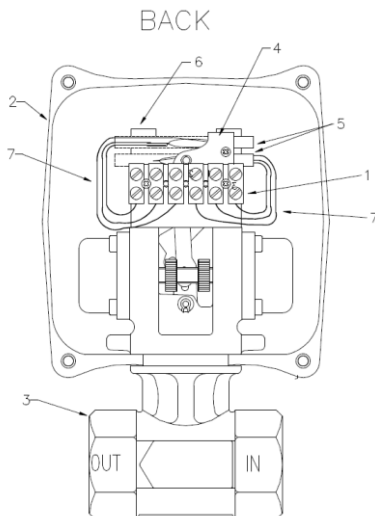


### Applications

- Chillers
- Petrochemical Industry Oil & Gas
- Industrial Energy & Utilities

### Principle of Operation

Our differential pressure flow meters are based on the premise that the pressure drop across the meter is proportional to the square of the flow rate. The flow rate is obtained by measuring the pressure differential and extracting the square root. Reed switches are an economical solution for equipment protection and automation for critical processes in a variety of industrial and commercial applications. LED's provide viewing at a glance and easy field calibration, LED operating voltage 24Vdc, 20mA. Each switch is independently adjustable from 15% to 90% of full scale. The switches can be configured to your factory set points.



### Specifications

	Standard	Options
<b>Housing</b>	Polycarbonate	Aluminum
<b>Body</b>	Bronze	Monel 316 SS
<b>Bellows</b>	Bronze	Monel 316 SS Inconel
<b>Seals</b>	Buna-N	Viton EPR Teflon
<b>Crystal</b>	Polycarbonate	Glass Plastic
<b>Gear Movement Pressure</b>	Bronze	316 SS
	Maximum 180 psig	400 psig
	Minimum 10 psig	10 psig
<b>Temperature</b>	Maximum 212°F	350°F
	Minimum -30°F	-80°F

### Reed Switches (Intrinsically Safe)

<b>Setability</b>	$\pm 5\%$ F.S.
<b>Repeatability</b>	$\pm 1\%$ F.S.
<b>Hysteresis</b>	7 to 13% F.S.
<b>Entity Parameters</b>	V <sub>max</sub> = 28V I <sub>max</sub> = 110mA P <sub>max</sub> = 1.2W C <sub>i</sub> = 0uF L <sub>i</sub> = -uH
<b>LED Rating</b>	0.50 Watts 24V, 20mA

### Hazardous Location Approval

CSA / NRTL/c:  
AEx ia IIC: Class I, Division I, Groups A, B, C, and D  
Class II, Division I, Groups E, F, and G  
KEMA: Ex ia IIC: Zone 0, II 1G T4 0° ≤ Ta ≤ 50°C  
ATEX EC Type Examination

## Model Number System

The example **1/2"-71-R-10-1S2** describes a 1/2" pipe size, 7000 series threaded connection, bronze material, flow from left to right, flow rate of 10 GPM, Options – 1 single pole double throw (1S2 option).

<u>1/2"</u>	-	<u>7</u>	<u>1</u>	-	<u>R</u>	-	<u>10</u>	-	<u>1S2</u>
Pipe Size		Series	Material		Flow Direction		Flow Rate		Options
1/4"	(8mm)	7000 Series	1 - Bronze		L – Right to Left		See Flow Chart		See Table
1/2"	(15mm)	8000 Series	2 - Monel		R – Left to Right				
3/4"	(20mm)		3 - SST		VUR – Vertical Up Flow Dial Right				
1"	(25mm)				VUL - Vertical Up Flow Dial Left				
1 1/2"	(40mm)				VDR - Vertical Down Flow Dial Right				
2"	(50mm)				VDL - Vertical Up Flow Dial Left				
2 1/2"	(65mm)								
3"	(80mm)								
4"	(100mm)								
5"	(125mm)								
6"	(150mm)								
8"	(200mm)								

## Table of Options

A	Viton Seals
B	EPR Seals
B2	Teflon Seals
C	Calibrated for Specific Gravity
E	Non-Standard Flow Rate
ES	Low Flow Rate (Below 2 GPM)
G	Custom Scales and Dials
H	High Pressure Service (400 psig max.)
I	Compressed Gas Service
P	Panel Mount
R2	Remote Readout, Brass (Mech. Indicator)
R3	Remote Readout, 316 SS (Mech. Indicator)
V	High Viscosity Service (5-500 cps)
1S2-IS	1 Single Pole Double Throw Switch (Intrinsic Safe Approval)
2S2-IS	2 Single Pole Double Throw Switches (Intrinsic Safe Approval)
1S2-IS-LED	1 Single Pole Double Throw Switch w/LED (Intrinsic Safe Approval)
2S2-IS-LED	2 Single Pole Double Throw Switches w/LED (Intrinsic Safe Approval)

## Flow Ranges – Series 7000 & 8000

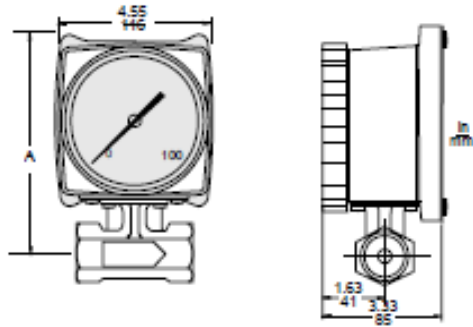
	Liquids					Gases				
	Size	GPM	LPM	SCFM	Nm <sup>3</sup> /h	Size	GPM	LPM	SCFM	Nm <sup>3</sup> /h
	1/4	2	8	10	15	2 1/2	60	240	600	1000
	1/4	3	10	20	30	2 1/2	100	400	800	1200
	1/4	4	15	30	50	2 1/2	150	600	1000	1500
						2 1/2	200	800	1200	2000
	1/2	2	8	10	15	3	200	800	1000	1500
	1/2	3	10	20	30	3	300	1000	2000	3000
	1/2	4	15	30	50	3	400	1500	3000	5000
	1/2	6	25	40	80	3	500	2000	4000	6000
	1/2	10	40	60	100				<b>SCFM</b>	<b>Nm<sup>3</sup>/m</b>
	3/4	6	25	60	100	4	300	1000	1500	50
	3/4	10	40	100	150	4	400	1500	3000	100
	3/4	15	60	150	200	4	600	2400	5000	150
	3/4	20	80	200	300	4	800	3000	6000	200
	1	15	60	150	250	5	300	1000	1500	50
	1	20	80	200	400	5	400	1500	3000	100
	1	30	120	300	500	5	600	2400	5000	150
	1	40	150	400	600	5	800	3000	6000	200
	1 1/2	30	120	300	500	6	600	2400	3000	100
	1 1/2	40	150	400	600	6	800	3000	5000	150
	1 1/2	60	240	600	1000	6	1000	4000	8000	250
	1 1/2	100	400	800	1200	6	2000	8000	15000	400
	2	40	150	400		8	600	2400	5000	150
	2	60	240	600		8	1000	4000	8000	250
	2	100	400	800		8	2000	8000	15000	400
	2	150	600	1000		8	3000	12000	20000	600
	2	200	800	1200						

## Low Flow Rates – Option ES

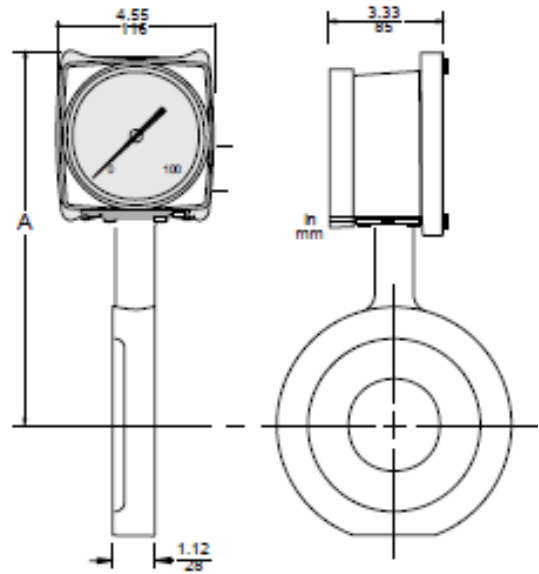
Size	GPH	l/h	cc/m
1/2	4	15	200
1/2	6	20	300
1/2	10	40	400
1/2	15	60	600
1/2	20	80	1000
1/2	30	120	2000
1/2	40	150	3000
1/2	60	240	4000
1/2	100	400	6000

Note: Available with 1/2" 7000 Series Only

## 7000 Series – 1/4" to 3" Connections



## 8000 Series – 1/2" to 8" Connection



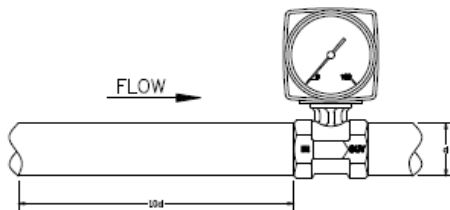
### Dimensions

Nominal Sizes		Series 7000 – A		Series 8000 - A	
In	mm	In	mm	in	mm
1/4	08	5.95	151	n/a	n/a
1/2	15	5.95	151	6.62	168
3/4	20	5.95	151	7.06	179
1	25	6.07	154	7.25	184
1 1/2	40	6.39	162	7.81	198
2	50	6.80	172	8.00	203
2 1/2	65	n/a	n/a	8.54	217
3	80	7.48	190	8.87	225
4	100	n/a	n/a	9.95	252
5	125	n/a	n/a	10.36	263
6	150	n/a	n/a	11.05	280
8	200	n/a	n/a	12.30	311

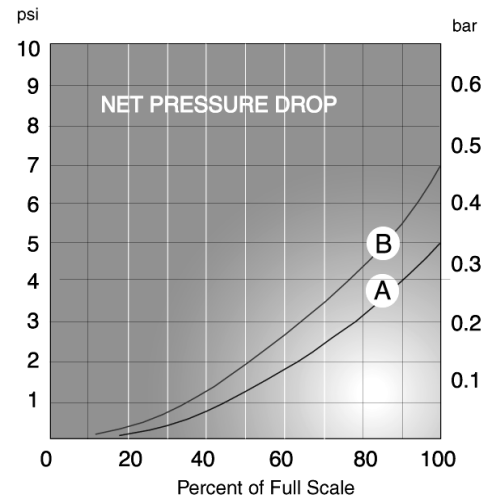
Note: Dimensions are based on bronze meters.

### Piping Requirements

The site selected should provide at least 10 pipe diameters of straight meter sized pipe between the meter inlet and any upstream fitting such as elbow, tee or valve.



### Pressure Drop Characteristics



Curve A – Bronze Bellows  
Curve B – Monel, SS, Inconel Bellows

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