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MEASUREMENT AND CONTROL

900 Series Flow Switch

Vane actuated switches are designed for direct sensing of liquid flow in pipelines. These switches are magnetically actuated and feature rugged internal construction and all stainless trim. Minimum line pressure loss is determined by vane position at actuation. These switches are designed for vertical mounting only.

The 900 Series Flow Switch can be adjusted for a wide range of pipe sizes from 2-1/2" upward. The standard model is furnished with a vane for an 8-inch line which can be field trimmed for installation in smaller lines. Special models are available for pipe over 8-inch size.



Product Specifications

Mounting	
Orientation	Vertical
Connection Size	2" through 3"
Connection Type	NPT(M) or flanged
Maximum Process Pressure	1000 psi
Process Temperature Range	250°F
Electrical	
Switch Type	Dry contact or hermetically sealed
Housing	Aluminum NEMA 4X/IP65 or explosion proof (Class I, Groups C,D; Class II, Groups F,G; Div. 1&2)
Connection Size	1" NPT(F)

Design Code	Designed to ANSI/ASME B31.1 and B31.3 guidelines
Warranty	5 Years
Agency Listing*	CSA Certified (US & Canada) or UL Listed

Safety Certified to IEC 61508 (SIL)
SOR products are certified to IEC 61508 for non-redundant use in SIL1 and SIL2 Safety Instrumented Systems for most models. For more details or values applicable to a specific product, see the Safety Integrity Level Quick Guide (Form 1528).

*See accessories for details.

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How to Order

Below is the SOR quick select model number tree that provides you with all the options to configure and order a product for your application. You must select a designator for each component.

1 Model

NPT	901
150#	902*
300#	903*
600#	904*

2 Process Conection Material

Carbon Steel	A
316/316L Stainless Steel	C

3 Process Connection Size

2” NPT(M)	F2
2-1/2” RF Flange	F7
3” RF Flange	F3

4 Process Connection Rating

NPT (901)	A
150# (902)	C*
300# (903)	D*
600# (904)	E*

5 Trim Material

316/316LSS Vane, 400SS Attraction Sleeve *Only available with A Process Connection Material*	B
316/316LSS Vane, 316/316LSS Attraction Sleeve	C

6 Switching Mechanism

See Pages 3-4 for selection information

7 Housing

N4	Aluminum Housing, 1” NPT Conduit Connection. NEMA 4, 4X, IP65
N7	Aluminum Explosion-Proof Housing, 1” NPT Conduit Connection. Class I, Groups C, D; Class II, Groups F, G; Divisions 1 & 2. NEMA 4, 4X, IP65

8 Accessories

CN	Conduit Reducer 1/2” NPT
CP	Conduit Reducer M20 x 1.5
CR	Conduit Reducer 3/4” NPT
CS	CSA Certification *Not available with WV accessory*
KK	Housing Breather Drain
MR	Mill Test Report
NC	NACE Construction
PY	Powder Coat Epoxy Coating (No coating on SS parts or plated screws. 500 hrs. salt spray)
RR	316SS Tag wired to housing for customer tagging
TT	Oversized Nameplate for customer tagging
WV	UL Listed *Not available with CS accessory*

Example Model No. 901 A - F2 A - B - A1 - N4 - CR

*Flanged units require customer specified nozzle length at time of order. See drawing on page 4 for reference.

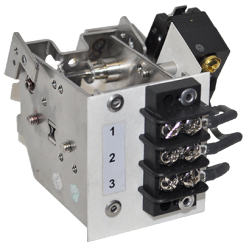
Note: Options may change specifications and dimensions, contact Customer Service for more information.

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SOR switching mechanisms are designed for use in harsh industrial atmospheres. SOR offers a variety of electrical switching mechanism types to fit a wide range of applications. The basic types of switch mechanisms available are listed below. See page 4 for specifications.

All SOR switching mechanisms are constructed from stainless steel and other durable manufactured materials. Each mechanism is individually calibrated and inspected to insure accuracy and repeatability. See below for the benefits and application of each switch type. All mechanisms are interchangeable with most competitor units.



Types A, B, C, E; Standard Dry-Contact Switches

Standard dry-contact switches have open mechanisms and exposed switching elements. These switching mechanisms are easy to maintain. Visual confirmation of operation is obvious. Dry-contact switch mechanisms are recommended for most level switch applications and are available in SPDT and DPDT switch arrangements.

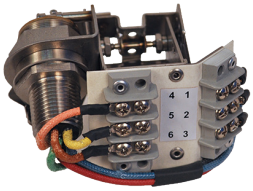
- High-load carrying capacity
- High-quality phenolic insulator
- Vibration resistance
- Versatility of application



Types F, G, H; Hermetically Sealed Switches

Hermetically sealed switches are entirely enclosed in a hermetically sealed enclosure. Both switching elements and mechanisms are sealed. Good for volatile atmospheres and low temperatures.

- Completely enclosed switching mechanism and switch contacts
- Long-term reliability in harsh environmental conditions
- Vibration resistance



Types L, S, V; Mini-Hermetically Sealed Switches

Mini-hermetically sealed switches have a hermetically sealed switch element on an exposed mechanism. Good for high-temperature service and normal applications that require hermetically sealed contacts.

- Rugged stainless steel construction
- Class I Group A rating for use in hazardous areas
- High operating temperature limits

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Switching Mechanism

Switch Designator			Resistive Amperage					Inductive Amperage					Minimum Temperature[1]	Maximum Temperature
			110-130VAC	210-250VAC	20-30VDC	110-130VDC	210-250VDC	110-130VAC	210-250VAC	20-30VDC	110-130VDC	210-250VDC		
A	Standard Dry Contact		15	15	5	.5	.25	15	15	5	.4	.13	-15°F (-26°C)	250°F (121°C)
B	Hi-Temperature Dry Contact		5	5	1.5	.5	-	5	5	1	.25	-	-15°F (-26°C)	400°F (204°C)
C	Gold Contact		1	-	1	-	-	1	-	.5	-	-	-15°F (-26°C)	250°F (121°C)
E	High-Amp DC		-	-	10	10	3	-	-	10	10	3	-15°F (-26°C)	250°F (121°C)
F	Hermetically Sealed		11	11	5	.5	.25	11	11	.25	.25	.13	-65°F (-54°C)	250°F (121°C)
G[3]	Gold Contact Hermetically Sealed		1	-	1	-	-	1	-	.5	-	-	-65°F (-54°C)	250°F (121°C)
H	High-Temperature Hermetically Sealed		5	5	1.5	.3	-	5	5	1	.25	-	-65°F (-54°C)	350°F (177°C)
L[2]	Mini-Hermetically Sealed	DPDT	5	5	5	.5	-	5	5	2.5	.25	-	-15°F (-26°C)	250°F (121°C)
		SPDT	11	11	5	.5	.25	11	11	2.5	.25	.13		
S[3]	Gold Contact Mini-Hermet		1	-	1	-	-	1	-	.5	-	-	-15°F (-26°C)	250°F (121°C)
V[3]	High-Temperature Mini-Hermet		5	5	1.5	.5	-	5	5	1	.25	-	-15°F (-26°C)	400°F (204°C)

Notes

1. Minimum ambient temperature at which the switch mechanism will operate normally. This may vary according to actual climatic conditions. Actual minimum process temperature may be much lower. Consult the factory for details.
2. These switch designators have higher current rating for SPDT than DPDT.
3. For high humidity environments and low current (<100mA), use hermetically sealed gold contact switches (S & G switches). For high temperatures, high humidity, and low current, a "V" switch is available with gold contacts upon request.

Select the switch mechanism from the chart below. See above table for contact and temperature ratings.

Switch Type	SPDT Single Pole Double Throw	DPDT Double Pole Double Throw
Switching Description	**Designator**	
Standard Dry Contact High-Temperature Dry Contact Gold Contact	A1 B1 C1	A4 B4 C4
High-Amperage DC Service	E1	E4
Hermetically Sealed	F1	F4
Gold Contact Hermetically Sealed	G1	G4
High-Temperature Hermetically Sealed	H1	H4
Standard Mini-Hermetically Sealed	L1	L4
Gold Contact Mini-Hermet High-Temperature Mini-Hermet	S1 V1	S4 V4

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	D1	D2	C1	C3	C4	C5	C6	C7	B5	B6	B7
Calibration			◆						◆	◆	◆
Inspection Report				◆					◆	◆	◆
Compliance / Conformance					◆						◆
Dielectric Test						◆			◆		
Insulation Resistance							◆		◆	◆	
Certificate of Origin	◆										
Manufacturer's Certification		◆									

Limited Warranty: SOR agrees to repair or replace any switch found to be defective in material or workmanship within five years from date of shipment. The limited warranty is valid only if the switch was installed in accordance with published factory installation instructions, operated within the design limitations stated on the nameplate, and returned to the factory for inspection, freight prepaid, within the warranty period. Contact the factory for return authorization. No claim for labor or consequential damages will be allowed.

Safety Certified to IEC 61508 (SIL)

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Adjustable Flow Rate

For pipe sizes over 8", consult factory.

Pipeline* Size (inches)	Flow Increase GPM		Flow Decrease GPM	
	Minimum	Maximum	Minimum	Maximum
2.50	25	75	20	55
3.00	30	90	25	65
4.00	45	115	30	85
6.00	80	180	55	125
8.00	120	230	80	160

*Schedule 40

Note: These switches may be adjusted in service to actuate per the values charted here. They are intended for flow indication only, not flow measurement.

Specific Gravity Correction Factors

To determine the actuating flow rates for liquids with a specific gravity other than 1.00, a correction factor must be applied to the flow rates given in the above table. These factors are listed below.

Specific Gravity	Multiplication Factor	Specific Gravity	Multiplication Factor
.40 (minimum)	1.65	.95	1.03
.45	1.55	1.00	1.00
.50	1.46	1.05	.97
.55	1.39	1.10	.95
.60	1.33	1.15	.92
.65	1.27	1.20	.90
.70	1.22	1.25	.88
.75	1.17	1.30	.86
.80	1.13	1.35	.84
.85	1.10	1.40	.82
.90	1.06	1.45	.80

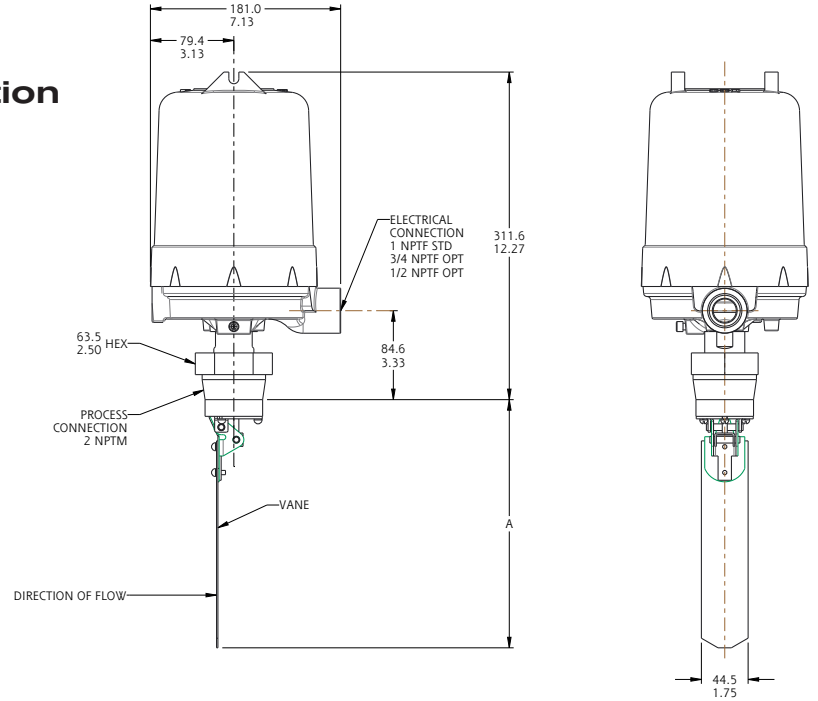
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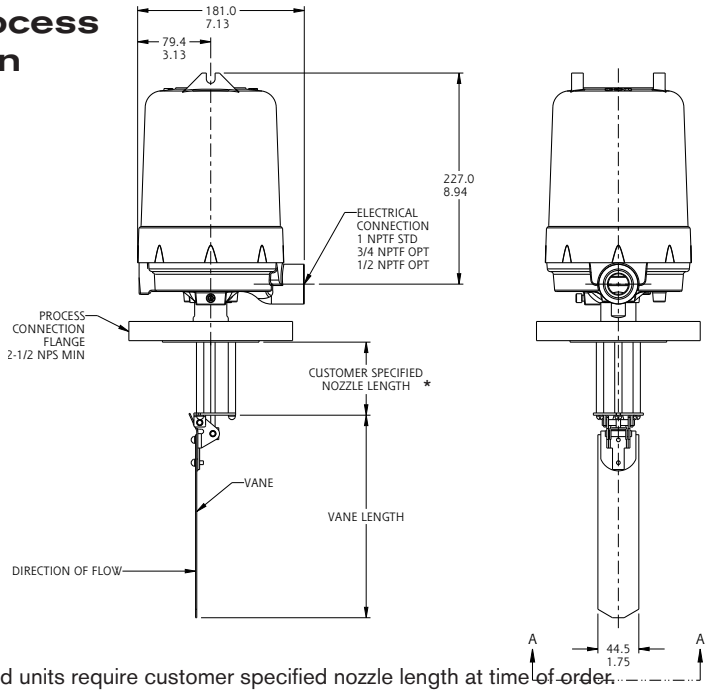
2" NPT Process Connection

Linear = mm/inches
Drawing 0390467



Flange Process Connection

Linear = mm/inches
Drawing 0390749



*Flanged units require customer specified nozzle length at time of order.

MEASUREMENT AND CONTROL
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