



Mechanical Level Detectors

Form 912

SOR® mechanical level detectors

are rugged, industrial products specifically designed for versatility of application. This catalog contains application and ordering data for float and displacer-operated level detectors. Detectors are available with flanged or sealed chambers or as insertion models.

Options available for each type of detector include: detector type and number, housing type, chamber material, process connections, accessories, and more. Units may be customized to suit customers' needs.

Inside this catalog you will find solutions to your level sensing puzzles. SOR mechanical level detectors have many configurations available. If you don't see what you need, we will engineer a solution for your application.



Features and Benefits

- Five-year warranty
- ASME Section IX and AWS qualified welding system
- Designed to ANSI/ASME B31.1 and B31.3 guidelines
- Hermetically sealed detecting mechanisms available
- Stainless steel detecting mechanisms
- High-temperature capability
- Wide variety of explosion-proof housings
- Versatile detecting mechanisms which retro-fit into other manufacturers' units
- Worldwide listings and certifications
- Quick worldwide delivery
- Only ASTM grade materials with certified mill test reports used
- 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).

Mechanical Level Detectors



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Mechanical Level Detectors

Principles

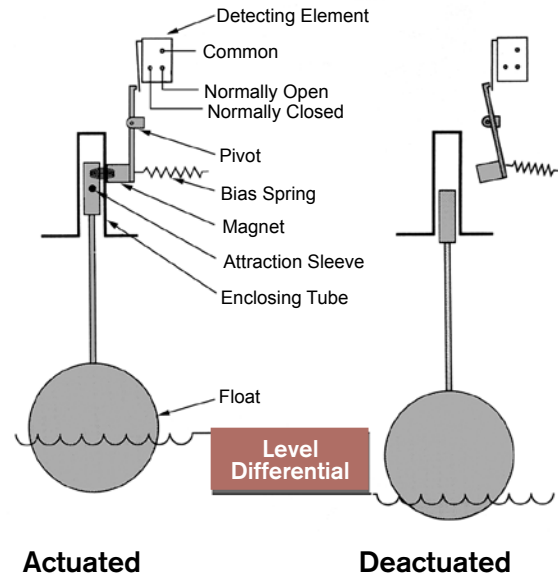
Float-Operated Level Detectors Model Series 100, 200 and 300

The float rides on the process liquid surface, precisely tracking liquid surface motion.

Rising liquid level lifts the float, sliding the attraction sleeve up inside the enclosing tube and into the magnetic field to actuate the electrical or pneumatic detector (signaling liquid presence).

Subsequently, falling liquid level lowers the float, drawing the attraction sleeve out of the magnetic field to deactivate the electrical or pneumatic detector (signaling liquid absence). Float-type level detectors are generally able to handle high-temperature applications, and sometimes prove useful for close interface detection.

Floats can operate up to three detecting elements. Independent detecting levels may be obtained with tandem floats. Consult the factory for special float-detecting arrangements.

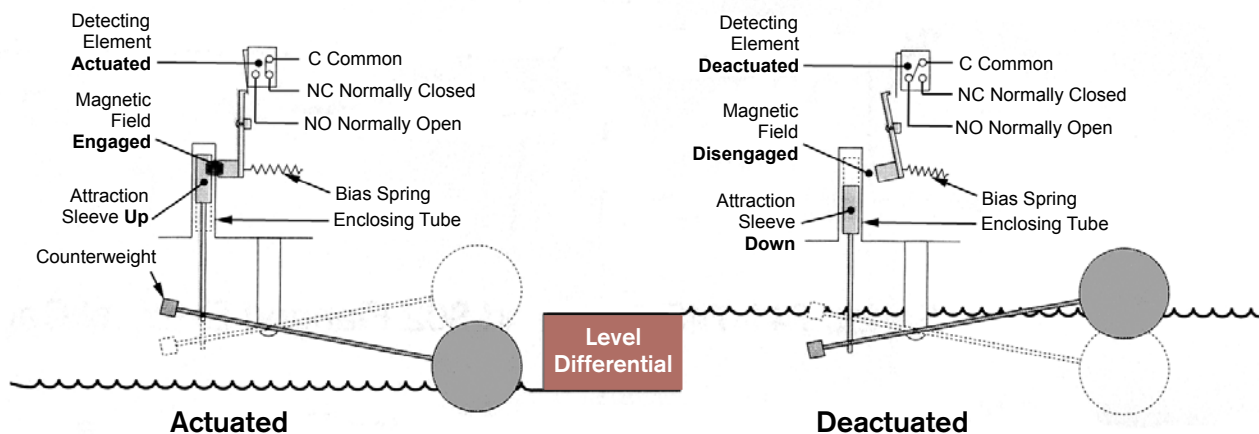


Float-Operated Level Detectors Model Series 108/208 and 400

The float rides on the process liquid surface, precisely tracking liquid surface motion.

Rising liquid level lifts the float via a pivot mechanism, sliding the attraction sleeve down inside the enclosing tube and out of the magnetic field to deactivate the electrical or pneumatic detector (signaling liquid presence).

Subsequently, falling liquid level lowers the float, drawing the attraction sleeve into the magnetic field to actuate the electrical or pneumatic detector (signaling liquid absence). Float-type level detectors are generally able to handle high-temperature applications.

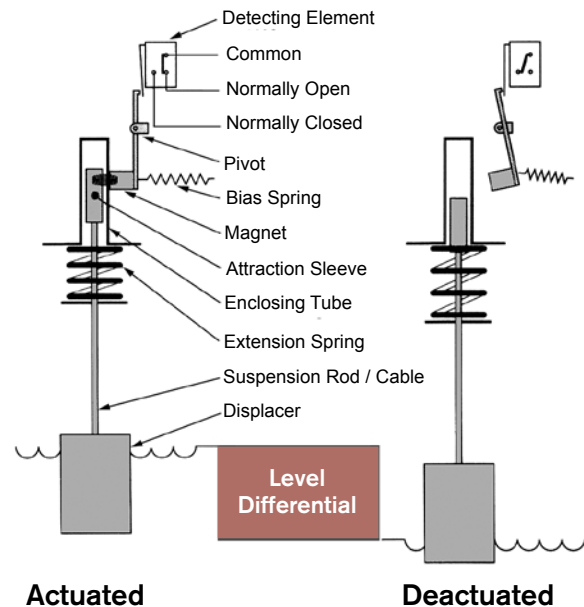


Displacer-Operated Level Detectors Model Series 700, 730, 740, 750 and 800

Displacer controls offer alternative features to the float-operated control. The sensor is a weight (displacer), heavier than the liquid, that is suspended by a spring. When liquid contacts the displacer, a buoyancy force is produced, which causes the effective weight of the displacer to change. This causes the spring to retract slightly to a new equilibrium position. When the spring retracts, the attraction sleeve also moves upward into the field of the external magnet, thus overcoming the force of the bias spring and actuating the detecting element.

This principle provides for narrow or wide detecting differential, and allows detecting point alteration by moving the displacer(s) up or down the suspension cables.

Displacers may be arranged in combinations of narrow and wide differential to operate up to three detecting stages. Displacer controls operate under higher pressure conditions than float-operated detectors.



General

- Rugged carbon steel or stainless steel construction
- Five-year manufacturer's warranty
- Quick, worldwide delivery
- All ASTM materials (see page 57)
- Quality management system is registered to ISO-9001:2008
- Safety Certified to IEC 61508 (SIL)

Standard Chamber Materials

- All SOR level detector chambers are constructed using ASTM grade materials with full material certification. Mill Test Reports are kept on file for all raw materials. Copies are available upon request at the time of order placement.

Carbon Steel Construction

Chamber Center Section	A106 Grade B
Flanges/Weld Fittings	A105
Weld Cap	A234-WPB
Studs/Nuts	A193-B7/A194-2H

Stainless Steel Construction

Chamber Center Section	A312-TP316/316L
Flanges/Weld Fittings	A182-316/316L
Weld Cap	A403-316/316L
Studs/Nuts	A193-B7/A194-2H

Gaskets

- All standard models are provided with a Nitrile binder composite gasket that is selected for its resistance to hydrocarbons and steam.
- For high-temperature, high-pressure or NACE-constructed units, a spiral-wound gasket is used with 316SS wound-around Grafoil.
- Extreme high-pressure model 802 uses a soft-iron, ring-joint gasket on the chamber head flange.

Internal Trim

- All sensing elements (floats and displacers) are constructed of either 316/316LSS or porcelain as a minimum.
- Attraction sleeves are available in 400SS as a standard, with 316/316LSS or other exotic metals as an option.
- All other wetted internal parts are 316SS or better. Displacer springs are made of Inconel 600.

Detecting Mechanisms

SOR detecting mechanisms are designed for use in punishing industrial conditions.

- All stainless steel construction - no aluminum or brass.
- Temperature ratings available from -65°F (-54°C) to 1000°F (538°C) on dry, non-condensing services.
- Condensing service (steam) temperature ratings available up to 800°F (427°C), and up to 1200°F (649°C) with protection (see page 52).
- Available detecting mechanisms include hermetically sealed, standard open contacts, or pneumatic contacts.
- Agency listings are available on most detector mechanisms: UL, CSA, ATEX or TestSafe (Australia).

Detector Housings

All SOR detector housings are made from rugged castings. Materials are copper-free aluminum or cast iron. A wide range of explosion-proof ratings and agency listings are available.

Quality Assurance

SOR maintains a high level of quality throughout our corporation. Many quality assurance features are built into our products.

- ISO 9001 certified engineering design and production system (certified since 1993).
- Level-welded chambers designed to the guidelines of ASME B31.1 and B31.3 (inspection certificate available – see page 55).
- All welders and weld procedures are qualified and maintained to ASME Section IX.
- All ASTM grade materials used - Certified Mill Test Reports required on all raw materials.

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).

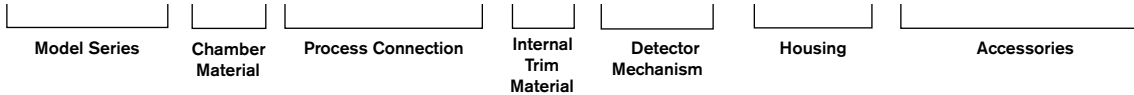
Product Support

SOR has a full-time engineering staff dedicated to solving your mechanical level detector problems.

- Engineers and technicians are knowledgeable about sales and production techniques, and are dedicated to providing the best solution to our customers at the best price.

Model Number System

101 A-A1C-B-A1-N4-CRTT



The level detector model number is divided into seven sections that individually specify the components of an SOR level detector. This diagram illustrates the model number arrangement.

Select the component designators from the appropriate pages of this brochure. Standard components and ratings are highlighted throughout the brochure for ease of use.

Each section includes a valid model number at the top of each listing of component designators. The position of the designator listed below it will be shown in color for reference.

How to Order

Steps 1 through 5 are required; Step 6 is optional. Orders must have complete model numbers, i.e. each component must have a designator.

Step 1: Select **Model Series** based on maximum working pressure and minimum specific gravity.

Step 2: Select **Chamber Material**.

Step 3: Select **Process Connection**.

Step 4: Select **Trim Material**.

Step 5: Select **Detector Mechanism & Housing**. (Pages 44 through 48).

Step 6: Select **Accessories** as required for service. (Page 49).

Page Numbers for Selected Steps

Step	100 Series	200 Series	108/208 Series	300 Series	400 Series	741-743, 802 Series	740 and 804 Series	700 Series	730 Series	750 Series
1	9	14	18	20	23	26	30	33	36	40
2	10	15	18	20	23	26	30	33	36	40
3	10	15	18	21	24	27	31	34	37	41
4	10	15	18	21	24	27	31	34	37	41
5	44-48	44-48	44-48	44-48	44-48	44-48	44-48	44-48	44-48	44-48
6	49	49	49	49	49	49	49	49	49	49

Design and specifications are subject to change without notice. For latest revision, see www.sorinc.net.

The 100 Series mechanical liquid level detector is float operated with a fanged, serviceable external chamber. Select the sensing unit from the following charts. Then refer to pages 44 through 50 for detecting elements, housings and accessories.

Select a model series from the charts below based on maximum operating pressure and minimum specific gravity.

Maximum Working Pressure

See page 53 for pressure ratings at higher temperatures.

Model Series	Chamber Material	Pressure at Listed Temperature in psid (bar)*									
		100°F (38°C)	200°F (93°C)	300°F (149°C)	350°F (177°C)	400°F (204°C)	450°F (232°C)				
101	A106B	285 (19.7)	260 (17.9)	230 (15.9)	215 (14.8)	200 (13.8)	185 (12.8)				
	316SS	275 (18.9)	235 (16.2)	215 (14.8)	205 (14.1)	195 (13.4)	182 (12.6)				
102	A106B	500 (34.5)	500 (34.5)	500 (34.5)	486 (33.5)	473 (32.6)	460 (31.7)				
	316SS	500 (34.5)	500 (34.5)	500 (34.5)	486 (33.5)	473 (32.6)	460 (31.7)				
103	A106B	740 (51.0)	675 (46.6)	655 (45.2)	645 (44.5)	635 (43.8)	622 (42.9)				
	316SS	720 (49.7)	620 (42.8)	560 (38.6)	537 (37.0)	515 (35.5)	497 (34.3)				
104	A106B	990 (68.2)	900 (62.0)	875 (60.3)	860 (59.2)	845 (58.2)	822 (56.6)				
	316SS	1000 (69.0)	1000 (69.0)	1000 (69.0)	973 (67.1)	946 (65.2)	920 (63.4)				
109	A106B	285 (19.7)	260 (17.9)	230 (15.9)	215 (14.8)	200 (13.8)	185 (12.8)				
	316SS	275 (18.9)	235 (16.2)	215 (14.8)	205 (14.1)	195 (13.4)	182 (12.6)				
121	A106B	285 (19.7)	260 (17.9)	230 (15.9)	215 (14.8)	200 (13.8)	185 (12.8)				
	316SS	275 (18.9)	235 (16.2)	215 (14.8)	205 (14.1)	195 (13.4)	182 (12.6)				
122	A106B	350 (24.1)	350 (24.1)	350 (24.1)	340 (23.4)	331 (22.8)	322 (22.2)				
	316SS	350 (24.1)	350 (24.1)	350 (24.1)	340 (23.4)	331 (22.8)	322 (22.2)				
123	A106B	740 (51.0)	675 (46.6)	655 (45.2)	645 (44.5)	635 (43.8)	622 (42.9)				
	316SS	720 (49.7)	620 (42.8)	560 (38.6)	537 (37.0)	515 (35.5)	497 (34.3)				
124	A106B	1250 (86.2)	1250 (86.2)	1250 (86.2)	1216 (83.9)	1182 (81.5)	1150 (79.3)				
	316SS	1250 (86.2)	1250 (86.2)	1120 (77.2)	1075 (74.1)	1030 (71.0)	992 (68.2)				

*Consult the factory for pressure ratings of units with Monel trim.

Minimum Specific Gravity

For Monel Trim please consult factory.

Model Series	Minimum Specific Gravity (Dual Detector, anti-vibration, pneumatic or extra-high temperature)							
	Standard				w/ ET or FE Option			
	316SS / 400SS "B" Trim		All 316SS "C" Trim		316SS / 400SS "B" Trim		All 316SS "C" Trim	
101	0.52	(0.64)	0.56	(0.67)	0.56	(0.67)	0.60	(0.71)
102	0.62	(0.73)	0.66	(0.77)	0.65	(0.76)	0.69	(0.80)
103	0.51	(0.57)	0.53	(0.59)	0.53	(0.59)	0.55	(0.61)
104	0.62	(0.68)	0.64	(0.70)	0.64	(0.70)	0.66	(0.72)
109	0.38	(0.41)	0.39	(0.42)	0.39	(0.42)	0.40	(0.43)
121	0.66	(0.87)	0.73	(0.94)	0.72	(0.93)	0.79	(1.01)
122	0.66	(0.87)	0.73	(0.94)	0.72	(0.94)	0.79	(1.01)
123	0.93	-	0.98	-	0.99	-	1.04	-
124	0.94	-	0.99	-	1.00	-	1.05	-

100 Series

Step 2: Chamber Material

101 A-A1C-B-A1-N4-CRTT

Select chamber material from the following chart. Maximum working pressure in the chart on page 9 is based on the material selected here. Consult the factory for alternative materials.

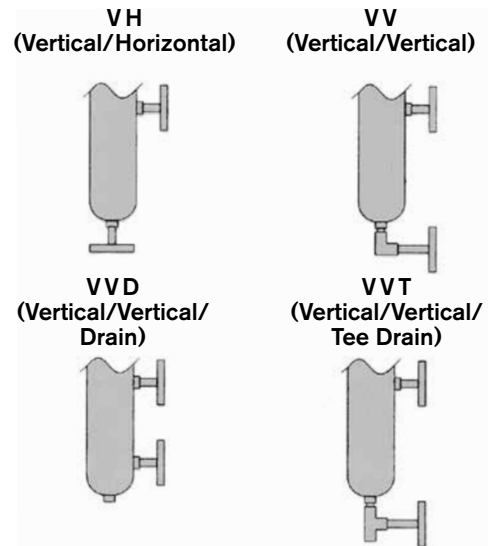
Designator	Material
A	A106 Grade B Carbon Steel with A105 and A234-WPB fittings
C	A312-TP316/316L Stainless Steel with A182-316/316L and A403-316/316L fittings

Step 3: Process Connection

101 A-A1C-B-A1-N4-CRTT

Select a process connection size, style and designator from the chart below. Consult the factory for variations. Flanged process connections may reduce the maximum working pressure of the unit.

Size	Style	NPT Thread	Socket Weld	Flange		
				150#	300#	600#
1"	VH	A1A	A1B	A1C	A1D	A1E
	VV	-	-	B1C	B1D	B1E
	VVD	C1A	C1B	C1C	C1D	C1E
	VVT	-	-	D1C	D1D	D1E
1-1/2"	VH	A5A	A5B	A5C	A5D	A5E
	VV	-	-	B5C	B5D	B5E
	VVD	C5A	C5B	C5C	C5D	C5E
	VVT	-	-	D5C	D5D	D5E
2"	VH	A2A*	A2B*	A2C	A2D	A2E
	VV	-	-	B2C	B2D	B2E
	VVD	C2A*	C2B*	C2C	C2D	C2E
	VVT	-	-	D2C	D2D	D2E



*Not available on Models 121 and 122.

Step 4: Trim Material

101 A-A1C-B-A1-N4-CRTT

Select the internal trim material from the chart below. Consult the factory for pressure ratings on Monel trim.

Designator	Float Material	Attraction Sleeve	Available with Chamber Material:
B	316/316L Stainless Steel	400 Stainless Steel	A106 Carbon Steel (A) only
C	316/316L Stainless Steel	316/316L Stainless Steel	A106 Carbon Steel (A) or 316/316L Stainless Steel (C)
M	Monel 400	Monel 400	A106 Carbon Steel (A) or 316/316L Stainless Steel (C)

The charts below provide typical standard Set Points. As the specific gravity used on a level detector changes, the Set Points will also change. These values are based on the specific gravity listed and units with "B" trim and an A1 detector. For other materials or detectors, please consult factory. If a specific Set Point is needed, please use the "SC" option found in the accessories section of this catalog.

Model 101		
Specific Gravity	"B"	"C"
.52	3-1/4"	4-7/16"
1.0	5-1/4"	5-15/16"

Model 102		
Specific Gravity	"B"	"C"
.62	2-3/4"	3-13/16"
1.0	4-7/16"	5-1/8"

Model 103		
Specific Gravity	"B"	"C"
.51	3-1/4"	3-7/8"
1.0	4-13/16"	5-3/16"

Model 104		
Specific Gravity	"B"	"C"
.62	3-3/8"	3-15/16"
1.0	4-5/8"	5"

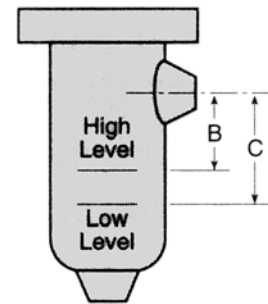
Model 109		
Specific Gravity	"B"	"C"
.38	4-3/4"	5-15/16"
1.0	7-1/4"	7-9/16"

Model 121		
Specific Gravity	"B"	"C"
.66	2-11/16"	4-1/8"
1.0	3-13/16"	4-13/16"

Model 122		
Specific Gravity	"B"	"C"
.66	2-1/2"	3-15/16"
1.0	3-5/8"	4-5/8"

Model 123		
Specific Gravity	"B"	"C"
.93	2-7/8"	3-13/16"
1.0	3-3/16"	4-1/16"

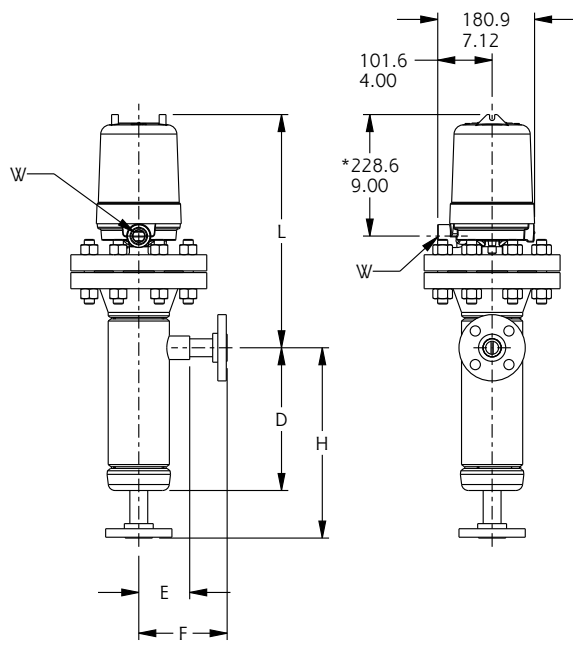
Model 124		
Specific Gravity	"B"	"C"
.94	2-7/8"	3-13/16"
1.0	3-1/8"	4"



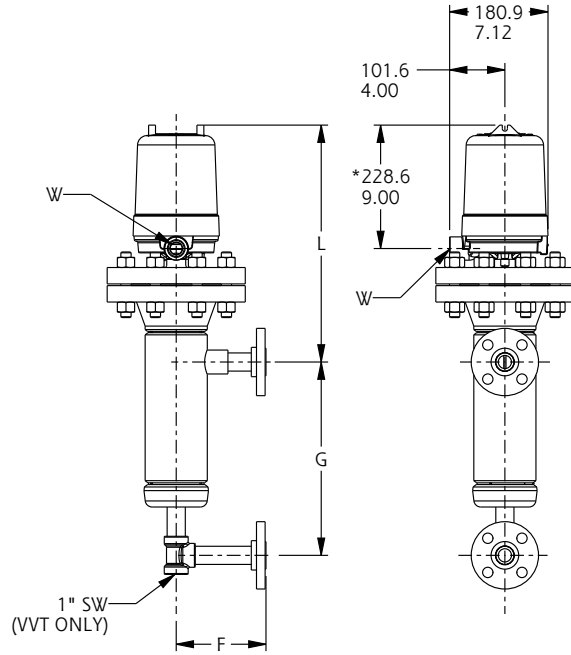
100 Series

Chamber Dimensions

Dimensions listed are for reference only and are expressed as millimeters over inches. (Linear = mm/in.) They are subject to change without notice. Contact SOR for certified drawings of particular models or if special dimensions are required.



Drawing 0390019



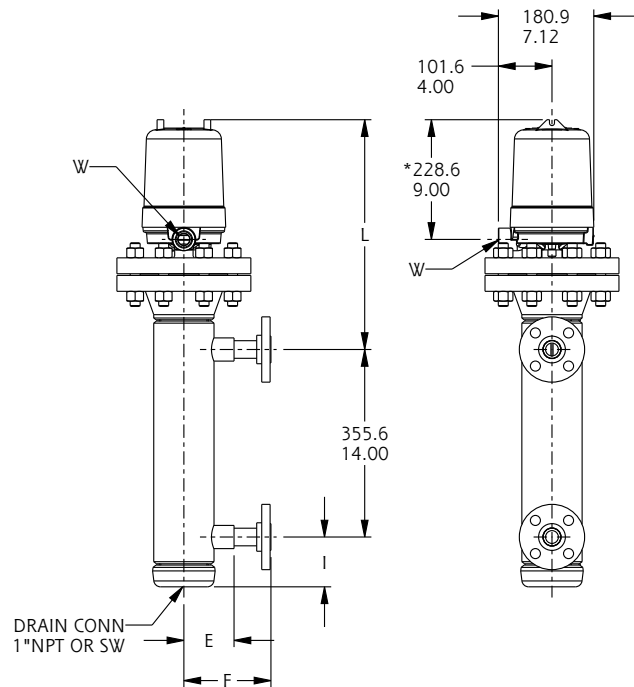
Drawing 0390021

Housing**		W
General Purpose	N4	1" NPT
Explosion Proof	N7	
Explosion Proof	B1	
Explosion Proof	B2	(3) 1/4" NPT
Pneumatic	P1	
ATEX	T6	
Flame Proof/IS	S3 w/CL	M20 x 1.5***
TestSafe	S3	
Flame Proof	S8	

* Minimum 5-3/4" (146 mm) overhead clearance required to remove housing cover.

** See Housing section (page 48).

*** M20 adapters are brass. Contact the factory for alternate materials.



Drawing 0390010

Note: All process flange nipples are 1" standard.

1" Connection

Model	D ^{1,2}		E ^{1,2}		F ⁴		G		H ⁴		I ²		L ²	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
101	10-1/2	267	3-3/4	95	6-1/2	165	14	356	14	356	3-3/4	95	16-5/8	422
102													17-5/16	440
103	10-1/4	260	4-13/16	122	7-7/16	189	14	356	14	356	4-9/16	116	18	457
104													19-3/4	502
109	12-5/8	321	5-13/16	148	8-7/16	214	16	406	16	406	7-1/2	191	17-13/16	452
121	9	229	3-1/4	83	6	152	14	356	14	356	3-3/4	95	16-3/8	416
122													16-15/16	430
123	10-1/2	267	3-3/4	95	6-1/2	165	14	356	14	356	3-3/4	95	17-5/16	440
124													18-3/4	476

1-1/2" Connection

Model	D ^{1,2}		E ^{1,2}		F ⁴		G		H ⁴		I ²		L ²	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
101	10-1/2	267	4	102	6-1/2	165	14	356	14	356	3-3/4	95	16-5/8	422
102													17-5/16	440
103	10-1/4	260	5-1/16	129	7-7/16	189	14	356	14	356	4-9/16	116	18	457
104													19-3/4	502
109	13-1/16	332	6-1/16	154	8-7/16	214	16	406	16	406	7-1/2	191	17-13/16	452
121	9	229	3-1/2	89	6	152	14	356	14	356	3-3/4	95	16-3/8	416
122													16-15/16	430
123	10-1/2	267	4	102	6-1/2	165	14	356	14	356	3-3/4	95	17-5/16	440
124													18-3/4	476

2" Connection

Model	D ^{1,2}		E ^{1,2}		F ⁴		G		H ⁴		I ^{2,3}		L ^{2,3}	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
101	10-1/2	267	4-5/16	110	6-1/2	165	14	356	14	356	4-3/4	121	17-5/8	448
102													18-5/16	467
103	10-1/4	260	5-3/8	137	7-7/16	189	14	356	14	356	4-9/16	116	19	483
104													20-3/4	527
109	13-3/8	340	6-3/8	162	8-7/16	214	16	406	16	406	8-1/2	216	18-13/16	478
121	-	-	-	-	6	152	14	356	14	356	3-3/4 ⁵	95 ⁵	16-3/8 ⁵	416 ⁵
122													16-15/16 ⁵	430 ⁵
123	10-1/2	267	4-5/16	110	6-1/2	165	14	356	14	356	4-3/4	121	18-5/16	465
124													19-3/4	502

Notes

1. Dimensions D and E apply to socket-weld connections only. Consult factory for NPT dimensions.
2. Consult factory for dimensions for materials other than carbon steel.
3. Applies to socket weld or NPT process connections only.
4. Consult the factory if weld neck process flanges are required. Dimensions may vary from those shown above.
5. Applies to flanged process connections only.

The 200 Series mechanical level detector is float operated with a sealed, tamper-proof external chamber. Select the sensing unit from the following charts. Then refer to pages 44 - 50 for detecting elements, housings and accessories.

Select a model series from the charts below based on maximum operating pressure and minimum specific gravity.

Model Series	Chamber Material	Pressure at Listed Temperature in psig (bar)*									
		100°F (38°C)	200°F (93°C)	300°F (149°C)	350°F (177°C)	400°F (204°C)	450°F (232°C)				
201	A106B 316SS	225 (15.5)	225 (15.5)	225 (15.5)	219 (15.1)	213 (14.7)	207 (14.3)				
202	A106B 316SS	300 (20.7)	300 (20.7)	300 (20.7)	292 (20.1)	284 (19.5)	276 (19.0)				
203	A106B 316SS	500 (34.5)	500 (34.5)	500 (34.5)	486 (33.5)	473 (32.6)	460 (31.7)				
204	A106B 316SS	1250 (86.2)	1250 (86.2)	1250 (86.2) 1187 (81.9)	1216 (83.9) 1139 (78.6)	1182 (81.5) 1091 (75.2)	1150 (79.3) 1052 (72.6)				
205	A106B 316SS	750 (51.7)	750 (51.7)	750 (51.7)	729 (50.3)	709 (48.9)	690 (47.6)				
206	A106B 316SS	1000 (68.9)	1000 (68.9)	1000 (68.9) 945 (65.2)	973 (67.1) 907 (62.6)	946 (65.2) 869 (59.9)	920 (63.4) 838 (57.8)				
207	A106B 316SS	1000 (68.9)	1000 (68.9)	1000 (68.9) 945 (65.2)	973 (67.1) 907 (62.6)	946 (65.2) 869 (59.9)	920 (63.4) 838 (57.8)				
209	A106B 316SS	450 (31.0)	450 (31.0)	450 (31.0)	438 (30.2)	426 (29.4)	414 (28.6)				
221	A106B 316SS	350 (24.1)	350 (24.1)	350 (24.1)	340 (23.4)	331 (22.8)	322 (22.2)				

*Consult the factory for pressure ratings of units with Monel trim.

Minimum Specific Gravity

For Monel Trim please consult factory.

Model Series	Minimum Specific Gravity (Dual Detector, anti-vibration, pneumatic or extra-high temperature)							
	Standard				w/ ET or FE Option			
	316SS / 400SS "B" Trim		All 316SS "C" Trim		316SS / 400SS "B" Trim		All 316SS "C" Trim	
201	0.38	(0.44)	0.40	(0.46)	0.40	(0.44)	0.42	(0.48)
202	0.52	(0.63)	0.55	(0.67)	0.55	(0.66)	0.59	(0.70)
203	0.61	(0.72)	0.65	(0.76)	0.64	(0.75)	0.68	(0.79)
204	0.91	-	0.96	-	0.98	-	1.03	-
205	0.50	(0.56)	0.52	(0.58)	0.52	(0.58)	0.54	(0.60)
206	0.65	(0.75)	0.68	(0.79)	0.68	(0.79)	0.71	(0.82)
207	0.61	(0.67)	0.63	(0.69)	0.63	(0.69)	0.65	(0.71)
209	0.38	(0.41)	0.39	(0.42)	0.39	(0.42)	0.40	(0.43)
221	0.64	(0.86)	0.72	(0.93)	0.71	(0.92)	0.78	(0.99)

200 Series

Step 2: Chamber Material

201 A-A1C-B-A1-N4-CRTT

Select chamber material from the following chart. Maximum working pressure in the chart on this page is based on the material selected here. Consult the factory for alternative materials.

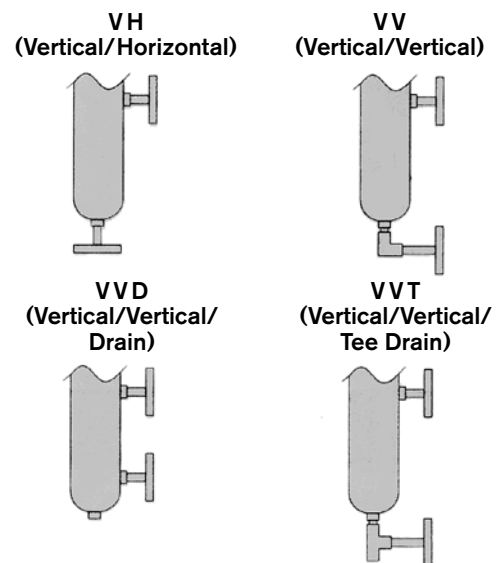
Designator	Material
A	A106 Grade B Carbon Steel with A105 and A234-WPB fittings
C	A312-TP316/316L Stainless Steel with A182-316/316L and A403-316/316L fittings

Step 3: Process Connection

201 A-A1C-B-A1-N4-CRTT

Select a process connection, size, style and rating from the chart below. Consult the factory for variations. Flanged process connections may reduce the maximum working pressure of the unit.

Size	Style	NPT Thread	Socket Weld	Flange		
				150#	300#	600#
1"	VH	A1A	A1B	A1C	A1D	A1E
	VV	-	-	B1C	B1D	B1E
	VVD	C1A	C1B	C1C	C1D	C1E
	VVT	-	-	D1C	D1D	D1E
1-1/2"	VH	A5A	A5B	A5C	A5D	A5E
	VV	-	-	B5C	B5D	B5E
	VVD	C5A	C5B	C5C	C5D	C5E
	VVT	-	-	D5C	D5D	D5E
2"	VH	A2A*	A2B*	A2C	A2D	A2E
	VV	-	-	B2C	B2D	B2E
	VVD	C2A*	C2B*	C2C	C2D	C2E
	VVT	-	-	D2C	D2D	D2E



*Not available on Model 221.

Step 4: Trim Material

201 A-A1C-B-A1-N4-CRTT

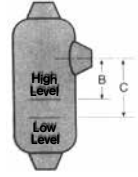
Select the internal trim material from the chart below. Consult the factory for pressure ratings on Monel trim.

Designator	Float Material	Attraction Sleeve	Available with Chamber Material:
B	316/316L Stainless Steel	400 Stainless Steel	A106 Carbon Steel (A) only
C	316/316L Stainless Steel	316/316L Stainless Steel	A106 Carbon Steel (A) or 316/316L Stainless Steel (C)
M	Monel 400	Monel 400	A106 Carbon Steel (A) or 316/316L Stainless Steel (C)

200 Series

Calibration Dimensions

The charts below provide typical standard Set Points. As the specific gravity used on a level detector changes, the Set Points will also change. These values are based on the specific gravity listed and units with "B" trim and an A1 detector. For other materials or detectors, please consult factory. If a specific Set Point is needed, please use the "SC" option found in the accessories section of this catalog.



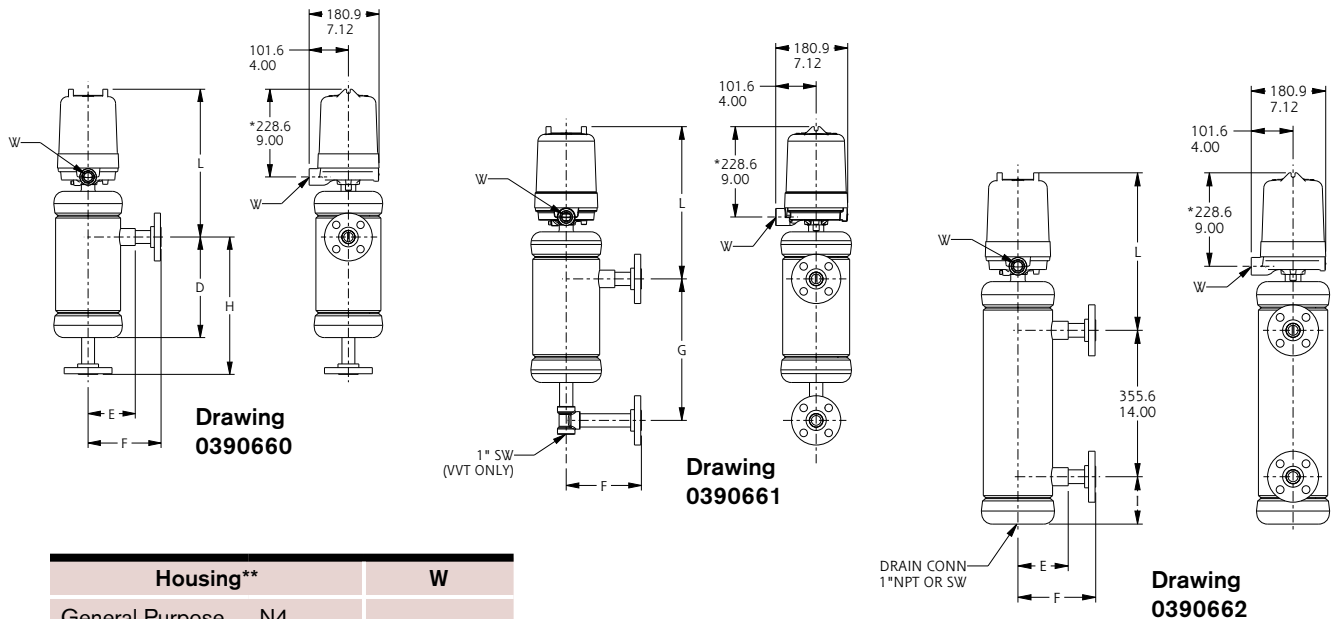
Model 201			Model 202			Model 203		
Specific Gravity	"B"	"C"	Specific Gravity	"B"	"C"	Specific Gravity	"B"	"C"
.38	3-3/16"	4"	.52	3-1/4"	4-7/16"	.61	3"	4-1/16"
1.0	5-3/16"	5-9/16"	1.0	5-1/4"	5-16/16"	1.0	4-3/4"	5-7/16"

Model 204			Model 205			Model 206		
Specific Gravity	"B"	"C"	Specific Gravity	"B"	"C"	Specific Gravity	"B"	"C"
.91	3"	3-15/16"	.50	3"	3-11/16"	.65	3-1/2"	4-1/4"
1.0	3-3/8"	4-1/4"	1.0	4-11/16"	5"	1.0	4-5/8"	5-1/16"

Model 207			Model 209			Model 221		
Specific Gravity	"B"	"C"	Specific Gravity	"B"	"C"	Specific Gravity	"B"	"C"
.61	3"	3-9/16"	.38	4-3/4"	5-1/4"	.64	2-9/16"	4-1/16"
1.0	4-5/16"	4-5/8"	1.0	7-1/4"	7-1/2"	1.0	3-13/16"	4-13/16"

Chamber Dimensions

Dimensions listed are for reference only and are expressed as millimeters over inches. (Linear = mm/in.) They are subject to change without notice. Contact SOR for certified drawings of particular models or if special dimensions are required.



Housing**		W
General Purpose	N4	1" NPT
Explosion Proof	N7	
Explosion Proof	B1	
Explosion Proof	B2	
Pneumatic	P1	(3) 1/4" NPT
ATEX	T6	M20 x 1.5***
Flame Proof/IS	S3 w/CL	
TestSafe	S3	
Flame Proof	S8	

Note: All process flange nipples are 1" standard.

* Minimum 5-3/4" (146 mm) overhead clearance required to remove housing cover. (Linear = mm/in.)

** See Housing section (page 48).

*** M20 adapters are brass. Contact the factory for alternate materials.

1" Connections

Model	D ^{1,2}		E ^{1,2}		F ⁴		G		H ⁴		I ^{1,2}		L ²	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
201	10-1/4	260	4-13/16	122	7-7/16	189	14	356	14	356	4-9/16	116	15-3/16	386
202	10-1/2	267	3-3/4	95	6-1/2	165	14	356	14	356	3-3/4	95	14-3/8	365
203														
204														
205	10-1/4	260	4-13/16	122	7-7/16	189	14	356	14	356	4-9/16	116	15-3/16	386
206														
207														
209	12-5/8	321	5-13/16	148	8-7/16	214	16	406	16	406	7-1/2	191	18-1/16	459
221	9	229	3-1/4	83	6	152	14	356	14	356	3-3/4	95	14-3/8	365

1-1/2" Connections

Model	D ²		E ²		F ⁴		G		H ⁴		I ²		L ²	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
201	10-1/4	260	4-13/16	122	7-7/16	189	14	356	14	356	4-9/16	116	15-3/16	386
202	10-1/2	267	4	102	6-1/2	165	14	356	14	356	3-3/4	95	14-3/8	365
203														
204														
205	10-1/4	260	5-1/16	129	7-7/16	189	14	356	14	356	4-9/16	116	15-3/16	386
206														
207														
209	13-1/16	332	6-1/16	154	8-7/16	214	16	406	16	406	7-1/2	191	18-1/16	459
221	9	229	3-1/2	89	6	152	14	356	14	356	3-3/4	95	14-3/8	365

2" Connections

Model	D ²		E ²		F ⁴		G		H ⁴		I ^{2,3}		L ^{2,3}	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
201	10-1/4	260	5-3/8	137	7-7/16	189	14	356	14	356	5-9/16	141	16-3/16	411
202	10-1/2	267	4-5/16	110	6-1/2	165	14	356	14	356	4-3/4	121	15-3/8	391
203														
204														
205	10-1/4	260	5-3/8	137	7-7/16	189	14	356	14	356	5-9/16	141	16-3/16	411
206														
207														
209	13-3/8	340	6-3/16	162	8-7/16	214	16	406	16	406	7-1/2	191	19-1/16	484
221	-	-	-	-	6	152	14	356	14	356	3-3/4 ⁵	95 ⁵	14-3/8	365

Notes

1. Dimensions D and E apply to socket-weld connections only. Consult factory for NPT dimensions.
2. Consult factory for dimensions for materials other than carbon steel.
3. Applies to socket weld or NPT process connections only.
4. Consult the factory if weld neck process flanges are required. Dimensions may vary from those shown above.
5. Applies to flanged process connections only.

108/208 Series

Step 1: Model Series

108 A-E1A-F-A1-N4-CRTT

The 108/208 Series mechanical level detectors are float operated, horizontal mounted with sealed, tamper-proof or flanged, serviceable chambers. Select the sensing unit from the following charts. Then refer to pages 44 - 50 for detecting elements, housings and accessories.

Select a model series from the charts below based on maximum operating pressure and minimum specific gravity. See page 52 for pressure ratings at higher temperatures.

Model Series	Chamber Material	Pressure at Listed Temperature in psid (bar)									
		100°F (38 C)	200°F (93°C)	300°F (149°C)	350°F (177°C)	400°F (204°C)	450°F (232°C)				
108	A106B	740 (51.0)	675 (46.5)	655 (45.1)	645 (44.4)	635 (43.7)	622 (42.8)				
	316SS	720 (49.6)	620 (42.7)	560 (38.6)	537 (37.0)	515 (35.5)	497 (34.2)				
208	A106B	1794 (123.6)	1794 (123.6)	1794 (123.6)	1794 (123.6)	1794 (128.0)	1794 (128.0)				
	316SS	2248 (155.0)	1937 (133.5)	1746 (120.3)	1644 (113.4)	1602 (110.4)	1548 (106.7)				

Minimum Specific Gravity

For all model series on this page, single detector only is equal to .65. Consult the factory for units used with specific gravity lower than .65.

Step 2: Chamber Material

108 A-E1A-F-A1-N4-CRTT

Select chamber material from the following chart. Maximum working pressure in the chart above is based on the material selected here. Consult the factory for alternative materials.

Designator	Material
A	A106 Grade B Carbon Steel with A105 and A234-WPB fittings
C	A312-TP316/316L Stainless Steel with A182-316/316L and A403-316/316L fittings

Step 3: Process Connection

108 A-E1A-F-A1-N4-CRTT

Select a process connection style and size from the chart below. Consult the factory for variations. NPT connections not recommended above 900°F.

Size	Style	NPT Thread
E1A	1"	NPT
E1B		SW
E5A	1-1/2"	NPT
E5B		SW
E2A	2"	NPT
E2B		SW

Step 4: Trim Material

108 A-E1A-F-A1-N4-CRTT

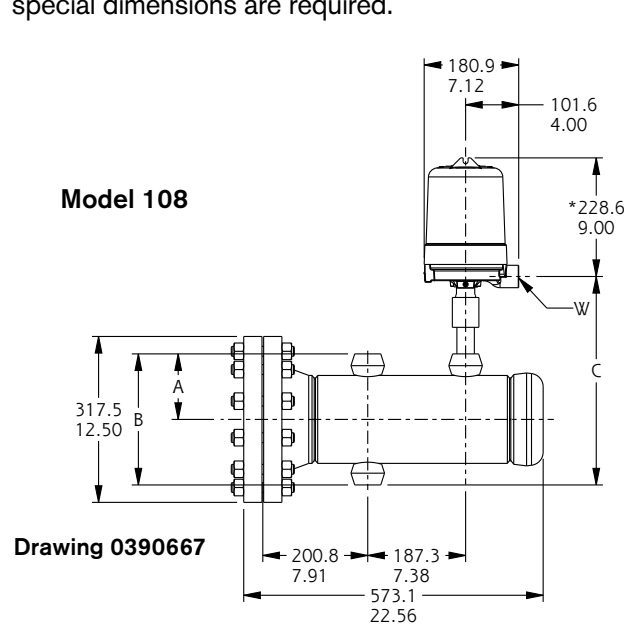
Select the internal trim material from the chart below.

Designator	Float Material	Attraction Sleeve	Available with Chamber Material:
F	321 Stainless Steel	400 Stainless Steel	A106 Carbon Steel (A) only
G	321 Stainless Steel	316/316L Stainless Steel	A106 Carbon Steel (A) or 316/316L Stainless Steel (C)

108/208 Series

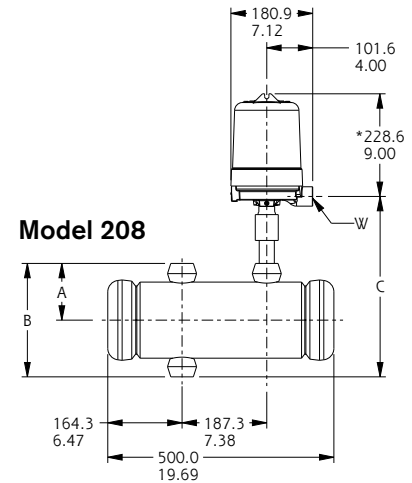
Chamber Dimensions

Dimensions listed are for reference only and are expressed as millimeters over inches. (Linear = mm/in.) They are subject to change without notice. Contact SOR for certified drawings of particular models or if special dimensions are required.



Drawing 0390667

- * Minimum 5-3/4" (146 mm) overhead clearance required to remove housing cover.
- ** See Housing section (page 48).
- *** M20 adapters are brass. Contact the factory for alternate materials.



Drawing 0390666

Housing**		W
General Purpose	N4	1" NPT
Explosion Proof	N7	
Explosion Proof	B1	
Explosion Proof	B2	(3) 1/4" NPT
Pneumatic	P1	
ATEX	T6	M20 x 1.5***
Flame Proof/IS	S3 w/CL	
TestSafe	S3	
Flame Proof	S8	

1" Connections

Model	A		B		C	
	inch	mm	inch	mm	inch	mm
108	4-13/16 ¹	122 ¹	9-5/8 ²	244 ²	15-1/2	394
208	4-15/16	125	9-7/8	250	15-5/8	396

1-1/2" Connections

Model	A ¹		B ¹		C ¹	
	inch	mm	inch	mm	inch	mm
108	5-1/16	129	10-1/8	258	15-3/4	401
208	5-1/16	129	10-1/8	258	15-3/4	401

2" Connections

Model	A ¹		B ¹		C ¹	
	inch	mm	inch	mm	inch	mm
108	5-3/8	137	10-3/4	274	16-1/8	409
208	5-3/8	137	10-3/4	274	16-1/8	409

Notes 1. Dimensions valid for socket weld process connections. Consult factory for threaded connection dimensions.

The 300 series mechanical level detectors are float-operated detectors suitable for top-insertion mounting. Select the sensing unit from the following charts. Then refer to pages 44 - 50 for detecting elements, housings and accessories. Select a model series from the charts below based on maximum operating pressure and minimum specific gravity.

Model Series	Pressure at Listed Temperature in psid (bar)*									
	100°F (38°C)	200°F (93°C)	300°F (149°C)	350°F (177°C)	400°F (204°C)	450°F (232°C)				
301	225 (15.5)	225 (15.5)	225 (15.5)	219 (15.1)	213 (14.6)	207 (14.2)				
303	500 (34.4)	500 (34.4)	500 (34.4)	486 (33.5)	473 (32.6)	460 (31.7)				
304	750 (51.7)	750 (51.7)	750 (51.7)	729 (50.2)	709 (48.8)	690 (47.5)				

*Consult the factory for pressure ratings of units with Monel trim.

Minimum Specific Gravity

Minimum specific gravity will be lower for shorter insertion depths. Consult the factory.

Model Series	Insertion Depth*	Minimum Specific Gravity Single Detector (Dual Detector, anti-vibration, pneumatic or extra-high temperature)					
		316SS / 400SS Trim (B)		All 316SS Trim (C)		All Monel Trim (M)	
301	24"	.40 (.45)	.42 (.48)	.48 (.54)			
	48"	.44 (.49)	.46 (.52)	.53 (.59)			
303	24"	.68 (.79)	.72 (.84)	.82 (.93)			
	48"	.75 (.87)	.80 (.91)	.91 (1.02)			
304	24"	.52 (.58)	.55 (.61)	.62 (.68)			
	48"	.56 (.62)	.59 (.65)	.67 (.73)			

*Insertion depth is defined as the approximate value of a rising level setpoint at a Specific Gravity of 1.0. If more precise setpoint action is required, please select the SC option from the accessories section of the catalog. Please note: An insertion depth or SC information must be supplied at the time of order on all 300 series detectors.

Step 2: Process Connection Material

Select process connection material from the following chart.

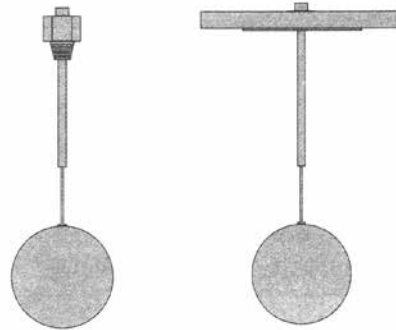
Designator	Material
A	A106 Carbon Steel
C	A182-TP316/316L Stainless Steel

Select a process connection, size and designator from the chart below. Consult the factory for variations. Flanged process connections may reduce the maximum working pressure of the unit.

Select Designator				
Size	NPT Thread	Flange		
		150#	300#	600#
1"	F1A	-	-	-
2"	F2A	-	-	-
3"	F3A	F3C	F3D	F3E
4"	-	F4C	F4D	F4E
6"	-	F6C	F6D	F6E

NPT Mounting

Flange Mounting



Note: It is important to consider the installation configuration when selecting the process connection. Be sure that the float will fit through the process connection, or that the vessel has access to attach the float from inside the vessel after instrument installation. See page 26 for float dimensions.

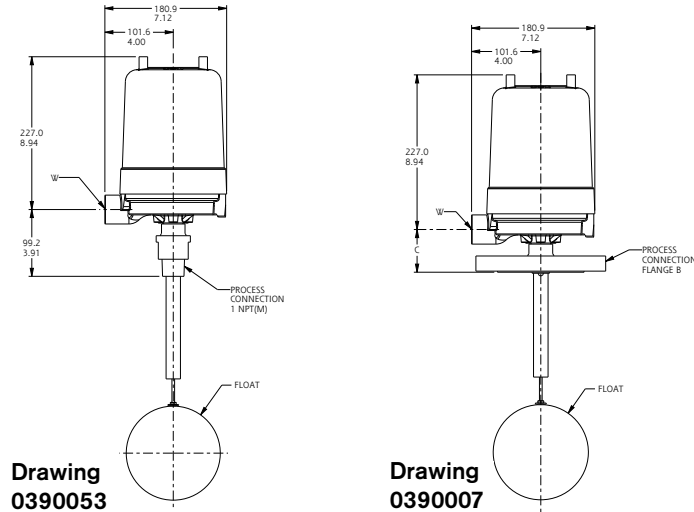
Step 4: Trim Material

Select the internal trim material from the chart below. Consult the factory for pressure ratings on Monel trim.

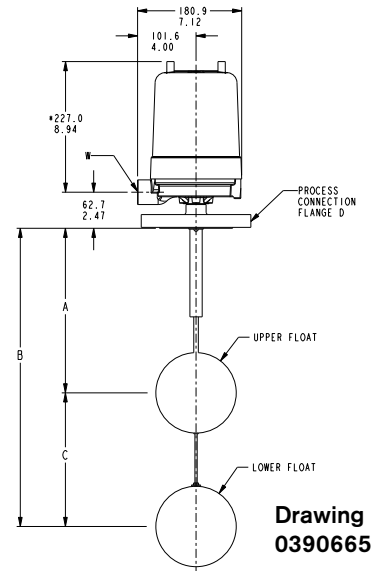
Designator	Float Material	Attraction Sleeve	Available with Chamber Material:
B	316/316L Stainless Steel	400 Stainless Steel	A106 Carbon Steel (A) only
C	316/316L Stainless Steel	316/316L Stainless Steel	A106 Carbon Steel (A) or 316/316L Stainless Steel (C)
M	Monel 400	Monel 400	A106 Carbon Steel (A) or 316/316L Stainless Steel (C)

Dimensions in this catalog are for reference only. They may be changed without notice. Contact the factory for certified drawings for a particular model number. Dimensions are expressed as millimeters over inches. (Linear = mm/in.)

Standard Units



Tandem Float Units



Minimum 5-3/4" (146 mm) overhead clearance required to remove housing cover.

** See Housing section (page 48).

***M20 adapters are brass.
Contact the factory for alternate materials.

Housing**		W
General Purpose	N4	1" NPT
Explosion Proof	N7	
Explosion Proof	B1	
Explosion Proof	B2	
Pneumatic	P1	(3) 1/4" NPT
ATEX	T6	M20 x 1.5***
Flame Proof/IS	S3 w/CL	
TestSafe	S3	
Flame Proof	S8	

Standard Units					
Series	Float Size	Minimum Insertion		Maximum Insertion	
		mm	inch	mm	inch
303	3-1/2 x 6"	114	4-1/2	1219	48
301	5-1/2"	108	4-1/4		
304					

Tandem Float Units													
Series	Float Size	High Insertion				Low Insertion				Differential			
		Minimum		Maximum		Minimum		Maximum		Minimum		Maximum	
		mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
303	3-1/2 x 6"	114	4-1/2	1016	40	305	12	1219	48	203	8	1105	43-1/2
301	5-1/2"	108	4-1/4	1041	41	279	11	1219	48	178	7	1111	43-3/4
304													

Notes

- Standard Units:** It is important to consider the installation configuration when selecting the process connection. Be sure that the float will fit through the process connection, or that the vessel has access to attach the float from inside the vessel after instrument installation.
- Tandem Float Units:** It is important to consider the installation configuration when selecting the process connection. Be sure that the float will fit through the process connection. Tandem floats are not removable and must be installed through the nozzle opening. Operating specific gravity and insertion depths must be specified.

400 Series

Step 1: Model Series

401 A-G3A-B-A1-N4-CRTT

The 400 Series mechanical level detector is float operated suitable for horizontal-insertion mounting. Select the sensing unit from the following charts. Then refer to pages 44 - 50 for detecting elements, housings and accessories.

Select a model series from the charts below based on maximum operating pressure and minimum specific gravity.

Maximum Working Pressure

Model Series	Chamber Material	Pressure at Listed Temperature in psig (bar)*							
		100°F (38°C)	200°F (93°C)	300°F (149°C)	350°F (177°C)	400°F (204°C)	450°F (232°C)		
401	A106B 316SS	230 (15.8)	230 (15.8)	230 (15.8)	224 (15.4)	218 (15.0)	212 (14.6)		
402	A106B 316SS	350 (24.1)	350 (24.1)	350 (24.1)	340 (23.4)	331 (22.8)	322 (22.2)		
403	A106B 316SS	230 (15.8)	230 (15.8)	230 (15.8)	215 (14.8)	200 (13.7)	185 (12.7)		
				215 (14.8)	205 (14.1)	195 (13.4)	182 (12.5)		
404	A106B 316SS	500 (34.4)	500 (34.4)	500 (34.4)	486 (33.5)	473 (32.6)	460 (31.7)		
405	A106B 316SS	740 (51.0)	675 (46.5)	655 (46.1)	645 (44.4)	635 (43.7)	618 (42.6)		
		720 (49.6)	620 (42.7)	560 (38.6)	537 (37.0)	515 (35.5)	497 (34.2)		
406	A106B 316SS	1250 (86.2)	1250 (86.2)	1250 (86.2)	1216 (83.8)	1182 (81.5)	1150 (79.3)		
			1240 (85.5)	1120 (77.2)	1075 (74.1)	1030 (71.0)	992 (68.4)		

*Consult the factory for pressure ratings of units with Monel trim

Minimum Specific Gravity

Model	Single Detector
401	.50
402	.90
403	.50
404	.60
405	.60
406	.60

Note: Insertion depth may affect minimum specific gravity.

Step 2: Chamber Material

401 A-G3A-B-A1-N4-CRTT

Select chamber material from the following chart. Maximum working pressure in the chart above is based on the material selected here. Consult the factory for alternative materials.

Designator	Material
A	A106 Grade B Carbon Steel with A105 and A234-WPB fittings
C	A312-TP316/316L Stainless Steel with A182-316/316L and A403-316/316L fittings

400 Series

Step 3: Process Connection

401 A-G3A-B-A1-N4-CRTT

Select a process connection designator from the chart below based on style and size. Consult the factory for variations. 3" flanged process connections may require the float to be installed from inside the process connection.

Model	Float Size	Connection		
		Designator	Size	Style
401	3"	G3A	3"	NPT(M) Thread
402	2-1/2"	G7A	2-1/2"	NPT(M) Thread
403	3"	G3F	3"	150# RF Weld Neck Flange
403	3"	G4F	4"	150# RF Weld Neck Flange
404	3 x 6"	G3A	3"	NPT(M) Thread

Model	Float Size	Connection		
		Designator	Size	Style
405	3 x 6"	G3G	3"	300# RF Weld Neck Flange
405	3 x 6"	G4G	4"	300# RF Weld Neck Flange
406	3 x 6"	G3H	3"	600# RF Weld Neck Flange
406	3 x 6"	G4H	4"	600# RF Weld Neck Flange

Step 4: Trim Material

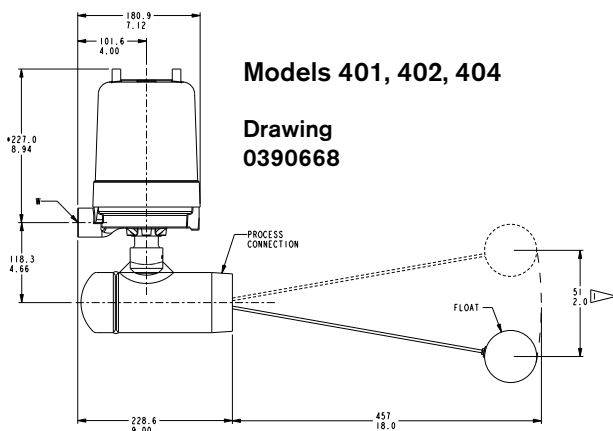
401 A-G3A-B-A1-N4-CRTT

Select the internal trim material from the chart below. Consult the factory for pressure ratings on Monel trim.

Designator	Float Material	Attraction Sleeve	Available with Chamber Material:
B	316/316L Stainless Steel	400 Stainless Steel	A106 Carbon Steel (A) only
C	316/316L Stainless Steel	316/316L Stainless Steel	A106 Carbon Steel (A) or 316/316L Stainless Steel (C)
M	Monel 400	Monel 400	A106 Carbon Steel (A) or 316/316L Stainless Steel (C)

Chamber Dimensions

Dimensions in this catalog are for reference only. They may be changed without notice. Contact the factory for certified drawings for a particular model number. Dimensions are expressed as millimeters over inches. (Linear = mm/in.)

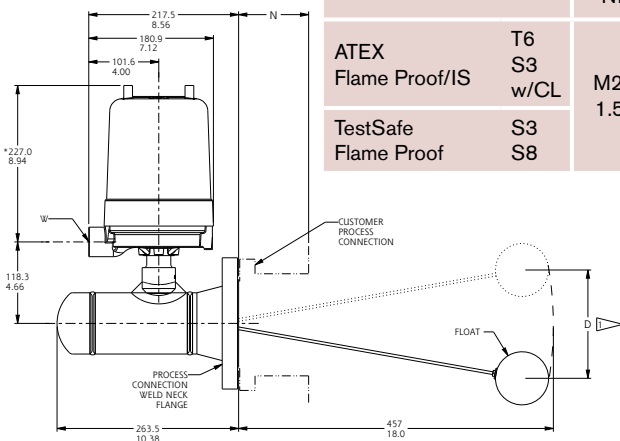


Models 401, 402, 404

Drawing 0390668

Models 403, 405, 406

Drawing 0390669



Housing**		W
General Purpose	N4	1" NPT
Explosion Proof	N7	
Explosion Proof	B1	
Explosion Proof	B2	(3) 1/4" NPT
Pneumatic	P1	
ATEX	T6	M20 x 1.5***
Flame Proof/IS	S3 w/CL	
TestSafe	S3	
Flame Proof	S8	

* Minimum 146.1 (5.75) overhead clearance required to remove housing cover.

** See Housing section (page 48).

*** M20 adapters are brass. Contact the factory for alternate materials.

Standard Differential (D)

Model	"D" @ Minimum Specific Gravity
401	3" (76 mm)
402	
403	
404	
405	2-3/4" (70 mm)
406	

Note: With anti-vibration, extra-high temperature and pneumatic detector, minimum differential will increase.

Maximum Differential (D)

Differential Dimension "D" is calibrated to the minimum shown above as standard. Wider differentials are available by placing an SC in the accessory section of the model number. The charts below give the maximum differentials available.

NPT Units

Model	Customer Mounting	
	1/2 Coupling	Full Coupling
401	12-3/8" (356 mm)	10-1/4" (292 mm)
402	8-7/8" (292 mm)	8-7/8" (292 mm)
404	12-3/8" (356 mm)	10-1/4" (292 mm)

Flanged Units

Model	Customer Nozzle Length (N)				
	2" (51 mm)	4" (102 mm)	6" (152 mm)	8" (203 mm)	10" (254 mm)
403	13" (330 mm)	9" (229 mm)	7" (178 mm)	5" (127 mm)	4-1/2" (114 mm)
405*	6" (152 mm)		5" (127 mm)		
406*	6" (152 mm)		5" (127 mm)		

*Based on 4-inch flange size.

741-743 and 802 Series

Step 1: Model Series

741 A-A1C -B-A1-N4-CRTT

The 741-743 and 802 Series mechanical level detectors are displacer-operated with fanged, serviceable external chambers. Select the sensing unit from the following charts. Then refer to pages 44 - 50 for detecting elements, housings and accessories.

Select a model series from the charts below based on maximum operating pressure and minimum specific gravity.

Maximum Working Pressure

Model Series	Chamber Material	Pressure at Listed Temperature in psig (bar)*									
		100°F (38°C)	200°F (93°C)	300°F (149°C)	350°F (177°C)	400°F (204°C)	450°F (232°C)				
741	A106B	285 (19.7)	260 (17.4)	230 (15.8)	215 (14.8)	200 (13.7)	185 (12.7)				
	316SS	275 (18.9)	240 (16.5)	215 (14.8)	205 (14.1)	195 (13.4)	182 (12.5)				
742	A106B	740 (51.0)	680 (46.9)	655 (45.1)	645 (44.4)	635 (43.7)	618 (42.6)				
	316SS	720 (49.6)	620 (42.7)	560 (38.6)	537 (37.0)	515 (35.5)	497 (34.2)				
743	A106B	1480 (102.0)	1294 (89.2)	1166 (80.4)	1118 (77.1)	1070 (73.8)	1034 (71.3)				
	316SS	1440 (99.3)	1240 (85.5)	1120 (77.2)	1075 (74.1)	1025 (70.7)	990 (68.3)				
802	A106B	3376 (232.8)	3019 (208.2)	2721 (187.6)	2609 (179.9)	2497 (172.2)	2414 (166.4)				
	316SS	3504 (241.6)	3019 (208.2)	2721 (187.6)	2609 (179.9)	2497 (172.2)	2414 (166.4)				

*Consult the factory for pressure ratings of units with Monel trim. Standard displacer units are not available above 450°F (232°C).

Minimum Specific Gravity

Model Series	Standard	Anti-Vibration or Pneumatic
741	0.43	0.57
742		
743		
802	0.41	0.5

Step 2: Chamber Material

741 A-A1C-B-A1-N4-CRTT

Select chamber material from the following chart. Maximum working pressure in the chart above is based on the material selected here. Consult the factory for alternate materials.

Designator	Material
A	A106 Grade B Carbon Steel with A105 and A234-WPB fittings
C	A312-TP316/316L Stainless Steel with A182-316/316L and A403-316/316L fittings

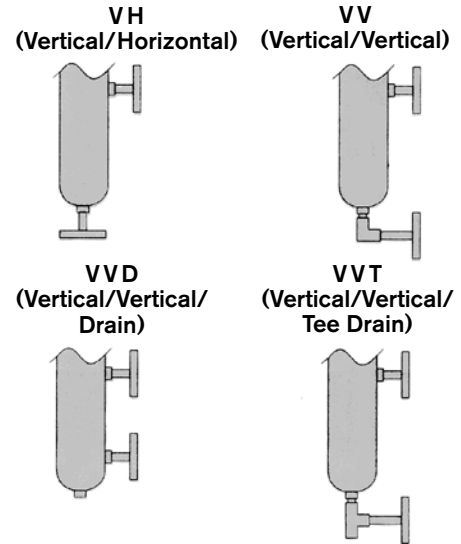
741-743 and 802 Series

Step 3: Process Connection

741 A-A1C-B-A1-N4-CRTT

Select a process connection size, style and designator from the chart below. Consult the factory for variations. Flanged process connections may reduce the maximum working pressure of the unit.

Size	Style	NPT Thread	Socket Weld	Flange			
				150# RF	300# RF	600# RF	1500# RTJ
1"	VH	A1A	A1B	A1C	A1D	A1E	A1T
	VV	-	-	B1C	B1D	B1E	B1T
	VVD	C1A	C1B	C1C	C1D	C1E	C1T
	VVT	-	-	D1C	D1D	D1E	D1T
1-1/2"	VH	A5A	A5B	A5C	A5D	A5E	A5T
	VV	-	-	B5C	B5D	B5E	B5T
	VVD	C5A	C5B	C5C	C5D	C5E	C5T
	VVT	-	-	D5C	D5D	D5E	D5T
2"	VH	A2A*	A2B*	A2C	A2D	A2E	A2T
	VV	-	-	B2C	B2D	B2E	B2T
	VVD	C2A*	C2B*	C2C	C2D	C2E	C2T
	VVT	-	-	D2C	D2D	D2E	D2T



*Not available on Models 741, 742, and 743.

Step 4: Trim Material

741 A-A1C-B-A1-N4-CRTT

Select the internal trim material from the chart below. Consult the factory for pressure ratings on Monel trim.

Designator	Displacer Material	Attraction Sleeve	Available with Chamber Material:
B	316/316L Stainless Steel	400 Stainless Steel	A106 Carbon Steel (A) only
C	316/316L Stainless Steel	316/316L Stainless Steel	A106 Carbon Steel (A) or 316/316L Stainless Steel (C)
M	Monel 400	Monel 400	A106 Carbon Steel (A) or 316/316L Stainless Steel (C)

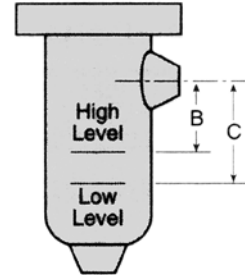
741-743 and 802 Series

Calibration Dimensions

The charts below provide typical standard Set Points. As the specific gravity used on a level detector changes, the Set Points will also change. These values are based on the specific gravity listed and units with "B" trim and an A1 detector. For other materials or detectors, please consult factory. If a specific Set Point is needed, please use the "SC" option found in the accessories section of this catalog.

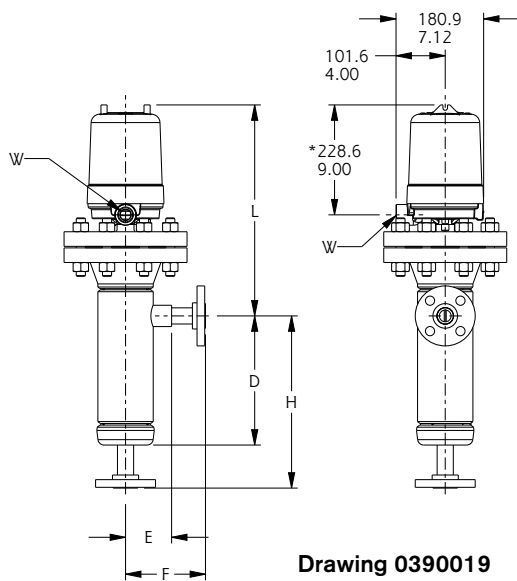
Model 741, 742, 743		
Specific Gravity	"B"	"C"
.43	1-13/16"	4-5/8"
1.0	4-9/16"	6-1/16"

Model 802		
Specific Gravity	"B"	"C"
.41	2-3/8"	5-5/16"
1.0	5-1/16"	6-7/16"

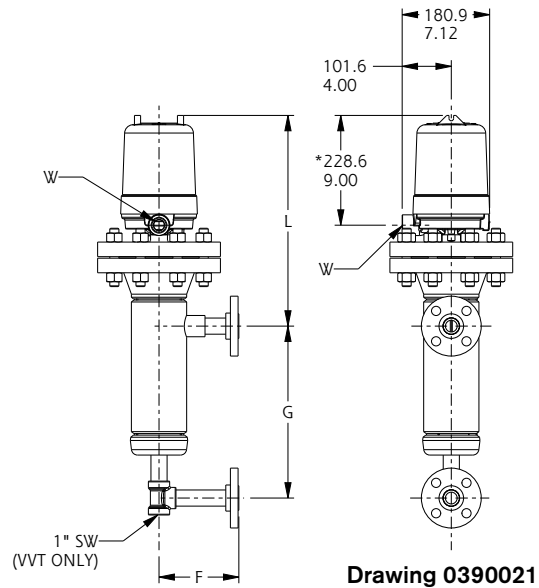


Chamber Dimensions

Dimensions listed are for reference only and are expressed as millimeters over inches. (Linear = mm/in.) They are subject to change without notice. Contact SOR for certified drawings of particular models or if special dimensions are required.



Drawing 0390019



Drawing 0390021

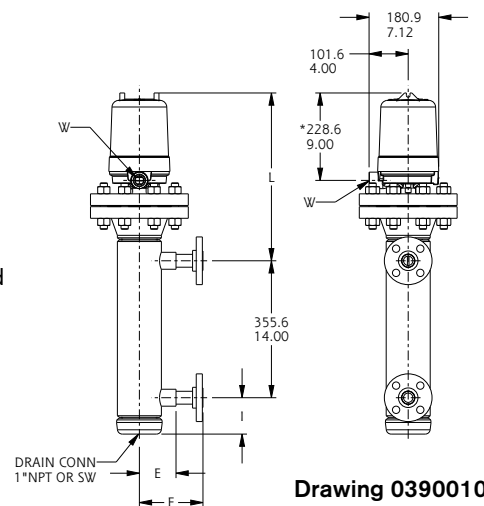
Note: All process flange nipples are 1" standard.

Housing**	W
General Purpose N4	1" NPT
Explosion Proof N7	
Explosion Proof B1	
Explosion Proof B2	
Pneumatic P1	(3) 1/4" NPT
ATEX Flame Proof/IS T6	M20 x 1.5***
S3 w/CL	
TestSafe S3	M20 x 1.5***
Flame Proof S8	

* Minimum 5-3/4" (146 mm) overhead clearance required to remove housing cover.

** See Housing section. (Page 48.)

*** M20 adapters are brass. Contact the factory for alternate materials.



Drawing 0390010

741-743 and 802 Series

Chamber Dimensions

1" Connections

Model	D ^{1,2}		E ^{1,2}		F ⁴		G		H ⁴		I ²		L ²	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
741	13	330	3-1/4	83	6	152	16	406	16	406	3-3/4	95	19-5/16	491
742													19-1/2	495
743													19-7/8	505
802	12-3/4	324	3-7/8	98	8	203	16	406	16	406	6-3/4	171	20-3/4	527

1-1/2" Connections

Model	D ²		E ²		F ⁴		G		H ⁴		I ²		L ²	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
741	13	330	3-1/2	89	6	152	16	406	16	406	3-3/4	95	19-5/16	491
742													19-1/2	495
743													19-7/8	505
802	12-7/8	327	4	102	8	203	16	406	16	406	6-3/4	171	20-3/4	527

2" Connections

Model	D ²		E ²		F ⁴		G		H ⁴		I ^{2,3}		L ^{2,3}	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
741	-	-	-	-	6	152	16	406	16	406	3-3/4 ⁵	95 ⁵	19-5/16 ⁵	491 ⁵
742													19-1/2 ⁵	495 ⁵
743													19-7/8 ⁵	505 ⁵
802	13-3/16	335	4-5/16	110	8	203	16	406	16	406	7-3/4	197	21-5/16	541

Notes

1. Dimensions D and E apply to socket-weld connections only. Consult factory for NPT dimensions.
2. Consult factory for dimensions for materials other than carbon steel.
3. Applies to socket weld or NPT process connections only.
4. Consult the factory if weld neck process flanges are required. Dimensions may vary from those shown above.
5. Applies to flanged process connections only.

740 and 804 Series

Step 1: Model Series

740 A-A1C-B-A1-N4-CRTT

The 740 and 804 Series mechanical level detectors are displacer operated with sealed, tamper-proof external chambers. Select the sensing unit from the following charts. Then refer to pages 44 - 50 for detecting elements, housings and accessories.

Select a model series from the charts below based on maximum operating pressure and minimum specific gravity.

Maximum Working Pressure

Model Series	Chamber Material	Pressure at Listed Temperature in psig (bar)*									
		100°F (38°C)	200°F (93°C)	300°F (149°C)	350°F (177°C)	400°F (204°C)	450°F (232°C)				
740	A106B 316SS	1480 (102.0)	1294 (89.2)	1166 (80.4)	1118 (77.1)	1070 (73.8)	1034 (71.3)				
804	A106B 316SS	3376 (232.8)	3019 (208.2)	2721 (187.6)	2609 (179.9)	2497 (172.2)	2414 (166.4)				
		3504 (241.6)									

*Consult the factory for pressure ratings of units with Monel trim. Standard displacer units are not available over 450°F (232°C).

Minimum Specific Gravity

Model Series	Standard	Anti-Vibration or Pneumatic
740	0.43	0.57
804	0.41	0.50

Step 2: Chamber Material

740 A-A1C-B-A1-N4-CRTT

Select chamber material from the following chart. Maximum working pressure in the chart above is based on the material selected here. Consult the factory for alternative materials.

Designator	Material
A	A106 Grade B Carbon Steel with A105 and A234-WPB fittings
C	A312-TP316/316L Stainless Steel with A182-316/316L and A403-316/316L fittings

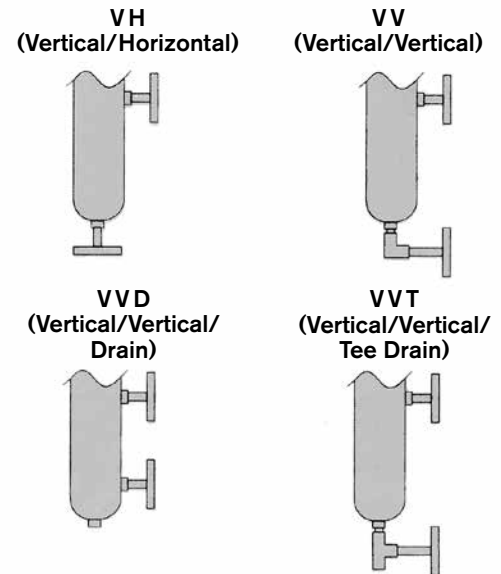
740 and 804 Series

Step 3: Process Connection

740 A-A1C-B-A1-N4-CRTT

Select a process connection size, style and designator from the chart below. Consult the factory for variations. Flanged process connections may reduce the maximum working pressure of the unit.

Size	Style	NPT Thread	Socket Weld	Flange			
				150# RF	300# RF	600# RF	1500# RTJ
1"	VH	A1A	A1B	A1C	A1D	A1E	A1T
	VV	-	-	B1C	B1D	B1E	B1T
	VVD	C1A	C1B	C1C	C1D	C1E	C1T
	VVT	-	-	D1C	D1D	D1E	D1T
1-1/2"	VH	A5A	A5B	A5C	A5D	A5E	A5T
	VV	-	-	B5C	B5D	B5E	B5T
	VVD	C5A	C5B	C5C	C5D	C5E	C5T
	VVT	-	-	D5C	D5D	D5E	D5T
2"	VH	A2A*	A2B*	A2C	A2D	A2E	A2T
	VV	-	-	B2C	B2D	B2E	B2T
	VVD	C2A*	C2B*	C2C	C2D	C2E	C2T
	VVT	-	-	D2C	D2D	D2E	D2T



*Not available on Model 740.

Step 4: Trim Material

740 A-A1C-B-A1-N4-CRTT

Select the internal trim material from the chart below. Consult the factory for pressure ratings on Monel trim.

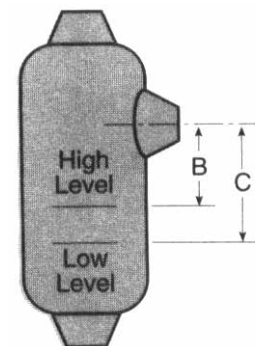
Designator	Displacer Material	Attraction Sleeve	Available with Chamber Material:
B	316/316L Stainless Steel	400 Stainless Steel	A106 Carbon Steel (A) only
C	316/316L Stainless Steel	316/316L Stainless Steel	A106 Carbon Steel (A) or 316/316L Stainless Steel (C)
M	Monel 400	Monel 400	A106 Carbon Steel (A) or 316/316L Stainless Steel (C)

Calibration Dimensions

The charts below provide typical standard Set Points. As the specific gravity used on a level detector changes, the Set Points will also change. These values are based on the specific gravity listed and units with "B" trim and an A1 detector. For other materials or detectors, please consult factory. If a specific Set Point is needed, please use the "SC" option found in the accessories section of this catalog.

Model 740		
Specific Gravity	"B"	"C"
.43	1-13/16"	4-5/8"
1.0	4-9/16"	6-1/16"

Model 804		
Specific Gravity	"B"	"C"
.41	2-3/8"	5-5/16"
1.0	5-1/16"	6-7/16"



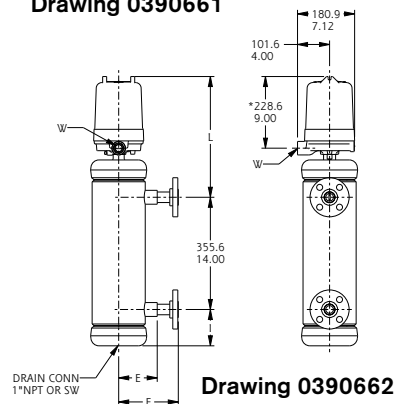
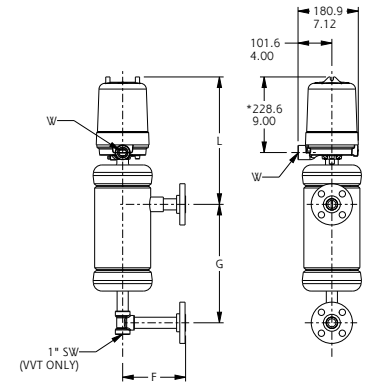
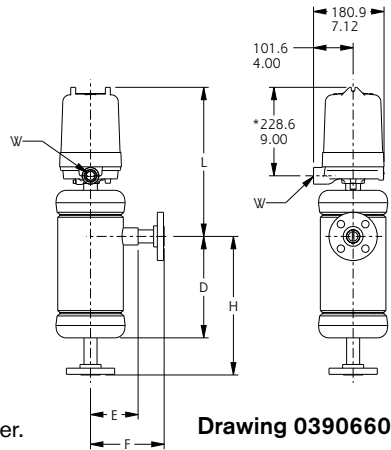
740 and 804 Series

Chamber Dimensions

Dimensions listed are for reference only and are expressed as millimeters over inches. (Linear = mm/in.) They are subject to change without notice. Contact SOR for certified drawings of particular models or if special dimensions are required.

Housing**		W
General Purpose	N4	1" NPT
Explosion Proof	N7	
Explosion Proof	B1	
Explosion Proof	B2	
Pneumatic	P1	(3) 1/4" NPT
ATEX	T6	M20 x 1.5***
Flame Proof/IS	S3 w/CL	
TestSafe	S3	
Flame Proof	S8	

* Minimum 5-3/4" (146 mm) overhead clearance required to remove housing cover.
 ** See Housing section (page 48).
 *** M20 adapters are brass. Contact the factory for alternate materials.



Note: All process flange nipples are 1" standard.

1" Connection

Model	D ^{1,2}		E ^{1,2}		F ⁴		G		H ⁴		I ²		L ²	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
740	13	330	3-1/4	83	6	152	16	406	16	406	3-3/4	95	20-1/4	514
804	12-3/4	324	3-7/8	98	8	203	16	406	16	406	6-3/4	171	21-3/4	552

1-1/2" Connection

Model	D ²		E ²		F ⁴		G		H ⁴		I ²		L ²	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
740	13	330	3-1/2	89	6	152	16	406	16	406	3-3/4	95	20-1/4	514
804	12-7/8	327	4	102	8	203	16	406	16	406	6-3/4	171	21-3/4	552

2" Connection

Model	D ²		E ²		F ⁴		G		H ⁴		I ^{2,3}		L ^{2,3}	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
740	-	-	-	-	6	152	16	406	16	406	3-3/4 ⁵	95 ⁵	20-1/4 ⁵	514 ⁵
804	13-3/16	335	4-5/16	110	8	203	16	406	16	406	7-3/4	197	21-3/4	552

Notes

1. Dimensions D and E apply to socket-weld connections only. Consult factory for NPT dimensions.
2. Consult factory for dimensions for materials other than carbon steel.
3. Applies to socket weld or NPT process connections only.
4. Consult the factory if weld neck process flanges are required. Dimensions may vary from those shown above.
5. Applies to flanged process connections only.

700 Series

Step 1: Model Series

702 A-F7A-B-A1-N4-CRTT

The 700 Series mechanical level detectors are single-stage, displacer-operated detectors suitable for top-insertion tank mounting. Select the sensing unit from the following charts. Then refer to pages 44 - 50 for detecting elements, housings and accessories.

Select a model series from the charts below based on maximum operating pressure and minimum specific gravity. Minimum specific gravity is based on single detector. Anti-vibration and pneumatic detectors have higher minimum specific gravities.

Maximum Working Pressure

Model Series	Minimum Specific Gravity	Function	Connection Style	Displacer Material	Connection Material	Pressure Rating - psig (bar)			
						100°F	(38°C)	450°F	(232°C)
701	0.51	Narrow Differential	NPT	Porcelain	All	1000	(69)	750	(52)
702	0.45			SS	All	1000	(69)	750	(52)
703	0.51		Flange	Porcelain	A105	285	(20)	185	(13)
					316SS	275	(19)	182	(13)
704	0.45	Flange	SS	A105	285	(20)	185	(13)	
				316SS	275	(19)	182	(13)	
705	0.50	Wide Differential	NPT	Porcelain	All	1000	(69)	750	(52)
706				SS	All	1000	(69)	750	(52)
707			Flange	Porcelain	A105	285	(20)	185	(13)
					316SS	275	(20)	182	(13)
708			Flange	SS	A105	285	(20)	185	(13)
					316SS	275	(19)	182	(13)

Displacer units are not available over 450°F (232°C).

*An operating specific gravity is required for models 705 through 708 at time of order.

Step 2: Process Connection Material

702 A -F7A-B-A1-N4-CRTT

Select a process connection material from the chart below. Maximum working pressure in the chart above is based on the material selected here. Consult the factory for alternative materials.

Designator	Material
A	A105 Carbon Steel fittings or flanges
C	A182-TP316/316L Stainless Steel fittings or flanges

700 Series

Step 3: Process Connection

702 A -F7A-B-A1-N4-CRTT

Select a process connection style, size and rating from the chart below. Consult the factory for variations. Flanged process connections may reduce the maximum working pressure of the unit.

Size	Style	Model							
		701	702	703	704	705	706	707	708
2-1/2"	NPT	F7A	F7A	-	-	F7A	F7A	-	-
3"	NPT	F3A	F3A	-	-	F3A	F3A	-	-
	150# RF Flange	-	-	F3C	F3C	-	-	F3C	F3C
	300# RF Flange	-	-	F3D	F3D	-	-	F3D	F3D
4"	150# RF Flange	-	-	F4C	F4C	-	-	F4C	F4C
	300# RF Flange	-	-	F4D	F4D	-	-	F4D	F4D
6"	150# RF Flange	-	-	F6C	F6C	-	-	F6C	F6C
	300# RF Flange	-	-	F6D	F6D	-	-	F6D	F6D

Step 4: Trim Material

702 A -F7A-B-A1-N4-CRTT

Select the internal trim material from the chart below.

Displacer Material	Attraction Sleeve	Construction Material	Model							
			701	702	703	704	705	706	707	708
316/316L SS	400SS	A only	-	B	-	B	-	B	-	B
316/316L SS	316/316L SS	A or C	-	C	-	C	-	C	-	C
Porcelain	400SS	A only	P	-	P	-	P	-	P	-
Porcelain	316/316L SS	A or C	R	-	R	-	R	-	R	-

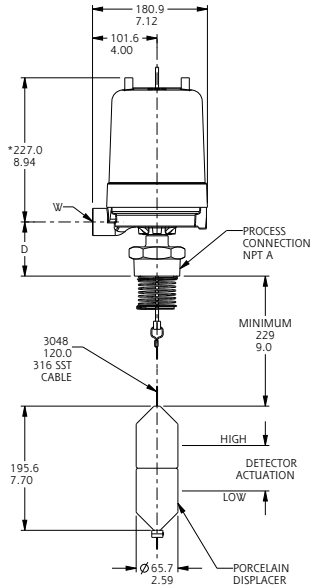
Standard displacer spring material is Inconel 600.

700 Series

Unit Dimensions

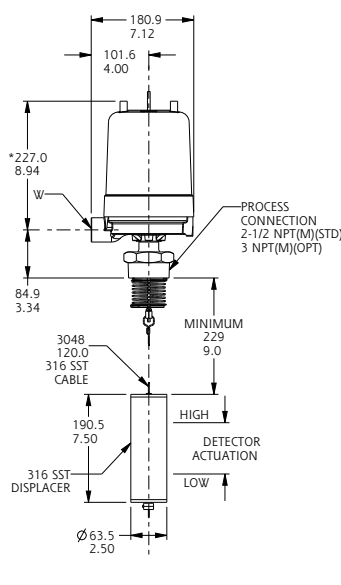
Dimensions in this catalog are for reference only. They may be changed without notice. Contact the factory for certified drawings for a particular model number. Dimensions are expressed as millimeters over inches. (Linear = mm/in.)

Model 701/703 2-1/2" NPT/Flanged Narrow Differential



Drawing 0390670

Model 702/704 2-1/2" NPT/Flanged Narrow Differential



Drawing 0390671

Narrow Differential Models 701-704:

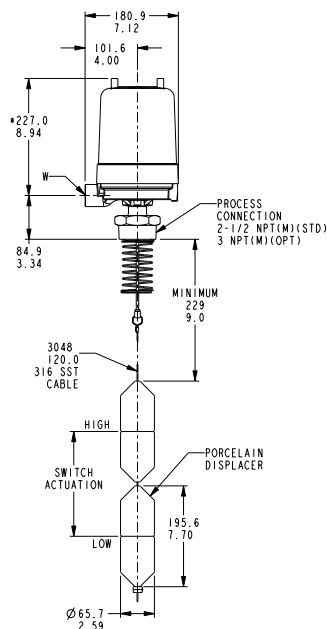
Actuation differential is approximately 1-7/16" @ Specific Gravity of 1.0 @ 100°F.

Wide Differential Models 705-708:

Actuation differential is adjustable from approximately 9-1/2" (minimum @ Specific Gravity of 1.0 @ 100°F) to available cable length.

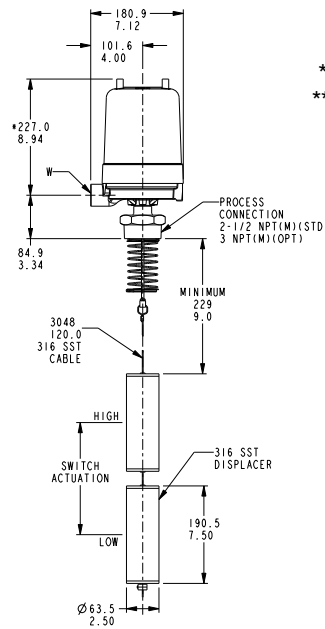
Housing**		W
General Purpose	N4	1" NPT
Explosion Proof	N7	
Explosion Proof	B1	
Explosion Proof	B2	
Pneumatic	P1	(3) 1/4" NPT
ATEX	T6	M20 x 1.5***
Flame Proof/IS	S3 w/CL	
TestSafe	S3	
Flame Proof	S8	

Model 705/707 2-1/2" NPT/Flanged Wide Differential



Drawing 0390672

Model 706/708 2-1/2" NPT/Flanged Wide Differential



Drawing 0390673

- * Minimum 5-3/4" (146 mm) overhead clearance required to remove housing cover.
- ** See Detector Housing section (page 48).
- *** M20 adapters are brass. Contact the factory for alternate materials.

730 Series

Step 1: Model Series

731 A-F7A-B-A2-N4-CRTT

The 730 Series mechanical liquid level detectors are dual-stage, displacer-operated detectors suitable for top-insertion tank mounting. Select the sensing unit from the following charts. Then refer to pages 44 - 50 for detecting elements, housings and accessories.

Select a model series from the charts below based on maximum operating pressure and minimum specific gravity.

Maximum Working Pressure

Model Series	Minimum Specific Gravity	Function	Connection Style	Displacer Material	Connection Material	Pressure Rating - psig (bar)			
						100°F	(38°C)	450°F	(232°C)
730	0.72	Narrow Differential	NPT	Porcelain	All	1000	(69)	750	(52)
731	0.64			SS	All	1000	(69)	750	(52)
732	0.72		Flange	Porcelain	A105	285	(20)	185	(13)
					316SS	275	(19)	182	(13)
733	0.64		Flange	SS	A105	285	(20)	185	(13)
					316SS	275	(19)	182	(13)
734	0.64	Wide Differential	NPT	Porcelain	All	1000	(69)	750	(52)
735				SS	All	1000	(69)	750	(52)
736			Flange	Porcelain	A105	285	(20)	185	(13)
					316SS	275	(20)	182	(13)
737			Flange	SS	A105	285	(20)	185	(13)
					316SS	275	(19)	182	(13)

Displacer units are not available over 450°F (232°C).

*An operating specific gravity is required for all 730 series at time of order.

Step 2: Process Connection Material

731 A -F7A-B-A2-N4-CRTT

Select a process connection material from the chart below. Maximum working pressure in the chart above is based on the material selected here. Consult the factory for alternative materials.

Designator	Material
A	A106 Carbon Steel fittings or flanges
C	A182-TP316/316L Stainless Steel fittings or flanges

730 Series

Step 3: Process Connection

731 A -F7A-B-A2-N4-CRTT

Select a process connection style, size and rating from the chart below. Consult the factory for variations. Flanged process connections may reduce the maximum working pressure of the unit.

Size	Style	Model							
		730	731	732	733	734	735	736	737
2-1/2"	NPT	F7A	F7A	-	-	F7A	F7A	-	-
3"	NPT	F3A	F3A	-	-	F3A	F3A	-	-
	150# RF Flange	-	-	F3C	F3C	-	-	F3C	F3C
	300# RF Flange	-	-	F3D	F3D	-	-	F3D	F3D
4"	150# RF Flange	-	-	F4C	F4C	-	-	F4C	F4C
	300# RF Flange	-	-	F4D	F4D	-	-	F4D	F4D
6"	150# RF Flange	-	-	F6C	F6C	-	-	F6C	F6C
	300# RF Flange	-	-	F6D	F6D	-	-	F6D	F6D

Step 4: Trim Material

731 A -F7A-B-A2-N4-CRTT

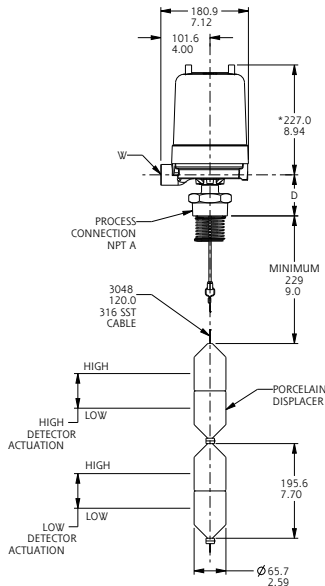
Select the internal trim material from the chart below.

Displacer Material	Attraction Sleeve	Construction Material	Model							
			730	731	732	733	734	735	736	737
316/316L SS	400SS	A only	-	B	-	B	-	B	-	B
316/316L SS	316/316L SS	A or C	-	C	-	C	-	C	-	C
Porcelain	400SS	A only	P	-	P	-	P	-	P	-
Porcelain	316/316L SS	A or C	R	-	R	-	R	-	R	-

Standard displacer spring material is Inconel 600.

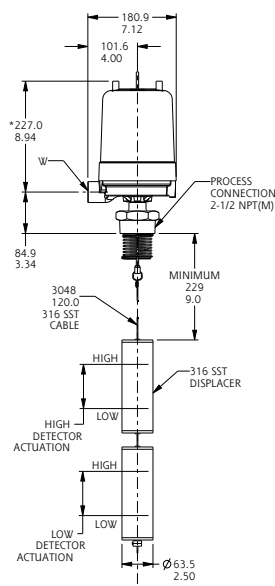
Dimensions in this catalog are for reference only. They may be changed without notice. Contact the factory for certified drawings for a particular model number. Dimensions are expressed as millimeters over inches. (Linear = mm/in.)

Model 730/732
2-1/2" NPT/Flanged
Narrow Differential



Drawing 0390677

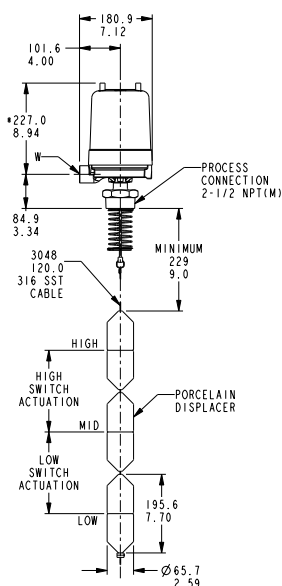
Model 731/733
2-1/2" NPT/Flanged
Narrow Differential



Drawing 0390678

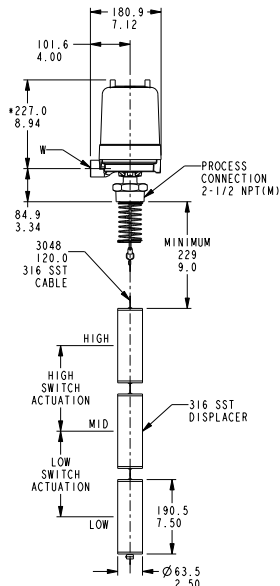
Housing**		W
General Purpose	N4	1" NPT
Explosion Proof	N7	
Explosion Proof	B1	
Explosion Proof	B2	(3) 1/4" NPT
Pneumatic	P1	
ATEX	T6	M20 x 1.5***
Flame Proof/IS	S3 w/CL	
TestSafe	S3	
Flame Proof	S8	

Model 734/736
2-1/2" NPT/Flanged
Wide Differential



Drawing 0390679

Model 735/737
2-1/2" NPT/Flanged
Wide Differential



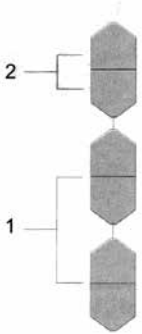
Drawing 0390680

- * Minimum 5-3/4" (146 mm) overhead clearance required to remove housing cover.
- ** See Detector Housing section (page 48).
- *** M20 adapters are brass. Contact the factory for alternate materials.

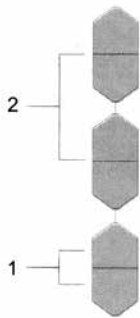
Optional Detecting Arrangements

Dual-stage, wide differential detectors may be ordered with detecting arrangements different from those shown on page 38. To order, select the desired arrangement below and add **SC** to the accessory section of the model number. At the time of order, specify the required arrangement number. Porcelain displacers are shown for pictorial purposes only.

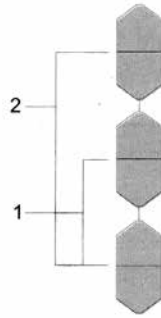
Arrangement 1



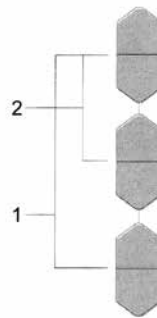
Arrangement 2



Arrangement 4



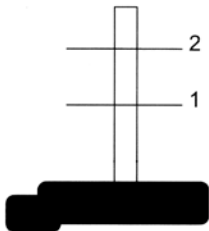
Arrangement 5



Arrangement 6



Detector Position



750 Series

Step 1: Model Series

751 A-F7A-B-A3-N1-CRTT

The 750 Series mechanical level detectors are three-stage, displacer-operated detectors suitable for top-insertion tank mounting. Select the sensing unit from the following charts. Then refer to pages 44 - 50 for detecting elements, housings and accessories.

Maximum Working Pressure

Model Series	Minimum Specific Gravity	Function	Connection Style	Displacer Material	Connection Material	Pressure Rating - psig (bar)			
						100°F	(38°C)	450°F	(232°C)
750	0.96	Narrow Differential	NPT	Porcelain	All	1000	(69)	750	(52)
751	0.85			SS	All	1000	(69)	750	(52)
752	0.96		Flange	Porcelain	A105	285	(20)	185	(13)
					316SS	275	(19)	182	(13)
753	0.85		Flange	SS	A105	285	(20)	185	(13)
					316SS	275	(19)	182	(13)
754	0.96	Wide Differential	NPT	Porcelain	All	1000	(69)	750	(52)
755	0.95			SS	All	1000	(69)	750	(52)
756	0.96		Flange	Porcelain	A105	285	(20)	185	(13)
					316SS	275	(20)	182	(13)
757	0.95		Flange	SS	A105	285	(20)	185	(13)
					316SS	275	(19)	182	(13)

Displacer units are not available over 450°F (232°C).

*An operating specific gravity is required for all 750 series at time of order.

Step 2: Process Connection Material

751 A -F7A-B-A3-N1-CRTT

Select a process connection material from the chart below. Maximum working pressure in the chart above is based on the material selected here. Consult the factory for alternative materials.

Designator	Material
A	A105 Carbon Steel fittings or flanges
C	A182-TP316/316L Stainless Steel fittings or flanges

750 Series

Step 3: Process Connection

751A -F7A-B-A3-N1-CRTT

Select a process connection style, size and rating from the chart below. Consult the factory for variations. Flanged process connections may reduce the maximum working pressure of the unit.

Size	Style	Model							
		750	751	752	753	754	755	756	757
2-1/2"	NPT	F7A	F7A	-	-	F7A	F7A	-	-
3"	NPT	F3A	F3A	-	-	F3A	F3A	-	-
	150# RF Flange	-	-	F3C	F3C	-	-	F3C	F3C
	300# RF Flange	-	-	F3D	F3D	-	-	F3D	F3D
4"	150# RF Flange	-	-	F4C	F4C	-	-	F4C	F4C
	300# RF Flange	-	-	F4D	F4D	-	-	F4D	F4D
6"	150# RF Flange	-	-	F6C	F6C	-	-	F6C	F6C
	300# RF Flange	-	-	F6D	F6D	-	-	F6D	F6D

Step 4: Trim Material

751 A -F7A-B-A3-N1-CRTT

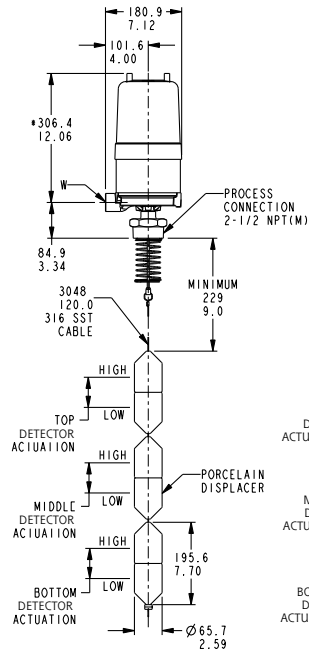
Select the internal trim material from the chart below.

Displacer Material	Attraction Sleeve	Construction Material	Model							
			750	751	752	753	754	755	756	757
316/316L SS	400SS	A only	-	B	-	B	-	B	-	B
316/316L SS	316/316L SS	A or C	-	C	-	C	-	C	-	C
Porcelain	400SS	A only	P	-	P	-	P	-	P	-
Porcelain	316/316L SS	A or C	R	-	R	-	R	-	R	-

Standard displacer spring material is Inconel 600.

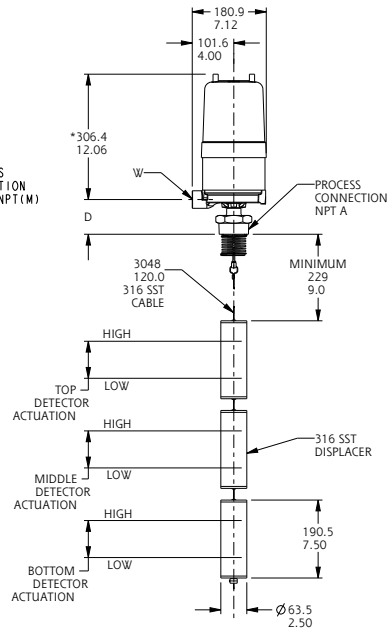
Dimensions in this catalog are for reference only. They may be changed without notice. Contact the factory for certified drawings for a particular model number. Dimensions are expressed as millimeters over inches. (Linear = mm/in.)

Model 750/752
2-1/2" NPT/Flanged



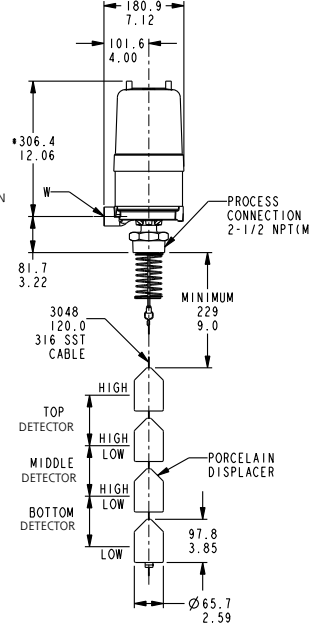
Drawing 0390681

Model 751/753
2-1/2" NPT/Flanged



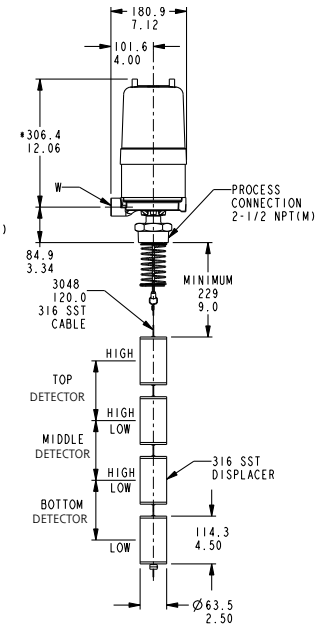
Drawing 0390682

Model 754/756
2-1/2" NPT/Flanged



Drawing 0390683

Model 755/757
2-1/2" NPT/Flanged



Drawing 0390684

* Minimum 8-3/4" (222 mm) overhead clearance required to remove housing cover.

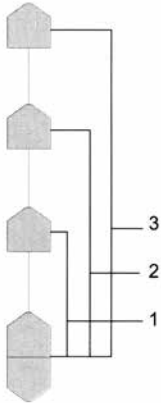
Housing**		W
Explosion Proof	B5	1" NPT
General Purpose	N1	
Explosion Proof	N8	

** See Detector Housing section (Page 48).

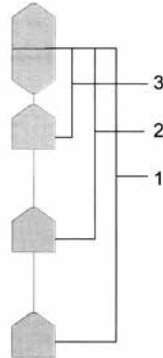
Optional Detecting Arrangements

Three-stage, wide differential detectors may be ordered with detecting arrangements different from those shown on page 39. To order, select the desired arrangement below and add **SC** to the accessory section of the model number. At the time of order, specify the required arrangement number. Porcelain displacers are shown for pictorial purposes only.

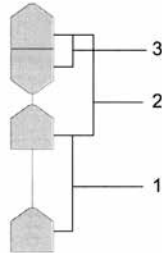
Arrangement B



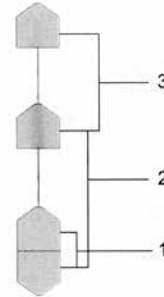
Arrangement C



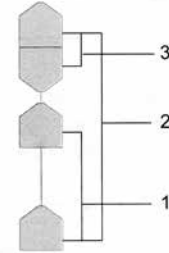
Arrangement D



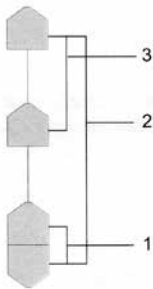
Arrangement E



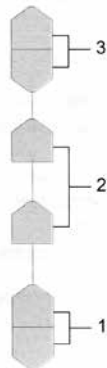
Arrangement F



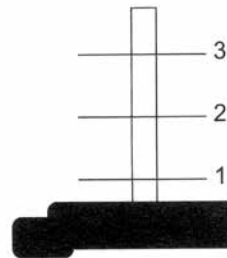
Arrangement G



Arrangement H



Detector Position



SOR detecting mechanisms are designed for use in harsh industrial atmospheres. SOR offers a variety of electrical and pneumatic detecting mechanism types to fit a wide range of applications. The basic types of detector mechanisms available are listed below. See page 47 for specifications.

All SOR detecting 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 detector type. All mechanisms are interchangeable with most competitor units.

Standard Dry-Contact Detectors Types A, B, C, E

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

Dry-Contact Detector Mechanisms feature:

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



Mini-Hermetically Sealed Detectors Types L, S, T, V

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

Mini-Hermetically Sealed Detector Mechanisms feature:

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



Anti-Vibration Detectors Types D and R

Anti-Vibration Detectors employ two magnets to provide vibration protection. Dual magnets prevent false trips by providing a positive mechanical lock to the enclosing tube when the detector is in any position.

(Type T detectors are mini-hermetically sealed units with dual magnets.)



Mechanical Level Detectors

Detecting Mechanisms

Pneumatic Detector Type J

Pneumatic detectors are available for applications that prohibit electrical detecting or where electricity is not available.

Pneumatic detectors feature:

- Three-way aluminum valve
- Anti-vibration design
- 1/4" NPT ports in 316SS for additional corrosion resistance



Extra-High Temperature Detector Type Y

The Y Series level detector mechanism is designed to operate normally under extremely high-temperature conditions. Constructed of stainless steel, ceramic, and oxidation-resistant alloys, the Y Series is designed to counteract the warping and seizure normally associated with this type of mechanism in high temperatures. The Y Series detector is especially well suited for power plant conditions.

Y Series Detector Mechanisms feature:

- Mica/glass insulation on wires and detectors
- Stainless steel and ceramic detector element and terminal block
- Detector mechanism rated at 800°F (427°C) continuous process temperature
- Can be combined with external temperature protection to function in temperatures up to 1200°F (649°C)
- Dual magnets for vibration protection





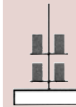
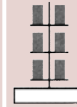
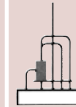


Mechanical Level Detectors

Detecting Mechanisms

741A -A1C-B-A1-N4-CRTT

Select the detector mechanism from the chart below.

Detector Type	SPDT Single Pole Double Throw			DPDT Double Pole Double Throw			3-Way Valve	Available Agency Listings					
	Single	Dual	Triple	Single	Dual	Triple		Single	CSA	UL	ATEX (flameproof)	ATEX (IS)	TestSafe
Detecting Stages													
Detecting Description	Detector Designator												
Standard Dry Contact	A1	A2	A3	A4	A5	A8	-	•	•	•	•	•	
High-Temperature Dry Contact	B1	B2	B3	B4	B5	B8	-	•	•	•	•	•	
Gold Contact	C1	C2	C3	C4	C5	C8	-	•	•	•	•	•	
Anti-Vibration Dry Contact ¹	D1 ¹	-	-	D4 ¹	-	-	-	•	•	•	•	•	
High-Amperage DC Service	E1	E2	E3	E4	E5	E8	-	•	•	•	•	•	
Standard Mini-Hermetically Sealed	L1	L2	L3	L4	L5	L8	-	•	•	•	•	•	
Anti-Vibration Gold Contact ¹	R1 ¹	-	-	R4 ¹	-	-	-	•	•	•	•	•	
Gold Contact Mini-Hermet	S1	S2	S3	S4	S5	S8	-	•	•	•	•	•	
Anti-Vibration Mini-Hermet ¹	T1 ¹	-	-	T4 ¹	-	-	-	•	•	•	•	•	
High-Temperature Mini-Hermet	V1	V2	V3	V4	V5	V8	-	•	•	•	•	•	
Extra-High Temperature (Ceramic)	Y1 ¹	-	-	Y4 ¹	-	-	-	•	•	•	•	•	
Pneumatic Non-Bleed with 316SS Fittings	-	-	-	-	-	-	J0 ^{1,2}						
Available with models:													
Series 100-200-300-740-800	•	•		•	•		•	•	•	•	•	•	
Series 108/208-400	•			•			•	•	•	•	•	•	
Series 700	•			•			•	•	•	•	•	•	
Series 730		•			•			•	•	•	•	•	
Series 750 (enclosures N1, N8 or B5 only)			•			•		•	•	•	•	•	

Notes

1. These detectors use two magnets and must be considered dual mechanisms when figuring minimum specific gravity.
2. Pneumatic detecting mechanisms must be specified with P1 housing.

Mechanical Level Detectors

Detector Ratings

Detector Designator		Resistive Amperage					Inductive Amperage					Minimum Temperature ¹		Maximum Temperature ²	
		24 volt	24 volt	24 volt	24 volt	24 volt	24 volt	24 volt	24 volt	24 volt	24 volt				
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)		
D	Anti-Vibration	15	15	5	.5	.25	15	15	5	.4	.13	-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)		
L ⁵	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	-15°F (-26°C)	250°F (121°C)	
R	Anti-Vibration Gold Contact	1	-	1	-	-	1	-	.5	-	-	-15°F (-26°C)	250°F (121°C)		
S	Gold Contact Mini-Hermet	1	-	1	-	-	1	-	.5	-	-	-15°F (-26°C)	250°F (121°C)		
T ⁵	Anti-Vibration Mini-Hermet	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	.5	.13	-15°F (-26°C)	250°F (121°C)	
V	High-Temperature Mini-Hermet	5	5	1.5	.5	-	5	5	1	.25	-	-15°F (-26°C)	400°F (204°C)		
Y ⁶	Extra-High Temperature (Ceramic)	1	1	1	.4	-	1	1	.4	-	-	-40°F (-40°C) <small>Note 3</small>	800°F (427°C)		
J ⁴	Pneumatic 316SS Fittings	Non-bleed 3-way aluminum valve body. Buna-N O-Rings 150 psi maximum supply, 24CFM @ 100 psi										5°F (-15°C)	200°F (93°C)		

Notes

1. Minimum ambient temperature at which the detector 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. Maximum process temperature at which the detector mechanism will operate normally. This can be increased according to the type of process. Refer to pages 51 - 52 for more details.
3. -40°F Temperature rating with no icing.
4. Pneumatic detectors must be used with clean, dry air or gas.
5. These detector designators have higher current rating for SPDT than DPDT.
6. Manufacturer specifications state maximum operating humidity must be <85% and minimum power rating is 100mW.

Mechanical Level Detectors

Housings

741A -A1C-B-A1-N4-CRTT

SOR housings are designed to protect the detecting mechanisms from harsh environmental conditions, as well as protecting the surrounding atmosphere from potential ignition sources. The basic types of housings are listed below.

General Purpose, NEMA 4 Housings

are heavy duty cast aluminum. All housings are rated NEMA 4 (IP65) as a minimum.

Explosion-Proof Housings

are available in aluminum or cast iron. Explosion-Proof ratings include Class I, Group B, C, D; Division 1 & 2, and EEx d IIC T6 (ATEX) and Ex d IIC T6 (TestSafe).

Pneumatic Detector Housings

are required for use with a pneumatic detecting mechanism. These enclosures are General Purpose, NEMA 4 (IP65) only.

NEMA 4X Housings

are standard in aluminum. Cast iron enclosures can be rated NEMA 4X by adding epoxy coating.

Detector Housings

Select the housings from the chart below.



Designator	Description	Enclosure Rating ²	Agencies				Available with Models					
			CSA	UL	ATEX	TestSafe	100, 200, 300	108, 208, 400	740, 800	700's	730's	750's
B1	Aluminum	Groups B, C, & D	●	●			●	●	●	●	●	
B2 ²	Cast Iron	Groups B, C, & D	●	●			●	●	●	●	●	
B5	Aluminum Extended	Groups B, C, & D	●									●
N1	Aluminum Extended	NEMA 4, 4X	●									●
N4	Aluminum	NEMA 4, 4X	●	●			●	●	●	●	●	
N6 ²	Cast Iron Double Hub	Groups C & D	●				●	●	●	●	●	
N7	Aluminum	Groups C & D	●	●			●	●	●	●	●	
N8	Aluminum Extended	Groups C & D	●									●
P1 ¹	Aluminum Pneumatic	NEMA 4, 4X					●	●	●	●		
S3	Aluminum	Ex d IIC T6 (TestSafe) EEx d IIC T6 (ATEX) Ex ia IIC T6 Gb (ATEX)			●	■	●	●	●	●	●	
S8 ²	Cast Iron	Ex d IIC T6 (TestSafe)				■	●	●	●	●	●	
T6 ²	Cast Iron	EEx d IIC T6 (ATEX) Ex ia IIC T6 Gb (ATEX)			■		●	●	●	●	●	

● – Available

■ – Standard (Agency listing accessory designator is not needed.)

1. P1 housing must be used with pneumatic detector mechanisms.

2. All cast iron housings can be rated NEMA 4X by adding PY to the accessory section of the model number.

Mechanical Level Detectors

Accessories

SOR accessories are provided for customizing the level detectors in this **741A -A1C-B-A1-N4-CRTT** catalog according to the requirements of the application. Place accessory designator(s) from the table below at the end of the model number. Check the compatibility chart below for correct use of each accessory.

Accessory Compatibility Chart

Description		Model Series									
		100	200	108/ 208	300	400	741-743 802	740 804	700	730	750
AF ¹	Air Filter & Gauge	●	●	●	●	●	●	●	●		
FE	Finned Extension	●	●	●	●	●	●	●	●		
CL	ATEX Approved for S3 Hsg	●	●	●	●	●	●	●	●	●	
CN ⁷	Conduit Reducer M20 x 1.5	●	●	●	●	●	●	●	●	●	●
CP ⁷	Conduit Reducer 1/2" NPT	●	●	●	●	●	●	●	●	●	●
CR ⁷	Conduit Reducer 3/4" NPT	●	●	●	●	●	●	●	●	●	●
CS ²	CSA Certification	●	●	●	●	●	●	●	●	●	●
CV	Canadian Registration Number (CRN)	●	●	●	●	●	●	●	●	●	●
CY	Certificate of Conformance (power plant piping, ANSI 31.1)	●	●	●	●	●	●	●	●	●	●
CZ ³	Certificate of Conformance (petrochemical piping, ANSI 31.3)	●	●	●	●	●	●	●	●	●	●
DN	Special Drain Connection	●	●	●	●	●	●	●	●	●	●
EC ⁸	Extra Chamber Connection	C/F	C/F	C/F			C/F	C/F			
ET ⁵	Temperature Extension	●	●	●	●	●	●	●	●	●	●
FE	Finned Extension	●	●	●	●	●	●	●	●	●	●
GG	Sealed Conduit	●	●	●	●	●	●	●	●	●	●
ID ⁹	Interface Detection	●	●	●	●	●	●	●	●	●	●
KK	Housing Breather Drain	●	●	●	●	●	●	●	●	●	●
MC ⁴	Manual Check								●	●	●
MR	Mill Test Report	●	●	●	●	●	●	●	●	●	●
MT	Mag Particle Examination	●	●	●	●	●	●	●	●	●	●
NC	NACE Construction	●	●	●	●	●	●	●	●	●	●
PP	Fiber Tag	●	●	●	●	●	●	●	●	●	●
PT	Dye Penetration Examination	●	●	●	●	●	●	●	●	●	●
PY	Powder coat epoxy coating. No coating on stainless steel parts or plated screws. (500 hrs. salt spray)	●	●	●	●	●	●	●	●	●	●
RR	SS Tag wired to housing	●	●	●	●	●	●	●	●	●	●
RT	Radiograph Examination	●	●	●	●	●	●	●	●	●	●
SC ¹⁰	Special Calibration	C/F	C/F	C/F	C/F	C/F	C/F	C/F	C/F	C/F	C/F
SD ¹¹	Special Dimensions	C/F	C/F	C/F			C/F	C/F			
SL ¹²	Special Cable Length								●	●	●
TC ⁴	Tru-Check								●	●	●
TF	Tandem Floats	C/F	C/F		●						
TT	Oversized Nameplate for customer tagging	●	●	●	●	●	●	●	●	●	●
UT	Ultrasonic Examination	●	●	●	●	●	●	●	●	●	●
VV	Fungicidal Varnish	●	●	●	●	●	●	●	●	●	●
WC	Water Column Unit	C/F									
WV ²	UL Listed	●	●	●	●	●	●	●	●	●	●
YY	Epoxy Coating (enclosure only)	●	●	●	●	●	●	●	●	●	●

Notes

C/F = Consult the Factory

1. Pneumatic detecting mechanisms only (P1)
2. Consult detector and housing sections for agency availability.
3. Process media must be known prior to manufacture. Different processes (service categories) require different quality inspection procedures. Consult the factory for details.
4. Appropriate for Model Series 701 through 704 and 730 through 733. See page 55 for details. Not available with NACE.
5. See high-temperature selection for application.
6. Not available with agency-listed housings.
7. Not available with T6 and S3 (ATEX) housings.
8. Need connection size, type, and location on chamber.
9. The upper and lower specific gravity required to determine functionality.
10. Operating specific gravity, Set Point (referenced from upper process connection) and if Set Point is rising or falling are required.
11. Specific details of chamber dimensional changes.
12. Length of cable required (10 ft. is standard).

Float Operated Detectors

	Certificates	C1	C2	C3	C4	C5	C6	C7	B2	B3	B5	B6	B7	A2	A3	A4	A7	A8	A9
Series 100	Calibration	◆							◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Series 200	Hydrostatic Pressure Test		◆						◆	◆				◆	◆	◆	◆	◆	◆
Series 220	Inspection Report			◆					◆	◆	◆	◆	◆		◆	◆	◆	◆	◆
Series 300	Compliance / Conformance				◆					◆			◆	◆		◆		◆	◆
Series 400	Dielectric Test					◆					◆							◆	
Series 108/208	Insulation Resistance						◆				◆	◆						◆	◆
	QA Test Report							◆	◆	◆									◆

Displacer Operated Detectors

	Certificates	C1	C3	C4	C5	C6	C7	B5	B6	B7
Series 700, 730, 750 *Series 740 *Series 800	Calibration	◆						◆	◆	◆
	Inspection Report		◆					◆	◆	◆
	Compliance / Conformance			◆						◆
	Dielectric Test				◆			◆		
	Insulation Resistance					◆		◆	◆	
	QA Test Report						◆			

*These products also have Certificate C2 - Hydrostatic Pressure Test.

Mechanical Level Detectors

High Temperature Selection

SOR level detectors can accommodate high-temperature applications up to 1200°F (649°C). These temperatures may be safely reached by a proper combination of chamber material, detector mechanism and temperature extension. Refer to page 52 to select the proper components for your process temperature.

ET Accessory

The straight temperature extension provides physical distance between the process and the detecting mechanism. It is constructed of a straight piece of pipe welded between the chamber and enclosing tube connection.

How It Works

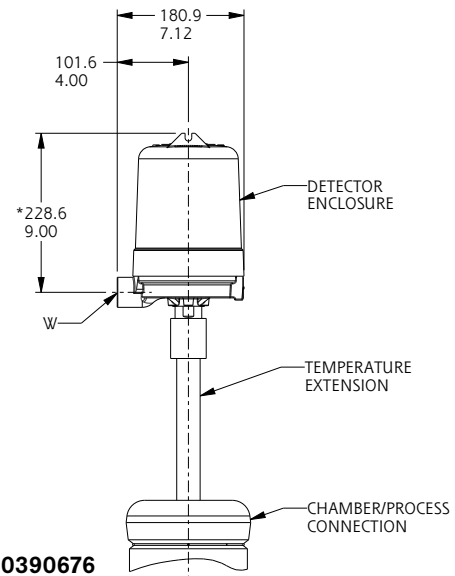
The straight temperature extension is designed to remove the detector from direct radiant heat in dry heat processes. Consult the chart on page 52 for application.

To Specify

Add Accessory Designator ET to the end of the SOR level detector model number per the selection chart on the next page.

The ET accessory automatically matches the material and rating of the specified level detector chamber. This option can be supplied on SOR level detectors Series 100, 200, 300 and 400.

201 A -A1C-B-A1-N4-ET TT



FE Accessories

201 A -A1C-B-A1-N4-FE TT

The finned temperature extension is designed to protect the electrical portion of a level detector from heat damage due to condensing processes. When used in combination with high-temperature detector mechanisms, this option allows operation in process temperatures up to 1200°F (649°C).

How It Works

The finned temperature extension condenses process steam and reduces its heat before it can reach the detecting mechanism. The design reduces steam to its saturation temperature in the enclosing tube, protecting the detecting mechanism from deterioration due to high temperatures. The process pressure dictates the saturation temperature, see page 58.

To Specify

Add Accessory Designator FE to the end of the SOR level detector model number per the selection chart on the next page.

The finned temp. extension automatically matches the material and rating of the specified level detector chamber. These options can be supplied on SOR level detectors series 100, 200, 108/208, 300 and 400.

Note: For proper cooling, temp. extensions must not be insulated or placed inside an enclosed structure. High ambient temperatures (over 100°F/38°C), intense direct sunlight, or heat loading from adjacent piping or vessels will affect cooling performance. Consult the factory if any of these conditions exist.



Mechanical Level Detectors

High Temperature Selection

There are two sections to the chart, Steam Heat and Dry Heat. Fundamental differences in condensing (steam) and non-condensing (dry) heat require different methods of protection.

Steam Heat processes carry it's heat with the vapor. These processes effectively heat every portion of their enclosure. To reduce the heat effects of condensing processes, we must either condense or physically block the vapor. SOR uses a condensing system to avoid the sealing problems associated with blocking the steam.

Dry Heat processes transfer heat through direct conduction. Heat is only passed to the areas where they touch the enclosure. Therefore, radiant heat is the only concern with these processes. This may be resolved by adding distance between the process and the protected portion of the control.

To use the selection chart, first select the column that represents the desired maximum temperature. Select a chamber material that is allowable in the chosen column. Move down to the proper process type section, Steam Heat or Dry Heat. Within that section, select a detector mechanism from those listed in the chosen column. The symbol will indicate if a temperature reduction device is required.

High Temperature Selection Chart

Features	Designator	0-400°F (204°C)	450°F (232°C)	500°F (260°C)	550°F (288°C)	600°F(316°C)	650°F (343°C)	700°F (371°C)	750°F (399°C)	800°F (427°C)	850°F (454°C)	900°F (482°C)	950°F (510°C)	1000°F (538°C)	1050°F (566°C)	1100°F (593°C)	1150°F (621°C)	1200°F (649 °C)	
Chamber Material (Select one)																			
A106B Carbon Steel	A																		
304/304LSS																			
316/316LSS	C																		
A333 GR.6																			
A335-P11 Chrome Moly																			
A335-P91																			
Hastelloy C																			
Alloy-20																			
Monel-400																			
Steam Heat Applications																			
Detector Mechanism (Select one)																			
Hi-Temp Dry Contact or Mini-Hermet	B/V	■	●	●	❖	❖													
Hi-Temperature Ceramic/SS	Y	■	■	■	■	■	■	■	■	■	❖	❖	❖	❖	❖	❖	❖	❖	❖
Dry Heat Applications																			
Detector Mechanism (Select one)																			
Hi-Temp Mini-Hermet or Dry Contact	B/V	■	●	●	●	●													
Hi-Temperature Ceramic/SS	Y	■	■	■	■	■	■	■	■	■	●	●	●	●					

For proper cooling, temperature extensions and finned extensions must not be insulated or placed inside an enclosed structure. High ambient temperatures (over 100°F/38°C), intense direct sunlight or heat loading from adjacent piping or vessels will affect cooling performance. Consult the factory if any of these conditions exist.

■ = Detector Only ❖ = Finned Extension ● = Temperature Extension

Mechanical Level Detectors

High Temperature Selection

Float Detector Pressure Rating (in psi) above 450°F (232°C)

Model	Material	500°F (260°C)	550°F (288°C)	600°F (316°C)	650°F (343°C)	700°F (371°C)	750°F (399°C)
101	CS & SS	170	155	140	125	110	95
102	CS & SS	447	435	423	411	400	389
103	CS	600	575	550	535	535	505
	SS	480	465	450	445	430	425
104	CS & SS	894	870	846	823	800	778
108	CS	600	575	550	535	535	505
	SS	480	465	450	445	430	425
109	CS & SS	170	155	140	125	110	95
121	CS & SS	170	155	140	125	110	95
122	CS & SS	313	304	296	288	280	272
201	CS & SS	201	196	190	185	180	175
202	CS & SS	268	261	254	247	240	233
203	CS & SS	447	435	423	411	400	389
204	CS & SS	1118	1087	1057	1029	1000	972
205	CS & SS	671	652	634	617	600	584
206	CS & SS	894	870	846	823	800	778
207	CS & SS	894	870	846	823	800	778
208	CS	1794	1794	1794	1794	1722	1554
	SS	1495	1453	1411	1387	1351	1339
209	CS & SS	403	391	381	370	360	350
221	CS & SS	313	304	296	288	280	272

Higher temperatures available with other materials. Consult with the factory.

Certificate of Conformance

Specify either a CY or CZ option in the accessory section of the model number for a certificate of conformance.

Designator	Certificate of Conformance to
CY	ASME/ANSI B31.1 Power Piping
CZ	ASME/ANSI B31.3 Petrochemical Piping

If certification to B31.3 is required, SOR must know the fluid category per the chart below. Refer to the ASME/ANSI B31.3 Fluid Category Section to determine the applicable category.

ANSI/ASME B31.3 Fluid Category

Normal	A fluid service not subject to the following four categories.
Category D	A fluid service in which all of the following apply: <ol style="list-style-type: none">1. The fluid handled is non-flammable, non-toxic, and not damaging to human skin.2. The design gage pressure does not exceed 150 psi.3. The design temperature is between -20°F and 366°F.
Category M	A fluid service in which the potential for personnel exposure is judged to be significant and in which a single exposure to a very small quantity of a toxic fluid, caused by leakage, can produce serious irreversible harm to persons on breathing or bodily contact, even when prompt restorative measures are taken.
Severe Cyclic	A fluid service with high-cycle rates that cause extreme stress on components.
High Pressure	Pressure in excess of that allowed by the ASME B16.5 Class 2500 rating for the specified temperature and material group or any piping so designated by the customer.

Weld Examination

When CY or CZ is specified, SOR performs examination to meet these codes. This includes visual inspection and ultrasonic, X-ray, magnetic particle or dye penetrant testing as required by ASME B31.1 or B31.3. If CY or CZ is not selected but examination is required, accessories UT (ultrasonic), RT (X-ray), MT (magnetic particle) or PT (dye penetrant) can be added to the model number to include this testing.

Hydrostatic Testing

SOR performs a hydrostatic pressure test on all welded chambers at 1.5 times the design pressure for three minutes. CY and CZ options and Hydrotest Certificates include a hydrostatic pressure test at 1.5 times the design pressure for ten minutes as required by ASME B31.1 and B31.3 codes. A hydrostatic test certificate is also available as an accessory. See Test Certificates, Form 1254.

Mechanical Level Detectors

MC and TC Options

702A-AIC-B-A1-MC-CRTT

Manual Check (MC) and Tru-Check (TC) options permit manual actuation of vertical displacer level detectors, addressing EPA and OSHA safety requirements. The standard 30-foot stainless steel chain allows manual actuation from the tank base, eliminating potentially hazardous trips to the top of the tank. Specify either an MC or TC option by placing the designator in the accessory section of the model number.

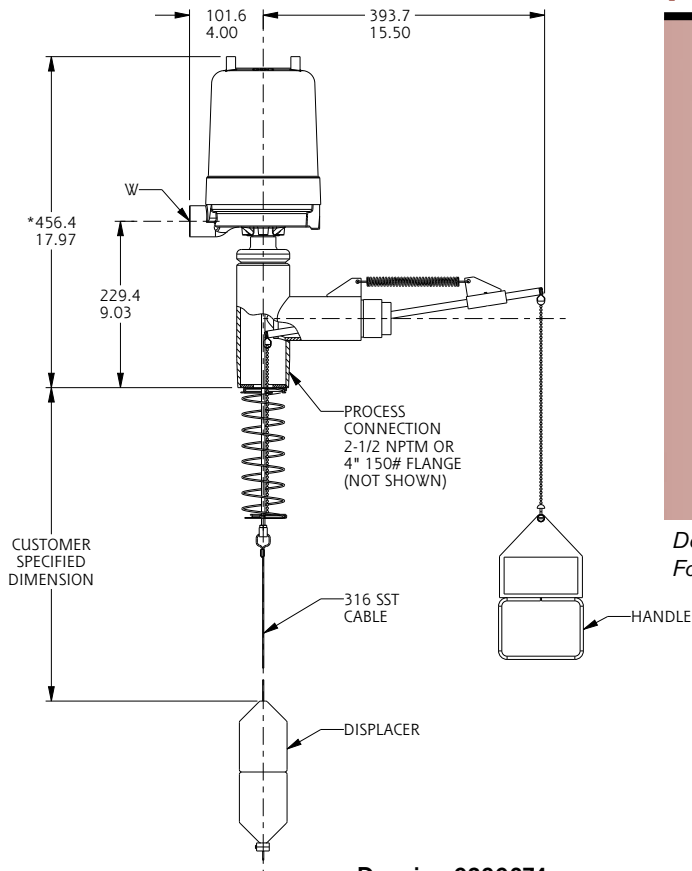
Designator	Application
TC	Tanks or vessels pressurized to 100 psi
MC	Atmospheric vented tanks or vessels

These options are available on SOR level detector Series 701 through 704 and 730 through 733. MC and TC option available on carbon steel units only. Series 730 through 733 are more sensitive to both high and low SG values. Please consult factory before ordering the MC or TC options for these models.

How It Works

Pulling the handle transfers downward motion to the actuator lever by means of the beaded stainless steel chain. The resultant motion lifts the entire level sensing assembly which moves the attraction sleeve and actuates the detecting element to simulate a high-level condition. Detecting action for alarm, shutdown or control is verified.

Dimensions



Drawing 0390674

Product Specifications

Pressure Range

TC (Tru-Check) *0 to 100 psi
 MC (Manual Check) 0 psi (vented to atmosphere)

*Maximum pressure for entire level sensing assembly is 100 psi with Tru-Check installed.

Temperature Range -40 to 300°F (-40 to 150°C)

Wetted Parts

Ball	Chrome Plated Brass
Seal	Teflon
Spring	Spring Steel
Body	1018 Steel

Design and specifications are subject to change without notice. For latest revision, see www.sorinc.net.

SOR uses all ASTM grade materials in the construction of mechanical level detectors. The following chart lists the specific ASTM (or UNS) materials that are normally used for each component in our detectors. Consult the factory if you do not see the specific material required for your application.

Material	ANSI B36.10	ANSI B16.9	ANSI B36.10	ANSI B16.5	Temperature Range
	Seamless Pipe	Butt Weld Fitting	Screwed/Socket Fitting	Flanges	
Carbon Steel	A106B	A234-WPB	A105	A105	-20°F to 800°F
304/304LSS ²	A312-T304	A403-WP304	A182-F304	A182-F304	-425°F to 750°F
316/316LSS	A312-T316	A403-WP316	A182-F316	A182-F316	-325°F to 750°F
Low Temperature ² Carbon Steel	A333 Gr. 6	A420-WPL6	A350-LF2	A350-LF2	-50°F to 700°F
1-1/4% Chrome ² 1/2% Moly	A335-P11	A234-WPL11	A182-F11	A182-F11	-20°F to 1100°F
Hastelloy-C276 ² N10276	B622 ¹	B366/B564	B366/B564	B366/B564	-325°F to 800°F
Alloy-20 ² N08020	B464 ¹	B366/B962	B366/B462	B366/B462	-325°F to 800°F
Monel 400 ² N04400	B-165 ¹	B366/B564	B366/B564	B366/B564	-325°F to 900°F
Duplex SS ²	A-790	A-815	A182-F51	A182-F51	-60°F to 600°F
2-1/4% Chrome ² 1% Moly	A335-P22	A335-P22	A182-F22	A182-F22	-20°F to 1100°F
9% Chrome 1% Moly Vanadium	A335-P91	A234-WP91	A182-F91	A182-F91	-20°F to 1200°F

Notes

1. UNS numbers are given in parenthesis for special alloys.
2. These materials are available by special order only.

Flange Face Finishes

The most common flange face finishes are shown. SOR standard flange finishes are highlighted.

Raised Face Flanges (RF)

All raised-face flange finishes are given as a range. AARH (Average Arithmetic Root Height) values are given with their metric equivalent.

AARH (µin.)	1000-2000	500-1000	250-500	125-250	63-125	32-63	16-32
Ra (µm)	25-50	12.5-25	6.3-12.5	3.2-6.3	1.6-3.2	0.8-1.6	0.4-0.8

Ring Tight Joint Flanges (RTJ)

The side surfaces of RTJ gasket surfaces shall not exceed 63µ" (1.6µm) roughness per ANSI B16.5.

The specific gravity of water changes depending on its temperature and pressure. The chart below lists properties of saturated steam. Saturated steam is the state where water is in transition between liquid and vapor. The chart provides the process temperature with the associated pressure and specific gravity of the condensate water. If a water application has a high temperature and low pressure, condensate will only be present at the temperature that corresponds to the maximum pressure. Select the proper row based on the temperature and pressure, and read the specific gravity.

Figures are based on saturated steam.

Boiling Temperature F°	Vacuum Inches Hg	Specific Gravity	Boiling Temperature F°	Pressure psig	Specific Gravity	Boiling Temperature F°	Pressure psig	Specific Gravity
32	29.74	.9999	212	0.0	.96	450	407.0	.82
40	29.67	1.0000	220	2.49	.96	460	451.2	.81
50	29.56	.9997	230	6.08	.95	470	498.8	.80
60	29.40	.9990	240	10.27	.95	480	550.1	.80
70	29.18	.9980	250	15.13	.94	490	605.2	.79
80	28.89	.9966	260	20.14	.94	500	664.3	.78
90	28.50	.9950	270	27.17	.93	510	728.3	.77
100	27.99	.9931	280	34.52	.93	520	795.3	.76
110	27.33	.9909	290	42.87	.92	530	868.3	.76
120	26.48	.9886	300	52.30	.92	540	945.3	.74
130	25.40	.9860	310	63.00	.91	550	1028.3	.73
140	24.04	.9832	320	75.00	.91	560	1116.3	.71
150	22.35	.9803	330	89.3	.91	570	1209.3	.70
160	20.27	.9772	340	103.3	.90	580	1308.3	.69
170	17.72	.9730	350	119.9	.89	590	1414.3	.68
180	14.63	.9704	360	138.3	.88	600	1529.3	.67
190	10.91	.9668	370	158.5	.88	610	1644.3	.66
200	6.46	.9631	380	180.9	.87	620	1769.3	.65
210	1.17	.9592	390	205.4	.86	630	1902.3	.63
			400	232.3	.86	640	2042.3	.62
			410	261.6	.85	650	2190.3	.60
			420	293.4	.84	660	2346.3	.58
			430	328.4	.84	670	2511.3	.56
			440	366.2	.83	680	2690	.49
						690	2883	.48
						700	3075	.44
						705	3189	.32

Mechanical Level Detectors

Conversions

General English-to-Metric unit conversions are listed below.

Pressure

To Convert from:	To:	Use this formula:		
Bar	Pounds per Square Inch (psi)	bar	x 14.504	= psi
Kilo Pascals (kPa)	Pounds per Square Inch (psi)	kPa	x 0.145	= psi
Mega Pascals (MPa)	Pounds per Square Inch (psi)	MPa	x 145	= psi
Kilograms per cm ² (kg/cm ²)	Pounds per Square Inch (psi)	kg/cm ²	x 14.223	= psi
Pounds per Square Inch (psi)	Bar	psi	÷ 14.504	= bar
Pounds per Square Inch (psi)	Kilo Pascals (kPa)	psi	÷ 0.145	= kPa
Pounds per Square Inch (psi)	Mega Pascals (MPa)	psi	÷ 145	= MPa
Pounds per Square Inch (psi)	Kilograms per cm ² (kg/cm ²)	psi	÷ 14.223	= kg/cm ²

Specific Gravity

To Convert from:	To:	Use this formula:		
Kilograms per meter ³ (kg/m ³)	Specific Gravity (SG)	kg/m ³	x 0.001	= SG
Pounds per foot ³ (lb/ft ³)	Specific Gravity (SG)	lb/ft ³	÷ 62.4	= SG
Degrees API	Specific Gravity (SG)	141.5	÷ (API + 131.5)	= SG
Specific Gravity (SG)	Kilograms per meter ³ (kg/m ³)	SG	x 1000	= kg/m ³
Specific Gravity (SG)	Pounds per foot ³ (lb/ft ³)	SG	x 62.4	= lb/ft ³
Specific Gravity (SG)	Degrees API	(141.5 ÷ SG) - 131.5		= API

Length

To Convert from:	To:	Use this formula:		
millimeters (mm)	Inches (in.)	mm	÷ 25.4	= in.
meters (m)	Feet (ft.)	m	x 3.281	= ft.
Inches (in.)	millimeters (mm)	in.	x 25.4	= mm
Feet (ft.)	meters (m)	ft.	÷ 3.281	= m

Temperature

To Convert from:	To:	Use this formula:		
Degrees Fahrenheit (°F)	Degrees Centigrade (°C)	(°F - 32) ÷ 1.8		= °C
Degrees Centigrade (°C)	Degrees Fahrenheit (°F)	(1.8 x °C) + 32		= °F

Fluid Flow Rates

To Convert from:	To:	Use this formula:		
Feet per Second (FPS)	Gallons per Minute (GPM)	FPS x 448.83 x A1		= GPM
Kilograms per Hour (kg/H)	Gallons per Minute (GPM)	(kg/H ÷ kg/m ³) x 4.403		= GPM
Meters per Second (m/s)	Gallons per Minute (GPM)	m/s x A2 x 15,852		= GPM
Cubic meters per Hour (m ³ /hr)	Gallons per Minute (GPM)	m ³ /hr ÷ 0.2271		= GPM
Gallons per Minute (GPM)	Feet per Second (FPS)	GPM ÷ (448.83 x A1)		= FPS
Gallons per Minute (GPM)	Kilograms per Hour (kg/H)	GPM x kg/m ³ ÷ 4.403		= kg/H
Gallons per Minute (GPM)	Meters per Second (m/s)	GPM ÷ (A2 x 15,852)		= m/s
Gallons per Minute (GPM)	Cubic meters per Hour (m ³ /hr)	GPM ÷ 4.4		= m ³ /hr

Variables:

A1 = Area of pipe in square feet (ft²)

A2 = Area of pipe in square meters (m²)

kg/m³ = Specific gravity in kilograms/cubic meter

Mechanical Level Detectors

Weights

The approximate shipping weights shown below are for standard models. Weights will vary based on pipe size, length and flange size. Consult the factory for the weight of a specific unit.

Floats				Displacers			
Model	pounds	kilograms	Page	Model	pounds	kilograms	Page
101*	55	25	12	701	18	8.5	36
102*	80	37	12	702	18	8.5	36
103*	130	60	12	703	30	13.5	36
108	130	59	21	704	30	13.5	36
109*	125	53	12	705	20	9	36
121*	40	18	12	706	30	9	36
122*	50	23	12	707	32	14.5	36
123*	80	36	12	708	32	14.5	36
124*	90	42	12	730	20	9	39
201*	45	20.5	17	731	20	9	39
202*	26	12	17	732	32	14.5	39
203*	26	12	17	733	32	14.5	39
204*	26	12	17	734	22	10	39
205*	45	20.5	17	735	22	10	39
206*	45	20.5	17	736	34	15.5	39
207*	45	20.5	17	737	34	15.5	39
208	89	22	17	740*	28	12.5	33
209*	62	29	17	741*	48	22	29
221*	22	10	17	742*	60	27	29
301	12	5.5	23	743*	68	31	29
303	12	5.5	23	750	24	11	43
304	12	5.5	23	751	24	11	43
401	15	7	26	752	36	16	43
402	12	5.5	26	753	36	16	43
403	28	12.5	26	754	26	12	43
404	15	7	26	755	26	12	43
405	12	19	26	756	38	17	43
406	70	32	26	757	38	17	43
				802	185	82	29
				804	50	22.5	33

*Add weights from the table below to the base model weight for VV, VVT, or VH configurations with flanges.

VV, VVT and VH Additional Weights

Size	150#		300#		600#	
	pounds	kilograms	pounds	kilograms	pounds	kilograms
1"	5	2.5	8	4	9	4.5
1-1/2"	8	4	15	7	15	7
2"	12	5.5	16	7.5	18	8.5

Weights shown in this table include two flanges, pipe nipples, and fittings.

Note: Consult the factory for additional weight due to accessories or non-standard requirements.

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