2210 **Side Mounted Level Switch**

General Instructions

The SOR® 2210 Side Mounted Level Switch is a horizontally mounted, float-operated level switch. The 2210 is suitable for plant and OEM applications where open or closed contacts are required to signal presence or absence of liquid at a discrete level.

When the liquid rises, the float extension arm moves a magnet which repels an internal magnet de-actuating a microswitch. When the liquid level falls, the float extension arm moves the magnet in the opposite direction, actuating the microswitch.

The 2210 is recommended for use in clean liquids only.

NOTE: If you suspect that a product is defective, contact the factory or the SOR Representative in your area for a return authorization number (RMA). This product should only be installed by trained and competent personnel.

Design and specifications are subject to change without notice.

For latest revision, go to ***SORInc.com***

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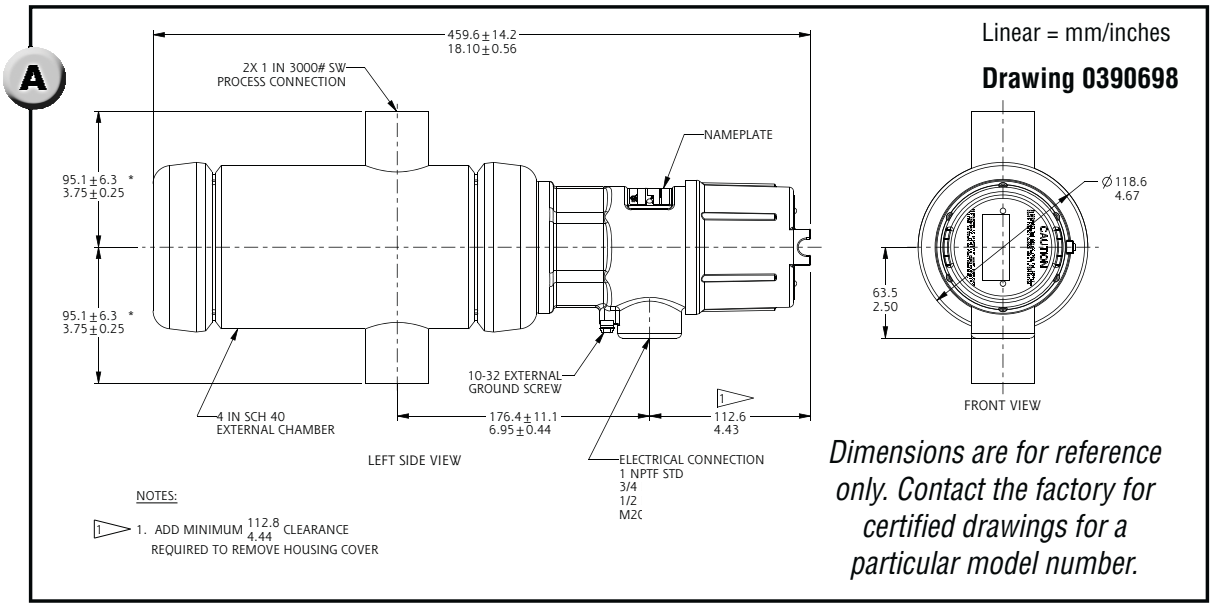


Dimensions are for reference only. Contact the factory for certified drawings for a particular model number.

Installation

- External switch chambers must be mounted so that the centerline is within 3º of horizontal. The conduit connection centerline must be within 3° of vertical and the nameplate at 12 o'clock (facing up - see A). Switch actuation cannot be reversed by rotating the unit 180°.
- Pipe support hangers or stands should be used where necessary.
- All isolation valves must be fully open during service, as restricted valves may cause erroneous level switching.

Single Switch Chamber

- External chamber piping should be short, straight and unrestricted.
- Pipe must be of a diameter equal to or greater than the process connection diameter.
- Valves and other equipment between the chamber and process must be of the same diameter or larger than the process connection diameter to allow adequate liquid flow into the chamber.

Multiple Switch Chambers

In addition to the Single Switch installation instructions, multiple chamber installations have the following requirements:

- Headers connecting multiple chambers to the process must be larger than the chamber process connection diameter to allow adequate liquid flow to all chambers. Header diameters are listed below:
  - Header diameter must be 1.5 times larger than process connection diameter for two chambers.
  - Header diameter must be 2 times larger than process connection diameter for three or four chambers.
  - Header diameter must be 2.5 times larger than process connection diameter for five or more chambers.
- Valves, tees, elbows and other pipe fittings in a header must be the same diameter as the recommended header diameter.

Not following these installation instructions, including pipe and valve diameter and pipe lengths can affect operation of the switch, including differential. See Single Switch Chamber Installation (B) and Multiple Switch Chamber Installation (C).

Insulation of the control chamber is acceptable, but switch housing and cover must not be insulated.

Single Switch Chamber Installation

❶ Locate switch chamber process connection 12” to 24” (300mm to 600mm) away from the process pipe or tank.

❷ Locate the switch chamber so that the switch actuates or deactuates at the desired level. For liquids with a specific gravity of 1.0, switch actuation will occur approximately 3/4” (20mm) above the chamber centerline and deactuation will occur at approximately 3/8” (10mm) above the chamber centerline. Consult factory for other specific gravity values.

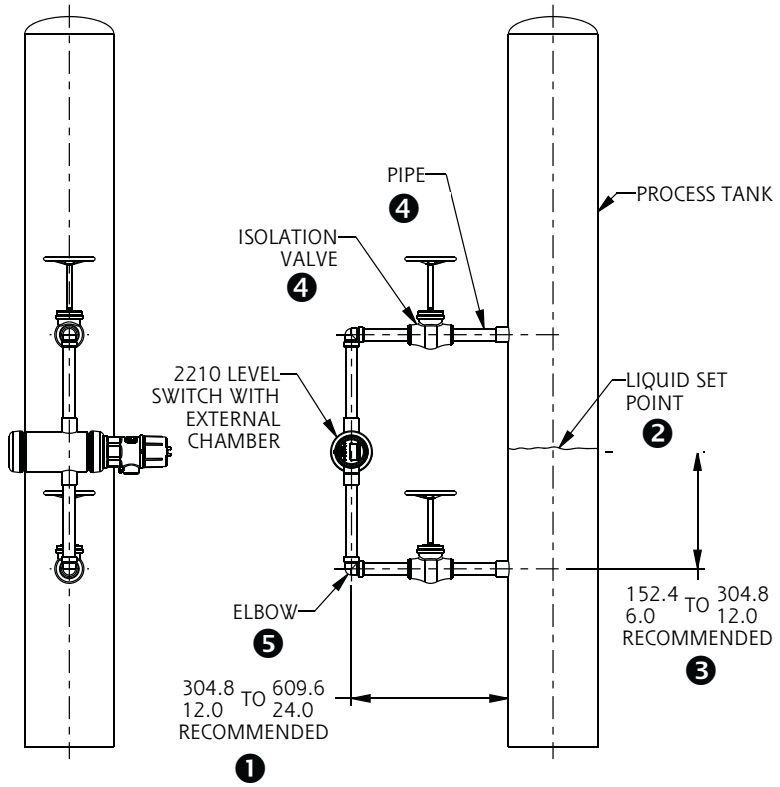
❸ Connect the bottom chamber process connection to the process pipe or tank 6” to 12” (150mm to 300mm) below the centerline of the chamber. This will ensure liquid level in the switch chamber is as close as possible to process liquid level.

❹ Inside diameter of piping, including elbows, tees and valves, must be equal to or greater than process connection diameter.

❺ One elbow is recommended to connect the level switch with the process pipe or tank.

Drawing 0390736

(B)



Deviating from any of these instructions may adversely affect operation of the level switch by restricting liquid flow into the switch chamber. The recommended dimensions allow adequate space for isolation valves, pipe fittings and insulation. Structural support (not shown) must be provided for level switch chambers.

Multiple Switch Chamber Installation

❶ The header pipe diameter for three (3) or four (4) chambers needs to be two times the process connection diameter. For 1" (25mm) process connections, the pipe header must be 2" (50mm) in diameter. This includes pipe connecting the header to the process, fittings, valves and other pipe equipment installed as part of the header piping. Headers should be arranged to use one elbow or tee to connect to the process pipe or tank.

❷ Pipe connecting the header to individual chambers can be the same size as the process connection on the switch chamber. Fittings and valve diameters must also be equal to or greater than the process connection diameter. One elbow is recommended to connect the level switch chamber to the header pipe.

❸ Install each chamber so that the actuate or deactuate point is at the desired process liquid level. See Single Switch Chamber Note 2 for set point locations.

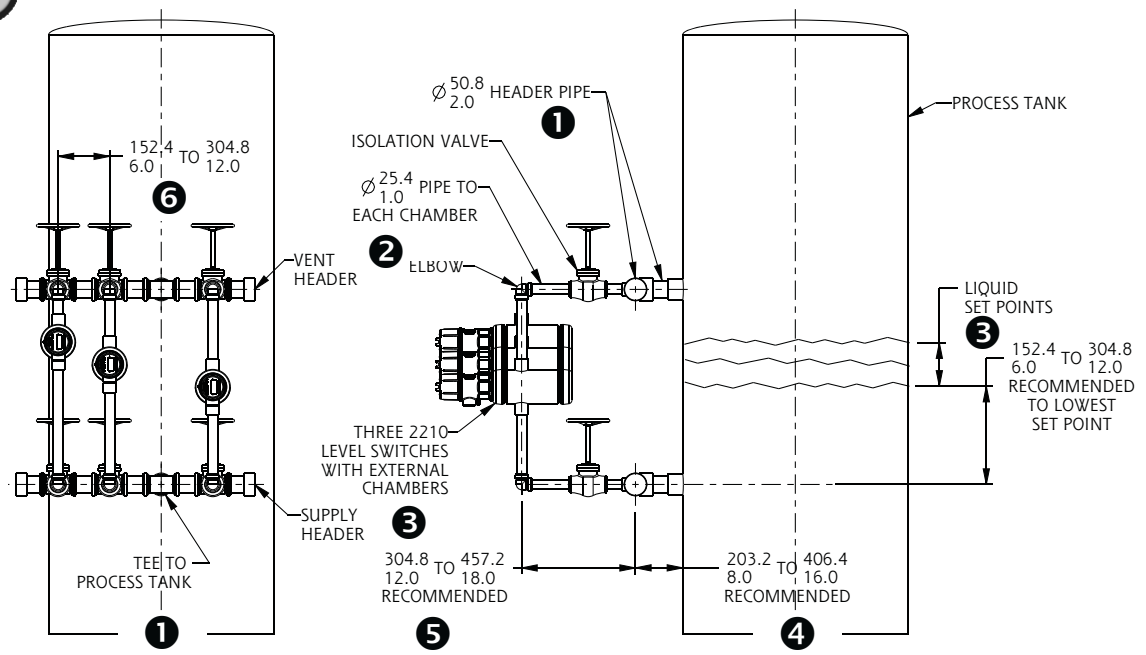
❹ Locate the header 8" to 16" (200mm to 400mm) away from the process tank.

❺ Locate switch chamber process connection 12" to 18" (300mm to 450mm) away from the header pipe.

❻ Horizontal spacing of level switch chambers should be 6" to 12" (150mm to 300mm).

C

Drawing 0390736



IMPORTANT

Deviating from any of these recommendations may adversely affect operation of the level switch by restricting liquid flow into the switch chamber. The recommended dimensions leave adequate space for isolation valves, fittings and insulation. Structural support (not shown) must be provided for level switch chambers.

Safety Integrity Level (SIL) Installation Requirements

The SOR pressure switches have been evaluated as Type-A safety related hardware. To meet the necessary installation requirements for the SIL system, the following information must be utilized:

- Proof Test Interval shall be one year.
- Units may only be installed for use in Low Demand Mode.
- Products have a HFT (Hardware Fault Tolerance) of 0, and were evaluated in a 1oo1 (one out of one) configuration.

Electrical Installation

❶ Remove the end cover to gain acess to the switch mechanism and terminal block.

❷ Feed the switching wires into the housing through the electrical connection. Wire to the terminal block(s) as shown in (D). Select wires which are compatible with temperature and electrical load required by the application. Keep wire length as short as possible to prevent damage when cover is installed.

❸ Connect the ground wire to the green ground screw located on the outside of the housing.

❹ Replace the switch cover. Ensure switch cover is screwed on all the way.

❺ Housing becomes very hot during regular use, high temp. conduit connections are necessary.

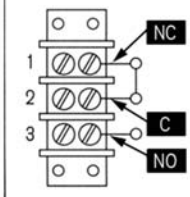
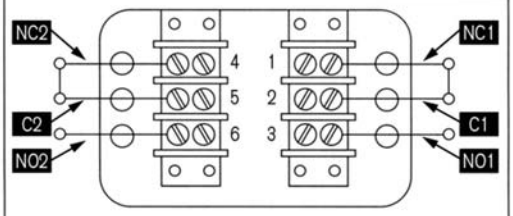
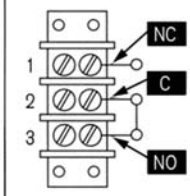
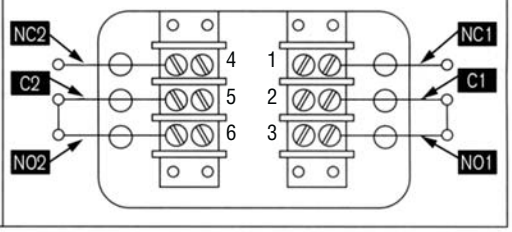
❻ Test the switch action by varying the liquid level in the chamber or tank.

All housings must be properly sealed at conduit connection to maintain NEMA classification.

The cover can become extremely hot during operation. Use adequate protection to prevent severe personal injury.

WIRING CONTINUITY

(D)

	SPDT	DPDT
LIQUID LEVEL LOW		
LIQUID LEVEL HIGH		

Maintenance

Do not remove the cover when the unit is energized. Risk of electrical shock resulting in serious injury and/or death.

- Keep the cover tightly secured to the housing.
- Prevent moisture or dirt from entering the housing when the cover is off.
- Check all screw terminal connections periodically. Vibration may loosen the screw terminals.
- Clean the float and counterweight mechanism periodically to assure continued free movement.
- Make no adjustments to the switch mechanism. It is factory calibrated for optimum performance.

Troubleshooting

Symptom	Probable Cause
The float is in actuated position but the switch does not actuate.	a. The terminal block is wired incorrectly. Check wiring. b. The unit is installed upside-down. Rotate housing so that the nameplate faces up. c. The switch is damaged. Contact the factory.
The float is in de-actuated position but the switch remains actuated.	a. The terminal block is wired incorrectly. Check wiring. b. The switch is damaged. Contact the factory.
The control will not function when installed but operates when removed from process connection.	a. Float travel is inadequate. Check for internal vessel obstructions. See Mounting Requirements
Liquid is in the vessel at the actuation level but the unit does not respond.	a. The float pivot pin is bound up or dirty. Clean the float pivot pin. b. The unit is installed upside-down. Rotate housing so that the nameplate faces up. c. The specific gravity of the liquid is not sufficient to lift the float. d. The float is leaking or collapsed. Contact the factory.

Replacement Parts

Replacement switch assemblies include: bracket, terminal block, magnet, microswitch(es) installation screws and ground screw. Order replacement parts by part number.

Part Number	Description
3698150	SPDT Switch Assembly (A1)
3698151	DPDT Switch Assembly (A4)
3698158	SPDT Switch Assembly (S1)
3698159	DPDT Switch Assembly (S4)
3698184	Interface & Float Assembly
3698185	Interface Gasket
2414001	Interface Screws

Maximum Operating Pressure Ratings*

Chamber Designator	Chamber Description	Pressure at Listed Temperature in psig (bar)								
		100°F (38°C)	200°F (93°C)	300°F (149°C)	400°F (204°C)	500°F (260°C)	600°F (316°C)	650°F (343°C)	700°F (371°C)	750°F (399°C)
A	**S40 Carbon Steel** *(includes float)*	1435 (99)	1435 (99)	1435 (99)	1435 (99)	1435 (99)	1435 (99)	1435 (99)	1378 (95)	1244 (86)
C	**S40 Stainless Steel** *(includes float)*	1799 (124)	1550 (107)	1397 (96)	1282 (88)	1196 (82)	1129 (78)	1110 (77)	1081 (75)	1072 (74)

* Maximum operating pressure is limited by the float or chamber, depending on the temperature.

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