



# Sliquid™ One, Two or Three Liquid Level Switches

For Liquid, Sludge or Slurry Product Level Control

## Specifications – Installation and Operating Instructions

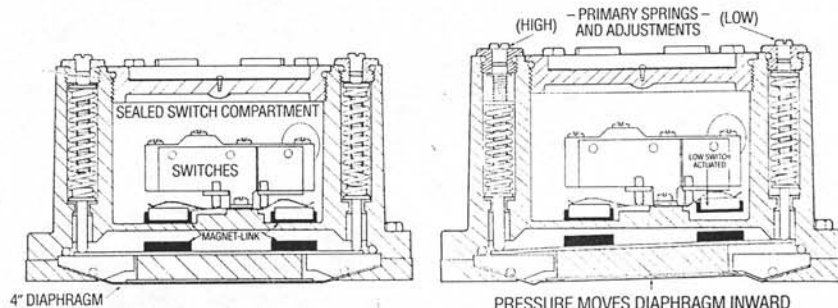
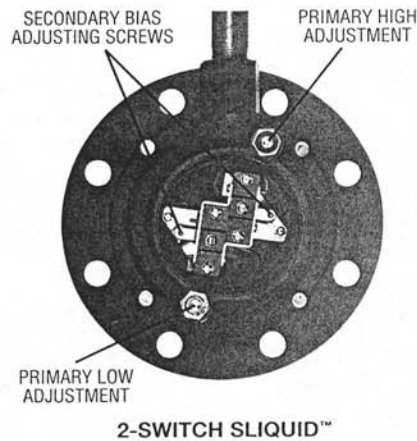


FIGURE 1

FIGURE 2

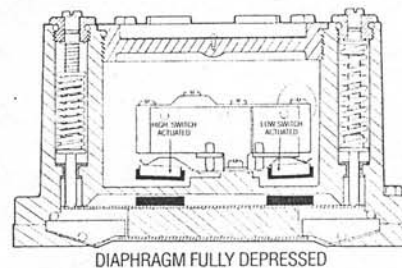


FIGURE 3

### GENERAL

The Sliquid™ level control responds to liquid level head pressure and actuates one, two or three adjustable switches. Repelling magnets link the diaphragm and switches through a solid nonferrous wall. Two compressible coil springs, positioned 180° apart, restrain the diaphragm and backplate from moving inward (Fig. 1). The adjusting screws on the coil springs provide high and low level adjustment ranges. The Proximity Magnet-Link design includes magnets on the diaphragm backplate that repel similar opposing magnets located on the individual switch arms in the switch enclosure. The switches are tripped when the diaphragm and backplate are moved inward. The low-level spring compresses first, allowing that side of the diaphragm to move inward. This actuates the low-level switch, (Fig. 2). As the head rises, the high-level spring and switch follow, (Fig. 3).

### VENTING

The external surface of the flexible diaphragm will normally be exposed to the measured fluid. Since only the liquid level head pressure is desired for measurement, the opposite side of the diaphragm (low pressure side) must be at the same pressure as the inside of the vessel above high level. If the vessel is at atmospheric pressure, the back side of the diaphragm may be vented to atmosphere through the vent port, (Fig. 4, next page). If the vessel operates under pressure or vacuum, the back side of the

diaphragm must be piped back to the vessel above high level, (Fig. 5, next page).

### MOUNTING

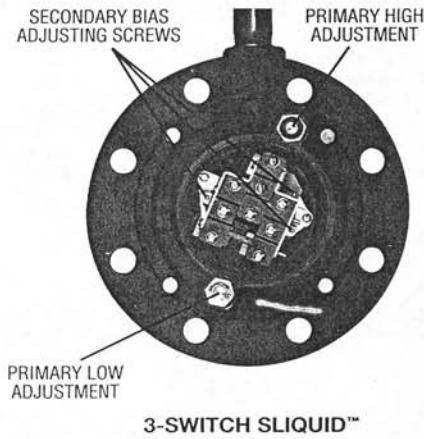
The control can be mounted:

- through the top of the vessel - Suspended,
- through the side - Flange mount, or with
- PVC Adapter mount.

The Sliquid™ controls are normally mounted in the vertical position. A horizontal position requires special factory settings. (See Adjustment Instructions). Adjustments at the factory are based on vertical mounting unless otherwise specified.

The suspended control is vented from the low pressure side of the diaphragm through a special hole into the conduit connector, up through the conduit and out the tee and vent fitting. In pressure applications, the tee and vent must be inside the tank above high level.

The standard PVC adapter bolts to the retaining ring on the control. Optional pipe threads from 1/2" to 3" are cut in the standard adapter to allow it to be screwed onto a tank nozzle. The Sliquid™ control is removed by unbolting the adapter from the aluminum diaphragm retainer. A one-piece adapter includes the diaphragm retainer as well as an adapter to a 2" flange or special valve. Removal is accomplished by unbolting the 2" flange or valve from the adapter.



3-SWITCH SLIQUID™

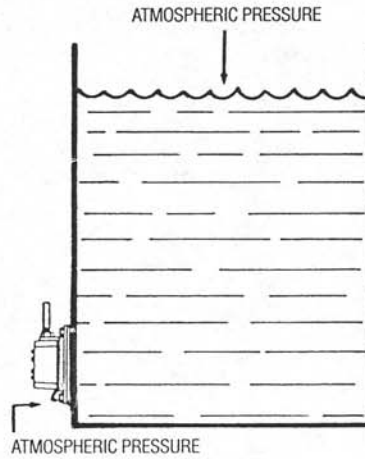


FIGURE 4

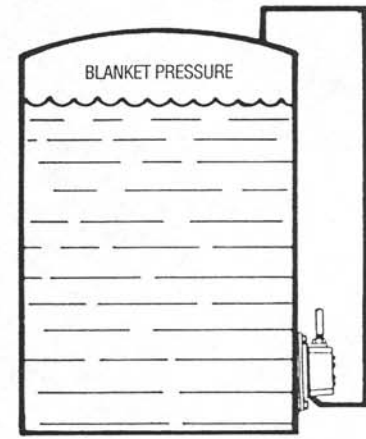


FIGURE 5

### ADJUSTMENT INSTRUCTIONS

The Sliquid™ level control is adjusted at the factory as specified by the customer. The settings are indicated under the cover of the switch compartment. Adjustment on site can also be done by:

- 1) Primary High and Low Adjustments and
- 2) Secondary Bias Adjustment.

Primary adjustments are accomplished with a screwdriver on the outside of the switch compartment. Secondary bias adjustments are done with an Allen wrench on the inside of the switch compartment. **Secondary Bias should not be changed if the desired results can be achieved by Primary Adjustments.**

Primary high and low adjustments compress coil springs. When turned clockwise, restraint is increased on the diaphragm. This requires a higher liquid level head pressure to move the diaphragm inward and trip the switch. Turning the Primary adjustments counterclockwise decrease the required liquid head pressure needed to trip the switch. Approximate adjustments can be made by counting the number of turns on each adjusting screw. One turn will equal a certain number of inches of water. The number will depend on the range of the spring installed. Initial adjustments can be made from the factory settings.

The 2 standard ranges are listed below. Special range springs may be used to fit a particular application. In all cases, "Inches H<sub>2</sub>O per turn" and "range" are indicated under the switch compartment cover.

Standard low range spring - (1 turn ≈ 1.3" H <sub>2</sub> O); (Range: 6" to 42" H <sub>2</sub> O).	Standard high range spring - (1 turn ≈ 4.0" H <sub>2</sub> O); (Range: 12" to 120" H <sub>2</sub> O).
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Note: If the specific gravity of the fluid being measured is not 1, the "inches of H<sub>2</sub>O" must be divided by the fluid's specific gravity to obtain "inches of measured fluid".

There are 28 turns of Proximity adjustments available. The original Primary springs installed are indicated by the 4th character of the model number:

A=2 low range springs, B=1 low and 1 high range,	C=2 high range springs and D=special springs.
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Note: The Primary springs should not be adjusted to perform the reverse of their indicated function (i.e. "high" should not be adjusted to perform the "low" function).

### MOUNTING OTHER THAN VERTICAL

The following changes will have to be made:

- 1) Horizontal with diaphragm facing down: Secondary Bias set screws will have to be turned out (counterclockwise) approximately 1/2 turn.
- 2) Horizontal with diaphragm facing up: Secondary Bias set screws will have to be turned out (clockwise) approximately 1/2 turn.

### SECONDARY BIAS ADJUSTMENTS

Single and two switch controls - Secondary Bias adjustment will be factory set so that the dead band is at the center of the diaphragm travel. The adjusting screws will be covered by red caps.

Three switch control - The intermediate switch adjustment is made by turning the set screw on the Secondary Bias adjustment (marked "INT"). If the switch operating on the same Primary spring is:

- A) the "high" switch, turn the INT Secondary Bias clockwise to approach the "high" set point or
- B) the "low" switch, turn the "INT" Secondary Bias counterclockwise to approach the "low" setpoint.

The range of the intermediate switch is 0 to 20% below high-level operating on Primary high spring and 0 to 20% above low-level if operating on the Primary low spring. One or two turns will normally adjust full range.

### FIELD CHECKING

Field checking can be done by raising and lowering the level of fluid in the tank past the set points.

For exact settings, the control should be put on a test stand and checked with air pressure or vacuum and calibrated gages with the control in the same position in which it will be mounted.