

DISPLACER LEVEL SWITCH [FDI - DLS - 603]



INTRODUCTION

Displacer from a flexible wire rope is connected to a coupler moving within a seal pipe via a compression spring. The rising liquid level exerts a buoyant force on the coupler in proportion to displaced liquid (Archimedes Principle) which releases the spring and moves the actuator within the field of the magnetic system to actuate the switch. During "falling level", the spring assumes its normal position to release the switch. Displacer level switch is used where High temperature and High-Pressure liquid level control is required. It gives potential free contacts for direct interface to Solenoid Valves, Relays Contactors, and Panel Lamps etc.

It consists of a displacer, process flange, spring, enclosure, actuator & microswitch, flexible wire rope. Displacer is designed to suit the specific gravity of liquid. Displacer is connected to a coupler by flexible wire rope through a compression spring. The level of liquid inside the vessel or tank is indicated by the movement of the displacer. It works on the Archimedes principle. Displacer moves up & down with the rising or falling liquid level. As the liquid level rises it applies a buoyant force on the coupler in proportion to displaced liquid. It releases the spring & moves the actuator in the magnetic field to actuate the switch. As the liquid level falls spring gets its normal position & the switch releases.

FIDICON is a pioneer in the field of manufacturing Level Switch in India since 2002 years of designing, manufacturing, installation and service of the same. Displacer Level Switch manufactured by FIDICON are user friendly and easy to install. It comes in many ranges and can be tailor made as per the requirements of customers.

WORKING PRINCIPLE

Working principle of the level switch is based on a buoyancy principle. This level switch is consisting of Switch Assembly, Wire Rope with Spring Assembly and Displacer suspended on spring. Displacer having more density than the process liquid is used. Selection of the Spring is determined by the weight of the displacer.

When level rises it, displacer is submerged and amount of weight equal to the weight of process liquid is displaced. This displacement relieves spring tension causes the actuation of microswitch.

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 switching element.

DIFFERENCE BETWEEN FLOAT & DISPLACER

Following are the major points of distinction between floats and displacers:

- ◆ Float Switches are available with a glandless design and are capable of fail-safe operation in extreme process conditions, unlike displacers, which if the torque tube fails can provide a leak path.
- ◆ A float generally rides above the surface of liquid whereas a displacer remains either partly or totally immersed in process liquid.
- ◆ Displacer switches are considered to be additionally stable and dependable as compared to standard float level switches in case of turbulent, surging, frothy and foamy services. However, in case of refineries, the use of displacers is decreasing owing to their high installation cost and inaccurate performance due to process density changes. In these applications, float level switches have been found to be reliable and useful.
- ◆ Settings of displacers can be changed very easily since they can be shifted at any place along the length of the suspension cable. Moreover, these level devices have the provision of interchangeability between tanks. This is due to the fact that the differences in process density can be endured by varying the tension of the spring attached to the displacers.
- ◆ Testing the appropriate working of a displacer switch is much easier than a customary float level switch since the former requires just lifting of a suspension whereas the latter necessitates filling of liquid in the tank up to the actuation mark.
- ◆ Displacer switches are simpler to test for proper operation than traditional float level switches because they only require the lifting of a suspension, as opposed to the need to fill the tank with liquid all the way to the activation mark with the latter.
- ◆ In the event of turbulent, surging, frothy, and foamy services, displacement switches are thought to be more stable and dependable than normal float level switches. However, because of their high installation costs and imprecise performance as a result of changes in process density, the employment of displacers is declining in refineries. It has been discovered that float level switches are dependable and practical in various applications.
- ◆ Displacer settings may be adjusted extremely easily because they can be moved anywhere along the suspension cable. Additionally, these level indicators allow for tank interchangeability. This is because altering the tension of the spring that is attached to the displacers allows for the tolerance of variations in process density.

OPERATION

This is top Mounted type level switch provided single or multiple set points. It uses Level sensor that do float on the surface of liquids with certain immersed section with respect to design. Working principle of the level switch is based on a buoyancy principle.

This level switch is consisting of switch assembly, wire rope with spring Assembly & level sensor suspended on spring. Level sensor having more density than the process liquid is used. Spring selection is determined by the weight of the level sensor. When level rises it the level sensor is submerged as per the design consideration and amount of weight equal to the weight of process liquid is displaced. This displacement relieves the spring tension which is related to tension constant R , causes the actuation of microswitch.

APPLICATIONS

- ◆ Scientific laboratory
- ◆ Research Centres
- ◆ Chemical industries
- ◆ Nuclear Power
- ◆ Generator Sealing Liquid
- ◆ Large Sumps & Fuel Tanks
- ◆ Petrochemical
- ◆ Interface Liquids
- ◆ Waste Water & Sewage
- ◆ Boiler Feed Water
- ◆ Used when conventional float-operated devices are inoperative
- ◆ Large fuel tanks and sumps, sewage and waste water, interface liquids, petrochemicals, and nuclear power

For wide switching differentials & higher-pressure ratings. Used where traditional float operated units cannot work.



FEATURES

- ◆ Heavy walled level sensor for critical application
- ◆ Durability defined on sealing and pressure and temperature application
- ◆ Improved reliability with dual opposed magnet design which provides snap action
- ◆ Versions with flanges, screwed, welded available
- ◆ Switch is CODE approved and certified for IP67, IP65
- ◆ Switch certified for group IIA/IIB, IIC
- ◆ Switch enclosure at die cast aluminum and SS available
- ◆ Versions with ATEX and FM certified available
- ◆ Tight sealing versions for sensors with switch to enable correct application solution, with sealing internals
- ◆ Applicable with various versions of MOC's depending on pressure and temperature, versions with Stainless and steel, Hastelloy, Monel, PTFE, PP, Titanium available

ADVANTAGES

- ◆ Displacement devices can be used over a wide range of temperatures and pressures.
- ◆ These instruments can be calibrated quickly and accurately. Some can be calibrated without removal from the vessel.
- ◆ Does not require electrical power – or calibration.
- ◆ Provides a proven, highly reliable solution.
- ◆ Enables easy setup without level change.
- ◆ Delivers multiple stage level control.
- ◆ Offers narrow and wide switch options – as well as transmitters for continuous output.

DISADVANTAGES

- ◆ Displacement devices should not be used where accumulation of solids can build up on the displacer surface. This would have the effect of increasing the volume of the displacer and changing the calibration.
- ◆ Changes in the specific gravity of the liquid can cause errors in the level measurement
- ◆ A substantial amount of additional cost may be required to eliminate turbulent liquid effects.

RECOMMENDED DISPOSAL

- ◆ Give it back to us & we will take care of recycling & possible disposal.
- ◆ User can dis-assemble the product in multiple stage
- ◆ The above may be handed over (state pollution board), authorized re-cycler item-wise.



ENQUIRY SPECIFICATIONS:

- [1] Service Media Details.
- [2] Size/Connection
- [3] System Operating and Design Pressure.
- [4] System Operating and Design Temperature.
- [5] Material Specifications (Body, Internal)

RECOMMENDED SPARES

- [1] Wire/Guide Rope
- [2] Displacer

OTHER RANGE OF PRODUCTS

- [1] Flame Arrester
- [2] Breather Valve
- [3] Level Indicators
- [4] Rotameters
- [5] Emergency Relief Valve
- [6] Gauge Hatch
- [7] Strainers
- [8] Pressure Reducing Valve
- [9] Safety Relief Valve
- [10] Flowmeters
- [11] Level Switches
- [12] Pressure Reducing Station
- [13] Level Gauge, etc.



Any Query?

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