

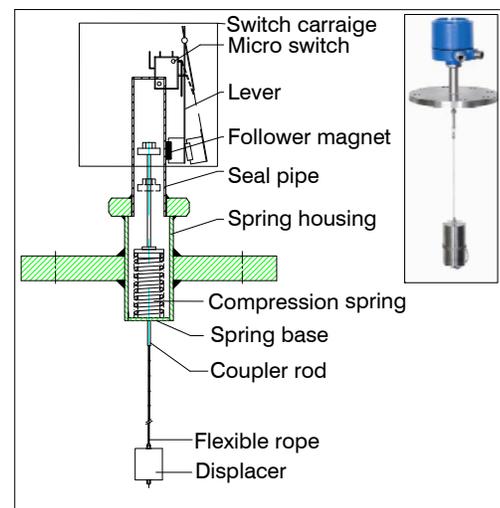
Instruction and Maintenance Manual For Displacer Switch -DS

To get best intrinsic value of every Techtrol product it should be installed, maintained properly and used within its specified limits. It will help to extend the working life of your instrument.

Construction and operations :

fig 1

Displacer is connected to coupler moving within a seal pipe by a flexible wire rope via a compression spring. The coupler is magnetically linked to a follower magnet, which operates a micro switch. The extent of immersion of displacer in Liquid " during " Rising & Falling Level " exerts a buoyant force on it equivalent to liquid displaced. (Archimedes Principle). This force effects a vertical displacement of displacer, which changes the spring tension and causes the coupler resting on it, to move " In & Out " of the field of follower magnets. This attracts & releases the follower magnet resulting in " Changeover " of micro switch contacts as shown in fig.1



Unpacking :

1. Examine the switch and ensure that it is in accordance with required specification.
2. Visually examine the instrument for any damages or breakages.
3. Check and record the model number and serial number for future reference.

Pre - Installation procedure :

1. Ensure that, Spring base as shown in (fig 1) is not loosened in transit. Screwed it properly if found loosened.

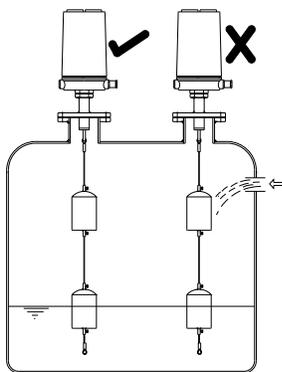
2. Remove the cover and connect continuity tester to `P' and `NO' contact of micro switch
3. Hold displacer switch in **upright position** and move coupler rod up and down. Ensure **change over** of microswitch contacts (**NO to NC**) with free movement of follower magnet lever.
4. In the same manner, check remaining switch contacts as per ordered model.
5. If the functioning of micro switch is all right, proceed for installation.

Installation :

Location :

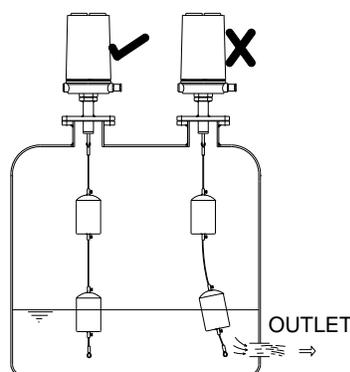
a) Ensure that any system generating vibrations is away from installation site.

b)



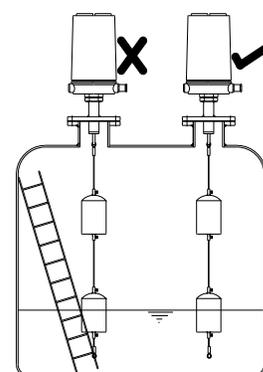
Ensure mounting location is away from inline of flow

c)



Switch mounting should be away from out flow/suction

d)



Ensure that the tank internals does not restrict the displacer movement.

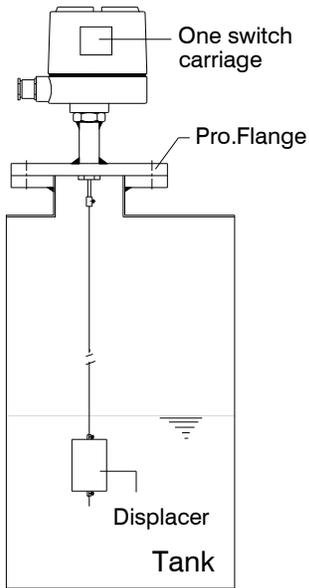
Mounting :

Switch is mounted internally from top or externally from side to suit the application as shown below. Perforated still well is recommended for tanks with excessive turbulent liquids. External mounting is resorted to, where space is a limiting factor or mechanical devices like stirrers operate within. Besides, in applications like boilers, reaction kettles etc. with external mounting, isolation valves should be provided for regular servicing.

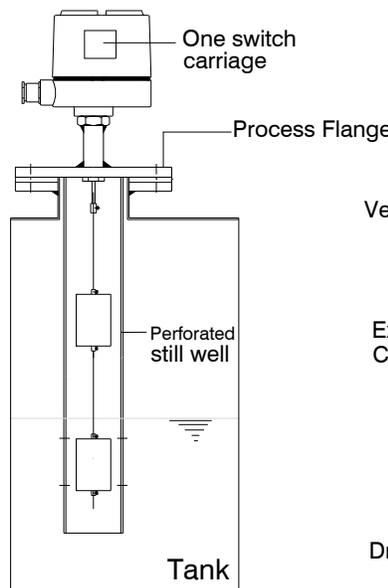
Styles of Installation:

fig 3

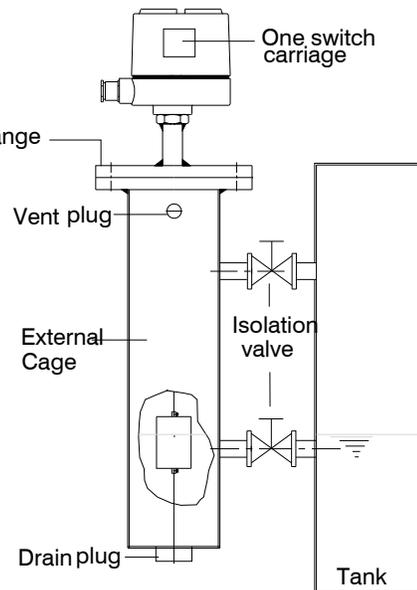
Internal Direct Mounting



Internal Mounting with Stillwell



External Mounting with Cage



Follow the guidelines and precautions below to ensure proper installation.

1. Before mounting the switch, ensure that the nozzle is vertical and flange is horizontal on the tank & in plumb fig 4.

2. Switch flange and nozzle flange should be matching.

3. No extra weight should be attached to the displacer.

4. In case of external mounting of switch, ensure its CC distance match with CC dist. of tank nozzles.

5. External cage should be provided with separate isolation

valve on tank for safety & removal of level switch during repairs / maintenance.

6. Provide suitable gasket between the flanges and appropriate thread sealant between threads before bolting/tightening, to ensure zero leakage through joints.

Note - Lowest level of switch must be at 100mm from tank bottom.

fig 4

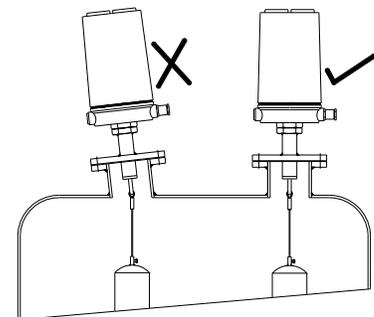
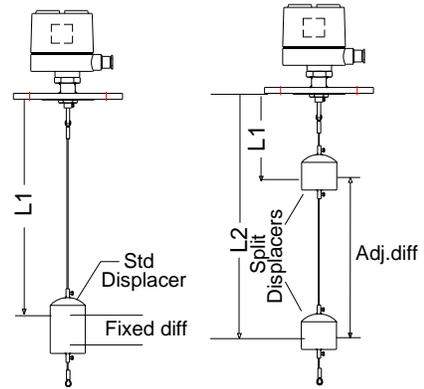


fig 5

Adjustment of set points and differential.

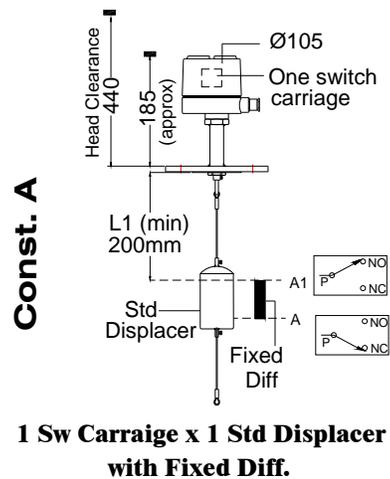
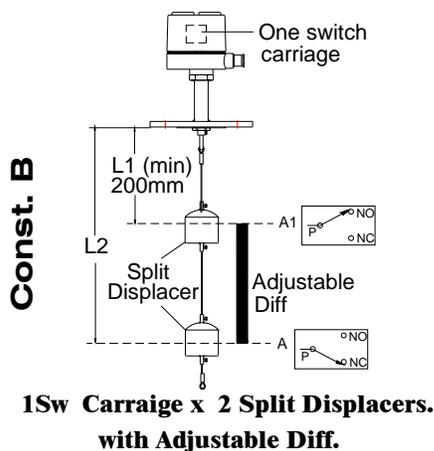
1. Each displacer is marked with actuation point according to specific gravity of liquid specified in your purchase order.
 2. 'Set point' of displacer switch can be set by simply relocating the displacer with reference to its actuation marking at required distance from flange bottom.
 3. Loosen the screws at the top & bottom of displacer and move displacer at required level on the rope and retighten the screw.
 4. In same manner differential can be changed by relocating the displacers over the rope length as per requirement. (Const B,D & F).
- Differential is distance between two split displacers

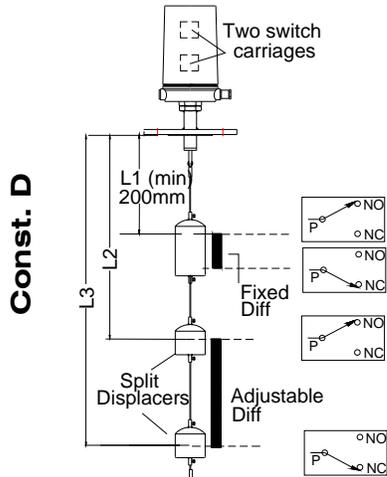


Note : Switches with fixed differential are factory set

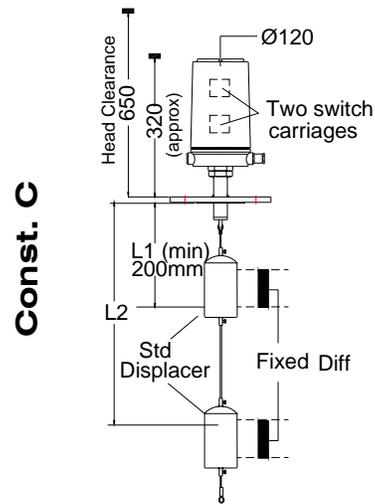
Switch Configurations and Terminations :

Displacer switch is designed to be used in 6 different constructions with combination of switch carriage and displacers (standard or split) to achieve fixed or adjustable differential as well as combination of both for various pump control/alarm applications. Refer figures of various styles of construction A to F below to get clear idea of their functioning.

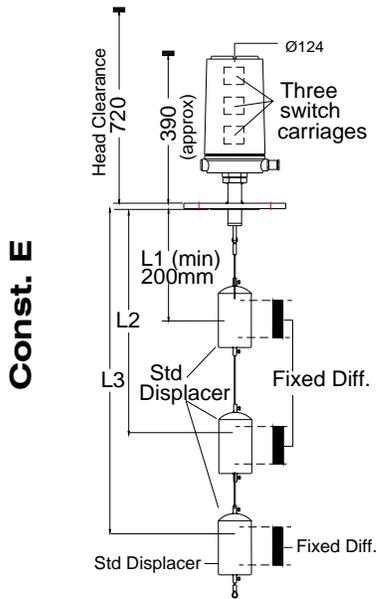




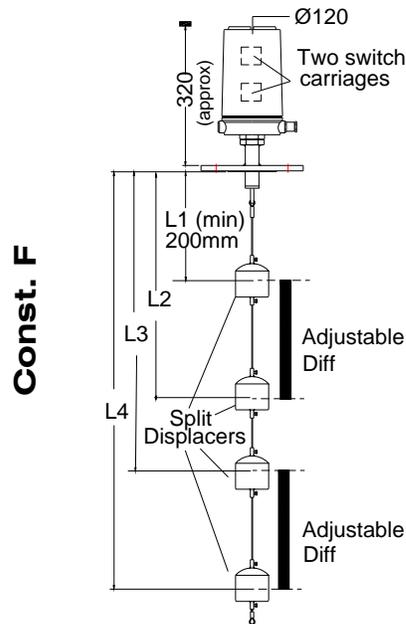
2 Sw carriage x 1 Std & 2 Split Displacers, one with Fixed diff. and second with Adjustable diff.



2 Sw Carriage x 2 Std Displacers with Fixed Differential

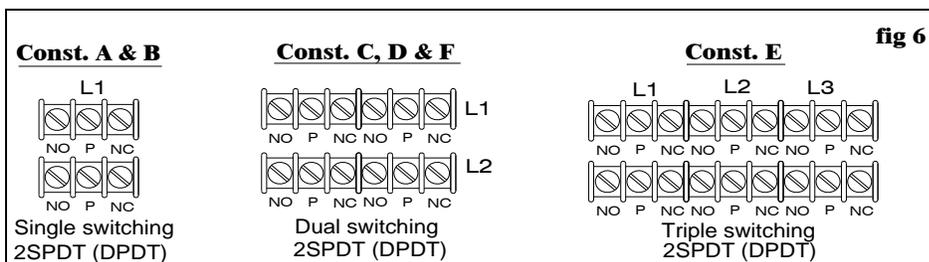


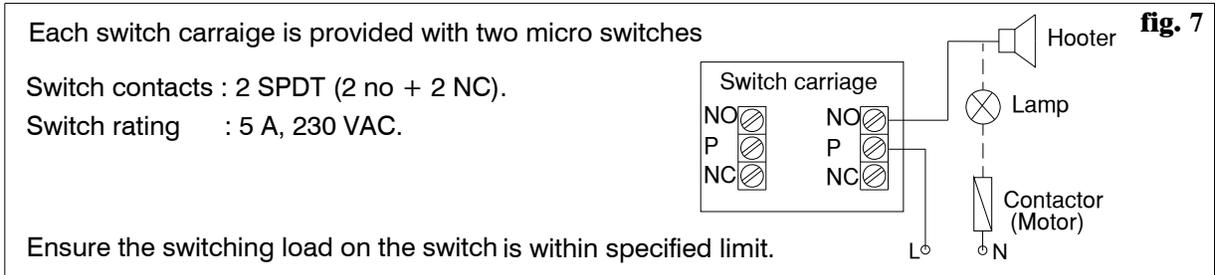
3 Sw Carriage x 3 Std. Displacers with Fixed Diff.



2 Sw Carriages x 4 Split Displacers with Adjustable Diff.

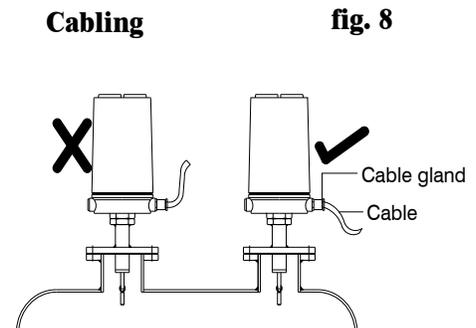
Terminations and Wiring :





Precautions :

1. Ensure that the switch is duly earthed.
2. Use proper cable (1.5mm²) for wiring, which should match the current rating of connected load, also ensure there should be no gap between Cable & Inner diameter of cable gland . Provide sealant in between, if gap is observed.
3. Ensure that terminal contacts are properly tightened.
4. For outdoor mounting, cable termination is routed downwards before cable gland to prevent water seepage in the enclosure (fig 8).
5. After completion of wiring, ensure the enclosure is with its protective cover along with gasket provided for it to protect from dust & weather



Operation :

1. After successful installation of switch, check operation of switch by varying liquid level in the tank.
2. Ensure that operating temperature and pressure do not exceed the specified limit.

Maintenance :

1. Before starting maintenance, **switch off** the power supply.
2. During shut down, remove the switch & wipe the displacer to remove deposits of scaling formed on it. Displacers must be cleaned frequently, if the liquid has high viscosity or contain floating material
4. Vibration may sometimes cause terminal screws to loosen. Check all terminal connections are tightened.
5. Ensure that contacts of switching mechanism are not pitted / oxidized due to sparking.
7. Check wiring carefully and replace at the first sign of brittle insulation

8. In hazardous locations, open enclosure only after disconnecting switch from supply to prevent explosion.

Troubleshooting :

SL	Problem	Cause	Solution
1.	Switch does not operate	<p>a. Wrong mounting location near inlet or outlet of tank</p> <p>b. Switch mounting is not vertically in plumb</p> <p>c. Switching point disturbed due to excessive deposition of dirt on displacer.</p> <p>d. Displacer movement stuck due to tank internals</p> <p>e. Improper or loose wiring connection.</p> <p>f. Switch faulty</p> <p>g. Specific gravity of liquid has changed.</p>	<p>a. Mount switch on proper location</p> <p>b. Mount switch vertically in plumb.</p> <p>c. Remove dirt deposited on displacer</p> <p>d. Check and remove tank internal or change mounting location of switch.</p> <p>e. Refer fig 7 for wiring and tighten</p> <p>f. Replace switch carriage</p> <p>g. Consult Pune Techtrol loose terminals</p>
2.	Switch does not operate at particular level	<p>a. Pt 1 - a,b,c,d</p> <p>b. Displacer position on rope is wrong</p>	<p>a. Pt.1- a,b,c,d</p> <p>b. Relocate and tighten displacer at correct position</p>
3.	Switch chattering	<p>a. Loose wiring</p> <p>b. Turbulence in liquid</p>	<p>a. Tighten loose connections</p> <p>b. Use Stillwell or external cage to isolate turbulence.</p>

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