

# INSTRUCTION & MAINTENANCE MANUAL

## Air Operated Diaphragm Switch - "ADS"



Innovating Level Controls since 1984

It is suitable for liquids, especially high viscosity liquids, sewage, dirty oil etc. in vessels under atmospheric conditions. The switch gives trouble free operation with minimum maintenance when installed properly ( air tight ).

### Construction and Operation ( Fig. 1 ) :

It consists of an air pipe of PVC or SS316 connected to diaphragm retainer. The neoprene diaphragm is sandwiched between retainer and enclosure held together through a set of screws. The enclosure contains a microswitch, which can be actuated through 1 to 2 mm of vertical motion of the diaphragm. The rising liquid level submerges the air pipe and enters through its lower open end and in the process compresses the captive air column sufficiently to initiate diaphragm motion to operate micro switch. Conversely during falling liquid level, the micro switch is set OFF. The length of liquid head (mm) above the air pipe open end at which the switch operates is defined as " Actuation Point " and liquid level (mm) at which the switch is set OFF is defined as " Release Point " and difference between the two gives us the " Switch Differential ".

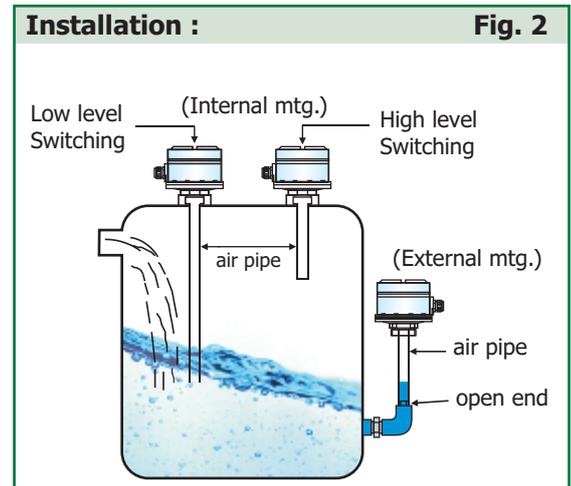
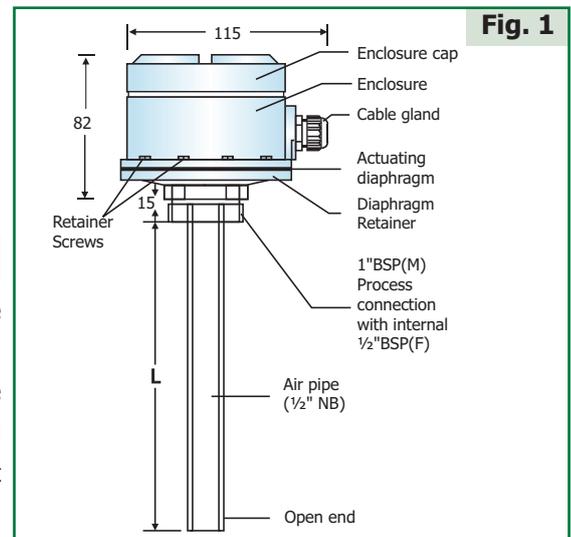
### Pre - Installation Procedure :

- 1. Ensure that all nuts, screws of the switch assembly are in place and not loose.
- 2. Ensure proper functioning of the micro switch with continuity tester / multimeter, blowing air by mouth through process connection.
- 3. If micro switch does not operate, reset the position of the switch by moving it slightly up or down.
- 4. Ensure free movement of diaphragm and plunger.

### Installation ( Fig. 2 ) :

Switch can be directly installed vertically or through an elbow, when side installation is desired. Standard pipe bore is suitable for regular liquids, however for highly viscous liquids the air pipe should be enlarged at the lower end. During switch installation, ensure that the diaphragm is horizontal and the connection between the air pipe and switch is completely airtight with zero leakage failing which the switch will not operate.

1. Select suitable location on the tank where vibrations if any are minimum.
2. Ensure that the process connection of the switch matches with that on the tank.
3. The length of the air pipe should be 50mm more than the operating point. ( Level required ).
4. Ensure that connection between air pipe and the switch is completely airtight to avoid malfunctioning of the switch ( Use sealing paste instead of Tape to ensure firm sealed joint).
5. Enlarge the lower end of the switch pipe, if being used for Highly viscous liquid
6. Ensure That air pipe used for ADS should be without Blow holes / Leakages.



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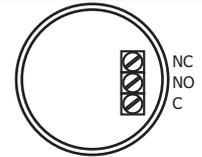
## Termination :

Before actually turning ON the power supply Make sure that all the wiring is done correctly.

### Precautions :

- Ensure that supply voltage and current rating is as per its rated capacity. Excessive voltage / current will permanently damage the switch contacts.
- Ensure that the switch is duly earthed.
- Ensure use of proper cable for wiring, which should match the current rating of connected load.
- Ensure terminal contacts are not loose.
- Ensure that enclosure is always covered with its terminals along with gasket provided for it, to protect it from dust and weather.

### Termination



1 C/O OUTPUT  
Potential free Micro switch contacts  
Contact rating 5A @ 230VAC

## Maintenance :

1. Switches must be cleaned frequently if the liquid has high viscosity or contains floating material.
2. Ensure that Terminal connections are not loose.
3. Ensure that contacts of switch mechanism are not pitted / oxidised due to sparking.
4. Be sure that switch enclosure cover is always in place on the enclosure.
5. Disconnect device from the supply socket before opening to prevent ignition of hazardous atmosphere.

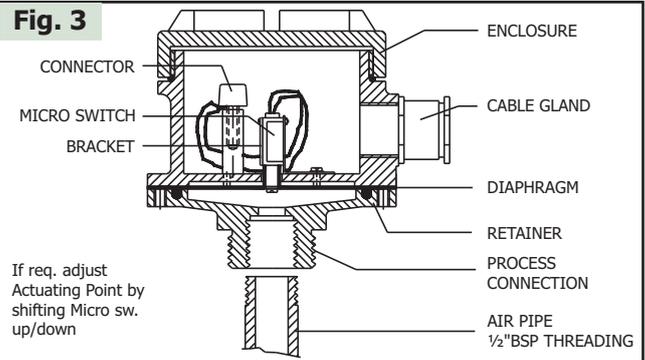
## Operating Differential :

Switch Differential is the actual distance between Actuation point and Release point. For Sp. Gr. 1.00 the differential is  $25 \pm 5$ mm. In case of Sp. GR. being other than 1.00 the actual differential is found out by dividing the differential for Sp. Gr. 1.00 by the Sp. Gr. of the liquid being handled.

## Adjusting the differential :

- To adjust the differential (Actuating point) move the micro switch fixed on the 'L' bracket up or down as desired.
- Where the actuating point is higher than the prescribed value, lower the micro switch and vice versa.
- Release point and response differential cannot be adjusted.

Fig. 3



## Precautions :

1. Sealing between the air pipe and switch process connection must be perfectly air tight. It is recommended that Sealing paste or Sealant be used to ensure perfect air tight sealing.
2. Mount the switch so that the diaphragm rests horizontally.
3. In case the switch is used for measuring lower liquid level, air and gases get trapped inside the pipe. It is advised to ventilate the sensor pipe from time to time.
4. Since the switch is of pressure type working on Pascal's law, change in cross sectional area of the air pipe will cause change of level detection position.
5. Switch works on micro pressure. It cannot be used on pressurized tanks.

## Trouble Shooting :

Fault / Defect	Cause	Solution
Switch does not operate.	a) Travel of the plunger not sufficient to operate the switch. b) Air pipe leaks. c) Vent / Air blockage, Hole blocked.	a) Adjust the position of the switch so that plunger operates it properly. b) Remove leakage in the joint or replace the pipe. c) Remove the blockage.
Switch operates before desired set point.	a) Switch position disturbed. b) Cross section area of air pipe is small. (In case of highly viscous liquids ).	a) Reset the switch position. b) Enlarge the air pipe.

All dimensions in mm, except specified.

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