

TECHTROL DISPLACER TYPE MAGNETIC LEVEL SWITCH - DS

Available in six configurations to provide upto triple switching for various industrial applications to operate pumps & auxiliary devices. Each configuration consists of displacers and switch carriages in various combinations.

Config A: 1 x 1



Config B: 1 x 2



Config C: 2 x 2



Config E: 3 x 3



CE IBR Ex

SALIENT FEATURES

- Ease of handling & installation of large range switches
- Single, double or triple switching, easily adjustable at site
- Wide choice of material in SS304/316/316L, PP or PVDF
- Safe, reliable glandless switching through magnetic coupling
- Robust, shockproof design ensures stable performance
- Wide differential switch design for pump control application.
- Hermetically sealed switch casing for corrosive applications
- Ex-proof IIC (CCOE, ATEX) enclosures for hazardous area
- Available for min. liquid Sp. Gr of 0.5

OPTIONS

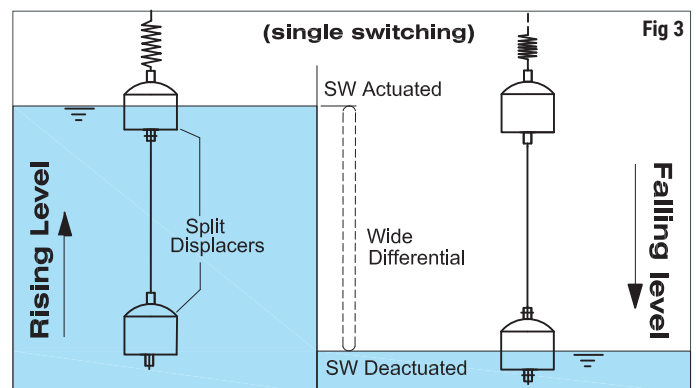
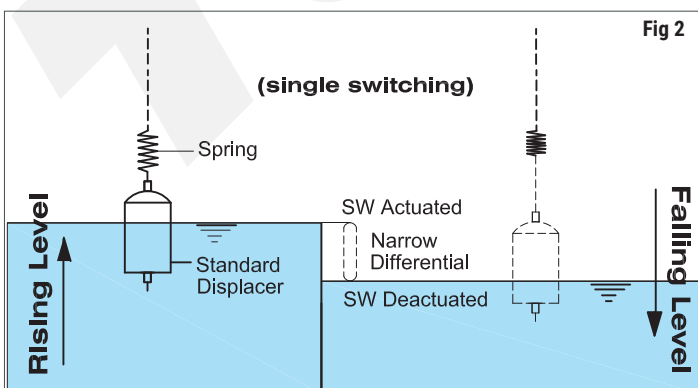
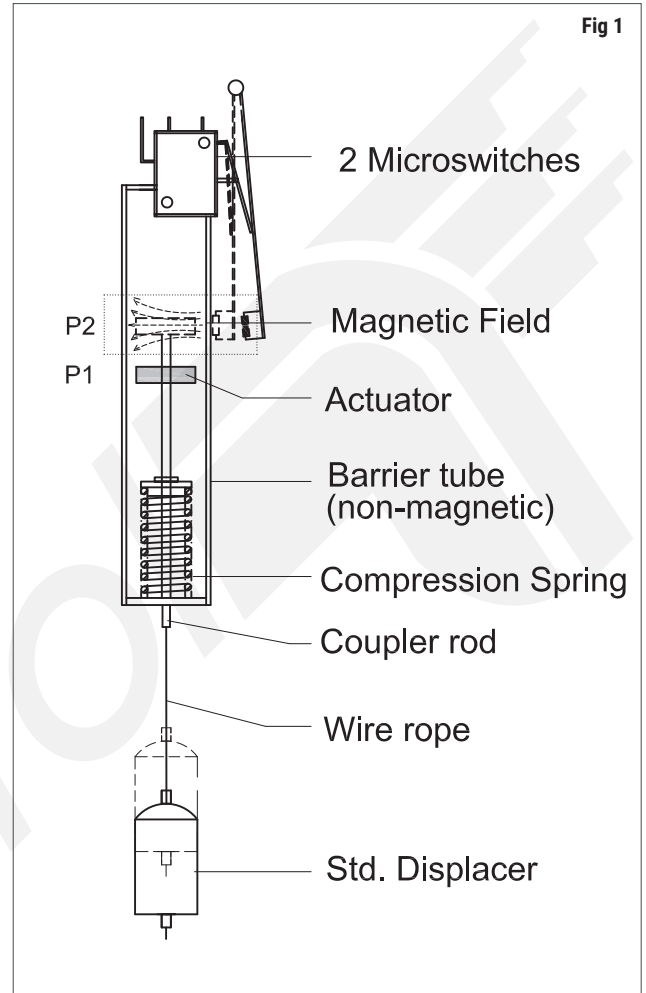
- High temperature (300 °C) & high pressure design (100kg/cm²)
- NACE compliance
- IBR Approval

CONSTRUCTION AND OPERATION

A single standard or two split displacers are suspended from a wire rope and connected to a coupler rod, carrying an actuator moving within a non-magnetic barrier tube via a compression spring (fig1). Initially when the displacer is not immersed in liquid, the spring is in compressed condition due to weight of the displacer so that the actuator is outside the magnetic field at position P1.

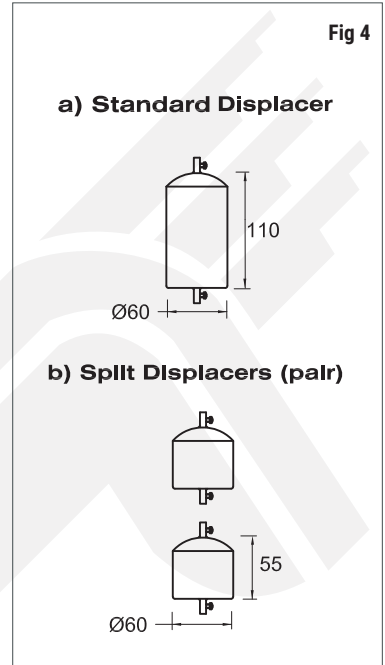
During rising level, the displacer gets immersed in liquid, undergoes weight loss (Archimedes Principle) causing an upward motion of the coupler rod, which makes the spring assume its original status and move the actuator to position P2 within the magnetic field, resulting in actuation of micro switches to provide change over contacts.

Narrow differential (nd) is achieved by using one standard displacer along with one switch carriage (fig 2) and wide differential (wd) is achieved by using two split displacers along with one switch carriage (fig 3). Narrow differential is fixed, however wide differential can be modified by varying the distance between split displacers.



SPECIFICATIONS

Range	: 500 to 15000 mm
Enclosure	: Cast Al, WP IP66 or Cast Al, Ex d Gr IIC T6, IP66 or Cast Al, ATEX Exd Gr IIC T6, IP66
Conduit Connection	: 1 no. x 3/4" ET Cable Gland (WP) Nylon or 1/2" NPT DC Cable Gland (Exd), Brass
Switch Carriage	: Microswitch (2 nos) or Microswitch (2 nos) in hermetically sealed casing (config. A, B, C, D & F)
Switch Contacts	: 2 x SPDT (DPDT) rated for 5A, 250VAC
Optg. Differential	: Refer Table-1 on page 5
Terminals	: Suitable for 1.5 mm ² cable conductor
Wire Rope	: SS304, SS316, SS316L, PP or PTFE
Displacer	: Ø 60 x SS304, SS316, SS316L, PP PVDF (config. E) or PTFE (config. A, B, C, D & F)
Displacer Type	: Standard or Split (fig 4a & b)
Spring MOC	: SS316, SS316L or PTFE/ ECTFE ctd SS316
Process Flange	: CS, CS ASTM A105, SS304, SS316, SS316L, PP or PTFE with steel cladding
Temperature	: - 20 to 70°C (PP), 100°C (PVDF), 200°C (metallic) - Standard 300°C with radiating fins - High temp
Max. Test Pressure	: Vacuum to 10 kg/cm ² (metallic), 2 kg/cm ² (PP/ PTFE/ PVDF) or High Pressure upto 100 kg/cm ² for metallic (optional)
Min. t SG	: 0.8 or Low SG upto 0.5 is available on demand



Accessories

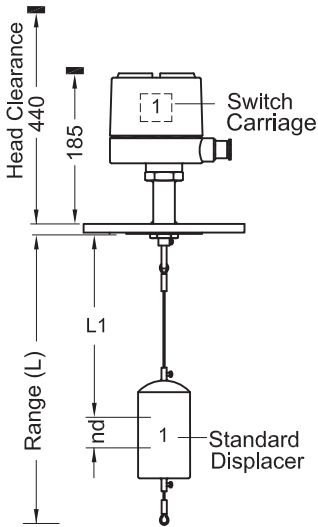
Perforated Stillwell	: 65 NB x CS, SS304, SS316, SS316L or PP
External Chamber	: 80 NB x CS, SS304, SS316, CS ASTM A106

SWITCH CONFIGURATIONS

The working of six configurations are shown here under. The switching points L1, L2, L3 & L4 can be adjusted by relocating the displacers along the wire rope (range). Wide differential (wd) can be achieved and modified by varying the distance between the split displacers.

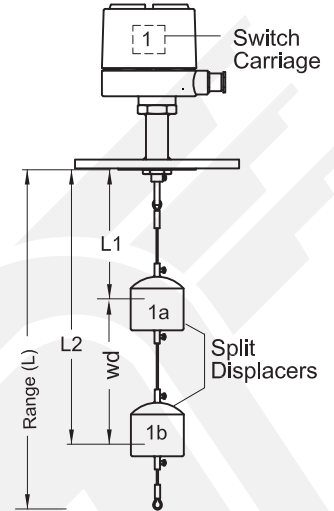
Switch with Narrow Differential (nd) - are used for actuation of an alarm; either ON or OFF of system / auxiliary device
Switch with Wide Differential (wd) - latched contacts between two set points are used for pump / valve control.

A) Single switching x one standard displacer with narrow differential (nd)



- L1 is adjustable
- Rising Level: Switch actuates at L1 & remains actuated during further level rise
- Falling Level: Switch de-actuates at (L1+nd) & remains de-actuated during further level fall
- Application: Point switching of one device i.e. Alarm or pump 'on or off' at L1 (SW1)

B) Single switching x two split displacers with wide deferential (nd)

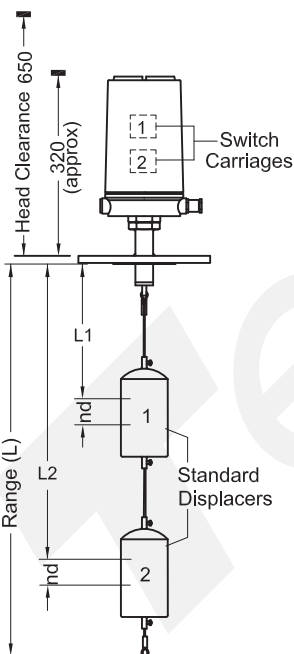


- L1 & L2 are adjustable
- Wide diff. can be modified
- Rising Level : Switch actuates at L1 & remains actuated during further level rise.
- Falling Level : Switch de-actuates at L2 & remains de-actuated during further level fall.
- Application : Control action of one device i.e. pump 'on-off' between L1 & L2 (SW1)

Terminations : Sw. Carriage 1

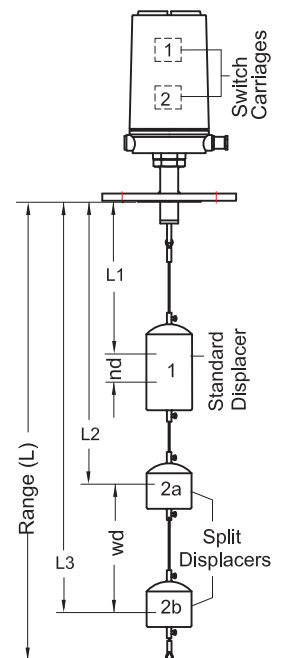
NO P NC NO P NC
1 DPDT potential free contacts

C) Dual switching x two standard displacers with narrow differential (nd)



- L1 & L2 are adjustable
- Rising Level: Switch 2 actuates at L2 & switch 1 at L1 and both remain actuated during further level rise
- Falling Level: Switch 1 de-actuates at (L1+nd) & switch 2 at (L2+nd) and both remain de-actuated during further level fall
- Application : Point switching of two devices i.e. Alarm or Pump-1 'on or off' at L1 (SW1) & Alarm or Pump-2 'on or off' at L2 (SW2)

D) Dual switching x one standard displacer with narrow deferential & two split displacers with wide deferential

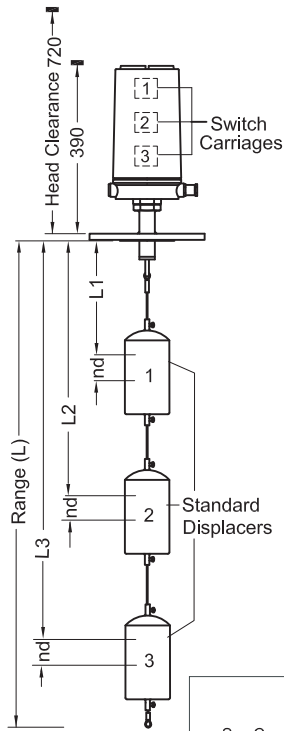


- L1, L2 & L3 are adjustable
- Wide diff. can be modified
- Rising Level: Switch 2 actuates at L2 & switch 1 at L1 and both remains actuated during further level rise
- Falling Level: Switch 1 de-actuates at (L1+nd) & switch 2 at L3 and both remain de-actuated during further level fall
- Application: Point switching & control action i.e. Alarm at L1 (SW1) and pump 'on-off' between L2 & L3 (SW2) or vice versa, by interchanging the position of standard & split displacers.

Terminations : Sw. Carriage 1 Sw. Carriage 2

NO P NC NO P NC NO P NC NO P NC
2 x DPDT potential free contacts

E) Triple switching x three standard displacers with narrow differential (nd)



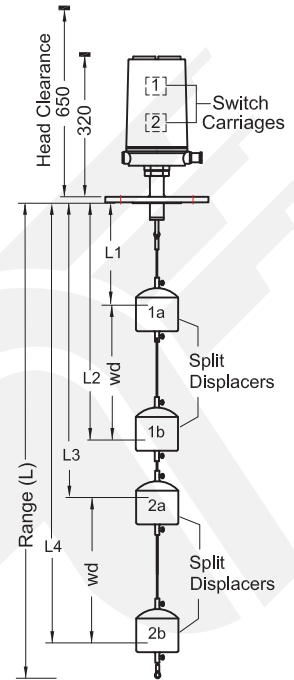
- L1, L2 & L3 are adjustable
- Rising Level : Switch 3 actuates L3, switch 2 at L2 & switch 1 at L1 and all remain actuated during further level rise
- Falling Level : Switch 1 actuates at (L1+nd), switch 2 at (L2+nd) & switch 3 at (L3+nd) and all remain de-actuated during further level fall
- Application: Point switching of three devices

Terminations :



F) Dual switching x four split displacers with wide differential (nd)

- L1, L2, L3 & L4 are adjustable
- Wide diff. can be modified
- Rising Level : Switch 2 actuates at L3 & switch 1 at L1 & both remain actuated during further level rise
- Falling Level : Switch 1 de-actuates at L2 & switch 2 at L4 and both remain de-actuated during further level fall
- Application: Control action of two devices i.e. Pump 1 'on-off' between L1 & L2 (SW1) & pump 2 'on-off' between L3 & L4 (SW2)



Terminations :

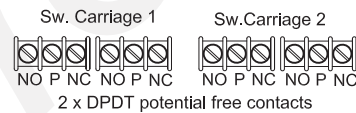


TABLE 1 - OPERATING DIFFERENTIALS FOR SIX CONFIGURATIONS

Configuration	No. of Switch Carriage	No. of Displacers	Displacer Type	Differential for SG 1
A	1	1	Standard	Narrow (40 ± 5 mm)
B	1	2	Split	Wide
C	2	2	Standard	Narrow (40 ± 5 mm)
D	2	3	1 Std + 2 Split	Narrow (40 ± 5mm) Wide
E	3	3	Standard	Narrow (60 ± 5 mm)
F	2	4	Split	Wide

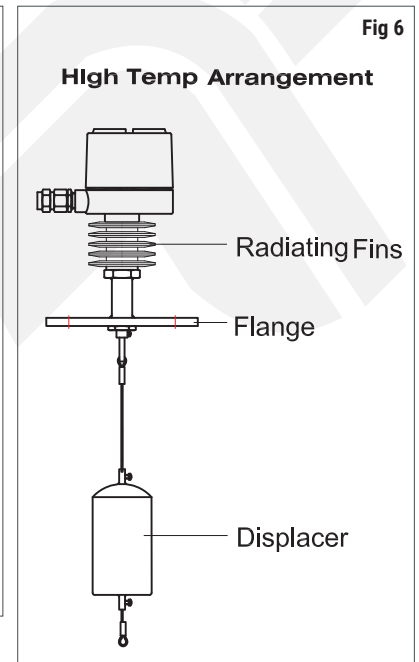
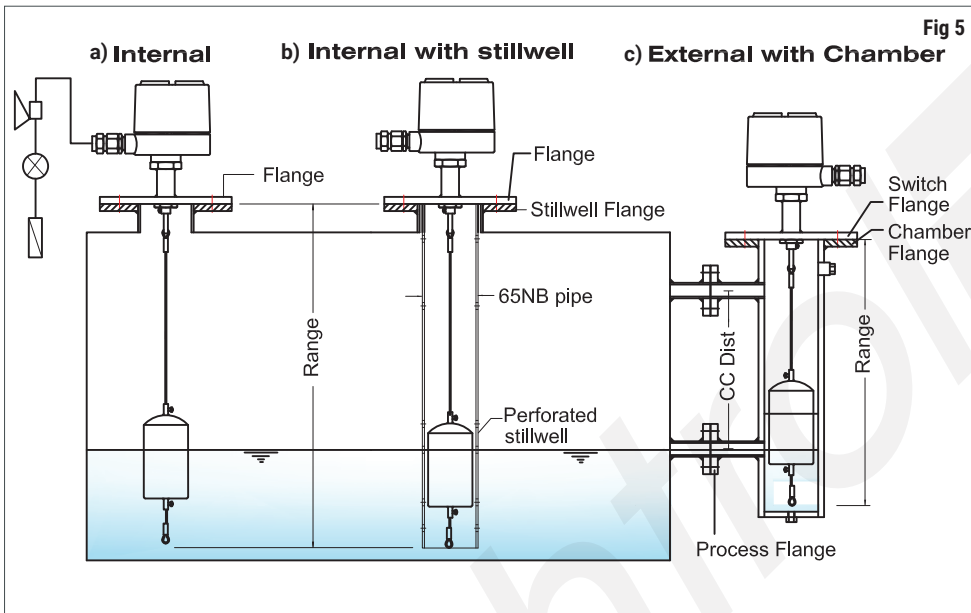
* Differential is inversely proportional to SG of liquid

APPLICATIONS / SERVICES

Large Sumps & Fuel Tanks, Oil Sumps, Boiler Feed Water, Acid / Alkali Dosing Tanks in Waste Water / Sewage / Effluent Treatment.

INSTALLATION

The switch can be installed internally on tank (fig 5a) or internally with stillwell for tanks having turbulence (fig 5b), It is mounted externally in a chamber to overcome limited space within the tank or where mechanical devices like stirrers operate (fig 5c)



MODEL IDENTIFICATION

	DS -								
1. Configuration (Switch Carriage x Displacer)									
One x One (Standard)	A								
One x Two (Split)	B								
Two x Two (Standard)	C								
Two x Three (Standard + Split)	D								
Three x Three (Standard)	E								
Two x Four (Split)	F								
2. Enclosure x Conduit Connection									
Cast Al. IP66 x ¾" ET Cable Gland	J								
Cast Al. IP66 x ½" NPT DC Cable Gland	K								

Cast Al. Ex d Gr IIC x ½" NPT DC Cable Gland	F							
Cast Al. ATEX Ex d Gr IIC x ½" NPT DC Cable Gland	H							
Cast Al. IP66 x Plug & Socket	T							
Others	O							
3. Displacer MOC								
SS304	N							
SS316	S							
SS316L	L							
PP	P							
PVDF (Config. E)	F							
PTFE (Config. A, B, C, D & F)	T							
Others	O							
4. Process Connection MOC								
CS	M							
SS304	N							
SS316	S							
SS316L	L							
PP with steel cladding	P							
PTFE with steel cladding	T							
CS ASTM A105	A							
Others	O							
5. Process Connection Size & Type								
80 NB ASME 150 # Flange							1	
80 NB ASME 300 # Flange							2	
80 NB ASME 600 # Flange							3	
Others							0	
6. Magnetic Switch Carriage								
Micro Switch (2 x SPDT)							M	
Micro Switch in Hermetically Sealed Casing (2 x SPDT), (A,B,C,D & F config. only)							H	
Others							O	
7. Max. Temperature								
Standard - 70 °C (PP), 100 °C (PVDF/PTFE), 200 °C (Metallic)							S	
High Temp - 300 °C with Radiating Fins							H	
8. Special Features								
Without								W
Low SG Displacer (<0.8)								L
Others								O

9. Accessories	
Without	W
Perforated Stillwell	S
External Chamber	C
Others	O

ORDERING INFORMATION

Model Number x Range x Liquid & its SG x Operating Temperature & Pressure



PTFE (Config c: 2 x 2)



PP (Config c: 2 x 2)



DS on Ex. Chamber

*All dimensions in mm except specified

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