



## Level Measurement & Control Solutions

### Paddle Type Level Switch, Series LC-135, For Free Flowing Solids, Powders, Granules & Food Grains

Paddle type level switch, Series LC-135 is a simple, modularly built reliable switch for level control of a wide variety of free flowing solids. These ruggedly built switches in weatherproof enclosure offer a lifetime of trouble free service.

#### PRINCIPLE OF OPERATION

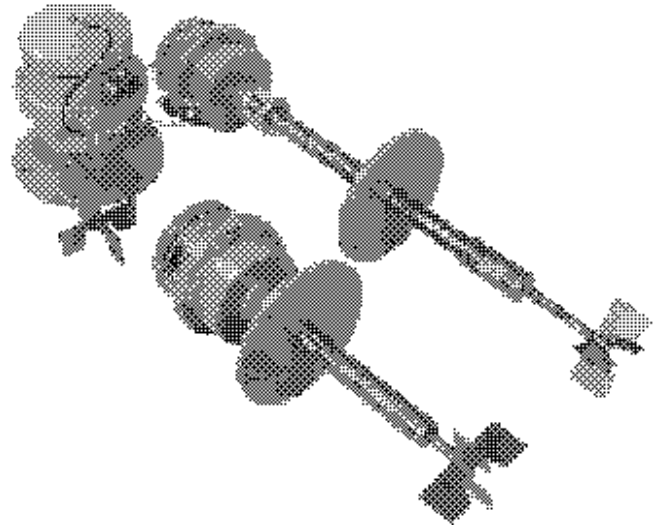
Paddle type switch consists of a motor, which drives a paddle through a planetary gearbox arrangement. When level of solid reaches the rotating paddle, it tends to stall the latter. The resultant rise in torque is sensed and used to actuate microswitches. One of these provide contacts for alarm actuation / process control and the other cuts off the supply to the motor. Disconnection of supply to the motor prevents overloading of the motor as well as formation of cavity in the material, which may cause false alarms. When the process material level falls below the paddle, the torque controlling spring pulls back the actuator, releasing the microswitches and resuming supply to the motor.

Paddle switch consists of four modules...

- Weatherproof enclosure housing motor & gearbox.
- Process connection - Flanged or Threaded.
- Shaft extension.
- Paddle to suit process requirement.

#### SALIENT FEATURES

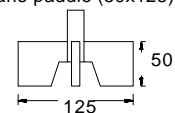
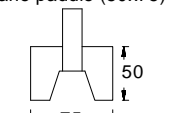
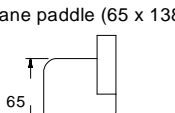
- | Cast Aluminium polyurethane painted weather proof enclosure conforming to IP-65 as per the IS 2147-1962.
- | Separate cable entries for supply and control.
- | Specially designed motor which does not burn under locked rotor condition.
- | Specially designed PTFE lip seal to prevent ingress of dust particles into main enclosure.
- | SS flexible coupling to prevent mechanical shocks to the gear box.
- | Fixed / adjustable shaft extensions to suit the functional requirement.
- | Field replaceable paddle assembly, to suit various applications.
- | Optional air purging facility ( Inbuilt for collet extension & high temperature stand off versions and optional for other versions. )
- | Optional dust seal assembly for fine particles less than 100 microns.



#### SPECIFICATIONS

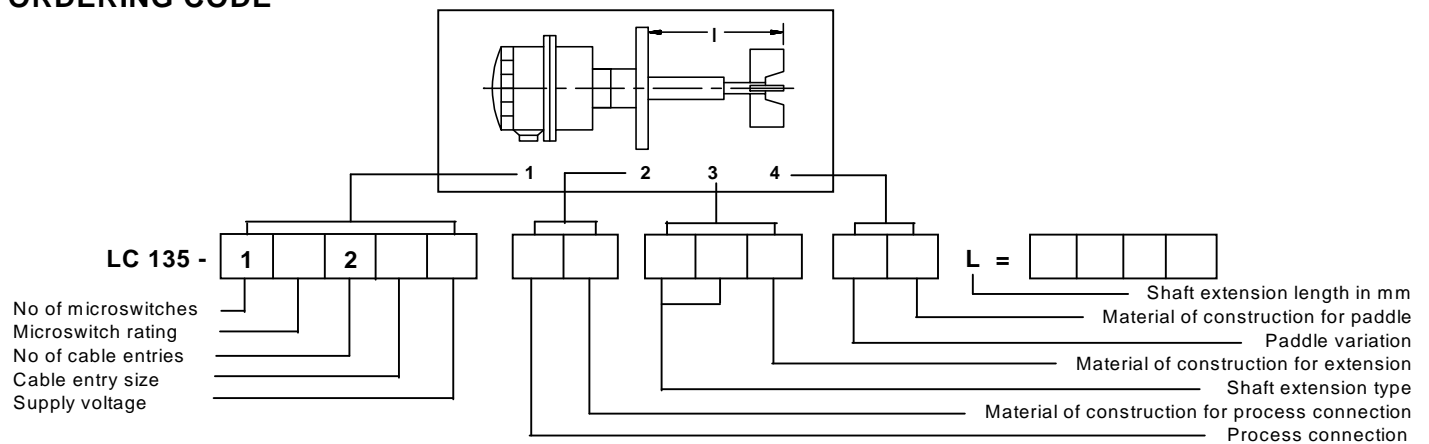
- | Mounting flange  
Standard - 204 mm  $\phi$ , 10 mm thick with 6 holes of 10 mm  $\phi$  on 178 mm PCD.  
Optional - Any other size and type of flange. (Minimum 125 NB or 5").
- | Shaft extension  
Upto 1000 mm for side mounting.  
Upto 3000 mm for top mounting.
- | Drive motor  
Type : Shaded pole .  
Insulation class 'B'.  
Power rating - 15 VA.
- | Alarm contacts  
1 change over contact.
- | Contact rating  
Standard - 5 Amps @ 230 VAC (Resistive).  
Optional - 10 Amps @ 230 VAC (Resistive).
- | Terminations  
Suitable for 2.5 mm<sup>2</sup> conductor (max).
- | Paddle speed  
Approximately 4-5 rpm.
- | Output torque of gear box (externally adjustable)  
< 2 to 3 Kg.cm at rated speed.
- | Weight  
5.8 Kgs (With standard extension of 150 mm)

## SELECTION TABLE

1 ENCLOSURE FOR GEAR BOX AND MOTOR		2 PROCESS CONNECTION		3 SHAFT EXTENSION TYPE		4 PADDLE VARIATION	
NO OF MICROSWITCHES	CODE		CODE		CODE		CODE
Microswitch - 1 no.	1	1 1/2" BSP (M) In case of threaded process connection, switch can only be fitted after removal of paddle vane. Access to inside of vessel through adequate sized opening is necessary, to attach paddle assembly to shaft, after mounting switch on vessel.	B	(A) Standard (L=150mm)	SO		F
Microswitch rating				(B) Extension (L > 100 mm)	EO		
10 Amp @ 230 VAC (Res) 5 Amp @ 230 VAC (Res)	1 5			(C) Extension and High Temperature Stand Off (L > 200 mm)	EH		T
NO OF CABLE ENTRIES				(D) Collet extension (L > 300 mm)	CE		
2 Nos.	2	Insulating flange (Cindano Sheet in between process connection.)	I	(E) Collet extension and High Temperature Stand Off (L > 300 mm)	CH		S
CABLE ENTRY SIZE				(F) Extension and dust Seal assly. (L > 350 mm)	EA		
3/4" UNF/ET 1/2" NPT	F T			S.B. standard mounting flange Dimensions : 204 mm φ, 10 mm thick, 6 holes of 10 mm φ on 178 mm PCD.	S	(G) Collet extension and Dust Seal assly. (L > 350 mm)	CA
POWER SUPPLY		Any other mounting Flange (Please specify) (Minimum 125 NB or 5") The nozzle should be sufficiently large so that paddle can be inserted in the bin without dismantling the paddle. If nozzle size is smaller than the paddle size then paddle needs to be dismantled before inserting it into the bin.	N	(H) Extension with dust Seal assly and High Temp Stand Off (L > 350 mm)	HS		
230 VAC, 1 φ, 50 Hz. 115 VAC, 1 φ, 50 Hz. 24 VAC, 1 φ, 50 Hz.	1 2 3			(I) Collet extension with Dust Seal Assembly and High Temperature Stand Off (L > 350 mm)	CS		
		MATERIAL OF CONSTRUCTION		MATERIAL OF CONSTRUCTION		MATERIAL OF CONSTRUCTION	
		C.S. (Painted)	1				
		S.S. 304	2	S.S. 304	2	S.S. 304	2
		S.S. 316	3	S.S. 316	3	S.S. 316	3

Note : In case more than 1 change over contacts are required, we recommend contact multiplication to be done externally.

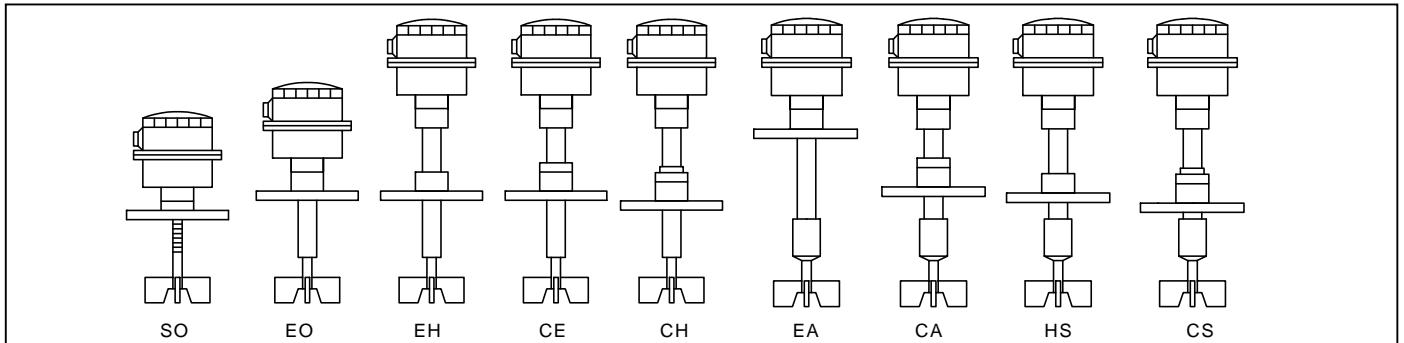
## ORDERING CODE



**Example :** 152T1 S1 EH3 F3 - 0500

1. Gear box with 1 microswitch of 5Amp. Contact rating, 2 cable entries of 1/2" NPT, supply voltage of 230V AC.
2. Standard mounting flange in C.S. of 204 mm φ, 10mm thick, 6 holes of 10mm φ on 178mm PCD.
3. Shaft with 500 mm extension and High Temperature Stand Off in SS 316. 4-vane paddle of 50 X 125 in SS 316.

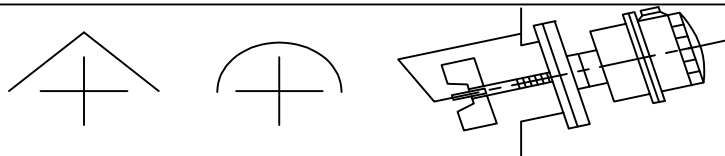
## SHAFT EXTENSION TYPES



## APPLICATION DETAILS

This type of switch is used to control the level in cement, fertilizers, nylon / PVC chips or pellets, detergents, tooth paste, food, grain, pulverized coal, limestone, milk powder etc.

SR.NO	DESCRIPTION	OPTIONS	APPLICATION DETAILS
1	GENERAL Service	Free flowing solid	<p>The material should flow freely both to and away from the paddle. The paddle must be out of direct flow of material while bin is being filled or emptied.</p> <p>For low level control in large or small bins and high level control in large bins. Unit should be mounted at a downward angle with horizontal, (Typically 5°-15°).</p> <p>For high level control in large bins.</p> <p>For low level control in small bins.</p> <p>Maximum working pressure - 1 kg/cm<sup>2</sup>.</p> <p>Normal working temperature without high temperature stand off.</p> <p>Refer note no 2 in " Note on features ".</p> <p>Refer note no 3 in " Note on features ".</p> <p>If shaft extensions are used in dusty atmosphere, then air purging is recommended. Refer note no 1 and 3 in "Note on features ".</p>
	Mounting	Side	
		Top	
	Pressure	Atmospheric	
	Temperature	0°C -100°C 100°C -200°C 200°C -400°C	
e	Working atmosphere	Clean or dusty	
2	ENCLOSURE		<p>The enclosure is designed to prevent ingress of dust and water. (Standard double compression cable gland is required to be used. )</p>
	a Weatherproof	IP-65	
3	PROCESS CONNECTION		<p>The switch can only be fitted after removal of paddle assembly. Access to inside of the vessel through adequate sized opening is necessary , to attach paddle assembly to shaft, after mounting the switch on the vessel,</p> <p>The size of the nozzle should be such that paddle can be inserted in the bin without paddle has to be dismantled and installed from inside the vessel.</p>
	a Threaded	1 1/2" BSP (M) or others.	
b	Flanged	Standard flange of any size and type	
4	EXTENSION TYPE		<p>This is used when process requires fixed set point.</p> <p>This is used when process requires set point to be adjusted. (Only with collet type extension).</p>
	a Fixed	SO,EO,EH,EA,HS	
b	Adjustable	CE,CH,CA,CS	
5	PADDLE SELECTION		<p>Choice of paddle assembly depends mainly on the particle size and bulk density amongst many other factors. Recommendations made here are as a general guideline; in specific cases the choice may differ.</p> <p>For particle size more than 1/8" <math>\phi</math> .</p> <p>For particle size less than 1/8" <math>\phi</math> and more than 100 mesh.</p> <p>For particle size smaller than 100 mesh.</p>
	a Four vane	Size - 50 x 125	
	b Two vane	Size - 50 x 75	
c	Single vane	Size - 65 x 138	



PROTECTION SHIELDS OR COVERS ARE NECESSARY FOR SIDE MOUNTED SWITCHES.

## NOTES ON FEATURES

(1) Dust / Ash Seal Assembly: There is a possibility of ingress of fine particles into the bearing housing through extension shaft guard. This will jam the bearing housing and restrict the rotation of the paddle. In such situations, use of the dust seal assembly is recommended. However, it is essentially required when particle size is smaller than 100 mesh.

(2) High Temperature Stand Off: When working temperature (inside the bin) is above 100°C upto 200°C, then some mechanism is required to dissipate the heat reaching the gear box and motor assembly. This is achieved by introducing high temperature stand off between process connection & paddle head assembly.

(3) High Temperature Stand Off with Cindano flange: When working temperature (inside the bin) is between 200°C and 400°C, then additional mechanism is required to prevent the heat from the bin from reaching the gear box and motor assembly. This is achieved by using high temperature stand off with a special flange. This special flange is made of Cindano which acts as a good thermal insulator.

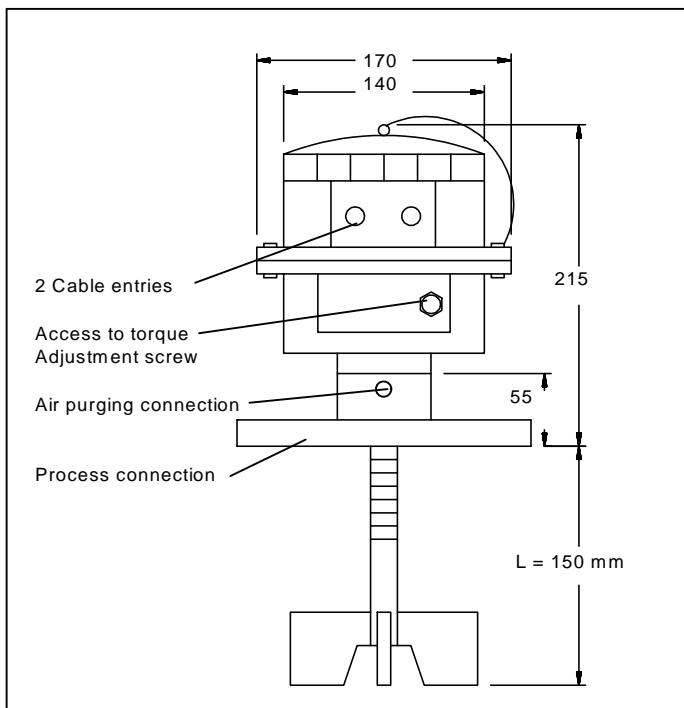
(4) Air purging facility: Air connection is provided on the switch enclosure to introduce compressed air into the housing to maintain positive pressure. This prevents ingress of fine particles into gear box and motor assembly. Air purging pressure should be more than the working pressure (in the bin) by 0.1 Kg/cm<sup>2</sup>.

*Note : Please note that all these features are inbuilt in the equipment. The optional accessories are necessarily fitted while assembling the equipment at factory and these can not be retrofitted at a later date.*

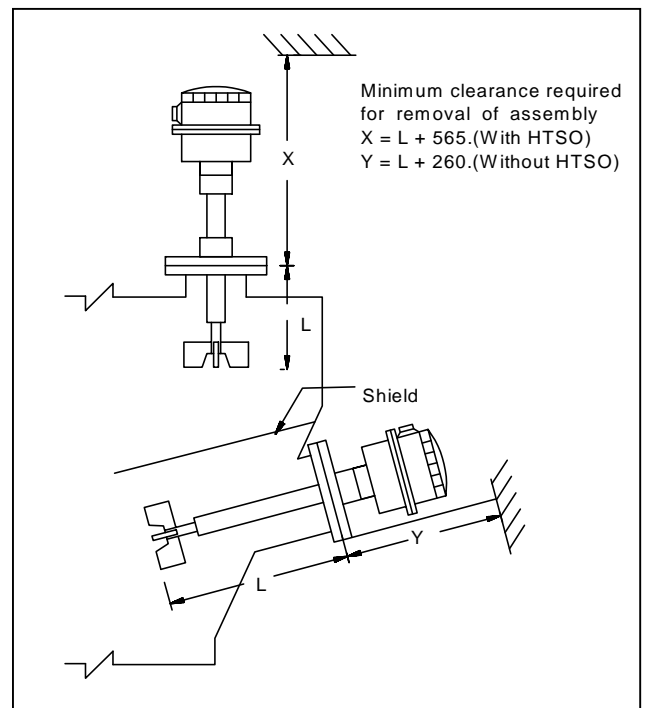
## INFORMATION REQUIRED FROM CUSTOMER

- Material - Product, bulk density, particle size, moisture content etc.
- Process - Mounting orientation of the switch,  
Process parameters like temperature (Max. & operating), pressure (Max. & operating) etc.
- Bin / Silo - Dimensional sketch of the bin showing material entry/exit points and internal obstructions, if any.

## DIMENSIONS



## INSTALLATION



\*\*\*Continuous developments may necessitate changes without notice.

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**SBEM Pvt. Ltd.**

39, Electronic Co-Operative Estate, Pune-Satara Road, Pune – 411 009 (INDIA)