

# TILT

## TILT SWITCH

**One moving part  
level measurement with  
simple and reliable  
operation !**

### **PL-SERIES**

Level measurement from  
lateral/longitudinal  
moving of powder and  
granules



### **TC-SERIES**

Microswitch  
activates when the  
enclosure body is  
tilted at 17°.



# TILT SWITCH

PL-SERIES  
TC-SERIES

## One moving part

### PL Series. Level switch detecting levels from lateral/longitudinal moving of powder and granules

#### Features of PL Series

- Structured simply and robustly, it can withstand the high-impact-load of powder / granules.
- It can be applied to upper/middle/lower limits.
- No power, low-cost wiring.

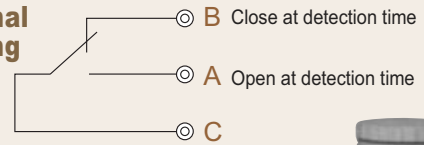
#### Principle of Operation

- The top of powder/granules inside a silo becomes dancette as shown on the right, and powder/granules flow along the slope. The flow laterally turns a sensing plate, thus resulting in the shaft tilting, and the level is detected. Sensing all 360° directions of tilt, it can reliably detect the level of unsteady flow of powder/granules as well and output signals.
- When the sensing plate and the shaft are buried under powder/granules, it can still keep measuring the level with downward forces of powder/granules. Even if the unit gets upright along the flowage of powder/granules while the shaft and the sensing plate are buried, therefore, it can

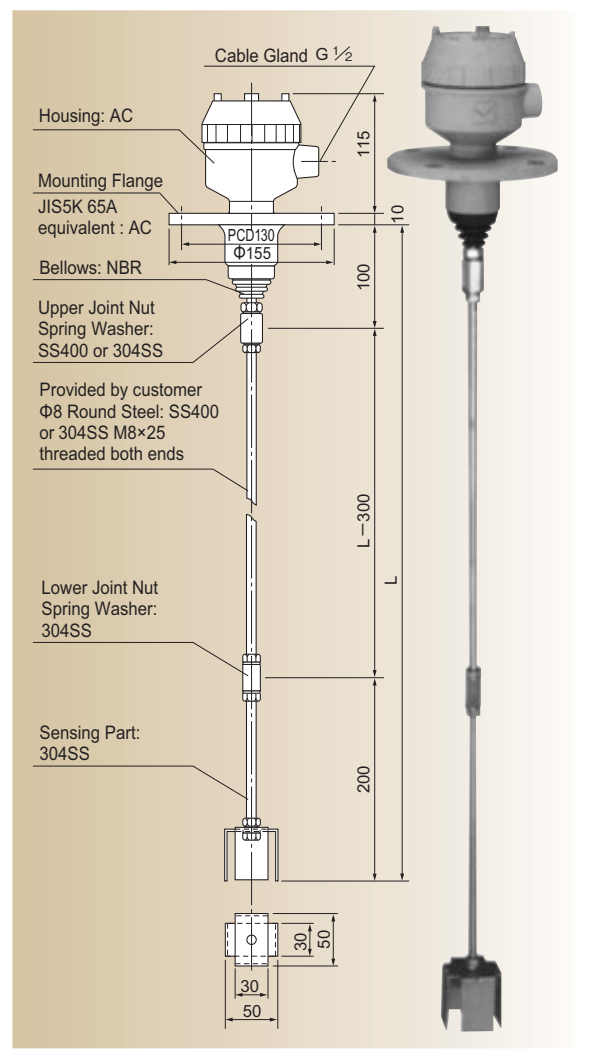
#### Standard Specifications

- Measuring Length : L=1,000(minimum) – 6,000(maximum)  
(Refer to OutlineDrawing as to L dimensions)
- Activation Point : 5°(Gradient Angle of Shaft)
- Contact Capacity : 250VAC – 15A, 30VDC – 15A
- Service Condition : In-a-silo pressure Ambient Pressure  
In-a-silo temperature -25°C – +70°C  
Ambient temperature -25°C – +70°C (no freeze, no condensation)
- Protection Rank : IP55 or equivalent, painted color N6
- Mounting Flange : JIS5K 65A FF
- Conduit Connection : G1/2
- Components provided : Refer to Outline Drawing.  
by customer PL-910  $\Phi$ 8 round steel threaded at both ends  
PL-920 32 x 6t flat bar with bolt holes at both ends
- Hazardous Area : May be used as Intrinsically Safe with a barrier relay installed together.

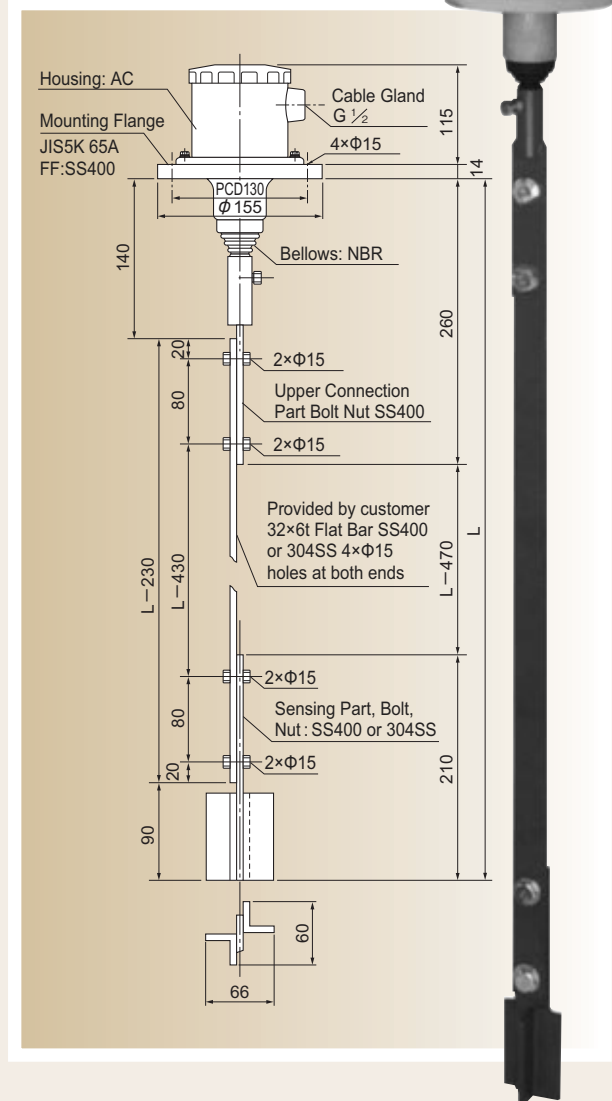
#### Terminal Drawing



#### PL-910



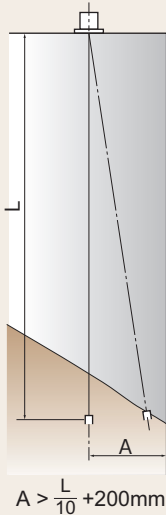
#### PL-920



# Level measurement with simple and reliable operation !

## ■ Installing Note of PL Series

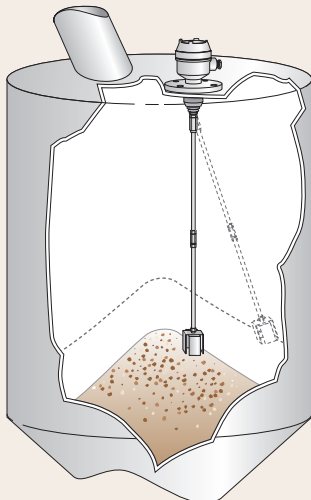
- Determine the distance from Wall Surface with reference to the following drawing.
- Make mounting-flange-face flat.
- Exert your cares so that clamping portions may not be vibrated or bended as it senses the vibration of the ceiling board of a silo or the bending possibly caused by people walking thereon.
- Exert your cares so that the shaft may swing with thrown powder/granules or airflow inside the silo by not more than 5°.
- In such a case that, when the shaft tilts nearly at 5°, the contact repeats ON / OFF due to vibration of powder/granules, you may stabilize signals with delay timer relay.



## ■ Application

**PL-910** : Suited for Sand, Charcoal dust, Plastic pellets, Grain, Feedstuff and other powder/granules that least adhere to shaft and sensing plate.

**PL920** : Suited for granules/block such as Gravel, Broken stone, Block coal. It can particularly withstand the great shock.



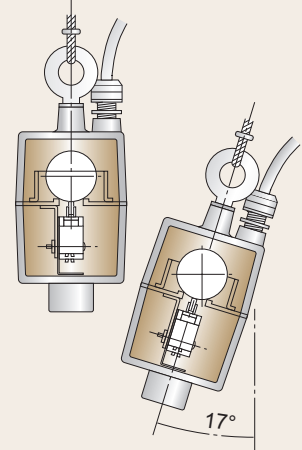
## TC Series ..... When enclosure body is tilted at 17° steel ball rolls off, activating the microswitch.

### TC Series in General

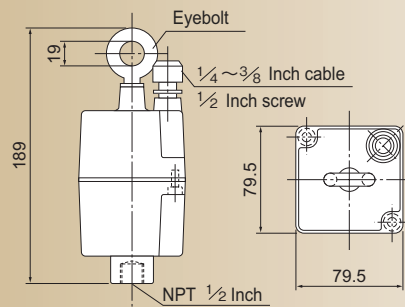
- Suspend the tilt switch unit from the ceiling by using wire and so on.
- Rising materials contact the tilt switch, which makes the housing begin to tilt.
- When the unit is tilted at 17° or more, the contact of housed switch is switched.

### Principle of Operation

- It houses steel ball inside, and, when the body gets upright, the steel ball centers itself on a microswitch.
- When the body is tilted at 17° or more, the steel ball rolls off to deactivate the microswitch and switch the contact.



## TC-3 TC-3 Dust Explosion-proof Tilt Switch

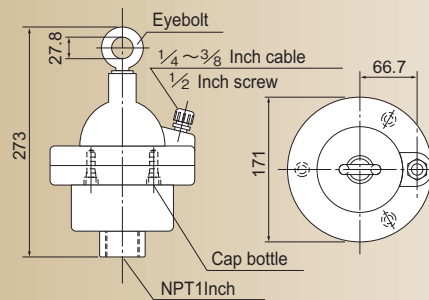


**Use for powder/granules such as grain, lime, coal, aggregate and so on.**



Body Weight : about 1.3kg (cast aluminum) 2 or 3 wire system  
 Contact Rating : 125/250/480VAC, 10A  
 Temperature : - 10 - +80°C  
 Cable Gland : 1/4 - 3/8 inch cable 1/2 inch screw  
 IP Rating : IP56

## TC-1 Heavy Loading Tilt Switch



Body Weight : about 11kg (cast-iron) 2 wire system  
 Contact Rating : 125/250/480VAC, 20A  
 Temperature : -10 - +120°C  
 Cable Gland : 1/4 - 3/8 inch cable 1/2 inch screw  
 IP Rating : IP56

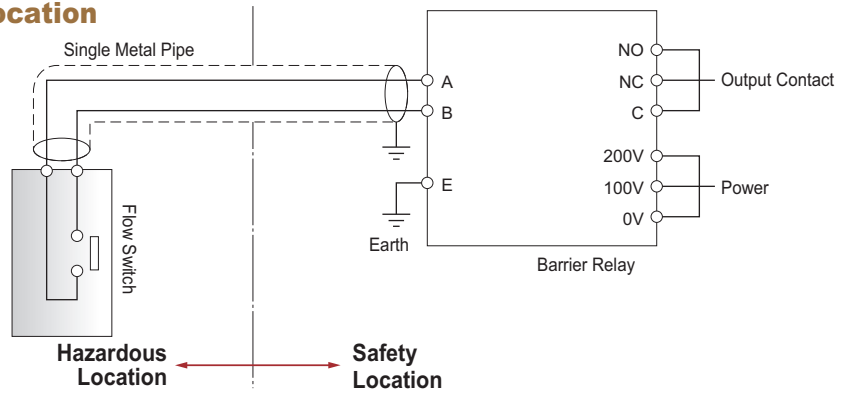
**Use for bulk solids in 50mm or over such as coal, ore, broken stone and so on.**



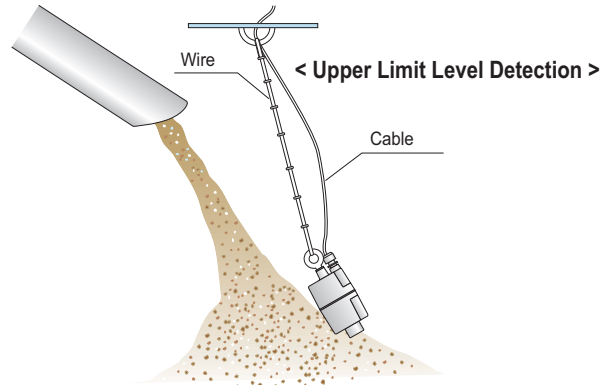
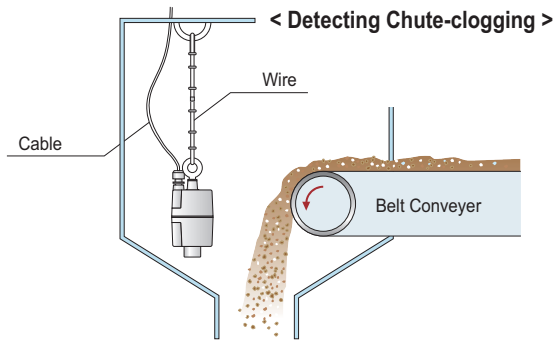
## PL Series - Hazardous Location

PL Level Switch can be used as Intrinsically Safe Explosion-proof Type if put together with a barrier relay.

\*TC series can also be used.

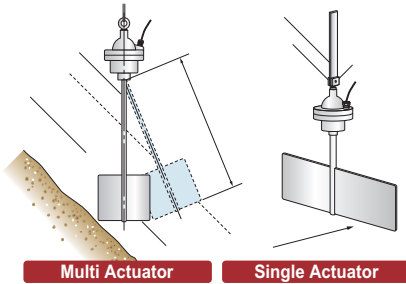


## TC Series - Applications



## Sensitivity upgrade by actuator

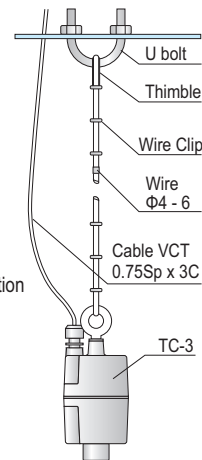
You can upgrade the sensitivity of the tilt switch in mounting 2 or 4 paddle actuators. The actuators are fixed on the tilt switch body with 1/2"PF screws. The dimensions of the actuators and the paddle forms are varied by the nature of materials, the mounting position and so on.



## Mounting a tilt switch

- Suspend with ample tilt-angular allowance using hanger, chain, wire and so on.
- Hangers must support the weight of the body and actuators, and avoid using a cable for suspension.
- The tilted angle is stable at 17° in all directions. You can confirm the actuation position by hearing the unit click.
- Install it at the location where it may not receive a direct hit of flowing materials

### < Mounting with Wire >



## Tilt switch wiring

Opening the enclosure by loosening 2 screws at the lower part on the tilt switch body, you may connect directly with the switch terminal.

### Switch Operation

In tilting: N.C. contact is closed.  
Upright position: N.O. contact is closed.

You do not need to demount other switch bracket and so on.  
In wiring, make sure that cables may not interfere the operation of the tilt switch.

## Line of business

- Rotary Paddle Type Level Switch
- Vibration Type Level Switch
- Swing Type Level Switch
- Acoustic Level Switch
- Capacitance Type Level Switch
- Capacitive Proximity Sensor
- Capacitance Type Level Indicator
- Diaphragm Type Level Switch
- Tilt Switch
- Leak Type Level Switch
- Microwave Switch
- Sounding Bob Type Level Indicator
- Flow Switch
- Conductance Type Level Switch
- Float Switch
- Float Type Level Indicator
- Ultrasonic Type Level Indicator
- Equipments For Conveyor Lines
- Dust Monitor System
- Zirconia Oxygen Analyzer
- Laser Type Level Indicator
- RADAR Type Level Indicator
- On-line Sensors for Accurate Liquid Analysis
- Ultrasonic Flow meter

\*Please be sure to read USER'S GUIDE, Installation & Operation Instructions before using the instrument.

\*The specifications herein may be subject to change without advance notice.

Nuclear Power Generation to Rice Milling

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Design, development, and manufacture of level measuring sensors

Agent



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