# **Tuning Fork Level Switch**

# **PRODUCT INTRODUCTION**

## WORKING PRINCIPLE

The tuning fork of level switch operated by using two piezoelectric elements built-in on vibration tube. The first piezoelectric element triggered by pulse signal that created from circuit to transport vibration energy out, and the other piezoelectric element receives the vibration and transmits it to output electric signal. While the probe contacts material, it will cause the frequency change of output signal and the vibration will hold and send out the relay on at the same time. Tuning fork of level switch provides reliable & maintenance-free for bulk solids. Just a simple mounting and calibration procedure that keep your facility in save and monitoring. This device can withstand fiercely lateral loads and static electricity.

For friendly use, Fail-safe is equipped as standard to prevent malfunction caused by power shortage.

### FEATURE

- Glass window, to review power supply and output directly without having to take off enclosure cover (SC 3 series).
- Dual insulation can reduce damage on PCB board caused by temperature, humidity, and condensation effects.
- Wide voltage supply range 20~250, 50~60Hz Vac/ Vdc.
- SPDT Relay output, SSR MOSFET output.
- No calibration required, easy use, sturdy and durable design.
- High / Low failure safe modes.
- Sensitivity adjustment is abailable for different density of media. Fine power can be detected.
- Suitable for liquid, power, solid applications.

Connection

Screw

# CONSTRUCTURE

Vibration Kit

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# APPLICATION

- Most materials in powder can be measurable, includes the grounded coffee, milk power, chocolate, coal ash, bulk, sugar, salt, wheat, grains, glass debris, plastic pellet, cement
- Sludge level detection in waste water

The SC series detects the min. and max of level in bins, silos and hoppers, filled with powdered materials. The following list shows its applications.

## **Solid Level Detection**

- \* Powdered milk
- \* Frozen potato chips
- \* Beans
- \* Sugar
- \* Sweets
- \* Coffee beans
- \* Coffee Powder
- \* Tea
- \* Salt
- \* Flour (in a flour mill)
- \* Foundry sand
- \* Spices
- \* Animal food
- \* Pellets

### For Liquid:

- \* Water & Solutions
- \* General Purpose Solvent
- \* Petroleum
- \* Oil
- \* Heavy oil

- \* Ink
- \* Corrosive liquid
- \* Cream

\* Peanuts

\* Tobacco

\* Chalk

\* Gravel

\* Soda

\* Soot dry

\* Styrofoam

\* Wood shavings

\* Powdered cellulose

\* Polystyrene powder

\* Glass fine power

\* Granular plastics

\* Powdered clay

\* Stearin chips

\* Drink & Beverage



Enclosure

FineTek

SC1400

# **SPECIFICATION**

Dimensions (Unit:mm)	φ113 108 108 1/2"NPT 20 25 1" PT 105 φ27			
Model No.	SC1400 [Standard Type]			
Level Sensor Housing		Aluminum / IP65		
Probe Construction	316L			
Mounting	1"PT			
Conduit	1/2"NPT × 2			
Max. Vertical load on rod.	177in.Lbs(20Nm)			
Operating Pressure.	-1~600PSI (40BAR)			
Power Supply	20~250,50/60Hz Vac/Vdc			
Power Consumption	10VA			
Operating Temp. In Ambient Air	-40°C~60°C			
Operating Temp. In Bin	-40°C~130°C			
Signal Output	Relay, SPDT, 5A/250Vac/ 28Vdc, 1 set or 2 set SSR(MOSFET) 400mA/60 Vac/ Vdc, 1 set or 2 set			
Min. material density sensed	Solid:≥0.07g/cm³, Liquid: ≥0.7g/cm³			
Time Delay	0.6 Second / Operate; 1~3 Seconds / Reset			
Vibrating Frequency.	350~370Hz			
Selectable Fail-safe	Hi./ Lo.			
Selectable Sensitivity		Hi./ Lo.		

# TERMINAL / SENSITIVITY ADJUSTMENT (SPDT TYPE)

### SC1400X,



## **Terminal Function**

- L+, N-: Power Supply
- NC, COM, No: Relay Output
- RT1, RT2: Remote-Test
- पूर्य: SSR(MOSFET) Output

# Fail-Safe High / Low Protection

## FSH (Fail-Safe High) Protection:

Switch to FSH mode.

Normal Status: The signal lamp is on. It means that the tuning fork switch does not sense the material and the relay is conductive.

Failure: When the power shuts down, the signal lamp is off. It means that the tuning fork switch is voided and the relay is not conductive.

#### FSL (Fail-Safe Low) Protection:

Switch to FSL mode.

Normal Status: The signal lamp is on. The tuning fork switch senses the material and the relay is conductive.

Failure: When the power shuts down, the signal lamp is off. The tuning fork switch is voided and the relay is not conductive.

	FSL		FSH	
Level				
Contact Form	NO COM NC	NO COM NC	NO COM NC	NO COM NC
Indication	0	-×	-) <b>)</b> -	0
Status	Fail	Normal	Normal	Fail



# **Panel Function**

- PWR: Power Supply (Green Light)
- SIGNAL: Output Indication (Red Light)
- FSH: Power On. The signal lamp is on and the relay is conductive. While the tuning fork switch senses the material, the signal lamp is off and relay is not conductive.
- FSL: Power On. The signal lamp is off and the relay is not conductive. While the tuning fork switch senses the material, the signal lamp is on and relay is conductive.
- SENSITIVITY L: Low Sensitivity
- SENSITIVITY H: High Sensitivity

# Sensitivity Adjustment

The SENSITIVITY is located on the right side of the panel. The user is able to do the minor adjustment by the screw driver. If it turns to H position clockwise, the sensitivity increases; if it turns to L position anti-clockwise, the sensitivity decreases. The sensitivity is originally set at max. value. The switching point is at 15mm from tip of tuning fork switch.

The switching point position will be changed by the sensitivity value. If the sensitivity adjusts to lower value, the switching point position is moving backward; if the sensitivity adjusts to high value, the switching point position is moving forward. The changing range of switching point is about 60mm.

For example, if the switching point needs to be moved backward by 30mm, the user needs to adjust SENSITIVITY anti-clockwise by 10 turns. In general case, it is no need for sensitivity adjustment.



# **TERMINAL / SENSITIVITY ADJUSTMENT (DPDT TYPE)**

### SC1400X,



# **Terminal Function**

- L+, N-: Power Supply
- NC1, COM1, NO1: Relay Output
- NC2, COM2, NO2: Relay Output
- RT1, RT2: Remote-Test
- ≟ : Ground Connection
- کیتیت: 1<sup>st</sup> SSR(MOSFET) Output کیتیت: 2<sup>st</sup> SSR(MOSFET) Output

# Fail-Safe High / Low Protection

## FSH (Fail-Safe High) Protection:

Switch to FSH mode.

Normal Status: The signal lamp is on. It means that the tuning fork switch does not sense the material and the relay is conductive.

Failure: When the power shuts down, the signal lamp is off. It means that the tuning fork switch is voided and the relay is not conductive.

#### FSL (Fail-Safe Low) Protection:

Switch to FSL mode.

Normal Status: The signal lamp is on. The tuning fork switch senses the material and the relay is conductive.

Failure: When the power shuts down, the signal lamp is off. The tuning fork switch is voided and the relay is not conductive.

	FSL		FSH	
Level				
Contact Form	NO COM NC	NO COM NC	NO COM NC	NO COM NC
Indication	0	-×	×	0
Status	Fail	Normal	Normal	Fail



RT2 RT1 COM2 NC2 NO2 COM1 NC1 NO1 N- L+



## **Panel Function**

- PWR: Power Supply (Green Light)
- SIGNAL: Output Indication (Red Light)
- FSH: Power On. The signal lamp is on and the relay is conductive. While the tuning fork switch senses the material, the signal lamp is off and relay is not conductive.
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# **INSTALLATION FOR TUNING FORK**

1. Can be applied for high viscosity fluid and power Do not install near around material inlet.



### Vertical Installation:

1. Depends on the sensitivity tuning, user should note the switching point is triggered around 15mm from the tip of fork.



2. Wiring port faces downward recommended.



3.Consistence of the wiring port direction for multituning fork installation



3.Consistence of the wiring port direction and always in downward direction for multi-tuning fork



3. Do not install near material inlet.



