

# SC2 Vibrating Probe Level Switch Operation Manual

## INTRODUCTION:

The vibrating probe level switch is a mechanical resonant system excited and kept in resonance by piezoelectric elements. When the vibration of probe is damped by the measuring material surrounding it, the change in vibration intensity is detected by an electronic unit and converted into a switching signal (Relay/SSR(MOSFET))Because of no need of an additional circuit for the signal amplification, end users do not have to adjust sensitivity frequently for different detected materials.

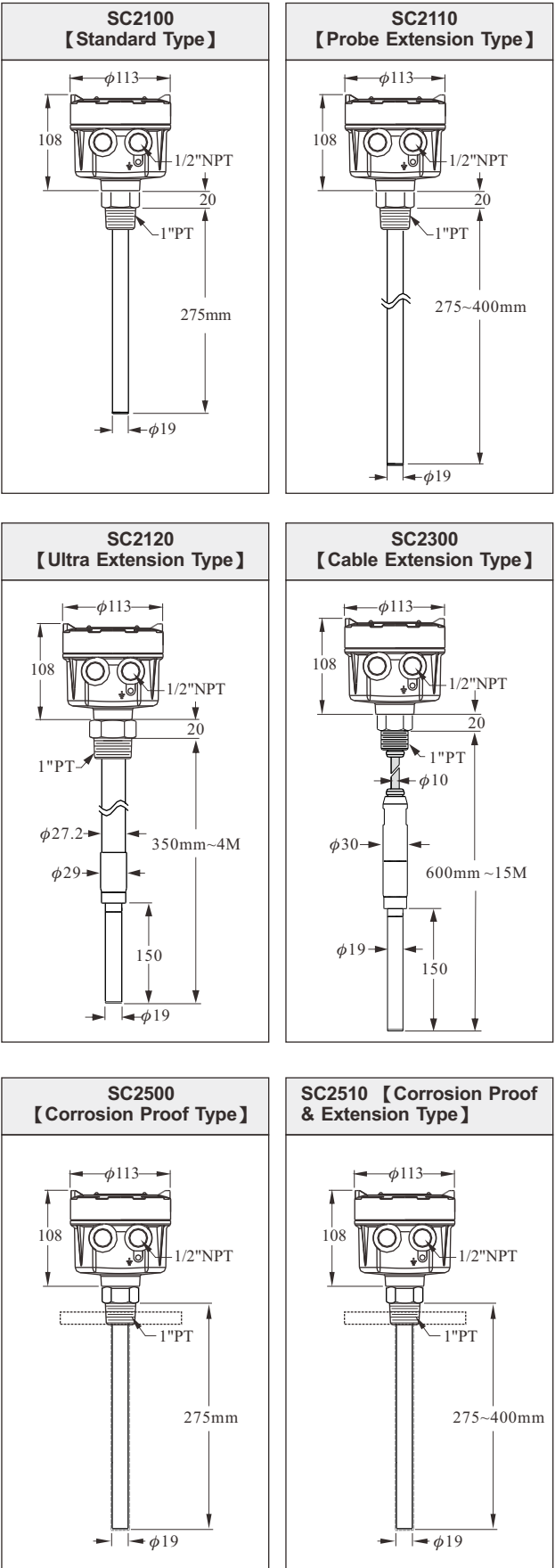
## FEATURE:

1. Providing a universal power supply for operating from a wide range of voltage from 20 to 250 Vac or Vdc.
2. No calibration needed, user friendly as well as sturdy and durable design.
3. Shed off build-up material. No fear about accumulated material on probe.
4. High/Low fail safe modes offer safety and reliability.
5. According to different density, its adjustable sensitivity wheel button can be set even for finest material.

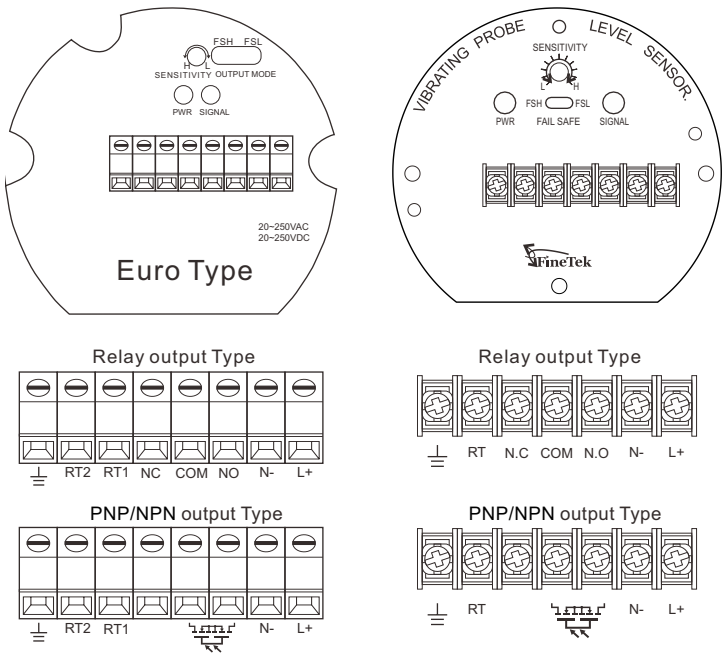
## SPECIFICATION :

1. Power Supply : 20~250 Vac / Vdc, 50/60 Hz  
under 18Vac / Vdc, 50/60 Hz, will be fail.
2. Power Consumption :  $\leq 10$  VA
3. Ambient Temp. :  $-40 \sim 60^{\circ}\text{C}$
4. Operating Temp. :  $-40 \sim 80^{\circ}\text{C}$
5. Operating Pressure : 10 Bar (Max.)
6. Vibrating Frequency : 395~405 Hz
7. Selectable Sensitivity : H / L
8. Medium Density :  $\geq 0.32 \text{ g/cm}^3$
9. Time Delay :  
0.6 s when the sensor is covered  
2~5 s when the sensor is exposed
10. Selectable (Fail-safe) : HIGH / LOW
11. Contact Output :  
1 x SPDT Relay contact : 3A / 250 Vac, 3A / 28Vdc or  
PNP / NPN : 400mA/60 Vac/Vdc  
Remote-test
12. Housing Spec. :  
Aluminum (ADC-12)
13. Enclosure Rating : IP 65
14. Probe Material : SUS 304 or 316
15. Max. Vertical load on Rod : 177in. Lbs(20Nm)
16. Mounting :  
1" PT(factory setting) or PF Screw;  
Flange1"~6" JIS / DIN / ANSI Standard or special specification
17. Conduit : 1/2" NPT \* 2

## DIMENSIONS:



## ELECTRICAL CONNECTION:



## OUTPUT CONTACT :

1. Before wiring, please select correct input power supply (L+ / N-) 20~250 Vac/Vdc, 50/60 Hz and relay or PNP/NPN output.
2. Test contacts of RT1 and RT2  
When RT1 and RT2 are short circuit and the mimic vibrating probe are contacted with the material, the relay or PNP/NPN output will be activated and conducted to keeo the probe vibrating.
3. To select output mode on FSH, please refer to Fig-1 :

### Relay Output : (Fig-2)

- A. The Signal Lamp lights up while Vibrating Probe Level Switch doesn't sense any materials or the bin is empty, where the NO & COM contact of the Relay are conducted.
- B. The Signal Lamp is off while Vibrating Probe Level Switch senses the material, where the NC & COM contact of the Relay are conducted.

### PNP/NPN contact : (Fig-3)

- A. The Signal Lamp lights up while Vibrating Probe Level Switch doesn't sense the material or the bin is empty, where the Output Transistor is conducted to output a signal that A and B contacts are conducted.
- B. The Signal Lamp is off while Vibrating Probe Level Switch senses the material, where the MOSFET Transistor is disconnected for output signal that A and B contacts are deactivated.

4. Select output mode on FSL.

### Relay Output : (Fig-2)

- A. The Signal Lamp lights up while Vibrating Probe Level Switch doesn't sense any materials or the bin is empty, where the NO & COM contact of the Relay are conducted.
- B. The Signal Lamp is off while Vibrating Probe Level Switch senses the material, where the NC & COM contact of the Relay are conducted.

### PNP/NPN : (Fig-3)

- A. The Signal Lamp is off while Vibrating Probe Level Switch doesn't sense the material or the bin is empty, where the Output Transistor is disconnected and no output signal
- B. The Signal Lamp lights up while Vibrating Probe Level Switch senses the material, where the MOSFET transistor is conducted to output a signal

## TERMINAL FUNCTIONS

- L+, N-: Power
- NC, COM, NO: Relay Output
- RT1, Rt2: Remote Test
- $\perp$  : Grounding
- $\overline{\text{PNP/NPN}}$  : PNP/NPN output

## PANEL FUNCTIONS

- PWR: Power
- SIGNAL: Output Signal
- FSH: After power on, signal lamp is on and relay functions. When probe senses material, signal lamp is off and relay is back to normal.
- FSL: After power on, signal lamp is off and relay doesn't function. When probe senses material, signal lamp is on and relay functions.
- SENSITIVITY L: Low Sensitivity
- SENSITIVITY H: High Sensitivity



Fig-1 Failure-mode switch

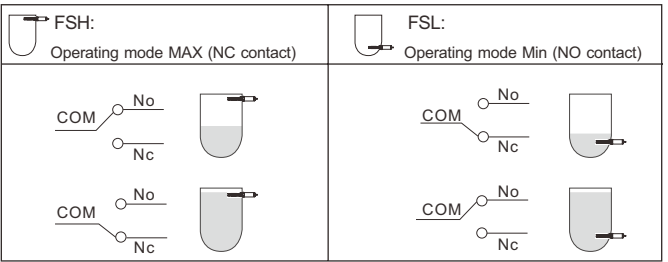


Fig-2 Diagram of relay output status

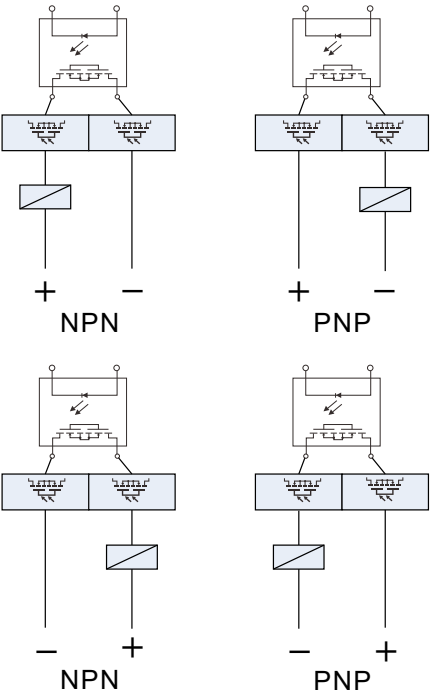


Fig-3 Diagram of PNP/NPN output

## PROCEDURE OF SENSITIVITY CALIBRATION:

1. If the level switch has been already installed on the tank, please confirm before calibration materials inside the tank.
2. By default, OUTPUT MODE is set at FSH mode, in which customers can adjust to different modes according to different situations.
3. According to the working condition, end users can adjust the SENSITIVITY by switching the knob where it has three different intensity of vibrating for selection.

## ALIGNMENT:

The SENSITIVITY can be adjusted by using the SENSITIVITY Switch which is on the circuit board of the housing; the protective function of FSL & FSH can be set by switching the MODE SWITCH.

## Sensitivity:

L --- Suitable for detecting the medium which has bigger volume or density or quantity, such as plastic particle.

H --- Suitable for detecting the medium which has smaller in density / volume or quantity, such as rice bran.

## FSH (FAIL-SAFE HIGH) PROTECTION:

On the OUTPUT MODE, select Fail-safe high mode (FSH) and install the vibration probe switch at the high position.

### Relay Output:

Normal Status: The Signal Lamp is on while Vibrating Probe Level Switch doesn't sense the material, where the NO & COM contacts of the relay are conducted.

**Failure:** When the power is shut down, the signal lamp is out, meaning the vibrating probe level switch is voided, where the NC & COM contacts of the relay are conducted. If the vibrating probe level switch senses the material, meaning the material is over the setting range and the above reaction will occur.

### PNP/NPN Output:

**Normal Status:** The Signal Lamp is on while Vibrating Probe Level Switch doesn't sense the material in which the Output Transistor is conducted to output a signal that NO & COM contacts are conducted.

**Failure:** When the power is shut down, the signal lamps is out, meaning the vibrating probe level switch is voided and the Output transistor is disconnected and no output signal, where the NO & COM contacts are disconnected. If the vibrating probe level switch senses the material, this means that the material is over the setting range and the above reaction will occur.

## FSL (FAIL-SAFE LOW) PROTECTION:

On the OUTPUT MODE, select Fail-safe low mode (FSL) and install the vibration probe switch at the low position.

### Relay Output:

**Normal Status:** The Signal Lamp is on, while the vibrating probe level switch senses the material, where the NC & COM contacts of the relay are conducted.

**Failure:** When the power is shut down, the signal lamp is out, meaning the vibrating probe level switch is voided and NC & COM of the relay are conducted. If the vibrating probe level switch senses the material, this means that the level of the material is lower than the setting range and the above reaction will occur.

### PNP/NPN Output:

Normal Status: The Signal Lamp is on while Vibrating probe Level Switch senses the material in which the Output transistor is conducted to output a signal that NO & COM contacts are conducted.

**Failure:** When the power is shut down, the signal lamps is out, meaning the vibrating probe level switch is voided and the Output transistor is disconnected. If the vibrating probe level switch doesn't sense the material, this means that the level of the material is lower than the setting range and the above reaction will occur.

## VERTICAL INSTALLATION (FIGURE 1):

1. It is suggested to install the vibrating probe away from the inlet to avoid material impact or false readings.
2. Users have to be aware of the material flow pattern and placing the vibrating probe in the appropriate position to avoid overflow.

## HORIZONTAL INSTALLATION (FIGURE 2)

1. It is suggested to install the vibrating probe away from the inlet to avoid of material impact. If it has to install the vibrating probe near an inlet, it is recommended to add a shield for protection.
2. Installing the vibrating probe at 20 degree inclined will optimize the result and increase the sensitivity.
3. Keep the conduit downward to avoid moisture getting inside the housing.

## NOTICE:

1. Please DO NOT climb on the vibrating probe while installation.
2. Users are advised to tighten the connection by using the spanner.
3. Please DO NOT bend the vibrating probe or modify the probe length.
4. The max. vertical pressure of the vibrating probe is 177in.Lbs (20Nm)
5. When you install the probe into tank nozzle, please note probe length has to be 150mm longer than nozzle at least.

All wiring should employ 18AWG cable. After completed, please dust off the housing and lock up the cable tie and lid to prevent moisture soak in.

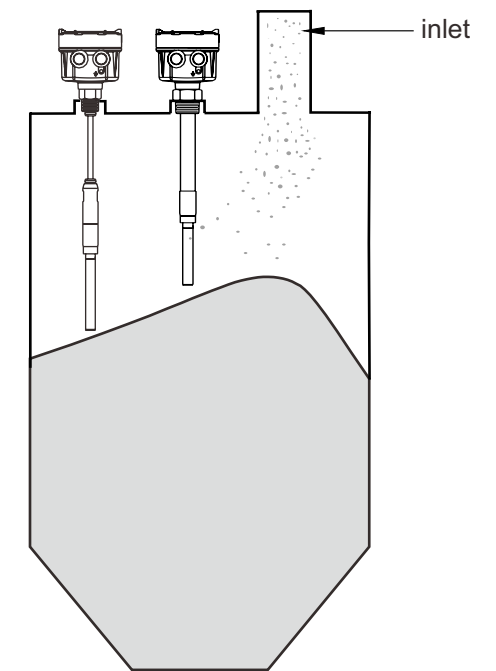


Figure 1

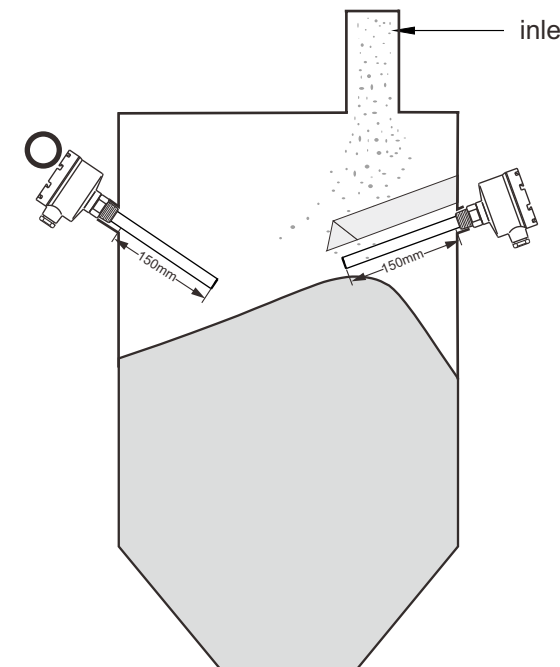


Figure 2

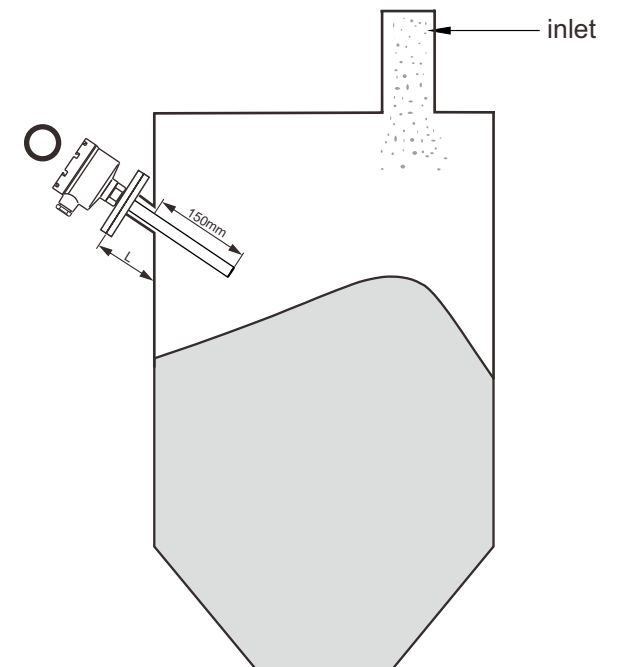


Figure 3



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