

SC17XX Series Explosion Proof Type Vibrating Probe Level Switch Operation Manual



NEPSI Ex d IIC T3~T6 Gb
Ex tD A20/A21 IP65 T80°C / T95°C / T135°C / T195°C
ATEX II 2G Ex d IIB T6 Gb
II 2D Ex tb IIIC T85°C Db

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.

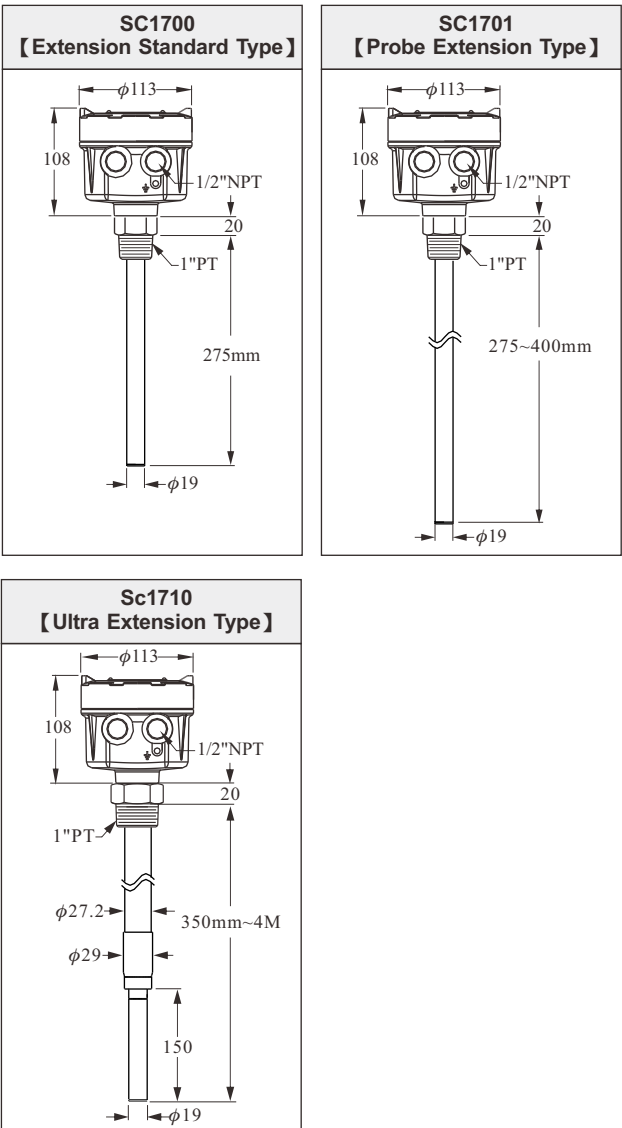
SPECIFICATION :

- Power Supply : 20~250 Vac / Vdc, 50/60 Hz
under 18Vac/Vdc, 50/60 Hz, will be fail.
- Power Consumption : 10 VA (Max.)
- Ambient Temp. : -20~+70°C
- Operating Temp. : -40~+80°C
- Operating Pressure : 10 Bar (Max.)
- Vibrating Frequency : 395~405 Hz
- Selectable Sensitivity : H / L
- Medium Density : $\geq 0.32 \text{ g/cm}^3$
- Time Delay :
0.6 s when the sensor is covered
2~5 s when the sensor is exposed
- Selectable (Fail-safe) : HIGH / LOW
- Contact Output :
1 x SPDT Relay contact : 3A / 250 Vac or
PNP/NPN : 400mA/60 Vac/Vdc
Remote-test
- Housing Spec. :
NEPSI Ex d IIC T3~T6 / Aluminum (ADC-12)
- Enclosure Rating : IP 65
- Probe Material : SUS 304 or 316
- Max. Vertical load on Rod : 177in. Lbs(20Nm)
- Mounting :
1" PT(factory setting) or PF Screw;
Flange1"~6" JIS / DIN / ANSI Standard or special specification
- Conduit : 1/2" NPT * 2

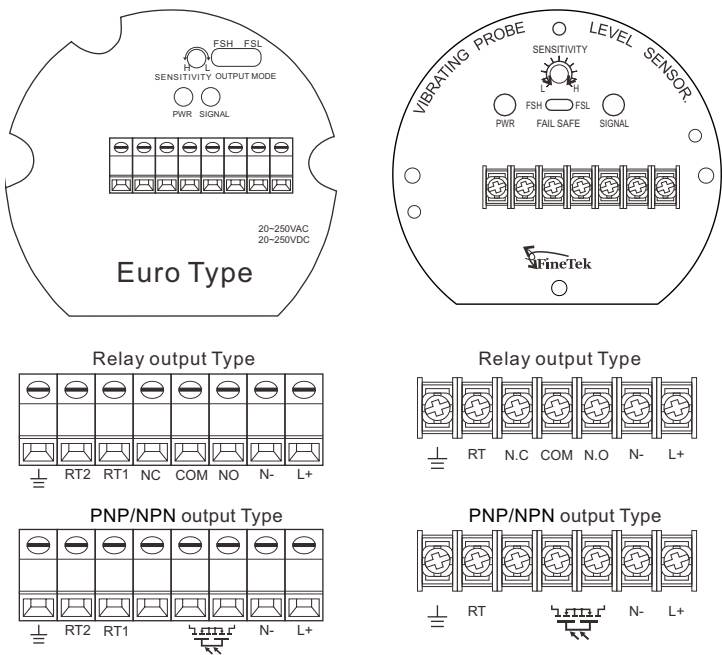
FEATURE:

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

DIMENSIONS:



ELECTRICAL CONNECTION:



OUTPUT CONTACT :

- Before wiring, please select correct input power supply (L+ / N-) 20~250 Vac/Vdc, 50/60 Hz and relay or PNP/NPN output.
- 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.
- To select output mode on FSH, please refer to Fig-1 :

Relay Output : (Fig-2)

- 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.
- 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)

- 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.
- 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.

- Select output mode on FSL.

Relay Output : (Fig-2)

- 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.
- 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)

- 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
- 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
- $\overline{\text{PNP}}$: 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

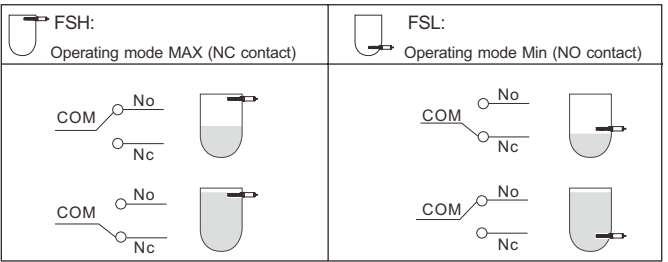


Fig-2 Diagram of relay output status

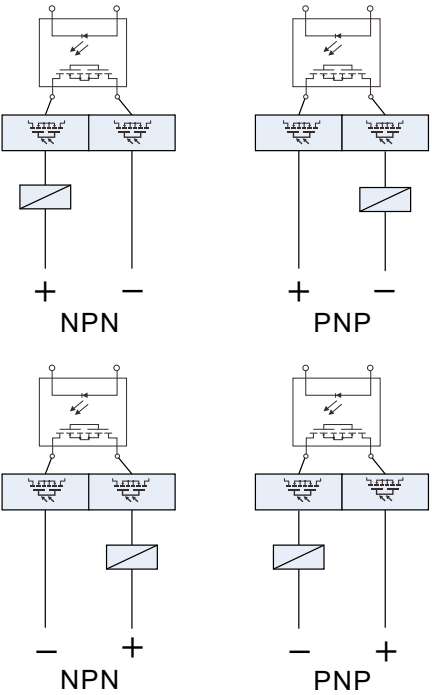


Fig-3 Diagram of PNP/NPN output

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 high 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.

INSTALLATION INSTRUCTIONS FOR EX-PROOF PRODUCTS:

1. There is an internal/external ground terminal in the housing. Please be sure to ground terminals when you use.

2. When install or maintain in the field, to comply with the caution "Open after power off"

3. Cable conduit should equip with explosion approval device (AD105DS). It can't be revised arbitrarily and have to lock well.

4. Be sure to obey the safe regulation of electric appliance for dangerous field when install and maintain.

5. Corrosive gas or liquid application isn't available for Aluminum & Stainless (SUS) material.

6. The level of temperature class for explosion sign and its maximum allowed temperature relating to the medium.

Temp. categories	T3	T4	T5	T6
Max. surface temp.	≤ 195°C	≤ 130°C	≤ 95°C	≤ 80°C
Medium temp.	≤ 200°C	≤ 135°C	≤ 100°C	≤ 85°C

7. Customers can't change the internal components and have to check the outer.

Top Mounting: (Fig 4)

- ※ Avoid installing directly under the inlet is to prevent the probe damaged by directly impact of the material.
- ※ Angle of repose should be considered during installation to prevent false alarm.

Side Mounting: (Fig 5)

- ※ It is recommended to use a shield to protect the vibrating probe level switch, if it has to be installed in a bad location. The cover should be parallel to the probe and the same length.
- ※ Incline the device for approx. 20 degree angle while installation.
- ※ Keep the conduit downward to avoid any moisture getting inside the housing while installation.

INSTALLATION NOTICE:

- ※ Please DO NOT climb on the vibrating probe while a gets inside the tank for installation.
- ※ Please tighten the connection by a spanner; please DO NOT rotate the housing directly.
- ※ Please DO NOT bend the vibrating probe or alter it's size.
- ※ The max vertical pressure of the vibrating probe is 177in.Lbs; (20Nm)
- ※ When you install the probe into tank nozzle,please note probe length has to be 150mm loger than nozzle at least.(Fig 6)

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.

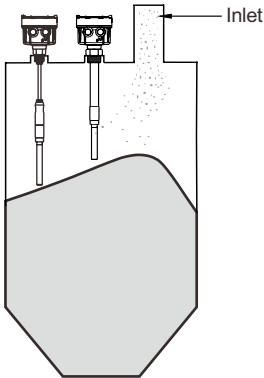


Fig 4

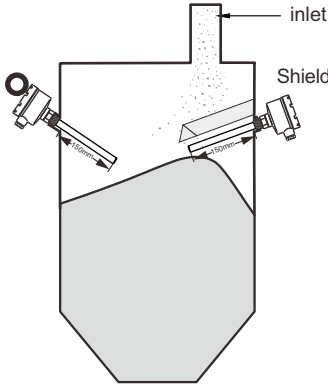


Fig 5

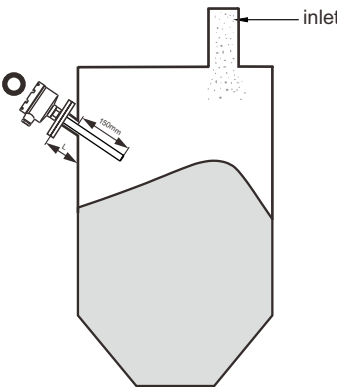


Fig 6



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