

SC174X Series Tuning Fork Level Switch Operation Manual



NEPSI Ex d IIC T3~T6 Gb
 Ex tD A20 / A21 IP65 T80°C / T95°C / T130°C / T195°C
 ATEX ©II 2 G Ex db IIB T4 or T5 or T6 Gb
 ©II 2 D Ex tb IIIC T130°C or T95°C or T80°C Db
 IECEx Ex db IIB T4 or T5 or T6 Gb
 Ex tb IIIC T130°C or T95°C or T80°C Db

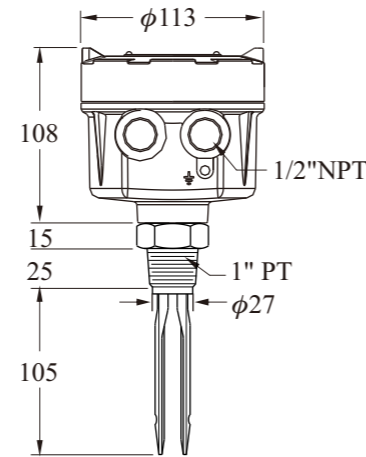
Introduction

The tuning fork level switch is a mechanical resonant device which excited by piezoelectric (PZT) elements. When the measured medium comes into contact with the tuning fork, it will change the feedback resonant frequency due to the damping resonances between the exciting PZT and receiving PZT. By detecting the frequency and appropriately tuning the sensitivity of tuning fork level switch on measured material, such device can easily operate for monitoring the alarm level of measured material.

Feature

1. Providing a universal power supply for operating in voltage range of 20 to 250 (Vac / Vdc).
2. No calibration or complex setting procedure are needed, robust, free of maintenance and operated in diversity abominable environments.
3. High / Low fail safe modes provide user the safety monitoring and real time communication.
4. Equipped with Remote Self-Testing function (RST) to diagnostic the hardware connection with peripherals

Dimensions



Terminals Arrangement :

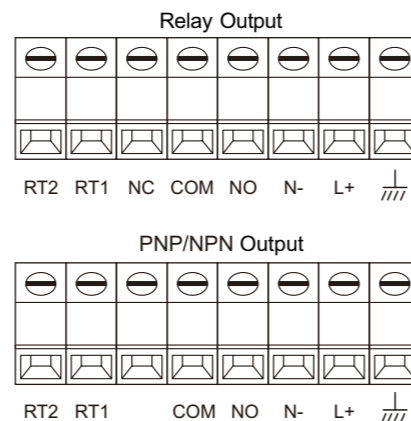
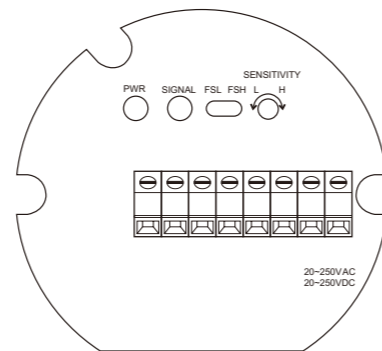


Fig-1. SPDT contact output model

Terminal Description

- L+,N-: Power Supply
- NC, COM, NO: Relay Output
- RT1, RT2: Remote Test
- \perp : Ground Connection
- COM, NO : PNP/NPN Output

Specification

Power Supply	20~250, 50/60 Hz Vac/Vdc
Power Consumption	Power consumption≤10 VA
Diagnostic Frequency	350~370 Hz
Fork Length	100 mm Max extension length: 4 m
Operating Humidity	20%~80% RH non-condensed
Operating Pressure	-1~600PSI (40BAR)
Act Time Lag	3 second
Medium Density	Solid:density:≥0.07g/cm ³ Liquid:density:≥0.7g/cm ³ Viscosity: 1~10000 cSt
Time Delay	0.6 s since the measured material contacted 1-3 s react to the measured material fall off
Output	Relay, SPDT, 3A/250Vac Max. PNP/NPN 400mA/60 Vac/ Vdc
Input	Remote-test
Status	Green light: indicate power supply Red light: indicate operating mode
Fail-safe	High / Low
Electrical safety	Over Voltage category III
Housing Material	Aluminum (ADC-12)
Probe Material	316L/316/304
Enclosure Rating	Ex db IIB T4~T6
Connection	1\"/>

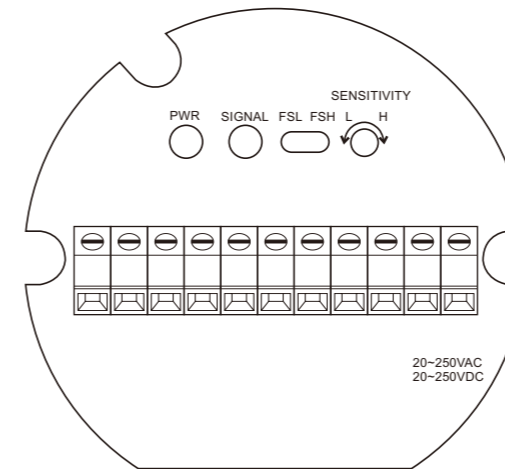


Fig-2. DPDT contact output model

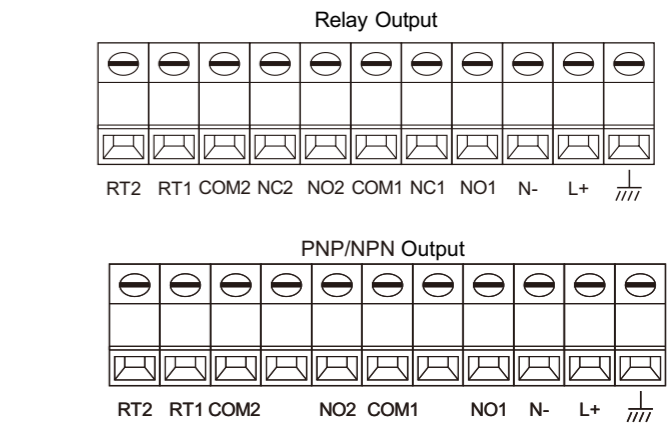
Terminal Function

- L+, N-: Power Supply
- NC1, COM1, NO1: Relay Output
- NC2, COM2, NO2: Relay Output
- RT1, RT2: Remote-Test
- \perp : Ground Connection
- COM1, NO1 : 1st PNP/NPN Output
- COM2, NO2 : 2nd PNP/NPN Output

Refer to the Fig.1-Fig.2, all the wiring should adopt the 18 AWG standard isolation cable and it is compulsory to keep from the dust in the housing and avoid of electric short. To prevent the water or moisture penetrating into the housing, please rotate the top lid in clockwise direction and make sure it is tightly lock.

Output Description

1. Make sure provide power supply (L+/N-) in range of 20~250 (Vac or Vdc,50/60Hz) and output relay (Relay or PNP/NPN) before wiring. Detail please see Fig-1 and Fig-2.
2. RT1 and RT2 are the testing points that easy user to verify the situation. When the RT1 and RT2 are in electric short, it means the measured material is in contact with the tuning fork level switch. The Relay or PNP/NPN should be activated. In examining the tuning fork level switch, user will find it keep vibrating.



Panel Function

- PWR: Power Supply (Green Light)
- SIGNAL: Output Indication (Red Light)
- FSH: Power on. The signal LED is on and the relay acts. While the tuning fork level switch contacts with measured material, the signal LED is off and the relay is in not act.
- FSL: Power on. The signal LED is off and the relay is in not act. While the tuning fork level switch contacts with measured material, the signal LED is on and the relay is in act.
- SENSITIVITY L: Low Sensitivity
- SENSITIVITY H: High Sensitivity

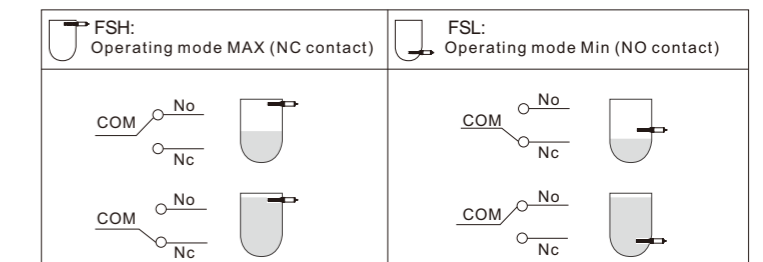


Fig-3. Diagram of Relay contact output

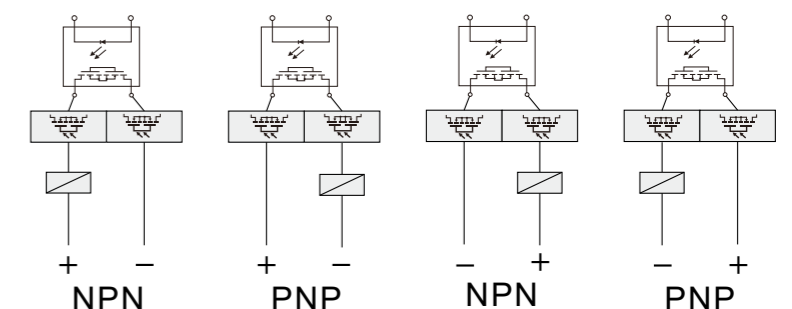


Fig-4. Diagram of PNP/NPN transistor output

FSH (FAIL-SAFE HIGH) PROTECTION:

On the OUTPUT MODE, select Fail-Safe High Mode (FSH) and install the tuning fork switch at the high position. Please refer to Fig-3 - Fig-4.

Relay Output:

Normal Status: NO & COM contact of the relay are conducted and the Signal Lamp lights up when tuning fork level switch doesn't sense any materials.

Failure: NC & COM contact of the relay are conducted and the Signal Lamp is out when tuning fork level switch senses the material or when there is power breakdown.

PNP/NPN Output:

Normal Status: Output is conducted and the Signal Lamp lights up when tuning fork level switch doesn't sense any materials.

Failure: Output is not conducted and the Signal Lamp is out when tuning fork level switch senses the material or when there is power breakdown.

FSL (FAIL-SAFE LOW) PROTECTION:

On the OUTPUT MODE, select Fail-Safe Low Mode (FSL) and install the tuning fork switch at the low position. Please refer to Fig-3 - Fig-4.

Relay Output:

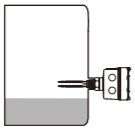
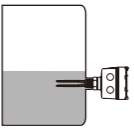
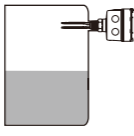
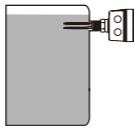
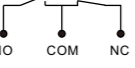







Normal Status: NO & COM contact of the relay are conducted and the Signal Lamp lights up when tuning fork level switch senses the materials.

Failure: NC & COM contact of the relay are conducted and the Signal Lamp is out when tuning fork level switch does not sense the material or when there is power breakdown.

PNP/NPN Output:

Normal Status: Output is conducted and the Signal Lamp lights up when tuning fork level switch senses materials.

Failure: Output is not conducted and the Signal Lamp is out when tuning fork level switch does not sense the material or when there is power breakdown.

Level	FSL		FSH	
				
Contact Form				
Indication				
Status	Fail	Normal	Normal	Fail

Sensitivity Adjustment/Calibration

Sensitivity knob located on the right side of the PCB board. It approximately allows 22 turns for sensitivity adjustment.

For higher sensitivity need, user please turn the knob clockwise toward H and counterclockwise toward L for lower sensitivity.

Factory default is calibrated (by water density 1g/cm^3) and set the acting point at front end of tuning fork 23mm (at the groove area) (Fig-5.)

It will slightly moving upward or downward along the axis of fork while the sensitivity is changed. For example, the point will move downward for H sensitivity and vice versa. The total movement range of acting point can be adjusted for around 60mm.

For instance, turning the SENSITIVITY 10 turns counterclockwise (sensitivity L) and will get the acting point moving 30 mm upward of the fork.

Installation Tips

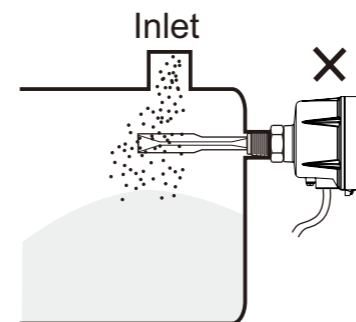
1. There is an internal/external ground terminal in the housing. Please be sure to ground terminals when you use.
2. When install or maintain in the field, to comply with the caution "Open after power off"
3. Cable conduit should equip with explosion approval device (AD105DS). It can't be revised arbitrarily 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 as below:

Temp. class	T4	T5	T6
Temp. of process medium	$\leq 125^\circ\text{C}$	$\leq 95^\circ\text{C}$	$\leq 80^\circ\text{C}$

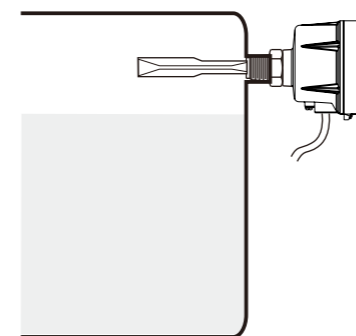
7. Customers can't change the internal components and have to check the outer.

Horizontal Installation:

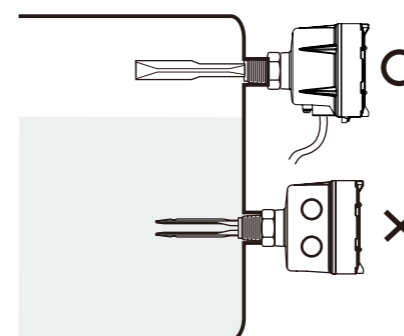
1. Can be applied in viscosity, powder, and liquid. Do not install near substance inlet.



2. Conduit faces downward at installation.

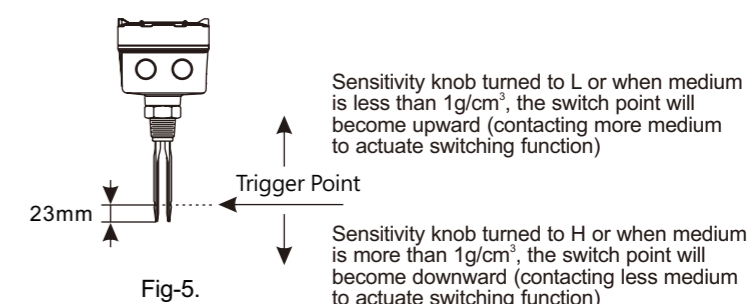


3. To be installed with the surface of two fork blades facing each other horizontally.

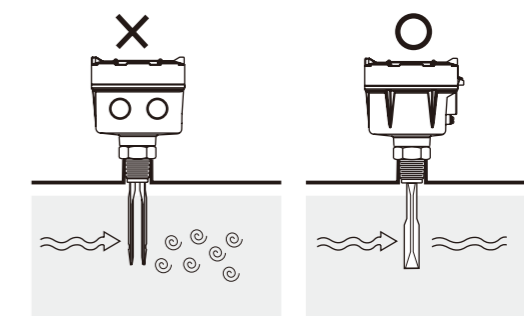


Vertical Installation:

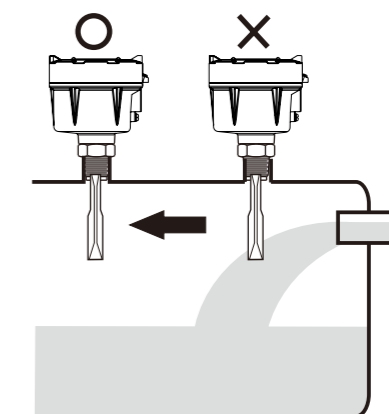
1. For detected medium of water (density 1g/cm^3), the switching point is located at the grooved part of fork, about 23mm from the end of fork.



2. Opening of the two fork blades is to be as the flow direction.



3. Do not install near substance inlet.



FineTek Co., Ltd.

No.16, Tzuchiang St., Tucheng Industrial Park, New Taipei City 23678, Taiwan.
Tel: 886-2-22696789 Fax: 886-2-22686682
Email: info@fine-tek.com http://www.fine-tek.com



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