Tuning Fork Level Switch YC02 Operation Manual

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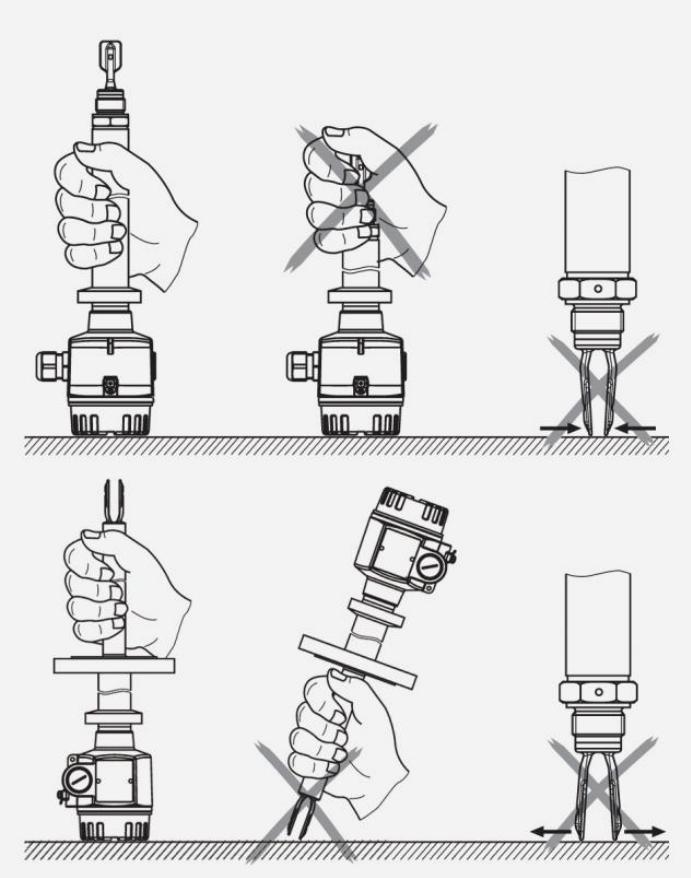
Working principle

The piezoelectric crystal and the natural frequency of the tuning fork are used to drive the tuning fork rod and provide signal feedback, causing the tuning fork rod to resonate. When a material level comes into contact with the tuning fork rod, the frequency signal fed back by the tuning fork rod is converted into a contact signal output when the circuit detects a decrease in the frequency of this signal. The damping effect produced when the object under test is wrapped around the tuning fork rod reduces the vibration frequency of the tuning fork rod and outputs a switch signal.

Features

- It can be applied for use in safety systems with SIL2/SIL3 functional safety requirements.
- It can be applied in aseptic applications in the life science industry.
- No adjustment required: Quick and economical start-up.
- No mechanical moving parts: maintenance-free, wear-free, and long service life.
- Functional safety: One-click calibration, system self-check.
- One-piece cast housing (optional material), customizable to the highest IP68 protection level, ensuring that the equipment is always in a sealed state. Even during high-intensity cleaning processes or after being immersed in water for several hours, water will not enter the equipment.

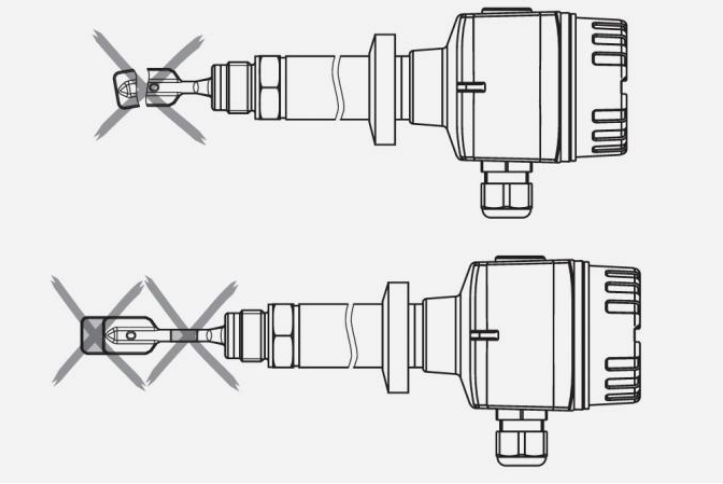


Precautions

When installing the tuning fork, please try to avoid areas with obvious vibration to prevent misoperation of the tuning fork. If this cannot be avoided, please recheck at the installation location or restore the factory Settings.

Allowed: Hold the insulation pipe, extension pipe, flange or thread.

Prohibited: Damaging the vibrating rod, bending the vibrating rod, stretching the vibrating rod, shortening the vibrating rod, lengthening the vibrating rod, and allowing the vibrating rod to come into contact with hard objects. Seal with PTFE tape and tighten the hexagonal bolts with a wrench. Do not tighten by rotating the casing.



Technical parameters




- 1.Supply voltage: Relay SPDT 20-250VAC, 19-60V DC
  Signal output: Relay DPDT 20-250VAC, 19-72VDC
  PNP/NPN 18-50V DC 3-WIRE
  NAMUR IEC60947-5-6 2-WIRE
  8/16MA 12.5-30V DC 2-WIRE
- 2. Operating temperature: Fork body -30 to 150°C(higher temperatures can be customized), instrument -20 to 70°C
- 3. Power consumption: 1W
- 4. Contact capacity: 5A/250VAC DPDT(Double Knife Double Throw)/SPDT(Single knife Double Throw)
- 5. Working pressure: ≤2MPa(Higher pressure resistance can be customized)
- 6. Material density: Liquid >0.7g/cm ³, solid ≥0.1g/cm ³
- 7. Switching time: The start-up time is approximately 2 seconds, and the response time is approximately 1 second
- 8. Viscosity: 1 to 10,000 CST

COMPACT TUNING FORK LIQUID LEVEL SWITCH

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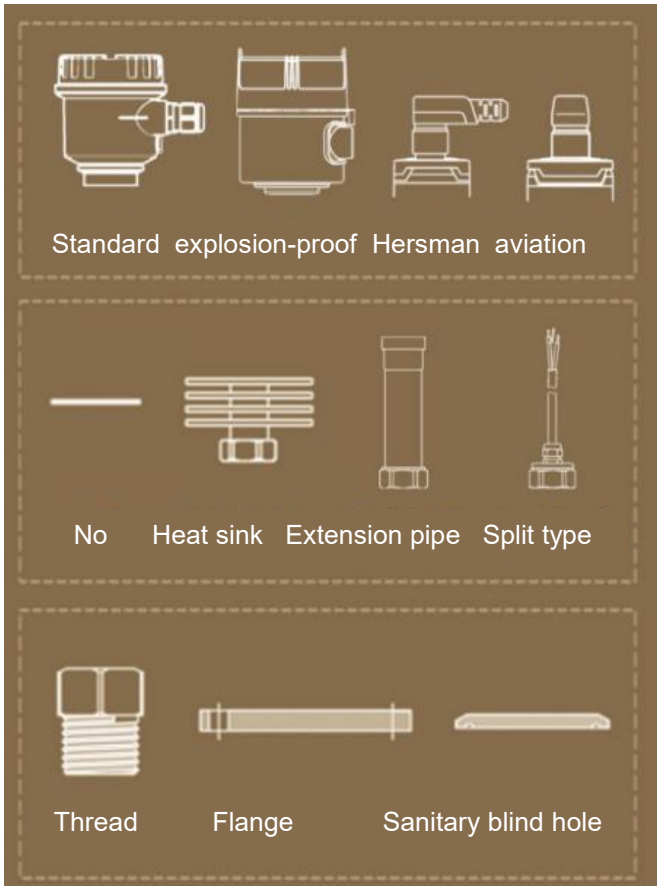
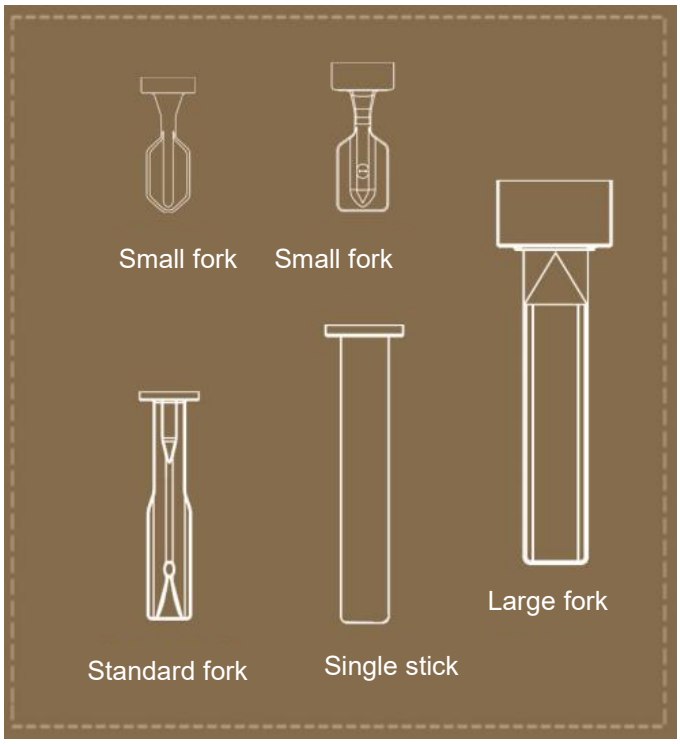
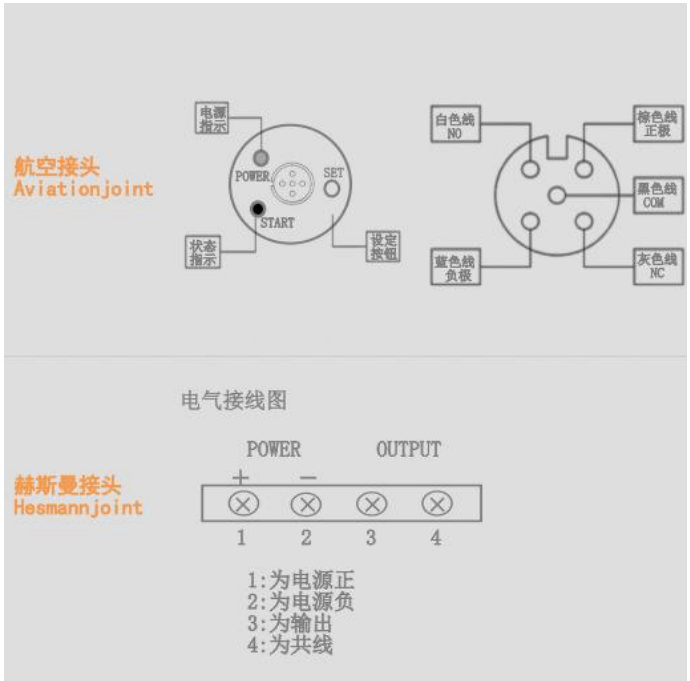
  Signal output: Relay DPDT 20-250VAC, 19-72VDC.
  PNP/NPN 18-50V DC3-WIRE.
  NAMUR IEC60947-5-6 2-WIRE.
  8/16MA 11-28V DC 2-WIRE.
- 2. Working temperature: Fork body -30 to 150° C, instrument -20 to 70°C.
- 3. Power consumption :1W.
- 4. Contact capacity :5A/250VACDPDT(Double Knife Double Throw)/SPDT(Single knife Double Throw)
- 5. Blade speed: Counterclockwise 1 R.P.M (revolutions per minute).
- 7. Rotational torque :10N·M.
- 7. Material density :≥ 0.6g /cm ³
- 8. Display status: Green light for power indicator, red light for action indicator.

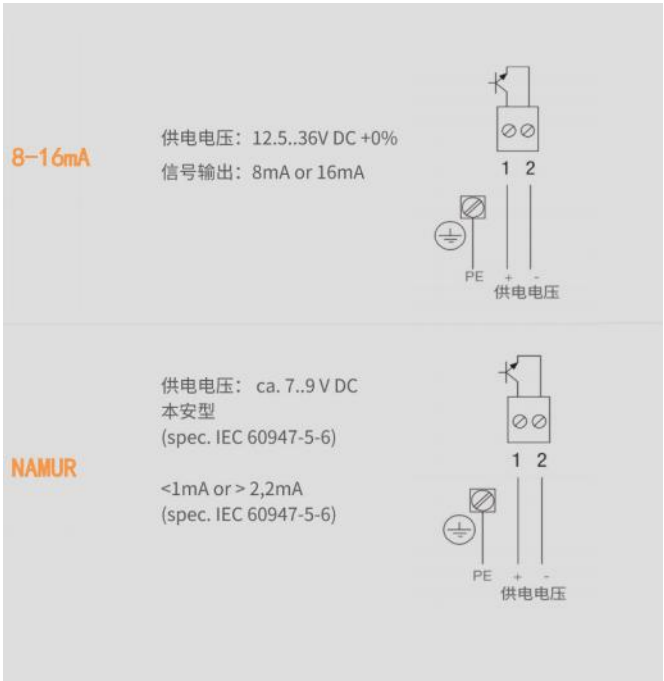
Structural form





Output form





Wiring and function introduction

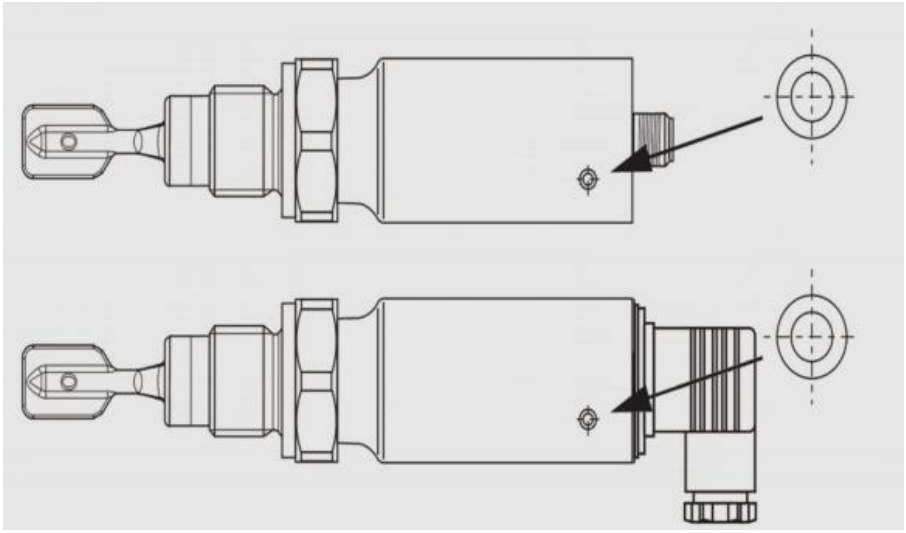
Power supply voltage :10-55VDC

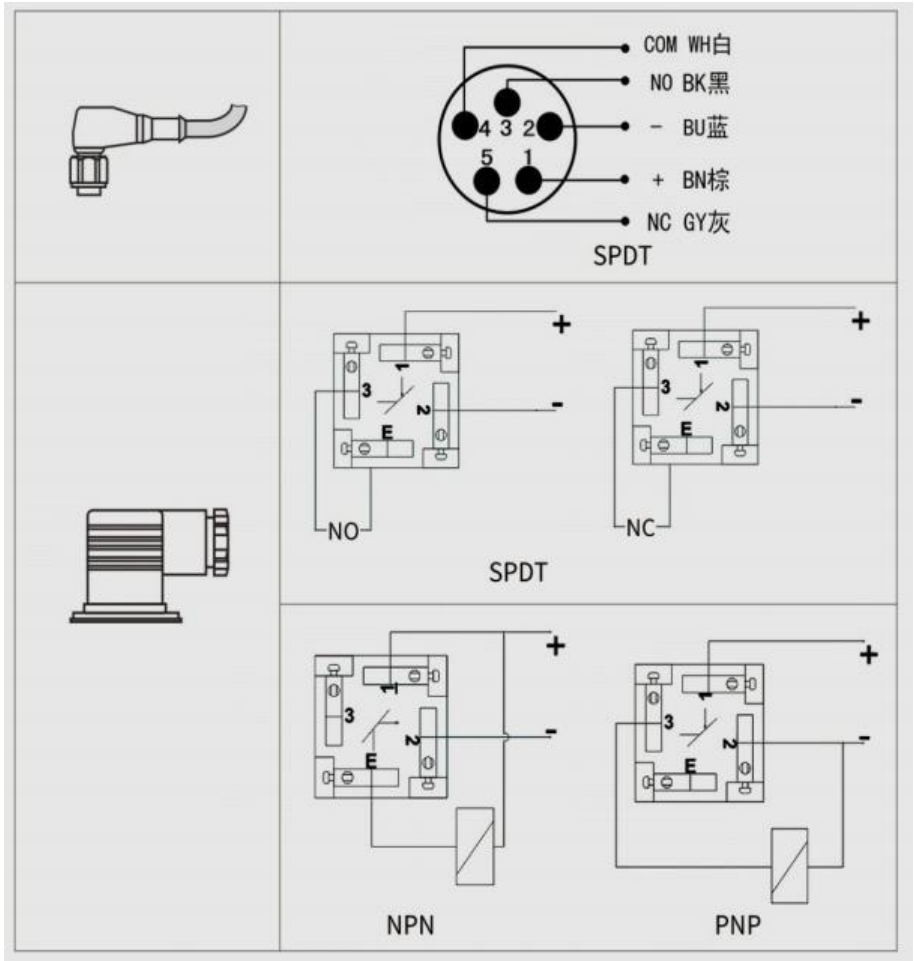
Signal output :relay DPDT/NPN/PNP

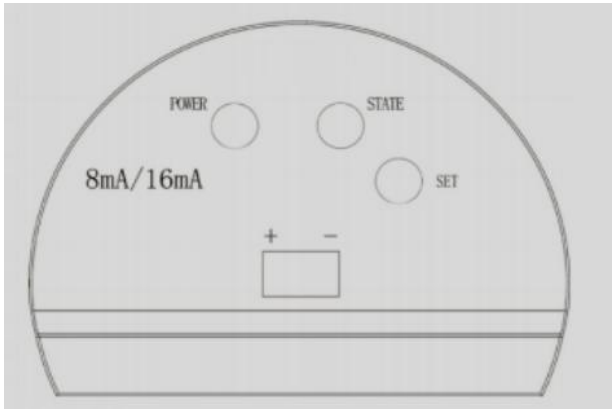
Green light: Power indicator light

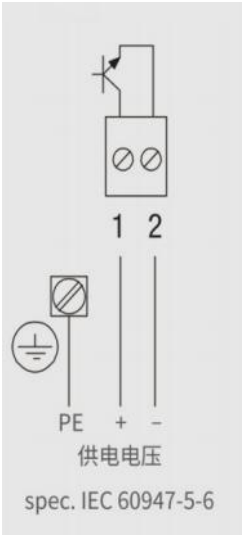
Red light; When outputting, switch to red light self-check function: Overcome the vibration absorption phenomenon that occurs after installation on the bucket wall, prevent noise interference, and avoid misoperation. The sensitivity is factory -set to the highest, making it suitable for places where the material to be tested is relatively stable. If the surface fluctuation of the material to be tested is large, the sensitivity needs to be reduced to prevent false alarms. When installing the tuning fork please try to avoid areas with obvious vibration to prevent incorrect operation of the tuning fork. If this cannot be avoided, please recheck the installation position.

Conduct functional tests during the operation of the instrument. Place the test magnet at the marked position on the casing and keep it there for at least 3 seconds. When the test magnet is placed on the marking of the housing for more than 3 seconds, remove the magnet when the red and green indicator lights alternate. After the instrument light stops flashing, the self-check is successful. The test magnet is a standard supply.

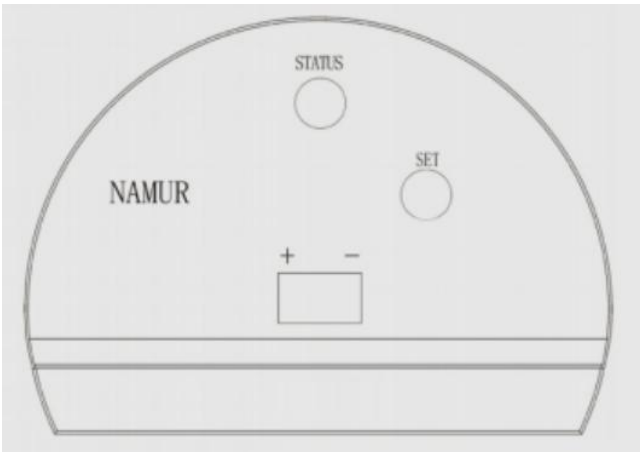


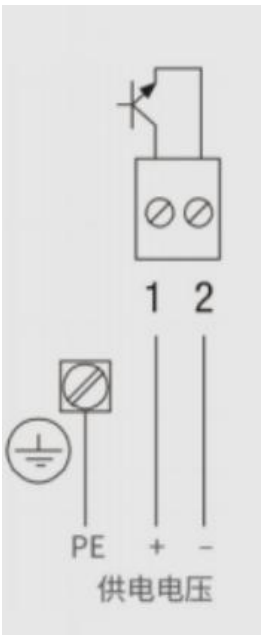




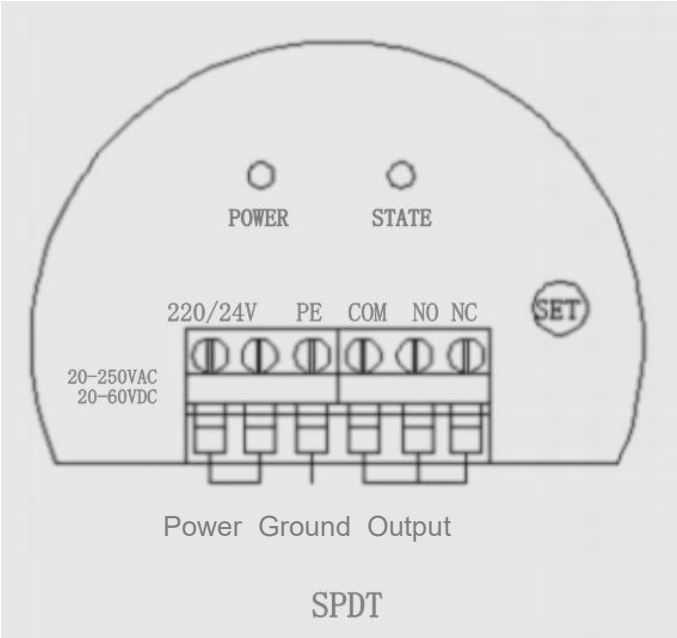


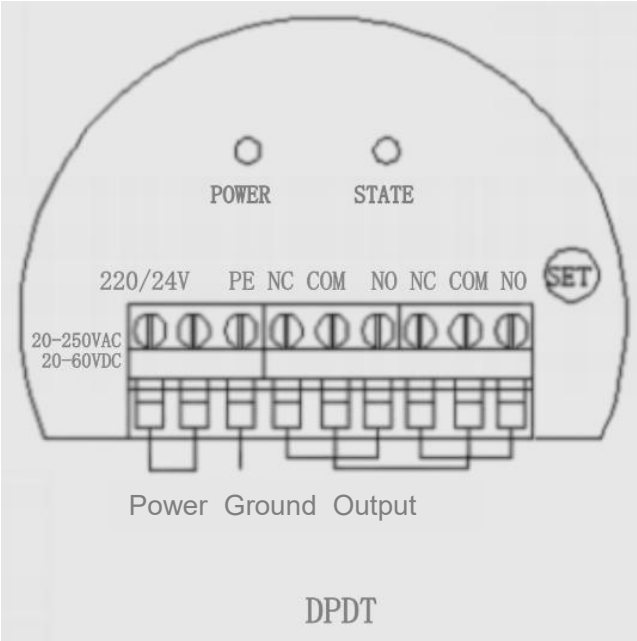
Supply voltage :spec.IEC60947-5-6<1mAor>2.2mA. Power: Green light for power indication, STATUS: Changes to red light when output. SET: Self-checking function, overcoming the vibration absorption phenomenon that occurs after installation on the bucket wall, preventing noise interference and avoiding misoperation. Conduct functional tests when the instrument is powered on. When the sound does not come into contact with the material, hold down the SET key. Release the key when the red and green indicator lights alternate. The self-check is successful when the instrument light stops flashing. The sensitivity is factory-set to the highest, making it suitable for places where the material to be tested is relatively stable. If the surface fluctuation of the material to be tested is large, the sensitivity needs to be reduced to prevent false alarms. When installing the tuning fork, please try to avoid areas with obvious vibration to prevent incorrect operation of the tuning fork. If this cannot be avoided, please recheck the installation position.

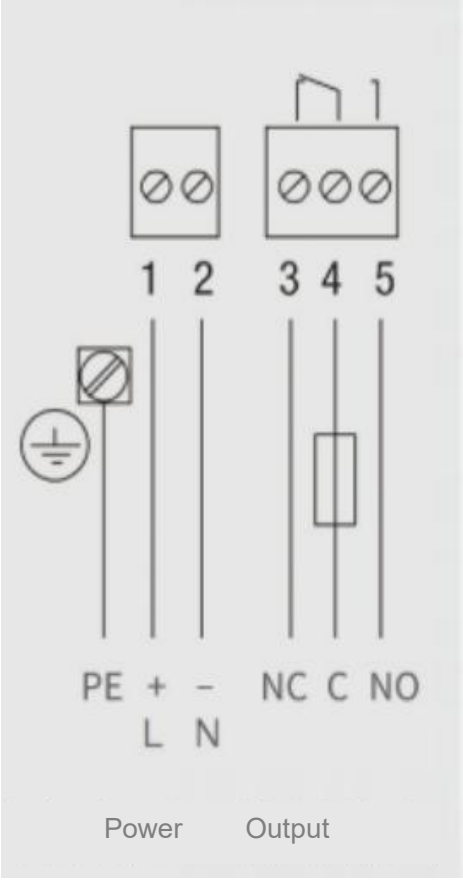




Power supply voltage :12.5-30V DC signal output :8mA or 16mAPOWER: Green light for power indication, STATE: Changes to red light during output SET: Self-checking function, overcoming the vibration absorption phenomenon that occurs after installation on the bucket wall, preventing noise interference and avoiding misoperation. Conduct functional tests when the instrument is powered on. When the sound does not come into contact with the material, hold down the SET key. Release the key when the red and green indicator lights alternate. After the instrument light stops flashing, the self-check is successful. The sensitivity is factory-set to the highest. It is suitable for places where the material to be tested is relatively stable. If the surface fluctuation of the material to be tested is large, the sensitivity needs to be reduced to prevent false alarms. When installing the tuning fork, please try to avoid areas with obvious vibration to prevent it from malfunctioning. If this cannot be avoided, please recheck the installation location.

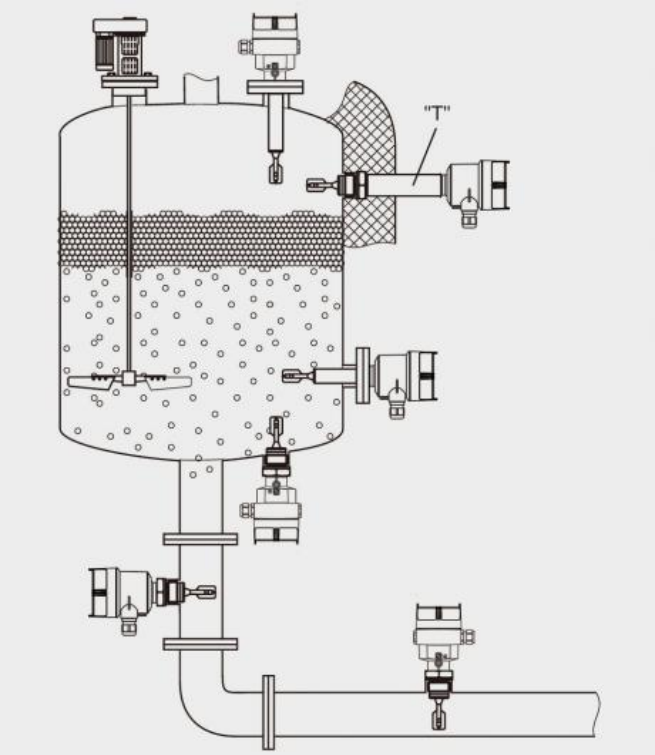






Power supply voltage :20-250VAC, 19-72VDC Signal output :relay DPDTPOWER: Power green light, switches to red light during output. Dip: The dip on the left is used to switch the normal operating mode of the relay, and the dip on the right is used to adjust the sensitivity. SET: Self-checking function, overcoming the vibration absorption phenomenon that occurs after installation on the bucket wall, preventing noise interference and avoiding misoperation. Conduct functional tests when the instrument is powered on. When the sound does not come into contact with the material, hold down the SET key. Release the key when the red and green indicator lights flash alternately. The self-check is successful when the instrument light stops flashing. The sensitivity is factory-set to the highest, making it suitable for places where the material to be tested is relatively stable. If the surface fluctuation of the material to be tested is large, the sensitivity needs to be reduced to prevent false alarms. When installing the tuning fork, please try to avoid areas with obvious vibration to prevent it from malfunctioning. If this cannot be avoided, please recheck the installation location.

Installation examples and precautions



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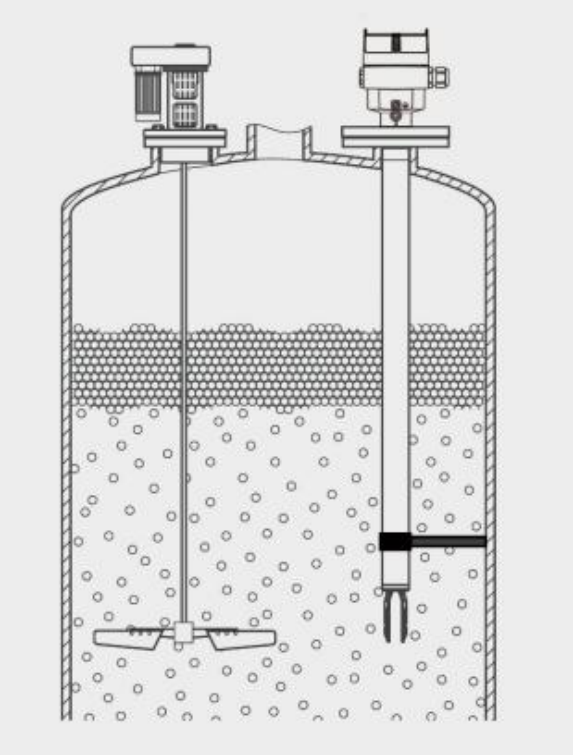
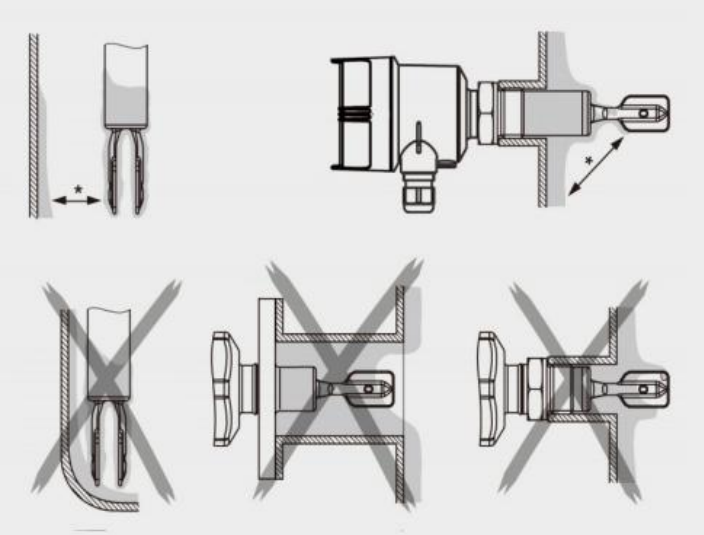


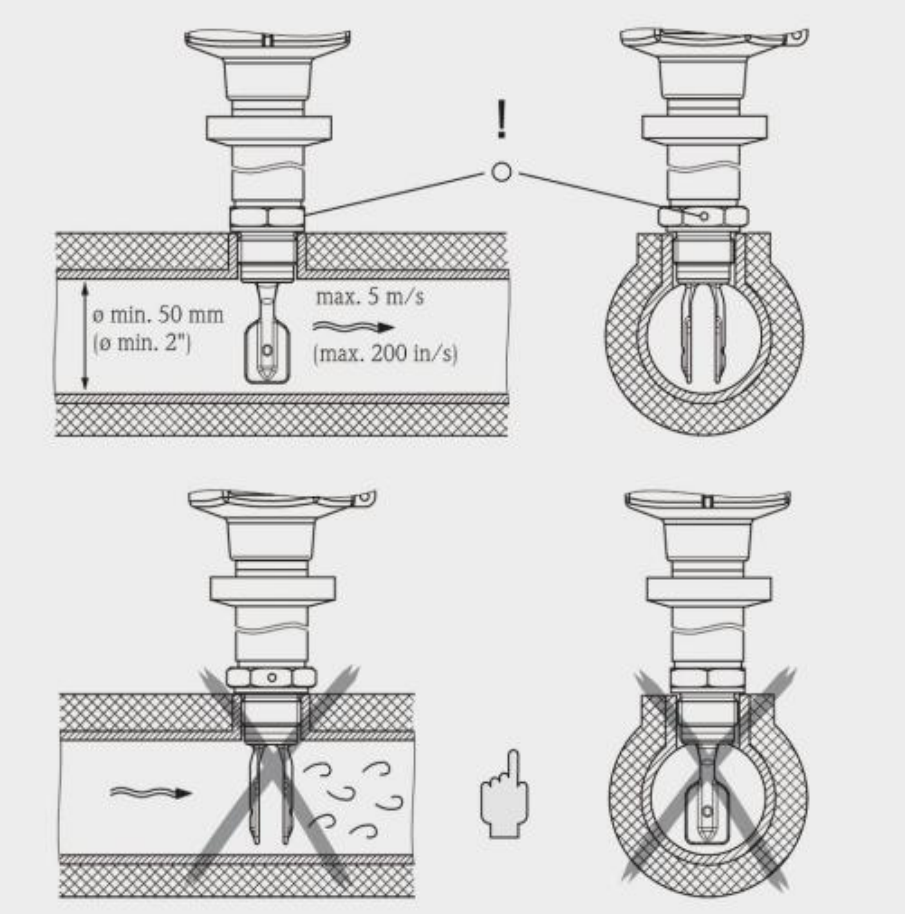
When there is an external force



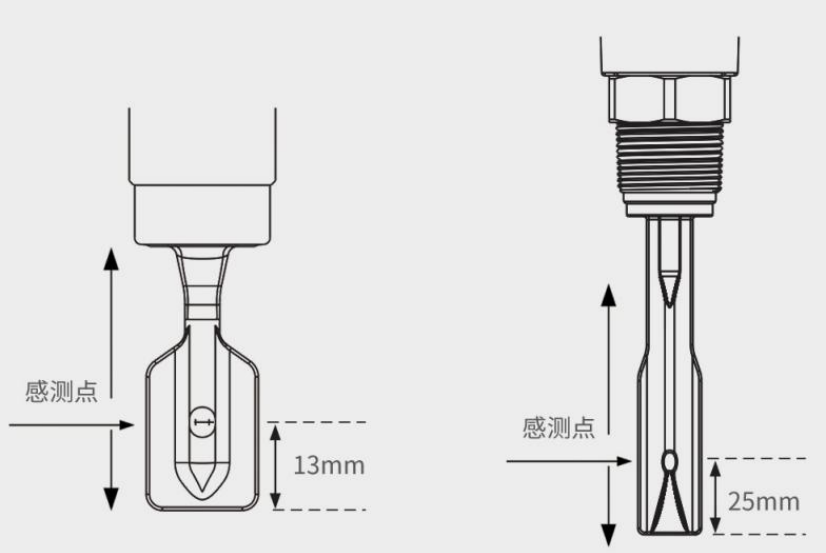
The fork body must not come into contact with any adhering substances

1. When installing, the switch can be placed horizontally downward at an Angle of 15 to 20 degrees to reduce the impact of materials and the occurrence of material hanging.
2. When installing, it should be as far away from the feed port of the tank as possible to avoid material impact and false alarms. If it is unavoidable, a partition board must be installed between the feed inlet and the material level for protection.
3. The entry port of the junction box must face down, and the fixing nut of the power cord entry port must be tightened.
4. When working in the tank, it is strictly prohibited for the staff to use the vibrating rods to climb or hang any ropes or objects.

Schematic diagram of pipeline installation



All kinds of fork bodies



Small fork body　　Standard fork body

The tuning fork sensor is located as shown in the figure. When the object to be measured is water (specific gravity =0.7g/cm ³), the sensing point is at the position of the tuning fork groove, approximately 13mm away from the top of the tuning fork, and about 8mm when installed horizontally. If the specific gravity of the object to be measured is lower than 0.7g/cm ³, the position of the sensing point will move upward. Conversely, if the specific gravity of the object to be measured is higher than 0.7g/cm ³, the position of the sensing point will move downward, and the extent of the displacement depends on the size of the specific gravity.

Fault detection

Fault phenomenon	Analysis of causes	Countermeasure
Failure to actuate	No power	Check power supply
	Signal line fault	Check signal lines
	The electronic plugin is not working L1 and n are directly connected	Replace the electronic plugin Always external load
	The liquid density is too low	Change the density setting on the electronic plug-in to>0.5
	Body scaling	Clean the body
	The internal impedance of the connected relay is too high	Connect the appropriate relay
	The current of the connected relay is too low	Connect a resistor in parallel with the relay
	Contacts welded together	Place the intermediate relay in the contact circuit
Switch is incorrect	The low/high alarm circuit is incorrectly configured	Set the correct mode for the electronic plugin
Occasional switch failure	Heavy foam, strong disturbance of the liquid surface, foam liquid surface	Install in the bypass pipe
	Severe rf interference	Use shielded cable
	Severe vibration	Reduce vibration and increase damping. Rotate the fork 90°.
	Water inside the casing	Tighten the housing cover and cable plug
	Output overload	Reduce load, (cable) capacitive reactance
Power failure The switch is not working properly	Abnormal performance during boot test (function test)	Maximum 45 seconds of device control time after power failure

※ Safety Notice

Installation, commissioning, operation and maintenance must be carried out by technicians with professional qualifications. The product must be used strictly in accordance with the specifications of this operation manual.