计为自动化

# Ring-21 Compact Liquid Level Switch


SHENZHEN JIWEI AUTOMATIONS LTD.

# Vibrating level switch

Vibrating level switch is based on a cantilever beam vibrating principle. A cylindrical rod or a fork is used as a vibration probe. Piezoelectric devices are utilized to drive and detect the vibration. With state-of-the-art techniques, the specifications of our vibrating level switch and its reliability reach to an advanced level in the field. When the vibrating probe comes in contact with the material under measure, the vibration amplitude and the frequency of the probe will substantially decrease, so does the output of the detecting piezoelectric device. The amount of decrease is analyzed by an intelligent circuit which outputs a switching signal as a result. Depending on the chemical and physical properties of the measured medium, a series of vibrating level switches can be chosen from.

Jiwei has been granted three invention patents and two utility patents on its vibrating level switches so far. One more invention patent is under checking and verification. Compared with the similar products in the market, our vibrating level switches have following advantages:

- Broader range of the medium density, can be used for the medium with extreme low density (as low as 0.008g/cm$^{3)}$.
- Excellent adaptability, particularly suits for the medium with unstable humidity and dielectric constant.
- Larger redundancy for medium buildup thanks to the precisely pre-adjusted resonance, highly reliable for the medium with higher viscosity and adhesiveness.
- High reliability because of higher quality chips purchasing, detail oriented design, and strict production flow and quality control.
- An industry-leading product for high process temperature applications, excellent performance under temperature up to 250℃, or ultra-high temperature up to 400℃ with water/air cooling.
- Smaller probe, particularly suitable for pipelines.
- Vibrating probe is made of strong corrosion resistant materials, such as 316L.
- Explosion protection certified, including gas/dust Flameproof Enclosure and gas/dust Intrinsic Safety & IP66/ IP67 ingress protection.
- Strong self-diagnostic function makes it possible to accurately locate the fault.

Our vibrating level switch has four series of product to meet requirements of a variety of applications:

### Tube-11 Vibrating Rod Level Switch:

This innovative vibrating rod level switch is designed with double vibration tubes, which is a first made-in-China model. It suits for the majority of level switch applications for granular and powdery bulk solids. The lowest medium density can be as low as 0.02g/cm$^3$.

### Fork-11 Tuning Fork Level switch:

The area of the fork body has been reasonably increased for higher sensitivity. It is particularly suitable for powder and fine-granule with the density as low as of 0.008g/cm$^3$.

### Ring-11 Liquid Level Switch:

With only 40mm length of the fork body, it is particularly designed to measure the liquid level in vessels, storage tanks, other process tanks, as well as bypass pipelines. The density of the liquid can be as low as 0.5 g/cm3.

### Ring-21 Compact Liquid level switch:

It is compact, lightweight, easy to carry and inexpensive. It is mainly aimed for the applications that are cost sensitive and no explosion protection requirement. It is particularly suitable for pipelines or other applications with constricted space.





# Ring-21 Compact Liquid Level Switch

## Overview


Ring-21 is an economical compact tuning fork liquid level switch. It is designed with a lightweight compact structure with the fork body 38 mm long, the total length 160.5 mm and the maximum diameter 31.5mm. Ring-21 can be applied to the level measurement for vessels, process tanks and storage tanks. It can tolerate foam, air bubbles, higher viscosity and vibration disturbance. Particularly it is a better choice for small containers or tanks within constricted space. It is also based on the principle that the vibrating frequency changes when the fork body is immersed into the measured medium. The measurable density can be as low as 0.7g/cm$^3$.

## Measuring principle

Same as Ring-11, Ring-21 Compact Liquid Level Switch is designed based on the fork resonant principle. When the fork body which vibrates in harmonic resonance immerses into the measured liquid, the vibrating frequency of tuning fork will greatly decrease. So does the output of the piezoelectric detection device. An integrated circuit is designed to analyze the signal from the piezoelectric device and output a switching signal.

## Features

- Compact and portable, with overall length 160.5mm, maximum diameter 31.5mm and the fork body only 38mm long.
- Particularly suitable for pipelines and other applications within constricted space.
- Economical and practical, high cost-effective ratio.
- Strong disturbance resistant ability, not influenced by foam, bubbles, viscosity, vibration and other liquid characteristics.
- Highly reliable because of detecting the changed of vibrating frequency of the fork.
- Safe and easy to operate, with great flexibility.

## Applications

- Applications that expecting low cost, in non-explosive environment or within constricted space.

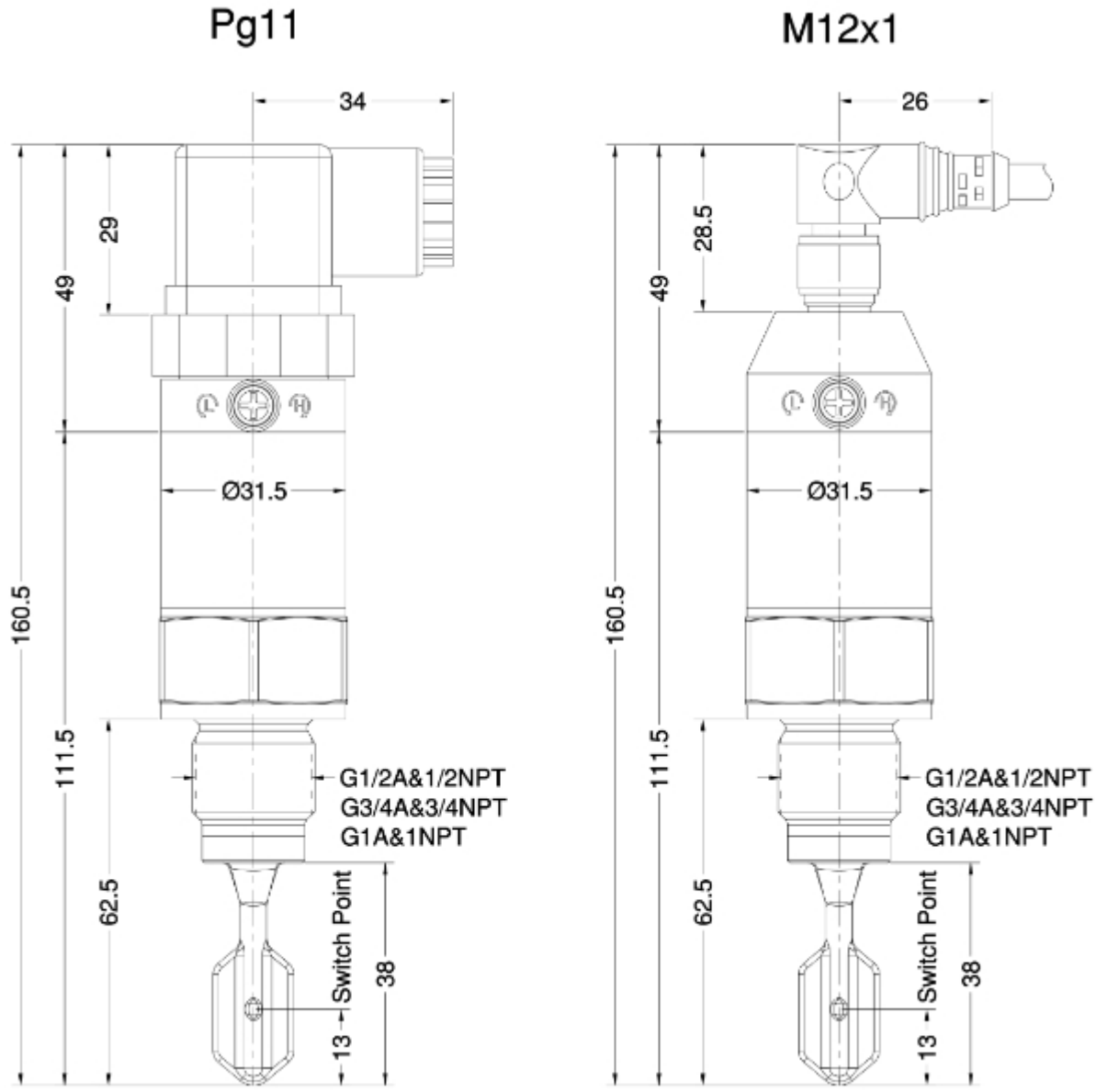
## Technical data

| | | |
|---|---|---|
| Applicable liquids | Density | ＞0.7g/cm$^3$ |
| | Viscosity | 1～10000mPa.s① |
| | Flow Velocity | Max 6m/s |
| Probe data | Vibrating frequency | ～1200Hz |
| | Fork length | 38mm |
| Accuracy | Measurement error | ±1mm |
| | Delay | 3.0±0.5mm |
| | Repeatability | 0.5mm |
| Switching delay | When immersed | 0.5s |
| | When laid bare | 1s |
| Power supply | Relay output | 85～253V AC |
| | | 10～35V DC |
| | Transistor PNP | 10～35VDC |
| | Power consumption | AC: < 3.8mA; DC: < 825mW |
| Working environment | Process pressure | -1～40bar |
| | Process temperature | -50～150℃ |
| | Ambient temperature | -40～70℃ |
| | Storage and transport temperature | -40～80℃ |
| Overvoltage protection | Relay output | Category III, class I |
| | Transistor PNP | Category III, class II |
| Approvals | Protection rating | Valve connector: IP65 |
| | | M12x1: IP66/IP67 |
| Materials | External housing | 316L |
| | Process fitting | 316L |
| | Process seal | Klingersil C-4400 |

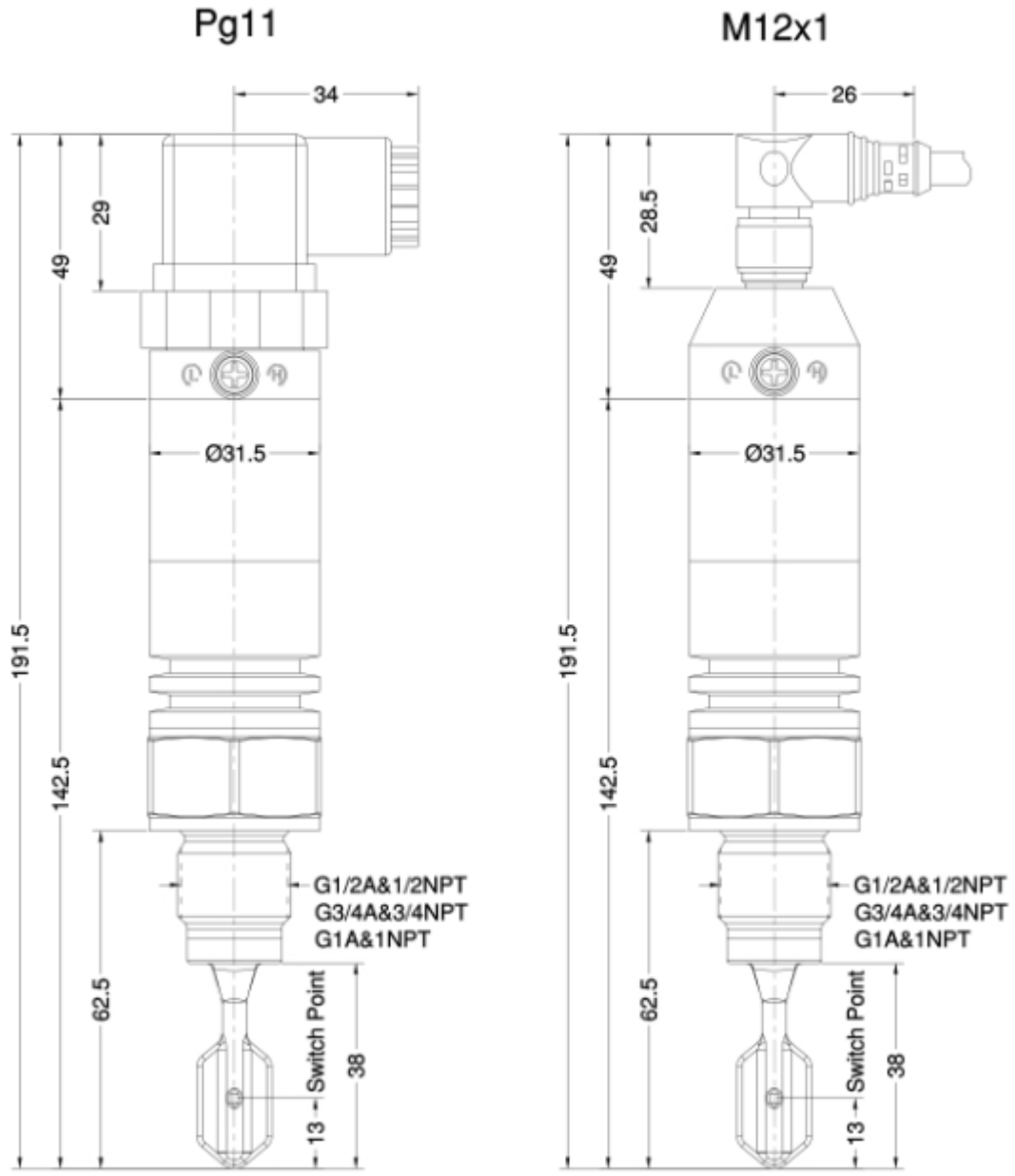
Note: ①: assume the medium density equals to1.

Dimensional drawings

## Ring-21 Regular Temperature



## Ring-21 High Temperature




**Installation diagrams**

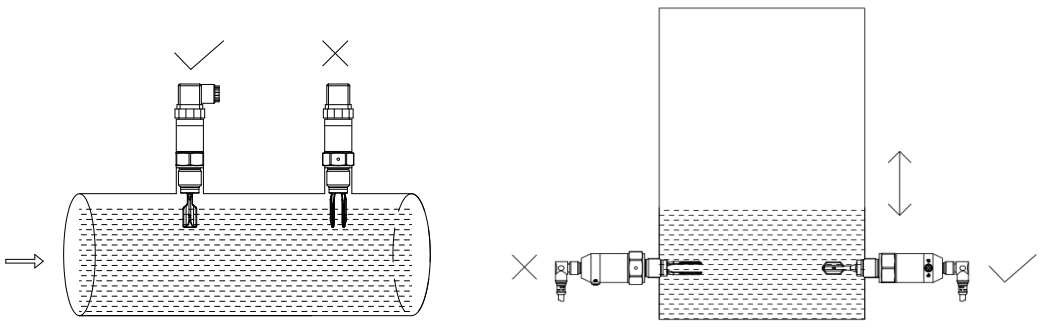


Fig.1

Fig.2

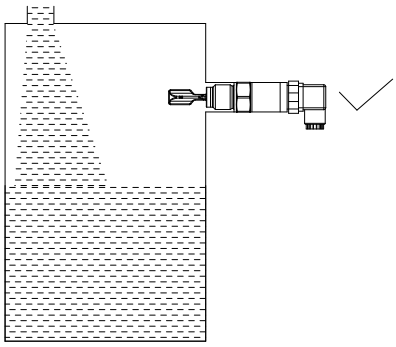


Fig.3

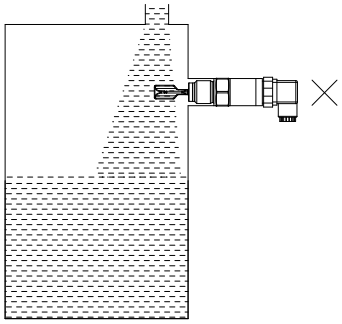


Fig.4

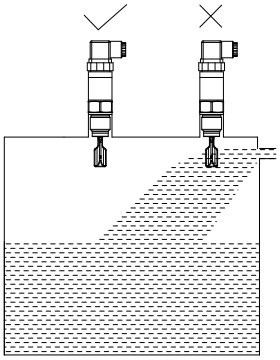


Fig.5

**Notes：**

- The surface of the fork wing should be parallel to the moving direction of the measured medium, as shown in Fig.1 (the medium moves horizontally) and Fig.2 (the medium moves vertically).
- Avoid installing the instrument near the inlet and outlet points. Fig.3 and Fig.4 are schemes to show the correct and wrong installation position respectively for horizontal installation. Fig.5 is a scheme to show the correct and wrong installation position for vertical installation.

## Order information

**Ring-21** □ □ □ □

| | | |
|---|---|---|
| Process temperature | C | -50～100℃ |
| | H | -50～150℃ |
| Process fitting | TA | Thread G ½"A |
| | TB | Thread ½ "NPT |
| | TC | Thread G ¾"A |
| | TD | Thread ¾ "NPT |
| | TH | Thread G 1"A |
| | TM | Thread 1"NPT |
| | XX | Customized |
| Power supply & signal output | R | Relay（10～35V DC) |
| | S | Relay（85～253V AC） |
| | T | PNP（10～35 V DC） |
| Cable entry | C | Pg11 |
| | M | M12×1 |