

Vibrating level switch Catalog



Vibrating level switch

Vibrating level switch uses piezoelectric devices to achieve vibration drive and detection. It is designed with state-of-the-art technique, which upgrades the product performance to an advanced level and has higher reliability in counterparts. When the vibrating probe contacts with the measured material, the vibration amplitude and the frequency of the probe will obviously decrease, also, the reduction is detected by the piezoelectric devices and will be converted into a switching signal by intelligent circuit. Depending on different chemical property and physical form of measured medium, different series of vibrating level switch can be chosen.

We firmly believe that details determine the quality and reliability of our products, and we have been paying highly attention to tiny details in technology and process while in R&D and production. Compared to the same products of other rival brands, our vibrating level switches have the following advantages:

- Highly sensitivity with measurable medium, the density can reach as low as 0.008 g/cm^3 ;
- Well adapted to medium with changing humidity and dielectric constant;
- With high redundancy for hanging and adhesion, has high reliability to measure viscous and easy hanging medium;
- Small probe, particularly suitable for pipelines measurement;
- Process temperature can reach up to 250°C , which is industry-leading;
- Vibrating probe is made of strong anti-corrosive materials, such as 316L;
- Got Ex-approval/Intrinsically Safe certification & IP66/67 ingress protection;
- Strong self-diagnostic function can recognize false position accurately.

In order to meet a variety of application conditions, our vibration level switches are divided into the following four series:

Tube-11 Vibrating Rod Level Switch: The first made-in-China vibration rod level switch designed with double vibration elements, is mainly used to measure the level of granular and coarse-grained bulk solids with the lowest measurable density of 0.02g/cm^3 .

Fork-11 Tuning Fork Level switch: By increasing the area of fork body, it is particularly suitable for the level measurement of powders and fine-grained bulk solids with the lowest measurable density of 0.008 g/cm^3 .

Ring-11 Liquid Level Switch: With only 40mm length of the fork body, it is particularly aimed to measure the level of liquid with the lowest measurable density of 0.5 g/cm^3 , and can be mounted in vessels, canisters and tanks, and also in bypass pipelines.

Ring-21 Compact Liquid level switch: Designed in compact and lightweight form, It is mainly applied in occasions that require low-cost price, and in non hazardous areas. It is particularly suitable to be installed in pipelines and constricted spaces.



Tube-11 Vibrating Rod Level switch

Overview

Tube-11, is the first made-in-China vibration rod level switch that designed with double vibration elements and with the lowest measurable density of 0.02g/cm^3 , is mainly used to measure the level of granular and coarse-grained bulk solids, such as PVC, sodium hydroxide, lime, cement, sand, soil, coal, dust, flour, sugar, salt, grain, bean, etc.



Measuring principles

The probe of Tube-11 vibrating rod level switch is designed with double vibration elements, the inner vibration element nests with the outer vibration element. By activating both the inner and outer vibration elements to work at the same resonance frequency, this makes the switch has high reliability and high detection sensitivity with the lowest measurable density of 0.02g/cm^3 . The product uses piezoelectric devices to achieve vibration drive and detection, resulting in resonance of both inner and outer vibration elements at completely consistent resonance frequency. When the vibrating rod contacts with measured material, the resonant frequency of outer vibration element will change, thereby destroying the resonance conditions of both the inner and outer vibration elements makes the vibration amplitude of the probe will be obviously decreased, which also decreases the amplitude of output signal from the piezoelectric detection device. This reduction is detected by the integrated electronics module and converted into a output switching signal.

Features

- First made-in-China double-rod probe designed with inner and outer vibration elements.
- With high redundancy for hanging and adhesion, has high reliability to measure viscous medium and it is easy to adapt to hanging medium.
- High sensitivity with the lowest medium density of 0.02g/cm^3 .
- Process temperature can reach up to 250°C , which is industry-leading.
- Strong self-diagnostic function, can detect false position accurately.
- Easy for installation and no calibration required.
- Made of strong anti-corrosive materials, such as 316L, 318 S13.

∨ Typical applications

- Particularly suitable to measure the outcome silos of the mixture of CaSO_4 and CaSO_3 in semi-dry desulfurization reaction unit at coal power plant.
- High redundancy for hanging and adhesion are benefited from double rods design, well solves the adhesion problem from mixture of CaSO_4 and CaSO_3 .
- Due to unstable changing of the dielectric constant caused by humidity changing from the mixture of CaSO_3 and CaSO_4 , the RF Admittance Level Switch cannot be reliably applied to such working condition, thus, the vibrating level switch has nothing to do with dielectric constant and is able to achieve highly reliable measurement.
- Well used at dust bin of desulfurization and silo of regeneration tower at power plant, where the temperature of active coke is up to $180\text{ }^\circ\text{C}$, but it is still less than the switch's highest process temperature -- $250\text{ }^\circ\text{C}$.
- Widely used in combustion systems bunker at power plant, in which the sawdust and straw density is only about $0.1\text{g}/\text{cm}^3$, but for other general level switches, it is difficult to reliably measure the level due to the low density. However, Tube-11 with the lowest measurable density of $0.02\text{g}/\text{cm}^3$ is perfect for this kind of occasion.
- Well installed in dust bag and ash conveying system of ash pump and storehouse at power plant. Tube-11, with only 150mm length of the probe, significantly reduces the probe's impacted area by heavy ashes, and greatly avoids the probe's damage caused by material impact.
- Used to measure the level of coal ash collecting device (fly ash silo).
- Used to measure the level of sintered ash silo at smelter plant.
- Used in PVC granule storage silos, and packaging line silo monitoring at chemical plant.
- Used in the measurement of cement raw material hoist hopper at cement plant.

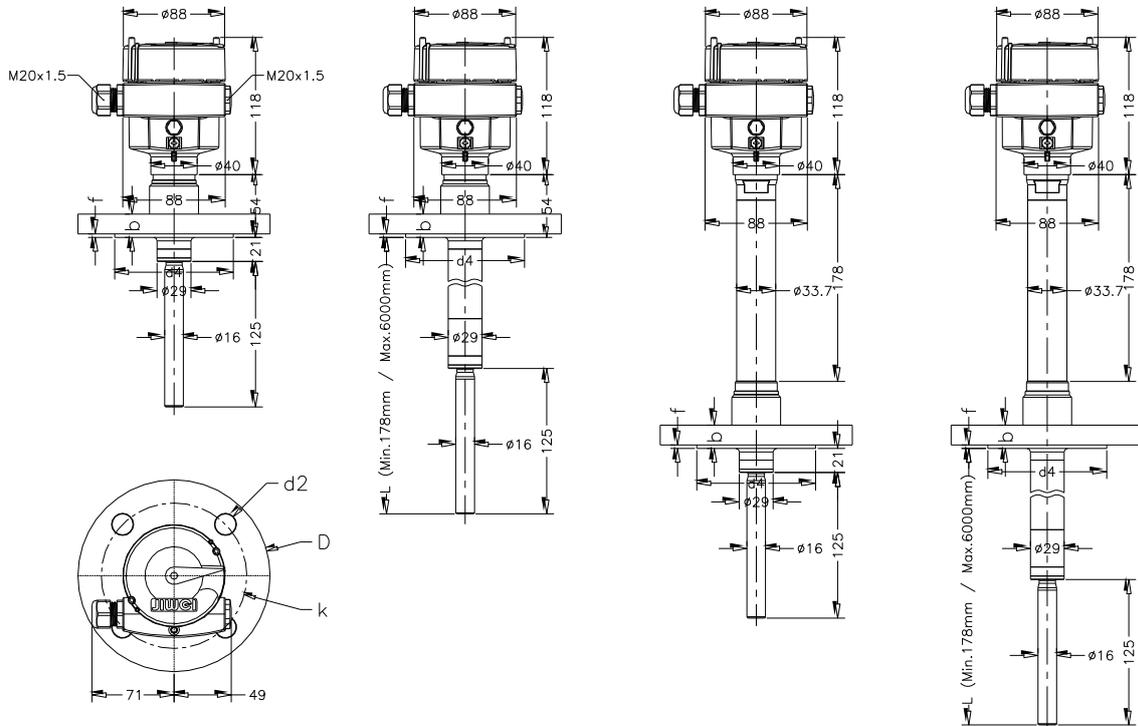
Technical data

Applicable materials	Solid	Granular or powder ^①
	Density	> 0.02g/cm ³
Probe data	Vibration frequency	~360Hz
	Probe length	125mm
	Probe diameter	16mm
Switching Delay	When immersed	0.5S
	When laid bare	1S
Power	Relay output	20~250VAC/20~72VDC
	Two-wire	10~36VDC
	Power consumption	AC1-8VA/DC1.5W
Output variable	Relay output	DPDT,5A/253VAC/24VDC
	Two-wire output	8mA/16mA,Alarm<2.3mA
Ambient conditions	Process pressure	-1~16bar
	Process temperature	-50℃~250℃
	Ambient temperature	-40℃~70℃
	Storage and transport temperature	-40℃~80℃
Electrical protections	Relay output	Category III, class I
	Two-wire	Category III, class II
Approvals	Protection rating	IP66/67
	Explosion-proof	EX d IIC T6,EXia IIC T6
Materials optional	Housing	Plastic, Aluminum, Stainless steel
	Ground terminal	316L
	Process fitting	316L
	Vibrating rod	316L,318 S13
	Process seal	Klingersil C-4400

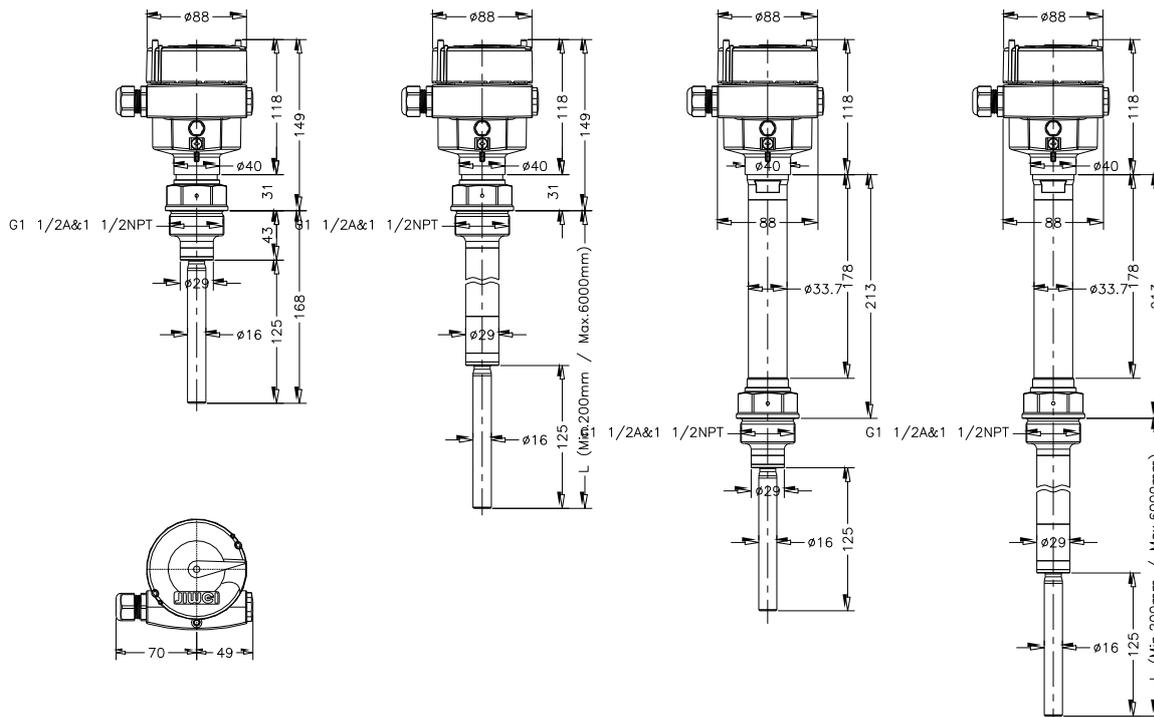
Notes: ①The Max particle size 20mm, on the basis of this requires medium density <0.05g/cm³.

Dimensions

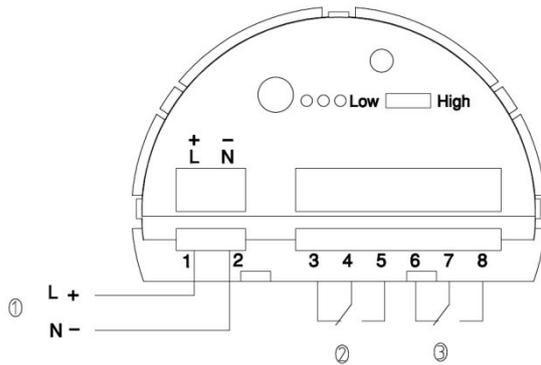
Tube-11-Flange



Tube-11-Thread

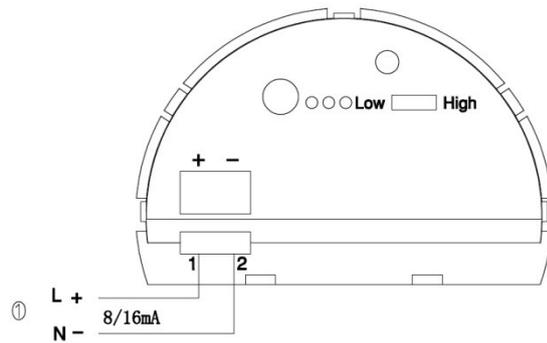


↘ Circuit Diagrams



Relay output

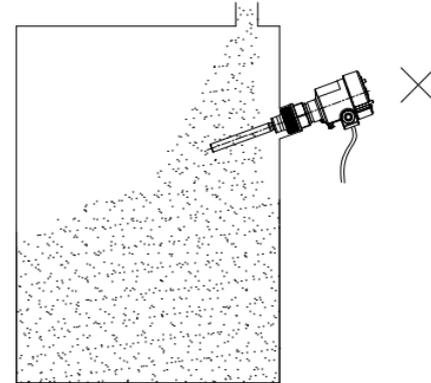
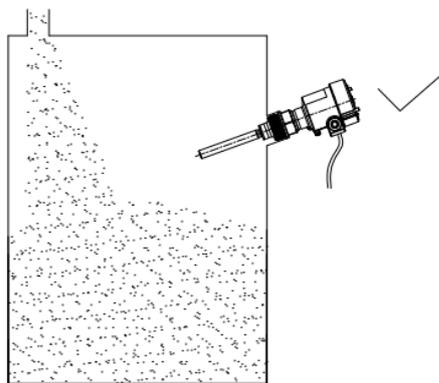
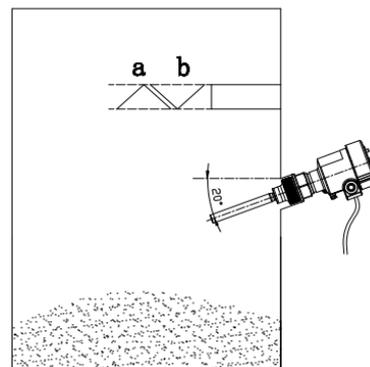
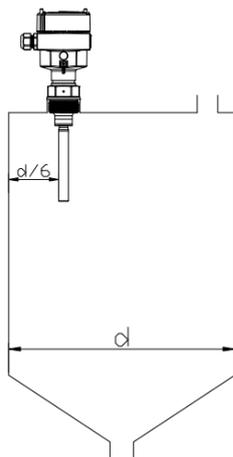
- ①: Power terminal
- ②③: Output, DPDT



Two-wire output

- ①: Power terminal / output (8/16mA)

↘ Installation diagrams



Notes:

- (1) When install vertically, install from a distance of $d/6$ from the vessel wall;
- (2) When install horizontally, install in approx. 20° inclined to the vessel bottom to avoid buildup;
- (3) Avoid installing in inlet and outlet points.

Order information

Tube-11	
Approvals	N For EX-free area I Intrinsically Safe(Exia IIC T6) D Flame-proof(Exd IIC T6)
Process temperature	C -50~150℃ H -50~250℃
Process fitting	TG Thread G1 1/2" A TN Thread NPT 1 1/2" A TH Thread G1" A TM Thread NPT 1" A FA Flange DN50 PN40 FB Flange DN80 PN40 FC Flange DN50 PN16 FD Flange DN80 PN16 XX Customized design
Electronics	R Relay (20~70V DC/20~253V AC) ① W Two-wire 8/16mA (12~36V DC)
Housing/Protection	P Plastic/IP66/67 A Aluminum/IP66/67 (0.2bar)
Cable entry	M M20*1.5 N 1/2NPT
Intruding depth	S Standard(168mm) L Lengthened(178mm≤L≤6000mm)

Notes: If ① is selected, the options of "I" of the certificate are not available.

Fork-11 Tuning Fork Level Switch

Overview

Fork-11 Tuning Fork Level Switch is mainly used to measure the level of powders and fine-grained bulk solids, such as sand, fine chemicals, flour, salt and other similar materials, which is particularly suitable for ultra low-density materials with the lowest measurable density of 0.008g/cm^3 . This switch has wide adaptability and high reliability.

Measuring principles

Designed on the basis of tuning fork, Fork-11 uses piezoelectric devices to achieve vibration drive and detection. The fork vibrates freely under the resonance frequency when it is not covered by material, the vibration amplitude of the fork will obviously decrease when the vibrating fork body is covered by material. This reduction is detected by piezoelectric devices and converted into a switching output signal by intelligent circuit. By increasing the area of fork body, its sensitivity will be improved markedly while the lowest measurable density is 0.008g/cm^3 .



Features

- By increasing the area of fork body, the lowest measurable density can reach to 0.008g/cm^3 .
- High redundancy for hanging and adhesion
- Particularly for level measurement of powders and fine-grained bulk solids.
- Process temperature can reach up to 250°C , which is industry-leading.
- Strong self-diagnostic function, can detect false position accurately.
- Easy for installation, no calibration required.
- Made of strong anti-corrosive materials, such as 316L, 318 S13.

Typical applications

- Reliably used in the hopper of foam molding machine and plastic machine. By increasing the area of fork body, the lowest measurable density is up to 0.008g/cm^3 . It is particularly suitable for measurement of ultra-low-density and non-conductive medium, such as foam particles.

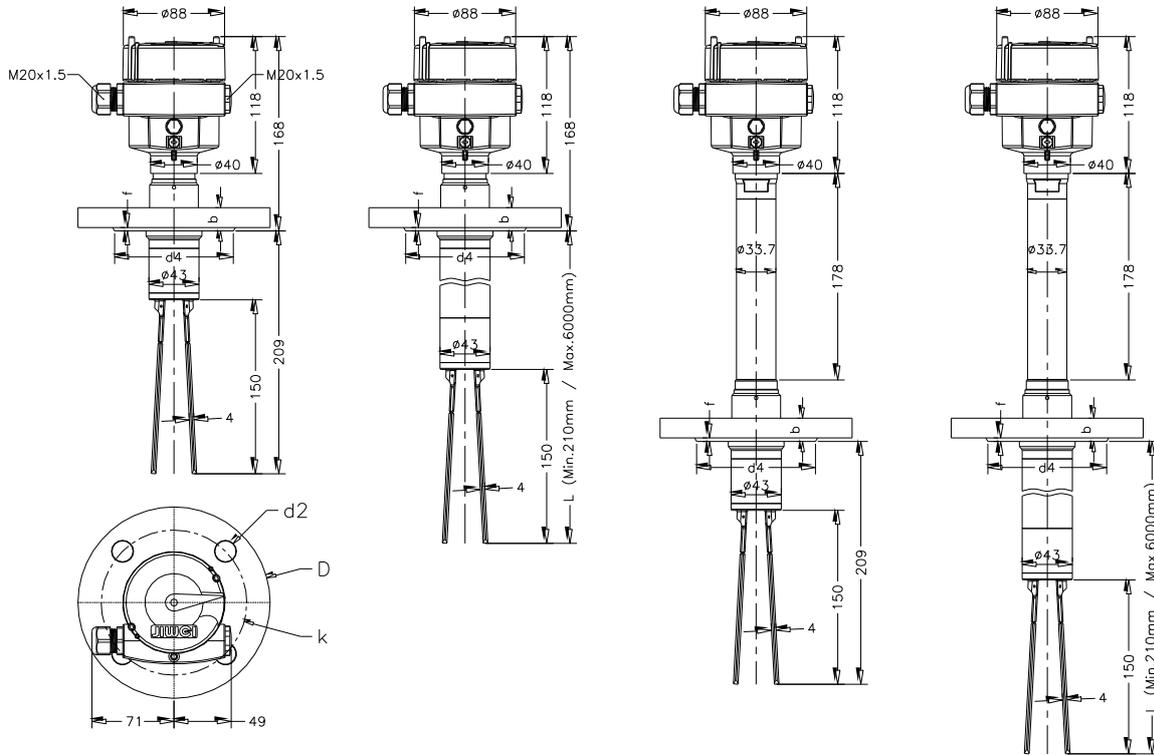
- Function works well in the hopper of cement packaging line. Fork-11, with thinner wing and larger separate space of the fork body, is particularly suitable to measure the level of powders and it can effectively prevent the accumulation of material on fork wing.
- Used to monitor the storage silo of salt.
- Used in rubber raw materials warehouse.

Technical data

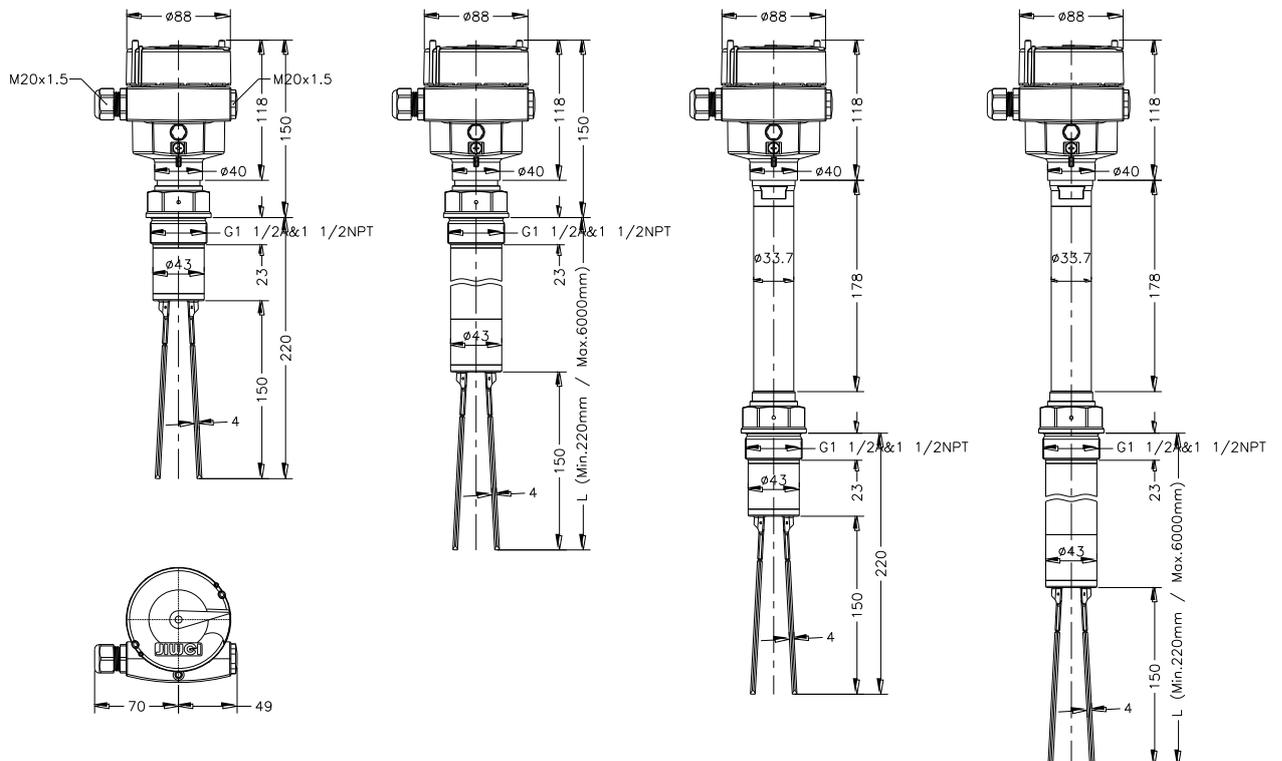
Applicable materials	Solid	powders or granular
	Density	> 0.008g/cm ³
	Granular size	Max 10mm
Fork data	Vibration frequency	~140Hz
	Fork length	150mm
Switching Delay	When immersed	0.5S
	When laid bare	1S
Power	Relay output	20~250VAC/20~72VDC
	Two-wire	10~36VDC
	Power consumption	AC1-8VA/DC1.5W
Output variable	Relay output	DPDT,5A/253VAC/24VDC
	Two-wire	8mA/16mA,Alarm<2.3mA
Ambient conditions	Process pressure	-1~25bar
	Process temperature	-50℃~250℃
	Ambient temperature	-40℃~70℃
	Storage and transport temperature	-40℃~80℃
Electrical protections	Relay output	Category III, class I
	Two-wire	Category III, class II
Approvals	Protection rating	IP66/67
	Explosion-proof	EX d IIC T6, EX ia IIC T6
	SIL	Under evaluation
Materials optional	Housing	Plastic, Aluminum, Stainless steel
	Ground terminal	316L
	Process fitting	316L
	Fork body	316L
	Process seal	Klingersil C-4400

Dimensional drawing

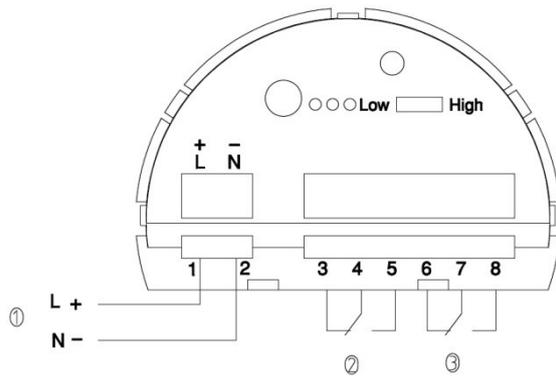
Fork-11-Flange



Fork-11-Thread



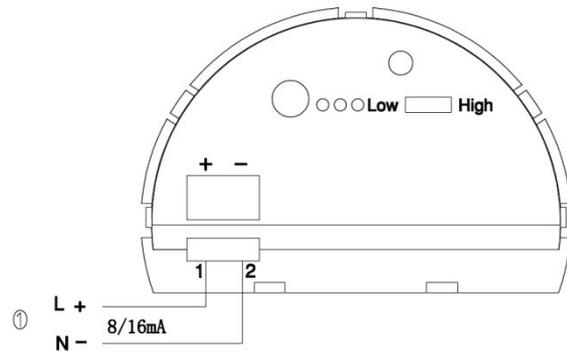
▾ Circuit diagrams



Relay output (DPDT)

①: Power terminal

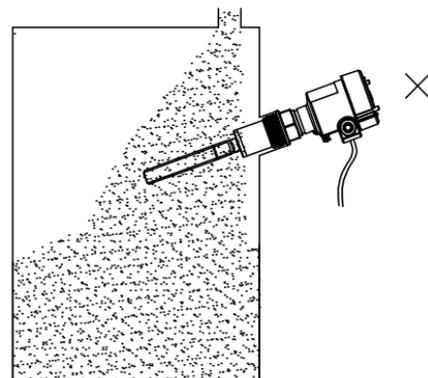
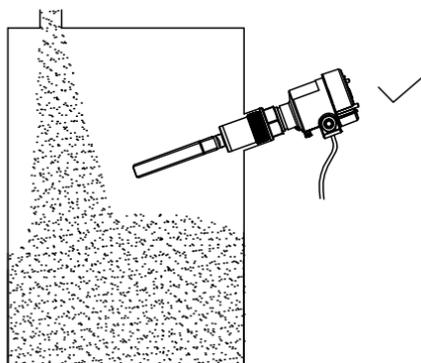
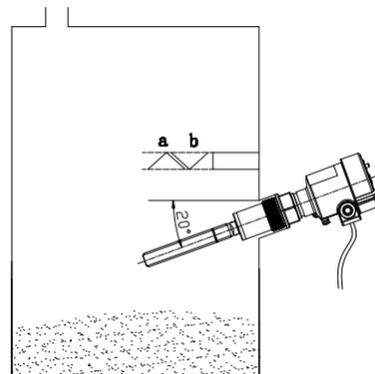
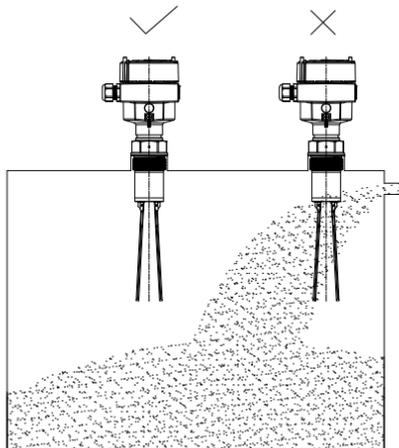
②③: Relay output (DPDT)



Two-wire

①: Power terminal /output (8/16mA)

▾ Installation diagrams



Notes:

- (1) When install horizontally, install in approx.20°inclined to the vessel bottom to avoid buildup.
- (2) The surfaces of the fork wings need to be installed parallel to the direction of product's movement.
- (3) Avoid installing in inlet and outlet points.

Order information

Fork-11							
Approvals	N	For EX-free area					
	I	Intrinsically Safe(Exia IIC T6)					
	D	Flame-proof(Exd IIC T6)					
Process temperature	C	-50~150℃					
	H	-50~250℃					
Process fitting	TG	Thread G1 1/2" A					
	TN	Thread NPT1 1/2" A					
	FA	Flange DN50 PN40					
	FB	Flange DN80 PN40					
	FC	Flange DN50 PN16					
	FD	Flange DN80 PN16					
	XX	Customized design					
Electronics	R	Relay (20~70V DC/20~253V AC) ①					
	W	Two-wire/8~16mA (12~36V DC)					
Housing/Protection	P	Plastic/IP66/67					
	A	Aluminum/IP66/67 (0.2bar)					
Cable entry	M	M20*1.5					
	N	1/2"NPT					
Intruding depth	S	Standard(220mm)					
	L	Lengthened(240mm≤L≤6000mm)					

Notes: If ① is selected, the options of "1" of the certificate are not available.

Ring-11 Liquid Level Switch

Overview

Ring-11, a high-reliable and compact level switch dedicated to liquid level measurement, is designed with only 40mm length of the fork body. Based on the design principle to detect vibration frequency change of the fork body immersed in medium, Ring-11, with the lowest measurable density of 0.5 g/cm³ and its precision is the same as a millimeter, is particularly aimed to measure the level of low density liquid. It can be mounted in vessels and canisters, and also in bypass pipelines and output tubes of canister. Ring-11 not only can be applied to the level measurement of hydrochloric acid, sulfuric acid, nitric acid, lye, industrial waste water, syrup, etc., but also suitable for difficult conditions, such as turbulence, air bubbles, foam generation, buildup, and strong external vibration.



Measuring principles

Ring-11 uses piezoelectric devices to achieve vibration drive and detection. By shortening the length of fork body to increase the vibration frequency, the frequency will obviously decrease when the vibrating fork body contacts with tested liquid. This change of vibration frequency directly reflects on the output signal of the piezoelectric detection device, thus, the detection circuit responds to the change of frequency and converts into a switching output signal.

Features

- Fork length is only 40mm, especially suitable for pipelines' measurement.
- Measurable medium's density can be as low as 0.5g/cm³.
- Strong anti-interference feature, can work even under tough conditions, such as turbulence, air bubbles, foam generation.
- Process temperature can reach up to 250°C, which is industry-leading.
- High reliability due to the detection of vibration frequency changing of the fork body.
- Made of strong anti-corrosive materials, such as 316L, 316 enameled, 316L with ECTFE coating, 316L with PFA coating.

Typical applications

- Used in the measurement of liquefied natural gas (LNG) with the density of 0.56g/cm^3 . Ring-11, with only 40mm long of fork body, and the lowest measurable density is 0.5g/cm^3 , especially suitable for LNG pipeline monitoring, which is under difficult working conditions, such as explosion-proof, high pressure and ultra low density.
- Widely used in producing chemical spices, which usually produce under highly corrosive condition and high temperature environment. In order to adapt to acid and alkali liquid, the fork body and the flange are coated with ECTFE or PFA, and its working temperature is up to $250\text{ }^\circ\text{C}$.
- Widely mounted in storage tanks of petroleum, crude oil, gasoline, lubricating oil, etc. This product has been approved by dual certifications of Intrinsically Safe and Explosion-Proof (Intrinsically Safe Ex ia IIC T6, flameproof Ex d IIC T6).
- Widely mounted in pipeline for pump protection.

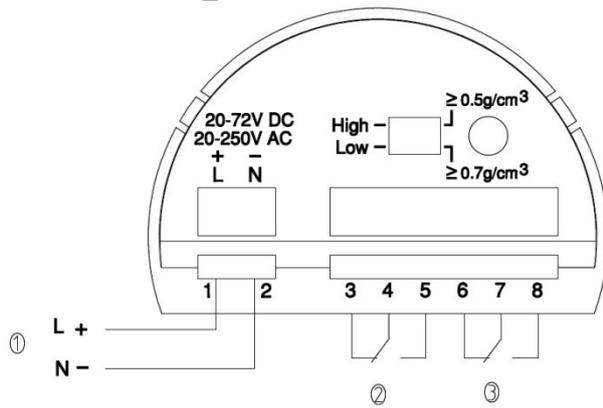
Technical data

Applicable liquid	Density	$> 0.5\text{g/cm}^3$
	Viscosity	$0.1\sim 10000\text{mPa}\cdot\text{s}^{\text{①}}$
	Flow Velocity	Max 6m/s
Fork data	Vibration frequency	$\sim 1200\text{Hz}$
	Fork length	40mm
Accuracy	Measurement	$\pm 1\text{mm}$
	Delay	2mm
	Repeatability	0.1mm
Switching delay	When immersed	0.5S
	When laid bare	1S
Power	Relay output	$20\sim 250\text{VAC}/20\sim 72\text{VDC}$
	Two-wire	$10\sim 36\text{VDC}$
	Power consumption	AC1-8VA/DC1.5W
Output variable	Relay output	DPDT,5A/253VAC/24VDC
	Two-wire	8mA/16mA,Alarm $<2.3\text{mA}$
Ambient conditions	Process pressure	$-1\sim 64\text{bar}$
	Process temperature	$-50\text{ }^\circ\text{C}\sim 250\text{ }^\circ\text{C}$
	Ambient temperature	$-40\text{ }^\circ\text{C}\sim 70\text{ }^\circ\text{C}$
	Storage and transport temperature	$-40\text{ }^\circ\text{C}\sim 80\text{ }^\circ\text{C}$

Electrical protections	Relay output	Category III, class I
	Two-wire	Category III, class II
Approvals	Protection rating	IP66/67
	Explosion-proof	EX d IIC T6, EX ia IIC T6
Materials optional	Housing	Plastic, Aluminum, Stainless steel
	Ground terminal	316L
	Thread fitting	316L
	Flange fitting	316L, 316 enameled, 316L with ECTFE coating, 316L with PFA coating
	Fork body	316L, 316 enameled, 316L with ECTFE coating, 316L with PFA coating
	Process seal	Klingsil C-4400

Note: conditions of ①: the viscosity range with the density of 1

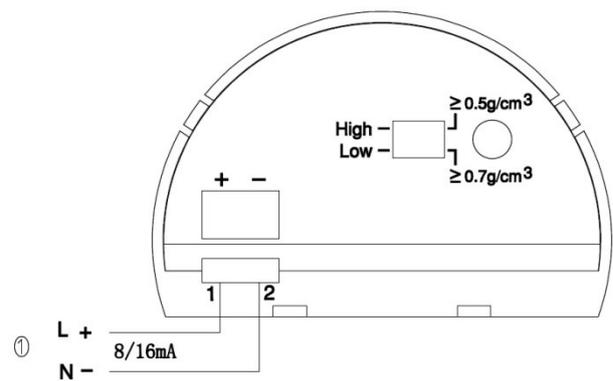
↘ Circuit diagrams



Relay output (DPDT)

①: Power terminal

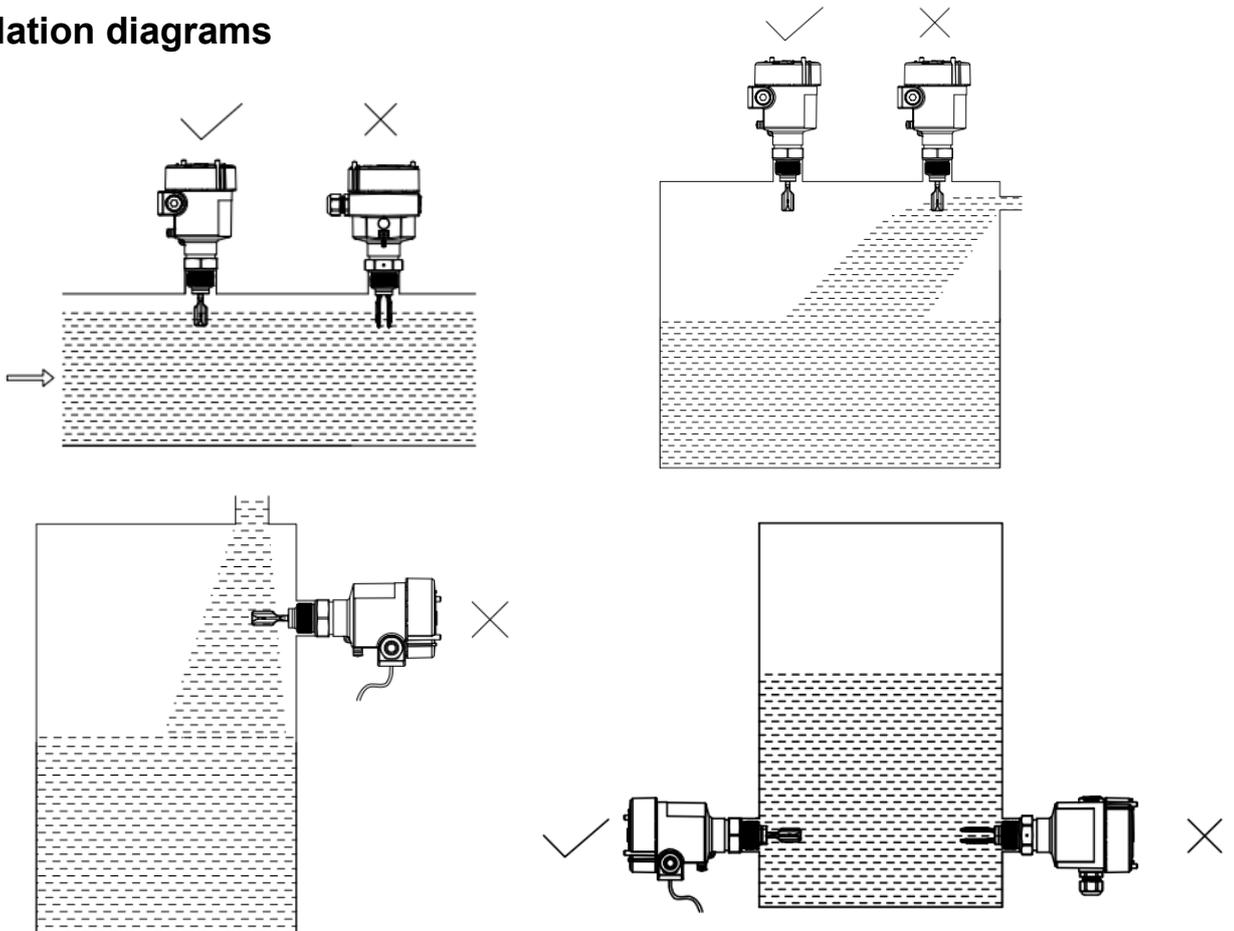
②③: Relay output (DPDT)



Two-wire

①: Power terminal /output (8/16mA)

↘ Installation diagrams



Notes:

- (1) The surfaces of the fork wings need to mount parallel to the direction of product's movement.
- (2) Avoid installing in inlet and outlet points.

Order information:

Ring-11	
Approvals	N For EX-free area I Intrinsically Safe(Exia IIC T6) D Flame-proof(Exd IIC T6)
Process temperature	C -50~150℃ H -50~250℃ A -50~150℃ / Gas-tight leadthrough B -50~250℃ / Gas-tight leadthrough
Process fitting	TC Thread G3/4"A TD Thread NPT3/4"A TH Thread G1"A TM Thread NPT1"A FA Flange DN25 PN40/316L FB Flange DN50 PN40/316L FC Flange DN25 PN40/ with ECTFE coating FD Flange DN50 PN40/ with ECTFE coating FE Flange DN25 PN40/ with PFA coating FF Flange DN50 PN40/ with PFA coating FG Flange DN25 PN40/ with Enamel coating FH Flange DN50 PN40/ with Enamel coating XX Customized design
Electronics	R Relay (20~70V DC/20~253V AC) ① W Two-wire 8/16mA (12~36V DC)
Housing/Protection	P Plastic/IP66/67 A Aluminum/IP66/67 (0.2bar)
Cable entry	M M20*1.5 N 1/2"NPT
Intruding depth	S Standard(69mm) L Lengthened(80mm≤L≤6000mm)

Notes: If ① is selected, the options of "I" of the certificate are not available.

Ring-21 Compact Liquid Level Switch

Overview

Ring-21, an economical compact tuning fork liquid level switch, is designed in a compact and lightweight structure, with only 40mm long of the fork body while the total length is only 167mm, and the maximum diameter is about only 32mm. Ring-21 can be applied to the level measurement of vessels, storage tanks under difficult conditions, such as air bubbles and vibration interference. This switch is particularly suitable to be installed in small containers and tanks with constricted mounting space. The design principles are also based on the detection of changing of vibration frequency when fork body is immersed in medium. The measurable medium density is as low as 0.5g/cm^3 .



Measuring principles

Ring-21 is also designed based on the principles of detecting the changing of fork's vibration frequency when it is immersed in medium. The vibration frequency of the fork obviously decreases when vibrating fork body contacts with tested liquid. This change of vibration frequency directly reflects on the output signal of the piezoelectric detection device, and the detection circuit will respond to the change of the frequency, as well as converting it into a switching output signal.

Features

- Compact and lightweight structure, with total length of 167mm, maximum diameter of 32mm, and is only 40mm long of the fork body.
- Particularly suitable for pipelines measurement in constricted mounting space.
- Measurable medium density can be low to 0.5g/cm^3 .
- Low price, cost-effective.
- Unaffected by the foam, air bubbles, viscous, vibration and liquid properties.
- High reliability due to the detection of vibration frequency changing of the fork body.
- Simple operation. Safe, reliable, and has strong compatibility.

Typical applications

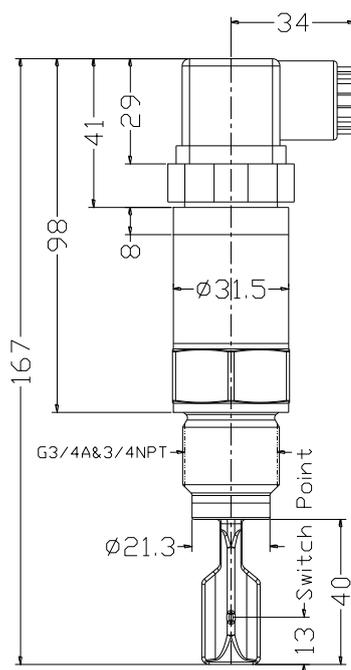
- Mainly applied in occasions that requires low-cost measurement, and it is suitable for nonhazardous areas, particularly applicable to install in pipelines and constricted spaces.

Technical data

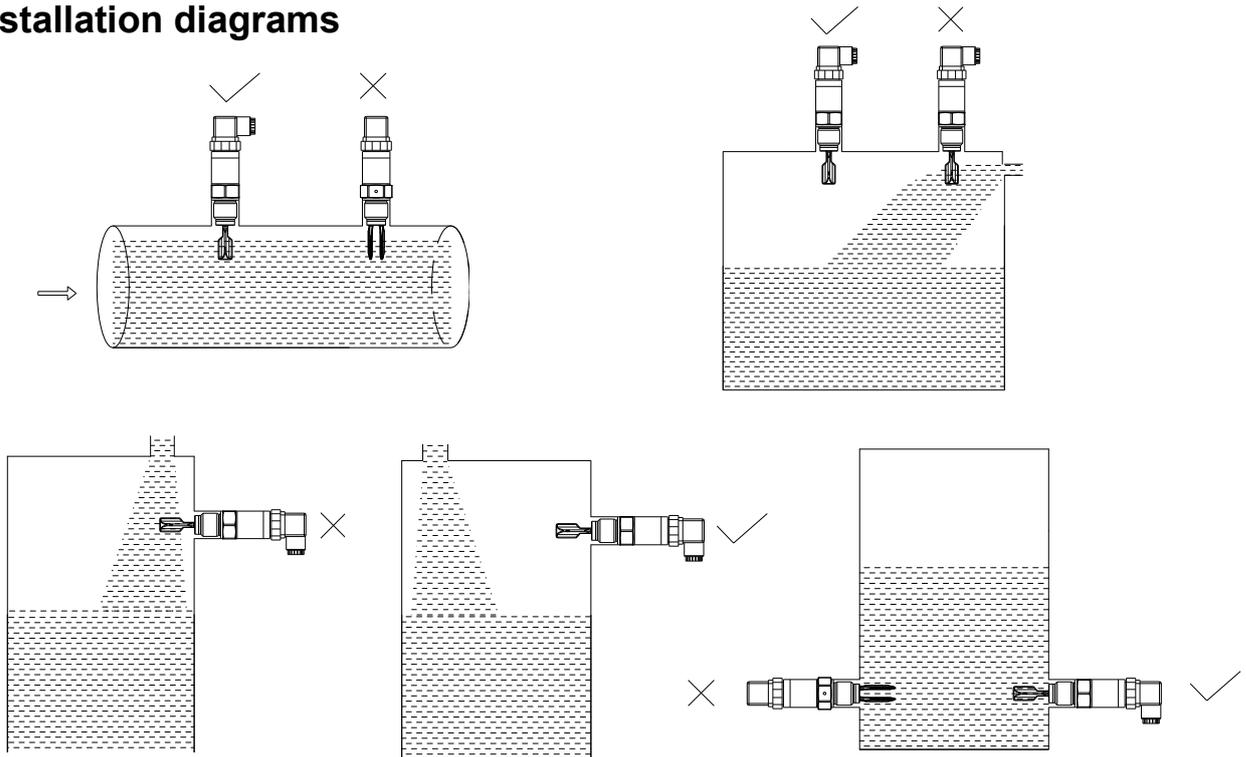
Applicable materials	Density	$>0.7\text{g/cm}^3$
	Viscosity	$1\sim 10000\text{mPa}\cdot\text{s}^{①}$
	Flow Velocity	Max 6m/s
Fork data	Vibration frequency	$\sim 1200\text{Hz}$
	Fork length	40mm
Accuracy	Measurement	$\pm 1\text{mm}$
	Delay	$3.0\pm 0.5\text{mm}$
	Repeatability	0.5mm
Switching delay	When immersed	0.5S
	When laid bare	1S
Power	Relay output	20~250V AC/20~72V DC
	PNP	10~35VDC
	Power	AC<3.8mA/DC,<825mW
Ambient conditions	Process pressure	-1~40bar
	Process temperature	$-50^{\circ}\text{C}\sim 150^{\circ}\text{C}$
	Ambient temperature	$-40^{\circ}\text{C}\sim 70^{\circ}\text{C}$
	Storage and transport temperature	$-40^{\circ}\text{C}\sim 80^{\circ}\text{C}$
Electrical protections	Relay output	category III, class I
	PNP	category III, class II
Approvals	Protection rating	IP66
Materials	Housing	316L+Plastic
	Process fitting	316L
	Fork body	316L
	Process seal	Klingsil C-4400

Note: conditions of ①: The viscosity range with the density of 1.

Dimensional drawing



Installation diagrams



Notes:

- (1) The surfaces of the fork wings need to mount parallel to the direction of product's movement.
- (2) Avoid installing in inlet and outlet points.

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 design				
Electronics	R	Relay (18~30VDC)				
	S	Relay (20~253VAC)				
	T	PNP (10~36VDC)				
Cable entry	C	Pg11				
	M	M12*1				
	N	1/2NPT				