Tuning Fork Level Switch
Model TLS

Applications

- Applicable to all liquids
- Suitable for overflow protection, dry running protection and pump running protection in container and pipeline
- Applicable to petroleum, chemical industry, water/ wastewater, food and beverage, pharmaceutical, metallurgy, light industry and other industries

Special features

- No mechanical moving parts, no wear, long service life
- Multiple process connections are available
- Stable measurement, not affected by flow, disturbance, bubble, vibration, the influence of solid containing amount or adhesion
- No calibration required, fast device enable mode
- Maintenance and maintenance costs are extremely low
- Applicable medium parameters:
  - Operating temperature: T = -100[1] ... +250 °C[2]
  - Operating pressure: P = -0.1 ... +10 MPa
  - Density: ρ ≥ 500 kg/m³

Tuning Fork Level Switch, Model TLS

Description

The core component of the tuning fork level switch is the vibration drive device located in the tuning fork, which drives the tuning fork to reach its resonant frequency. When the tuning fork is immersed by the medium, the frequency of the tuning fork decreases, and the frequency change is detected by the electronic circuit and converted into a switching signal to achieve the purpose of liquid level alarm or control.

1) -100°C is special design, the standard design is -40°C
2) 250°C is special design, the standard design is 200°C

More Features

- Obtain the explosion protection certificate of conformity, high safety and reliability, optimal solution for liquid level measurement in flammable and explosive fields such as petroleum and chemical industry
- High measurement precision, adjustable sensitivity level1 ... 10, adjustable output delay 1 ... 20 seconds
- The length of tuning fork 42 mm, 38 mm is standard and optional

Optional

- Provide customers with customized solutio
- Multiple process connection: thread (≥1/2″), flange (DN25 ... DN100), chuck (1″ ... 4″), DIN11851 (DN25 ... DN100), DRD65

Product Model

Model code	Description	Certification						
		None	Ex ia	Ex ib	Ex db	Ex tb	3-A	EHEDG
TLS-S	Tuning fork level switch PI Mode		×	×	×	×		
TLS-C	Tuning fork level switch IN Model - ASC4	×						
	Tuning fork level switch IN Model - M12	×						
TLS-H	Tuning fork level switch Hygienic Model - ASC4	×						
	Tuning fork level switch Hygienic Model - M12	×						

Model Code	SS 304	SS 316L	Hastelloy HC	SS 316L sprayed PFA	SS 316L sprayed ECTFE	Hastelloy HC EP	Temperature Range
TLS-S		×	×	×	×	×	-40 ... +200°C
TLS-C		×	×				-40 ... +150°C
TLS-H		×	×			×	-40 ... +150°C

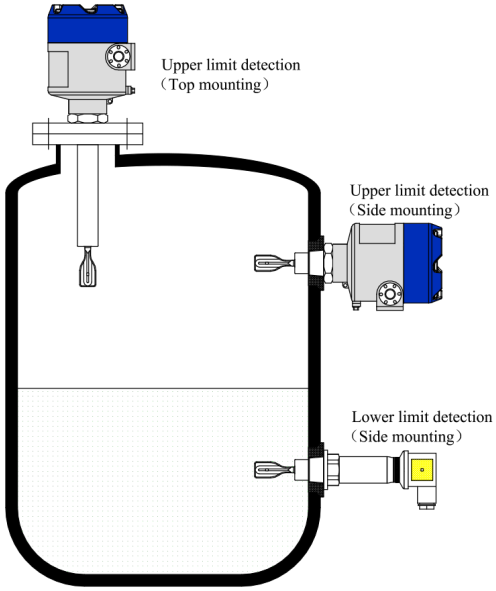
Explosion-proof Certification

Standard	Type	Model	Hazardous area
EN 60079	II 1/2 G Ex db IIC T6…T3 Ga/Gb	TLS-S	Zone 1, Gas
GB 3836	Ex d IIC T3...T6 Gb	TLS-S	Zone 1, Gas
GB 3836	Ex tb IIIC T85°C…T200°C Db	TLS-S	Zone 1, Dust
GB 3836	Ex ia IIC T3…T6 Ga	TLS-S	Zone 0, Gas
GB 3836	Ex ib IIIC T85°C…T200°C Db	TLS-S	Zone 1, Dust

Application examples

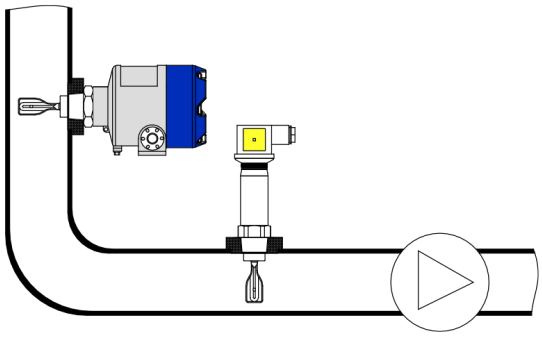
In practical use, the tuning fork level switch is mainly used in two aspects: on the one hand, it is used for container high/low level detection and control; on the other hand, it is used for pipe detection to prevent the idling of pump.

Container limit detection



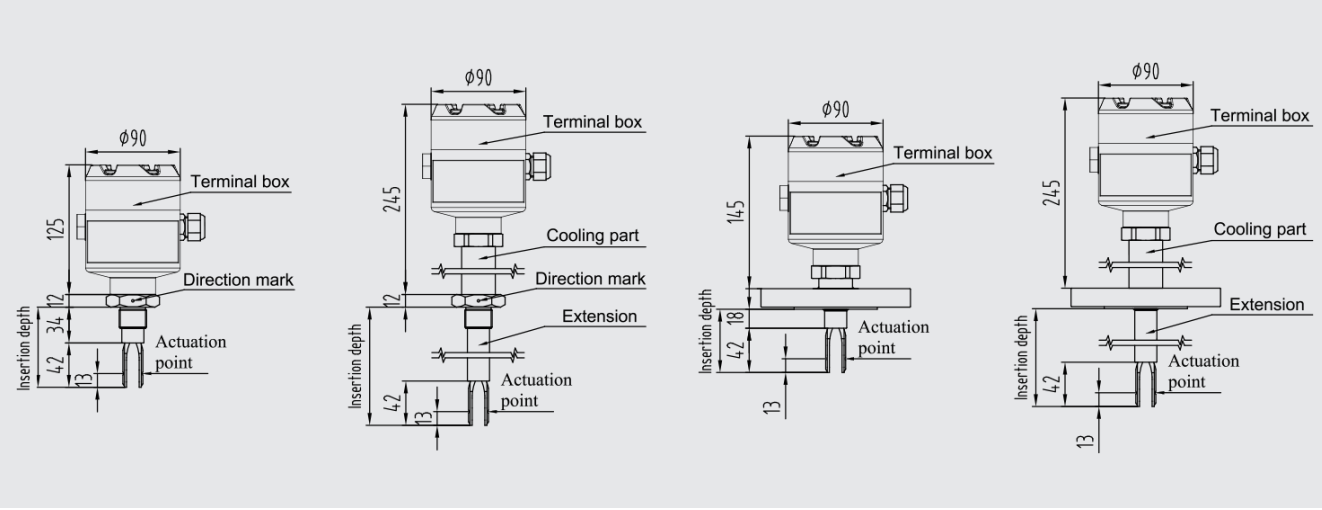
As shown in the left figure, the tuning fork level switch is usually installed on the side wall of the container by means of side mounting to detect the upper and lower limit positions of the liquid level. When the container is inconvenient to open holes on the side, the top mounting can be adopted, and the installation position needs to avoid the impact of feeding.

Pipeline inspection



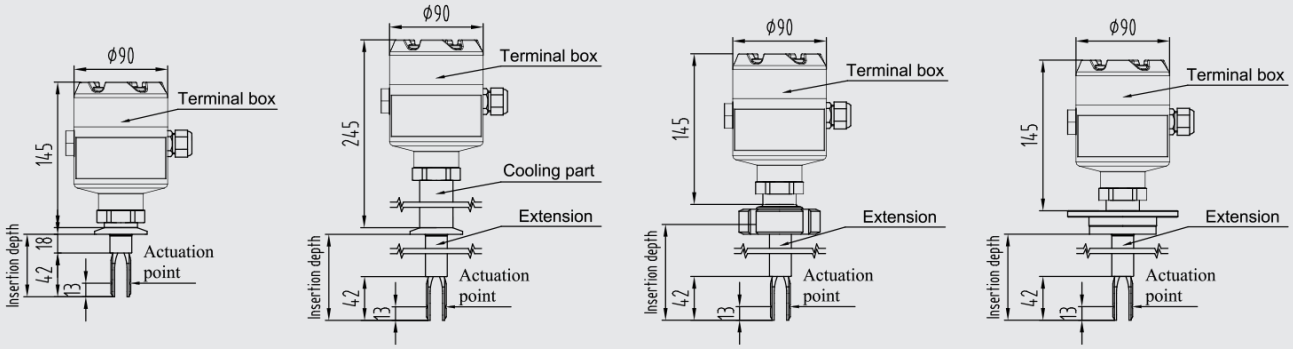
As shown in the left figure, the tuning fork level switch is used for pipeline measurement to prevent the idling of pump. Since the length of the tuning fork can be as short as 38 mm, it can be used for pipeline measurement with a smaller diameter.

Tuning Fork Level Switch, PI Model, TLS-S



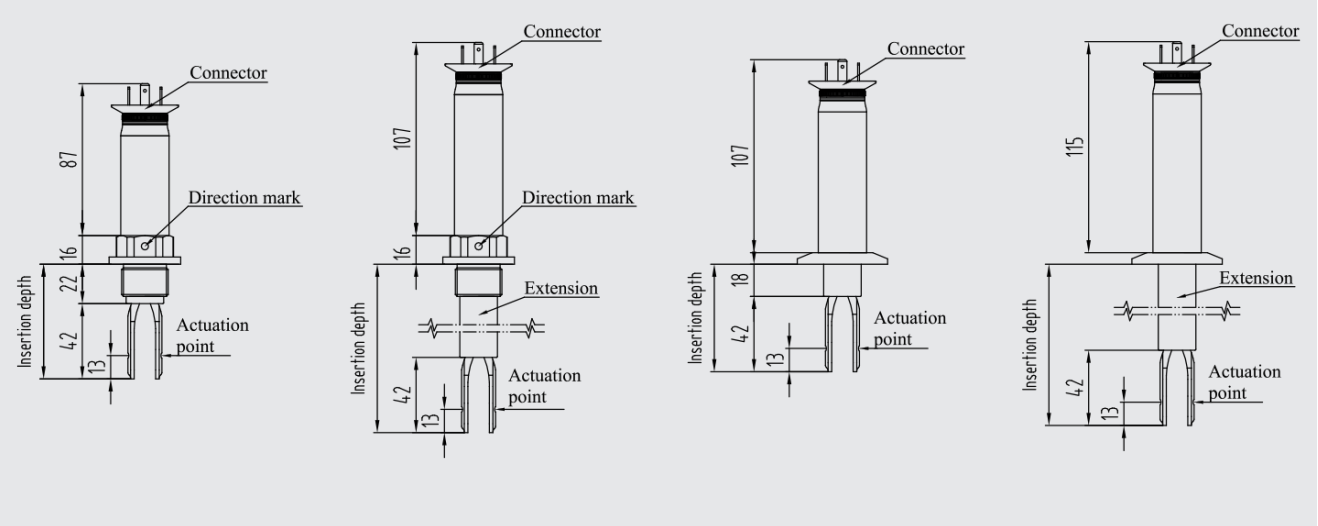
	Thread Mounting	Thread Mounting With cooing part With extension	Flange Mounting	Flange Mounting With cooing part With extension
Electrical Connection	Terminal box: Aluminum (Φ90*125mm), Electrical connection: M20*1.5 (or as required)			
Process Connection	Thread mounting: standard ≥3/4″, 1/2″ is optional (the length of tuning fork is 38mm)		Flange mounting: DN25 ... DN100, 1″ ... 4″	
Material	Process connection: 316L, Tuning fork: 316L (Hastelloy is optional)			
Ambient Temperature	-40 … +60°C			
Power Voltage	AC 220V 50Hz, DC 24V			
Operating Temperature	-40 … +150°C	-40 … +200°C	-40 … +150°C	-40 … +200°C
Medium Density	≥0.7 g/cm³ is standard, ≥0.5 g/cm³ is optional			
Operating Pressure	-0.1 … +10 MPa			
Output Delay	1 ... 20 seconds (adjustable)			
Sensitivity	1 ... 10 levels (adjustable)			
Output Mode	Relay output DPDT , Transistor output PNP, NAMUR			
Power Consumption	<1W			
Contact Rating	AC 220V 5A, DC 30V 5A			
Explosion-proof	ATEX: II 1/2 G Ex db IIC T6…T3 Ga/Gb NEPSI: Ex db IIC T3…T6 Gb, Ex tb IIIC T85°C…T200°C Db, Ex ia IIC T3…T6 Ga, Ex ib IIIC T85°C…T200°C Db			
IP	IP66 / 68			
Insertion Depth	76 mm	76 ... 6,000 mm	60 mm	60 ... 6,000 mm
Length of Tuning Fork	42mm is standard, 38mm is optional			
Wetted Material Protection	Sprayed PFA / ECTFE			

Tuning Fork Level Switch, PI Model, TLS-S



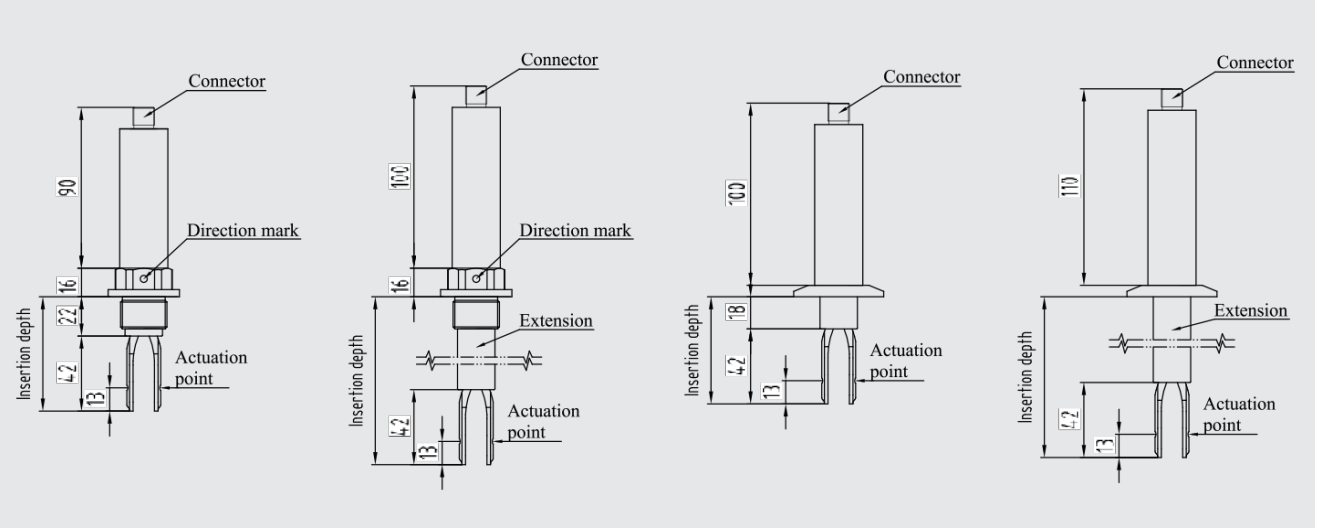
	Chuck Mounting	Chuck Mounting With cooing part With extension	DIN11851 Food and hygienic connection	DRD65 Food and hygienic connection
Electrical Connection	Terminal box: Aluminum (Φ90*125mm), Electrical connection: M20*1.5 (or as required)			
Process Connection	Chuck mounting: 1″ ... 4″		DN20 ... DN100	DRD65
Material	Process connection: 316L, Tuning fork: 316L (Hastelloy is optional)			
Ambient Temperature	-40 … +60°C			
Power Voltage	AC 100~250V, DC 24V			
Operating Temperature	-40 … +150°C	-40 … +200°C	-40 … +200°C (≥150°C, with cooling part)	-40 … +200°C (≥150°C, with cooling part)
Medium Density	≥0.7 g/cm³ is standard, ≥0.5 g/cm³ is optional			
Operating Pressure	-0.1 … +10 MPa			
Output Delay	1 ... 20 seconds (adjustable)			
Sensitivity	1 ... 10 levels (adjustable)			
Output Mode	Relay output DPDT , Transistor output PNP, NAMUR			
Power Consumption	<1W			
Contact Rating	AC 220V 5A, DC 30V 5A			
Explosion-proof	ATEX: II 1/2 G Ex db IIC T6…T3 Ga/Gb NEPSI: Ex db IIC T3…T6 Gb, Ex tb IIIC T85°C…T200°C Db, Ex ia IIC T3…T6 Ga, Ex ib IIIC T85°C…T200°C Db			
IP	IP66 / 68			
Insertion Depth	60 mm (43mm, 47mm optional)	60 ... 6,000 mm	60 ... 6,000 mm	60 ... 6,000 mm
Length of Tuning Fork	42mm is standard, 38mm is optional			
Surface Roughness	Ra ≤ 0.76, Ra ≤ 0.38			
Wetted Material Protection	Sprayed PFA / ECTFE			

Tuning Fork Level Switch, IN Model-ASC4, TLS-C



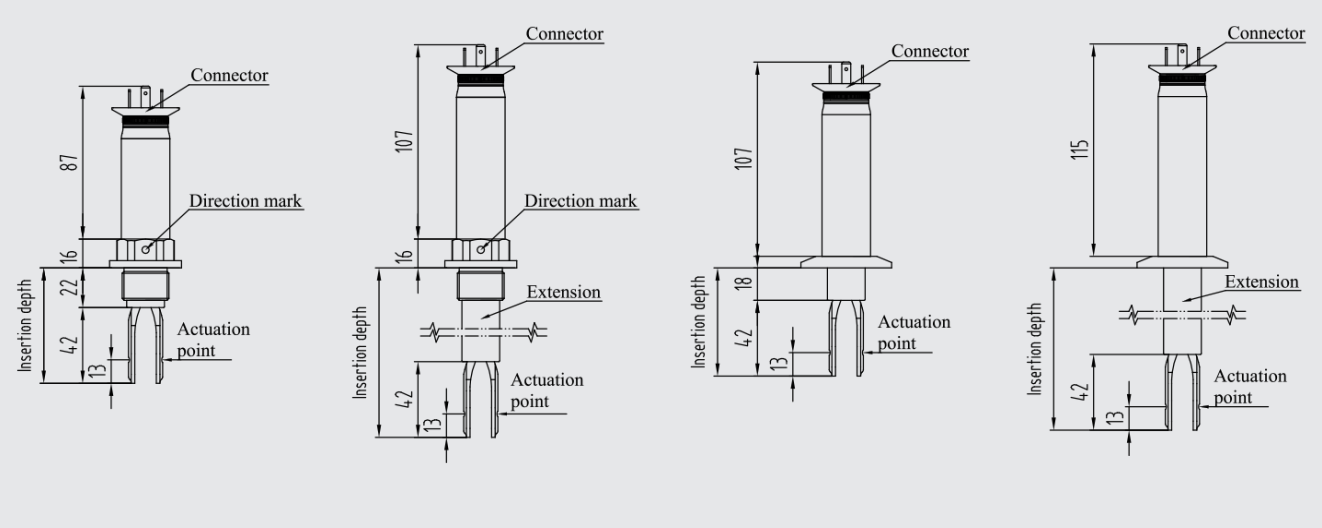
	Thread Mounting	Thread Mounting With extension	Chuck Mounting	Chuck Mounting With extension
Electrical Connection	Hersman connector, Electrical connection: M16*1.5			
Process Connection	Thread mounting: standard ≥3/4″, 1/2″ is optional (the length of tuning fork is 38mm)		Chuck mounting: 1″ ... 4″	
Material	Process connection: 316L, Tuning fork: 316L (Hastelloy is optional)			
Ambient Temperature	-40 … +60°C			
Power Voltage	DC 24V			
Operating Temperature	-40 … +100°C	-40 … +150°C	-40 … +100°C	-40 … +150°C
Medium Density	≥0.7 g/cm³ is standard, ≥0.5 g/cm³ is optional			
Operating Pressure	-0.1 … +6.4 MPa			
Output Mode	Relay output SPST, Transistor output PNP			
Power Consumption	<1W			
Contact Rating	DC 30V 3A			
IP	IP65			
Insertion Depth	64 mm	64 ... 3,000 mm	60 mm (43mm, 47mm is optional)	60 ... 3,000 mm
Length of Tuning Fork	42mm is standard, 38mm is optional			

Tuning Fork Level Switch, IN Model-M12, TLS-C



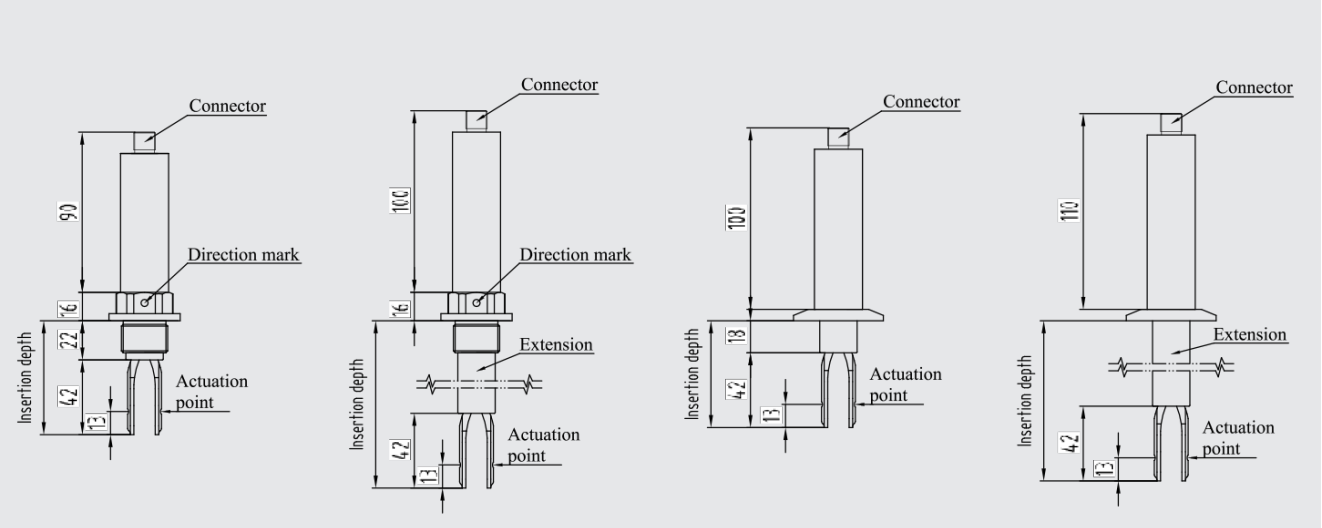
	Thread Mounting	Thread Mounting With extension	Chuck Mounting	Chuck Mounting With extension
Electrical Connection	Electrical connection: M12			
Process Connection	Thread mounting: standard ≥3/4″, 1/2″ is optional (the length of tuning fork is 38mm)		Chuck mounting: 1″ ... 4″	
Material	Process connection: 316L, Tuning fork: 316L (Hastelloy is optional)			
Ambient Temperature	-40 … +60°C			
Power Voltage	DC 24V			
Operating Temperature	-40 … +100°C	-40 … +150°C	-40 … +100°C	-40 … +150°C
Medium Density	≥0.7 g/cm³ is standard, ≥0.5 g/cm³ is optional			
Operating Pressure	-0.1 … +6.4 MPa			
Output Mode	Relay output SPST, Transistor output PNP			
Power Consumption	<1W			
Contact Rating	DC 30V 3A			
IP	IP66 / 68			
Insertion Depth	64 mm	64 ... 3,000 mm	60 mm (43mm, 47mm is optional)	60 ... 3,000 mm
Length of Tuning Fork	42mm is standard, 38mm is optional			

Tuning Fork Level Switch, Hygienic Model-ASC4, TLS-H



	Thread Mounting	Thread Mounting With extension	Chuck Mounting	Chuck Mounting With extension
Electrical Connection	Hersman connector, Electrical connection: M16*1.5			
Process Connection	Thread mounting: standard ≥3/4″, 1/2″ is optional (the length of tuning fork is 38mm)		Chuck mounting: 1″ ... 4″	
Material	Process connection: 316L, Tuning fork: 316L (Hastelloy is optional)			
Ambient Temperature	-40 … +60°C			
Power Voltage	DC 24V			
Operating Temperature	-40 … +100°C	-40 … +150°C	-40 … +100°C	-40 … +150°C
Medium Density	≥0.7 g/cm³ is standard, ≥0.5 g/cm³ is optional			
Operating Pressure	-0.1 … +6.4 MPa			
Output Mode	Relay output SPST, Transistor output PNP			
Power Consumption	<1W			
Contact Rating	DC 30V 3A			
IP	IP65			
Insertion Depth	64 mm	64 ... 3,000 mm	60 mm (43mm, 47mm is optional)	60 ... 3,000 mm
Surface Roughness	Ra ≤ 0.76, Ra ≤ 0.38			
Length of Tuning Fork	42mm is standard, 38mm is optional			

Tuning Fork Level Switch, Hygienic Model-M12, TLS-H



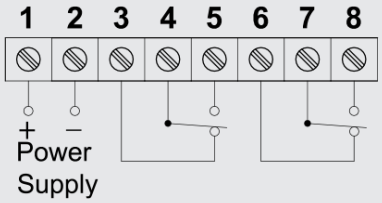
	Thread Mounting	Thread Mounting With extension	Chuck Mounting	Chuck Mounting With extension
Electrical Connection	Electrical connection: M12			
Process Connection	Thread mounting: standard ≥3/4″, 1/2″ is optional (the length of tuning fork is 38mm)		Chuck mounting: 1″ ... 4″	
Material	Process connection: 316L, Tuning fork: 316L (Hastelloy is optional)			
Ambient Temperature	-40 … +60°C			
Power Voltage	DC 24V			
Operating Temperature	-40 … +100°C	-40 … +150°C	-40 … +100°C	-40 … +150°C
Medium Density	≥0.7 g/cm³ is standard, ≥0.5 g/cm³ is optional			
Operating Pressure	-0.1 … +6.4 MPa			
Output Mode	Relay output SPST, Transistor output PNP			
Power Consumption	<1W			
Contact Rating	DC 30V 3A			
IP	IP66 / 68			
Insertion Depth	64 mm	64 ... 3,000 mm	60 mm (47mm is optional)	60 ... 3,000 mm
Surface Roughness	Ra ≤ 0.76, Ra ≤ 0.38			
Length of Tuning Fork	42mm is standard, 38mm is optional			

Wiring Diagram

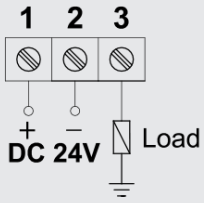
TLS-S

Please refer to the manual for the detail of wiring diagram.

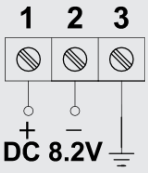
Relay output DPDT
Power supply is AC 220V or DC 24V,
Specify one when ordering.



Transistor output PNP
Power supply is DC 24V.



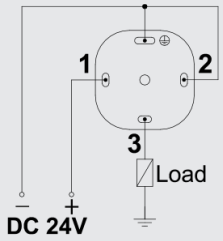
NAMUR
Power supply is DC 8.2V.



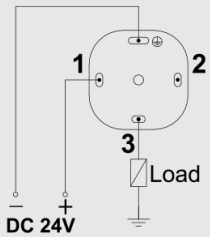
ASC4 Hersman connector

Please refer to the manual for the detail of wiring diagram.

Transistor output PNP
Power supply is DC 24V.

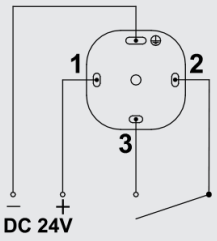


Max.



Min.

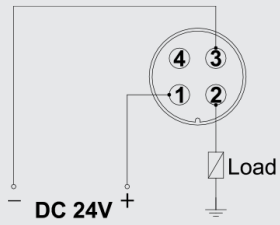
Relay output SPST
Power supply is DC 24V.



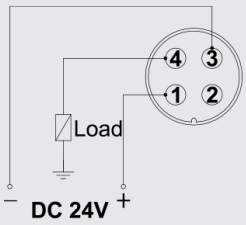
M12 connector

Please refer to the manual for the detail of wiring diagram.

Transistor output PNP
Power supply is DC 24V.

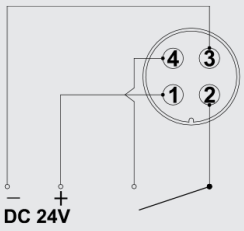


Max.



Min.

Relay output SPST
Power supply is DC 24V.



Model code

1	1# Key Electrical Connection		2# Key Process Connection		3# Key Material of Process Connection and Tuning fork	
.../.../...	A	Aluminum terminal box	NPT	Thread	V	SS 316L
	AV	Stainless steel terminal box	R	Thread	VE	SS electro-polished
			G	Thread	HC	Hastelloy
	AN6R	Hersman connector	MR	Thread (DIN 11851)	VED	SS sprayed PFA
	ASM12	M12 connector	FC	Clamping chuck (DIN32676)	VEC	SS sprayed ECTFE
	AD	Aluminum terminal box (Ex d)	F	Flange		

2	Process Connection					
.../.../...	...	Thread size 1/2″, 3/4″, 1″ (or as required)	...	Flange nominal pressure	...	Flange sealing surface
	...	Chuck size 1″ ... 4″				
	...	Flange nominal size				
	HG/20592	DN25 ... DN100		PN6 ... PN64		RF, M/FM, FF, T/G,RJ
	HG/20615	1″ ... 4″		Class 600		RF, M/FM, FF, T/G, RJ
	ANSI	1″ ... 4″		PN6 ... PN64		C, N, F, A, E
	DIN	DN25 ... DN100		Class 600		RF, FF, RTJ
	DRD	DRD 65				

3	1# Key Output Mode		2# Key Optional	
.../...	J	Relay SPST	-	None
	JT	Relay DPDT	HT	T>100°C (Hersman and M12 connector)
	TR	Transistor PNP		T>150°C (Terminal box)
	NR	NAMUR		

4	1# Key Insertiont Depth	
L ...	L ...	mm

Example:

1	-	2	-	3	-	4
AFV		**25/6/RF**		**JT**		**L64**

02/2023 EN

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