

Product manual

Magnetic flap level gauge

petroleum · water conservancy · metallurgy





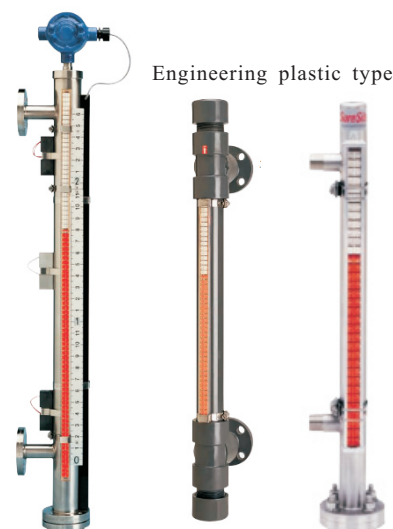
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Magnetic flap level gauge

Product description

The magnetic flap level gauge can be set up for most storage tanks or liquid media. From simple, stand-alone level indicators in process control systems to integral electronic assemblies. Pictured to the right is a fully equipped device. Nuoying Jiaye offers a variety of options to extend and enhance the operational performance and versatility of these level gauges. Indication scale provides digital reference in addition to traditional visual display; switch mode provides high, low or intermediate level alarm or logic control and continuous level transmitter, which transmits signal to remote receiver, records instrument and controller. Also, a variety of materials, sizes and connectors are available. In addition, a variety of manufacturing options are available, such as special welds, custom

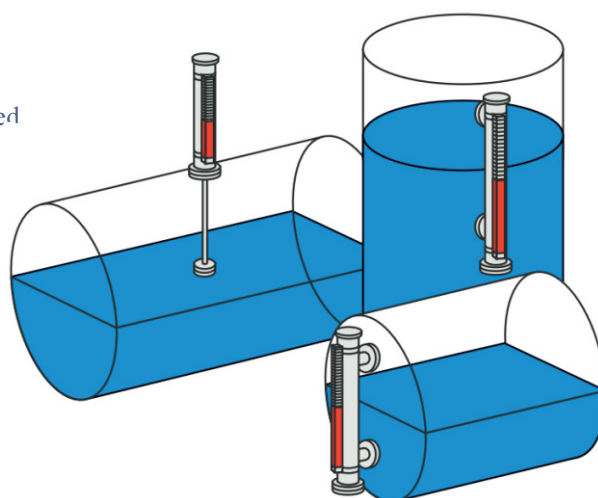
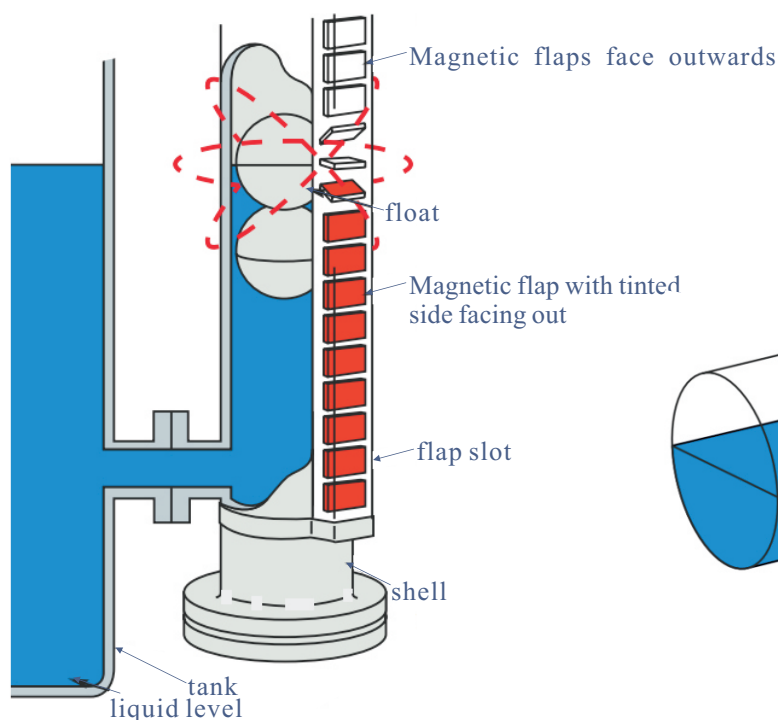


Standard Size Alloy Type

Mini alloy type

Working principle

When the liquid level rises, the magnetic float inside the device causes the colored side of the magnetic flap in the external indicator to turn out. The flap will remain magnetically interlocked until the liquid level drops, again flipped to the contrasting side by the magnetic float. The level is indicated by the junction of the "colored" and "contrasting"



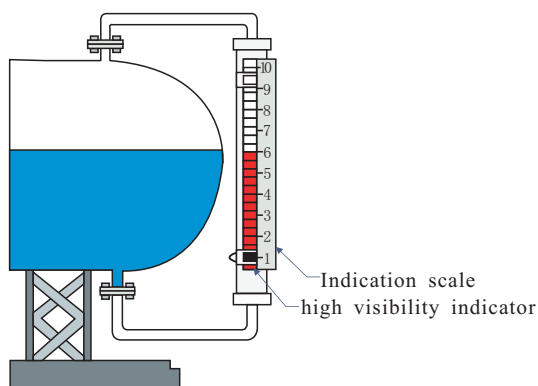


Design Features

- High Visibility - The flaps are brightly colored and easy to read even from a distance.
- Durability - Whatever the media needs, stainless steel, PVC, CPVC, PVDF Hastelloy or other external enclosures provide years of maintenance-free stable operation.
- Environmentally Safe - The liquid level being measured is enclosed within the entire sealed enclosure.
- Efficient - Continuous level monitoring without external energy.
- Electronic control - In addition to the function of directly observing the liquid level, the function of point liquid level switch or continuous liquid level transmission is added.
- Low maintenance - no breakable glass and robust housing.

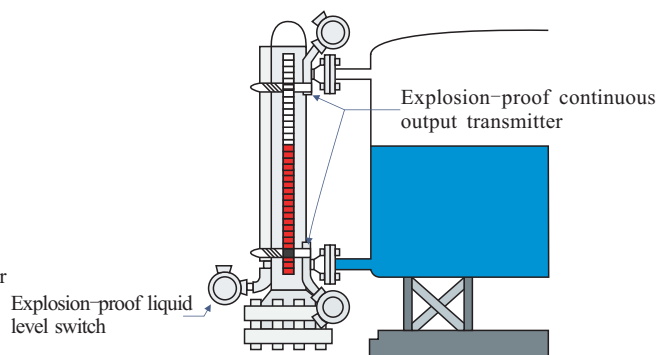
Visible Level Gauge

- Suitable for everything from vacuum to high pressure
- Excellent visibility from 100 feet (30 meters) away
- No downtime required
- Essentially maintenance free
- Product construction customizable



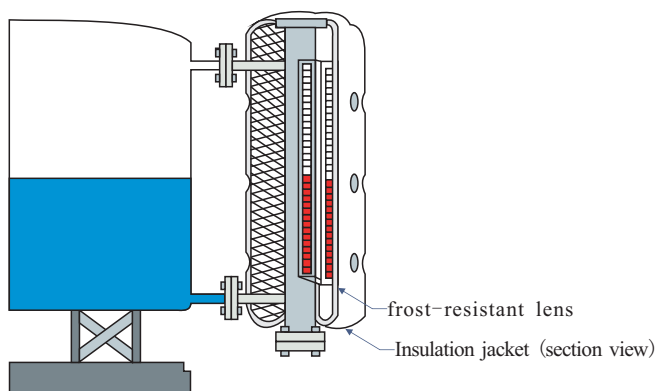
High Performance Level Gauge

- Pressures up to a 4200PSI
- Externally Mounted Circuitry
- High/Low Alarm, Level Action Set Point
- Meets the Following Standards: ANSI Flap / ASME Type
- Cenelec, FM, UL, CSA Approved



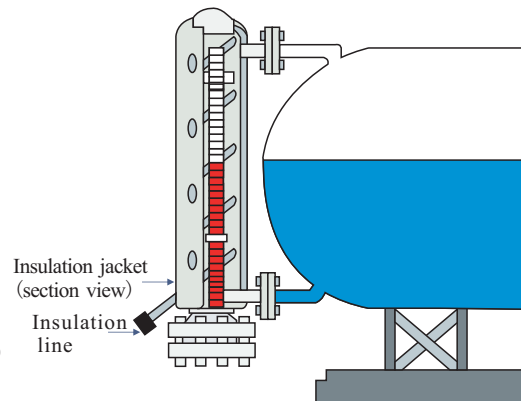
Cold Conditions

- -200°F (-129°C)
- Frost-proof lens
- Insulation (applications in cold conditions)
- Increased visibility



For high temperature applications

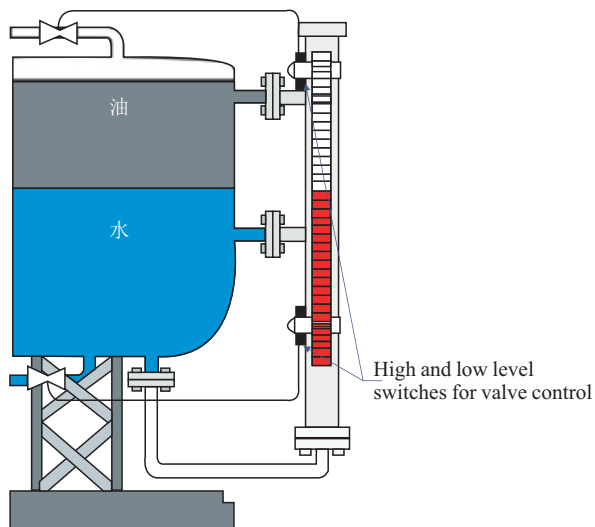
- Operating temperature up to 750°F (399°C)
- External circuit operating temperature up to 750°F (399°C)
- With high temperature insulation



Applications Oil/Moisture Interface

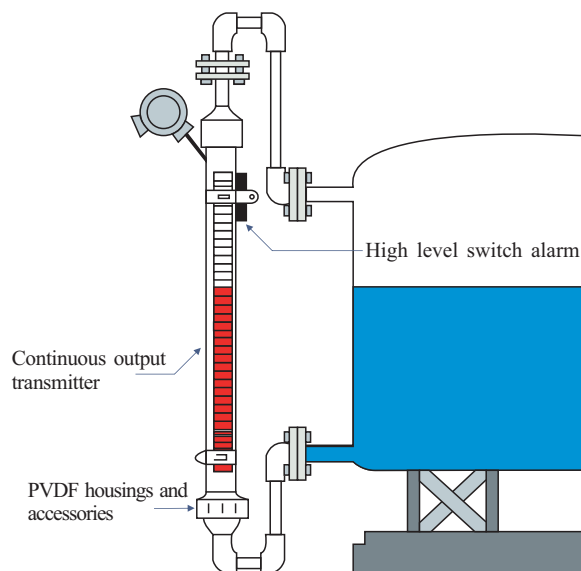
Measurement

- Oil/Moisture Interface Measurement
- Made of Stainless Steel or Engineering Plastics
- Multiple Processing Ports
- With Control Circuits
- With Valves



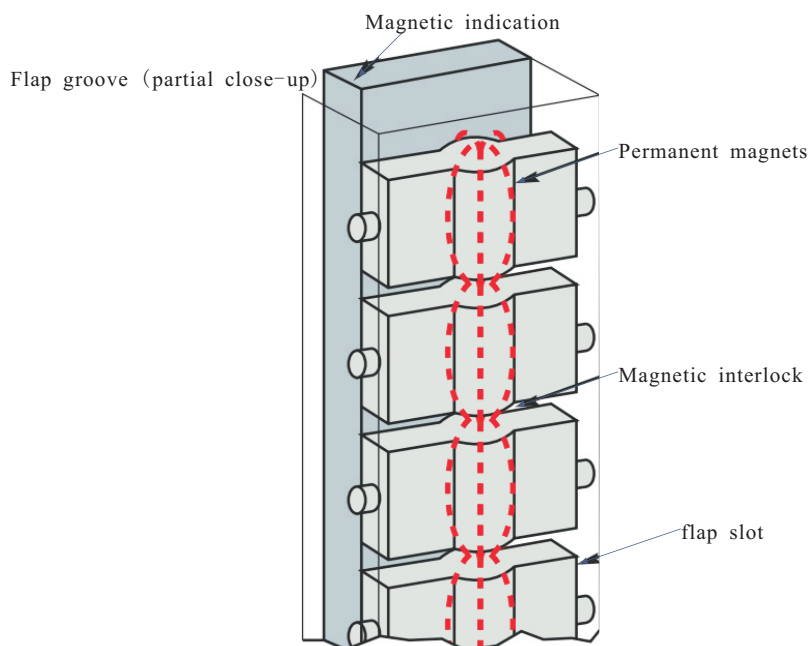
Measurement of Sour Liquids

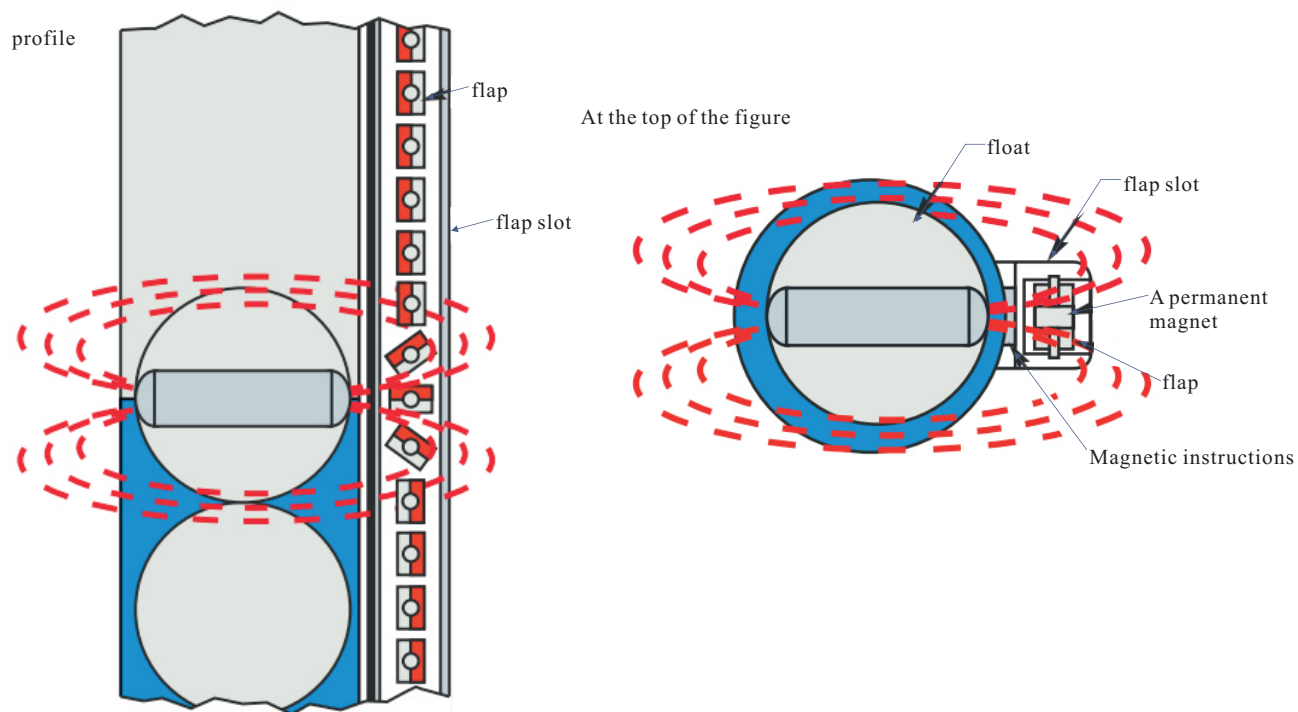
- Liquid Compatible Materials: Hastelloy C276, PVDF, Aluminium 20, Titanium
- Eliminates dangerous and unnecessary leaks



Structure size

The permanent magnets installed in each flap form a magnetic interlock between adjacent flaps. Alignment is guaranteed against vibration, chatter, oscillation or sharp level changes.





Alloy Type – Small Size

If the installation space is small, choose this mini magnetic flap. Only 1-1/4" in diameter! They replace existing old-fashioned glass level gauges with excellent external visual level indication. The mini magnetic flap is suitable for clean, low viscosity liquid media.

Design Features

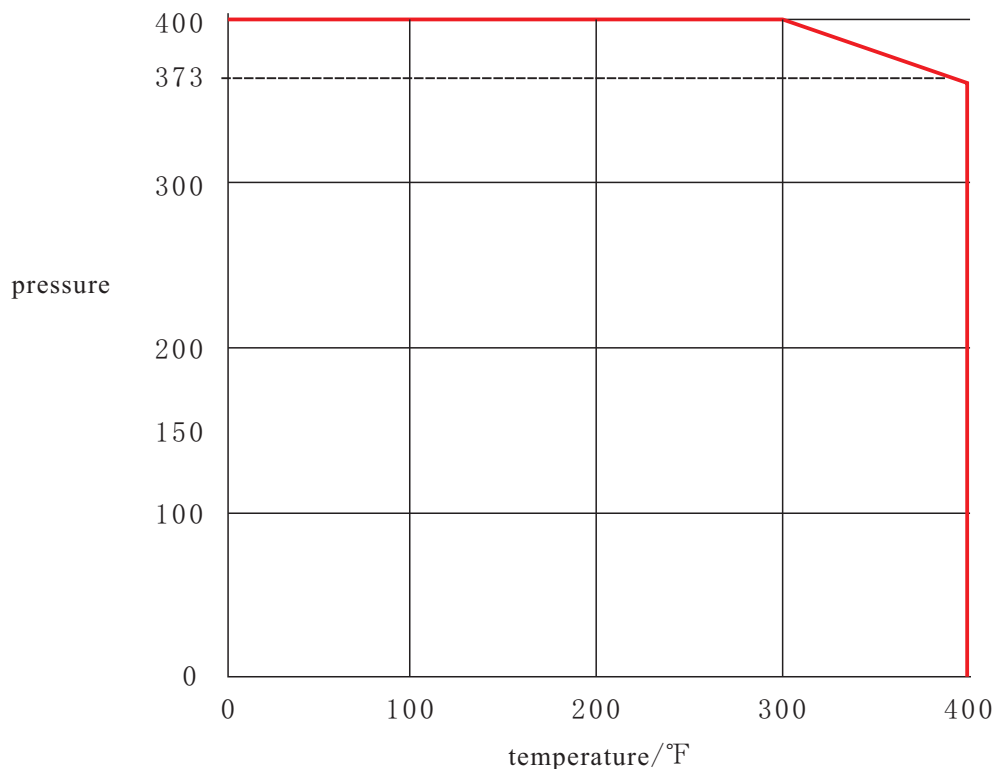
- ⊙ Can be over 20 feet (6.1 meters) in length
- ⊙ All stainless steel housing
- ⊙ Pressure resistance up to 400PSI(27bar)
- ⊙ Temperature resistance up to 400°F (204°C)

Typical application

- ⊙ Pharmaceutical
- ⊙ food and drinks
- ⊙ boiler
- ⊙ Medical equipment
- ⊙ semiconductor manufacturing

Technical parameter

The mini magnetic flap level gauge is available in a variety of materials and connectors. Can be used in the pressure/temperature ranges shown in the table below.



Installation requirements

	AM type	BM type
	top connection	side connection
L=visible length		
typical length	$C-C=L+7.72'' (196\text{mm})$	$C-C=L$
Flip material	plastic (300°F 148.9°C) or aluminum (400°F 或 204°C)	
Continuous indication length	240'' (610cm)	

	CM type	DM type
	top side connection	side bottom connection
L=visible length		
typical length	$C-C=L+3'' (76\text{mm})$	$C-C=L+5'' (127\text{mm})$
Flip material	plastic (300°F 148.9°C) or aluminum (400°F 或 204°C)	
Continuous indication length	240'' (610cm)	

* Dimensions vary by connection, material and specific gravity.

NOTE: Special materials, floats, connections and fabrication techniques are available to extend length and extend operational performance.

Electrical connections

All connections include SNSI connectors (see details below)

Top		blind end		NPT thread				Flange		welding	
				fixed		Detachable		fixed	Detachable	Butt welded pipe	Detachable butt welded pipe
		fixed	Detachable	female thread	male thread	female thread	male thread				
T	Standard connection										
	Hygienic connection										

side	Sa	blind end	NPT thread		flange	Sanitary Flange	Butt welded pipe
			male thread	female thread			
side	Sb						

Bottom		blind end		NPT thread				flange		welding	
				fixed		Detachable		fixed	Detachable	Butt welded pipe	Detachable butt welded pipe
		fixed	Detachable	female thread	male thread	female thread	male thread				
B	Standard connection										
	Hygienic connection										

● Connection code

T&B	(top and bottom connected)	Sa & Sb	Side connection
T/B 1	welding cap	S1	not connected
T/B 2	Welding cap with FNPT	S2	MNPT pipe joint
T/B 3	Welding cap with FNPT	S3	FNPT pipe joint
T/B 7	Sanitary flange	S4	ANSI flange
T/B 8	Sanitary flange with blind flange	S5	Sanitary flange
T/B 10	Standard fixed flange/blind flange	S6	Butt welded pipe
T/B 11	Standard fixed flange/with FNPT reducing flange		
T/B 12	Standard fixed flange / with flange with MNPT pipe		
T/B 13	Standard fixed flange / with flange with butt welded pipe		
T/B 18	Welding cap with butt welded pipe joint		
T/B 19	Welding cap with ANSI flange		
T/B 20	Standard fixed flange / with reducing flange short pipe with ANSI flange		

● Performance Notes

1. As an option, either the switch assembly or the transmitter can be used on the Mini Magnetic Level Gauge, but not both.
2. Minimum specific gravity is 0.7.
3. Standard O-ring seal material is Viton. Other materials are also available on request.
4. Outside diameter (OD) or inside diameter (ID) housing electropolished upon request.

● Notes

• Indicating scale

Added indicator scales to flaps.

• Switch module

Control pumps, valves, alarms and other equipment, externally installed on the shell to achieve unlimited expansion.

• Continuous output transmitter

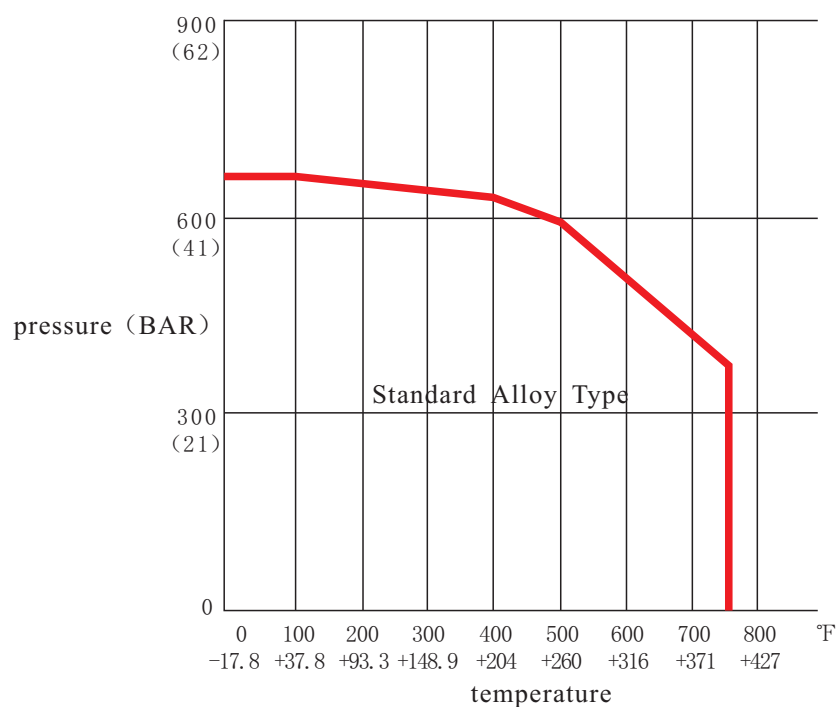
Signals are conditioned to be compatible with most electronic instruments and can withstand temperatures up to 300°F (149°C).

Standard Alloy Type - Standard Size

- Temperature resistance up to 750°F (399°C)
- Pressure resistant up to 700 PSI (48 bar)

This 2-1/2" (63.5 mm) diameter tube design features a robust all-welded construction that allows the Alloy gauge to maintain its reliability in long-term applications, (whether outdoors or indoors.)

Technical parameter



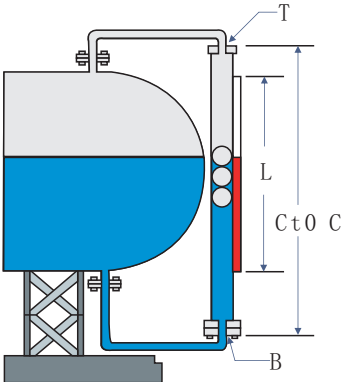
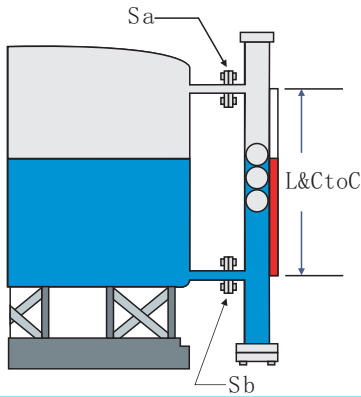
NOTE: The magnetic flap level gauge can be used in applications down to -200°F (-129°C).

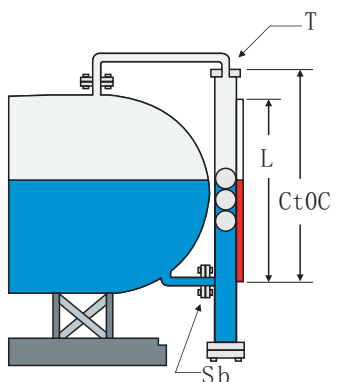
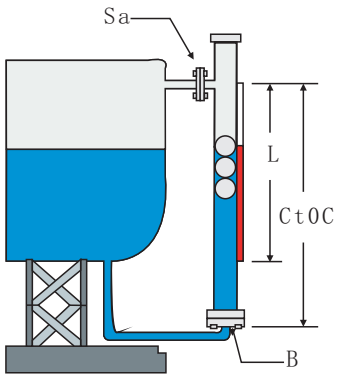
Material

Material		Code
Shell	float	
316L stainless steel	316L stainless steel	2
Carpenter Alloy 20	Hastelloy C276	3*
Hastelloy C276	Hastelloy C276	4*

Remarks: Products can be customized according to the specific requirements of users!

Installation requirements

L=visible length	AA type	BA type
	top connection	side connection
		
typical length	$C \text{ to } C = L + 10\text{-}1/4"$ (260.4 mm)	$C \text{ to } C = L$
Flip material	plastic (300°F/148.9°C) or aluminum (750°F/399°C)	
Continuous indication length	240" (610cm)	
Minimum liquid specific gravity	0.39	

L=visible length	CA type	DA type
	top side connection	side bottom connection
		
typical length	$C \text{ to } C = L + 3\text{-}3/4"$ (95.2 mm)	$C \text{ to } C = L + 6\text{-}1/2"$ (165.1 mm)
Flip material	plastic (300°F/148.9°C) or aluminum (750°F/399°C)	
Continuous indication length	240" (610cm)	
Minimum liquid specific gravity	0.39	

Electrical connections

Top  T	blind end		NPT thread				Flange	
			fixed		Detachable		fixed	Detachable
	fixed	Detachable	female thread	male thread	female thread	male thread		
								

側 Sa 	blind end	NPT thread		Flange
		male thread	female thread	
側 Sb 				

底  B	blind end		NPT thread				Flange	
			fixed		Detachable		fixed	Detachable
	fixed	Detachable	female thread	male thread	female thread	male thread		
								

● Connection code

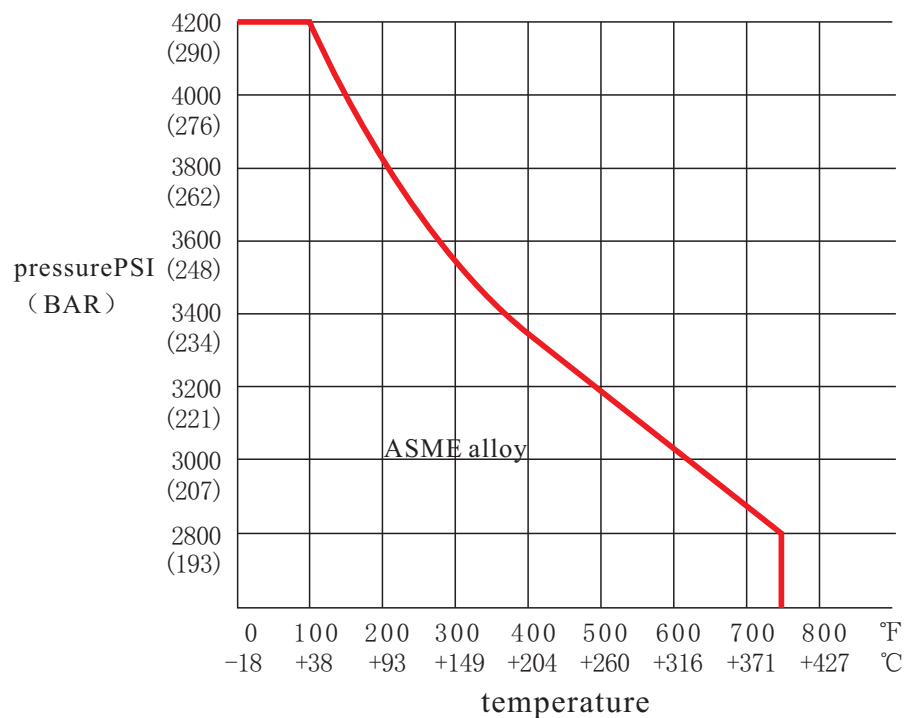
T&B	(top and bottom connected)	Sa&Sb	side connection
T/B 1	welding cap	S1	not connected
T/B 2	Standard fixed flange/blind flange	S2	MNPT pipe joint
T/B 3	Welding cap with FNPT thread	S3	FNPT pipe joint
T/B 5	Welding cap with FNPT pipe joint	S4	ANSI flange
T/B 6	Standard fixed flange/with FNPT reducing flange		
T/B 8	Standard fixed flange / with flange with MNPT pipe joint		
T/B 9	Welded cap with ANSI flange		
T/B 10	Standard Fixed Flange / Matching Reducer Flange Stub Pipe		

High Performance ASME Type - Standard Size

- Designed to meet ASME B31.1 / B31.3 requirements
- Temperature resistance up to 750°F (399°C)
- Withstand pressure up to 4200PSI (290Bar)

Suitable for your most demanding applications, these magnetic flap level gauges are available with ANSI flanges and fittings, and construction to exacting ASME standards.

Technical parameter



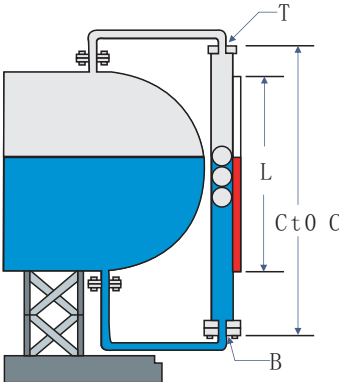
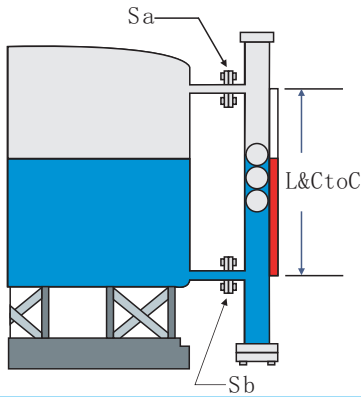
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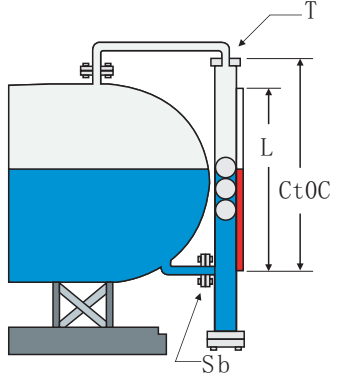
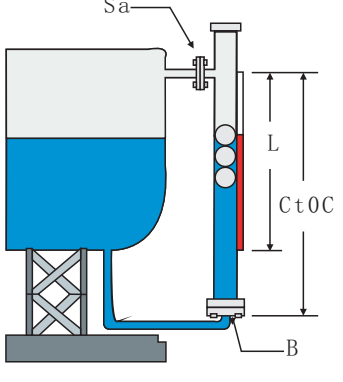
Material

material		Code
Shell	Float	
316L stainless steel	316L stainless steel600PSI-	2
316L stainless steel	Ti (Ti-6Al-4V)600PSI+	9

Note: Special materials, floats, connections and fabrication techniques are available to extend length and extend operational performance.

Installation requirements

L=visible length	AA type	BA type
	top bottom connection	side connection
		
typical length	$C \text{ to } C = L + 10\text{-}1/4"$ (260.4 mm)	$C \text{ to } C = L$
Flip material	plastic (300°F/148.9°C) or aluminum (750°F/399°C)	
Continuous indication length	240" (610cm)	
Minimum liquid specific gravity	0.39	

L=visible length	CA type	DA type
	top side connection	side bottom connection
		
typical length	$C \text{ to } C = L + 3\text{-}3/4"$ (95.2 mm)	$C \text{ to } C = L + 6\text{-}1/2"$ (165.1 mm)
Flip material	plastic (300°F/148.9°C) or aluminum (750°F/399°C)	
Continuous indication length	240" (610cm)	
Minimum liquid specific gravity	0.39	

Electrical connections

All connections include ANSI fittings (see details below)

Top 	blind end		NPT thread				Flange		welding			
			fixed		Detachable		fixed	Detachable	fixed		Detachable	
	fixed	Detachable	female thread	male thread	female thread	male thread			plug welding	Butt welded	plug welding	Butt welded
T 												
												

侧 Sa 	blind end		NPT thread		Flange		welding	
			male thread	female thread			plug welding	Butt welded
侧 Sb 								

底 	blind end		NPT thread				Flange		welding			
			fixed		Detachable		fixed	Detachable	fixed		Detachable	
	fixed	Detachable	female thread	male thread	female thread	male thread			plug welding	Butt welded	plug welding	Butt welded
B 												
												

NOTE: It is recommended that you choose removable top and/or bottom connections for easy access to the float.

● Connection code

NOTE: When selecting connections, take into account the requirements for exhaust and drain holes.

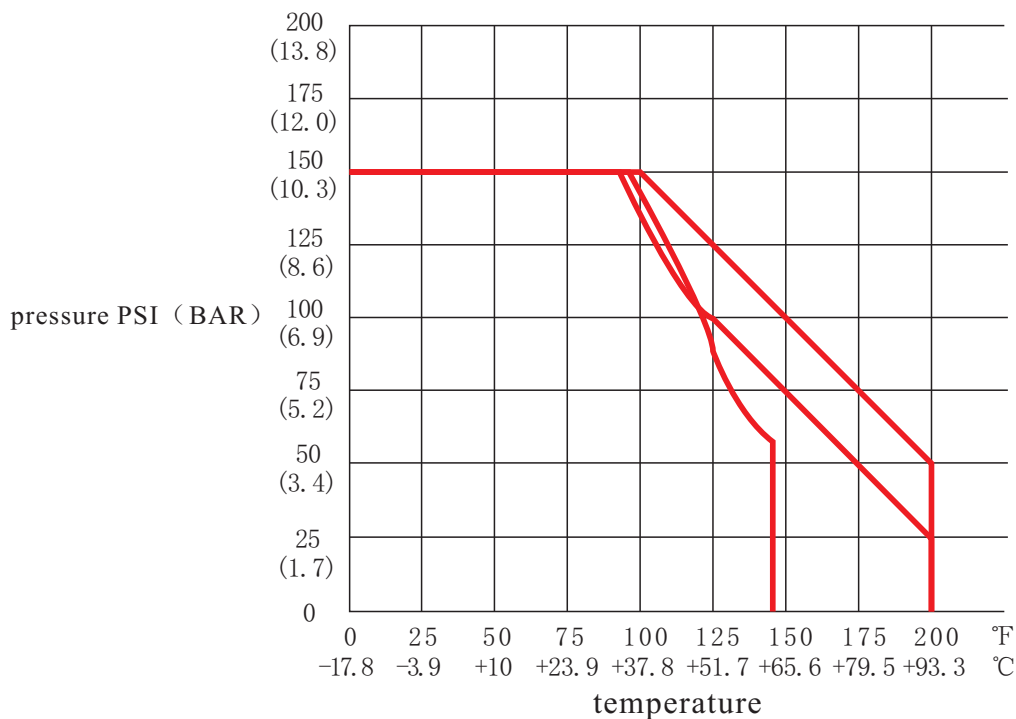
T&B	(top and bottom connected)	Sa & Sb	side connection
T/B 15	ANSI Welding Cap	S1	not connected
T/B 16	ANSI Fixed Removable Flange / Mating Blind Flange	S2	MNPT Fittings
T/B 17	ANSI Welding Cap with FNPT Thread	S3	FNPT Fittings
T/B 19	ANSI Weld Cap with MNPT Fitting	S4	ANSI flange
T/B 20	ANSI Fixed Removable Flange / Mating FNPT Reducing Flange	S5	Welded neck flange
T/B 22	ANSI Fixed Removable Flange/Mating Flange with MINPT Fittings	S6	Plug solder joint
T/B 23	ANSI Weld Cap with ANSI Flange	S7	Butt welded pipe
T/B 24	ANSI Fixed Detachable Flanges/Mating Reducing ANSI Flange Stubs		
T/B 25	ANSI Weld Cap with Plug Weld Tip		
T/B 26	ANSI Weld Cap with Butt Welded Pipe		
T/B 27	ANSI Fixed Removable Flange / Mating Flange with Plug Weld Fittings		
T/B 28	ANSI Fixed Removable Flange / Mating Flange with Butt Welded Pipe		
T/B 29	Fixed Weld Neck Flanges / Mating Blind Flanges		
T/B 30	ANSI Fixed Weld Neck Flange / Mating FNPT Reducing Flange		
T/B 32	ANSI Fixed Weld Neck Flange/Mating Flange with MNPT Fittings		
T/B 33	ANSI Fixed Weld Neck Flange / Blind Reducer Flange Stub		
T/B 34	ANSI Fixed Weld Neck Flange / Mating Flangewith Weld Neck Fitting		
T/B 35	ANSI Fixed Weld Neck Flange / Mating Flange with Butt Welded Pipe		

Engineering Plastic Type - Standard Size

- Temperatures up to 280°F (139°C)
- Pressure up to 150 PSI (10.3 Bar)
- Up to 19 feet (5.8 meters) continuous visual indication

The 2" Schedule 80 tube design is ideal for chemical storage tanks, or a variety of liquid level measurement applications where temperatures and pressures are moderate. All magnetic flap level gauges feature the patented flap used on alloy models and guides, so you can be assured of its high visibility and long-term reliability. PVC and CPVC materials are available here, but if required, they can be made of more special engineering plastics.

Technical parameter



NOTE: The magnetic flap level gauge can be used in applications down to -200°F (-129°C).

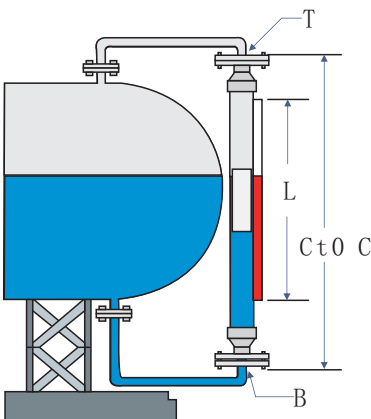
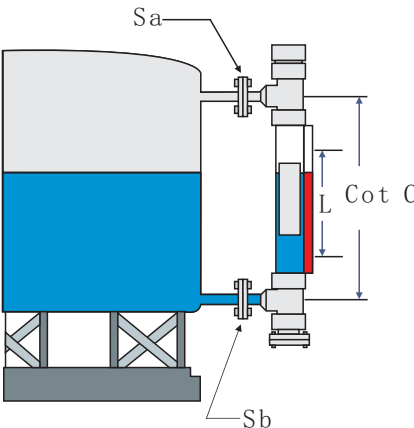
Material

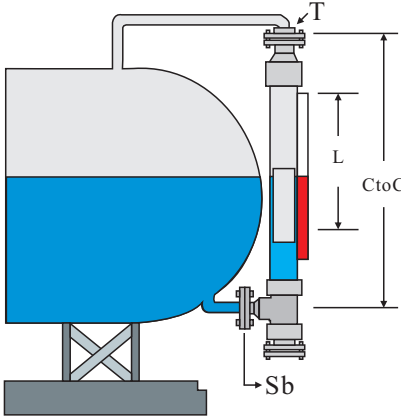
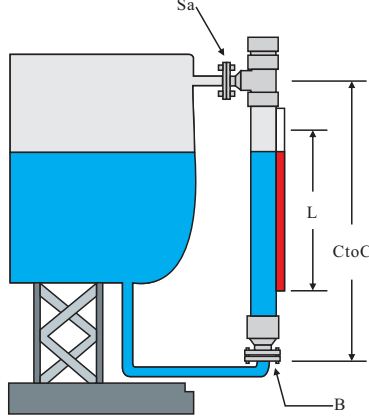
Material	Code
Shell&float	
PVC	1
Full PVC housing/PVC float	1A*
CPVC	2
PVDF	4

Note: Special materials, floats, connections and fabrication techniques are available to extend length and extend operational performance.

Installation requirements

To choose the best configuration for your application, pay attention to the process connections (the ones that usually let the liquid level in and out).

	AP type	BP type
	top connection	side connection
		
L=visible length		
typical length	C-C=total length	C to C=L+8" (203 mm) total length=C to C+11" (279mm)
Flip material	plastic	
Continuous indication length	228" (579 cm)	

	CP type	DP type
	top side connection	side bottom connection
		
L=typical length		
typical length	C to C = L + 9.5" (241 mm) total length=C to C+5-1/2" (140	C to C = L + 9.5" (241 mm) total length=C to C+5-1/2" (140
Flip material	plastic	
Continuous indication length	228" (579 cm)	

Electrical connections

Top  T	blind end		NPT thread						Flange	
			fixed		Detachable				固定	Detachable
	fixed	Detachable	female thread	male thread	male thread	female thread	female thread	female thread		
										

Side Sa  Side Sb 	blind end	NPT thread		Flange
		male thread	female thread	
				

Bottom  B	blind end		NPT thread						Flange	
			fixed		Detachable				fixed	Detachable
	fixed	Detachable	male thread	female thread	male thread	female thread	female thread	female thread		
										

NOTE: When selecting connections, take into account the requirements for exhaust and drain holes.

● Connection code

T & B	top and bottom connections	Sa & Sb	side connection
T/B 1	welding cap	S1	blind end - no connection
T/B 2	Welding cap (PVC, CPVC type only)	S2	MNPT Fittings
T/B 3	Fixed Flange / Blind Flange	S2	FNPT Fittings
T/B 4	Welded pipe joint / FNPT	S4	ANSI flange
T/B 5	Welded pipe joint / MNPT		
T/B 6	Threaded Fittings / MNPT		
T/B 7	Fixed flange/mating flange MNPT		
T/B 8	Threaded Fittings / FNPT		
T/B 9	Fixed flange/mating flange FNPT		
T/B 10	Welded pipe joint flange Welded connection flange		
T/B 11	Threaded Fitting Flange		

Continuous electronic output transmitter for all indicators

The transmitter adds the capability of the indicator to get both a visual indication and a continuous electronic output without penetrating the tank. Use this transmitter. The condition of your tank can be monitored remotely and a signal can be sent to the controller to determine the next action. These transmitters can be used with the display meters mentioned in this catalogue, or can specify the output mode and connect directly to the equipment.



low temperature transmitter



Explosion-proof transmitter

Technical parameter

	low temperature transmitter	Explosion-proof transmitter	Explosion Proof/High Temperature Transmitter
			
SureSite Type	Plastic and Standard Alloy Types	Mini Alloy and Plastic	Standard alloys and ANSI/ASME alloys
maximum operating emperature	+300°F (149°C)	+300°F (149°C)	+750°F (399°C)
shell material	polysulfone	316 Stainless Steel	
output terminal	cable	Junction Box (Ferro Alloy)	
Transmitter resolution	3/8" (9.5 mm)		
precision	3/8" (9.5 mm)		

● Signal conditioning module

Nuoying provides a variety of electrical junction boxes with built-in signal conditioners to improve the flexibility of the magnetic flap level gauge. The following voltage outputs can be provided: 0-5VDC, 0-10VDC, 0-12 VDC, and the following current outputs can be provided 4-20mA (loop powered), see page 20 for electrical specifications.

● Intrinsically Safe

Intrinsic safety can be achieved when the transmitter is properly connected to Nuoying or other brands of Zener barriers.

Signal Conditioning Module

- 0-5 VDC output
- 0-12 VDC output
- 4-20 mA output

Offers signal conditioning as an integral part of the XT Series and transmitter.

Shaft assembly	J-Box	Panel assembly
		
	J-Box Appendix	Panel Mount (Pedestal)

The output of the signal conditioner can be directly connected to many instruments, and they are ideal for large multi-vessel users. Products with a 4-20mA output are particularly suitable for control loops and do not require additional instrumentation.

● Performance parameters

Operating temperature	+5°F to +160°F (-15°C to +71°C)
Storage temperature	-40°F to +212°F (-40°C to +100°C)
Output temperature coefficient (%of maximum full scale)	±0.00388%/°F (±0.007%/°C)
4-20 mA Types	Less than ±1% at 16mA

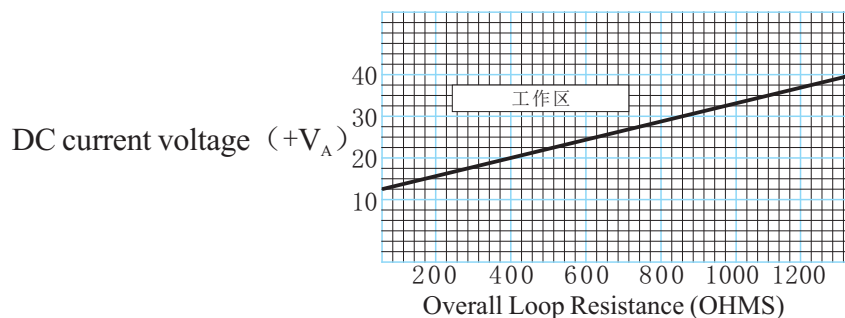
● Power module

Output Power	115 VAC, 60 Hz
	230 VAC, 60 Hz

If there is no external DC power supply, when the input is 115VAC or 230VAC, it will provide 24VDC power to the signal conditioner, and the maximum load is 70mA.

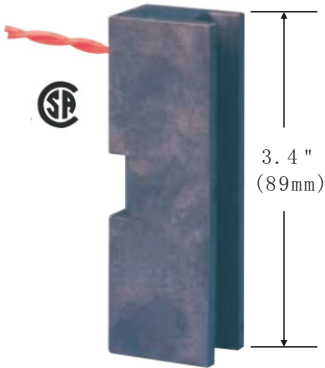
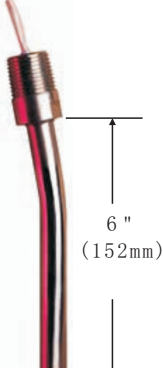
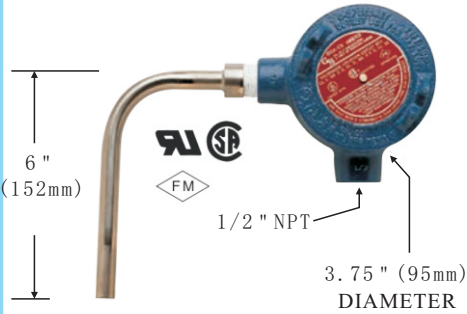
● Excitation required for transmitters equipped with 4-20 mA signal conditioners

The minimum excitation required for the operation of 4-20 mA, DC output transmitters (see the figure below) can be determined by the entire loop resistance shown in the figure. value decision. (all loop resistance = total resistance of the DC terminal + loop resistance). Optimum operation is a function of supply voltage (+V_A) and overall loop resistance, which should be greater than the minimum resistance of the associated



Switch assemblies provide high, medium and low level alarm or logic control

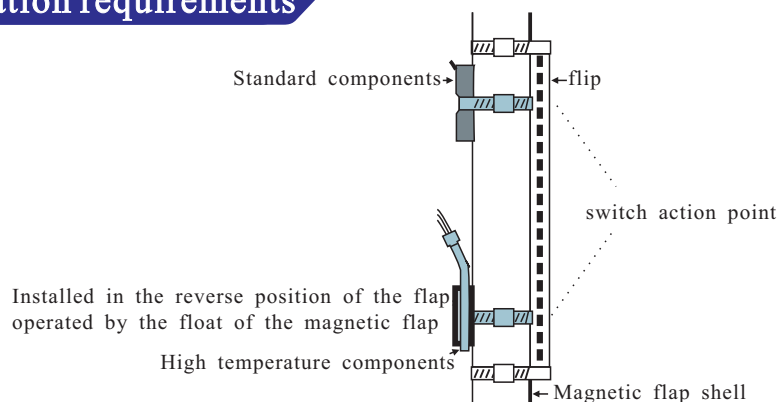
Technical parameter

Standard switch module	High temperature switch module	Explosion proof switch assembly
		
CSA certified	Temperature resistant up to 750°F (399°C)	UL, CSA, FM Approved
Includes stainless steel mounting clips	316 Stainless Steel Construction	Temperature resistant up to 750°F (399°C)
Polysulfone shell	1/2" MNPT connection	Junction Box Terminals
Temperature resistant up to 300°F (149°C)	with stainless steel mounting clip	Stainless steel construction
Connect 1/4" FNPT		Includes stainless steel mounting clips

● Switch logic (all models)

	lead up	The switch closes when the liquid level rises and remains closed until the liquid level drops.	These switch assemblies are suitable for intrinsically safe applications. 
	lead down	The switch opens when the liquid level rises and remains open until the liquid level drops.	

Installation requirements





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