

UHC MAGNETIC LEVEL GAUGE

Summary

UHC magnetic level gauge is a new generation of level meter based on the magnetic coupling principle. This product has advanced technology, reasonable structure, clear and intuitive display. It is suitable for petroleum, chemical, electric power, light industry, pharmaceutical and other industries. The level gauge is divided into side-mounted type and top-mounted type. Side-mounted type is for side-mounted applications. Top-mounted type for top-mounted applications, particularly suitable for level measurement in underground storage vessels.

Working Principle

UHC magnetic level gauge is mainly composed of measuring tube and local indicator. Side-mounted type level gauge is connected to the process vessel through interface flanges to form a connector. The float in the measuring tube moves up and down with the liquid level (or interface) changes. The magnetic steel in the float drives the local indicator, which clearly and intuitively indicates the liquid level (interface level) in the process vessel. Top-mounted type level gauge directly installed on the top of the process vessel. The float moves up and down with the liquid level (or interface) to drive the magnetic connecting rod to move up and down. The magnetic steel in the magnetic connecting rod drives the local indicator, which clearly and intuitively indicates the liquid level (or interface level) in the process vessel. If used in conjunction with remote transmitter and upper and lower limit alarms, it can easily realize remote transmission and automatic control of liquid level signals.



Summary

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Main Technical Data

1. UHC Magnetic Level Gauge Side-mounted Type Local Indicator

1.1 Side-mounted Type Magnetic Level Gauge (Normal Type)

- **Application Scope:** This level gauge is the most commonly used side-mounted magnetic level gauge. It is suitable for liquid level or interface level measurement with a pressure rating of not more than 6.3MPa and a medium temperature of 0℃~+350℃
- **Measuring range:** 200mm~6000mm (can be produced out of range)
- **Pressure rating:** ≤6.3MPa
- **Nominal diameter:** DN25 (or as customer requirement)
- **Ambient temperature:** -40℃~+80℃
- **Medium temperature:** 0℃≤T<350℃
- **Accuracy:** ±10mm
- **Density:** Level: $\rho \geq 0.36\text{g/cm}^3$ Interface: $\rho_1 - \rho_2 \geq 0.08\text{g/cm}^3$
- **Wetted material:** 304, 316L or as customer requirement
- **Flange standard:** HG/T20592-2009, HG/T20615-2009 as customer requirement

1.2 Side-mounted Type Magnetic Level Gauge (High Temperature Type)

- **Application Scope:** It is suitable for liquid level or interface level measurement in high temperature occasions. Pressure rating is not more than 6.3MPa, medium temperature +350℃~+450℃
- **Measuring range:** 200mm~6000mm (can be produced out of range)
- **Pressure rating:** ≤6.3MPa
- **Nominal diameter:** DN25 (or as customer requirement)
- **Ambient temperature:** -40℃~+80℃
- **Medium temperature:** 350℃≤T≤450℃
- **Accuracy:** ±10mm
- **Density:** Level: $\rho \geq 0.36\text{g/cm}^3$ Interface: $\rho_1 - \rho_2 \geq 0.08\text{g/cm}^3$
- **Wetted material:** 304, 316L or as customer requirement
- **Flange standard:** HG/T20592-2009, HG/T20615-2009 as customer requirement
- **Structural features:** Using high temperature resistant alnico magnets

1.3 Side-mounted Type Magnetic Level Gauge (High Pressure Type)

- **Application Scope:** It is suitable for liquid level or interface measurement. Maximum pressure rating is 32Mpa. Medium temperature is 0℃~+450℃
- **Measuring range:** 200mm~6000mm (can be produced out of range)
- **Pressure rating:** ≤42MPa
- **Nominal diameter:** DN25 (or as customer requirement)
- **Ambient temperature:** -40℃~+80℃
- **Medium temperature:** 0℃≤T≤450℃
- **Accuracy:** ±10mm
- **Density:** Level: $\rho \geq 0.36\text{g/cm}^3$ Interface: $\rho_1 - \rho_2 \geq 0.08\text{g/cm}^3$
- **Wetted material:** 304, 316L or as customer requirement
- **Flange standard:** HG/T20592-2009, HG/T20615-2009 as customer requirement

1.4 Side-mounted Type Magnetic Level Gauge (Anti-corrosion Type)

- **Application Scope:** The chamber is lined with PTFE, which is suitable for liquid level or interface measurement of strong corrosive medium in petroleum, chemical and other industries.
- **Measuring range:** 250mm~6500mm (can be produced out of range)
- **Pressure rating:** ≤2.5MPa
- **Nominal diameter:** DN25 (or as customer requirement)
- **Ambient temperature:** -40℃~+80℃
- **Medium temperature:** -40℃≤T≤+150℃
- **Accuracy:** ±10mm
- **Density:** Level: $\rho \geq 0.36\text{g/cm}^3$ Interface: $\rho_1 - \rho_2 \geq 0.08\text{g/cm}^3$
- **Wetted material:** Chamber is lined with PTFE. Float material is lined with PTFE
- **Flange standard:** HG/T20592-2009, HG/T20615-2009 as customer requirement

1.5 Side-mounted Type Magnetic Level Gauge (Low Temperature)

- **Application Scope:** It is suitable for liquid level or interface measurement in low temperature and frosty occasions.
- **Measuring range:** 200mm~6000mm (can be produced out of range)
- **Pressure rating:** ≤16.0MPa
- **Nominal diameter:** DN25 (or as customer requirement)
- **Ambient temperature:** -40℃~+80℃
- **Medium temperature:** -30℃~0℃ (vacuum jacket + vacuum seal magnetic flap indicator)
-196℃~-30℃ (vacuum jacket + vacuum seal magnetic flap indicator + anti-frost extension)
- **Accuracy:** ±10mm
- **Density:** Level: $\rho \geq 0.36\text{g/cm}^3$ Interface: $\rho_1 - \rho_2 \geq 0.08\text{g/cm}^3$
- **Wetted material:** 304, 316L or as customer requirement
- **Flange standard:** HG/T20592-2009, HG/T20615-2009 as customer requirement

2. UHC Magnetic Level Gauge Top-mounted Type Local Indicator

2.1 Top-mounted Type Magnetic Level Gauge (Normal Type)

- **Application Scope:** Top-mounted. It is suitable for liquid level or interface measurement of various underground storage tanks and containers whose sides are not suitable for opening.
- **Measuring range:** 200mm~4000mm (can be produced out of range)
- **Pressure rating:** ≤5MPa
- **Nominal diameter:** DN150, DN100
- **Ambient temperature:** -40℃~+80℃
- **Medium temperature:** -196℃≤T≤+450℃
- **Accuracy:** ±10mm
- **Density:** Level: $\rho \geq 0.45\text{g/cm}^3$ Interface: $\rho_1 - \rho_2 \geq 0.16\text{g/cm}^3$
- **Wetted material:** 304, 316L or as customer requirement
- **Flange standard:** HG/T20592-2009, HG/T20615-2009 as customer requirement

2.2 Top-mounted Type Magnetic Level Gauge (Anti-corrosion Type)

- **Application Scope:** Top-mounted. It is suitable for measuring the liquid level or interface level of various underground storage tanks and containers whose sides are not suitable for opening, and have strong corrosive medium.
- **Measuring range:** 300mm~4000mm (can be produced out of range)
- **Pressure rating:** ≤5MPa
- **Nominal diameter:** DN150, DN100
- **Ambient temperature:** -40℃~+80℃
- **Medium temperature:** -40℃≤T≤+150℃
- **Accuracy:** ±10mm

- **Density:** Level: $\rho \geq 0.7\text{g/cm}^3$ Interface: $\rho_1 - \rho_2 \geq 0.16\text{g/cm}^3$
- **Wetted material:** 304+PTFE or as customer requirement
- **Flange standard:** HG/T20592-2009, HG/T20615-2009 as customer requirement

3. Transmitter Part

There are two types of level transmitters: Hall-Resistive level transmitter and magnetostrictive level transmitter.

3.1 Hall-resistive level transmitter

The transmission device is tied to the outside of measuring tube. When the float moves up and down with liquid level, the hall switch corresponding to the liquid level value is turned on by the magnetic field of the float, which changes the resistance value and current, and is converted into a 4-20 mA signal through the conversion circuit to achieve the purpose of transmission.

- **Measuring range:** 200mm~6000mm (can be produced out of range)
- **Power supply:** 24 VDC
- **Output:** 4~20mA with HART
- **Ambient temperature:** -40 C ~ +80 C
- **Medium temperature:** -40 C $\leq T \leq$ +250 C (When $T \geq 120$ C, the transmission part is not allowed to keep warm)
- **Accuracy:** $\pm 10\text{mm}$
- **Cable Entry:** M20 \times 1.5 (female thread) or as customer requirement
- **Explosion-proof type:** Explosion-proof: Ex db II C T4...T6 Gb
Intrinsic safety: Ex ia II C T5...T6 Ga
- **Ingress protection:** IP66

3.2 Magnetostrictive Level Transmitter

The transmission device is tied to the outside of measuring tube, and there is a magnetostrictive wire in the remote transmission tube. A microprocessor-controlled sensor circuit emits current pulses along the magnetostriction, creating a circular magnetic field around the magnetostriction line. The magnetic steel inside the float magnetizes the magnetostrictive line along the axial direction. The superposition of the two magnetic fields generates a torsional pulse that travels along the magnetostrictive line to the top of the sensor, and the pulse transmission time is captured and calculated by the circuit unit to determine the float position. and is converted into a 4-20 mA signal through the conversion circuit to achieve the purpose of transmission.

- **Measuring range:** 200mm~6000mm (can be produced out of range)
- **Power supply:** 24 VDC
- **Output:** 4~20mA with HART
- **Ambient temperature:** -40 C ~ +80 C
- **Medium temperature:** -40 C $\leq T \leq$ +450 C (When $T \geq 300$ C, the transmission part is not allowed to keep warm)
- **Accuracy:** $\pm 2\text{mm}$
- **Cable Entry:** M20 \times 1.5 (female thread)
- **Explosion-proof type:** Explosion-proof: Ex d II C T3...T6 Gb
Intrinsic safety: Ex ia II C T5/T4 Ga
- **Ingress protection:** IP66

4. Upper and Lower Limit Alarms

It is installed on the outside of chamber, and can be adjusted to any position.

- **Output Signal:** Normally open and normally close
- **Ambient temperature:** -40 C ~ +80 C
- **Medium temperature:** $T \leq +300$ C
- **Working life:** ≥ 105 times
- **Ingress protection:** IP66
- **Cable Entry:** M20 \times 1.5 (female thread) or as customer requirement
- **Accuracy:** $\pm 10\text{mm}$
- **Contact capacity:** AC220VA, DC50W
- **Explosion-proof type:** Explosion-proof: Ex d II C T1 ~ T5/T6 Gb
Intrinsic safety: Ex ia II C T1 ~ T5/T6 Ga

Model Selection Table

Model	Code		Contents
UHC-			Magnetic Level Gauge
	A		Side-mounted
	B		Top-mounted
	T		Without transmitter
	S1		With hall-resistance level transmitter (upside)
	S2		With hall-resistance level transmitter (upside-down)
	U1		With magnetostrictive level transmitter (upside)
	U2		With magnetostrictive level transmitter (upside-down)
	D		Without alarms
		1	With 1 alarm
		2	With 2 alarms
		3	With 3 alarms
		4	With 4 alarms
		2	PN10(1.0MPa)
		3	PN16(1.6MPa)
		4	PN20(CLASS150)
		5	PN25(2.5MPa)
		6	PN40(4.0MPa)
		7	PN50(CLASS300)
		8	PN63(6.3MPa)
		9	PN100(10.0MPa)
		10	PN110(CLASS600)
		11	PN150(CL900)
		12	PN160(16.0MPa)
		13	PN250(25.0MPa)
		14	PN260(CL1500)
		15	PN320
		2	304
		4	316L
		127	304+PTFE
		X	Other material
		-	
		*	Level ρ or interface $\rho 1 / \rho 2$
		-	
		*	Measuring range (Please indicate the insertion depth or the length of the neck when choosing top-mounted type)
		d	Explosion-proof
		i	Intrinsic safety
		0	Without heat tracing
		W	Heat tracing with attached pipe (heat tracing interface R1/2)
		B	Jacket heat tracing (heat tracing interface R1/2)
		D	Electric heating
		-792	Complied with PED certification
		-	
		-	

Note:

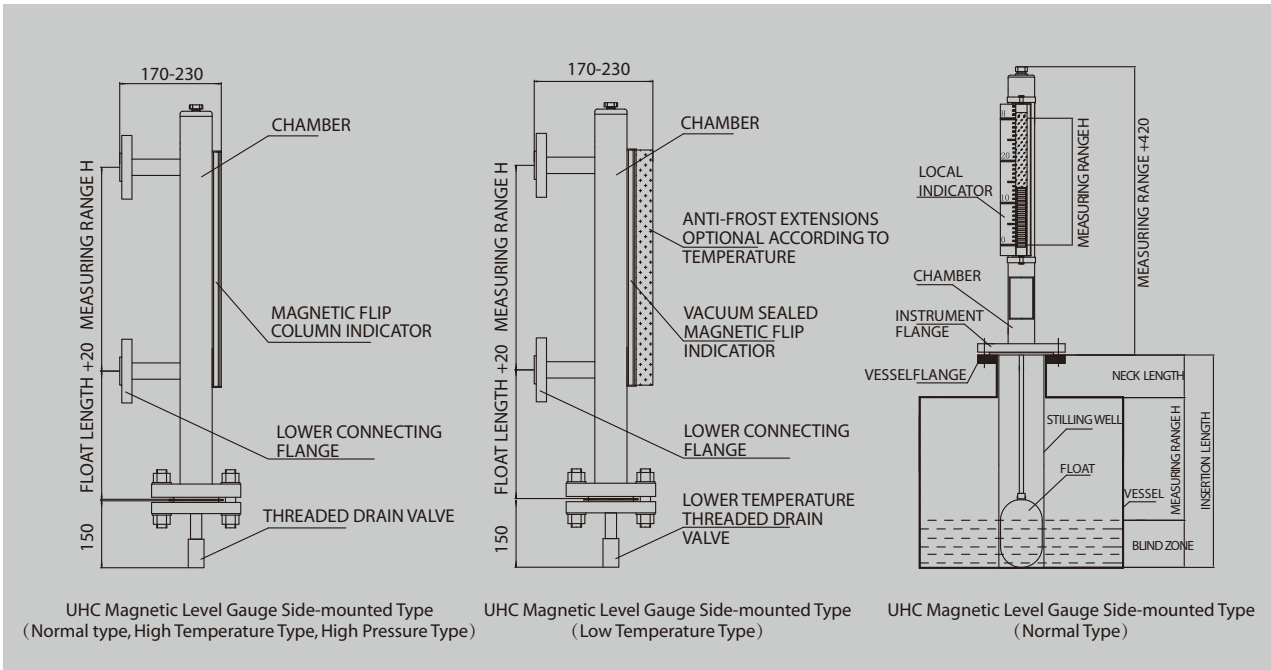
If nominal pressure rating exceeds the options in the table, refer to the model selection table for a model similar to the actual requirement.

Example of Model Selection

UHC-AS2142-0.8/0.5-1800dW , with Hall-resistive type (upside down) transmitter, with an alarm, pressure rating 2.0MPa, wetted material 304, interface measurement, medium density 0.8 g/cm3 and 0.5g/cm3, measuring range is 1800mm, explosion-proof type, side-mounted magnetic level gauge with attached pipe heat tracing.

Outline Drawing

1. Structure and Size



Note:

When choosing the side-mounted type of UHC magnetic level gauge, pay attention to the installation dimensions below the flange of the connecting device to avoid inability to install on site.

1.1 Float Size (standard float diameter 50mm) and Applicable Working Conditions

(1) Nominal pressure: $P \leq 5.0\text{MPa}$ ($T \leq 350\text{ }^\circ\text{C}$)

Material	Density (g/cm^3)	Length (mm)
Stainless Steel (316L)	$0.571 \leq \rho < 0.597$	454.5
	$0.597 \leq \rho < 0.633$	404
	$0.633 \leq \rho < 0.683$	353.5
	$0.683 \leq \rho < 0.759$	303
	$0.759 \leq \rho < 0.899$	252.5
	$0.889 \leq \rho < 1.161$	202
Titanium (TA2)	$1.161 \leq \rho$	151.5
	$0.428 \leq \rho < 0.447$	505
	$0.447 \leq \rho < 0.472$	454.5
	$0.472 \leq \rho < 0.506$	404
	$0.506 \leq \rho < 0.554$	353.5
	$0.554 \leq \rho < 0.627$	303
	$0.627 \leq \rho < 0.751$	252.5
	$0.751 \leq \rho < 1.009$	202
	$1.009 \leq \rho$	151.5

Note:

When nominal pressure is 5.0 Mpa, density is 0.9g/cm^3 , choose float made of 316L; When density is $0.889 \leq \rho < 1.161$, float length is 202mm, choose float made of TA2; When density is $0.751 \leq \rho < 1.009$, float length is 202mm.

(2) Nominal Pressure: $5.0\text{MPa} < P \leq 11\text{MPa}$ ($T \leq 350\text{ C}$)

Material	Density (g/cm ³)	Length (mm)
Titanium (TA2)	$0.545 \leq \rho < 0.565$	505
	$0.565 \leq \rho < 0.591$	454.5
	$0.591 \leq \rho < 0.626$	404
	$0.626 \leq \rho < 0.674$	353.5
	$0.674 \leq \rho < 0.749$	303
	$0.749 \leq \rho < 0.876$	252.5
	$0.876 \leq \rho < 1.139$	202
	$1.139 \leq \rho$	151.5

(3) Nominal Pressure: $11.0\text{MPa} < P \leq 16\text{MPa}$ ($T \leq 450\text{ C}$)

Material	Density (g/cm ³)	Length (mm)
Titanium (TA2)	$0.562 \leq \rho < 0.577$	512.5
	$0.577 \leq \rho < 0.595$	474
	$0.595 \leq \rho < 0.617$	397
	$0.617 \leq \rho < 0.644$	358.5
	$0.644 \leq \rho < 0.68$	320
	$0.68 \leq \rho < 0.729$	281.5
	$0.729 \leq \rho < 0.797$	243
	$0.797 \leq \rho < 0.902$	243
	$0.902 \leq \rho < 1.081$	204.5
	$1.081 \leq \rho$	166

(4) Nominal Pressure: $16.0\text{MPa} < P \leq 26\text{MPa}$ ($T \leq 450\text{ C}$)

Material	Density (g/cm ³)	Length (mm)
Titanium alloy (TC4)	$0.6 \leq \rho < 0.614$	516.4
	$0.614 \leq \rho < 0.632$	477.6
	$0.632 \leq \rho < 0.653$	438.8
	$0.653 \leq \rho < 0.68$	400
	$0.68 \leq \rho < 0.715$	361.2
	$0.715 \leq \rho < 0.763$	322.4
	$0.763 \leq \rho < 0.829$	283.6
	$0.829 \leq \rho < 0.93$	244.8
	$0.93 \leq \rho < 1.104$	206
	$1.104 \leq \rho$	167.2

(5) Nominal Pressure: $P \leq 5.0\text{MPa}$ ($T > 350\text{ C}$)

Material	Density (g/cm ³)	Length (mm)
Titanium (TA2)	$0.6 \leq \rho < 0.63$	506.6
	$0.63 \leq \rho < 0.66$	447.8
	$0.66 \leq \rho < 0.73$	389
	$0.73 \leq \rho < 0.85$	330.2
	$0.85 \leq \rho < 1.0$	271.4
	$1.0 \leq \rho$	212.6

2 Terms and Conditions

The measured medium must not contain ferromagnetic substances.

Ordering Information

- | | | |
|---|-------------------------|------------------------------------|
| ▶ Select according to model selection table | Medium name and density | Operating pressure and temperature |
| ▶ Wetted material | Measuring range | Flange standard |