

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.



Operating 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.

Technical Parameters

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 nominal pressure of not more than 6.3MPa and a medium temperature of 0°C ~ +350°C

Range: 200mm ~ 6000mm (can be produced out of range)

Nominal Pressure: $\leq 6.3\text{MPa}$

Nominal Diameter: DN25 (or as customer requirement)

Ambient Temperature: -40°C ~ + 80°C

Medium Temperature: $0^\circ\text{C} \leq T < 350^\circ\text{C}$

Accuracy: $\pm 5\text{mm}$

Density: Level: $\rho \geq 0.36\text{g/cm}^3$ Interface: $\rho_1 - \rho_2 \geq 0.1\text{g/cm}^3$

Wetted Material: 304, 316L or as customer requirement

Flange Standard: HG/T20592-2009, HG/T20615-2009 or 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.

Nominal pressure is not more than 6.3MPa, medium temperature +350°C ~ +450°C

Range: 200mm ~ 6000mm (can be produced out of range)

Nominal Pressure: $\leq 6.3\text{MPa}$

Nominal Diameter: DN25 (or as customer requirement)

Ambient Temperature: -40°C ~ + 80°C

Medium Temperature: $350^\circ\text{C} \leq T \leq 450^\circ\text{C}$

Accuracy: $\pm 5\text{mm}$

Density: Level: $\rho \geq 0.36\text{g/cm}^3$ Interface: $\rho_1 - \rho_2 \geq 0.1\text{g/cm}^3$

Wetted Material: 304, 316L or as customer requirement

Flange Standard: HG/T20592-2009, HG/T20615-2009 or as customer requirement

Structural Features: High temperature aluminum nickel cobalt magnets + ceramic magnetic flip column indicator

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

Application Scope: It is suitable for liquid level or interface measurement. Maximum nominal pressure is 32Mpa. Medium temperature is 0°C ~ +450°C

Range: 200mm ~ 6000mm (can be produced out of range)

Nominal Pressure: $\leq 32\text{MPa}$

Nominal Diameter: DN25 (or as customer requirement)

Ambient Temperature: $-40^{\circ}\text{C} \sim +80^{\circ}\text{C}$

Medium Temperature: $0^{\circ}\text{C} \leq T \leq 450^{\circ}\text{C}$

Accuracy: $\pm 5\text{mm}$

Density: Level: $\rho \geq 0.36\text{g/cm}^3$ Interface: $\rho_1 - \rho_2 \geq 0.1\text{g/cm}^3$

Wetted Material: 304, 316L or as customer requirement

Flange Standard: HG/T20592-2009, HG/T20615-2009 or as customer requirement

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

Application Scope: Chamber material is SS304 lined with PTFE. It is suitable for measuring the liquid level or interface level of corrosive medium in petroleum and chemical industries.

Range: 250mm ~ 6500mm (can be produced out of range)

Nominal Pressure: $\leq 2.5\text{MPa}$

Nominal Diameter: DN25 (or as customer requirement)

Ambient Temperature: $-40^{\circ}\text{C} \sim +80^{\circ}\text{C}$

Medium Temperature : $-50^{\circ}\text{C} \leq T \leq 180^{\circ}\text{C}$ (medium related)

Accuracy: $\pm 5\text{mm}$

Density: Level: $\rho \geq 0.65\text{g/cm}^3$ Interface: $\rho_1 - \rho_2 \geq 0.1\text{g/cm}^3$

Wetted Material: Chamber material is SS304 lined with PTFE. Float material is lined with PTFE

Flange Standard: HG/T20592-2009, HG/T20615-2009 or as customer requirement

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

Application Scope: It is suitable for liquid level or interface level measurement in low temperature and frosty occasions

Range: 200mm ~ 6000mm

Nominal Pressure: $\leq 16.0\text{MPa}$

Nominal Diameter: DN25 (or as customer requirement)

Ambient Temperature: $-40^{\circ}\text{C} \sim +80^{\circ}\text{C}$

Medium Temperature : $-40^{\circ}\text{C} \sim 0^{\circ}\text{C}$ (Indicator part: vacuum sealed magnetic flap indicator)

$-196^{\circ}\text{C} \sim -40^{\circ}\text{C}$ (Indicator part: vacuum sealed magnetic flap indicator plus anti-frost extension)

Accuracy: $\pm 5\text{mm}$

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 or 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.

Range: 200mm ~ 4000mm (can be produced out of range)

Nominal Pressure: $\leq 5\text{MPa}$

Nominal Diameter: DN150, DN100

Ambient Temperature: $-40^{\circ}\text{C} \sim +80^{\circ}\text{C}$

Operating Temperature: $-40^{\circ}\text{C} \leq T \leq +450^{\circ}\text{C}$

Accuracy: $\pm 5\text{mm}$

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 or 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.

Range: 300mm ~ 4000mm (can be produced out of range)

Nominal Pressure: $\leq 5\text{MPa}$

Nominal Diameter: DN150, DN100

Ambient Temperature: $-40^{\circ}\text{C} \sim +80^{\circ}\text{C}$

Operating Temperature: $-40^{\circ}\text{C} \leq T \leq +150^{\circ}\text{C}$

Accuracy: $\pm 5\text{mm}$

Liquid: 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 or as customer requirement

3. Transmitter Part

There are two types of level transmitters: reed-resistance level transmitters and magnetostrictive level transmitters.

3.1 Reed-resistance Level Transmitter

The transmission device is tied to the outside of measuring tube. When the float moves up and down with liquid level, the reed switch corresponding to the liquid level is absorbed by the action of 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.

Range: 200mm ~ 6000mm (can be produced out of range)

Power Supply: 24 VDC

Output Signal: 4 ~ 20mA with HART

Ambient Temperature: $-40^{\circ}\text{C} \sim +80^{\circ}\text{C}$

Medium Temperature: $-40^{\circ}\text{C} \leq T \leq +200^{\circ}\text{C}$ (When $T \geq 150^{\circ}\text{C}$, the transmission part is not allowed to keep warm)

Accuracy: $\pm 10\text{mm}$

Cable Entry: M20×1.5 (female thread) or as customer requirement

Explosion-proof Type: Flameproof: Ex d II C T1 ~ T5/T6 Gb

Intrinsic safety: Ex ia II C T1 ~ T5/T6 Ga

IP Rating: 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.

Range: 200mm ~ 6000mm (can be produced out of range)

Power Supply: 24 VDC

Output Signal: 4 ~ 20mA with HART

Ambient Temperature: -40°C ~ + 80°C

Medium Temperature: -40°C ≤ T ≤ + 450°C

Accuracy: ±2mm

IP Rating: IP66

Cable Entry: M20×1.5 (female thread)

Explosion-proof Type: Flameproof: Ex d II C T1 ~ T5/T6 Gb

Intrinsic safety: Ex ia II C T5/T6 Ga

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 ≤ + 300°C

Working Life: ≥ 105 times

IP Rating: IP66

Cable Entry: M20×1.5 (female thread) or as customer requirement

Accuracy: ±5mm

Contact Capacity: AC220VA, DC50W

Explosion-proof Type: Flameproof: 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 reed-resistance level transmitter (upside)
	S2		With reed-resistance level transmitter (upside-down)
	U1		With magnetostrictive level transmitter (upside)
	U2		With magnetostrictive level transmitter (upside-down)
	A		With upper or lower alarm (1 group)
	C		With upper and lower alarms (2 groups)
	D		Without 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
	3		316L
	127		304+PTFE
	X		Other material
	—		
	*		Level p or interface p1/p2
	—		
	*		Range (Please indicate the insertion depth or the length of the neck when choosing top-mounted type)
	d		Flameproof
	i		Intrinsic safety

	0	Without heat tracing
	W	Steam heat tracing with tube (Heat treating interface R1/2)
	B	Steam heat tracing with jacket (Heat treating interface R1/2)
	D	Electrical heat treating
	-792	Complied with PED certification

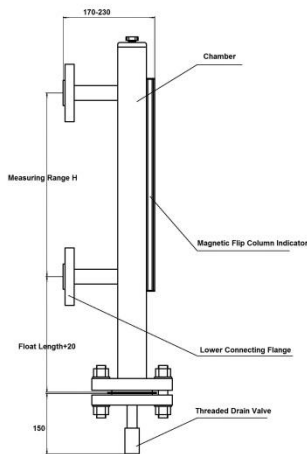
Note: If nominal pressure rating exceeds the options in the table, refer to the model selection table for a model similar to the actual requirement.

Example

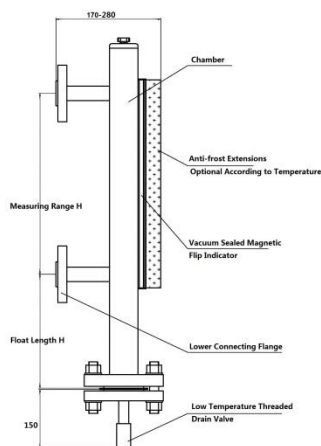
UHC-AS2C431-0.8/0.5-1800DW is the magnetic level gauge with reed-resistance level transmitter (upside-down), with upper and lower limit alarm. Nominal pressure is 2.0 Mpa. Wetted material is SS304. Interface measurement. Density is 0.8g/cm³ and 0.5g/cm³. Measuring range is 1800mm, flameproof type. Heating tracing type is steam heating tracing with tube. Mounted type is side-mounted.

Outline Drawing

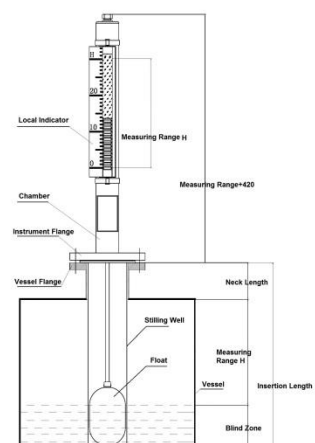
1. Structure and Size



UHC Magnetic Level Gauge Side-mounted Type
(Normal type, High Temperature Type, High Pressure Type)



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



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

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

Material	Density (g/cm ³)	Length (mm)
Stainless Steel (316L)	$0.889 \leq \rho < 1.161$	202
	$1.161 \leq \rho$	151.5
Titanium (TA2)	$0.428 \leq \rho < 0.447$	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/cm³, 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: $5.0\text{MPa} < P \leq 11\text{MPa}$ ($T \leq 350^\circ\text{C}$)

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: $11.0\text{MPa} < T \leq 16\text{MPa}$ ($T \leq 450^\circ\text{C}$)

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: $16.0\text{MPa} < P \leq 26\text{MPa}$ ($T \leq 450^\circ\text{C}$)

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

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. Usage Notice

The medium to be measured 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