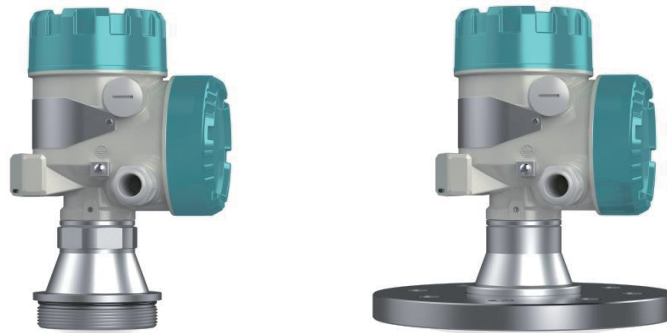


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MPS7000 Radar Level Transmitter



Overview

1.1. Measuring principle

MPS7000 FM radar level transmitter is a D-band (120 GHz) FM-CW radar level transmitter, which is suitable for continuous level measurement of various liquid and solid medium, with a maximum measuring span of 120 m.

MPS7000 FM radar level transmitter is designed with FM-CW technique. Its antenna emits a 120~140 GHz high frequency microwave signal of linear frequency modulation. After the signal reaches the surface of the measured medium, part will be absorbed, and the other part will be reflected. The radar mixes the collected reflected signal with the transmitted signal to get a difference frequency signal. Then the frequency difference is obtained by FFT or DFT transformation and a series of operations. The difference is proportional to the distance from the radar antenna and the surface of the measured medium. The larger the frequency difference is, the farther the material distance is. The distance from the measured medium to the meter flange can be calculated from equation (1).

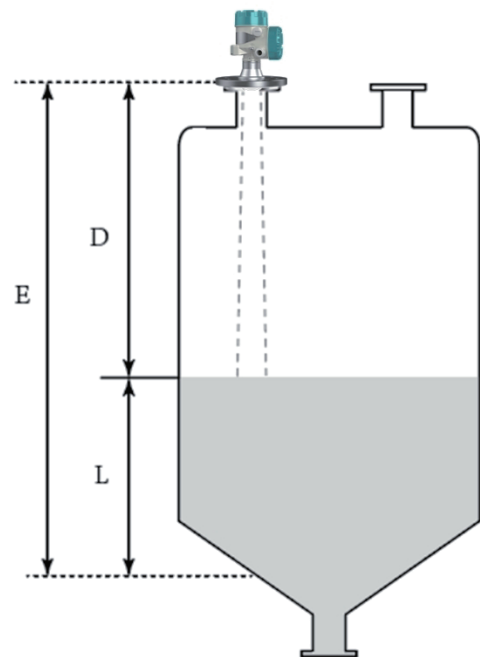
$$D = \frac{1}{2} \times c \times \frac{\Delta f}{R} \quad (1)$$

Wherein, D is the distance from the measuring reference surface to the measured medium, c is the propagation speed of light (electromagnetic wave) in vacuum, Δf is the frequency difference between the received signal and the transmitted signal, and R is the change rate of the frequency of the transmitted signal with time.

Then, the level height can be calculated from equation (2) according to the empty material level set by the user.

$$L = E - D \quad (2)$$

Wherein, E is the distance from the measuring reference surface to the empty material level set by the user, D is the distance from the measuring reference surface to the measured medium, and L is the level height.



1.2. Product advantages

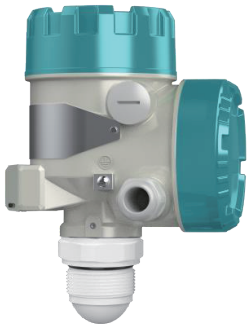
- **Well-focused beam:** With extremely narrow beam, the beam angle can be as small as 0.7°;
- **Intensified energy:** It has extremely strong penetrating power and extra-large measuring distance;
- **Small blind zone:** There are almost no blind zones at the near-end of the meter, so it can be measured for precise measurement of small containers;
- **Chinese menu:** Chinese menu is displayed by default. It is clear, and facilitates user operation;
- **Convenient commissioning:** The meter can be commissioned by means of keys, Bluetooth connection, upper computer software, HART data setter, etc.

1.3. Typical application

- Liquid level measurement in agitator tank, small storage tank, reactor, etc.;
- Level measurement in limited installation space;
- Level measurement in highly installed standpipe;
- Level measurement in extra-large solid tank, material pile, etc.;
- Level measurement in working conditions of concentrated dust and steam.

Technical characteristics

2.1. Technical parameters of MPS7100

Antenna type	Ø50 mm plastic rod antenna	Ø80 mm plastic rod antenna	Ø80 mm plastic horn antenna
Product pictures			
Scope of application	Liquid level measurement in small containers	Level measurement of liquid, lump or powder materials of simple process conditions	Level measurement of liquid, lump or powder materials of simple process conditions
Process materials	PTFE	PP+PTFE	PP+PTFE
Span	0~30m	0~120m	0~120m
Process connection	● G1-1/2"A thread ● Flange	● G3"A thread ● Flange	● Bracket ● Flange
Beam angle	Min. 0.7°		
Power supply and output	● 24 VDC two-wire (ripple≤100 mVp-p), 4~20 mA HART protocol; ● 24 VDC four-wire (ripple≤100 mVp-p), 4~20 mA HART protocol; ● 220 VAC four-wire, 4~20 mA HART protocol.		
Accuracy of the measurements	±2mm		
Signal frequency	D-band (about 120 GHz)		

Ambient temperature	-40°C~80°C		
Process temperature	-40°C~200°C	-40°C~200°C	-40°C~130°C
Process pressure	-1 kgf/cm ² ~2.5 kgf/cm ²	-1 kgf/cm ² ~2.5 kgf/cm ²	-1 kgf/cm ² ~2.0 kgf/cm ²
Degree of protection	IP67		
Electrical interface	● M20×1.5 thread (cable diameter 6~12 mm) ● 1/2" NPT thread (cable diameter 6~12 mm)		

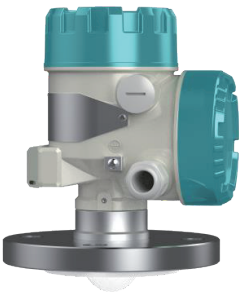
2.2. Technical parameters of MPS7101

Antenna type	Ø50 mm compact plastic antenna	Ø80 mm compact plastic antenna
Product pictures		
Scope of application	Liquid level measurement in small containers	Level measurement of liquid, lump or powder materials of simple process conditions
Process materials	PVDF	PP+PTFE
Span	0~30m	0~30m
Process connection	● G1-1/2"A thread ● Flange	● G3"A thread ● Flange
Beam angle	Min. 0.7°	
Power supply and output	24 VDC two-wire (ripple≤100 mVp-p), 4~20 mA HART protocol.	
Accuracy of the measurements	±2mm	
Signal frequency	D-band (about 120 GHz)	
Ambient temperature	-40°C~80°C	
Process temperature	-40°C~80°C	-40°C~200°C
Process pressure	-1 kgf/cm ² ~2.0 kgf/cm ²	-1 kgf/cm ² ~2.5 kgf/cm ²
Degree of protection	IP56	
Electrical interface	M20×1.5 thread (cable diameter 6~12 mm)	

2.3. Technical parameters of MPS7200

Antenna type	Ø50 mm integrated and sanitary antenna	Ø80 mm integrated and sanitary antenna	Universal antenna
Product pictures			
Scope of application	- Slight corrosive liquid of complex process conditions - Liquid measurement of food and drug industries (sanitary)	- Slight corrosive liquid of complex process conditions - Level measurement of lump or powder materials of simple process conditions	Level measurement of lump or powder materials of simple process conditions
Process materials	304+PTFE	304+PTFE	304+PTFE
Span	0~30m	0~120m	0~120m
Process connection	- G1-1/2"A thread - Flange 2" sanitary clamp	- G3"A thread - Flange 3" sanitary clamp	Flange
Beam angle	Min. 0.7°		
Power supply and output	24 VDC two-wire (ripple≤100 mVp-p), 4~20 mA HART protocol; 24 VDC four-wire (ripple≤100 mVp-p), 4~20 mA HART protocol; 220 VAC four-wire, 4~20 mA HART protocol.		
Accuracy of the measurements	±2mm		
Signal frequency	D-band (about 120 GHz)		
Ambient temperature	-40°C~80°C		
Process temperature	-40°C~200°C		
Process pressure	- Sanitary: -1 kgf/cm²~10 kgf/cm²; - Integrated: -1 kgf/cm²~25 kgf/cm²; - Universal: Atm (barometric pressure)		
Degree of protection	IP67		
Electrical interface	- M20×1.5 thread (cable diameter 6~12 mm) 1/2" NPT thread (cable diameter 6~12 mm)		

2.4. Technical parameters of MPS7300

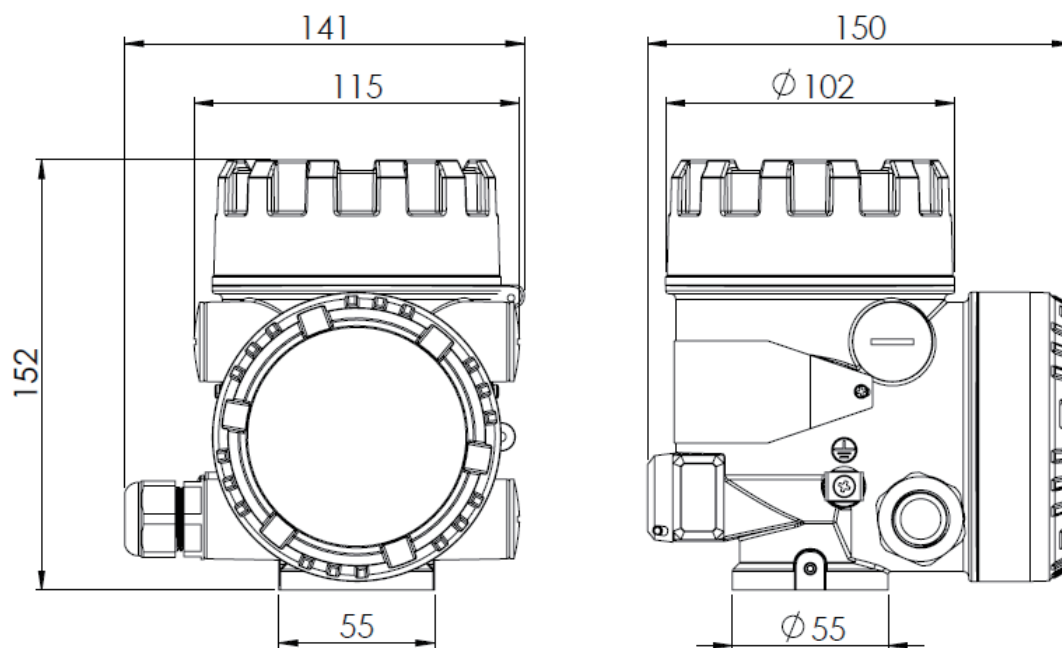
Antenna type	Ø50 mm process seal antenna	Ø80 mm process seal antenna
Product pictures		
Scope of application	Strong corrosive liquid of complex process conditions	Strong corrosive liquid of complex process conditions
Process materials	304+PTFE	304+PTFE
Span	0~30m	0~120m
Process connection	Flange	Flange
Beam angle	Min. 0.7°	
Power supply and output	● 24 VDC two-wire (ripple≤100 mVp-p), 4~20 mA HART protocol; ● 24 VDC four-wire (ripple≤100 mVp-p), 4~20 mA HART protocol; ● 220 VAC four-wire, 4~20 mA HART protocol.	
Accuracy of the measurements	±2mm	
Signal frequency	D-band (about 120 GHz)	
Ambient temperature	-40°C~80°C	
Process temperature	-40°C~200°C	
Process pressure	-1 kgf/cm ² ~25 kgf/cm ²	
Degree of protection	IP67	
Electrical interface	● M20×1.5 thread (cable diameter 6~12 mm) ● 1/2" NPT thread (cable diameter 6~12 mm)	

Note: The actual measuring range of the meter is determined by antenna size, medium reflectivity, installation position and possible noisy reflection. Laboratory accuracy under standard conditions is ±2mm.

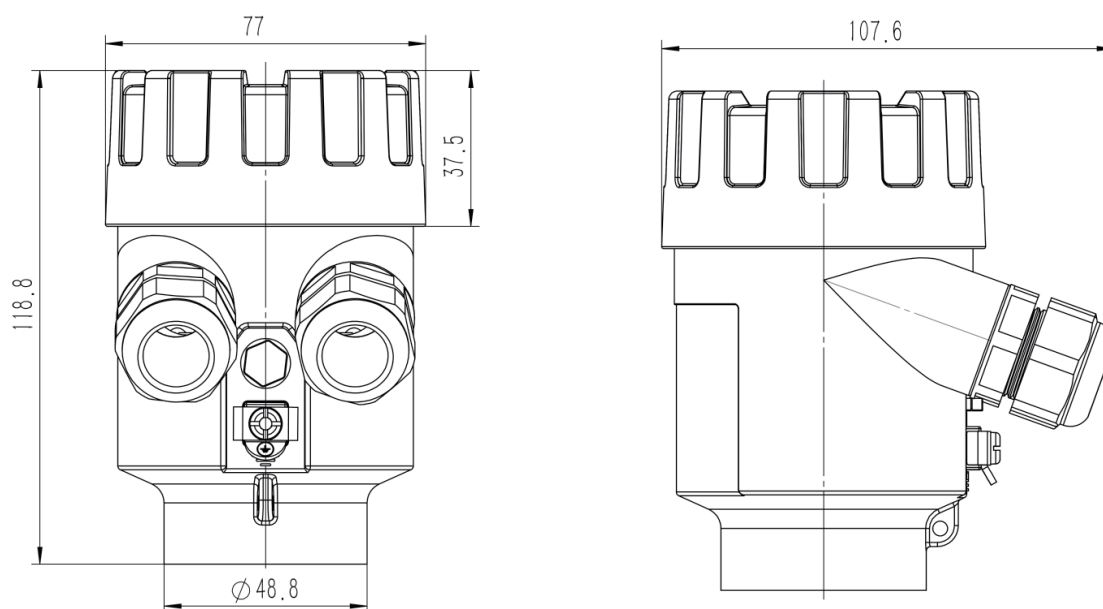
Structural size

3.1. Size of meter housing

3.1.1 Metallic double-chamber housing

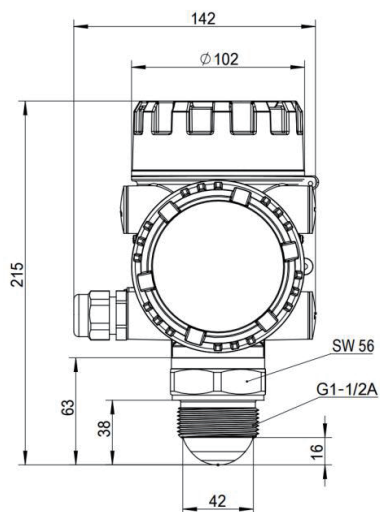


3.1.2 Plastic single-chamber housing

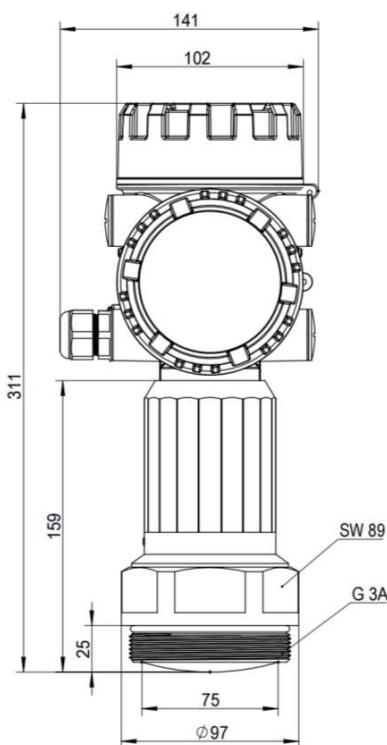


3.2. Dimensions of MPS7100

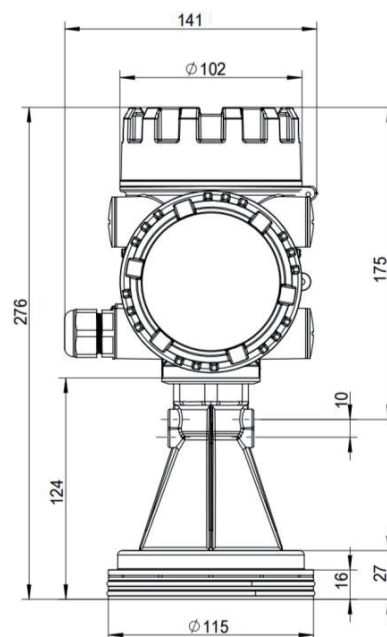
Ø50 mm plastic rod antenna



Ø80 mm plastic rod antenna

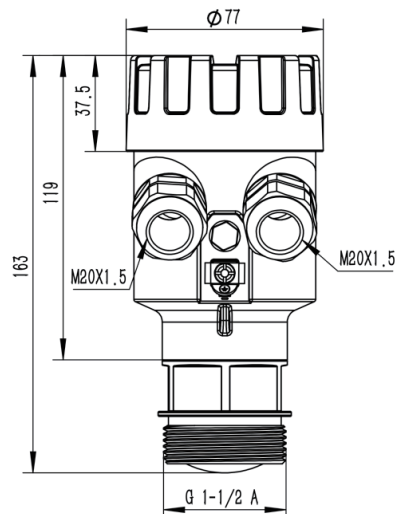


Ø80 mm plastic horn antenna

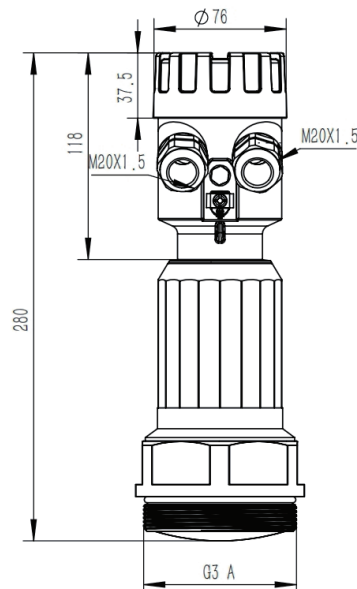


3.3. Dimensions of MPS7101

Ø50 mm compact plastic antenna

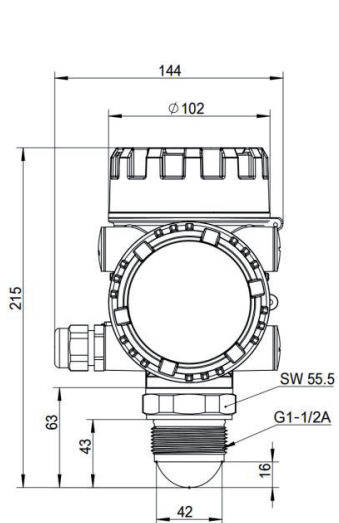


Ø80 mm compact plastic antenna

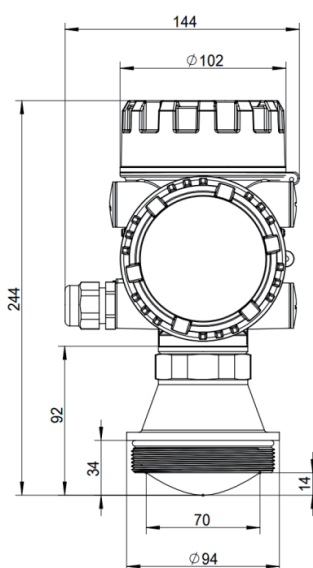


3.4. Dimensions of MPS7200

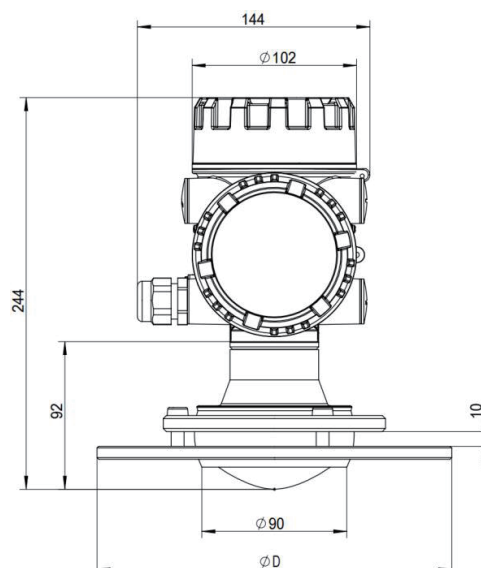
Ø50 mm integrated antenna



Ø80 mm integrated antenna

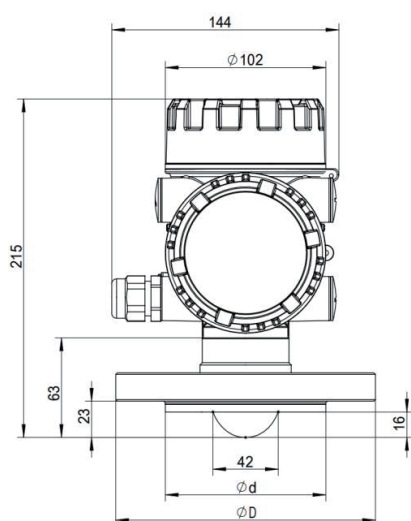


Universal purge type antenna

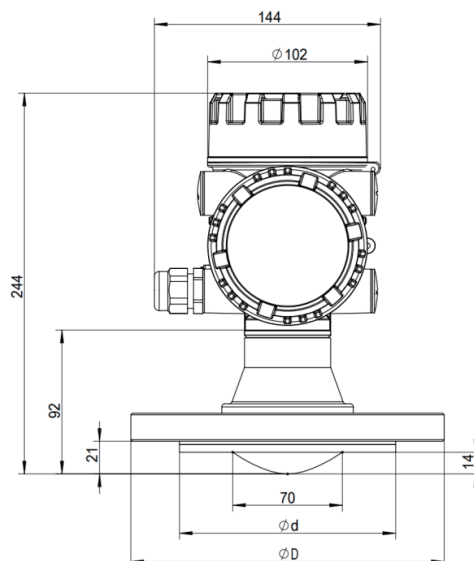


3.5. Dimensions of MPS7300

Ø50 mm process seal antenna

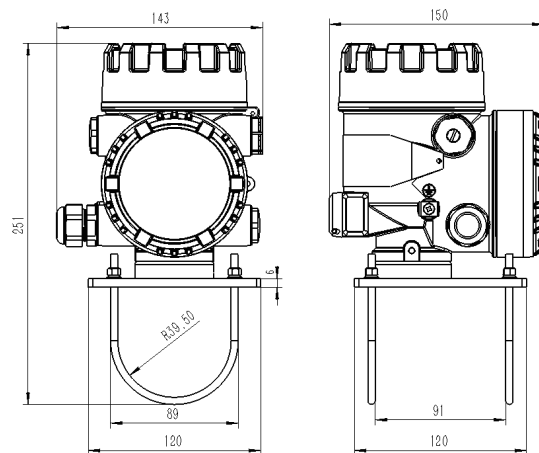


Ø80 mm process seal antenna

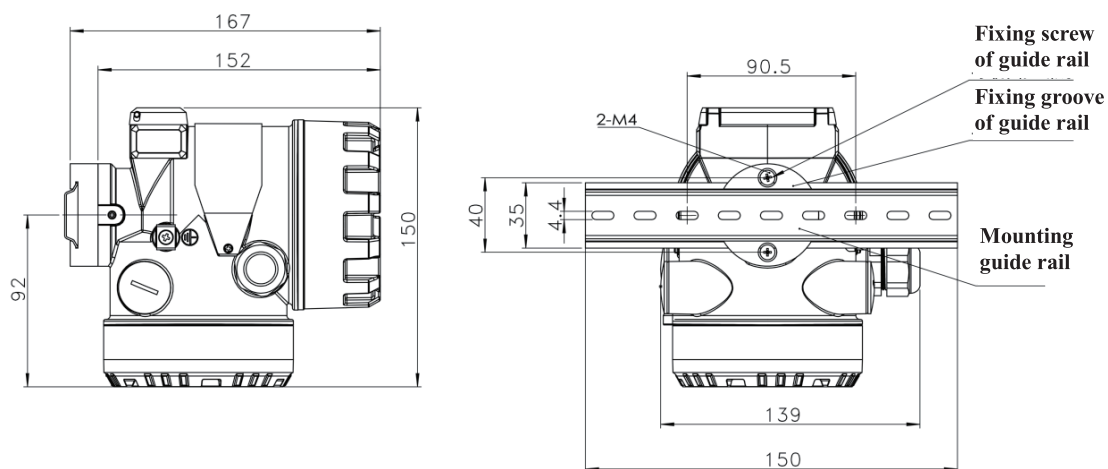


3.6. Dimensions of tank-side indicator (optional)

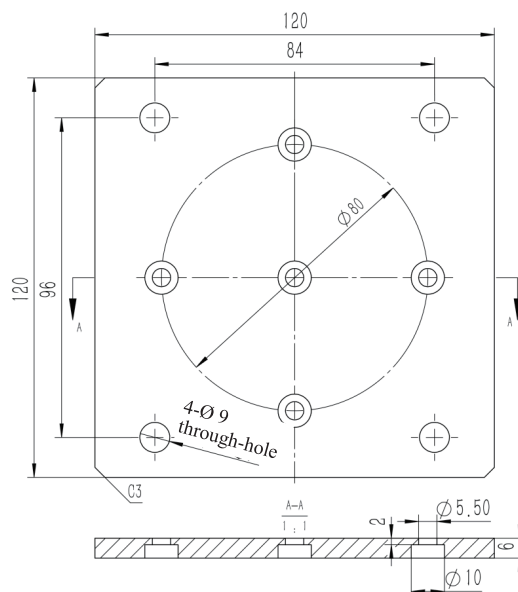
3.6.1 Installation by Ø80 hoop (installation by default)



3.6.2 Installation by DIN35 guide rail



3.6.3 Installation of base plate for tank-side indicator



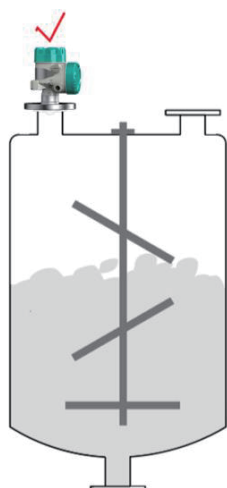
Installation guide

4.1. Unpacking and inspection

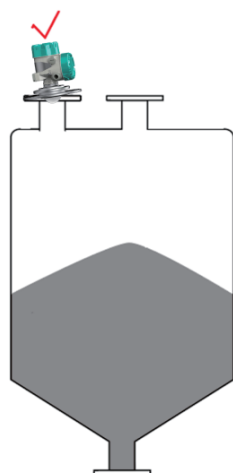
- The meter is packed in a carton box or wooden box. Rudely loading or unloading is forbidden. It must be very careful with carrying and handling. The storage site should be in compliance with the conditions as follows:
 - (1) Rain-proof and moisture-proof;
 - (2) No mechanical vibration or shock;
 - (3) Range of temperature: $-20^{\circ}\text{C}\sim 75^{\circ}\text{C}$;
 - (4) Relative humidity is no more than 80%;
 - (5) No corrosive gas in the environment;
- Check all the items listed in the packing list, which includes meter model and quantity, accessories, operating manual etc. In case of any mistake, lack of goods or damage, please contact the company or its local agent. Packing boxes are not being taken back.

4.2. Selection of installation position

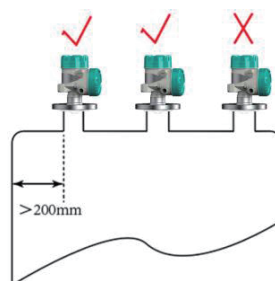
Recommended mounting position as shown below.



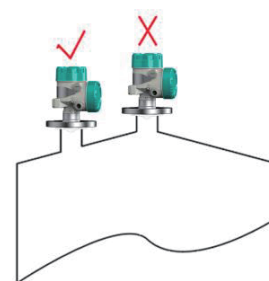
Installation in agitator tanks



Installation in solid tanks



Installation in flat-top tanks



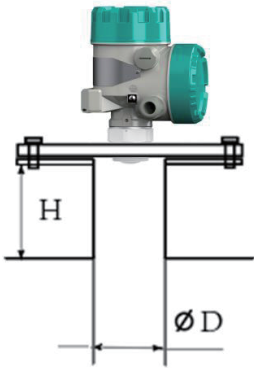
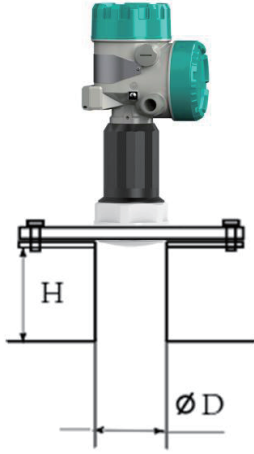
Installation in conical or arched tanks

Precautions:

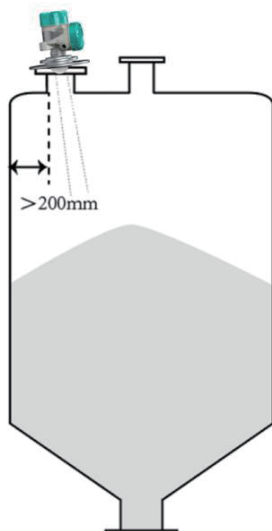
- Keep the meter far from the feed inlet, and avoid material flow.
- Keep the meter at least 200 mm away from the tank wall.
- For installation in conical, arched tanks, do not install the meter in the dead center.
- For installation in solid tanks, try to make sure that the meter antenna is pointing at the discharge port.
- For installation in agitator tanks, install the meter at 1/2 of the distance between the outer edge of the stirring blade and the tank wall as far as possible.
- It should be installed in a place which is convenient for installation and wiring, so as to promote future disassembly and assembly.
- If the meter is to be installed in an explosion-proof area, national provisions on explosion-proof hazardous areas should be followed.
- The meter should be kept from direct sunlight. Long-term exposure to the sunshine may cause the meter to be overheated or the plastic part aged.
- There should be no blocks in the antenna microwave transmitting beam angle, so the facilities such as ladder, limit switch, heating equipment, bracket, etc. in the tank should be kept away from as much as possible during the installation.

- The maximum level of the measured material should be lower than the measuring blind zone of the meter (usually the end of the antenna, and the blind zone of low dielectric constant or solid material should be properly increased), and the distance between the end of the antenna and the surface of the medium should be at least 50 mm, so as to prevent the antenna from being polluted by the material.

4.3. Installation requirement of liquid measurement

			
Inner diameter of standpipe ΦD	Standpipe height H	Inner diameter of standpipe ΦD	Standpipe height H
50mm 2"	<200mm	80mm 3"	<400mm
80mm 3"	<300mm	100mm 4"	<500mm
100mm 4"	<400mm	150mm 6"	<800mm
150mm 6"	<600mm	200mm 8"	<1000mm
● The meter should be installed vertically. ● It is advised to be installed from the opening at 1/2 of the tank radius. ● The smoother the standpipe end, the larger the diameter and the smaller the height, the better the use effect.			

4.4. Installation requirement of solid measurement

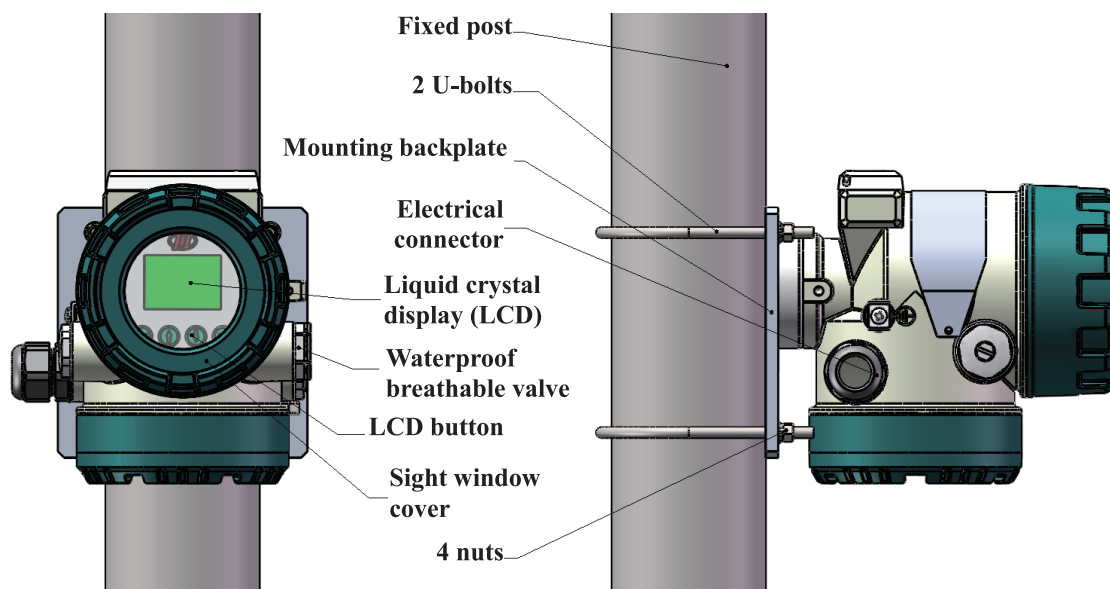


In measurement of solid and powder, the build-up of material may form a tapered surface. Therefore, the angle of the meter should be adjusted properly to achieve the best measurement effect.

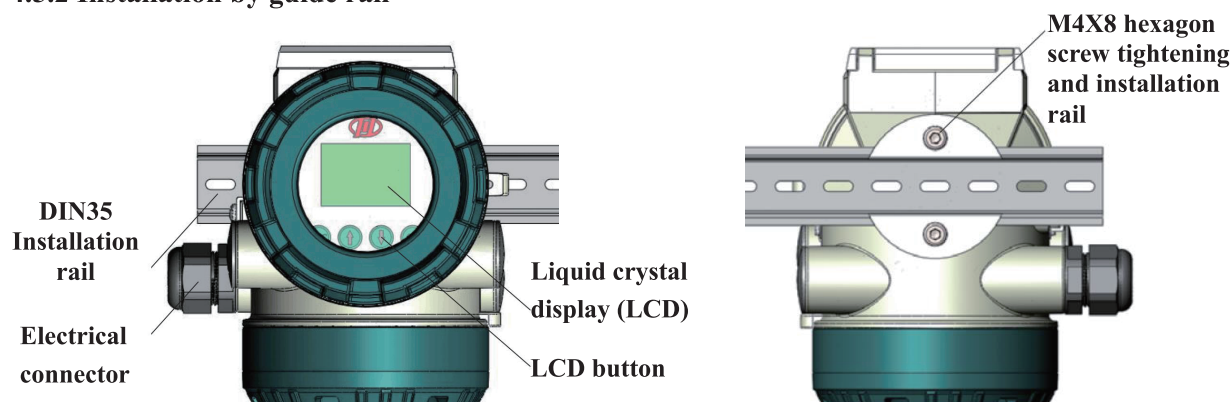
Note: If MPS7200 is equipped with a purge structure, the air source pressure is recommended to be 0.6 MPa~0.8 MPa (the pressure in the tank and the dryness of air source will affect the purging effect). By default, the air source interface has G1/8" female threads and a PC8-01 quick connector.

4.5 Installation in tank-side indicator (optional)

4.5.1 Installation by standpipe (installation by default)



4.5.2 Installation by guide rail



4.6. Installation confirmation

1. Confirm that the meter is grounded correctly;
2. Confirm that the meter enclosure has been screwed tightly;
3. Confirm that the meter measures normally and the output is consistent with the setup in the central control room;
4. Ensure that the outlet of the meter entrance cable is tightened and the unused outlet is sealed by plugging;
5. Make sure that the meter conduit arranged on site will not cause water accumulation to the meter;
6. Make sure that the cable connector of the meter complies with relevant protection standards and regulations;
7. Make sure that process connection components, such as flange gaskets and bolts, are suitable for the field working conditions;
8. Make sure that the process parameters of the field working conditions do not exceed the maximum process parameters allowed by the meter.

Warning:

- Improper process connection components may lead to the risk of injury or poisoning!
- If the meter is not installed correctly, high temperature, toxic, corrosive process media may be released at the connection between the meter and the tank!
- If the process parameters of the field working conditions exceed the maximum process parameters allowed by the meter, the meter may be damaged and there is a risk of explosion!
- Untightened or improperly connected cable connectors may have the risk of explosion in a hazardous zone!
- Do not loose, remove or disassemble the process connection components before the pressure in the tank is released!

Table of MPS7100 model

Model	Specification code	Description
MPS7100	_____	120 G FM-CW radar level transmitter (plastic rod type, plastic horn)
Measured medium	S_____	Solid
	L_____	Liquid
Span	0_____	15m
	1_____	30m
	2_____	70m
	3_____	120m
Enclosure	S_____	Die casting aluminum (electrical interface M20×1.5)
	B_____	Die casting aluminum (electrical interface 1/2"NPT)
	G_____	Stainless steel 316 (electrical interface M20×1.5)
	H_____	Stainless steel 316 (electrical interface 1/2"NPT)
Electronic module	B_____	24VDC, 4~20mA, HART
	C_____	24VDC, 4~20mA, HART, with blue tooth
	U_____	220VAC, 4~20mA, HART
	V_____	220VAC, 4~20mA, HART, with blue tooth
Output	2_____	Two-wire (only for electronic modules of B and C)
	4_____	Four-wire system
	6_____	Wireless remote transmission; GPRS; wireless CMesh networking
Display module	0_____	None
	1_____	Yes
	2_____	Tank-side passive indicator (power supply of master, recommended)
	3_____	Tank-side active indicator (only 24V two-wire power supply for tank-side indicator)
Safety certificate	X_____	No requirement
Antenna type	2_____	Ø50 mm plastic rod type (only for flange with size≥DN50)
	3_____	Ø80 mm plastic rod type (only for flange with size≥DN80)
	4_____	Ø80 mm plastic horn (only for flange with size≥DN80, process pressure ≤2 kgf/cm ² g)
	5_____	Ø80 mm universal plastic horn (only for flange with size≥DN80, process pressure M)
Information of antenna assistance	X_____	None
Process temperature (°C)	D_____	-40~80°C
	P_____	-40~130°C
	K_____	-20~130°C
	N_____	-40~200°C
Process pressure (kgf/cm ² g)	L_____	-1
	M_____	atm (atmosphere)
	A_____	2.5 (D only for process temperature)
Process connection	GD_____	G1-1/2"A (only for Ø50 mm rod antenna)
	GM_____	G3"A (only for Ø80 mm rod antenna)
	LM_____	Holder (only for plastic horn antenna)
	FB_____	Standard flange
Flange standard	A_____	HG/T20615-2009 (Class series)
	B_____	HG/T20592-2009 (PN series)

Model	Specification code	Description
Flange size	E_____	DN50 (2")
	C_____	DN65 (2.5")
	F_____	DN80 (3")
	G_____	DN100 (4")
	H_____	DN125 (5")
	J_____	DN150 (6")
	K_____	DN200 (8")
	M_____	DN250 (10")
Flange pressure rating (kgf/cm ²) (The process pressure should not be higher than the flange pressure rating and the maximum allowable process pressure)	A_____	PN2.5
	G_____	PN6
	B_____	PN10
	C_____	PN16
	D_____	PN25
	F_____	PN40
	M_____	Class150
	N_____	Class300
Flange sealing face type	A_____	RF (recommended)
	B_____	FM
	C_____	M
	E_____	FF flat (only for process pressure ≤PN16)
	F_____	Flat-thin plate flange (8 mm thick, M only for process pressure)
Material of flange	A_____	304
	B_____	316L
	C_____	Carbon steel (Q235)
	F_____	C4 steel
	D_____	PP(20 mm thick, M only for process pressure)
	E_____	PTFE (20 mm thick, M only for process pressure)
Companion flange (A, B and C options are inherently equipped with 304 bolt , nut, plate washer, flange gasket)	X_____	Without companion flange
	A_____	304
	B_____	316L
	C_____	Carbon steel (Q235)

Special notes:

- Typical model 1: MPS7100L0SB21D3XDMFB-BGCAAX
- Typical model 2: MPS7100L0SB21D3XDMGM
- Special model: if special selection is required for a certain digit in the model code, fill “Z” in the space of special model in the model code, and “/Z” behind the complete model code; If special accessory is required, please also fill “/Z” behind the complete model code. Then, explain all the "digit for special model" and special accessories in words, and do not omit items. Text description should be placed in brackets "()". Before each description, "Zn:" (n = 1, 2, 3, ...) should be used for guidance and each description should be separated by semicolon";". For special selection of process connection, change its second digit to "Z". For example, change "FB" to "FZ".
- Example of special model: MPS7100L0SB21X3XDMFB-BGCEDX/Z (Z1: equipped with 304 wall-mounted bracket).
- Tank-side cable: If tank-side indicator is optional, the standard configuration contains a communication cable of 25 m. Any excess is priced in meters.

Table of MPS7101 model

Model	Specification code	Description
MPS7101	_____	120 G FM-CW radar level transmitter (plastic rod type, plastic horn)
Measured medium	S_____	Solid
	L_____	Liquid
Span	0_____	15m
	1_____	30m
Enclosure	P_____	PBT plastic single-chamber housing (electrical interface: M20×1.5, enclosure protection class: IP56)
Electronic module	B_____	24VDC, 4~20mA, HART
	C_____	24VDC, 4~20mA, HART, with blue tooth
Output	2_____	Two-wire system
Display module	0_____	None
	1_____	Yes
Safety certificate	X_____	No requirement
Antenna type	2_____	Ø50mm compact plastic antenna (only for flange of size ≥DN50, process pressure ≤2kgf/cm²g)
	3_____	Ø80 mm compact plastic antenna (only for flange with size≥DN80)
Information of antenna assistance	X_____	None
Process temperature (°C)	D_____	-40~80°C
	P_____	-40~130°C (3 only for antenna type)
	N_____	-40~200°C (3 only for antenna type)
Process pressure (kgf/cm²g)	L_____	-1
	M_____	atm (atmosphere)
	A_____	2.5 (D only for process temperature)
Process connection	GD_____	G1-1/2"A (only for Ø50mm compact plastic antenna)
	GM_____	G3"A (only for Ø80mm compact plastic antenna)
	FB_____	Standard flange
Flange standard	A_____	HG/T20615-2009 (Class series)
	B_____	HG/T20592-2009 (PN series)
Flange size	E_____	DN50(2")
	C_____	DN65(2.5")
	F_____	DN80(3")
	G_____	DN100(4")
	H_____	DN125(5")
	J_____	DN150(6")
	K_____	DN200(8")
	M_____	DN250(10")
Flange pressure rating (kgf/cm²) (The process pressure should not be higher than the flange pressure rating and the maximum allowable process pressure)	A_____	PN2.5
	G_____	PN6
	B_____	PN10
	C_____	PN16
	D_____	PN25
	F_____	PN40
	M_____	Class150
	N_____	Class300

Model	Specification code	Description
Flange sealing face type	A_____	RF raised face (recommended)
	B_____	FM
	C_____	M
	E_____	FF flat (only for process pressure $\leq$ PN16)
	F_____	Flat-thin plate flange (8 mm thick, M only for process pressure)
Material of flange	A_____	304
	B_____	316L
	C_____	Carbon steel (Q235)
	F_____	C4 steel
	D_____	PP(20 mm thick, M only for process pressure)
	E_____	PTFE (20 mm thick, M only for process pressure)
Companion flange (A, B and C options are inherently equipped with 304 bolt , nut, plate washer, flange gasket)	X_____	Without companion flange
	A_____	304
	B_____	316L
	C_____	Carbon steel (Q235)

Special notes:

- Typical model 1: MPS7101L0PB21X3XDMFB-BGCAAX
- Typical model 2: MPS7101L0PB21X3XDMGM
- Special model: if special selection is required for a certain digit in the model code, fill “Z” in the space of special model in the model code, and “/Z” behind the complete model code; If special accessory is required, please also fill “/Z” behind the complete model code. Then, explain all the "digit for special model" and special accessories in words, and do not omit items. Text description should be placed in brackets "()". Before each description, "Zn:" (n = 1, 2, 3, ...) should be used for guidance and each description should be separated by semicolon";". For special selection of process connection, change its second digit to "Z". For example, change "FB" to "FZ".
- Example of special model: MPS7101L0PB21X3XDMGM/Z (Z1: equipped with M20×1.5 adapter 1/2" NPT cable joint).

Table of MPS7200 model

Model	Specification code	Description
MPS7200	_____	120 G FM-CW radar level transmitter (integrated, sanitary)
Measured medium	S_____	Solid
	L_____	Liquid
Span	0_____	15m
	1_____	30m
	2_____	70m
	3_____	120m
Enclosure	S_____	Die casting aluminum (electrical interface M20×1.5)
	B_____	Die casting aluminum (electrical interface 1/2"NPT)
	G_____	Stainless steel 316 (electrical interface M20×1.5)
	H_____	Stainless steel 316 (electrical interface 1/2"NPT)
Electronic module	B_____	24VDC, 4~20mA, HART
	C_____	24VDC, 4~20mA, HART, with blue tooth
	U_____	220VAC, 4~20mA, HART
	V_____	220VAC, 4~20mA, HART, with blue tooth
Output	2_____	Two-wire (only for electronic modules of B and C)
	4_____	Four-wire system
	6_____	Wireless remote transmission; GPRS; wireless CMesh networking
Display module	0_____	None
	1_____	Yes
	2_____	Tank-side passive indicator (power supply of master, recommended)
	3_____	Tank-side active indicator (only 24V two-wire power supply for tank-side indicator)
Safety certificate	X_____	No requirement
Antenna type/process material	2_____	Ø50 mm integrated/stainless steel 304 (only for flange with size≥DN50)
	3_____	Ø80 mm integrated/stainless steel 304 (only for flange with size≥DN80)
	4_____	2" sanitary/stainless steel 316L (only for process pressure≤10kgf/cm ² g)
	5_____	3" sanitary/stainless steel 316L (only for process pressure≤10kgf/cm ² g)
Information of antenna assistance	X_____	None (only for flange connection of type C)
	A_____	Universal adjustment (only for flange connection of type W)
	B_____	Purging (only for flange connection of type C)
	C_____	Universal+purging (only for flange connection of type W)
Process temperature (°C)	D_____	-40~80°C
	P_____	-40~130°C
	K_____	-20~130°C
	N_____	-40~200°C

Model	Specification code	Description
Process pressure (kgf/cm ² g)	L_____	-1
	M_____	atm (atmosphere)
	A_____	2.5
	B_____	6
	G_____	10
	C_____	16
	D_____	25
Process connection	GD_____	G1-1/2"A (only for Ø50mm integrated antenna)
	GM_____	G3"A (only for Ø80 mm integrated antenna)
	T2_____	2" sanitary clamp
	T3_____	3" sanitary clamp
	FB_____	Standard flange
Connection mode of flange	C_____	Direct-insertion type
	W_____	Universal type (only for process pressure of M)
Flange standard	A_____	HG/T20615-2009 (Class series)
	B_____	HG/T20592-2009 (PN series)
Flange size	E_____	DN50 (2")
	C_____	DN65 (2.5")
	F_____	DN80 (3")
	G_____	DN100 (4")
	H_____	DN125 (5")
	J_____	DN150 (6")
	K_____	DN200 (8")
	M_____	DN250 (10")
Flange pressure rating (kgf/cm ²) (The process pressure should not be higher than the flange pressure rating and the maximum allowable process pressure)	A_____	PN2.5
	G_____	PN6
	B_____	PN10
	C_____	PN16
	D_____	PN25
	F_____	PN40
	M_____	Class150
	N_____	Class300
Flange sealing face type	A_____	RF Raised flange (recommended fastening flange)
	B_____	FM
	C_____	M
	E_____	FF flat (only for process pressure ≤PN16)
	F_____	Flat- thin plate flange (universal flange recommended)

Model	Specification code	Description
Material of flange	A_____	304
	B_____	316L
	C_____	Carbon steel (Q235)
	F_____	C4 steel
	D_____	PP(20 mm thick, only for process pressure of M and flange connection of C)
	E_____	PTFE (20 mm thick, only for process pressure of M and flange connection of C)
Companion flange (A, B and C options are inherently equipped with 304 bolt , nut, plate washer, flange gasket)	X_____	Without companion flange
	A_____	304
	B_____	316L
	C_____	Carbon steel (Q235)

Special notes:

- Typical model 1: MPS7200S0SB21X3CDMFB-WBGCFAF
- Typical model 2: MPS7200L0SB21D3XDMGM
- Special model: if special selection is required for a certain digit in the model code, fill “Z” in the space of special model in the model code, and “/Z” behind the complete model code; If special accessory is required, please also fill “/Z” behind the complete model code. If special accessory is required, please fill “/Z” behind the complete model code. Then, explain all the “digit for special model” and special accessories in words, and do not omit items. Text description should be placed in brackets “()”. Before each description, “Zn:” (n = 1, 2, 3, ...) should be used for guidance and each description should be separated by semicolon“;”. For special selection of process connection, change its second digit to “Z”. For example, change “FB” to “FZ”.
- Example of special model: MPS7200S0SB21X3CNMFB-WBZCFAX/Z (Z1: DN300; Z2: equipped with insulated standpipe)
- Tank-side cable: If tank-side indicator is optional, the standard configuration contains a communication cable of 25 m. Any excess is priced in meters.

Table of MPS7300 model

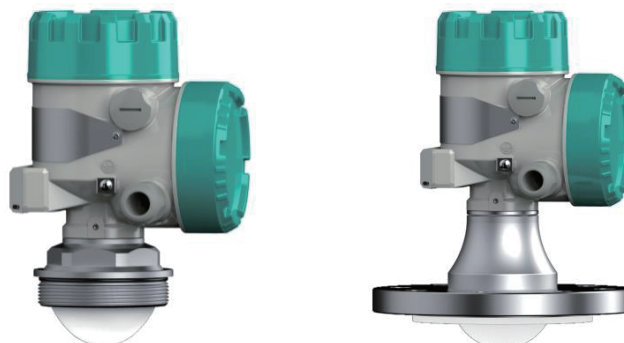
Model	Specification code	Description
MPS7300	—————	120 G FM-CW radar level transmitter (PTFE process seal antenna)
Measured medium	L—————	Liquid
Span	0—————	15 m (recommended)
	1—————	30 m (recommended)
	2—————	70m
	3—————	120m
Enclosure	S—————	Die casting aluminum (electrical interface M20×1.5)
	B—————	Die casting aluminum (electrical interface 1/2"NPT)
	G—————	Stainless steel 316 (electrical interface M20×1.5)
	H—————	Stainless steel 316 (electrical interface 1/2"NPT)
Electronic module	B—————	24VDC, 4~20mA, HART
	C—————	24VDC, 4~20mA, HART, with blue tooth
	U—————	220VAC, 4~20mA, HART
	V—————	220VAC, 4~20mA, HART, with blue tooth
Output	2—————	Two-wire (only for electronic modules of B and C)
	4—————	Four-wire system
	6—————	Wireless remote transmission; GPRS; wireless CMesh networking
Display module	0—————	None
	1—————	Yes
	2—————	Tank-side passive indicator (power supply of master, recommended)
	3—————	Tank-side active indicator (only 24V two-wire power supply for tank-side indicator)
Safety certificate	X—————	No requirement
Antenna type/process material	2—————	Ø50 mm process seal antenna/stainless steel 304+PTFE process seal (only for flange with size≥DN50)
	3—————	Ø80 mm process seal antenna/stainless steel 304+PTFE process seal (only for flange with size≥DN80)
Antenna material	A—————	PTFE
Process temperature (°C)	D—————	-40~80°C
	P—————	-40~130°C
	N—————	-40~200°C
Process pressure (kgf/cm ² g)	L—————	-1
	M—————	atm (atmosphere)
	A—————	2.5
	B—————	6
	G—————	10
	C—————	16
	D—————	25
Process connection	FB—————	Standard flange
Flange standard	A—————	HG/T20615-2009 (Class series)
	B—————	HG/T20592-2009 (PN series)

Model	Specification code	Description
Flange size	E_____	DN50 (2")
	C_____	DN65 (2.5")
	F_____	DN80 (3")
	G_____	DN100 (4")
	H_____	DN125 (5")
	J_____	DN150 (6")
	K_____	DN200 (8")
	M_____	DN250 (10")
Flange pressure rating (kgf/cm ²) (The process pressure should not be higher than the flange pressure rating and the maximum allowable process pressure)	A_____	PN2.5
	G_____	PN6
	B_____	PN10
	C_____	PN16
	D_____	PN25
	F_____	PN40
	M_____	Class150
	N_____	Class300
Flange sealing face type	A_____	RF (recommended)
	C_____	M
Material of flange	A_____	304
	B_____	316L
Companion flange (A, B and C options are inherently equipped with 304 bolt , nut, plate washer)	X_____	Without companion flange
	A_____	304
	B_____	316L
	C_____	Carbon steel (Q235)

Special notes:

- Typical model: MPS7300L0SB21X3ADMFB-BGCAAX
- Special model: if special selection is required for a certain digit in the model code, fill “Z” in the space of special model in the model code, and “/Z” behind the complete model code; If special accessory is required, please also fill "/Z" behind the complete model code. Then, explain all the "digit for special model" and special accessories in words, and do not omit items. Text description should be placed in brackets "()". Before each description, "Zn:" (n = 1, 2, 3, ...) should be used for guidance and each description should be separated by semicolon";". For special selection of process connection, change its second digit to "Z". For example, change "FB" to "FZ".
- Example of special model: MPS7300L0SB22X3ADGFB-BGCAAX/Z (Z1: equipped with sun shade)
- Tank-side cable: If tank-side indicator is optional, the standard configuration contains a communication cable of 25 m. Any excess is priced in meters.

MPS5000 Radar Level Transmitter



Overview

1.1. Measuring principle

MPS5000 radar level transmitter is a W-band (80 GHz) FMCW radar level transmitter, which is suitable for continuous level measurement of various liquid and solid medium, with a maximum measuring span of 120 m.

MPS5000 radar level transmitter is an advanced measurement system based on FMCW technology. The radar level transmitter can emit continuous microwave signals through an antenna sensor, and the frequency of the emitted signals is linearly modulated by sawtooth waves. When continuously emitted microwave signals encounter the surface of the measured medium, some of the energy of the microwave signals is continuously reflected back and received by the lens antenna system due to abrupt changes in dielectric constant.

There is always a difference between the frequency of the received signal and the transmitted signal, and the difference is proportional to the distance from the radar antenna and the surface of the measured medium. The larger the frequency difference is, the farther the material distance is. The distance from the measured medium to the meter flange can be calculated from equation (1).

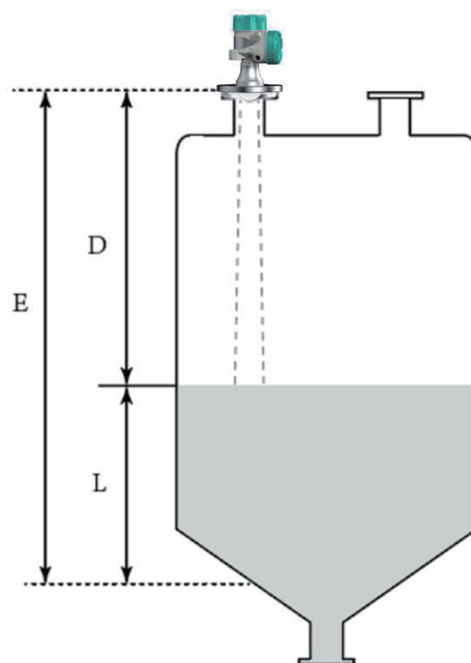
$$D = \frac{1}{2} \times c \times \frac{\Delta f}{R} \quad (1)$$

Wherein, D is the distance from the measuring reference surface to the measured medium, c is the propagation speed of light (electromagnetic wave) in vacuum, Δf is the frequency difference between the received signal and the transmitted signal, and R is the change rate of the frequency of the transmitted signal with time.

Then, the level height can be calculated from equation (2) according to the empty material level set by the user.

$$L = E - D \quad (2)$$

Wherein, E is the distance from the measuring reference surface to the empty material level set by the user, D is the distance from the measuring reference surface to the measured medium, and L is the level height.



1.2. Product advantages

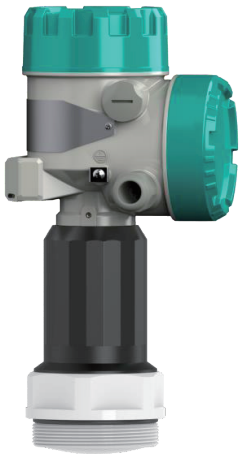
- Display interface is simple and easy to understand, and the quick setting menu is convenient for users to operate.
- Local parameters can be set according to the button or the Hart special data setter.
- Chinese menu is displayed to facilitate user operation.
- 80 GHz high frequency signal and 3° beam angle make field installation easier.
- There are almost no blind zones at the near-end of the meter, so it can be measured for precise measurement of small containers.

1.3. Typical application

- Liquid level measurement in agitator tank, small storage tank, reactor, etc.;
- Level measurement in limited installation space;
- Level measurement in highly installed standpipe;
- Level measurement in extra-large solid tank, material pile, etc.

Technical characteristics

2.1. Technical parameters of MPS5100

Antenna type	Ø50 mm plastic rod antenna	Ø80 mm plastic rod antenna	Ø80 mm plastic horn antenna
Product pictures			
Scope of application	Liquid level measurement in small containers	Level measurement of liquid, lump or powder materials of simple process conditions	Level measurement of liquid, lump or powder materials of simple process conditions
Process materials	PTFE	PP+PTFE	PP+PTFE
Span	0~30m	0~120m	0~120m
Process connection	● G1-1/2"A thread ● Flange	● G3"A thread ● Flange	● Bracket ● Flange
Beam angle	Min. 7°	Min. 3°	Min. 3°
Power supply and output	● 24 VDC two-wire (ripple≤100 mVp-p), 4~20 mA HART protocol; ● 24 VDC four-wire (ripple≤100 mVp-p), 4~20 mA HART protocol; ● 220 VAC four-wire, 4~20 mA HART protocol.		
Accuracy of the measurements	±2mm		
Signal frequency	W-band (76~81GHz)		

Ambient temperature	-40~80°C		
Process temperature	-40°C~200°C	-40°C~200°C	-40°C~130°C
Process pressure	-1kgf/cm ² ~2.5kgf/cm ²	-1kgf/cm ² ~2.5kgf/cm ²	-1kgf/cm ² ~2kgf/cm ²
Degree of protection	IP67		
Electrical interface	● M20×1.5 thread (cable diameter 6~12 mm) ● 1/2" NPT thread (cable diameter 6~12 mm)		
Safety certificate	● Intrinsic safety type Ex ia II C T6/T2 Ga ● Intrinsic safety explosion-proof type Ex d ia II C T6/T2 Gb ● Dust-explosion-proof type Ex iaD tD A21 IP67 T80°C /T290°C		

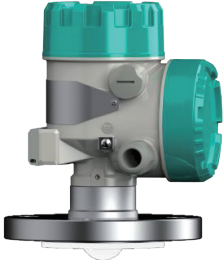
2.2. Technical parameters of MPS5101

Antenna type	Ø50 mm compact plastic antenna	Ø80 mm compact plastic antenna	Ø80 mm compact plastic horn antenna
Product pictures			
Scope of application	Level measurement of liquid of simple process conditions	Level measurement of lump or powder materials of simple process conditions	Level measurement of liquid of simple process conditions
Process materials	PP	PP	PP+PTFE
Span	0~35m	0~35m	0~35m
Process connection	● G1-1/2"A thread ● Flange ● G1"A thread (hoist)	● G3"A thread ● Flange ● G1"A thread (hoist)	● Bracket ● Flange ● G1-1/2"A thread (hoisted)
Beam angle	Min. 8°	Min. 3°	Min. 3°
Power supply and output	● 24 VDC two-wire (ripple≤100 mVp-p), 4~20 mA HART protocol; ● 24 VDC four-wire (ripple≤100 mVp-p), 4~20 mA HART protocol, RS485 protocol;		
Accuracy of the measurements	±2mm		
Signal frequency	W-band (76~81GHz)		
Ambient temperature	-40°C~80°C		
Process temperature	-40°C~80°C		
Process pressure	-1kgf/cm ² ~2.0kgf/cm ²		
Degree of protection	IP67		

2.3. Technical parameters of MPS5200

Antenna type	Ø50 mm integrated and sanitary antenna	Ø80 mm integrated and sanitary antenna	Universal antenna
Product pictures			
Scope of application	- Slight corrosive liquid of complex process conditions - Liquid measurement of food and drug industries (sanitary)	- Slight corrosive liquid of complex process conditions - Level measurement of lump or powder materials of simple process conditions	Level measurement of lump or powder materials of simple process conditions
Process materials	304+PTFE	304+PTFE	304+PTFE
Span	0~30m	0~120m	0~120m
Process connection	- G1-1/2" A thread - Flange 2" sanitary clamp	- G3" A thread - Flange 3" sanitary clamp	Flange
Beam angle	Min. 7°	Min. 3°	Min. 3°
Power supply and output	24 VDC two-wire (ripple≤100 mVp-p), 4~20 mA HART protocol; 24 VDC four-wire (ripple≤100 mVp-p), 4~20 mA HART protocol; 220 VAC four-wire, 4~20 mA HART protocol.		
Accuracy of the measurements	±2mm		
Signal frequency	W-band (76~81GHz)		
Ambient temperature	-40~80°C		
Process temperature	-40~200°C		
Process pressure	- Sanitary type: -1kgf/cm²~10kgf/cm²; - Integrated type: -1kgf/cm²~25kgf/cm²; - Universal: Atm (barometric pressure)		
Degree of protection	IP67		
Electrical interface	- M20×1.5 thread (cable diameter 6~12 mm) 1/2" NPT thread (cable diameter 6~12 mm)		
Safety certificate	- Intrinsic safety type Ex ia II C T6/T2 Ga - Intrinsic safety explosion-proof type Ex d ia II C T6/T2 Gb - Dust-explosion-proof type Ex iaD tD A21 IP67 T80°C /T290°C		

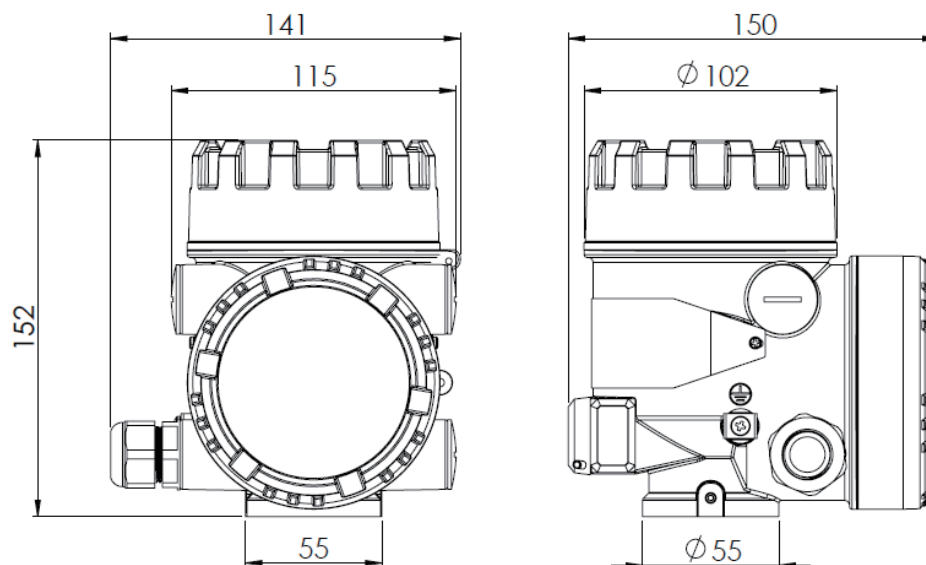
2.4. Technical parameters of MPS5300

Antenna type	Ø50 mm process seal antenna	Ø80 mm process seal antenna
Product pictures		
Scope of application	Strong corrosive liquid of complex process conditions	Strong corrosive liquid of complex process conditions
Process materials	304+PTFE	304+PTFE
Span	0~30m	0~120m
Process connection	Flange	Flange
Beam angle	Min. 3°	Min. 3°
Power supply and output	● 24 VDC two-wire (ripple≤100 mVp-p), 4~20 mA HART protocol; ● 24 VDC four-wire (ripple≤100 mVp-p), 4~20 mA HART protocol; ● 220 VAC four-wire, 4~20 mA HART protocol.	
Accuracy of the measurements	±2mm	
Signal frequency	W-band (76~81GHz)	
Ambient temperature	-40~80°C	
Process temperature	-40~200°C	
Process pressure	-1kgf/cm ² ~25kgf/cm ²	
Degree of protection	IP67	
Electrical interface	● M20×1.5 thread (cable diameter 6~12 mm) ● 1/2" NPT thread (cable diameter 6~12 mm)	
Safety certificate	● Intrinsic safety type Ex ia II C T6/T2 Ga ● Intrinsic safety explosion-proof type Ex d ia II C T6/T2 Gb	

Note: The actual measuring range of the meter is determined by antenna size, medium reflectivity, installation position and possible noisy reflection. Laboratory accuracy under standard conditions is ±2mm.

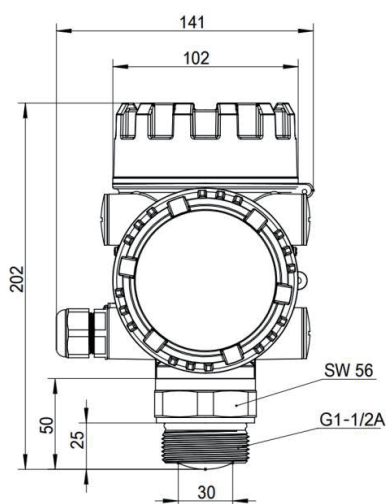
Structural size

3.1. Size of meter housing

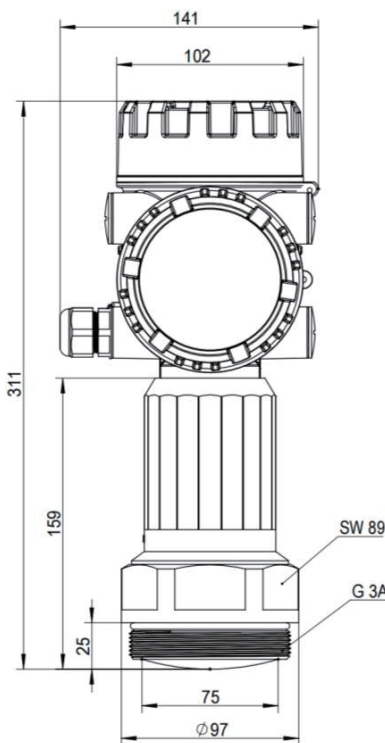


3.2. Dimensions of MPS5100

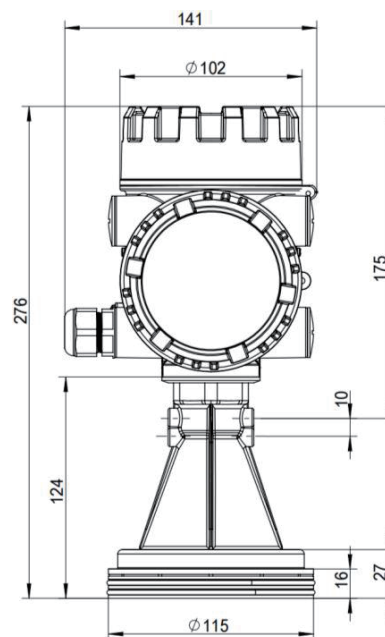
Ø50 mm plastic rod antenna



Ø80 mm plastic rod antenna

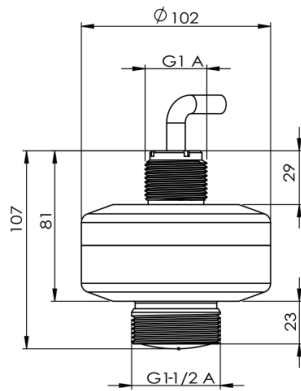


Ø80 mm plastic horn antenna

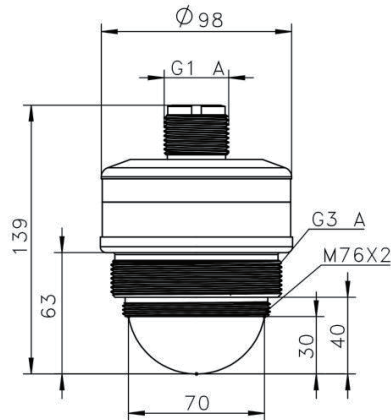


3.3. Dimensions of MPS5101

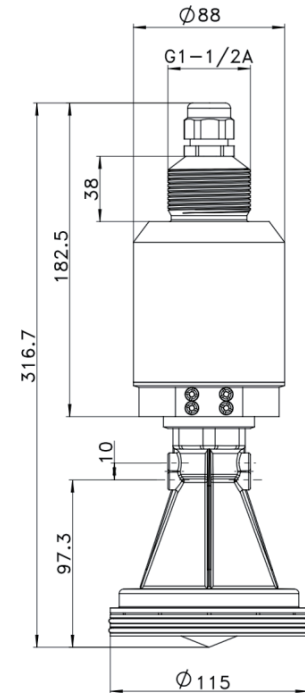
Ø50 mm compact plastic antenna



Ø80 mm compact plastic antenna

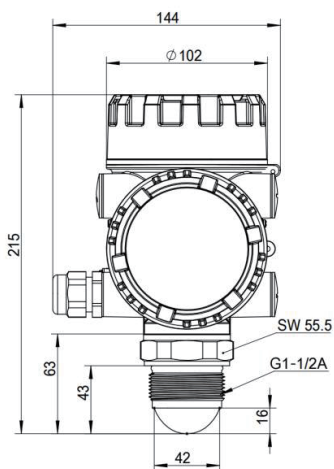


Ø80 mm compact plastic horn antenna

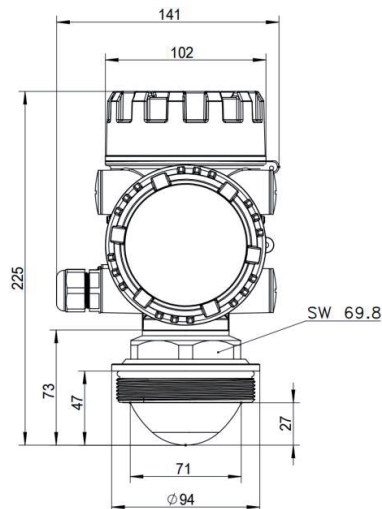


3.4. Dimensions of MPS5200

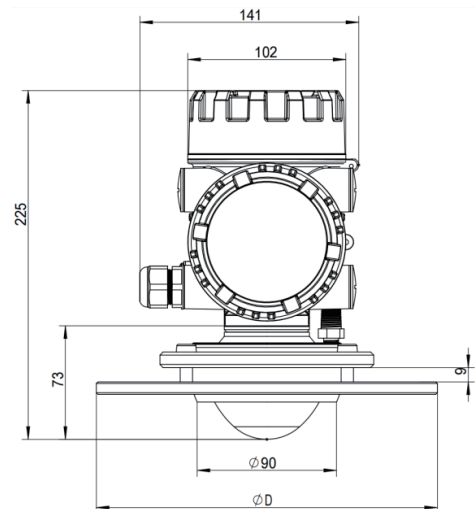
Ø50 mm integrated antenna



Ø80 mm integrated antenna

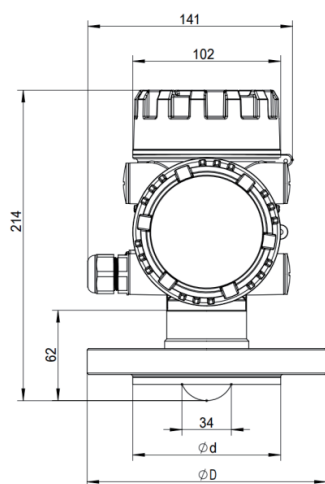


Universal purge type antenna

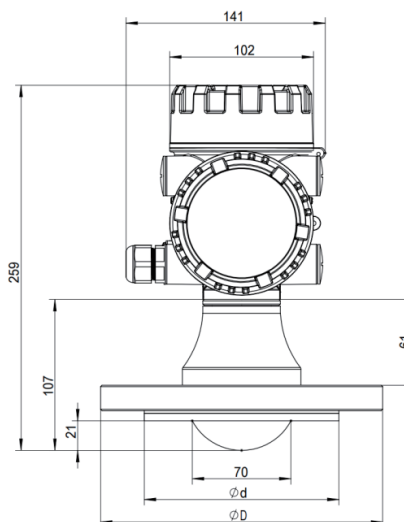


3.5. Dimensions of MPS5300

Ø50 mm process seal antenna

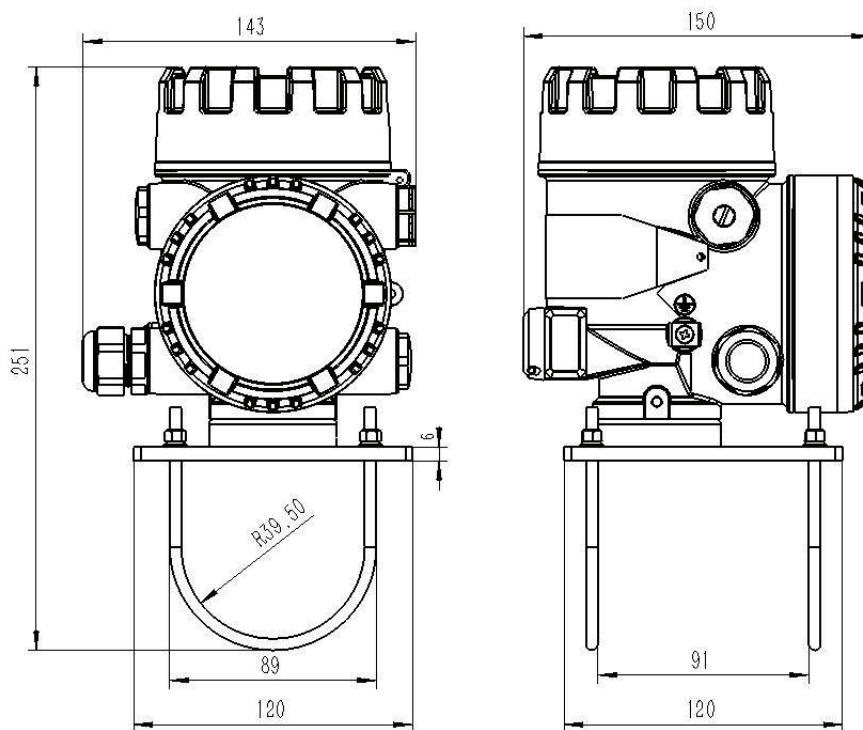


Ø80 mm process seal antenna

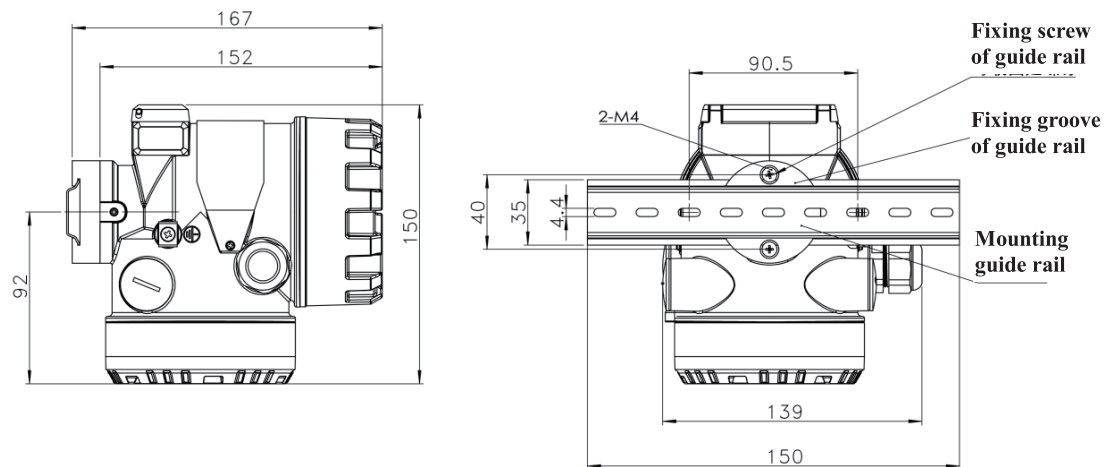


3.6. Dimensions of tank-side indicator (optional)

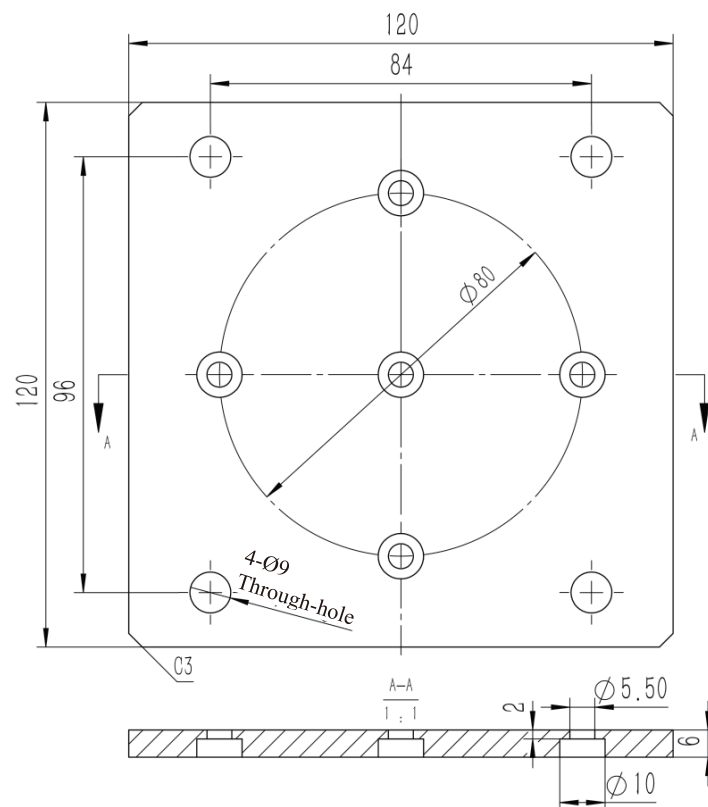
3.6.1 Installation by Ø80 hoop (installation by default)



3.6.2 Installation by DIN35 guide rail



3.6.3 Installation of base plate for tank-side indicator



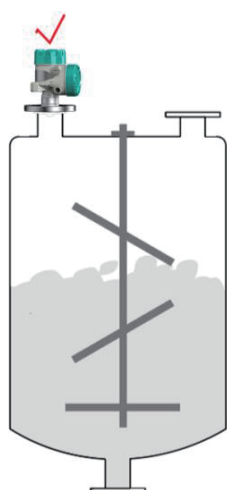
Installation guide

4.1. Unpacking and inspection

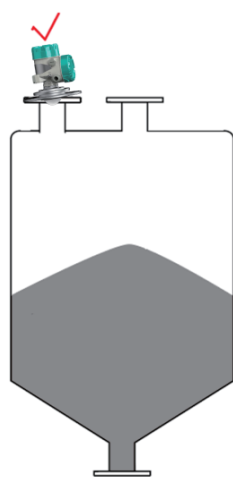
- The meter is packed in a carton box or wooden box. Rudely loading or unloading is forbidden. It must be very careful with carrying and handling. The storage site should be in compliance with the conditions as follows:
 - (1) Rain-proof and moisture-proof;
 - (2) No mechanical vibration or shock;
 - (3) Range of temperature: $-20^{\circ}\text{C}\sim 75^{\circ}\text{C}$;
 - (4) Relative humidity is no more than 80%;
 - (5) No corrosive gas in the environment;
- Check all the items listed in the packing list, which includes meter model and quantity, accessories, operating manual etc. In case of any mistake, lack of goods or damage, please contact the company or its local agent. Packing boxes are not being taken back.

4.2. Selection of installation position

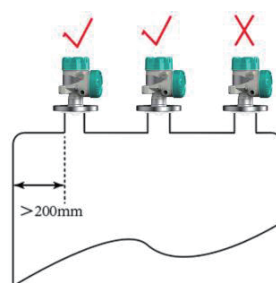
Recommended mounting position as shown below.



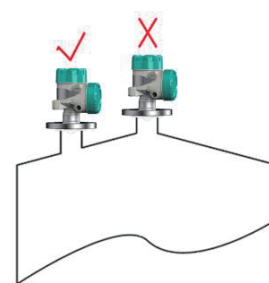
Installation in agitator tanks



Installation in solid tanks



Installation in flat-top tanks



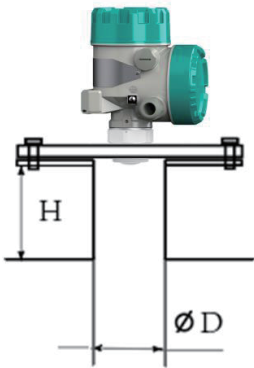
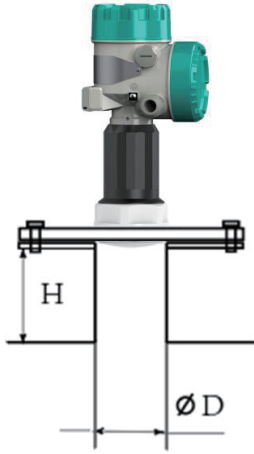
Installation in conical or arched tanks

Precautions:

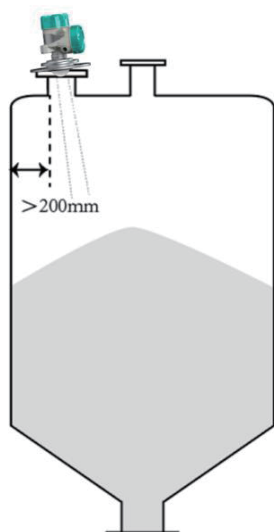
- Keep the meter far from the feed inlet, and avoid material flow.
- Keep the meter at least 200 mm away from the tank wall.
- For installation in conical, arched tanks, do not install the meter in the dead center.
- For installation in solid tanks, try to make sure that the meter antenna is pointing at the discharge port.
- For installation in agitator tanks, install the meter at 1/2 of the distance between the outer edge of the stirring blade and the tank wall as far as possible.
- It should be installed in a place which is convenient for installation and wiring, so as to promote future disassembly and assembly.
- If the meter is to be installed in an explosion-proof area, national provisions on explosion-proof hazardous areas should be followed.
- The meter should be kept from direct sunlight. Long-term exposure to the sunshine may cause the meter to be overheated or the plastic part aged.
- There should be no blocks in the antenna microwave transmitting beam angle, so the facilities such as ladder, limit switch, heating equipment, bracket, etc. in the tank should be kept away from as much as possible during the installation.

- The maximum level of the measured material should be lower than the measuring blind zone of the meter (usually the end of the antenna, and the blind zone of low dielectric constant or solid material should be properly increased), and the distance between the end of the antenna and the surface of the medium should be at least 50 mm, so as to prevent the antenna from being polluted by the material.

4.3. Installation requirement of liquid measurement

			
Inner diameter of standpipe ΦD	Standpipe height H	Inner diameter of standpipe ΦD	Standpipe height H
50mm 2"	<200mm	80mm 3"	<400mm
80mm 3"	<300mm	100mm 4"	<500mm
100mm 4"	<400mm	150mm 6"	<800mm
150mm 6"	<600mm	200mm 8"	<1000mm
● The meter should be installed vertically. ● It is advised to be installed from the opening at 1/2 of the tank radius. ● The smoother the standpipe end, the larger the diameter and the smaller the height, the better the use effect.			

4.4. Installation requirement of solid measurement

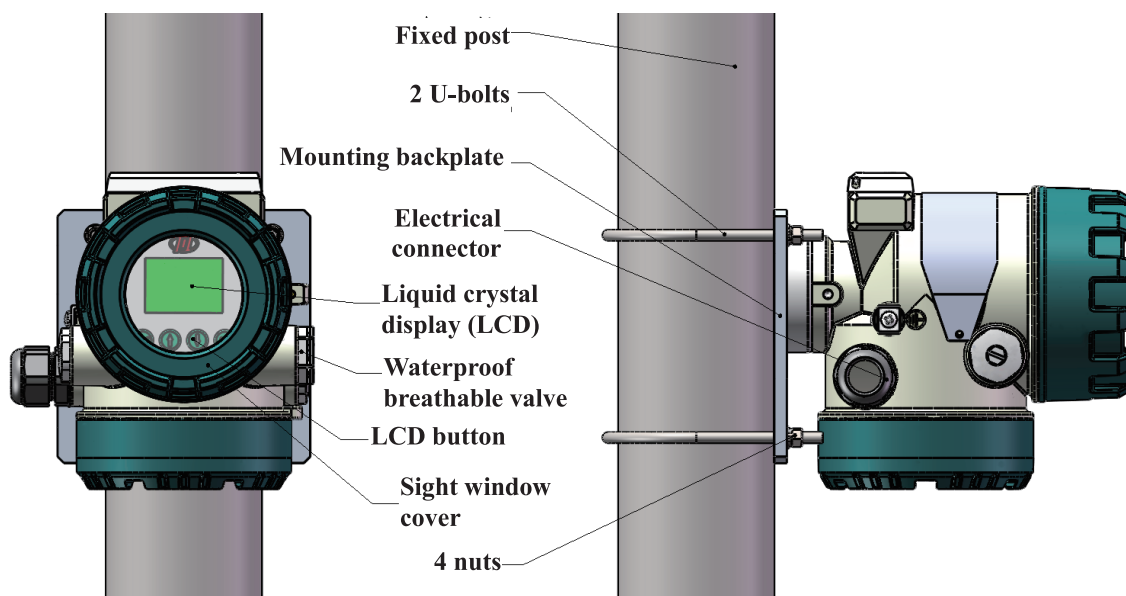


In measurement of solid and powder, the build-up of material may form a tapered surface. Therefore, the angle of the meter should be adjusted properly to achieve the best measurement effect.

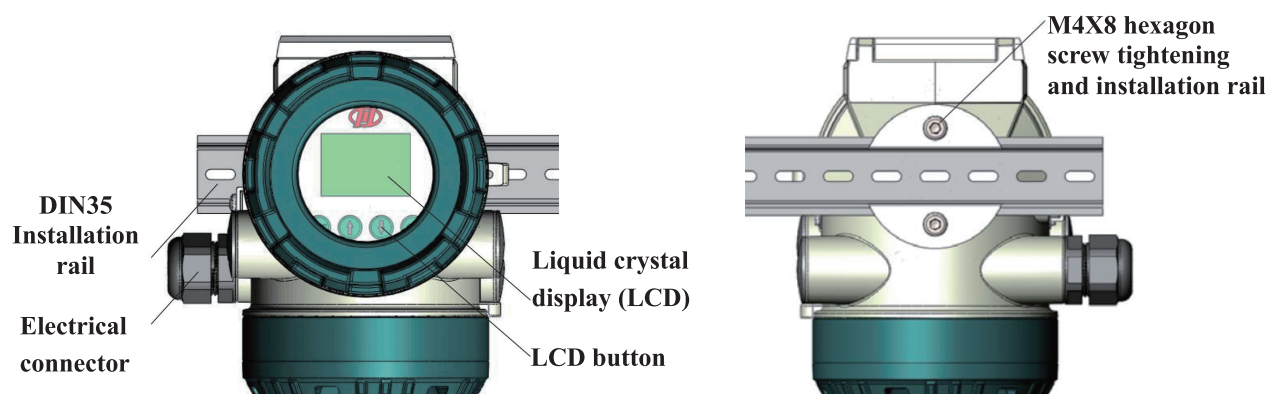
Note: If MPS5200 is equipped with a purge structure, the air source pressure is recommended to be 0.6 MPa~0.8 MPa (the pressure in the tank and the dryness of air source will affect the purging effect). By default, the air source interface has G1/8" female threads and a PC8-01 quick connector.

4.5 Installation in tank-side indicator (optional)

4.5.1 Installation by standpipe (installation by default)



4.5.2 Installation by guide rail



4.6. Installation confirmation

1. Confirm that the meter is grounded correctly;
2. Confirm that the meter enclosure has been screwed tightly;
3. Confirm that the meter measures normally and the output is consistent with the setup in the central control room;
4. Ensure that the outlet of the meter entrance cable is tightened and the unused outlet is sealed by plugging;
5. Make sure that the meter conduit arranged on site will not cause water accumulation to the meter;
6. Make sure that the cable connector of the meter complies with relevant protection standards and regulations;
7. Make sure that process connection components, such as flange gaskets and bolts, are suitable for the field working conditions;
8. Make sure that the process parameters of the field working conditions do not exceed the maximum process parameters allowed by the meter.

Warning:

- Improper process connection components may lead to the risk of injury or poisoning!
- If the meter is not installed correctly, high temperature, toxic, corrosive process media may be released at the connection between the meter and the tank!
- If the process parameters of the field working conditions exceed the maximum process parameters allowed by the meter, the meter may be damaged and there is a risk of explosion!
- Untightened or improperly connected cable connectors may have the risk of explosion in a hazardous zone!
- Do not loose, remove or disassemble the process connection components before the pressure in the tank is released!

Table of MPS5100 model

Model	Specification code	Description
MPS5100	_____	80G FM-CW radar level transmitter (plastic rod type, plastic horn)
Measured medium:	S_____	Solid
	L_____	Liquid
Span	0_____	15m
	1_____	30m
	2_____	70m
	3_____	120m
Enclosure	S_____	Die casting aluminum (electrical interface M20×1.5)
	B_____	Die casting (electrical interface 2×1/2"NPT)
	G_____	Stainless steel 316 (electrical interface M20×1.5)
	H_____	Stainless steel 316 (electrical interface 1/2" NPT)
Electronic module	B_____	24VDC, 4~20mA, HART
	C_____	24VDC, 4~20mA, HART, with blue tooth
	U_____	220VAC, 4~20mA, HART
	V_____	220VAC, 4~20mA, HART, with blue tooth
Output	2_____	Two-wire (only for electronic modules of B and C)
	4_____	Four-wire system
	6_____	Wireless remote transmission; GPRS; wireless CMesh networking
Display module	0_____	None
	1_____	Yes
	2_____	Tank-side passive indicator (power supply of master, recommended)
	3_____	Tank-side active indicator (only 24V two-wire power supply for tank-side indicator)
Safety certificate	X_____	No requirement
	A_____	Intrinsic safety type Ex ia IIC T6/T2 Ga
	D_____	Intrinsic safety explosion-proof type Ex d ia IIC T6/T2 Gb
	N_____	Dust-explosion-proof type Ex iaD tD A21 IP67 T80°C /T290°C
	M_____	Gas+dust-explosion-proof type ExdiaIICT6/T2Gb; Ex iaD tD A21 IP67 T80°C /T290°C
Antenna type	2_____	Ø50 mm plastic rod type (only for flange with size≥DN50)
	3_____	Ø80 mm plastic rod type (only for flange with size≥DN80)
	4_____	Ø80 mm plastic horn (only for flange with size≥DN80, process pressure ≤2 kgf/cm ² g)
	5_____	Ø80 mm universal plastic horn (only for flange with size≥DN80, process pressure M)
Information of antenna assistance	X_____	None
Process temperature (°C)	D_____	-40~80°C
	P_____	-40~130°C
	K_____	-20~130°C
	N_____	-40~200°C
Process pressure (kgf/cm ² g)	L_____	-1
	M_____	atm (atmosphere)
	A_____	2.5 (D only for process temperature)
Process connection	GD_____	G1-1/2"A (only for Ø50 mm rod antenna)
	GM_____	G3"A (only for Ø80 mm rod antenna)
	LM_____	Holder (only for plastic horn antenna)
	FB_____	Standard flange
Flange standard	A_____	HG/T20615-2009 (Class series)

Model	Specification code	Description
	B	HG/T20592-2009 (PN series)
Flange size	E	DN50 (2")
	C	DN65 (2.5")
	F	DN80 (3")
	G	DN100 (4")
	H	DN125 (5")
	J	DN150 (6")
	K	DN200 (8")
	M	DN250 (10")
Flange pressure rating (kgf/cm ²) (The process pressure should not be higher than the flange pressure rating and the maximum allowable process pressure)	A	PN2.5
	G	PN6
	B	PN10
	C	PN16
	D	PN25
	F	PN40
	M	Class150
	N	Class300
Flange sealing face type	A	RF (recommended)
	B	FM
	C	M
	E	FF flat (only for process pressure ≤PN16)
	F	Flat-thin plate flange (8 mm thick, M only for process pressure)
Material of flange	A	304
	B	316L
	C	Carbon steel (Q235)
	F	C4 steel
	D	PP(20 mm thick, M only for process pressure)
	E	PTFE (20 mm thick, M only for process pressure)
Companion flange (A, B and C options are inherently equipped with 304 bolt , nut, plate washer, flange gasket)	X	Without companion flange
	A	304
	B	316L
	C	Carbon steel (Q235)

Special notes:

- Typical model 1: MPS5100L0SB21D3XDMFB-BGCAAX
- Typical model 2: MPS5100L0SB21D3XDMGM
- Special model: if special selection is required for a certain digit in the model code, fill “Z” in the space of special model in the model code, and “/Z” behind the complete model code; If special accessory is required, please also fill "/Z" behind the complete model code. Then, explain all the "digit for special model" and special accessories in words, and do not omit items. Text description should be placed in brackets "()". Before each description, "Zn:" (n = 1, 2, 3, ...) should be used for guidance and each description should be separated by semicolon";". For special selection of process connection, change its second digit to "Z". For example, change "FB" to "FZ".
- Example of special model: MPS5100L0SB21D3XDMFB-BGCAAX/Z (Z1: content of cooper and zinc in the part receiving liquid <0.5%, and content of cooper and zinc in the part not receiving liquid <1.0%)
- Tank-side cable: If tank-side indicator is optional, the standard configuration contains a communication cable of 25 m. Any excess is priced in meters.

Table of MPS5101 model

Model	Specification code	Description
MPS5101	_____	80G FM-CW radar level transmitter (compact)
Measured medium	S_____	Solid
	L_____	Liquid
Span	0_____	8m
	1_____	15m
	2_____	35m
Housing material	P_____	PP plastic
Electronic module	B_____	24VDC
	C_____	24VDC, with blue tooth
Output	0_____	RS485 four-wire
	2_____	4~20 mA, HART two-wire
	4_____	4~20 mA, HART four-wire
Display module	0_____	None (for 0 output only)
	3_____	Tank-side active indicator
Safety certificate	X_____	No requirement
Antenna type	2_____	Ø50 mm compact plastic antenna (only for flange with size≥DN50)
	3_____	Ø80 mm compact plastic antenna (only for flange with size≥DN80)
	4_____	Ø80 mm compact plastic horn antenna (only for flange with size≥DN80)
Tank-side/meter cable length (L)	A_____	5m
	B_____	10m
	C_____	15m
	D_____	20m
	E_____	25m
Process temperature (°C)	D_____	-40~80°C
Process pressure (kgf/cm ² g)	L_____	-1
	M_____	atm (atmosphere)
	A_____	2
Process connection	GD_____	G1-1/2"A (only for Ø50 mm compact plastic antenna)
	GM_____	G3"A (only for Ø80mm compact plastic antenna)
	LM_____	Hoisting holder
	FB_____	Standard flange
Flange standard	A_____	HG/T20615-2009 (Class series)
	B_____	HG/T20592-2009 (PN series)
Flange size	E_____	DN50 (2")
	C_____	DN65 (2.5")
	F_____	DN80 (3")
	G_____	DN100 (4")
	H_____	DN125 (5")
	J_____	DN150 (6")
	K_____	DN200 (8")
	M_____	DN250 (10")

Model	Specification code	Description
Flange pressure rating (kgf/cm ²) (The process pressure should not be higher than the flange pressure rating and the maximum allowable process pressure)	A	PN2.5
	G	PN6
	B	PN10
	C	PN16
	D	PN25
	F	PN40
	M	Class150
	N	Class300
Flange sealing face type	A	RF (recommended)
	B	FM
	C	M
	E	FF flat (only for process pressure ≤PN16)
	F	Flat-thin plate flange (8 mm thick, M only for process pressure)
Material of flange	A	304
	B	316L
	C	Carbon steel (Q235)
	F	C4 steel
	D	PP(20 mm thick, M only for process pressure)
	E	PTFE (20 mm thick, M only for process pressure)
Companion flange (A, B and C options are inherently equipped with 304 bolt , nut, plate washer, flange gasket)	X	Without companion flange
	A	304
	B	316L
	C	Carbon steel (Q235)

Special notes:

- Typical model 1: MPS5101L0PB23X2BDMFB-BECADX
- Typical model 2: MPS5101S0PB23X3CDMLM
- Special model: if special selection is required for a certain digit in the model code, fill “Z” in the space of special model in the model code, and “/Z” behind the complete model code; If special accessory is required, please also fill “/Z” behind the complete model code. Then, explain all the "digit for special model" and special accessories in words, and do not omit items. Text description should be placed in brackets "()". Before each description, "Zn:" (n = 1, 2, 3, ...) should be used for guidance and each description should be separated by semicolon";". For special selection of process connection, change its second digit to "Z". For example, change "FB" to "FZ".
- Example of special model: MPS5101L0PB23X2BDMFB-BECADX/Z (Z1: with nameplates and manuals in Chinese and English)

Table of MPS5200 model

Model	Specification code	Description
MPS5200	_____	80G FM-CW radar level transmitter (integrated, sanitary)
Measured medium	S_____	Solid
	L_____	Liquid
Span	0_____	15m
	1_____	30m
	2_____	70m
	3_____	120m
Enclosure	S_____	Die casting aluminum (electrical interface M20×1.5)
	B_____	Die casting aluminum (electrical interface 1/2"NPT)
	G_____	Stainless steel 316 (electrical interface M20×1.5)
	H_____	Stainless steel 316 (electrical interface 1/2"NPT)
Electronic module	B_____	24VDC, 4~20mA, HART
	C_____	24VDC, 4~20mA, HART, with blue tooth
	U_____	220VAC, 4~20mA, HART
	V_____	220VAC, 4~20mA, HART, with blue tooth
Output	2_____	Two-wire (only for electronic modules of B and C)
	4_____	Four-wire system
	6_____	Wireless remote transmission; GPRS; wireless CMesh networking
Display module	0_____	None
	1_____	Yes
	2_____	Tank-side passive indicator (power supply of master, recommended)
	3_____	Tank-side active indicator (only 24V two-wire power supply for tank-side indicator)
Safety certificate	X_____	No requirement
	A_____	Intrinsic safety type Ex ia IIC T6/T2 Ga
	D_____	Intrinsic safety explosion-proof type Ex d ia IIC T6/T2 Gb
	N_____	Dust-explosion-proof type Ex iaD tD A21 IP67 T80°C /T290°C
	M_____	Gas+dust-explosion-proof type Ex d ia IIC T6/T2 Gb; Ex iaD tD A21 IP67 T80°C /T290°C
Antenna type/process material	2_____	Ø50 mm integrated/stainless steel 304 (only for flange with size≥DN50)
	3_____	Ø80 mm integrated/stainless steel 304 (only for flange with size≥DN80)
	4_____	2" sanitary/stainless steel 316L (only for process pressure≤10kgf/cm²g)
	5_____	3" sanitary/stainless steel 316L (only for process pressure≤10kgf/cm²g)
Information of antenna assistance	X_____	None (only for flange connection of type C)
	A_____	Universal adjustment (only for flange connection of type W)
	B_____	Purging (only for flange connection of type C)
	C_____	Universal+purging (only for flange connection of type W)
Process temperature (°C)	D_____	-40~80°C
	P_____	-40~130°C
	K_____	-20~130°C
	N_____	-40~200°C
Process pressure	L_____	-1

Model	Specification code	Description
(kgf/cm ² g)	M—————	atm (atmosphere)
	A—————	2.5
	B—————	6
	G—————	10
	C—————	16
	D—————	25
Process connection	GD—————	G1-1/2"A (only for Ø50mm integrated antenna)
	GM—————	G3"A (only for Ø80 mm integrated antenna)
	T2—————	2" sanitary clamp
	T3—————	3" sanitary clamp
	FB—————	Standard flange
Connection mode of flange	C—————	Direct-insertion type
	W—————	Universal type (only for process pressure of M)
Flange standard	A—————	HG/T20615-2009 (Class series)
	B—————	HG/T20592-2009 (PN series)
Flange size (For installation with companion flange, the flange size should not be smaller than the diameter of the integrated type)	E—————	DN50 (2")
	C—————	DN65 (2.5")
	F—————	DN80 (3")
	G—————	DN100 (4")
	H—————	DN125 (5")
	J—————	DN150 (6")
	K—————	DN200 (8")
	M—————	DN250 (10")
Flange pressure rating (kgf/cm ²) (The process pressure should not be higher than the flange pressure rating and the maximum allowable process pressure)	A—————	PN2.5
	G—————	PN6
	B—————	PN10
	C—————	PN16
	D—————	PN25
	F—————	PN40
	M—————	Class150
	N—————	Class300
Flange sealing face type	A—————	RF Raised flange (recommended fastening flange)
	B—————	FM
	C—————	M
	E—————	FF flat (only for process pressure ≤PN16)
	F—————	Flat- thin plate flange (universal flange recommended)
Material of flange	A—————	304
	B—————	316L
	C—————	Carbon steel (Q235)
	F—————	C4 steel
	D—————	PP(20 mm thick, only for process pressure of M and flange connection of C)
	E—————	PTFE (20 mm thick, only for process pressure of M and flange connection of C)
Companion flange	X—————	Without companion flange

Model	Specification code	Description
(A, B and C options are inherently equipped with 304 bolt , nut, plate washer, flange gasket)	A _____	304
	B _____	316L
	C _____	Carbon steel (Q235)

Special notes:

- Typical model 1: MPS5200S0SB21X3CDMFB-WBGCFAX
- Typical model 2: MPS5200L0SB21D3XDMGM
- Special model: if special selection is required for a certain digit in the model code, fill “Z” in the space of special model in the model code, and “/Z” behind the complete model code; If special accessory is required, please also fill “/Z” behind the complete model code. Then, explain all the "digit for special model" and special accessories in words, and do not omit items. Text description should be placed in brackets "()". Before each description, "Zn:" (n = 1, 2, 3, ...) should be used for guidance and each description should be separated by semicolon";". For special selection of process connection, change its second digit to "Z". For example, change "FB" to "FZ".
- Example of special model: MPS5200S1SB21X3CDMFB-WBGCFAX/Z (Z1: separately equipped with stainless steel number plate; Z2: equipped with M20×1.5 adapter 3/4” NPT cable joint)
- Tank-side cable: If tank-side indicator is optional, the standard configuration contains a communication cable of 25 m. Any excess is priced in meters.

Table of MPS5300 model

Model	Specification code	Description
MPS5300	—————	80G FM-CW radar level transmitter (PTFE process seal antenna)
Measured medium	L—————	Liquid
Span	0—————	15 m (recommended)
	1—————	30 m (recommended)
	2—————	70m
	3—————	120m
Enclosure	S—————	Die casting aluminum (electrical interface M20×1.5)
	B—————	Die casting aluminum (electrical interface 1/2"NPT)
	G—————	Stainless steel 316 (electrical interface M20×1.5)
	H—————	Stainless steel 316 (electrical interface 1/2"NPT)
Electronic module	B—————	24VDC, 4~20mA, HART
	C—————	24VDC, 4~20mA, HART, with blue tooth
	U—————	220VAC, 4~20mA, HART
	V—————	220VAC, 4~20mA, HART, with blue tooth
Output	2—————	Two-wire (only for electronic modules of B and C)
	4—————	Four-wire system
	6—————	Wireless remote transmission; GPRS; wireless CMesh networking
Display module	0—————	None
	1—————	Yes
	2—————	Tank-side passive indicator (power supply of master, recommended)
	3—————	Tank-side active indicator (only 24V two-wire power supply for tank-side indicator)
Safety certificate	X—————	No requirement
	A—————	Intrinsic safety type Ex ia IIC T6/T2 Ga
	D—————	Intrinsic safety explosion-proof type Ex d ia IIC T6/T2 Gb
Antenna type/process material	2—————	Ø50 mm process seal antenna/stainless steel 304+PTFE process seal (only for flange with size≥DN50)
	3—————	Ø80 mm process seal antenna/stainless steel 304+PTFE process seal (only for flange with size≥DN80)
Antenna material	A—————	PTFE
Process temperature (°C)	D—————	-40~80°C
	P—————	-40~130°C
	N—————	-40~200°C
Process pressure (kgf/cm²g)	L—————	-1
	M—————	atm (atmosphere)
	A—————	2.5
	B—————	6
	G—————	10
	C—————	16
	D—————	25
Process connection	FB—————	Standard flange
Flange standard	A—————	HG/T20615-2009 (Class series)
	B—————	HG/T20592-2009 (PN series)

Model	Specification code	Description
Flange size	E_____	DN50 (2")
	C_____	DN65 (2.5")
	F_____	DN80 (3")
	G_____	DN100 (4")
	H_____	DN125 (5")
	J_____	DN150 (6")
	K_____	DN200 (8")
	M_____	DN250 (10")
Flange pressure rating (kgf/cm ²) (The process pressure should not be higher than the flange pressure rating and the maximum allowable process pressure)	A_____	PN2.5
	G_____	PN6
	B_____	PN10
	C_____	PN16
	D_____	PN25
	F_____	PN40
	M_____	Class150
	N_____	Class300
Flange sealing face type	A_____	RF (recommended)
	C_____	M
Material of flange	A_____	304
	B_____	316L
Companion flange (A, B and C options are inherently equipped with 304 bolt , nut, plate washer)	X_____	Without companion flange
	A_____	304
	B_____	316L
	C_____	Carbon steel (Q235)

Special notes:

- Typical model : MPS5300L0SB21X3ADMFB-BGCAAX
- Special model: if special selection is required for a certain digit in the model code, fill “Z” in the space of special model in the model code, and “/Z” behind the complete model code; If special accessory is required, please also fill "/Z" behind the complete model code. Then, explain all the "digit for special model" and special accessories in words, and do not omit items. Text description should be placed in brackets "()". Before each description, "Zn:" (n = 1, 2, 3, ...) should be used for guidance and each description should be separated by semicolon";". For special selection of process connection, change its second digit to "Z". For example, change "FB" to "FZ".
- Example of special mode: MPS5300L0SB22X3APGFB-BJCAAX/Z (Z1: equipped with 30 m tank-side communication cable)
- Tank-side cable: If tank-side indicator is optional, the standard configuration contains a communication cable of 25 m. Any excess is priced in meters.

MPS3000 Pulse Radar Level Transmitter



Function and measurement system

Measuring principle

Based on the time-travel principle, MPS3000 pulse radar level transmitter is an “emit pulse downward” measurement system. The meter transmits a 1mW micro-power microwave pulse from the radar antenna (such as a 26G frequency radar, that is, sending a pulse of $\Delta t=1\text{ns}$ and superimposing a sine wave signal of 26GHz). This pulse propagates in space at the speed of light and touches the surface of the measured medium, and part of its energy is reflected back and received by the same antenna. The time difference between the pulse signal emission and acceptance is proportional to the distance between the radar antennas to the objects.

Input

The antenna receives the microwave pulse signal reflected from the surface of the material and transmits it to the electronic components. The microprocessor will process these signals and identify the echo which is made by the microwave pulse in material surface. Correct recognition of the echo signal is made by intelligence software, whose precision can reach mm. The distance from material surface (D) is proportional to the time schedule of the pulse (T):

$$D=c \times t/2 \text{ --- } c \text{ is for light speed}$$

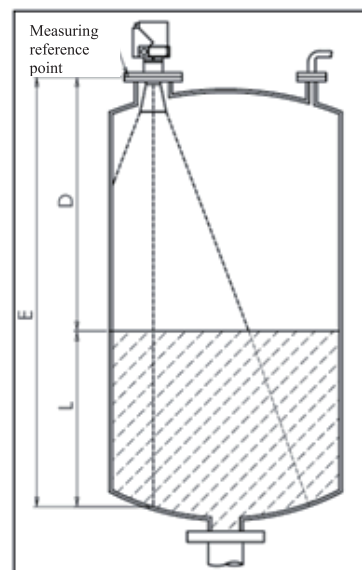
Because the distance between the empty cans (E) is known, so the level (L) is:

$$L=E-D \text{ --- The reference point of empty cans E can be seen above.}$$

Output

According to the field working conditions, the meter can automatically adapt to the measurement environment by inputting the empty tank height (zero point), the full tank height (full span) and setting the application parameters.

The output of 4~20mA can be calibrated according to the span set by users. It can be communicated by HART.





Application industries

- Petrochemical industry (oil field, petrochemical plant, oil extraction plant, oil refinery, chemical plant, coking plant, etc.)

Measuring media---crude oil, light oil, natural gas, methanol, ethanol, ammonia, benzene, polystyrene, esters, water vapor, liquid carbon dioxide, liquid nitrogen

- Power industry (power plant, etc.)

Measuring media---raw coal bin, pulverized coal bin, pulverized coal ash bin, chemical water

- Metallurgy industry (steel works, etc.)

Measuring media---limestone, coke and pulverized coal, cold back to min, raw material bin, powder bin, coal ash bin and chemical water

- Cement industry (cement plant, etc.)

Measuring medium---clinker warehouse, powder bin, raw coal bin and chemical water

Product advantages

- With high accuracy and two-wire technology, it is a substitute product for lever meters of differential pressure type, magnetostrictive type, radio frequency admittance and magnetic flip type.

- Free from pressure, vacuum, temperature, inert gas, smoke, steam and other environmental impacts and with reliable measurement results.

- With two CPUs, it has stronger processing ability, more intelligent algorithm and more stable system.

- Double-chamber housing, inherent magnetic button and high protection level.

- Special setter for remote debugging and diagnosis.

- Inherent anti-surge protector, with level-4 electromagnetic compatibility.

- Suitable for high temperature working conditions and even process temperature up to 150°C. The temperature can reach 350°C when high temperature extended antenna is adopted.

- Dot matrix LCD of meter pattern supports complex operations such as field waveform display and false echo creation so that the operative difficulty and maintenance are reduced.

- LCD unit can be externally connected with 50m(I²C) and 2km(HART) to form a display and operation unit beside the tank, in order to reduce the risk and labor intensity that are caused by patrol work on the high risk area, such as large tank, high temperature, high pressure, toxic, and so on.

- All-Chinese menu is preset for meters sold in China, which further reduces the difficulty of meter debugging.

General description

Meter model	MPS3100	MPS3200
		
Application	Measurement of strongly corrosive liquid	Liquid measurement under general working conditions
Span	20m	35m
Process connection	Thread or flange	Flange
Process temperature	-40°C~150°C	-60°C~350°C
Process pressure	-1~2.5kgf/cm ²	-1~40kgf/cm ²
Accuracy of the measurements	3mm or 0.1%, whichever is greater	3mm or 0.1%, whichever is greater
Blind zone of meter	End of sensor	End of sensor
Signal frequency	26GHz	26GHz
Signal output	4~20mA HART	4~20mA HART
Power	24VDC, 4-20mA, HART, two-wire 24VDC, 4-20mA, HART, four-wire 220VAC, 4-20mA, HART, four-wire	24VDC, 4-20mA, HART, two-wire 24VDC, 4-20mA, HART, four-wire 220VAC, 4-20mA, HART, four-wire

Meter model	MPS3300	MPS3600	MPS3700
			
Application	Liquid measurement under complex strongly corrosive conditions	Measurement of blocky, granular and powdery solids	
Span	20m	35m	70m
Process connection	Flange	Flange	
Process temperature	-40°C~150°C	-60°C~350°C	
Process pressure	-1~25kgf/cm ²	-1~40kgf/cm ²	
Accuracy of the measurements	3mm or 0.1%, whichever is greater	3mm or 0.1%, whichever is greater	
Blind zone of meter	End of sensor	End of sensor	
Signal frequency	26GHz	26GHz	
Signal output	Output signal: 4~20mA HART	Output signal: 4~20mA HART	
Power	24VDC, 4-20mA, HART, two-wire 24VDC, 4-20mA, HART, four-wire 220VAC, 4-20mA, HART, four-wire	24VDC, 4-20mA, HART, two-wire 24VDC, 4-20mA, HART, four-wire 220VAC, 4-20mA, HART, four-wire	

Specification and size of antenna

Antenna					
No.	1	2	3	4	5
Material	PTFE	Stainless steel	PTFE	Stainless steel (PTFE housing)	Stainless steel
Specification	Φ50 Φ65 Φ80	Φ50 Φ80 Φ100 Φ125	Φ50 Φ80	Φ50 Φ80 Φ100 Φ125	Φ200 Φ250
Applicable models	MPS3100	MPS3200 MPS3600 MPS3700	MPS3300	MPS3600 MPS3700	MPS3600 MPS3700
Features	Corrosion resistance	Temperature resistance/pressure resistance	Corrosion resistance/pressure resistance	Normal temperature/normal pressure	Temperature resistance

Companion flange

Flange			
No.	1	2	3
Material	(PTFE/PP) flange	Stainless steel (carbon steel) flange	Stainless steel (carbon steel) universal joint flange
Features	Corrosion resistance	High temperature/high pressure	High temperature/normal pressure
Specification	DN50/80/100/125/150/200/250		



Technical characteristics

Technical indicator	Working frequency: 26GHz		
	Measurement range: MPS3100, 0~20m MPS3200, 0~35m MPS3300, 0~20m MPS3600, 0~35m MPS3700, 0~70m		
	Repeatability: $\pm 1.5\text{mm}$		
	Resolution: 1mm		
	Output signal: 4~20mA HART		
	Accuracy: 3mm or 0.1%, whichever is greater		
Antenna material	MPS3100: PP+PTFE		
	MPS3200: 316L		
	MPS3300: 304+PTFE		
	MPS3600: 316L or 304		
	MPS3700: 316L or 304		
Communication interface	HART communication protocol		
Process connection	MPS3100: G1.5, G3A, M68×2 thread or flange		
	MPS3200: fastening flange		
	MPS3300: fastening flange		
	MPS3600: fastening flange and universal flange		
	MPS3700: fastening flange and universal flange		
Process temperature	MPS3100: -40°C~150°C MPS3200: -60°C~350°C MPS3300: -40°C~150°C		
	MPS3600: -60°C~350°C MPS3700: -60°C~350°C		
Process pressure	MPS3100: -1~2.5kgf/cm ² MPS3200: -1~40kgf/cm ² MPS3300: -1~25kgf/cm ²		
	MPS3600: -1~40kgf/cm ² MPS3700: -1~40kgf/cm ²		
Power supply and output	24 VDC two-wire (ripple $\leq$ 100 mVp-p), 4~20 mA HART protocol		
	24 VDC four-wire (ripple $\leq$ 100 mVp-p), 4~20 mA HART protocol		
	220 VAC, four-wire, 4~20mA protocol		
Environmental condition	-40°C~+80°C		
Case protection class	IP67		
Safety certification information	Intrinsic safety and explosion-proof type: Ex ia II C T6/T2 Ga		
	Explosion-proof: Ex d ia [iaGa] II C T6/T2 Gb		
Cable entry	M20×1.5 thread, 1/2" NPT thread (cable diameter 6~12mm)		

Guide for Selection

• MPS3000 pulse radar level transmitter can be used for continuous level measurement of liquid, slurry and solid. The actual measuring range is determined by the antenna size, medium reflectivity, installation position and possible noisy reflection.

Medium classification Liquid

Liquid

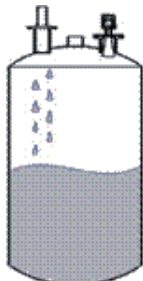
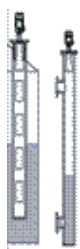
Medium classification	Dielectric constant (ϵ_r)	Example
A	1.4~1.9	Non-conductive liquid, e.g. liquefied gas
B	1.9~4	Non-conductive liquid, e.g. benzene, oil, and toluene
C	4~10	Concentrated acid, organic solution, vinegar, aniline, alcohol and acetone
D	>10	Conductive liquid, e.g. aqueous solution, gadoleic acid and alkali

Solid

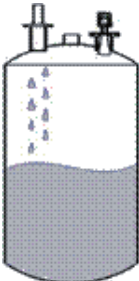
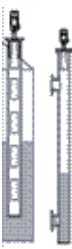
Medium classification	Particle size	Example
A	<1mm	Lime powder, flour, cement, dolomite dust
B	1mm~10mm	Broken coal, coke, metal rock fine
C	>10mm	Raw coal, limestone

Measuring range of meter (related to tank type, operating conditions and medium type)

• MPS3100 plastic rod antenna pulse radar is mainly used to measure corrosive liquid, slurry and other media in storage or process tanks, such as water and liquid tanks, acid and alkali tanks and slurry tanks.

Rod pulse radar			MPS3100				
Typical application conditions			Antenna size (mm)	Type of measured medium			
				A	B	C	D
				Span (m)			
Storage tank		Surface of static medium (for example: intermittent feeding, bottom feeding, immersion tube)	Ø50	-	0~3	0~5	0~10
			Ø80	0~3	0~5	0~10	0~20
Buffer tank		Fluctuating surface (for example: continuous feeding, top feeding and mixture injection)	Ø50	-	-	0~3	0~5
			Ø80	-	0~3	0~5	0~10
Process tank with agitator		Disturbing surface Single-stage stirring <60U/min	Ø50	-	-	0~2	0~3
			Ø80	-	0~3	0~5	0~10
Waveguide pipe and by-pass pipe			Ø50	0~10			
			Ø80	0~20			

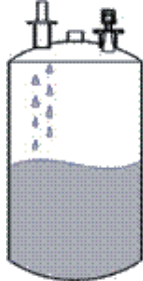
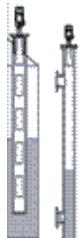
• MPS3200 horn antenna pulse radar can be widely used to measure the level of storage or process tanks, liquids with certain temperature and pressure, slurry, etc. according to the different sizes of antenna openings. For example: crude oil and light oil tanks, volatile liquid tanks, slurry tanks, etc.

Horn pulse radar		MPS3200				
Typical application conditions		Antenna size (mm)	Type of measured medium			
			A	B	C	D
			Span (m)			
Storage tank	 Surface of static medium (for example: intermittent feeding, bottom feeding, immersion tube)	Ø50	-	0~4	0~8	0~15
		Ø80	0~3	0~10	0~15	0~20
		Ø100	0~10	0~15	0~20	0~30
		Ø125	0~15	0~20	0~40	0~75
Buffer tank	 Fluctuating surface (for example: continuous feeding, top feeding and mixture injection)	Ø50	-	-	0~4	0~7
		Ø80	0~3	0~4	0~7	0~12
		Ø100	0~5	0~7.5	0~10	0~15
		Ø125	0~7.5	0~10	0~20	0~30
Process tank with agitator	 Disturbing surface Single-stage stirring <60U/min	Ø50	-	-	0~2	0~3.5
		Ø80	-	0~2	0~3	0~5
		Ø100	0~3	0~4	0~7	0~10
		Ø125	0~4	0~6	0~15	0~25
Waveguide pipe and by-pass pipe		Ø50	0~10			
		Ø80	0~20			
		Ø100	0~30			
		Ø125	0~60			

1) For category-A media, please select the waveguide pipe (20m).

2) For category-A and B media, please select the by-pass pipe if possible.

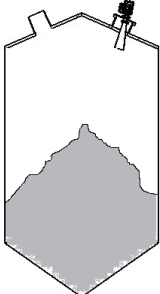
• According to the different sizes of antennas, the MPS3300 process seal antenna pulse radar can be widely used to measure the liquid and slurry with strong corrosiveness and complicated working conditions in storage or process tanks, such as water and liquid tanks, acid and alkali tanks and slurry tanks.

Process seal pulse radar		MPS3300				
Typical application conditions		Antenna size (mm)	Type of measured medium			
			A	B	C	D
			Span (m)			
Storage tank	 Surface of static medium (for example: intermittent feeding, bottom feeding, immersion tube)	Ø50	-	0~5	0~10	0~15
		Ø80	-	0~10	0~15	0~20
		Ø100	-	0~15	0~20	0~20
Buffer tank	 Fluctuating surface (for example: continuous feeding, top feeding and mixture injection)	Ø50	-	0~2.5	0~5	0~7.5
		Ø80	-	0~8	0~7.5	0~10
		Ø100	-	0~7.5	0~10	0~12.5
Process tank with agitator	 Disturbing surface Single-stage stirring <60U/min	Ø50	-	0~1.5	0~2	0~3
		Ø80	-	0~2	0~3	0~5
		Ø100	-	0~3	0~5	0~7
Waveguide pipe and by-pass pipe		Ø50~100	0~20			

1) For category-A media, please select the waveguide pipe (20m).

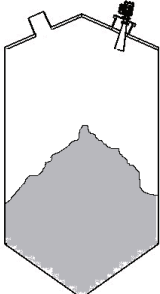
2) For category-A and B media, please select the by-pass pipe if possible.

•MPS3600 pulse radar can be widely used to measure the level of solid in process tanks in a large span according to the different sizes of antenna openings. For example, tanks of blocky, powdery and granular materials.

Horn pulse radar	MPS3600			
Typical application conditions	Antenna size (mm)	Type and span of measured medium (m)		
		A	B	C
	Ø80 horn	-	5	10
	Ø100 horn	5	8	15
	Ø125 horn	7	12	20
	Ø200 paraboloid	10	17	30
	Ø250 paraboloid	15	20	35

• MPS3700 pulse radar can be widely used to measure the level of solid in process tanks in a large span according to the different sizes of antenna openings.

For example, coke level, slurry tank, solid particles, etc.

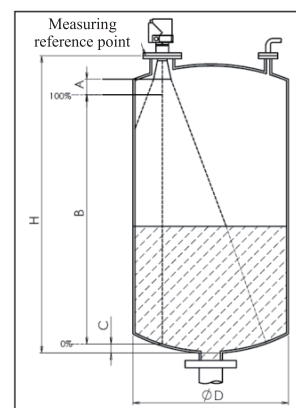
Horn pulse radar	MPS3700			
Typical application conditions	Antenna size (mm)	Type and span of measured medium (m)		
		A	B	C
	Ø80 horn	-	8	18
	Ø100 horn	9	15	28
	Ø125 horn	12	20	35
	Ø200 paraboloid	18	30	55
	Ø250 paraboloid	30	40	70

Measuring conditions

- The measuring range begins when the beam touches the tank bottom. Especially when the tank has a disc bottom or adopts a conical discharge port, the level below this point cannot be measured.

- For the medium with low dielectric constant (category-A and B), if the medium is at a low level (in Fig.C on the right), the tank bottom is visible. The measurement in this range will reduce the accuracy, so it is suggested to set the measurement zero point at a distance C from the tank bottom (as shown in the figure).

- In theory, the measuring range can reach the terminal of the antenna. In consideration of the influence of corrosion and adhesion, the distance of measuring range should be at least A (as shown in the figure) from terminal to top of antenna. Please pay attention to the phenomenon of condensation especially.



- The minimum measuring range B is associated with chosen antenna type. (As listed below)

- The tank diameter should be greater than D (as shown in the following table) and the tank height should be at least H (as shown in the following table).

Type of meter	A[mm]	B[m]	C[mm]	D[m]	H[m]
MPS3100	50	>0.2	50~250	>0.2	>0.3
MPS3200	150	>0.2	50~250	>0.2	>0.3
MPS3300	50	>0.2	50~250	>0.2	>0.3
MPS3600 Φ 200 paraboloid	300	>1	50~250	>1	>1.3
MPS3700 Φ 250 paraboloid	300	>1	50~250	>1	>1.3

- Effect of gaseous phase

When there is steam on the liquid surface, high pressure will slow down the signal transmission speed, which is related to the type of steam, especially in low temperature environment. When the distance between the measurement zero point (at the flange) and the surface of the material increases, the measurement error caused by this effect increases. The measurement error caused by this effect is as shown in the following table.

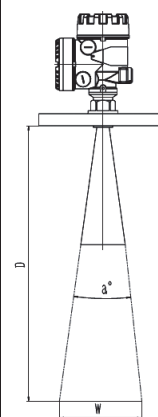
Gaseous phase	Temperature		Pressure				
	$^{\circ}\text{C}$	$^{\circ}\text{F}$	1kgf/cm ² (14.5psi)	10kgf/cm ² (145psi)	50kgf/cm ² (725psi)	100kgf/cm ² (1450psi)	160kgf/cm ² (2320psi)
Nitrogen	20	68	0.00%	0.22%	1.2%	2.4%	3.89%
	200	392	-0.01%	0.13%	0.74%	1.5%	2.42%
	400	752	-0.02%	0.08%	0.52%	1.1%	1.70%
Hydrogen	20	68	-0.01%	0.10%	0.61%	1.2%	2.00%
	200	392	-0.02%	0.05%	0.37%	0.76%	1.23%
	400	752	-0.02%	0.03%	0.25%	0.53%	0.86%
Water (saturated steam)	100	212	0.20%	-	-	-	-
	180	356		2.1%	-	-	-
	263	505.4			8.6%	-	-
	310	590				22%	-
	364	687.2					41.8%

Tips! When the pressure is known and constant, the measurement error can be compensated by methods such as linearization.

Beam angle

Beam angle means that energy density of radar wave reaches the half of maximum value (3db). The microwave not only can scatter to the area beyond beam angle, but also can be reflected by interference. The diameter of Beam width (W) is antenna type (beam angle α) and the function of measuring distance (D).

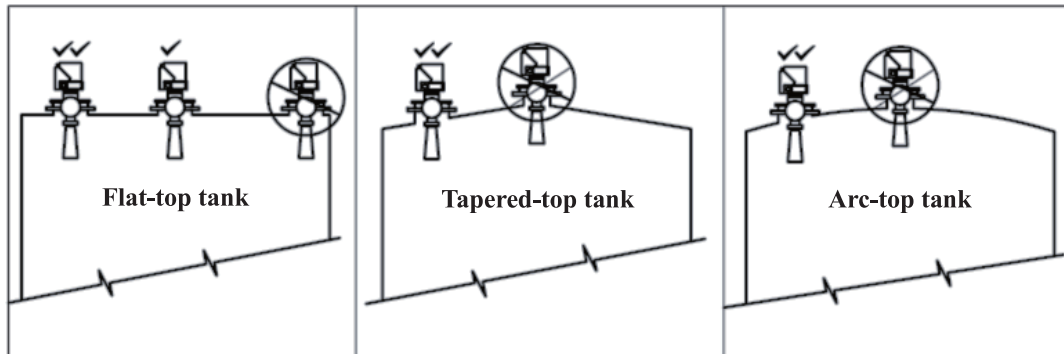
Antenna type	Horn antenna				Parabolic antenna		Rod antenna	
Antenna size	Φ50	Φ80	Φ100	Φ125	Φ200	Φ250	φ50	Φ80
Beam angle α	18°	12°	8°	6°	5°	4°	20°	15°
Measuring distance (D)	Beam width diameter (W)							
3m	0.95	0.63	0.42	0.31	0.26	0.21	1.06	0.79
6m	1.90	1.26	0.84	0.62	0.52	0.42	2.12	1.58
9m	2.85	1.89	1.26	0.93	0.79	0.63	3.18	2.37
12m	3.80	2.52	1.68	1.24	1.05	0.84	4.24	3.16
15m	4.75	3.15	2.10	1.55	1.31	1.05	5.30	3.95
20m	-	4.20	2.80	2.07	1.75	1.40	7.07	5.27
25m	-	-	3.50	2.58	2.18	1.75	-	-
30m	-	-	4.20	3.10	2.62	2.10	-	-
35m	-	-	-	3.62	3.06	2.44	-	-
40m	-	-	-	-	-	2.79	-	-
45m	-	-	-	-	-	3.14	-	-



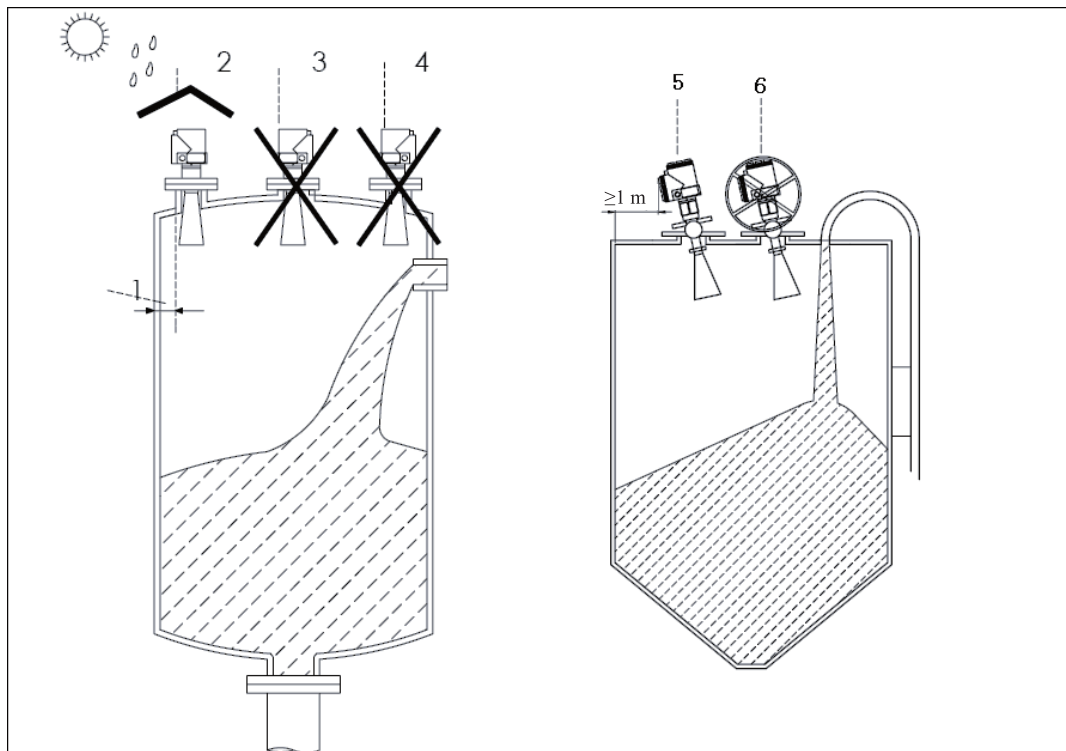
Installation guide

Recommended mounting position as shown below. For tapered shaped tank and arc shaped tank, the meter can not be installed at the center of the tank top, otherwise the interference will lead to signal loss.

Installation position



- Please do not install it above the feed inlet as shown in "Fig.4" below.
- As shown in "Fig.1" below, the distance from the tank wall to the outer wall of the mounting tube is about 1/4 of the tank diameter. For the meter with plastic rod antenna, it is suggested that the installation distance should not be less than 30cm; For the meter with horn antenna, the installation distance should not be less than 15cm.
- It is recommended to install a protective cover as shown in "Fig.2" below to prevent the meter from direct sunlight and rain.
- During solid measurement, the emission angle of the meter should be adjusted to ensure that the axis of the meter is perpendicular to the inclined plane of the material as far as possible, as shown in "Fig.5" below.



Installation of tank

•Do not install devices such as limit switches and temperature sensors within the signal beam angle.

•Heating coils, vacuum rings, baffles and other devices within the signal beam angle may interfere with the measurement, as shown in the figure on the right.

•Optimal choice

---Antenna size: the larger the antenna size, the smaller the beam angle and the weaker the disturbing echo.

---False echo curve: the interference wave can be shielded by false echo curve, so as to achieve the best measurement effect.

---Installation of antenna: refer to the "preferred mounting position".

---Waveguide pipe: usually, the waveguide pipe is used to avoid signal interference.

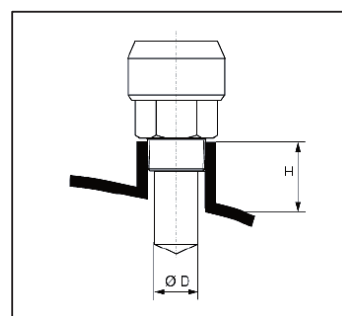
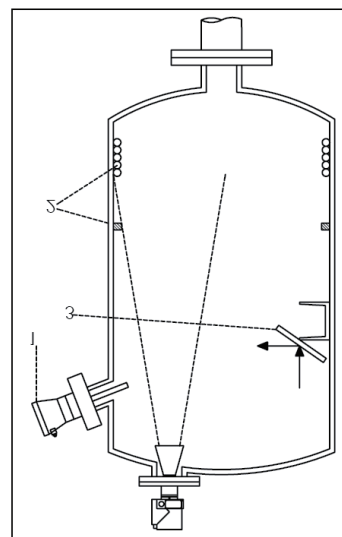
---The metal-shield net on the slant (as shown in Fig.“3” on the right) can emit radar wave signal, which could reduce disturbing echo.

---After installation, the housing can rotate for 350°, which is convenient for operation display and terminal wiring.

---The end of the rod antenna must extend out of the mounting tube.

---The rod antenna should be installed vertically.

Antenna size	50mm	80mm
D[mm]	45	75
H[mm]	<100	<100



Meters with horn antennas installed in tanks

---Suitable for measuring the level of medium with dielectric constant $\epsilon_r \geq 1.9$.

---After installation, the housing can rotate for 350°, which is convenient for operation display and terminal wiring.

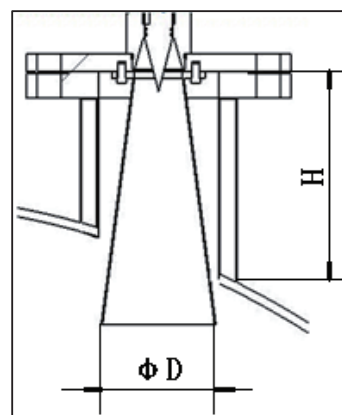
---The horn antenna must extend out of the mounting tube to obtain the best measurement results.

---The antenna with an extension tube longer than 100mm can be selected.

---When the antenna horn cannot extend out of the mounting tube due to the mechanical structure, the mounting tube with a length of less than 500mm can be selected.

---The horn antenna should be installed vertically.

Antenna size	50mm	80mm	100mm	125mm
D[mm]	48	75	95	123
H[mm]	<115	<210	<280	<520



Warning: 1. Please contact the manufacturer if a mounting tube with length $\geq 500\text{mm}$ is needed.

2. If the horn antenna is not installed vertically, the maximum span may be reduced.

---Antenna extension tube

•When the mounting tube is excessively long, the antenna extension tube should be selected to ensure that the horn antenna can extend out of the mounting tube.

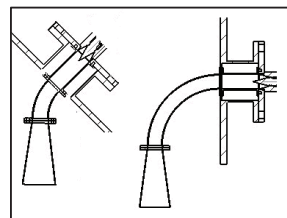
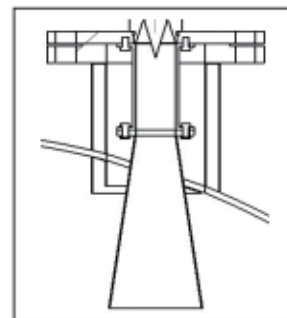
•If the diameter of the horn mouth of the antenna is larger than the nominal width of the mounting tube, the antenna and its extension tube should be installed in reverse from the inside of the tank. Then, they should be lifted up and fastened with bolts from the outside. An extension tube that enables the antenna to be lifted by at least 100 mm should be selected.

- The recommended torque should be 10 Nm.

---Special extension tube

•If the antenna needs to be installed on the inclined or vertical tank wall, the antenna extension elbow with an angle of 45° or 90° should be selected.

- The minimum curvature radius R of the extension elbow is 300mm.



Measurement through the plastic tank wall from the outside

- Dielectric constant of medium $\epsilon_r > 10$.
- The distance between the highest level and the tank top is at least 15cm (6").
- The distance (H) should be greater than 100mm (4").
- It is recommended to use the mounting bracket to adjust to the desired distance H.
- Try to avoid installation in an environment where condensation or adhesion occurs.

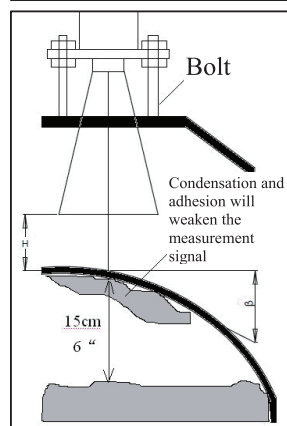
Mounting in the open air, the clearance should be taken protective measure between the antenna and the vessel.

- The optimal angle β should be between 15° and 20°.

•Please choose the tank material with low dielectric constant and suitable tank wall thickness. Please don't use electrically conductive plastic (black) (refer to the following table).

- Please select DN250/10" antenna as far as possible.

•Do not install any devices (such as pipes) that may cause interference in the beam angle outside the tank.



Penetration material	PE (Polyethylene)	PTFE (Teflon)	PP (Polypropylene)	Perspex (Plastics)
DK/ ϵ_r	2.3	2.1	2.3	3.1
Optimal thickness (mm) ¹⁾	15.7	16.4	15.7	13.5

Note: Other possible thickness values are integral multiples of the values listed in the table (for example, PE: 31.4 mm, 47.1mm...).

Installation of MPS3200 in waveguide pipe

---Suitable for measuring the level of medium with dielectric constant $\epsilon_r \geq 1.4$.

---After the meter is installed, its housing can rotate for 350°, which is convenient for operation and wiring.

---The radar antenna should be installed perpendicular to the surface of the measured medium and parallel to the wall of the measuring tank.

---The measurement can be carried out by a full-bore ball valve.

---Suggestions on waveguide pipe

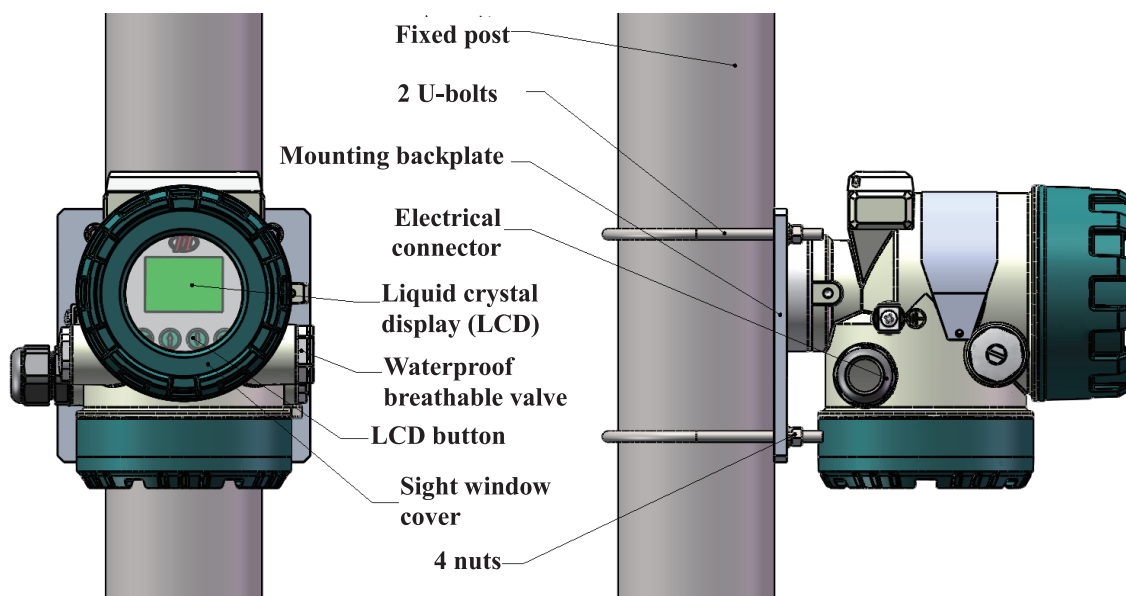
- Choose a horn antenna with the largest diameter as much as possible.

•The diameter of the inner wall of the waveguide pipe should be consistent, and the inner wall should always be smooth.

- The measurement accuracy will be reduced at $\pm 20\text{cm}$ of the tank connecting pipe.
- The waveguide pipe must be made of metal, which cannot be coated with enamel or plastic, and can be parallel or seamless welded stainless steel pipe.
- If the two sides of the waveguide need to be drilled, the positions of the holes should be symmetrical (the included angle is 180°), and burrs should be removed from the holes.
- When the waveguide pipe needs to be extended, it can be achieved by welding the flange or sleeve, but the joint must not have a gap of more than 1 mm.

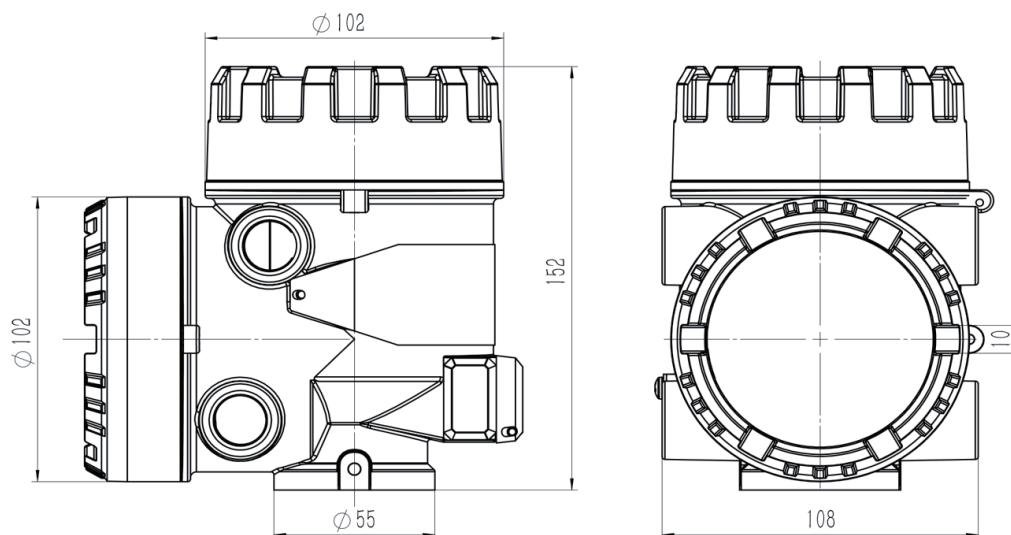
Tank-side indicator

Schematic diagram for installation



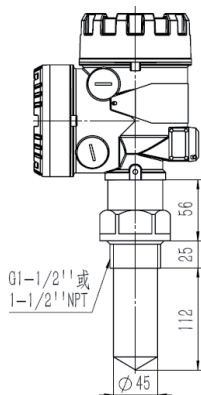
Structural size

Dimensions of case

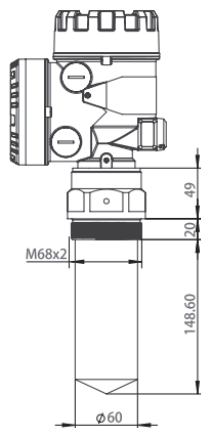


Dimensions of meter

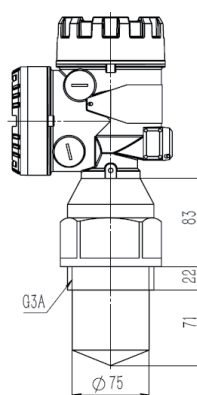
MPS3100 - $\phi 50$ rod type



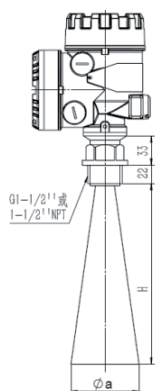
MPS3100 - $\phi 65$ rod type



MPS3100 - $\phi 80$ rod type

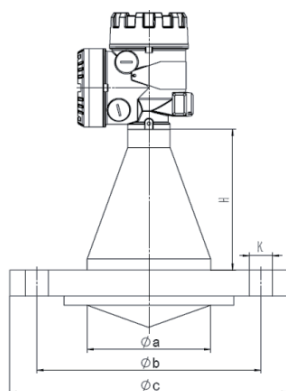


MPS320 fastening horn



a (mm)	H (mm)
48	190
78	215
98	295
123	610

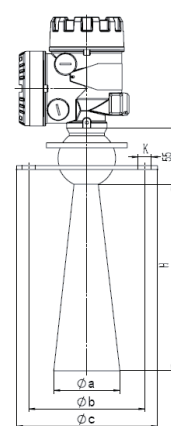
MPS3300 process seal antenna



Flange (PN16)	a (mm)	b (mm)	c (mm)	H (mm)	K (mm)
DN80	45	125	165	190	18
DN100	75	160	200	215	18
DN125	95	180	220	295	18

MPS3600/MPS3700

Universal horn and universal paraboloid
Fastening horn and fastening paraboloid



Flange (PN16)	a (mm)	b (mm)	c (mm)	H (mm)	K (mm)
DN80	78	160	200	215	18
DN100	98	180	220	295	18
DN125	123	210	250	610	18

Table of MPS3100 model

Model	Specification code	Description
MPS3100	_____	26G pulse radar level transmitter (plastic rod type, plastic horn)
Enclosure	S_____	Die casting aluminum (electrical interface M20×1.5)
	B_____	Die casting aluminum (electrical interface 1/2"NPT)
	G_____	Stainless steel 316 (electrical interface M20×1.5)
	H_____	Stainless steel 316 (electrical interface 1/2"NPT)
Power supply and output	B2_____	24VDC, 4~20mA, HART, two-wire
	B4_____	24VDC, 4~20mA, HART, four-wire
	U4_____	220VAC, 4~20mA, HART, four-wire
	R2_____	24VDC, 4~20mA, HART, two-wire (equipped with tank-side passive indicator)
	R4_____	24VDC, 4~20mA, HART, four-wire (equipped with tank-side passive indicator)
	A4_____	220VAC, 4~20mA, HART, four-wire (equipped with tank-side passive indicator)
Safety certificate	X_____	No requirement
	I_____	Intrinsic safety type Ex ia II C T6/T2 Ga
	O_____	Intrinsic safety explosion-proof type Ex d ia [iaGa] II C T6/T2 Gb
Antenna type	2_____	Ø50 mm plastic rod type (only for flange with size≥DN50)
	5_____	Ø65mm plastic rod type (only for flange with size ≥DN65)
	3_____	Ø80 mm plastic rod type (only for flange with size≥DN80)
	4_____	Ø80 mm plastic horn (only for flange with size≥DN80, process pressure ≤2 kgf/cm ² g)
Information of antenna assistance	X_____	None
Process temperature (°C)	D_____	-40~80°C (T6)
	E_____	-20~150°C (T2)
Process pressure (kgf/cm ² g)	L_____	-1
	M_____	atm (atmosphere)
	A_____	2.5 (D only for process temperature)
Process connection	GD_____	G1-1/2"A (only for Ø50 mm rod antenna)
	T4_____	M68×2 (only for Ø65mm rod antenna)
	GM_____	G3"A (only for Ø80 mm rod antenna)
	LM_____	Holder (only for plastic horn antenna)
	FB_____	Standard flange
Flange standard	A_____	HG/T20615-2009 (Class series)
	B_____	HG/T20592-2009 (PN series)
Flange size	E_____	DN50 (2")
	C_____	DN65 (2.5")
	F_____	DN80 (3")
	G_____	DN100 (4")
	H_____	DN125 (5")
	J_____	DN150 (6")
	K_____	DN200 (8")
	M_____	DN250 (10")

Model	Specification code	Description
Pressure rating (kgf/cm ²)	A—————	PN2.5
	G—————	PN6
	B—————	PN10
	C—————	PN16
	D—————	PN25
	F—————	PN40
	M—————	Class150
	N—————	Class300
Flange sealing face type	A—————	RF (recommended)
	B—————	FM
	C—————	M
	E—————	FF flat (only for process pressure ≤PN16)
	F—————	Flat-thin plate flange (8 mm thick, M only for process pressure)
Material of flange	A—————	304
	B—————	316L
	C—————	Carbon steel (Q235)
	F—————	C4 steel
	D—————	PP(20 mm thick, M only for process pressure)
	E—————	PTFE (20 mm thick, M only for process pressure)
Companion flange (A, B and C options are inherently equipped with 304 bolt , nut, plate washer, flange gasket)	X—————	Without companion flange
	A—————	304
	B—————	316L
	C—————	Carbon steel (Q235)

Special notes:

- Typical model 1: MPS3100SB2X3XDMFB-BGCAAX
- Typical model 2: MPS3100SB2X3XDMGM
- Special model: if special selection is required for a certain digit in the model code, fill “Z” in the space of special model in the model code, and “/Z” behind the complete model code; If special accessory is required, please also fill “/Z” behind the complete model code. Then, explain all the "digit for special model" and special accessories in words, and do not omit items. Text description should be placed in brackets "()". Before each description, "Zn:" (n = 1, 2, 3, ...) should be used for guidance and each description should be separated by semicolon";". For special selection of process connection, change its second digit to "Z". For example, change "FB" to "FZ".
- Example of special model: MPS3100SZ2X3XDMFB-BGCAAX/Z (Z1: equipped with 24V Tank-side active indicator unit; Z2: equipped with flange gasket and fastener)
- Tank-side cable: If tank-side indicator is optional, the standard configuration contains a communication cable of 25 m. Any excess is priced in meters.

MPS3101 Pulse Radar Water Level Meter

MPS3102 Open Channel Flowmeter

MPS3103 Liquid Level Difference Meter

MPS3104 Average Liquid Level Gauge

Technical parameters

Model	MPS3101, MPS3102, MPS3103, MPS3104
Product pictures	
Scope of application	Measurement of urban pipe network, water treatment level, flow, liquid level difference and average liquid level
Housing material	PP
Process materials	PP+PTFE
Span	0~15m
Blind zone	0.3m
Process connection	• Bracket • Flange • G1-1/2"A thread (hoisted)
Power supply and output	• 24VDC two-wire, 4~20mA HART protocol; • 24VDC four-wire, 4~20mA HART protocol, Modbus protocol. • 220VAC four-wire, 4~20mA HART protocol, Modbus protocol.
Accuracy of the measurements	±3mm
Signal frequency	26GHz
Ambient temperature	-40°C~80°C
Ambient humidity	<95%
Process temperature	-40°C~80°C

Process pressure	atm (atmosphere)
Degree of protection	IP67
Display and operation	Tank-side indicator or HART data setter
Cable specifications	6-core shielded wire, 0.3mm ²

Note: The actual measuring range of the meter is determined by antenna size, medium reflectivity, installation position and possible noisy reflection. Meter accuracy in laboratory under standard conditions is $\pm 3\text{mm}$.

Dimensions

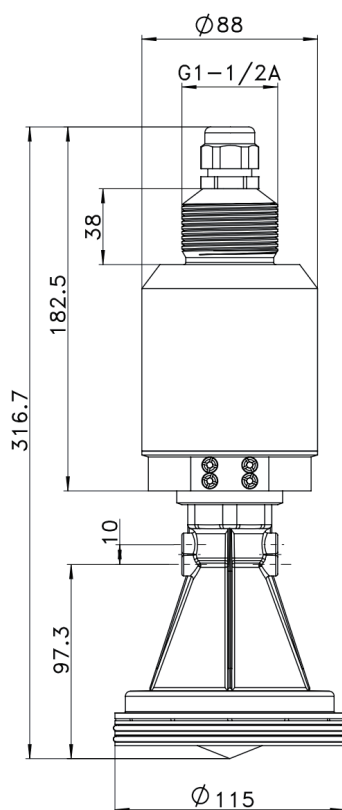


Table of MPS3101~3104 model

Model	Specification code	Description
MPS3101~3104	-----	MPS3101 pulse radar water level meter, MPS3102 open channel flowmeter, MPS3103 level difference meter and MPS3104 average level gauge
Power supply and output	B2-----	24VDC, 4~20mA, HART, two-wire
	B4-----	24VDC, 4~20mA, HART, four-wire
	M4-----	24VDC, Modbus, four-wire
	U4-----	220VAC, 4~20mA, HART, four-wire
	W4-----	220VAC, Modbus, four-wire
Certification information	X-----	No requirement
Process temperature	D-----	40~80°C
Process pressure (bar)	M-----	atm (atmosphere)
Measuring range	1-----	0~5m
	2-----	0~10m
	3-----	0~15m
Process connection	GD-----	G1-1/2"A (hoisted)
	LM-----	Bracket
	FB-----	Flange (HG/T20592-2009 DN100 PN16, FF, PP, thickness: 20mm)
Tank-side indicator	P-----	Ordinary tank-side indicator
	T-----	Intelligent tank-side indicator (only for MPS3103 and MPS3104)
	X-----	None
Tank-side/meter cable length (L)	XX-----	(unit: m, range: 5-25m, minimum step: 5m)
Weir flume	Y-----	With (only for MPS3102)
	X-----	Without

Remark 1:

MPS3101 is suitable for level measurement at normal temperature and pressure under the condition free from steam, foam and stirring (such as circulating water, fire water and tap water).

MPS3102 is suitable for measuring the flow of open channel.

MPS3103 is suitable for measuring the liquid level different between two points and needs to be equipped with two sensors and one intelligent tank-side indicator.

MPS3104 is suitable for measuring the average liquid level at two points and needs to be equipped with two sensors and one intelligent tank-side indicator.

Remark 2: The intelligent tank-side indicator should be applied to MPS3103 and MPS3104.

Remark 3: The cable length is measured in meters and increases in steps of 5m. For example, 05 at 5m and 10 at 10m.

Remark 4: The weir flume is only optional for open channel flowmeter and is in a standard size. The user should provide the maximum flow and weir flume type for selecting a suitable weir flume (Appendix I shows the size of Parshall flume).

Special notes:

- Typical model: MPS3101B2XDM1GDP05X
- Special model: if special selection is required for a certain digit in the model code, fill "Z" in the space of special model in the model code, and "/Z" behind the complete model code; If special accessory is required, please also fill "/Z" behind the complete model code. Then, explain all the "digit for special model" and special accessories in words, and do not omit items. Text description should be placed in brackets "()". Before each description, "Zn:" (n = 1, 2, 3, ...) should be used for guidance and each description should be separated by semicolon";". For special selection of process connection, change its second digit to "Z". For example, change "FB" to "FZ".
- Example of special model: MPS3101B2XDM1GDP05X/Z (Z1: with nameplates and manuals in Chinese and English)

Appendix I Structural size of Parshall flume Unit: m

Class	SN	Throat section			Contraction section			Diffusion section			Wall height
		b	L	N	B1	L1	La	B2	L2	K	D
Small	1	0.025	0.076	0.029	0.167	0.356	0.237	0.093	0.203	0.019	0.23
	2	0.051	0.114	0.043	0.214	0.406	0.271	0.135	0.254	0.022	0.26
	3	0.076	0.152	0.057	0.259	0.457	0.305	0.178	0.305	0.025	0.46
	4	0.152	0.305	0.114	0.400	0.610	0.407	0.394	0.610	0.076	0.61
	5	0.228	0.305	0.114	0.575	0.864	0.576	0.381	0.457	0.076	0.77
Standard	6	0.25	0.60	0.23	0.78	1.325	0.883	0.55	0.92	0.08	0.80
	7	0.30	0.60	0.23	0.84	1.350	0.902	0.60	0.92	0.08	0.95
	8	0.45	0.60	0.23	1.02	1.425	0.948	0.75	0.92	0.08	0.95
	9	0.60	0.60	0.23	1.20	1.500	1.0	0.90	0.92	0.08	0.95
	10	0.75	0.60	0.23	1.38	1.575	1.053	1.05	0.92	0.08	0.95
	11	0.90	0.60	0.23	1.56	1.650	1.099	1.20	0.92	0.08	0.95
	12	1.00	0.60	0.23	1.68	1.705	1.139	1.30	0.92	0.08	1.0
	13	1.20	0.60	0.23	1.92	1.800	1.203	1.50	0.92	0.08	1.0
	14	1.50	0.60	0.23	2.28	1.95	1.303	1.80	0.92	0.08	1.0
	15	1.80	0.60	0.23	2.64	2.10	1.399	2.10	0.92	0.08	1.0
	16	2.10	0.60	0.23	3.00	2.25	1.504	2.40	0.92	0.08	1.0
	17	2.40	0.60	0.23	3.36	2.40	1.604	2.70	0.92	0.08	1.0
Large	18	3.05	0.91	0.343	4.76	4.27	1.794	3.68	1.83	0.152	1.22
	19	3.66	0.91	0.343	5.61	4.88	1.991	4.47	2.44	0.152	1.52
	20	4.57	1.22	0.457	7.62	7.62	2.295	5.59	3.05	0.229	1.83
	21	6.10	1.83	0.686	9.14	7.62	2.785	7.32	3.66	0.305	2.13
	22	7.62	1.83	0.686	10.67	7.62	3.383	8.94	3.96	0.305	2.13
	23	9.14	1.83	0.686	12.31	7.93	3.785	10.57	4.27	0.305	2.13
	24	12.19	1.83	0.686	15.48	8.23	4.785	13.82	4.88	0.305	2.13
	25	15.24	1.83	0.686	18.53	8.23	5.776	17.27	6.10	0.305	2.13

Table of MPS3200 model

Model	Specification code	Description
MPS3200	_____	26G pulse radar level transmitter (horn antenna)
Enclosure	S_____	Die casting aluminum (electrical interface M20×1.5)
	B_____	Die casting aluminum (electrical interface 1/2"NPT)
	G_____	Stainless steel 316 (electrical interface M20×1.5)
	H_____	Stainless steel 316 (electrical interface 1/2"NPT)
Power supply and output	B2_____	24VDC, 4~20mA, HART, two-wire
	B4_____	24VDC, 4~20mA, HART, four-wire
	U4_____	220VAC, 4~20mA, HART, four-wire
	R2_____	24VDC, 4~20mA, HART, two-wire (equipped with tank-side passive indicator)
	R4_____	24VDC, 4~20mA, HART, four-wire (equipped with tank-side passive indicator)
	A4_____	220VAC, 4~20mA, HART, four-wire (equipped with tank-side passive indicator)
Safety certificate	X_____	No requirement
	I_____	Intrinsic safety type Ex ia II C T6/T2 Ga
	O_____	Intrinsic safety explosion-proof type Ex d ia [iaGa] II C T6/T2 Gb
Antenna type/process material	1_____	Ø50mm horn/stainless steel 316L(only for flange with size≥DN50)
	2_____	Ø80mm horn/stainless steel 316L(only for flange with size≥DN80)
	3_____	Ø100mm horn/stainless steel 316L(only for flange with size≥DN100)
	4_____	Ø100mm extension horn/stainless steel 316L (only for flange with size≥DN100)
	5_____	Ø125mm horn/stainless steel 316L(only for flange with size≥DN125)
Antenna protection	X_____	No requirement
	A_____	With PEFE protective cover (4 and 5 are optional only for antenna type/process material)
	B_____	With purging function
Process temperature	D_____	-40~80°C (T6)
	E_____	-20~150°C (T2)
	F_____	-40~250°C (T2)
	G_____	-20~250°C (T2)
	H_____	-60~350°C (X is optional only for safety certification)
Process pressure (kgf/cm ² g)	L_____	-1
	M_____	atm (atmosphere)
	A_____	2.5
	B_____	6
	G_____	10
	C_____	16
	D_____	25
	E_____	40
Process connection	GD_____	G1-1/2"A (recommended)
	TN_____	1-1/2"NPT
	FB_____	Standard flange
Flange standard	A_____	HG/T20615-2009 (Class series)
	B_____	HG/T20592-2009 (PN series)

Model	Specification code	Description
Flange size	E_____	DN50 (2")
	C_____	DN65 (2.5")
	F_____	DN80 (3")
	G_____	DN100 (4")
	H_____	DN125 (5")
	J_____	DN150 (6")
	K_____	DN200 (8")
	M_____	DN250 (10")
Flange pressure rating (kgf/cm ²) (The process pressure should not be higher than the flange pressure rating and the maximum allowable process pressure)	A_____	PN2.5
	G_____	PN6
	B_____	PN10
	C_____	PN16
	D_____	PN25
	F_____	PN40
	M_____	Class150
	N_____	Class300
Flange sealing face type	A_____	RF (recommended)
	B_____	FM
	C_____	M
	E_____	FF flat (only for process pressure ≤PN16)
	F_____	Flat-thin plate flange (8 mm thick, M only for process pressure)
Material of flange	A_____	304
	B_____	316L
	C_____	Carbon steel (Q235)
	F_____	C4 steel
	D_____	PP(20 mm thick, M only for process pressure)
	E_____	PTFE (20 mm thick, M only for process pressure)
Companion flange (A, B and C options are inherently equipped with 304 bolt, nut, plate washer, flange gasket)	X_____	Without companion flange
	A_____	304
	B_____	316L
	C_____	Carbon steel (Q235)

Special notes:

- Typical model 1: MPS3200SB2X3XDMFB-BGCAAX
- Typical model 2: MPS3200SB2X3XDMGD
- Special model: if special selection is required for a certain digit in the model code, fill "Z" in the space of special model in the model code, and "/Z" behind the complete model code; If special accessory is required, please also fill "/Z" behind the complete model code. Then, explain all the "digit for special model" and special accessories in words, and do not omit items. Text description should be placed in brackets "()". Before each description, "Zn:" (n = 1, 2, 3, ...) should be used for guidance and each description should be separated by semicolon";". For special selection of process connection, change its second digit to "Z". For example, change "FB" to "FZ".
- Example of special model: MPS3200SB2X3XDFFB-BGZAAX/Z (Z1: PN63)
- Tank-side cable: If tank-side indicator is optional, the standard configuration contains a communication cable of 25 m. Any excess is priced in meters.

Table of MPS3300 model

Model	Specification code	Description
MPS3300	_____	26G pulse radar level transmitter (PTFE process seal antenna)
Enclosure	S_____	Die casting aluminum (electrical interface M20×1.5)
	B_____	Die casting aluminum (electrical interface 1/2"NPT)
	G_____	Stainless steel 316 (electrical interface M20×1.5)
	H_____	Stainless steel 316 (electrical interface 1/2"NPT)
Power supply and output	B2_____	24VDC, 4~20mA, HART, two-wire
	B4_____	24VDC, 4~20mA, HART, four-wire
	U4_____	220VAC, 4~20mA, HART, four-wire
	R2_____	24VDC, 4~20mA, HART, two-wire (equipped with tank-side passive indicator)
	R4_____	24VDC, 4~20mA, HART, four-wire (equipped with tank-side passive indicator)
	A4_____	220VAC, 4~20mA, HART, four-wire (equipped with tank-side passive indicator)
Safety certificate	X_____	No requirement
	I_____	Intrinsic safety type Ex ia II C T6/T2 Ga
	O_____	Intrinsic safety explosion-proof type Ex d ia [iaGa] II C T6/T2 Gb
Antenna type/process material	2_____	Ø50 mm process seal antenna/stainless steel 304+PTFE process seal (only for flange with size≥DN50)
	3_____	Ø80 mm process seal antenna/stainless steel 304+PTFE process seal (only for flange with size≥DN80) (recommended)
Antenna protection	A_____	PTFE process seal
Process temperature	D_____	-40~80°C (T6)
	E_____	-20~150°C (T2)
Process pressure (kgf/cm ² g)	L_____	-1
	M_____	atm (atmosphere)
	A_____	2.5
	B_____	6
	G_____	10
	C_____	16
	D_____	25
Process connection	FB_____	Standard flange
Flange standard	A_____	HG/T20615-2009 (Class series)
	B_____	HG/T20592-2009 (PN series)
Flange size	E_____	DN50 (2")
	C_____	DN65 (2.5")
	F_____	DN80 (3")
	G_____	DN100 (4")
	H_____	DN125 (5")
	J_____	DN150 (6")
	K_____	DN200 (8")
	M_____	DN250 (10")

Model	Specification code	Description
Flange pressure rating (kgf/cm ²) (The process pressure should not be higher than the flange pressure rating and the maximum allowable process pressure)	A—————	PN2.5
	G—————	PN6
	B—————	PN10
	C—————	PN16
	D—————	PN25
	F—————	PN40
	M—————	Class150
	N—————	Class300
Flange sealing face type	A—————	RF (recommended)
	C—————	M
Material of flange	A—————	304
	B—————	316L
Companion flange (A, B and C options are inherently equipped with 304 bolt , nut, plate washer)	X—————	Without companion flange
	A—————	304
	B—————	316L
	C—————	Carbon steel (Q235)

Special notes:

- Typical model : MPS3300SB2X3ADMFB-BGCAAX
- Special model: if special selection is required for a certain digit in the model code, fill “Z” in the space of special model in the model code, and “/Z” behind the complete model code; If special accessory is required, please also fill “/Z” behind the complete model code. Then, explain all the "digit for special model" and special accessories in words, and do not omit items. Text description should be placed in brackets "()". Before each description, "Zn:" (n = 1, 2, 3, ...) should be used for guidance and each description should be separated by semicolon";". For special selection of process connection, change its second digit to "Z". For example, change "FB" to "FZ".
- Example of special model: MPS3300SB2X3ADMFB-BGCAAX/Z (Z1: housing is coated with anti-corrosive paint)
- Tank-side cable: If tank-side indicator is optional, the standard configuration contains a communication cable of 25 m. Any excess is priced in meters.

Table of MPS3600 model

Model	Specification code	Description
MPS3600	_____	26G pulse radar level transmitter (horn antenna and parabolic antenna)
Enclosure	S_____	Die casting aluminum (electrical interface M20×1.5)
	B_____	Die casting aluminum (electrical interface 1/2"NPT)
	G_____	Stainless steel 316 (electrical interface M20×1.5)
	H_____	Stainless steel 316 (electrical interface 1/2"NPT)
Power supply and output	B2_____	24VDC, 4~20mA, HART, two-wire
	B4_____	24VDC, 4~20mA, HART, four-wire
	U4_____	220VAC, 4~20mA, HART, four-wire
	R2_____	24VDC, 4~20mA, HART, two-wire (equipped with tank-side passive indicator)
	R4_____	24VDC, 4~20mA, HART, four-wire (equipped with tank-side passive indicator)
	A4_____	220VAC, 4~20mA, HART, four-wire (equipped with tank-side passive indicator)
Safety certificate	X_____	No requirement
	I_____	Intrinsic safety type Ex ia II C T6/T2 Ga
	O_____	Intrinsic safety explosion-proof type Ex d ia [iaGa] II C T6/T2 Gb
Antenna type/process material	1_____	Ø50mm horn/stainless steel 316L(only for flange with size≥DN50)
	2_____	Ø80mm horn/stainless steel 316L(only for flange with size≥DN80)
	3_____	Ø100mm horn/stainless steel 316L(only for flange with size≥DN100)
	4_____	Ø100mm extension horn/stainless steel 316L(only for flange with size≥DN100)
	5_____	Ø125mm horn/stainless steel 316L(only for flange with size≥DN125)
	6_____	Ø200mm paraboloid/stainless steel 304 (only for flange with size≥DN200)
	7_____	Ø250mm paraboloid/stainless steel 304 (only for flange with size≥DN250)
Antenna protection	X_____	No requirement
	A_____	With PEFE protective cover (4 and 5 are optional only for antenna type/process material)
	B_____	With purging function
Process temperature	D_____	-40~80°C (T6)
	E_____	-20~150°C (T2)
	F_____	-40~250°C (T2)
	G_____	-20~250°C (T2)
	H_____	-60~350°C (X is optional only for safety certification)
Process pressure (kgf/cm ² g)	L_____	-1
	M_____	atm (atmosphere)
	A_____	2.5
	B_____	6
	G_____	10
	C_____	16
	D_____	25
	E_____	40

Model	Specification code	Description
Process connection	GD—————	G1-1/2" A (recommended)
	TN—————	1-1/2"NPT
	FB—————	Standard flange
Connection mode of flange	C—————	Direct-insertion type
	W—————	Universal type (only for process pressure of M)
Flange standard	A—————	HG/T20615-2009 (Class series)
	B—————	HG/T20592-2009 (PN series)
Flange size	E—————	DN50 (2")
	C—————	DN65 (2.5")
	F—————	DN80 (3")
	G—————	DN100 (4")
	H—————	DN125 (5")
	J—————	DN150 (6")
	K—————	DN200 (8")
	M—————	DN250 (10")
Flange pressure rating (kgf/cm ²) (The process pressure should not be higher than the flange pressure rating and the maximum allowable process pressure)	A—————	PN2.5
	G—————	PN6
	B—————	PN10
	C—————	PN16
	D—————	PN25
	F—————	PN40
	M—————	Class150
	N—————	Class300
Flange sealing face type	A—————	RF Raised flange (recommended fastening flange)
	B—————	FM
	C—————	M
	E—————	FF flat (only for process pressure ≤PN16)
	F—————	Flat- thin plate flange (universal flange recommended)
Material of flange	A—————	304
	B—————	316L
	C—————	Carbon steel (Q235)
	F—————	C4 steel
	D—————	PP(20 mm thick, only for process pressure of M and flange connection of C)
	E—————	PTFE (20 mm thick, only for process pressure of M and flange connection of C)
Companion flange (A, B and C options are inherently equipped with 304 bolt , nut, plate washer, flange gasket)	X—————	Without companion flange
	A—————	304
	B—————	316L
	C—————	Carbon steel (Q235)

Special notes:

- Typical model 1: MPS3600SB2X5BDMFB-WBHCFA X
- Typical model 2: MPS3600SB2X5BDMGD
- Special model: if special selection is required for a certain digit in the model code, fill “Z” in the space of special model in the model code, and “/Z” behind the complete model code; If special accessory is required, please also fill “/Z” behind the complete model code. Then, explain all the "digit for special model" and special accessories in words, and do not omit items. Text description should be placed in brackets "()". Before each description, "Zn:" (n = 1, 2, 3, ...) should be used for guidance and each description should be separated by semicolon";". For special selection of process connection, change its second digit to "Z". For example, change "FB" to "FZ".
- Example of special model: MPS3600SB2X5BDMFB-WBHCFA X/Z (Z1: equipped with nameplate and manual in Russian)
- Tank-side cable: If tank-side indicator is optional, the standard configuration contains a communication cable of 25 m. Any excess is priced in meters.

Table of MPS3700 model

Model	Specification code	Description
MPS3700	_____	26G pulse radar level transmitter (horn antenna and parabolic antenna)
Enclosure	S_____	Die casting aluminum (electrical interface M20×1.5)
	B_____	Die casting aluminum (electrical interface 1/2"NPT)
	G_____	Stainless steel 316 (electrical interface M20×1.5)
	H_____	Stainless steel 316 (electrical interface 1/2"NPT)
Power supply and output	B2_____	24VDC, 4~20mA, HART, two-wire
	B4_____	24VDC, 4~20mA, HART, four-wire
	U4_____	220VAC, 4~20mA, HART, four-wire
	R2_____	24VDC, 4~20mA, HART, two-wire (equipped with tank-side passive indicator)
	R4_____	24VDC, 4~20mA, HART, four-wire (equipped with tank-side passive indicator)
	A4_____	24VDC, 4~20mA, HART, four-wire (equipped with tank-side passive indicator)
Safety certificate	X_____	No requirement
	I_____	Intrinsic safety type Ex ia II C T6/T2 Ga
	O_____	Intrinsic safety explosion-proof type Ex d ia [iaGa] II C T6/T2 Gb
Antenna type/process material	1_____	Ø50mm horn/stainless steel 316L(only for flange with size≥DN50)
	2_____	Ø80mm horn/stainless steel 316L(only for flange with size≥DN80)
	3_____	Ø100mm horn/stainless steel 316L(only for flange with size≥DN100)
	4_____	Ø100mm extension horn/stainless steel 316L(only for flange with size≥DN100)
	5_____	Ø125mm horn/stainless steel 316L(only for flange with size≥DN125)
	6_____	Ø200mm paraboloid/stainless steel 304 (only for flange with size≥DN200)
	7_____	Ø250mm paraboloid/stainless steel 304 (only for flange with size≥DN250)
Antenna protection	X_____	None
	B_____	With purging function
Process temperature	D_____	-40~80°C (T6)
	E_____	-20~150°C (T2)
	F_____	-40~250°C (T2)
	G_____	-20~250°C (T2)
	H_____	-60~350°C (X is optional only for safety certification)
Process pressure (kgf/cm ² g)	L_____	-1
	M_____	atm (atmosphere)
	A_____	2.5
	B_____	6
	G_____	10
	C_____	16
	D_____	25
	E_____	40
Process connection	GD_____	G1-1/2"A (recommended)

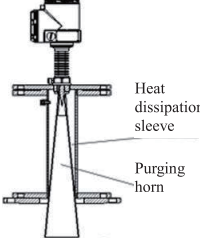
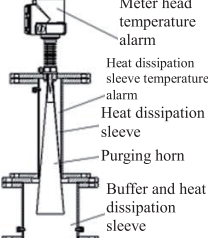
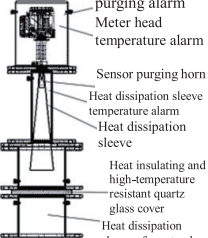
Model	Specification code	Description
	TN—————	1-1/2"NPT
	FB—————	Standard flange
Connection mode of flange	C—————	Direct-insertion type
	W—————	Universal type (only for process pressure of M)
Flange standard	A—————	HG/T20615-2009 (Class series)
	B—————	HG/T20592-2009 (PN series)
Flange size	E—————	DN50 (2")
	C—————	DN65 (2.5")
	F—————	DN80 (3")
	G—————	DN100 (4")
	H—————	DN125 (5")
	J—————	DN150 (6")
	K—————	DN200 (8")
	M—————	DN250 (10")
Flange pressure rating (kgf/cm ²) (The process pressure should not be higher than the flange pressure rating and the maximum allowable process pressure)	A—————	PN2.5
	G—————	PN6
	B—————	PN10
	C—————	PN16
	D—————	PN25
	F—————	PN40
	M—————	Class150
	N—————	Class300
Flange sealing face type	A—————	RF Raised flange (recommended fastening flange)
	B—————	FM
	C—————	M
	E—————	FF flat (only for process pressure ≤PN16)
	F—————	Flat- thin plate flange (universal flange recommended)
Material of flange	A—————	304
	B—————	316L
	C—————	Carbon steel (Q235)
	F—————	C4 steel
	D—————	PP(20 mm thick, only for process pressure of M and flange connection of C)
	E—————	PTFE (20 mm thick, only for process pressure of M and flange connection of C)
Companion flange (A, B and C options are inherently equipped with 304 bolt , nut, plate washer, flange gasket)	X—————	Without companion flange
	A—————	304
	B—————	316L
	C—————	Carbon steel (Q235)

Special notes:

- Typical model 1: MPS3700SB2X7XDMFB-WBMCFAFX
- Typical model 2: MPS3700SB2X7XDMGD
- Special model: if special selection is required for a certain digit in the model code, fill “Z” in the space of special model in the model code, and “/Z” behind the complete model code; If special accessory is required, please also fill "/Z" behind the complete model code. Then, explain all the "digit for special model" and special accessories in words, and do not omit items. Text description should be placed in brackets "()". Before each description, "Zn:" (n = 1, 2, 3, ...) should be used for guidance and each description should be separated by semicolon";". For special selection of process connection, change its second digit to "Z". For example, change "FB" to "FZ".
- Example of special model: MPS3700SB2X7XDMFB-WZMCFAFX/Z (Z1: GB/T9119-2010)
- Tank-side cable: If tank-side indicator is optional, the standard configuration contains a communication cable of 25 m. Any excess is priced in meters.

Introduction to High Temperature Radar Probe

MPS—370x

Model	MPS—3701		MPS—3702		MPS—3703	
Appearance and structure						
	Appearance	Structure	Appearance	Structure	Appearance	Structure
Application	Detection of high temperature material level in metal sintering		Detection of material level in blast furnace and dry quenching coke oven		Detection of material level in calcium carbide furnace and electric arc heating furnace	
Span	70m		70m		70m	
Process temperature	800°C		1200°C		1600°C	
Process seal	Graphite+alumina		Graphite+alumina		Graphite+alumina	
Process pressure	1.0kgf/cm ²		1.0kgf/cm ²		1.0kgf/cm ²	
Precision	±3mm or ≤0.1%FS		±3mm or ≤0.1%FS		±3mm or ≤0.1%FS	
Resolution	1mm		1mm		1mm	
Frequency	26GHz		26GHz		26GHz	
Power supply	24VDC two-wire; 24VDC four-wire; 220VAC four-wire		24VDC two-wire; 24VDC four-wire; 220VAC four-wire		24VDC two-wire; 24VDC four-wire; 220VAC four-wire	
Signal output	4-20mA+HART		Level signal: 4-20mA+HART Temperature signal: 4-20mA or SPDT		Level signal: 4-20mA+HART Temperature signal: 4-20mA or SPDT	
Display programming	With display (tank-side indicator) and programming buttons/menus in Chinese and English		With display (tank-side indicator) and programming buttons/menus in Chinese and English		With display (tank-side indicator) and programming buttons/menus in Chinese and English	
Antenna type	Horn mouth/316L		Horn mouth/316L		Horn mouth/316L	
Process connection	Flange of DN200 or above		Flange of DN200 or above		Flange of DN200 or above	
Degree of protection	IP67		IP67		IP67	

Remark: It is specially designed according to field working conditions

MGS Guided Wave Radar Level Transmitter



Function and measurement system

Measuring principle

MGS series guided wave radar level transmitter is a "downward-looking" measurement instrument based on ToF (Time of Flight). The high-frequency pulses are injected to a probe and led along the probe. When it encounters the surface of the material, it is reflected. The reflected signal returns along the probe and is received by the meter. Through the unique equivalent sampling technique, the time difference between pulse transmission and reception is converted into the distance from the meter reference point (instrument process connection) to the surface of the material, thus the level is calculated. This method is also known as TDR (Time Domain Reflectometry).

Input

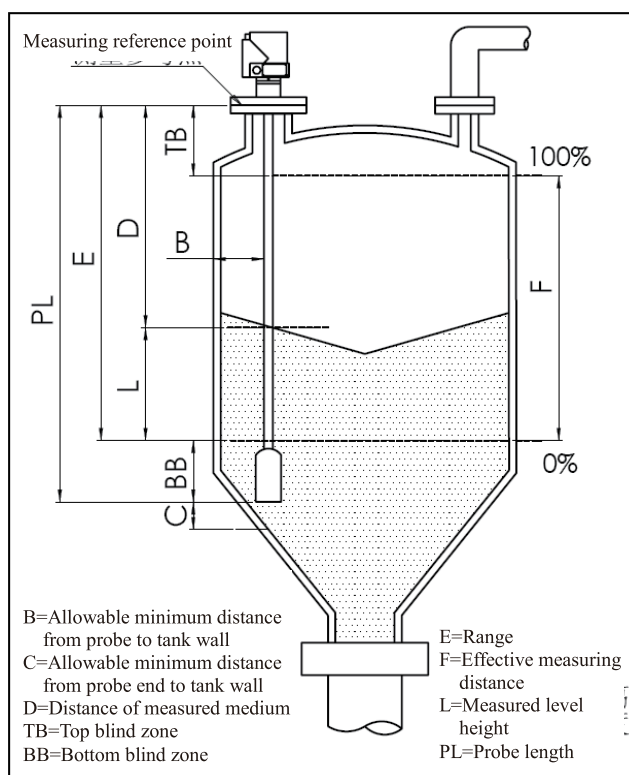
The reflected pulse signal is transmitted to the electronic unit of the meter along the probe and the microprocessor analyzes the received signal to identify the true level echo signal. The correct echo signal can be identified by intelligent software. The measuring distance D is proportional to the time of flight t of the pulse:

$$D = \frac{c \cdot t}{2} \text{ - where } c \text{ is the light speed.}$$

According to the known empty tank height E , the level $L = E - D$ can be calculated - the reference point of empty tank height E is shown in the right figure.

Output

According to the field working conditions, the empty tank height (zero), full tank height (full span) and application





parameters are set, so that the meter can automatically adapt to the current measurement application. According to the span set by the user, the instrument outputs 4~20mA proportionally. It is compatible with HART communication protocol. It can be communicated by HART.

Application industries

- Petrochemical industry (oil field, petrochemical plant, oil extraction plant, oil refinery, chemical plant, coking plant, etc.)
Measuring media: crude oil, light oil, natural gas, methanol, ethanol, ammonia, benzene, polystyrene, esters, liquid carbon dioxide, liquid nitrogen
- Electric power industry (power plant high/low-pressure heater, condenser, etc.)
Measuring media: raw coal bin, powder bin, coal ash bin, chemical water
- Metallurgy industry (steel works)
Measuring media: limestone, coke and pulverized coal, cold back to min, raw material bin, powder bin, coal ash bin and chemical water
- Cement industry (cement plant, etc.)
Measuring medium: clinker warehouse, powder bin, raw coal bin and chemical water

Product advantages

- Measurement is not affected by following factors
 - Liquid density, loose degree of solid materials;
 - Temperature;
 - Dust;
 - Steam;
- Foam on the liquid surface has no effect on measurement.
- Chinese menu is easy and intuitive to operate
- Measurement with the coaxial rod probe is completely independent of the internal structure of the tank and the mounting standpipe.
- Rod and cable probes are convenient for replacement

Technical characteristics

Technical indicator	• Working frequency: 100MHz~1.8GHz • Measuring range: cable type 0~22 m; rod type 0~4 m; coaxial type 0~3 m • Repeatability: ± 3mm • Resolution: 1mm • Output signal: 4~20 mA • Accuracy: 0.1%
Communication interface	HART communication protocol
Process connection	1-1/2" NPT, G1-1/2" A or flange
Process temperature	-196°C ~ 450°C
Process pressure	-1.0~10 kgf/cm ² , consult the manufacturer before placing order for special pressure
Power supply	24VDC two-wire ordinary power supply 18~36VDC, ripple voltage: 100mVp-p 24 VDC two-wire intrinsic safety type power supply: 21-30 V DC, ripple voltage: 100 mVp-p 24VDC two-wire intrinsically safe and flameproof power supply: 20~36VDC, ripple voltage: 100mVp-p 24VDC four-wire power supply: 20~36VDC, power consumption: 3W 220VAC four-wire power supply: 90~260VAC, 50/60Hz, power consumption: 3W Maximum current: 22.5mA
Environmental condition	-40°C ~80°C
Case protection class	IP67
Safety certification information	SIL2 Intrinsic safety type: Ex ia II C T3/T4 Ga Intrinsic safety explosion-proof type: Ex d ia [ia Ga] II C T6/T2 Gb
Electrical interface	M20×1.5 or 1/2"NPT (cable diameter: Ø9-13mm)

Guide for Selection **MGS guided microwave radar transmitter is used for continuous level measurement of liquid and solid powder as well as particulates**

Selection of electrode **Different probes are selected for different working conditions**

Model	MGS2100		MGS2200			MGS2500	
MGS guided wave radar level transmitter							
	Ø4mm Cable probe	Ø8mm Cable probe	Ø8mm Rod probe	Ø10mm Rod probe	Ø16mm Rod probe	Ø22mm Coaxial rod probe	Ø42mm Coaxial rod probe
Tensile strength (min) Load (max)	12kN 16kN	30kN 35kN	Irrelevant			Irrelevant	
Lateral force	Irrelevant	Irrelevant	10Nm		30Nm	300Nm	
Application	Liquid	Environment with solid particulates and large dust	Liquid and powder		Solid particulates	Liquid	
Measuring range	20m	20m	4m		4m	3m	
Selection of measuring medium	• Liquid with dielectric constant ≥ 1.6 • Viscous liquid medium	• Any medium with dielectric constant ≥ 1.6	• Any medium with dielectric constant ≥ 1.6 • Medium with viscosity $\leq 500\text{cst}$ • Measurement is not affected due to strong capability of inhibiting steam and foam			• Any medium with dielectric constant ≥ 1.4 and viscosity $\leq 500\text{cst}$ • Measurement is independent of the conductivity of the medium	
Description	• Usually, cable probe is used to measure solid particulates, while rod probe is only suitable for measuring light solid particulates with good fluidity and small measuring span (about 4m); • Usually, rod or coaxial rod probe is used to measure the liquid with small measuring span. Cable probe is used for measuring liquids with measuring span larger than 4m or when rigid probe cannot be installed on the top. • Coaxial rod probe can measure the liquid with viscosity up to 500cst and the liquefied gas and the internal structure of nozzle and material tank has no influence on the measurement; • When used for measuring the material level of large tank, the cable probe should be equipped with plastic sheath to keep the seal so as to prevent the cable from breaking due to lateral pressure; • For corrosive medium, anti-corrosion option should be selected; • When measured medium is very loose, it can be classified as a kind with lower dielectric constant; • The maximum span of the meter will be reduced due to the effect of working conditions, such as: very loose substances, adhesion caused by moist medium, etc.						

Blind zone and measuring distance

MGS series guided microwave radar	Effective measuring distance F[m]		Top blind zone TB [m] min	Bottom blind zone BB[m] min
	min	max		
Cable probe	1	20	0.2	0.25
Rod probe	0.5	4	0.2	0.05
Coaxial rod probe	0.5	3	0	0.05

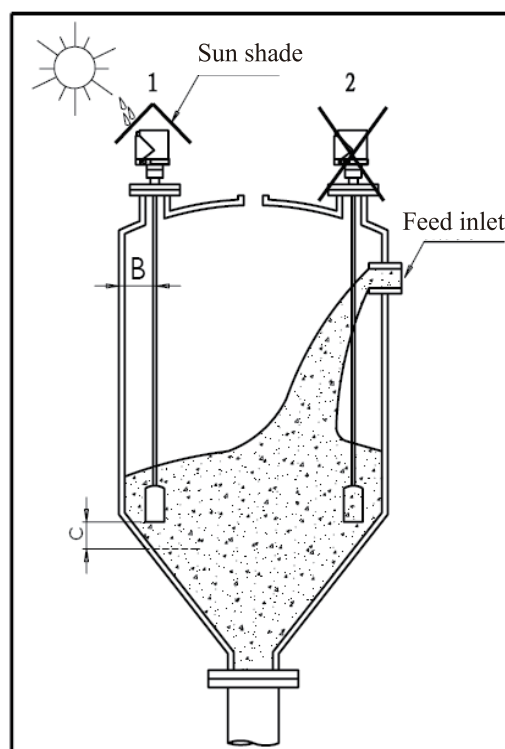
Remarks:

1. Top blind zone refers to the minimum distance between the allowable highest material surface and the measuring reference point;
2. Bottom blind zone refers to the section of the end of the probe within which material level cannot be accurately measured;
3. Effective measuring distance refers to the distance between the top blind zone and the bottom blind zone. Only within this distance can the material be reliably measured.

Installation guide

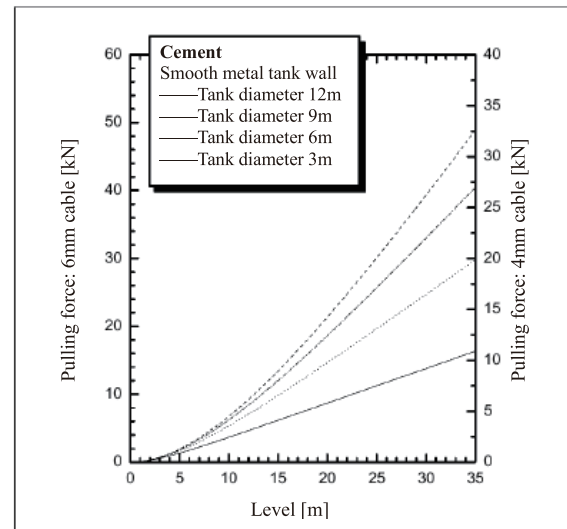
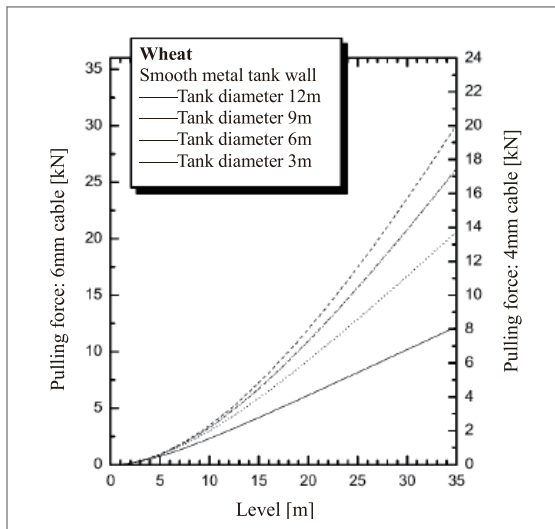
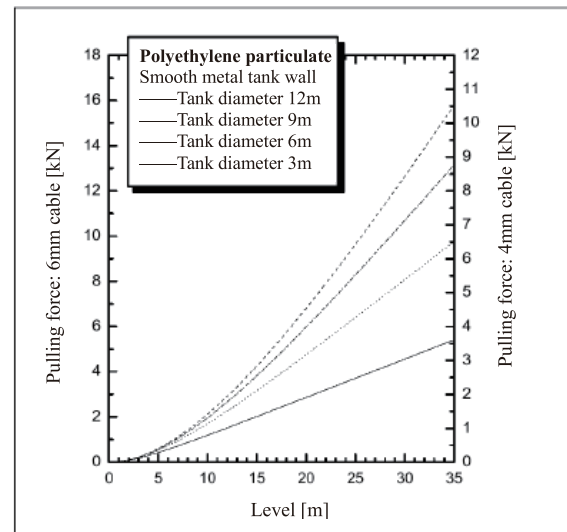
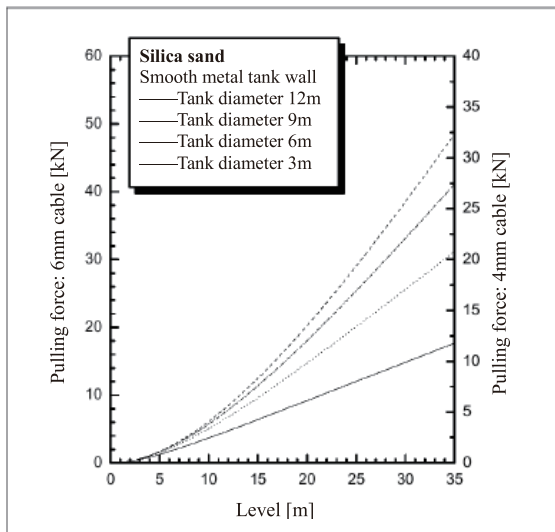
Installation position

- Rod probes and cable probes should be installed as far away as possible from the feed inlet;
- Rod probe and cable probe should be kept at a proper distance "B" from the tank wall. In case material adheres to the tank wall, the distance between the probe and the tank wall should be ≥ 300 mm;
- Rod probe and cable probe should be installed as far away as possible from the installed equipment (such as tuning fork and holder), with a distance ≥ 300 mm;
- When rod probe and cable probe are used in plastic tanks, the distance between the metal parts outside the tank and the probe should be ≥ 300 mm;
- Rod probes and cable probes should not come into contact with the metal tank wall and the bottom;
- Ensure that the cable does not come into contact with the internal obstacles in the whole measuring span, and fix the cable to the tank bottom if necessary;
- Minimum distance "C" between the probe end and the tank bottom:
 - Cable probe: 150 mm
 - Rod probe: 50 mm
 - Coaxial rod probe: 10 mm
- For outdoor installation, protective measures are recommended;
- Select the appropriate installation position to prevent the bent cable probe deviating during installation or operation (e.g. pull the probe toward the tank wall when materials move).



Measurement of solid particulates

- For measurement of solid particulates, the probe should be installed as far away as possible from the feed inlet to avoid impact and abrasion;
 - In the concrete bin, as shown in the above figure, the optimal distance B between the probe and the cement tank wall should be ≥ 1 m and at least ≥ 0.5 m;
 - The cable probe must be installed carefully. If possible, it should be installed when the tank is empty;
 - Solid particulates produce pulling force on the cable probe, and the pulling force depends on the following factors:
 - Probe length
 - Material density
 - Tank diameter
 - Probe diameter
- Typical loads of common solid particulates are shown in the following figure. They can be used as reference for calculation under the following conditions:
- Free overhang probe (probe end not fixed);
 Free pouring solid
 Safety factor 2 is adopted to compensate for the normal fluctuation of solid bulk materials.



Measurement of corrosive medium

When measuring the corrosive liquid, please select the "anti-corrosion" option in the spectrum.

When used for measuring the liquid level in the plastic tank, it can be installed on the outer wall of the tank, so that the meter can measure the liquid level across the plastic tank wall, or the probe can be installed in a closed plastic pipe. The size of the plastic pipe can reach 50 mm so that the meter can measure the liquid level across the plastic pipe.

Installation

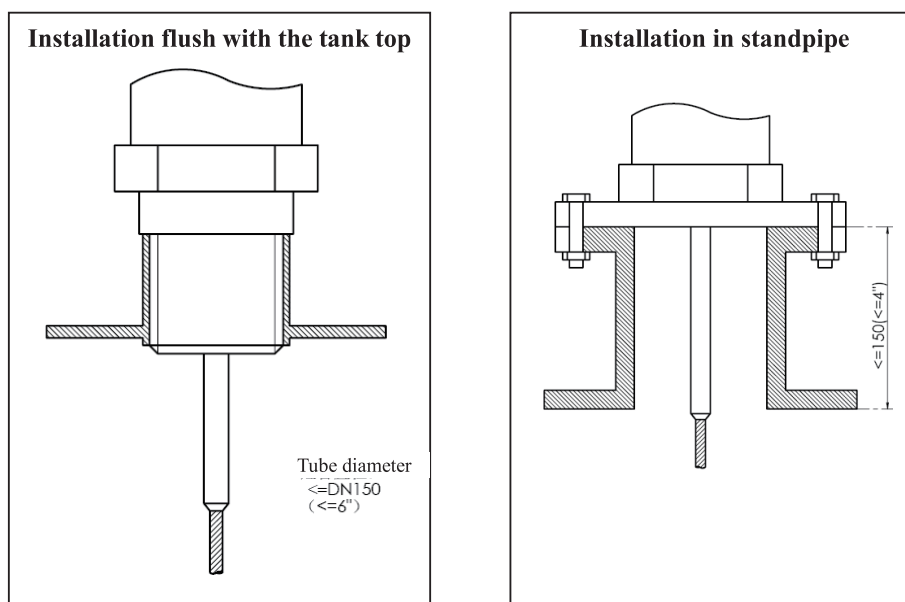
1) Basic installation requirement

---Meter should be connected by thread or flange.

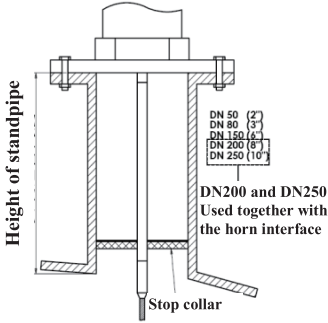
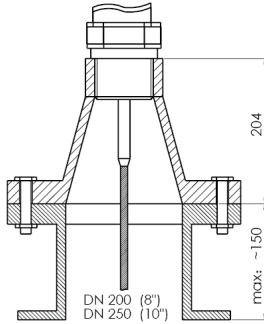
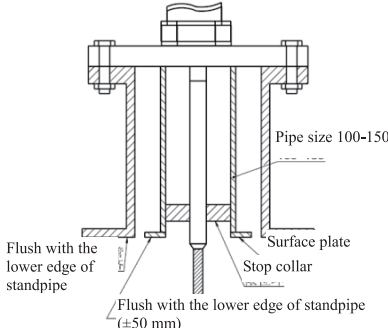
---During installation, if the probe end contacts the tank bottom or tapered tank wall due to movement, it can be shortened or fixed by fixing the cable probe to the thread joint inside the tank bottom.

---The ideal method is to install the meter with an internally welded thread joint flush with the tank top (as shown in the left figure below).

---To install the meter in a standpipe, the diameter of the standpipe should be DN50-150 and its height should be less than 150 mm (as shown in the right figure below)

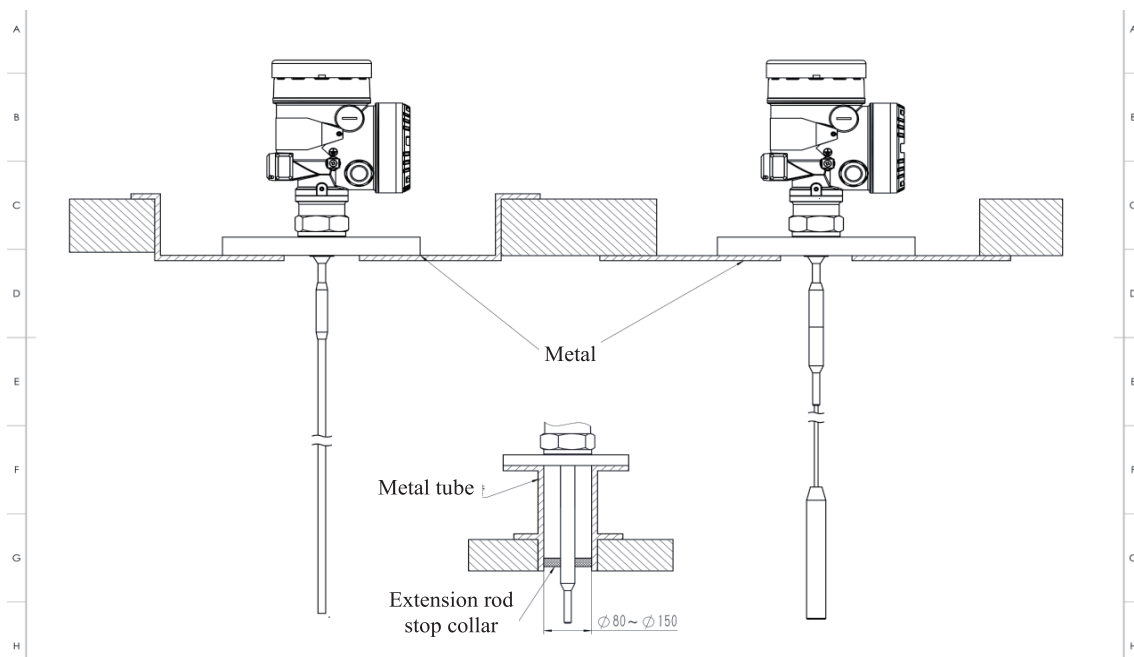


2) Installation in standpipe

Standpipe specification	Installation requirements	Schematic diagram for installation						
Installation in DN40~DN250 standpipes with height exceeding 150mm	• If the probe is installed in a standpipe with a size of DN40~250 and height >150mm, the probe may contact the standpipe end due to the flow of medium in the tank. Therefore, the extension rod probe with stop collar is recommended. • If the standpipe is too small or is used for measuring solid granules, a stop collar should be installed. Stop collar should be ordered separately; Stop collars should be ordered separately; • When the size of the standpipe is DN40/50 and the stop collar needs to be installed, it should be ensured that the materials will not accumulate in the standpipe.							
Installation in DN200 and DN250 standpipes	• When the meter is installed in a standpipe with a size of DN 200 ~ 250, the echo generated on the inner wall of the standpipe will cause measurement error when the dielectric constant of the medium is low. Therefore, a special flange with a "horn interface" is required to be selected, and the "horn interface" type flange can be selected in the spectrum; • If cable probe is prone to deflection, extension rod and stop collar are recommended.							
Installation in standpipes with a size >DN250	• If the size of the standpipe is >DN250, the straight standpipe flange as shown in the right figure should be installed and it can be selected in the spectrum. <table border="1"><thead><tr><th>Size of standpipe</th><th>Flat diameter (mm)</th></tr></thead><tbody><tr><td>DN300</td><td>Ø280</td></tr><tr><td>≥DN400</td><td>≥Ø350</td></tr></tbody></table>	Size of standpipe	Flat diameter (mm)	DN300	Ø280	≥DN400	≥Ø350	
Size of standpipe	Flat diameter (mm)							
DN300	Ø280							
≥DN400	≥Ø350							
Remarks	The probe should be prevented from being installed in a standpipe with a size larger than DN250. When the size of the standpipe is larger, please select coaxial rod probe.							

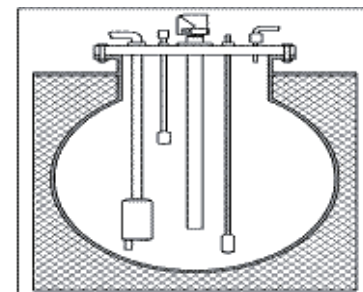
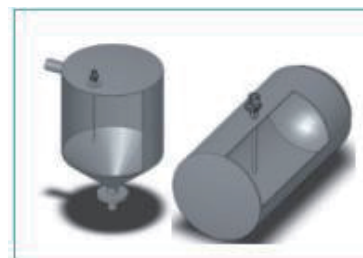
3) Installation in concrete bin

As shown in the following figure, when an instrument is installed in the thick-walled concrete bin, line a metal plate at the lower edge of the opening or insert a standpipe into the opening. Note that the standpipe should keep the shortest length flush with the lower edge of the bin top. When the inner diameter of the standpipe is less than $\text{Ø}150\text{mm}$, accessories like extension rod and stop collar should be selected (as shown in the right figure below)



4) Installation of meter on horizontal and vertical tanks containing liquid

The measuring range of rod probe can reach 4m, and that of coaxial rod probe can reach 3m. For tanks with measuring range exceeding that of rod probe and coaxial rod probe, $\text{Ø}4\text{ mm}$ cable probe can be selected; The installation and fixing methods are the same as those for solid particle measurement; If there are many obstacles in the tank or the obstacles are close to the probe, please choose the coaxial rod probe; When it is used in curved roof metal tank, the rod or cable probe should not be installed in the center of the tank, but the coaxial probe can be installed anywhere in the tank, and its performance will not be weakened.



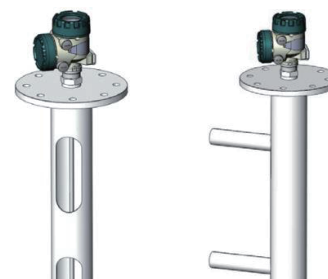
5) Installation of meter in underground tank

Installation of meter in underground tank is the same as 4).

6) Installation of meter on waveguide pipe or by-pass pipe

Rod probe can be used in the conduit with size of DN40~100.

When rod probe is installed in the metal conduit with a size $\leq \text{DN}100$, its measurement effect is equivalent to that of coaxial rod probe. The inner wall of the conduit should be smooth as far as possible, and the height of weld crater should be $<5\text{mm}$.



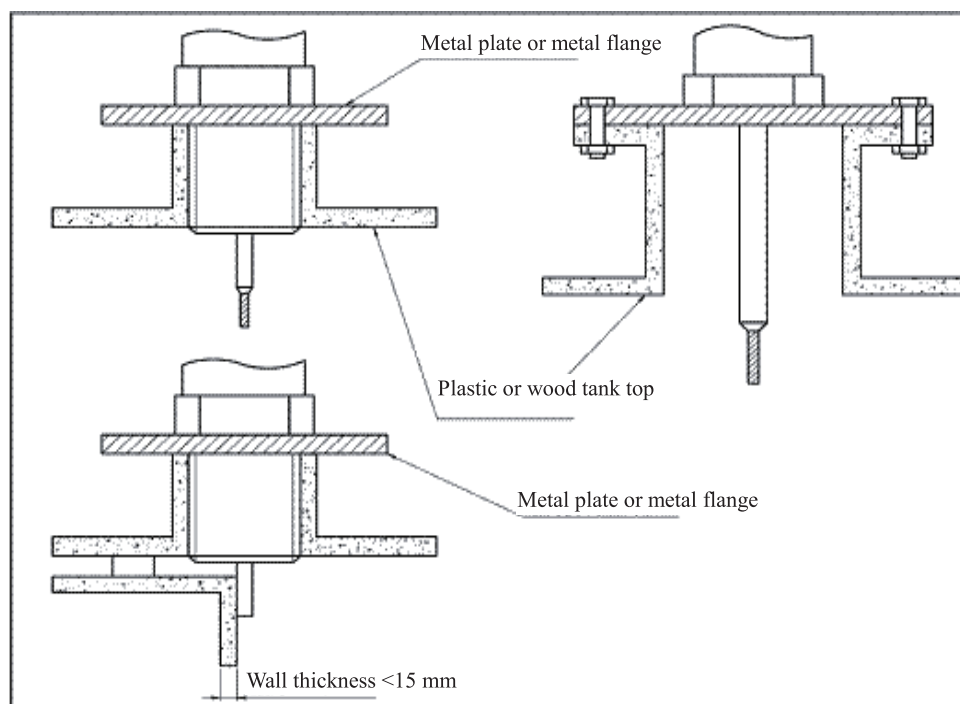
7) Installation on plastic tank

When the guided microwave radar is used to measure the material level, a metal surface is needed at the process connection; When the rod probe or cable probe is installed in the plastic silo, if the silo roof is made of non-metallic material, the probe should be installed with a metal flange, and the diameter of the flange should be $\geq \text{DN}80$. If it is installed with threads, a metal plate with a diameter of $> \text{Ø}200\text{mm}$ should be equipped. When measuring aqueous solution, the probe can be installed on the outer wall of the tank and penetrated through the tank wall for non-contact measurement. If there are people coming and going near the installation position of the probe, a plastic semi-circular baffle or other protective parts with a diameter of about $\text{Ø}200\text{mm}$ should be installed outside the probe so as not to affect the measurement.

---No metal fixing ring in the tank

---The thickness of the tank wall should be less than 15mm when made of enhanced glass fiber

---No gap between the tank wall and the probe



8) The end of cable probe should be fixed for measurement of solid level

If the cable probe is likely to contact the tank wall, tapered tank bottom or other parts, or if the distance between the probe and the tank wall in the concrete tank is less than 0.5m or the probe is not vertically installed, the probe end needs to be fixed;

The probe end is equipped with M16 thread, which can be used for fixing probe:

---Ø8mm cable probe end: M16

When the cable needs to be fixed, please select Ø8mm cable with high tensile strength;

When fixed, the cable should be reliably grounded or insulated;

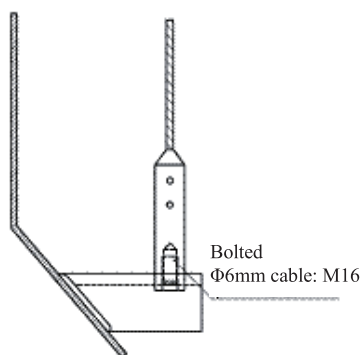
To prevent the cable from being broken due to excessive stress during feeding, the cable should be kept loose as much as possible. It is recommended that the length of the selected cable is longer than the actual measuring range to ensure a looseness $> 1\text{cm/m}$ in the center of the cable;

If the probe end needs to be fixed, there are two ways to fix it:

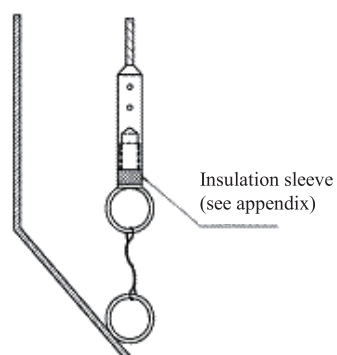
Insulation fixation: When the dielectric constant of the measured medium is low and the cable is fixed at the bottom of the metal tank, insulation fixation is required (see the right figure below).

Non-insulation fixation: Used when the dielectric constant of the measured medium is very high, and the tank is made of non-metallic material or material with very low dielectric constant or material with dielectric constant very close to that of the measured medium (as shown in the left figure below).

Non-insulation fixation

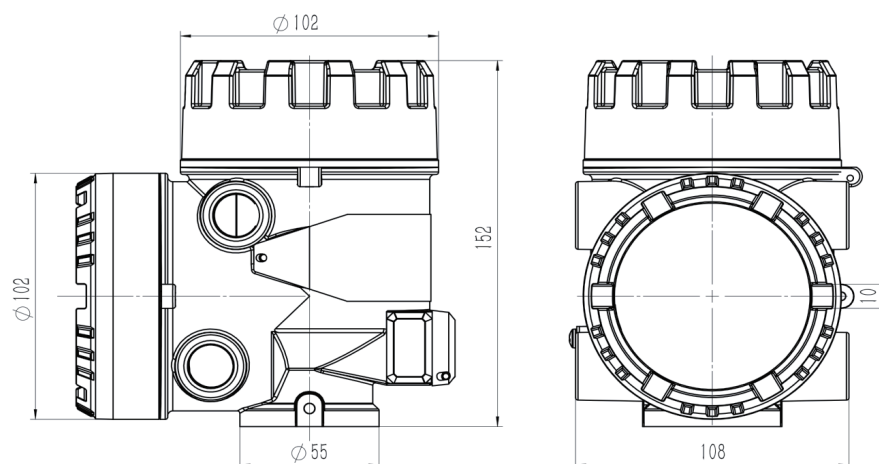


Insulation fixation



Structural size

Dimensions of case



Dimensions of meter

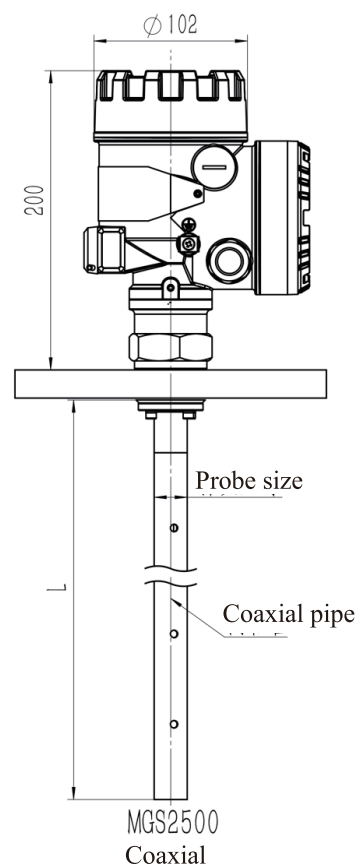
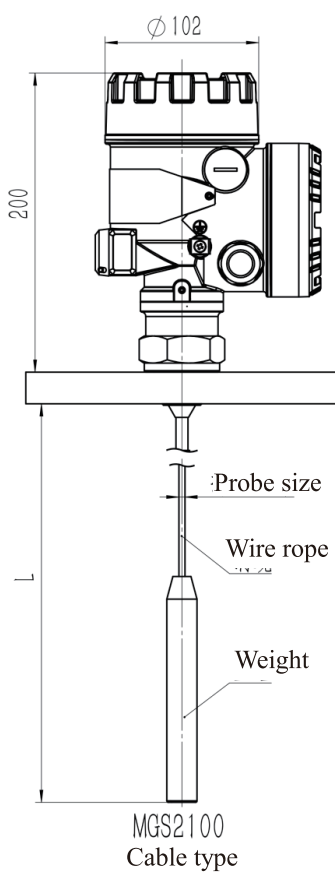
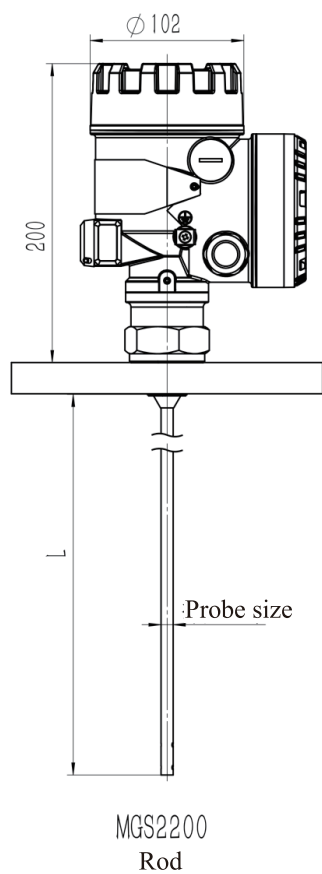


Table of MGS2000 model

Model	Specification code	Description
MGS2000 series	_____	Guided wave radar level transmitter
Type of probe	2100	Single-cable probe (20 m)
	2200	Single-rod probe (4 m)
	2500	Coaxial probe (3 m) (preferred when dielectric constant < 2)
Measured medium:	L_____	Liquid
	S_____	Solid
Enclosure	S_____	Die casting aluminum (electrical interface M20×1.5)
	B_____	Die casting aluminum (electrical interface 1/2"NPT)
	G_____	Stainless steel 316 (electrical interface M20×1.5)
	H_____	Stainless steel 316 (electrical interface 1/2"NPT)
Power supply and output	B2_____	24VDC, 4~20mA, HART, two-wire
	B4_____	24VDC, 4~20mA, HART, four-wire
	U4_____	220VAC, 4~20mA, HART, four-wire
	R2_____	24VDC, 4~20mA, HART, two-wire (equipped with tank-side passive indicator)
	R4_____	24VDC, 4~20mA, HART, four-wire (equipped with tank-side passive indicator)
	A4_____	220VAC, 4~20mA, HART, four-wire (equipped with tank-side passive indicator)
Safety certificate	X_____	No requirement
	I_____	Intrinsic safety type
	O_____	Intrinsic safety and explosion-proof type
Material of probe	A_____	304
	B_____	316L
Probe size	A_____	Ø4mm (cable type for liquid)
	B_____	Ø8mm (cable type for solid)
	C_____	Ø8mm (single-rod type for liquid)
	D_____	Ø10mm (single-rod type for liquid)
	F_____	Ø16mm (single-rod type for solid)
	G_____	Ø22mm (coaxial rod type for liquid)
	H_____	Ø 42 mm (coaxial rod type for liquid)
	K_____	Ø2mm (cable type for liquid) (recommended when there are waveguide pipes at site)
Probe protection	X_____	No requirement
	A_____	Anti-corrosion type (span of single-rod≤3 m, span of single-cable>3 m)
Probe length (L)	XXXX	(unit: cm, range: 80~2000cm, minimum step: 1cm)
Extension rod	X_____	No requirement
	A_____	Extension rod (optional for cable electrode with standpipe height >150 mm)
	B_____	Stop collar+extension rod (optional for cable electrode prone to contact with standpipe wall)

Model	Specification code	Description
Process temperature (°C)	D_____	-40~80°C
	E_____	-20~150°C
	J_____	-40~150°C
	K_____	-40~200°C
	G_____	-20~250°C
	F_____	-40~250°C
	H_____	-196~450°C
Process pressure (kgf/cm ² g)	L_____	-1
	M_____	atm (atmosphere)
	A_____	2.5
	B_____	6
	G_____	10
	C_____	16
	D_____	25
	E_____	40
Process connection	GA_____	G3/4"A (limited to probe size of A, C, K)
	GD_____	G1-1/2"A
	TN_____	1-1/2"NPT
	FB_____	Standard flange
Connection mode of flange	X_____	Standard
	A_____	Horn-interface
	B_____	Straight short pipe
Flange standard	A_____	HG/T20615-2009 (Class series)
	B_____	HG/T20592-2009 (PN series)
Flange size	E_____	DN50 (2")
	C_____	DN65 (2.5")
	F_____	DN80 (3")
	G_____	DN100 (4")
	H_____	DN125 (5")
	J_____	DN150 (6")
	K_____	DN200 (8")
	M_____	DN250 (10")
Flange pressure rating (kgf/cm ²) (The process pressure should not be higher than the flange pressure rating and the maximum allowable process pressure)	A_____	PN2.5
	G_____	PN6
	B_____	PN10
	C_____	PN16
	D_____	PN25
	F_____	PN40
	M_____	Class150
	N_____	Class300

Model	Specification code	Description
Flange sealing face type	A_____	RF (recommended)
	B_____	FM concave (X only for probe protection)
	C_____	M convex (X only for probe protection)
	E_____	FF flat (only for process pressure $\leq$ PN16)
	F_____	Flat-thin plate flange (8 mm thick, M only for process pressure)
Material of flange	A_____	304
	B_____	316L
	C_____	Carbon steel (Q235)
Companion flange (A, B and C options are inherently equipped with 304 bolt, nut, plate washer, flange gasket)	X_____	Without companion flange
	A_____	304
	B_____	316L
	C_____	Carbon steel (Q235)

Special notes:

- Typical model 1: MGS2500LSB2XBHX0150XEMFB-XBFCAX
- Typical model 2: MGS2200LSB2XADX0130XDMTN
- Special model: if special selection is required for a certain digit in the model code, fill “Z” in the space of special model in the model code, and “/Z” behind the complete model code; If special accessory is required, please also fill “/Z” behind the complete model code. Then, explain all the "digit for special model" and special accessories in words, and do not omit items. Text description should be placed in brackets "()". Before each description, "Zn:" (n = 1, 2, 3, ...) should be used for guidance and each description should be separated by semicolon";". For special selection of process connection, change its second digit to "Z". For example, change "FB" to "FZ".
- Example of special model: MGS2500LSB2XBHX0150XEMFB-XBFCAX/Z (Z1: equipped with 304 measuring cylinder. Specification of branch flange HG/T20592-2009 DN20 PN16 RF, spacing of branch pipe 1,000 mm)
- Tank-side cable: If tank-side indicator is optional, the standard configuration contains a communication cable of 25 m. Any excess is priced in meters.
- Split guided microwave radar: "Split" means that the sensor and the case (electronic unit) are separated from each other and connected by a high-frequency coaxial cable. For guided microwave radars with tank-side indicator, its sensor and case (electronic unit) are still a whole, but the display module is led out for tank-side indicator. If a split guided microwave radar is needed, consult our technical staff to determine the specific program.

MCS RF Admittance Level Meter



Basic information

MCS intelligent radio frequency admittance level meter is a kind of level meter which realizes intelligence fundamentally. It is a high-end product designed based on the principle of radio frequency admittance, and inherits the advantages of high stability and wide application of capacitive level instrument.

Compared with the traditional capacitive level instrument, MCS adopts modular design and is equipped with LCD debugging module, which can automatically obtain and display the current value of the measured level without any peripheral auxiliary equipment, and provide users with more reliable measurement data. The LCD debugging module has dual functions of debugging and displaying, which enables users to read the required data concisely and intuitively, which is convenient for debugging.

Measuring principle

For the traditional capacitive level instrument, the increase of the material level and the material covering the probe, the capacitance between the probe and the medium in the circuit (in the case of conductive material) or between the probe and the pipe wall (in the case of insulating material) also increases. Since the change of material level leads to the imbalance of capacitance bridge, the change of capacitance value depends on the dielectric constant of the measured material, and then the corresponding signal is output by detecting and amplifying the signal. However, the capacitive level instrument has some shortcomings, especially when the probe is adhered with materials, which will seriously affect the measurement results.

Radio frequency admittance measurement technology is a level measurement technology with unique advantages, which can realize independent measurement of impedance and capacitive reactance. According to the calculation based on physical laws, the impedance and capacitive reactance of any adhered materials are equal, so the effect caused by adhered materials can be measured and eliminated from the total output through the phase shift of the oscillating circuit.

The radio frequency admittance technology has high accuracy and is not affected by the adhered materials of the

probe, so it is the most widely used measurement technology at present.

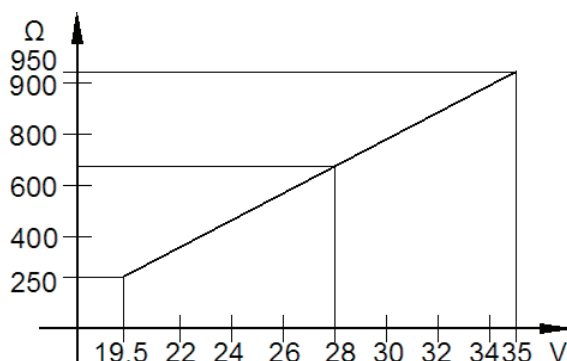
Product features

- **Resistance to adhesion of materials** The unique design of individually measuring impedance and capacitive reactance improves the resistance to adhesion of materials.
- **Strong adaptability** Temperature range of probe: $-100\text{ }^{\circ}\text{C} \sim 500\text{ }^{\circ}\text{C}$.
- **Span** The minimum span can reach 10cm
The maximum span can reach 2200cm
- **High stability** Stable and reliable output and resistance to fly ash, blanking, moisture and crystallization
- **Maintenance free** No moving parts or quick-wear parts and no need for frequent cleaning, maintenance and debugging

Technical description

1. Power

- Power supply: 14~35VDC (standard)
- Maximum allowable ripple of power supply: $< 100\text{Hz}$ $U_{ss} < 1\text{V}$
 $100\text{Hz} \dots 10\text{kHz}$ $U_{ss} < 10\text{mV}$
- Power consumption: 770mW(Max.)
- Loading capacity:



2. Input

- Measurement variable: continuously measure the capacitance between probe rod and tank wall or grounding pipe.
- Measuring range: 0...47000pF
- Frequency: 100kHz

3. Output

- Current output: 4~20mA/20~4mA
- Minimum current: 3.5mA
- Maximum current: 22mA
- Delay: 0~99s
- Startup stability time: 1.5s
- Measurement response time: $< 0.5\text{s}$

- HART communication: optional

4. Accuracy and stability

- Linearity: 0.5%
- Repeatability: 0.1%
- Temperature drift: <0.01%/°C (within full span)

5. Housing protection

- Housing protection level: IP67

6. Environment

- Ambient temperature: -40°C~+70°C
- Storage temperature: -20°C~+65°C
- Ambient humidity: <90%

Scope of application

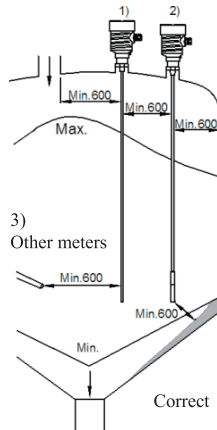
■ Power plant	Coal pile, raw coal bunker, fuel bunker, reservoir, waste gas purification tank, bunker pump, ash storage, fuel tank, etc.
■ Chemical	Crude oil distillation tower, raw material and intermediate silo, reaction tank, ammonia tank, toxic liquid tanks, solid tank, separator, etc.
■ Petrochemical industry	Oil pipeline, distillation tower, concentration tank, liquefied gas tank, ammonia tank, steam drum, oil depot in oil refinery, electrodeionization interface, asphalt tank, etc.
■ Water and water treatment	Water tank, sewage pool, water treatment tank, clarifier, digestion tower, gas pipeline, deep well, drinking water network, etc.
■ Cement	Stone silo, raw material silo, cement silo, pulverized coal bunker, slag storage silo, etc.
■ Metallurgical industry	Ore bin, ore crusher, raw material bin, auxiliary material bin, blast furnace, alumina powder bin, electrolytic cell buffer tank, etc.
■ Oil field	Crude oil or refined oil tank, three-phase separator, settling tank, sewage tank (pool), oil-water interface, drilling mud tank, etc.
■ Papermaking	Raw material bin, storage tower, drying drum, etc.
■ Others	Quarry, food, pharmaceutical, environmental protection, shipbuilding industries

Parameters

Probe	Insulating rod type	Insulating cable type	Cable type
Part receiving liquid			
Process seal	PTFE/FEP	PTFE+PVDF	PTFE
Probe diameter	Φ12mm insulating rod type	Φ8mm insulating cable type	Φ8mm cable type
Process pressure	-0.1...4.0MPa	-0.1...4.0MPa	-0.1...6.3MPa
Process temperature	-100...260°C	-40...150°C	-100...260°C
Probe length	0.1...4m(3.94"...157.5")	0.1...22m(3.94"...866.1")	0.1...22m(3.94"...866.1")
Maximum tensile resistance of cable type	10KN	5KN	30KN
Probe	Insulating double-rod type	High-temperature cable type	Coaxial insulating rod type
Part receiving liquid			
Process seal	FEP	Mica	PTFE
Probe diameter	Φ12 mm double-insulating rod	Φ8mm cable type	Φ38 mm coaxial insulating rod
Process pressure	-0.1...2.5MPa	-0.1...1.6MPa	-0.1...6.3MPa
Process temperature	-100...200°C	-50...500°C	-100...260°C
Probe length	0.1...4m(3.94"...157.5")	0.1...22m(3.94"...866.1")	0.1...2.5m(3.94"...98.4")
Maximum tensile resistance of cable type		30KN	

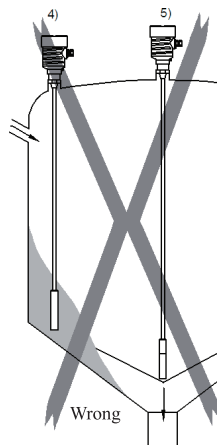
Installation requirements of probe

Powdery or particle materials are taken as examples.



Remarks:

1. There should be enough spacing between the meter probe and other probes, which is recommended to be greater than 600 mm. See Fig.1), Fig.2) and Fig.3).
2. There should be enough distance between the meter probe and the feed inlet. It is recommended to be greater than 600 mm. See Fig.1).
3. It is necessary to ensure that there is enough distance between the silo wall and the materials adhered to the wall. It is recommended to be greater than 600 mm. See Fig.2)

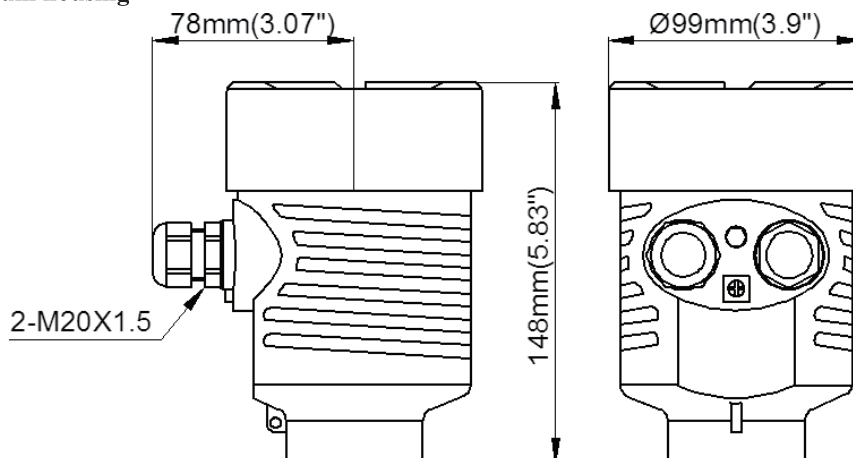


Remarks:

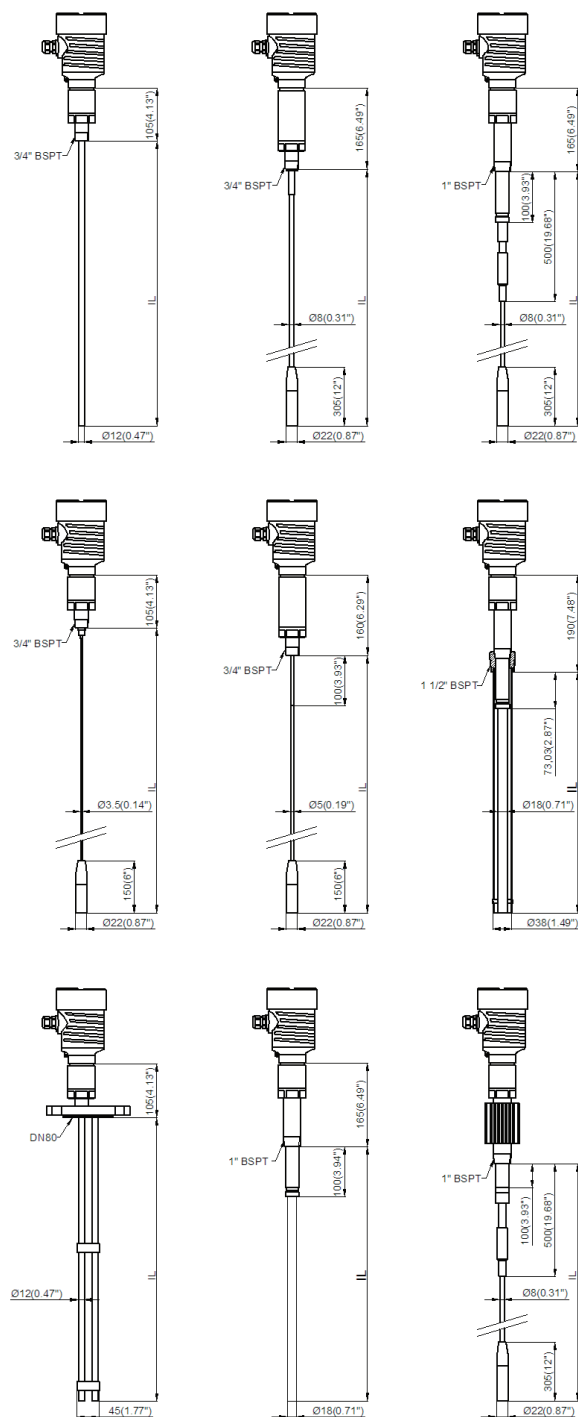
1. The lowest end of the probe should enter the conical range of the conical discharge port. See Fig.5), if it is installed like this, the tensile force generated in this position is likely to damage the probe or the tank roof.
2. The probe should not come into contact with the tank bottom or the material adhered to the tank bottom. As shown in 4) of the figure, the long probe in the figure must be shortened, otherwise the meter will always give an alarm.
3. Ensure that there is enough distance between the probe and tank wall as well as the materials adhered to the tank wall. As shown in 4) of the figure, if it is too close to the tank wall, the probe will come into contact with the tank wall or material adhered to the tank wall even if slight swinging of the probe, it is likely to cause false alarm.
4. The probe can't be installed at the feed port or groove and other locations where the material flows directly. See Fig.4), if it is installed like this, the meter may alarm falsely.

Dimensional drawing

1. Aluminium housing



2. Complete machine



Default length unit in the figure: mm



Table of MCS model

	Code	Description
Products	MCS22	Series
Measured medium:	L_____	Liquid
	S_____	Solid
Enclosure	S_____	Die casting Al, 2*M20*1.5
	B_____	Die casting Al, 2*1/2"NPT
Power supply and output	B2_____	24 v two-wire, HART
	B4_____	24 v four-wire, HART
	U4_____	220 v four-wire, HART
<u>Safety certificate</u>	X_____	None
	I_____	Intrinsic safety type
	D_____	Explosion-proof
Material of rod probe	A_____	304
	B_____	316L
	C_____	316L+PFA
	D_____	316L+PTFE
Type of probe	C_____	Cable type
	P_____	Rod
Length of shielded pole	A_____	9 cm (probe material A and B)
	B_____	25 cm (probe material A and B)
	D_____	0 (probe material C and D)
Probe length	XXXX	Unit cm, range 10~2,200 cm
Process temperature (°C)	D_____	-40~80
	F_____	-40~230
	G_____	-40~400
Process pressure (kgf/cm ²)	L_____	-1
	A_____	10
	C_____	16
	D_____	20
Process connection	TA_____	3/4NPT
	TN_____	1-1/4NPT
	TC_____	G1.5
	HS_____	304 welding seat
	HC_____	Carbon steel welding seat
	FB_____	Flange
Flange standard	A_____	HG/T20615-2009 (Class series)
	B_____	HG/T20592-2009 (PN series)
	C_____	ANSI
Flange size	E_____	DN50(2")
	F_____	DN80(3")
	G_____	DN100(4")
	H_____	DN125(5")
	J_____	DN150(6")
	K_____	DN200(8")
	M_____	DN250(10")

	Code	Description
Pressure rating (kgf/cm ²)	A_____	PN2.5
	G_____	PN6
	B_____	PN10
	C_____	PN16
	D_____	PN25
	F_____	PN40
	M_____	Class150
	N_____	Class300
Flange sealing face type	A_____	RF (recommended)
	B_____	FM
	C_____	M
	E_____	FF flat (only for process pressure ≤PN16)
	F_____	Flat-thin plate flange (8 mm thick, M only for process pressure)
Material of flange	A_____	304
	B_____	316L
	C_____	Carbon steel
	D_____	PP (thickness 20mm, only applicable to atmosphere (ATM))
	E_____	PTFE (thickness 20mm, only applicable to atmosphere (ATM))
Companion flange	X_____	Without companion flange
	A_____	304
	B_____	316L
	C_____	Carbon steel

HS-AW Ultrasonic Level Transmitter



Measuring principle

The ultrasonic probe transmits high-power acoustic pulses to the target to be measured. When the acoustic waves meet obstacles (or obvious interfaces) in transmission, part of the energy will be reflected back. The reflected signals are recognized by the probe and processed by the electronic unit, thus realizing the measurement of the spatial distance from the probe surface to the material interface. The level height can be obtained through "operating mode-level mode" in the meter.

Product features

- Solid and stable sensor, suitable for severe industrial working conditions
- Built-in temperature transducer for automatic temperature compensation
- Two-wire, three-wire and four-wire output, with relay and NPN output
- HART, GPRS, RS485 and other optional communication methods
- Integrated type and remote display-type (optional)

Application industries

Utility: open pipe, pump station, water tower, dike, etc.

Power: boiler ash powder bin, raw coal bin, fly ash bin, lime bin, etc.

Chemical: crude oil, light oil, chemical raw material, etc.

Food: winery, granary, food material can, etc.

Technical characteristics

Power supply	12 ~ 28VDC
	18 ~ 32VDC
	3.7VDC
	220VAC
	Built-in battery power supply
	Solar cell power supply
Power consumption	< 1.5W
Span	1~40m
Frequency	20kHz ~ 2000kHz
Precision	±0.5%FS
Blind zone	<0.5m

Display	OLED
Safety certificate	SIL2
Working temperature	- 40°C ~ 110°C
Analog Output	4 ~ 20mA 1 ~ 5V 1 ~ 10V
Switch output	Relay NPN
Communication mode	HART RS485 4G GPS NB LORA

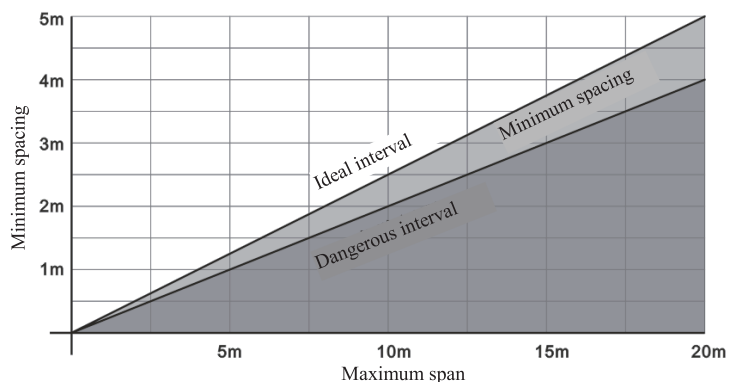
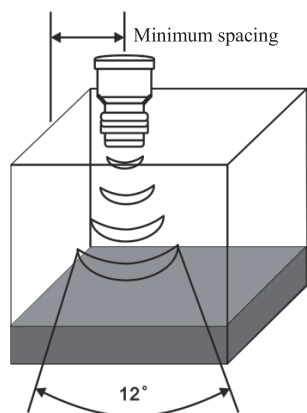
Installation guide

The bottom of the probe should be extruded from the bottom of the process interface;

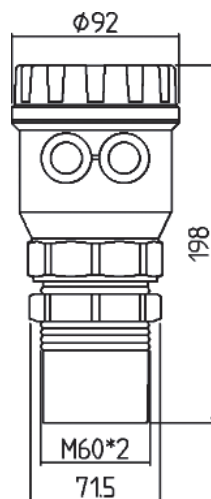
To be installed on conical or spherical tank top, it should be installed 1/3 of the tank wall from the center feed inlet of the tank wall;

If far away from the feed inlet, the probe should be installed at a position where there is no obstacle between the transmitting surface of the probe and the medium to be measured;

Installation of the probe should ensure that the acoustic channel and the container wall are kept within the "ideal spacing" shown in the figure below. If the installation distance is smaller than the ideal spacing, the probe should be installed within the area of "min. spacing". If the installation distance is below the "min. spacing" line, the transmitter might be unable to measure the target correctly.



Structural size



Note: corresponding relation between blank zone and span

Blank zone (mm)
60 (1m span)
100 (remote display-type 1m span)
150 (2m span)
200 (remote display-type 2m span)
250 (3m span)
300 (5m span, remote display-type 3m span)
400 (5m span)
500 (recommended) (10 m span, remote display-type 5 m span)
600 (15m span, remote display-type 10m span)
800 (remote display-type 15m span)
1,000 (20m span, remote display-type 20m span)
1,500 (30 m span, remote display-type 30 m span)
2,000 (40m span, remote display-type 40m span)

Table of HS-AW model

Model	Specification code	Description
HS-AW		Ultrasonic Level Transmitter
Measured medium:	L_____	Liquid/slurry (for span exceeding 15 m, G3-1/2 thread is used for process connection)
	S_____	Solid (for span exceeding 5 m, G3-1/2 thread is used for process connection)
Max. span (m)	XX	Rang 00~40, progressive increase of 1m, E.g.: 5m for 05
Signal strength	R_____	Conventional
	E_____	Enhanced
	F_____	Anti-sweat
Housing/cable inlet	A_____	Die casting Al (2×M20×1.5)
	B_____	Die casting Al (2×1/2"NPT)
	C_____	Plastic ABS (2×M20×1.5) (recommended)
	G_____	Die casting Al (4×M20×1.5) (remote display-type)
	H_____	Die casting Al (4×1/2"NPT) (remote display-type)
	J_____	Plastic ABS (5×M16×1.5) (remote display-type)
Power supply	B_____	12~28VDC
	C_____	18~32VDC (recommended)
	D_____	3.7VDC
	U_____	220VAC
	E_____	Built-in battery power supply
	F_____	Solar cell power supply
Output of analog quantity	2_____	4~20mA two-wire (recommended)
	3_____	4~20mA three-wire
	4_____	4~20mA four-wire
	5_____	1~5V three-wire
	6_____	1~10V three-wire
Switch output	X_____	None
	K_____	One-way SPST relay, with 2 optional channels
	L_____	Tow-way SPST relay (supplied with remote display-type), with 4 optional channels
	M_____	One-way NPN
	N_____	Two-way NPN
	P_____	Three-way NPN

Model	Specification code	Description
Communication mode	X—————	None
	H—————	HART protocol
	R—————	RS485
	G—————	4G
	P—————	GPS satellite positioning
	N—————	NB
	L—————	LORA
	J—————	HART+RS485
	K—————	HART+4G
	S—————	RS485+4G
	Q—————	NB+RS485
	M—————	LORA+RS485
Safety certificate	X—————	No requirement
	I—————	Intrinsic safety type
Degree of protection	A—————	IP60 (applicable to remote display-type)
	B—————	IP65 (recommended)
	C—————	IP67
	D—————	IP68
Probe cable length (m)	00	Integrated type
	XX	Remote display-type (standard configuration:10m)
Material of probe housing	S—————	ABS
	P—————	PP (recommended)
	F—————	PVDF
Material of probe housing	E—————	PTFE
	A—————	304
	B—————	316
Process temperature	C—————	—20~45°C (recommended)
	D—————	—20~70°C
	E—————	—20~110°C
Process pressure (kgf/cm ² gauge pressure)	L—————	-0.7
	M—————	1 (recommended)
	A—————	3
	B—————	10

Model	Specification code	Description
Process connection	A—————	G1-1/2"A (span 2~5 m)
	B—————	G2"A (span 5~15) (recommended)
	C—————	G3-1/2"A (span 15~40 m)
	D—————	M30×1.5 (span 1~2 m)
	E—————	M60×2 (span 5~15 m)
	F—————	Flange (see the table for type selection of flange)
	G—————	Bracket (stainless steel)
	H—————	2"NPT (span 0~15 m)
	I—————	M65×2 (span 0~10 m)
Flange standard	A—————	HG/T20615-2009 (Class series)
	B—————	HG/T20592-2009 (PN series)
Flange size	E—————	DN50 (2")
	C—————	DN65 (2.5")
	F—————	DN80 (3")
	G—————	DN100 (4")
	H—————	DN125 (5")
	J—————	DN150 (6")
	K—————	DN200 (8")
	M—————	DN250 (10")
Pressure rating (kgf/cm ²)	A—————	PN2.5
	G—————	PN6
	B—————	PN10
	C—————	PN16
	D—————	PN25
	F—————	PN40
	M—————	Class150
	N—————	Class300
Flange sealing face type	A—————	RF (recommended)
	B—————	FM
	C—————	M
	E—————	FF flat (only for process pressure ≤PN16)
	F—————	Flat-thin plate flange (8 mm thick, M only for process pressure)

Model	Specification code	Description
Material of flange	A—————	304
	B—————	316L
	C—————	Carbon steel
	D—————	PP (only for atmosphere, 10 mm thick below DN100, 15 mm thick above DN100)
	E—————	PTFE (only for atmosphere, 10 mm thick below DN100, 15 mm thick above DN100)
Companion flange (A, B and C options are inherently equipped with 304 bolt , nut, flat washer, flat PTFE gasket for flange seal)	X—————	Without companion flange
	A—————	304
	B—————	316L
	C—————	Carbon steel

MB Magnetic Flip Level Gauge



Working principle

MB magnetic flip level gauge is designed with the theory of communicating vessels. It is connected with the container through the gas phase and liquid connection flange. According to the principles of buoyancy and magnetic coupling, the magnetic float in the measuring cylinder (i.e. the connector) drives the double-color magnetic flip panel on the external display of the measuring cylinder to turn over with the rise (fall) of the measured liquid level. When the liquid level rises, the magnetic float drives the flip column to rotate by 180 degrees, displaying red or green; when the liquid level drops, the magnetic float drives the flip column to rotate by 180 degrees in reverse, displaying white. The height of the red strip (or green strip) is the height of the measured liquid level, achieving the target of measuring and displaying the measured liquid level.

Each magnetic flip panel has a two-color axial symmetrical structure. The spacing between the two magnetic flip panels is 10mm, indicating the gas phase part and the liquid phase part with white and red (green), respectively. The junction of red (or green) and white is the boundary of the liquid phase and the gas phase. This level gauge can measure both the liquid level and the interface of two media of different density;

Product standards: HG/T 2742-1995, GB/T25153, 25477-2010.

Execution standard of flange: HG/T20592~20615-2009 ((in case of not indicated in ordering)

Application scope of product

MB magnetic flip level gauge can be widely used for measuring and displaying the liquid level and interface of two different mediums compatible with 304, 321, 316L, 304+PTFE, PVC, PP and other materials for liquid storage tank, liquid ammonia storage tank, storage reservoir, reaction tank, fermentation tank, liquid ammonia storage separator, boiler steam drum, deaerator, drain tank, return tank, high and low pressure heater, condenser, evaporator and other pressure vessels in industries such as petroleum, chemical industry, oil field, medicine, food and wine industry, etc. There are several installation forms for installation to adapt for requirements of different occasions and environments.

MB magnetic flip level gauge can be used to reliably measure the liquid level of high temperature, low temperature, high pressure, strong corrosion, highly toxic, dangerous environment.

Product features

Parts of MB flip column level gauge are made of 304, 321, 316L, 1Cr18Ni9Ti, 00Cr17Ni14Mo2, 0Cr18Ni9, 304 or 0Cr18Ni9 lined PTFE (polytetrafluoroethylene), PVC, PP and other material as well as imported high quality electronic elements. The product has high reliability, good stability, long durability and strong corrosion resistance. Its features are very distinctive:

- It has the advantages of simple structure, firmness, reliability and durability. Almost no maintenance is required. It can be installed and used outdoors for a long time;

- The measured medium is completely isolated from the display part, liquid level transmitter and magnetic level controller;

- Its operating pressure range is wide, and the pressure resistance is from vacuum to 42 MPa;

- Range of working temperature, applicable to $-190\sim+425^{\circ}\text{C}$;

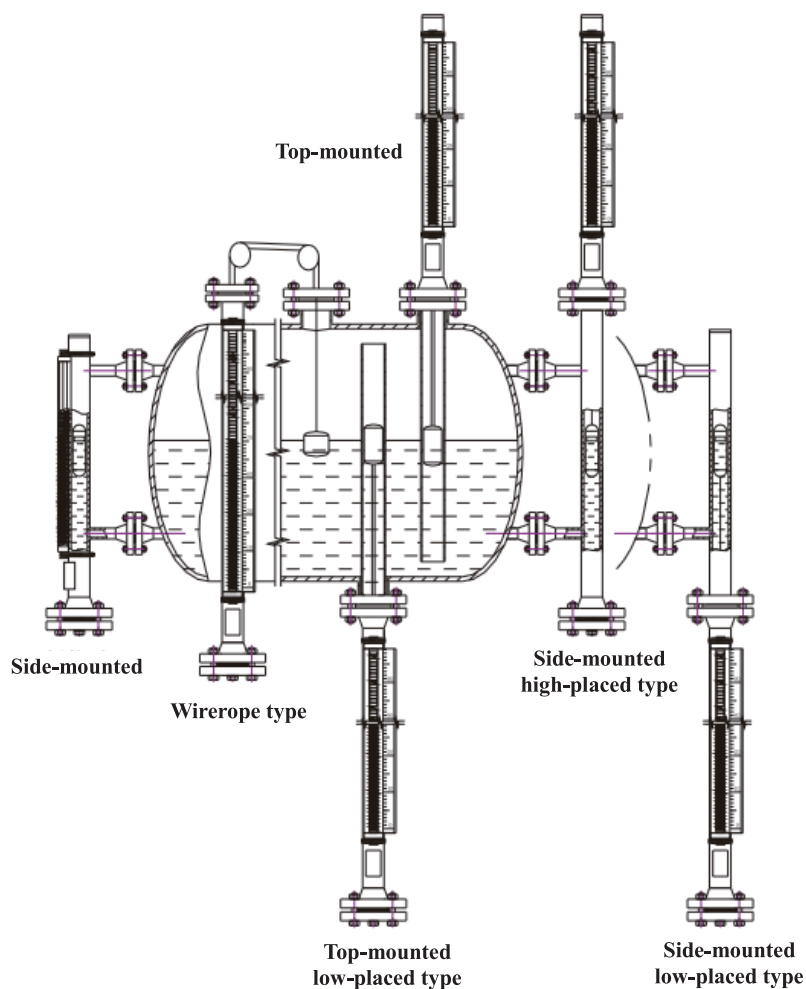
- No influence by the physical and chemical state of the measured medium. Such as: Influence of medium conductivity, dielectric constant, foam, pressure, temperature, evaporation, boiling, bubble, etc.; It is widely used to measure various strong and weak corrosive, flammable, explosive, toxic, highly radioactive, agitated, muddy liquid surfaces and interfaces.

- Single-pole single-throw (SPST) and single-pole double-throw (SPDT) passive bistable magnetic level controllers can be selected to realize high and low liquid level, interface control or alarm. The number of magnetic level controllers is not limited.

- Reed pipe liquid level transmitter or capacitance level sensor, magnetostrictive level transmitter and two-wire 4 ~ 20 mADC (or with HART protocol) output signal can be selected to realize remote centralized measurement and control.

- The two-wire liquid level transmitter can be provided with LED digital display to be convenient for observation at night.

Installation diagram of MB magnetic flip level gauge



Description on auxiliary functions of product

To meet the needs of different occasions, environments and functions, the MB magnetic flip level gauge can be supplied with the following options:

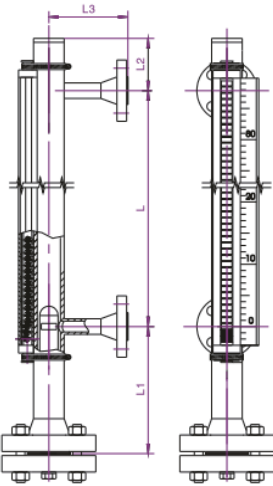
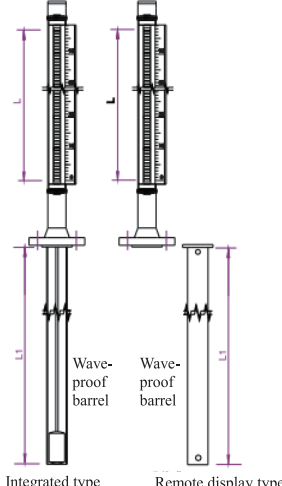
*Single-pole single-throw (SPST) and single-pole double-throw (SPDT) passive bistable magnetic level controllers can be selected to realize high and low liquid level, interface control or alarm. The number of magnetic level controllers is not limited.

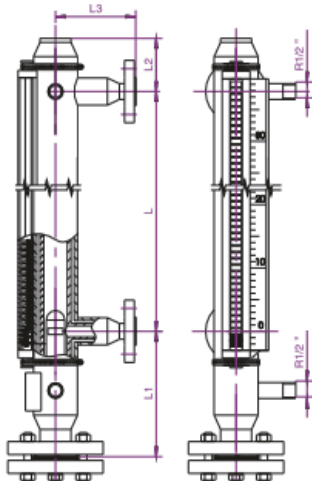
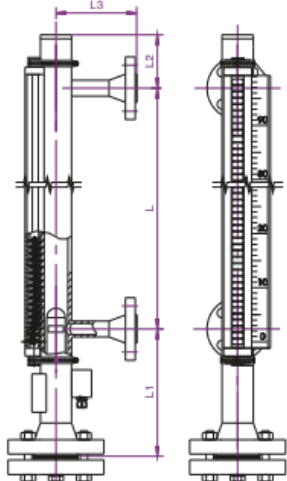
*Two-wire magnetic level transmitter and 4~20 mADC output signal might be provided to achieve remote measurement and control.

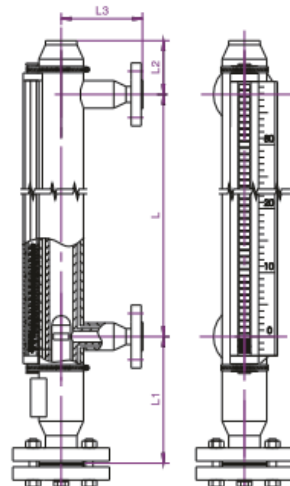
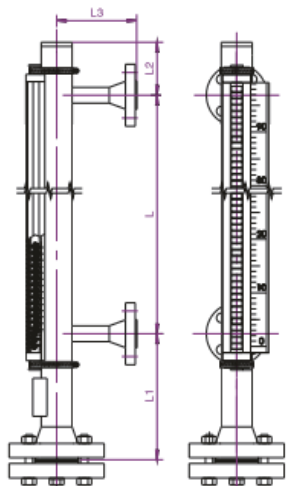
*Two-wire magnetostrictive or capacitance level transmitter and 4 ~ 20 mADC output can be selected to realize high precision and continuous measurement and control.

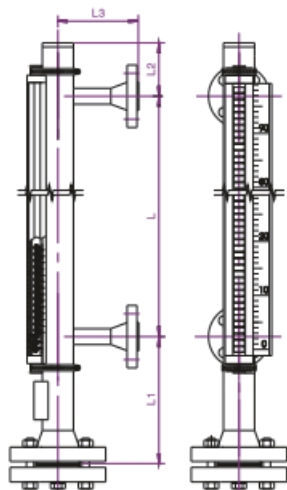
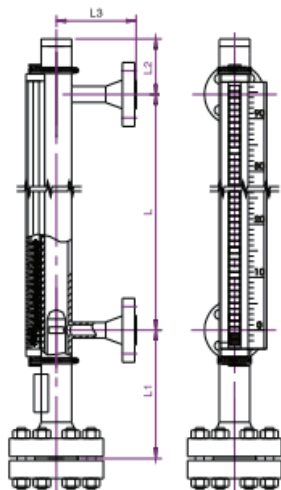
*Output 4~20 mADC, with HART protocol

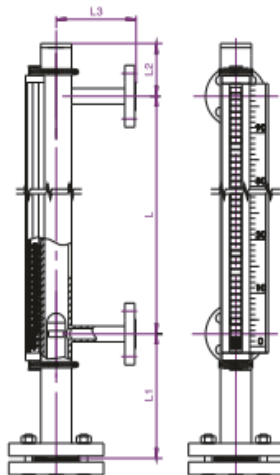
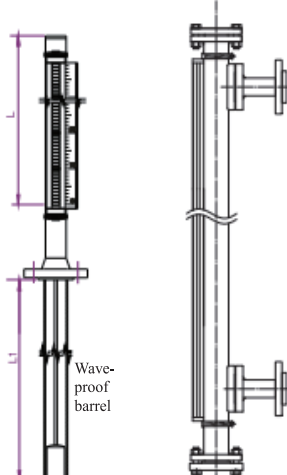
General description

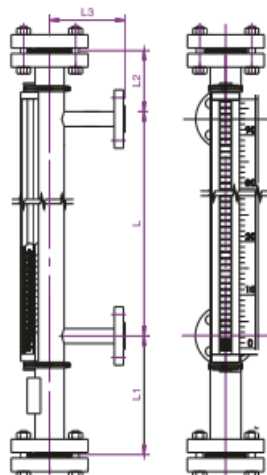
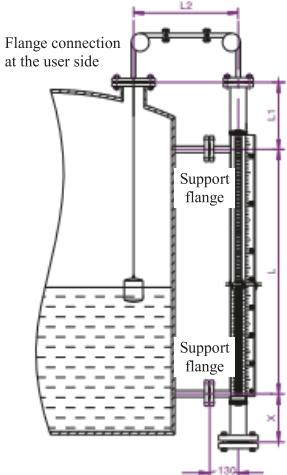
Structure type	Side-mounted basic type		Top-mounted basic type
Dimensions of meter	 L: center distance for installation L1: float length+10 L2: ~100 L3: ~120		 L: measurement range L1: insertion depth
Center distance for installation	150-6,000 mm (negotiable for longer than 6m)		150-6,000 mm (negotiable for longer than 6m)
Medium density	More than 0.45 g/cm ³		More than 0.45 g/cm ³
Nominal pressure	PN2.5-PN40(×0.1MPa) segmented selection (ordinary basic type)	PN63-PN420(×0.1 MPa) segmented selection (high pressure basic type)	PN2.5~PN160 (×0.1MPa) segmented selection
Material of level gauge	304, 316L, 321, titanium alloy and so on		304, 316L, 321, titanium alloy and so on
Range of working temperature	-190~+425°C		-190~+425°C
Form of installation interface	If it is not specified, refer to the supply of DN20/RF welded flange		Supply of DN80~DN250/RF welded flange
Top structure of main pipe	If the provision of weld cap is not specified (refer to the attached figure for the structure)		If the provision of weld cap is not specified (refer to the attached figure for the structure)
Bottom structure of main pipe	If the provision of blind flange is not specified (refer to the attached figure for the structure)		—
Dimension of wave-proof barrel	—		If the outer diameter is less than the flange size, a certain height should be reserved at the bottom of L1 and the container, so as to prevent silting up.
Magnetic flip panel display	Type A: Aluminum alloy, high-strength plastic flip panel Type C: 316L sheath, PC pipe+magnetic flip panel Type D: 316L sheath, glass pipe+magnetic flip panel Type E/F: Aluminum alloy, LED display G/H 316L sheath, LED display		Type A: Aluminum alloy, high-strength plastic flip panel Type C: 316L sheath, PC pipe+magnetic flip panel Type D: 316L sheath, glass pipe+magnetic flip panel Type E/F: Aluminum alloy, LED display G/H 316L sheath, LED display
Degree of protection	IP65		IP65
Options of auxiliary functional piece	MB-CB level transmitter can be supplied (see P128~132) Or MB-HB magnetic level controller (see P133~135)		

Structure type	Side-mounted and top-mounted steam tracing type	Side-mounted and top-mounted electrical tracing types
Dimensions of meter	 L: center distance for installation L1: float length+10 L2: ~100 L3: ~120	 L: center distance for installation L1: float length+10 L2: ~100 L3: ~120
Center distance for installation	150-6,000 mm (negotiable for longer than 6m)	150-6,000 mm (negotiable for longer than 6m)
Medium density	More than 0.45 g/cm ³	More than 0.45 g/cm ³
Nominal pressure	PN6-PN320(×0.1MPa) segmented selection	PN6-PN320(×0.1MPa) segmented selection
Material of level gauge	304, 316L, 321, titanium alloy and so on	304, 316L, 321, titanium alloy and so on
Range of working temperature	-190~+425°C	-190~+425°C
Form of installation interface	If the side installation is not specified, refer to the installation of DN20/RF welded flange; in case of installation at top, refer to the installation of DN80/RF welded flange	
Top structure of main pipe	If the provision of weld cap is not specified (refer to the attached figure for the structure)	If the provision of weld cap is not specified (refer to the attached figure for the structure)
Bottom structure of main pipe	If the provision of blind flange is not specified (refer to the attached figure for the structure)	If the provision of blind flange is not specified (refer to the attached figure for the structure)
Heating parameters	Tracing steam pressure ≤0.6 MPa (it should be indicated in case of >0.6 MPa); R1/2" male thread, or specified by the user	The user should indicate the working power supply, the lowest ambient temperature, the insulation temperature of the heater and whether it is explosion-proof or not.
Magnetic flip panel display	Type A: Aluminum alloy, high-strength plastic flip panel Type C: 316L sheath, PC pipe+magnetic flip panel Type D: 316L sheath, glass pipe+magnetic flip panel Type E/F: Aluminum alloy, LED display G/H 316L sheath, LED display	Type A: Aluminum alloy, high-strength plastic flip panel Type C: 316L sheath, PC pipe+magnetic flip panel Type D: 316L sheath, glass pipe+magnetic flip panel Type E/F: Aluminum alloy, LED display G/H 316L sheath, LED display
Degree of protection	IP65	IP65
Options of auxiliary functional piece	MB-CB level transmitter can be supplied (see P128~132) Or MB-HB magnetic level controller (see P133~135)	

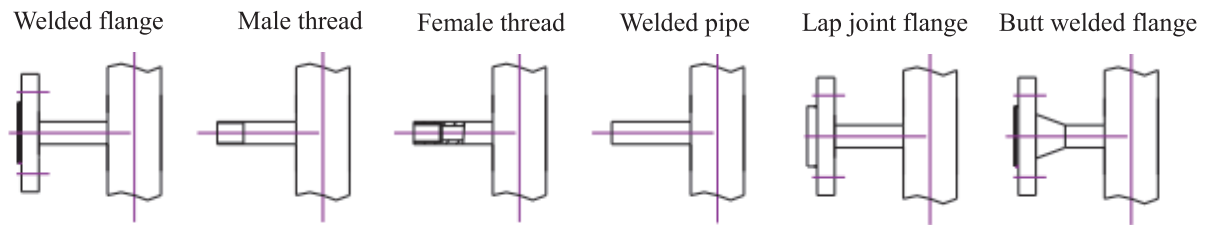
Structure type	Side-mounted and top-mounted frost prevention types	Special type for liquefied gas
Dimensions of meter	 L: center distance for installation L1: float length+10 L2: ~100 L3: ~120	 L: center distance for installation L1: float length+10 L2: ~100 L3: ~120
Center distance for installation	150-6,000 mm (negotiable for longer than 6m)	150-6,000 mm (negotiable for longer than 6m)
Medium density	More than 0.45 g/cm ³	More than 0.45 g/cm ³
Nominal pressure	PN6-PN320(×0.1MPa) segmented selection	PN6-PN63(×0.1MPa) segmented selection
Material of level gauge	304, 316L, 321, titanium alloy and so on	304, 316L, 321, titanium alloy and so on
Range of working temperature	-190~+425°C	<80°C
Form of installation interface	If the side installation is not specified, refer to the installation of DN20/RF welded flange; in case of installation at top, refer to the installation of DN80/RF welded flange	If the side installation is not specified, refer to the installation of DN20/RF welded flange
Top structure of main pipe	If the provision of weld cap is not specified (refer to the attached figure for the structure)	If the provision of weld cap is not specified (refer to the attached figure for the structure)
Bottom structure of main pipe	If the provision of blind flange is not specified (refer to the attached figure for the structure)	If the provision of blind flange is not specified (refer to the attached figure for the structure)
Magnetic flip panel display	Type A: Aluminum alloy, high-strength plastic flip panel Type C: 316L sheath, PC pipe+magnetic flip panel Type D: 316L sheath, glass pipe+magnetic flip panel Type E/F: Aluminum alloy, LED display G/H 316L sheath, LED display	Type A: Aluminum alloy, high-strength plastic flip panel Type C: 316L sheath, PC pipe+magnetic flip panel Type D: 316L sheath, glass pipe+magnetic flip panel Type E/F: Aluminum alloy, LED display G/H 316L sheath, LED display
Degree of protection	IP65	IP65
Options of auxiliary functional piece	MB-CB level transmitter can be supplied (see P128~132) Or MB-HB magnetic level controller (see P133~135)	

Structure type	Special type for liquid ammonia tank and ammonia separator	Special type for boiler drum and HPs
Dimensions of meter	 L: center distance for installation L1: float length+10 L2: ~100 L3: ~120	 L: center distance for installation L1: float length+10 L2: ~100 L3: ~120
Center distance for installation	150-6,000 mm (negotiable for longer than 6m)	150-6,000 mm (negotiable for longer than 6m)
Medium density	More than 0.55 g/cm ³	More than 0.5 g/cm ³
Nominal pressure	PN16-PN320(×0.1MPa) segmented selection	PN20~PN250(×0.1 MPa) segmented selection
Material of level gauge	304, 316L, 321, titanium alloy and so on	304, 316L, 321, titanium alloy and so on
Range of working temperature	≤80°C	-190~+425°C
Form of installation interface	If the side installation is not specified, refer to the installation of DN20/RF welded flange	If the side installation is not specified, refer to the installation of DN20/RF welded flange
Top structure of main pipe	If the provision of weld cap is not specified (refer to the attached figure for the structure)	If the provision of weld cap is not specified (refer to the attached figure for the structure)
Bottom structure of main pipe	If the provision of blind flange is not specified (refer to the attached figure for the structure)	If the provision of blind flange is not specified (refer to the attached figure for the structure)
Magnetic flip panel display	Type A: Aluminum alloy, high-strength plastic flip panel Type C: 316L sheath, PC pipe+magnetic flip panel Type D: 316L sheath, glass pipe+magnetic flip panel Type E/F: Aluminum alloy, LED display G/H 316L sheath, LED display	Type A: Aluminum alloy, high-strength plastic flip panel Type C: 316L sheath, PC pipe+magnetic flip panel Type D: 316L sheath, glass pipe+magnetic flip panel Type E/F: Aluminum alloy, LED display G/H 316L sheath, LED display
Degree of protection	IP65	IP65
Options of auxiliary functional piece	MB-CB level transmitter can be supplied (see P128~132) Or MB-HB magnetic level controller (see P133~135)	

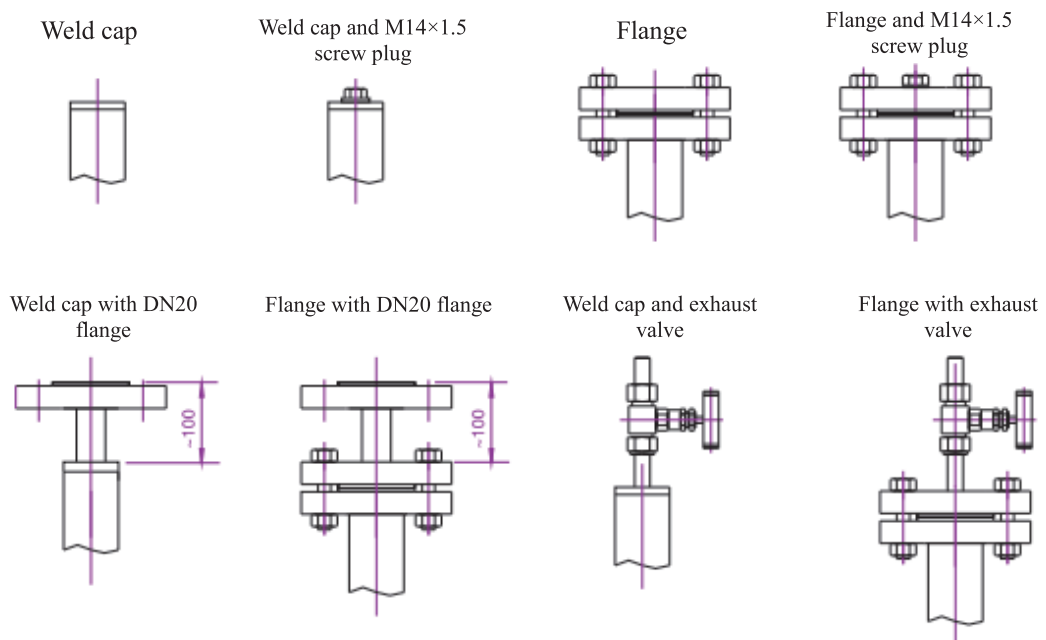
Structure type	Anti-corrosion polypropylene (PP)	Anti-corrosion type, side-mounted and top-mounted type 304 lined PTFE
Dimensions of meter	 L: center distance for installation L1: float length+10 L2: ~100 L3: ~120	 L: center distance for installation L1: float length+10 L2: ~100 L3: ~120
Center distance for installation	150-6,000 mm (negotiable for longer than 6m)	150-6,000 mm (negotiable for longer than 6m)
Medium density	More than 0.45 g/cm ³	More than 0.45 g/cm ³
Nominal pressure	PP: PN2.5~PN16(×0.1 MPa) segmented selection	PN2.5-PN40(×0.1MPa) segmented selection
Material of level gauge	PP	304 or 0Cr18Ni9 lined polytetrafluoroethylene (PTFE)
Range of working temperature	PP: ≤80°C (up to 100°C at normal pressure)	-20~+180°C
Form of installation interface	If the side installation is not specified, refer to the installation of DN20/RF welded flange	If the side installation is not specified, refer to the installation of DN20/RF welded flange
Top structure of main pipe	If the provision of weld cap is not specified (refer to the attached figure for the structure)	If the provision of weld cap is not specified (refer to the attached figure for the structure), please otherwise specify the provision of PTFE valve)
Bottom structure of main pipe	If the provision of blind flange is not specified (refer to the attached figure for the structure)	If the provision of blind flange is not specified (refer to the attached figure for the structure), please otherwise specify the provision of PTFE valve)
Magnetic flip panel display	Type A: Aluminum alloy, high-strength plastic flip panel Type C: 316L sheath, PC pipe+magnetic flip panel Type D: 316L sheath, glass pipe+magnetic flip panel Type E/F: Aluminum alloy, LED display G/H 316L sheath, LED display	Type A: Aluminum alloy, high-strength plastic flip panel Type C: 316L sheath, PC pipe+magnetic flip panel Type D: 316L sheath, glass pipe+magnetic flip panel Type E/F: Aluminum alloy, LED display G/H 316L sheath, LED display
Degree of protection	IP65	IP65
Options of auxiliary functional piece	MB-CB level transmitter can be supplied (see P128~132) Or MB-HB magnetic level controller (see P133~135)	

Structure type	Anti-corrosion poly(perfluoropropene) (F46)	Wire rope type
Dimensions of meter	 L: center distance for installation L1: float length+10 L2: ~100 L3: ~120	 L: center distance for installation L1: float length+10 L2: ~100 L3: ~120
Center distance for installation	150-6,000 mm (negotiable for longer than 6m)	1,000-10,000mm (negotiable for super-long center distance)
Medium density	More than 0.45 g/cm ³	More than 0.45 g/cm ³
Nominal pressure	PN2.5-PN40(×0.1MPa) segmented selection	PN2.5-PN25(×0.1MPa) segmented selection
Material of level gauge	Poly(perfluoropropene) (F46)	304, 316L, 321, titanium alloy and so on
Range of working temperature	-20~+180°C	-190~+425°C
Form of installation interface	If the side installation is not specified, refer to the installation of DN20/RF welded flange	If the side installation is not specified, refer to the installation of DN20/RF welded flange
Top structure of main pipe	If unspecified at the top and bottom, provide blind flange	--
Bottom structure of main pipe	If unspecified at the top and bottom, provide blind flange	If unspecified, provide blind flange
Magnetic flip panel display	Type A: Aluminum alloy, high-strength plastic flip panel Type C: 316L sheath, PC pipe+magnetic flip panel Type D: 316L sheath, glass pipe+magnetic flip panel Type E/F: Aluminum alloy, LED display G/H 316L sheath, LED display	Type A: Aluminum alloy, high-strength plastic flip panel Type C: 316L sheath, PC pipe+magnetic flip panel Type D: 316L sheath, glass pipe+magnetic flip panel Type E/F: Aluminum alloy, LED display G/H 316L sheath, LED display
Degree of protection	IP65	IP65
Options of auxiliary functional piece	MB-CB level transmitter can be supplied (see P128~132) Or MB-HB magnetic level controller (see P133~135)	

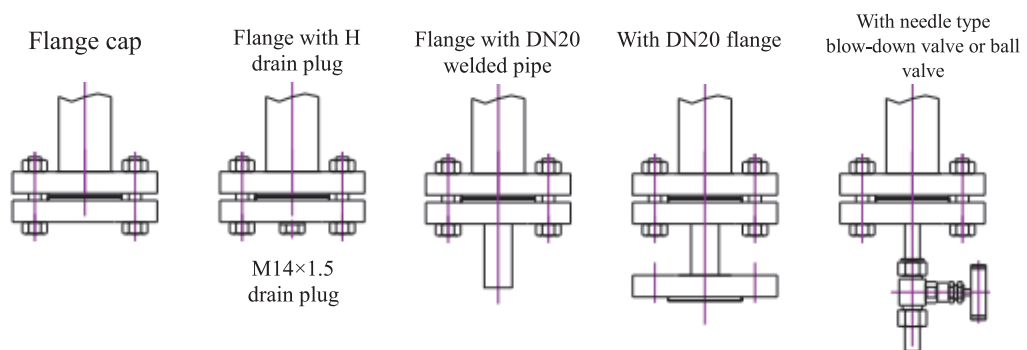
Attached figure of installation process interface



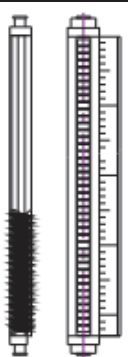
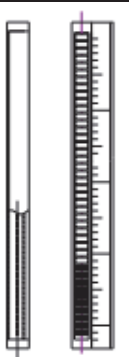
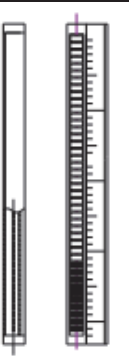
Attached figure of top structure of main pipe

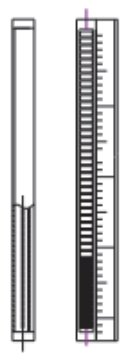
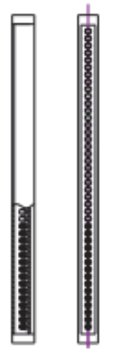
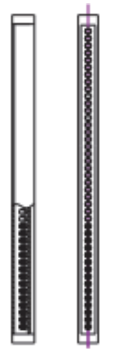


Attached figure of bottom structure of main pipe



Technical parameters of magnetic flip panel display

Structure type	Aluminum alloy, high-strength plastic flip panel	Aluminum alloy, ceramic flip panel (high temperature type)	316L sheath, PC pipe+magnetic flip panel
Dimensions of flip panel			
Display rack	Anodized surface of aluminum alloy	Anodized surface of aluminum alloy	316L
Display mode	Magnetic flip column	Magnetic flip column	Magnetic flip column
Raw materials of display	Red and white high-strength engineering plastics	Red and white ceramic	Yellow and brown magnetic flip panel
Display resolution	10mm	10mm	10mm
Display hood	High-strength bullet-proof glass	Glass	High-strength PC pipe
Display scale	PET or stainless steel	Aluminum alloy or stainless steel	PET or stainless steel
Maximum working temperature	150°C	350°C	120°C
Model code of the display	A	C	D

Structure type	316L sheath, glass pipe+magnetic flip panel	Aluminum alloy, LED display		316L sheath, LED display	
Dimensions of flip panel					
Display rack	316L	316L or anodized aluminum alloy		316L or anodized aluminum alloy	
Display mode	Magnetic flip column	High brightness LED band		High brightness LED band	
Raw materials of display	Yellow and brown magnetic flip panel	Red and green LEDs		Red and green LEDs	
Display resolution	10mm	10mm		10mm	
Display hood	High borosilicate glass pipe	PC pipe		High borosilicate glass pipe	
Maximum working temperature	180°C	120°C		350°C	
Working power supply		24VDC	220VAC	24VDC	220VAC
Model code of the display	E	F	G	H	J



MBS model selection

Model	Specification code	Description
MBS	_____	Side-mounted magnetic flip level gauge
Installation form	A_____	Side-mounted
	B_____	Side-mounted low-placed type
	C_____	Side-mounted high-placed type
Structure type	A_____	Basic
	B_____	Anti-corrosion type (process pressure of PP PN2.5~PN16, working temperature $\leq 80^{\circ}\text{C}$; process pressure of 304 lined PTFE PN2.5~PN40, working temperature $-20\sim 180^{\circ}\text{C}$; process pressure of Poly(perfluoropropene) PN2.5~PN40, working temperature $-20\sim 180^{\circ}\text{C}$)
	C_____	Steam tracing type
	D_____	Electrical tracing type (lap joint flange should not be used as process flange)
	E_____	Frost prevention and insulation type (lap joint flange should not be used as process flange)
	F_____	Special type for liquid ammonia (the process pressure is PN16-PN320; working temperature $< 80^{\circ}\text{C}$)
	G_____	Liquefied gas type (the process pressure is PN6-PN63; working temperature $< 80^{\circ}\text{C}$)
	H_____	Special type for boiler drum and HPs (the process pressure is PN20-PN250; medium density is greater than 0.5 g/cm^3 ; lap joint flange should not be used as process flange)
Material code (Main pipe material; the float material is consistent with that of the main pipe)	A_____	304
	B_____	316L
	C_____	321
	D_____	PP
	E_____	304+PTFE
Type of interface on top of main pipe	A_____	Weld cap
	B_____	Weld cap with M14 $\times$ 1.5 screw plug
	C_____	Flange
	D_____	Flange with M14 $\times$ 1.5 screw plug
	E_____	Weld cap with DN20 flange
	F_____	Flange with DN20 flange
	G_____	Weld cap and exhaust valve
	H_____	Flange with exhaust valve
Type of interface at bottom of main pipe	A_____	Flange cap
	B_____	Flange with H drain plug
	C_____	Flange with DN20 welded pipe
	D_____	With DN20 flange
	E_____	With needle type blow-down valve or ball valve
Span (unit: mm)	XXXX	Center distance L
Type of flip column display	A_____	Aluminum alloy+high-strength plastic flip column (process temperature $\leq 150^{\circ}\text{C}$)
	C_____	Aluminum alloy+ceramic flip panel (process temperature $\leq 350^{\circ}\text{C}$)
	D_____	PVC+high-strength plastic flip column (process temperature $\leq 120^{\circ}\text{C}$)
	E_____	Anti-corrosion polypropylene+high-strength plastic flip column (process temperature $\leq 180^{\circ}\text{C}$)
	F_____	24 V LED (120°C) (process temperature $\leq 120^{\circ}\text{C}$)
	G_____	220 V LED (120°C) (process temperature $\leq 120^{\circ}\text{C}$)
	H_____	24V LED (350°C) (process temperature $\leq 350^{\circ}\text{C}$)
	J_____	220 V LED (350°C) (process temperature $\leq 350^{\circ}\text{C}$)

Model	Specification code	Description
Process temperature	D_____	20~80°C
	E_____	20~150°C
	F_____	20~250°C
	G_____	20~350°C
	H_____	20~425°C
	I_____	-40~20°C
	J_____	-70~20°C
	K_____	-150~20°C
	L_____	-190~20°C
Process pressure (kgf/cm ²)	A_____	2.5
	B_____	6.0
	C_____	16
	D_____	25
	E_____	40
	F_____	63
	G_____	100
	H_____	160
	J_____	220
	K_____	320
Process connection	A_____	G1/2" internal thread
	B_____	M20×1.5 male thread
	C_____	Outer diameter φ25× (wall thickness) 3 mm welded pipe
	D_____	Standard flange
Flange standard	A_____	HG/T20615-2009 (Class series)
	B_____	HG/T20592-2009 (PN series)
Flange type	A_____	Welded flange (process pressure≤40 kgf/cm ²)
	B_____	Lap joint flange (process pressure≤40 kgf/cm ²)
	C_____	Butt welded flange
Flange size	A_____	DN15
	B_____	DN20
	C_____	DN25
	D_____	DN32
	N_____	DN40
	E_____	DN50
	F_____	DN80
Pressure rating (kgf/cm ²)	A_____	PN2.5
	G_____	PN6
	B_____	PN10
	C_____	PN16
	D_____	PN25
	F_____	PN40
	H_____	PN63
	J_____	PN100
	K_____	PN160
	M_____	Class150
	N_____	Class300

Model	Specification code	Description
Flange sealing face type	A—————	RF raised face
	B—————	FM
	C—————	M
	D—————	T tongue face
	E—————	FF
	F—————	RJ ring joint face
Material of flange	A—————	304
	B—————	316L
	C—————	PP
	E—————	304+PTFE
Companion flange (A, B and C options are inherently equipped with 304 bolt , nut, flat washer, flat PTFE gasket for flange seal)	X—————	Without companion flange
	A—————	304
	B—————	316L
	C—————	Carbon steel
Connection accessories	X—————	Without bolt group and flange gasket
	A—————	304 bolt group+flange gasket

Table of MBT model

Model	Specification code	Description
MBT	_____	Top-mounted magnetic flip level gauge
Installation form	A_____	Top-mounted
	B_____	Top-mounted low-placed type
Structure type	A_____	Basic type (process pressure is PN16~PN160)
	B_____	Anti-corrosion type (only 304 lined PTFE is allowed. The process pressure is PN2.5-PN40, working temperature is -190-200°C)
	C_____	Steam tracing type
	D_____	Electrical tracing type
	E_____	Frost-proof insulating type
Material code	A_____	304
	B_____	316L
	C_____	321
	F_____	304+PTFE
Type of interface on top of main pipe	A_____	Weld cap
	B_____	Weld cap with M14×1.5 screw plug
	C_____	Flange
	D_____	Flange with M14×1.5 screw plug
	E_____	Weld cap with DN20 flange
	F_____	Flange with DN20 flange
	G_____	Weld cap and exhaust valve
	H_____	Flange with exhaust valve
Span (unit: mm)	XXXX/XXXX	(Center distance L/insertion depth L1)
Type of flip column display	A_____	Aluminum alloy+high-strength plastic flip column (process temperature≤150°C)
	C_____	Aluminum alloy+ceramic flip panel (process temperature≤350°C)
	D_____	PVC+high-strength plastic flip column (process temperature≤120°C)
	E_____	An-corrosion polypropylene+high-strength plastic flip column (process temperature≤180°C)
	F_____	24 V LED (120 °C) (process temperature≤120 °C)
	G_____	220 V LED (120 °C) (process temperature≤120 °C)
	H_____	24V LED (350°C) (process temperature≤350°C)
	J_____	220 V LED (350 °C) (process temperature≤350 °C)
Process temperature	D_____	20~80°C
	E_____	20~150°C
	F_____	20~250°C
	G_____	20~350°C
	H_____	20~425°C
	J_____	-40~20°C
	K_____	-70~20°C
	M_____	-150~20°C
	N_____	-190~20°C
Process pressure (kgf/cm ²)	A_____	2.5
	B_____	6.0
	C_____	16
	D_____	25
	E_____	40
	F_____	63
	G_____	100
	H_____	160
Process connection	D_____	Standard flange
Flange standard	A_____	HG/T20615-2009 (Class series)
	B_____	HG/T20592-2009 (PN series)

Model	Specification code	Description
Flange size	F_____	DN80
	G_____	DN100
	H_____	DN125
	J_____	DN150
	K_____	DN200
	M_____	DN250
Pressure rating (kgf/cm ²)	A_____	PN2.5
	G_____	PN6
	B_____	PN10
	C_____	PN16
	D_____	PN25
	F_____	PN40
	H_____	PN63
	J_____	PN100
	K_____	PN160
	M_____	Class150
	N_____	Class300
Flange sealing face type	A_____	RF raised face
	B_____	FM
	C_____	M
	D_____	T tongue face
	E_____	FF
	F_____	RJ ring joint face
Material of flange	A_____	304
	B_____	316L
	C_____	321
	F_____	304+PTFE
Companion flange (A, B and C options are inherently equipped with 304 bolt , nut, flat washer, flat PTFE gasket for flange seal)	X_____	Without companion flange
	A_____	304
	B_____	316L
	C_____	Carbon steel
Connection accessories	X_____	Without bolt group and flange gasket
	A_____	304 bolt group+flange gasket

Table of MBG model

Model	Specification code	Description
MBG	_____	Cable-type magnetic flip level gauge
Structure type	A_____	Basic
Material code	A_____	304
	B_____	316L
	C_____	321
Type of interface at bottom of main pipe	A_____	Flange cap (recommended)
	B_____	Flange with H drain plug
	C_____	Flange with DN20 welded pipe
	D_____	With DN20 flange
	E_____	With needle type blow-down valve or ball valve
Span (unit: mm)	XXXX/XXXX/XXXX	(see attached figure for L/L1/L2, L, L1 and L2)
Type of flip column display	A_____	Aluminum alloy+high-strength plastic flip column (process temperature≤150℃)
	C_____	Aluminum alloy+ceramic flip panel (process temperature≤350℃)
	D_____	PVC+high-strength plastic flip column (process temperature≤120℃)
	E_____	An-corrosion polypropylene+high-strength plastic flip column (process temperature≤180℃)
	F_____	24 V LED (120 °C) (process temperature≤120 °C)
	G_____	220 V LED (120 °C) (process temperature≤120 °C)
	H_____	24V LED (350℃) (process temperature≤350℃)
	J_____	220 V LED (350 °C) (process temperature≤350 °C)
Process temperature	D_____	20~80℃
	E_____	20~150℃
	F_____	20~250℃
	G_____	20~350℃
	H_____	20~425℃
	J_____	-40~20℃
	K_____	-70~20℃
	M_____	-150~20℃
	N_____	-190~20℃
Process pressure (kgf/cm ²)	A_____	2.5
	B_____	6.0
	C_____	16
	D_____	25
Installation with support flange	A_____	DN20/PN10/RF welded flange (HG/T 20592-2009)
Process connection	D_____	Standard flange (see Table of Flange Model)
Flange standard	A_____	HG/T20615-2009 (Class series)
	B_____	HG/T20592-2009 (PN series)
Flange size	F_____	DN80
	G_____	DN100

Model	Specification code	Description
	H_____	DN125
	J_____	DN150
	K_____	DN200
	M_____	DN250
Pressure rating (kgf/cm ²)	A_____	PN2.5
	G_____	PN6
	B_____	PN10
	C_____	PN16
	D_____	PN25
	M_____	Class150
Flange sealing face type	A_____	RF raised face
	B_____	FM
	C_____	M
	D_____	T tongue face
	E_____	FF
	F_____	RJ ring joint face
Material of flange	A_____	304
	B_____	316L
Companion flange (A, B and C options are inherently equipped with 304 bolt , nut, flat washer, flat PTFE gasket for flange seal)	X_____	Without companion flange
	A_____	304
	B_____	316L
	C_____	Carbon steel
Connection accessories	X_____	Without bolt group and flange gasket
	A_____	304 bolt group+flange gasket

MB-CB Level Transmitter

The level transmitter is divided into magnetic level transmitter, magnetostrictive level transmitter and capacitance level transmitter. The level transmitter and the magnetic flip level gauge are used together to measure and control the liquid level signal remotely and centrally.

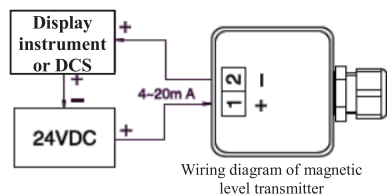
MB-CBY series refer to magnetic level transmitter composed of imported reed pipe, precision resistor and amplified converting circuit. When the magnetic line of the magnetic float in the magnetic flip level gauge acts on the reed pipe at a position, the reed pipe closes to enable the three-wire potentiometer to output the resistance value corresponding to the liquid level. The resistance value of three-wire potentiometer is proportional to the liquid level change. The amplified converting circuit converts the level change into 4-20 mADC signal and outputs it to detect and transmit the liquid level signal.

MB-CBC series refer to capacitance level transmitter, composed of measuring pole and capacitance converting circuit. The measuring pole is installed in the bypass pipe of the magnetic flip level gauge. The pole detects the liquid level change and outputs a 4-20 mADC signal proportional to the liquid level change across the capacitance converting circuit. The output signal is not affected by the float position of the magnetic flip level gauge. As long as there is liquid level, the 4-20 mADC signal corresponding to the liquid level can be outputted, further improving the reliability. In the meantime, it is featured by resistance to corrosion, high working temperature and continuous output signal.

MB-CBS series refer to magnetostrictive level transmitter. Developed based on the magnetostrictive principle, the magnetostrictive level transmitter is a new generation of level transmitter with high measurement accuracy. With stable performance, the product will not be affected by the change of gas, temperature and pressure in the tank. It can provide two-wire 4-20mA (with HART), ModBus and other signal outputs.

Technical parameters of MB-CBY magnetic level transmitter	Technical parameters of MB-CBC capacitance level transmitter	Technical parameters of MB-CBS magnetostrictive level transmitter
Output current: 4-20 mADC (two-wire)	Output current: 4-20mADC	Operating power supply: 18-30VDC
Resolution: 10mm (common), 5mm	Accuracy class: class 0.5, 1.0 and 1.5	Load resistance: 500 Ω (24 VDC power supply and without digital display case)
Load resistance: 500 Ω (24VDC power supply and without digital display case)	Load resistance: 500 Ω (24VDC power supply and without digital display case)	Output signal: two-wire 4-20mADC (with HART), ModBus
Transmission distance: >1,000m	Transmission distance: >1,000m	Working temperature: -40~+85°C
Working temperature: $\leq 80^{\circ}\text{C}$; $\leq 150^{\circ}\text{C}$ (high temperature); $\leq 350^{\circ}\text{C}$ (superhigh temperature)	Working temperature: -150°C~150°C	Non-linear error: < $\pm 0.05\%$ F.S
Operating power supply: 18-28VDC	Operating pressure: -0.1-32MPa	Repeatability: < $\pm 0.02\%$ F.S
Outer tube of transmitter: stainless steel seamless tube	Operating power supply: 24VDC	Resolution: 16bitD/A conversion, 4 μm
Transmitter housing: aluminum alloy with plastic-sprayed surface	Bypass pipe of transmitter: DN20 or DN25	Material of measuring rod and meter housing: 304
Ingress protection: IP65	Transmitter housing: aluminum alloy with plastic-sprayed surface	Ingress protection: electronic bin IP65, measuring rod IP68
Explosion proof: explosion-proof type	Ingress protection: IP65	Explosion-proof sign: explosion-proof
Ex d IIC T6 Gb; Intrinsic safety type		Ex db IIC T4 Gb
Ex ia IIC T6 Ga		

Diagram of wiring of MB-CBY magnetic level transmitter



Two-wire 4-20mA DC

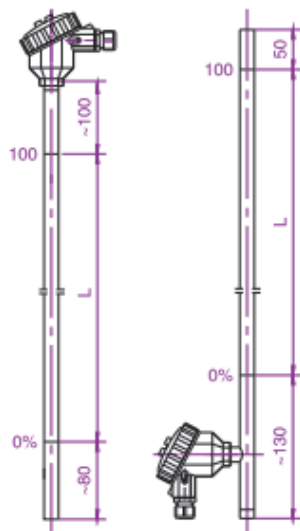
Accuracy of MB-CBY magnetic level transmitter

$$\text{Accuracy} = \frac{\text{Resolution} \times 100}{\text{Span (mm)}} \times \%$$

Note: For the same resolution, the wider the measurement range is, the higher the measurement accuracy is
 For example, when resolution is 10 mm and measurement range is 1,000 mm, the measurement accuracy is 1%; when resolution is 10 mm and measurement range is 2,000 mm, the measurement accuracy is 0.5%

Dimensions and installation method of transmitter

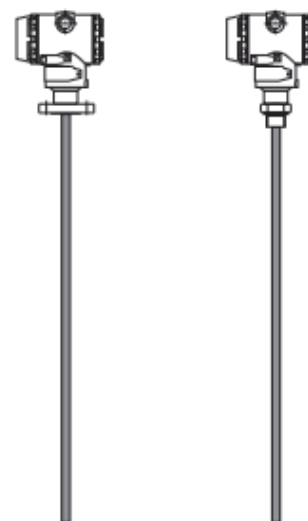
Dimensions of MB-CBY magnetic level transmitter



Dimensions of MB-CBS magnetostrictive level transmitter



Dimensions of MB-CBC capacitance level transmitter



MB-CBY magnetic level transmitter



MB-CBS magnetostrictive level transmitter



MB-CBC capacitance level transmitter



Table for models of MB-CBY magnetic level transmitter

Model	Specification code	Description
MB-CBY	-----	Magnetic level transmitter
Housing/cable inlet	S-----	Die casting Al M20×1.5
	B-----	Die casting Al 1/2"NPT
Resolution	A-----	5mm
	B-----	10mm
Safety certificate	X-----	No requirement
	I-----	Intrinsic safety Exia II CT6Ga
	O-----	Explosion-proof type Exd II CT6Gb
Display code	X-----	No display
	A-----	LCD display with HART protocol
	B-----	LED display
Range (unit: mm)	XXXX	
Working temperature	D-----	-40~80°C
	E-----	-40~150°C

■ Typical model: MBSAAAAE1500ADAD-BADCAAXX-CBYSBOX1500D

Table for models of MB-CBS magnetostrictive level transmitter

Model	Specification code	Description
MB-CBS	-----	Magnetostrictive level transmitter
Housing/cable inlet	S-----	304 housing M20×1.5
	B-----	304 housing 1/2" NPT
Output	A-----	4~20mA DC
	B-----	4-20 mA DC (with HART)
	C-----	ModBus
Safety certificate	X-----	No requirement
	O-----	Explosion-proof type Ex db IIC T4 Gb
Display code	X-----	No display
	B-----	LED display
Measuring range (unit mm) (explosion-proof ≤1,350 mm)	XXXX	
Working temperature	A-----	-40~20°C
	B-----	20~85°C

■ Typical model: MBSAAAAE1500ADAD-BADCAAXX-CBSSBOX1500B

Table for models of MB-CBC capacitance level transmitter

Model	Specification code	Description
MB-CBC	-----	Capacitance level transmitter
Housing/cable inlet	S-----	Die casting Al M20×1.5
	B-----	Die casting Al 1/2"NPT
Accuracy class	A-----	0.5 class
	B-----	Class 1.0
	C-----	Class 1.5
Safety certificate	X-----	No requirement
Display code	X-----	No display
	A-----	LCD display with HART protocol
	B-----	LCD display
Range (unit: mm)	XXXX	
Working temperature	D-----	20~80°C
	E-----	20~180°C
	J-----	-40~20°C
	K-----	-70~20°C
	M-----	-150~20°C

■ Typical model: MBSAAAAE1500ADAD-BADCAAXX-CBCSBXX1500D

MB-HB Magnetic Level Controller

The magnetic level controller and magnetic flip panel are used together and widely applied to alarm or automatic control of various liquid level (interface).

Measuring principle

The magnetic level controller adopts the imported high-quality reed pipe. There are two kinds of switch contact, i.e. single-pole double-throw (SPDT) and single-pole single-throw (SPST). When the magnetic float passes by the midpoint of the magnetic switch, the magnetic switch contact switches to and remains a stable state. When the magnetic float reversely passes by the midpoint of the magnetic switch, the magnetic switch contact switches to the original stable state and remains.

The two stable states of the magnetic level controller are only switched by the magnetic float. No external operating power supply is required.

Technical parameters of MB-HB magnetic level controller

Type of magnetic level controller: reed pipe

Switch contact state: bistable state (passive)

Switch contact type: 1 SPDT (single-pole double-throw) or 1 SPST (single-pole single-throw)

Maximum switching voltage: 230VAC, 250VAC (resistive load)

Maximum switching power supply: 0.5A, 1.0A, 2.0A (resistive load)

Maximum switching power: 20W, 60W, 200W (resistive load)

Maximum switching frequency: $\leq 1 \times 10^9$ times

Switching error: $\leq \pm 8^{\pm 2}$ mm

Working temperature: $\leq 80^{\circ}\text{C}$; $\leq 150^{\circ}\text{C}$; $\leq 350^{\circ}\text{C}$

Installation method: installed by guide rail or hoop; the switching position can be adjusted

Electrical interface: non explosion-proof type: provided with 0.3m outgoing line

Explosion-proof type: M20 $\times$ 1.5 female thread or 1/2"NPT female thread

Ingress protection: IP65

Explosion proof: Ex db IIC T6 Gb

State definition of HB magnetic level controller

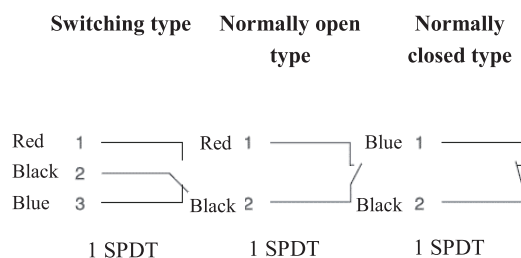
The states of switch contact in the magnetic level controller include "normally open", "normally closed" and "switching type", defined as

Normally open type: The float closes when passing by the switch contact from above or under the normal liquid level.

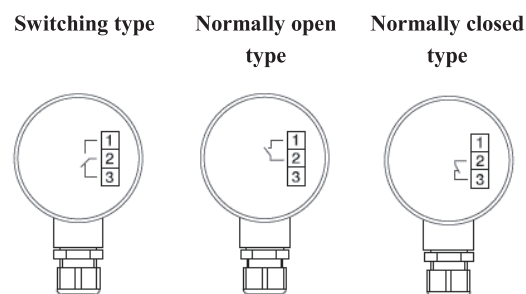
Normally closed type: The float is disconnected when passing by the switch contact from above or under the normal liquid level.

Switching type: The state switches when the float passes by the switch contact from above or under the normal liquid level.

Diagram of wiring of MB-HB magnetic level controller

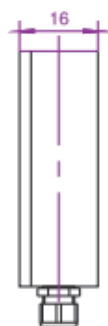


Non explosion-proof type



Explosion-proof type

Housing structure of MB-HB magnetic level controller



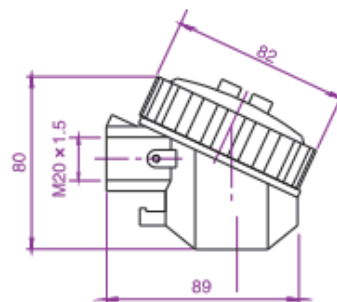
Provided with 0.3m outgoing line

Non explosion-proof aluminum alloy housing
For switch codes: A, B, C, D, E, F

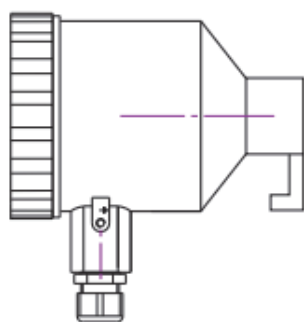


Provided with 0.3m outgoing line

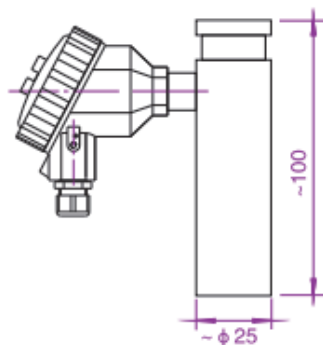
Non explosion-proof 304 housing
For switch codes: A, B, C, D, E, F



Explosion-proof aluminum alloy housing
For switch codes: A, E, F



350°C high temperature explosion-proof aluminum alloy or 304 housing
For switch code: G



Explosion-proof stainless steel housing+aluminum alloy junction box
For switch codes: A, B, C, D, E, F

Table for models of MB-HB magnetic level controller

Model	Specification code	Description
MB-HB	-----	Magnetic level controller
Housing/cable inlet	A-----	Aluminum alloy provided with 0.3 m outgoing line (non explosion-proof) (for switches A, B, C, D, E and F; ambient temperature $\leq 150^{\circ}\text{C}$)
	B-----	304 provided with 0.3 m outgoing line (non explosion-proof) (for switches A, B, C, D, E and F; ambient temperature $\leq 150^{\circ}\text{C}$)
	C-----	Aluminum alloy M20 $\times$ 1.5 (explosion-proof) (for switches A, E and F; ambient temperature $\leq 150^{\circ}\text{C}$)
	D-----	Aluminum alloy 1/2" NPT (explosion-proof) (for switches A, E and F; ambient temperature $\leq 150^{\circ}\text{C}$)
	E-----	Aluminum alloy M20 $\times$ 1.5 (high-temperature explosion-proof type) (for switch type G; ambient temperature 350°C)
	F-----	Aluminum alloy 1/2" NPT (high-temperature explosion-proof type) (for switch type G; ambient temperature 350°C)
	G-----	304 housing M20 $\times$ 1.5 (high-temperature explosion-proof type) (for switch type G; ambient temperature 350°C)
	H-----	304 housing 1/2" NPT (high-temperature explosion-proof type) (for switch type G; ambient temperature 350°C)
	J-----	Stainless steel housing+aluminum alloy junction box M20 $\times$ 1.5 (for explosion prevention) (for switches A, B, C, D, E and F; ambient temperature $\leq 150^{\circ}\text{C}$)
	K-----	Stainless steel housing+aluminum alloy junction box 1/2" NPT (for explosion prevention) (for switches A, B, C, D, E and F; ambient temperature $\leq 150^{\circ}\text{C}$)
Type of switches	A-----	Switching type (1 SPDT, 250 VAC voltage, 0.5 A current, 20 W power)
	B-----	Switching type (1 SPDT, 250 VAC voltage, 1.0 A current, 60 W power)
	C-----	Normally open type (1 SPST, 250 V AC voltage, 20 A current, 200 W power)
	D-----	Normally closed type (1 SPST, 250 V AC voltage, 20 A current, 200 W power)
	E-----	E Normally open type (1 SPST, 250 VAC voltage, 0.5 A current, 20 W power)
	F-----	F Normally closed type (1 SPST, 250 VAC voltage, 0.5 A current, 20 W power)
	G-----	Switching type (1 SPDT, 250 VAC voltage, 0.3 A current, 500 W power)
Safety certificate	X-----	No requirement
	O-----	Ex db IIC T6 Gb
Ambient temperature	D-----	$\leq 80^{\circ}\text{C}$
	E-----	$\leq 150^{\circ}\text{C}$
	F-----	$\leq 350^{\circ}\text{C}$
Qty	XX	(Unit: Nos)

- Typical model 1: MBSAAAAE1500ADAD-BADCAAXX-HBJBOD02
- Typical model 2: MBSAAAAE1500ADAD-BADCAAXX-CBYSBOX1500D-HBJBOD02

MBQ Magnetic Float Level Gauge



Measuring principle

MBQ magnetic float level gauge is composed of reed pipe, precision resistor and amplified converting circuit. When the magnetic line of the magnetic float acts on one position of the liquid level sensor, the reed pipe at such position closes and the magnetic float varies with the liquid level (interface). The amplified converting circuit converts the liquid level (interface) change into linear 4-20mA DC signal and outputs it to detect and transmit the liquid level (interface) signal.

With imported high-quality sensor components and signal converters, MBQ magnetic float level gauge has excellent long-term stability and reliability.

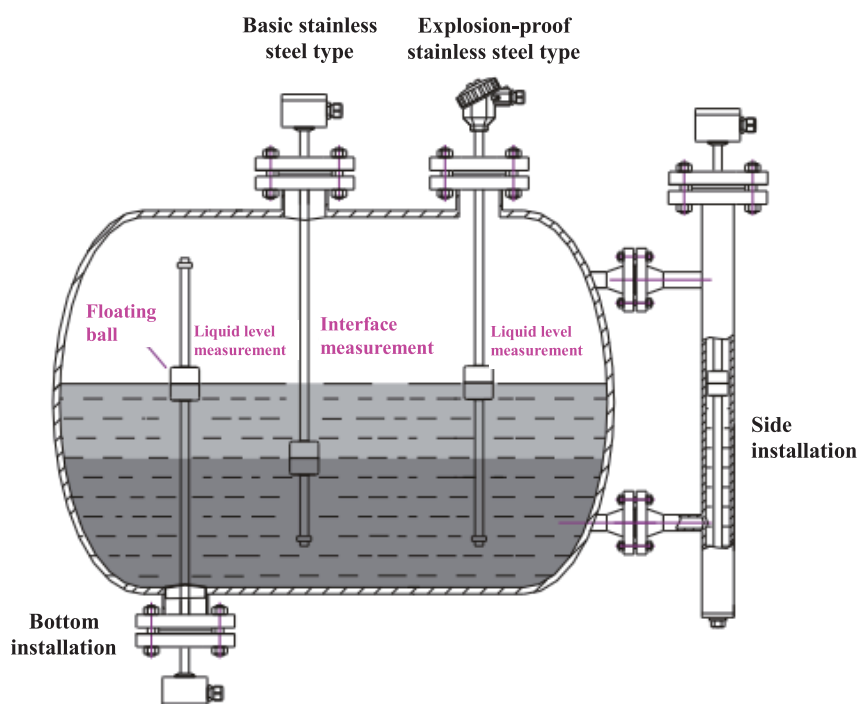
Application industries

MBQ magnetic float level gauge is widely used to measure, transmit and display the liquid level of the medium or the interface of two media of different density (liquid, oils and strong and weak acid-base solution) in various kinds of vessels, such as liquid storage tank, storage tank, storage reservoir, reaction tank and fermentation tank used in the industries related to oil, chemicals, pharmaceuticals and food.

Product features

- Simple structure, good stability and reliability, excellent repeatability;
- No influence by the physical and chemical state of the measured medium. Such as: Influence of conductivity, dielectric constant, foam, pressure, temperature, evaporation, bubble, etc.;
- Made of different materials and used in all kinds of strong and weak, flammable and explosive, toxic, radioactive and muddy media;
- Measuring the liquid level or the interface of two media of different density;
- Explosion-proof structure design for explosive environment;
- Two-wire 4-20 mA current output, with 0.56" LED digital display, convenient for the long-distance observation at night.

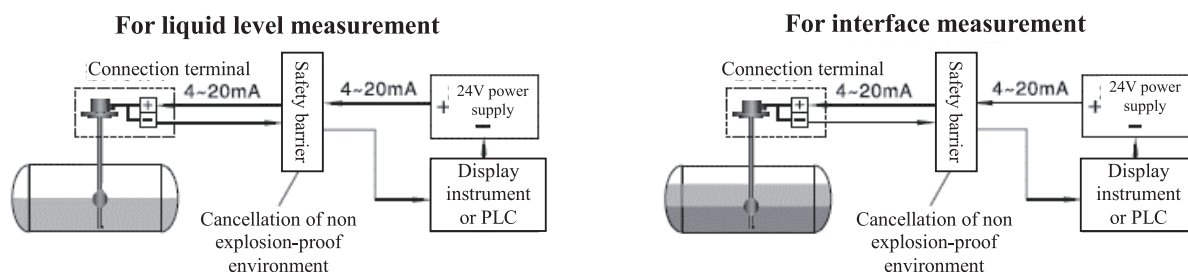
Schematic diagram for the installation of MBQ magnetic float level gauge



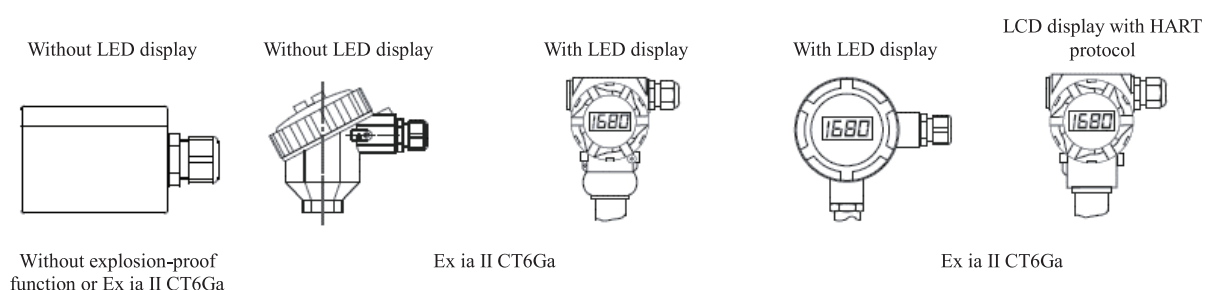
Technical characteristics

- Measurement range: 200-6,000mm (special order if greater than 6m)
- Resolution: 10mm (common), 5mm, 20mm
- Output signal: 4-20 mADC (two-wire)
- Linear resistance, 200 Ω /m (1/2", 3/8" thread installation method)
- Load resistance: 500 Ω (24VDC power supply and without digital display case)
- Transmission distance: >1,000m
- Working temperature: $\leq 80^{\circ}\text{C}$; $\leq 120^{\circ}\text{C}$; $\leq 150^{\circ}\text{C}$
- Operating power supply: 16-30VDC
- Medium density: $\geq 0.5\text{g/cm}^3$ ($< 0.5\text{g/cm}^3$, special orders are required)
- Nominal pressure: PN2.5-PN160 (kgf/cm^2) (up to PN320 kgf/cm^2 , special orders are required)
- Float diameter: $\phi 45$ - $\phi 120$ (determined by pressure and density)
- Installation flange: DN50~DN150 (HG/T 20592-2009)
- Electrical interface: M20 $\times$ 1.5 female thread or 1/2"NPT female thread
- Nonperpendicularity of installation: $\leq \pm 25^{\circ}$
- Ingress protection: IP65
- Explosion-proof level: Intrinsic safety Exia II CT6Ga, explosion-proof Exd II CT6Gb

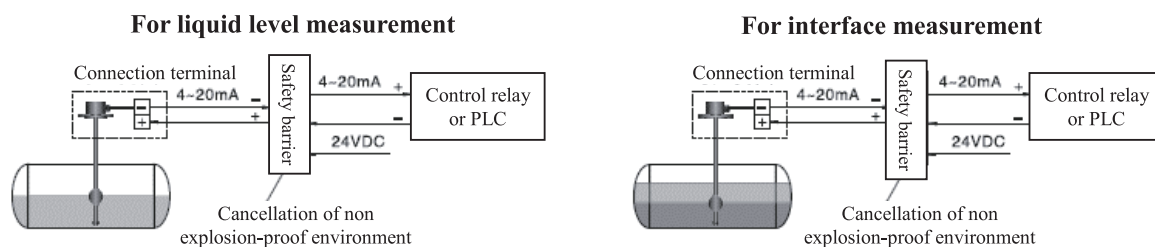
Application example of magnetic level gauge (transmitter)



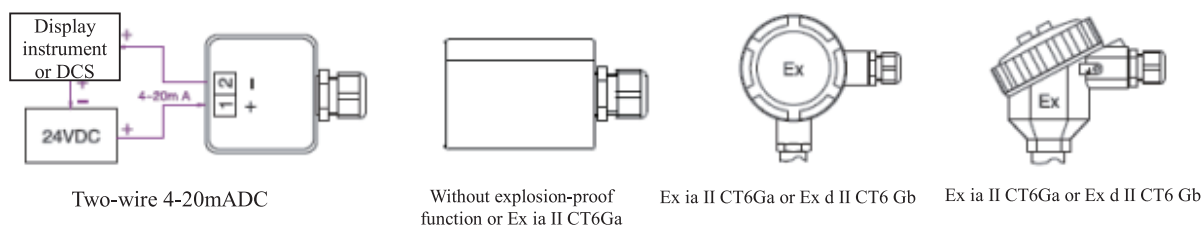
Junction box type of magnetic level gauge (transmitter)



Schematic diagram for the wiring of MBQ magnetic float level gauge (intrinsic safety type)

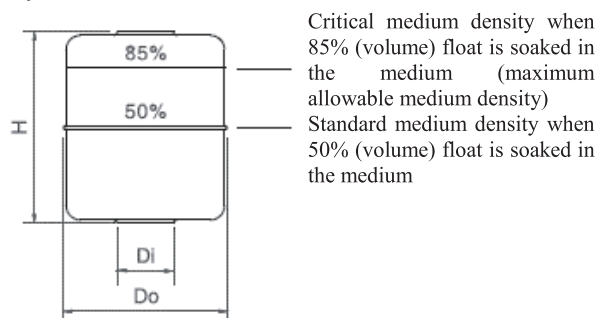


Junction box type and diagram of wiring of MBQ magnetic float level gauge

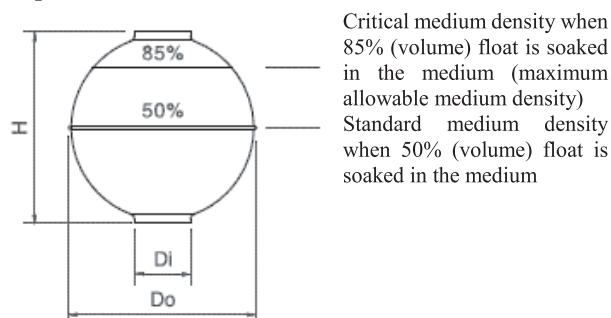


Introduction of float

Cylindrical float



Spherical float



Float material	Float code	Di(mm)	Do(mm)	H(mm)	Maximum operating pressure (PN)	Working temperature (°C)	Standard density g/cm ³	Critical density g/cm ³
1Cr18Ni9Ti 316L	V24	9	24	24	10~16	150	1.0	0.8
	V28	9	24	28	10~16	150	1.0	0.78
	V38	9	38	27	10~16	150	1.0	0.55
	V45	16	45	50	10~16	150	1.0	0.6
	V51	16	51	60	10~16	150	1.0	0.5
	V75	16	75	75	25	150	1.0	0.55
	V125	22	125	125	25	150	1.0	0.55
	V110	16	110	110~180	40~63	150	1.0	0.8
Titanium alloy	T95	16~22	95	110~180	40~160	150	1.0	0.5
	T110	16~22	110	110~180	40~160	150	1.0	0.5
Teflon	F48	22	48	70~100	6~16	150	1.0	0.7
Polypropylene (PP)	P48	24.5	48	60~120	6~20	≤80	1.0	0.8
	P58	24.5	58	60~120	6~20	≤80	1.0	0.6
	P76	24.5	76	70~120	6~16	≤80	1.0	0.5

- Notes: 1. Float specifications can be specially ordered according to actual conditions. If the medium density is less than 0.5 g/cm³, special orders can be placed;
2. Titanium alloy, polytetrafluoroethylene and polypropylene floats are all cylindrical floats, while the others are cylindrical or spherical floats (those not coded are cylindrical floats);
3. The data in the above-mentioned table are for reference only. Manufacturers are allowed to change the structural type and size of floats according to the difference of operating pressure and medium density.

General description

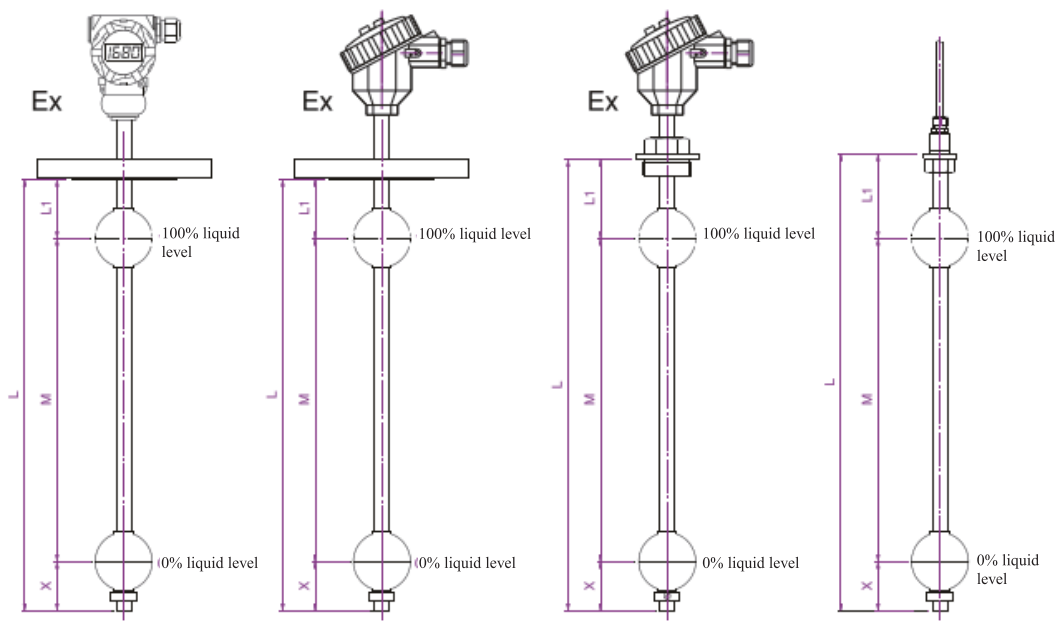
Dimensions of meter					
Installation	Flange DN50~DN150 sealing face RF (HG/T20592-2009)		Thread G2" Installation from the top down	DIN clip-type components Size ≥ DN50	Thread G1/2" or G3/8" Installation from the bottom up
Conduit diameter	20mm	14mm	20mm	14mm	14mm
Maximum installation depth	6000mm	2000mm	6000mm	2000mm	2000mm
Transmission resolution	10 mm (recommended), 20 mm and 5 mm (optional)				
Float type and diameter	See the introduction of floats (determined by the manufacturers according to the operating pressure, medium density and installation method, or designated by the user)				
Process temperature	304 and 304+PTFE: -40~120°C; polypropylene ≤80°C; PVC ≤60°C				
High temperature type	≤150°C				
Process pressure	304 and 304+PTFE: ≤16 MPa, polypropylene and PVC: ≤1.6 MPa				
Perpendicularity of installation	≤ ± 25°				
Medium density	≥0.5g/cm ³				
Degree of protection	IP65				
Explosion-proof certification	Exia II CT6Ga or Exd II CT6Gb				
Cable entry	M20×1.5 or 1/2" NPT				Three-core shaded conductor (0.5m)
Typical medium	Media compatible with 304, 316L, PTFE, polypropylene and PVC				

Table of MBQ model

Model	Specification code	Description
MBQ	-----	Magnetic float level gauge
Housing/cable inlet	X-----	0.5 m conductor (for upward thread installation)
	S-----	Aluminum alloy M20×1.5
	B-----	Aluminum alloy 1/2" NPT
Output type	A-----	4~20mA
	B-----	4~20 mA, with HART protocol
	C-----	0~20mA
	D-----	0~10mA
Resolution	A-----	5mm
	B-----	10mm
	D-----	20mm
Safety certificate	X-----	No requirement
	I-----	Intrinsic safety type Ex ia II C T6 Ga
	O-----	Explosion-proof type Ex d II C T6 Gb
Conduit material	A-----	304
	B-----	316L
	E-----	PP
	F-----	304+PTFE (conduit diameter can only be 20 mm)
Conduit diameter (unit: mm)	A-----	14 (process pressure≤16 kgf/cm ² ; installation depth≤2 m)
	B-----	16
	C-----	20
Float material	A-----	304
	B-----	316L
	E-----	PP
	F-----	304+PTFE
Span (unit: mm)	XXXX/XXXX	(installation depth L/span M) (note: maximum span≤installation depth-float height-30)
Case display type	X-----	No display head
	A-----	LED head
	B-----	LCD case (with HART protocol)
	C-----	0.56" LED display
Process temperature	D-----	-20-80°C (for upward installation)
	E-----	-40~80°C
	F-----	-20~120°C
Process pressure (kgf/cm ²)	A-----	2.5
	B-----	6
	C-----	16
	D-----	25
	E-----	40
	F-----	63
	G-----	100
	H-----	160

Model	Specification code	Description
Process connection	A_____	G2" thread (downward installation)
	B_____	G3/8" thread (upward installation)
	C_____	G1/2" thread (upward installation)
	K_____	Sanitary DIN bayonet
	D_____	Standard flange (see Table of Flange Model)
Flange standard	A_____	HG/T20615-2009 (Class series)
	B_____	HG/T20592-2009 (PN series)
Flange size	E_____	DN50
	F_____	DN80
	G_____	DN100
	H_____	DN125
	J_____	DN150
Pressure rating (kgf/cm ²)	A_____	PN2.5
	G_____	PN6
	B_____	PN10
	C_____	PN16
	D_____	PN25
	F_____	PN40
	H_____	PN63
	J_____	PN100
	K_____	PN160
	M_____	Class150
	N_____	Class300
Flange sealing face type	A_____	RF raised face
	B_____	FM
	C_____	M
	D_____	T tongue face
	E_____	FF
	F_____	RJ ring joint face
Material of flange	A_____	304
	B_____	316L
	C_____	321
	D_____	PP
	E_____	304+PTFE
Companion flange (A, B and C options are inherently equipped with 304 bolt , nut, flat washer, flat PTFE gasket for flange seal)	X_____	Without companion flange
	A_____	304
	B_____	316L
	C_____	Carbon steel
Connection accessories	X_____	Without bolt group and flange gasket
	A_____	304 bolt group+flange gasket

MFT Displacement Level Meter



Measuring principle

MFT intelligent displacer (interface) level gauge is an (interface) level gauge developed based on foreign techniques. It consists of intelligent processing unit, measuring chamber, inner buoy, and torque tube assembly. The change of the liquid level of the measured medium causes the buoyancy of the inner displacer to change, which changes the resultant force of the torque tube and transmits it to the torque tube assembly, so that the torque tube and the spindle deflect synchronously. By measuring the displacement of the deflection, the intelligent processing unit converts the displacement into a signal of 4~20 mA for output. The intelligent processing unit can detect the change of ambient temperature and compensate the output signal linearly, and can also compensate the change of liquid density caused by the change of process temperature.

MFT intelligent (interface) level gauges provide standard 4~20 mA current signal output, on-site LCD, and can provide communication functions such as HART.

Product features

- Torque tube type, high sensitivity, little drift and high accuracy;
- High stability and high disturbance resistance;
- Output 4-20 mADC, HART protocol might be added;
- LCD;
- Convenient debugging. It can be debugged through the buttons on the case at site.

Technical characteristics

Product Model	MFT displacement level meter
Appearance	
Measuring range	300 mm~3,000 mm(>3,000 mm negotiated supply)
Accuracy of the measurements	0.5%FS, 1.0%FS
Nominal pressure	$\leq 42.0\text{MPa}$
Medium density	$\geq 0.45\text{g/cm}$
Density difference	$\geq 0.1\text{g/cm}$
Output signal	4~20 mADC (HART protocol might be supplied)
Load resistance	500 Ω (at 24 VDC)
Working temperature	-70°C~+450°C (>450°C negotiated supply)
Material of torque tube	304, 316L, Ni - Cr alloy, Mone, etc.
Liquid receiving material	Carbon steel, 304, 316K or as per user requirements
Flange standard	HG/T20592-2009, HG/T20615-2009 or as per user requirements
Electrical interface	M20x1.5 or 1/2NPT (female thread)
Outer casing tracing	Bouy type steam tracing or electrical tracing tape
Tracing pressure	$\leq 0.6\text{MPa}$
Ambient temperature	-40°C~+80°C(LCD>-30°C)
Working power supply	18~30VDC
Degree of protection	IP65, IP67(other protection levels might be negotiated for supply)
Explosion-proof sign	Ex db IIC T6 Gb

Application industries

■ Power plant	Water tank, waste gas purification tank, oil tank, etc.
■ Oil field	Crude oil or refined oil tank, three-phase separator, settling tank, sewage tank (pool), etc.
■ Petrochemical industry	Oil pipeline, liquefied gas tank, ammonia tank, oil refinery depot, gas station storage tank, etc.
■ Chemical	Distillation tower, ammonia tank, toxic liquid tank, etc.
■ Water and water treatment	Water tank, sewage pool, water treatment tank, clarifier, digestion tower, etc.
■ Others	Food, pharmaceutical, environmental protection, paper making and other industries

Definition of case installation direction

Install the case on the measuring chamber of the buoy. If the case is installed on the right side of the displacer measuring chamber, it is right-mounted. The torque tube rotates clockwise when the liquid level rises. If the case is installed on the left side of the displacer measuring chamber, it is left-mounted. The torque tube rotates counterclockwise when the liquid level rises.

Outline and mounting dimensions

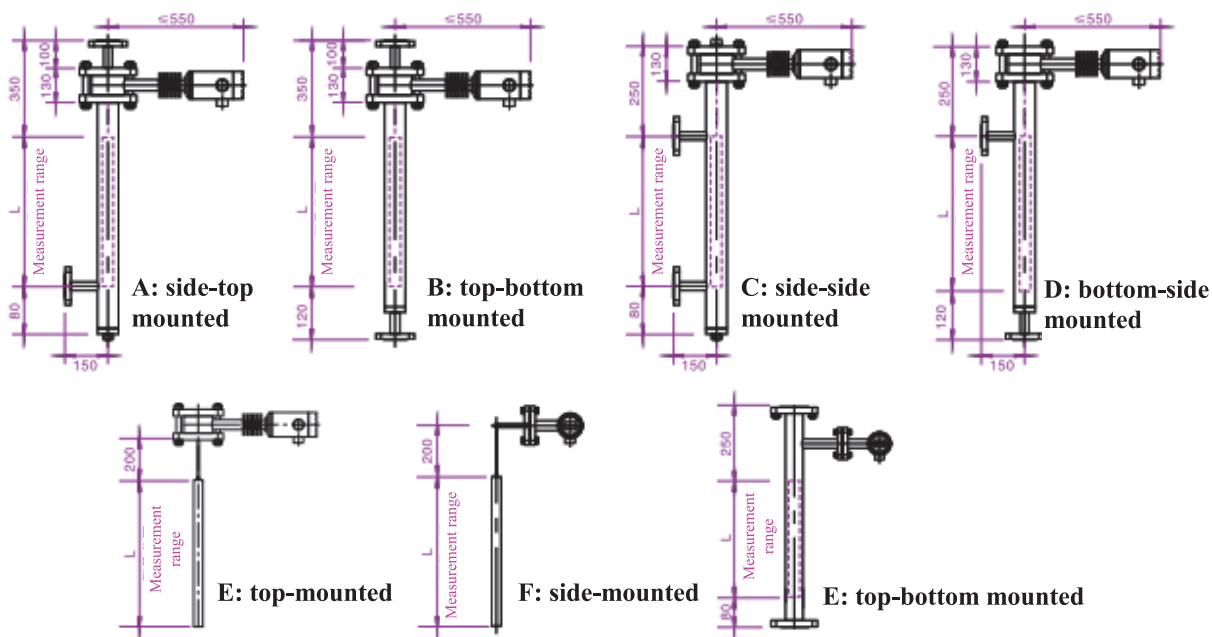


Table of MFT model

Model	Specification code	Description
Products	MFT31	0.5% accuracy
	MFT32	1.0% accuracy
Measuring type	L	Liquid level
	B	Interface level
	P	Density
Output	B1	4~20mA
	B2	4~20mA, HART
Enclosure	S	Die casting Al, 2XM20x1.5
	B	Die casting Al, 2X1/2"NPT
Case position	L	Installed on the left
	R	Installed on the right
Installation	A	Top-side mounted
	B	Top-bottom mounted
	C	Side-side mounted
	D	Bottom-side mounted
	E	Top-mounted
	F	Inverted
	S	Top-bottom mounted
Safety certification information	X	No requirement
	D	Explosion-proof type Ex db IIC T6 Gb
Material of outer buoy	A	304
	B	316L
	C	Carbon steel
	D	321
	E	Carbon steel+PTFE
	F	304+PTFE
	T	Titanium alloy
Material of inner buoy	A	304
	B	316L
	D	321
	E	Carbon steel+PTFE
	F	304+PTFE
	T	Titanium alloy
Outer casing tracing	X	No tracing
	A	Steam tracing, flange DN15 PN1.6 RF
	B	Steam tracing, thread R1/2
	D	Electrical tracing tape, 220 VAC power
Span	XXXX	0300-3000 (unit mm)
Process temperature	D	-40~80
	E	-40~150
	F	-40~250
	G	-40~425

Model	Specification code	Description
Process pressure (unit Mpa)	1	2.5
	2	4.0
	3	6.3
	4	10.0
	5	16.0
	6	26.0
	7	42.0
Flange standard	A	HG/T20615-2009 (Class series)
	B	HG/T20592-2009 (PN series)
Flange size	A	DN25(1")
	B	DN32(1.25")
	D	DN40(1.5")
	E	DN50(2")
	C	DN65(2.5")
	F	DN80(3")
Flange size	G	DN100(4")
	H	DN125(5")
	J	DN150(6")
Pressure rating (kgf/cm ²)	A	PN2.5
	G	PN6
	B	PN10
	C	PN16
	D	PN25
	F	PN40
	M	Class150
	N	Class300
Flange sealing face type	A	RF (recommended)
	B	FM
	C	M
	E	FF flat (only for process pressure ≤PN16)
	F	Flat-thin plate flange (8 mm thick, M only for process pressure)
Material of flange	A	304
	B	316L
	C	Carbon steel
Companion flange	X	Without companion flange
	A	304
	B	316L
	C	Carbon steel

MGP Glass Plate Level Gauge



Measuring principle

MGP glass plate level gauge has transparent type, reflective type and sight glass type. The level gauge mainly consists of liquid level gauge, steam side valve, liquid side valve, blow-down valve (or drain plug), exhaust valve (or drain plug), safety steel ball, etc. When the glass plate breaks suddenly, if the steam-liquid side pressure is not lower than 0.3 MPa, the steel ball in the valve would be automatically closed to prevent the medium from spraying out (slow dripping is allowed), so as to be convenient for manually disconnection of the root valve of the level gauge for treatment. The level gauge has the advantages of firm structure, reliable sealing, simple installation, available LED light source and convenient observation. It is an ideal meter for observing the liquid level in various high, medium and low pressure containers.

The steam-liquid side connecting flanges of the level gauge are respectively connected with the steam-liquid side flanges of the container to form a communicating vessel to observe the liquid level directly.

MGP glass plate level gauges are manufactured according to HG 21588-95.

Product features

- Simple structure and easy installation;
- Automatic protection, safe and reliable;
- LED display, convenient for observation;
- Debugging-free.

Technical parameters

Product Model	MGP series glass plate level gauge
Appearance	
Center distance L	500, 550, 800, 850, 1100, 1150, 1400, 1450, 1700, 1750mm
Visible range	260, 560, 860, 1160, 1460mm
Center distance L	580, 920, 1260, 1600, 1940mm
Visible range	300, 642, 984, 1326, 1,668 mm; (other center distance can be negotiated at ordering)
Material	Carbon steel, 304, 316K
Pressure grade	1.6, 2.5, 4, 6.4, 10, 16, 20, 26MPa
Working temperature	$\leq 450^{\circ}\text{C}$ (in section, indicate the working temperature at ordering)
Connecting flange	DN20 GB/T 9112-2010 (default)
Tracing pipe joint	RC1/4 female thread
Tracing steam pressure	$\leq 1.0\text{MPa}$
Safety protection	When the glass plate breaks suddenly, if the steam-liquid side pressure is not lower than 0.3 MPa, the steel ball in the valve would be automatically closed.
Light source	High light LED lamp
Power consumption	20 W/m (for non explosion-proof environment)
Power of light source	24 VDC (recommended), 220 VAC, solar power (negotiated)

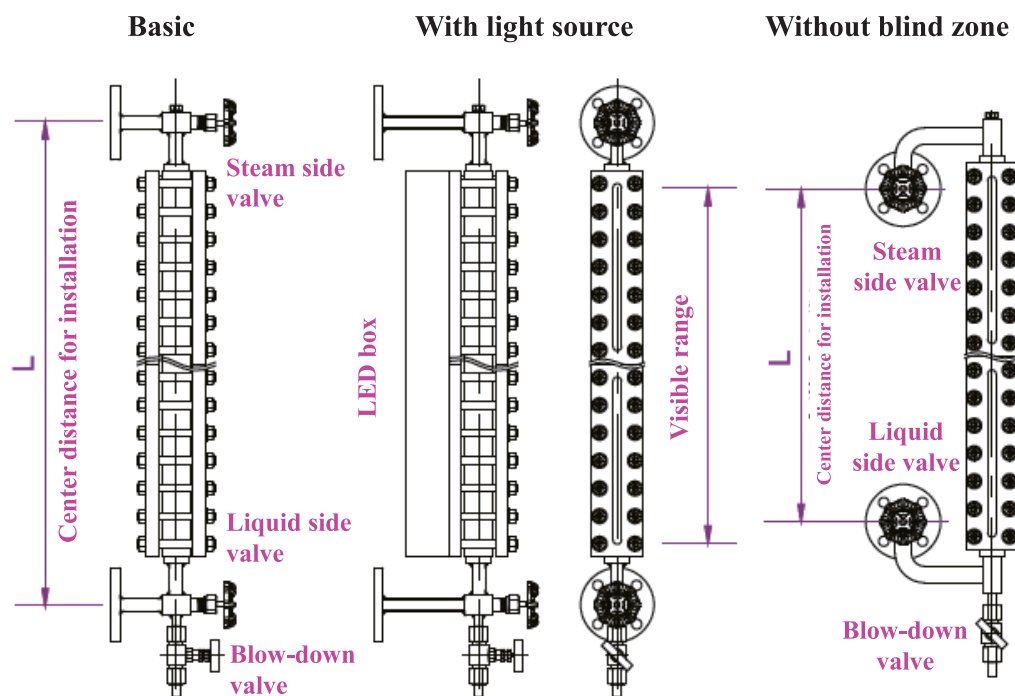
Note: The medium density should be indicated.

Application industries

- | | |
|------------------------------------|---|
| ■ Power plant | Water tank, waste gas purification tank, oil tank, etc. |
| ■ Oil field | Crude oil or refined oil tank, three-phase separator, settling tank, sewage tank (pool), etc. |
| ■ Chemical | Distillation tower, ammonia tank, toxic liquid tank, etc. |
| ■ Water and water treatment | Water tank, sewage pool, water treatment tank, clarifier, digestion tower, etc. |
| ■ Others | Food, pharmaceutical, environmental protection, paper making and other industries |

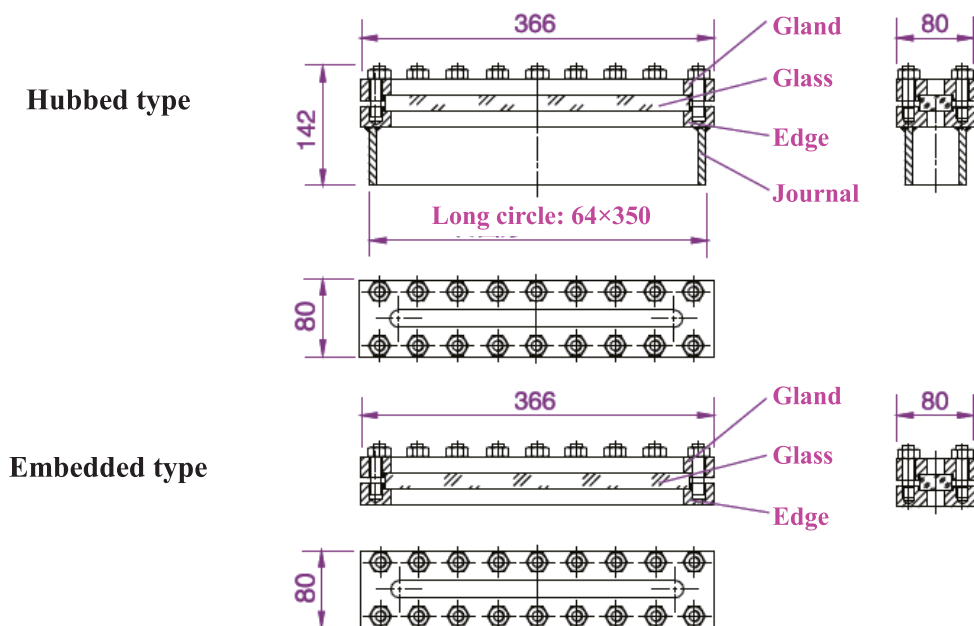
Outline structure

Transparent type, reflective type glass plate level gauges



Note: The transparent type level gauges can be supplied with LED light sources to be convenient to observation of liquid level at night.

Sight glass plate level gauge



Note: The length of the level gauge can be made according to user requirements.

Transparent type (T): The level gauge has a transparent glass and a gland before and after, so that light can pass through.

Reflective (R): The level gauge has a transparent glass and a gland before, and a closed back, so that the light cannot pass through.

Table for models of MGP transparent type and reflective type

Model	Specification code	Description
Products	MGP	Glass plate level gauge
Flange type	A	Raised face flange (RF), HGJ 50
	B	Male flange (M), HGJ 50
	C	Raised face flange (RF), ANSI B16.5
Type	T	Transparent type
	R	Reflective type
Nominal pressure (MPa)	X.X	E.g. 1.6 means 1.6 MPa
Material code	I	Carbon steel
	II	304
	V	316L
Structure	X	Common type
	W	Tracing type
	F	Frost-proof type
	N	Without blind zone
Nominal length (mm)	XXXX	
Drain outlet	V	Sewage outfall equipped with needle valve
	P	Sewage outfall equipped with plug screw
LED light source	X	Without LED
	B	24VDC
	U	220VAC
	T	Solar supply

■ Typical model: MGPBT6.3 II N0600VX

Table for models of MGP sight glasses

Model	Specification code	Description
Products	MGP	Glass plate level gauge
Type	S	Type of sight glasses
Nominal pressure (MPa)	X.X	E.g. 1.6 means 1.6 MPa
Material code	I	Carbon steel
	II	304
	III	Lined carbon steel
	V	316L
Structure	J	Hubbed type
	Q	Embedded connected type

■ Typical model: MGPS1.6 II J

MS Magnetostrictive level transmitter



Measuring principle

Substances expand when heated and contract when cooled. Except for heating, magnetic fields and electric fields can also lead to the size elongation or shortening of objects. The size of ferromagnetic substance is extended (or shortened) under the action of an external magnetic field and restores to its original length after the external magnetic field is removed. This phenomenon is called magnetostrictive phenomenon (or effect).

Based on the magnetostrictive principle, a magnetostrictive wire with one end connected with a sensor is installed in the nonmagnetic probe. The main electronic control unit sends an electromagnetic narrow pulse to the magnetostrictive line. The electromagnetic pulse is conducted along the magnetostrictive line. When the magnetic field generated by the pulse interacts with the magnetic field generated by the magnet in the float of the marked liquid level/interface, a torsional stress wave is generated on the magnetostrictive line, which will return to the above sensor along the magnetostrictive line. The sensor will capture the return wave and convert it into an electronic pulse signal and send it back to the main electronic control unit. The main electronic control unit accurately measures the time interval between the transmitted pulse and the return pulse through the precision circuit, and calculates the position of the float, that is, the height of the liquid level/interface.

Product features

- | | |
|------------------------------------|--|
| ■ Multifunction | The liquid level and interface position can be measured independently or simultaneously. |
| ■ High accuracy | Measurement accuracy ± 1 mm or 0.1%FS (whichever is greater) |
| ■ Wide range of application | Flexible and diversified installation methods |
| ■ Output mode | Support field indication and remote electrical output |
| ■ Split installation | Support split installation |

Technical characteristics

Product Model	MS magnetostrictive level transmitter
Appearance	
Operating voltage	16-35 VDC (ripple less than 100 mVp-p)
	30-250VAC (50/60HZ)
Power consumption	<770 mW (two-wire)
	<1.5 W (four-wire)
Input	Measuring variable: change of float position for change of level
	Medium density: $\geq 0.38 \text{ g/cm}^3$
	Medium density different: $\geq 0.2 \text{ g/cm}^3$
	Medium viscosity $\leq 1.5 \text{ Pas}$ (1,500 cp)
Output	Current output: 4-20 mA
	Min. current: 3.8 mA
	Maximum current: 22mA
	Resolution: 1.6 uA
	Display output: meter optional
	HART communication: meter optional
	Optional switch output: optional; relay output: SPDT(3A/250VAC)×3
Delay	0-40S
Resolution	0.254mm
Precision	$\pm 1 \text{ mm}$ or 0.1%FS (whichever is greater)
Max. process pressure	6.3MPa
Process temperature	-196~450°C



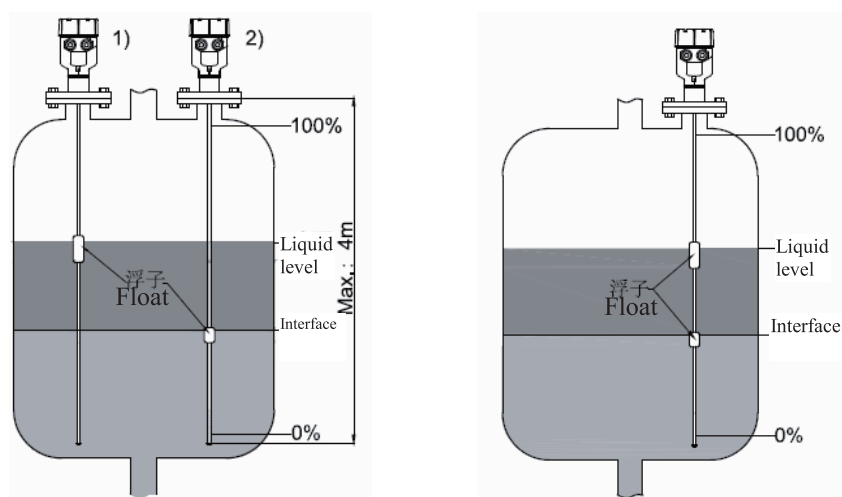
Process connection	3/4NPT or flange
Ambient temperature	-40~80°C
Case protection class	IP67
Safety certification information	Intrinsic safety type Ex ia IIC T5/T6 Ga
	Explosion-proof type Ex db IIC T6 Gb
	Dust explosion proof Ex tb IIIC T80°C Db
Cable entry	2 M20x1.5 or 1/2"NPT (cable diameter 9~13mm)

Application industries

- **Power plant** Water tank, waste gas purification tank, oil tank, etc.
- **Oil field** Crude oil or refined oil tank, three-phase separator, settling tank, sewage tank (pool), etc.
- **Petrochemical industry** Oil pipeline, liquefied gas tank, ammonia tank, oil refinery depot, gas station storage tank, etc.
- **Chemical** Distillation tower, ammonia tank, toxic liquid tank, etc.
- **Water and water treatment** Water tank, sewage pool, water treatment tank, clarifier, digestion tower, etc.
- **Others** Food, pharmaceutical, environmental protection, paper making and other industries

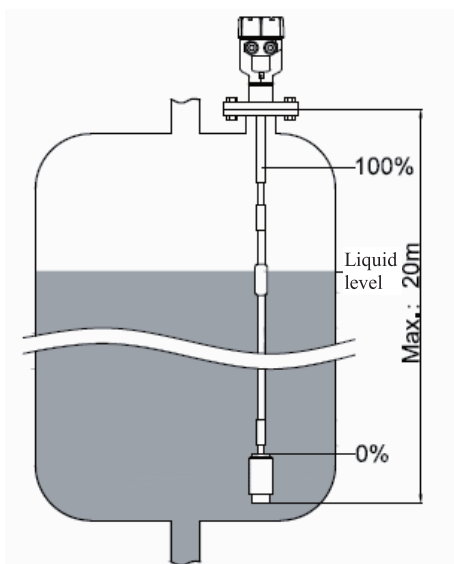
Installation guide

Rod probe



Rod probes with different floats can be used to measure liquid level or interface, with a maximum length of 4 m. Double floats can be used to measure liquid level and interface at the same time.

Cable probe



Cable probes with different floats can be used to measure liquid level or interface, with a maximum length of 20 m.

Table of MS model

Model	Specification code	Description
Products	MS22	0.1% accuracy
	MS13	0.5% accuracy
Type of probe	P	Rod
	C	Cable type
Enclosure	S	Die casting Al, 2XM20x1.5
	B	Die casting Al, 2X1/2"NPT
Power supply and output	B2	24 v two-wire, HART
	B4	24 v four-wire, HART
	U4	220 v four-wire, HART
Safety certificate	X	None
	I	Intrinsic safety type
	D	Explosion-proof
	N	Dust
Float quantity	0	No float
	1	Single float
	2	Double floats
Number of temperature detection points	0	No temperature detection point
	1	Single temperature detection point
	2	Double temperature detection points
Material of rod probe	A	304
	B	316L
	C	316+PFA
	D	316+ECTFE
	E	Titanium alloy
	F	Hastelloy
Probe length	XXXX	0000-2,000 (unit mm)
Process temperature	C	-196~80
	D	-40~120
	E	-40~150
	F	-40~260
	G	-40~450
Process pressure	L	-1
	M	1
	A	2.5
	B	6
	C	16
	D	25
	E	63

Model	Specification code	Description
Process connection	TA	3/4NPT
	FB	Flange
Flange standard	A	HG/T20615-2009 (Class series)
	B	HG/T20592-2009 (PN series)
Flange size	E	DN50(2")
	F	DN80(3")
	G	DN100(4")
	H	DN125(5")
	J	DN150(6")
	K	DN200(8")
	M	DN250(10")
Pressure rating (kgf/cm ²)	A	PN2.5
	G	PN6
	B	PN10
	C	PN16
Pressure rating (kgf/cm ²)	D	PN25
	F	PN40
	M	Class150
	N	Class300
Flange sealing face type	A	RF (recommended)
	B	FM
	C	M
	E	FF flat (only for process pressure ≤PN16)
	F	Flat-thin plate flange (8 mm thick, M only for process pressure)
Material of flange	A	304
	B	316L
	C	Carbon steel
	D	PP (thickness 20mm, only applicable to atmosphere (ATM))
	E	PTFE (thickness 20mm, only applicable to atmosphere (ATM))
Companion flange	X	Without companion flange
	A	304
	B	316L
	C	Carbon steel

Note: The medium density should be indicated.

MTP Input Hydrostatic Level Transmitter



Measuring principle

MTP input hydrostatic level transmitter converts the change of material (liquid) level into linear 4-20 mADC standard signal based on the linear change rule of liquid level, density and pressure and then outputs the signal. With imported high stability sensors and integrating temperature compensation and correction technology, the level transmitter has good anti-disturbance property, reliability and excellent stability.

Application of product

MTP input hydrostatic level transmitter can be widely used for liquid level measurement of media under normal pressure in the industries related to oil, steel, metallurgy, oil fields, chemicals, thermal power plants, light industry, sewage treatment, dam water level, deep well, etc.

Product features

- Strong anti-disturbance property, stable and reliable running;
- Lightning protection design;
- Special application design can be provided.

Technical characteristics

Measurement range: 0-200m (cable type), 0-5m (rod type)

Measurement accuracy: class 0.5

Output signal: 4~20 mADC

Load resistance: 0~500 Ω

Transmission distance: 1,000 m

Operating power supply: 24VDC

Working temperature: -50~+80°C, -50~+150°C (for static pressure rod type only)

Ambient temperature: -40~50°C

Relative moisture: $\leq 85\%$ Materials of wet parts: stainless steel, polypropylene, PTFE

Installation method: 1. Installation with flange: Min. DN32 (HGT20592-2009)

2. Installation with thread: G2" threaded junction box interface: M20×1.5

General description

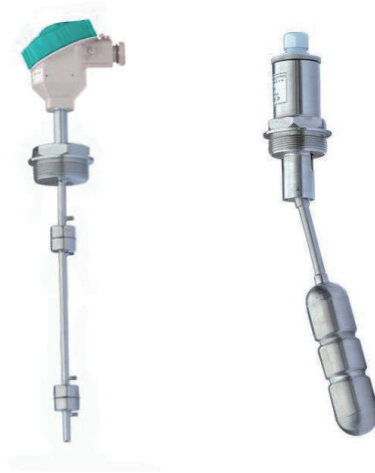
Type of meters	Cable type structure	Rod type structure
Dimensions of meter	With instrument housing Without instrument housing Gas conduction cable Installation with flange Without fixtures	Measurement rod Measurement rod Installation with flange Installation with thread
Electrical connection	Intrinsic safety and explosion-proof place With wiring of instrument housing Without wiring of instrument housing Gas conduction cable Red 24V+ Blue 24V-	Intrinsic safety and explosion-proof place 4-20mA 4-20mA 24V power supply or distributor Display instrument or PLC
Schematic diagram of typical installation	Deep well Rivers and reservoirs Dam	Suitable for general or slight stirring environment Suitable for violent stirring environment Suitable for narrow spaces

Table of MTP model

Model	Specification code	Description
MTP	_____	Input Hydrostatic Level Transmitter
Type of contacted liquid	A_____	Cable type (span: 0-200 m)
	B_____	Rod type (span: 0-5 m)
Housing/cable inlet	S_____	Aluminum alloy M20×1.5
	B_____	Aluminum alloy 1/2" NPT
	X_____	No housing
Output signal	A_____	4~20mADC
	B_____	0~20mA
Safety certificate	X_____	No requirement
	I_____	Ex ia II C T6 Ga
With display head	A_____	No display head
	B_____	LED head
	D_____	LCD head
Span (unit: m)	XXX	
Materials of wet parts	A_____	304
	B_____	316L
	C_____	Titanium alloy
	D_____	PTFE (only for process temperature: -50~+80°C)
	E_____	PP (only for process temperature: -20~+80°C)
Process temperature	D_____	-50~80°C
	E_____	-50~450°C (only optional for rod type structure)
Process connection	A_____	G2" thread
	D_____	Standard flange
Flange standard	A_____	HG/T20615-2009 (Class series)
	B_____	HG/T20592-2009 (PN series)
Flange size	D_____	DN32
	N_____	DN40
	E_____	DN50
	F_____	DN80
	G_____	DN100
	H_____	DN125
	J_____	DN150

Model	Specification code	Description
Pressure rating (kgf/cm ²)	A—————	PN2.5
	G—————	PN6
	B—————	PN10
	C—————	PN16
	D—————	PN25
	F—————	PN40
	H—————	PN63
	J—————	PN100
	K—————	PN160
	M—————	Class150
	N—————	Class300
Flange sealing face type	A—————	RF (recommended)
	B—————	FM
	C—————	M
	D—————	T tongue face
	E—————	FF
	F—————	RJ ring joint face
Material of flange	A—————	304
	B—————	316L
	C—————	321
Companion flange (A, B and C options are inherently equipped with 304 bolt , nut, flat washer, flat PTFE gasket for flange seal)	X—————	Without companion flange
	A—————	304
	B—————	316L
	C—————	Carbon steel
Connection accessories	X—————	Without bolt group and flange gasket
	A—————	304 bolt group+flange gasket

MBK Magnetic Float and Displacer Level Controller



Measuring principle

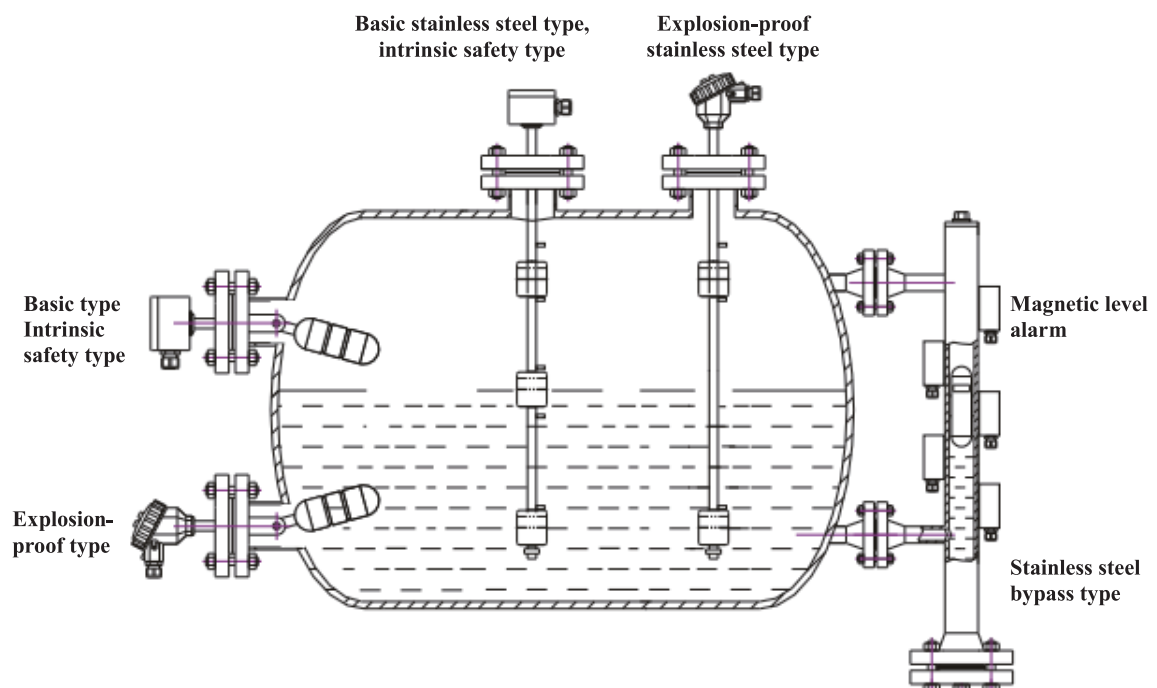
MBK magnetic float and displacer level controller is composed of reed pipe and magnetic float. Based on the principle of buoyancy, the floating ball with a magnetic component is used to drive the reed pipe of each corresponding position in the measuring cylinder to close or open along with the rise and fall of the liquid level, thus detecting and controlling the states of the liquid level. This series is mainly classified into: MBKS basic top-mounted type, MBKL basic side-mounted type, MBKT displacer type, MBKC direct-insertion type magnetic float level controller.

MBK magnetic float and displacer level controller can be equipped with 8 switches at most for the detection of 8 points. The magnetic float level controller is not in direct contact with the medium to be measured during operation. The contacts have no mechanical abrasion, and can work without external power supply.

Product features

- External power supply is not required and the output contacts are passive;
- Featured with long service life, stable and reliable running and easy installation, it is almost maintenance-free;
- No influence by the physical and chemical state of the measured medium. Such as: Influence of conductivity, dielectric constant, foam, pressure, temperature, evaporation, bubble, etc.;
- Selecting corresponding materials to be used in all kinds of adverse environments with medium $\geq 0.5 \text{ g/cm}^3$;
- Interface measurement with two media of different density;
- Explosion-proof structure design for explosive environment;
- Special application design can be provided.

Schematic diagram for the installation of MBK basic magnetic float, displacer and direct-insertion level controller



Technical characteristics

MBK basic magnetic float, displacer and direct-insertion level controller

- Type of contact:
- AO—normally open type (250VAC0.5A20W resistive)
 - AC—normally closed type (250VAC0.5A20W resistive)
 - BO—normally open type (250VAC2.0A200W resistive)
 - BC—normally closed type (250VAC2.0A200W resistive)
 - C—switching type (250VAC1.0A60W resistive)

Note: The above-mentioned voltage, current and power are all their maximum values. Switching voltage and switching current should not exceed their limits required by the switching power

Maximum switching frequency: $\leq 1 \times 10^9$ times

Switching error: $\leq \pm 10$ mm

Minimum distance between switches: 50mm

Transmission distance: $> 2,000$ m

Operating power supply: requiring no external power supply

Working temperature: $\leq 80^\circ\text{C}$; $\leq 120^\circ\text{C}$; $\leq 150^\circ\text{C}$

Medium density: ≥ 0.5 g/cm³

Nominal pressure: PN2.5-PN160 (kgf/cm²) (up to PN320 kgf/cm², special orders are required)



Float diameter: $\phi 28\text{-}\phi 120$ (determined by pressure and density)

Installation method: flange: DN32-DN150 (HG/T 20592-2009)

1-1/2", 2" thread (downward installation)

3/8" thread (upward installation)

1/2" thread (upward installation)

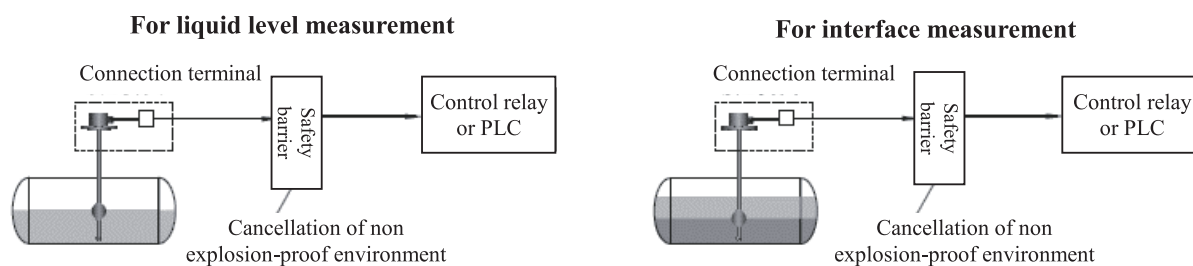
Electrical interface: M20 $\times$ 1.5 female thread or 1/2"NPT female thread

Nonperpendicularity of installation: $\leq \pm 25^\circ$

Ingress protection: IP65

Explosion proof: explosion-proof type Ex db IIC T6 Gb

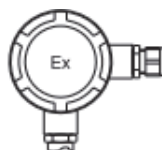
Schematic diagram for the wiring of MBK basic magnetic float, displacer and direct-insertion level controller (intrinsic safety type)



Junction box type and diagram of wiring MBK basic magnetic float, displacer and direct-insertion level controller



Non-explosion proof



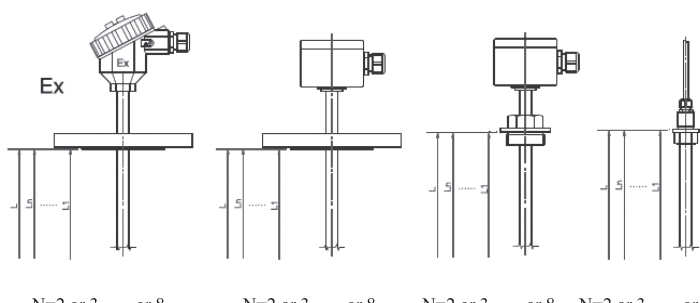
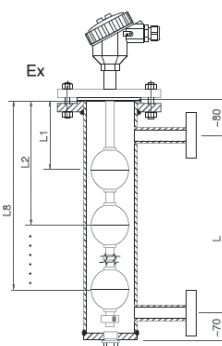
Explosion-proof



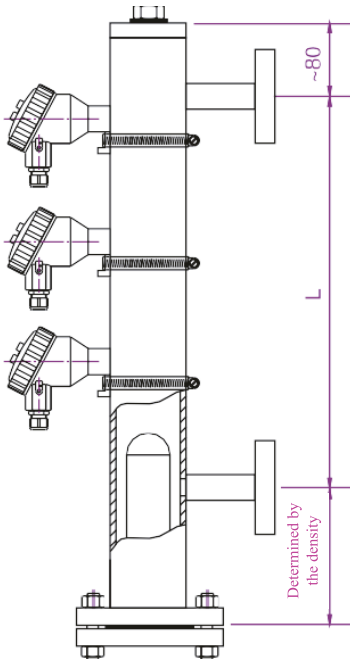
Explosion-proof

General description

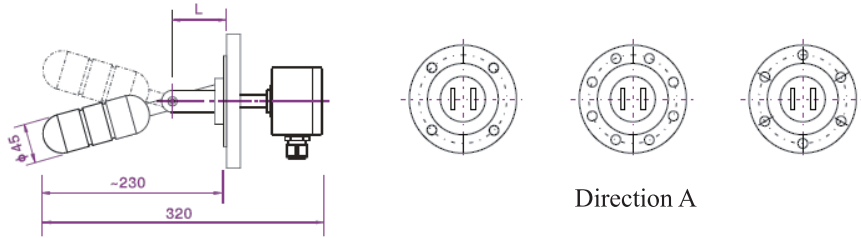
MBKS(L) magnetic float basic level controller

Optional materials	Stainless steel, stainless steel+PTFE, polypropylene, PVC			304, 316L, titanium alloy
Dimensions of meter	 N=2 or 3.....or 8 N=2 or 3.....or 8 N=2 or 3.....or 8 N=2 or 3.....or 6			
Type of mounting	MBKS top-mounted type			MBKL side-mounted type
Installation	Flange DN50-DN150 Sealing face RF (HG/T20592-2009)	Thread G2" or CG1-1/2" Downward installation	Thread G1/2" or G3/8" Upward installation	Flange DN20-DN25 (HG/T20592- 2009)
Conduit diameter	14 mm (recommended), 16 mm, 20 mm			Determined by the manufacturer
Maximum installation depth	6000mm			
Switch status	Normally open type, normally closed type, switching type			
Maximum quantity of switches	Normally open and normally closed type: 8 Nos.; switching type: 6 Nos.			
Float type and diameter	See the introduction of floats (determined by the manufacturers according to the operating pressure, medium density and installation method, or designated by the user)			
Process temperature	304 and 304+PTFE: -40~120°C; polypropylene ≤80°C; polyvinyl chloride≤60°C			
High temperature type	≤120°C			≤120°C
Process pressure	304 and 304+PTFE: ≤16MPa, polypropylene and PVC: ≤1.6MPa			≤1.6MPa
Perpendicularity of installation	≤±25°			≤+10°
Medium density	≥0.5g/cm ³			
Degree of protection	IP65			
Explosion-proof certification	Ex db IIC T6 Gb	——		Ex db IIC T6 Gb
Cable entry	M20×1.5 or 1/2" NPT	0.5m conductor		
Typical medium	Carbonic acid, organic acid, strong and weak alkali liquor, brine, alcohols, aldehydes, light oil, toluene, 98% fuming sulfuric acid, water and other media compatible with 304, 316L, PTFE, polypropylene, PVC, etc.			

MBKT magnetic displacer level controller

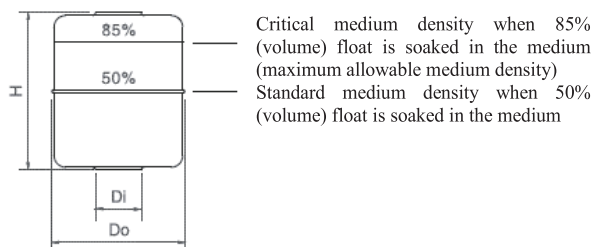
	Bouy type
Optional materials	20#, 304, 316L, titanium alloy, etc.
Dimensions of meter	
Installation	Flange DN20-DN25 (HG/T20592-2009)
Center distance for installation	150~6000mm
Switch status	1 SPDT switching type
Quantity of switches	Unlimited
Process temperature	-40~80°C; -40~120°C (in section)
Process pressure	≤32MPa
Perpendicularity of installation	≤±10°
Medium density	≥0.5g/cm ³
Degree of protection	IP65
Explosion-proof certification	Ex db IIC T6 Gb
Cable entry	M20×1.5 or 1/2" NPT
Typical medium	Carbonic acid, organic acid, strong and weak alkali liquor, brine, alcohols, aldehydes, light oil, toluene, 98% fuming sulfuric acid, water and other media compatible with stainless steel

MBKC magnetic float direct-insertion level controller

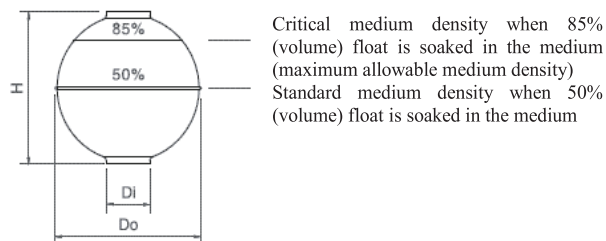
Optional materials	304, 316L, titanium alloy, etc.
Dimensions of meter	
Installation	Plate-type welded flange DN50/RF(HG/T20592-2009; when >PN100, DN≥65, HG/T20615-2009
Installation depth	80~300mm
Float diameter	If ≤6.3MPa, the float diameter is 45mm. If >6.3MPa, the float diameter is 65mm
Switch status	Switching type, 1 switch
Maximum switching voltage	250VAC 230VDC。 Both are resistive load
Maximum switching current	Both 0.6A (SPDT) and 2A (SPST) are resistive load
Maximum contact capacity	0.6A/60W (reed pipe type); 2A/200W(microswitch type); both are resistive load
Process temperature	-40~80°C; -40~120°C (in section)
Process pressure	PN2.5-PN160 for different levels (if >PN100, connection flange≥DN65)
Perpendicularity of installation	≤±10°
Medium density	≥0.5g/cm ³
Degree of protection	IP65
Explosion-proof certification	Ex db IIC T6 Gb
Cable entry	M20×1.5 or 1/2"NPT
Typical medium	Carbonic acid, organic acid, strong and weak alkali liquor, brine, alcohols, aldehydes, light oil, toluene, 98% fuming sulfuric acid, water and other media compatible with stainless steel

Introduction of MBKS float

Cylindrical float



Spherical float

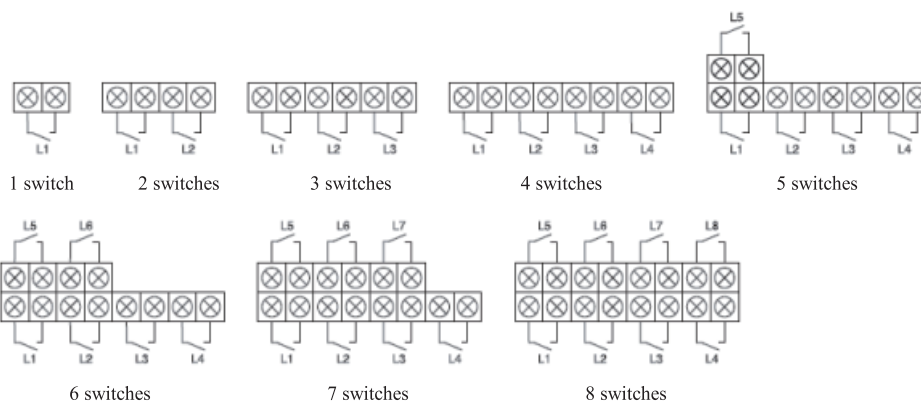


Float material	Float code	Di(mm)	Do(mm)	H(mm)	Maximum operating pressure (PN)	Working temperature (°C)	Standard density g/cm ³	Critical density g/cm ³
1Cr18Ni9Ti316L	V24	9	24	24	10~16	150	1.0	0.8
	V28	9	24	28	10~16	150	1.0	0.78
	V38	9	38	27	10~16	150	1.0	0.55
	V45	16	45	50	10~16	150	1.0	0.6
	V51	16	51	60	10~16	150	1.0	0.5
	V75	16	75	75	25	150	1.0	0.55
	V125	22	125	125	25	150	1.0	0.55
	V110	16	110	110~180	10~16	150	1.0	0.8
Titanium alloy	T95	16~22	95	110~180	40~160	150	1.0	0.5
	T110	16~22	110	110~180	40~160	150	1.0	0.5
Teflon	F48	22	48	70~110	6~16	150	1.0	0.7
Polypropylene (PP)	P48	24.5	48	60~120	6~20	≤80	1.0	0.8
	P58	24.5	58	60~120	6~20	≤80	1.0	0.6
	P76	24.5	76	70~120	6~16	≤80	1.0	0.55

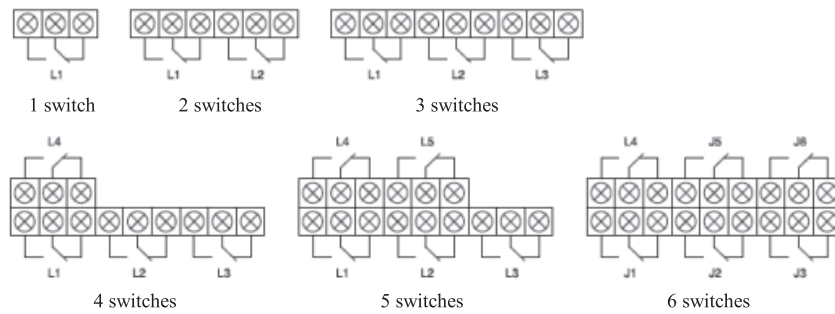
- Notes: 1. Float specifications can be specially ordered according to actual conditions. If the medium density is less than 0.5 g/cm³, special orders can be placed;
2. Titanium alloy, polytetrafluoroethylene and polypropylene floats are all cylindrical floats, while the others are cylindrical or spherical floats (those not coded are cylindrical floats);
3. The data in the above-mentioned table are for reference only. Manufacturers are allowed to change the structural type and size of floats according to the difference of operating pressure and medium density.

Wiring type

Normally open type or normally closed type

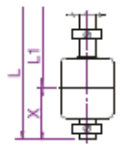


Switching type

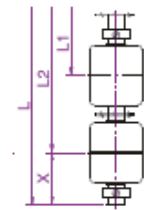


Indication of MBKS switch positions

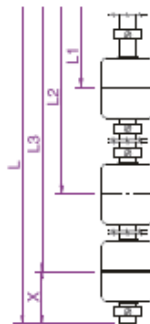
1 switch contact



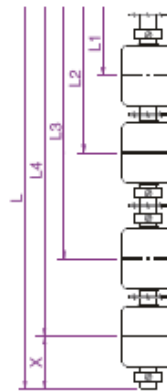
2 switch contacts



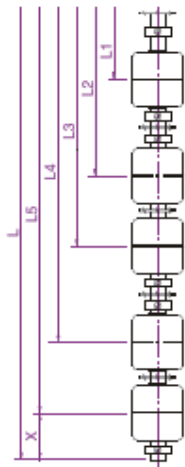
3 switch contacts



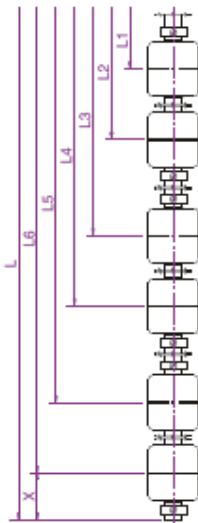
4 switch contacts



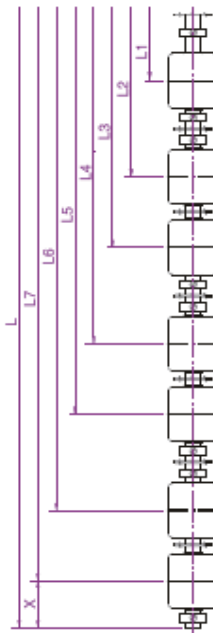
5 switch contacts



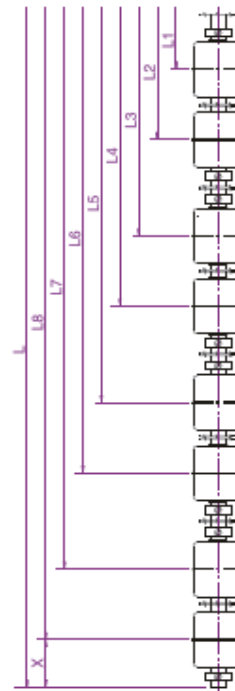
6 switch contacts



7 switch contacts



8 switch contacts



Note: 1. "X" value varies with density and pressure;

2. If the switch position and state are as required by the users, the manufacturer may change the position of positioning ring.

Table of MBK model

Model	Specification code	Description
MBK	_____	Magnetic float basic level controller
Installation form	S_____	Top-mounted
	L_____	Side-mounted (process pressure $\leq$ 16 (kgf/cm ²))
Housing/cable inlet	X_____	0.5 m conductor (for upward installation)
	S_____	Aluminum alloy M20 $\times$ 1.5
	B_____	Aluminum alloy 1/2" NPT
Safety certificate	X_____	No requirement (upward installation required)
	O_____	Explosion-proof type Ex db IIC T6 Gb
Conduit material	A_____	304
	B_____	316L
	E_____	PP (process temperature $\leq$ 80°C)
	F_____	304+PTFE
Conduit diameter (Unit: mm)	A_____	14 (process pressure $\leq$ 16 kgf/cm ² ; installation depth $\leq$ 2 m)
	B_____	16
	C_____	20
Quantity of switch contact	X	Directly fill in the quantity, and fill in the table (continued II) based on the quantity filled
Float material	A_____	304
	B_____	316L
	E_____	PP
	F_____	304+PTFE
Installation depth (Unit: mm)	XXXX	Top-mounted: $\leq$ 6,000 mm; side-mounted: 150-1,500 mm (the center distance L of connection flange);
Process temperature	C_____	-30-80°C (for upward installation)
	D_____	-40~80°C
	E_____	-40~120°C
Process pressure (kgf/cm ²)	A_____	2.5
	B_____	6.0
	C_____	16
	D_____	25
	E_____	40
	F_____	63
	G_____	100
	H_____	160
Process connection	A_____	G2" thread (downward installation)
	B_____	G3/8" thread (upward installation)
	C_____	G1/2" thread (upward installation)
	E_____	G1-1/2" thread (downward installation)
	D_____	Standard flange

Model	Specification code	Description
Flange standard	A	HG/T20615-2009 (Class series)
	B	HG/T20592-2009 (PN series)
Flange type	A	Welded flange (process pressure ≤ 40 kgf/cm ²)
	B	Lap joint flange (process pressure ≤ 40 kgf/cm ²)
	C	Butt welded flange
Flange size	B	DN20 (for side-mounted type only)
	C	DN25 (for side-mounted type only)
	E	DN50
	F	DN80
	G	DN100
	H	DN125
	J	DN150
Pressure rating (kgf/cm ²)	A	PN2.5
	G	PN6
	B	PN10
	C	PN16
	D	PN25
	F	PN40
	H	PN63
	J	PN100
	K	PN160
	M	Class150
	N	Class300
Flange sealing face type	A	RF raised face
	B	FM
	C	M
	D	T tongue face
	E	FF
	F	RJ ring joint face
Material of flange	A	304
	B	316L
	C	PP
	E	304+PTFE
Companion flange (A, B and C options are inherently equipped with 304 bolt , nut, flat washer, flat PTFE gasket for flange seal)	X	Without companion flange
	A	304
	B	316L
	C	Carbon steel
Connection accessories	X	Without bolt group and flange gasket
	A	304 bolt group+flange gasket

Model	Specification code	Description
Position of the first switch contact (unit: mm)	□ □ □ □ (four-digit number)	
State of the first switch contact	A—————	Normally open type
	B—————	Normally closed type
	C—————	Switching type
Position of the second switch contact (unit: mm)	□ □ □ □ (four-digit number)	
State of the second switch contact	A—————	Normally open type
	B—————	Normally closed type
	C—————	Switching type
Position of the third switch contact (unit: mm)	□ □ □ □ (four-digit number)	
State of the third switch contact	A—————	Normally open type
	B—————	Normally closed type
	C—————	Switching type
Position of the fourth switch contact (unit: mm)	□ □ □ □ (four-digit number)	
State of the fourth switch contact	A—————	Normally open type
	B—————	Normally closed type
	C—————	Switching type
Position of the fifth switch contact (unit: mm)	□ □ □ □ (four-digit number)	
State of the fifth switch contact	A—————	Normally open type
	B—————	Normally closed type
	C—————	Switching type
Position of the sixth switch contact (unit: mm)	□ □ □ □ (four-digit number)	
State of the sixth switch contact	A—————	Normally open type
	B—————	Normally closed type
	C—————	Switching type
Position of the seventh switch contact (unit: mm)	□ □ □ □ (four-digit number)	
State of the seventh switch contact	A—————	Normally open type
	B—————	Normally closed type
	C—————	Switching type
Position of the eighth switch contact (unit: mm)	□ □ □ □ (four-digit number)	
State of the eighth switch contact	A—————	Normally open type
	B—————	Normally closed type
	C—————	Switching type



Table of MBKT model

Model	Specification code	Description
MBKT	_____	Magnetic displacer level controller
Housing/cable inlet	S_____	Aluminum alloy M20×1.5
	B_____	Aluminum alloy 1/2" NPT
Safety certificate	X_____	No requirement
	O_____	Explosion-proof type Ex db IIC T6 Gb
Material of bypass pipe	A_____	304
	B_____	316L
	C_____	321
Float material	A_____	304
	B_____	316L
	C_____	321
Installation depth (Unit: mm)	XXXX	(150~6,000 mm) (center distance L of connection flange)
Process temperature	D_____	-40~80°C
	E_____	-40~120°C
	F_____	20~250°C
	G_____	20~350°C
Process pressure (kgf/cm ²)	A_____	2.5
	B_____	6.0
	C_____	16
	D_____	25
	E_____	40
	F_____	63
	G_____	100
	H_____	160
Process connection	D_____	Standard flange
Flange standard	A_____	HG/T20615-2009 (Class series)
	B_____	HG/T20592-2009 (PN series)
Flange type	A_____	Welded flange (process pressure≤40 kgf/cm ²)
	B_____	Lap joint flange (process pressure≤40 kgf/cm ²)
	C_____	Butt welded flange
Flange size	A_____	DN15
	B_____	DN20
	C_____	DN25
	D_____	DN32
	N_____	DN40
	E_____	DN50
	F_____	DN80
Pressure rating (kgf/cm ²)	A_____	PN2.5
	G_____	PN6

Model	Specification code	Description
	B_____	PN10
	C_____	PN16
	D_____	PN25
	F_____	PN40
	H_____	PN63
	J_____	PN100
	K_____	PN160
	M_____	Class150
	N_____	Class300
Flange sealing face type	A_____	RF raised face
	B_____	FM
	C_____	M
	D_____	T tongue face
	E_____	FF
	F_____	RJ ring joint face
Material of flange	A_____	304
	B_____	316L
	C_____	321
Companion flange (A, B and C options are inherently equipped with 304 bolt , nut, flat washer, flat PTFE gasket for flange seal)	X_____	Without companion flange
	A_____	304
	B_____	316L
	C_____	Carbon steel
Connection accessories	X_____	Without bolt group and flange gasket
	A_____	304 bolt group+flange gasket

Table of MBKC model

Model	Specification code	Description
MBKC	_____	Magnetic float direct-insertion level controller
Housing/cable inlet	S_____	Aluminum alloy M20×1.5
	B_____	Aluminum alloy 1/2" NPT
Safety certificate	X_____	No requirement
	O_____	Explosion-proof type Ex db IIC T6 Gb
Material of bypass pipe	A_____	304
	B_____	316L
	C_____	321
Float material	A_____	304
	B_____	316L
	C_____	321
Installation depth (unit: mm)	XXX	80~300
Process temperature	D_____	-40~80°C
	E_____	-40~120°C
Process pressure (kgf/cm ²)	A_____	2.5
	B_____	6.0
	C_____	16
	D_____	25
	E_____	40
	F_____	63
	G_____	100
	H_____	160
Process connection	D_____	Standard flange
Flange standard	A_____	HG/T20615-2009 (Class series)
	B_____	HG/T20592-2009 (PN series)
Flange size	E_____	DN50 (not for process pressure≥63 kgf/cm ²)
	F_____	DN80
	G_____	DN100
	H_____	DN125
	J_____	DN150
Pressure rating	A_____	PN2.5

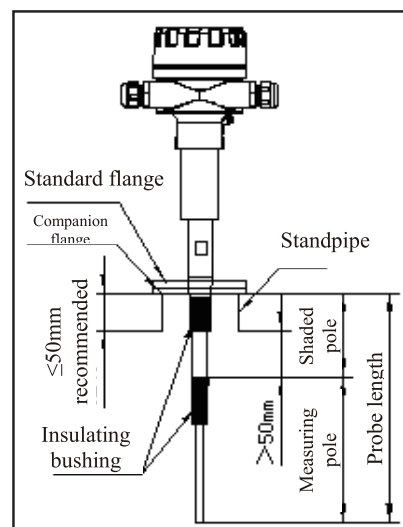
Model	Specification code	Description
(kgf/cm ²)	G—————	PN6
	B—————	PN10
	C—————	PN16
	D—————	PN25
	F—————	PN40
	H—————	PN63
	J—————	PN100
	K—————	PN160
	M—————	Class150
	N—————	Class300
Flange sealing face type	A—————	RF (recommended)
	B—————	FM
	C—————	M
	D—————	T tongue face
	E—————	FF
	F—————	RJ ring joint face
Material of flange	A—————	304
	B—————	316L
	C—————	321
Companion flange	X—————	Without companion flange
	A—————	304
	B—————	316L
Connection accessories	X—————	Without bolt group and flange gasket
	A—————	304 bolt group+flange gasket

RAS RF Admittance Level Switch



Measuring principle

RAS RF admittance level switch consists of a measuring pole, a shaded pole and an earthing pole (the threaded part). When the measuring pole is covered by the material the admittance value will increase, thus the instrument sends switch signal or alarm current signal. The shaded pole is located between measuring pole and earthing pole, whose signal waveform is identical with that of measuring pole. The earthing pole is completely isolated from the measuring pole. In case material adheres to the probe, variation of admittance between measuring pole and earthing pole can be restrained. Meanwhile, only the variation of admittance between the measuring pole and the tank wall can be sensed so as to eliminate the incorrect signal as the result of the material adhesion.



Product features

- Highly-universal: Be able to measure the level of liquid and material and extensively applicable to flying ash, particulates, powder, liquid, ropiness, conductivity, non-conducting material; be able to measure under varied temperatures, pressures and with varied media as well as be applicable to harsh sites with corrosion, impact and others;
- Anti-buildup of material: The circuit is designed uniquely to allow the measuring circuit to ignore the material adhered to the probe and allow for automatic correction;
- Maintenance-free: There is no mobile component during measuring. There is also no problem such as mechanical damage. It is free from maintenance;
- Anti-disturbance: It supports contacting measurement and has high capacity of resisting disturbance. It can overcome the impact from steam, foam and stirring;
- Simple installation: The meter can be installed with thread or flange in a simple, easy and quick way.

Application industries

RF Admittance Level Switch is widely used. Its typical applications are:

- Liquid: conductive liquid and insulating liquid (industries: chemical industry, oil field, water and sewage treatment)

- Slurry: conductive slurry and insulating slurry (industries: papermaking, pharmacy, water and sewage treatment)
- Powder: cement, flying ash, etc. (industries: power plant, metallurgy, cement)
- Particulates: coal, cereal, fodder, plastic particulates, etc. (industry: power plant, metallurgy, cereal)

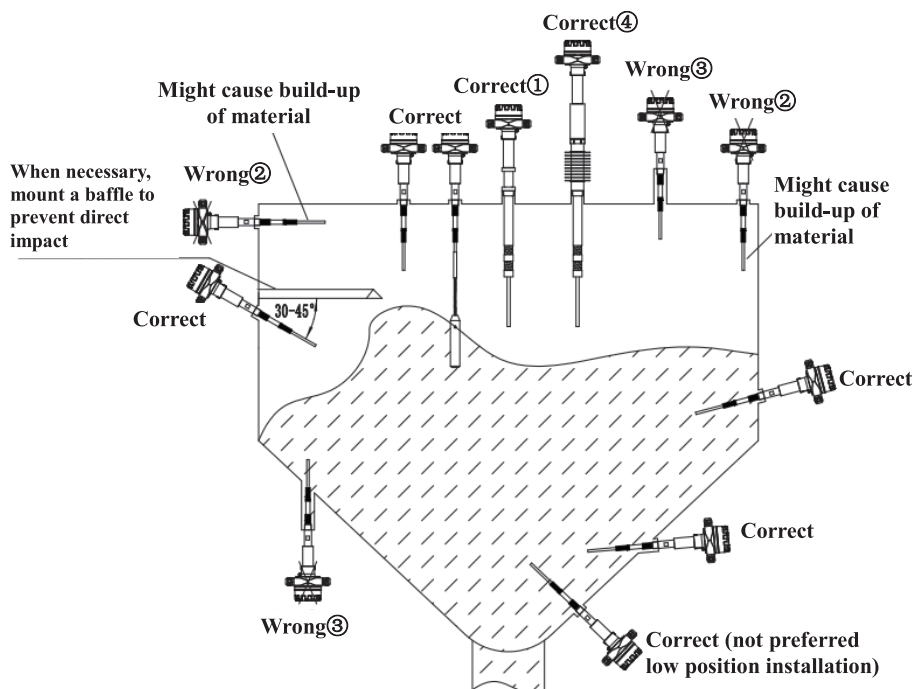
Technical characteristics

Operating voltage	18 ~ 36 VDC (output ripple less than 100 mVp-p) 90~ 265VAC 50/ 60Hz
Power consumption	<0.8W@24VDC <5V A@240VAC
Output	DPDT relay output 8mA/16mA two-wire output
Relay contact capacity	5A / 250VAC
Alarm delay	Adjustable within 0~20 s
Measurement range	1 ~ 3300PF
Resolution	0.01PF
Electrical accuracy	0.05PF
Stability	0.01%/°C
Max. process pressure	20 kgf/cm ²
Process temperature	-40 ~ 1,200°C (it can be customized if process temperature is higher than 230°C)
Process connection	Installation with thread or flange
Ambient temperature	-40 ~ 80°C
Case protection class	IP66/ IP67
Safety certification information	Intrinsic safety and explosion proof type Ex ia IIC T ₂₀₀ ...T ₄ Ga Intrinsic safety and dust explosion proof type Ex ia IIIC T ₂₀₀ 135°C ...T ₂₀₀ 300°C Da Complex explosion proof type Ex ia/db IIC T ₂ ...T ₄ Ga/Gb Complex dust explosion proof type Ex ia/tb IIIC T ₂₀₀ 135°C...T ₂₀₀ 300°C/ T135°C Da/Db
Cable entry	2 M20*1.5 or 1/2"NPT (cable diameter 9-13 mm)

Installation guide

Selection of installing position

- The meter can be installed at top, on the side and at the bottom.
See the following figure:
—“①” and “④” are high temperature probes. During installation, ensure that the ambient air is circulated to ensure the proper radiation of the hot extended part of the meter;
—“②” probe represents an improper installation which gets excessively closer to the wall and top of the container. Thus, this can affect the sensitivity of the probe and generate build-up of material between the probe and the wall of container;
—“③” probe represents an improper installation where the measuring pole does not reach out of the standpipe. It is highly possible that material may accumulate between the shaded pole and the standpipe and thus the instrument can't make proper measurement. The shaded pole should reach out of the standpipe over 50mm.



● Installation: Attentions for installation

—Feed:

The probe should be installed where it is far away from the feed inlet, so as to reduce effect of build-up of material and impact and avoid wrong action.

—Distance to the container wall

Install the probe at a point far away from the wall of the container so as to prevent the rob probe or cable probe from contacting the wall and thus to avoid forming an enclosed space and accumulating material over time.

—Installation with a standpipe:

Ensure the length of the shielded pole $\geq$ (height of standpipe + thickness of tank wall + 50 mm)

—Installation at top:

Make sure of an adequate distance between the probe and the wall of container. Avoid forming an enclosed space and accumulating material over time. To use a cable probe, make sure of an adequate distance from the probe to the wall of container to avoid accumulating material over time.

—Installation on the side:

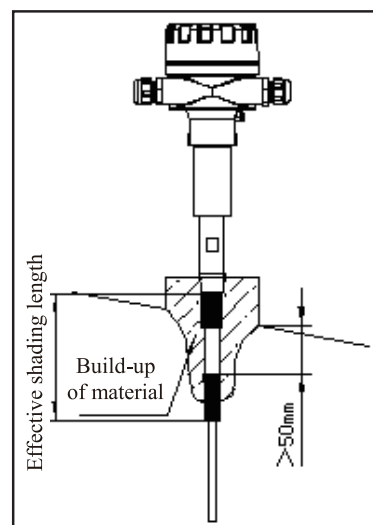
The probe should be installed with a downward inclination of 30 to 45 degrees. A protective plate should be used to ensure that the probe is not affected by the impact from the falling material.

—Installation at the bottom:

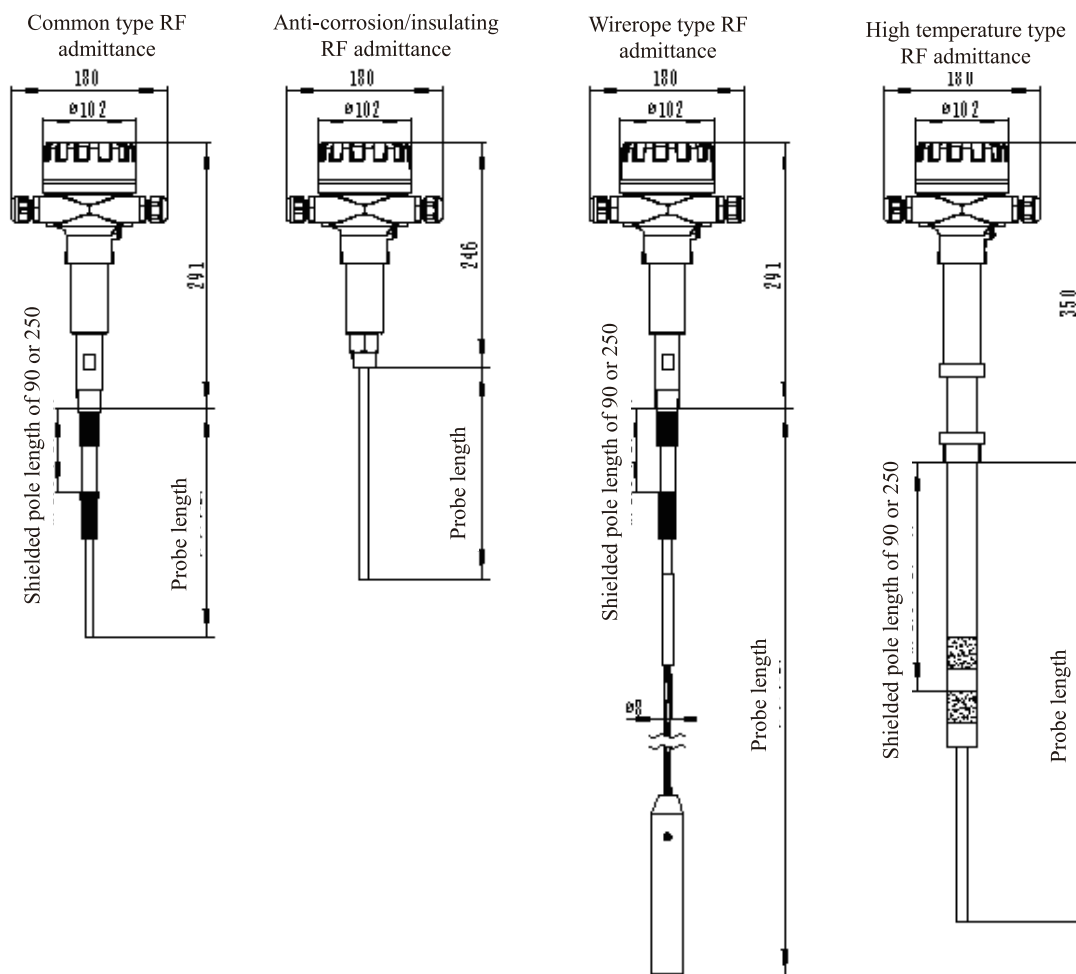
It is not recommended to install the instrument at the bottom of the container. The instrument can be installed at the bottom only when material doesn't accumulate.

—Installation on tank:

When the tank is made of metal, the earth terminal on the housing should be connected with the container; If the tank is non-metallic, the earth terminal of the enclosure should be grounded.

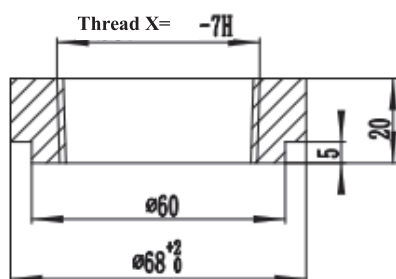


Structural size

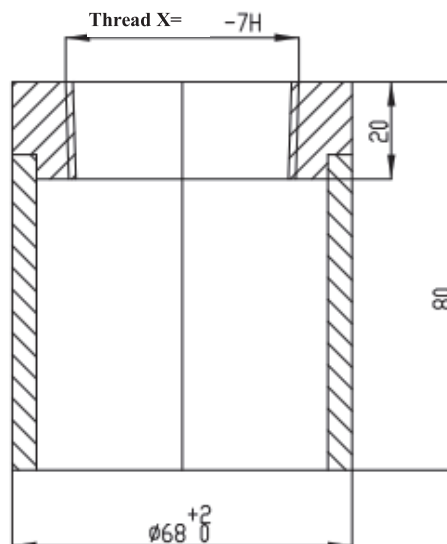


Size of welding seat

Height of welding seat 20 mm, HS or HC



Height of welding seat 80 mm, HA or HD



Note: thread X should be machined as required

Table of RAS model

Model	Specification code	Description
RAS Series		RF Admittance Level Switch
Measured medium:	L————	Liquid
	S————	Solid
Housing/cable inlet	S————	Die casting Al (cable inlet 2×M20×1.5)
	B————	Die casting Al (cable inlet 2×1/2"NPT)
Power supply and output	B2————	24VDC, 8mA/16mA two-wire output
	B4————	24VDC, DPDT relay output
	U4————	220VAC, DPDT relay output
	U6————	24VDC, transistor NPN output
	U8————	24VDC, transistor PNP output
	N2————	Namur output
Safety certificate	X————	No requirement
	I————	Intrinsic safety and explosion proof type (Ex ia II C T ₂ ...T ₄ Ga) (only applicable to B2 of power supply)
	M————	Intrinsic safety and dust explosion proof type (Ex ia IIIC T ₂₀₀ 135°C ...T ₂₀₀ 300°C Da) (only applicable to B2 of power supply)
	N————	Complex explosion proof type (Ex ia/db II C T ₂ ...T ₄ Ga/Gb) (only applicable to B4/U4 of power supply)
	D————	Complex dust explosion proof type (Ex ia/tb IIIC T ₂₀₀ 135°C ...T ₂₀₀ 300°C /T135°C Da/Db) (only applicable to B4/U4 of power supply)
Material of probe	A————	304
	B————	316L
Type of probe	B————	Flat plate type (specially ordered)
	C————	Wirerope type (probe length optional in 1-3.5 m)
	P————	Rod type (probe length optional in 0.15-1 m)
Shielded pole length (cm)	A————	9 (probe protection of X and probe length of ≥20 cm)
	B————	25 (probe protection of x and probe length of ≥35 cm)
	D————	0 (only applicable to probe protection of A)
	E————	40 (probe protection x and probe length ≥50 cm)
	F————	60 (probe protection of X and probe length of ≥70 cm)
	G————	80 (probe protection of X and probe length of ≥90 cm)
Probe length (cm)	XXX	(length range: 15-350cm, progressive increase of 5 cm)
Probe protection	X————	No requirement
	A————	Anti-corrosion/insulating (rod type+PFA, only applicable to process temperature of D and F)
Process temperature	D————	-40~80°C (process pressure≤20 kgf/cm ²)
	F————	-40~230°C (process pressure≤10 kgf/cm ²)
	G————	-40~400°C (process pressure<1 kgf/cm ²)
	H————	-40~800°C (process pressure<1 kgf/cm ²)
	I————	-40~1200°C (process pressure<1 kgf/cm ²)

Model	Specification code	Description
Process pressure (kgf/cm ²)	L_____	-1
	M_____	1
	A_____	2.5
	B_____	6
	C_____	16
	D_____	20
	E_____	40 (integrated extrusion sensor)
	F_____	63 (integrated extrusion sensor)
Process connection	TA_____	3/4 NPT (process temperature D, F)
	TN_____	1-1/4NPT
	FB_____	Standard flange
	HS_____	304 welding seat (height 20 mm)
	HC_____	Carbon steel welding seat (height 20 mm)
	HA_____	304 welding seat (height 80 mm)
	HD_____	Carbon steel welding seat (height 80 mm)
Flange standard	A_____	HG/T20615-2009 (Class series)
	B_____	HG/T20592-2009 (PN series)
Flange size	D_____	DN40 (1.5")
	E_____	DN50 (2")
	C_____	DN65 (2.5")
	F_____	DN80 (3")
	G_____	DN100 (4")
	H_____	DN125 (5")
	J_____	DN150 (6")
Pressure rating (kgf/cm ²)	A_____	PN2.5
	G_____	PN6
	B_____	PN10
	C_____	PN16
	D_____	PN25
	F_____	PN40
	M_____	Class150
	N_____	Class300
Flange sealing face type	A_____	RF (recommended)
	B_____	FM
	C_____	M
	E_____	FF flat (only for process pressure ≤PN16)
	F_____	Flat-thin plate flange (8 mm thick, M only for process pressure)
Material of flange	A_____	304
	B_____	316L
	C_____	Carbon steel
Companion flange (A, B and C options are inherently equipped with 304 bolt , nut, plate washer, flat PTFE gasket for flange seal)	X_____	Without companion flange
	A_____	304
	B_____	316L
	C_____	Carbon steel

VS Tuning Fork Level Switch



Measuring principle

VS tuning fork level switch is an universal level limit switch. The stainless steel tuning fork vibrates at resonant frequency under the excitation of piezoelectric ceramics. The vibration frequency and amplitude of the tuning fork would change when the fork comes into contact with the materials and is gradually sunk into the materials. These changes are detected and processed by the electronic unit, which subsequently outputs a switch signal for indication or control.

Product features

- High adaptability: Varied electric parameters and densities of the materials under measurement do not have any effect on the measuring. Such harsh conditions as scaling, stirring, turbulence, air bubble, vibration, medium viscosity, high temperature, high pressure and others do not have any effect on the detection;
- Maintenance-free: As the detection is performed by electronic circuit and tuning fork level switch is composed of immobile parts, the tuning fork level switch is free from maintenance once it is installed and put into operation;
- Adjusting-free: As the detection is free from the effect of electric parameters and density of the medium to be measured, on-site adjustment is not required for whichever liquid is to be measured;

Application industries

The tuning fork switch is usually used together with the level transmitter to control level control.

It mainly aims at the detection of powder and small particle materials with a wide range of density, such as the blockage detection of the inlet and outlet pipes of the dust collector, the material level measurement of the flue-dust retainer of the dust collector, and the limit measurement of plastic, rubber powder, flour, various grains, food and chemical products. It also aims at the limit measurement of liquid of various characters, such as pasty, sticky, foamy and corrosive medium.

Technical characteristics

Operating voltage	18 ~ 36 VDC (output ripple less than 100 mVp-p)
	90 ~ 260V AC 50/60Hz
Power consumption	<0.8W@24VDC
	<5VA@240VAC
Output	DPDT relay output

	8mA/16mA two-wire output
Frequency of vibration	Liquid tuning fork 1,200 Hz Solid tuning fork 130Hz Vibrating rod 350 Hz
Relay contact capacity	5A/250VAC
Alarm delay	Adjustable within 0~20 s
Sensitivity	Liquid tuning fork: 500 g/l Solid tuning fork: 10g/l Vibrating rod: 200 g/l
Stability	0.01%/°C
Max. process pressure	20kgf/cm ²
Process temperature	-40~250°C
Process connection	1" NPT (for liquid tuning fork) 3/4"NPT (only for liquid tuning fork, recommended) 1-1/2" NPT
Ambient temperature	-40~80°C
Case protection class	IP66/ IP67
Safety certification	SIL2
information	Gas explosion proof: Ex db IIC T2...T4 Gb Dust explosion proof: Ex tb IIIC T135°C...T300°C Db
Cable entry	2 M20×1.5 or 1/2" NPT (cable diameter 9~13 mm)

Installation guide

Selection of installing position

The meter can be installed at top, on the side and at the bottom.

See the following figure:

“①” is high temperature probe which is applicable to the site with high temperature that ranges from -40~250°C. During installation of high temperature probe, ensure that the ambient air is circulated to ensure the proper radiation of the hot extended part of the meter;

“②”probe represents an improper installation which gets excessively closer to the wall and top of the container. It is likely to generate build-up of material between the probe and the wall of container, as a result, the meter cannot measure properly;

“③” probe represents an improper installation, the fork is not extended out of the standpipe. It is likely to come into contact with the standpipe wall or tank wall, and the material might be accumulated between the fork, as a result, the meter cannot measure properly;

—Disturbance from feed:

The probe should be installed far away from the feed inlet, so as to reduce effect of material impact and avoid wrong action due to material flow.

—Disturbance from container wall

The probe should be installed far away from the container wall to prevent the fork from coming into contact with the container wall after extending into the container and avoid build-up of material between the fork and the container wall over time.

—Installation with a standpipe:

Make sure that the fork would not come into contact with the mounting standpipe after entering (see the right figure).

—Installation at top:

Make sure of an adequate distance from the probe to the container wall to avoid accumulating material over time.

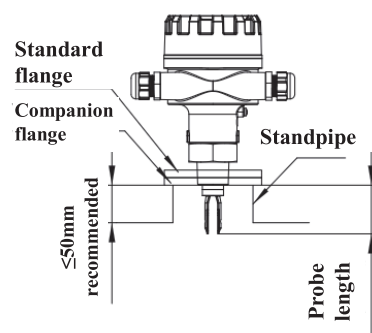
To use a cable probe, make sure of an adequate distance from the fork to the wall of container to avoid accumulating material over time.

—Installation on the side:

The probe should be installed with a downward inclination of 30 to 45 degrees. A protective plate should be mounted to ensure that the probe is not affected by the impact from the falling material.

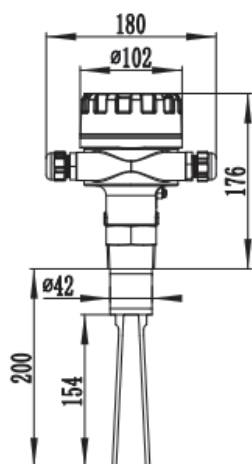
—Installation at the bottom:

It is not recommended to install the instrument at the bottom of the container. The instrument can be installed at the bottom only when material doesn't accumulate.

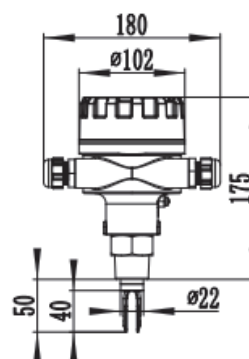


Structural size

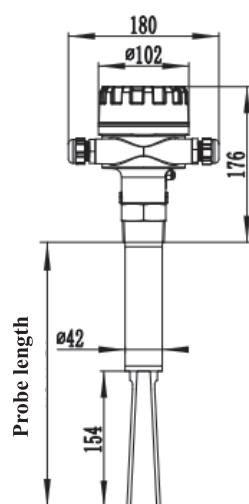
Standard solid tuning fork



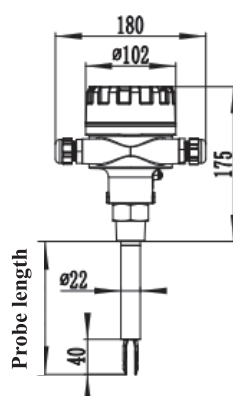
Standard liquid tuning fork



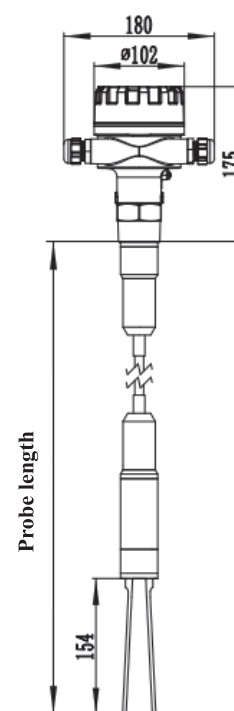
Extended solid tuning fork



Extended liquid tuning fork

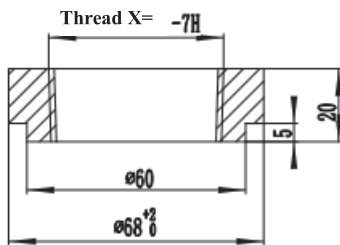


Cable type solid tuning fork



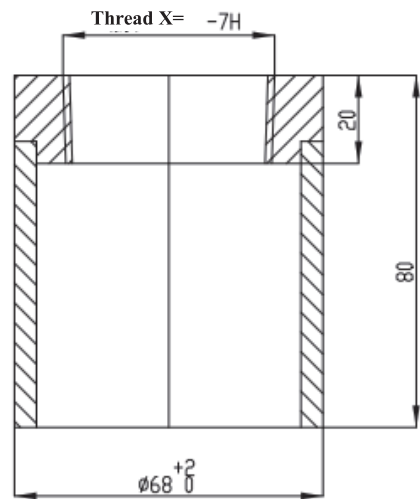
Size of welding seat

Height of welding seat 20 mm, HS or HC

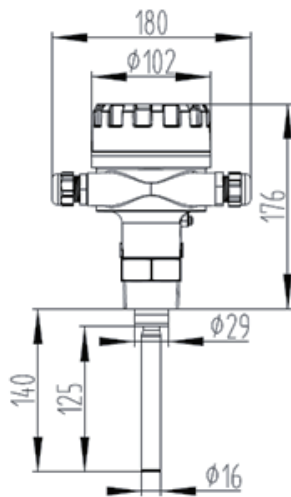


Note: thread X should be machined as required

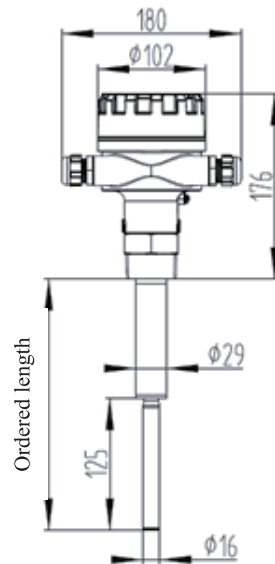
Height of welding seat 80 mm, HA or HD



Standard vibrating rod



Extended vibrating rod



Cable type vibrating rod

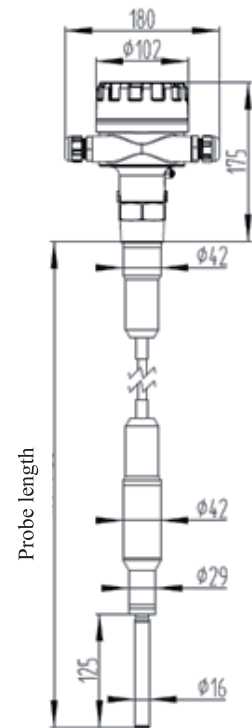


Table of VS model

Model	Specification code	Description
VS Series		Tuning Fork Level Switch
Measured medium:	P_____	Liquid (liquid tuning fork), probe length $\geq$ 50 mm
	S_____	Solid (solid tuning fork), probe length $\geq$ 200 mm
	R_____	Solid (vibrating bar), probe length $\geq$ 140 mm
Housing/cable inlet	S_____	Die casting Al (cable inlet 2×M20×1.5)
	B_____	Die casting Al (cable inlet 2×1/2"NPT)
Power supply and output	B2_____	24 V DC, 8 mA/16 mA two-wire current output
	B4_____	24VDC, DPDT relay output
	U4_____	220VAC, DPDT relay output
	U6_____	24VDC, transistor NPN output
	U8_____	24VDC, transistor PNP output
	N2_____	Namur output
Safety certificate	X_____	No requirement
	D_____	Gas explosion proof: Ex db IIC T2...T4 Gb
	N_____	Dust explosion proof: Ex tb IIIC T135°C...T300°C Db
	I_____	Intrinsic safety and explosion proof type (Ex ia IIC T6 Ga) (only applicable to B2 of power supply)
Material of probe	A_____	304
	B_____	316L
	C_____	316L liquid-contacting component lined with fluorine ECTFE (only used for process temperature D,E)
	D_____	316L liquid-contacting components lined with fluorine PFA
Type of probe	P_____	Rod type (probe length $\leq$ 2 m optional; 2 m<length $\leq$ 4 m customized)
	C_____	Cable type (probe length>0.5 m optional, only applicable to installation at top)
Probe length (cm)	XXX	(range: 5~100, unit cm, progressive increase of 10 cm)
Process temperature	D_____	-40~80°C
	E_____	-40~150°C
	F_____	-40~250 °C (except cable type tuning fork and cable type vibrating rod)
Process pressure (kgf/cm ²)	L_____	-1
	M_____	1
	A_____	2.5
	B_____	6
	C_____	16
	D_____	20
	E_____	40 (only liquid tuning fork or liquid tuning fork lined with fluorine C and D)
	F_____	63 (only liquid tuning fork P)
Process connection	TA_____	1" NPT (for liquid tuning fork)
	TB_____	3/4"NPT (for liquid tuning fork, recommended)
	TN_____	1-1/2" NPT
	FB_____	Flange (see the table for type selection of flange)
	HS_____	304 welding seat (height 20 mm)
	HC_____	Carbon steel welding seat (height 20 mm)
	HA_____	304 welding seat (height 80 mm)
	HD_____	Carbon steel welding seat (height 80 mm)

Model	Specification code	Description
Flange standard	A_____	HG/T20615-2009 (Class series)
	B_____	HG/T20592-2009 (PN series)
Flange size	A_____	DN25 (1")
	B_____	DN32 (1.25")
	D_____	DN40 (1.5")
	E_____	DN50 (2")
	C_____	DN65 (2.5")
	F_____	DN80 (3")
	G_____	DN100 (4")
	H_____	DN125 (5")
	J_____	DN150 (6")
Pressure rating (kgf/cm ²)	A_____	PN2.5
	G_____	PN6
	B_____	PN10
	C_____	PN16
	D_____	PN25
	F_____	PN40
	M_____	Class150
	N_____	Class300
Flange sealing face type	A_____	RF (recommended)
	B_____	FM
	C_____	M
	E_____	FF flat (only for process pressure ≤PN16)
	F_____	Flat-thin plate flange (8 mm thick, M only for process pressure)
Material of flange	A_____	304
	B_____	316L
	C_____	Carbon steel
Companion flange (A, B and C options are inherently equipped with 304 bolt , nut, plate washer, flat PTFE gasket for flange seal)	X_____	Without companion flange
	A_____	304
	B_____	316L
	C_____	Carbon steel

RS Rotating Paddle Level Switch (solid)



Measuring principle

RS rotating paddle level switch's synchronous motor drives the spindle and paddle through the reduction gear. When the solid material to be measured contacts or covers the paddle, the rotation of the blade is blocked, the resistance is transmitted to the detector inside the meter through the spindle, and the detector outputs a switch signal to the outside and cuts off the power supply of the motor to stop the paddle. The resistance of the paddle disappears when the materials leave. The detector restores to the original state by virtue of the spring tension and the paddle restores rotation. The rotating paddle level switch can measure material of wide specific gravity by adjusting the spring tension. Increase the spring tension in case of large specific gravity; otherwise reduce the spring force.

Product features

- Supported by bearing which offers more reliable operation;
- Ingenious sealing design which keeps dust from penetrating along the shaft
- Adjustable steady and reliable torque
- The clutch starts to slip to prevent the motor from being damaged in case the paddle is overloaded
- It is not necessary to remove the whole meter away from the site when the internal components need to be checked or maintained
- IP65 design of excellent sealing property offers reliable outdoor installation and usage

Application industries

- Plastic industry: dust, particle, grain cluster, etc.
- Building industry: limestone, foamed polystyrene, molding sand, urea, cement, gypsum, magnetite
- Food industry: milk powder, flour, salt, bran, minerals, herbs, rice
- Paper/pulp industry: wood, sawdust, etc.
- Chemical industry: rubber, coating, foam
- Iron and steel industry: iron ore, coal, coke, sand

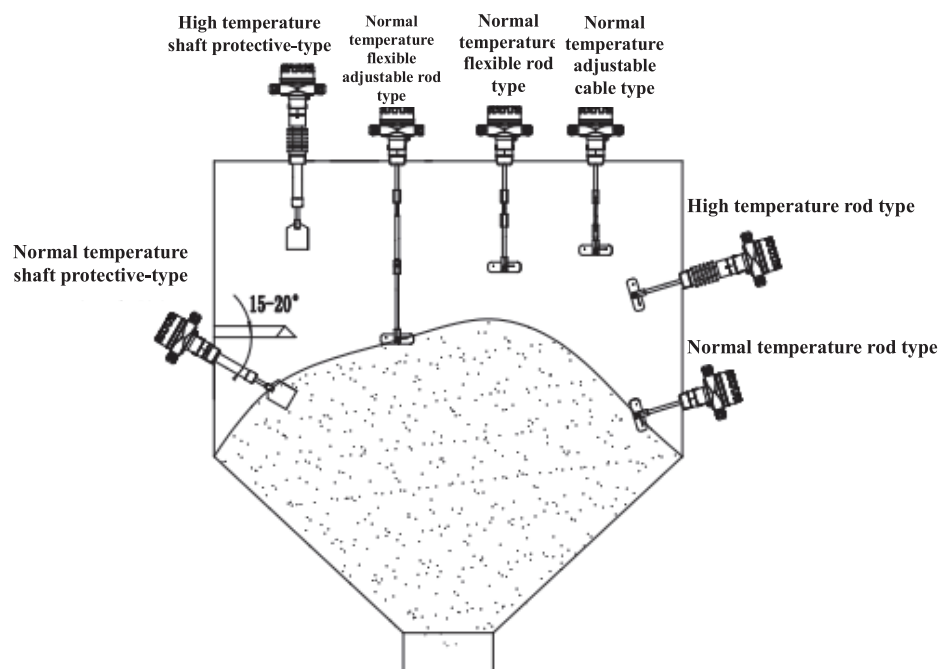
Technical characteristics

Operating voltage	24 V DC (output ripple less than 100 mVp-p) 220VAC 50/60Hz
Power consumption	4W
Output	SPDT relay output
Relay contact capacity	5A/250VAC
Paddle speed	1RPM (r/min)
Alarm torque	1.0kg.cm
Density of material	$\geq 0.5\text{g/cm}^3$
Process temperature	-40 ~ 400°C
Process connection	1-1/2"NPT or installation with flange
Ambient temperature	-40 ~ 80°C
Case protection class	IP65
Process pressure	Atmosphere
Insulation resistance	$\geq 50\text{M}\Omega$
Safety certification information	SIL2 Gas explosion proof: Ex db IIC T1...T4 Gb. Dust explosion proof: Ex tb IIIC T135°C...T450°C Db
Cable entry	2 M20×1.5 or 1/2" NPT (cable diameter 9 ~ 13 mm)

Installation guide

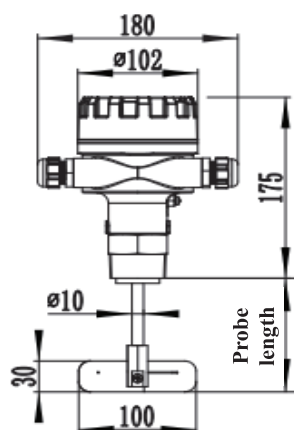
Attentions for installation

- Attentions for installation: The case outlet must be installed downward.
- The cable must be fixed and tightened with nuts.
- In case of 1" thread installation, sickle-type paddle might be selected, so that the paddle can enter the mounting hole.
- The shaft protection type and wirerope type are applicable to installation at top.
- In case of side installation, the meter can be installed downward 15°~20°, to reduce the impact of material on the probe.
- When measuring massive materials, it is recommended to weld a steel plate on the warehouse wall above the probe, so as to reduce the impact of materials on the probe.
- In case of side installation and probe length $\geq 300\text{mm}$, it is recommended to weld a steel plate of enough strength on the warehouse wall above the probe, so as to reduce the impact of materials on the probe and avoid damage to the probe.

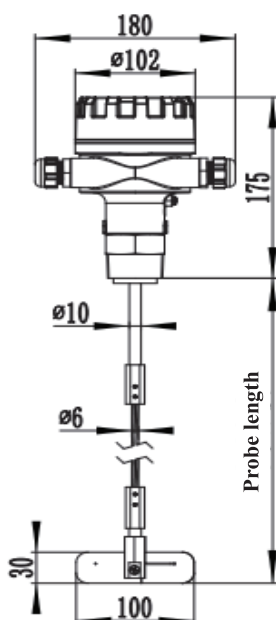


Structural size

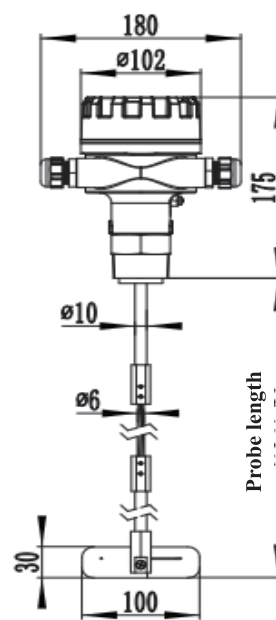
Standard thread installation type



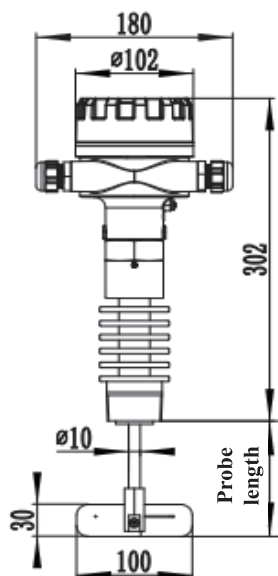
Normal temperature steel cable type



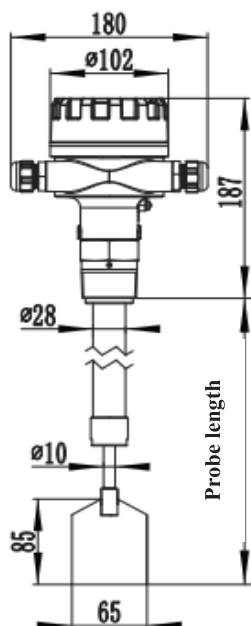
Normal temperature adjustable cable type



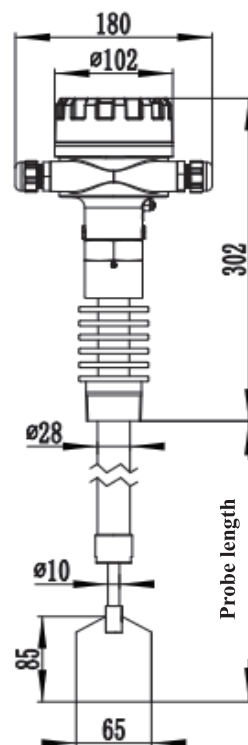
High temperature
standard-type



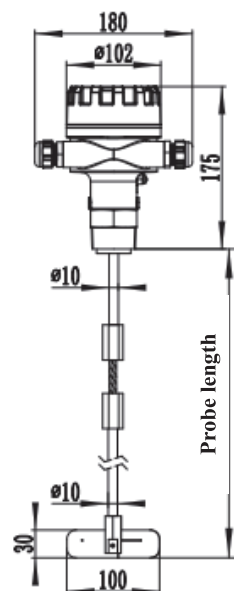
Normal temperature shaft
protective-type



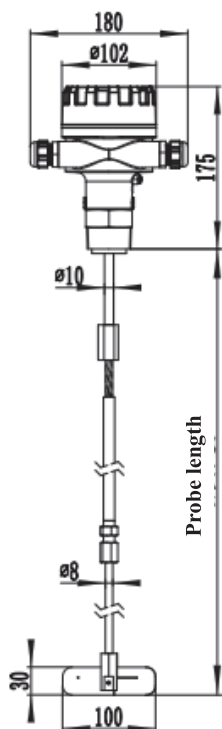
High temperature shaft
protective-type



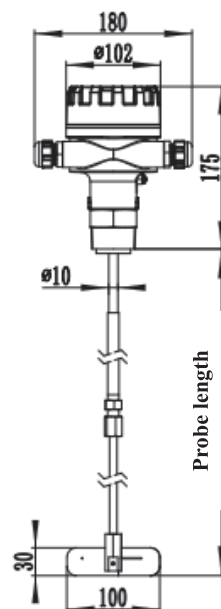
Flexible rod type



Flexible adjustable rod type

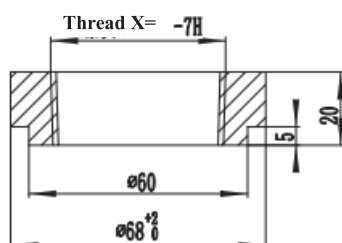


Adjustable rod type

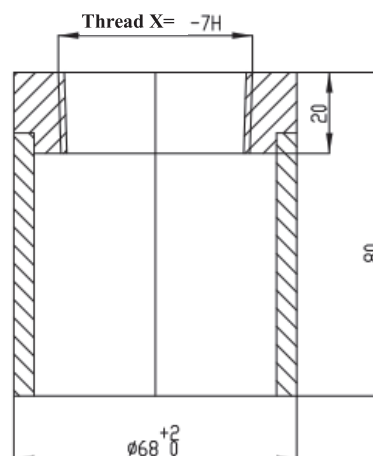


Size of welding seat

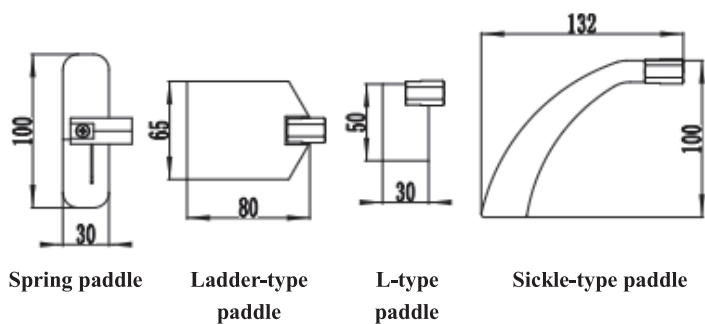
Height of welding seat 20 mm, HS or HC



Height of welding seat 80 mm, HA or HD



Note: thread X should be machined as required



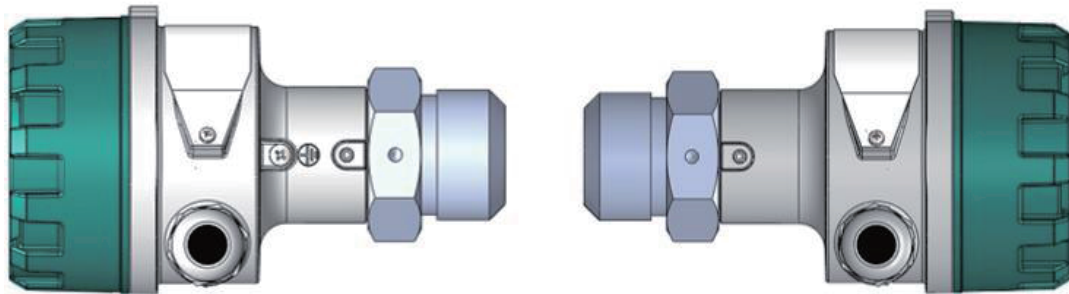
Special note: Extended spring paddle (applicable to special working condition of light powder)

Table of RS model

Model	Specification code	Description
RS series		Rotating paddle level switch
Power	B—————	24VDC
	U—————	220VAC
Safety certificate	X—————	No requirement
	O—————	Gas explosion proof: Ex db IIC T1...T4 Gb
	N—————	Dust explosion proof: Ex tb IIIC T135°C...T450°C Db
Output selection/probe material	S—————	SPDT output/304 material
	B—————	SPDT output/316L material
	H—————	SPDT output/Hastelloy C22 material
Housing/cable inlet	S—————	Die casting Al (cable inlet 2×M20×1.5)
	B—————	Die casting Al (cable inlet 2×1/2"NPT)
Process temperature	D—————	-40~80°C
	F—————	-40~200°C
	G—————	-40~400°C
Sensor type	A—————	Rod
	B—————	Cable type
	C—————	Adjustable cable type
	D—————	Shaft protective-type
	E—————	Flexible rod type (shot cable rod type)
	F—————	Flexible adjustable rod type (short cable adjustable rod type, the robe length is the maximum length)
	G—————	Flexible rod type (the robe length is the maximum length)
Paddle type	A—————	Spring paddle
	B—————	Ladder-type paddle
	C—————	L-type paddle
	D—————	Sickle-type paddle
	E—————	Extended spring paddle (light ash)
Probe length (cm)	015	(standard rod type)
	020~070	(progressive increase of 10 cm, applicable to extended rod type)
	070~300	(progressive increase of 10 cm, applicable to cable type)
	070~350	(progressive increase of 10 cm, applicable to adjustable cable type, with an adjustable scope of 50 cm)
	070~150	(progressive increase of 10 cm, applicable to rod and shaft protection type)
	040~150	(progressive increase of 10 cm, applicable to flexible rod type)
	150~250	(progressive increase of 10 cm, applicable to flexible adjustable rod type and adjustable rod type, with an adjustable scope of 50 cm)
Process connection	TN—————	1-1/2" NPT
	FB—————	Flange (see the table for type selection of flange)
	HS—————	304 welding seat (height 20 mm)
	HC—————	Carbon steel welding seat (height 20 mm)
	HA—————	304 welding seat (height 80 mm)
	HD—————	Carbon steel welding seat (height 80 mm)

Model	Specification code	Description
Flange standard	A_____	HG/T20615-2009 (Class series)
	B_____	HG/T20592-2009 (PN series)
Flange size	D_____	DN40 (1.5")
	E_____	DN50 (2")
	C_____	DN65 (2.5")
	F_____	DN80 (3")
	G_____	DN100 (4")
	H_____	DN125 (5")
	J_____	DN150 (6")
Pressure rating (kgf/cm ²)	A_____	PN2.5
	G_____	PN6
	B_____	PN10
	C_____	PN16
	D_____	PN25
	F_____	PN40
	M_____	Class150
	N_____	Class300
Flange sealing face type	A_____	RF (recommended)
	B_____	FM
	C_____	M
	E_____	FF flat (only for process pressure ≤PN16)
	F_____	Flat-thin plate flange (8 mm thick, M only for process pressure)
Material of flange	A_____	304
	B_____	316L
	C_____	Carbon steel
Companion flange (A, B and C options are inherently equipped with 304 bolt , nut, plate washer, flat PTFE gasket for flange seal)	X_____	Without companion flange
	A_____	304
	B_____	316L
	C_____	Carbon steel

GMS1000 Microwave Limit Grid



Measuring principle

The microwave limit grid consists of transmitter and receiver. The transmitter and the receiver are installed in pairs at the position where the material is to be monitored. A specific microwave energy beam is transmitted from the transmitter to the receiver. If the microwave energy beam is absorbed or reflected in the transmission, the receiver will be unable to detect the microwave energy beam signal. The receiver controls the relay according to the appearance or disappearance of the microwave energy beam to achieve the purpose of indication or control.

Product features

- Strong orientation: 24 GHz microwave beam of good orientation is adopted;
- Span: the measuring distance can be up to 100 m;
- Mode of power supply: AC and DC power supply are available;
- Process temperature: with the addition of the radiator, the maximum process temperature can reach 800°C;
- Adjustable delay: adjustable time delay of 0.5 s to 20 s;
- Highly protective: waterproof, dustproof, chemical corrosion proof.

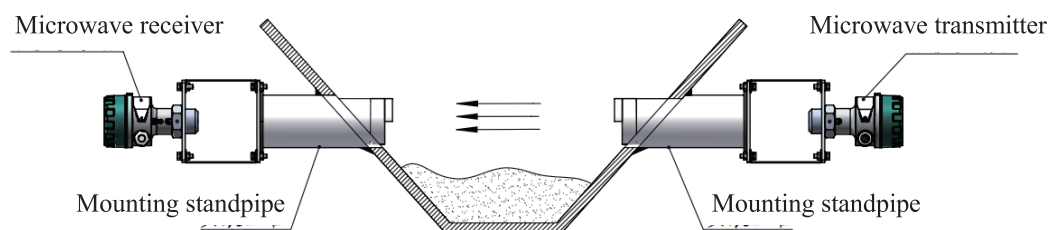
Scope of application

- Chute blockage detection
- Low level detection, high level detection
- Conveyor item detection
- Overload detection of rail/truck
- Anti-collision detection of lift
- Blockage detection of viscous material in feed pipe
- Level measurement of calcium carbide, acetylene tank
- Flow/stop detection

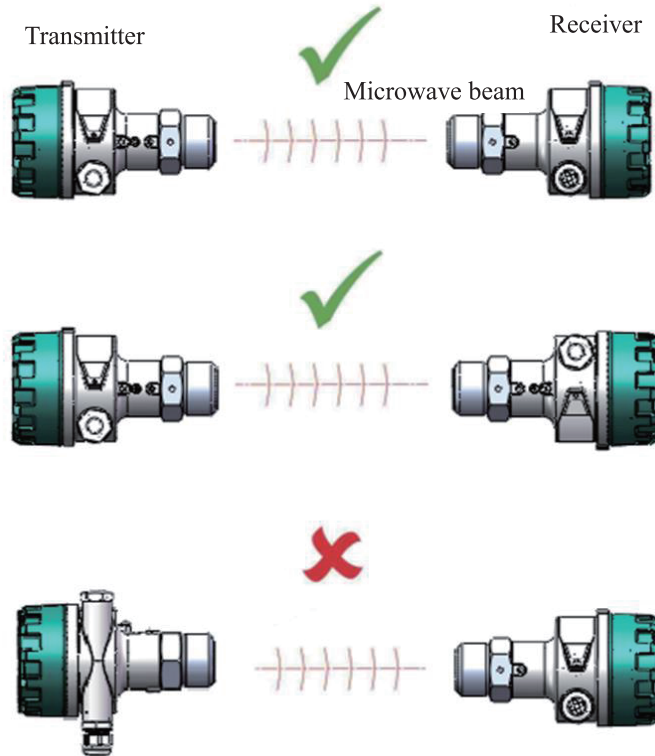
Technical characteristics

Operating voltage	18~36VDC (output ripple<100mVp-p) 90~260VAC, 50/60Hz
Power consumption	Transmitter<2 W, receiver<3 W
Output mode	DPDT (double-pole double-throw) relay output
Relay contact capacity	5A/250VAC
Measuring range	0.2m~40m/0.2m~100m
Microwave frequency	24GHz
Beam angle	20°
Alarm mode	High level alarm/low level alarm
Alarm delay	0.5-20s
Ambient temperature	-30°C~+65°C
Process temperature	-40°C~+80°C (With the addition of the radiator, the maximum temperature can reach 800°C)
Process pressure	-0.1~2.5MPa
Indication of power state	Green LED display
Indication of level alarm	Red LED indicator display
Degree of protection	IP66/IP67
Cable entry	2 M20x1.5 or 1/2NPT (cable diameter 9~13 mm)
Housing material	aluminum casting
Process connection	G1.5 male thread, or 4 installation holders with 10 mm holes Standard flange With UHMW or PTFE window weldment Ceramic window component Firebrick window component
Safety certification information	Ex db IIC T6 Gb Ex tb IIIC T80°C Db

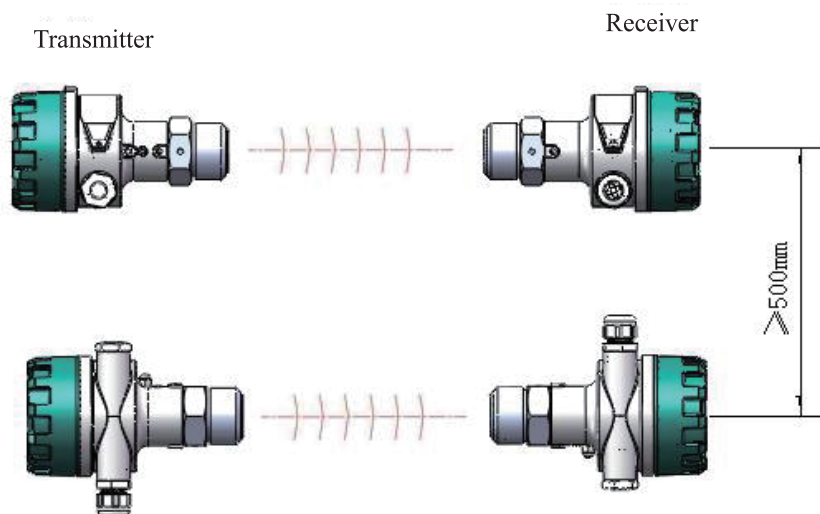
Installation example



Installation angle



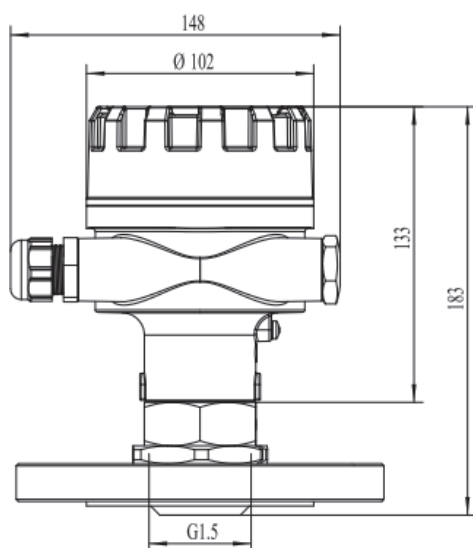
Because the microwave beam is directional, the transmitter and receiver installed in pairs must have the same direction or have an offsetting of 180°. If the offsetting is 90°, the receiver cannot receive the microwave beam signal.



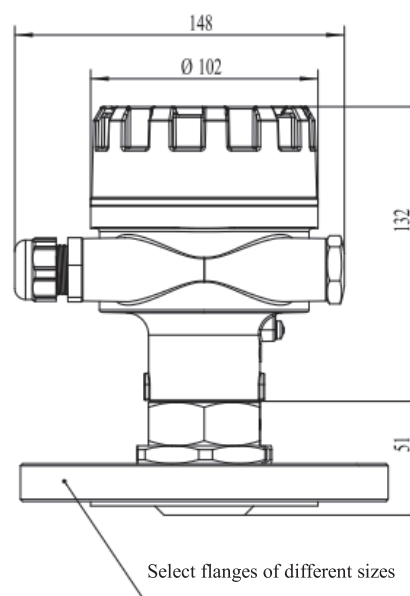
To install several pairs of microwave limit grids in close proximity, each of the two adjacent pairs of limit grids should be installed with an offsetting of 90°, and the center distance should be maintained at more than 500 mm.

Structural size

Installation with thread



Installation with flange



Installation with holder

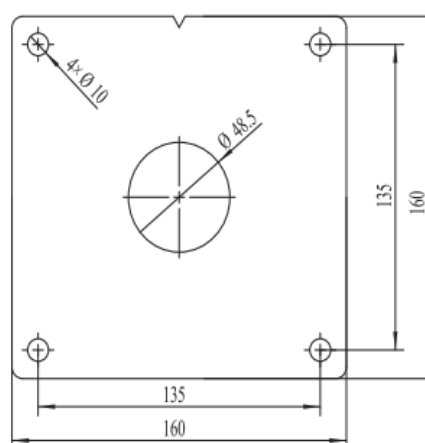
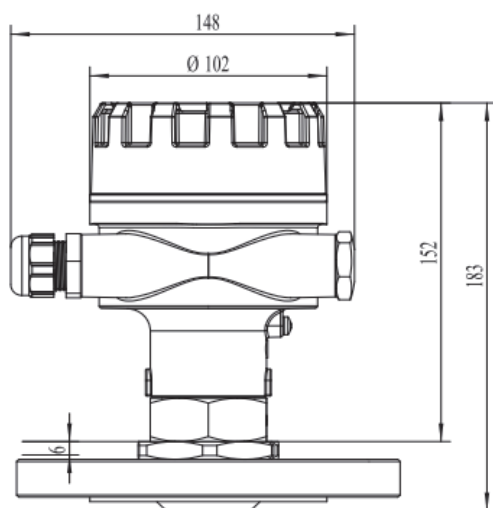




Table of GMS model

Model	Specification code	Description
GMS1000	_____	Microwave limit grid
Classification of functions	T_____	Transmitter
	R_____	Receiver
Measured medium:	L_____	Liquid
	S_____	Solid
Housing/cable inlet	S_____	Die casting Al (cable inlet 2×M20×1.5)
	B_____	Die casting Al (cable inlet 2×1/2"NPT)
Power supply and output	B4_____	24 VDC, DPDT
	U4_____	220 VAC, DPDT
Safety certificate	X_____	No requirement
	D_____	Gas explosion proof
	N_____	Dust explosion Proof
Sensor material	A_____	304+PTFE
	B_____	304+ceramics
Span	A_____	40m
	B_____	100 m
Installation accessories	M01_____	Calcium carbide inclined standpipe (carbon steel)
	M11_____	Calcium carbide vertical standpipe(carbon steel)
	M02_____	Acetylene inclined standpipe (carbon steel)
	M12_____	Acetylene vertical standpipe (carbon steel)
	M03_____	Blast furnace inclined standpipe(carbon steel)
	M04_____	Flange pipe (carbon steel)
	M05_____	Microwave mounting base (carbon steel, thread installation for sensor)
	M06_____	Installation with flange (specific flange specifications should be selected)
	M07_____	Installation with holder
Flange standard	A_____	HG/T20615-2009 (Class series)
	B_____	HG/T20592-2009 (PN series)
Flange size	E_____	DN50 (2")
	F_____	DN80 (3")
	G_____	DN100 (4")
	H_____	DN125 (5")
	J_____	DN150 (6")
	K_____	DN200 (8")
	M_____	DN250 (10")
Pressure rating (kgf/cm ²)	A_____	PN2.5
	G_____	PN6
	B_____	PN10
	C_____	PN16
	D_____	PN25
	F_____	PN40
	M_____	Class150
	N_____	Class300

Model	Specification code	Description
Flange sealing face type	A_____	RF raised face
	B_____	FM
	C_____	M
	E_____	FF
	F_____	FF Flat- thin plate flange
Material of flange	A_____	304
	B_____	316L
	C_____	Carbon steel
Companion flange	X_____	Without companion flange
	A_____	304
	B_____	316L
	C_____	Carbon steel

