INTELLIGENT ULTRASONIC LEVEL TRANSMITTERS (VRPWCS 70 SERIES)

丹东德泽科技有限公司

DANDONG VIRTUE RIVER TECHNOLOGY CO., LTD

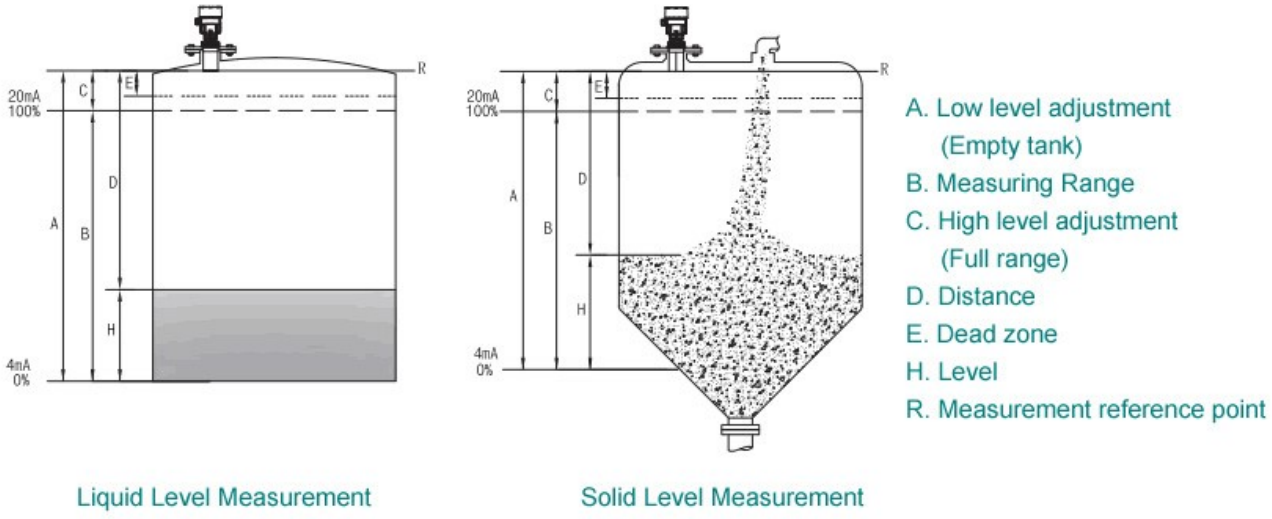
1.Principle of operation

The ultrasonic level metering technology is based on the principle that the energy transducer (the sensor) emits an ultrasonic pulse train, then receives and selects some echoes reflected from the medium surface, converting them into electronic signals.

The ultrasonic pulse travels at the speed of sound, and the time interval between emitting and receiving is in proportion to the distance between the sensor and the medium surface. The formula relating the distance S, sound speed C and the transmitting time T is as following:

$$S=C\times T/2$$

The emitting and reflecting signals overlap each other within an area close to the transducer due to the limit width of the emitting ultrasonic pulses, they cannot be identified and measured, this area is called Dead Zone. The distance of the dead zone is associated with the working frequency of the ultrasonic level transmitter.



Liquid Level Measurement　　Solid Level Measurement

Applications: These level transmitters are suitable for liquid or solid particles level measurement in different kinds of industrial areas, especially for water treatment industry.

Features of the instrument:

- 1. Adopting advanced microprocessor
- 2. Unique echo processing technology
- 3. False echo storage

- 4. Built-in temperature compensation
- 5. Narrow beam, easily debugging and calibration
- 6. Available for either aluminum enclosure or plastic enclosure
- 7. With a menu in both English and Chinese, and an echo curve display.
- 8. Optional for intrinsically safe

2. Product Description

VRPWCS71

Measuring range:
With standard probe: 0.25m - 5m for liquids/ 0.25m - 2m for solids
With anti-corrosive sealed probe: 0.25 - 4m for liquids/ 0.25 - 2m for solids.
Process connection: Thread G1$^{1}/_{2}$ A or flange, bracket
The housing material of the transducer: PA66+GF30 or PVDF
Process temperature: -40℃ - +70℃
Process pressure: -0.02MPa - 0.1MPa
Accuracy: ±0.25% of full range
Output: 4 - 20 mA/ HART (24 V DC two wires or four wires)
4 – 20 mA/ HART (220V AC for four wires)
RS485/ MODBUS (6 – 24 V DC)
Explosion proof: Ex ia IIB T6 Ga
Enclosure protection grade: Plastic enclosure-IP66; AL enclosure-IP67

VRPWCS72

Measuring range:
With standard probe: 0.3m - 10m for liquids/ 0.3m - 4m for solids
With anti-corrosive sealed probe: 0.3 - 8m for liquids/ 0.3 - 4m for solids.
Process connection: Thread G2 A or flange, bracket
The housing material of the transducer: PA66+GF30 or PVDF
Process temperature: -40℃ - +70℃
Process pressure: -0.02MPa - 0.1MPa
Accuracy: ±0.25% of full range
Output: 4 - 20 mA/ HART (24 V DC two wires or four wires)
4 - 20 mA/ HART (220V AC for four wires)
RS485/ MODBUS (6 – 24 V DC)
Explosion proof: Ex ia IIB T6 Ga

Enclosure protection grade: Plastic enclosure-IP66; AL enclosure-IP67

VRPWCS73

Measuring range:

With standard probe: 0.4m - 15m for liquids/ 0.4m - 6m for solids

With anti-corrosive sealed probe: 0.4 - 12m for liquids/ 0.4 - 6m for solids.

Process connection: Thread M66×2 or flange, bracket

The housing material of the transducer: PA66+GF30 or PVDF

Process temperature: -40℃ - +70℃

Process pressure: -0.02MPa - 0.1MPa

Accuracy: ±0.25% of full range

Output: 4 - 20 mA/ HART (24 V DC two wires or four wires)

4 – 20 mA/ HART (220V AC for four wires)

RS485/ MODBUS (6 – 24 V DC)

Explosion proof: Ex ia IIB T6 Ga

Enclosure protection grade: Plastic enclosure-IP66; AL enclosure-IP6

VRPWCS74

Measuring range:

With standard probe: 0.5m - 20m for liquids/ 0.5m - 8m for solids

With anti-corrosive sealed probe: 0.5 - 16m for liquids/ 0.5 - 8m for solids.

Process connection: Thread M95×2 or flange, bracket

The housing material of the transducer: PA66+GF30

Process temperature: -40℃ - +70℃

Process pressure: -0.02MPa - 0.1MPa

Accuracy: ±0.25% of full range

Output: 4 - 20 mA/ HART (24 V DC two wires or four wires)

4 – 20 mA/ HART (220V AC for four wires)

RS485/ MODBUS (6 – 24 V DC)

Explosion proof: Ex ia IIB T6 Ga

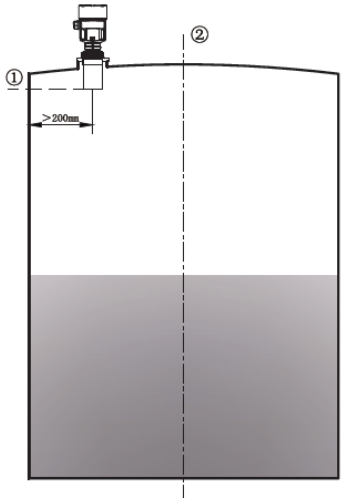
Enclosure protection grade: Plastic enclosure-IP66; AL nclosure-IP67

3. Installation Guidance

3.1. Installation position

The installation of VRPWCS71, VRPWCS72 and VRPWCS73

During the installation of PWCS71, VRPWCS72 and VRPWCS73, please keep the symmetrical central line of the transmitter at least 200mm away from the inner wall of the tank, 500mm or above is as suggested. Please refer to the picture right.

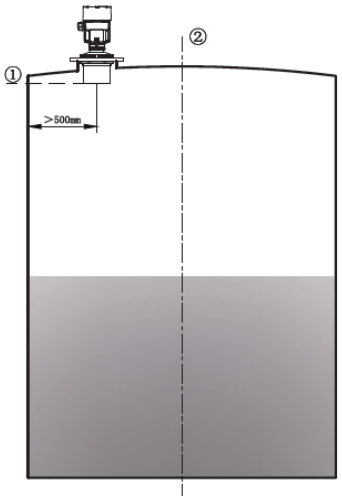


① The bottom surface of the sensor (The emission surface of sound wave)

② The symmetrical central line of the tank

The installation of VRPWCS74

During the installation of PWCS74, please keep the symmetrical central line of the transmitter at least 500mm away from the inner wall of the tank. Please refer to the picture right.



① The bottom surface of the sensor (The emission surface of sound wave)

② The symmetrical central line of the tank

3.2. Installation

- **Installation requirements**

There should be a certain distance between the transmitter and the inner tank wall (please refer to the installation position instructions item 3.1 for details).

There is a certain beam angle when the transducer emits ultrasonic pulse. Therefore, make sure that no obstacle (e.g. ladders, level switches, heating coils, diversion trenches, etc.) in the area of sensing cone of the ultrasonic beam.

Notes:

1. Make sure that there is no crossing between the ultrasonic beam and the feeding flow.
2. The highest liquid level cannot get into the dead zone during installation.
3. Try to install the transmitter at the position where the emitting direction of the transducer is vertical to the liquid (or medium level) surface.
4. Installation of instrument with explosion proof should comply with the regulations of the state on the installation of instruments with explosion proof in dangerous area. The housing material

of intrinsically safe instrument should be aluminum, which can be installed in the area where the explosion-proof is compulsory area. The instruments must be grounded.

5. Mounting the instrument with a plastic flange: plastic flange with material of PP, PTFE, PA, etc is suggested when mount the instrument at the site. The flange central hole can be machined with thread with the same size and grade which match the thread of the process connection of the instrument, or can be machined as a through-hole. If so, the flange will be fixed with the equipped locking nuts from the manufacturer. While, when the instrument is mounted with a stainless steel flange, which central hole is suggested to be machined as a through-hole (not be machined with threads). The flange will be fixed with the equipped locking nuts from the manufacturer. You also can order an adapter for stainless steel flange direct from us. For some installation with special requirements, please inquiry us.

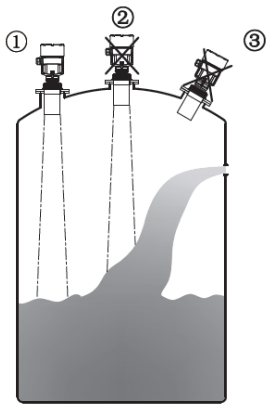
- **Typical wrong installation**

Instrument cannot be mounted above feeding inlet. If so, it cannot measure the actual liquid level. Keep the installation place away from sunshine or rain for the outdoor installation.

① Correct

② Wrong

The transducer should be vertical to the liquid surface.
The instrument cannot be mounted at the middle of a tank with an arch top to avoid possible multiple echoes.



① Correct

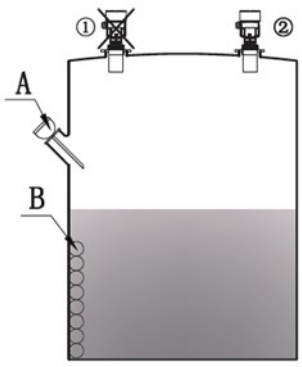
② Wrong

③ Wrong

Obstacles A or B should be avoided during installation.

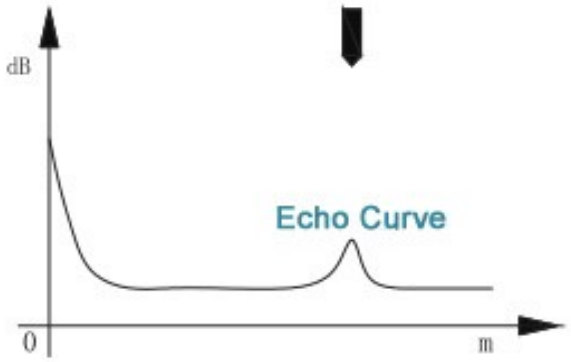
① Wrong

② Correct



Echo curve

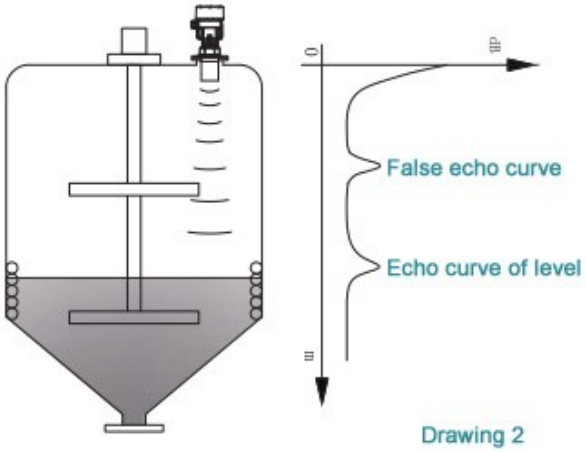
Please refer to Drawing 1 to see the normal echo curve



Drawing 1

When there is a blender or agitator inside the tank, there will be false echo produced around blade.

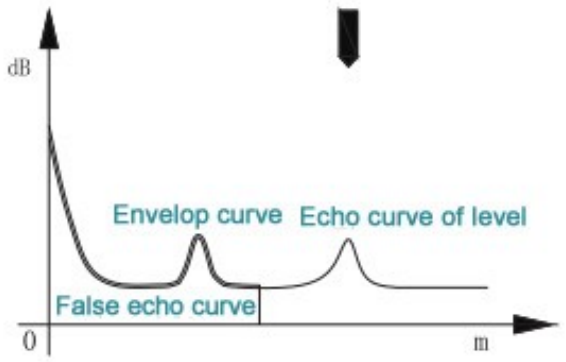
Please refer to Drawing 2



Drawing 2

The instrument can select correct echo curve of level by using false echo curve storage function.

Please refer to Drawing 3

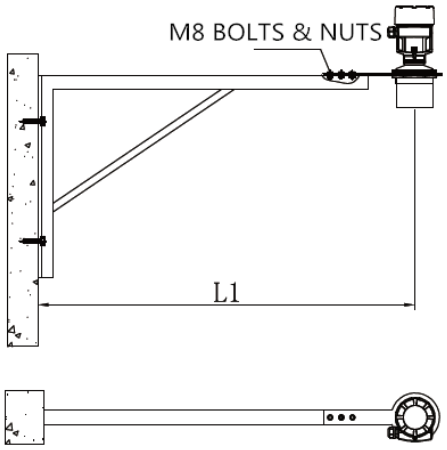


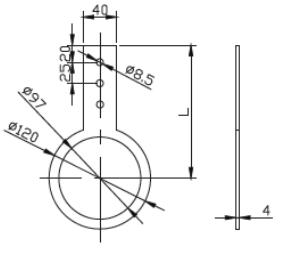
Drawing 3

False echo curve storage function can eliminate interference produced by false echo.

Installation with bracket

VRPWCS74 being installed with brackets



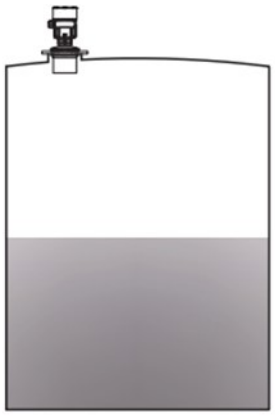


MOUNTING BRACKET

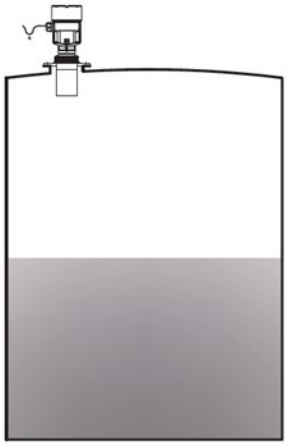
	D	d	L
VRPWCS71	83	49	143.5
VRPWCS72	83	61	143.5
VRPWCS73	83	67	143.5
VRPWCS74	120	97	180

VRPWCS74 being installed with flange

For the instruments to be installed with flange, refer to the picture right.

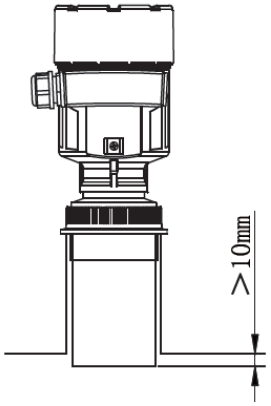


Prevention of damp: Cable gland should be tightened for instruments mounted at outside or in damp environment, and the cable at the inlet should be bent down with shape of “U”. Please refer to the picture on the right.



Mounting with a nozzle

The length of nozzle or mounting extension pipe: Make sure that the sensor should be at least 10mm out of the inner surface of vessel. Please refer to the picture on the right.

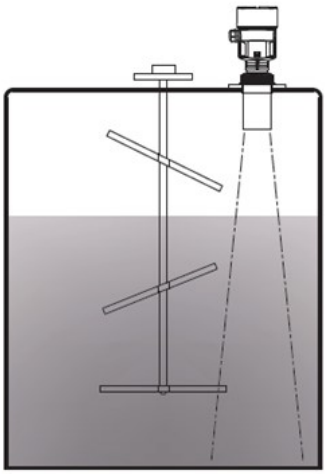


Foam

Foaming of some of the liquid surface due to feeding, agitating or other process inside the vessel is to weaken the emission signal. When foaming may cause measuring error, the sensor should be mounted in a stilling pipe or guided wave radar level transmitter should be selected and used. Guided wave radar level transmitter is the best choice for this application, which will not be affected by foam.

Agitating

When there is agitating within a tank, please keep the instrument away from the agitator. When there is foam or wave caused by agitating, a wave guiding pipe should be used. Please refer to the picture right.



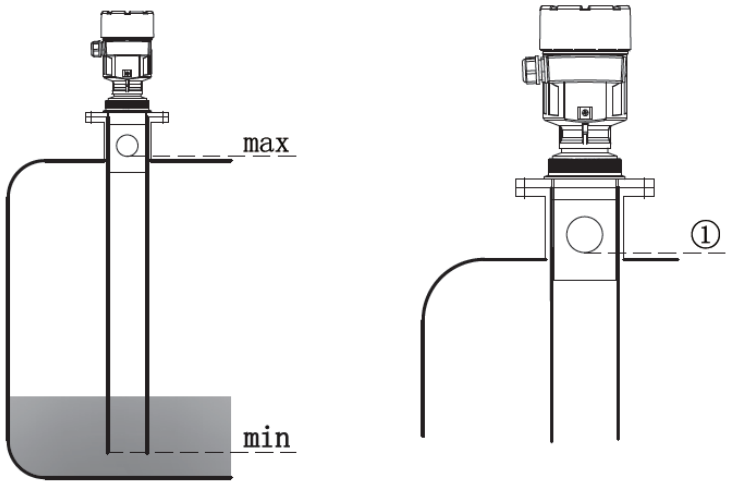
Air flow

When there is strong air flow in a vessel, e.g. outdoor installation and the wind is strong, or there is strong air vortex in a vessel, the sensor is recommended to be mounted with a wave guiding pipe, or pulse radar level transmitter or guided wave radar level transmitter is suggested to be used.

Installation with a wave guiding pipe

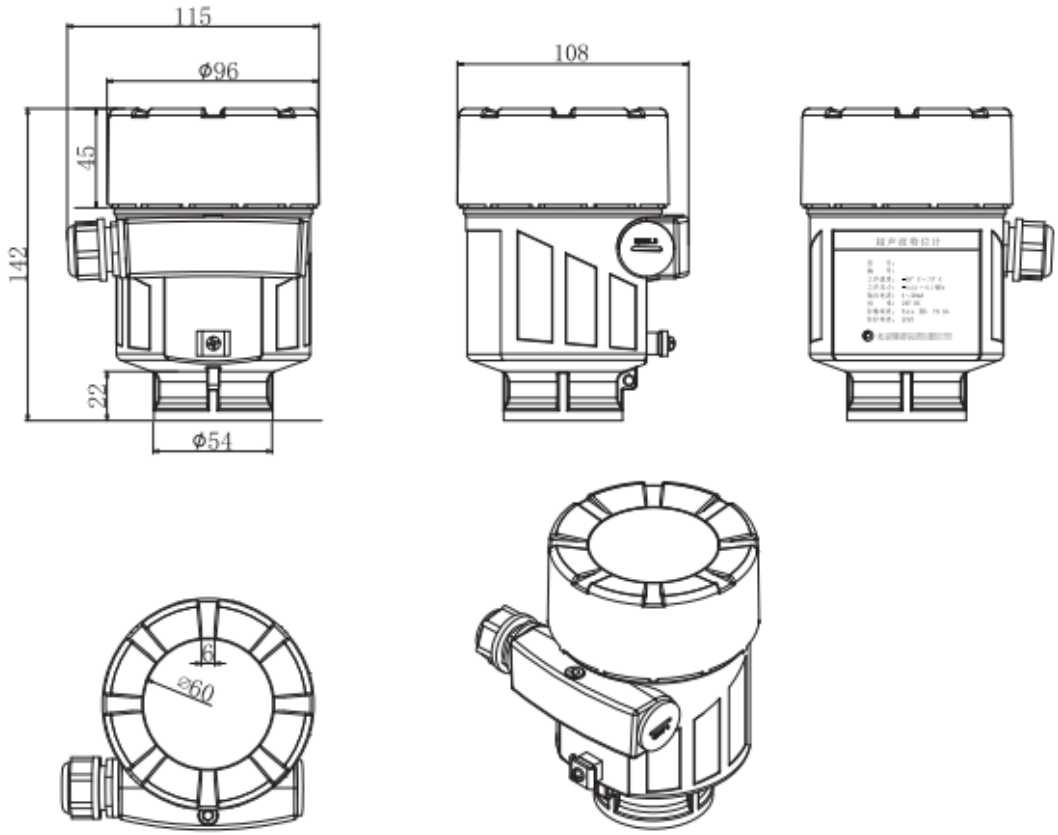
Wave guiding pipe (wave guiding pipe or by-pass pipe) with an air hole with diameter of 5mm-10mm can be used, which can avoid measurement error affected by obstacles, foam and air turbulence. Please refer to the picture right.

Note: Wave guiding pipe cannot be used for measurement with sticky medium.

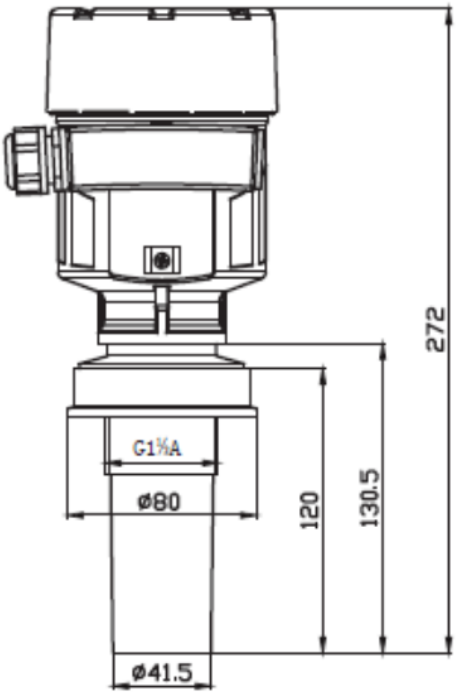


4. Structure Dimension (Unit: mm)

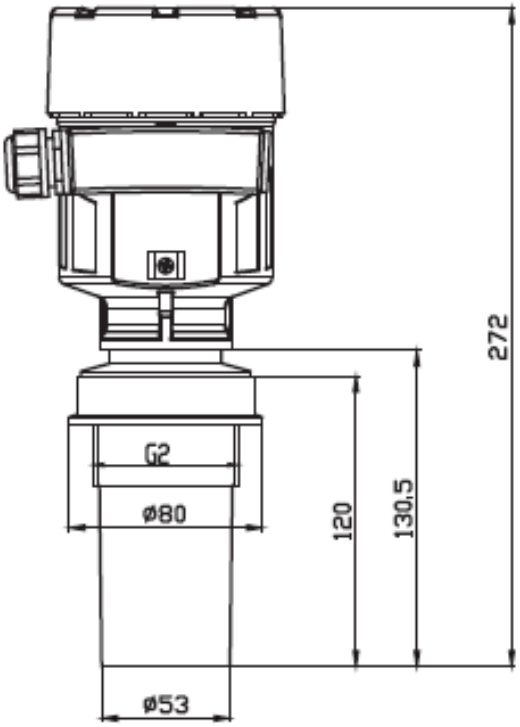
Housing material: Aluminum



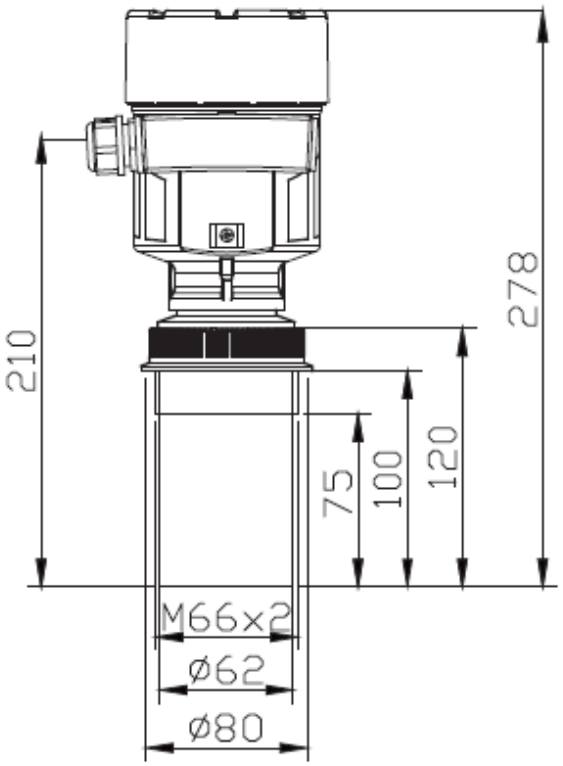
VRPWCS71



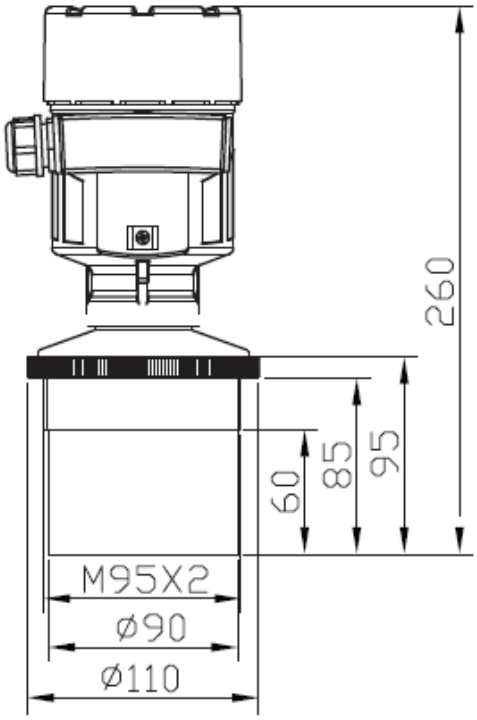
VRPWCS72



VRPWCS73



VRPWCS74



5. Wiring

Power supply

Power supply DC 24V (two wires) and 4 – 20mA/HART current output share one 2-core cable. Please refer to the technical data for the actual power supply voltage range. A safety barrier must be equipped between the power supply and the transmitter for the intrinsically safe type explosion proof.

Power supply 220 V AC/24 V DC (4-wire) and (4-20) mA/HART current output are separated, using one 2-core cable respectively and individually. Please refer to the technical data for the actual power supply voltage range. The current output of standard transmitters can be output by grounding. And the current output of transmitter with explosion-proof must be floating null. Make sure to keep the terminals to a transmitter and the grounding terminal in good connection condition. Usually the grounding terminal is grounded at the grounding point of the tank or at a piece of land nearby to a plastic tank.

Cable connection

1. General introduction

Common 2-wire cable can be used for power supply. The outer diameter of the cable should be 5 – 9 mm to ensure cable entry sealing. Shielded cable is recommended where there is electromagnetic interference.

2. 4-20mA/HART (2-wire), Shielded cable should be used for power supply.

3. 4-20mA/HART (4-wire), Both two ends of shielded cable should be grounded. Inside an instrument, the shielding cover layer must be connected directly to the internal grounding terminal. And the outer grounding terminal on the housing must be connected to the ground.

4. Shielding and wiring of the cable

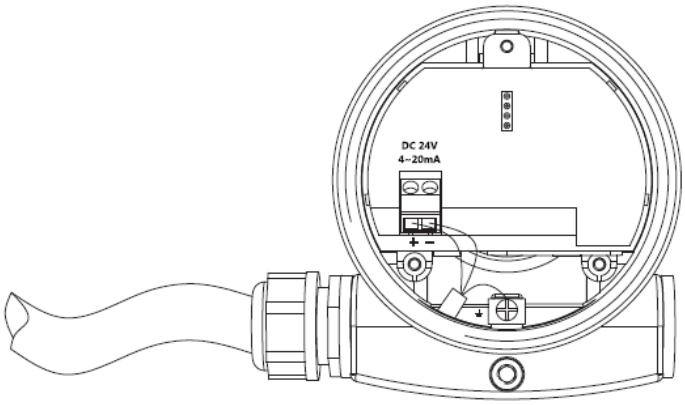
When there is grounding current, the shielded cable end away from the transmitter must be grounded via a ceramic capacitor (e.g. InF 1500V) in order to play the role of isolation and as a bypass high frequency signal.

Wiring

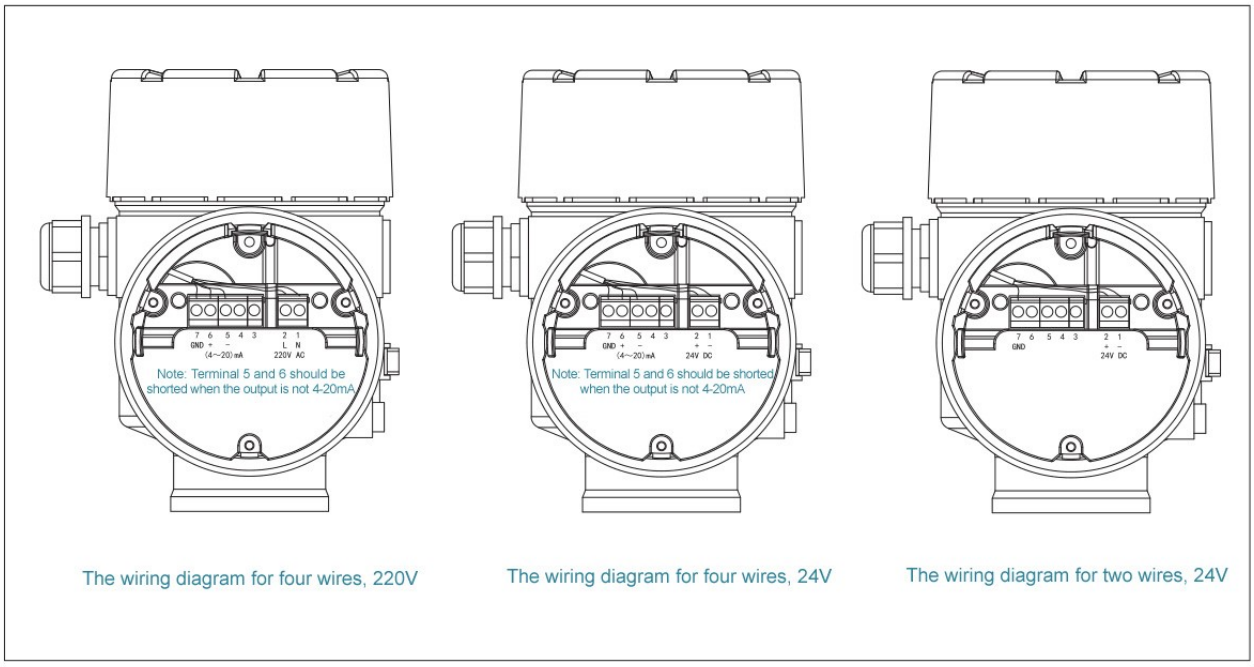
1. Wiring the ultrasonic level transmitter with single chamber

24V DC power supply, and 4-20 mA output

Please refer to the picture below:



2. Wiring the ultrasonic level transmitter with double chambers



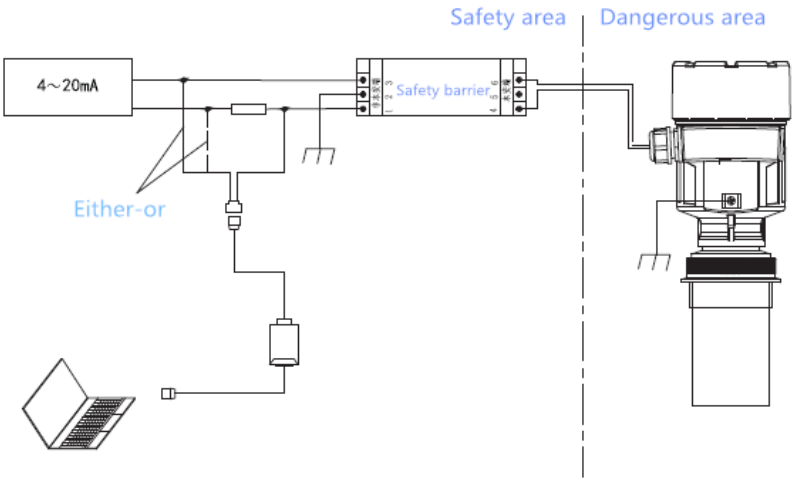
Explosion-proof wiring

This transmitter is intrinsically safe type of explosion-proof with the mark of Ex ia ⅡB T6 Ga. The intrinsically safe type of ultrasonic level transmitter adopts aluminum housing, and silicon rubber sealing for the inner structure to ensure that any possible spark caused by failure of transducer and circuit will not leak out. It is applicable to continuous level measurement of combustible medium with explosive-proof grade lower than Ex ia ⅡB T6.

A safety barrier should be used for power supply for explosion-proof application.

All the cables should be shielded type with max. length of 600m.

Distributed capacitance ≤ 0.1μ F/km, and distributed inductance ≤ 1mH/km. The ultrasonic level transmitter must be grounded during installation.



6. Calibration

Calibration methods

There are three calibration methods for VRPWCS70X:

1. Programmer with built-in buttons
2. By a PC with the software
3. With a HART handhold communicator

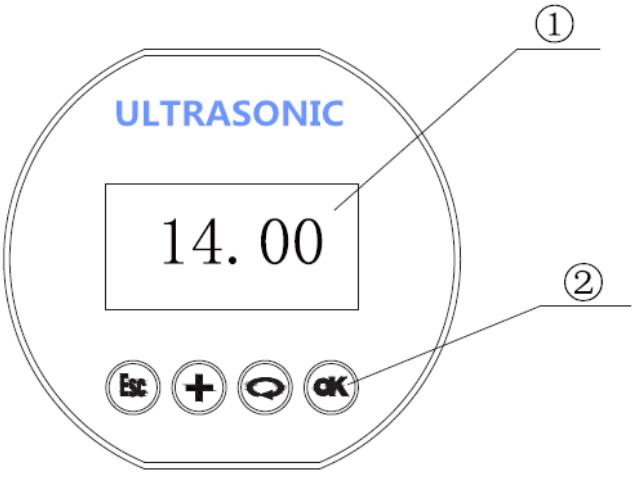
Programmer with built-in buttons

An instrument can be calibrated with the 4 buttons built in the programmer.

After calibration, the display keeps the normal working condition at the site.

① LCD display

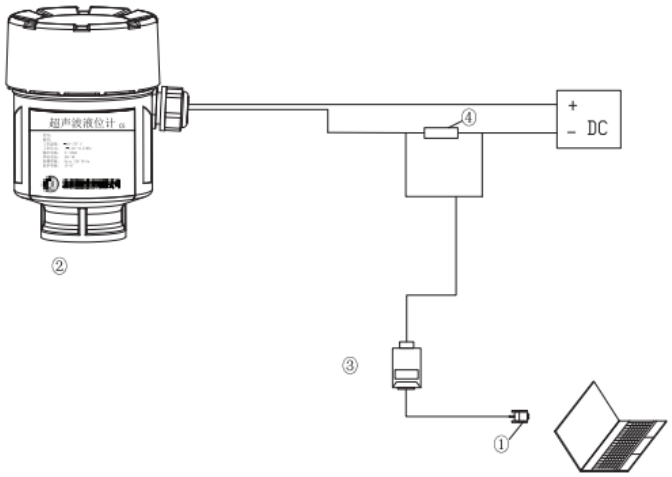
② Buttons



Calibration with a PC with a software

Connect a PC with a HART modem

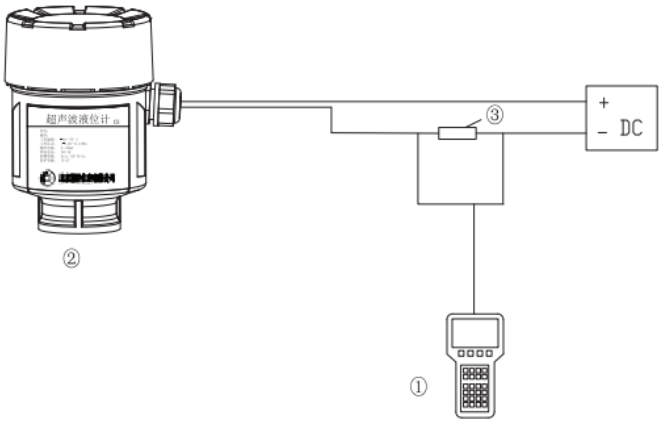
① USB interface/ 233 interface
② VRPWCS7X
③ HART adapter
④ A resistance of 250 Ω



HART handhold communicator

Be calibrated with a HART handhold communicator.

① Handhold communicator
② VRPWCS7X
③ A resistance of 250 Ω



7. Technical Data

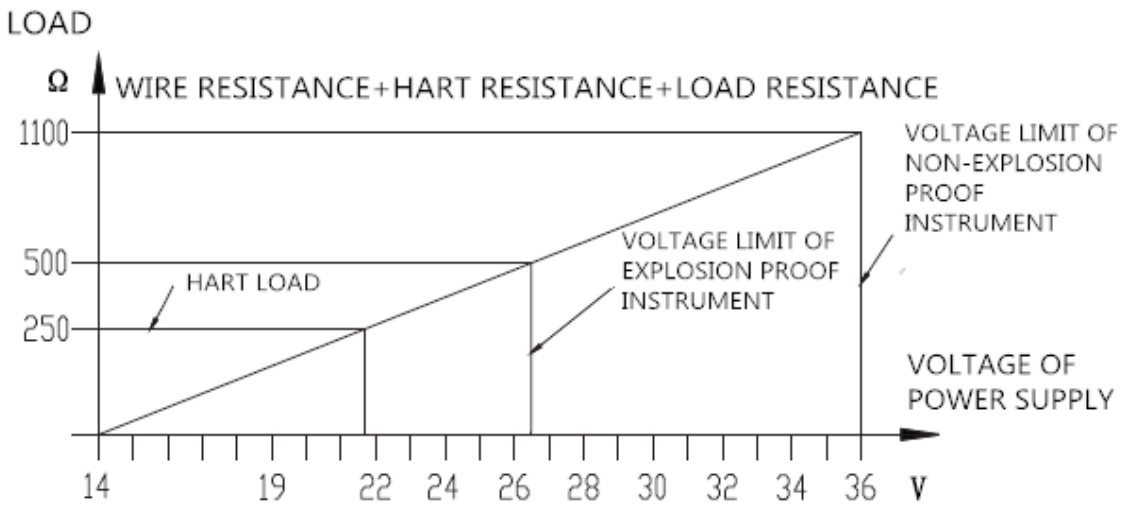
General data

Model		VRPWCS71	VRPWCS72	VRPWCS73	VRPWCS74
Process connection		Thread G1 1/2A Bracket or flange	Thread G2A Bracket or flange	Thread M66×2 Bracket or flange	Thread M95×2 Bracket or flanges
Mat.	Transducer	PA66+GF30/ PVDF			PA66+GF30
	Transducer sealing	VITON			
	Housing	Aluminum/ Plastic			
	Housing sealing	VITON			
	Cover window	PC			
	Grounding terminal	Stainless steel			
Weight (Depends on the		1.3kg	1.4kg	1.5kg	1.9kg

process connection)					
Power	2-wire	Standard type: 24 V DC			
		Intrinsically safe type: 21.5 to 26.5V DC			
		Power consumption: max.22.5mA, 0.54W			
		Allowed ripple: -<100Hz, Uss<1V -(100～100k)Hz, Uss<10mV			
	4-wire	Standard type: 24V DC/ 220V AC			
		Power consumption: max.1VA, 1W			
Cable parameter		Cable inlet / plug: 1 M20×1.5 cable entry (cable diameter 5…9mm), and 1 blind block, M20×1.5			
		Spring wiring terminal: cross section 2.5mm²			
Output parameter		Output signal: 4 – 20 mA or 4 – 20 mA with HART			
		Resolution: 1.6μA			
		Error output: 20.5mA；22mA；3.9mA			
		Damping time: (0 - 30) s, adjustable			
Features	Dead zone	0.25m	0.3m	0.4m	0.5m
	Max. measuring range	5m (Liquid) With standard probe	10m (Liquid) With standard probe	15m (Liquid) With standard probe	20m (Liquid) With standard probe
		4m (Liquid) With sealed probe	8m (Liquid) With sealed probe	12m (Liquid) With sealed probe	16m (Liquid) With sealed probe
		2m (Solid) With standard probe	4m (Solid) With standard probe	6m (Solid) With standard probe	8m (Solid) With standard probe
		2m (solid) With sealed probe	4m (solid) With sealed probe	6m (solid) With sealed probe	8m (solid) With sealed probe
	Ultrasonic frequency	60kHz	50kHz	40kHz	28kHz

	Emission angle	5°	5°	5°	3°
	Measurement interval	>2s (Decided by parameters setting)			
	Adjustment time	>3s (Decided by parameters setting)			
	Resolution	1mm			
	Repeatability	±3mm			
	Accuracy	±0.25% for full range			
	Process temperature	-40℃ … +70℃			
	Relative humidity	<95%			
	Pressure	<0.1MPa			
	Resistance to vibration	Mechanic vibration 10m/s			

Curve of two-ware load and resistance:



8. Model Selection

VRPWCS71

Code	Approvals	
P I	Standard type (Non-explosion) Intrinsically safe type (Ex ia IIB T6 Ga)	
Code	Transducer material/ Transducer type/ Process temperature/ Enclosure protection grade/ Max. range	
A B C	PA66+GF30/ Open/ (-40 ~ +70)℃/ IP65/ Liquid 5m, solid 2m PA66+GF30/ Sealed/ (-40 ~ +70)℃/ IP66/ Liquid 4m, solid 2m PVDF/ Sealed/ (-40 ~ +70)℃/ IP67/ Liquid 4m, solid 2m	
Code	**Process connection**	
GPM Y	Thread G1 1/2 A Special design	
Code	**Flange matching/ Material**	

Material / Code / Flange size	PP Face flange	PTFE Face flange	SS304 Face flange	SS316L Face flange
DN80 PN16 flange	DP	DF	DA	DB
DN100 PN16 flange	EP	EF	EA	EB
DN125 PN16 flange	FP	FF	FA	FB
DN150 PN16 flange	GP	GF	GA	GB
DN200 PN16 flange	HP	HF	HA	HB
DN250 PN16 flange	JP	JF	JA	JB
ANSI 3” 150lb flange	DPM	DFM	DAM	DBM
ANSI 4” 150lb flange	EPM	EFM	EAM	EBM

ANSI 5” 150lb flange	FPM	FFM	FAM	FBM
ANSI 6” 150lb flange	GPM	GFM	GAM	GBM
ANSI 8” 150lb flange	HPM	HFM	HAM	HBM
ANSI 10” 150lb flange	JPM	JFM	JAM	JBM

X None
Y Special design

Code	Electronic unit
2	(4~20)mA/ 24V DC 2-wire
3	(4~20)mA/ 24V DC 4-wire
4	(4~20)mA/ 220V AC 4-wire
5	(4~20)mA/ 24V DC/ HART/ 2-wire
6	(4~20)mA/ 24V DC/ HART/ 4-wire
7	(4~20)mA/ 220V AC/ HART/ 4-wire
8	RS485/MODBUS
Y	Special design

Code	Housing/ Enclosure protection grade
L	Aluminum/ IP 67
G	Stainless steel 304/ IP 67

Code	Cable entry
M	M20x1.5
N	½″ NPT

Code	Display/ Programmer
V	With display+programmer
B	With display+programmer+backlight
X	Without

VRPWCS72

Code	Approvals	
P I	Standard type (Non-explosion) Intrinsically safe type (Ex ia IIB T6 Ga)	
Code	Transducer material/ Transducer type/ Process temperature/ Enclosure/ Max. range	
A B C	PA66+GF30/ Open/ (-40 ~ +70)℃/ IP65/ Liquid 10m, solid 4m PA66+GF30/ Sealed/ (-40 ~ +70)℃/ IP66/ Liquid 8m, solid 4m PVDF/ Sealed/ (-40 ~ +70)℃/ IP67/ Liquid 8m, solid 4m	
Code	**Process connection**	
GPM Y	Thread G2A Special design	
Code	**Flange matching/ Material**	

Material / Code / Flange size	PP Face flange	PTFE Face flange	SS304 Face flange	SS316L Face flange
DN80 PN16 flange	DP	DF	DA	DB
DN100 PN16 flange	EP	EF	EA	EB
DN125 PN16 flange	FP	FF	FA	FB
DN150 PN16 flange	GP	GF	GA	GB
DN200 PN16 flange	HP	HF	HA	HB
DN250 PN16 flange	JP	JF	JA	JB
ANSI 3” 150lb flange	DPM	DFM	DAM	DBM
ANSI 4” 150lb flange	EPM	EFM	EAM	EBM

ANSI 5” 150lb flange	FPM	FFM	FAM	FBM
ANSI 6” 150lb flange	GPM	GFM	GAM	GBM
ANSI 8” 150lb flange	HPM	HFM	HAM	HBM
ANSI 10” 150lb flange	JPM	JFM	JAM	JBM

X None
Y Special design

Code	Electronic unit
2	(4~20)mA/ 24V DC 2-wire
3	(4~20)mA/ 24V DC 4-wire
4	(4~20)mA/ 220V AC 4-wire
5	(4~20)mA/ 24V DC/ HART/ 2-wire
6	(4~20)mA/ 24V DC/ HART/ 4-wire
7	(4~20)mA/ 220V AC/ HART/ 4-wire
8	RS485/MODBUS
Y	Special design

Code	Housing/ Enclosure protection grade
L	Aluminum/ IP 67
G	Stainless steel 304/ IP 67

Code	Cable entry
M	M20x1.5
N	½″ NPT

Code	Display/ Programmer
V	With display+programmer
B	With display+programmer+backlight
X	Without

VRPWCS73

Code	Approvals	
P I	Standard type (Non-explosion) Intrinsically safe type (Ex ia IIB T6 Ga)	
Code	Transducer material/ Transducer type Process temperature/ Enclosure/ Max. range	
A B C	PA66+GF30/ Open/ (-40 ~ +70)℃/ IP65/ Liquid 15m, solid 6m PA66+GF30/ Sealed/ (-40 ~ +70)℃/ IP66/ Liquid 12m, solid 6m PVDF/ Sealed/ (-40 ~ +70)℃/ IP66/ Liquid 12m, solid 6m	
Code	**Process connection**	
GPM Y	Thread M66*2 Special design	
Code	**Flange matching/material**	

Material / Code / Flange size	PP Face flange	PTFE Face flange	SS304 Face flange	SS316L Face flange
DN100 PN16 flange	EP	EF	EA	EB
DN125 PN16 flange	FP	FF	FA	FB
DN150 PN16 flange	GP	GF	GA	GB
DN200 PN16 flange	HP	HF	HA	HB
DN250 PN16 flange	JP	JF	JA	JB
ANSI 4” 150lb flange	EPM	EFM	EAM	EBM
ANSI 5” 150lb flange	FPM	FFM	FAM	FBM
ANSI 6” 150lb flange	GPM	GFM	GAM	GBM

ANSI 8” 150lb flange	HPM	HFM	HAM	HBM
ANSI 10” 150lb flange	JPM	JFM	JAM	JBM

X None
Y Special design

Code	Electronic unit
2	(4~20)mA/ 24V DC 2-wire
3	(4~20)mA/ 24V DC 4-wire
4	(4~20)mA/ 220V AC 4-wire
5	(4~20)mA/ 24V DC/ HART/ 2-wire
6	(4~20)mA/ 24V DC/ HART/ 4-wire
7	(4~20)mA/ 220V AC/ HART/ 4-wire
8	RS485/MODBUS
Y	Special design
Code	**Housing/ Enclosure protection grade**
L	Aluminum/ IP 67
G	Stainless steel 304/ IP 67
Code	**Cable entry**
M	M20x1.5
N	½″ NPT
Code	**Display/ Programmer**
V	With display+programmer
B	With display+programmer+backlight
X	Without

VRPWCS74

Code	Approvals	
P I	Standard type (Non-explosion) Intrinsically safe type (Ex ia IIB T6 Ga)	
Code	Transducer material/ Transducer type Process temperature/ Enclosure/ Max. range	
A B	PA66+GF30/ Open/ (-40 ~ +70)℃/ IP65/ Liquid 20m, solid 8m PA66+GF30/ Sealed/ (-40 ~ +70)℃/ IP66/ Liquid 16m, solid 8m	
Code	**Process connection**	
GPM Y	Thread M95*2 Special design	
Code	**Flange matching/material**	

Material / Code / Flange size	PP Face flange	PTFE Face flange	SS304 Face flange	SS316L Face flange
DN100 PN16 flange	EP	EF	EA	EB
DN125 PN16 flange	FP	FF	FA	FB
DN150 PN16 flange	GP	GF	GA	GB
DN200 PN16 flange	HP	HF	HA	HB
DN250 PN16 flange	JP	JF	JA	JB
ANSI 4” 150lb flange	EPM	EFM	EAM	EBM
ANSI 5” 150lb flange	FPM	FFM	FAM	FBM
ANSI 6” 150lb flange	GPM	GFM	GAM	GBM

ANSI 8” 150lb flange	HPM	HFM	HAM	HBM
ANSI 10” 150lb flange	JPM	JFM	JAM	JBM

X None
Y Special design

Code	Electronic unit
2	(4~20)mA/ 24V DC 2-wire
3	(4~20)mA/ 24V DC 4-wire
4	(4~20)mA/ 220V AC 4-wire
5	(4~20)mA/ 24V DC/ HART/ 2-wire
6	(4~20)mA/ 24V DC/ HART/ 4-wire
7	(4~20)mA/ 220V AC/ HART/ 4-wire
8	RS485/MODBUS
Y	Special design

Code	Housing/ Enclosure protection grade
L	Aluminum/ IP 67
G	Stainless steel 304/ IP 67

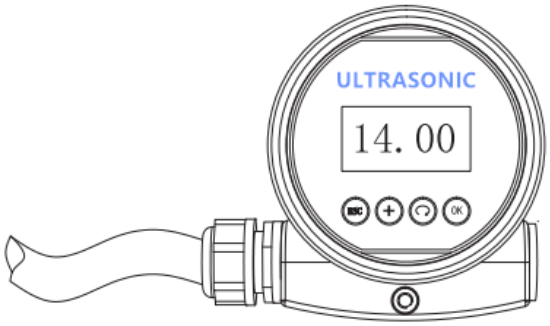
Code	Cable entry
M	M20x1.5
N	½″ NPT

Code	Display/ Programmer
V	With display+programmer
B	With display+programmer+backlight
X	Without

9. Explanation on Calibration

Function description on keys:

There are 4 four keys on the face plate, with which calibration to the instrument could be done. And there are four languages optional in the menu. After calibration being finished, the LCD screen will show the measured value, which is clearly readable via the glass window. Please refer to the picture below:



KEY “OK”

- Enter programming state
- Confirm completion of operation
- Confirm the changes to the parameters

KEY “+”

- Revise parameters
- Select display mode

KEY “SELECTION”

- Select an item to be edited
- Select a digit (position) to be edited
- Display the content of a parameter item

KEY “ESC”

- Exit from a programming state
- Go back to the previous menu
- Switching between measured value and echo curve during operation

Programming method:

When the instrument is at measuring state, press key “OK” to enter the programming state. And then, main menu comes out. When each parameter has been edited, you must press key “OK” for confirmation. Otherwise, the editing that you have done will be invalid. After editing being finished, press key “ESC”, to make the instrument to exit the programming state, and goes back to the measuring state. At any moment of programming, press key “ESC” to exit from a parameter programming state.

Parameters editing method:

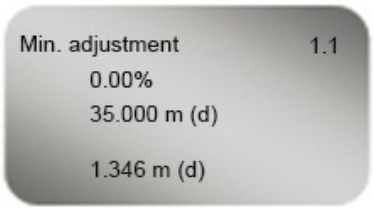
Characters, numbers, and parameters programming:

When menu is at character/number programming state, the first digit or character to a parameter to be edited goes black. At this time, press key “+” to change the character or digit until the needed one to be presented. And then press key “SELECTION”, the other digits or characters become black in turn, edit them respectively. Every time, when editing is finished, please press “OK” for confirmation. At the measuring state, press key “OK” to enter editing state, the screen shows the main menu.

Note: the number at the right top corner is the number of the submenu.

1. Min. Adjustment

Min. adjustment is for measuring range setting. It determines the proportion of current output linearity corresponding relationship together with max. adjustment. In main menu, when the menu number is 1, press button “OK”, enter the submenu of basic settings. LCD shows as follows:



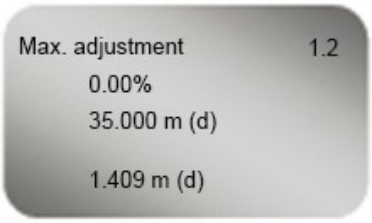
Press button “OK”, enter programming for low level percentage, refer to the character/figure parameter editing method in the parameter editing method previously stated to edit the percentage value and distance value. After the completion of the editing, press button “OK” for confirmation, or press button “ESC” for quitting editing.

Note: Min. adjustment means that the distance from the flange bottom surface to the bottom of the tank is 4mA; while, Max. adjustment means that the distance from the flange bottom surface to the level of full-range is 20mA.

2. Max. Adjustment:

Max. adjustment is for measuring range setting. It determines the proportion of output current linearity corresponding relationship together with min. adjustment. When LCD indicates the menu number 1.1, press button “SELECTION”, enter max. adjustment. LCD indicates as follows:

At this time, you can edit the max. adjustment with button “OK”.



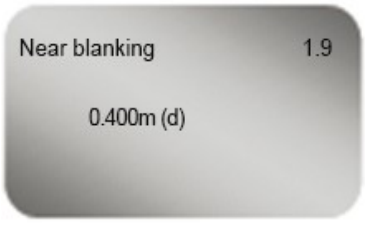
3. Range setting:

In order to get correct measuring result, measuring range must be set. When LCD indicates the menu number 1.7, press button “SELECTION” to enter range setting menu. LCD displays as follows:

Press button “OK”, the corresponding parameter turns black, press button “SELECTION” or button “+” set the parameters to the value you want, and then press button “OK” for confirmation.

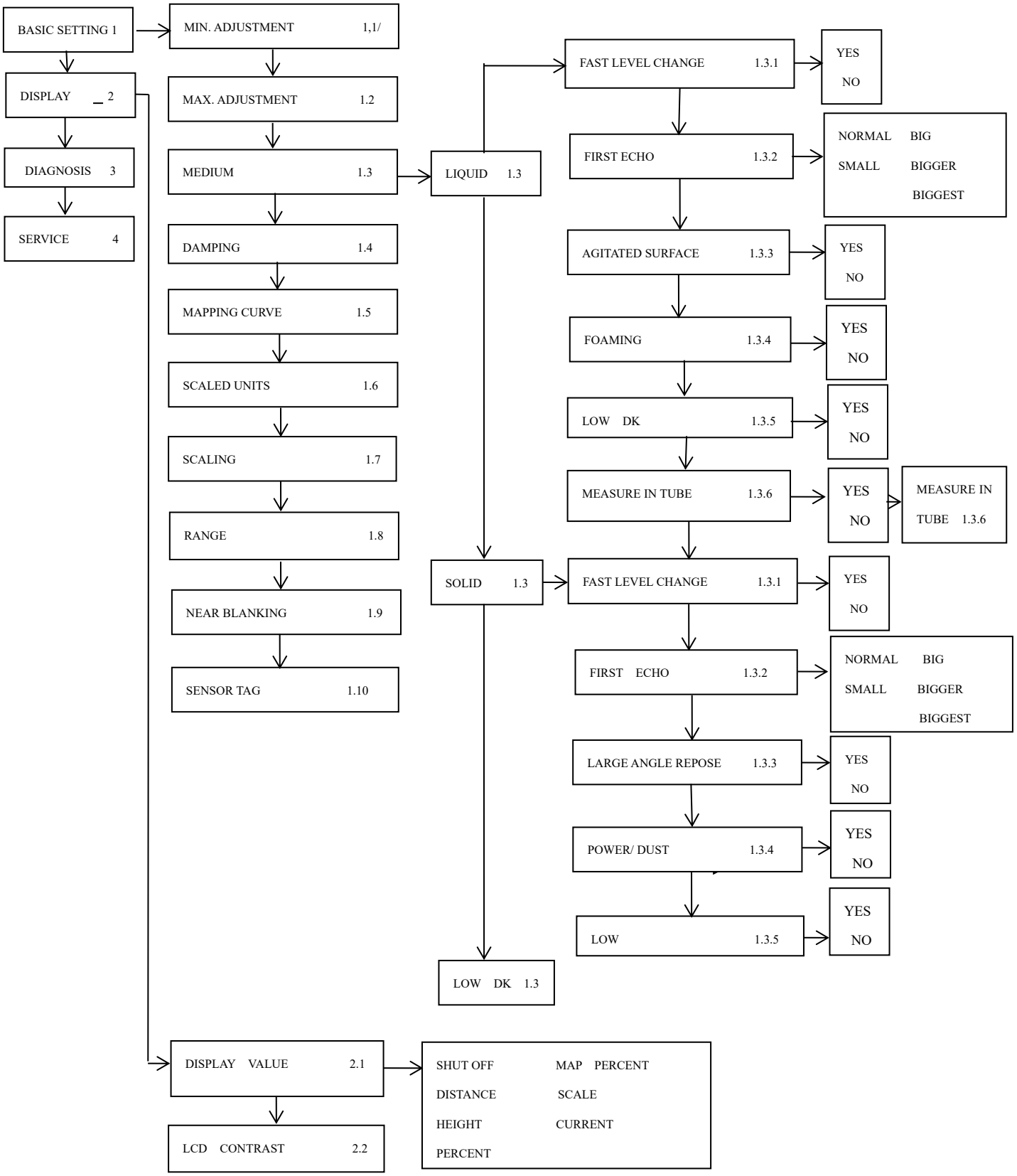
4. Dead zone (Near blanking)

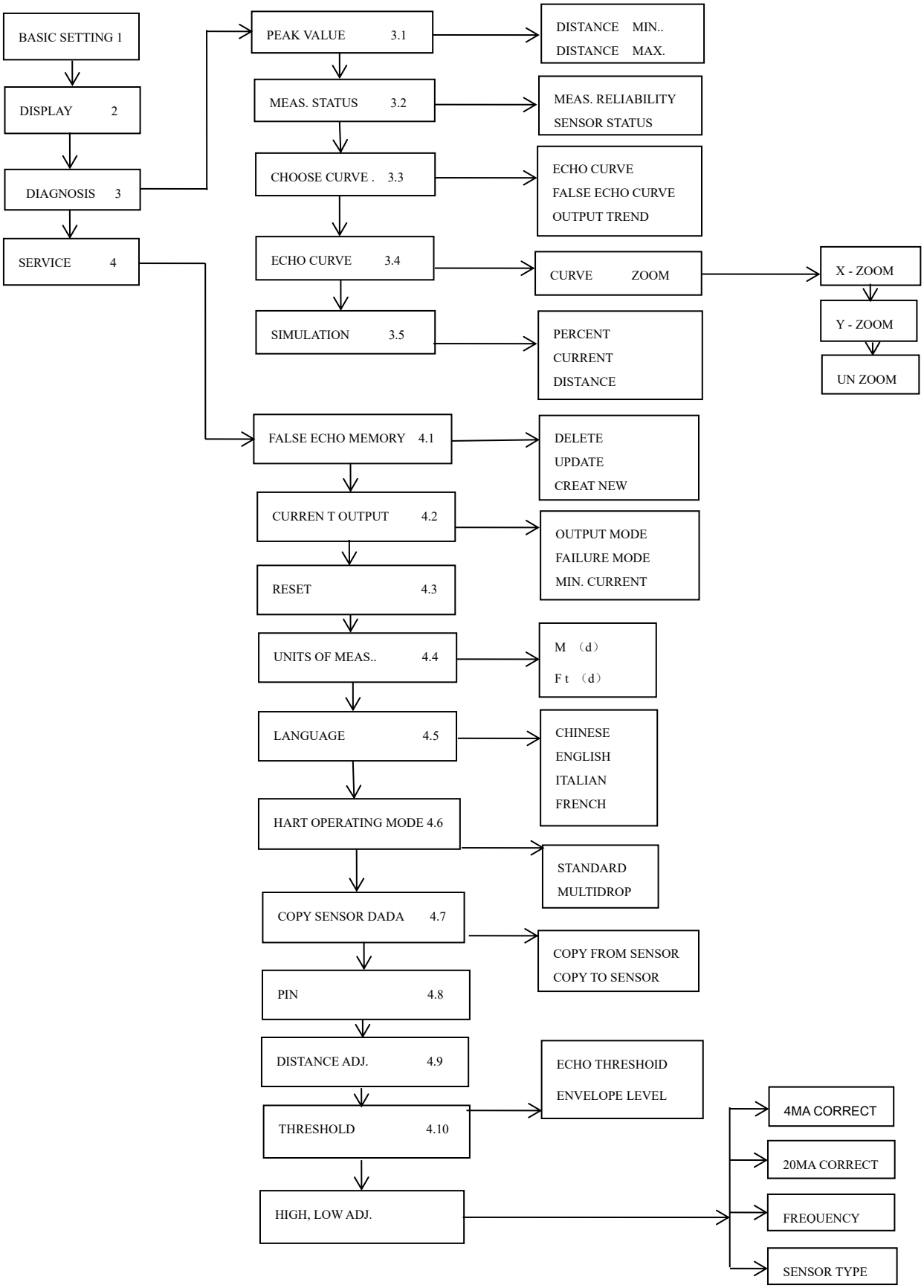
When there is a fixed obstacle close to the propagator, it interferes the measurement, when the maximum medium level cannot be up to the obstacle, using near blanking setting can avoid measurement mistake. When LCD indicates the menu number 1.8, press button “SELECTION” to enter near blanking setting submenu. LCD displays as follows:



Press button “OK”, enter the parameter editing mode (the corresponding number will turn black), press button “SELECTION” or button “+” for setting parameters, and press button “OK” for confirmation when editing finishes.

Menu diagram




BASIC SETTING 1
DISPLAY 2
DIAGNOSIS 3
SERVICE 4
PEAK VALUE 3.1
MEAS. STATUS 3.2
CHOOSE CURVE . 3.3
ECHO CURVE 3.4
SIMULATION 3.5
DISTANCE MIN..
DISTANCE MAX.
MEAS. RELIABILITY
SENSOR STATUS
ECHO CURVE
FALSE ECHO CURVE
OUTPUT TREND
CURVE ZOOM
PERCENT
CURRENT
DISTANCE
X - ZOOM
Y - ZOOM
UN ZOOM
FALSE ECHO MEMORY 4.1
CURREN T OUTPUT 4.2
RESET 4.3
UNITS OF MEAS.. 4.4
LANGUAGE 4.5
HART OPERATING MODE 4.6
COPY SENSOR DADA 4.7
PIN 4.8
DISTANCE ADJ. 4.9
THRESHOLD 4.10
HIGH, LOW ADJ.
DELETE
UPDATE
CREAT NEW
OUTPUT MODE
FAILURE MODE
MIN. CURRENT
M （d）
F t （d）
CHINESE
ENGLISH
ITALIAN
FRENCH
STANDARD
MULTIDROP
COPY FROM SENSOR
COPY TO SENSOR
ECHO THRESHOID
ENVELOPE LEVEL
4MA CORRECT
20MA CORRECT
FREQUENCY
SENSOR TYPE

10. Transport and storage

Transport should be performed strictly in conformity with the requirements of the manual and the characters of the products.

The instrument should be stored in a dry and ventilated indoor place with ambient temperature with 0 - 40 degree Celsius, and relative humidity no higher 80%. It is strictly forbidden to keep the instrument with any corrosive material at the same place. Those instruments that have been stored for a long term can only be used after being tested and proven well.

12. Information requested when inquiry

Customer information

Company：_____ Contact person：_____

Add.：_____ Post code：_____

Tel.：_____Fax：_____Mobile：_____

E-mail：_____ Date：_____

Approvals

□ Standard type (non-explosion proof) □ intrinsically safe type (Ex ia IIB T5 Ga)

□ Intrinsically safe type (Ex ia IIC T6 Ga) □ Intrinsically safe + marine approval (Ex ia IIC T6 Ga)

□ Intrinsically safe + explosion proof type (Ex d [ia] IIC T6 Ga)

Tank/ container information

Tank type:

□ Storage tank □ Reaction tank □ Separation tank □ Marine tank

Tank structure:

□ Tank material：_____ □ Tank pressure：_____

Tank size:

□ Height of tank：_____m □ Diameter of tank: ___m

Top of a tank:

□ Arch □ Flat top □ Open □ Conic

Bottom of a tank:

□ Tapered □ Flat □ Inclined □ Arch

Installation position:

□ Top □ Side □ Bypass pipe □ Wave guiding pipe

Extension pipe on the tank top (Important information):

Height of extension pipe: _____mm

Diameter of extension pipe: _____mm

Measuring medium:

Medium name:_____ □ Liquid □ Solid □ Mixed

Medium temperature: _____℃

Dielectric constant: _____

Adhesive: □ Yes □ No

Stirring: □ Yes □ No

Process connection:

Thread: □ 66×2 □ 95×2

□ Flange（DN=_____） □ Flange（ANSI=_____）

Power supply: □ 24V DC 2-wire □ 24V DC 4-wire □ 220V AC

Output: □ 4-20mA □ HART

Display: □ With display and programmer □ Without display and programmer

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