YSQF Ultrasonic flowmeter/heat meter

Instruction manual



SIBO.X INDUSTRIAL CO.,LTD.
Add: No. Building 1, No. 1, Jingshi Road, Cicheng Town Industrial Park, Jiangbei District, Ningbo City, Zhejiang, China
https://www.sbxsun.com
Email: info@sbxsun.com
Tel: +86-15958288207

Contents

1.Products Categories 1

2.Check Components 2

3.Measuring Diagrams 3

4.Converter Installation and Wiring Diagram 4

5.Transducer Introduction and Wiring Diagram 9

6.Display and Operation 12

7.Transducers Installation 21

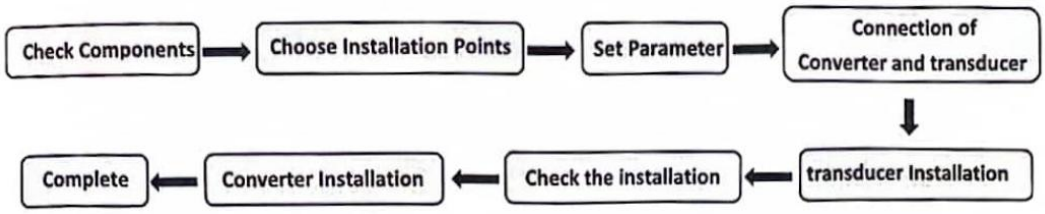
8.Finish Installation 33

Welcome to use the new generation ultrasonic flow meter made of our patented technology.

For Series Ultrasonic Flow/Heat Meters utilize the transit-time principle to measure the velocity of rclatively clean liquids in full pipes.

The purpose of this guide is to provide installation procedures and basic operating instructions for Series Ultrasonic Flow/Heat Meters.

Installation Procedure



1.Products Categories

1.1 Composition of Ultrasonic flow meter

Ultrasonic Flow meter=Converter+transducer
Ultrasonic Heat meter=Converter+transducer+Temperature transducer

1.2 Types of Converters

Model	Wall Mount I type	Wall Mount II type	Wall Mount III type	Explosion proof
Picture				
Model	Panel mount	Module	Fix Mount	
Picture				

1.3 Types of Flow/Temperature transducers

Flow transducer	Picture	Models and options	Mcasuring range	Temperature
Clamp on		TS-2 small(4.TS2)	DN15-100	-30~90℃
		TM-1 medium (5.TM1)	DN50-700	
		TL-1 large(6.TL1)	DN300-6000	
High temp. Clamp on		TS-2-HT small(4.TS2)	DN15-100	-30~160℃
		TM-1-HT medium(5.TM1)	DN50-700	
		TL-1-HT large(6.TLI)	DN300-6000	
Insertion		TC-1 standard(7.TC1)	DN50-6000	-30~160℃
		TC-2 extended(7.TC1)		
		TP-1 parallel(9.pipes sensor)	DN80-6000	
Inline		Standard	DN15-1000	-30~160℃

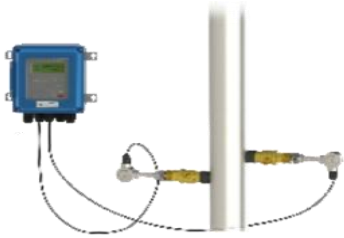
Temperature transducer	Picture	Model	Measuring range	Temperature	Cutoff water
Clamp on		CT-1	DN50-6000	-40～160℃	No need
Insertion		TCT-1	DN50-6000	-40~160℃	Need
Insertion under pressure		PCT-1	DN50-6000	-40～160℃	No need
Insertion small sizes		SCT-1	<DN50	-40~160℃	Need

2.Check Components

1.Please check you have all the components in the order.

3.Measuring Diagrams

3.1 Separated Mounting

		
Clamp on	**Insertion**	**Inline**

3.2 Separated Mounting

		
Clamp on	**Insertion**	**Inline**

Note:Mounting of Wall Mount,Panel mount,Module,and Explosion proof are in the same way.

3.3 Fixed Mounting

		
Clamp on	**Insertion**	**Inline**

3.4 Module type

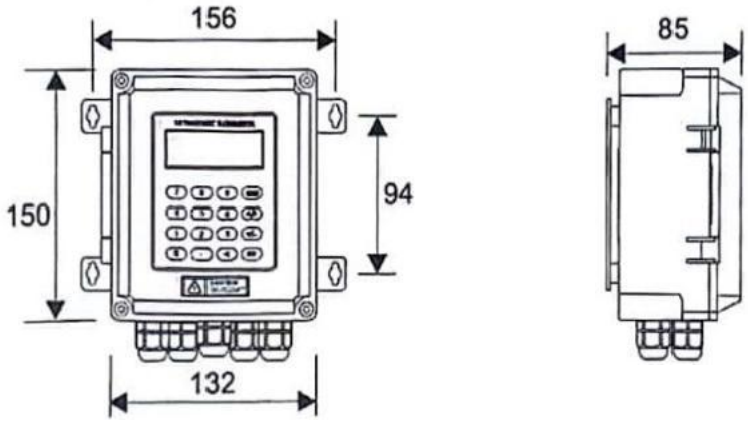
		
Clamp on	**Insertion**	**Inline**

★ Temperature and heat can be measured by connecting PT¹00 temperature sensors on both water supply and rctum pipes.

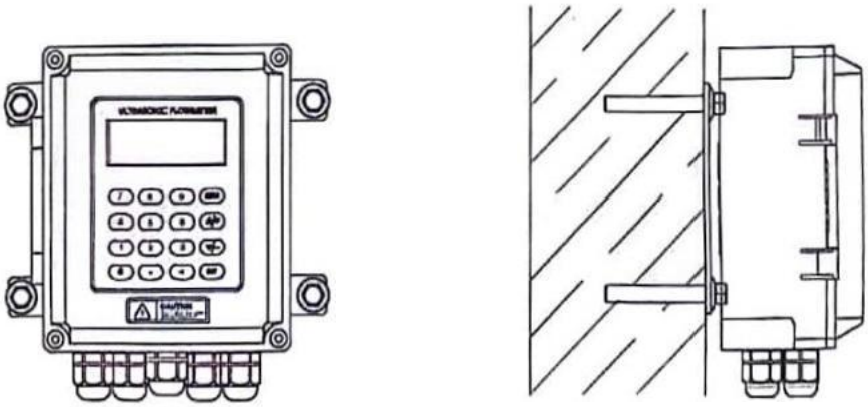
4.Converter Installation and Wiring Diagram

4.1 Separated Mounting

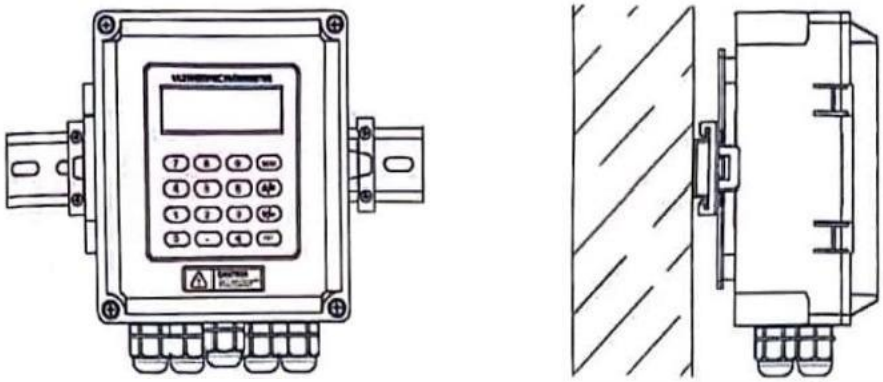
- **I type Installation Instruction**



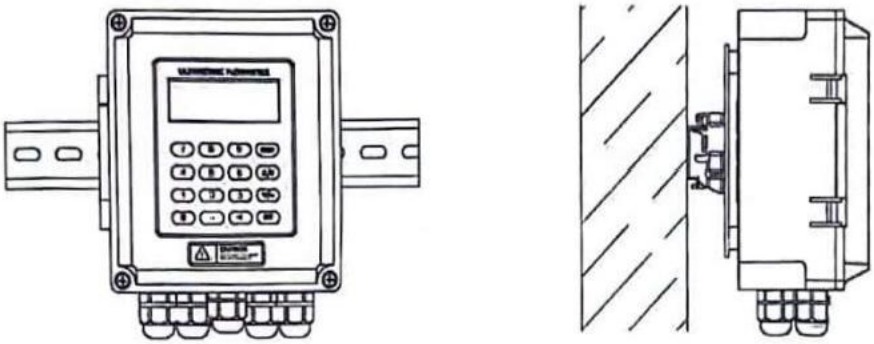
- Wall mounting:Fix the converter with 4Φ6 expansion bolts or normal nails.



● DIN-rail mounting by using rail fixing clamps.

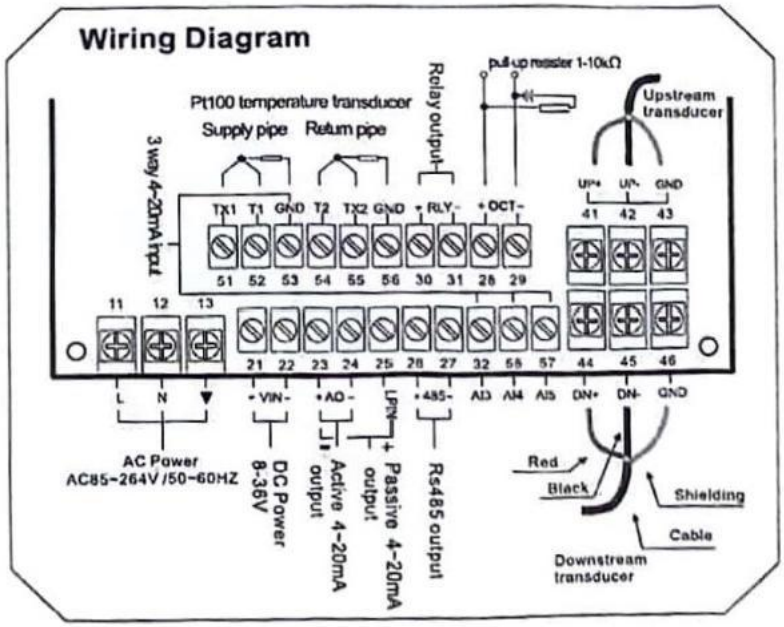


● DIN-rail mounting by using PCB bracket

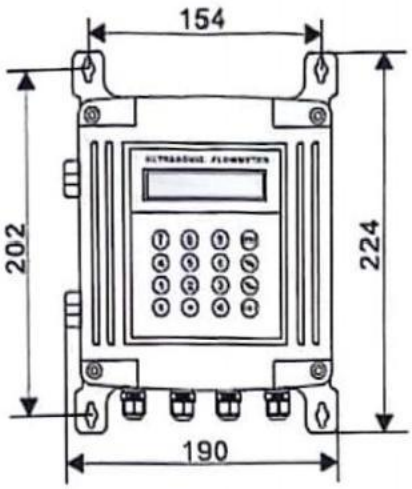


Converter ofI type can be installed on the wall or in distribution box and explosion-proof box

● I type Wiring Diagram

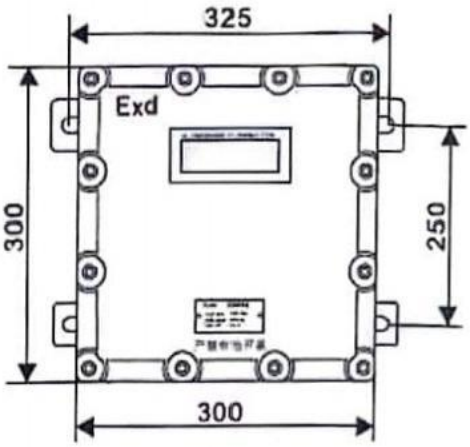


- **Ⅱ type and Explosion proof Installation Instruction(Ⅱ type(Grey)is the same way)**



Thickness:75mm

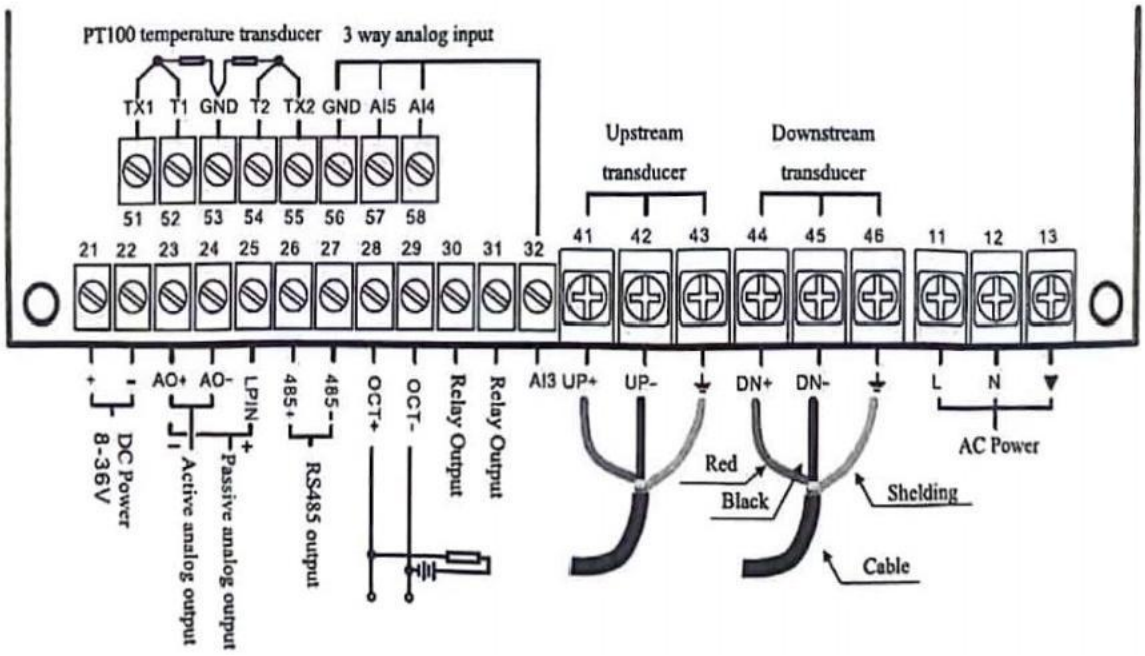
Wall mounting:Fix the converter with 4 Φ6 expansion bolts.



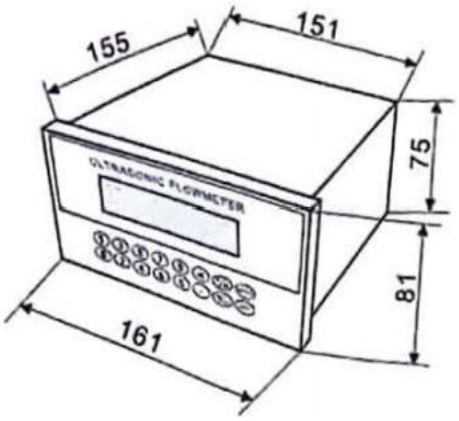
Thickness:165mm

Explosion-proof grade:DⅡBT5
Fix the converter with 4 Φ8 expansion bolts.

- Ⅱ type and Explosion proof Wiring Diagram



- **Panel mount Installation and Wiring Diagram**

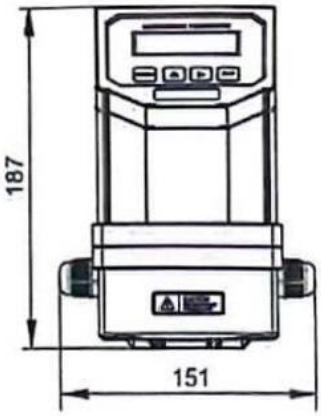


RS485		4-20mA		Upstream sensor			Downstream sensor		
+	-	+	-	UP+	UP-	GND	DN+	DN-	GND
L	N	⏚	TX2	T2	GND	T1	TX1	+	-
AC Pouer220V			Return water		Supply water		OCT		

●Used for Panel Mounting Hole size:152×76mm

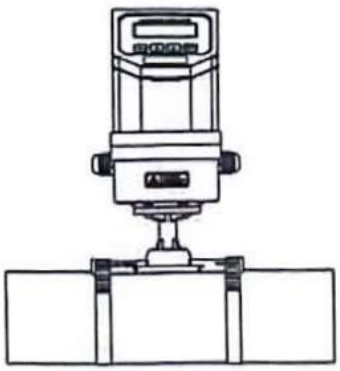
4.2 Fix mounting

- **Fix Mount Installation and Wiring Diagram**

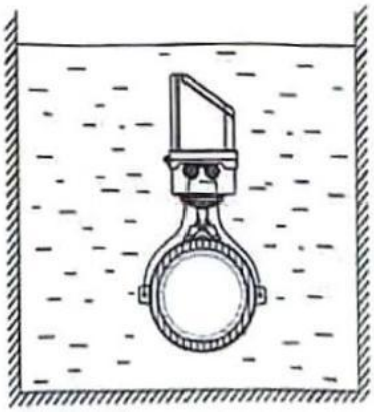


Thickness:117mm

The converter is generally installed on the pipeline,sometimes installed in the water.

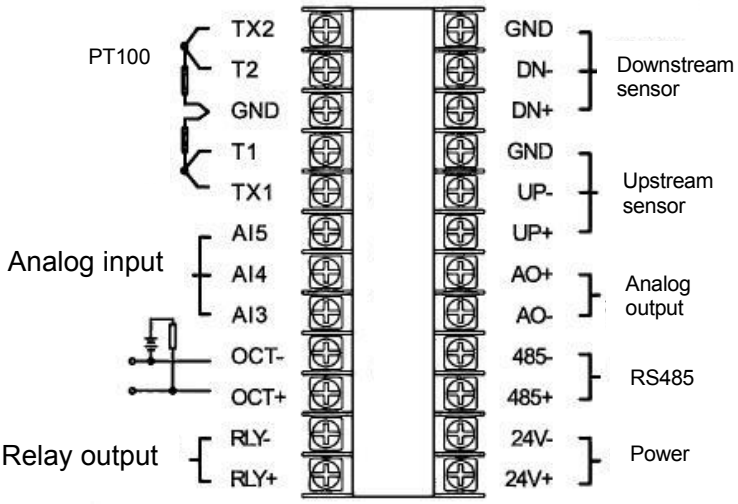


Install on the pipeline



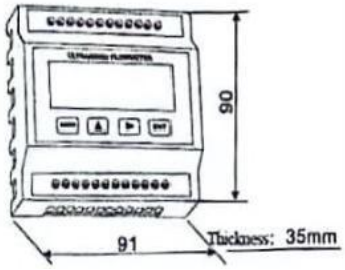
Install in the water

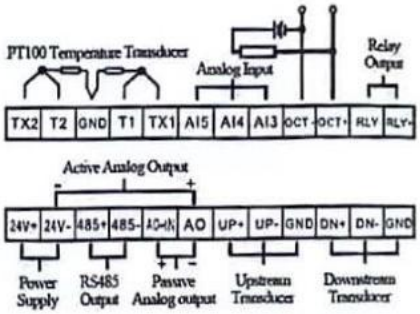
- Fix Mount Wiring Diagram



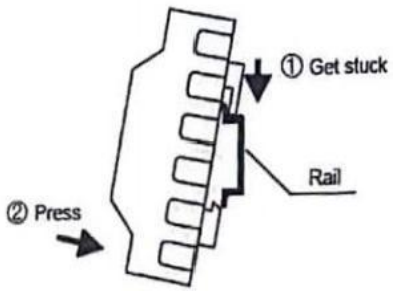
Open the flip cover and complete the wiring.To avoid leaking,please tighten the water joint and screws of the back cover after wiring,then fill with glue to make the motherboard waterproof

4.3 Module type



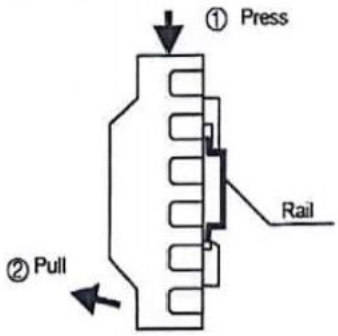


Installation



① Get the above slot stuck in the rail

Remove



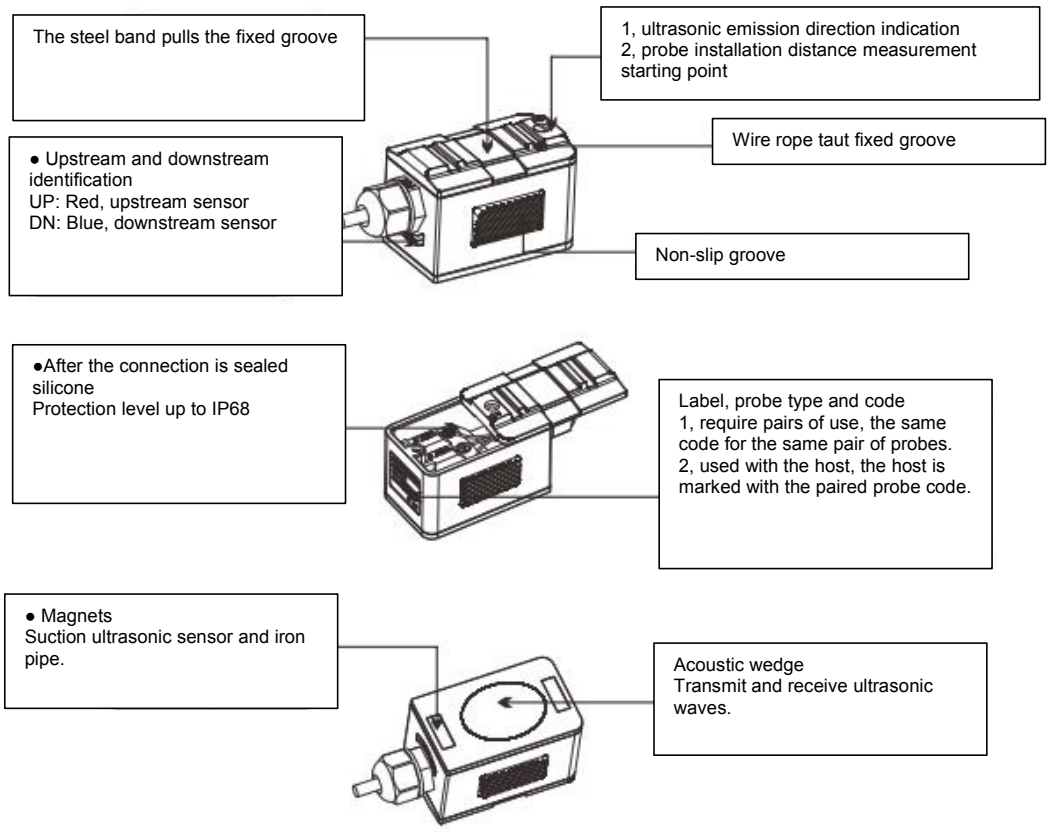
① Press the converter top hard

② Press the bottom of converter to make itotaly suck in the al.②Outward plthe bottom pat

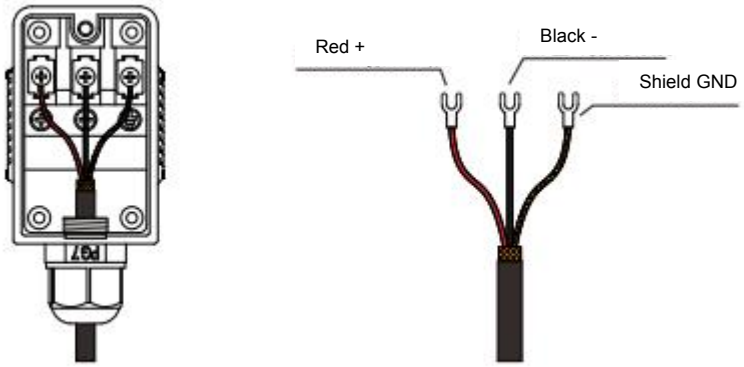
5.Transducer Introduction and Wiring Diagram

5.1 Clamp on type transducer

- Introduction

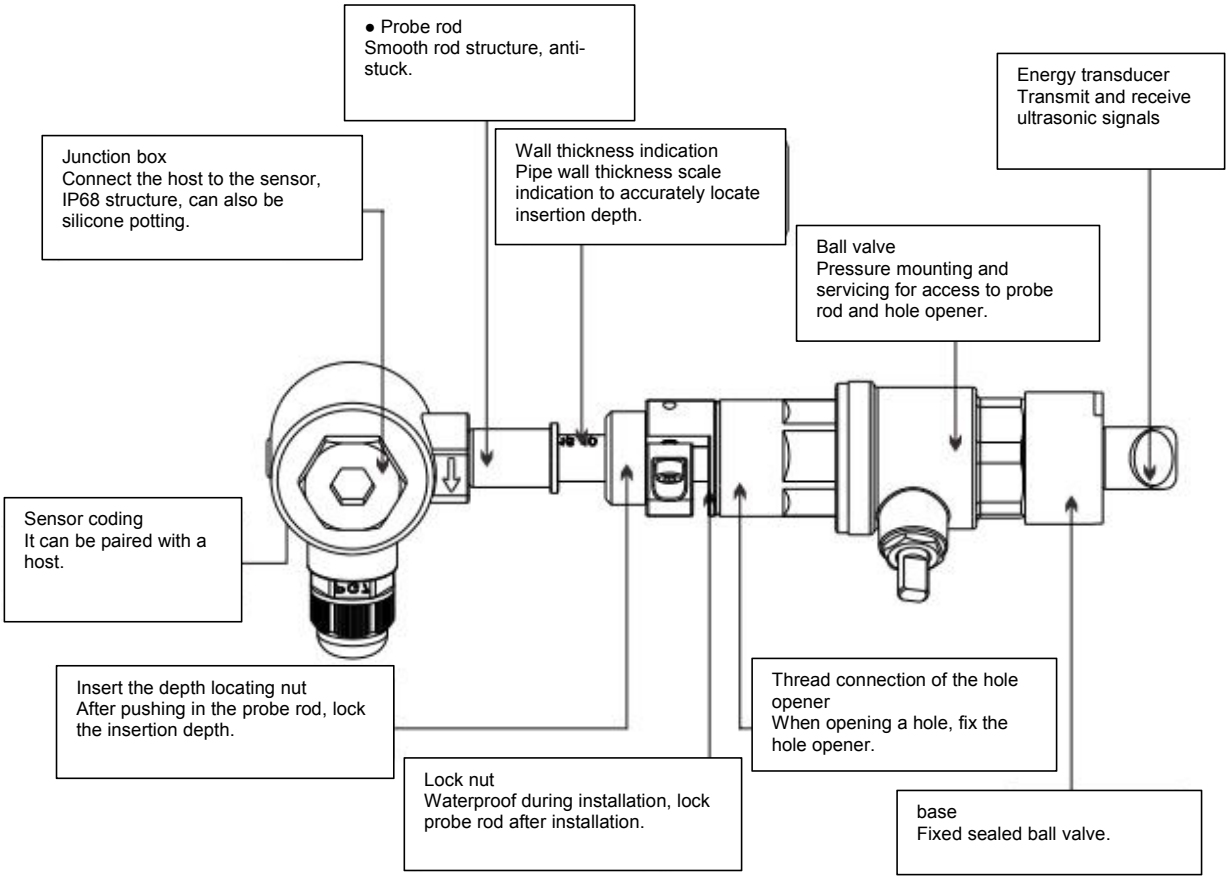


Wiring

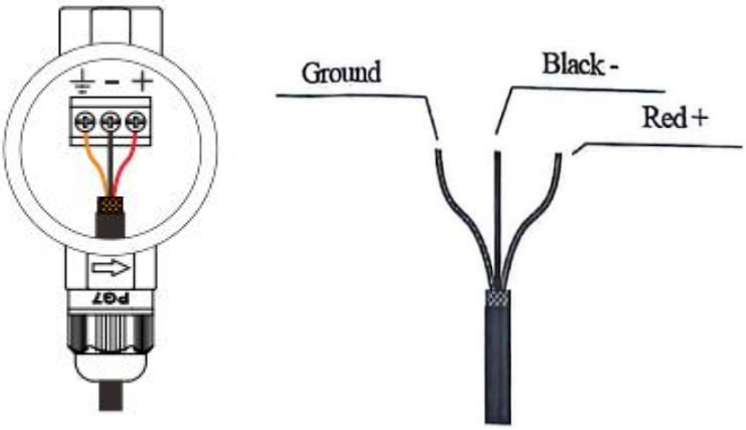


5.2 Insertion type transducer

- Introduction

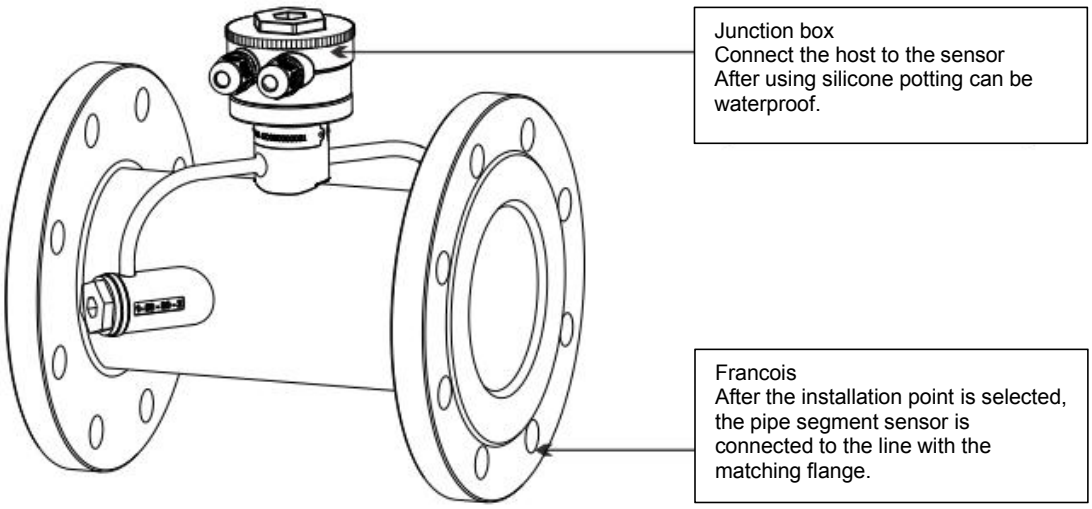


Wiring Diagram

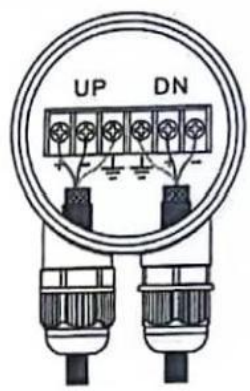


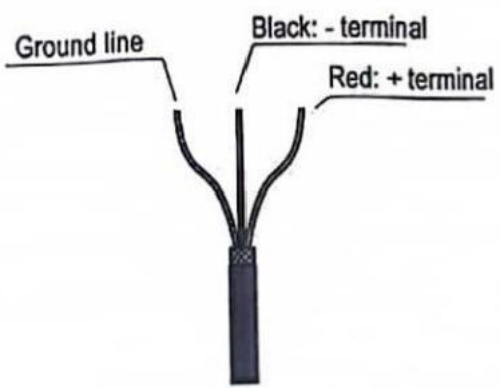
5.3 Inline type transducer

- Introduction



- Wiring Diagram



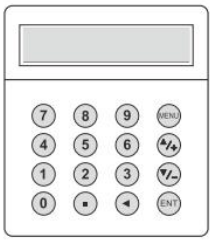


6.Display and Operation

6.1 Display and keyboard

Display is 2×20 characters LCD with backlight,available to set backlight time and contrast.

- 16-key Keyboard



Separated Mounting

0-9 and ■ are used for inputing numbers or menu numbers.

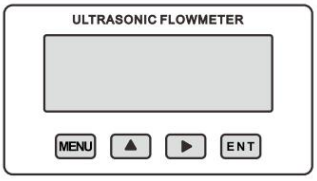
◄ used for back left or delete the left character.

▲/+ and ▼/- are used for entering into the last and next menu.Also can be used as±sign when inputting numbers.

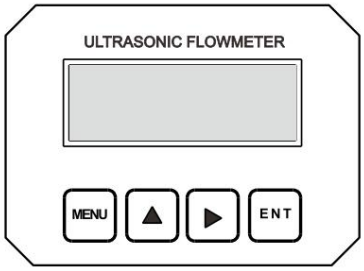
MENU is used for accessing the menu.Press this key first, then type the number keys to enter into the matched menu.

ENT is the ENTER key,used for confirming the contents you input or choose.

- 4-key Keyboard



Module



F

MENU:used for entering into menus.

▲:used for menuup or choosing 0-9,+,-

► : used for menudown or moving the cursor to next.

ENT:used for finishing menu inputting or entering into submenu.

6.2 Operation

The user interface of this flow meter comprises about 100 different menu windows that are numbered by M00,M01,M02...M99.

Method to enter Menu:Press MENU first,and follow the two-digit number keys.Take M35 as an example,the corrct key sequence is MENU35

To move between the adjacent menus,press ▲/+ and ▼/- for 16-key keyboard;press ▲ and ►for 4-key keyboard.

6.3 Menu Details

Menu No.	Function
M00	Display flow rate and totalizer.If the accumulator is turned off(see M35),the accumulator value displayed on the scrcen is the value before it was turmed oft.Select the totalizer unit in menu M32.
M01	Display flow rate,velocity. (low direction can be adjusted through M83)
M02	Display flow rate and POS(positive)totalizer If the positive totalizer is tumed off,the positive totalizer value shown on the screen is the value prior to its tum off
M03	Display flow rate and NEG(negative)totalizer. If the negative totalizer is turmed off,the negative totalizer value shown on the screen is the value prior to its tum off
M04	Display date and time,flow rate.The date and time setting mcthod is found in MENU60.
M05	Display energy rate(instantaneous Caloric)and total energy(Caloric).
M06	Display total heat and total cooling capacity
M07	Display temperatures,inlet T1,outlet T2.
M08	Display the working status code,the normal situation is&quot--------"
M09	Display today's total NET flow.
M10	Display system working time(display *R working time)
M11	Window for entering the outer diameter of the pipe.NOTE:You only need to enter the outer diameter in M11 or the inner diameter in M13
M12	Window for entering pipe wall thickness
M13	Window for entering the inncr diameter of the pipe If pipe outer diameter and wall thickness are enter correctly,the inner diameter will be calculated automatically,thus no nced to change anything in the window
M14	Window for selecting pipe material Standard pipe materials(No need to enter material sound speed)include: (0)carbon steel (1)stainless steel (2)cast iron (3)ductile iron (4)copper (5)PVC (6)aluminum ,(7)asbestos (8)fiberglass (9)other(need to enter material sound speed in M15)
M15	Window for entering the pipe material speed,only for non-standard pipe materials
M16	Window for selecting the liner material,select none for pipes without any liner. Standard liner materials(no need to enter the liner sound speed)include: (0)None,No liner (1)Tar Epoxy (2)Rubber (3)Mortar (4)Polypropylene (5) Polystryol (6)Polystyrene (7)Polyester (8)Polyethylene (9)Ebonite (10) Teflon (11)Other(nced to enter liner sound speed in M17)
M17	Window for entering the non-standard liner material speed.

M18	Window for cntering the liner thickness,if therc is a liner
M19	Window used to cnter the ABS thickness of the inner wall of the pipe(generally enter 0)
M20	Window for selecting fluid type For standard liquids(no need to cnter fluid sound speed)include: (0)Water (1)Sea Water (2)Kerosene(3)Gasoline(4)Fuel oil (5)Crude Oil (6)Propanc at -45C (7)Butane at OC (8)Other liquids(need to enter sound speed in M21 and viscosity in M22) (9)Diesel Oil (10)Caster Oil(11)Peanut Oil(12)#90 Gasoline(13)#93 Gasoline (14)Alcohol(15)Hot water at 125C
M21	Window for entering the sound speed of non-standard liquid,used only when option item 8'Other'is selected in M20
M22	Window for entering the viscosity of the non-standard liquids,used only when option item 8'Other'is selected in M20
M23	Window for selecting transducer type,There are 9 types as following 0. Standard-S (Small size transducer #S2) 1. Standard-M (The middle sizetransducer #M2) 2. Standard-L (large size transducer #L1) 3. Standard Insertion B 4. Calmp-on TS-2 5. Clamp-on TM-1 6. Clamp-on TL-1 7. Insertion TC-1 8. Self-prepared clamp sensor 9. pipes sensor If the user-type-transducer is selected,you need enter additional 4 user-type-wedge parameters that describe the user transducers. If the PI-type transducer is selected,you nced enter additional 4 PI-type transducer parameters that describe the PI-type transducers
M24	Window for selecting the transducer mounting mcthods Four methods can be selected: (0)Z-method(1)V-method (2)N-method(3)W-method
M25	Display the transducer mounting spacing or distance
M26	Save commonly used parameters to flash for easy direct calling in the future (10 different pipeline parameter configurations can be saved)
M27	Up to 10 different pipeline parameter configurations can be restored from internal flash memory.Please use the up or down key to select the address number and then press the "ENT"key.
M28	Signal quality cutoff value,below which the flow rate displays 0
M29	Signal strength cutoff value,below which the flow rate displays 0 Entry to setup empty signal threshold.When the signal is less than this threshold,the pipe is regarded as empty pipe,and the flow meter will not totalize flow. This is based on the fact that,for most occasions,when pipe is empty,the transducer

	would still receive signal,just smaller than normal,As a result,The flow meter would show normal operation,which is not correct. Make sure that the entered value must be less than the normal signal strength
M30	Window for selecting unit system.The conversion English to Metric or vice versa will not affect the unit for totalizers.
M31	Window for sclecting the instantaneous flow unit system. Flow rate can be in 0.Cubic meter short for (m^3) 1.Liter (1) 2.USA gallon (gal) 3.Imperial Gallon (igl) 4.Million USA gallon (mgl) 5.Cubic fect (cf) 6.Oil barrel (ob) 7.Oil barrel (Ib) 8.tons (t) The flow unit in terms of time can be per day,per hour,per minute or per second
M32	Window for selecting the totalizers unit.Available units are the same as those in M31
M33	Accumulator decimal places setting window(default 0)
M34	Maximum allowed instantancous traffic
M35	Tum on or tum off the POS(positive)totalizer
M36	Turm on or tum off the NEG(negative)totalizer
M37	Totalizer reset
M38	Manual totalizer used for easier calibration.Press a key to start and press a key to stop the manual totalizer.
M39	Language selection. The selection could also be changed automatically by the system,if English LCD display is used as the display device.
M40	Flow rate damper for a stable value.The damping parameter ranges from5 to 30 seconds. 0means there is no damping.Factory default is 10 seconds .
M41	Low flow rate(or zero flow rate)cut-off to avoid invalid accumulation
M42	Zero calibration/Zero point setup.Make sure the liquid in the pipe is not running while doing the setup.
M43	Clear the zero point value,and restore the solidified zero point value
M44	Set up a flow bias.Generally this value should be 0.
M45	Flow rate scale factor.The default value is'I'. Keep this value as'I',when no calibration has been made.
M46	Networks address identification number.Any integer can be entered except carriage return),10(0AH,line feeding).42(2AH),38,65535 Every sct of the instrument in a network environment should have a unique IDN.Please refer to the chapter for communication.
M47	System lock to prevent modification of system parameters.If you forget your password

	please contact the manufacturcr in timc
M48	Entry to lincarity correcting data inputs.By using of this function,the non-linearity of flow meter will be corrected.Correcting data shall be obtained by carcful calibration.
M49	Displays the input contents for the serial port. By checking the displays,you can know if the communication is ok.
M50	Switches for the built-in data logger.There are as many as 21 different items can be chosen.To turm this function,select 'YES'the system will ask for selecting the items There are 22 items available.Tum on all those items you want to output
M51	Window to setup the time of scheduled output function.This includes start time,time interval and how many times of output.When a number great than 8000 entered for the times of output,It means the output will be keeping always.The minimum time interval is I second and the maximum is 24 hours.
M52	Data logging direction control (1)If 'Send to RS485'is selected,all the data produced by the data logger will be transmitted out through the RS-232/RS485 interface (2)If 'To the internal serial BUS is selected,the data will be transmitted to the internal serial bus which allows a thermal printer,
M53	Display analog inputs,AI3/AI4,current value and its corresponding temperature or pressure or liquid level value.
M54	Display analog inputs,AIS,current value and its corresponding temperature or pressure or liquid level value.
M55	Select analog output(4-20mA current loop,or CL)mode.Available options: (0)4-20mA corresponding to flow rate (1)4-20mA corresponding heat flow rate (2)4-20mA corresponding flow velocity (3)RS232 Serial port controls 4-20mA
M56	4mA output value, Set the value which corresponds to 4mA output current(4mA is determined by the setting in M55)
M57	20mA output value, Set the value which corresponds to 20mA output current
M58	Current loop and frequcncy output verification (1)Check whether the current loop is calibrated correctly (2)(2)Frequency output test M78 must select 19.
M59	Display the present output of current loop circuit.
M60	Setup system date and time.Press ENT for modification.Use the dot key to skip the digits that need no modification.
M61	Display Version information and Electronic Serial Number(ESN)that is unique for each flow meter The users may employ the ESN for instrumentation management
M62	RS485 setup.All the devices connected with flow meter should have matched serial configuration. The following parameters can be configured:Baud rate(2400 to 19200 bps),parity,data bits(always is 8),stop bits(I).
M63	Select communication protocol

	The factory default is "auto recognition".No action
M64	AI3 value range. Used to enter temperature/pressure values that are corresponding to 4mA and 20mA input current.The display values have no unit,so that they can present any physical paramcter.
M65	AI4 value range. Used to enter tempecrature/pressure values that are corresponding to 4mA and 20mA input current.
M66	AIS valuc range. Used to enter temperature/pressure values that are corresponding to 4mA and 20mA input current.
M67	Windows to setup the frequency range(lower and upper limit)for the frequency output function.Valid range is (0)0-1KHz (1)0-5KHz (2)0-10KHz. you need a hardware module,which shall be plugged to the Serial Expanding Bus,; Otherwise you will get a flow meter which has no frequency output circuits. OCT frequency output range selection(three options:1K,5K,10K,only valid if configured in M78)
M68	Window to setup the minimum flow rate value which corresponds to the lower frequency limit of the frequency output.
M69	Windows to setup the maximum flow Rate value that corresponds to the upper frequency limit of the frequency output.
M70	LCD display backlight control.The entered value indicates how many seconds the backlight will be on with every key pressing.If the enter value is great than 60 seconds It means that the backlight will always keeping on.
M71	LCD contrast control.The LCD will become darker or brighter when a value is entered. (Not valid for some LCDs)
M72	Window to setup the lower limit of flow rate for Alarm#1 When the flow rate is below the set value,Alarm#1 equals 'on'
M73	Window to setup the upper limit of flow rate for Alarm#1 When the flow rate is above the set value,Alarm#1 equals 'on' There are two alarms in the flow meter,and every alarm can be pointed to alarm output devices such as the BUZZER or OCT output or RELAY output.For example,if you want the Alarm#l is to output by the OCT circuit,you need to set M78 at selection item 6.
M74	Window to setup the lower limit of flow rate for Alarm#2.
M75	Window to setup the upper limit of flow rate for Alarm#2.
M76	OCT output equivalent and pulse width setting(pulse width range I~1000mS)
M77	Relay output equivalent and pulse width setting(pulse width range 200mS~1000mS)
M78	OCT (Open Collect Transistor Output)setup By selecting a proper input source,the OCT circuit will close when the trigger event

	occurs.The available trigger sources are: 0.Not Ready(No*R) 1.Reversc Flow 2.AO Over 100% 3.Alert#1 Lower limit excceded 4.Alert#1 Maximum limit exceeded 5.Alert #2 Lower limit excceded 6.Alert #2 Maximum limit exceeded 7.Alert#2 has not exceeded the limit 8.Batch Controller 9.POS Int Pulse 10.NEG Int Pulse 11.NET Int Pulse 12.Energy POS Pulse 13.Energy NEG Pulse 14.Energy NET Pulse 15.ON/OFF viaRS485 16.Disable OCT 17.Flow Rate Pulse The OCT circuit does not source voltage at its output.It must be connccted with an external power and pull-up resistant for some occasions. When the OCT circuit is close,it will draw current.The maximum current shall not be over 100mA. Attention:the maximum voltage applied to OCT can not be over 80 volts.
M79	Relay setup By selecting a proper input source,the RELAY will close when the trigger event occurs The available trigger sources are: 0.Not Ready(No*R) 1.Reverse Flow 2.AO Over 100% 3.Alert#1Lower limit exceeded 4.Alert#1Maximum limit exceeded 5.Alert #2 Lowcr limit exceeded 6.Alert #2 Maximum limit exceeded 7.Alert #2 has not exceeded the limit 8.Batch Controller 9.POS Int Pulse 10.NEG Int Pulse 11.NET Int Pulse 12.Energy POS Pulse 13.Energy NEG Pulse 14.Energy NET Pulse 15.ON/OFF viaRS485 16.Disable Relay The RELAY is of SPST(Single pole,single throw)type.It is rated for 110VAC max and have a current rating of 0.5A resistive load. It highly recommended that a salve relay to be utilized whenever a large resistive load or inductive load is to be controlled Note.In order to make the user interface compatible with the former version7,the name RELAY was used other than OCT2,but in fact it is an OCT output
M80	Window for selecting the trigger signal for the built-in batch controller.Available trig sources: 0.Key input (press ENT key to start the batch controller) 1.Serial port 2.AIS rising edge(when AI5 receives 2mA or more current) 3.AIS falling edge(when AI5 stops receiving 2mA or less current)

M81	The built-in batch controller Set the fow batch value(dose) The internal output of the batch controller can be directed cither to the OCT or the RELAY output circuits. M81 and M80 should be used together to configure the batch controller. Note:Because the measuring period is 500mS,the flow for every dos should be keeping at 60 seconds long to gct a1%dose accuracy.
M82	View the daily,monthly,and annual flow accumulation values and heat energy accumulation values.Accumulator values for the past 99 days,the past 63 months,and the past 31 ycars.To view them,use the 'ENT'and 'UP"Down'keys.
M83	Instrumcnt installation method selection(llow direction can be adjusted through this menu)
M84	Set the thermal energy unit: 0.GJ 1.KC 2.KWh 3.BTU 4.KBTU
M85	Select temperature source 0.From T1,T2(factory default PT100) 1.From T1,T2(plcase specify when ordering PT1000) 2.From AI3,AI4
M86	T1,T2 temperature compensation setting
M87	Turn on or tum off the Energy totalizer.
M88	Number of decimal places for accumulated heat
M89	Window for entering the lowest temperature difference.
M90	Display signal strengths S(one for upstream and one for downstream),and signal quality Q value. Signal strength is presented by 00.0 to 99.9,the bigger the value,the bigger the signal strength will be,and more rcliable readings will be made. Q value is presented by 00 to 99,the bigger the better.It should at least be great than 60 for normal operations.
M91	Displays the Time Ratio between the Measured Total Transit Time and the Calculated timc.If the pipc parameters are cntered correctly and the transducers are properly installed,the ratio value should be in the range of 100±1%.Otherwise the entered parameters and the transducer installation should be checked.
M92	Displays the estimated fluid sound velocity.If this value has an obvious difference with the actual fluid sound speed,pipe parameters entered and the transducer installation should be checked again.
M93	Displays total transit time and delta time(transit time difference)
M94	Maximum time difference setting range(default 1000nS,please adjust under the guidancc of the manufacturer)
M95	Ultrasonic transmission power adjustment,small diameter(DN40 and below)can reduce signal quality
M96	spare
M97	Receive signal offset adjustment(must be operated under the guidance of the manufacturer)
M98	Received signal waveform display
M99	The system settings menu is usually hidden and can only appear by pressing MENU.

	There are 5 submenus under it,F01~F05. F01.Modify factory instrument coefficients F02.Modify cumulative amount F03.4~20mA input calibration F04.4~20mA output calibration F05.Simulation run function

6.4 Quick setup of measured parameters

Accurate measured parameters can have a great influence on measuring precision and reliability.It is suggested to measure the practical perimeter and wall thickness of the pipeline.Ultrasonic thickness gauge can be used to measure the pipe thickness.

Measured parameters setup is from Menu10 to Menu29.Please complete one by onc.

>>>Following parameters need to be inputted before measurement:

1.Outer diameter unit:mm
2.Pipe thickness unit:mm
3.Pipe material
4.Lining paramcters:thickness and sound velocity (If have lining)
5.Liquid type
6.transducer type
7.transducer mounting type

>>Above parameters setup generally follow the steps below:

1.Press keys MENU11 to enter MI1 window to input the pipe outer diameter,and then press ENT key.
2.Press key ▼/- to enter M12 window to input the pipe outer diameter and then press ENT key.
3.Press key ▼/- to enter M14 window,and press ENT key to enter the option selection mode. Use keys ▲/+ and ▼/- to select the pipe material,and then press ENT key.
4.Press key▼/- to enter M16 window,press ENT key to enter the option selection mode.Use keys ▲/+ and ▼/- to select the liner material,and then press ENT key.Select "No Liner", if there is no liner.
5.Press key ▼/- to enter M20 window,press ENT key to enter the option selection mode.Use keys ▲/+ and ▼/- to select the proper liquid,and then press ENT key.
6.Press key ▼/- to enter M23 window,press ENT key to enter the option selection mode.Use keys ▲/+ and ▼/- to select the proper transducer type,and then press ENJ key.
7.Press key▼/- to enter M24 window,press ENT key to enter the option selection mode.Use keys ▲/+ and ▼/- to select the proper transducer mounting method,and then press ENT key.
8.Press key ▼/- to enter M2S window and get the transducer installation distance.

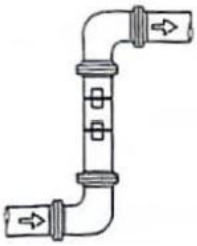
7.Transducers Installation

7.1 Choose installation points

Proper installation point is a key for transducer installation.Following factors must be considered: Full filled pipeline,shaking,steady flow,scaling,temperature,pressure,EMI,instrument well.

>>Full filled pipeline

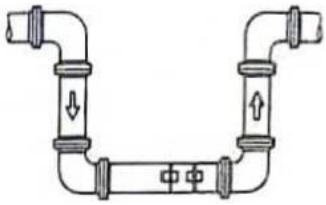
Following situations can be full filled of liquid:



Vertical upward



Obliquely upward



Lowest point

>>Shaking

There cannot be obvious shaking on the installation point,otherwise it needs to be tightened.

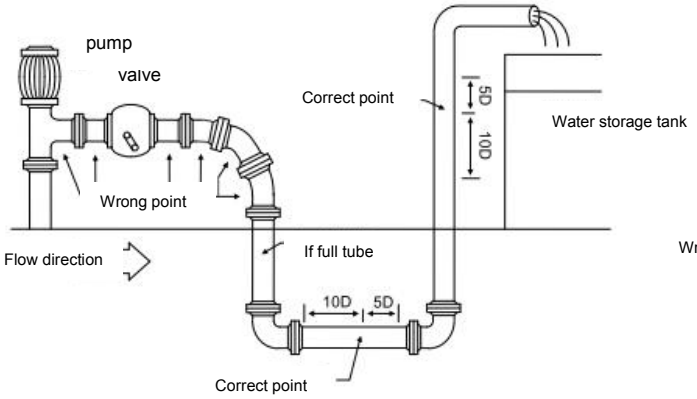
>>Steady flow

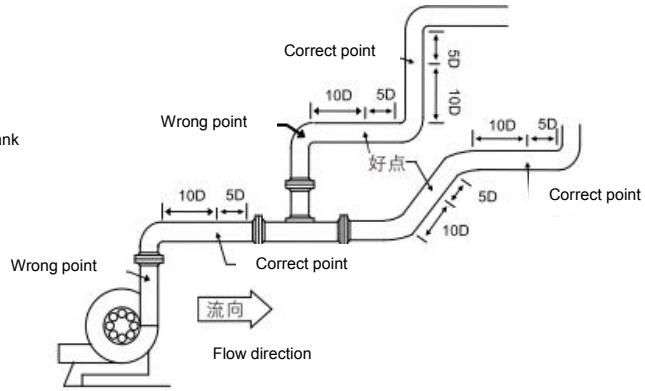
Steady flow is helpful for ensuring measurement accuracy.

Standard requests for steady flow are:

1.The pipe should be far away from pump outlet and half-open valve. 10D to upstream and 5D to downstream.(D means outer diameter)

2.30D to pump outlet and half-open valve.





>>Scaling

The inside scaling would have bad effect on ultrasonic signal transmission,and would decrease the inner diameter as well.As a result,the measurement accuracy can not be guaranteed. Please try to avoid choosing the installation point with inside scaling.

>>Temperature

The liquid temperature on installation point should be in the working range of transducers. Please try to choose the point with lower temperature.Avoid to choose points like the outlet of boiler water and heat exchanger.Retum water pipe would be better.

Temperature range of standard clamp on and insertion transducers:-30~90℃

Temperature range of high temperature clamp on and insertion transducers:-30~160℃

>>Pressure

The maximum pressure for standard insertion and inlinc transducer is **1.6MPa**

Out of this range need customized.

>>EMI(electromagnetic interference)

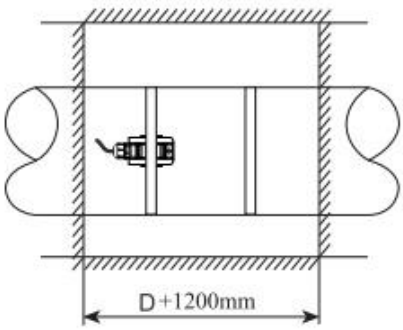
The ultrasonic flow meter,transducer and signal cable can be easily interfered by interference sources such as frequency changer,radio station,microwave station,GSM base station and high-tension cable.Please try to avoid these interference sources when choosing installation points.

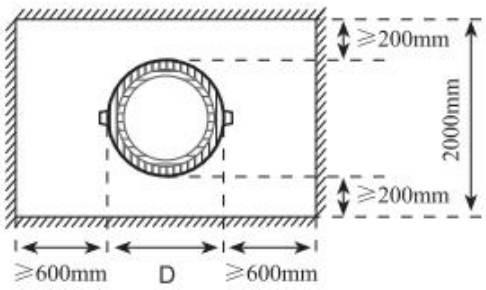
The shield layer of flow meter,transducer and signal cable should be connected to earth.

Better to use isolated power supply.Do not use the same power supply with the frequency converter.

>>Instrument well

When measuring underground pipes or need to protcct the measuring points,an instrument well is required.To ensure the enough installation spacc,the sizes of instrument well should meet the following requirements.





D means the pipe diameter

7.2 Clamp on transducer Installation

!!! Before installation,please verify the parameters of pipeline and liquid.To ensure the installation accuracy.

1)Installation procedure

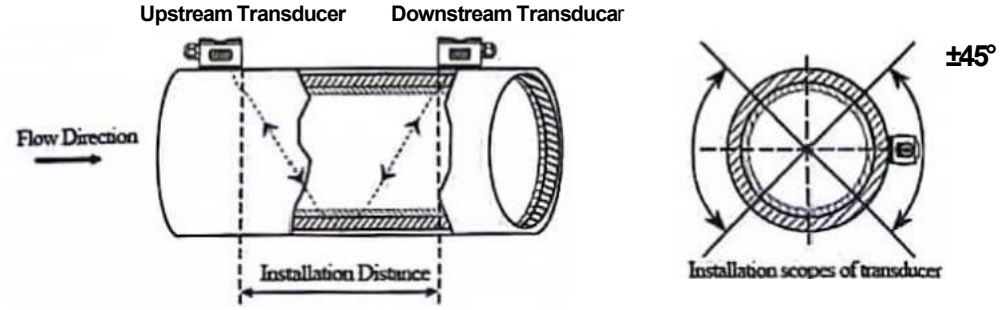
Select an installation method→Input the measuring parameters→Clean pipe surface→ Install transducers→Check the installation

2)Select an installation method

There are two different methods for clamp on transducers:Vmethod and Zmcthod.

>>V method

V method should be priority selected for pipe sizes DN25-DN200.Let the pair of transducers horizontal alignment,the central line in parallel with the pipeline axis.

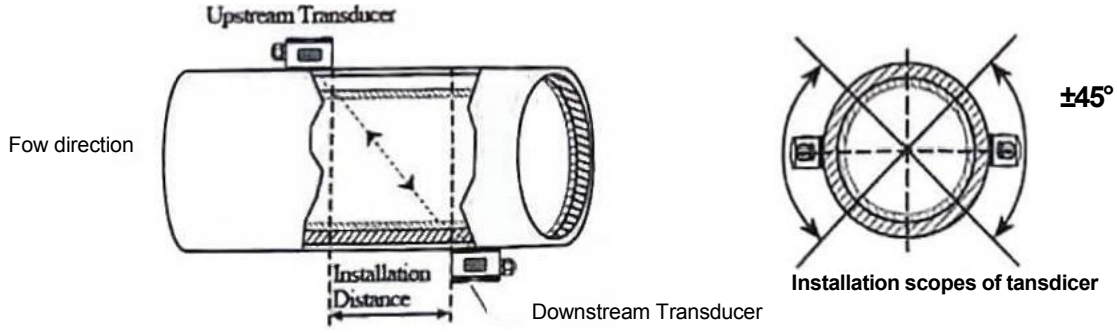


Top View

Side View

>>Z method

Z method should be priority selected for pipe sizes DN200-DN6000.Also can be used when V method doesn't work well.Make sure the vertical distance of two transducers equals to the installation distance,and the two transducers are on the same axis surface.



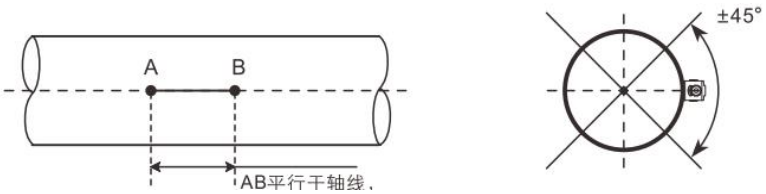
Top View

Side View

3)Positioning installation points

>>V method

The line between two transducers is parallel to pipe axis,and equal to the distance shown in the converter.As shown,A,B are the two installation points.



AB is parallel to the axis and equal to the installation

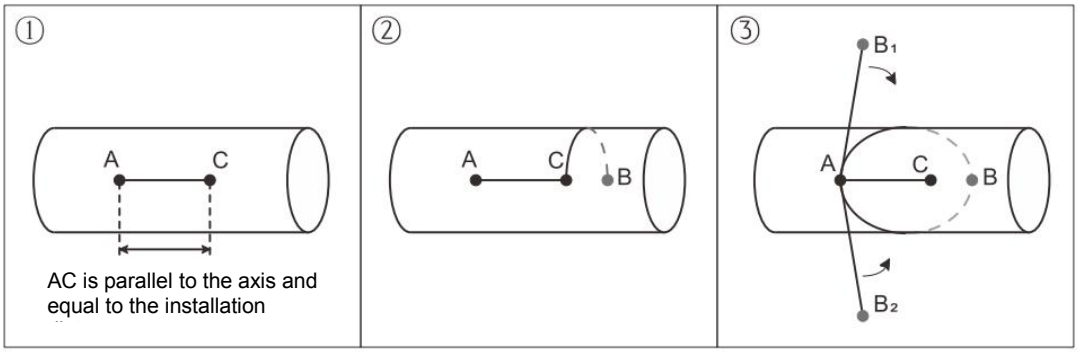
>>Z method

① Firstly according to the installation distance shown in converter,positioning two points A,C on the same side of pipeline.AC is parallel to pipe axis.

② Perpendicular to the pipe axis,opposite to point C,get Point B.

③ Check.Measure the length between A and B from both sides of the pipe,get ABand AB_2 .If ABi=AB_2 ,then B is the correct point.Ifnot,need to positioning point B and C again.

As shown,A,B are the two installation points.

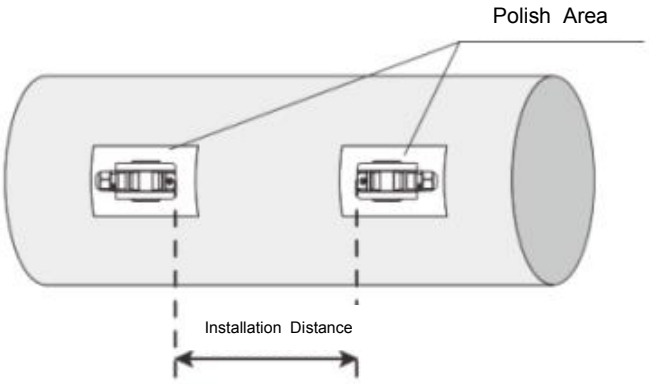


AC is parallel to the axis and equal to the installation

4)Clean the surface of installation points

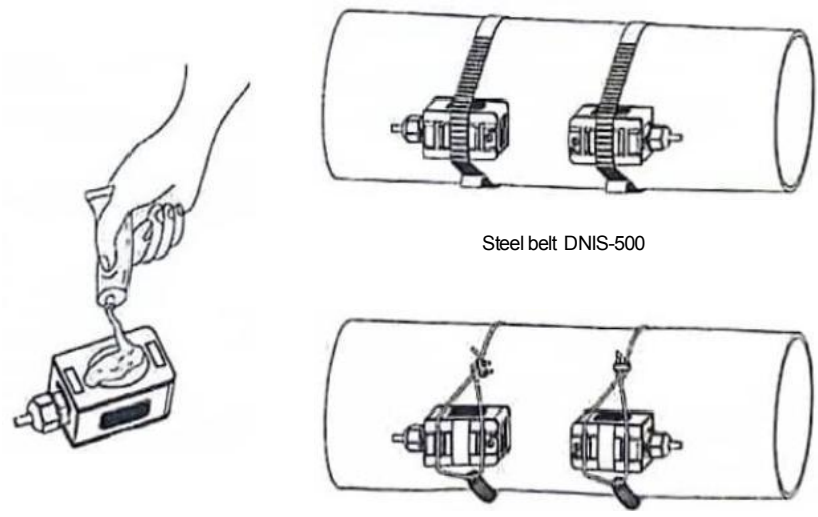
Paint,rust and anti-corrosive coating on installation points need to be cleaned.It's good to use a polishing machine to get the metal luster.

As shown below:



5)Install transducers

After transducer wiring and sealing,please evenly smear 2-3mm couplant on the transducer emiting surface.Then put the transducers on the installtion points,fixed with steel belt orsel rope.



Steel belt DNIS-500

Steel rope>DNS00

6)Check Installation

Please see details in Chapler 7.5

7.3 Insertion type transducer installation

!!! Before installation,please verify the parameters of pipeline and liquid.To ensure the Installation accuracy.

1)Installation procedure

Select an installation method→Input the measuring parameters→Positioning installation points →Fix ball valve base→Open hole under pressure→Install transducers→Check the installation

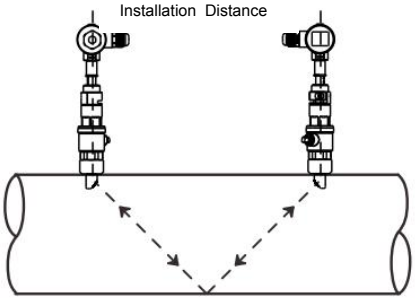
2)Select installation method and positioning installation points

Insertion type transducers are suitable for pipe sizes>50mm.

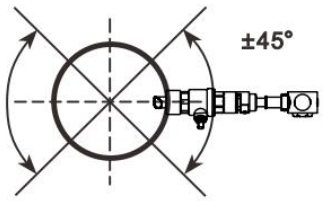
Two different installation methods:V method and Z method.Generally use Z method,only use V method for lack of space.

>>V method

V method can be used for DN50mm-300mm.Let the pair of transducers horizontal alignment, the central line in parallel with the pipeline axis,and the transmit direction mush be opposite.



Top View

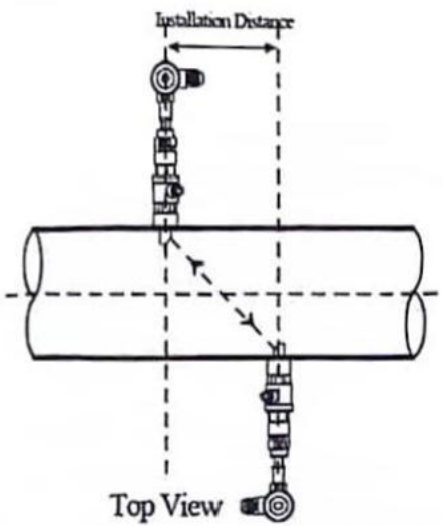


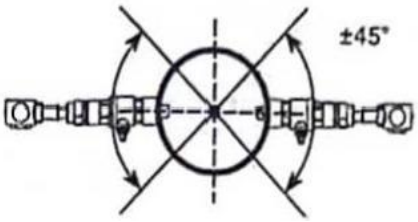
Transducer Installanan Scope

Side View

>>Zmethod

Z method can be used for all pipes>DNS0mm.Make sure the vertical distance of two transducers equals to the installation distance,and the two transducers are on the same axis surface The transmit direction mush be opposite.





Tcadrr Intlban Sapo

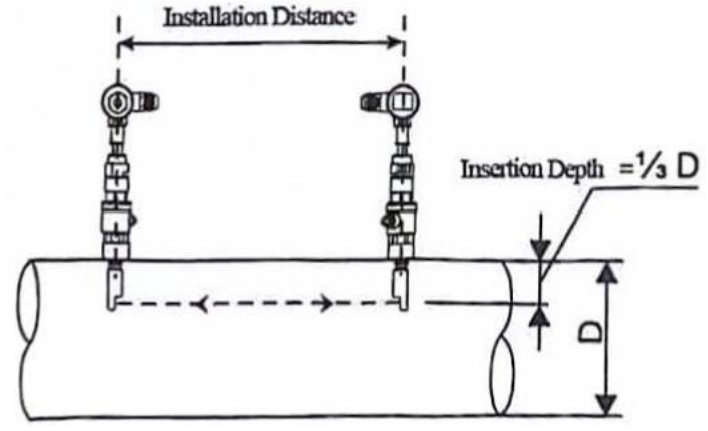
Side View

>>Parallel insertion

If there is insufficient installation space or the transducers can be only installed on the top of pipeline,parallel insertion transducer will be a good choice.(Pipe size≥300)

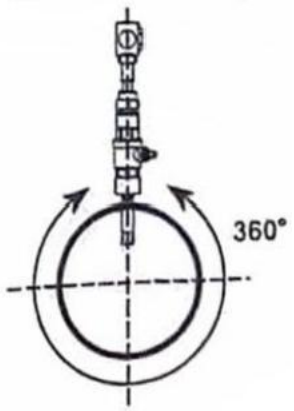
Positioning of parallel insertion transducer need to meet the 3 factors as follow:

- Installation distance=Vertical distance of two transducers along the pipe axis direction
- Make sure two transducers are in the same horizontal line, Insertion depth=1/3 inner diameter
- Users can set the distance between transducers by themselves.Recommend 300~500mm



Front View

Transchicr InstallahionScope

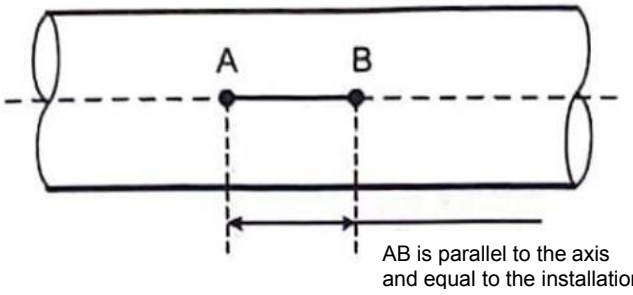


Side View

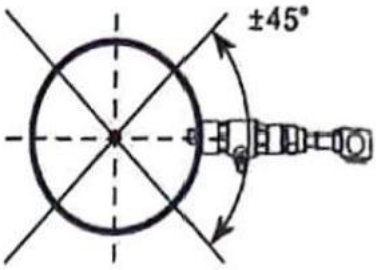
3)Positioning installation points

>>V method

The line between two transducers is parallel to pipe axis,and equal to the distance shown in the converter.As shown,A,B are the two installation points.



Front View



Side View

>>Zmethod

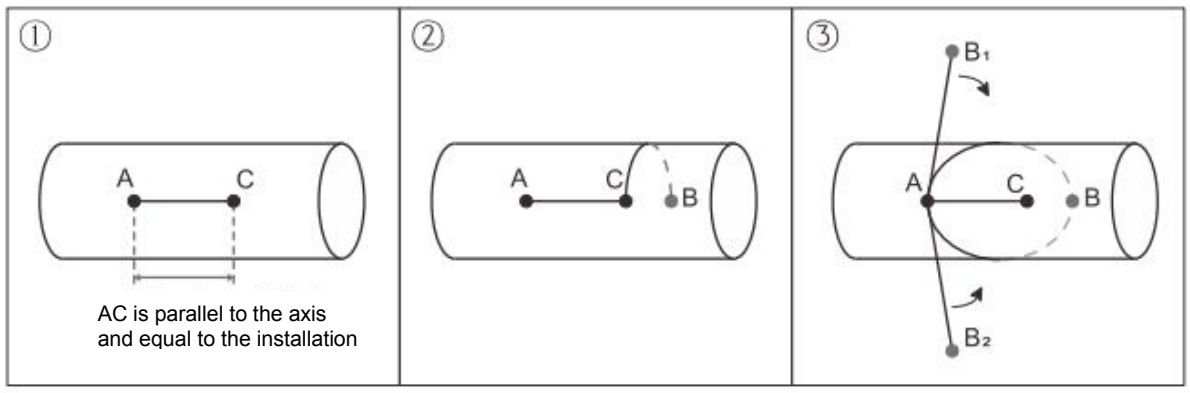
① Firstly according to the installation distance shown in converter,positioning two points A,C on the same side of pipeline.AC is parallel to pipe axis.

② Perpendicular to the pipe axis,opposite to point C,get Point B.

③ Check.Measure the length between A and B from both sides of the pipe,get AB_1 and AB_2 .If

ABi=AB_2 ,then Bis the correct point.If not,need to positioning point B and C again.

As shown,A,B are the two installation points.



4)Fix ball valve base

>>Welding Fix

For carbon steel pipes,the ball valve base can be welded directly.Make sure that the central point of ball valve base is overlapped with the transducer installation point.

Matters need attention:

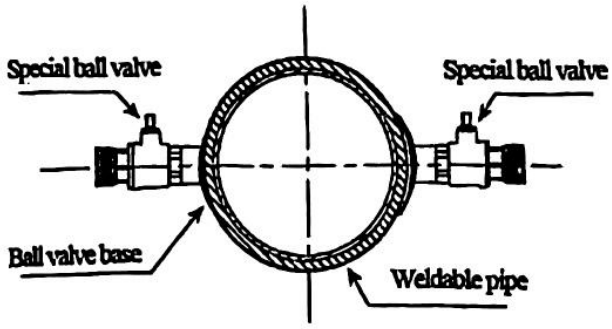
- Please take the PTFE sealing gasket out from the base before welding.
- Please clean the pipe surface around welding point before welding.Pay attention that there should not be any air hole during welding,which can avoid leaking.Welding strength must be ensured.
- Do not sputter welding slag on the base thread.
- Non-deformation of base during welding.

After welding,tighten ball valve into the base.

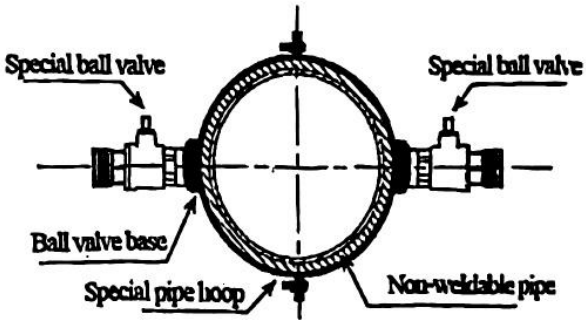
>>Pipe hoop Fix

For pipes can't be welded directly like cast iron pipe,cement pipe,copper pipe and composite pipe,customized pipe hoop is recommended.

The hoop center should be overlapped with the transducer installation point.Please compress the sealing gasket tightly to avoid leaking.



Welding Fix

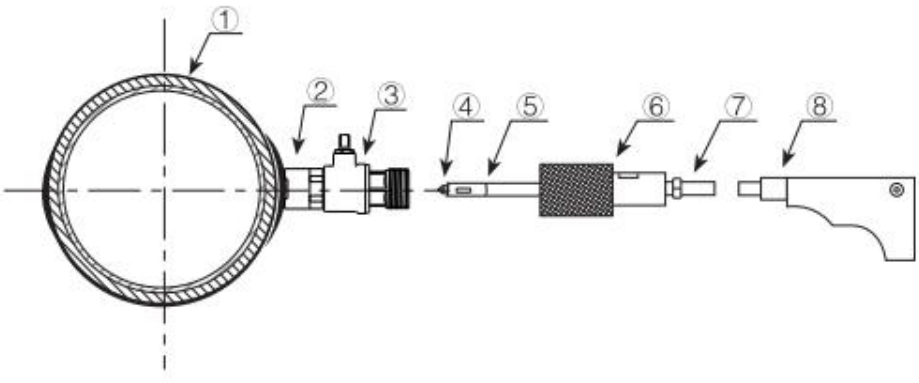


Pipe hoop Fix

5)Open hole

After finishing the installation of ball valve and base,insert the open-hole tool into ball valve and lock it.Then open the ball valve,start drilling,from slow to fast.Close ball valve after drilling.

See more details in the video of insertion transducer installation



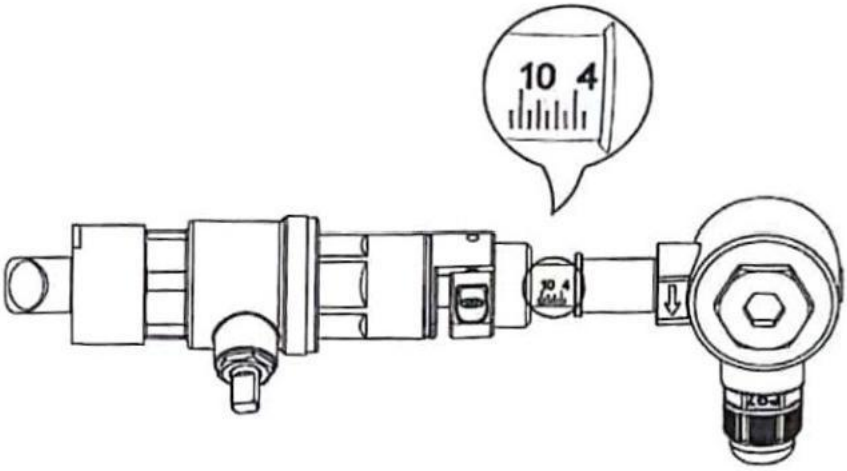
① Pipeline
② Ball valve base
③ Special ball valve
④ Positioning bit
⑤18 Hole drill
⑥ Sealing sleeve
⑦ Drill pipe
⑧ Electric hand drill

6)Install transducer and adjustment

Adjust the proper insertion depth and transmit direction to get good ultrasound signal.

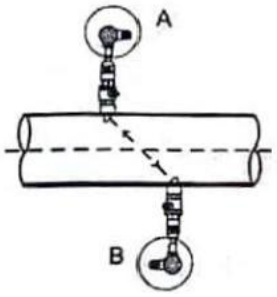
>>Insertion depth adjustment

Adjust the depth scale according to pipe wall thickness,and completely push in the transducer rod.

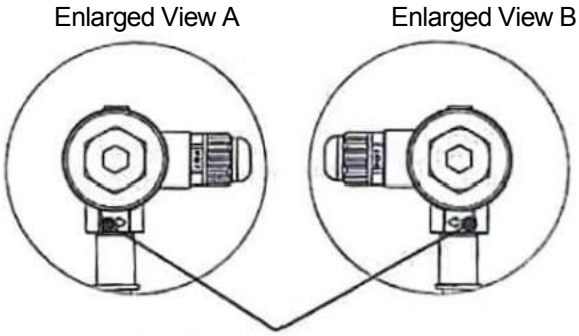


>>Transmit direction

There is a indicating arrow on the transducer junction box,the arrow direction on two transducers should be opposite"→←"and parallel to the pipe axis.



Top View



Two direction arrows are opposite

>>Operation steps

- Tighten the locknut into ball valve,adjust the insertion depth scale.
- Open ball valve,completely push in the upstream transducer rod.Adjust the transmit direction parallel with pipe axis,and point to the installation point of downstream transducer. Lock it after adjustment.
- Install downstream transducer in the same way.Adjust the transmit direction to get the best signal strength and watching Menu91,if the value is between 97%~103%,the installation is correct.If not,need to re-adjust the insertion depth and transmit direction until meet the requirement.

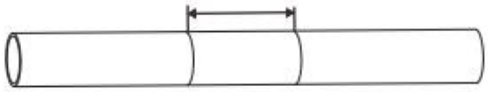
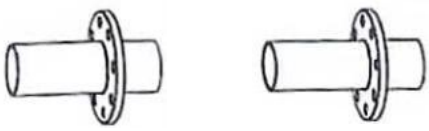
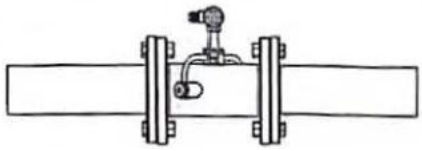
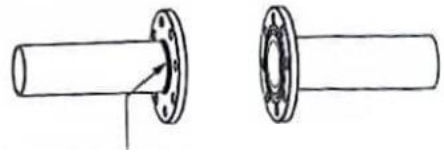
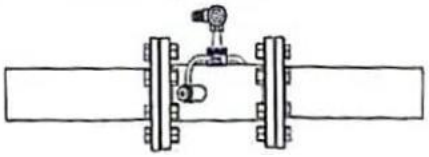
7)Check installation

Please see details in Chapter 7.5

7.4 In-line type transducer installation

After choosing the installation point,install the transducer in the pipeline with companion flanges. Then connect the transducer to converter with special signal cable.Installation is complete.

1)Installation method

<table>
<tr>
<td>①Confirm installation size
Length of transducer L+2×thickness of seal gasket+10mm
</td>
<td>②Cutting pipeline
</td>
</tr>
<tr>
<td>③Equip companion flanges
</td>
<td>④Positioning the flanges

3 screws, equal positioning flange, spot welding fixed</td>
</tr>
<tr>
<td>⑤Welding the flanges

Remove tube type sensor and weld flange</td>
<td>⑥As the flanges cooled,put in the seal gasket and tighten the screws.Then connect to converter with signal cable
</td>
</tr>
</table>

2)Check installation

Please see details in Chapter 7.5

7.5 Check Installation

The flow meter includes the detection ability.M90 is used for checking signal strength and quality. M91 is used for checking the ratio of measured and theoretical transmission time(transmission time ratio).

1)Check signal strength and quality

M90 is used for checking the signal strength and signal quality(Q value)of upstream and downstream transducers.
Signal strength is represented by numbers 00.0~99.9,00.0 means no signal and 99.0 means maximum signal.Generally,the flow meter can work properly when signal strength is>60.0
Signal quality(Q value)is represented by numbers 00～99.00 means signal is worst and 99 means signal is best.The flow meter can work properly when Q>60.
During the installation,please adjust the transducer to make the signal strength and signal quality the larger the better.This will ensure the flow meter long term stable operation and lead to accurate measurement.

Signal strength and Q value	Installation Judgement
<60	Can not work
60~75	Bad
75~80	Good
>80	Excellent

2)Check transmission time ratio

M91 is used for displaying transmission time ratio.It is a percentage ratio between theoretical transmission time and measured transmission time.It shows the relation between scting parameters and actual transducer installation distance.This ratio should be betveen 97%~103% If not in the range of97%~103%,it means that the parameters and transducer instalation distance are inconsistent.Please check separately.

8.Finish Installation

1)Commonly used menus.M00 or M02 is for meter reading.M30~M33 is for unit selection. M40 is for selecting damping factor,generally 10~15 sec.M60 is for correcting time and date.

2)To avoid signal reduction and improve anti-jamming ability,it is better to use the customized signal cable from flow meter manufacturer

3)The length of cables betwecn converter and transducer should be as short as possible, cannot exceed 100m.

4)The temperature and humidity of working environment should be in the range of technical specifications.Avoid direct sunlight on LCD.