



Ultrasonic Flow Meter (Clump-on type) Specification

SSX30151 16.02

1. Outline

This is clump-on type ultrasonic flow meter which can measure liquid flow from outside of a pipe.

This flow meter apply propagation time difference method which propagation time of ultrasonic is different depend on the flow speed of liquid in a pipe.

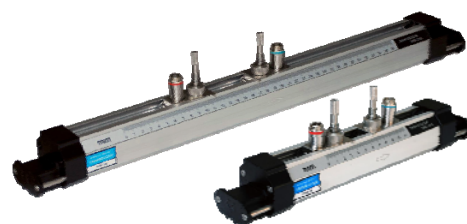
It is available to measure various kind of liquid without care of the corrosion, because of measuring from outside of a pipe.

We have not only wall-mount type which is stable for permanent standing, but also hand held type which is suitable for checking and inspecting of flow of various place.



2. Features

- It is available for installing to the current pipe-line.
- This can show installation position.
- This is completely non-wetted type, and it does not influence from pressure and conductivity of measured liquid.
- It is available for applying to small size piping by changing transducer.
- This is easy operation with large ten-key
- Small size and light weight hand held type makes convenience to bring.
- Hand held type has chargeable battery of which 10 hours duration.



3. Specification

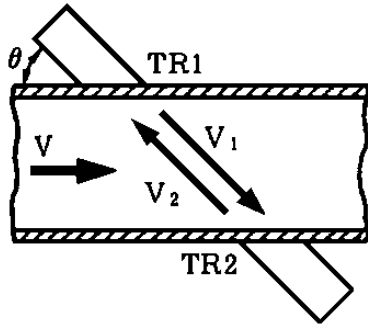
For transducer

Article	Contents
Measured liquid	Homogeneity liquid of which ultrasonic can propagate. (Water, Sea water, Industrial water, Acid, Alkali, Alcohol, etc)
Turbidity	10,000ppm or less
LiquidTemp.	-30~+90°C (Same as ambient Temp. of transducer)
Nominal size	15~600mm (HS0: 15~100mm, HM0: 50~600mm)
Material of pipe and lining	Pipe shall be penetrated material by ultrasonic such as Copper, Stainless, PVC, Ductile iron. Lining must adhere to original pipe. (Lining material: Tar-epoxy, Mortar, Rubber, etc.)
Flow rate range	0~±10m/s
Nos. of traverse line	1 line
Method	Propagation time difference by ultrasonic pulse
Accuracy (Calibrated accuracy at factory)	±2.0% of indicated value (In case of less than 2m/s of flow rate, accuracy is ±0.04m/s) Note) It is required the pipe filled with liquid, and ideal velocity distribution. Note) It is required longer straight pipe than specified.
Protection level	IP67
Length of code	5m as standard. (Please inquiry in case more length is required)

For transmitter

Article	Contents	
Component	Wall mount type	Hand held type
Power	For AC: 100~220V AC±10% 50/60Hz For DC: 24V DC±10%	100~220V AC±10% 50/60Hz 10 Hrs operation is available at full charge.
Power consumption	1.5W or less	2W or less
Ambient Temp.	-10~+60°C (Humidity 85% or less)	
Atomosphere	Avoid direct sunshine, radiant heat, corrosive environment, and explosive atomosphere	
Analog output	Kind of signal	4~20mADC
	Converted Precision	0.1%
	Allowable load resistance	750Ω以下
Open collector output	Setting frequency	1~9,999Hz
	Current-Voltage	DC80V、100mA or less
	Voltage at ON	1V or less
Relay output	"Without", "Excessive flow", "Back flow alarm" etc.	
Communication	RS485 serial port	RS232C serial port
Indication	LCD (20 digits × 2 line), back light Momentary flow rate, integrated flow volume, etc	LCD (16 digits × 4 line), back light Momentary flow rate, integrated flow volume, etc
Protection level	IP65	
Explosion-proof	Non-explosion proof	

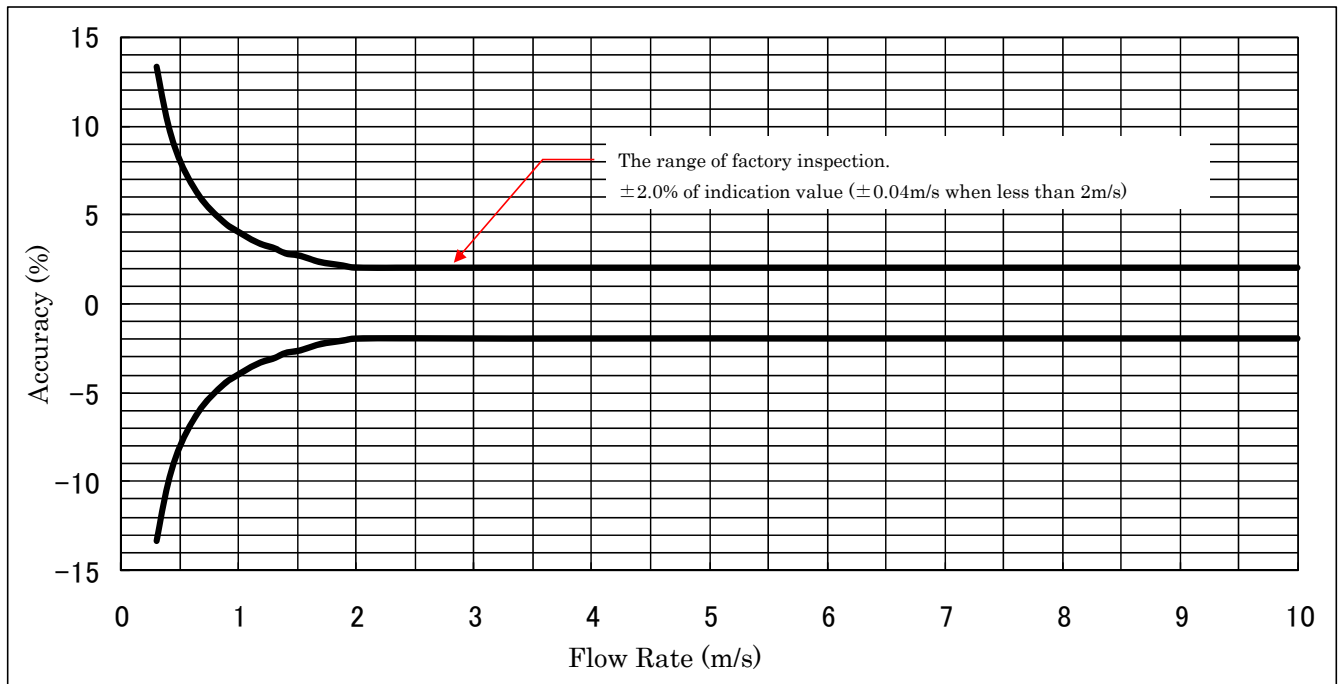
4. Measurement principle



- TR1: Transducer at upper stream
- TR2: Transducer at down stream
- θ : Incidence angle of sensor
- V : Flow speed in a pipe
- V_1 : Ultrasonic propagation speed (Upper stream to downstream)
- V_2 : Ultrasonic propagation speed (Downstream to upper stream)
- C : Sonic speed in a liquid

When install ultrasonic generator as above picture, ultrasonic from up-stream to down-stream is faster propagation than its of down-stream to up-stream. This time difference is direct proportion to flow rate. Volumetric flow rate is calculated by cross sectional area of pipe.

5. Characteristic of accuracy



Note) This is calibrated by manufacture's factory inspection facility before delivery.

Please use calibration function if you find instrumental error due to operating environment.

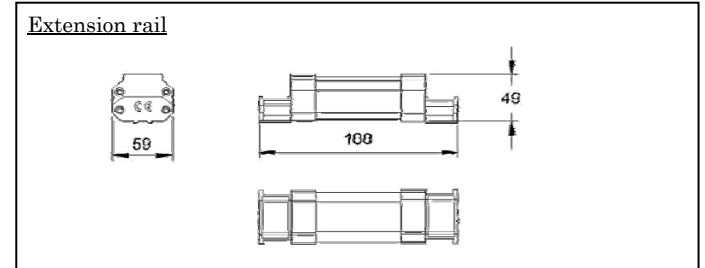
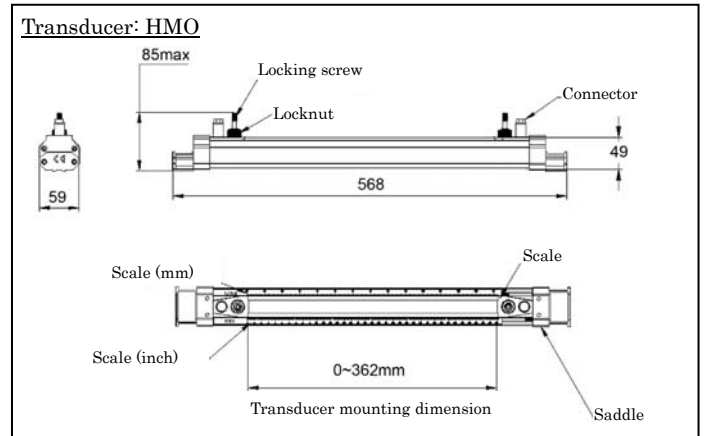
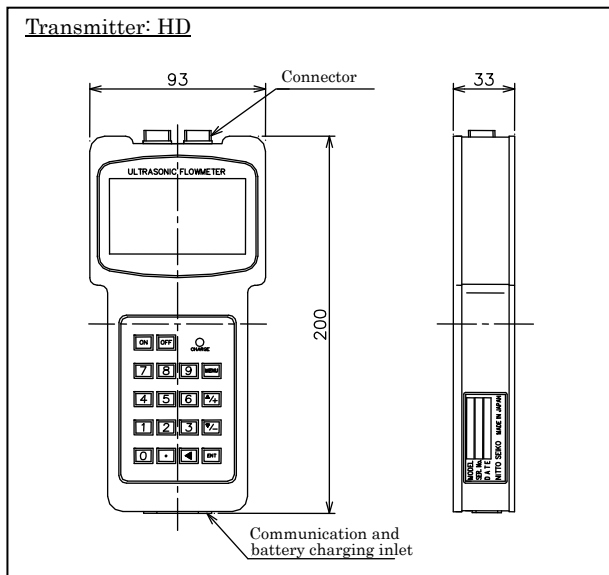
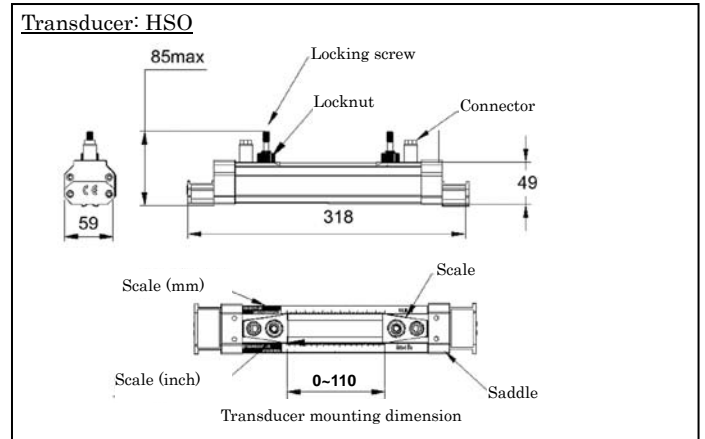
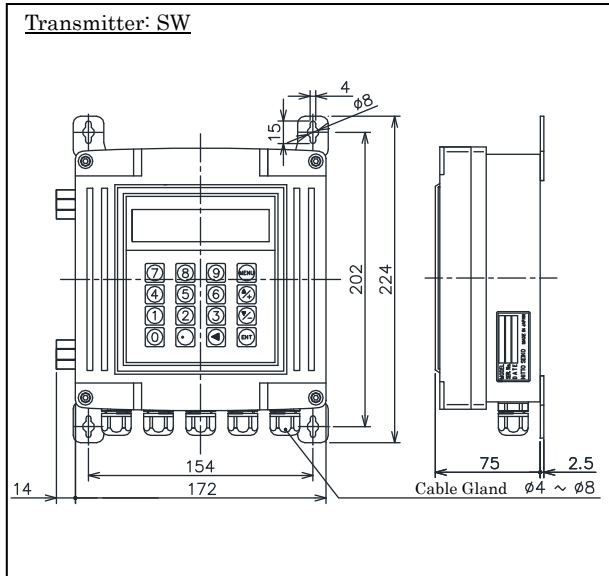
Note) Pipe line shall be filled by liquid, and flow rate shall be ideal distribution.

Flow rate conversion table

Piping example/ Material: SGP Liquid: Water Value: Unit m³/H

Nominal Size	Internal diameter	Flow Rate (m/s)									
		1	2	3	4	5	6	7	8	9	10
A	mm										
15	16.1	0.7	1.5	2.2	2.9	3.7	4.4	5.1	5.9	6.6	7.3
20	21.6	1.3	2.6	4.0	5.3	6.6	7.9	9.2	10.6	11.9	13.2
25	27.6	2.2	4.3	6.5	8.6	10.8	12.9	15.1	17.2	19.4	21.5
32	35.7	3.6	7.2	10.8	14.4	18.0	21.6	25.2	28.8	32.4	36.0
40	41.6	4.9	9.8	14.7	19.6	24.5	29.4	34.3	39.1	44.0	48.9
50	52.9	7.9	15.8	23.7	31.6	39.6	47.5	55.4	63.3	71.2	79.1
65	67.9	13.0	26.1	39.1	52.1	65.2	78.2	91.2	104.3	117.3	130.4
80	80.7	18.4	36.8	55.2	73.7	92.1	110.5	128.9	147.3	165.7	184.1
100	105.3	31.4	62.7	94.1	125.4	156.8	188.1	219.5	250.8	282.2	313.5
125	130.8	48.4	96.7	145.1	193.5	241.9	290.2	338.6	387.0	435.4	483.7
150	155.2	68.1	136.2	204.3	272.4	340.5	408.6	476.7	544.8	612.9	681.0
200	204.7	118.5	237.0	355.4	473.9	592.4	710.9	829.3	947.8	1066.3	1184.8
250	254.2	182.7	365.4	548.1	730.8	913.5	1096.2	1278.9	1461.6	1644.3	1827.0
300	304.7	262.5	525.0	787.5	1050.0	1312.5	1575.0	1837.5	2100.0	2362.5	2625.0
350	339.8	326.5	652.9	979.4	1305.9	1632.3	1958.8	2285.3	2611.7	2938.2	3264.7
400	390.6	431.4	862.8	1294.1	1725.5	2156.9	2588.3	3019.6	3451.0	3882.4	4313.8
450	441.4	550.9	1101.8	1652.6	2203.5	2754.4	3305.3	3856.2	4407.0	4957.9	5508.8
500	492.2	685.0	1370.0	2054.9	2739.9	3424.9	4109.9	4794.8	5479.8	6164.8	6849.8

6. External dimension

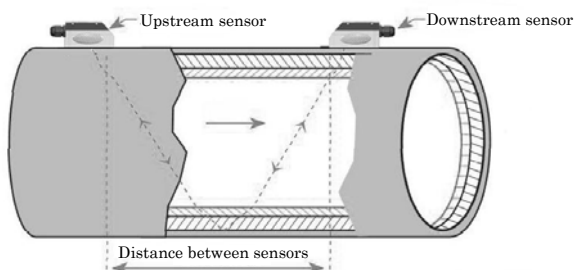


7. Caution for installation

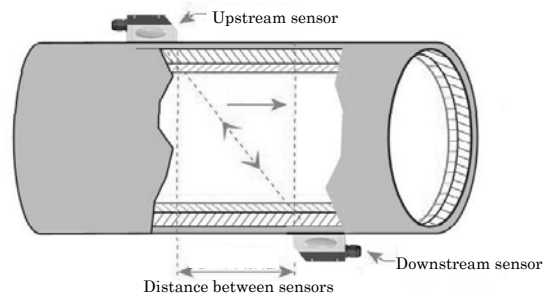
(1) Please select suitable installation method for piping condition in order to measure correctly. Please select from V method, Z method and W method as below.

※ Extension rail as an option is required for Z method.

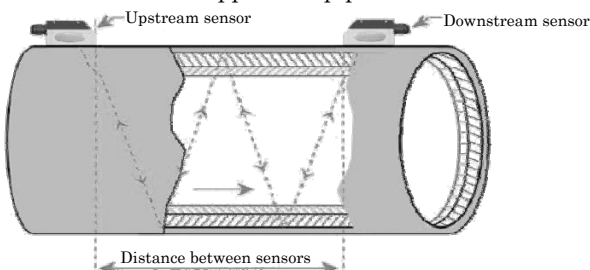
● V method (Applicable pipe size: 15~300mm)



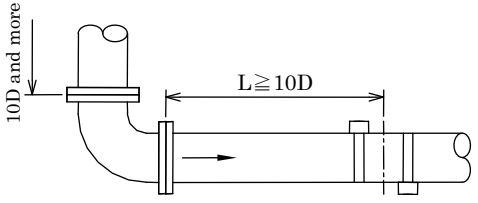
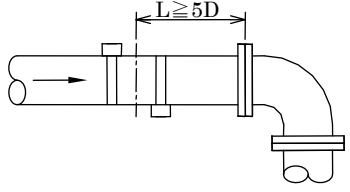
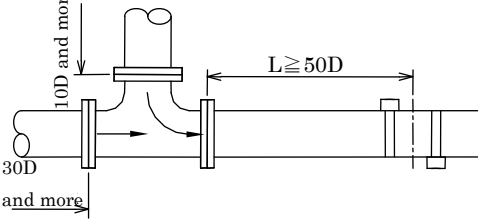
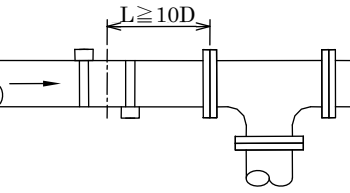
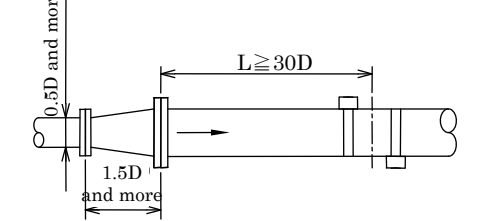
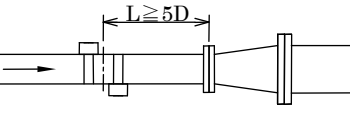
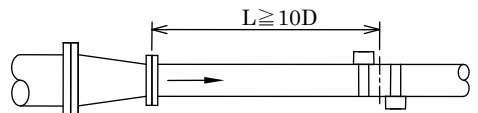
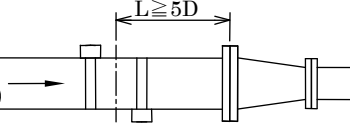
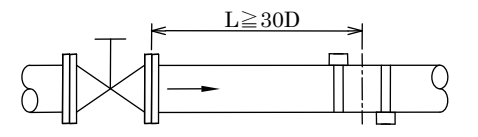
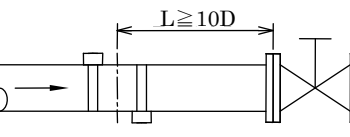
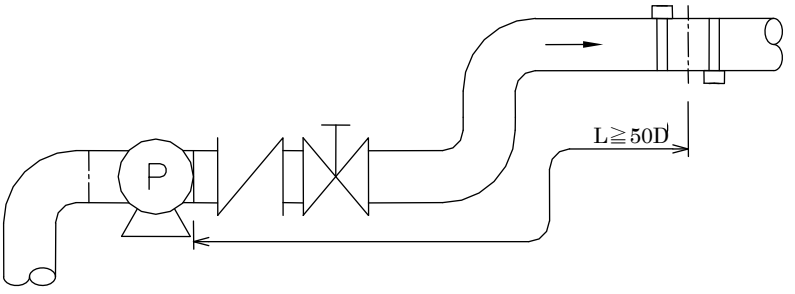
● Z method (Applicable pipe size: 200mm and more)



● W method (Applicable pipe size: 15~300mm)



(2) Straight piping portion is required at before and after transducer. Please refer to below.

Class	Upstream side	Downstream side
90 degree bend		
Tee		
Expanding pipe		
Contraction pipe		
Valve		
Pump		

D = Nominal Size

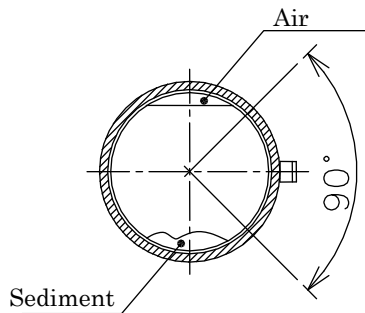
[JEMIS032-1987 Standard]

(3) Ambient temperature shall not exceed specification temperature. Less thermal variation is preferable.

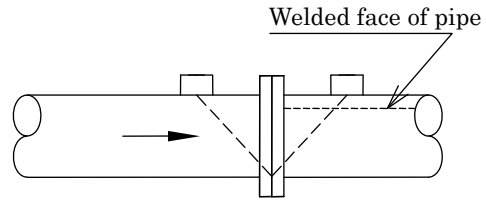
(4) Please install to the pipe less obstacle of ultrasonic such as rust or scale. In case of impossibility, please set obstacle as a liner, and measurement accuracy is equivalent of specification. However, please clean a pipe as possible.

(5) Space between pipe and liner makes difficulty of measurement because of less propagation of ultrasonic.

- (6) Please select the place where pipe is filled by liquid while liquid does not flow. And also, please avoid to install the place where may appear air bubbles.
- (7) Please avoid to install sensor at right above and right under of the pipe in order to avoid air pocket and sediments. Sensor shall be installed side within 90 degree angle from horizontal. And also, please avoid installation at a joint of flange or welded part of pipe.

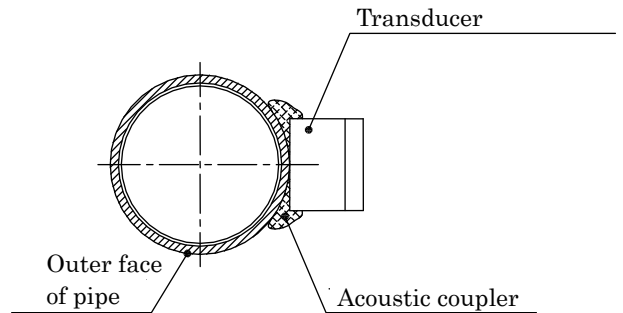
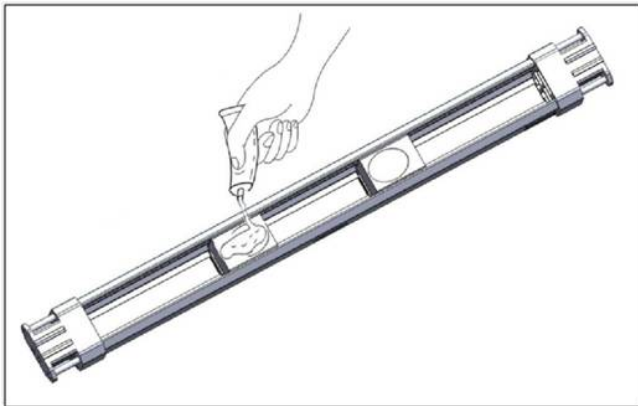


Pipe sectional view



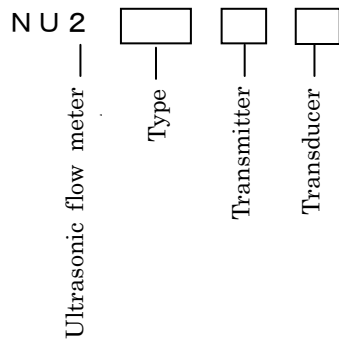
Non installation part

- (8) Please apply acoustic coupler to sensor when install transducer. When apply the acoustic coupler, please be careful not to include air.



Pipe sectional view

8. Model and specification code



Model	Code		Specification
NU2			Ultrasonic flow meter
Type	000		Clump-on type
Transmitter	SW		Wall mount
	HD		Hand held
Transducer	HSO		For pipe size: 15~ 100mm
	HMO		For pipe size: 50~ 600mm

- ◆◆◆◆◆◆◆◆ Matters to be specified at the time of ordering ◆◆◆◆◆◆◆◆
1. Type and specification code
 2. Name of measured liquid, viscosity, temperature

► Specification and contents are subject to change without notice



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