Features

Series 7200 is single-board, self-contained and state-of-the-art ultrasonic flow meter.
It has the notable characteristics of high precision, high reliability, high performance, low price etc..
Main features are

- The sensors being clamp-on type, there's no pressure loss. The sensors are easily mounted on the surface of the pipe without interrupting the flow for installation or maintenance.
- Advanced intelligent display, computation and printing to suit user's diversified requirements. The flow is displayed in all pertinent engineering units.
  It runs out of regular power(110V/220V), built-in battery or DC power.
- Using the most advanced direct-time-measuring method, the unit offers a signal resolution of 0.2ns. In addition, advanced data processing functions ensure series 7200 of high linearity.
- Signal outputs including current signal, frequency signal and RS-232 serial data ;
  switch output includes one OCT and one relay output ;
  And all the outputs displayed on the unit can be configured to be transmitted to a PC via RS-232C.

Description

When an ultrasonic wave travels in a liquid, the flow of the liquid will cause its speed to change.
When it travels in the flow direction, its speed increases and against it, it decreases. By measuring the difference in travel times between both directions, one can measure the flow speed.
As shown in Chart 1, a pair of sensors are mounted upstream and downstream on the surface of the pipe. Its mounting configuration can be 'Z' or 'V'. The time - difference of ultrasonic signals transmitted and received across upstream and downstream are calculated as below;

$$T_{UP} = \frac{MD / COS\theta}{Co + VSIN\theta} \quad (1) \qquad T_{DOWN} = \frac{MD / COS\theta}{Co - VSIN\theta} \quad (2)$$

M - travel time D - inner diameter
θ - transmit angle C_0 - fluid static sound velocity
T_{UP} - travel time of upstream signal
T_{DOWN} - travel time of downstream signal
△T - time difference as per equations (1) and (2), Using these, we can get the average velocity across the pipe diameter :

$$V = \frac{MD}{Sin2\theta} \cdot \frac{\triangle T}{T_{UP} \times T_{DOWN}}$$

7200 Series Smart-IN^{US} Ultrasonic Flow Meter

Technical Specifications

Liquids Measured
Water, sea water and other clean liquids with a content of suspended solids less than 10000ppm (mg / l) and without a high content of air bubbles.
-20°C ~ +80°C, without ice in pipes at low temperature

Pipe Materials Measured
Steel, stainless steel, cast iron, plastics etc. (25 ~ 3000mm)

Up & Down Stream Straight Runs
In the upstream, it must be 10D and in the downstream 5D. If there's a pump in the upstream, the length must be at least 30D from the pump.

Flow Velocity
0 ~ ±32m/s

Measurement Accuracy
±0.5 ~ 1% of rate
Repeatability : ±0.2 ~ 0.5 % at 0 ~ ±32 m/s
Linearity : ±0.5%
Pipe size : 25mm ~ 3000mm (ID)

Display
Alphanumeric 2 x 20 digit backlight LCD
Total (㎥), flow velocity (m/s), and instant flow (㎥/ hr)
W / 4x4 keyboard

Output
0/4 ~ 20mA(precision 0.1%)
Frequency output : 1 ~ 9999Hz
Relay Output
RS-232C serial output. (Optional RS-485)

Power Requirement
Wall mount type : 110VAC, 220VAC ±10% or 8~36VDC
Portable type : 110VAC, 220VAC ±10% (Recharge)
Panel mount type : 220VAC ±10% or 8~36VDC
Hand-held type : 80-240VAC ±10% (Recharge)

Printer Output
Via RS - 232C : Total flow, flow velocity and instant flow.

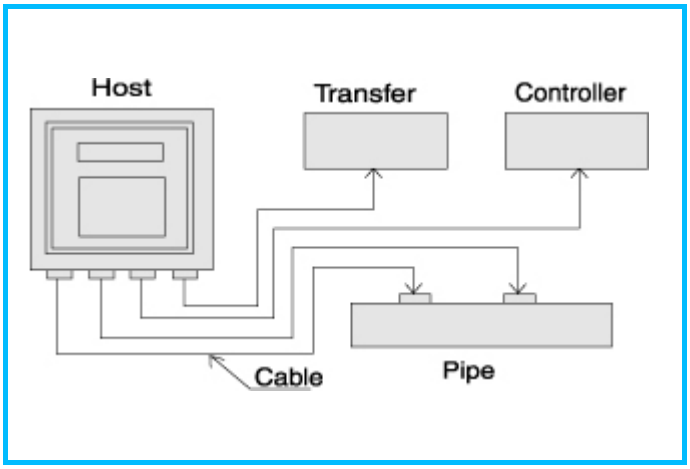
Operating Condition
Host : Temp : -20 ~ +50°C
Humid : 85% RH max.
Sensor : Temp : -20~+80°C
Humid : 98% RH max.
(able to operate immersed in water depth of 2m max.)

Weight
Series 7210 Wall mount Type - 3.1kg
Series 7220 Portable Type - 6.5kg
Series 7230 Panel mount Type - 2kg
Series 7240 Hand-held Type - 4.5kg

Sensor Distance

The distance takes the fronts edges as the standard. After inputting the necessary parameter, check up the numbers displayed in M25 window, sensors and pipe wall.
At the some time, on the horizontal pipe sensors must be mounted horizontally and symmetrically, to prevent existing air bubble on the upper part in the pipe, this will effect the measurement precision.
Pay attention to the mounting direction.

Series 7200 SYSTEM SCHEMATIC



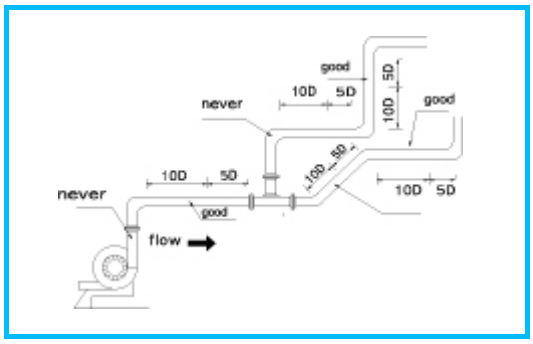
Transducer Type

- Standard - M1 (50 ~ 700 mm range)
- Standard - S1 (15 ~ 100 mm range)
- Standard - L1 (300 ~ 6000 mm range)

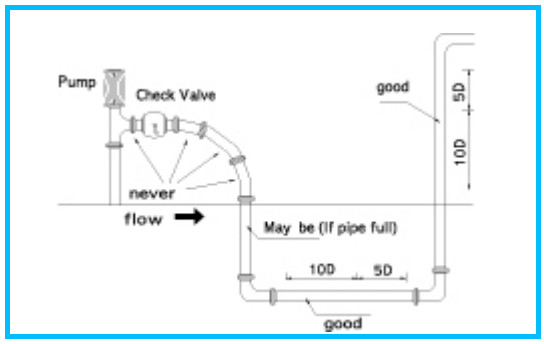
Application

- Water supply, draining off and the processor of filthy water
- Oil field, petroleum chemical engineer system
- Power plant (heat power, water power, fire power)
- Steel factory, mining industry
- Food, Medicine, paper-made
- Automobile making and check-up
  Semi-conductor (Pure water)
- Heat net balance of heat supply system

Sensor Installation



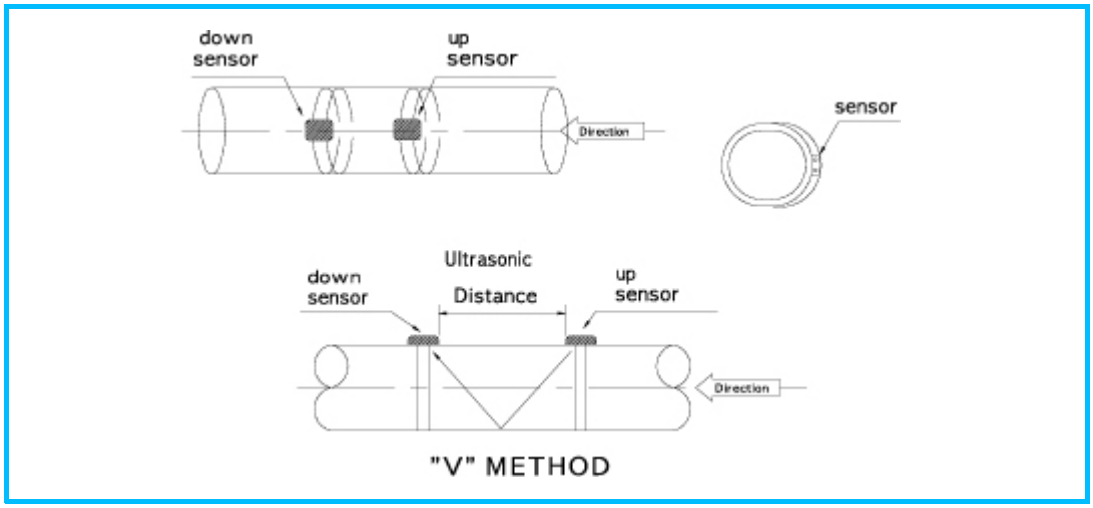
Site Selection



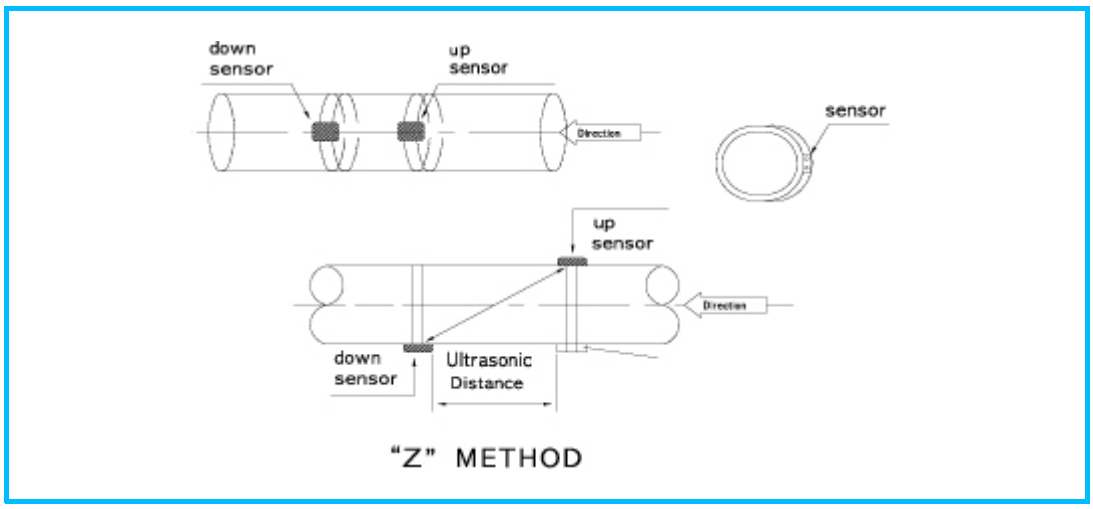
Sensor Location

Mounting method of sensor

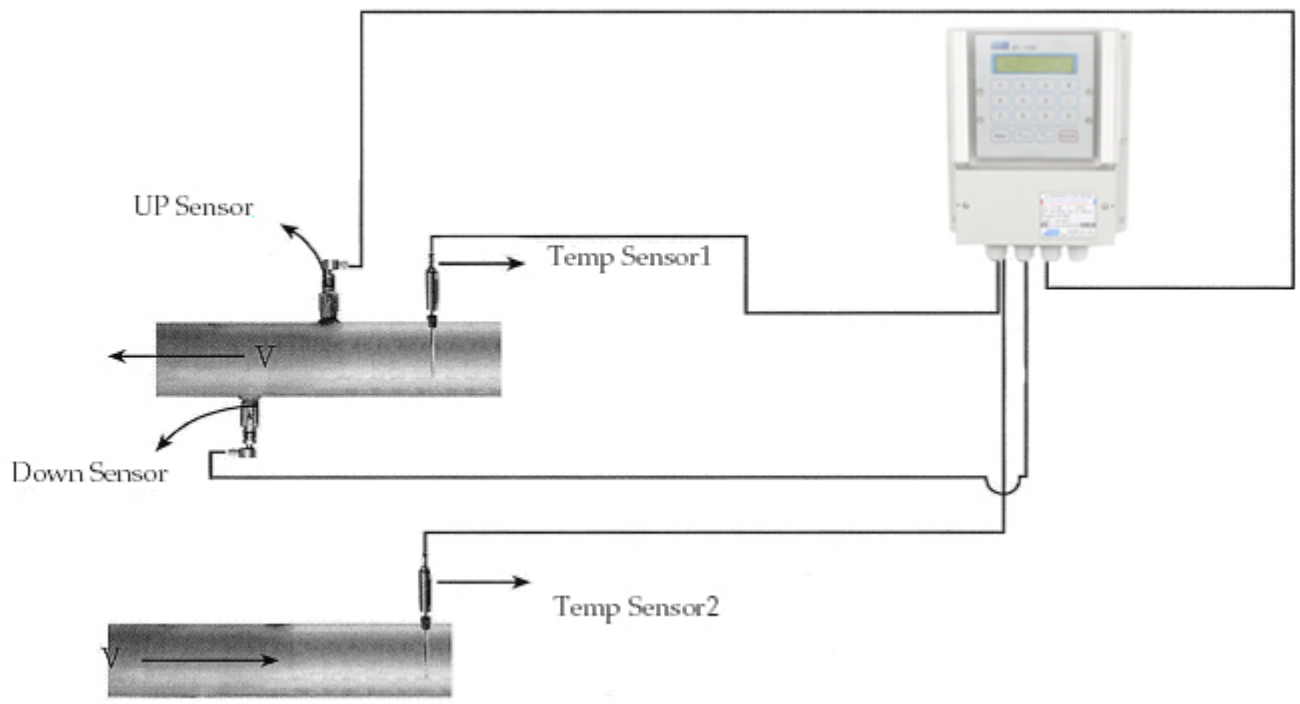
There are two mounting methods, “V” method and “Z” method :
“V” method : usually “V” method is the standard method. It’s easier to install and offers high grade of accuracy. The scope of pipe diameter that “V” method can measure is 50 ~ 350mm; while mounting, two sensors should be horizontal and aligned, their axis and the center lines should be aligned.



“Z” method : When the signal can be attenuated or interfered by scale quilted up inside pipe, by a thick liner, suspended solids in the fluid, etc., use “Z” method instead Using “Z” method ultrasonic wave spreads in the pipe directly without diffraction (straight sound signal path)



7200 Series Ultrasonic Calorimeter

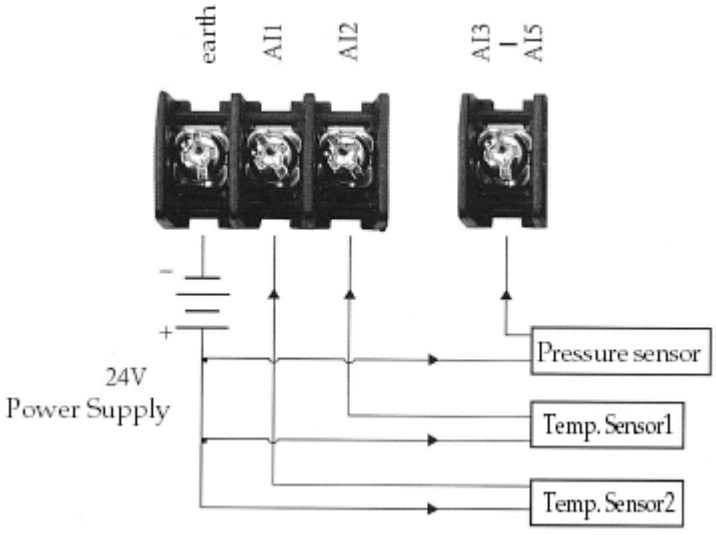


Ultrasonic + Temp sensor = Ultrasonic Calorimeter

- Display of flow calorimeter, Net calorimeter, Temp.
- Select of Temperature Range
- Temp output : 4-20 mA (PT100, PT1000, Semi con)

Method of Calorimeter Calculation

- Calorimeter = flow rate x $((\Delta T1 \times K) - (\Delta T2 \times K))$
- Calorimeter = flow rate x $\Delta T \times K$(Thermal capacity)



Various Ultrasonic Sensor

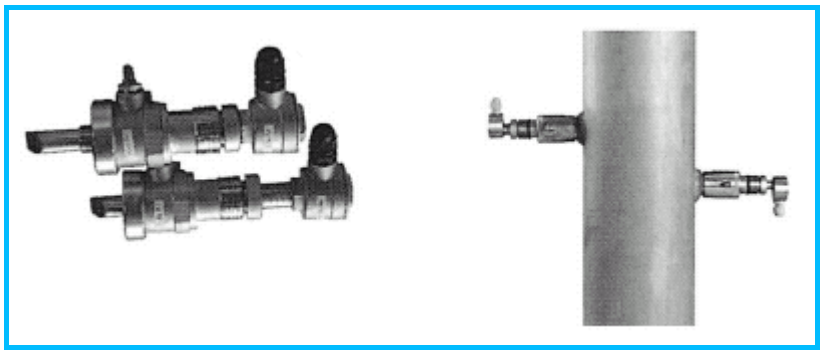
1. Clamp-on Sensor Type

Standard “S1” (Magnetic)
DN15 - DN100
Fluid Temp. < 80℃

Standard “M1” (Magnetic)
DN50 – DN700
Fluid Temp. < 80℃

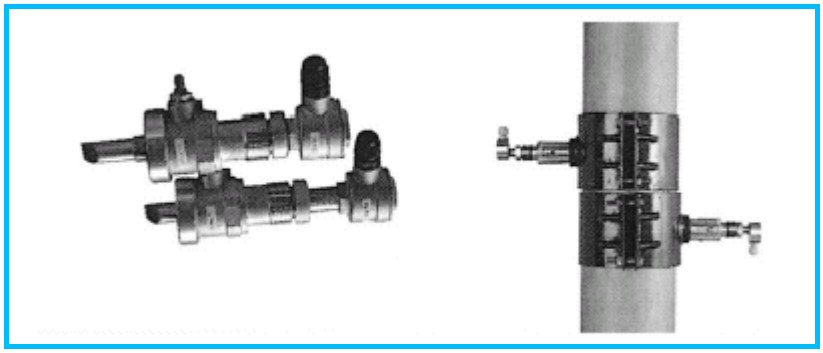
Standard “L1”
DN300 - DN6000
Fluid Temp. < 80℃

2. Insert Type



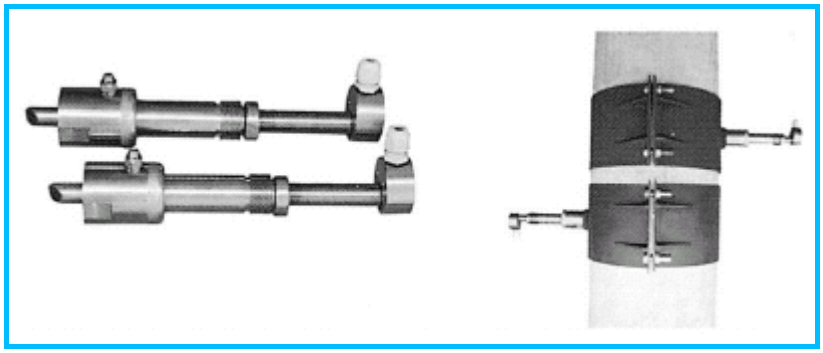
Wetted “WS”

(1) Wetted Type (WS)
DN50 ~ Fluid Temp. < 120℃



Cast iron Pipe Band “CI”

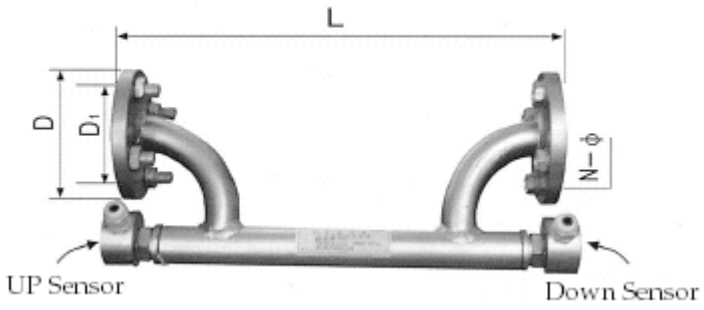
(2) Cast iron Pipe Type (CI)
DN50 ~ Fluid Temp. < 120℃



Cement Pipe Band “CB”

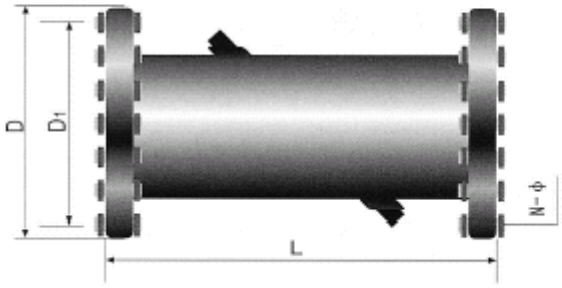
(3) Cement Pipe Bend (CB)
DN100~ Fluid Temp. < 120℃

3. Standard “ л ” pipe Sensor Type



DN(mm)	L(mm)	SIZE (mm)			Pressure MAX. (Mpa)
		D	D1	N-Ø	
15	360	95	65	4-14	2.5
20	460	105	75	4-14	
25	520	115	85	4-14	
32	600	135	100	4-18	
40	630	145	110	4-18	

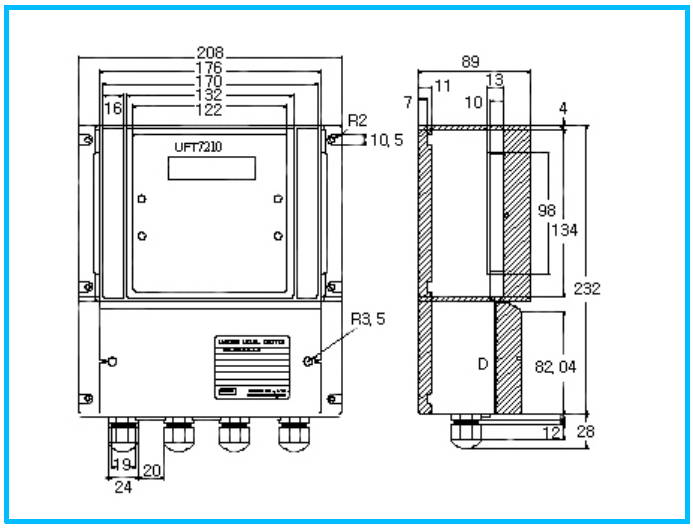
4. Flange Type



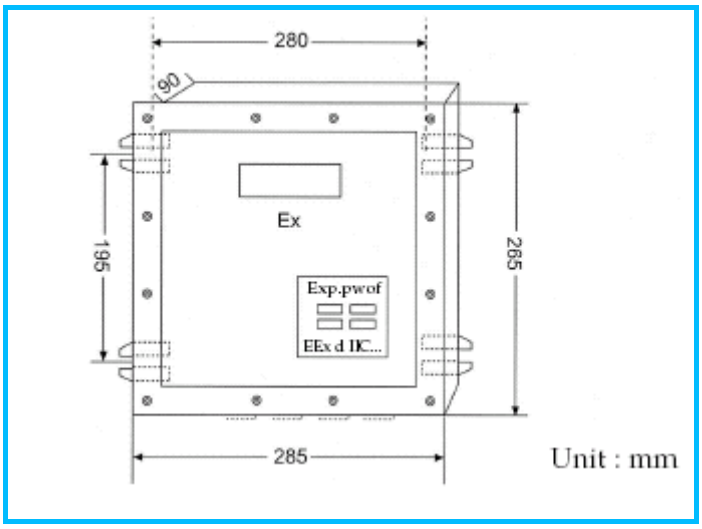
PIPE DIA DN(mm)	PIPE LENGTH (mm)	SIZE (mm)			Max. Pressure (Mpa)
		D	D1	N-¢	
50	350	160	125	4-18	1.6
65	350	180	145	4-18	
80	350	195	160	8-18	
100	400	215	180	8-18	
125	425	245	210	8-18	
150	450	280	240	8-23	
200	500	335	295	12-23	
250	575	405	355	12-25	
300	650	460	410	12-25	
350	700	520	470	16-25	
400	750	580	525	16-30	
450	800	640	585	20-30	
500	850	705	650	20-34	
600	950	840	770	20-41	

Dimensional Specification

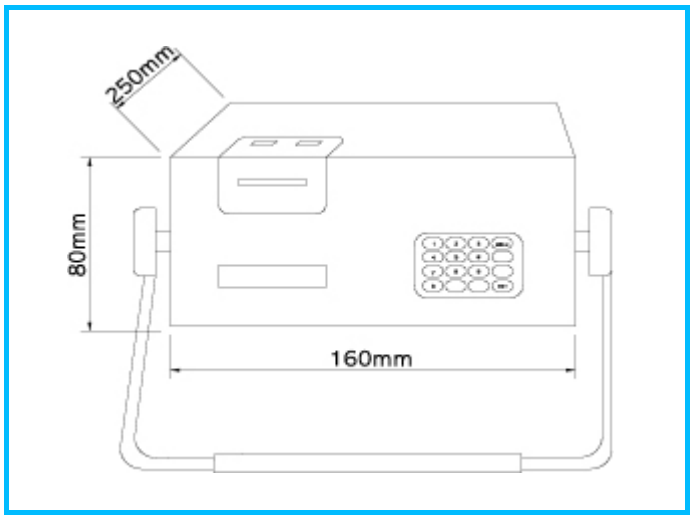
- Series 7210 HOST (Wall mount Type EN2)



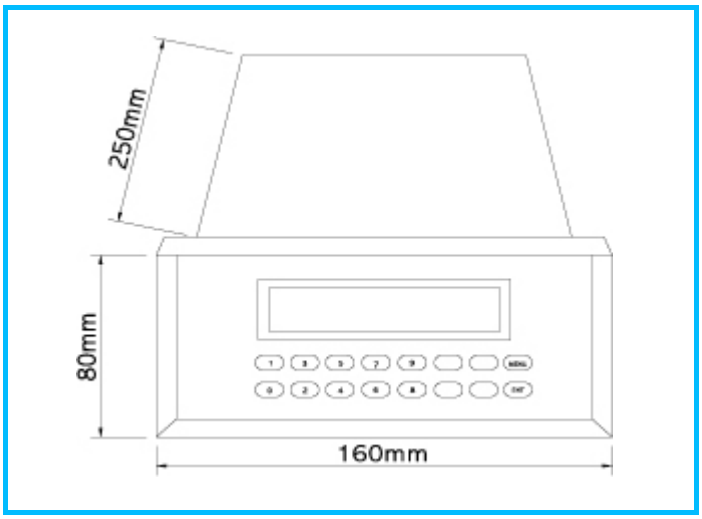
- Series 7210 HOST (Wall mount Type E2)



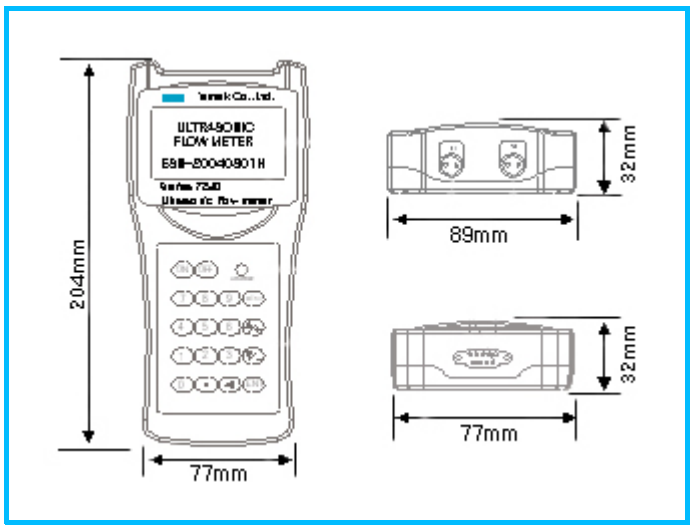
- Series 7220 HOST (Portable Type)



- Series 7230 HOST (Panel mount Type)



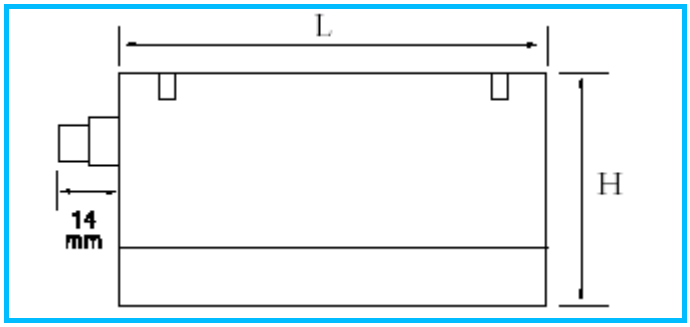
- Series 7240 HOST (Hand-held Type)



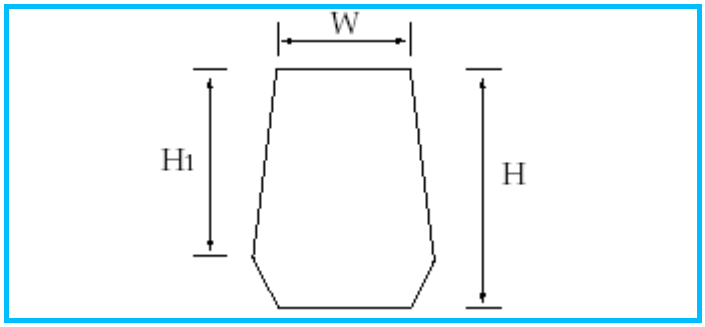
Transducer dimension

- UFT-7210, 7220, 7230

Size	L	H	H1	W	Note
S1	45mm	30mm		30mm	
M1	60mm	45mm	35mm	45mm	
L1	80mm	70mm		55mm	

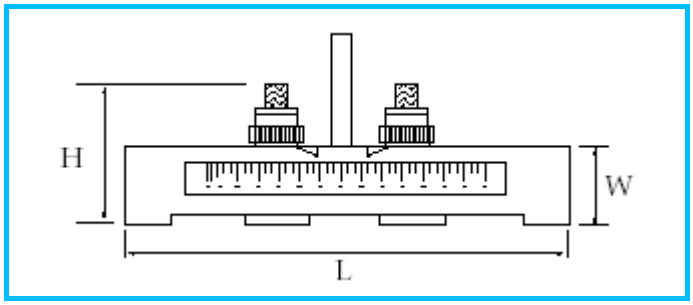


Front View

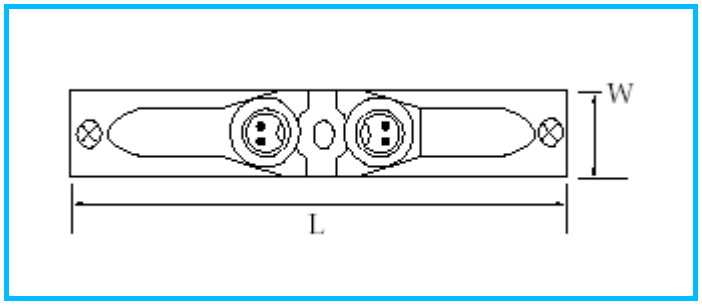


Side View

- UFT-7240
  26mm (W) x 200mm (L) x 42mm (H)

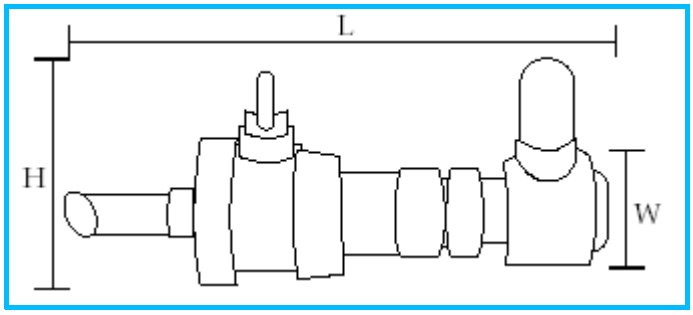


Front View

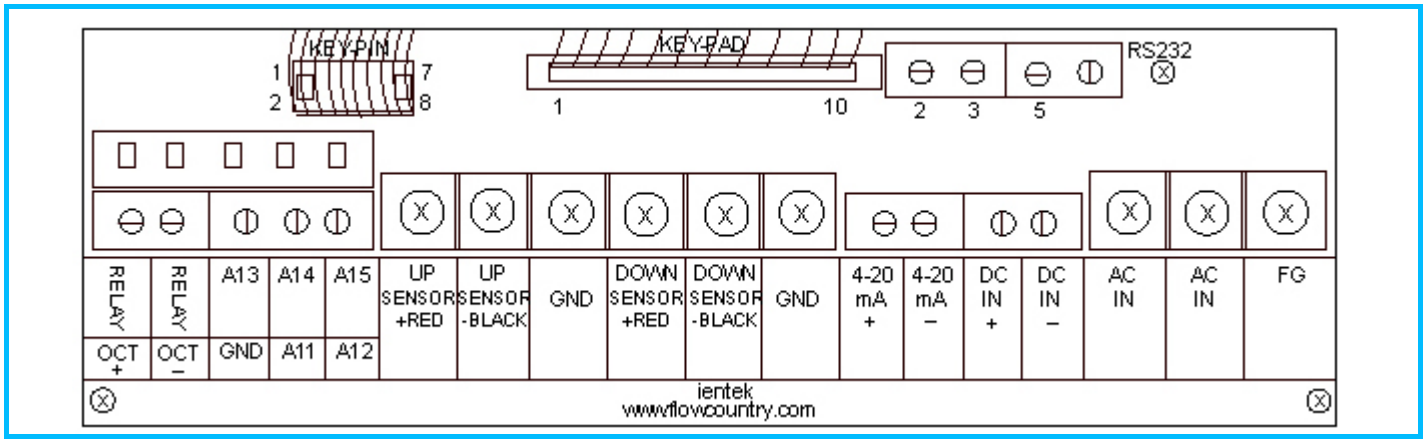


Side View

- Wetted type sensor - L
  52mm (W) x 141mm (L) x 77mm (H)



Wiring Connection (UFT-7210)



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www.flowcountry.com , www.flowcountry.co.kr

Order Information Sheet(OIS)

UFT 7200

Ultrasonic Flow Meter

	Type	Agency	Sensor Type	Power	Output	Display	Cable Con.	Cable Len.	Enclosures
UFT–72	[ ][ ] S–	[ ][ ][ ] –	[ ][ ] –	[P][ ] –	[V][ ] –	[ ][ ] –	[ ][ ] –	[ ][ ] –	[ ][ ]
	1	2	3	4	5	6	7	8	9

	Pipe D.	Option
	[D][ ] –	[ ]
	10	11

Model Direction	Code 1
WALL Ultrasonic Flow Meter	10
PORT Ultrasonic Flow Meter	20
PAN Ultrasonic Flow Meter	30
HAND Ultrasonic Flow Meter	40
Agency approved, customer specified	W

Agency Approvals	Code 2
Non-Agency Approved Meter	NAA
Explosion Proof for Class 1, Division 1, Groups B, C, D	CSA
EEx d IIC T6...T2 CENELEC	EEx
Explosion Proof for Class 1, Division 1, Groups B, C, D	FM
Agency approved, customer specified	W

Sensor Type		Code 3
Clamp-on transducer	“S1”	CS1
Clamp-on transducer	“M1”	CM1
Clamp-on transducer	“L1”	CL1
Wetted transducer	“WS”	WS
Cast Iron Pipe Bend	“CI”	CI
Cement Pipe Bend	“CB”	CB
Standard “л” pipe	DN15	D15
Standard “л” pipe	DN20	D20
Standard “л” pipe	DN25	D25
Standard “л” pipe	DN32	D32
Standard “л” pipe	DN40	D40
Flange type * DN( ) : 50-600 mm	DN ( )	F ( )
Agency approved, customer specified		W

Input Power	Code 4
DC24V ±10%	P2
AC 110V±10%	P3
AC 220V ±10%	P4
AC 80-240V Adaptor (7240 Only)	P5
Agency approved, customer specified	W

Output	Code 5
0/4 ~ 20mA and pulse	V1
Relay Output(when using in net)	V2
RS-232 series port	V3
RS-485 (Option)	V4
Agency approved, customer specified	W

Display	Code 6
No Readout	NR
Digital Display	DD
Agency approved, customer specified	W W

Cable Connector	Code 7
Standard Connector	SC
BNC Connector	BC
Agency approved, customer specified	W

Cable Length	Code 8
Standard Length (5m)	S5
Special Length ( )m	S( )
Agency approved, customer specified	W

Enclosures	Code 9
Hazardous-Area Location Enclosure	E2
NEMA 4X	EN2
Agency approved, customer specified	W

Pipe Dimension	Code 10
Pipe Dia. DN ( ) mm	D ( )
Not Application	NA
Agency approved, customer specified	W

Option	Code 11
Pressure Test Certificate	PT
Certificate of Conformance	CC
NACE Certificate	NC
Mount Fixture (Transducer Space 200mm)	SFA
Mount Fixture (Transducer Space 75mm)	SFB
Mount Fixture (Transducer Space 350mm)	SFC
Mounting ball valve w/drill hall tool.	MVT
Agency approved, customer specified	W

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www.flowcountry.com , www.flowcountry.co.kr

Application Data Sheet (ADS)
1000 and 3000 Series
7200 Series

CUSTOMER INFORMATION

Customer Name & Address :

P.O. No :

Customer Order No:

Contact :

Phone :

Tag Number(s) :

Fax :

E-mail :

PROCESS DETAILS

Application Description

Describe type of application (example; boiler feed, flare gas, etc.)

Process Media

Include gas name and percent composition by volume (moles) or Weight (mass). Please attach a gas composition list or fill in composition below. Total composition must add up to 100%

Gas Components : □ % Volume (moles) □ % Weight (mass)

_____ _____ %
_____ _____ %
_____ _____ %
_____ _____ %
_____ _____ %
_____ _____ %
_____ _____ %

Process Conditions

	Nominal	Minimum	Maximum	Flow Units
Flow Rate :	_____	_____	_____	_____
Temperature :	_____	_____	_____	_____
Pressure :	_____	_____	_____	_____

Required Dimensions

Pipe/Duct Size (ID and units of measurement) _____
B-dimension per diagram below : _____
Upstream straight length pipe/duct : _____
Downstream straight length pipe/duct : _____
Upstream disturbance _____

Installation Details or Drawing

Hot tap □ No □ Yes

INSTRUMENT DETAILS

Flow Element Mounting

□ Horizontal pipe, side mount, flow left to right
□ Horizontal pipe, side mount, flow right to left
□ Horizontal pipe, top mount, flow left to right
□ Horizontal pipe, top mount, flow right to left
□ Vertical pipe, Flow up
□ Vertical pipe, Flow down

Flow Transmitter Setup

Input Power : □ 110VAC±10% □ 220VAC±10% □ 24VDC±10%
□ 90 ~ 240 VAC

Application : □ Flow (default)
□ Temperature

Signal Output : □ 4 to 20mA
□ 1 to 5VDC
□ 0 to 5VDC
□ 0 to 10VDC
□ RS-232C

Output Units _____ _____
Zero Value _____ _____
Full Scale _____ _____
Alarm Set points _____ _____

Standard Temperature and Pressure

70 °F and 14.7 psia [21.1 ℃ and 1.013 bar(a)] is the factory calibration default for standard temperature and pressure unless otherwise indicated below.

Standard □ 70 °F [21.1 °C] □ 14.7 psia [1.013 bar(a)]
Other _____ _____

Note (Remark)