

Clamp-on

Wall-mount Clamp-on Transit Time Ultrasonic Flow Meters provide abundant capabilities for accurate liquid flow measurement from outside of a pipe. It utilizes state-of-the-art technologies in ultrasonic transmission receiving, digital signal processing and transit-time measurement. The proprietary signal quality tracking and self-adapting technologies allow the system to optimally adapt to different pipe materials automatically.

The flow meters of this family are carefully designed with their user-interfaces self-explanatory and their operation simple and easy. The unique clamp-on fixture design makes the installation very simple, requiring no special skills or tools.

Due to the non-invasive nature of clamp-on transducers, there is no pressure drop, no moving parts, no leaks, and no risk of contamination or corrosion.



▲ Transmitter & Transducer



▲ Ex Transmitter & Transducer

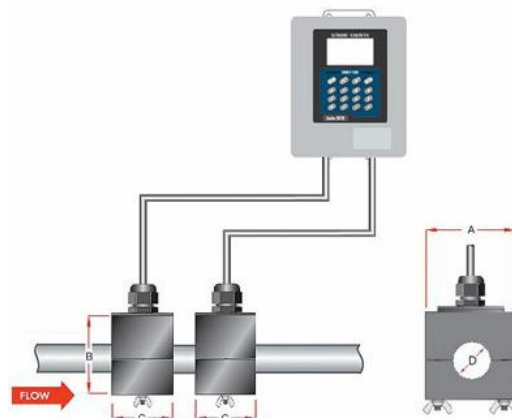


▲ Wireless Handheld Operator

Features:

1. Non-invasive transducers are easy to install, cost effective, and require no pipe cutting or processing interrupt. Since the transducers do not contact with the liquid, fouling and maintenance are eliminated.
2. Standard and Explosion-Proof ATEX (ExdIIBT6; LCIE 09 ATEX 3008) transmitters are available, Wide liquid temperature range: $-40^{\circ}\text{C} \sim 250^{\circ}\text{C}$.
3. Remote operation by the wireless handheld operator. No matter the pipeline in high altitude or underground, users can install or adjust the transducers more convenient.
4. The wireless handheld operator has wireless remote reading function and it also can operate the meters instead of panel operations.
5. Built-in large capacity memory and USB data download function. The downloaded data can be opened by EXCEL directly.
6. The heat measurement function by configuring with paired Pt1000 temperature sensors.
7. Wide range of pipe sizes from DN20 to DN4500.
8. Wide bi-directional flow range of 0.003 m/s to 12 m/s.

K transducer:



Size	A	B	C	D
K1: 3/4", 1"	55	39	42	34
K2: 3/4", 1", 1-1/4"	64	46	42	43
K3: 1-1/4", 1-3/4", 2"	80	46	42	61

Note: K transducers utilize the Round-Clamp method, and the transducers' transmitting and receiving sides are connected with the pipe surface thoroughly to acquire enough coupling area, better reliability, stability, etc.

Applications:

- ◆ Water (hot water, cooling water, potable water, sea water etc.)
- ◆ Petroleum products
- ◆ Chemicals, including alcohol, acids, etc
- ◆ HVAC, energy measurement system
- ◆ Beverage, food and pharmaceutical processors
- ◆ Secondary sewage, waste treatment, etc.
- ◆ Power plants (nuclear power plants, thermal & hydropower plants), heat energy boiler feed water.
- ◆ Metallurgy and mining applications
- ◆ Pipeline leak detection, inspection, tracking and collection
- ◆ Network monitoring

Principle of Measurement

Transit time flow meter utilizes two transducers that function as both ultrasonic transmitters and receivers. The transducers are clamped on the outside of a closed pipe at a specific distance from each other. The transducers can be mounted in V-method in which case the ultra sound transverses the pipe twice, or W-method in which case the ultra sound transverses the pipe four times, or in Z-method in which case the transducers are mounted on opposite sides of the pipe and the ultra sound transverses the pipe only once. The selection of mounting method depends on pipe and liquid characteristics. When the flow meter works, the two transducers transmits and receives ultrasonic signals amplified by multi beam which travels firstly downstream and then upstream (Figure 1). Because ultra sound travels faster downstream than upstream, there will be a difference of time of flight (Δt). When the flow is still, the time difference (Δt) is zero. Therefore, as long as we know the time of flight both downstream and upstream, we can work out the time difference, and then the flow velocity (V) and flow volume (Q) via the following formula.

$$V=K*\Delta t$$

$$Q=S*V$$

Where: V Liquid velocity
 K Constant
 Δt Difference in time of flight
 Q Flow rate
 S Sectional area of pipe

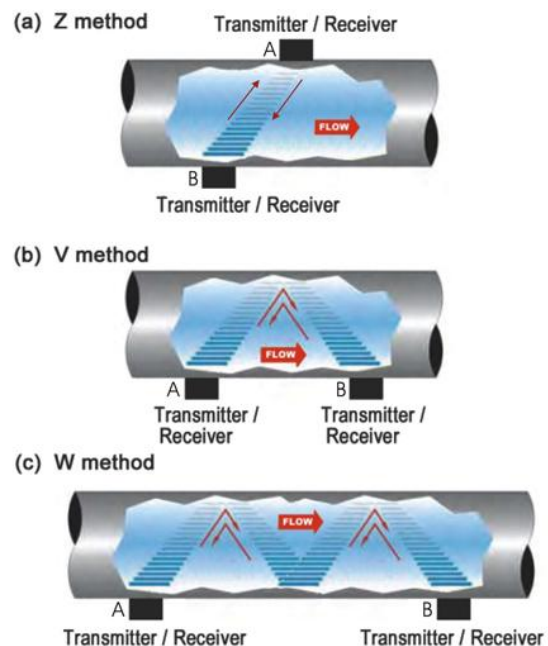


Figure 1

Specifications

Transmitter	Power Supply	100-240VAC 50/60Hz \pm 15% 12 - 36 VDC Solar supply 12VDC
	Velocity	0.003 to 12 m/s, bi-directional
	Display	4 line \times 16 English letters LCD, it can display total flow, flow rate, velocity and meter running status etc.
	Units Rate Totalized	User Configured (English and Metric) Rate and Velocity Display gallons, ft ³ , barrels, lbs, liters, m ³ ,kg
	Output	Data storage function, 4~20mA, Frequency (For Flow rate or Total flow), Relay (For Total flow or Alarm), RS485(Modbus-RTU) options: Wireless handheld operator, GPRS
	Accuracy	\pm 1.0% of reading at rates >0.5 m/s \pm 0.005 m/s of reading at rates <0.5 m/s
	Sensitivity	0.003m/s
	Repeatability	0.2% of reading
	Dimensions and Weight	Std.:261*193*80, Weight: <2.5kg Exp: 310*226*127, Weight: <7.5kg
	Security	Keypad lockout, access code enable
Transducer	Liquid Types Supported	Virtually most any liquid containing less than 5% total suspended solids (TSS) or aeration
	Suited Liquid Temperature	Std. Temp.: -40 $^{\circ}$ C~121 $^{\circ}$ C High Temp.: -40 $^{\circ}$ C~250 $^{\circ}$ C
	Cable Length	Std: 6m (20 feet); Opt: Maximum: 300m (990 feet)
	Pipe Size	S transducer: DN20-50mm Std M transducer: DN40 -1000mm L transducer: DN1000-4500mm K-mode round transducer: DN20-50mm (For K, S transducer on the stainless steel pipe, It is better that the thickness of the pipe is more than 2.5mm.)
	Dimensions and weight	S: Size:42*25*25; weight:<0.2kg M: Size:60*43*43; weight:<0.5kg L: Size:80*53*53; weight:<1.0kg

Parts Identification:

Transmitters:



Standard wall-mounted



Explosion-proof (ATEX)

Transducers:



Ex-proof type (ATEX)



K transducer



High temperature transducer



S-Transducer



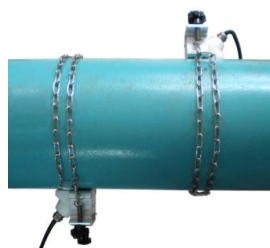
M-Transducer



L-Transducer



M-Mounting Frame (V method and Z method)



S-Mounting Frame (V method and Z method)

Accessories:



Stainless Steel Strap



Flexible belts



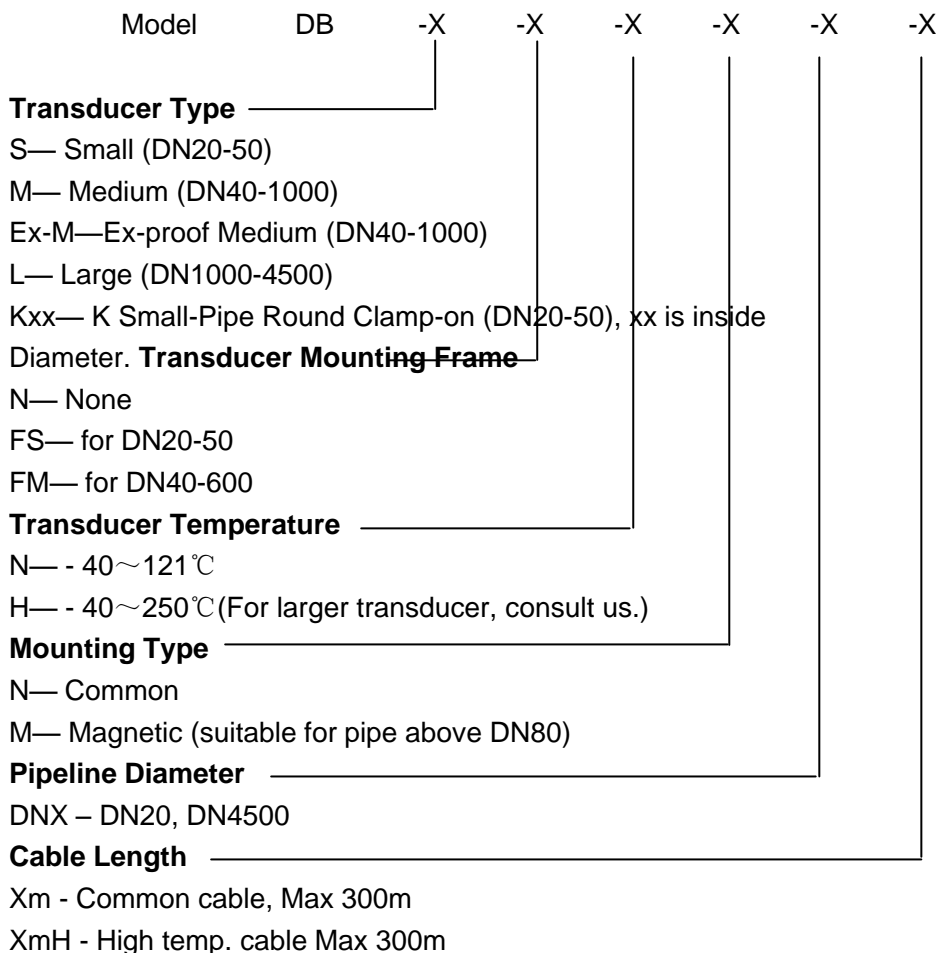
Couplant

Clamp-on Ultrasonic Flow Meter Selection Table

Model	-X	-X	-X	-X	-X	-X	/* (Transducers)
Clamp-on Series							
Approvals							
N—N/A							
Ex—ATEX (ExdIIBT6)							
Power Supply							
A—110VAC							
B—220VAC							
E—24VDC							
S—Solar supply (including solar board)							
Output Selection 1							
N—N/A							
0—Data storage function							
1—4-20mA							
2—Frequency Output (Flow rate or Totalizer)							
3—Relay Output (Totalizer or Alarm)							
4—RS485 Output (ModBus-RTU)							
5—Wireless handheld operator							
6—GPRS Wireless Module (Excluding software)							
Output Selection 2							
Same as above							
Output Selection 3							
Same as above							
Output Selection 4							
Same as above							

Note:
Output Selections 4 and 6 can be selected one.

Transducer Selection for Clamp-on Ultrasonic Flow Meter

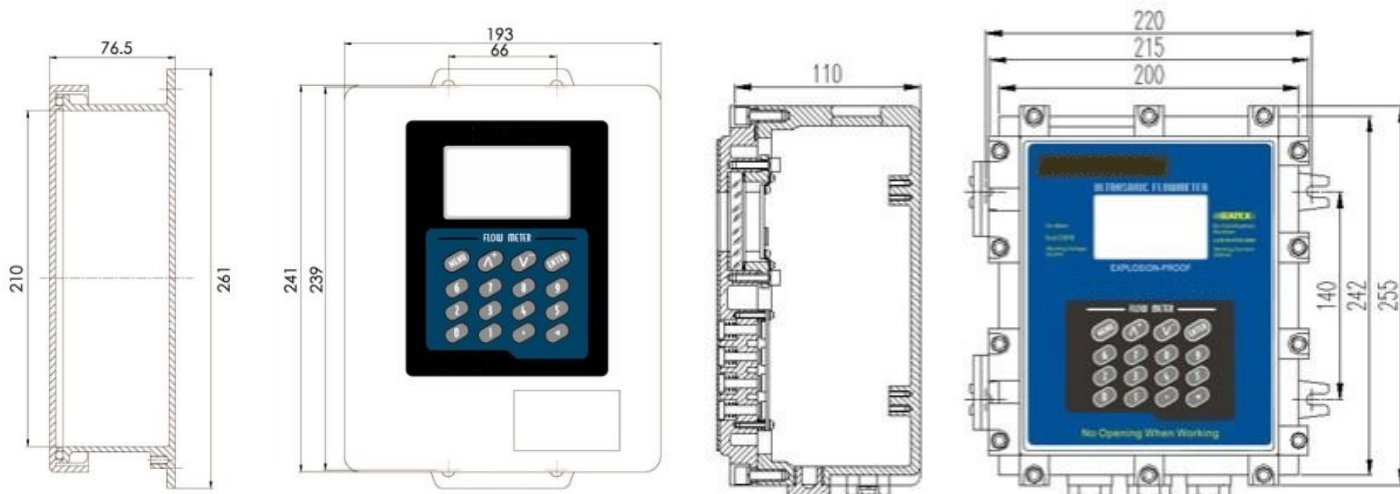


Parts Number Construction example:

N-B-0 4 N N/DB-M-N-N-N-DN400-30m

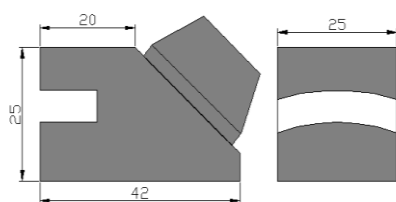
Description: standard Clamp-on ultrasonic flow meter, no explosion-proof, 220VAC power supply, Data storage function and RS485 output; standard M type transducer, no mounting frame, standard temperature, common mounting type, used in pipeline DN400, transducer cable length 30m.

Parts & Dimensions

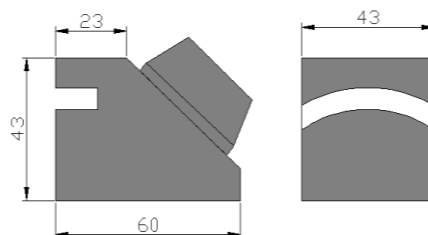


Standard Transmitter

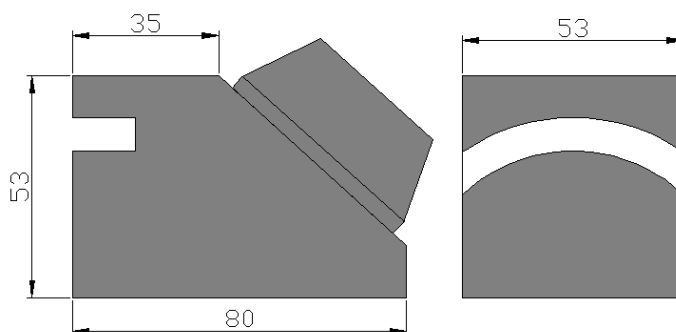
Explosion-proof Transmitter



S Transducer



Std. M Transducer



L Transducer

Wiring Terminals

Conduit holes: M18× 1.5for standard and M20× 1.5for Ex.

Housing: NEMA 4 X [IP65], aluminum alloy diecasting for standard.

NEMA 4 X [IP65], aluminum casting alloy for Ex.

