TF1100-EC

Transit-time Ultrasonic Flowmeter

General:

TF1100 Transit-time Ultrasonic Flowmeter works on the transit-time method.

The clamp-on ultrasonic transducers (sensors) are mounted on the external surface of the pipe for non-invasive and non-intrusive flow measurement of liquid in fully filled pipe. Two pairs of transducers are sufficient to cover the most common pipe diameter ranges. In addition, its optional thermal energy measurement capability makes it possible to carry out a complete analysis of thermal energy usage in any facility.

The Insertion ultrasonic transducers (sensors) is hot-tapped mounting, there is no ultrasonic compound and coupling problem; Even though the transducers are inserted into pipe wall, they do not intrude into the flow, thus, do not generate disturbance or pressure drop to the flow. The insertion (wetted) type has the advantage of long-term stability and better accuracy.

This flexible and easy to use flow meter is the ideal tool for the support of service and maintenance activities. It can also be used for the control or even for the temporary replacement of permanently installed meters.

Applications:

General

- Service and maintenance
- Replacement of defective devices
- Support of commissioning process and installation
- Performance and efficiency measurement
  - Evaluation and assessments
  - Capacity measurement of pumps
  - Monitoring of regulating valves
- Energy efficiency audits

Water and waste water industry – hot water, cooling water, potable water, sea water, etc

Petrochemical industry

Chemical industry –chlorine, alcohol, acids, thermal oils, etc

Refrigeration and air conditioning systems

Food, beverage and pharmaceutical industry

Power supply– nuclear power plants, thermal & hydro-power plants, heat energy boiler feed water, etc

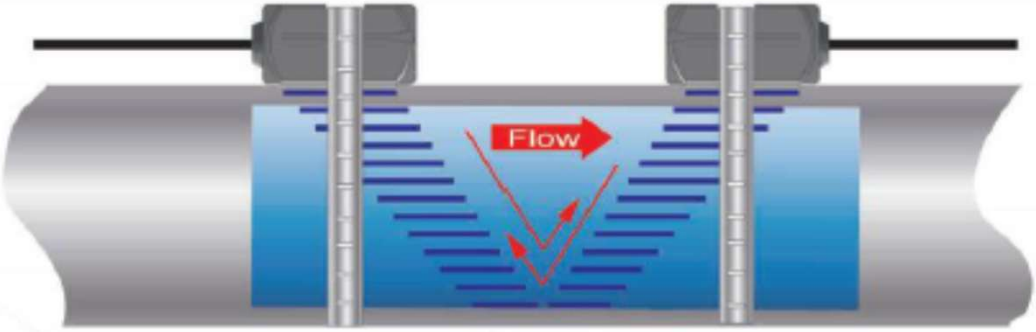
Metallurgy & mining applications

Mechanical engineering and plant engineering– pipeline leak detection, inspection, tracking and collection.

Principle of Measurement:

The Transit Time Difference Correlation Principle makes use of the fact that the time–of–flight of an ultrasonic signal is affected by the flow velocity of the carrier medium. Like a swimmer working his way across a flowing river, an ultra–sonic signal travels slower upstream than downstream.

Our TF1100 ultrasonic flow meters work according to this transit–time principle:



$$V_f = Kdt / TL$$

Where:

- V_f:Flow velocity
- K:Constant
- dt:Difference in time of flight
- TL:Average Transit Time

When the flow meter works, the two transducers transmits and receives ultrasonic signals amplified by multi beam which travels firstly downstream and then upstream. Because ultra sound travels faster downstream than upstream, there will be a difference of time of flight (dt). When the flow is still, the time difference (dt) 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 (Vf) via the following formula.

Features:

- Non–invasive transducers are easy to install, cost effective, and require no pipe cutting or processing interrupt.
- Wide liquid temperature range: –35℃~200℃.
- Data logger function.
- Thermal energy measurement capability can be optional.
- For commonly used pipe materials and diameters from 20mm to 5000mm.
- Wide bi–directional flow range of 0.01 m/s to 12 m/s.

Specifications:

Transmitter:

Measurement principle	Ultrasonic transit-time difference correlation principle
Flow velocity range	0.01 to 12 m/s, bi-directional
Resolution	0.25mm/s
Repeatability	0.2% of reading
Accuracy	±1.0% of reading at rates >0.3 m/s;±0.003 m/s of reading at rates<0.3 m/s
Response time	0.5s
Sensitivity	0.003m/s
Damping of displayed value	0-99s(selectable by user)
Liquid Types Supported	Both clean and somewhat dirty liquids with turbidity <10000 ppm
Power Supply	AC: 85-265V DC: 24V/500mA
Enclosure type	Wall-mounted
Degree of protection	IP66 according to EN60529
Operating temperature	-20℃ to +60℃
Housing material	Fiberglass
Display	3.5'' color LCD display, 16 keys
Units	User Configured (English and Metric)
Rate	Rate and Velocity Display
Totalized	gallons, ft^3, barrels, lbs, liters, m^3,kg
Thermal energy	unit GJ. KWh can be optional
Communication	4–20mA, OCT, Relay,RS232, RS485 (Modbus), Datalogger, NB–IoT, GPRS
Size	244*196*114mm
Weight	2.4kg

Transducer:

Degree of protection	IP65 according to EN60529.(IP67 or IP68 Upon request)
Suited Liquid Temperature	-35℃~200℃
Pipe diameter range	20–50mm for type B, 40–5000mm for type A
Transducer Size	Type B 40(h)*24(w)*22(d)mm Type A 46(h)*31(w)*28(d)mm
Material of transducer	Aluminum + Peek
Cable Length	Std:10m
Temperature Sensor	Pt1000 clamp-on Accuracy: ±0.1%

Configuration Code:

TF1100-EC	**Wall-mounted Transit-time Clamp-on Ultrasonic Flowmeter**	
	Power supply	
	A	85-265VAC
	D	24VDC
	S	65W Solar supply
	Output Selection 1	
	N	N/A
	1	4-20mA (accuracy 0.1%)
	2	OCT
	3	Relay Output (Totalizer or Alarm)
	4	RS232 Output
	5	RS485 Output (ModBus-RTU Protocol)
	6	Data storage function
	7	GPRS
	Output Selection 2	
	Same as above	
	Output Selection 3	
	Transducer Type	
	B	DN20–50 –35–200℃
	A	DN40–5000 –35–200℃
	Temperature Input Sensor	
	N	None
	T	Clamp-on PT1000
	Pipeline Diameter	
	DNX	e.g.DN20—20mm, DN6000—6000mm
	Cable length	
	10m	10m (standard 10m)
	Xm	Common cable Max 300m(standard 10m)
	XmH	High temp. cable Max 300m

TF1100-EC —A — 1 — 2 — 3 /LTC— B — N — DN100 —10m (example configuration)

Description:

Power supply: 85–265VAC; Output: 4–20mA, OCT & Relay; transducer type: A for DN40–5000 –35–200℃; without PT1000 temperature sensor; DN100 application; 10m transducer cables.