Portable Ultrasonic Flowmeter

General

The UFM-2012 is composed by a digital converter and two clamp-on ultrasonic transducers. It is designed to measure the fl uid velocity of a liquid inside a closed conduit. The transducers are a non-contacting, clamp-on type, which provide benefi ts of non-fouling operation and easy installation. The DSP digital technology (Digital Signal Processing) ensure a low sensibility of the instrument against potential transient factors.

Working Principle

The meter is designed to measure the fluid velocity inside a pipe. The clamp-on transducers models allow an easy installation. The transit time flow meter uses two ultrasonic transducers that function as transmitters and receivers. They are installed externally to the pipe at a specifi c distance from each other. They can be installed at V mode (2 sonic section), at W mode (4 sonic section) or at Z mode (1 sonic section). The installation method choice depends on the pipe and the fluid characteristics. The UFM2012 measures the transit time via the two transducers that alternatively transmit and receive a sound pulses sequence. The difference in the measured transit time is directly related to the fluid velocity in the pipe, as shown in fi gure 2-1

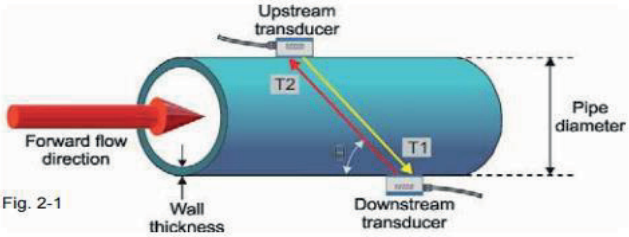

Fig. 2-1

$$V=\frac{MD}{\sin 2\theta}\cdot\frac{\Delta T}{T1\cdot T2}$$

Sonic section angle

Sonic section length

D = Pipe internal diameter

T1 = Sound transit time from the upstream transducer to the transducer downstream

T2 = Sound transit time from the downstream transducer to the transducer upstream

ΔT = Tup-Tdown

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Features

Measure method	V, Z, W, N
Liquids	Water (general), sea water, kerosene, gasoline, fuel oil, crude oil, propane (-45°C), Butane (0°C), other liquid, diesel oil, castor oil, peanut oil, gasoline #90, gasoline #93, alcohol, water (125°C)
Rechargeable battery	10 h lasting
Battery charger	100-240 VAC
Display:	4x16 Alphanumeric Character,
Displayed data	fl ow rate, flow totalizer and more
Housing	ABS
Linearity	± 0.5%
Repeatability	± 0.2%
Total accuracy	± 1%
Max medium speed	±12 m/s
Totalizer	7 digits for positive,negative and net flow
Electric current	100mA, max 310mA, stand-by 100microA
Pipe materials	Carbon steel, stainless steel, cast iron, ductile iron, copper, PVC, aluminium, asbestos, fi ber-glass-epoxy, other
Recording interval	5s, 10s, 20s, 30s, 60s
Max data stored	According to the SD used, 16GB can store data for 10 years
Pipe sizes	DN15 DN4000 (using different transducers)

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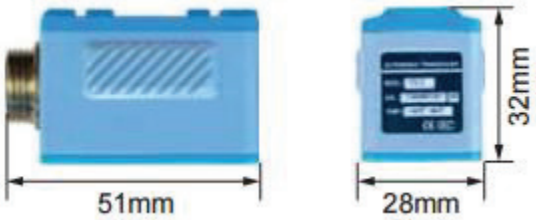
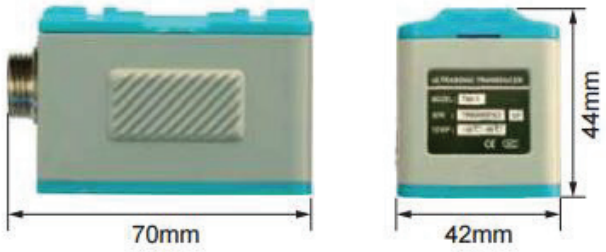
Clamp-on transducers

T-S2 suitable for pipes from 15 to 100mm (-30÷90°C) Ops 160°C



T-M1 suitable for pipes from 50 to 1000mm (-30÷90°C) Ops.160 °C



T-L1 suitable for pipes from 300 to 4000mm (-30÷90°C) Ops.160°C