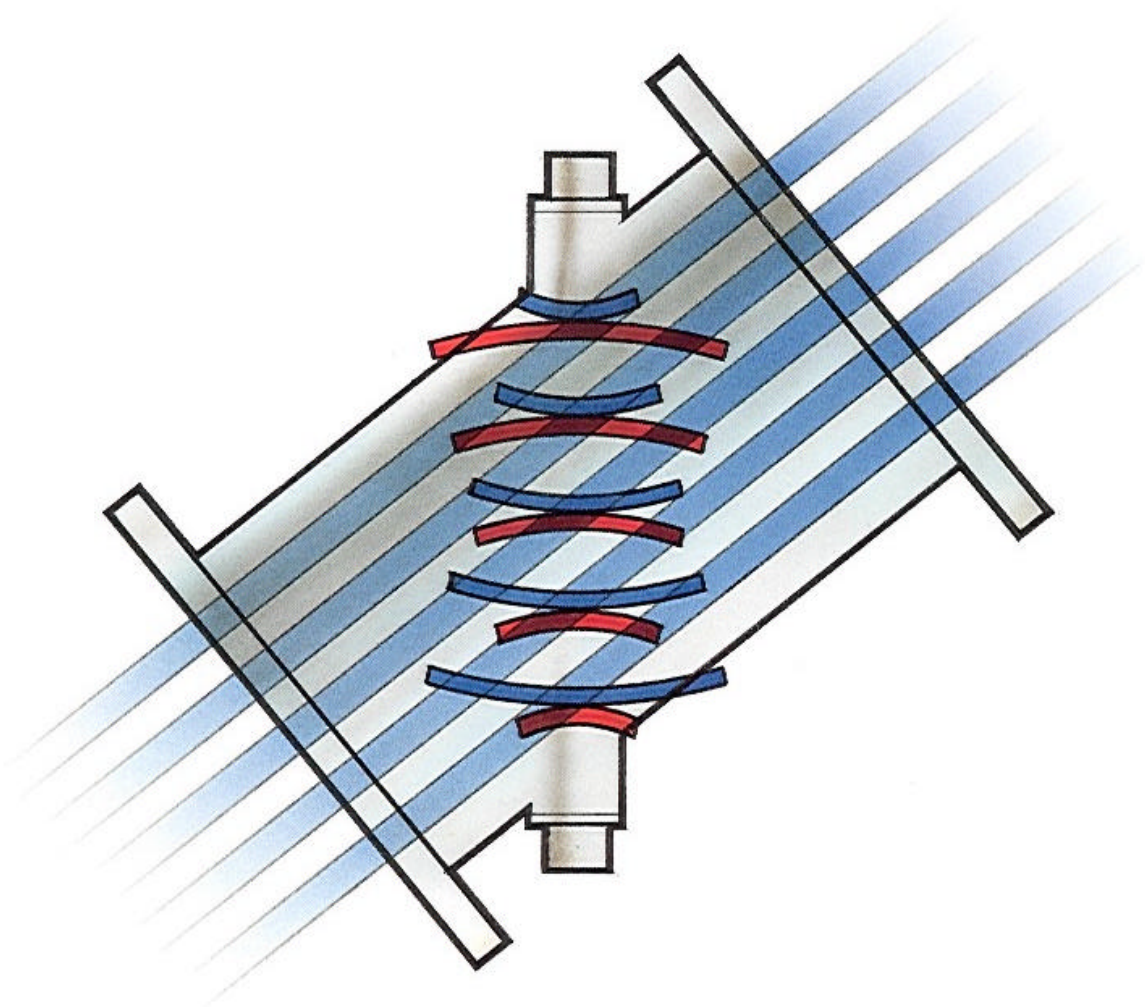


ULTRASONIC FLOWMETER

 **maddalena**



A3000 ULTRASONIC FLOWMETER

The ultrasonic flowmeter is able to operate with potable water, irrigation water or water with particles in suspension without limitations to the liquid conductivity. The meter has a free passage therefore blockage of the pipe and head loss problems are irrelevant. The measuring principle is based on the difference in transit time of an ultrasonic impulse that travels through the liquid. This impulse which the meter emits gives an output signal directly proportional to the flow velocity of the liquid without the necessity of further elaboration of the signal.

The calculation of the time difference and a particular elaboration system, ensure that the flowrate value measured is completely independent from the speed of sound in the liquid.

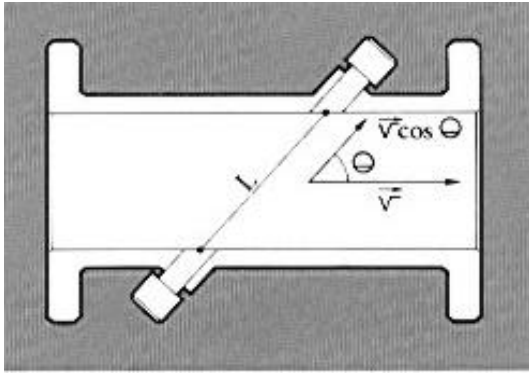
The electronic components and the high technology used in the design of this meter have given life to a simple and effective flow meter.

- Easy programming: both for the full scale value and output signals preset, are programmable on site through the keyboard.
- Compact construction: only two printed circuit boards.
- Standard output signal: The 4-20mA signal is interfaceable with any standard type of indicator.
- Bidirectional indication. The meter offers the possibility to read flowrate in both directions.
- Auto diagnosis : the meter display indicates to the operator all the possible faults.
- Long distance connection: the meter and electronic unit can be connected at up to 100m distance.
- LCD display. the meter is equipped with an LCD display and simple to use keyboard for the programming of all parameters and visualization of flow rate, totalized volumes .

SONOFLO ULTRASONIC FLOWMETER OFFERS A REAL SOLUTION TO FLOWMETERING PROBLEMS.

- The system is not affected by grease or scaling that can deposit on the inside of the pipe and does not require automatic cleaning systems.
- None of the active parts of the flowmeter come into contact with the liquid being measured so it is not necessary to interrupt the flow in the case of maintenance activities. The two transducers are contained in two stainless steel housings (which resist up to 40 bar pressure) welded to the pipe.
- The system has an extremely low power consumption (10 watt) in all sizes, furthermore the free passage in the pipe avoids loss of energy due to head loss.
- The transducers are the same for all sizes therefore a minimum quantity of spare parts is required.
- The measuring system avoids the cost of connection to earth of the flowmeter.
- The absence of the internal lining avoids costly maintenance operations.
- The general maintenance costs are very low: the A2000 flow metering system has no pressure taps to be cleaned periodically, no 5 way valves or other groups that can cause leakage, has no need for venting and there are no mechanical parts that can block or wear out.

OPERATING PRINCIPLE



The A 2000 flowmeter operates using ultrasonic pulses which are transmitted through the liquid that is flowing in the pipe. The transit time of one of the pulses, which forms an angle θ with the flow direction depends on the diameter of the pipe D , the mean velocity of the propagation of the vibrational energy C and the mean velocity of the liquid V . The impulses which are transmitted in the flow direction and those transmitted against the flow require different intervals to cover the distance between the two transducers. The difference in these two times is directly in relation to the flow velocity of the liquid..

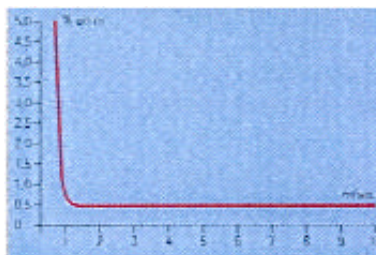


In any case the velocity of the impulses varies with the temperature and type of liquid a compensation for the measurement is needed .

The electronic signal elaborator of the A 2000 measures both the difference in the transit times of the pulses and gives an output signal proportional only to the flow velocity of the liquid. This result is obtained thanks to the use of a digital control of a precise ramp generator synchronized at the average of the two transit times. All the functions of the A2000 flowmeter are digital thus avoiding all the regulations necessary with analogical control. In order to guarantee the correct functioning of the system (both in the kit and pipe section versions) the meter must have clear pipe sections upstream and down stream the lengths of these pie sections are 15 diameters upstream and 10 diameters down stream.

PRINCIPLE WORKING CHARACTERISTICS

- Diameters:
 - Diameters from 150mm to 400mm with single track version
 - Diameters up to 3000mm with double track version .
- Indication of the measured values, the programmed values, the error codes on a LCD display 2X16 digits
- Accuracy: +/- 0,7% from 10 to 100% of the full scale value.
- Repeatability: higher than 0,25%.
- Temperature limits: ambient temperature -20° $+100^{\circ}$ C ;fluid temperature $-20+100^{\circ}$ C.
- Working pressure: 16 bar standard, maximum 40Bar.
- Measuring range: from 0-1m/s to 0-10m/sof liquid flow velocity.
- Flange connections : UNI 2223-2229 PN 16.
- Output signal 4-20mA (max 800 ohm).
- Power supply :110,120,220,240VAC-.24VDC
- Body Material: Fe 42 B carbon steel with epoxy paint finish.
- Enclosure: Pipe section IP 67 , electronic unit IP 67
- Power consumption: 10-20 VA



Error Curve

KIT FOR A2000 ULTRASONIC FLOWMETER.



The kit for ultrasonic flowmeter consists of all the parts necessary to create a complete measuring system on an existing pipeline. The is supplied with all the necessary parts for the assembly (transducers, housings for transducers, mounting supports and 15m of cable. The holes to be bored on the pipeline must be of 60mm diameter. The transmitter housing is made for panel mounting application.

Sizes: the kit can be used for the construction of flowmeter with diameters from 400 mm to 2000 mm.(for diameters up to 3000mm a double track version is necessary)

Accuracy: it is difficult to foresee the accuracy of a kit mounted flowmeter, however if the pipe diameter is know and the assembly is carried out with good workmanship the accuracy can easily reach 2,5% of the instantaneous flowrate.

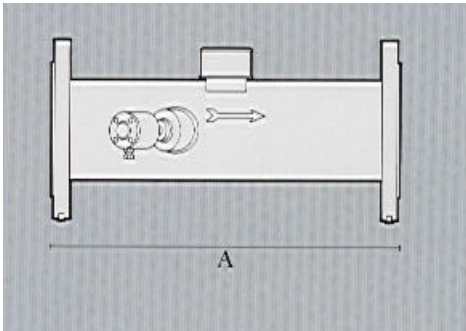
other characteristics as for the pipe section version.

APPLICATION OF THE TRANSDUCERS.

The supports for the transducers must be welded to the pipe before boring of the pipe and welding of the two collars. The two support collars have been designed to guarantee the correct inclination of the transducers when installed. The instructions for the correct positioning of the transducers on the pipe are included in the kit. PLEASE NOTE in order to supply the correct parts of the kit when ordering please mention the following:

- Full scale flowrate.
- External diameter of the pipe
- Internal diameter of the pipe.
- Pipe material.

OVERALL DIMENSIONS



Size mm	A mm	Size mm	A mm
200	700	600	1075
250	700	700	1100
300	760	800	1150
350	800	900	1200
400	870	1000	1250
500	980	1200	1330



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