

**INTRA-AUTOMATION**

MESS- UND REGELINSTRUMENTE / MEASUREMENT AND CONTROL



TÜVRheinland®  
**CERT**  
ISO 9001

# PORTABLE ULTRASONIC-FLOWMETER NON-INVASIV / CLAMP-ON-SENSORS

Type: IS210-P



**Technical Information**

**2013**



**FLOW**

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**THE EXPERT IN LEVEL AND FLOW**



## Portable Ultrasonic-Flowmeter – Principle of Measurement

IS210 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 ( $\Delta t$ ). When the flow is still, the time difference ( $\Delta t$ ) is zero. Therefore, as long as 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.

$$V = K \times D \times \Delta t$$

$$Q = S \times V$$

### Whereas:

K = Constant

D = Distance between the two transducers

S = pipe cross section

V = Liquid velocity

$\Delta t$  = Difference in time of flight

Q = flow rate

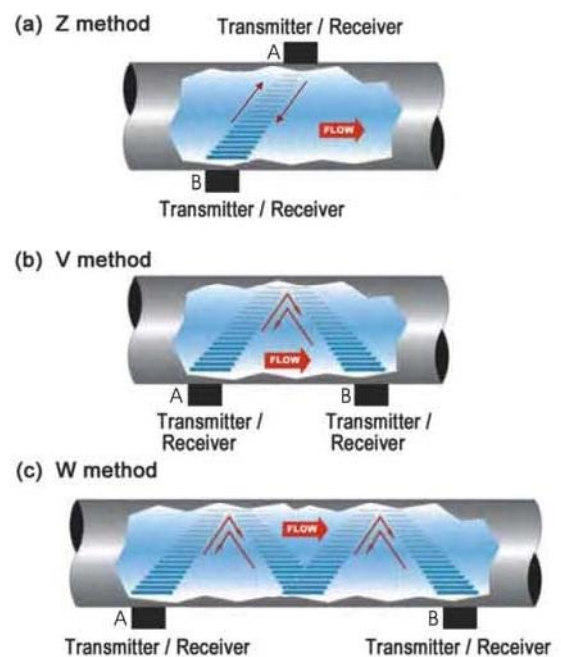


Figure 1

## Clamp-on Portable Ultrasonic-Flowmeter Series IS210-P

Series IS210-P Portable Transit Time Ultrasonic Flow Meter is a state-of-the-art universal transit-time flow meter designed using MultiPulse™ technology and low-voltage broadband pulse transmission, feature the worlds advanced non-invasive flow measurement technology providing a measuring system with unsurpassed accuracy, versatility, ease of installation and dependability. Although designed primarily for cleaner liquids, the flow meter can reliably measure liquids containing moderate amounts of suspended solids or aeration. IS210-P is designed for long- or short-term flow measurement surveys on full-pipe liquid systems and is ideal for verifying calibration of permanently mounted flow meters of all types.

### Features:

- ◆ Advanced DSP and MultiPulse™ Technology
- ◆ 40-hour battery (rechargeable), back-lit 4 lines letters display all integrated into a rugged, watertight enclosure.
- ◆ cost-effective and versatile
- ◆ Providing SD card data logger functions. The SD card capacity can be up to 8GB.
- ◆ Works reliably in both clean and somewhat dirty liquids.
- ◆ Lightweight and easily transportable in case
- ◆ 4-20 mA, OCT pulse (flow rate or total flow) output as standard output
- ◆ Optional Heat flow BTU function, two temperature transmitters 4-20ma input for inlet and outlet temperature display and heat flow rate, total heat flow display.



### Applications:

- ◆ Water, including hot water, chilled water, city water, sea water, etc.
- ◆ Sewage and drainage water with small particle quantity.
- ◆ Oil, including crude oil, lubricating oil, diesel oil, fuel oil, etc.
- ◆ Chemicals, including alcohol, acids, etc.
- ◆ Solvents
- ◆ Beverage and food processors
- ◆ HVAC hot and cool water, water /glycol solutions.
- ◆ Water and waste treatment
- ◆ Power plants, heat energy boiler feed water.
- ◆ Energy consumption supervision and water conservation management
- ◆ Metallurgy and miming applications (e.g., acid recovery)
- ◆ Marine operation and maintenance
- ◆ Pulp and paper industries
- ◆ Pipeline leak detection, inspection, tracking and collection
- ◆ Energy measurement and balancing
- ◆ Network monitoring



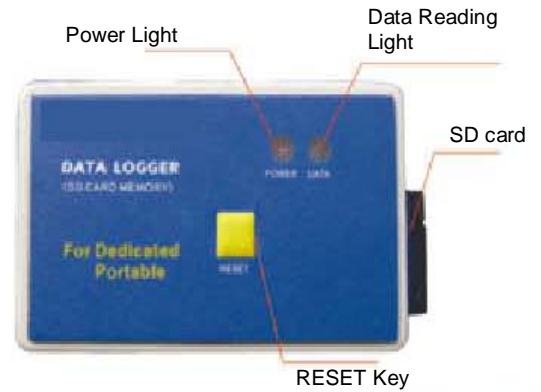
## Technical Specifications:

Transmitter	Power Supply	Internal 7.2AH Charging battery, Provides 42 hrs. Of continuous operation @ 20 °C. Charging power: 220VAC±15%. Solar energy
	Velocity	0 ...± 12 m/s (0 ... ±40 ft/s), bi-directional
	Display	4 line x 16 English letters LCD back lit, can display total flow, flow rate, velocity and meter run status etc.
	Units Rate Totalized	User Configured (English and Metric); Rate and Velocity Display; (FWD, NET, REV or BATCH) gallons, ft <sup>3</sup> , barrels, lbs, liters, m <sup>3</sup> ,kg
	Output	4...20 mA, Pulse, Relay, RS232C or RS485, options: Up to 8 GB Data logger, Hart+(4...20 mA), MODBUS
	Accuracy	± 1,0 % of reading at rates > 0,5 m/s ± 0,003 m/s of reading at rates < 0,5 m/s
	Sensitivity	Flow Rate: 0,0003 m/s (0,001 ft/s)
	Repeatability	0,2 % of reading
	Security	Keypad lockout, access code enable
Transducer	Liquid Types Supported	Virtually most any liquid containing less than 2 % total Suspended solids (TSS) or aeration
	Suited Liquid Temperature	Std. Temp. Transducer: -40...+121 °C High Temp. Transducer: -40...+250 °C
	Cable Length	Standard: 6 m (20 ft); Opt: max. 300 m (990 ft)
	Pipe-Ø	Sensor Type S: 12...50 mm Sensor Type M: 40...1000 mm (Standard) Sensor Type L: 1000...4570 mm Sensor Type K: 12...50 mm
	Transducer Size	Type S: 42 x 25 x 25 mm; weight < 0,3 kg Type M: 60 x 43 x 43 mm; weight < 0,6 kg Type L: 80 x 53 x 53 mm; weight < 1,0 kg
Accessories	Couplant	Dow Corning 111 or 732 (112 for high temp.)
	Elastic Belts	2 bundles
	Battery Charger	1 pcs
	Data Logger	Optional: 512 MB to 8 GB SD card
	Software	Windows-based Software Utility, data logging, data report, and data curve and analyze.

## Data Logger and Software Utility

**Features:**

- 1.) Provides data logging, based on SD card data memory capacity can be 512MB, 1GB, 2GB, 4GB, 8GB. Normally, 1GB can store 5 year data with 5 minutes logging interval.
- 2.) Very easy to read data from SD card (just plug it out from Data Logger, and run Data Logging and Analyze software, browse the SD card file).
- 3.) Data report and Data Curve functions (showed in the right).
- 4.) User can edit and Excel report and print it on PC (showed in the right).
- 5.) Analyze Functions Included (showed in the right).
- 6.) Logging Parameters: Flow Rate, Velocity, Positive total flow, Negative total flow, Net total flow, Total Heat flow, and Heat flow rate. If user is interested in other parameters, please consult us. Users can delete the unnecessary parameters from Excel Table and then print the data table.
- 7.) We have two types of data logger, one for dedicated and Portable Series, the other for Handheld Series.



## Parts and Dimensions

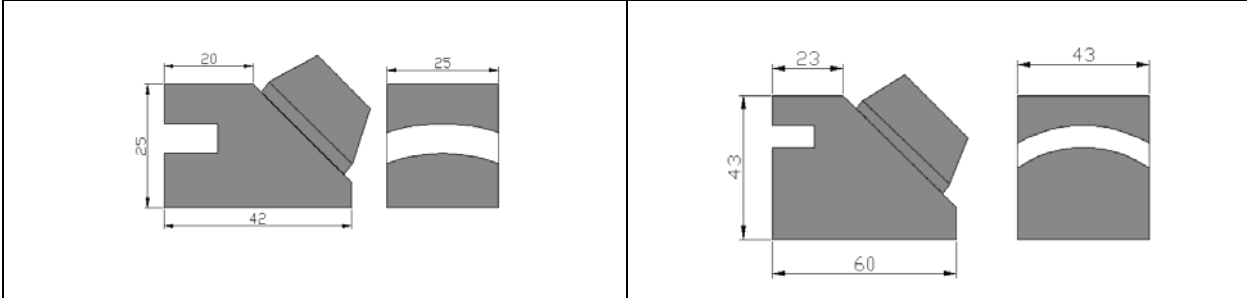
<p>Portable Transmitter</p> 	<p>Portable Case</p> 	
 <p>Transducer Type L</p>	 <p>Transducer Type S</p>	
 <p>Transducer Type M (Standard)</p>	 <p>Transducer Type K</p>	
 <p>S-S Belts</p>	 <p>Couplant</p>	 <p>Elastic Belts</p>



**Parts and Dimensions / Continuation**

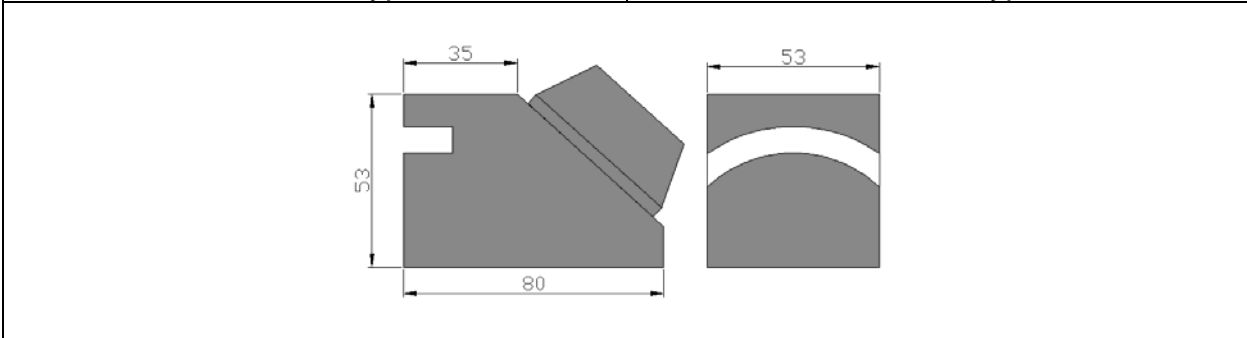


Portable Case Dimensions



Transducer Type S

Transducer Type M



Transducer Type L

## Wiring Terminals



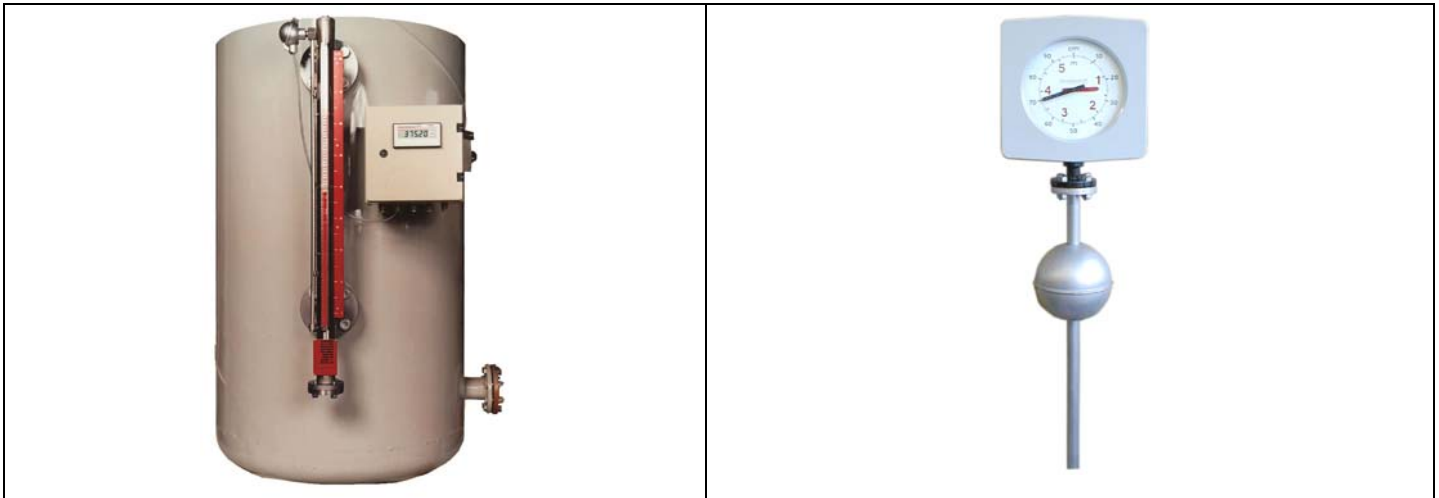
Besides the products covered by this brochure, Intra-Automation GmbH also manufactures other high-quality and high precision instruments for industrial measurement tasks. For more information, please contact us (contact details on the backside of this brochure).

### Flow Measurement



Itabar®-Flow-Sensor

### Level Measurement



ITA-mag. level gauges

MAGLINK level indicators

### Other measurement tasks:



DigiFlow Flow and Level Computers

IntraCont digital Controllers

IntraDigit digital indicators

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