



YEARS APATOR
POWOGAZ

Ultrasonic heat and cooling energy meters

INVONIC

Maksym Kijak

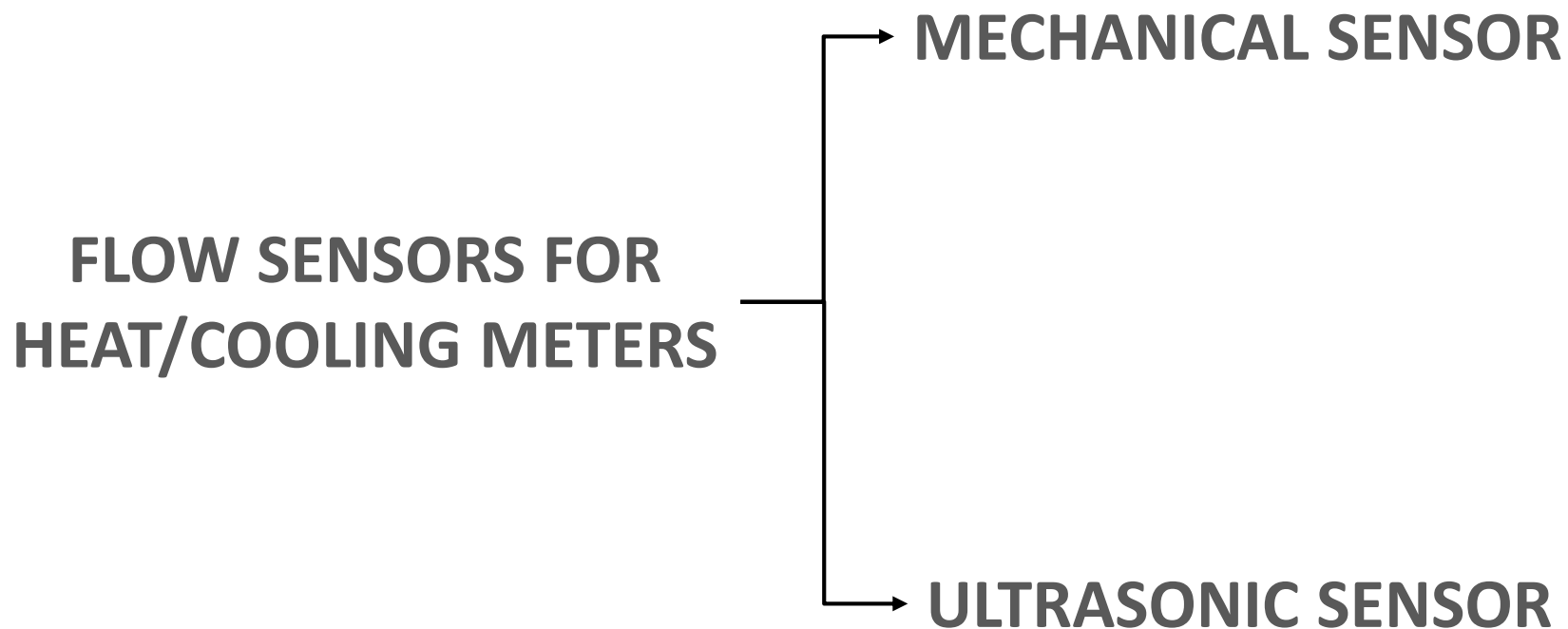
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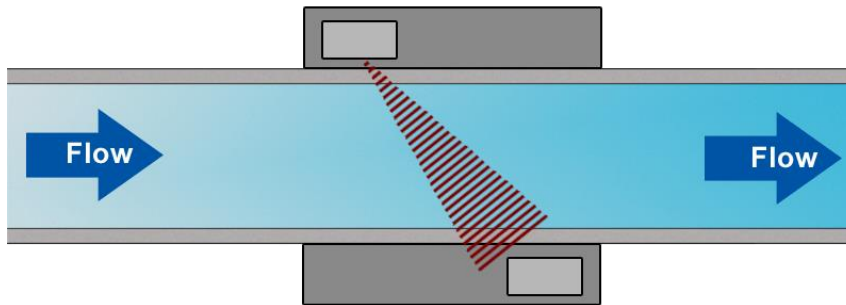
What is the difference between mechanical and ultrasonic heat/cooling meters?



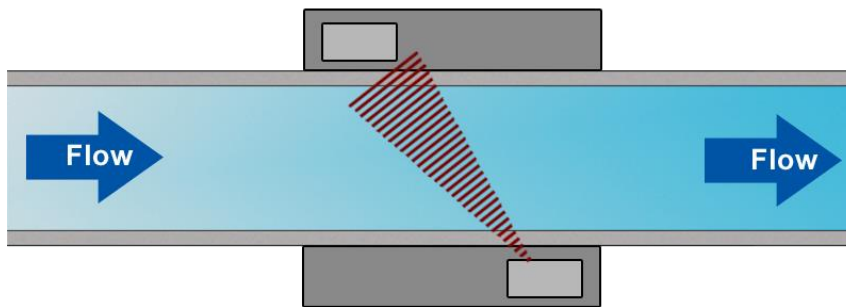
How transit-time ultrasonic flow sensor works?

TRANSIT-TIME ULTRASONIC FLOW SENSOR

Downstream transit time

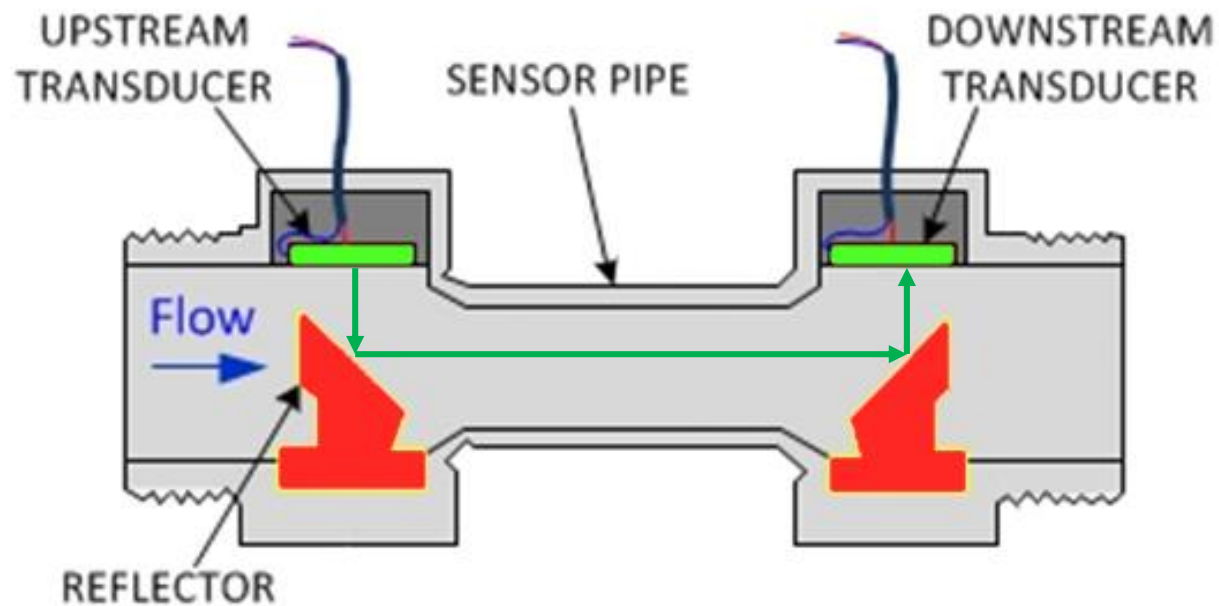


Difference in the transit time of ultrasonic pulses propagating towards and against flow direction is used for calculation of average velocity of the fluid along the path of the ultrasonic beam.





Upstream transit time

How transit-time ultrasonic flow sensor is built?



Pros and cons of ultrasonic heat and colling energy meters

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- No mechanical moving parts (low pressure drop and no wear & tear effect)
 - Accuracy does not degrade over time (unaffected by mineral deposits)
 - Same measuring precision in vertical and horizontal position
 - Measuring range up to 250 $\left(\frac{q_p}{q_i} = \frac{\text{permanent (nominal) flow-rate}}{\text{minimum flow rate}}\right)$
 - Tamper proof design (not affected by magnetic interference)
 - No requirements for straight pipeline in upstream and downstream direction
 - Lifetime of battery power supply up to 16 years

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- No measurement when air or solid particles in the pipe
 - The measurement part of pipeline must be always full during measurement

Compact ultrasonic heat/cooling meter

INVONIC H

INVONIC H

COMPACT ULTRASONIC HEAT/COOLING METER (DN15-50)



APPLICATION

INVONIC H is a modern and accurate meter for measuring consumption energy in heating and cooling* systems in residential, office and industrial facilities. Ultrasonic flow sensor, with brass housing, is key part of device that ensures high precision, dynamic and measurement stability of meter regardless of its mounting position (horizontal/vertical). Besides it ensures insensitivity of device to magnetic field. Information from the meter can be read remotely by wire (M-Bus, Modbus RTU, pulse/analog output) or wirelessly (Wireless M-Bus 868 Mhz), allowing cooperation of INVONIC H with different data reading systems and building automation.



KI. 2



Pt500



Compact ultrasonic heat/cooling meter

INVONIC H

PRODUCT FEATURES

- Capable to work with systems containing water or glycol-water solutions (ethylene / propylene glycol)
- Easy to read 8 digit display, with symbols indicating operation state of meter, operated by a single button
- Rotatable by 180° calculator with wall-mount possibility (standard length of connecting cable 1,2 m)
- Power supply from 230 V AC, 12/24/48 V AC/DC or battery (battery lifetime up to 11 years)
- Built-in data logger capable of storing data from last 36 months for period of 15 years without power supply
- Integrated pulse outputs for energy and volume or two pulse inputs for water meters
- Possibility to mount communication modules without compromising manufacturer protecting seals

REMOVABLE COMMUNICATION MODULES

- M-Bus
- Wireless M-Bus (868 Mhz)
- Modbus RTU (RS485)
- analog current loop



Compact ultrasonic heat/cooling meter

INVONIC H

q_p [m ³ /h]	q_s [m ³ /h]	Measuring range (q_p/q_i)	DN [mm]	Length [mm]	Pressure loss at q_p [kPa]	Connection	Weight [kg]	Other parameters
0,6	1,2	100	15	110	7,0	G $\frac{3}{4}$	0,8	temperature range of medium: 5...105/130 °C** nominal pressure: PN16/PN25* protection class: IP65/IP67* energy units: GJ (kWh, MWh, Gcal)*
			20	190	0,9	G1/flange	1,1/2,9	
1,0	15		110	11,3	G $\frac{3}{4}$	0,8		
	20		190	2,5	G1/flange	1,1/2,9		
1,5	3,0	100/250*	15	110	17,1	G $\frac{3}{4}$	0,8	
			20	130/190	7,2/5,8	G1	0,9/1,1	
2,5	20		190	5,8	flange	2,9		
	20		130/190	19,8/9,4	G1	0,9/1,1		
3,5	7,0	100	25	260	4	G1 $\frac{1}{4}$	3,6	
						flange	6,1	
6,0	12,0	100/250*	25	260	10	G1 $\frac{1}{4}$	3,6	
						flange	6,1	
10,0	20,0		40	300	18	G2	7,2	
						flange	8,4	
15,0	30,0		50	270	12	flange	8,5	

*) option

**) maximum temperature depends from the selected temperature sensors, minimum temperature concerns only type approval (flow meter measure starting from 0,1 °C)



Compact ultrasonic heat/cooling meter

INVONIC H



Type		TOPE 41	TOPE 42	TOP 1068
Resistance cable temperature sensors				
Temperature range	°C	0...150	0...105	0...150
Temperature difference range	°C	3...150	3...105	3...150
Measuring resistor	–	Pt100 or Pt500		
Max working pressure	MPa	1,6	1,6	1,6
Immersion length	mm	28	28	42...160
Sensor cover material	–	1H18N9T	1H18N9T	M63
Mounting cover material	–	–	–	M63 or 1H18N9T
Cable	–	straight, cord	spiral	straight, cord
Cable isolation	–	silicone	polyurethane	silicone
Cable length	Pt100	1...3 m, every 0,5 m*	2 m	1...3 m, every 0,5 m**
	Pt500	1...15 m, every 1 m*	2 m	1...15 m, every 1 m**
Approval	–	GUM, MID	GUM, MID	GUM, MID
Mounting	–	on T-pipes	on T-pipes	in mounting covers

*) standard 2 m

**) standard 3 m



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THANK YOU

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