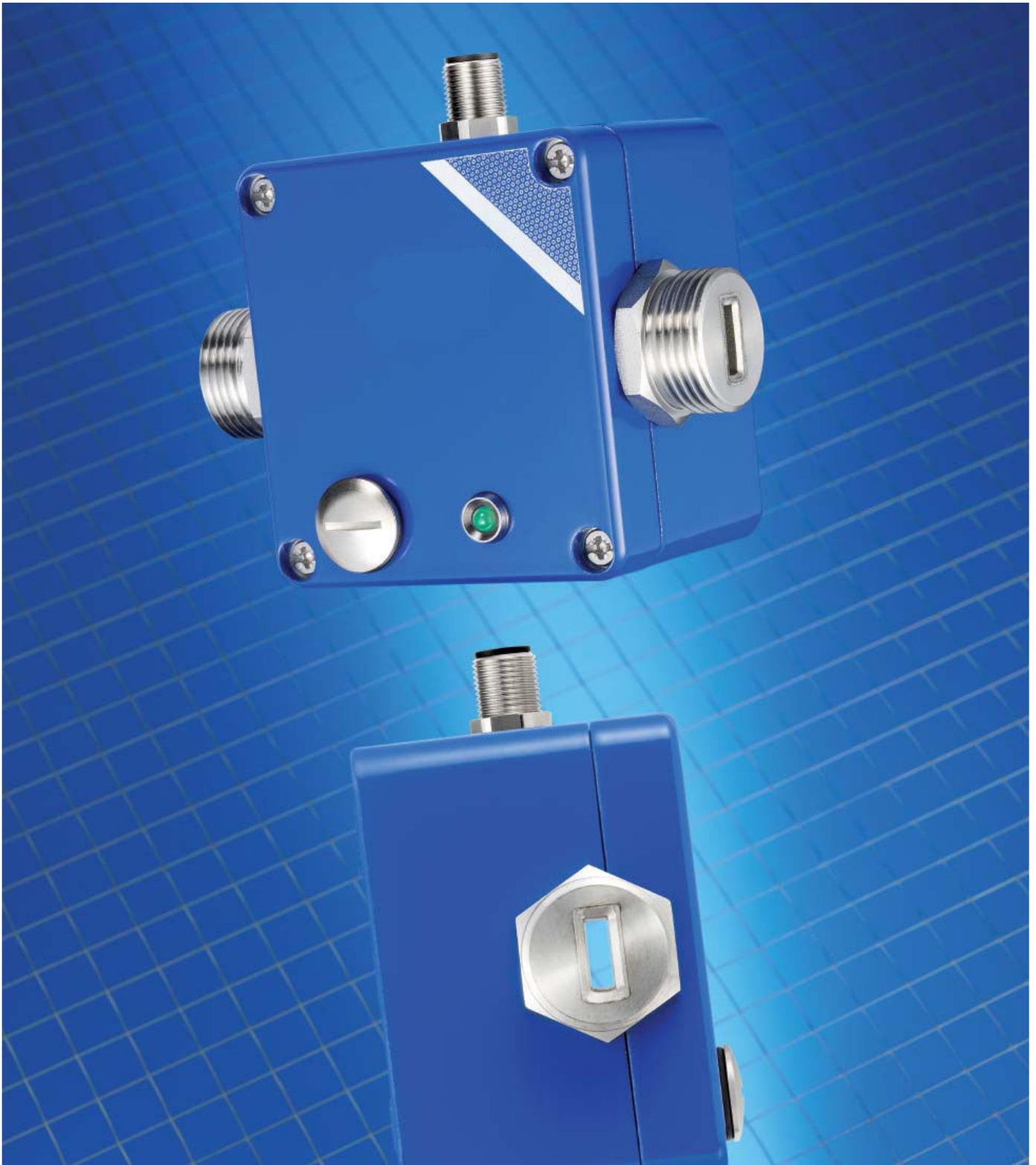


Ultrasonic Flow Sensors

VUS Series



Ultrasonic Flow Sensors, VUS Series

Just a straight pipe

Flow measurement without moving parts

The VUS is a solid state flow sensor. The medium just flows through a straight stainless steel pipe. Nothing extends into a measuring pipe. The ultrasonic transducers are positioned on the outer surface of the pipe and therefore not in contact with the medium.

Exceptional features:

- No moving parts
- Only one wetted material, chemically resistant (stainless steel)
- No mechanical wear
- Three output signals
 - frequency output
 - analog output 4...20 mA
 - alarm output
- Independent of pipe and installation position
- Suitable for electrically non-conductive liquids, e. g. DI water
- Fast response
- Air detection
- Insensitive against pressure peaks and particles in the medium because of protected transducers
- Customised set-up on request



Typical application areas

The VUS is the ideal flow sensor for interference free operation combined with a long-life cycle.

VUS can be used in areas where flow sensors with moving parts cannot be applied, e. g. paddle wheel sensors.

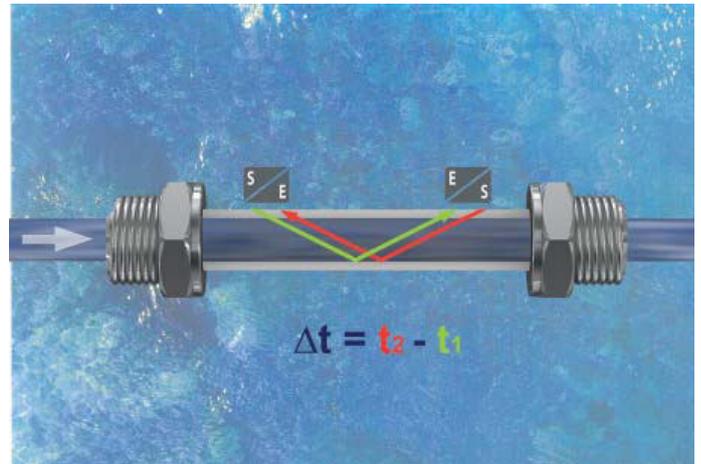
The wide independence to the inlet and outlet pipes creates the advantage to be able to install the sensor even in compact machines with cramped confines.

Operational principle

Ultrasonic flow metering is a method to measure flow rates without any moving parts.

The VUS operates on the transit time principle: Two ultrasonic transducers are positioned on the outer surface of the measuring pipe. These transducers are used alternately as transmitter (S) and receiver (E). Thus the sonic signal is transmitted in the flow direction (→) and reverse to the flow direction (←).

The difference of both transit times (Δt) is proportional to the average flow velocity.

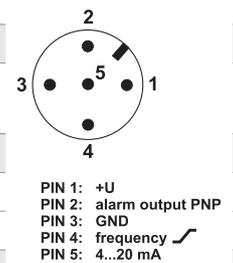


Materials

Process connections	Stainless steel 1.4404
Measuring pipe	Stainless steel 1.4404
Housing	Aluminium casting

Technical data

Measurement range	1,5...30 l/min	
Accuracy*	3...30 l/min ±4 % of reading 1,5...3 l/min ±8 % of reading	
Signal output starting from	1 l/min	
Max. flow rate	33 l/min	
Repeatability	1 %	
Medium	Water and aqueous solutions	
Medium temperature	5...60 °C	
Ambient temperature	5...60 °C	
Nominal pressure	PN16	
Diameter	DN 10	
Process connection	1/2" BSP male thread or 3/4" BSP male thread	
Flow indication / alarm indication	LED green / red	
Output signals		
Frequency output signal		
• Pulse rate	855 pulses/l (factory setting in the range of 1...3.000 pulses/l)	
• Signal shape	Square wave signal NPN or PNP open collector (factory setting)	
• Signal current	max. 100 mA, short-circuit-proof	
• Max. pull-up voltage	30 VDC	
Analog output signal	4...20 mA acc. NAMUR NE43, max. burden = $\frac{40 - 15 \text{ V}}{250 \text{ mA}}$	
• Flow or	0...30 l/min, others on request or	
• Temperature	0...60 °C, others on request (accuracy ±0,5 K)	
Alarm output signal	- Alarm in case of lack of flow or air in the pipe - PNP open collector, max. 100 mA short-circuit-proof - 16 different set points selectable with rotary switch	
Electrical data		
Electrical connection	5 pin plug connector M12x1	
Power supply	10...30 VDC	
Current consumption	Max. 80 mA	
Electrical protection measures	Short-circuit proof (up to 30 V) and polarity protection (up to -30 V)	
Protection class	IP 54	



* Water 30 °C

Order code

		Order no.		
Frequency output signal	PNP open collector NPN open collector	VU13VP VU13VN		
Analog output signal	flow 0...30 l/min temperature 0...60 °C		A1AAAA A1AAA1	
Process connection	1/2" BSP male thread 3/4" BSP male thread			510 520

Accessory

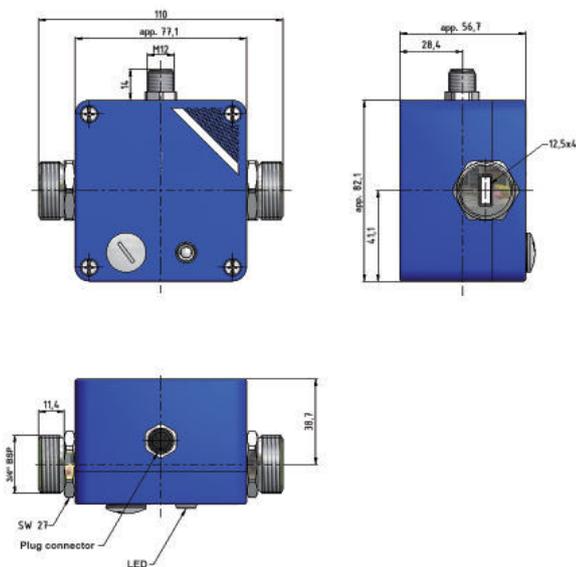
Accessory part	Length	Order code	
Connection cable with 5 pin cable socket	3 m	XVUS055	
M12x1, angle type molded cable, sheathing material PUR, screened, ($T_{max} = 80\text{ °C}$)	5 m	XVUS057	
	10 m	XVUS058	
5 pin cable socket M12x1 angle type unassembled		XVUS056	

Set point table for the alarm output



Switch position	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Set point decreasing flow (l/min)	2	3	4	5	6	7	8	9	10	12	14	16	18	20	22	24
Set point increasing flow	0,5 l/min above the set point decreasing flow															

Dimensions



Pressure drop

