

USH-9

Ultrasonic level sensor



Continuous snow depth and water-level measurements are very important in avalanche risk forecast and water resource management .

The USH-9 is a continuous measurement device for the contact-free determination of snow depth and water level. It measures the transit time of an ultrasonic signal between a variable surface and the USH-9 sensor, and translates it to a snow or water level. An integrated processor compensates the detected signal for temperature and filters interfering reflections of precipitation within the measurement path.

The USH-9 sensor contains an additional feature to sense precipitation and to discriminate snow from rain. This offers the option to detect the settling of snow, used for example in road weather monitoring systems.

Versions

Art	Version
21069	USH-9 standard version including sensor mount (Art 21068), sensor cable (Art 20789) and USB to RS-485 converter cable (Art 21150)

Scope of delivery

Qty	Name
1	USH-9 sensor including sensor mount, sensor cable 10 m and RS-485 to USB converter
1	Manual and Commander Software on USB stick
1	Commander support software

Accessories

Art	Accessories
20789	MAIN sensor cable SQ/USH-9, 10 m
20791	20791 MAIN sensor cable SQ/USH-9, 20 m
19294	USB to RS485 embedded converter cable, 1.8 m

Modbus converters (PROFIBUS, CANOpen, PROFINET, Ether-Cat) are available on request.

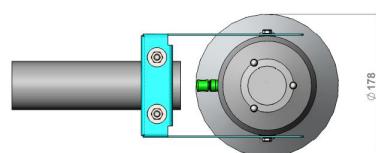
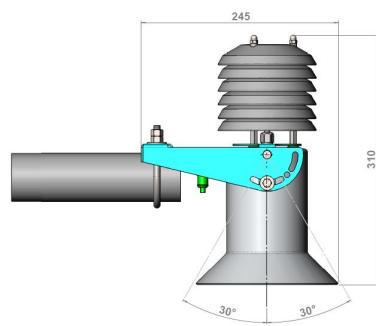
Specifications

Snow depth measurement	
Measurement range	0...10 m
Near blanking distance	0.7 m
Accuracy	max. ± 1 cm; typically 0.1% FS
Accuracy at 2.5 m	$\pm \leq 0.4\%$ of range
Resolution	1 mm
Non-linearity	$\leq 0.15\%$
System	55 s ¹
Response time	
Measurement duration	2...20 s
Measurement interval	20 s...3 h
Measurement principle	Ultrasonic (frequency 50 kHz)
Beam aperture	12°

Temperature measurement	
Temperature sensor	Pt1000 with radiation shield
Measurement range	-41...60 °C (-42...140 °F)
Accuracy	0.3 °C
Resolution	0.01 °C

¹ Cold-start-time

Power	
Power supply	9...28 VDC; Reverse voltage protection, overvoltage protection
Power consumption at 12 VDC	Sleep mode: <0.4 mA Active measurement: typically 40 mA (max. 300 mA for 0.05 s)



Interfaces	
Serial	RS-485 ASCII / Modbus RTU SDI-12
Analog	2 Analog outputs 4...20 mA (14 bit, max. load 250 Ω)

Physical and environmental	
Operating temperature	-41...60 °C (-42...140 °F)
Storage temperature	-41...60 °C (-42...140 °F)
Environmental humidity	0...100 %rH
Protection rating	Housing and cable connectors: IP66, Ultrasonic head: IP68
Lightning protection	Integrated protection against indirect lightning with a discharge capacity of 0.6 kV peak
Housing material	Anodized aluminium
Mounting bracket	Ø32...60 mm
Size Ø x H	Ø180 x 320 mm
Weight	1.2 kg

Maintenance	
Interval	≥ 36 months ¹

¹ Interval if the data is well, see [Maintenance](#) for details