



OIML Member State
Czech Republic

OIML Certificate No.
R49/2013-A-CZ1-25.07

OIML CERTIFICATE ISSUED UNDER SCHEME A

OIML Issuing Authority

Name: Czech Metrology Institute
Address: Okružní 31, 638 00 Brno, Czech Republic

Person responsible: Jan Kalandra

Applicant

Name: Sensus GmbH Hannover
Address: Meineckestrasse 10, 30880 Laatzen, Germany

Manufacturer

Name: Sensus GmbH Hannover
Address: Meineckestrasse 10, 30880 Laatzen, Germany

Identification of the certified type *(the detailed characteristics will be defined in the additional pages)*

water meter - ultrasonic
Cordonel

Designation of the module *(if applicable)*

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This OIML Certificate attests the conformity of the above identified type (represented by the sample(s) identified in the OIML type evaluation report) with the requirements of the following Recommendation of the International Organization of Legal Metrology (OIML):

OIML R 49

Edition (year): 2013

For accuracy class (if applicable): 2

This OIML Certificate relates only to metrological and technical characteristics of the type of measuring instrument covered by the relevant OIML Recommendation identified above.

This OIML Certificate does not bestow any form of legal international approval.

The conformity was established by the results of tests and examinations provided in the associated OIML type evaluation report:

No. 0511-ER-V033-24 dated 23 October 2025 that includes 47 pages including annex 1

OIML test report No. 6015-PT-P0035-25 that includes 206 pages including annexes

Software validation test report No. 6011-PT-SW028-25 that includes 10 pages including annex 1

EMC OIML test report No. 8551-PT-E0212-24 that includes 10 pages including annex 1

The technical documentation relating to the identified type is contained in documentation file:

0511-UL-V033-24

OIML Certificate History

Revision No.	Date	Description of the modification
-	29 October 2025	Issuing certificate

The OIML Issuing Authority

RNDr. Pavel Klenovský

Head of Certification Body

Date: 29 October 2025



Important note: Apart from the mention of the Certificate's reference number and the name of the OIML Member State in which the Certificate is issued, partial quotation of the Certificate and of the associated OIML type evaluation report(s) is not permitted, although either may be reproduced in full.

Measuring system description

The water meters type Cordonel are designed to measure, memorise and display the volume at metering conditions of water passing through the measurement transducer.

The water meter type Cordonel is a battery powered ultrasonic water meter. It works on the ultrasonic time-of-flight principle. The meter has three transducer pairs.

The meter comprises a body with two pipe-shaped flanged end connections. The body has 6 openings for mounting the ultrasonic transducers, as well as an opening for mounting an optional pressure sensor. In the area of the measuring section, the channel of measurement is constricted. Body and measuring section are of symmetrical construction which allows a bi-directional measurement with the same accuracy.

The ultrasonic transducers are internally flush mounted with the measuring tube surface in one plane. On the opposite side of the measuring tube a reflector is located

With DN 50 to DN 125 the flow channel has a hexagonal cross-section and the ultrasonic measuring paths are arranged at a 120° angle to each other to cover the whole flow section.

With DN 150 the flow channel has a rectangular cross-section and the ultrasonic measuring paths are arranged parallel, distributed over the long wing to cover the whole flow section.

The meter electronics is fixed in a register casing, which is waterproof IP68. The meter electronics calculates two times per second the transit time difference of the signals sent with and against the flow direction. The volume-integration is effected by taking the invariable cross section and corrective calculations into account.

The consumption value is shown permanently on a 9-digit, 7-segment LC display. Display resolution in standard mode is 000000,001 m³ with DN 50 to 125 and 0000000,01 m³ with DN 150. Display resolution in standard mode is 000,000001 m³ with DN 50 to 125 and 0000,00001 m³ with DN 150.

The water meters type Cordonel can be installed to operate in horizontal and vertical position.

The water meters type Cordonel are designed to measure reverse flow.

Marking and inscriptions

The water meters types type Cordonel shall be clearly and indelibly marked with the following information:

- Unit of measurement (m³)
- Numerical value Q₃ in m³/h (Q₃ ×.×) and the ratio Q₃ / Q
- OIML certificate of conformity number or/and type approval sign according to national regulations
- Name of trademark of the manufacturer
- Year of manufacture, two last digits of the year of manufacture, or the month and year of manufacture
- Serial number (as near as possible to the indicating device)
- Direction of flow, by means of an arrow (shown on both sides of the body or on one side only provided the direction of flow arrow is easily visible under all circumstances)
- Maximum admissible pressure (MAP ××)
- Letter V and/or H (vertical position and/or horizontal position with the indication device positioned on the top)
- The temperature class (T××)
- The pressure loss class (Δp ××)
- The installation sensitivity class (U× D×)
- The latest date by which the meter shall be replaced (non- replaceable battery)

These markings shall comply with the requirements of OIML R 49 and shall be visible without dismantling the water meter after the instrument has been placed on the market or put into use.

The following classification and electromagnetic class may be given on a meter or on a separate datasheet, unambiguously related to the meter by a unique identification.

- Environmental classification
- Electromagnetic environmental class

Characteristics

Manufacturer:	Sensus GmbH Hannover					
Model name:	Cordonel					
Nominal diameter:	50	65	80	100	125	150
Type details:						
Q_1 [m³/h]:	flowrates are shown in Table <i>Basic metrological data (flowrates)</i>					
Q_2 [m³/h]:						
Q_3 [m³/h]:						
Q_4 [m³/h]:						
Q_3/Q_1 :	≤ 1000					
Q_2/Q_1 :	1.6					
Q_4/Q_3 :	1.25					
Measuring principle:	ultrasonic					
Accuracy class:	2					
Temperature class:	T50					
Water pressure class:	MAP16					
Pressure loss class:	Δp_{16}					
Reverse flow:	designed to measure					
Environmental class:	B, O, M					
Electromagnetic environment: ¹	E1; E2					
Temperature range ambient:	-25 °C / 70 °C					
Maximum admissible temperature [°C]:	50					
Maximum admissible pressure [MPa]:	1.6					
Orientation limitation:	horizontal position with the indicating device positioned at the top vertical position flow from bottom to top with the indicating device positioned at the side vertical position flow from top to bottom with the indicating device positioned at the side					
Indicating range – testing mode/user mode [m³]:	999.999999/999999.999					9999.99999/999999.99
Resolution of the indicating device testing mode/user mode [m³]:	000.000001/000000.001					0000.00001/000000.01
Resolution of the device for rapid testing – testing mode/user mode [dm³/pulse]:	0.01, 0.1/1, 10, 100, 1000					0.1, 1/10, 100, 1000
EUT testing requirements (OIML R 49-2:2024, 8.1.8):						
Category:	Ultrasonic water meters					
Case:	B					

Installation details:						
Connection type (screw thread):	flanges					
Minimum straight length of inlet pipe [mm]:	0					
Minimum straight length of outlet pipe [mm]:	0					
Flow profile sensitivity class:	U0D0					
Flow conditioner (details if required):	No					
Mounting:	-					
Orientation:	horizontal position with the indicating device positioned at the top vertical position flow from bottom to top with the indicating device positioned at the side vertical position flow from top to bottom with the indicating device positioned at the side					
Other relevant information:	To refer to manual MB2000 and general test recommendation MB2010					
Length [mm]:	200/270/ 300/311	200/300	200/225/ 300/350/ 413	250/350/ /483	250	300/500
Reed switch power supply ($U_{\max} / I_{\max}$):	-					
Reed switch K-factor (impulse / L):	-					
Installation details (electrical):						
Wiring instructions:	-					
Mounting arrangement:	-					
Orientation limitations:	-					
Power supply:						
Type (battery, mains AC, mains DC):	Non-replaceable battery					
$U_{\max}$ (V):	3.6V DC					
$U_{\min}$ (V):	3V DC					
Frequency:	-					
Minimum battery life time [years]:	20					
Software version (of legally relevant SW):	302					
CRC checksum (of legally relevant SW):	A3A6					
Ancillary devices (not certified):						
Reed sensor power supply ($U_{\max} / I_{\max}$):						
Type						
Power supply ($U_{\max} / I_{\max}$) ² :						
K-factor [pulse/Litres]:						
Reed sensor power supply ($U_{\max} / I_{\max}$):						
Further information specified by the manufacture (not certified)						
-	-					

ⁱ The ratio Q_3 / Q_1 shall be chosen according to paragraph 4.1.4 of OIML R 49-1:2024

Basic metrological data (flowrates)

Manufacturer:		Sensus GmbH Hannover		
Model number:		Cordonel		
Nominal diameter:		50		
Type details:				
Q_3/Q_1	Q_4 (m³/h)	Q_3 (m³/h)	Q_2 (m³/h)	Q_1 (m³/h)
40	50	40	1.600	1.000
50	50	40	1.280	0.800
63	50	40	1.016	0.635
80	50	40	0.800	0.500
100	50	40	0.640	0.400
125	50	40	0.512	0.320
160	50	40	0.400	0.250
200	50	40	0.320	0.200
250	50	40	0.256	0.160
315	50	40	0.203	0.127
400	50	40	0.160	0.100
500	50	40	0.128	0.080
630	50	40	0.102	0.064
800	50	40	0.080	0.050

Manufacturer:		Sensus GmbH Hannover		
Model number:		Cordonel		
Nominal diameter:		50		
Type details:				
Q_3/Q_1	Q_4 (m ³ /h)	Q_3 (m ³ /h)	Q_2 (m ³ /h)	Q_1 (m ³ /h)
40	31.25	25	1.000	0.625
50	31.25	25	0.800	0.500
63	31.25	25	0.635	0.397
80	31.25	25	0.500	0.313
100	31.25	25	0.400	0.250
125	31.25	25	0.320	0.200
160	31.25	25	0.250	0.156
200	31.25	25	0.200	0.125
250	31.25	25	0.160	0.100
315	31.25	25	0.127	0.079
400	31.25	25	0.100	0.063
500	31.25	25	0.080	0.050
630	31.25	25	0.064	0.040

Manufacturer:		Sensus GmbH Hannover		
Model number:		Cordonel		
Nominal diameter:		50		
Type details:				
Q_3/Q_1	Q_4 (m³/h)	Q_3 (m³/h)	Q_2 (m³/h)	Q_1 (m³/h)
40	20	16	0.640	0.400
50	20	16	0.512	0.320
63	20	16	0.406	0.254
80	20	16	0.320	0.200
100	20	16	0.256	0.160
125	20	16	0.205	0.128
160	20	16	0.160	0.100
200	20	16	0.128	0.080
250	20	16	0.102	0.064
315	20	16	0.081	0.051
400	20	16	0.064	0.040

Manufacturer:		Sensus GmbH Hannover		
Model number:		Cordonel		
Nominal diameter:		65		
Type details:				
Q_3/Q_1	Q_4 (m³/h)	Q_3 (m³/h)	Q_2 (m³/h)	Q_1 (m³/h)
40	78.75	63	2.250	1.575
50	78.75	63	2.016	1.260
63	78.75	63	1.600	1.000
80	78.75	63	1.260	0.788
100	78.75	63	1.008	0.630
125	78.75	63	0.806	0.504
160	78.75	63	0.394	0.630
200	78.75	63	0.504	0.315
250	78.75	63	0.403	0.252
315	78.75	63	0.320	0.200
400	78.75	63	0.252	0.158
500	78.75	63	0.126	0.202
630	78.75	63	0.100	0.160
800	78.75	63	0.126	0.079
1000	78.75	63	0.101	0.063

Manufacturer:		Sensus GmbH Hannover		
Model number:		Cordonel		
Nominal diameter:		65		
Type details:				
Q_3/Q_1	Q_4 (m³/h)	Q_3 (m³/h)	Q_2 (m³/h)	Q_1 (m³/h)
40	50	40	1.600	1.000
50	50	40	1.280	0.800
63	50	40	1.016	0.635

Manufacturer:		Sensus GmbH Hannover		
Model number:		Cordonel		
Nominal diameter:		65		
Type details:				
Q_3/Q_1	Q_4 (m³/h)	Q_3 (m³/h)	Q_2 (m³/h)	Q_1 (m³/h)
40	31.25	25	1.000	0.625
50	31.25	25	0.800	0.500
63	31.25	25	0.635	0.397

80	50	40	0.800	0.500
100	50	40	0.640	0.400
125	50	40	0.512	0.320
160	50	40	0.400	0.250
200	50	40	0.320	0.200
250	50	40	0.256	0.160
315	50	40	0.203	0.127
400	50	40	0.160	0.100
500	50	40	0.128	0.080
630	50	40	0.102	0.064

80	31.25	25	0.500	0.313
100	31.25	25	0.400	0.250
125	31.25	25	0.320	0.200
160	31.25	25	0.250	0.156
200	31.25	25	0.200	0.125
250	31.25	25	0.160	0.100
315	31.25	25	0.127	0.079
400	31.25	25	0.100	0.063

Manufacturer:		Sensus GmbH Hannover		
Model number:		Cordonel		
Nominal diameter:		80		
Type details:				
Q_3/Q_1	Q_4 (m³/h)	Q_3 (m³/h)	Q_2 (m³/h)	Q_1 (m³/h)
40	125	100	4.000	2.500
50	125	100	3.200	2.000
63	125	100	2.540	1.587
80	125	100	2.000	1.125
100	125	100	1.600	1.000
125	125	100	1.280	0.800
160	125	100	1.000	0.625
200	125	100	0.800	0.500
250	125	100	0.640	0.400
315	125	100	0.508	0.318
400	125	100	0.400	0.250
500	125	100	0.320	0.200
630	125	100	0.254	0.159
800	125	100	0.200	0.125
1000	125	100	0.160	0.100

Manufacturer:		Sensus GmbH Hannover		
Model number:		Cordonel		
Nominal diameter:		80		
Type details:				
Q_3/Q_1	Q_4 (m ³ /h)	Q_3 (m ³ /h)	Q_2 (m ³ /h)	Q_1 (m ³ /h)
40	78.75	63	2.250	1.575
50	78.75	63	2.016	1.260
63	78.75	63	1.600	1.000
80	78.75	63	1.260	0.788
100	78.75	63	1.008	0.630
125	78.75	63	0.806	0.504
160	78.75	63	0.394	0.630
200	78.75	63	0.504	0.315
250	78.75	63	0.403	0.252
315	78.75	63	0.320	0.200
400	78.75	63	0.252	0.158
500	78.75	63	0.126	0.202
630	78.75	63	0.100	0.160

Manufacturer:		Sensus GmbH Hannover		
Model number:		Cordonel		
Nominal diameter:		80		
Type details:				
Q_3/Q_1	Q_4 (m ³ /h)	Q_3 (m ³ /h)	Q_2 (m ³ /h)	Q_1 (m ³ /h)
40	50	40	1.600	1.000
50	50	40	1.280	0.800
63	50	40	1.016	0.635
80	50	40	0.800	0.500
100	50	40	0.640	0.400
125	50	40	0.512	0.320
160	50	40	0.400	0.250
200	50	40	0.320	0.200
250	50	40	0.256	0.160
315	50	40	0.203	0.127
400	50	40	0.160	0.100

Manufacturer:		Sensus GmbH Hannover		
Model number:		Cordonel		
Nominal diameter:		100		
Type details:				
Q_3/Q_1	Q_4 (m³/h)	Q_3 (m³/h)	Q_2 (m³/h)	Q_1 (m³/h)
40	200	160	6.400	4.000
50	200	160	5.120	3.200
63	200	160	4.064	2.540
80	200	160	3.200	2.000
100	200	160	2.560	1.600
125	200	160	2.048	1.280
160	200	160	1.600	1.000
200	200	160	1.280	0.800
250	200	160	1.024	0.640
315	200	160	0.813	0.508
400	200	160	0.640	0.400
500	200	160	0.512	0.320
630	200	160	0.406	0.254
800	200	160	0.320	0.200
1000	200	160	0.256	0.160

Manufacturer:		Sensus GmbH Hannover		
Model number:		Cordonel		
Nominal diameter:		100		
Type details:				
Q_3/Q_1	Q_4 (m³/h)	Q_3 (m³/h)	Q_2 (m³/h)	Q_1 (m³/h)
40	125	100	4.000	2.500
50	125	100	3.200	2.000
63	125	100	2.540	1.587
80	125	100	2.000	1.125
100	125	100	1.600	1.000
125	125	100	1.280	0.800
160	125	100	1.000	0.625
200	125	100	0.800	0.500
250	125	100	0.640	0.400
315	125	100	0.508	0.318
400	125	100	0.400	0.250
500	125	100	0.320	0.200
630	125	100	0.254	0.159

Manufacturer:		Sensus GmbH Hannover		
Model number:		Cordonel		
Nominal diameter:		125		
Type details:				
Q_3/Q_1	Q_4 (m³/h)	Q_3 (m³/h)	Q_2 (m³/h)	Q_1 (m³/h)
40	312.5	250	10.000	6.250
50	312.5	250	8.000	5.000
63	312.5	250	6.349	3.968
80	312.5	250	5.000	3.125
100	312.5	250	4.000	2.500
125	312.5	250	3.200	2.000
160	312.5	250	2.500	1.563
200	312.5	250	2.000	1.250
250	312.5	250	1.600	1.000
315	312.5	250	1.270	0.794
400	312.5	250	1.000	0.625
500	312.5	250	0.800	0.500
630	312.5	250	0.635	0.397
800	312.5	250	0.500	0.313
1000	312.5	250	0.400	0.250

Manufacturer:		Sensus GmbH Hannover		
Model number:		Cordonel		
Nominal diameter:		125		
Type details:				
Q_3/Q_1	Q_4 (m³/h)	Q_3 (m³/h)	Q_2 (m³/h)	Q_1 (m³/h)
40	200	160	6.400	4.000
50	200	160	5.120	3.200
63	200	160	4.064	2.540
80	200	160	3.200	2.000
100	200	160	2.560	1.600
125	200	160	2.048	1.280
160	200	160	1.600	1.000
200	200	160	1.280	0.800
250	200	160	1.024	0.640
315	200	160	0.813	0.508
400	200	160	0.640	0.400
500	200	160	0.512	0.320
630	200	160	0.406	0.254

Manufacturer:		Sensus GmbH Hannover		
Model number:		Cordonel		
Nominal diameter:		150		
Type details:				
Q_3/Q_1	Q_4 (m³/h)	Q_3 (m³/h)	Q_2 (m³/h)	Q_1 (m³/h)
40	500	400	16.000	10.000
50	500	400	12.800	8.000
63	500	400	10.159	6.349
80	500	400	8.000	5.000

Manufacturer:		Sensus GmbH Hannover		
Model number:		Cordonel		
Nominal diameter:		150		
Type details:				
Q_3/Q_1	Q_4 (m³/h)	Q_3 (m³/h)	Q_2 (m³/h)	Q_1 (m³/h)
40	312.5	250	10.000	6.250
50	312.5	250	8.000	5.000
63	312.5	250	6.349	3.968
80	312.5	250	5.000	3.125

100	500	400	6.400	4.000
125	500	400	5.120	3.200
160	500	400	4.000	2.500
200	500	400	3.200	2.000
250	500	400	2.560	1.600
315	500	400	2.032	1.270
400	500	400	1.600	1.000
500	500	400	1.280	0.800
630	500	400	1.016	0.635
800	500	400	0.800	0.500
1000	500	400	0.640	0.400

100	312.5	250	4.000	2.500
125	312.5	250	3.200	2.000
160	312.5	250	2.500	1.563
200	312.5	250	2.000	1.250
250	312.5	250	1.600	1.000
315	312.5	250	1.270	0.794
400	312.5	250	1.000	0.625
500	312.5	250	0.800	0.500
630	312.5	250	0.635	0.397

Remark: Flows Q_1 , Q_2 , Q_3 and Q_4 were calculate according to paragraph 10.1.3 of OIML R 49-2:2024

Securing components and verification marks

Mechanical sealing

DN 50 - DN 125

Two outer body shells, snap-fitted together, as well as a locking cap enclose the sensor parts, the metering electronic parts and the display and protect them against manipulative tampering. The locking cap, together with the register below, is snap-fitted in such a manner that willful opening is only possible by force leaving visible traces.

The marking affixed on the locking cap (metrological marking as well as meter data) are permanent through laser edging.

Version DN 150

The register adaptor is screwed by means of four screw connectors into the cover flange and secured by sealing plugs against unauthorized opening. The locking cap, together with the register below, is snap-fitted in such a manner that willful opening is only possible by force leaving visible traces. The complete assembly is screwed by means of four screws onto the meter body and sealed by means of a security seal.

Electronic sealing

After completion of manufacture and configuration, the instrument is electronically closed by a defined bit pattern. Afterwards any modifications of the metrologically relevant parameters and values are no longer possible.



Figure 1 Ultrasonic water meter CordoneL DN50 to DN150

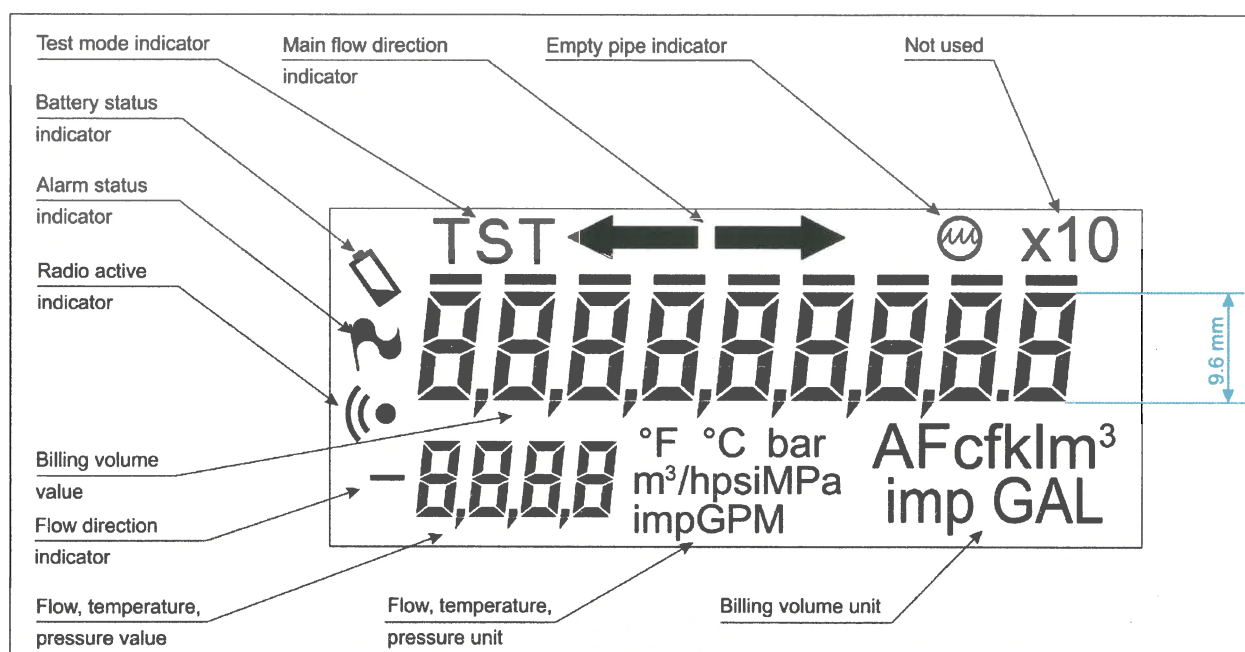


Figure 2 Layout Display of ultrasonic water meter Cordonel DN50 to DN150