

**OIML Member State**  
The Netherlands

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Project number 2230361  
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Issuing authority  
Person responsible: NMI Certin B.V.  
C. Oosterman

Applicant and  
Manufacturer: KROHNE Altometer  
Kerkeplaat 12  
3313 LC Dordrecht  
The Netherlands

Identification of the  
certified type: A **measuring device**, intended to be used as a part of a measurement  
instrument  
Type: ALTOSONIC 5 UFC and UFC 5

Characteristics: See page 2 and further

This OIML Certificate is issued under scheme B

This 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):

**R 117-1 (2007)** "Dynamic measuring systems for liquids other than water"

Accuracy class: 0,3

This Certificate relates only to the metrological and technical characteristics of the type of measuring instrument covered by the relevant OIML International Recommendation identified above.  
This Certificate does not bestow any form of legal international approval.

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Issuing Authority: **NMI Certin B.V., OIML Issuing Authority NL1**  
18 October 2018

  
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The conformity was established by the results of tests and examinations provided in the associated report(s):

- No. NMI-13200516-01 dated 24 April 2015 that includes 60 pages;
- No. NMI-14200268-01 revision 1 dated 1 May 2015 that includes 63 pages.

### Characteristics of the measuring instrument

In Table 1 the general characteristics of the measuring instrument are presented.  
The construction of the measuring instrument is recorded in the Documentation folder no. T8548-3.

**Table 1 General characteristics**

Minimum – maximum flow rate	See table 2
Minimum measured quantity	See table 2
Accuracy class	0,3
Environmental classes	M2 / E2
Ambient temperature range	-25 / +55 °C
Intended for the measurement of	See table 3 for the measurement sensor.
Software Identification	See table 6 for the measurement transducer.

The complete family of meter consists of one family (which are of similar construction) and have the following flow characteristics indicated in table 2.

**Table 2 General characteristics of the family of instruments**

Meter size	DN100	DN150	DN200	DN250	DN300
Minimum flow rate [m <sup>3</sup> /h]	10	12	60	60	60
Maximum flow rate [m <sup>3</sup> /h]	375	750	1750	2250	3125
MMQ [m <sup>3</sup> ]	1	2	5	5	5
Minimum Reynolds number	23	19	70	56	46
Diameter in/outlet [mm]	100	150	200	250	300

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Meter size	DN350	DN400	DN450	DN500	DN600
Minimum flow rate [m <sup>3</sup> /h]	60	150	150	150	150
Maximum flow rate [m <sup>3</sup> /h]	3750	4500	5800	7000	10000
MMQ [m <sup>3</sup> ]	5	5	5	5	10
Minimum Reynolds number	40	87	77	70	58
Diameter in/outlet [mm]	350	400	450	500	600

### Parts of the measurement instrument

The conformity of the following parts was established by the results of tests and examinations provided in the associated report(s):

Part: Measurement sensor (ultrasonic sensor)  
 Producer: KROHNE Altometer  
 Type: ALTOSONIC 5 UFS 5  
 Documentation folder: TC8722-1  
 Reports: No. NMI 13200516-01 dated 24 April 2015 that includes 60 pages.

**Table 3 General characteristics of the measurement sensor type ALTOSONIC 5 UFS 5**

Minimum – maximum flow rate	See table 2
Minimum measured quantity	See table 2
Maximum pressure	See table 2
Accuracy class	0,3
Environmental classes	M2 / E2
Ambient temperature range	-25 / +55 °C
Product temperature range	-200 / +250 °C
Intended for the measurement of	liquid petroleum and related products, liquids food and chemical products in liquid state, with viscosities between 0,1 mm <sup>2</sup> /s and 1500 mm <sup>2</sup> /s.
Number of sounds paths	8 (including 1 path for diagnostics)
Sound frequency	1 MHz; 2 MHz
Path angle	45° ± 10°

The ultrasonic transmitters/receivers are available in four versions and each version has a standard and a high pressure variant. Thus in total there are eight possible transducers.

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**Table 4 Characteristics of the ultrasonic transmitters/recievers of the measurement sensor type ALTOSONIC 5 UFS 5**

Version	Name	Tmin [°C]	Tmax [°C]	Pmax [bar(g)]	Max Visc [cSt]
Standard (STD)	UFS 5-R-EX	- 40	+ 120	160	150
Low Temperature (LT)	UFS 5-R-LT-Ex	- 200	+ 120	160	150
High Temperature (HT)	UFS 5-R-HT-Ex	- 40	+ 250	135	150
High Viscosity (HV)	UFS 5-R-HV-Ex	- 40	+ 120	160	1500

Note: The maximum pressure for the specific application depends on the used type of transducer and flange size.

Part: Measurement transducer (flow converter)  
 Producer: KROHNE Altometer  
 Type: UFC 5  
 Documentation folder: TC8548-3  
 Reports: No. NMI-14200268-01 rev 1 dated 01 May 2015 that includes 63 pages

**Table 5 General characteristics of the measurement transducer type UFC 5**

Accuracy class	0,3
Environmental classes	M3 / E2
Ambient temperature range	-40 / +55 °C
Power supply voltage	24 V DC

The measurement transducer UFC 5 drives and receives the transducers for a connected measuring sensor type ALTOSONIC 5 UFS 5, make KROHNE Altometer.

The transit times of both sound signals (upstream and downstream) are measured. From the time difference between the two transit times, the velocity of the liquid is determined. The values are transmitted with frequency output, serial KROHNE protocol using RS485 communication over MODBUS or over TCP/IP, to other instruments, for instance a calculating and indicating device.

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**Table 6 Software versions of the measurement transducer type UFC 5**

- Software versions: Model dependent

**ALTOSONIC 5 + UFC 5**

Product Version		Main App		DSP2	
version	CRC	version	CRC	version	CRC
05.1.2.3	1A30E4CA	05.2.7.3	42AA78B3	05.01.02.01	4332D367
05.1.3.0	2A7C0E34	05.2.8.0	587FB6F3	05.01.03.00	798AAE80
05.1.3.1	3E58AF51	05.2.8.1	025BD1DF	05.01.03.00	798AAE80
05.1.4.3	12FE819C	05.2.9.3	9C9F0983	05.01.04.03	AE055613

Note: Main App is the main application with file name AS5\_MCD.exe.

- Software versions: Platform dependent

FPGA		APB		UFX	
version	CRC	version	CRC	version	CRC
00.01.00.05	C3270EB1	00.01.02.00	63B06DA0	00.01.02.00	611D09A0
00.01.00.06	7312BC17	00.01.03.00	3342FCD7	00.01.03.00	B7049537
		00.01.03.01	7B2C024A	00.01.03.01	1730613C
00.01.00.07	61B7FC46	00.01.04.01	A6B9CB4B	00.01.04.01	583E33EA

The Product Version CRC checksum is calculated over all used parts: Main App, DSP2, FPGA, APB, UFX. So by checking the CRC checksum of the Product Version a check is performed that all used parts are correct for the released product version.

The software versions and checksums can be visualized by means of a program called MCD tool, in the "Object tree details" under the chapter 1.3 "Approvals". The MCD tool is available from the manufacturer.