

OIML Member State
The Netherlands

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Project number 3568185
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Identification of the certified type An **electronic calculating device** intended to be used as a part of a dynamic measuring system for liquids other than water.

Type: NANO or NANO flow computer

Characteristics See following page(s)

This OIML Certificate is issued under scheme A.

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: 2019 "Dynamic measuring systems for liquids other than water"

Accuracy class 0,3 / 0,5 / 1,0 / 1,5

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**
12 September 2022

Certification Board

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The conformity was established by the results of tests and examinations provided in the associated reports:

- No. NMI-2502312-01 dated 8 March 2021 that includes 45 pages;
- No. NMI-2502312-02 dated 8 March 2021 that includes 34 pages;
- No. NMI-2607496-01 dated 19 July 2021 that includes 20 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. TC11943-1.

Table 1 General characteristics

Environmental classes	M1 / E2 / H1
Ambient temperature range	- 25 °C ... + 55 °C Non-condensing humidity
Power supply voltage	24 -32 V DC with use of P578 Energy Store If the P578 Energy Store is not used a redundant/back-up power supply should be used
Approved inputs	<ul style="list-style-type: none"> - 2 x frequency/pulse input (configurable as dual pulse 90° phase shift) - 2 x Temperature input (RTD); - 6 x Analog inputs configurable for <ul style="list-style-type: none"> • Current input (4...20 mA); • Voltage input (1...5 V); - 1 x RS232 Serial communication port with shielded cable; - 2 x RS422 Serial communication ports with shielded cable; - 1 x Galvanic isolated, RS485 Serial communication port; - Ethernet communication with shielded cable.
Approved outputs	<ul style="list-style-type: none"> - Serial communication with shielded cable; - Ethernet communication with shielded cable.

<p>Approved conversion calculations</p>	<p>API Manual of Petroleum Measurements Standards, Chapter 11, Physical Properties Data, Section 1 (also known as ASTM D1250-07) tables 53A, 53B, 53D, 54A, 54B, 54D, 54C, 59A, 59B, 59D, 60A, 60B, 60D and 60C.</p> <p>API Manual of Petroleum Measurements Standards, Chapter 11, Physical Properties Data, Section 2 Part 4 (also known as ASTM/GPA TP-27) tables 53E and 54E.</p> <p>API Manual of Petroleum Measurements Standards, Chapter 11.2.2M (pressure correction).</p> <p>GPA TP-15:2003 (Calculation of Vapour Pressure for NGL).</p> <p>OIML R22 International Alcoholometric tables (Alcohol concentration density calculations).</p>
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Table 2 Software identification of the electronic calculating and indicating device type NANO or NANO flow computer

Software part	CRC Checksum	Remark
Totaliser	281ee714633b1e8d5d6623bb61936774	Totaliser block takes the calculated increments from the Liquid Flow Handler block and integrates these into check-summed totals and remainders, maintaining very high resolution over a wide number range.
Liquid Flow Handler	ecd270d90c5863c3e1c7589fc72d8ba8	Liquid Flow Handler generates the high-resolution increments once corrections are applied to the pulse input stream. The block also calculate instantaneous corrected flow rate values for indication purposes.
KF Linearisation	31802dcd1dc23e23af6345effcbbdde1	Multi point K-factor linearisation code block, that performs straight line interpolation between the points with clamped start and end values
API_Ch11-1_2012	d22d623940f6cd3d386a3f97f304310a	API Ch11.1 (2012) incorporating API Ch11.2.5

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Software part	CRC Checksum	Remark
		Temperature and Pressure Volume Correction Factors for Generalized Crude Oils, Refined Products, and Lubricating Oils
API_Ch11-2-5_2007	b93fe392eacc567d368bfbea9aab40fe	API Ch11.2.5, GPA TP-15 (2007) Simplified Vapor Pressure Correlation for Commercial NGLs
API_Ch11-2-4_2019	ed8159c9433b793c16fc1a40b5372ef0	API Ch11.2.4, GPA 8217 (2019) (formally TP-27) incorporating API Ch11.2.2M Temperature Correction for the Volume of NGL and LPG Tables, 53E, 54E, 59E and 60E Pressure correction provided by API Ch11.2.2M
API_Ch11-2-2M_2017	39d2ff37492343e213c2ccccf40d82a65	API Ch11.2.2M (R2017) Compressibility Factors for Hydrocarbons: 350-637 Kilograms per Cubic Meter Density (15°C) and -46°C to 60°C Metering Temperature
OIML_R022	00794f1ee95633a66005927cb10ee9dd	OIML R022 International Alcoholometric Tables including the Bettin Spiewick ITS90 calculation

The metrological software version can be checked via the "System information" page of the build-in webserver.

Certificate history:

This revision replaces the previous version.

Revision	Date	Description of the modification
0	12 September 2022	Initial release