Evaluation Certificate

Number **TC11943** revision 2
Project number 3866765

Issued by NMi Certin B.V.

In accordance with
- WELMEC 8.8, 2017: Guide on the General and Administrative Aspects of the Voluntary System of Modular Evaluation of Measuring instruments
- OIML R117, 2019: Dynamic measuring systems for liquids other than water
- WELMEC 7.2, 2019: Software Guide

Producer
Newflow Ltd.
Unit 4B, 21 Cherry Farm Close
Malton Enterprise Park
Malton, North Yorkshire
YO17 6AW, United Kingdom

United Kingdom

Part
An **electronic calculating and indicating device** intended to be used as a part of an non- interruptible dynamic measuring systems for liquids other than water.

Producer mark or name	:	Newflow Ltd.
Type designation	:	NÅNO or NÅNO Flow Computer
Accuracy class	:	0.3

Further properties and test results are described in:
- Description TC11943 revision 2.
- Documentation folder TC11943-2.

Initially issued 8 March 2021

Remark
- This revision replaces the previous version(s), including its documentation folder.

Issuing Authority
NMi Certin B.V.
16 April 2026

Certification Board

NMi Certin B.V.
Thijsseweg 11
2629 JA Delft
The Netherlands
T +31 88 636 2332
certin@nmi.nl
www.nmi.nl

1 General information on the electronic calculating and indicating device

All properties of the electronic calculating and indicating device, whether mentioned or not, shall not be in conflict with the legislation.

This Evaluation Certificate is the positive result of the applied voluntary, modular approach, for a component of a measuring instrument, as described in WELMEC 8.8, 2017.

The complete measuring instrument must be covered by relevant metrological certification that is valid in the country where the instrument is put into use.

Example of the electronic calculating and indicating device

1.1 Essential parts

The electronic calculating and indicating device can be composed of the following parts:

Description	Documentation	Remarks
P511 Analog board	11943/0-01; 02; 03; 11943/2-13; 14;	-
P513 Main board with Power supply	11943/0-04; 05; 06; 11943/2-07; 08; 15	-
P514 CPU board	11943/0-07; 08; 09; 11943/2-09	-
P578 Energy Store	11943/0-10; 11; 12; 11943/2-03; 04; 05	Optional. See section 1.2.3.
Display board	11943/2-10; 11; 12;	Optional.

1.2 Essential characteristics

1.2.1 Temperature range ambient:
- -25 °C … +55 °C
- Humidity class H1: non-condensing temperature controlled enclosed location

1.2.2 Environment classes: M2 / E2

1.2.3 Power supply
The electronic calculating and indicating device is supplied by an external power supply of 24 – 32 V DC which shall be redundant or with emergency power supply. The emergency power shall be CE marked and comply with IEC 61000-4-5 and IEC61000-4-11, see documentation no. 11943/2-02 to ensure, during a failure of the principal power source, that all measuring functions are safeguarded.

1.2.4 Software specification (refer to WELMEC guide 7.2)
- Software type U.
- Risk Class C.
- Extension L, T, S, D and I-5 are applicable.
- The software is composed of calculation blocks, see documentation no. 11943/0-14 for a schematic overview of the calculation blocks. The approved modules are as follows:

Software versions	CRC Checksum	Remarks
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** Temperature and Pressure Volume Correction Factors for Generalized Crude Oils, Refined Products, and Lubricating Oils

Software versions	CRC Checksum	Remarks
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	39d2ff37492343e213c2cccf40d82a65	**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 v5	00794f1ee95633a66005927cb10ee9dd	**OIML R022** International Alcoholometric Tables including the Bettin Spiewick ITS90 calculation
OIML_R022 v7	c3d3a1e3a80c75f724c33e6912d4ac8b	**OIML R022** International Alcoholometric Tables including the Bettin Spiewick ITS90 calculation

The validity of the program and the parameters are continuously checked. If these checks fail, an alarm is generated. The metrological software is identified by the software version and/or checksum, which can be checked on the “System information page” of the build-in webserver.

1.2.5 Data communication

The following input(s) can be used for legally relevant data:
- 4 pulse inputs for frequency, periodic density and pulse counting;
  - Inputs can be used in pairs for Dual Pulse operation
  - maximum frequency is 10 kHz
- 2 temperature inputs (4 wire RTD)
- 6 analog inputs, configurable for pressure and temperature:
  - 4…20 mA analog current input;
  - 1…5 V analog voltage input.
- 9 digital inputs;
- Modbus RS232, RS422 or RS485 serial communication
- 2 ethernet ports

The following output(s) can be used for legally relevant data:
- Ethernet

- Modbus RS232, RS422 or RS485 serial communication

The following in- and outputs are present on electronic calculating and indicating device, but **cannot** be used for legally relevant data:
- 2 Analog outputs (4…20 mA);
- 6 digital outputs;
- 1 Alarm Relay;
- 2 pulse outputs;
- 1 bi-directional pulse bus;
- USB port;
- SD card port.

1.2.6 Legal software functions

The Weights and Measures part of the program that contains the test routines for memory, transmissions and calculation.
Other functions are for optional valve management, monitoring the nozzle-switches, managing and protection of the pump motors, monitoring and protection of the volume / mass impulses / data, registering of volume(s), check on communication between calculator and hydraulic controller, calibration procedure and setting of prices per unit.

1.2.7 Density input

- Density can be entered in the electronic calculating device through the approved legally relevant inputs mentioned in chapter 1.2.5.
- When the analogue signal is used for density input, the density input range can be scaled for a maximum span of 1150 kg/m^3 over the 4…20 mA or 1…5 V range.
- When the density input is used for legally relevant conversion calculations, the density input should be through a density meter covered by an Evaluation / Parts Certificate.

1.2.8 Temperature input

- Temperature can be entered in the electronic calculating device through the approved legally relevant inputs mentioned in chapter 1.2.5.
- When the analog signal is used for temperature input, the temperature input range can be scaled for a maximum span of 400 °C over the 4…20 mA or 1…5 V range.
- When the temperature input is used for legally relevant conversion calculations, the temperature input should be through a temperature transmitter covered by an Evaluation / Parts Certificate. This requirement is not applicable if the temperature input for the legally relevant conversion is through a 4 wire RTD.

1.2.9 Pressure input

- Pressure can be entered in the electronic calculating device through the approved legally relevant inputs mentioned in chapter 1.2.5.
- When the analog signal is used for Pressure input, the pressure input range can be scaled for a maximum span of 600 bar over the 4…20 mA or 1…5 V range.
- When the pressure input is used for legally relevant conversion calculations, the pressure input should be through a pressure transmitter covered by an Evaluation / Parts Certificate.

1.2.10 Conversions

The electronic calculating device can perform conversion calculations according to the following standards:
- API Manual of Petroleum Measurements Standards, Chapter 11, Physical Properties Data, Section 1 (also known as ASTM D1250-07) at reference conditions (0 kPa, 15 °C)
  - tables 53A and/or 54A (crude oil);
  - tables 53B and/or 54B (refined petroleum products);

  - table 54C (Special products);
  - tables 53D and/or 54D (lube oils).
- API Manual of Petroleum Measurements Standards, Chapter 11, Physical Properties Data, Section 1 (also known as ASTM D1250-07) at reference conditions (0 kPa, 20 °C)
  - tables 59A and/or 60A (crude oil);
  - tables 59B and/or 60B (refined petroleum products);
  - table 60C (Special products);
  - tables 59D and/or 60D (lube oils).
- 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/or 54E (NGL and LPG);
- API Manual of Petroleum Measurements Standards, Chapter 11.2.2M (pressure correction).
- GPA TP-15:2003 (Calculation of Vapour Pressure for NGL).
- OIML R22:1975 International Alcoholometric tables (Alcohol concentration density calculations).

1.3 Essential shapes

1.3.1 Inscriptions

On the electronic calculating and indicating device, clearly visible, at least the following is inscribed:

- Evaluation Certificate number **TC11943**.
- Name or trademark of the producer.
- Type designation.
- Serial number and year of manufacture.

See below for an example of the markings:

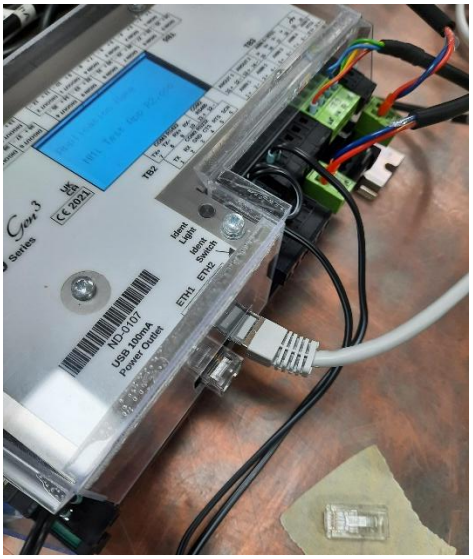
The markings must be clearly visible without removing any covers.

NMi Certificate:	TC11943
Producer:	Newflow Ltd
Type:	NÅNO Flow Computer
YOM:	2021
S/N	

1.4 Conditional parts

1.4.1 Housing

The housing of the electronic calculating and indicating device is made of plastic with a stainless-steal lid and covered by an protective closure. Unused ethernet ports shall be protected as well.



1.4.2 Display
Only the NÅNO 312 has a display however an external display must be used for indication in all versions. All displays screens are web browser based. The basic browser display indicates a single meter. The system can be configured for indication of multiple meters.

1.4.3 EMC measures
The following measure prevent significant EMC influence on the electronic calculating device:
- The ethernet, RS232, RS422 and RS485 cables are unshielded cables;
- Surge protection is required on RS232, RS422 and RS485 cables if longer than 10m in the field, see documentation no. 11943/2-01.

1.4.4 Grounding
Example of grounding, see documentation no. 11943/2-01.

1.5 Conditional characteristics

1.5.1 Programming
The legal metrological changes can be done via the ethernet interface. For putting the device in the secure mode “read-only”, the W&M switch on the CPU board shall be enabled. For the optional lid key switch: To protect metrological values, the device should be placed into W&M “locked” mode using the lid key switch (if fitted) or the internal CPU switch.

1.5.2 Parameter settings
The below mentioned parameters shall be set to the belonging values and in the secure mode “read only”.

2 Seals

The following items are sealed:
- The inscriptions are fixed to the electronic calculating and indicating device and secured against removal by seal or it will be destroyed when removed.
- The top cover of the electronic calculating and indicating device is secured against opening by seal.

See below / documentation number 11943/0-13 for an example of the sealing positions.

3 Conditions for conformity assessment

- Other parties may use this Evaluation Certificate only with the written permission of the producer.

4 Reports

An overview of the performed tests is given in Evaluation Report ER11943 revision 2 issued together with this Evaluation Certificate.