Evaluation certificate

Number **TC11067** revision 10
Project number 3469548

Issued by	NMi Certin B.V.
In accordance with	– WELMEC 8.8, 2017 "General and Administrative Aspects of the Voluntary System of Modular Evaluation of Measuring instruments under the MID"; – WELMEC 7.2, 2015: Software Guide; – European Standard EN 12405-1:2005+A2:2010 "Gas meters – Conversion devices – Part 1: volume conversion".
Producer	ABB B.V. Achtseweg Zuid 151A 5651 GW Eindhoven The Netherlands
Part	A **calculating and indicating device**, intended to be used as part of an electronic gas-volume conversion device (EVCD). Producers Mark : ABB Type : Flow-X/C Conversion principle : PTZ Device type : 2 (separate transmitters) Ambient temperature range : see § 1.1 of the description Designed for : non-condensing humidity Environment classes : M2 / E2 The intended location for the instrument is "closed". Further properties are described in the annexes: - Description TC11067 revision 10; - Documentation folder number TC11067-5.
Initially issued	3 April 2017
Remark	– This revision replaces the previous revisions. – The documentation folder is not changed.

Issuing Authority **NMi Certin B.V.**
8 December 2023

Certification Board

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Description

1 General information about the electronic gas-volume conversion device

All properties of the 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.

The device is a so-called type 2 device, with external separate transducers for pressure and temperature (PTZ), and optional gas compositions.

One Flow-X/C calculating and indicating device can be used for one or two meters per stream.

Flow X/C

1.1 Essential parts

Part	Part number	Documentation	Ambient temperature range
Digital board	xx-211-006	11067/0-01, -02	+5 °C / +55 °C
	xx-211-007	11067/4-01, -02	-25 °C / +55 °C
	xx-211-008	11067/6-01, -02	
Analog board	xx-212-004 xx-212-003	11067/0-03, -04	+5 °C / +55 °C
	xx-212-005	11067/4-03, -04	-25 °C / +55 °C
	xx-212-006	11067/6-03, -04 11067/9-01	
Power board	xx-213-003	11067/0-05, -06	+5 °C / +55 °C
	xx-213-004	11067/4-05, -06	-25 °C / +55 °C
Backplane panel	xx-216-003	11067/0-07, -08	-25 °C / +55 °C
Connector panel	xx-218-004	11067/0-09, -10	+5 °C / +55 °C
	xx-218-005	11067/5-01, 11067/0-08	-25 °C / +55 °C
Display interconnection board	xx-219-004	11067/0-11, -12	+5 °C / +55 °C
	xx-219-005	11067/4-09, -10	-25 °C / +55 °C
7" touch screen display	TST070WSBE	11067/5-02, 11067/6-05	-25 °C / +55 °C
	xx Can be any set of characters.		

1.2 Essential characteristics

1.2.1 Calculation of volumetric and / or mass flow totals from volume impulses and / or mass impulses and / or serial data (RS232, RS485 or Ethernet).
The calculation and indication of cumulative gross volume, base volume and / or mass, for station and each run, and for both forward and reverse streams, are under legal control.
The correction of the meter errors is under legal control.

1.2.2 The validity of serial communication is always checked by determining and comparing the CRC of received messages and in some cases additionally by checking if the received value is between valid limits.

The validity of Modbus messages is checked by comparing the received checksum with the calculated checksum of received bytes.

Modbus ASCII mode and RTU mode use different methods to determine the checksum.
Modbus ASCII uses LRC (Longitudinal Redundancy Check) to generate the checksum.
Modbus RTU uses CRC (Cyclic Redundancy Check) to generate the checksum.
The checksum of HART messages is the result of the XOR function of all bytes in the message.

1.2.3 Software specification (see WELMEC 7.2):

- Software type P;
- Risk Class C;
- Extensions L, T, S, I;
  Extension D is not applicable.

Software part	Software and checksum		Remarks
Firmware	Software checksum acts as software version identification.	2F494636	Core calculation, reporting and communication engine
		11143FE8	
		1AAD4807	
	1.9.0.7041	47E8CD2F	
	2.1.1.9285	712C1E6B	
	2.1.2.10217	0B29E8A2	
	2.1.3.10452	0B29E8A2	
	2.1.4.12541	0B29E8A2	
	3.0.0.10988	A9B2B7D9	
	3.1.1.12149	13D0B0C5	
	3.1.3.12952	13D0B0C5	
	3.2.0.13638	2555BE9D	
	3.2.1.13738	2555BE9D	
	3.2.3.14630	2555BE9D	
	3.2.4.14771	2555BE9D	
	3.2.6.16452	37B727D5	
	2.0.0.8200	Label: Aug 4, 2017 15:38:44	
	2.3.0.11844	Label: Oct 7, 2019 16:24:57	
	2.4.0.12900	Label: Apr 14, 2020 13:03:41	
	3.2.8.17090	37B727D5	

Software part	Software and checksum		Remarks
Add-on Programs	1.1.1.6855	Label: Apr 20, 2016 11:02:11	Boot loader and other auxiliary programs
	2.0.0.8200	Label: Aug 4, 2017 15:38:44	
	2.3.0.11844	Label: Oct 7, 2019 16:24:57	
	2.4.0.12900	Label: Apr 14, 2020 13:03:41	
Operating system	1.1	Release_20160425	Real-time operating system
	1.1	Release_20180327	
	1.1	Release 20190625	
	2.0	3175	
	2.0	3186	
	2.0	3423	
	2.0	3753	
	2.0	4121	
	2.0	4616	
Gas application	2.1.0.x	10B99759D0	-
	2.2.0.x	FDCF1662D	
	2.3.0.x	E33FB1F61	
	2.3.0.x	215D6456A8	
	3.0.0.x	139A69A4FE 181F09C1D7 210A06EE73	
FPGA	0879.914A.E820.BBF1	20D4.7372.2349.0DFB	-
	0879.914A.E820.BBF1	6B1A.43BD.C7C8.F1D5	
	0000.0000.9367.6641	0000.0000.707E.0117	
	0000.0000.4486.EE18	0000.0000.5AF4.9B91	
	0000.0000.4486.EE18	0000.0000.354A.32F1	

Software part	Software and checksum		Remarks
	0000.0000.2244.331C	0000.0000.00E4.231B	
	0000.0000.2244.331C	0000.0000.8F26.C78C	
	0000.0000.2244.331C	0000.0000.BE45.0762	
	0000.0000.2244.331C	0000.0000.38D2.DDE6	

Remarks:
The 'x' in the software version is metrologically not relevant and can be any number.
Label and Release number act as checksum.
The software version number and appertaining information can be inspected on the local display by selecting display 'Metrological', 'Software version'.

1.2.4 Conversion

The conversion is performed according to the following formula as stated below:

$$V_b = V \times \frac{p_{abs}}{p_b} \times \frac{273{,}15 + t_b}{273{,}15 + t} \times \frac{Z_b}{Z}$$

Symbol	Represented quantity	Unity
V_b	volume at base conditions	m^3
V	volume at measurement conditions	m^3
p_{abs}	absolute pressure at measurement conditions	bar
p_b	absolute pressure at base conditions	bar
t	gas temperature at measurement conditions	°C
t_b	temperature at base conditions	°C
Z_b	compression factor at base conditions	-
Z	compression factor at measurement conditions	-

1.2.5 Compression

The compression factor Z_b/Z can be programmed in the EVCD as a fixed value or it can be calculated on the basis of the following algorithms:

- SGERG91 (ISO12213-3) (known parameters are mol%N_2, mol%H_2, Hs and d), with correction factors for Hs and d for combustion temperatures other than 25 °C and reference temperatures other than 0 °C;
- AGA8 (ISO12213-2) (complete gas analyses).
- AGA NX-19 1962 (mol%N_2, mol%CO_2 and specific gravity d);
- AGA NX-19 MOD – BR.KORR.3H (PTB G9 correction for higher calorific gases).
  The calculation of compressibility factor Z using NX-19 MOD + PTB G9 correction (BR.KORR.3H) compression method is valid for the following boundary conditions:
  - P_{abs} = 0 to 80 Bars;
  - T = 0 to 30 °C;
  - d = 0,554 to 0,691;

- H_s = 39.8 to 46,2 MJ/m^3;
- Mol%N_2 = 0 to 7 %;
- Mol%CO_2 = 0 to 2,5 %.

Beyond the above stated boundary conditions, the NX-19 MOD + PTB G9 correction (BR.KORR.3H) compression method results in higher uncertainties.
A 'Compressibility calculation out of range' alarm is generated by the Flow X/C in case if values beyond above stated limits are used, except for when heating values lower than 39.8 MJ/m^3 are used. For heating values lower than 39.8 MJ/m^3 the compressibility is calculated according to NX-19 MOD without the PTB G9 correction.

A gas composition can be read from an optional gas chromatograph or Calorific Value Determining Device (CVDD) or can be manually input.
In case the communication to the gas chromatograph or CVDD fails, the last good composition before failure or a manually input override composition is used. The electronic gas-volume conversion device can be connected to 2 gas chromatographs or CVDD's. In case of a failure in one chromatograph or CVDD, the composition and the values issued from the other chromatograph or CVDD are used.

Composition setup is described in manufacturer's documentation no. 02.10.03.A-2B (Gas Metric Application Manual) and can be configured on display Configuration -> Run / Station -> Gas properties -> Gas composition. See the documentation folder s TC11067/0-13.
When using a fixed compression factor (T or PT conversion), the pressure and temperature range shall be limited such, that the error of the EVCD remains within the maximum permissible error limits.

1.2.6 Gas temperature range

The temperature range is: -30 °C ≤ t ≤ +80 °C; apart from that the temperature range has to be within the working range of the algorithm used for correcting the deviation from the ideal gas law.

1.2.7 Presentation of legal data

The legal data is presented via a special menu 'Metrological' accessible on the touch screen. The menu structure, display and (alarm) indicators are described in chapter 'User interface' of document no. TC11067/0-13.

1.2.8 Programming

Change of metrological parameters is protected by an enabled and sealed tamper switch. See paragraph 'Software and data protection' in document no. TC11067/0-13, for a full description of the programming, the parameters and the data protection.
All metrological parameters are at security level 750 or higher. All metrological parameters are at a security level of 750 or higher are locked by the tamper switch. The definition of the security levels is under the metrological checksum.

1.2.9 Accountable alarms

The EVCD has to be programmed such that accountable alarms will be generated if extreme values are measured by the EVCD or if a defect is detected. Accountable alarms cause the registration of the volume at base conditions to be stopped.

Additionally to the registration in the main totalizer, if there's no accountable alarm the volume at measurement conditions will be registered in the accountable totalizer, while during the alarm the volume at measurement conditions will be registered in the non-accountable

totalizer.

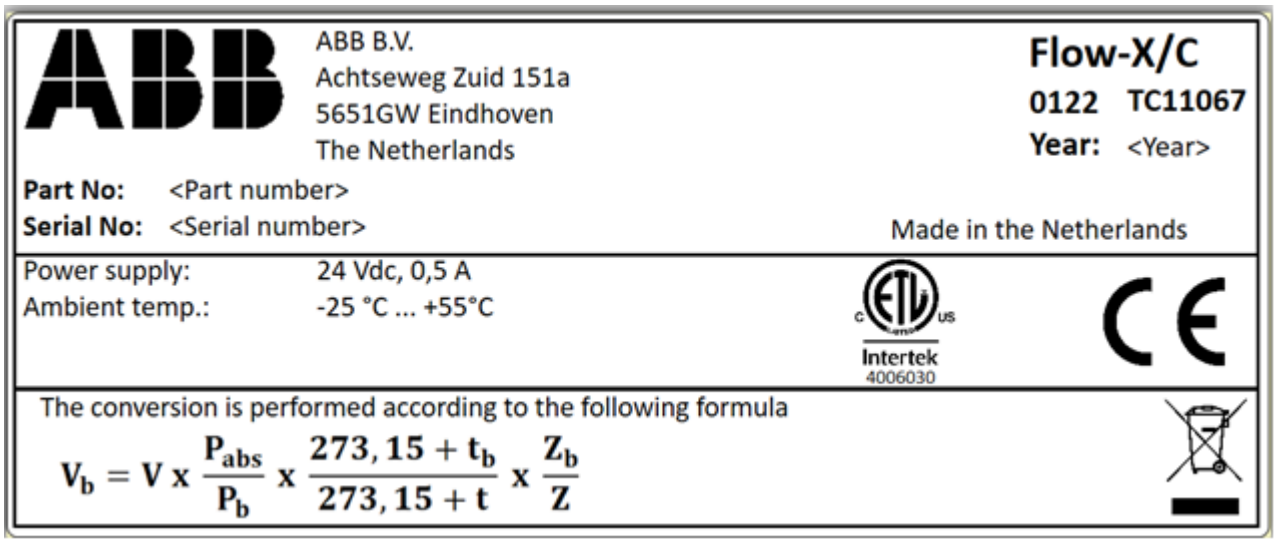
An accountable alarm is raised if a remote transmitter is frozen.

The alarm indication can be acknowledged using the “Acknowledge” button on the alarms display. However, it is not possible to clear an alarm as long as the cause of the alarm is still present.”

1.3 Essential shapes

1.3.1 Markings
The nameplate is bearing at least, good legible, the following information:
- Name of the manufacturer;
- Type;
- serial number and year of manufacture
- ambient temperature range;
- Evaluation certificate no. TC11067.

The following information is mentioned on the name plate or in the manual:
- mechanical environment class;
- electromagnetic environment class.



Example of a name plate.

This measuring instrument was previously placed on the market under the name “Spirit IT”.

1.3.2 A redundant external uninterruptible power supply must be used.

1.3.3 Seals: see chapter 2.

1.4 Conditional parts

1.4.1 Housings
The EVCD has a metal housing, which has sufficient tensile strength. For an example of the housing see page 1 of this document.

1.4.2 Temperature transducer
Any temperature transducer may be used provided the following conditions are met:
- For the temperature transducer a Parts certificate has been issued by a Notified Body responsible for type examination.
- The output signal is according to the HART-protocol, it uses a standard 4-20 mA signal or the sensor is a Pt100.
- The temperature range is according to the appertaining Parts certificate; however the temperature t must not exceed: -30 °C ≤ t ≤ +80 °C.
- The temperature range must be within the working range of the algorithm used for correcting the deviation from the ideal gas law.
  The electronic gas-volume conversion device may be equipped with an application that allows connection of two temperature transmitters per stream, for calculating and presenting the average value of the two measured temperature values.
  In case one of the temperature transmitters fails, the calculated average temperature value is replaced by the measured temperature value of the good temperature transmitter.
  One of the transmitters can be manually taken out of service for calibration purposes. In that case the measured temperature of the other transmitter is used.
  If the deviation is larger than the preset deviation limit value, the flow computer can be configured to use either the value from transmitter 1, the value from transmitter 2, or the average value. Of course, the checks on the selected transmitter value(s) (not out of service, not defective, etc.) apply. Alternatively, the flow computer can be configured to regard a transmitter deviation alarm as a transmitter failure, upon which the configured transmitter fallback mode (last good value, fallback value or override value) will be used.

1.4.3 Pressure transducer
Any pressure transducer may be used provided the following conditions are met:
- For the pressure transducer a Parts certificate has been issued by a Notified Body responsible for type examination.
- The output signal must be according to a standard 4-20 mA signal or HART protocol.
- The pressure range is according to the appertaining Parts certificate; apart from that the following restrictions are valid.
- Maximum pressure dose not exceed 120 bar.
  The pressure range must be within the working range of the algorithm used for correcting the deviation from the ideal gas law. On top of that the Flow-X optionally also raises an accountable alarm if the pressure drops below a configurable minimum accountable pressure PT_{min}.
  Note: if a gauge pressure transducer is used the constant value for the atmospheric pressure is stated on the main menu – MID page.

A gauge pressure transducer may be used if its minimum operating absolute pressure is equal to or greater than 21 bar. The electronic gas-volume conversion device may be equipped with an application that allows connection of two pressure transmitters per stream, for calculating and presenting the average value of the two measured pressure values.
In case one of the pressure transmitters fails, the calculated average pressure value is replaced by the measured pressure value of the good pressure transmitter.

One of the transmitters can be manually taken out of service for calibration purposes. In that case the measured pressure of the other transmitter is used.
If the deviation is larger than the preset deviation limit value, the flow computer can be configured to use either the value from transmitter 1, the value from transmitter 2, or the average value. Of course, the checks on the selected transmitter value(s) (not out of service, not defective, etc.) apply. Alternatively, the flow computer can be configured to regard a transmitter deviation alarm as a transmitter failure, upon which the configured transmitter fallback mode (last good value, fallback value or override value) will be used.

1.4.4 Use of a gas chromatograph or Calorific Value Determining Device (optionally)
Any gas chromatograph or CVDD may be used provided the following conditions are met:
- For the gas chromatograph or CVDD a part certificate has been issued by a Notified Body.
- the communication between the EVCD and the gas chromatograph or CVDD takes place through an RS232, RS485 or Ethernet interface; when the connection between the EVCD and gas chromatograph or CVDD is broken or when the gas chromatograph or CVDD is defective an accountable alarm is raised.

1.5 Conditional characteristics

1.5.1 One additional serial RS232 port.

1.5.2 2 Ethernet interfaces, the length of ethernet cable if connected to the device should be less than 10 meters long.

1.5.3 Maximum impulse input frequency: dual impulse train: 20 kHz; single impulse train: 20 kHz.

1.5.4 For information on and the programming of the parameters see documentation 10987/0-13.
The below mentioned parameters shall be set to the belonging values and in case the device is locked to “read only”. It must always be possible to read the parameters.

Menu	Parameter	Value
Common settings		
Configuration, Overall setup, Common settings	Disable totals if meter is inactive	No
	MID compliance	Enabled
	Calculation out of range alarms	Enabled
Constants		
Configuration, Overall setup, Constants	Atmospheric pressure	1)
	Molar mass of air	1)
	Base density of air	1)
	Reference pressure	1)
	Reference temperature	1)
Metrological		
Configuration, Metrological	Minimum accountable flow rate	1)
	Maximum accountable flow rate	1)
	Low flow accountable alarm delay	1)
	Minimum accountable temperature	1)
	Maximum accountable temperature	1)
	Minimum accountable pressure	1)
	Maximum accountable pressure	1)

Menu	Parameter	Value
Run setup		
Configuration, Run, Run setup	Meter device type	1)
	Single or dual meter temperature transmitter(s)	1)
	Single or dual meter pressure transmitter(s)	1)
	Observed density input type	1)
	Density temperature input type	1)
	Density pressure input type	1)
	Base density input type	1)
	Specific gravity input type	1)
	Relative density input type	1)
	Gas composition input type	1)
Pulse input		
Configuration, Run, Flow meter, Pulse input (if applicable)	Type of pulse input (single or dual pulse)	1)
	Pulse input quantity type	1)
	Dual pulse fidelity level	1)
	Meter active threshold frequency	1)
Smart meter		
Configuration, Run, Flow meter, Smart meter (if applicable)	Smart meter input type	1)
	Smart meter internal device number	1)
	Use flow rate or total	1)
	Pulse is primary	1)
	Fallback to secondary flow signal	1)
	Meter active threshold flow rate	1)
Meter K-factor		
Configuration, Run, Flow meter, Meter K-factor (if applicable)	K-factor curve enabled	1)
	Curve extrapolation allowed	1)
	Fwd nominal K-factor	1)
	Rev nominal K-factor	1)
	Fwd K-factor curve (max. 12 points)	1)
	Rev K-factor curve (max. 12 points)	1)
Meter factor		
Configuration, Run, Flow meter, Meter factor	Type of input value (meter factor or meter error)	1)
	Meter factor / error curve enabled	1)
	Curve extrapolation allowed	1)
	Fwd nominal meter factor / error	1)
	Rev nominal meter factor / error	1)
	Fwd meter factor curve (max. 12 points)	1)
	Rev meter factor / error curve (max. 12 points)	1)

Menu	Parameter	Value
Data valid input		
Configuration, Run, Flow meter, Data valid input	Data valid input type	1)
	Data valid digital input module	1)
	Data valid digital input channel	1)
Meter body correction		
Configuration, Run, Flow meter, Meter body correction (if applicable)	Meter body correction enabled	1)
	Body correction reference temperature	1)
	Body correction reference pressure	1)
	Cubical temperature expansion coefficient	1)
	Cubical pressure expansion coefficient	1)
Temperature		
Configuration, Run / Station, Temperature (for each individual temperature transmitter)	Temperature input type	1)
	Analog / PT100 input module	1)
	Analog / PT100 input channel	1)
	HART internal device number	1)
	HART variable	1)
	HART to analog fallback	1)
	Fallback type	1)
	Fallback value	1)
	Dual transmitter mode	1)
	Dual transmitter deviation limit	1)
	Dual transmitter deviation fallback mode	1)
	Serial number of the transmitter(s)	Correct serial number.
Pressure		
Configuration, Run / Station, Pressure (for each individual pressure transmitter)	Pressure input type	1)
	Pressure input units (gauge or absolute)	1)
	Analog input module	1)
	Analog input channel	1)
	HART internal device number	1)
	HART variable	1)
	HART to analog fallback	1)
	Fallback type	1)
	Fallback value	1)
	Dual transmitter mode	1)
	Dual transmitter deviation limit	1)
	Dual transmitter deviation fallback mode	1)
	Serial number of the transmitter(s)	Correct serial number.

Menu	Parameter	Value
Observed density		
Configuration, Run / Station, Density, Observed density (if applicable)	Observed density input type	1)
	Analog input module	1)
	Analog input channel	1)
	HART internal device number	1)
	HART variable	1)
	HART to analog fallback	1)
Base density		
Configuration, Run / Station, Density, Base density (if applicable)	Fallback type	1)
	Fallback value	1)
Densitometer setup		
Configuration, Run / Station, Density, Densitometer setup (if applicable; for each individual densitometer)	Densitometer type	1)
	Time period input module	1)
	Time period input number	1)
	Density correction factor	1)
Densitometer constants		
Configuration, Run / Station, Density, Densitometer constants. (if applicable; for each individual densitometer)	Densitometer constants as given on the appertaining calibration certificate (Solartron / Sarasota / UGC)	1)
Gas composition		
Configuration, Run / Station, Gas properties, Gas composition	Composition fallback type	1)
	Composition fail on limit alarm	1)
	Neo-Pentane mode	1)
	Live composition split mode	1)
	Live composition split percentages	1)
	Override composition split mode	1)
	Override composition split percentage	1)
Calculation setup		
Configuration, Run / Station, Gas properties, Calculation setup	Compressibility calculation method	1)
	Meter compressibility override value	1)
	Density compressibility override value	1)
	Base compressibility calculation method	1)
	Base compressibility override value	1)
	Molar mass calculation method	1)
	Molar mass override value	1)
	SGERG input method	1)
	SGERG reference conditions	1)
	ISO6976-1995 reference conditions	1)
	ISO6976-1995 molar mass calculation method	1)
	ISO6976-1983 metering reference temp.	1)
	ISO6976-1983 combustion ref. temp.	1)

Menu	Parameter	Value
CO2 input		
Configuration, Run / Station, Gas properties, CO2 input (SGERG only)	Input type	1)
	Analog input module	1)
	Analog input channel	1)
	HART internal device number	1)
	HART variable	1)
	HART to analog fallback	1)
	Fallback type	1)
	Fallback value	1)
N2 input		
Configuration, Run / Station, Gas properties, N2 input (SGERG only)	Input type	1)
	Analog input module	1)
	Analog input channel	1)
	HART internal device number	1)
	HART variable	1)
	HART to analog fallback	1)
	Fallback type	1)
	Fallback value	1)
H2 input		
Configuration, Run / Station, Gas properties, H2 input (SGERG only)	Input type	1)
	Analog input module	1)
	Analog input channel	1)
	HART internal device number	1)
	HART variable	1)
	HART to analog fallback	1)
	Fallback type	1)
	Fallback value	1)
Analog inputs		
IO, Module, Configuration, Analog inputs (for each individual analog input)	Input type	1)
	Averaging method	1)
	Full scale	1)
	Zero scale	1)
	High fail limit	1)
	Low fail limit	1)
PT100 inputs		
IO, Module, Configuration, PT100 inputs (for each individual PT100 input)	Input type	1)
	High fail limit	1)
	Low fail limit	1)

Menu	Parameter	Value
Pulse input		
IO, Module, Configuration, Pulse input	Pulse input A channel	1)
	Pulse input B channel	1)
	Dual pulse fidelity level	1)
	Fall back to secondary pulse	1)
	Error pulses limit	1)
	Good pulses reset limit	1)
	Error rate limit	1)
	Dual pulse fidelity threshold	1)
Time period inputs		
IO, Module, Configuration, Time period inputs (for each individual time period input)	Time period input channel	1)
Calibration		
IO, Module, Calibration, Analog inputs	Selected analog input	None
	Freeze all analog and PT100 inputs	Disabled
IO, Module, Calibration, PT100 inputs	Selected PT100 input	None
	Freeze all analog and PT100 inputs	Disabled
Calibration, HART inputs	HART freeze mode	Off
	HART value offsets	Correct values
Forces		
IO, Module, Force IO, Analog inputs (for each individual analog input)	Force mode	Disabled
IO, Module, Force IO, PT100 inputs (for each individual PT100 input)	Force mode	Disabled
IO, Module, Force IO, Digital IO (for each individual digital IO)	Force mode	Normal
IO, Module, Force IO, Pulse input	Force mode	Disabled
IO, Module, Force IO, Time period inputs (for each individual time period input)	Force mode	Disabled
Communication, HART transmitters (for each individual HART transmitter)	Force mode	Disabled
Communication, flow meter	Force mode	Disabled

Menu	Parameter	Value
Maintenance mode		
Maintenance mode	Maintenance mode	Disabled

1) These values should be specified and motivated by the producer or the owner of the flow computer. Prior to Weights & Measures verification a list with the parameter settings and motivation of these setting should be present at the flow computer location

1.6 Non-essential characteristics

1.6.1 Impulse outputs.

1.6.2 Analogue 4 ... 20 mA outputs.

1.6.3 For station and each run, and for both forward and reverse streams the calculation and indication device support the following totalizers.
These totalizers are not for custody transfer use.

Cumulative totalizers
- Cumulative number of impulses (does not apply to station totalizers)
- Cumulative number of error impulses (does not apply to station totalizers)
- Cumulative energy
- Cumulative accountable energy
- Cumulative non-accountable indicated (volume or mass, does not apply to station totalizers)
- Cumulative non-accountable gross volume
- Cumulative non- accountable base volume
- Cumulative non-accountable mass
- Cumulative non-accountable energy

Period totalizers
- Current [xxx] indicated (volume or mass, does not apply to station totalizers)
- Current [xxx] number of impulses (does not apply to station totalizers)
- Current [xxx] number of error impulses (does not apply to station totalizers)
- Current [xxx] gross volume
- Current [xxx] base volume
- Current [xxx] mass
- Current [xxx] energy
- Current [xxx] accountable indicated (volume or mass, does not apply to station totalizers)
- Current [xxx] accountable gross volume
- Current [xxx] accountable base volume
- Current [xxx] accountable mass
- Current [xxx] accountable energy
- Current [xxx] non-accountable indicated (volume or mass, does not apply to station totalizers)
- Current [xxx] non-accountable gross volume
- Current [xxx] non-accountable base volume
- Current [xxx] non-accountable mass
- Current [xxx] non-accountable energy
- Previous [xxx] indicated (volume or mass, does not apply to station totalizers)
- Previous [xxx] number of impulses (does not apply to station totalizers)

- Previous [xxx] number of error impulses (does not apply to station totalizers)
- Previous [xxx] gross volume
- Previous [xxx] base volume
- Previous [xxx] mass
- Previous [xxx] energy
- Previous [xxx] accountable indicated (volume or mass, does not apply to station totalizers)
- Previous [xxx] accountable gross volume
- Previous [xxx] accountable base volume
- Previous [xxx] accountable mass
- Previous [xxx] accountable energy
- Previous [xxx] non-accountable indicated (volume or mass, does not apply to station totalizers)
- Previous [xxx] non-accountable gross volume
- Previous [xxx] non-accountable base volume
- Previous [xxx] non-accountable mass
- Previous [xxx] non-accountable energy

With [xxx] either ‘hour’, ‘hour open’, ‘day’, ‘day open’, ‘period A’, ‘period A open’, ‘period B’, or ‘period B open’.

“Current” totalizers register during the applicable time period. At the start of the applicable time period the respective “current” totalizers are reset to zero. “Previous” totalizers show the previous applicable time period. Totalizers indicated with the word “open” show the value of the cumulative totalizers at the start of the applicable time period.

2 Seals

The following items are sealed:
- the nameplate with the housing; removal without destroying the nameplate shall not be possible, otherwise the nameplate shall be sealed to the housing.
  the housing is sealed by sealing the tamper switch on the back plane.
- the programming switch and the terminals of the pressure- and temperature transmitter.

If the Flow-X/C is unlocked by disabling the tamper switch and the MID compliance is enabled an alarm is raised.

To ensure the presence of the correct temperature transmitters and pressure transmitters the serial numbers can be shown in the display. Change of that serial number is only possible after breaking the seal of the Tamper Switch.

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 ER11067 issued together with this Evaluation Certificate.