EU-type examination Certificate

Issued by	NMi Certin B.V., designated and notified by the Netherlands to perform tasks with respect to conformity assessment procedures mentioned in article 17 of Directive 2014/32/EU, after having established that the Measuring instrument meets the applicable requirements of Directive 2014/32/EU, to:
Manufacturer	Wigersma & Sikkema B.V. Leigraafseweg 4 6983 BP Doesburg The Netherlands

Measuring instrument   An **electronic gas volume conversion device (EVCD)**, intended to be used for gas volume conversion as a sub-assembly (according to article 4 of the MID) of a gas meter.

Type	:	UNIGAS 300
Manufacturer's mark or name	:	Wigersma & Sikkema or Kamstrup
Brand, type	:	Itron, Corus SC
Conversion principle	:	T, TZ, PT or PTZ
Ambient temperature range	:	–40 °C / +55 °C
Designed for	:	condensing humidity
Environment classes	:	M2 / E2

The intended location for the instrument is open.

Further properties are described in the annexes:
– Description T10132 revision 13;
– Documentation folder T10132-6.

Valid until	11 November 2028
Initial issued	11 November 2008
Remark	– This revision replaces the previous revisions; – The documentation folder replaces the previous documentation folder.

Issuing Authority   **NMi Certin B.V., Notified Body number 0122**
20 October 2023

Certification Board

PRODUCTS
RvA C 681

Description

1 General information about the electronic gas-volume conversion device

All properties of the EVCD, whether mentioned or not, shall not be in conflict with the legislation.

1.1 Essential parts

The electronic gas volume conversion device is composed of the following parts:

Part	Document	Remarks
Metrological (bottom) PCB	10132/0-03/04/05	-
Display (top) PCB	10132/0-06/07/08	-
Pressure transmitter	10132/0-09	Manufacturer: GE Druck, Type: PDCR2210-3221 (built in) Type: PDCR2210-3220 (external)
Pressure transmitter	10132/7-03	Manufacturer: Baumer Type: PRAR/10600948
Temperature transmitter Pt500	10132/0-10	Manufacturer: Kamstrup Type: 65-00-0X0 XXX
Temperature transmitter Pt500 ø5.8 mm	10132/13-01	Manufacturer: Kamstrup Type: 61-63-D0-08X-XXX

1.2 Essential characteristics

1.2.1 Software specification (refer to WELMEC 7.2):
- Software type P;
- Risk Class C;
- Extension L and T;

while extensions O, S and D are not applicable or excluded.

Name	Used language / algorithm	Version	Checksum
Display (top) PCB	English, German and Dutch	1.2.2 or 1.2.4 or 1.2.12 or 1.3.11 or 1.3.20	6941 or 12123 or 3337 or 52023 or 995
	English and Dutch	1.3.26 or 2.3.37 or 2.3.38	27629 or 52861 or 8002

Description

Name	Used language / algorithm	Version	Checksum
	English and Italian	1.3.11 or 1.3.20 or 1.3.26 or 2.3.37 or 2.3.38	53502 or 65318 or 60892 or 60633 or 6150
	German	1.4.4 or 1.4.14 or 2.4.22 or 2.4.23	37314 or 50006 or 33485 or 52889
Metrological (bottom) PCB	AGA 8	1.2.2 or 1.2.6 or 1.3.11 or 1.3.17 or 1.3.26 or 1.3.40 or 1.4.6 or 1.4.14 or 1.4.40	54347 or 59773 or 2972 or 43000 or 34029 or 55636 or 951 or 49359 or 1054
	AGA NX19 mod	1.2.2 or 1.2.6 or 1.3.11 or 1.3.17 or 1.3.26 or 1.3.40 or 1.4.6 or 1.4.14 or 1.4.40	14795 or 7153 or 40551or 27310 or 9847 or 3757 or 43743 or 25173 or 54247
	SGERG – Method 1	1.2.2 or 1.2.6 or 1.3.11 or 1.3.17 or 1.3.26 or 1.3.40 or 1.4.6 or 1.4.14 or 1.4.40	3123 or 31192 or 9619 or 18678 or 59943 or 19521 or 60601 or 44549 or 37131

Name	Used language / algorithm	Version	Checksum
	SGERG – Method 2	1.2.2 or 1.2.6 or 1.3.11 or 1.3.17 or 1.3.26 or 1.3.40 or 1.4.6 or 1.4.14 or 1.4.40	960 or 38178 or 45902 or 58216 or 50340 or 25203 or 48002 or 32902 or 48953
	SGERG – Method 3	1.2.2 or 1.2.6 or 1.3.11 or 1.3.17 or 1.3.26 or 1.3.40 or 1.4.6 or 1.4.14 or 1.4.40	33946 or 53879 or 62930 or 4993 or 14044 or 60907 or 34622 or 29438 or 12449
	SGERG – Method 4	1.2.2 or 1.2.6 or 1.3.11 or 1.3.17 or 1.3.26 or 1.3.40 or 1.4.6 or 1.4.14 or 1.4.40	53641 or 58005 or 63299 or 57120 or 61291 or 42805 or 57716 or 43849 or 31359

Remark: The software version and checksum can be read under the system menu (9) by pressing the arrow keys. (See chapter 6 of the documentation no. 10132/7-01).

1.2.2 Conversion

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

$$V_b = V_m \text{ or } V_c \times \frac{p_{abs}}{p_b} \times \frac{273,15 + t_b}{273,15 + t} \times \frac{Z_b}{Z}$$

Symbol	Represented quantity	Unity
V_b	volume at base conditions	m³
V	volume at measurement conditions	m³
V_c	volume at measurement conditions meter error corrected (optional)	m³
p_{abs}	absolute pressure at measurement conditions	bar

Symbol	Represented quantity	Unity
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	-

Instead of conversion as a function of pressure and temperature (PT- or PTZ-EVCD), also conversion as a function of temperature only (T- or TZ-EVCD) is possible.
In case of the T- or TZ-EVCD the pressure is not measured, but may be included as a fixed value in the processing of the conversion.

1.2.3 Compression

The compression factor Z_b/Z can be programmed in the EVCD as a fixed value (T- or PT-EVCD) or it can be calculated on the basis of the following algorithms (TZ- or PTZ-EVCD):
- SGERG – Method 1 (mol%CO_2, mol%H_2, H_s and d);
- SGERG – Method 2 (mol%N_2, mol%H_2, H_s and d);
- SGERG – Method 3 (mol%CO_2, mol%N_2, mol%H_2 and d);
- SGERG – Method 4 (mol%CO_2, mol%N_2, mol%H_2 and H_s);
- AGA8 "Gross characterization method 1" (mol%CO_2, mol%H_2, H_s and d);
- AGA NX19 mod (mol%N_2, mol%CO_2 and d).

When using a fixed compression factor (T or PT conversion), the pressure and temperature range are limited such, that the error of the EVCD remains within the maximum permissible error limits.

1.2.4 Meter error curve correction

Meter error curve correction (see Chapter 16 of the User's and maintenance guide no. 10132/7-01) can be applied if the gas meter produces at least 10 pulses per second at Q_{min}.
The correction is performed by linear interpolation using a maximum of 10 points.
Besides the corrected volume V_c, also the uncorrected volume V_m can be read via the display.

1.2.5 Pressure range

The pressure ranges are:

Type	pressure range p [bar]
PDCR2210-3221;	$0,8 \leq p_{abs} \leq 2,5$
PDCR2210-3220	$1,5 \leq p_{abs} \leq 6$
	$2,5 \leq p_{abs} \leq 10$
	$5 \leq p_{abs} \leq 20$

Type	Model	pressure range p [bar]
PRAR/10600948	R228EX	$0,8 \leq p_{abs} \leq 2,8$
	R260EX	$0,9 \leq p_{abs} \leq 6$
	R310EX	$1,5 \leq p_{abs} \leq 10$
	R320EX	$3 \leq p_{abs} \leq 20$
	R340EX	$6 \leq p_{abs} \leq 40$
	R380EX	$12 \leq p_{abs} \leq 80$

1.2.6   Gas temperature range
The temperature range is: $-40°C \leq t \leq +55°C$, besides the temperature range has to be within the working range of the used algorithm for correcting the deviation from the ideal gas law.

1.2.7   Totalizers
The EVCD has 3 totalizers. V_m1 is basis for the conversion. V_m2 can be used for checking purposes and V_m3 for general non-accountable purposes. See Chapter 3 figure 3 of the User's and maintenance guide no. 10132/7-01.

1.2.8   Presentation of legal data
The legal data is presented via a special menu by pressing the arrows keys on the front panel.
The menu structure, keyboard, display and (alarm) indicators are described in Chapter 6 of the User's and maintenance guide no. 10132/7-01.

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 otherwise a defect arises. Accountable alarms cause that the registration of the volume at base conditions will be stopped.

During the alarm, the volume at measurement conditions will (besides the main totalizer) also be registrated in the alarm totalizer.

The alarm indication can be reset by using the keyboard (see Chapter 10, paragraph Status registers of the User's and maintenance guide no. 10132/7-01). 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:
- CE marking including the supplementary metrological marking (M + last 2 digits of the year in which the instrument has been put into use);
- Notified Body identification number, following the supplementary metrological marking;
- EU-type examination certificate no. T10132;
- manufacturer's name, registered trade name or registered trade mark;
- manufacturer's postal address;
- serial number of the meter and year of manufacture;
- ambient temperature range.

The following information is mentioned on the nameplate or on the display:
- the gas temperature range;
- the gas pressure range;
- the base pressure (if applicable);
- the base temperature;
- the compression algorithm (if applicable);
- the gas properties (if applicable);
- the parameters for gas meter error correction curve (if applicable).

The following information is mentioned on the display:
- upper and lower limits of the transducers.

The following information is mentioned on the nameplate:
- mechanical environment class;
- electromagnetic environment class.

Examples of the markings are shown in the documents no. 10132/7-04 and 10132/10-01.

1.3.2   Sealing: see chapter 2.

1.4   Conditional parts

1.4.1   Housing
The EVCD has an aluminium housing, which has sufficient tensile strength. For an example of the housing, see documentation no. 10132/7-02.
Metrological important parts only are accessible after breaking one or more seals.

1.4.2   Display board
This board is used for the presentation of legal data and (accountable) alarms.
See documentation no. 10132/0-08 for an example of the display board.

1.4.3   Power supply
1.4.3.1 Battery power supply
The EVCD is powered by a Lithium-Thionyl chloride battery (3,6 V, D-size -18,5 Ah or DD-size - 35 Ah). The normal lifetime is at least 5 years. For further details, see chapter 8 "Replacement of the battery" of the User's and maintenance guide no. 10132/7-01. A low battery alarm is generated at least half a year before the device stops functioning.

1.4.3.2 External power supply
The EVCD also can be supplied by an external 6 -10V dc power supply.
In this case, the EVCD is provided with a CE marked emergency power supply device to ensure, during a failure of the principal power source, that all measuring functions are safeguarded.

1.4.4   Serial communication
The EVCD is equipped with three optical serial ports. Use of the serial communication may not influence the working of the EVCD. In the normal situation (also see paragraph 1.5.2) the essential parameters needed for the conversion cannot be changed via the communication ports.

Optional the Display (top) PCB can be equipped with a CI-module to transform the present serial communication protocol to other protocols (see documentation 10132/5-01).

1.5   Conditional characteristics

1.5.1   The gas meter has a LF, HF or encoder output.
LF-output: max frequency is 2 Hz, impulse duration minimum 75 ms
HF-output: NAMUR, max frequency is 5 kHz, impulse duration minimum 100 µs
Encoder: NAMUR.
For further details see chapter 4, paragraph 4.2 and 4.3 of the User's and maintenance guide no. 10132/7-01.

1.5.2   Programming
Change of metrological parameters is protected by a push button on the metrological PCB. Exceptions are the gas parameters, which are protected by a push button on the metrological PCB or password.

When the gas parameters are not protected by the push button the password must be active.

See chapter 10 of documentation no. 10132/7-01 for a full description of the programming and data protection.

1.6   Non-essential parts

1.6.1   Alarm inputs
1.6.2   Alarm outputs
1.6.3   Pulse outputs

2   Seals

The following items are sealed:
- the nameplate with the housing; ***)**
- the covering plate of the display (top) PCB;
- the covering plate of the metrological (bottom) PCB;
- the push button on the metrological PCB;
- the terminals of the pressure- and temperature transmitter.

*) Removal without destroying the nameplate shall not be possible; otherwise the nameplate shall be sealed to the housing.

An example of the sealing is presented in the document no. 10132/0-12.