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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 14;
- Documentation folder T10132-7.

Valid until 11 November 2028

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Remark - This revision replaces the previous revisions;
- The documentation folder replaces the previous documentation folder.

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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, 10132/14-03/04 | - |
| Pressure transmitter | 10132/0-09 | Manufacturer: GE Druck, Type: PDCR2210-3221 (built in) Type: PDCR2210-3220 (external) |
| Pressure transmitter | 10132/7-03 10132/14-05 | 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 or 3.3.38 | 27629 or 52861 or 8002 or 38273 |

| 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 or 3.3.38 | 53502 or 65318 or 60892 or 60633 or 6150 or 36839 |
| | German | 1.4.4 or 1.4.14 or 2.4.22 or 2.4.23 or 3.4.23 | 37314 or 50006 or 33485 or 52889 or 49728 |
| | German and French | 3.3.40 | 285 |
| 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 40551 or 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 and 10132/14-01).

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 | m^3 |
| V | volume at measurement conditions | m^3 |
| V_c | volume at measurement conditions meter error corrected (optional) | m^3 |
| 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%CO₂, mol%H₂, H_s and d);
- SGERG – Method 2 (mol%N₂, mol%H₂, H_s and d);
- SGERG – Method 3 (mol%CO₂, mol%N₂, mol%H₂ and d);
- SGERG – Method 4 (mol%CO₂, mol%N₂, mol%H₂ and H_s);
- AGA8 "Gross characterization method 1" (mol%CO₂, mol%H₂, H_s and d);
- AGA NX19 mod (mol%N₂, mol%CO₂ 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 or Chapter 12 of the Installation, operating and maintenance manual no. 10132/14-01) 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; PDCR2210-3220 | $0,8 \leq p_{abs} \leq 2,5$ |
| | $1,5 \leq p_{abs} \leq 6$ |
| | $2,5 \leq p_{abs} \leq 10$ |
| | $5 \leq p_{abs} \leq 20$ |

| 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: $-40^{\circ}\text{C} \leq t \leq +55^{\circ}\text{C}$, 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 or Chapter 3 Figure 2 of the Installation, operating and maintenance manual 10132/14.01.

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 or Chapter 6 of the Installation, operating and maintenance manual 10132/14-01.

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 6, paragraph Status registers of the User's and maintenance guide no. 10132/7-01 or Chapter 6 of the Installation, operating and maintenance manual 10132/14.01). 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. 10132/9-01, 10132/10-01 and 10132/14-01 Chapter 3 Figure 1.

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 and 10132/14-02.

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 and 10132/14-04 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 and chapter 8 Replacing the battery of the Installation, operating and maintenance manual no.10132/14/01. 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 and 10132/14-06).

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 μ s

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 or chapter 4, paragraph 4.2 and 4.3 of the the Installation, operating and maintenance manual no.10132/14/01.

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 or 10132/14-01 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 and 10132/14-01.