EU-type examination certificate

Number **T10983** revision 9
Project number 3600874

Issued by

NMi Certin B.V.,
designated and notified by the Netherlands to perform tasks with respect to conformity asssessment 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

Transus Instruments B.V.
Bloesemlaan 4
3897 LN Zeewolde
The Netherlands

Measuring instrument

An **Ultrasonic Gas Meter**

Type	:	UIM-4F
Manufacturer's mark or name	:	Transus Instruments B.V.
Destined for the measurement of	:	Gas volume
Accuracy class	:	Class 1,0
Environment classes	:	M2 / E2
Ambient temperature range	:	-25 °C / +55 °C
Designed for	:	Condensing humidity
Intended location	:	Open

Further properties are described in the annexes:
- Description T10983 revision 9;
- Documentation folder T10983-6.

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21 December 2026

Remarks

This revision replaces the earlier versions, including its documentation folder.

Issuing Authority

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1 General information about the gas meter

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

The measuring part of the ultrasonic gas meter consists of a meter body in which several measuring paths are incorporated. The metal meter body can be made of carbon steel, stainless steel, duplex steel, Inconel or aluminium.

Each measuring path consists of two transducers, which are connected to the Signal Processing Unit (SPU). Between two transducers, acoustic pulses are sent and received. The travel time of the pulses between a pair of transducers is measured and has a correlation with the gas flow through the meter. The measured volume is presented on an electronic display.

1.1 Essential parts

Description	Document	Remarks
Spoolpiece	10983/3-01 10983/3-02	The UIM-4F meter constsist of a cylindrical spoolpiece with 4 horizontal paths
Transducers	10983/3-02	Transducer type UIM-U2 and UIM-U5
Mainboard	10983/3-03 10983/9-01	Assembly drawing and parts list
Optionboard (optional)	10983/9-03	Assembly drawing and parts list

1.2 Essential characteristics

1.2.1 Flow characteristics
The meter has the following flow characteristics:

Diameter		Unidirectional or Bidirectional USM			Unidirectional USM	
Nominal size [-]	Inner diameter [mm]	V_{max} [m/s]	V_{min} [m/s]	V_t [m/s]	V_{min} [m/s]	V_t [m/s]
3" / DN80	70 ~ 80	35,00	0,51	1/10 V_{max}	-	-
4" / DN100	80 ~ 105	33,50	0,51		-	-
6" / DN150	130 ~ 155	30,00	0,40		0,24	1/10 V_{max}
8" / DN200	180 ~ 210	30,00	0,30			
10" / DN250	230 ~ 260	30,00				
12" / DN300	270 ~ 320	30,00				
14" / DN350	300 ~ 345	30,00				
16" / DN400	350 ~ 390	30,00				
18" / DN450	380 ~ 440	30,00				
20" / DN500	450 ~ 490	30,00				
24" / DN600	520 ~ 590	29,00				
30" / DN750	680 ~ 730	28,00				

The corresponding flow rates can be calculated as follows:

$$Q = v \cdot \frac{1}{4} \cdot \pi \cdot D^2 \cdot 3600$$

Where:
Q = flow rate [m³/h]
v = velocity [m/s]
D = internal diameter [m]

Higher values of Q_{min} and lower values of Q_{max} are allowed on condition that $Q_{min} \leq 0{,}05\ Q_{max}$ and $Q_{max} / Q_t \geq 5$.

1.2.2 Pressure range
For a maximum working pressure of the ultrasonic gas meter above 120 bar(a), a maximum $p_{calibration}$ of 60 bar(a) (with a maximum deviation of 5 bar) is allowed since this is the highest possible test pressure at any test location traceable to (inter)national standards.

The meter is programmed with a density setting corresponding to the applied gas at a preset pressure to provide the meter with a Reynolds number dependent correction.

1.2.3 Measuring principle
The measuring principle of transit time difference measurement is used.

1.2.4 Bi-directional flow
All sensors can be used to measure flow in forward and reverse directions. See also the conditions as stated in chapter 3.

For bidirectional meters V_{min} limitations apply, see section 1.2.1.

1.2.5 Operating pressure range
The spoolpiece and the transducers may be used up to and including 153 bar(a).

The operating pressure range of the meters is as follows:
- In general, for any meter: $½ \cdot p_{calibration}$ up to and including $2 \cdot p_{calibration}$.
- For specifically a 3", 4" and 6" meter, having a maximum operating pressure range between 3 and 12 bar(g), a calibration on one pressure (pcalibration ≤6 bar(g)) suffices.

1.2.6 Software specification (refer to WELMEC 7.2):
- Software type P;
- Risk Class C;
- Extension S, while extensions L, D and T are not applicable.

Part	Software version	Checksum
Main version / FPGA version	1.0.4 / 1.0.1	77A54A9D
Main version / FPGA version	1.0.6 / 1.0.4	43F6D289
Main version / FPGA version	1.0.7 / 1.0.4	544882BB
Main version / FPGA version	2.0.1 / 2.0.1	67D31506
Main version / FPGA version	2.3.1 / 2.3.0	3C12C30A
Main version / FPGA version	2.4.1 / 2.3.0	B87E9BB9

Part	Software version	Checksum
Main version / FPGA version	2.5.0 / 2.3.0	94AC0AE9
Main version / FPGA version	2.7.0 / 2.3.0	2A8D6FB7
Main version / CFPGA version/ DFPGA version	3.0.1 / 2.0.0.20 / 2.0.0.11	440DC1CC

The software versions can be readout via the display of the meter.

1.2.7 Measuring paths

The meter consist of a cylindrical spool piece with 4 horizontal paths. Multiple configurations can be combined in a single housing:

- 4 paths configuration Single meter;
- 4+1 configuration 4 pay and 1 check;
- 4+2 configuration 4 pay and 2 check;
- 4+3 configuration 4 pay and 3 check;
- 4+4 configuration Either as Pay and check or as 2 separate meters.

See document no. 10983/3-01 for an example of the double configuration construction.

1.2.8 Operation and presentation of legal data

The meter is equipped with an electronic display and can be operated using the keys on the display module also see paragraph 1.5.1 of this description).
The operation is further described in Chapter 6 of the Manual 10983/3-06.

1.2.9 Totalizers and (optional) bi-directional flow measurement

The meter is equipped with totalizers which indicate the flow in forward and (optional) reverse direction. These totalizers indicate the volume with 8 integers and 4 decimal digits. On the nameplate an arrow indicates the positive and negative direction of the volume.

For bidirectional meters V_{min} limitations apply, see section 1.2.1.

1.2.10 Accountable alarms

If malfunctions are detected a visible alarm will be active which remains present until the alarm is acknowledged and the cause of the alarm is suppressed (see Chapter 6 and Appendix A of 10983/3-06). The meter has two LED's indicating the operational status of the meter as specified in the table below.

LED	LED Status	Interval	Description
Green	Off	-	Power off
	Flashing	2 Sec	Power on, system running
Red	Off	-	Status OK
	Flashing	1 Sec	Warning
	Flashing	0,5 Sec	Error
	Flashing	2 Sec	Status OK, unacknowledged transient Error present

1.2.11 Transducers

Different transducers are used depending on the meter nominal size:

- ≤12" have type UIM-U2 transducers installed.
- >12" have type UIM-U5 transducers installed.

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. T10983;
- manufacturer's name, registered trade name or registered trade mark;
- manufacturer's postal address;
- serial number of the meter and year of manufacture;
- mechanical environment class;
- electromagnetic environment class;
- Q_{max}, Q_t and Q_{min};
- the working pressure range;
- ambient temperature range;
- accuracy class;
- pulse values of HF and LF frequency outputs;
- indication of the flow direction, e.g. an arrow.

An example of the markings is shown in document no. 10983/2-01.

The individual transducers have a unique serial number.

When two meters are combined in a single housing, a clear distinction shall be present between the Pay and Check meter. In case of two separate meters, both meters must have their own nameplate with unique serial number.

1.3.2 Sealing: see chapter 2.

1.4 Conditional parts

1.4.1 Display enclosure
The assembly of the display enclosure and electronic assembly are presented in documents 10983/3-05, 10983/9-02 and 109830/0-06.

1.4.2 Pressure measuring point
The housing contains a pressure tapping to determine the reference pressure in the gas meter. This pressure tapping is provided with the indication "p_m" or "p_r".

1.4.3 Power supply
The gas meter needs an external 18 – 28 V DC power supply. During a power failure the registration of the volume will stop. The meter needs to be connected to an emergency power supply (e.g. and UPS).

1.4.4 Communication interface
The meter is capable of communicating via USB and optionally RS485. It is not possible to alter legally relevant data via the communication interfaces without breaking a seal.

1.5 Conditional characteristics

1.5.1 Programming
Essential parameters can be changed after the programming switch is unlocked (ON position) see document no. 10983/0-09.
The programming switch is only accessible after breaking a seal, see chapter 2.
During normal operation the programming switch is placed in the OFF position.

1.5.2 Low flow cut off
The low flow cut off is a programmable minimum flow.
If the flow measured by the meter is below the programmed low flow cut off, the flow will be considered zero, so the meter reading will no longer change
The programmed value shall not exceed 20% of Q_{min}.

1.5.3 Velocity of sound and the gas velocity range.
These application-specific parameters have to be set for a correct functioning of the meter.

1.5.4 Linearization
Independently for forward and reverse flow directing a maximum of 10 adjustment factors (20 in total) can be applied. Linear interpolation is used between these points.

1.6 Non-essential parts

1.6.1 Alarm or pulse outputs

1.6.2 Digital outputs (optional)

2 Seals

The following items of the meter are sealed:

- the nameplate with the housing; *)
- the electronics including the programming switch;
- access to the transducers.

See the drawings no. 10983/0-09 for an example of the sealing.

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

3 Conditions for conformity assessment

3.1 Installation of the gas meter
The meter needs to be installed according one of the following configurations:

- *Mild & severe flow disturbance*
  - Upstream: a minimum of 5D + NOVA 50E + 10D of straight pipe
    Downstream: a minimum of 4D straight pipe.
    The flow conditioner shall be a NOVA 50E compliant design (document no. 109830/0-10).

- *Mild & severe flow disturbance*
  - Upstream: a minimum of 5D + PTB Flow conditioner + 5D of straight inlet pipe
    Downstream: a minimum of 3D straight pipe.
    The flow conditioner shall be a PTB compliant design (document no. 10983/2-02).

- *Mild & severe flow disturbance*
  - Upstream: a minimum of 2D + TI TWIN type flow conditioner + 3D of straight inlet pipe. Downstream: a minimum of 3D straight pipe.
    The TI TWIN type flow conditioner consists of a combination of one PTB compliant and one NOVA 50E compliant flow conditioner design (document no. 10983/4-01).

All flow straighteners shall be installed in the piping with their marking on the flange (consisting of e.g. a dimple or a slot) in line with the top side (the electronic index) of the ultrasonic gas meter.

A thermowell may be mounted at 2D - 5D from the outlet of the meter.

3.2 Bidirectional flow measurement
For bidirectional flow measurement the outlet pipe and flow conditioner shall be identical to the inlet. The installation of a temperature sensor is at 2–5D from the outlet of the meter. For bidirectional applications an additional temperature sensor can be installed 2–5D upstream of the meter. For bidirectional applications the meter and pipe spools including the thermo well(s), shall be calibrated as a meter package during the examination for putting into use of the gas meter.

For bidirectional meters V_{min} limitations apply, see section 1.2.1.

3.3 Alternative welded configuration of the gas meter
The central meter body can be welded directly onto the flanges or to inlet and outlet pipes. The welding may not cause more than a 3% diameter step. The meter shall be installed as stated in paragraph 3.1. The central meter body, including welded piping or welded flanges, shall be calibrated as a meter package during the examination for putting into use of the gas meter.

3.4 Maintenance
A transducer path pair can be exchanged without deterioration of the metrological performance.

The electronics mainboard can be exchanged without deterioration of the metrological performance.