Kamstrup

Versatile

Communication

Large memory capacity

Easy operation

Long battery life

No special earthing required

UNIGAS 300

Electronic gas volume converter for all applications

Table of contents

Major characteristics of UNIGAS 300

- communication port for remote reading
- battery life up to 15 years
- easy installation
- no special earthing provisions required
- provided with large module space and designed for future communication protocols
- encoder input and high and low frequency pulse inputs

- communication port on behalf of certified tester on location
- easy modification of parameters in UNIGAS 300 with UNITOOL software

- communication port for process computer
- real-time conversion
- real-time pulse outputs
- real-time alarm outputs
- advanced graphical display

1. Introduction

Natural gas consumption is measured by means of a gas meter. The gas meter measures the volume of natural gas supplied and gives this as cubic metres [m3]. The amount of natural gas in a measured volume actually depends on the condition of the gas. A cubic metre of natural gas measured under high pressure will contain more natural gas molecules than one measured under low pressure. There is a similar effect for temperature changes of natural gas; at low temperatures a cubic metre measured by the gas meter contains more natural gas molecules than one measured at a higher temperature. The volume measured by the gas meter is a volume measured under operating conditions and is therefore referred to as the operating volume [Vm].

By converting the operating volume into a volume under normal conditions, the gas consumption can be determined independent of the operating condition. To measure the supplied amount of natural gas under normal conditions, an electronic volume conversion device (EVCD) is used. By means of an EVCD the quantity of natural gas measured by the gas meter at measurement conditions is converted to an amount at base conditions [Vb]. The volume of natural gas measured at base conditions is referred to as the converted volume. To convert the volume at measurement conditions to the volume at base conditions, the EVCD uses the following equation:

$$V_b = V_m \bullet C = V_m \bullet \left[\frac{p}{p_b} \bullet \frac{T_b}{T} \bullet \frac{Z_b}{Z} \right]$$

where:

V_b : amount of natural gas in m^3 at base conditions (converted volume);
V_m : measured amount of natural gas in m^3 at measurement conditions (unconverted volume);
C : calculated conversion factor;
p : pressure [bar abs.] of natural gas that passes through the gas meter;
p_b : reference pressure [bar abs.];
T_b : reference temperature [K];
T : temperature [K] of natural gas that passes through the gas meter;
Z_b : compressibility of natural gas at base conditions;
Z : compressibility of natural gas at measurement conditions.

The value of the compressibility factor Zb/Z is calculated on the basis of a compressibility algorithm (SGERG TM5 1991 methods 1-4, AGA NX19 modified (Gasunie) or AGA 8 gross method 1).
The algorithm is in its full-length present in the memory of the UNIGAS 300 volume converter, as is the composition of the gas that is needed for the calculation.

UNIGAS 300 is a highly advanced and extraordinary versatile volume converter that can be used in combination with all gas meters. Apart from volume conversion over a wide temperature and pressure range, UNIGAS 300 offers a large number of functionalities such as:

- recording volumes and consumption figures including peak use rates;
- presenting serial information to communication equipment for Automatic Meter Reading (AMR);
- recording data for Automatic Meter Management (AMM);
- correcting the gas meter measuring error ;
- presenting data on graphical display;
- presenting pulses and serial information to a process computer;
- recording of parameter changes.

UNIGAS 300 fully conforms to all current European standards and directives – such as EN 12405-1/A1 and ATEX 94/9/EC – as well as to the Dutch Technical Gas Codes and is certified according to MID 2004/22/EC.

Certain functions, such as alarm outputs and a serial port are especially intended for the end-user of the gas.

UNIGAS 300 is highly suitable for integration in data collection systems, and can also be used as a stand alone unit.

2. Primary functions

2.1 Measurement and conversion

UNIGAS 300 contains two processors, one for the metrological functions and one for the display and for external communication.

For gas temperature measurements, UNIGAS 300 has a Pt500 temperature sensor. Gas pressure is measured by a pressure sensor that is based on silicon wafer technology. UNIGAS 300 is equipped with an extremely accurate 24-bit A/D converter that digitalises the signals that come from the temperature and pressure sensors. Temperature and pressure measurements by UNIGAS 300 are made at a fixed interval. This interval time can be set between 5 and 25 s.

UNIGAS 300 is available in four different models: PTZ, PT, TZ and T.

The converted volume is calculated on the basis of the values measured for volume, pressure, temperature and compressibility factor as has been calculated. UNIGAS 300 determines the compressibility factor on the basis of a compressibility algorithm. This compressibility algorithm is not determined by means of a method of approximation, but by using the full algorithm.
UNIGAS 300 is available with compressibility algorithms SGERG TM5 1991 (methods 1-4), AGA NX19 modified (Gasunie) or AGA 8 gross method 1.

The accuracy of UNIGAS 300 complies with the European standards for volume converters EN 12405-1/A1.

2.2 Signal inputs

UNIGAS 300 has a NAMUR input and three low-frequency pulse inputs.

UNIGAS 300 can be connected to a gas meter provided with encoder technology. The interval at which UNIGAS 300 reads the position of the counter of the gas meter can be set between 5 and 25 s. The use of encoder technology ensures that the UNIGAS 300 counter is always synchronous with the gas meter counter.

- NAMUR input: high-frequency pulse input or encoder input; this input can be used to convert or verify the pulses received on input 1.
- Pulse input 1: low-frequency pulse input; this input can be used for conversion.
- Pulse input 2: low-frequency pulse input; this input can be used to verify the pulses received on input 1.
- Pulse input 3: low-frequency pulse input; this input is available for a second gas meter.

Volume conversion takes place on the basis of the signal from the NAMUR input or from pulse input 1.

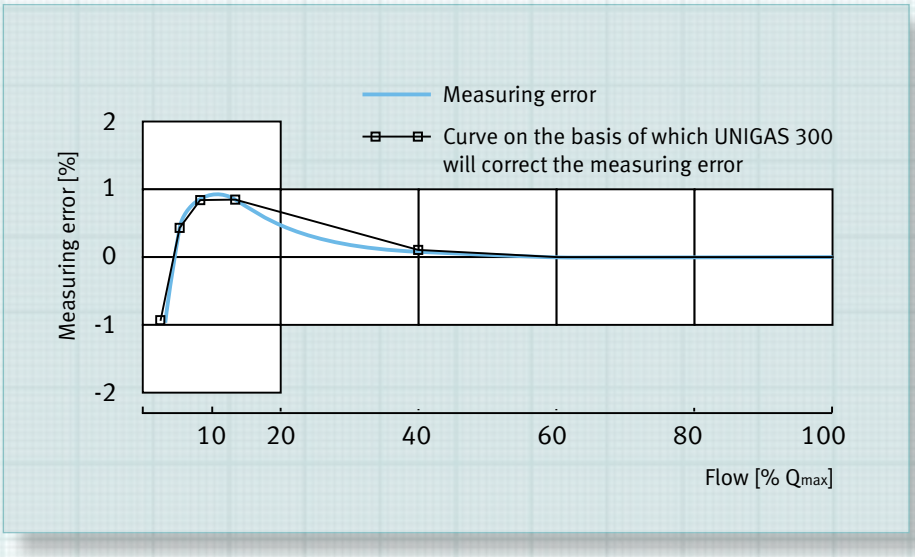
The signal from the gas meter (low- or high-frequency) is multiplied by the conversion factor on a real-time basis and the information in the UNIGAS 300 display is updated immediately.
All pulse inputs are provided with a filter that suppresses pulse instability. Consequently, counter readings in UNIGAS 300 are up-to-date and reliable.

2.3 Error curve correction

All measuring devices will show a minor inaccuracy. This inaccuracy is referred to as measuring error. Such minor inaccuracy also applies to gas meters. The measuring error of a gas meter is determined at a calibration station and can be shown in a graph. This graph shows the error curve for the gas meter.

UNIGAS 300 can save five points of the gas meter error curve. On this basis UNIGAS 300 will then apply linear interpolation to correct the volume measured by the gas meter. This error correction complies with standards EN 12405 1/A1. Using this functionality will considerably increase the accuracy of the operating volume measurement.
Correction of the error curve of the gasmeter is possible if a high frequency pulse input is in use.

Gas meter error curve



3. User-friendly

Easy operation

3.1 Display and navigation keys

UNIGAS 300 is provided with a large graphical display and four navigation keys. With these navigation keys all the information can easily and logically be displayed. The menu has a conveniently arranged structure and is provided with logical symbols to explain what is shown in the display. Historical data can also be displayed in addition to all relevant current values.

By activating any navigation key, the most important data will be shown in the display.
In this way, the following data can be presented in the display:

- current measured values and counters;
- values of parameters;
- current flow;
- logged measured values (intervals: 5, 10, 15, 30 or 60 min);
- logged measured values on a daily basis;
- logged measured values on a monthly basis;
- configuration of inputs and outputs;
- status messages;
- system information;
- battery information;
- modem configuration;
- adjustment;
- language.

Menu structure

Display 1	Menu	
Unconverted volume Vm1	Current values	Status messages
Converted volume Vb1	Parameters	System information
	Flow	Battery information
Display 2	Interval logger	Modem configuration
Counter Vc1	Day logger	Adjustment
Counter Vc1err	Month logger	Language
Counter Vb1err	Inputs and outputs	
Counter Vm2		
Counter Vm3		
Current pressure		
Current temperature		

3.2 UNITOOL

UNITOOL is universal software with which UNIGAS 300 can be read and configured. UNITOOL is also suitable for reading energy meters that use the IEC 62056-21 (previously the IEC 61107) protocol.

The user-friendly interface makes the use of UNITOOL extremely simple. For the management of meter data the Windows®-compatible software uses a universal SQL database.

Major functions of UNITOOL:

- reading and modifying the UNIGAS 300 configuration;
- reading counters, measured values and status information;
- presentation of counter readings and measured values;
- storage of measured values in CSV, Görlitz and XML formats (information of other formats on request);
- communication through RS-232, RS-485, GSM and GPRS connection;
- automatic identification of the energy meter to which UNITOOL is connected;
- identification of user and right of use.

All functions can be used both locally and remotely.

4. Advanced memory

Large memory capacity

UNIGAS 300 has ample memory space for data storage. At every 5-min the measured and converted values are stored in an internal database. The memory of UNIGAS 300 can store these 5-min values over a period of 91 days. The values in storage can be retrieved and displayed, that is in only a few logical steps with the navigation keys of UNIGAS 300. It can be decided whether 5, 10, 15, 30 or 60-min values are to be shown. Status information of UNIGAS 300 is stored separately.

As UNIGAS 300 always stores the values in the memory each 5-min, the history can be accurately analysed. On the basis of these 5-min values it is also possible to prepare very detailed consumption profiles.

All values stored in the memory can also be read using UNITOOL software. UNITOOL presents the measuring data as a table on the computer screen. UNITOOL also offers the choice to read 5, 10, 15, 30 or 60-min values.

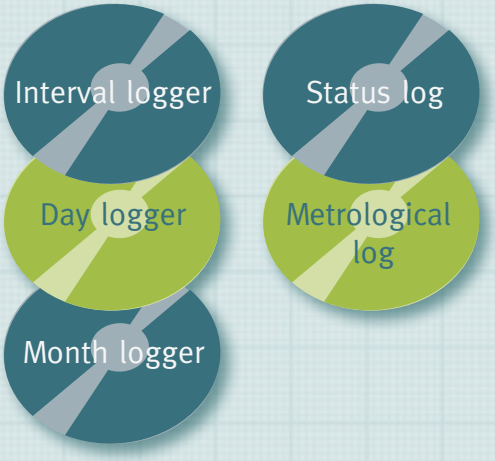
UNIGAS 300 is equipped with the following loggers and logs:

- interval logger: capacity for 26,208 lines (91 days). Logging every 5-min;
- day logger: capacity for 100 days. Logging every day;
- month logger: capacity for 60 months. Logging every month;
- status log: capacity for 360 lines. Each status message is logged;
- metrological log: capacity for 360 lines. Each parameter modification is logged.

26.208 lines – 91 days
Vb1, Vb1err, Vm1, Vc1, Vm2, Vm3
t, p, status messages with date/time indication

100 lines – 100 days
Vb1, Vb1err, Vm1, Vc1, Vm2, Vm3,
t, p, status messages with date/time indication

60 lines – 60 months
Vb1, Vb1err, Vm1, Vc1, Vm2, Vm3,
t, p, status messages with date/time indication



360 status messages with date/time indication

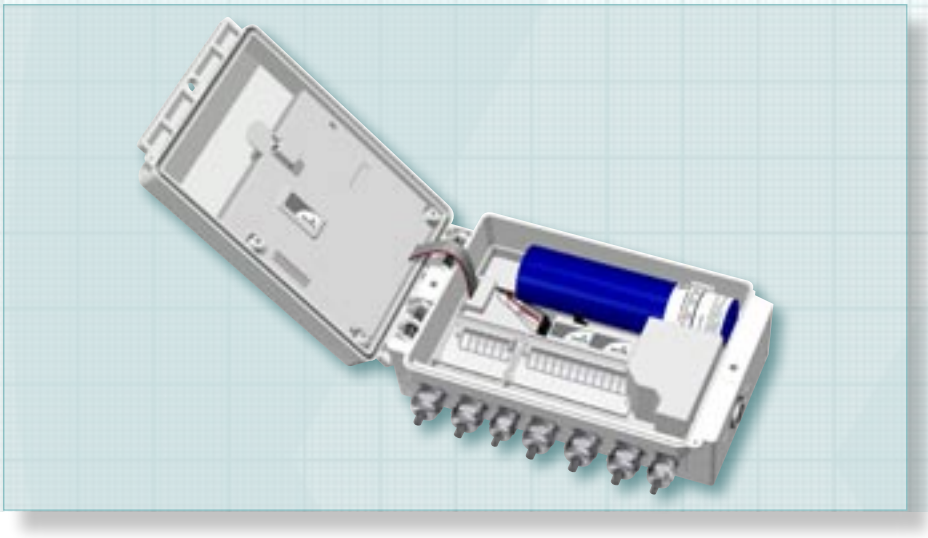
360 lines
Modified parameter old and new values, Vb1, Vc1, status messages with date/time indication

5. Easy installation and low maintenance costs

UNIGAS 300 is a robust and easy to install electronic volume conversion device. UNIGAS 300 requires hardly any or very little maintenance, and consequently the maintenance cost will be minimized. The following aspects will keep the *total cost of ownership* low:

- for a device to comply with the legal provisions for explosion protection, it must be properly earthed. UNIGAS 300 is provided with optical isolation and therefore no special earthing arrangements are required;
- long battery life;
- parameters can easily by changed by means of UNITOOL, also remotely;
- input and output signals can be checked in the display;
- robust metal housing provided with adequately spaced high-quality metal cable glands;
- high-quality, well accessible conduction terminals;
- infrared connector for serial communication is easily and quickly placed;
- degree of protection: IP66, suitable for outdoor installation;
- automatic identification of optional plug-in modules;
- all inputs and outputs are optically isolated. This provides UNIGAS 300 with optimum protection against external electric intervention;
- where pressure and temperature sensors are placed inside an explosion-hazardous zone and UNIGAS 300 is placed outside this zone, no special explosion protection separations (e.g. relay or zener barrier) are required;
- sealing is simple and reliable;
- customer-specific information on type plate is possible;
- universal mounting bracket is available on request.

Interior of UNIGAS 300

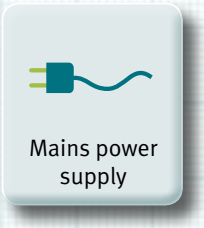


6. Electric power supply

6.1 Battery supply

By using a battery UNIGAS 300 can work fully on its own for a long time. UNIGAS 300 can be provided with a lithium D cell, or with a lithium DD cell for extra long battery life.

Under normal conditions, battery life for the D cell is at least 10 years. If, however, the DD cell is used, battery life is extended to at least 15 years. Thanks to an ingenious electronic circuit, battery life is not adversely affected by the pulse width of the pulse outputs. The capacity of the DD cell suffices to provide the encoder with energy for a period of five years, in addition to UNIGAS 300.



6.2 Mains power supply

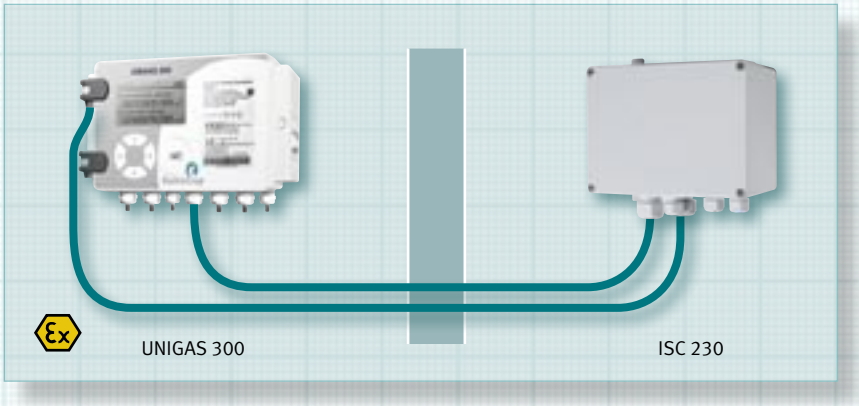
If a Kamstrup external power supply unit is used (ISC 230), it is still allowed to install UNIGAS 300 in an explosion hazardous zone.

Where pressure and temperature sensors are placed inside an explosion-hazardous zone and UNIGAS 300 is placed outside this zone, UNIGAS 300 may be provided with the internal mains supply module.

If the high-frequency pulse input is used, UNIGAS 300 must be supplied by one of the mains supply units.

In the event of mains supply breakdown, the battery acts as an emergency supply provision.

External mains power supply with ISC 230



ISC 230
- Ex-barrier serial outputs
- Ex-barrier pulse outputs
- Ex-safe electric power supply for UNIGAS 300
- Signal converter RS-232 ‹› RS-485 (optional)

7. Central data collection

Volume converters on location are often connected to telemetry equipment to allow for remote reading of measuring data by means of a central data collection system (Automatic Meter Reading, AMR). Automatic Meter Management (AMM) systems will provide the measuring data company with additional information on the measuring devices connected.

7.1 System description

UNIGAS 300 in its standard configuration is provided with three communication ports (see page 14):

Communication port 1: remote communication;
Communication port 2: reading and configuration on location;
Communication port 3: communication to a process computer.

For remote reading and configuration of UNIGAS 300 via communication port 1, one of the following Kamstrup products can be connected by means of an infrared connector:

- UNILOG MU (GSM/GPRS-modem);
- ISC 230 (intrinsically safe power supply and communication unit).

UNILOG MU is available in versions for battery supply as well as for mains power supply. UNILOG MU with mains supply can also supply UNIGAS 300 with power.

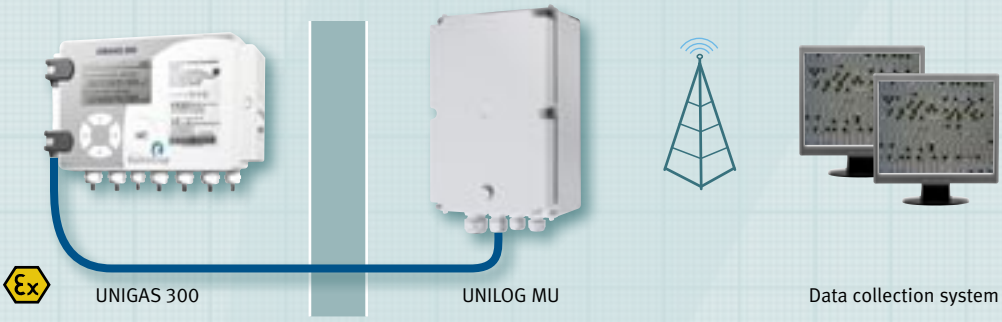
The intrinsically safe power supply and local communication unit ISC 230 can also be used for supplying power to UNIGAS 300.

For reading or configuring UNIGAS 300 on location, an infrared communication head is used that is connected to communication port 2.

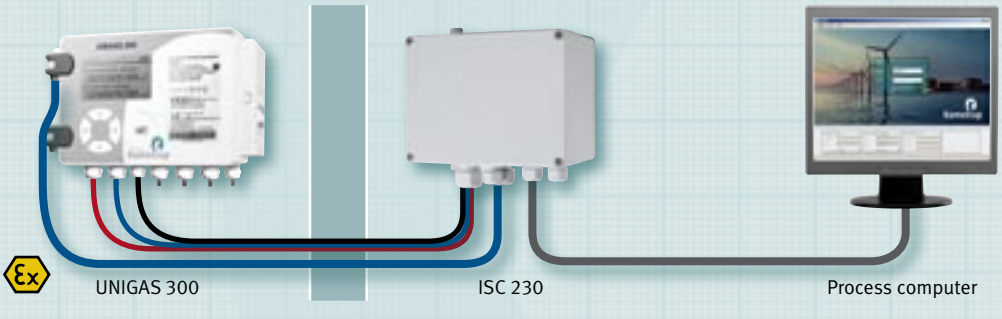
A process computer is connected to communication port 3 by means of an infrared connector.

UNIGAS 300 will communicate with VDEW 2.1 (previously IEC 61107) by means of protocol IEC 62056-21.

UNIGAS 300 for central data collection



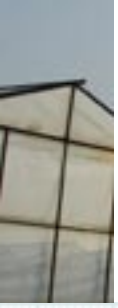
UNIGAS 300 for local energy management



UNILOG MU
- modem (GSM/GPRS)

Additional functions for 230 V AC power-supplied version:
- Ex-barrier serial outputs
- Ex-barrier pulse outputs
- Ex-safe electric power supply for UNIGAS 300
- signal converter RS-232 ‹› RS-485 (optional)

ISC 230
- Ex-barrier serial outputs
- Ex-barrier pulse outputs
- Ex-safe electric power supply for UNIGAS 300
- signal converter RS-232 ‹› RS-485 (optional)



7.2 Status information

UNIGAS 300 continuously compares a number of variables with pre-set limit values, e.g. pressure, temperature, volume and flow. A variable exceeding a pre-set value is detected by UNIGAS 300 and indicated by means of a status message. A status message can be either a warning or an alarm. Status messages are logged in UNIGAS 300. It is possible to activate one of the alarm outputs when certain status messages are received.

The current and historical status messages of UNIGAS 300 can be read by means of UNITOOL software, both locally and remotely.

7.3 Remote configuration

Certain parameters of UNIGAS 300 can be changed remotely by means of UNITOOL or a central data collection system. For example, if a change-over is made to another gas delivery contract, UNIGAS 300 can be adapted accordingly. Naturally only a certified person may modify certain parameters. To ensure this, the modification process is protected by a password. Modifications of parameters are stored in the UNIGAS 300 metrological log.

7.4 Future proof

UNIGAS 300 has been designed for the implementation of all current and future communication protocols. This ensures that UNIGAS 300 will work with the most sophisticated central data collection systems for many years to come. UNIGAS 300 has a large module space.

Local configuration of UNIGAS 300 with UNITOOL

8. UNIGAS 300 and process computer

8.1 Energy management

UNIGAS 300 plays a major role in the chain of gas meter, volume converter and process computer. To obtain optimum process control, UNIGAS 300 supplies real-time information to the process computer. This enables the saving of natural gas and the avoidance of high consumption peaks. The unique capabilities of UNIGAS 300 are essential for effective energy management, e.g. in horticulture under glass, the industry and the real estate sector. UNIGAS 300 makes it possible to draft contracts with the gas supplier accurately to the wishes of the client. UNIGAS 300 allows the client to keep his gas consumption within the limits of what is agreed in the contract and consequently to avoid high penalties for exceeding the agreements.

To allow for energy management UNIGAS 300 has the following outputs:

- four real-time pulse outputs, of which two real-time alarm outputs;
- three real-time serial communication ports.

8.2 Signal outputs

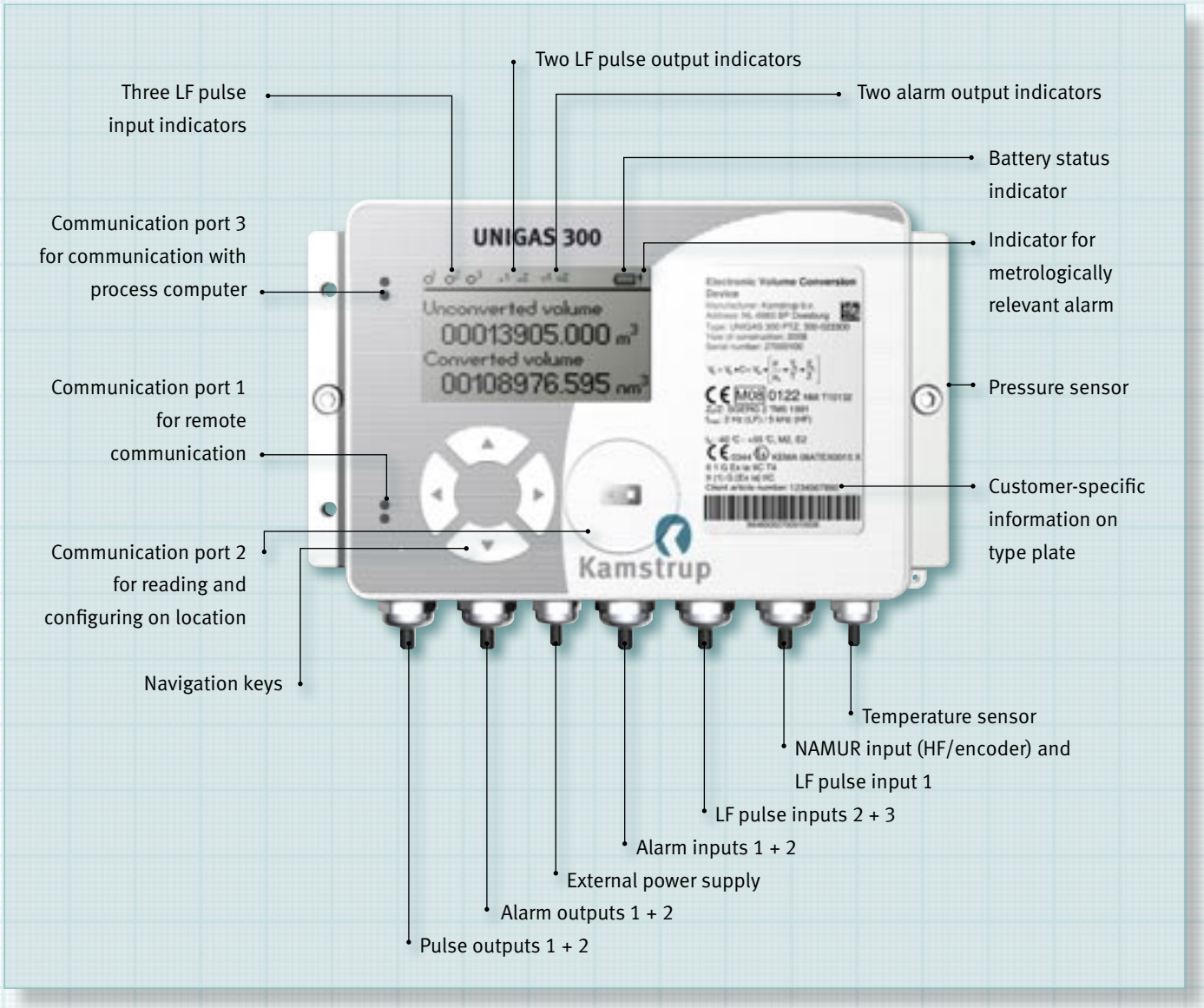
UNIGAS 300 in its standard configuration is provided with four signal outputs. By two of these outputs a process computer can control the related process. These pulse outputs give real-time information on the converted and unconverted volumes, for example, on the basis of which the process computer can respond immediately.
The two other signal outputs can be used for alarm purposes. For example, an alarm signal may be given when there is a threat that a pre-set consumption value per hour is going to be exceeded.

Using UNITOOL software the pulse outputs can be configured.

8.3 Serial communication ports

One of the three serial communication ports is available for communication with the process computer. Through this communication port the process computer may retrieve data on flow, counter readings, status messages, pressure, temperature, conversion factor and historical data from the loggers of UNIGAS 300.
This communication port provides the end-user with reliable actual measuring data and counter readings. These data are the same as the data that the gas supplier uses for invoicing.

UNIGAS 300


Two LF pulse output indicators
Three LF pulse input indicators
Two alarm output indicators
Battery status indicator
Communication port 3 for communication with process computer
Indicator for metrologically relevant alarm
Communication port 1 for remote communication
Pressure sensor
Customer-specific information on type plate
Communication port 2 for reading and configuring on location
Navigation keys
Temperature sensor
NAMUR input (HF/encoder) and LF pulse input 1
LF pulse inputs 2 + 3
Alarm inputs 1 + 2
External power supply
Alarm outputs 1 + 2
Pulse outputs 1 + 2
UNIGAS 300
Unconverted volume
00013905.000 m³
Converted volume
00108976.595 nm³
Kamstrup

9. Technical specifications

General	
Dimensions	194 x 120 x 70 mm
Material	coated aluminium, suitable to be exposed to direct sunlight
Weight	approx. 1.5 kg
Glands	2 x ø 2 – 5 mm 5 x ø 5 – 9 mm
Module space	yes
Space for additional power supply module	yes
Fraud detection	when housing is opened
Ambient conditions	-40 – +55 °C, 0 – 100 %, condensing
IP class	IP66 (jet-proof)
Medium conditions	-40 – +55 °C, 0.8 – 80 bar (abs.)
Mechanical class	M2 according to EN 12405-1/A1
Electrical class	E2 according to EN 12405-1/A1

Metrology	
Approval	MID 002, MID 2004/22/EC by NMI NMI T10132
Measuring interval	5 – 25 s, configurable
Conversion interval	- LF: each pulse - HF: each second (with pulses being present) - encoder: each measuring interval
Standard	EN 12405-1/A1
Accuracy at delivery	‹ 0.4% of value as measured

Explosion protection	
ATEX	- II 1 G, Ex ia IIC T4 (for placement in Ex-zone 0) - II (1) G, [Ex ia] IIC (for placement in safe zone)
Approval	08ATEX0015 X
Serial outputs	optically galvanically isolated, no Ex-earthing required
Pulse and alarm outputs	- inside zone: U_i = 20 V, I_i = 600 mA, P_i = 480 mW, C_i = 27 nF, L_i = 0 mH - outside zone: U_n = 20 V DC, U_m = 250 V AC; the outputs may be directly connected to other equipment

Electric power supply	
External supply	ISC 230 or UNILOG with 230 V AC
Voltage	5 – 10 V DC
Current consumption	≤ 40 mA
Internal battery supply	D cell or DD cell
Service life of D cell in normal operation: pulse inputs activated, communication with data collection system once daily and 15 min/month display use	- PTZ version, 10 years without encoder 8 years with encoder (5-min measuring interval) - TZ version: 12 years without encoder 10 years with encoder (5-min measuring interval)
Service life of DD cell in normal operation: pulse inputs activated, communication with data collection system once daily and 15 min/month display use	- PTZ version ≥ 15 years without encoder 5 years with encoder (25-s measuring interval) 13 years with encoder (5-min measuring interval) - TZ version ≥ 15 years without encoder 6 years with encoder (25-s measuring interval) 13 years with encoder (5-min measuring interval)
Battery status	- indicator in main screen - initial and consumed capacity in menu
Capacity of D cell	19 Ah
Capacity of DD cell	35 Ah

Human interface	
Display	graphical LCD, 66 x 33 mm, 8 lines with 20 characters
Display readable	≥ -25 °C
Number of digits, counter	XXXXXXXX.XXX m^3 (8 digits and 3 decimals)
Number of digits, pressure and temperature	XXXX.XX mbar and °C, respectively (4 digits and 2 decimals)
Number of navigation keys	4
Display of data	- 2 on-screen views with current measuring data and counters - further indications through the menu
Configurability by means of keys	adjustment of pressure and temperature sensors after seal has been broken and activation of programming switch

Signal inputs

Number of inputs	6
Connection	screw clamps
NAMUR input	HF or encoder input for counter 1 for conversion purposes (encoder input also configurable for counter 2)
Pulse input 1	LF input for counter 1 for conversion purposes, configurable
Pulse input 2	LF input for counter 2
Pulse input 3	LF input for counter 3
Alarm input 1	input for contact that is normally closed
Alarm input 2	input for contact that is normally closed
Specification LF	3.6 V, 6 µA, reed or transistor
Maximum frequency	2 Hz
Minimum pulse duration	75 ms
Scaling factor	- counter 1: 0.1 – 100,000 imp/m³, configurable - counters 2 and 3: 0.1 – 100 imp/m³, configurable
Specification HF	NAMUR, 5 kHz DC 50%, mains power supply is necessary (1000 h emergency supply by D cell in case of voltage breakdown)
Maximum frequency	5 kHz
Minimum pulse duration	100 µs
Error curve correction	linear interpolation based on five coordinates of the gas meter error curve
Specification of encoder	NAMUR, suitable for encoder counters of GWF and Elster
Specification of alarm inputs	3.6 V, 6 µA, reed or transistor

Pressure sensor

Type	PDCR series
Measuring technology	silicon piezo-resistive
Dimensions	ø 25 x 82 mm
Connection	G¼, flat sealing
Arrangement of pressure ranges	- 0,8 – 2,5 bar (abs.) - 1,5 – 6 bar (abs.) - 2,5 – 10 bar (abs.) - 5 – 20 bar (abs.) - 10 – 40 bar (abs.) - 20 – 80 bar (abs.)
Standard	EN 12405-1/A1
Maximum overload	twice maximum pressure, without loss of accuracy
Adjustment	to be set offset by means of display and keys after seal has been broken and activation of programming switch
Form of construction	- internal - external, with cable of approx. 3 m

Temperature sensor

Type	Pt500, twin-core
Measuring technology	platinum resistance measuring (500 Ω at 0 °C)
Dimensions	approx. ø 5.8 x 45 mm
Range	-40 – +55 °C
Standard	EN 12405-1/A1
Adjustment	offset at 0 °C and span in positive and negative temperature range, to be set by means of display and keys after seal has been broken and activation of programming switch
Form of construction	external, with silicon cable of approx. 3 m

Conversion algorithms

Form of construction	- PTZ (pressure, temperature and compressibility) - PT (pressure and temperature) - TZ (temperature and compressibility) - T (temperature)
Conversion algorithms	- AGA NX19 modified (Gasunie) - SGERG TM5 1991 (method 1-4) - AGA 8 gross method 1
Determination of compressibility factor	full algorithm implemented in UNIGAS 300

Data storage

Loggers:

interval logger (5-min interval)	(26.208 lines) V_{b1}, V_{b1err}, V_{m1}, V_{c1}, V_{m2}, V_{m3}, t, p, status message with date/time indication
day logger	(100 lines) V_{b1}, V_{b1err}, V_{m1}, V_{c1}, V_{m2}, V_{m3}, t, p, status message with date/time indication
month logger	(60 lines) V_{b1}, V_{b1err}, V_{m1}, V_{c1}, V_{m2}, V_{m3}, t, p, status message with date/time indication

Logs:

status log, storage of status information	(360 lines) status messages with date/time indication
metrological log, storage of metrological characteristic modifications	(360 lines) modified parameter, old and new values V_{b1}, V_{m1}, status messages with date/time indication

Signal outputs

Number of pulse outputs	4, configurable
Pulse outputs 1 and 2	- V_{b1} or - $V_{b1,err}$ or - V_{m1} or - V_{c1} or - V_{m2} or - V_{m3}
Maximum frequency	2 Hz
Scaling factors	1 - 100, configurable
Pulse width	≈ 100 ms
Alarm outputs 1 and 2	alarm output, configurable
Activation of alarm outputs 1 and 2	activation when pre-set status message is reached
Pulse width	≈ 100 ms, repetitive pulse every 5-min interval in case of an active alarm
Ex-isolation	galvanic (optical)
Connection	screw clamps
Specification	see paragraph “Explosion protection”

Communication ports

Communication port 1	- serial, screwed connection - infrared connector - sealable with adhesive seal
Communication port 2	- serial, magnetic connection - infrared communication head according to IEC 62056-21
Communication port 3	- serial, screwed connection - infrared connector - sealable with adhesive seal
Specification	- 9600 baud, 7E1 - objects according to OBIS (EN 13757-1), VDEW - IEC 62056-21 (previously IEC 61107) - reading of current and stored data - reading and writing of metrological data (metrological lock) - reading and writing of supplier’s data (supplier lock) - reading and writing of consumer data (consumer lock)

Status messages

Exceedance of alarm Q_{b1}	flow of converted volume, configurable in range of 1 - 10.000 m^3/h
Exceedance of warning Q_{b1}	flow of converted volume, configurable in range of 1 - 10.000 m^3/h
Exceedance of alarm $V_{b1\_}60$	converted volume (current hourly consumption), configurable in range of 1 - 10.000 m^3
Exceedance of warning $V_{b1\_}60$	converted volume (current hourly consumption), configurable in range of 1 - 10.000 m^3
Exceedance of alarm Q_{c1}	flow of corrected operating volume, configurable in range of 1 - 10,000 m^3/h
Exceedance of warning Q_{c1}	flow of corrected operating volume, configurable in range of 1 - 10,000 m^3/h
Exceedance of alarm $V_{c1\_}60$	corrected operating volume (current hourly consumption), configurable in range of 1 - 10,000 m^3
Exceedance of warning $V_{c1\_}60$	corrected operating volume (current hourly consumption), configurable in range of 1 - 10,000 m^3
Alarm input 1	pulse recorded on alarm input 1
Alarm input 2	pulse recorded on alarm input 2
Status messages relating to:	- metrology - inputs and outputs - clock - opening of housing - metrological lock - logs - volume differences - electric power supply

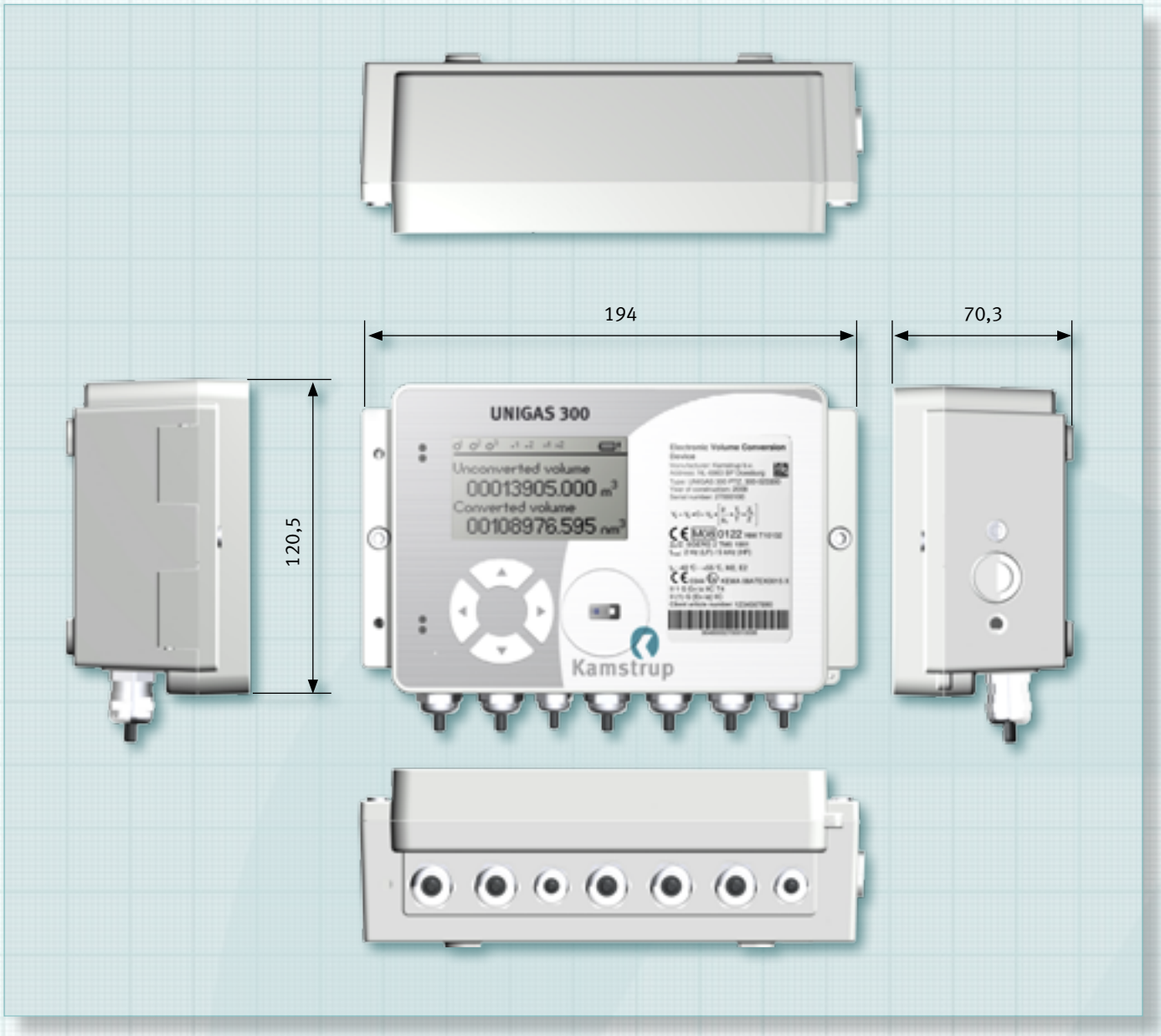
Clock

Type	POSIX
Summer and winter time (DST)	according to 2000/84/EC
Typical accuracy	20 ppm at 25 °C

Compatibility	
Hardware	- UNILOG MU - ISC 230
Software	UNITOOL, suitable for Windows 2000, Windows XP and Windows Vista operating systems

Standards/regulations	
Overall	- CE conformity marking - RoHS - WEEE
	- EN 12405-1/A1, Gas meters. – Conversion devices – Part 1: Volume conversion, 2005 - Council Directive 2004/22/EC on measuring instruments, MI 002 2004
Software metrology	Welmec 7.2 Software Guide (Measuring Instruments Directive 2004/22/EC), 2005
Housing	IEC 60529, Degrees of protection provided by enclosures of electrical equipment (IP Codes), 2001
Explosion hazard	- EN-IEC 60079-0, Electrical apparatus for explosive gas atmospheres – Part 0: General requirements, 2006 - EN-IEC 60079-11, Electrical apparatus for explosive atmospheres – Part 11: Electric protection by intrinsic safety “i”, 2007 - EN-IEC 60079-28, Electrical apparatus for explosive atmospheres - Part 28: Protection of equipment and transmission systems using optical radiation, 2006 - EN-IEC 60079-26, Electrical apparatus for explosive atmospheres - Part 26: Equipment with equipment protection level (EPL) Ga, 2007 - Directive 94/9/EC on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres, 1994
Serial communication	- EN-IEC 62056-21, Electricity Metering - Data Exchange for Meter Reading, Tariff and Load Control - Part 21: Direct Local Data Exchange, 2002 - VDEW-Lastenheft, Elektronische Lastgangzähler, Erweiterte Version 2.1.2, November 2003 - EN 13757-1 Communication system for meters and remote reading of meters – Part 1: Data exchange, 2003

Dimensions UNIGAS 300



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