GAS METERING

GAS METERS

PRODUCT RANGE

APATOR

GAS METERING

SMART thinking

Vision

Apator Group is one of the most important suppliers in EMEA region in the development and sales metering equipment and systems as well as switchgear equipment.

Mission

Be promoter and leading supplier of modern metering systems for utility services and maintain the possition of important supplier on the market of low voltage switchgear equipment.

Strategic objective

The establishment of strong technological group acting in metering and switchgear segments based on strong brand of Apator and oriented at the increase of sales on foreign markets.

CONTENT

Apator Metrix

- **EXISTS FROM:**
  Established in 1948 (Pomeranian gas meter factory) since 2004 is part of the Apator Group
- **SCOPE OF BUSINESS:**
  Diaphragm domestic, commercial and industrial gas meter including smart solutions.
- **CERTIFICATES:**
  ISO 9001:2008, ISO 14001:2004
- **CONFORMITY TO:**
  2004/22/EC (MID); EN1359; OIML

GAS METERING

Smart gas measurement

with remote reading


metrix
GRUPA APATOR
UG G4
iSMART
metrix
GRUPA APATOR
UG G4
HYBRID
SMART

HybridSmart

Modular concept of smart index

HybridSmart is the product from Apator Metrix dedicated for flexible Smart Gas Metering solutions. Retaining the best functionality from the traditional conservative mechanical Index while implementing various of Smart Technology including Shut-Off-Valve, Temperature Compensation and Radio Modules. This package is MID-approved whilst offering OEM-customers enough space in separate compartments to integrate their own printed circuit boards providing additional functionalities as communication modules, valve control with related PAYG functionalities and others.

HybridSmart provides you with great versatility you can choose from. It offers a platform you Can build your own Smat Gas Meter.

HybridSmart has been developed based on the experience of the production of hundreds of thousands of smart meters for the EU markets in recent years.

VERSATILITY

HYBRID SOLUTION

The Product offers 2 in 1 in terms of the gas consumption registration. Mechanical Index and Electronic Encoder under one common housing. Additional internal electronic modules offers various combination of extended functionalities.

OEM COMPARTMENT

Designed for OEM manufacturers. Index has available internal compartment where OEM customers can design their own circuit board integrating their own Additional Functionalities.

RANGE OF PRODUCTS

Compatible with UG-series 1,2l and 2,2l measuring units offering meters ranging from G1,6 to G6 wth bosses spacing: DN25, 100 mm, 110 mm, 130 mm, 6" , l60 mm, 220 mm, 250 mm.

ZERO PRESSURE DROP SHUT-OFF-VALVE

Products can be equipped with optional internal ball-valve. Highest security of valve operations is ensured by the endstop microswitch detecting real position of the valve (open/closed). Custom designed for Metrix UG-seres 1,2l and 2,2l measuring units. Tested and approved for Class 1 according EN16314.

ABSOLUTE ENCODER

High-End IP protected Swiss technology of Absolute Encoder offers real-state scanning of the mechanical index. Reading on demand ensures highest possible energy saving and 100% guaranteed readings.

INCREMENTAL ENCODER (AS AN OPTION TO ABSOLUTE ENCODER)

Cost-effective recording and archiving electronic module for gas volume encoding based on field proven optical detection using graycode disc.

RADIO MODULES WITH DEDICATED INTERNAL ANTENNAS

Products can be equipped with Radio Modules offering solutions for:

- 868 Mhz Wireless M-BUS in accordance with EN13757-3 and OMS;
- 169 Mhz Wireless M-BUS N-mode in accordance with EN13757-4:2013.
  It meets additional specificatrons required by the Italian Gas Metering market regulations;
- GSM/GPRS quad band. Full compliant ARG155/08,
  UNI/TS11291 and subsequent (Italian reference of AEEG standard). DLMS protocol implemented.

MECHANICAL OR ELECTRONIC TEMPERATURE COMPENSATION

Products can be equipped with optional mechanical or electronic temperature compensation fitting UG 1,2l and UG 2,2l measuring units (version with mechanical TC: V = 1.15 dm^3 and V = 1.9 dm^3).

iSmart

Modular concept of smart electronic index

SMART FEATURES

- Electronic and traditional mechanical seals for: MID battery and communication compartments
- Backup battery
- Real time battery life monitoring
- Real time clock accuracy ±0,5s/day
- Safe valve opening procedure
- Optional valve closure upon tamper detection
- Detection of the external magnetic field
- Tamper detection in case of unauthorised opening of the cover or trying to remove index
- Earthquake detection
- Elaborate password system
- RFID as special safety item and for traceability
- Prepayment functionality optional
- Event log books with 200 logs for connecting, tamper etc.
- Load profile 13 months long, 30 min periods
- COSEM/DLMS Firmware compliant
- Up to 48 TOU tariffs
- Up to 8x8 TOU/BLOCK matrix size
- Firmware remotely upgradeable - future proof design

TECHNICAL DATA

Standards/Directives/Compliances	2004/22/EC (MID), 1999/5/EC (RTTE), 2004/108/EC (EMC), EN1359:1998+A1:2006, EN16314, AR631/13, UNI/TS11291, WELMEC7.2
Gas meter class	1,5 (optional error curve correction)
Mechanical Class	M1
Pmax (also with valve included)	50kPa (0.5 bar)
Temperature range	-25°C... +55°C
Resistance to high ambient temperature	T@0,1bar acc. EN1359
Index measuring resolution	00000,0000 m^3
Nominal cyclic volume	1,2 dm^3 (optional 2,2 dm^3)
Weight	~2,2 kg
Family of gases	1.2.3 acc. EN437:2003+A1:2009
Smart Electronic Index Ingress Protection Rating	IP65 / IP67 acc. EN60529
Smart Electronic Index Flame Rating	V-0 acc. UL-94
ATEX	Zone 2
Body & Coating	Zinc-coated pressed steel plate powder painted RAL7035
Band	Stainless steel
Shut-Off Valve (optional)	Shut-off zero pressure ball-drop valve. Endstop microswitch detecting real position of the valve (open/closed state) ensures highest security operation. Custom design by Metrix for UG-series measuring units. Tested and approved for Class 1 according to EN16314, Gas Meter with valve has a pressure drop at range of 150Pa@6m^3/h
Cable through	Pins gold plated, glass-ceramic, high temperature resistant, helium leakage tested
Service Interface	IR acc. EN62056-21
Batteries	Lithium Thyonyl-Chlorides C+D cells. The battery life depends from operating condition and technologies. Up to 15 years
Communication modules	GSM/GPRS, Wireless M-Bus 169 Mhz, Wireless M-Bus 868 MHz OMS, ZigBee 868 MHz, ZigBee 2,4 GHz
Communication protocols	DLMS/COSEM compliant UNI/TS 11291-11 Wireless M-BUS OMS compliant EN13757
Internal and external antennas	Internal antenna as default, optional external antenna to extend rangeability. Simplified in field Plug&Play installation of external antenna automatically switch radio modem operations from internal to external antenna without any additional manual reconfiguration and wiring.
Smat volume reading	Low power, elecironic solid state. Hall Effect sensor (patent pending)
Temperature compensation	Real NTC temperature measurement in the gas stream
LCD display	Large and clear view enabling LCD display with backlight illumination. Customisable to present: ■ (Vm) Volume at measuring condition [m^3] ■ (Vc) Corrected volume by error curve correction algorithm [m^3] ■ (Vb) Volume at base condition [m^3] ■ Energy [kWh] ■ Instantaneous flow rate [m^3/h] ■ Maximum demand (peak flow) ■ Measurement displayed to 0,1 litre resolution (00000.0000 m^3)
Customisation	Product can be easily customised to meet customer requirements in functionality, communication and design. The front layout and coloured frame can be adjusted to fit "Customer Branding".
Dimensions	see table on page 19 and 21

MAIN FEATURES

FLEXIBLE FUTURE PROOF

- New 2nd generation index design
- Very low pressure drop using ball valve technology
- Display and Main Board protected MID cover and primary tamper evident MID seal
- Available as either Front Viewing or Top Viewing Index (TVI) / Semi Concealed
- Interoperability with Smart Electricity Meters and In Home Display Units (IHD)
- Low power, electronic solid state, Hall Effect sensor (patent pending)
- High tech / state of the art electronic design with high quality components
- In service replacement of communications module
- Remotely upgradeable firmware
- Design in accordance to smart meter specifications

SEI Smart Gas Meter

SMART FEATURES

DATA MANAGEMENT

- Configurable time-of-use tariffs
- Profile recorder
  - 2 channels with independently configurable data capture
  - Channel 1:
    - Designed for general energy measurement
    - Configurable intervals (6,10,15,20,30 and 60 minutes)
    - Configurable capacity: dependant on registered reading requirements
  - Channel 2:
    - Designed for billing profile
    - Configurable intervals (day, week, month or specific day)
    - Configurable capacity: dependant on required tariff registers and consumption
- Data logger with five independent FIFO buffers (up to 50 events)
  - General (informational, clocks, schedules...)
  - Fault (general system faults)
  - Security (password activities)
  - Communications (session statistics)
  - Valve control (opening, closing...)
- Configurable AUTO and MANUAL scroll sequence with up to 16 entries
- Firmware upgrade through RF communication channel
- Optional prepayment feature

TAMPER PROTECTION

- 30 day backup battery (to support logging and clock maintenance)
- Supervision of the battery capacity and generating alarms in case of crossing low or failure level capacity
- Communication and battery tamper protection through compact housing design
- Tamper detection upon removal of index from meter housing
- Valve closure upon tamper detection
- Detection of the external magnetic field
- Data logger and display alarms

COMMUNICATION

- Optical interface according to the IEC 62056-21 (C mode) for reading and parameterisation of the smart gas index
- User friendly software package for reading, calibrating and parametrisating for PC and Hand Held Units
- Communication module – universal interface for various connections including
  - ZigBee RF
  - Wireless MBus 868 MHz - OMS standard
  - Wireless MBus 169 MHz
  - GSM
- Able to communicate with HDU if required
- Flexible communications platform

TECHNICAL DATA

METER SPECIFICATION

- Index specification: Weight < 0,3kg, Dimensions: 94 (H) x 142 (W) x 45 (D)
- Powdercoat RAL 7035 (light grey)
- Stainless steel band)

Cyclic volume [L]	Housing type	Meter size	Spacing [mm]	Valve (optional)
1,2	UG-F	G1,6 | G2,5 | G4	0	YES
			100	YES
			110	YES
			130	YES
	UG-EN		0	YES
			130	YES
			152,4 (6")	YES
			160	YES
	UG-NL		220	YES
	UG-DE		250	YES
2,2	UG-EN	G4 | G6	0	YES
			130	YES
			6" 152,4	YES
			160	YES
	UG-NL		220	YES
	UG-DE		250	YES

INDEX SPECIFICATION

- Battery: 1 x 3.6V, Lithium Thyonyl-Chloride
- Min. 15 years battery life
- Real time battery life monitoring
- Operating temperature range: -20°C to +55°C
- Real time clock accuracy: ±0.5s/day
- Minimum water and dust protection IP56 (IEC 60529)
- Individual battery and communication compartments
- Single removable front cover
- 2 button user interface:
  - Menu functions
  - Valve control
- Large and clear view enabling LCD display with backlight illumination
- Integral valve for closing and opening of the gas flow:
  - Closing: remote command, configurable tamper and battery failure
  - Safe reopening: through end user manual confirmation by pressing valve control button
- MID and ATEX compliant

MEASUREMENT

- Proven and reliable diaphragm gas meter
- High accuracy multipoint calibration throughout the flow range
- Register and calculation of the:
  - Volume at measuring condition [m^3]
  - Corrected volume [m^3]
  - Volume at base condition [m^3]
  - Energy [kWh]
  - Instantaneous flow rate [m^3/h]
  - Maximum demand (peak flow)
- Measurements displayed to 1 litre resolution (0.001 m^3)

UniSmart

Communication module for gas meters

UniSmart is the product of Apator Group dedicated for AMR systems in the gas industry and constitutes a cheaper alternative to the smart meter. It is designed for customers and users not requiring full functionality offered by smart gas meters, and also where low gas consumption and lower frequency of reading requires the use of economic relevant technologies.

At the same time, it is a product offering broad functionality for reading gas and its balancing in the network, in line with European standards. UniSmart is another proposition of our company to realise the challenge of widespread implementation of smart metering in the EU countries.

UniSmart is based on the experience of the production of hundreds of thousands of smart meters for the EU markets in recent years.

THE BASIC FEATURES

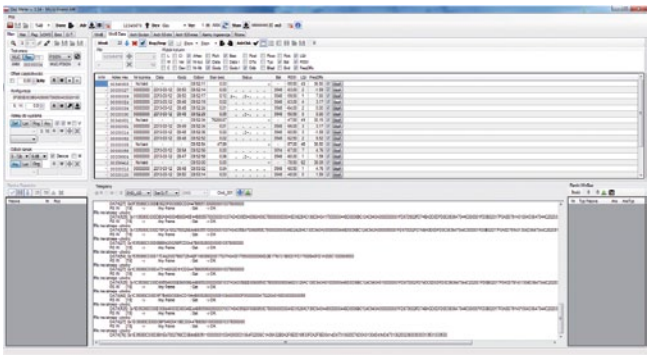
- **Versatility** – suitable to be connected to any type of meter equipped with a burglary Apator Metrix S.A. index, produced after 2005.
- **Easy to install and setup** – connected as a standard impulse transmitter in the meter hanging in the network and configured wirelessly.
- **Interoperability** – the usage of open communication protocol in accordance with standards EN 13757-3 and BS EN 13757-4 provides interoperability with devices of other manufacturers and the ability to communicate within a single system AMR. Reading is carried out by radio. The product is compatible with other existing technical specifications in the EU countries, such as OMS and NTA.
- **Flexibility** – can be used in walk-by or stationary systems. We also offer software for these systems operating on readily available equipment (e.g. Psion).

FUNCTIONAL FEATURES

- An open, widely communication protocol used wireless M-Bus based on European Standard, EN 13757-3 and EN 13757-4.
- Modes:
  - T1 (transmission frame with readings)
  - T2 (parameterisation module)
  - service mode
- Count the number of pulses
  - 1 pulse means 1 rotation of the last drum with the least significant digit of mechanical index
  - an algorithm of elimination errors caused for example by vibration of drum in mechanical index
- Recalculation of pulses per volume (m^3)
- History of flows (60 - daily, 120 - monthly)
- The alarm log
  - interference by an external magnetic field
  - exceeding the maximum flow (Q_{max})
  - no pulses
- Firmware upgrade through RF communication channel
- Estimated time of battery discharge
- Power 1x AA lithium battery
- Operation time without replacing the battery (above 10 years)
- Parametrisation
  - initial state
  - time (date, time)
  - definition of flow precision
  - definition of broadcast schedule the reading frame
  - definition of the contents of a sent frame
- Optional parameters sent in a radio frame
  - volume of the last billing period
  - battery status
  - gas meter type
  - spacing of connector pipes
  - manufacturer
  - year of production
  - installation number
- Data Encryption AES-128 in accordance with NTA/OMS, in accordance with EN 13757-3, 5.10:
  - NTA method (with static initialisation vector)
  - NTA method (with dynamic initialisation vector)
  - OMS method (with dynamic initialisation vector)

DEVELOPMENT PROGRAM (for a system integrator)

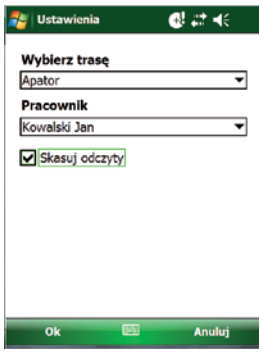
- To configure UniSmart:
  - setting installation number,
  - transmission time settings,
  - current volume setting,
  - max flow setting,
  - current date,
  - alarms setting, etc.

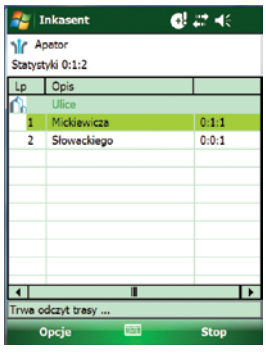


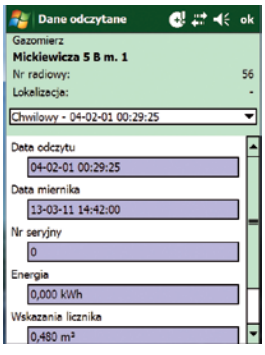
ADDITIONAL EQUIPMENT

Psion WorkAbout

Compatible with wireless M-Bus EN 13757-4







Software for reading the meter indication with the usage of PSION (walk-by system).

metrix GRUPA APATOR

Residential and commercial gas meters

with mechanical index

Type		UG-G1,6	UG-G2,5	UG-G4	UG-G4	UG-G6	UG-G10	UG-G16
Maximum flow rate	m^3/h	2,5	4	6	6	10	16	25
Minimum flow rate	m^3/h	0,016	0,016 / 0,025	0,016 / 0,025 / 0,040	0,040	0,06	0,1	0,16
Nominal flow rate	m^3/h	1,6	2,5	4	4	6	10	16
Cyclic volume	dm^3	1,2	1,2	1,2	2,2	2,2	5	5
Max working pressure	bar	0,5 / 2*	0,5 / 2*	0,5 / 2*	0,5	0,5	0,5	0,5
Index max indication	m^3/h	99999,999	99999,999	99999,999	99999,999	99999,999	999999,99	999999,99
Starting flow rate	dm^3/h	3	5	5	5	8	13	13
Fireproof up to 650 °C according to EN 1359	bar	0,1	0,1	0,1	0,1	0,1	0,1	0,1
Thread		Threaded connections may be manufactured acc. to any international norm (ISO; ANSI; British Standard etc.....)						

*) Aluminium case

Aluminium case 110

000

100 / 110 / 130 mm

152,4 mm (6")

160 mm

220 mm

250 mm

000

130 mm

152,4 mm (6")

220 mm

250 mm

000

130 mm

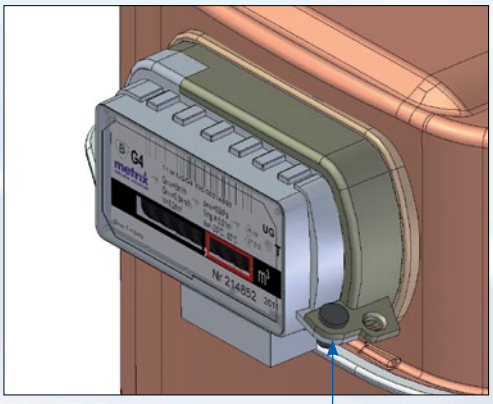
220 mm

250 mm

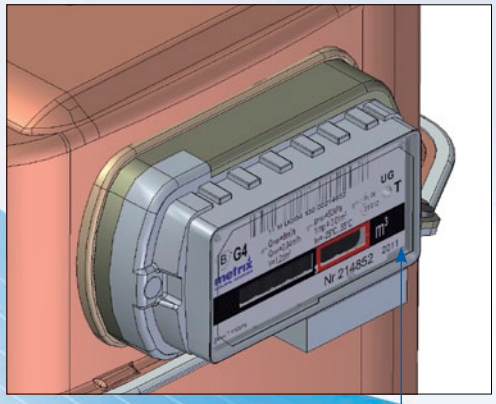
280 / 300 mm

Innovative index

with innovative protection against fraud



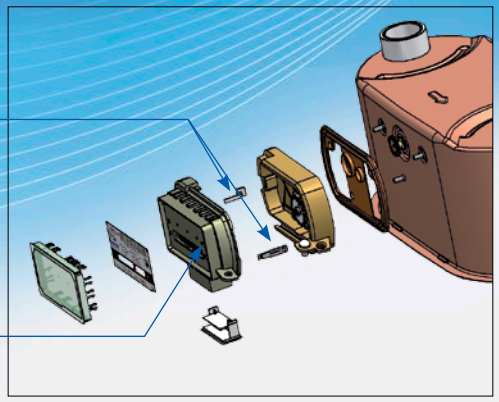
PLACE FOR APPLYING
AN ORDINARY SEAL (OPTIONAL)



NEW GENERATION SOLUTION FOR SEAL
Stamp from inside

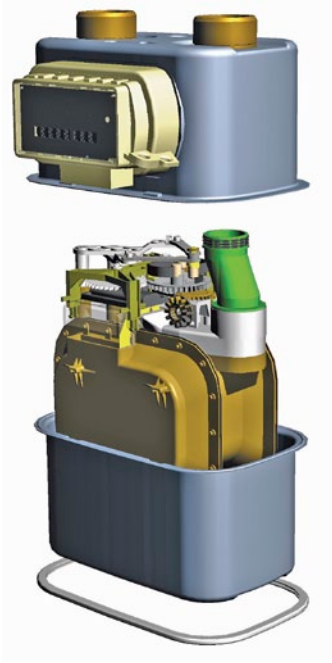
INDEX BLOCKADE
Applying (or not applying) decides,
if the index is disassemblable
or non-disassemblable

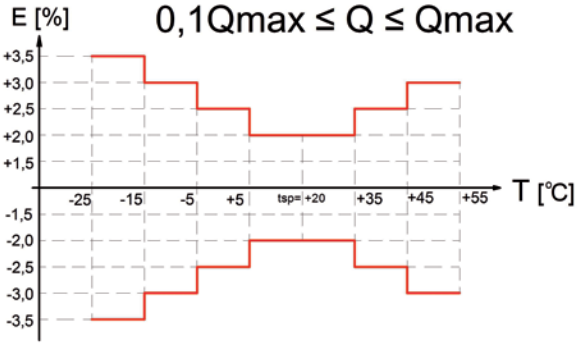
BLOCKADE OF COUNTING
REVERSE FLOW

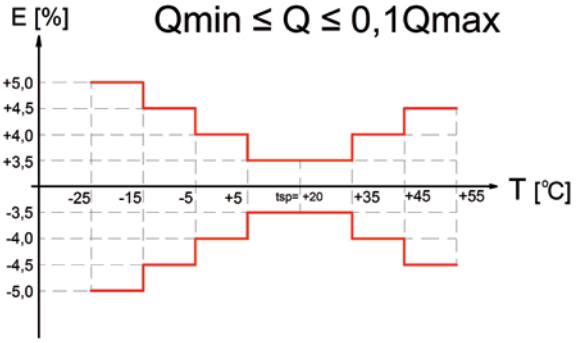


MECHANICAL TEMPERATURE COMPENSATION

All UG family gas meters can be equipped with mechanical temperature compensation (bimetal).







Gas is a substance subject to thermal expansion, which means that depending on temperature, it increases or decreases its volume. Consequently, what changes is the measuring accuracy of a gas meter with relation to its energy content. Simply speaking, when gas with some energy content, volume and temperature is already in pipes and is heated, then the index unit is to show a bigger consumption after flow, whereas when gas is cooled, the gas meter will indicate a lower consumption. It is a very important issue as a temperature change of 3°C corresponds to a volume change of approximately 1%. Such considerable temperature changes are likely to occur especially to meters placed on the outside of a building. Consequently the meter works at various temperatures depending on the season. A gas meter with temperature compensation provides a solution to this problem as it uses and undergoes thermal expansion as well. A temperature compensation mechanism installed in the measuring unit is adjusted in such a way so that it changes the cyclic volume of the measuring mechanism exactly like gas undergoing expansion due to temperature changes. Elements responsible for compensation installed in the meter allow a radial shift of the diaphragm, which results in moving the curve of typical error up or down in relation to the zero line.

Thus the gas meter converts the measured value of gas volume into its value at fiducial temperature – irrespective of measuring temperature.

UG SERIES V=1,2 dm³

UG 1,2 dm³ series gas meters are designed for measurement of gas supplied to appartments where consumption of gas is up to 6 m³/h of air density of 1,2 kg/m³.

THE GAS METERS CAN BE USED FOR MEASUREMENT OF:

- Natural gas
- City gas
- Propane-butane gas

Gas meter is equipped with pulse magnet as standard. Pulse transmitter can be added at any time (1 imp = 0,01 m³).

TECHNICAL DATA

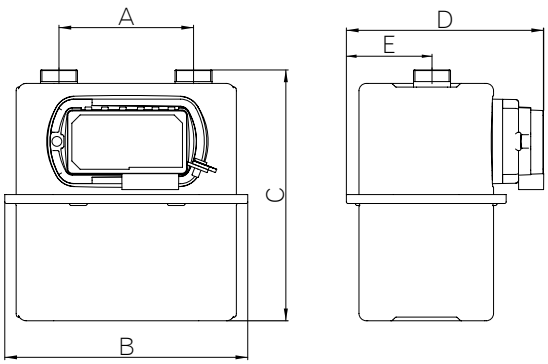
		UG-G1,6	UG-G2,5	UG-G4
Maximum flow rate	m³/h	2,5	4	6
Minimum flow rate	m³/h	0,016	0,016 / 0,025	0,016 / 0,025 / 0,040
Nominal flow rate	m³/h	1,6	2,5	4
Cyclic volume	dm³	1,2	1,2	1,2
Max working pressure	bar	0,5 / 2*	0,5 / 2*	0,5 / 2*
Index max indication	m³/h	99999,999	99999,999	99999,999
Starting flow rate	dm³/h	3	5	5
Fireproof up to 650 °C according to EN 1359	bar	0,1	0,1	0,1

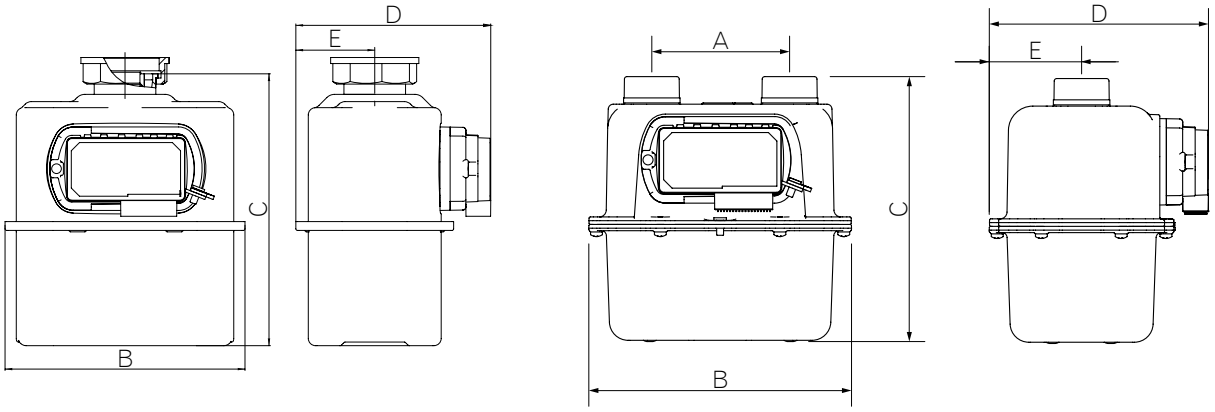
*) Aluminium case

ADDITIONAL INFORMATION ON GAS METERS WITH MECHANICAL TEMPERATURE COMPENSATION

	UG-T
Cyclic volume	1,15 dm³
Allowable indication errors limits during initial verification:	
- Qmin to 0,1 Qmax	± 3,5%
- 0,1max to Qmax	± 2,0%
Temperature range	-25 ÷ 55°C
UG T - TC correction range:	
- standard	-10 ÷ 40°C
- optional	-25 ÷ 40°C

DIMENSIONS



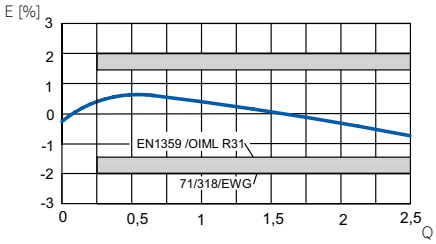


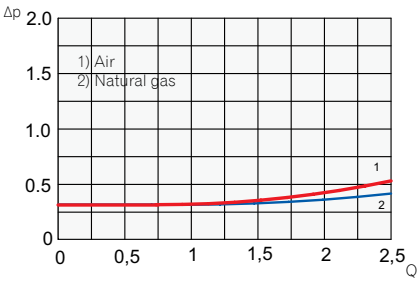
A [mm]	B [mm]		C [mm]		D [mm]		E [mm]		Weight
	Steel case	Alu case*	Steel case	Alu case*	Steel case	Alu case*	Steel case	Alu case*	
000	200	–	227	–	161	–	65	–	~ 1,7 kg
100	200	210	205 to 211	210	161	175	70	74	~ 1,7 kg
110	200	210	205 to 211	210	161	175	70	74	~ 1,7 kg
130	200	–	205 to 211	–	161	–	70	–	~ 2,0 kg
152,4	235	–	268	–	177	–	73	–	~ 3,0 kg
160	235	–	240	–	177	–	73	–	~ 3,0 kg
220	283	–	222	–	176	–	72	–	~ 2,0 kg
250	325	–	222	–	177	–	72	–	~ 3,2 kg

*) Aluminium case

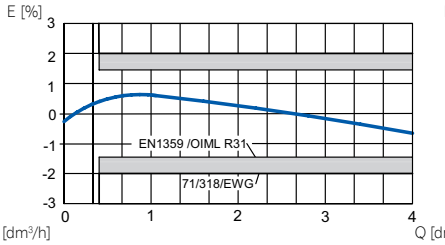
CURVES OF TYPICAL ERROR AND PRESSURE LOSS

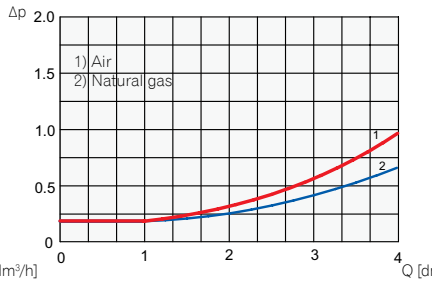
UG-G1,6



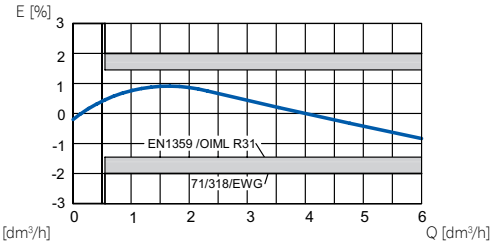


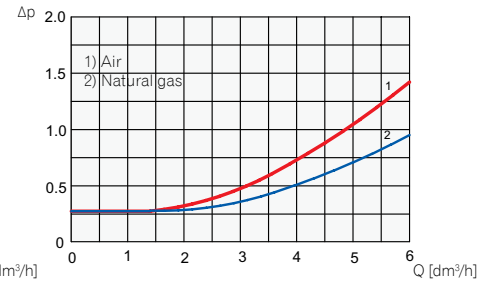
UG-G2,5





UG-G4





UG SERIES V=2,2 dm³

UG 2,2 dm³ series gas meters are designed for measurement of gas supplied to appartments where consumption of gas is up to 10 m³/h of air density of 1,2 kg/m³.

THE GAS METERS CAN BE USED FOR MEASUREMENT OF:

- Natural gas
- City gas
- Propane-butane gas

Gas meter is equipped with pulse magnet as standard. Pulse transmitter can be added at any time (1 imp = 0,01 m³).

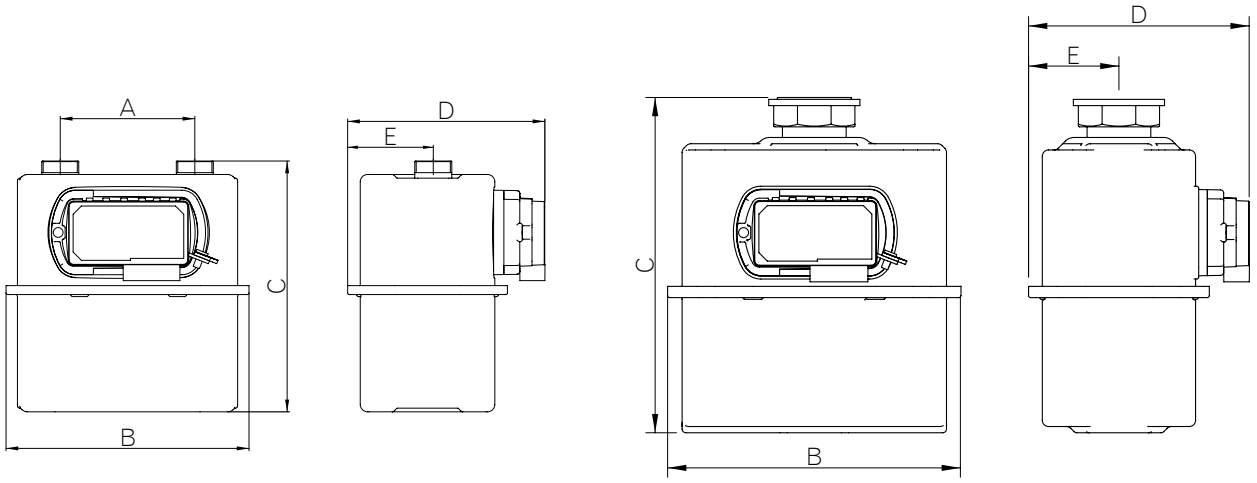
TECHNICAL DATA

		UG-G4	UG-G6
Maximum flow rate	m³/h	6	10
Minimum flow rate	m³/h	0,040	0,060
Nominal flow rate	m³/h	4	6
Cyclic volume	dm³	2,2	2,2
Max working pressure	bar	0,5	0,5
Index max indication	m³/h	99999,999	99999,999
Starting flow rate	dm³/h	5	5
Fireproof up to 650 °C according to EN 1359	bar	0,1	0,1

ADDITIONAL INFORMATION ON GAS METERS WITH MECHANICAL TEMPERATURE COMPENSATION

	UG-T
Cyclic volume	1,9 dm³
Allowable indication errors limits during initial verification:	
- Qmin to 0,1 Qmax	± 3,5%
- 0,1max to Qmax	± 2,0%
Temperature range	-25 ÷ 55°C
UG T - TC correction range:	
- standard	-10 ÷ 40°C
- optional	-25 ÷ 40°C

DIMENSIONS

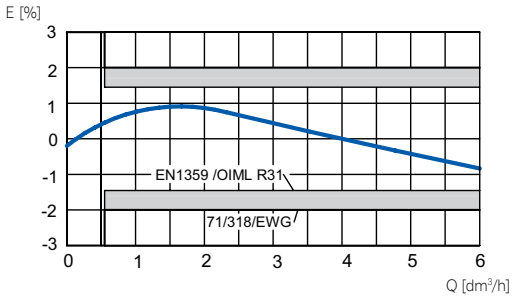


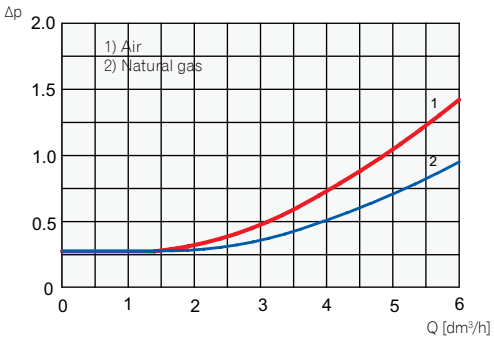
A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	Weight
	Steel case	Steel case	Steel case	Steel case	
000	235	270	177	73	3,0 kg
130	235	240	177	73	2,9 kg
152,4	235	262	177	73	3,1 kg
160	235	240	177	77	2,9 kg
220	283	222	176	72	3,2 kg
250	325	222	177	73	3,2 kg

*) Aluminium case

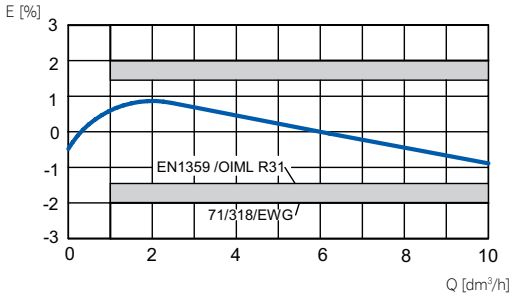
CURVES OF TYPICAL ERROR AND PRESSURE LOSS

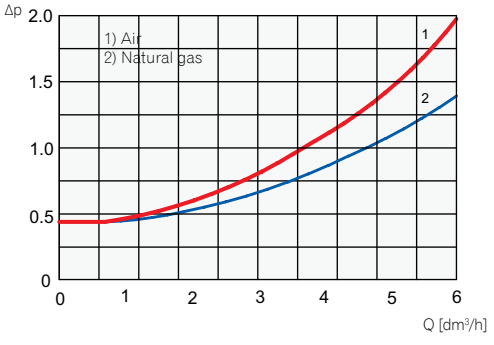
UG-G4





UG-G6





UG SERIES V=5,6 dm³

UG 5,6 dm³ series gas meters are designed for measurement of gas supplied to commercial and industrial gas meters where maximum consumption of gas is up to 25 m³/h of air density of 1,2 kg/m³.

THE GAS METERS CAN BE USED FOR MEASUREMENT OF:

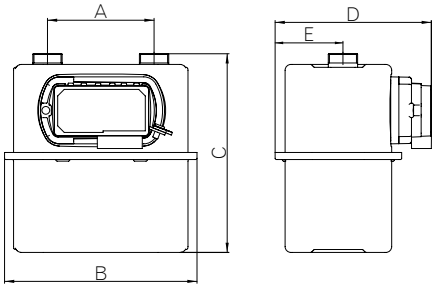
- Natural gas
- City gas
- Propane-butane gas

Gas meter is equipped with pulse magnet as standard. Pulse transmitter can be added at any time (1 imp = 0,1 m³).

TECHNICAL DATA

		UG-G10	UG-G16
Maximum flow rate	m³/h	16	25
Minimum flow rate	m³/h	0,1	0,16
Nominal flow rate	m³/h	10	16
Cyclic volume	dm³	5,6	5,6
Max working pressure	bar	0,5	0,5
Index max indication	m³/h	999999,99	999999,99
Starting flow rate	dm³/h	13	13
Fireproof up to 650 °C according to EN 1359	bar	0,1	0,1

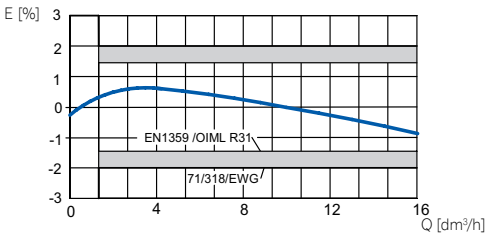
DIMENSIONS

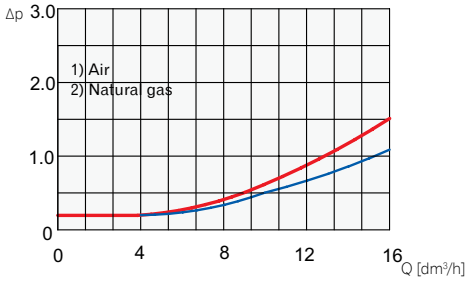


A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	Weight
280	395	345	214	93	6,8 kg
300	395	345	214	93	6,8 kg

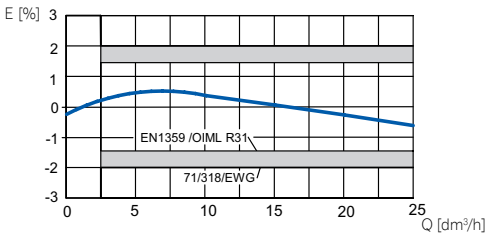
CURVES OF TYPICAL ERROR AND PRESSURE LOSS

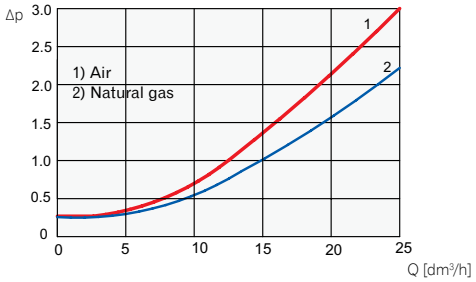
UG-G10





UG-G16





NOTES

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