

Instructions for installation and operation

Residential diaphragm gas meters UG & UGT (G1.6, G2.5, G4), 2UG (G4, G6)



Table of contents

1. Applications	3
2. Technical data.....	3
3. Dimensions	5
4. Construction of the gas meter.....	6
4.1 Measuring unit	7
4.2 Gas meter casing.....	7
4.3 Index	7
5. Additional equipment.....	7
6. Operating principals.....	7
7. Mechanical temperature compensation	8
8. Initial verification (sealing)	8
9. Conformity assessment.....	8
9.1 Declaration of conformity	9
10. Storage and transportation.....	9
10.1 Storage	9
10.2 Transportation.....	9
11. Installation of gas meter	9
12. Using gas meters.....	10
13. Reparation.....	10
14. Handling with worn-out gas meters	10
15. Parts of the UG gas meter.....	11
16. Parts of the 2UG gas meter.....	12
17. Parts of the UGT gas meter (bimetal).....	13

1. Applications

The residential gas meters UG (standard version) and UG T (with mechanical temperature compensation) are designed acc. to the European Standard EN1359 to measure the consumption of gas in households and at other consumers, where the maximum consumption of all gas appliances does not exceed 2.5 m³/h in case of gas meter UG G1.6, 4 m³/h in case of gas meter UG G2.5, 6 m³/h in case of gas meter UG G4 and 10m³/h in case of gas meter 2UG G6 of the air of density 1,2 kg/m³. They are suitable to measure the consumption of natural gas, synthetic gases and their mixtures. They can optionally be equipped with low frequency pulse transmitter type NI-3 manufactured by APATOR METRIX.

2. Technical data

	UG G1,6	UG G2,5	UG G4	2UG G4	2UG G6
Nominal flow rate Q _n	1,6 m ³ /h	2,5 m ³ /h	4 m ³ /h	4 m ³ /h	6 m ³ /h
Minimal flow rate Q _{min} *)	0,016 m ³ /h	0,025 m ³ /h *)	0,04 m ³ /h *)	0,04 m ³ /h	0,06 m ³ /h
Maximum flow rate Q _{max}	2,5 m ³ /h	4 m ³ /h	6 m ³ /h	6 m ³ /h	10 m ³ /h
Transitional flowrate Q _t	0,25 m ³ /h	0,4 m ³ /h	0,6 m ³ /h	0,6 m ³ /h	1 m ³ /h
Overload flowrate Q _r	3 m ³ /h	4,8 m ³ /h	7,2 m ³ /h	7,2 m ³ /h	12 m ³ /h
*) optional version G2,5 and G4 with Q _{min} =0,016 m ³ /h					

Cyclic volume – V (measured at 20°C)

UG 1,2 dm³; 2,2 dm³
 UG T 1,15 dm³; 1,9 dm³
 2UG 2,2 dm³

Allowable indication errors limits during initial verification:

- Q_{min} to 0,1Q_{max} – E
- 0,1Q_{max} to Q_{max} – E

UG UG T
 ±3% ±3,5%
 ±1,5% ±2%

Ambient temperature range - t_m

-25÷55°C

Gas temperature range - t_g

-25÷55°C

UG T - TC correction range

standard -10÷40°C
 optional -25÷40°C

Maximum working pressure P_{max}

50 kPa (0,5 bar)

Max. pressure drop Δp at Q_{max}

≤200 Pa (2 mbar)

Index measuring range

99999,999 m³

Pulse value (pulse is optional):

0,01m³

Distance between connection bosses:

0 mm; 100 mm; 110 mm; 130 mm;
 6" (152,4 mm); 160 mm; 220 mm;
 250 mm

Weight

~1,7 kg to 3,2 kg

Family of gases

Gaseous fuels: family 1,2 & 3 acc. to EN 437

Electromagnetic are classified into classes

E1

Mechanical are classified into classes

M1

Class of gas meter

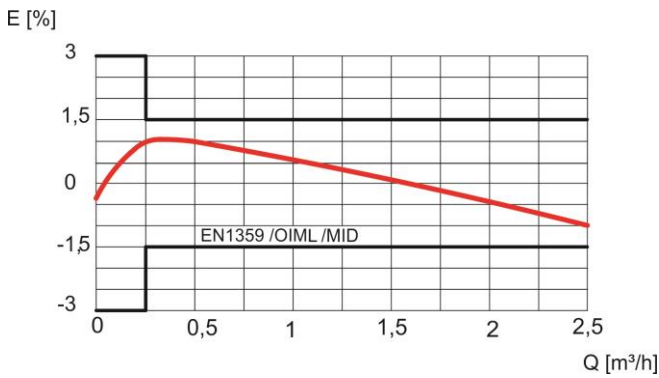
1,5

Possible connection standards:

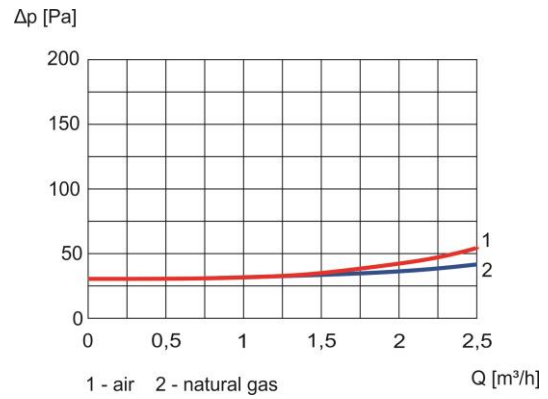
ISO, British Standard, NPT, NPR and others.

UG G1,6

Typicall error curve

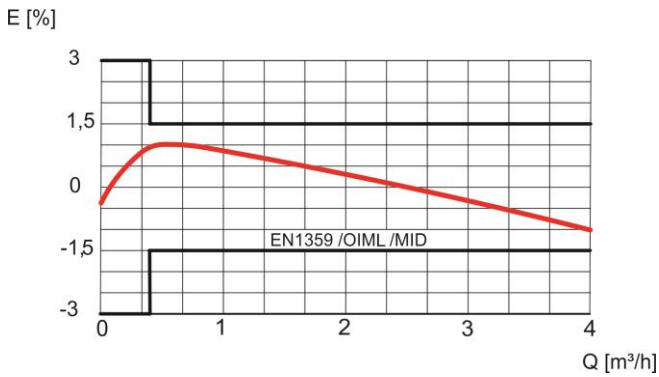


Typicall pressure loss curve

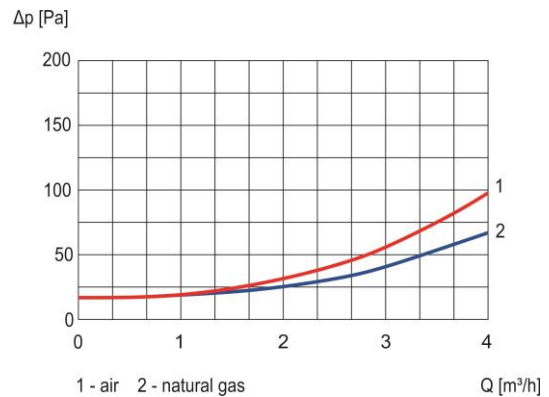


UG G2,5

Typicall error curve

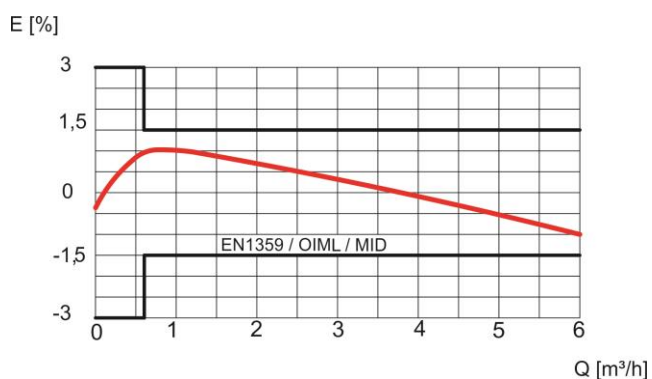


Typicall pressure loss curve

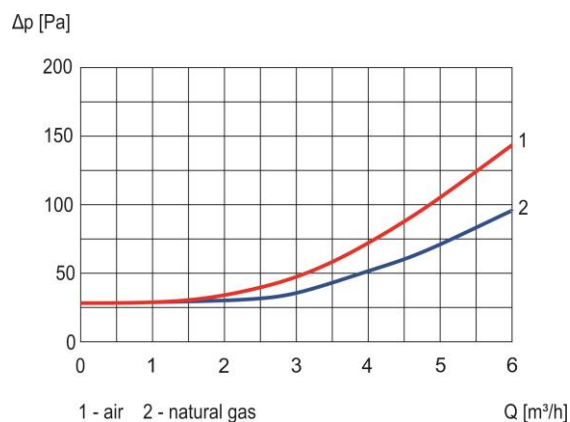


UG G4

Typicall error curve

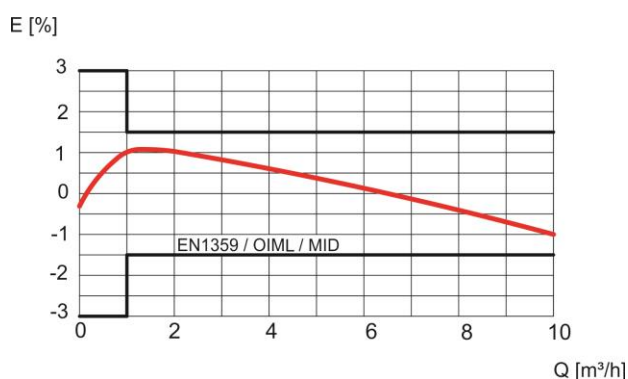


Typicall pressure loss curve

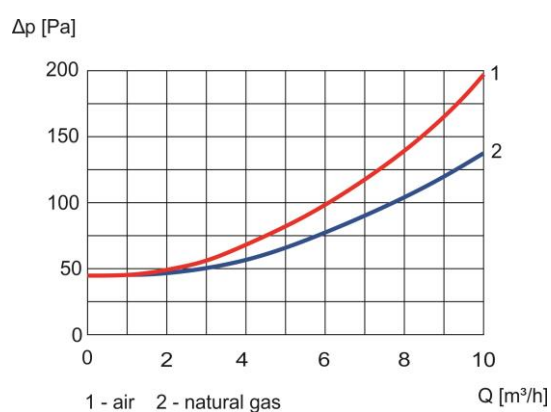


2UG G6

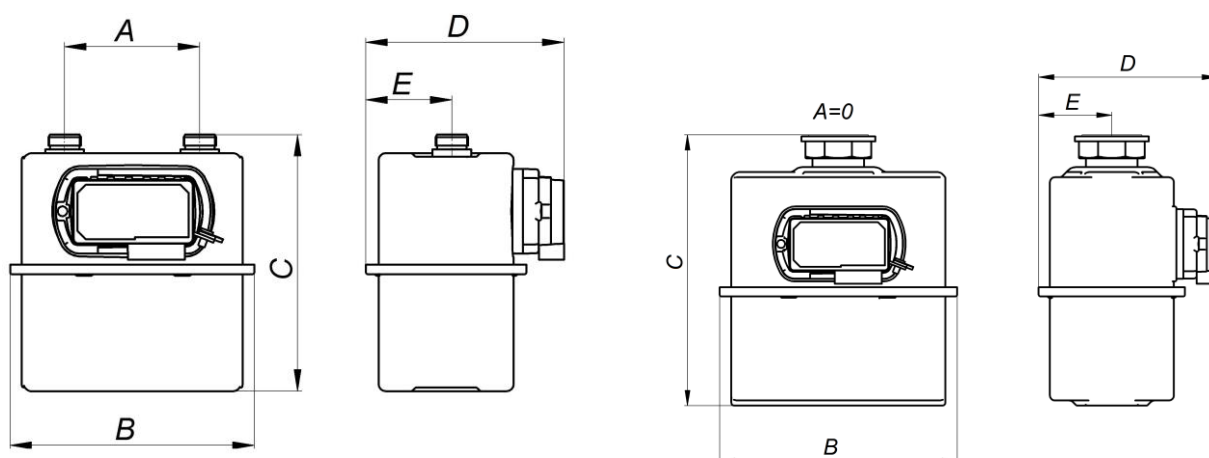
Typicall error curve



Typicall pressure loss curve



3. Dimensions



UG V=1.2dm³ and UG T V=1,15dm³

A [mm]	B [mm]		C [mm]		D [mm]		E [mm]		Weight
	Steel casing	Alu casing*	Steel casing	Alu casing*	Steel casing	Alu casing*	Steel casing	Alu casing*	
000	200	-	226	-	162	-	65	-	~1,7kg
100	200	210	211	210	162	175	65	74	~1,7kg
110	200	210	211	210	162	175	65	74	~1,7kg
130	200	-	211	-	162	-	65	-	~1,7kg
152,4	235	-	262	-	177	-	72	-	~3,1kg
160	235	-	241	-	177	-	77	-	~3,0kg
220	283	-	222	-	177	-	72	-	~2,9kg
250	325	-	222	-	177	-	72	-	~3,2kg

*) Aluminium casing

UG V=2.2dm³ and UG T V=1,9dm³ , 2UG V=2,2dm³ (only 2UG G6)

A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	Weight
	Steel casing	Steel casing	Steel casing	Steel casing	
000	235	254	177	72	~2,9kg
130	235	241	177	72	~2,9kg
152,4	235	262	177	72	~3,1kg
160	235	241	177	77	~3,0kg
220	283	222	177	72	~2,9kg
250	325	222	177	72	~3,2kg

4. Construction of the gas meter

The gas meter consists of three basic units:

- measuring unit
- gas meter casing
- index

4.1 Measuring unit

It contains two measuring chambers including diaphragm, distributing duct and control mechanism including valves and sliders, rocking levers, connecting rods, crank and crankshaft. The measuring unit is equipped with the a device to prevent the registration of reverse flow acc. to the norm EN1359.

4.2 Gas meter casing

It consists two subassemblies, i.e. top casing and bottom casing. These units are joint hermetically by means of a casing hoop (band). The following parts belong to the top casing: magnetic drive with internal and external magnet subassembly and a driving pinion.

4.3 Index

It is connected to the top casing with screws and is protected from outside by the index housing, which can be locked by a lead seal or the index blockade. The index design allows connecting a Pulse Transmitter NI-3 or Telemetry Module Unismart at any time of the gas meter operation without damaging the seal.

5. Additional equipment

Upon request of our clients the gas meter can be additionally equipped with:

- washer 2pcs.
- joint 2pcs.
- nut 2pcs.
- LF Pulse Transmitter NI-3
- Telemetry Module UniSmart WMBOS 868
- different pipes (threads, excenter pipes etc.)

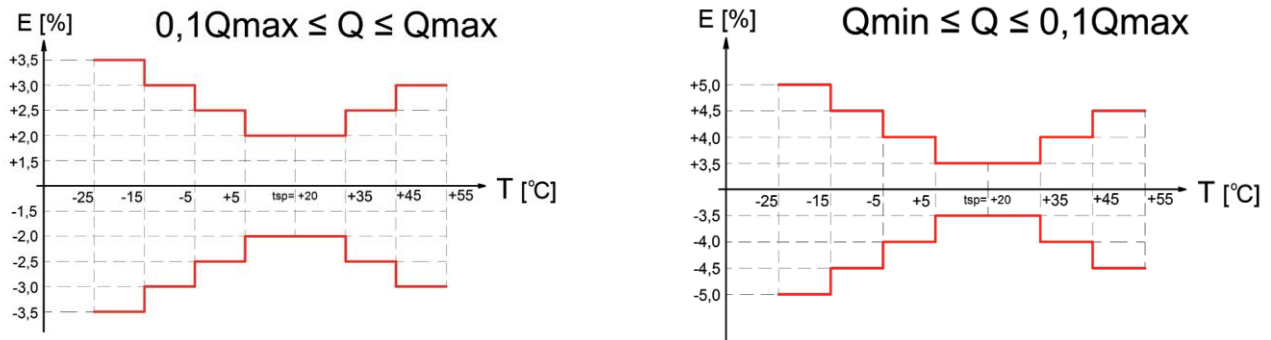
6. Operating principals

The highly precise instrument – gas meter – measures the volume of gas that moves through it. Gas entering the meter flows through the holes of the distribution duct and causes a diaphragm to move, allowing gas into a chamber. The movement of the diaphragms causes a rotary reversible movements of the connected shafts. The rocking levers are fastened on the shafts. The rocking levers are connected throughout the connecting rods to the crank shaft. The rotary movement of the crank shaft is transferred to the slider and through the transmission and magnetic drive to the index driving pinion.

As the cycle continues, the gas is moved from the chamber into the gas line that feeds home's gas appliances. The meter records the number of times the chamber is filled and emptied.

7. Mechanical temperature compensation

Gas meters UG G1.6 up to UG G4 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. In other words 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 unit 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.

8. Initial verification (sealing)

The gas meters under obligation are subject of initial verification. The sealing is carried out by authorized staff. The proof of initial verification is the stamp in the right-down corner of the index window or on a traditional seal. Sealing is invalid in case of gas meter damage or if the indication error exceeds the permissible error settled by appropriate regulations.

9. Conformity assessment

Gas meters are required to comply with the 2014/32 / EU (MID) conformity assessment. Proof of conformity assessment is stamped by the manufacturer. The deadline for reporting to the next metrological control is the separate national regulations. The conformity assessment will be invalidated if the meter is faulty.

9.1 Declaration of conformity

CE	CE -DECLARATION OF CONFIRMITY
PN-EN 1359:2004/A1:2006 [EN 1359:1998/A1 :2006] PN-EN 1359:2017 (only applies to UG G1,6; UG G2,5; UG G4) Directive MID (2014/32/EC)	

10. Storage and transportation

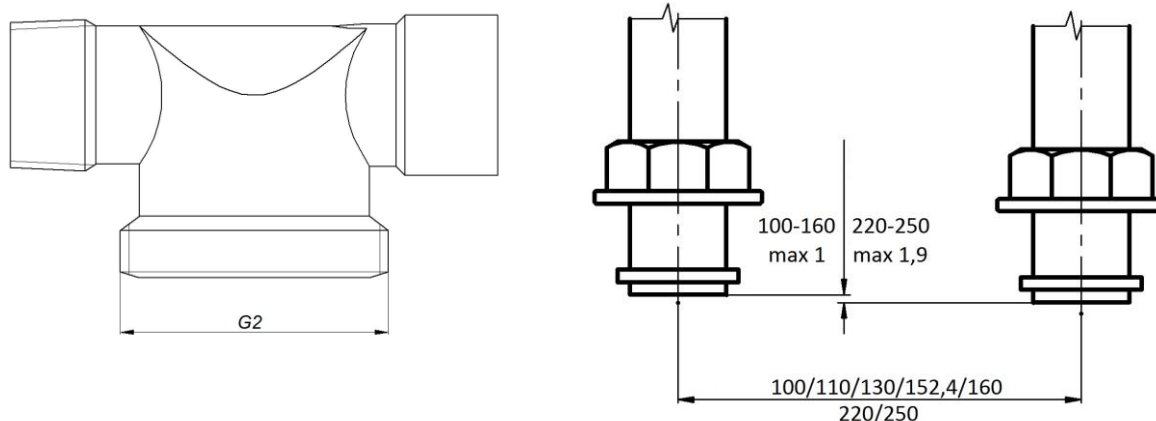
10.1 Storage

The gas meters must be stored in their single packages in a dry storing room free from dust and chemical fumes of strong corrosive effects. During storing the gas meter pipes must be protected by pipe plugs. The pipe plugs should not be removed from sealing time up to gas meter installation. Under condition that the gas meters must be protected from falling and overturning, in the single packages they can be placed one on each other according to the signs on the packages. The storage room temperature must be between -25°C to $+60^{\circ}\text{C}$ and relative humidity not more than 75%.

10.2 Transportation

The gas meters must be transported in single packages placed according to the signs on the packages. During transportation they must be well protected against falling and displacing. Because of damage possibility transportation of a single gas meter to its installation point without the package is not allowed.

11. Installation of gas meter



The gas pipes installation is to be carried out allowing to install the gas meter without causing tensions. A properly carried out gas meter installation with spacing 0(G2); 100÷250 mm are shown on the illustrations. It is recommended to use a special installation terminal assuring a proper installation of the gas meter. Before installing the gas meter a valve must be installed on the gas pipe to make it possible to turn off the gas inflow. Gas inflow direction is marked on top of the gas meter casing.

The gas meter must be connected to the gas installation by means of the attached nuts, screwing them manually, then use a spanner not longer than 30 cm. Screwing moment of the nuts can not exceed 70 Nm. The gas meter and the gas installation junction must be tight fitting.

12. Using gas meters

Diaphragm gas meters does not need any service. Before the end of initial verification expiry date, gas meter must be disconnected from the gas installation and checked on leakage and indication errors. A positive result of the mentioned tests allows the renewal of the verification validity. Indication errors and verification expiry periods are specified by appropriate internal regulations in the appropriate country. Periodical checking of gas installation including gas meters are carried out according to utility regulations.

13. Reparation

In case of impairment gas meter must be repaired by the manufacturer or at a certified service point. Manufacturer provides training, instructions and supply spare parts necessary to repair gas meter. After repairing service point must place a fix mark on the index plate. These signs are necessary to define the service point (for example 20M means that, the repairing is done by METRIX in 2020).

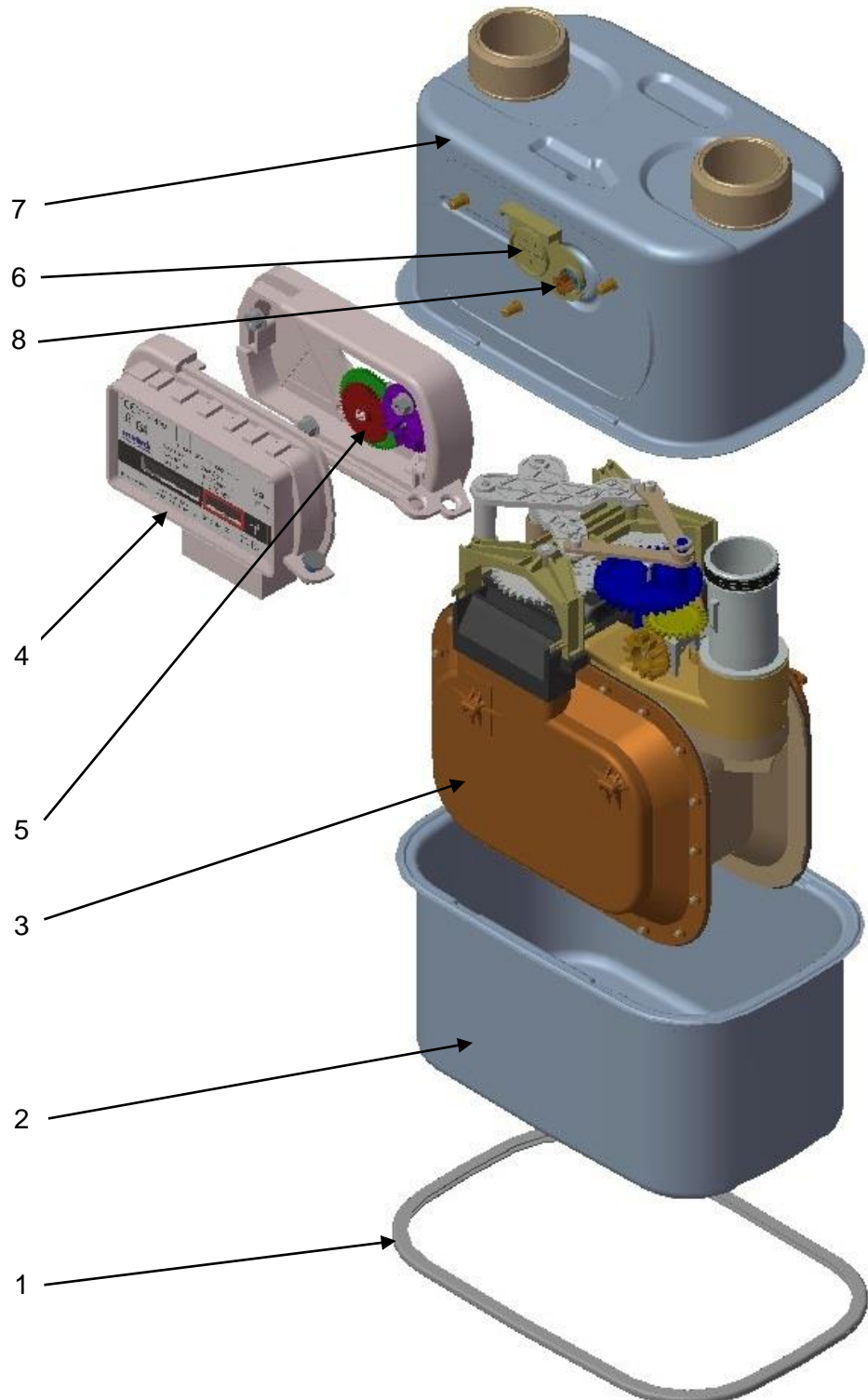
Indication errors of a repaired gas meter must be checked and gas meter must be sealed by the appropriate Office of Measures. Reading errors and expiry date of verification are specified by appropriate regulations of OM.

14. Handling with worn-out gas meters

Local environmental regulations are to be applied with regards to worn-out gas meters. They should be handed over to a licensed waste collector. After dismantling most of the materials used for the production of a worn-out product are recyclable. Detailed information on the recycling of particular materials from which the meter is made can be obtained from the manufacturer. Used packaging must be disposed of in accordance with current local environmental regulations. The packaging is made of corrugated cardboard and plastic parts that are recyclable.

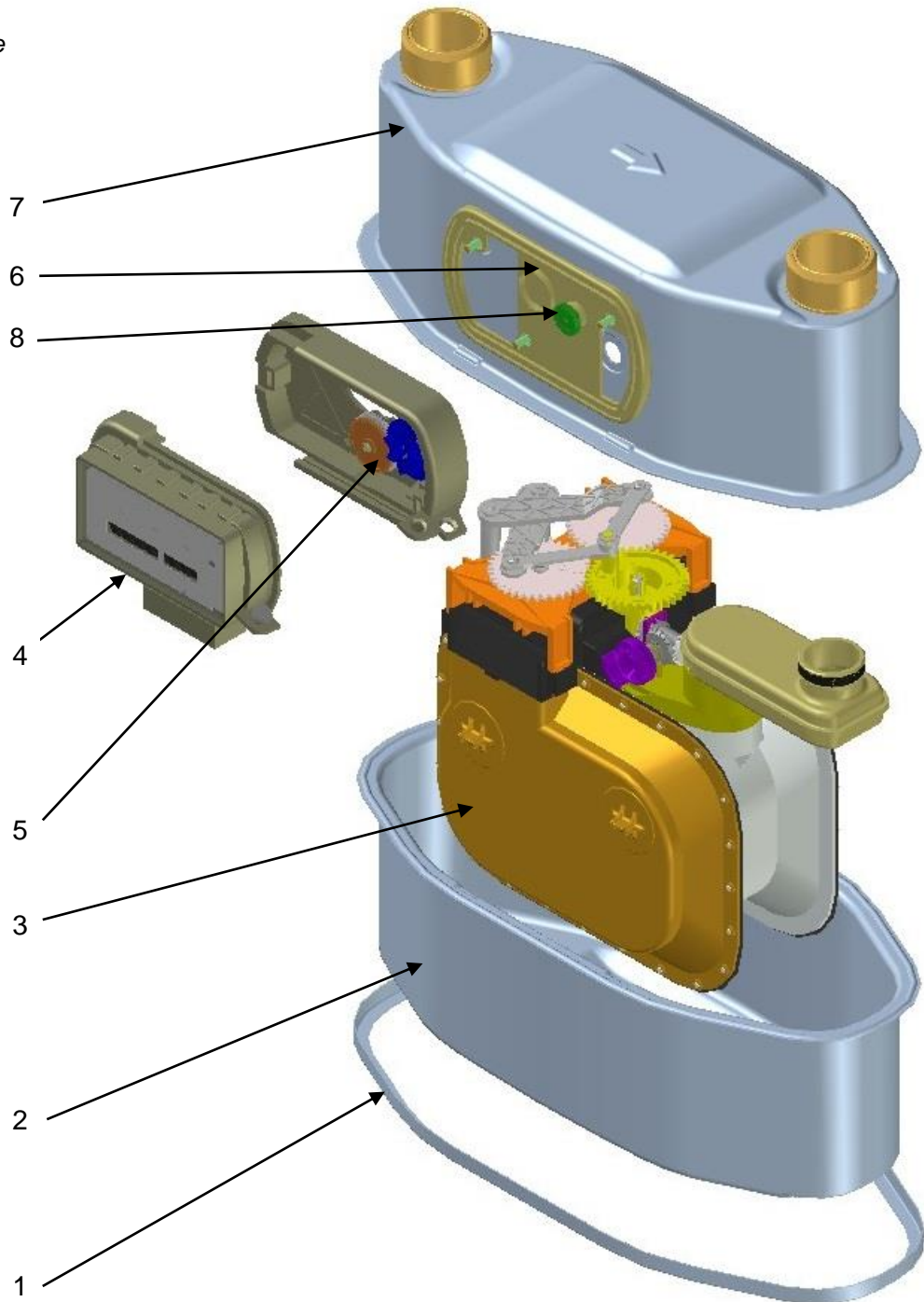
15. Parts of the UG gas meter

- 1) *Band*
- 2) *Bottom casing*
- 3) *Measuring unit*
- 4) *Index*
- 5) *Gears*
- 6) *Sealing insert*
- 7) *Top casing*
- 8) *Wheel drive*



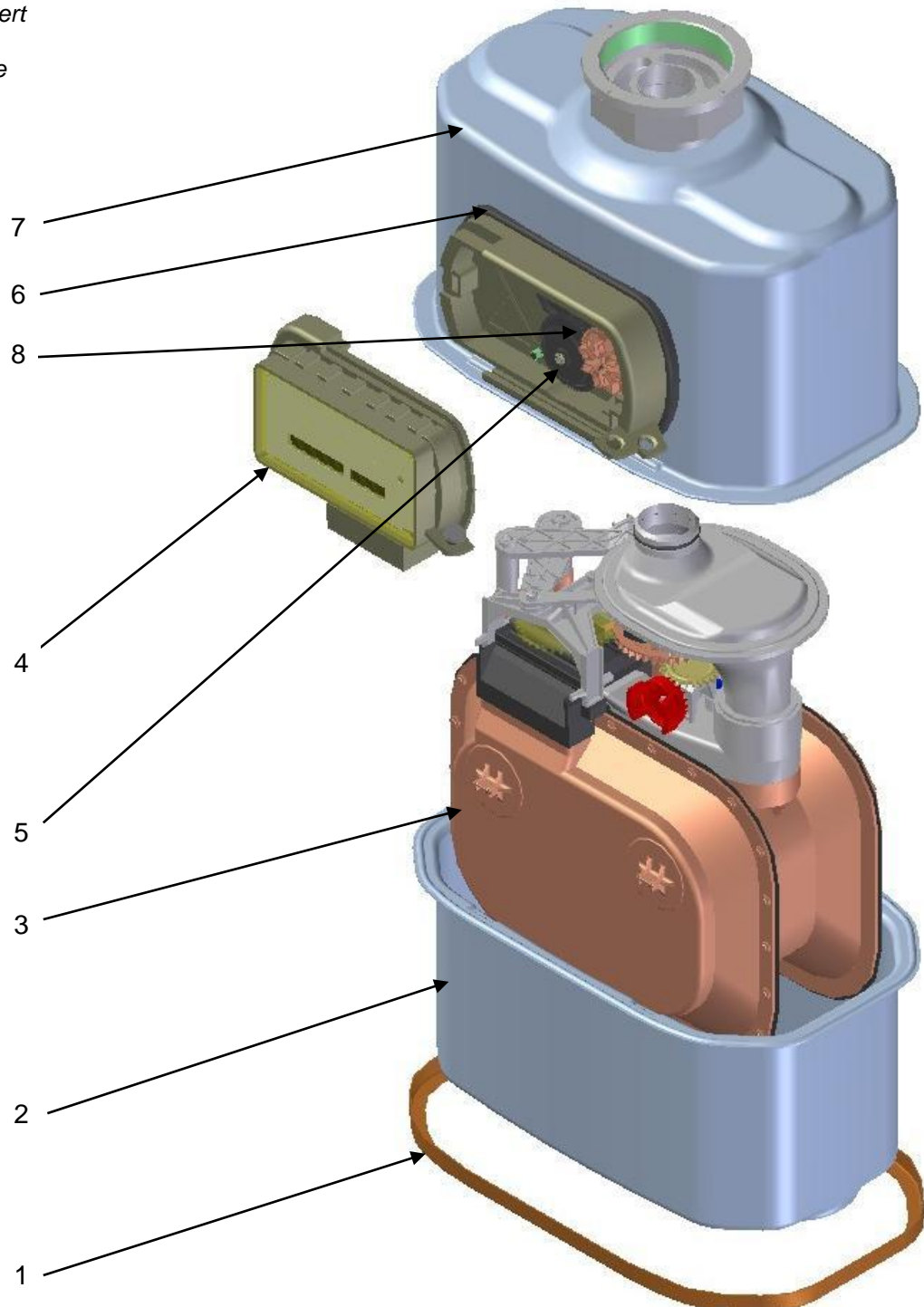
16. Parts of the 2UG gas meter

- 1) *Band*
- 2) *Bottom casing*
- 3) *Measuring unit*
- 4) *Index*
- 5) *Gears*
- 6) *Sealing insert*
- 7) *Top casing*
- 8) *Wheel drive*



17. Parts of the UGT gas meter (bimetal)

- 1) *Band*
- 2) *Bottom casing*
- 3) *Measuring unit*
- 4) *Index*
- 5) *Gears*
- 6) *Sealing insert*
- 7) *Top casing*
- 8) *Wheel drive*





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