

RABO®

Rotary gas meter



Applications

RABO is suitable for measuring gases of the first, second and third families pursuant to EN 437:2009 and for measuring a range of technical gases.

Brief information

General

Rotary gas meters are characterized by high measuring ranges and compact dimensions. They ensure high accuracy, even if the gas flow is low or irregular.

RABO combines tried-and-tested product features of previous rotary gas meters from Elster-Instromet and is a convincing product because it offers a large range of future-oriented features.

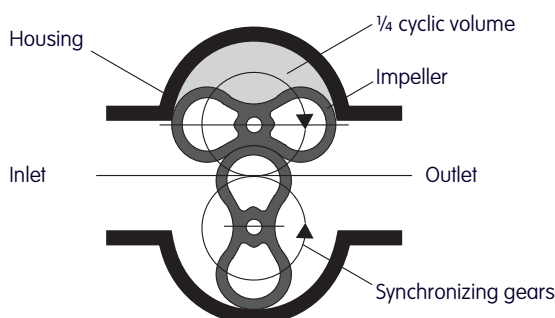
Operating principle

Rotary gas meters are volume-measuring devices for gaseous media which operate according to the positive displacement principle. Due to their volumetric measuring principle, their functioning is not influenced by the installation and they are therefore ideal for compact measuring systems without an inlet section. They record the gas volume under operating conditions and are approved for custody transfer applications. Electronic volume conversion devices can be used in order to convert the volume.

Measurement procedure

Two rotating impellers which look like a figure of eight (8) when viewed in cross-section are mounted in a single housing with one inlet and one outlet. The two impellers are coupled together using synchronizing gears. When gas flows, the impellers rotate without touching one another and propel a gas volume to the outlet which is defined by the cyclic volume. One rotation of the system thus corresponds to a defined gas volume. The revolutions of the impellers are transferred to the mechanical index via a reducing gear and a magnetic coupler. The rotary gas meter is adjusted using a pair of gears in the index.

Working principle of rotary gas meters



Main features

- Meter sizes G16 to G250
- Flow rates from 0.6 to 400 m³/h
- Nominal sizes DN 32 to DN 100
- Pressure ratings PN 10/16 and Class 150 in accordance with ASME B 16.5
- Temperature range -25 °C to +70 °C
- Measuring ranges up to 1:160
- Aluminium or spheroidal cast iron housing
- Compact dimensions
- 5-year maintenance interval
- Index can be rotated for horizontal and vertical installation
- Optional index solutions (e.g. Absolute ENCODER SID)
- Approvals pursuant to MID/PED/ATEX Directives

Technical data	
Gas temperature	-25 °C to +70 °C
Ambient temperature	-25°C to +70 °C
Storage temperature	-40 °C to +70 °C
Operating pressure	max. 20 bar
Protection class	IP 67 (suitable for outdoor installation)
Housing	Aluminium or spheroidal cast iron
MID approval	DE-12-MI002-PTB001 (PTB)
PED approval	CE-0085CN0022 (DVGW Cert GmbH)
ATEX approval	Ex-zone 1
Medium	Gases of the first, second and third families to EN 437:2009 and a range of technical gases
Metrological Accuracy Class	AC 1,0
Reproducibility	<0.1%
Indexes	SIV (standard), S1 45° readout (optional, no extra cost), Optional at extra cost: Absolute ENCODER SID, double index SID, double index MI-2D
Pulse outputs	- LF pulser IN-Sx (reed contact, standard) in accordance with EC type-examination certificate TÜV 03 ATEX 2123 - LF pulser IN-W11 (Wiegand sensor, optional) in accordance with EC type-examination certificate TÜV 01 ATEX 1776 - HF pulser A1K (Namur sensor, optional) in accordance with EC type-examination certificate PTB 99 ATEX 2219X

Performance data (measuring ranges, pressure loss, pulse value)																
DN (mm)	Type	Q _{max} (m ³ /h)	Q _{min} (m ³ /h)								V (dm ³)	NF [imp/m ³]	HF [imp/m ³]	HF [Hz] at Q _{max}	Δp (air) * [mbar] at Q _{max}	Δp (natural gas) * [mbar] at Q _{max}
			1:160	1:130	1:100	1:80	1:65	1:50	1:30	1:20						
32	G 16	25	-	-	-	-	-	-	0.8	1.3	0.87	10	11460	80	0.9	0.6
32	G 25	40	-	-	-	-	0.6	0.8	1.3	2	0.87	10	11460	127	2.3	1.5
32	G 40	65	-	-	0.6	0.8	1	1.3	2	3	0.87	10	11460	207	5.9	3.8
32	G 65	100	0.6	0.8	1	1.3	1.6	2	3	5	0.87	10	11460	318	14.1	9.1
40	G 16	25	-	-	-	-	-	-	0.8	1.3	0.87	10	11460	80	0.3	0.2
40	G 25	40	-	-	-	-	0.6	0.8	1.3	2	0.87	10	11460	127	0.9	0.6
40	G 40	65	-	-	0.6	0.8	1	1.3	2	3	0.87	10	11460	207	2.3	1.5
40	G 65	100	0.6	0.8	1	1.3	1.6	2	3	5	0.87	10	11460	318	5.4	3.5
50	G 16	25	-	-	-	-	-	-	0.8	1.3	0.87	10	11460	80	0.2	0.1
50	G 25	40	-	-	-	-	0.6	0.8	1.3	2	0.87	10	11460	127	0.4	0.3
50	G 40	65	-	-	0.6	0.8	1	1.3	2	3	0.87	10	11460	207	1.0	0.6
50	G 65	100	0.6	0.8	1	1.3	1.6	2	3	5	0.87	10	11460	318	2.3	1.5
50	G 100	160	1	1.3	1.6	2	2.5	3	5	8	1.61	1	6210	276	4.4	2.8
80	G 100	160	1	1.3	1.6	2	2.5	3	5	8	1.61	1	6210	276	2.4	1.5
80	G 160	250	1.6	2	2.5	3	4	5	8	13	2.99	1	3276	228	2.0	1.3
80	G 250	400	2.5	3	4	5	6	8	13	20	3.7	1	2653	295	3.8	2.4
100	G 160	250	1.6	2	2.5	3	4	5	8	13	2.99	1	3276	228	1.8	1.2
100	G 250	400	2.5	3	4	5	6	8	13	20	3.7	1	2653	295	4.3	2.8

* Typical values, depending on test rig conditions

Error limits

Typical error limits:

±0.5 % for Q_t* to Q_{max}

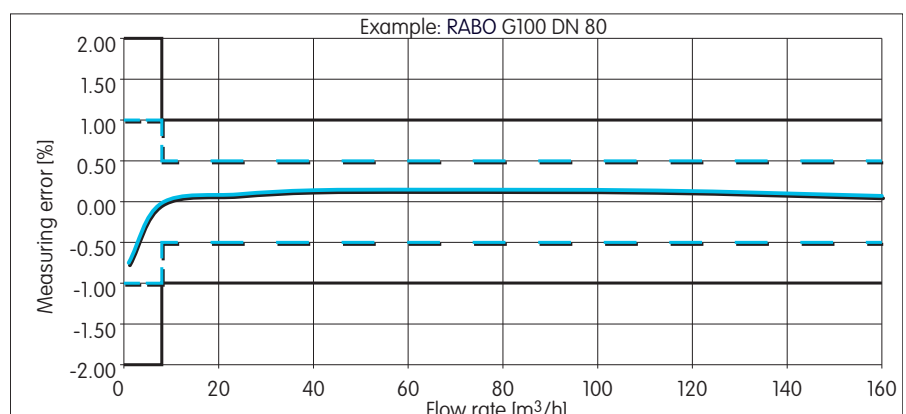
±1.0 % for Q_{min} to Q_t

Maximum permissible error limits
in accordance with EN 12480

±1.0 % for Q_t to Q_{max}

±2.0 % for Q_{min} to Q_t

* Q_t dependent on measuring range
(example: 0.05 Q_{max} at > 1:50)



Indexes

SIV index (standard)



- 8-digit mechanical index
- Index can be rotated 350°
- Protection class IP 67
- Can be used as main index

Absolute-ENCODER STD (option)



- Electronically readable double index
 - PTB and ATEX approvals
 - Various data interfaces available (Namur, SCR+, M-Bus)
- Detailed information can be found on the data sheet "Absolute ENCODER S1/D"

Index with EK280 (optional)



Pulse generators

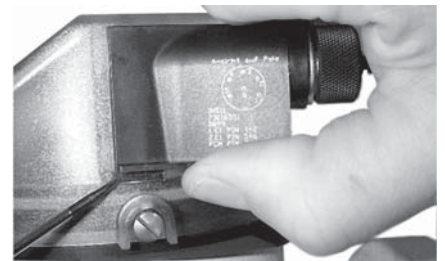
LF pulsers E1 and PCM

Elster-Instromet rotary gas meters are fitted with 2 low-frequency (LF) pulsers E1 and a monitoring contact (PCM) for detection of interferences caused by external magnetic fields as standard. Pulser modules IN-S1x can be plugged on without opening the index and can be retrofitted or replaced at any time.



Installation of the pulser module IN-S1x:

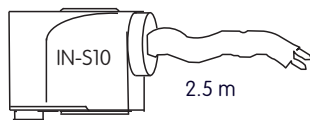
- Slide the guides of the IN-S1x into the guide groove on the index cover.
- Slide the IN-S1x over the safety catch on the index cover by applying slight pressure until the IN-S1x can be heard to engage.



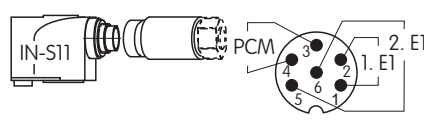
Removal of the pulser module IN-S1x

- Lift the lower catch of the IN-S1x using a screwdriver and pull gently out of the guide on the index cover.

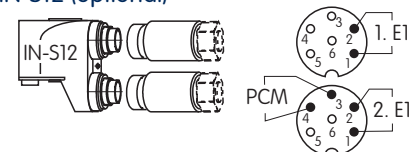
IN-S10 (standard)



IN-S11 (optional)



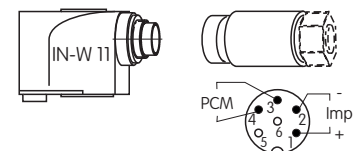
IN-S12 (optional)



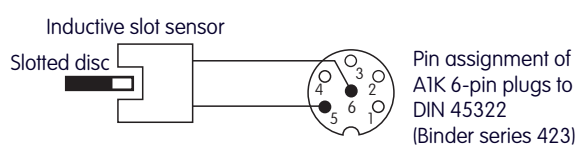
LF pulser IN-W11

Elster-Instromet rotary gas meters can be optionally fitted with the LF Wiegand sensor module IN-W11 at the factory, instead of with the LF pulser module IN-S1x.

The IN-W11 is a low-frequency pulse generator with a defined pulse width for maximum reliability with no mechanical wear.



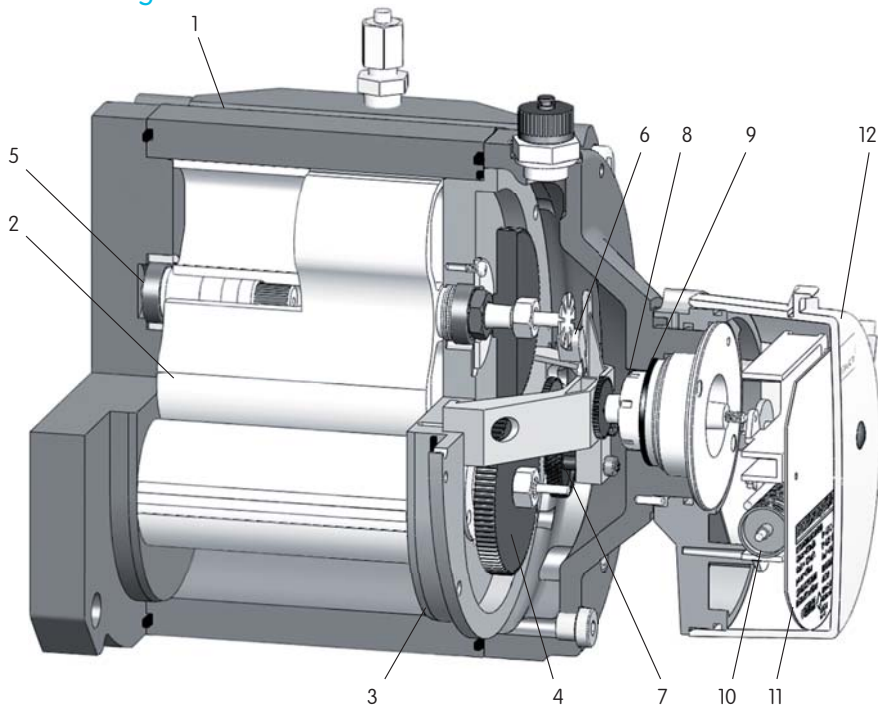
HF pulser AIK



Characteristic data for the switch version in accordance with DIN EN 60947-5 (Namur):

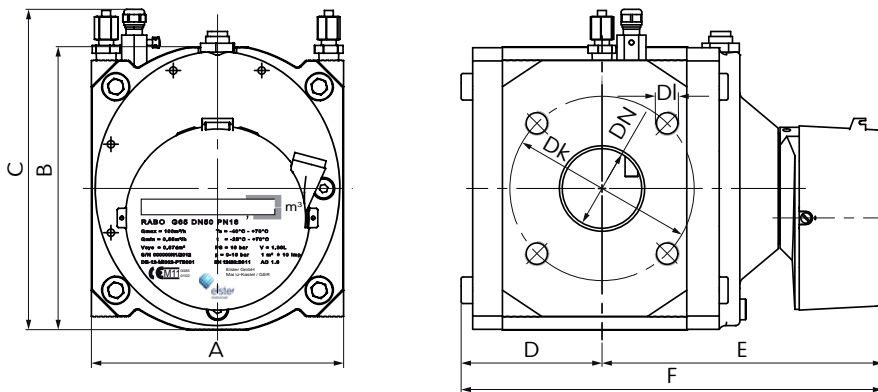
Rated voltage:	$U_n = 8 \text{ V DC}$
Internal resistance:	$R_i = 1 \text{ k } \Omega$
Current consumption:	active area free $I > 3 \text{ mA}$
	active area covered $I \leq 1 \text{ mA}$

Meter configuration



- 1: Housing
- 2: Impeller
- 3: Bearing cover
- 4: Synchronizing gears
- 5: Permanently lubricated ball bearings
- 6: HF pulser A1K (option)
- 7: Gear
- 8: Magnetic coupler
- 9: Partition
- 10: Index
- 11: Main plate
- 12: Index cover

Dimensions, weights and connections



Connections			
DN	Pressure rating	D _k	D _l
32	PN 16	100	4 x M16
	Class 150	88.90	4 x M12
40	PN 16	110	4 x M16
	Class 150	98.60	4 x M12
50	PN 16	125	4 x M16
	Class 150	120.70	4 x M16
80	PN 16	160	8 x M16
	Class 150	152.40	4 x M16
100	PN 16	180	8 x M16
	Class 150	190.50	8 x M16

Aluminium: Dimensions and weights

Size	Dimensions [mm]						Weight [kg]
	A	B	C*	D	E	F	
G16 – G65	171	192	216	96	191	286	11
G65 (EBL 150**)	-	-	-	-	-	-	-
G100	171	192	216	138	233	371	15
G160	241	256	280	131	271	402	30
G250	241	256	280	156	296	451	34

Spheroidal cast iron: Dimensions and weights

Size	Dimensions [mm]						Weight [kg]
	A	B	C*	D	E	F	
G16 – G65	171	209	233	96	191	286	30
G65 (EBL 150**)	150	209	233	138	233	371	36
G100	171	209	233	138	233	371	37
G160	241	266	290	131	271	402	67
G250	241	266	290	156	296	451	75

* When connecting thermowells, pressure taps or the high-frequency pulser and when mounting a volume conversion device, height C changes accordingly (e.g. RABO with fitted EK280 = B + 270 mm)

** EBL = Installation length

Your contacts



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