



ULTRASONIC GAS FLOW METER

GFA424

Product Data Sheet



2026



GFA424 gas meters are designed to measure the flow rate and volume of natural gas and other gaseous media having a density not less than 0.4 kg/m^3 in the forward direction; with conversion of the measured gas volume at working conditions to standard conditions (for versions with a built-in corrector), displaying total gas volume at operating conditions (for versions without a built-in corrector), and for both - operating and standard conditions and energy (for versions with a built-in corrector) on the display, with the capability of transmitting information to centralized data collection, monitoring, and process control systems. The meters comply with the requirements of OIML R137:2012 (w/ amend. 2014), EN 12405-1:2021, EN 12405-2:2012 and the EU directive 2014/32/EU (MID).

GFA424 meters do not require straight pipe sections.

Meters with an integral volume corrector include pressure and temperature transducers.

GFA424 meters have 4 measurement channels.

The description, characteristics, and features related to gas volume conversion to standard conditions, energy calculation, corrector operation, pressure and temperature transducers apply only to meters with a built-in corrector.

Application area: gas metering, including commercial metering, in the gas extraction industry, at gas distribution points, municipal utility facilities, and industrial enterprises.

Operating conditions: standard ambient air temperature from minus 25°C to 55°C , humidity up to 100%.

Under order, the meter can be manufactured for operation at elevated ambient air temperature from minus 25°C to 70°C . Also on order, the meter can be produced for an extended temperature range from minus 40°C to 70°C .

The GFA424 gas meter is designed with types of protection "explosion-proof enclosure "d" according to EN 60079-1:2014/AC:2018-09, "intrinsically safe electrical circuit "i" according to EN 60079-11:2012 and meets the requirements of EN IEC 60079-0:2018/AC:2020-02.

The meters comply with the requirements of the EU directive 2014/34/EU (ATEX).

The explosion protection marking of meters depending on the type of built-in modem is given in Table 1.

Table 1 — Explosion protection marking depending on built-in modem type

Model	Built-in modem type	Explosion protection marking
GFA424-*-*-*-*-*X-*-*-* GFA424-*-*-*-*-*D-*-*-*	None	II 2(1)G Ex db ib [ia Ga] IIC T4 Gb
GFA424-*-*-*-*-*N-*-*-*	Nb-IoT	II 2(1)G Ex db ib [ia Ga] IIC T4 Gb
GFA424-*-*-*-*-*G-*-*-*	GSM/GPRS	II 2(1)G Ex db ib [ia Ga] IIA T4 Gb

WARNING!

- *Do not use batteries other than the ones supplied / approved by the Manufacturer.*
- *It is forbidden to open the battery covers in a hazardous area..*

Meters are available with the following flow ratings depending on the required gas flow rate measurement range: G65, G100, G160, G250, G400, G650, G1000, G1600.

Meters are manufactured for maximum working pressure of 1.6; 2.0; 6.3; 10 MPa.

The meter provides measurement of volumetric flow rate and gas volume with normalized error within the volumetric flow rate ranges specified in Table 2, corresponding to gas flow velocity in the pipeline from 0.15 m/s to 25.0 m/s.

The meter calculates the current volumetric gas flow rate as the product of the measured flow velocity and the internal cross-sectional area of the pipeline according to the expression:

$$Q = (\pi \cdot D^2 / 4) \cdot V \cdot 3600 \cdot Sg$$

where: Q — current volumetric flow rate, m³/h;
Sg — hydrodynamic coefficient;
V — measured flow velocity, m/s;
D — internal diameter of the pipeline, m.

Table 2 – GFA424 Nominal values of volumetric flow rates

DN	Meter standard size	Volumetric flow rate, m3/h				Measuring ranges $Q_{\min}/Q_{\max}$
		threshold* Q_{thr}	minimal $Q_{\min}$	transitional Q_t	maximal $Q_{\max}$	
50	G65	0.2	1.0	16	100	1:100
	G100				160	1:160
80	G160	0.5	2.5	40	250	1:100
	G250				400	1:160
100	G250	0.8	4.0	65	400	1:100
	G400				650	1:160
150	G650	2	10	160	1000	1:100
	G1000				1600	1:160
200	G1000	3.4	17	250	1600	1:100
	G1600				2500	1:160

Note: * - factory setting of the programmable meter function that determines the lower limit of the volume flow rate at which its value is automatically set to zero, while the volume measured by the meter remains unchanged.

The relative error of meters in gas volume measurement is normalized in two flow rate ranges: from $Q_{\min}$ to Q_t (inclusive) and from Q_t to $Q_{\max}$.

Permissible relative error limits of the meter in gas volume measurement under working conditions are given in Table 3.

Table 3 — Permissible relative errors

Flow rate range	Relative meter error, %, not exceeding
From $Q_{\min}$ (incl.) to Q_t	± 2
From Q_t (incl.) to $Q_{\max}$ (incl.)	± 1

Note: Failure of one or more flow rate channels leads to partial inoperability. In this case, the meter records with unnormalized error.

Compensation for inoperative channels in partial inoperability mode is based on calculating flow velocity from measured values in the operative channels, taking into account the actual velocity ratios between channels.

The working velocity range is divided into six intervals. Under full operability conditions, for each interval the following are determined:

- Average flow velocity values for each of the four channels;
- Average hydrodynamic coefficient values for each of the four channels;
- Number of measurements for each of the four channels.

The hydrodynamic coefficient is calculated as the ratio of the flow-weighted average velocity to the velocity in an individual channel.

In case of failure of at least one channel, the flow-weighted average velocity is estimated from the sum of velocities in the operative channels, taking into account hydrodynamic coefficients.

Permissible relative error limits in the pressure range from 0.2 P max to P max in gas volume measurement reduced to standard conditions do not exceed:

- In the range from Q min (inclusive) to Q t: $\pm 2.25\%$;
- In the range from Q t (inclusive) to Q max (inclusive): $\pm 1.25\%$.

Measurement repeatability: not worse than $\pm 0.1\%$.

The minimum gauge pressure in the measurement pipeline at which the meter ensures the required measurement accuracy is 0 MPa.

Under standard conditions, the gas pressure drop across the GFA424 meter does not exceed 4,000 Pa.

The meter provides two pulse outputs that, depending on the configuration, can generate low-frequency (LF) pulse signals with frequency up to 0.5 Hz and high-frequency (HF) pulse signals with frequency up to 600 Hz, proportional to the gas volume passed through the meter in the forward direction.

The duration of LF pulses can be set in the range from 50 to 300 ms.

Output type: "dry contact".

Closed circuit resistance does not exceed 60 Ohm; open circuit resistance is at least 1 MOhm.

The HF output is intended for connecting the meter to an automated verification facility during calibration, to an external corrector, or to an automatic control system.

Low-frequency pulse outputs are used for connecting the meter to an external volume corrector.

When operating from an external power supply, the meter can generate both LF and HF signals. In autonomous mode, the meter generates only LF signals.

Permissible frequency output configurations are given in Table 4.

Table 4 — Permissible frequency output configurations

Signal type	Battery-powered — Output 1	Battery-powered — Output 2	External power — Output 1	External power — Output 2
LF: forward flow	+	+	+	+
LF: forward flow (volume at standard conditions)	-	+	-	+
HF: forward flow	-	-	+	+

LF and HF dry-contact outputs of the meter accept supply voltage up to 28 V at a current up to 50 mA. HF outputs operate only when external supply voltage is present.

Each output pulse corresponds to a fixed increment of gas volume. Pulse weight values depending on the internal diameter and meter size are given in Tables 5 and 6.

Table 5 — Pulse weight values depending on internal diameter

DN	Pulse weight — HF output (pulses/m ³)	Pulse weight — LF output (pulses/m ³)
50	5000	5
80	2000	2
100	1000	1
150	500	0.5
200	500	0.2

Table 6 - "Pulse value" of the low-frequency output depending on the meter size and maximum pressure for standard conditions

DN, mm/ P, MPa	0,1	0,6	1	1,6	2	2,5	4	5	6,3	10	16	25
50	5	0,5	0,5	0,2	0,2	0,2	0,1	0,1	0,05	0,05	0,02	0,02
80	2	0,2	0,2	0,1	0,1	0,05	0,05	0,05	0,02	0,02	0,01	0,01
100	1	0,2	0,1	0,05	0,05	0,05	0,02	0,02	0,02	0,01	0,005	0,005
150	0,5	0,05	0,05	0,02	0,02	0,02	0,01	0,01	0,01	0,005	0,002	0,002
200	0,2	0,05	0,02	0,02	0,01	0,01	0,005	0,005	0,005	0,002	0,002	0,002

The integrated volume corrector can calculate the gas compression factor using one of the following methods: NX19 mod., GERG-91 mod. or SGERG88.

The relative error of calculating volumetric flow rate, gas volume reduced to standard conditions, and energy does not exceed $\pm 0.02\%$.

Meter has a built-in temperature transducer with nominal static characteristic Pt100, which corresponds to class A according to IEC 60751:2022.

The absolute error of the temperature conversion channel does not exceed $\pm 0.1^{\circ}\text{C}$.

The absolute temperature measurement error in the range from minus 55°C to plus 70°C does not exceed $\pm 0.3^{\circ}\text{C}$.

The meter has a built-in pressure transducer (PT) for measuring gas pressure with intrinsic safety explosion protection type, approved in the established manner for use in hazardous areas, in accordance with the explosion protection marking and requirements of EN IEC 60079-0:2018/AC:2020-02, EN 60079-11:2012. Limiting parameters of intrinsically safe electrical circuits for connecting the pressure transducer (connector XS10 of the Insert Section harness) are given in Table 7.

Table 7 — Limiting parameters of intrinsically safe circuits for pressure transducer connection

Parameter	Value (not more than)
Output voltage, U_o	6.0 V
Output current, I_o	300 mA
Output power, P_o	0.44 W
External capacitance, C_o	25 μF
External inductance, L_o	0.3 mH

The total error of pressure measurement in the range from $0,2 P_{\text{max}}$ to P_{max} does not exceed $\pm 0,1 \%$.

The meter automatically creates and stores the following archives in its non-volatile memory:

- Hourly — for each previous hour. Archive depth: 1080 records (45 days);
- Daily — for each previous day. Archive depth: 365 records (12 months);
- Periodic values of all measured parameters, with a period set during configuration as a multiple of 60 s (default: 1800 s / 30 min). Archive depth: 4320 records;
- Instantaneous values of all measured parameters, with a period set in increments of 1 s. Archive depth: 3000 records.

The meter generates emergency event archives. The list of emergency events is given in Table D.7 of Appendix D.

The meter records in separate archives:

- Emergency events archive — emergency event messages. Archive depth: 1000 records;
- Intervention archive — messages about changes to configuration parameters (depth: 1000 records). The list of meter configuration parameters is given in Table D.8 of Appendix D;
- Security archive — messages about user authorization time and logout time, changes to username and password, user additions and deletions (see Table D.9 of Appendix D). Archive depth: 600 records.

When the archive is full, the oldest records are replaced by new ones.

Data exchange between the meter and PC is performed via the RS-485 interface.

Communication protocol: ModBus RTU.

Data exchange rate is selected during meter configuration from the following series: 1200; 2400; 4800; 9600; 19200; 38400; 57600; 115200 bit/s.

RS-485 communication line length: up to 1200 m. Communication channels operate only when the meter is powered from external source.

For transmitting processed and accumulated data to a remote server, the GFA meter can be equipped with a built-in GSM/GPRS modem or LTE Nb-IoT modem.

GSM/GPRS modem specifications:

- Frequency band: GSM 900/1800 MHz;
- Radiated power: Class 4 at 900 MHz and Class 1 at 1800 MHz;
- GPRS: Class 10; SMS.

LTE Nb-IoT modem specifications:

- Frequency band: B1/B3/B5/B8;
- Transmitter power: up to 23 dBm.

By default, the meter connects to the server once per day.

On order, meters can be configured with an additional output — current (4...20) mA or RS-485 — as per the meter order code in Appendix A. Similarly, on order, meters without modems can be supplied with 2 discrete outputs (max. 50 mA, 24 V) according to the meter order code in Appendix A.

The meter is powered by two built-in lithium batteries. Capacity of each battery: at least 14 A·h at 7.2 V. Operating time of the GFA424 meter without battery replacement (for version without a modem): at least 5 years.

The meters can be operated from external 12VDC (± 3 V) power supply.

The degree of protection of the meter against penetration of foreign particles and water is IP 67 (according to EN/IEC 60529).

Meters are resistant to vibrations with frequency from 10 Hz to 150 Hz and acceleration amplitude up to 7 m/s².

Level of radio emissions from the meter complies with applicable requirements of EU directive 2014/30/EU (EMC), as well as EN IEC 61000-6-4:2019 "Electromagnetic compatibility. Part 6-4. Basic standards. Emission of interference in industrial environments".

Overall dimensions of the EU, mm, not more than: 216 × 140 × 145.

EU mass, kg, not more than: 2.0.

The IS for each meter size has its own geometric dimensions with a unified design solution (see Appendix B).

Reliability indicators:

- Average service life: 20 years;
- Mean time between failures: at least 50,000 hours.

Meter Components

The list of meter components is given in Table 8 below.

Table 8 — Meter Components

Label	Name	Q-ty.	Note
636128.314EU-424	Gas Meter GFA424-**-**-**-**-**-**-**-**-**-** components:	1	Meter code as per Annex A
B1.801.00.00.000-____	Electronics unit	1	according to order specification
B1.XXX.00.00.000	<u>In-line section</u>	1	according to order specification
B1.XXX.XX.00.000	Mounting kit	1	according to order specification
BX.XXX.XX.XX.XXX	Pressure transducer	1	according to order specification
	Resistive temperature transducer	1	sleeve diameter according to order specification
	TSP 101 Pt100 A4		
	<u>Kits</u>		
	<u>Maintenance documentation set</u>		
636128.314EU PS	Passport / Device data sheet	1 pcs.	
636128.314EU-424 OM	Operation manual	1 pcs.	*
	Software		
	software for configuration and data management	1	**for single installation only

XXX – serial number assigned to the manufacturer's classification.
 * When a batch of meters is delivered to a single customer, 1 copy may be enclosed per batch.
 ** Supplied on a separate order

Typical Ordering Code for the GFA 424 meters

GFA	4	2	4-	__-	___-	DN_-	G_-	_-	_-	_-	_-	_-	_-	_-
Meter type														
Number of Channel : 4														
In-line section: 2 - straight runs not needed														
Number of EAT pairs: 4														
Maximum operating pressure, MPa														
Type of calibration:	A – air; G – natural gas; W – without calibration;													
IS nominal diameter, mm														
Meter standard size G according to Table 2														
Flange type:	D –DIN; xxxx – PN, bar; A –ANSI; xxxx – pressure; O – on order;													
Ambient temperature:	S – Standard (-25.. +55 °C); H – High temperature (-25 .. +70 °C); L – Low temperature (-40...+55 °C); LH - Extended temperature range (-40...+70 °C)													
Availability of a modem or discrete outputs:	G – GSM/GPRS; N – Nb-Iot; D – two discrete outputs; X – not available;													
Additional outputs:	C - current; R - RS-485;													
Power supply:	B – autonomous power with the possibility of connecting external power source; D – external;													
Flow correction features:	C – with integrated flow corrector (PTZ); W – without volume correction feature (without integrated pressure and temperature measurement)													
Flow configuration:	1 – only in the forward direction													