Speed Pressure Flow Rate Temperature

FLUIDISTOR GAS FLOWMETER GD 100 (EX)

for measuring of all technical and medical gases DN25 - DN400

Rev.-Nr.: DS 300 E V1.2 2011-11-30

- Oscillating measuring principle, without moving parts
- Resistent to dirt, e.g. oil and rust residues in compressed-air systems
- Best results measuring wet biogas with a newly developed biogas-sensor
- Short response time T90 ≤ 100 ms
- High accuracy (± 1,5% of true value)
- High reproducibility (0,1% of true value)
- Low loss of pressure
- Maximum operating pressure 40 bar, temperature 120°C
- Each flowmeter with calibration report
- Ex II 1 G EEX ia IIC T4 SP 03ATEX3614X (Standard)

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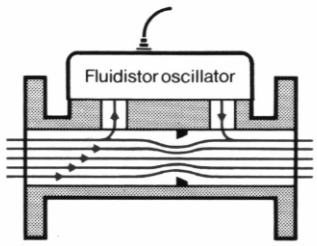
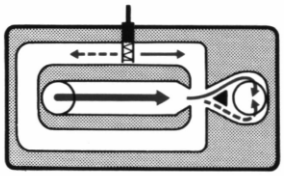
Principle of measurement

The meter is a fluidistor oscillator with an oscillating frequency which is directly proportional to the gas passing through it.

The frequency / velocity ratio is constant for all gases within a large flow range. The volume per pulse is not affected by changes in gas density and viscosity.

The fluidistor works as a bypass to the main housing. The main flow is throttled by an orifice plate, thus creating the same flow coefficient as in the fluidistor. The flow through the fluidistor is a part of the total flow through the meter.
As there is a fixed ratio between these two flows, the oscillating frequency of the fluidistor is regarded as the measurement of the total flow through the meter.





The right hand picture shows a cross section of the fluidistor. The gas flow enters the meter on the left and leaves it through the connection to the right.

The flow alternately selects one of the two channels directly upstream of the outlet. The occuring oscillation is caused by the reciprocating flow within the U-shaped channel connecting the control channels.

The oscillating frequency is measured in the U-shaped channel by a hot wire sensor. The sensor can easily be replaced without removing the meter and does not have an influence on the calibration of the meter.

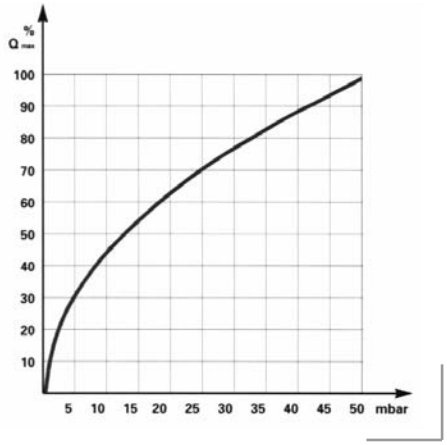
In the signal converter, the oscillations are amplified to a pulse or analogue signal to be received by a counter, a recorder or an indicating instrument.

Pressure loss / Pressure flow

The diagram applies to gases of air density at NTP,
e.g. 0°C and 1000 mbar.

The decrease of pressure is always proportional to the gas density.

If e.g. the operating pressure rises by 100%,
the pressure drop is double.



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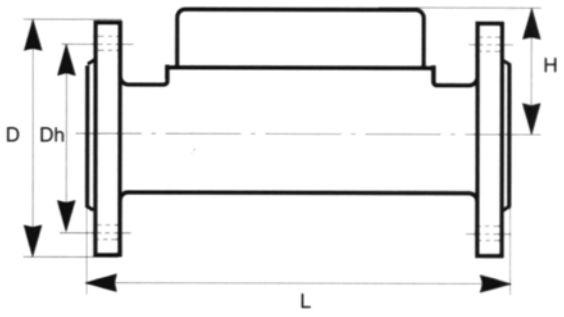
Dimension and weight

mm						WEIGHT
DN (NOMINAL WIDTH)	L	D	DH	H	H WITH AVF	(kg)
25	300	115	85	140	180	10
32	300	140	100	160	200	11
40	300	150	110	145	185	12
50	300	165	125	145	185	13
65	300	185	145	175	215	14
80	300	200	160	160	205	20
100	300/360	220	180	190	230	23
125	300	250	210	245	285	20
150	350	285	240	240	280	26
200	350	340	295	265	305	36
250	450	405	355	290	330	53
300	350/500	460	410	320	360	70
350	500	520	470	335	375	83
400	500	580	525	400	400	90

Flanges according to EN-1092-2

DN100 with orifice plate 3



Option

AVF	Ball valve (Blocking valve) Removal / installation of the flow-sensor without emptying the system

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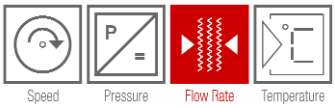

Technical details

The usage of the ball valve increases the availability of the plant. The installation / removal of the flow-sensor in the GD 100 can be carried out during operation.

During system engineering it has to be considered that the nominal width of the pipe must not be increased in order to avoid tampering the measurand. It is important that the defined measurement range of each nominal width must not be exceeded.

Measurand below the limit value Q_{min} (flow range) can not be displayed.

Technical data

Meter Size	DN25 to DN400
Pressure-Classification	PN16 (standard), PN25 and PN40 (option)
Temperature	-30 to +120°C; gas as well as enviroment Max. 60°C Ex-model.
Material	Meter housing: cast iron or optional stainless steel 1.4571 Orifice plate: stainless steel Fluidistor: polyethersulphone (PPS) Sensor: platinum wire Sealings: Silicon, nitrile or vitron Protection class: IP65
Ex-model	II 1 G EEX ia IIC T4 SP 03ATEX3614X ATEX-Certificate No. SP06ATEX3634

For the measurement of wet biogas a newly developed sensor is available.

Installation information

The meter can be installed in horizontal as well as vertical pipes.

In case of potential risk of condensate or liquid in the gas, the GD 100 has to be installed horizontally with the meterhead upwards.

Up-stream the meter requires a straight pipe length of 10 x DN (D=pipe diameter), downstream 5 x DN is required.

The gas velocity of an upstream flow may not exceed supersonic speeds anywhere. Thus supercritical pressure drops must be avoided.

To install the sensor cable, the cover of the GD 100 has to be lifted, therefore the device has to be installed at a minimum distance of 10 cm to the ceiling.

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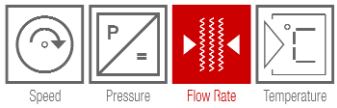

Flow range

DN (mm)	m³/h					
	1		2		3	
	Q_{min}	Q_{max}	Q_{min}	Q_{max}	Q_{min}	Q_{max}
25	0,20	20	0,35	35	0,70	70
32	0,20	20	0,60	60	1,00	100
40	0,20	20	0,90	90	2,00	200
50	0,20	20	1,10	110	2,50	250
65	0,90	90	1,70	170	4,50	450
80	1,40	140	4,50	450	8,00	800
100	2,70	270	6,50	650	10,00	1000
125	4,00	400	8,00	800	15,00	1500
150	6,00	600	12,00	1200	30,00	3000
200	12,00	1200	25,00	2500	60,00	6000
250	20,00	2000	40,00	4000	75,00	7500
300	30,00	3000	50,00	5000	113,00	13000
350	40,00	4000	70,00	7000	140,00	14000
400	50,00	5000	100,00	10000	160,00	16000

Accuracy of measurement

At low flow rates the density of the gas influences the accuracy.

Above the limit value (Q_t), the accuracy is 1,5% of measuring value.

Below Q_t the accuracy is 5% of the measuring value.

Example:

At a density of x kg/m³ the limit value is Q_t = x % of Q_{max}

Density		Limit value Q_t
0,5 kg/m³	=	16 %
1,0 kg/m³	=	8 %
2,0 kg/m³	=	4 %
4,0 kg/m³	=	2 %
8,0 kg/m³	=	1 %

Natural gas with a methan component of 85 % a density of 0,85 kg/m³ is assumed.

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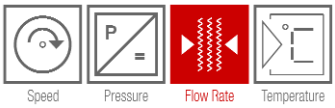

Evaluation electronics

Flow Rate Correction Calculator GDR 1403 for all technical and medical gases

The Flow Rate-Correction Calculator detects the impulse signals of up to two fluidistor gas flow meters GD 100 using 1 or 2 channels. According to the assignment it converts the impulse signals into m³/h or Nm³/h. The actual flow rate is displayed in m³/h resp. Nm³/h or the quantity in m³ resp. Nm³ on the LCD-display.

For further information see datasheet DS 303 E.

CHP Gas Monitor GDR 1404 for the sector biogas

In addition to the calculation of flow, the GDR 1404 offers the following functions:

- Calculation of efficiency (ETA)
- Calculation of feeding loss (EVU)
- Integration of various gas analysis

For further information see datasheet DS 307 E.

Fermenter-Gas-Controller GDR 1406 for the sector biogas

In addition to the calculation of flow at the fermenter, the GDR 1406 offers the following functions:

- Integrated gate control for the feeding pressure control in the gas collecting pipe
- Control of under- and overpressure at filling and withdrawal at the fermenter

For further information see datasheet DS 308 E.

The devices share the following options:

- Integrated recorder to log measured values in the ring buffer (2 GB) for fast identification of faults during operation
- Saving logged data in external SQL-database using the Energy Management and Configuration Software E3DM
- Visualisation of data in time series using the Energy Management and Configuration Software E3DM
- Integration into IT-networks via Ethernet TCP/IP
- Data transfer via PROFIBUS-DP, Modbus-RTU, Modbus-TCP, Ethernet/IP

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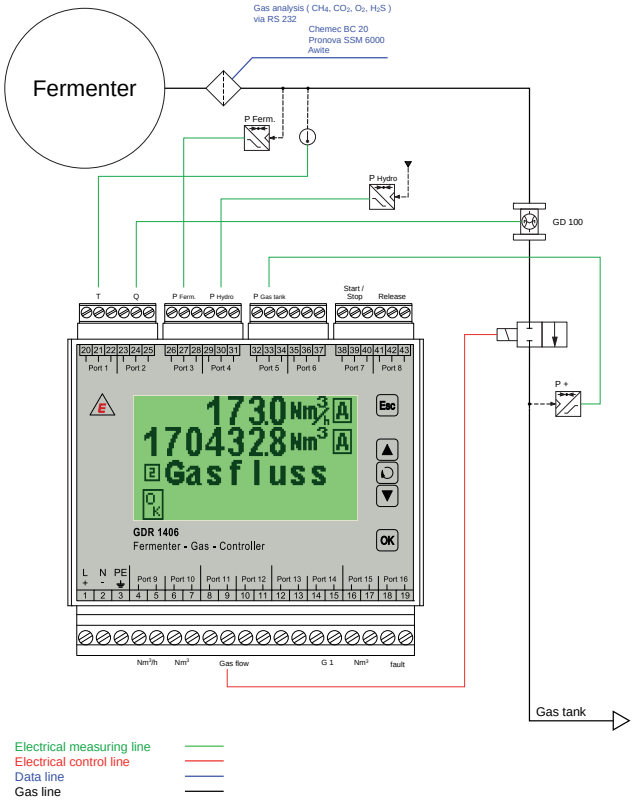
Ordering information

A)	Minimum flow rate (m³/h)
B)	Maximum flow rate (m³/h)
C)	Medium, e.g. wet biogas
D)	Nominal width DN (e.g. DN50)
E)	Operating pressure (bar)
F)	Operating temperature (°C)
G)	Maximum pressure loss (mbar)
H)	Display in Nm³/h or m³/h
I)	4 - 20 mA and impulse output
J)	BUS-output, e.g. PROFIBUS-DP, Modbus-RTU, instead of mA-output

Application example

Fermenter-Gas-Controller GDR 1406 with control of the feed pressure



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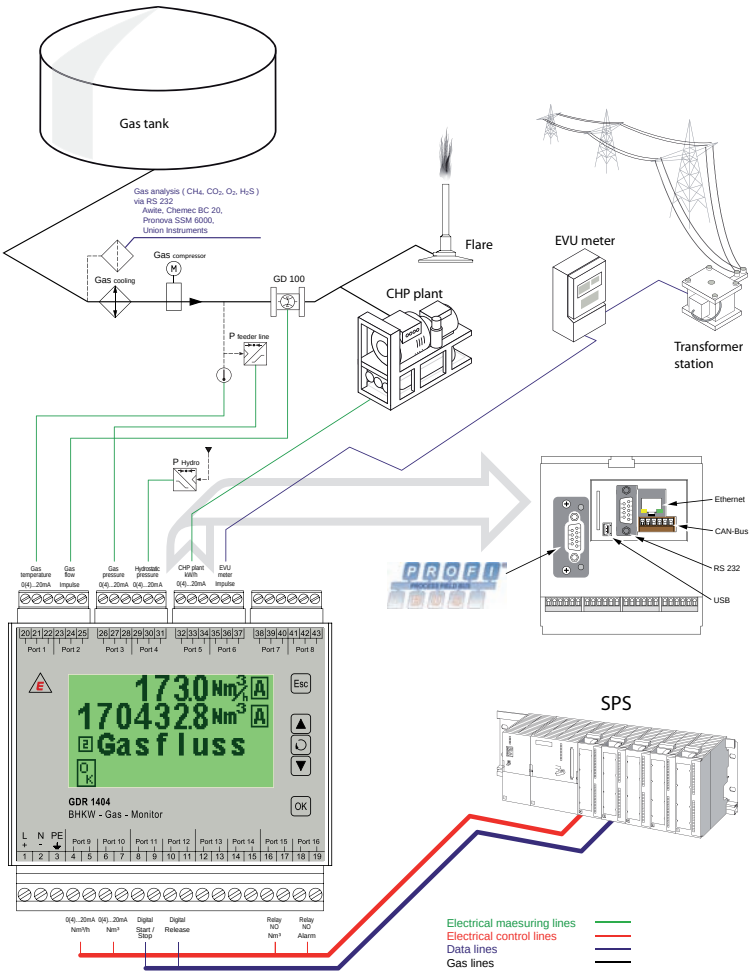
CHP Gas Monitor GDR 1404 with gas engine



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