Speed Pressure **Flow Rate** Temperature

CHP Gas Monitor GDR 1404
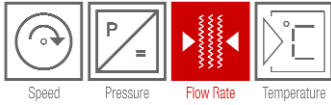
with Ethernet/IP, PROFIBUS-DP, Modbus-RTU, Modbus-TCP

The series GDR 1404 is characterized by direct calculation of the gas consumption in Nm³.

According to the configuration and the measuring method, the device collects data from up to 4 sensors (flow rate, pressure, temperature and hydrostatic pressure) which are necessary for the calculation in Nm³. If one of these values is not measured by a sensor, the Nm³ can be calculated with an adjustable fixed value.

In stage of expansion the device is also able to process the electrical capacity (CHP) and the infeed loss. On basis of these data the electrical efficiency factor of the CHP is calculated.
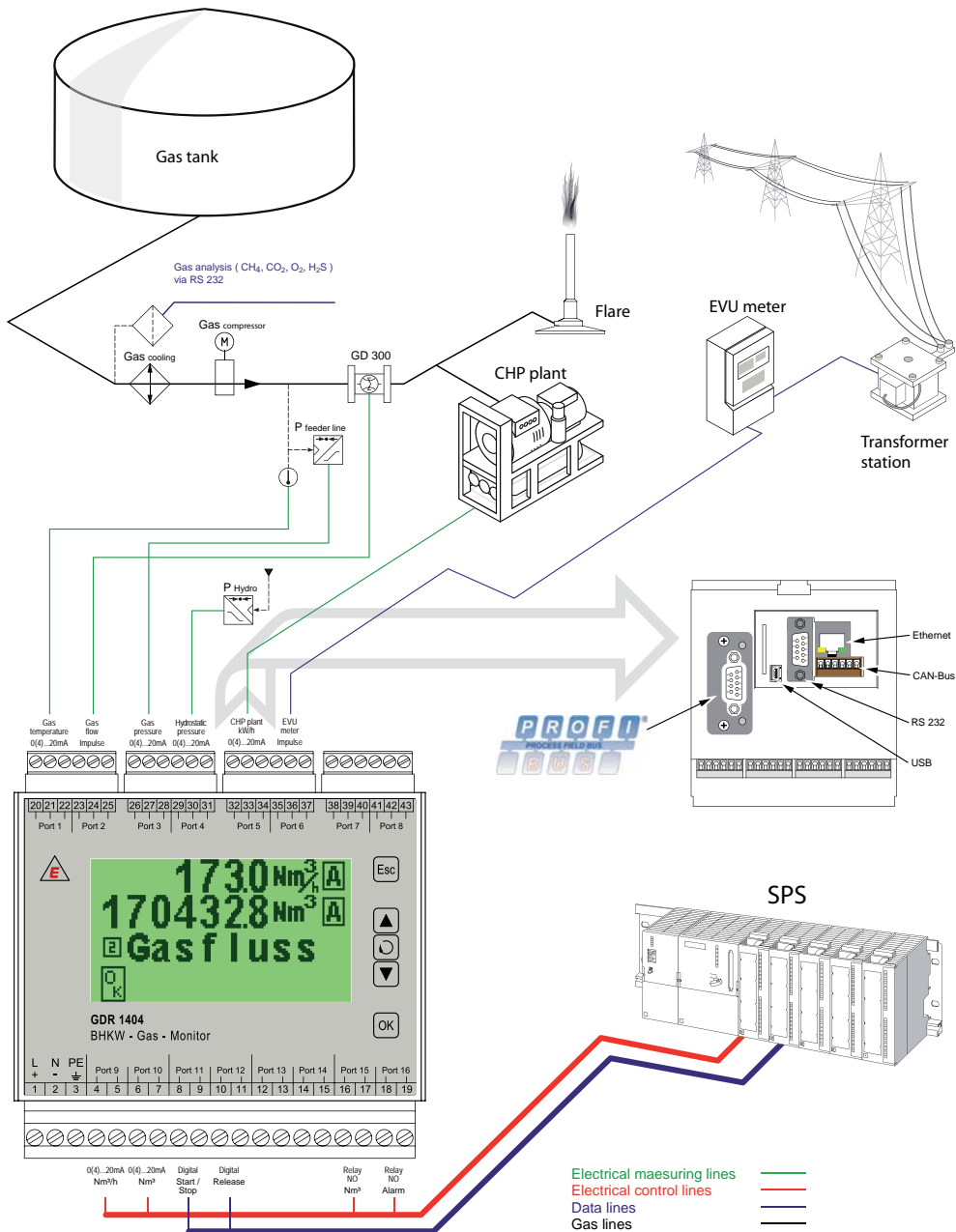
The programming of the device is carried out by PC using the software "E3DM" via Ethernet or USB interface.

- Calculating the efficiency factor of the CHP

- Integrated recording function to register measurement data (ring buffer 2 GB)

- Optional measurement of partial gas quantity to operate over SPS

- Integration into IT-networks using Ethernet TCP/IP to remote data transmission and device control

- Up to 12 devices curable through internal CANBUS

- At network loss persistent data management of the total counter reading for a period of 5 years

- Calculation according to DIN 1343, DIN 6358, DIN ISO 2533, DIN 102/ISO 1-1975

- Optional input for measured value clearing

- Optional connection of a gas analysis
  (e.g. Awite, Bieler & Lang, Chemec, Esders, ExTox, Fresenius, Pronova, Union Instruments)

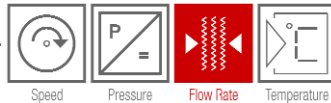- Optional data input for up to 4 measuring values

Speed Pressure **Flow Rate** Temperature

Application example

CHP Gas Monitor with gas engine

Gas tank

Gas analysis (CH_4, CO_2, O_2, H_2S)
via RS 232

Gas compressor

Gas cooling

GD 300

Flare

EVU meter

CHP plant

Transformer station

P feeder line

P Hydro

Ethernet

CAN-Bus

RS 232

USB

PROFI PROCESS FIELD BUS

Gas temperature 0(4)...20mA	Gas flow Impulse	Gas pressure 0(4)...20mA	Hydrostatic pressure 0(4)...20mA	CHP plant kW/h 0(4)...20mA	EVU meter Impulse		

20 21 22 23 24 25	26 27 28 29 30 31	32 33 34 35 36 37	38 39 40 41 42 43
Port 1 Port 2	Port 3 Port 4	Port 5 Port 6	Port 7 Port 8

173.0 Nm³/h [A]
1704328 Nm³ [A]
E **Gasfluss**
OK

Esc
▲
○
▼
OK

GDR 1404
BHKW - Gas - Monitor

SPS

L+ N- PE⏚	Port 9	Port 10	Port 11	Port 12	Port 13	Port 14	Port 15	Port 16
1 2 3	4 5	6 7	8 9	10 11	12 13	14 15	16 17	18 19

0(4)...20mA Nm³/h | 0(4)...20mA Nm³ | Digital Start / Stop | Digital Release | Relay NO Nm³ | Relay NO Alarm

Electrical maesuring lines
Electrical control lines
Data lines
Gas lines

I0712062d

Datasheet DS 307 E

Technical data

The devices of the series GDR 1404 are designed as a modular system. This system enables the configuration of inputs, outputs, interfaces and software options which are required according to the individual requirements of the installation and application. This section provides an overview of all technical information of the series.

INPUT	
INPUT 1 **TEMPERATURE**	0 (4) - 20 mA, 2-/3-wire (temperature) = -100 - 2000 °C (14 bit), input resistance < 100 ohm using 20 mA
INPUT 2 **FLOW RATE**	0 (4) - 20 mA (flow rate) = 0 - 20.000 m³/h (14 bit), input resistance < 100 ohm using 20 mA or pulse input for gas flowmeter GD 300/GD 500 (flow rate), up to 1 kHz at 5 % duty cycle, pulse length > 500 μs
INPUT 3 **PRESSURE**	0 (4) - 20 mA, 2-/3-wire (pressure) = 0 - 30 bar (14 bit), input resistance < 100 ohm
INPUT 4 **HYDROSTATIC PRESSURE**	0 (4) - 20 mA, 2-/3-wire (hydrostatic pressure) = 0 - 30 bar (14 bit), input resistance < 100 ohm using 20 mA
INPUT 5 **ETA**	0 (4) - 20 mA, calculation of efficiency factor (ETA)
INPUT 6 **EVU**	pulse, calculation of feeding loss (EVU), 10 - 1 kHz at 5 % duty cycle, pulse length > 500 μs
INPUT 7	0 (4) - 20 mA, 2-/3-wire, input resistance < 100 ohm
INPUT 8	0 (4) - 20 mA, 2-/3-wire, input resistance < 100 ohm
DIGITAL INPUT S1	digital gate input, partial quantity (start/stop)
DIGITAL INPUT S2	digital gate input, release

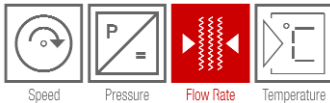| OUTPUT	
OUTPUT 1	0 (4) - 20 mA = 0 - (x) Nm³/h flow rate (freely programmable), load 500 ohm
OUTPUT 2	0 (4) - 20 mA = 0 - (x) Nm³ partial quantity (freely programmable), load 500 ohm

RELAY	
K1: COUNTING OUTPUT	relay 1 or 10 or 100 Nm³ per pulse (freely programmable), counting output quantity, NO switch
K2: DEVICE ERROR	If an instrument failure occurs the relay is released. Superior systems are able to detect a failure in the measuring system through this signal (NO switch). Load 250 V, AC, 1,5A inductive

ELECTRIC VALUES	
ACCURACY	± 0,05 % EW ± 1 digit at 23 °C
POWER SUPPLY	24 V, DC ± 3 V

ENVIRONMENTAL INFLUENCES	
AMBIENT TEMPERATURE	-10 to +55 °C
STORAGE TEMPERATURE	-20 to +85 °C
TEST VOLTAGE	3 kV
HUMIDITY CLASS	E-DIN 40040
ELECTROMAGNETIC COMPATIBILITY	acc. to EN 61000

| DISPLAY, HOUSING, WEIGHT	
DISPLAY	6-digit LCD-display for flow rate in Nm³/h (resolution 0,1 Nm³) 8-digit LCD-display in Nm³ (resolution 0,1 Nm³) display height 8 mmm
STANDARD HOUSING RAIL MOUNTING	dimensions: 100 mm (W) x 100 mm (H) x 107 (D) mm protection class: IP20 net weight: approx. 480 g
PROTECTIVE HOUSING (OPTION M104) WALL MOUNTING	dimensions: 343 mm (W) x 330 mm (H) x 210 mm (D) with tab and high-strength cable gland protection class: IP65
PROTECTIVE HOUSING WITH EX-ZONE (OPTION M105) WALL MOUNTING	dimensions: 385,5 mm (W) x 487 mm (H) x 210 mm (D) with tab and high-strength cable gland protection class: IP65
SWITCHBOARD HOUSING (OPTION M112) SWITCHBOARD DOOR MOUNTING	switchboard disruption: $151^{\pm 1}$ mm x 332,5 $^{\pm 1}$ mm front frame: 169,7 mm (W) x 351 mm (H) front frame height: 51 mm installation depth: 140 mm max. wall thickness: 23 mm protection class: IP30
PORTABLE HOUSING (OPTION M122)	dimensions: 147 mm (W) x 364 mm (H) x 261 mm (D) protection class: IP30
SWITCHBOARD HOUSING (OPTION M113) SWITCHBOARD DOOR MOUNTING	switchboard disruption: $151^{\pm 1}$ mm x 332,5 $^{\pm 1}$ mm front frame: 169,7 mm (W) x 351 mm (H) front frame height: 51 mm installation depth: 140 mm max. wall thickness: 23 mm protection class: IP65
PORTABLE HOUSING (OPTION M123)	dimensions: 147 mm (W) x 364 mm (H) x 261 mm (D) protection class: IP65
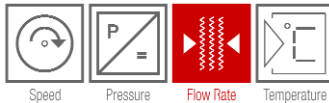
SOFTWARE & RECORDER	
GAS ANALYSIS (OPTIONAL)	data transmission of connected gas analysis (Awite, Bieler & Lang (GMC Biogas 08), Chemec (BC20, BC30), Esders (Goliath Biogas), ExTox (ET-4D2, ET-8D), Fresenius Umwelttechnik (BioBasic), Pronova (SSM6000), Union Instruments (INCA, Kaloriemeter)
E3DM	Esters Energy Efficiency and Device Manager Energy Management- and Configuration Software for Microsoft Windows (32-Bit)
RECORDER (OPTIONAL)	ring buffer 2 GB data recorder for logging of measurement values over a period of several years

| INTERFACES	
RS 232	9-pin connection to update the firmware
USB	Mini-USB connection (5-pin, USB 2.0) for configuration and data transfer through PC
CAN BUS (OPTIONAL)	internal communication of up to 12 curable devices
PROFIBUS-DP (OPTIONAL)	data transmission via Profibus-DP protocol
MODBUS-RTU (OPTIONAL)	data transmision via MODBUS-RTU protocol
MODBUS-TCP (OPTIONAL)	data transmision via MODBUS-TCP protocol
ETHERNET/IP (OPTIONAL)	integration into the IT network for configuration and data transfer by PC

Software E3DM - Esters Energy Efficiency and Device Manager
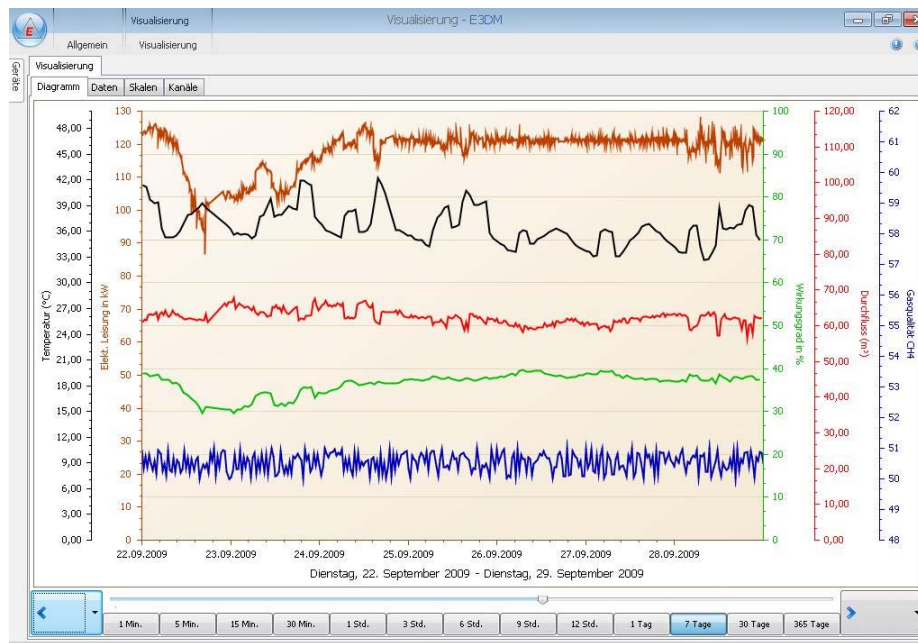
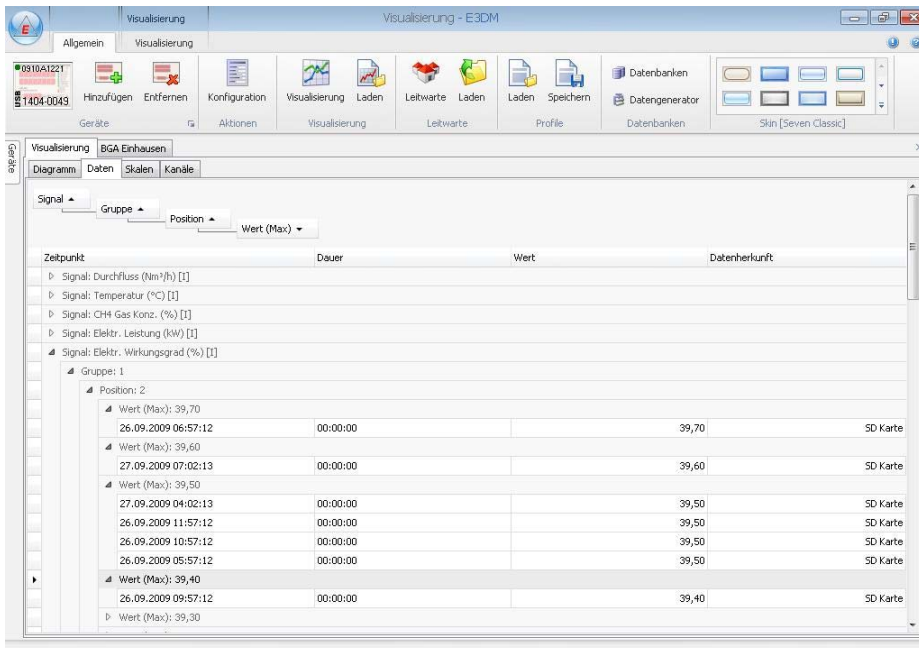The graphic visualization of the measured values continuously recorded in the ring buffer can be freely configurated by the user. In the illustration the following measured values are displayed:

- efficiency factor in %
  (Wirkungsgrad in %)
- flow (m³)
  (Flow rate m³)
- gas quality (CH_4)
  (Gasqualität (CH_4))
- electrical capacity in kW
  (elektrische Leistung in kW)
- temperature in °C
  (Temperatur in °C)
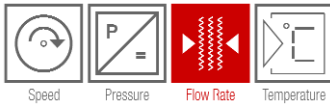
Speed Pressure Flow Rate Temperature

In the tabular visualization of the measured values continuously stored in the ring buffer the reported data can be assorted with multi-level column sort.

The illustration shows the data arranged according to signal and height of the measured values.
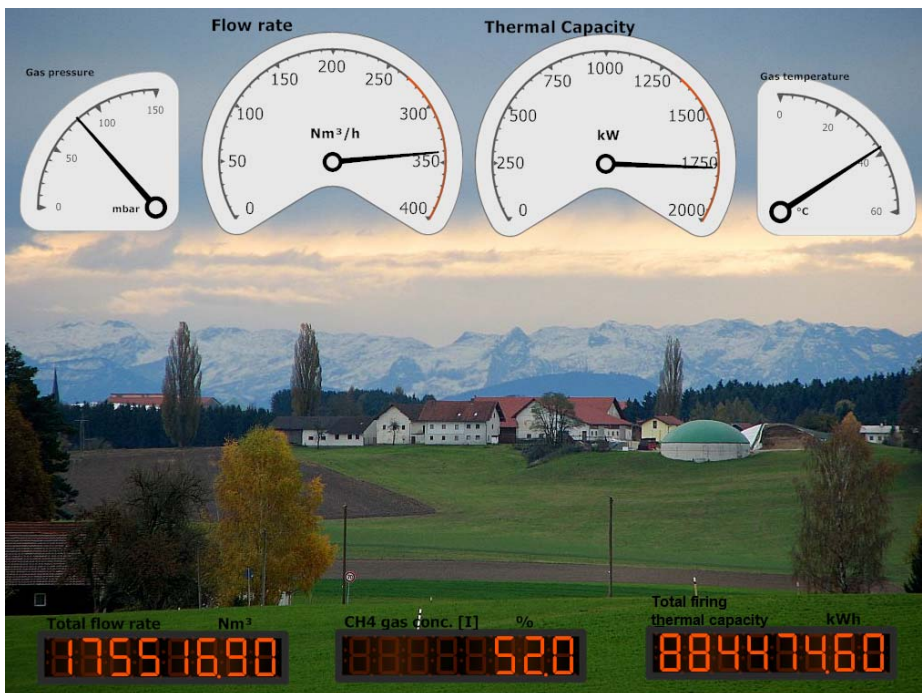
In the master display the actual measured values are mapped. The amount of the displayed values and the graphical illustration can be adjusted individually.
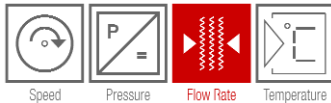
Order information

The ordering code consists of the device type GDR 1404 and an eight-digit code, which is devided into 2 parts with four points:

GDR 1404-xxxx-00yy

In the following tables the first four points are defined according to the desired equipment. The fifth and sixth positions are already defined by digit sequences. The last two digits define the content of functions (such as ring buffer, interfaces for industrial bus systems).

Example:

GDR 1404-01FD-001C M104

The CHP gas monitor has a pulse input for flow measurement, two inputs for pressure and temperature measurement, an input for hydrostatic pressure, a pulse input for the utility meter and the function for determining the efficiency. The unit is also equipped with the optional functions Profibus-DP interface, Ethernet TPC/IP interface, a 2 GB ring buffer and is built into the field housing M104 for wall mounting.

Legend:

● hardware integrated

v virtual via software integrated (fixed value)
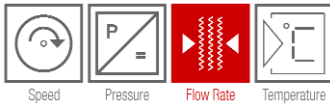
Devices with pulse input for flow measurement (GD 300, GD 500 incl. signal amplifier)

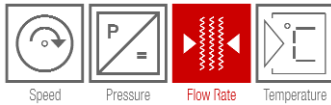| GDR 1404-xxxx-00yy	ECONOMY		STANDARD				ADD. MEASURING CHANNELS							
	0241	0249	0041	0049	005D	0069	0849	084D	1849	184D	0869	086D	1869	186D
INPUT														
1: 0 (4) - 20 mA, 2/3-wire temperature	●	●	●	●	●	●	●	●	●	●	●	●	●	●
2: Pulses, flow rate	●	●	●	●	●	●	●	●	●	●	●	●	●	●
3: 0 (4) - 20 mA, 2/3-wire pressure			●	●	●	●	●	●	●	●	●	●	●	●
4: 0 (4) - 20 mA, 2/3-wire hydrostatic press.			●	●	●	●	●	●	●	●	●	●	●	●
5: 0 (4) - 20 mA, for add. sensor							●	●	●	●	●	●	●	●
6: 0 (4) - 20 mA, for add. sensor							●	●	●	●	●	●	●	●
7: 0 (4) - 20 mA, for add. sensor									●	●			●	●
8: 0 (4) - 20 mA, for add. sensor										●			●	●
DIGITALE INPUT														
11: partial quantity (start/stop)					●		●		●		●		●	
12: release					●			●		●		●		●
OUTPUT														
9: 0 (4) - 20 mA = 0 - (x) Nm³/h flow rate		●		●	●	●	●	●	●	●	●	●	●	●
10: 0 (4) - 20 mA = 0 - (x) Nm³ part. quantity					●									
RELAY														
K1 (NO switch) rate Nm³	●	●	●	●	●	●	●	●	●	●	●	●	●	●
K2 (NO switch) alarm relay	●	●	●	●	●	●	●	●	●	●	●	●	●	●
INTERNAL SOFTWARE														
Integration of gas analysis					●						●	●	●	●
Power supply: 24 V, DC	●	●	●	●	●	●	●	●	●	●	●	●	●	●
USB & RS 232	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Software E3DM	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Speed Pressure **Flow Rate** Temperature

Devices with mA-input for flow measurement (third-party products)

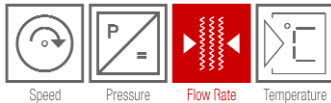| GDR 1404-xxxx-00yy	ECONOMY		STANDARD				add. MEASURING CHANNELS			
	0201	0209	0001	0009	001D	0029	0809	1809	0829	1829
INPUT										
1: 0 (4) - 20 mA, 2/3-wire temperature	●	●	●	●	●	●	●	●	●	●
2: 0 (4) - 20 mA, flow rate	●	●	●	●	●	●	●	●	●	●
3: 0 (4) - 20 mA, 2/3-wire pressure			●	●	●	●	●	●	●	●
4: 0 (4) - 20 mA, 2/3-wire hydrostatic press.			●	●	●	●	●	●	●	●
5: 0 (4) - 20 mA, for add. sensor							●	●	●	●
6: 0 (4) - 20 mA, for add. sensor							●	●	●	●
7: 0 (4) - 20 mA, for add. sensor								●		●
8: 0 (4) - 20 mA, for add. sensor								●		●
DIGITAL INPUT										
11: partial quantity (start/stop)					●					
12: release					●					
OUTPUT										
9: 0 (4) - 20 mA = 0 - (x) Nm³/h flow rate		●		●	●	●	●	●	●	●
10: 0 (4) - 20 mA = 0 - (x) Nm³ partial quantity					●					
RELAY										
K1 (NO switch) rate Nm³	●	●	●	●	●	●	●	●	●	●
K2 (NO switch) alarm relay	●	●	●	●	●	●	●	●	●	●
INTERNAL SOFTWARE										
Integration of gas analysis						●			●	●
Power supply: 24 V, DC	●	●	●	●	●	●	●	●	●	●
USB & RS 232	●	●	●	●	●	●	●	●	●	●
Software E3DM	●	●	●	●	●	●	●	●	●	●

Devices with integrated efficiency calculation

Devices with pulse input for flow measurement (GD 300, GD 500 incl. signal amplifier)

GDR 1404-xxxx-00yy	00E1	00E9	00FD	01E1	01E9	01FD	50C1	50C9	50DD	51C1	51C9	51DD
INPUT												
1: 0 (4) - 20 mA, 2/3-wire temperature	●	●	●	●	●	●	●	●	●	●	●	●
2: Pulses, flow rate	●	●	●	●	●	●	●	●	●	●	●	●
3: 0 (4) - 20 mA, 2/3-wire pressure	●	●	●	●	●	●	●	●	●	●	●	●
4: 0 (4) - 20 mA, 2/3-wire hydrostatic press.	●	●	●	●	●	●	●	●	●	●	●	●
5: 0 (4) - 20mA, efficiency calculation (ETA)	●	●	●	●	●	●	●	●	●	●	●	●
6: Pulses, calculation of feeding loss (EVU)				●	●	●				●	●	●
7: 0 (4) - 20 mA, CH_4-value (gas analysis)							●	●	●	●	●	●
8: 0 (4) - 20 mA, for add. sensor							●	●	●	●	●	●
DIGITALE INPUT												
11: partial quantity (start/stop)			●			●			●			●
12: release			●			●			●			●
OUTPUT												
9: 0 (4) - 20 mA = 0 - (x) Nm³/h flow rate		●	●		●	●		●	●		●	●
10: 0 (4) - 20 mA = 0 - (x) Nm³ partial quantity			●			●			●			●
RELAY												
K1 (NO switch) rate Nm³	●	●	●	●	●	●	●	●	●	●	●	●
K2 (NO switch) alarm relay	●	●	●	●	●	●	●	●	●	●	●	●
INTERNAL SOFTWARE												
Integration of gas analysis	●	●	●	●	●	●						
Efficiency calculation	●	●	●	●	●	●	●	●	●	●	●	●
Power supply: 24 V, DC	●	●	●	●	●	●	●	●	●	●	●	●
USB & RS 232	●	●	●	●	●	●	●	●	●	●	●	●
Software E3DM	●	●	●	●	●	●	●	●	●	●	●	●

Speed · Pressure · Flow Rate · Temperature
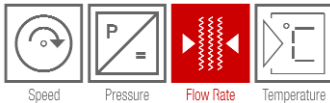
Rev.-Nr.: DS 307 E V 1.0-2013-02-01

Devices with mA-input for flow measurement (third-party products)

GDR 1404-xxxx-00YY	00A1	00A9	00BD	01A1	01A9	01BD	5081	5089	509D	5181	5189	519D
INPUT												
1: 0 (4) - 20 mA, 2/3-wire temperature	●	●	●	●	●	●	●	●	●	●	●	●
2: 0 (4) - 20 mA, flow rate	●	●	●	●	●	●	●	●	●	●	●	●
3: 0 (4) - 20 mA, 2/3-wire pressure	●	●	●	●	●	●	●	●	●	●	●	●
4: 0 (4) - 20 mA, 2/3-wire hydrostatic press.	●	●	●	●	●	●	●	●	●	●	●	●
5: 0 (4) - 20mA, efficiency calculation (ETA)	●	●	●	●	●	●	●	●	●	●	●	●
6: Pulses, calculation of feeding loss (EVU)				●	●	●				●	●	●
7: 0 (4) - 20 mA, CH_4-value (gas analysis)							●	●	●	●	●	●
8: 0 (4) - 20 mA, for add. sensor							●	●	●	●	●	●
DIGITALE INPUT												
11: partial quantity (start/stop)			●			●			●			●
12: release			●			●			●			●
OUTPUT												
9: 0 (4) - 20 mA = 0 - (x) Nm³/h flow rate		●	●		●	●		●	●		●	●
10: 0 (4) - 20 mA = 0 - (x) Nm³ partial quantity			●			●			●			●
RELAY												
K1 (NO switch) rate Nm³	●	●	●	●	●	●	●	●	●	●	●	●
K2 (NO switch) alarm relay	●	●	●	●	●	●	●	●	●	●	●	●
INTERNAL SOFTWARE												
Integration of gas analysis	●	●	●	●	●	●						
Efficiency calculation	●	●	●	●	●	●	●	●	●	●	●	●
Power supply: 24 V, DC	●	●	●	●	●	●	●	●	●	●	●	●
USB & RS 232	●	●	●	●	●	●	●	●	●	●	●	●
Software E3DM	●	●	●	●	●	●	●	●	●	●	●	●

Optional device funtions and housings

GDR 1404-xxxx-00		
0		without option
1		PROFIBUS-DP interface
2		Modbus-RTU interface
4		Modbus-TCP interface
	0	without option
	1	CAN bus interface
	4	Ethernet TCP/IP interface
	5	CAN bus, Ethernet TCP/IP interface
	8	ring buffer 2 GB (data recorder)
	9	ring buffer 2 GB (data recorder), CAN bus interface
	C	ring buffer 2 GB (data recorder), Ethernet TCP/IP interface
	D	ring buffer 2 GB (data recorder), CAN bus, Ethernet TCP/IP interface

HOUSING	
M104	field housing for wall mounting, protection class IP65
M105	field housing with Ex zone for wall mounting, protection class IP65
M112	switchboard door housing, protection class IP30
M122	portable housing, protection class IP30
M113	switchboard door housing, protection class IP65
M123	portable housing, protection class IP65

Fluidistor Gas Flowmeter GD 300

The Fluidistor Gas Flowmeter measures all technical and medical gases with a nominal width of DN 25 to DN 400 and a measurement range of 0,2 ... 20 ... 16.000 m^3/h.
Accuracy: ± 1,5%

For further information see datasheet DS 312 E.

Compact Fluidistor Gas Flowmeter GD 500

The Compact Fluidistor Gas Flowmeter (stainless steel 1.4571) measures all technical and medical gases with a measurement range of 0,21 - 16,8 m^3/h (process connection G 1/2", G 1").
Accuracy: ± 1,5%

For further information see datasheet DS 312 E.

Datasheet DS 307 E