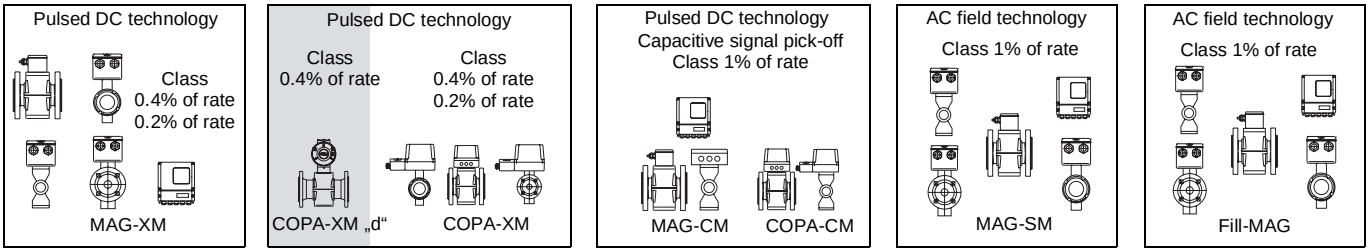
Electromagnetic flowmeter for hazardous area zone 1 with pulsed DC technology and of compact design

Process connection: Flange



The electromagnetic flowmeter enables the exact measurement of the flow volume of liquids, pulps, pastes and sludges with a min. electrical conductivity of 5 µS/cm.

The COPA-XM “d” (µP-technology) is a flowmeter system of **Compact design** – primary and converter are assembled to one unit. There is no need for a long connecting cable between the primary and the converter. The principle of operation is described on page 2.

The electromagnetic flowmeter system has following main design features:

- Flowmeter with flameproof converter housing suitable for the application in hazardous zone 1, type EEx de [ib] IIC T3-T6, PTB-No. Ex-95.D.2059X
- Signal in-/outputs of intrinsically safe - (NAMUR) and not intrinsically safe design (PELV).
- Standardized laid length of DIN-flanged primaries correspond with specified laid length of VDE/VDI 2641 and DVGW work sheet W420 (type WP, ISO 4064, short), as well as ISO 13359.
- Primary of flanged design DN 3-2000.
- Ambient temperature -20 °C to + 60 °C. (-4 °F to 140 °F)
- 130 °C fluid temperature (higher temp. upon request).
- Same electronics for all meter sizes.
- Parameter entry within the hazardous zone by means of 3-button keyboard. Instrument housing remains closed.
- 2x16 digits illuminated LC-Display, free configurable for the display of flow and totalling. Display pluggable into 3 positions.
- Automatic detection of empty meter pipe is standard.
- Difference counting or individual recording of forw. and reverse flow.
- Integrated presetting counter.
- Two flow rate ranges with automatic - or external changeover.
- Storage of all measuring point parameters and calibration data in an EEPROM module.
- Converter housing rotatable through 90°.
- Flowmeter system **COPA-XM “d”** with maximum 0.4 % deviation of measured value.

Fig.1 COPA-XM “d” flowmeter system of compact design

Contents **Page**

Reference conditions, Accuracy and Principle of operation

Reference conditions per EN 29104

Fluid temperature
20 °C ± 2 K

Ambient temperature
20 °C ± 2 K

Power supply
Voltage per name plate U_N ± 1 %

Installation requirements straight pipe sections
Upstream of primary >10 x DN,
Downstream of primary >5 x DN,
DN = Meter size

Warm up time
30 min

Influence of analog output
Same as pulse output ± 0,1 % of flow rate

Principle of operation

The operating principle of the electromagnetic flowmeter is based on Faraday´s law of magnetic induction which states that the voltage induced across any conductor as it moves at right angles through a magnetic field is proportional to the velocity of that conductor (see diagram below).

The voltage induced within the fluid is picked up by two diametrically opposed mounted electrodes. The induced signal voltage **(U_E)** is proportional to the magnetic flux density **(B)**, the distance between the electrodes **(D)** and the average flow velocity **(v)** of the fluid.

If one considers that the flux density and the electrode spacing are constants, it is readily apparent that the flow signal is proportional to the average flow velocity of the fluid. From the equation for the volume flow rate it follows that the flow signal is linearily proportional to the volume flow rate. The converter processes the electrode signal voltage into normalized, analog, and digital output signals.

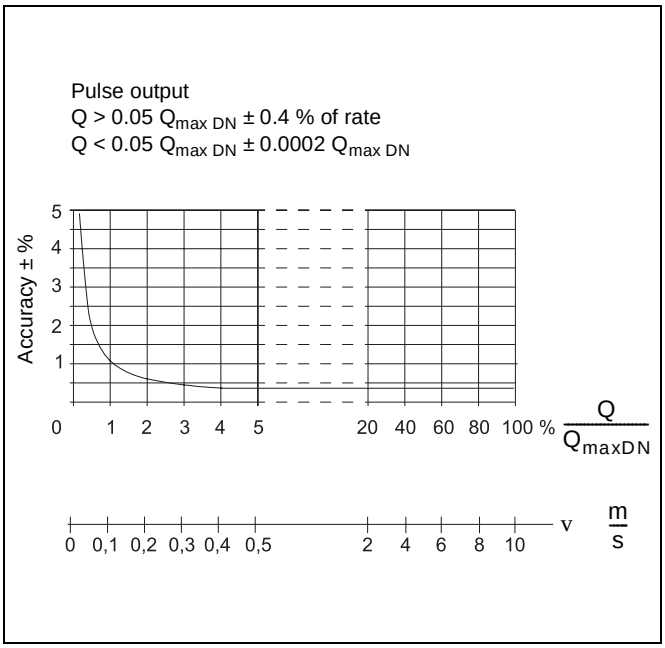


Fig.2 Accuracy of flowmeter system

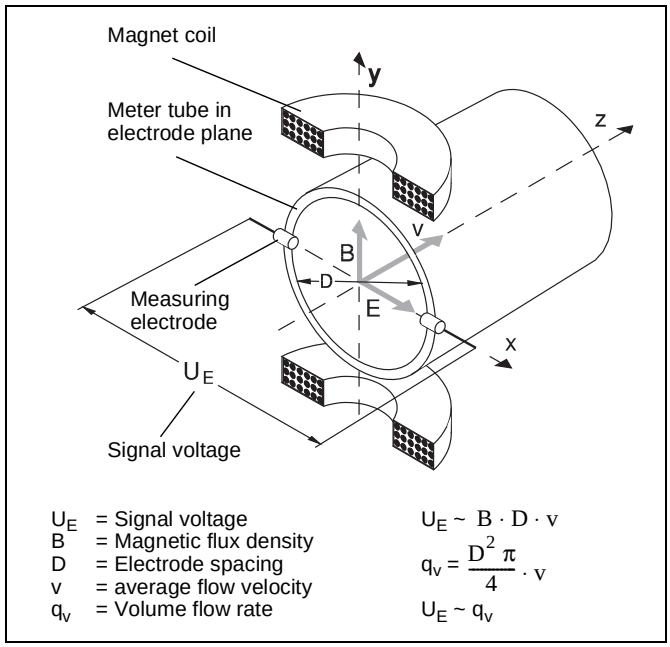


Fig.3 Basic operating principle of an electromagnetic flowmeter

Overview of designs

	COPA-XM “d”
Accuracy	0,4 % of rate
Model number	10DX3711

Primary

	Meter size (DN)	Pressure rating (PN)
Flange	3 - 2000	6 - 40
Liner material	Hard rubber, Soft rubber, PTFE, PFA, Polyurthane, others upon request	
Conductivity	≥ 5 µS/cm	
Electrode material	Stn. stl. 1.4571, 1.4539 Hastelloy B-2/C-4 Platinum-Iridium, Tantalum, Titanium	
Enclosure classification	IP 67	
Fluid temperature	-20 to +130 °C (-4 to +216 °F)	

Converter

Power supply	115/230 V AC 24 V/48 V AC 24 V DC	
In-/outputs	Intrinsically safe (NAMUR)	Not intrinsically safe (PELV)
Current output configurable	0-5 mA 0/2-10 mA 0/4-20 mA 0-10, 10-20 mA 4-12, 12-20 mA	
Pulse output	Optocoupler Relay	Optocoupler 24 V active
Contact input: external output cut-off external totalizer reset external measuring range changeover	Optocoupler	Optocoupler
Contact output: system alarm contact configurable contact output	Optocoupler Relay	Optocoupler
HART-Protocol	yes	
Limit alarm	yes	
Flow.-/reverse flow measurement	yes	
2 measuring ranges	yes, automatic- or external changeover	
Presetting totalizer	yes, with **Start/Stop** by means of buttons	
Self-monitoring	yes	
Local indication/-totalling	yes	
Detector empty pipe	yes, Standard ≥ DN 10	

EEx-design	PTB No. Ex-95.D.2059X	EEx de [ib] IIC T3-T6 ambient temperature -20 °C...+60 °C (-4 to +140 °F)

Meter size, pressure rating, flow rate range and flow nomograph

Meter size, pressure rating, flow rate range

Meter size DN	Std. press. rating PN (bar)	Min. flow rate range flow velocity 0 to 0.5 m/s	Flow rate range flow velocity 0 to 10 m/s	Max. flow rate range flow velocity 0 to 15 m/s
3	40	0 to 0,2 l/min	0 to 4 l/min	0 to 6 l/min
4	40	0 to 0,4 l/min	0 to 8 l/min	0 to 12 l/min
6	40	0 to 1 l/min	0 to 20 l/min	0 to 30 l/min
8	40	0 to 1,5 l/min	0 to 30 l/min	0 to 45 l/min
10	40	0 to 2,25 l/min	0 to 45 l/min	0 to 67,5 l/min
15	40	0 to 5 l/min	0 to 100 l/min	0 to 150 l/min
20	40	0 to 7,5 l/min	0 to 150 l/min	0 to 225 l/min
25	40	0 to 10 l/min	0 to 200 l/min	0 to 300 l/min
32	40	0 to 20 l/min	0 to 400 l/min	0 to 600 l/min
40	40	0 to 30 l/min	0 to 600 l/min	0 to 900 l/min
50	40	0 to 3 m^3/h	0 to 60 m^3/h	0 to 90 m^3/h
65	40	0 to 6 m^3/h	0 to 120 m^3/h	0 to 180 m^3/h
80	40	0 to 9 m^3/h	0 to 180 m^3/h	0 to 270 m^3/h
100	16	0 to 12 m^3/h	0 to 240 m^3/h	0 to 360 m^3/h
125	16	0 to 21 m^3/h	0 to 420 m^3/h	0 to 630 m^3/h
150	16	0 to 30 m^3/h	0 to 600 m^3/h	0 to 900 m^3/h
200	10/16	0 to 54 m^3/h’	0 to 1080 m^3/h	0 to 1620 m^3/h
250	10/16	0 to 90 m^3/h	0 to 1800 m^3/h	0 to 2700 m^3/h
300	10/16	0 to 120 m^3/h	0 to 2400 m^3/h	0 to 3600 m^3/h
350	10/16	0 to 165 m^3/h	0 to 3300 m^3/h	0 to 4950 m^3/h
400	10/16	0 to 225 m^3/h	0 to 4500 m^3/h	0 to 6750 m^3/h
500	10	0 to 330 m^3/h	0 to 6600 m^3/h	0 to 9900 m^3/h
600	10	0 to 480 m^3/h	0 to 9600 m^3/h	0 to 14400 m^3/h
700	10	0 to 660 m^3/h	0 to 13200 m^3/h	0 to 19800 m^3/h
800	10	0 to 900 m^3/h	0 to 18000 m^3/h	0 to 27000 m^3/h
900	10	0 to 1200 m^3/h	0 to 24000 m^3/h	0 to 36000 m^3/h
1000	10	0 to 1350 m^3/h	0 to 27000 m^3/h	0 to 40500 m^3/h
1200	6	0 to 2100 m^3/h	0 to 42000 m^3/h	0 to 63000 m^3/h
1400	6	0 to 2700 m^3/h	0 to 54000 m^3/h	0 to 81000 m^3/h
1600	6	0 to 3600 m^3/h	0 to 72000 m^3/h	0 to 108000 m^3/h
1800	6	0 to 4500 m^3/h	0 to 90000 m^3/h	0 to 135000 m^3/h
2000	6	0 to 5700 m^3/h	0 to 114000 m^3/h	0 to 171000 m^3/h

Note:
The upper range limit of the COPA-XM “d” is adjustable from 0.5 to 15 m/s, though the nomographs on page 5 are layed out from 0.5 to 10 m/s.
(upper range see table “Flow rate range”).

Flow nomograph

Flow nomograph
The volumetric flow rate is a function of the flow velocity and the meter size. The flow nomographs (Fig. 4 + 5) indicates the flow rate range available of a specific flowmeter size and which size is best suitable for a particular flow rate.

Example:
Flow rate = 7 m^3/h (maximum value = end of flow rate range). Suitable are primaries of sizes DN 20 to DN 65 for a flow velocity from 0.5 to 10 m/s.

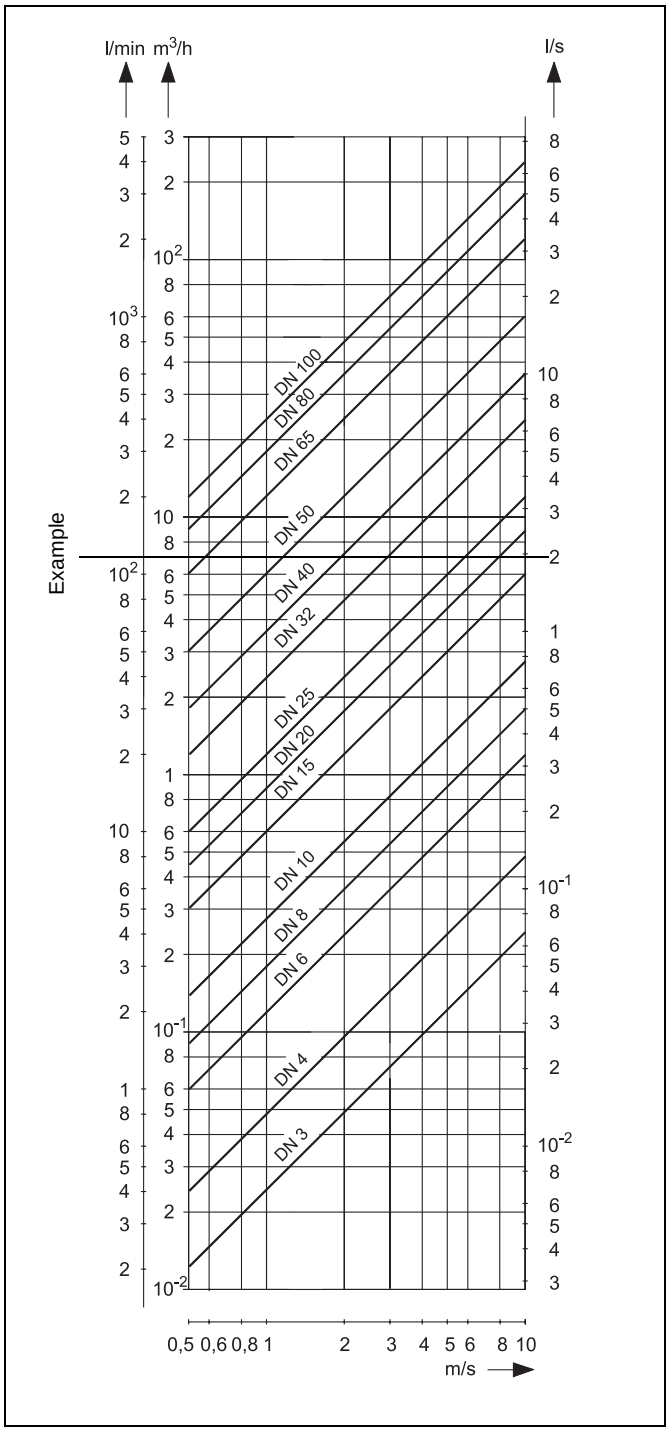


Fig.4 Flow nomograph DN 3 to DN 100

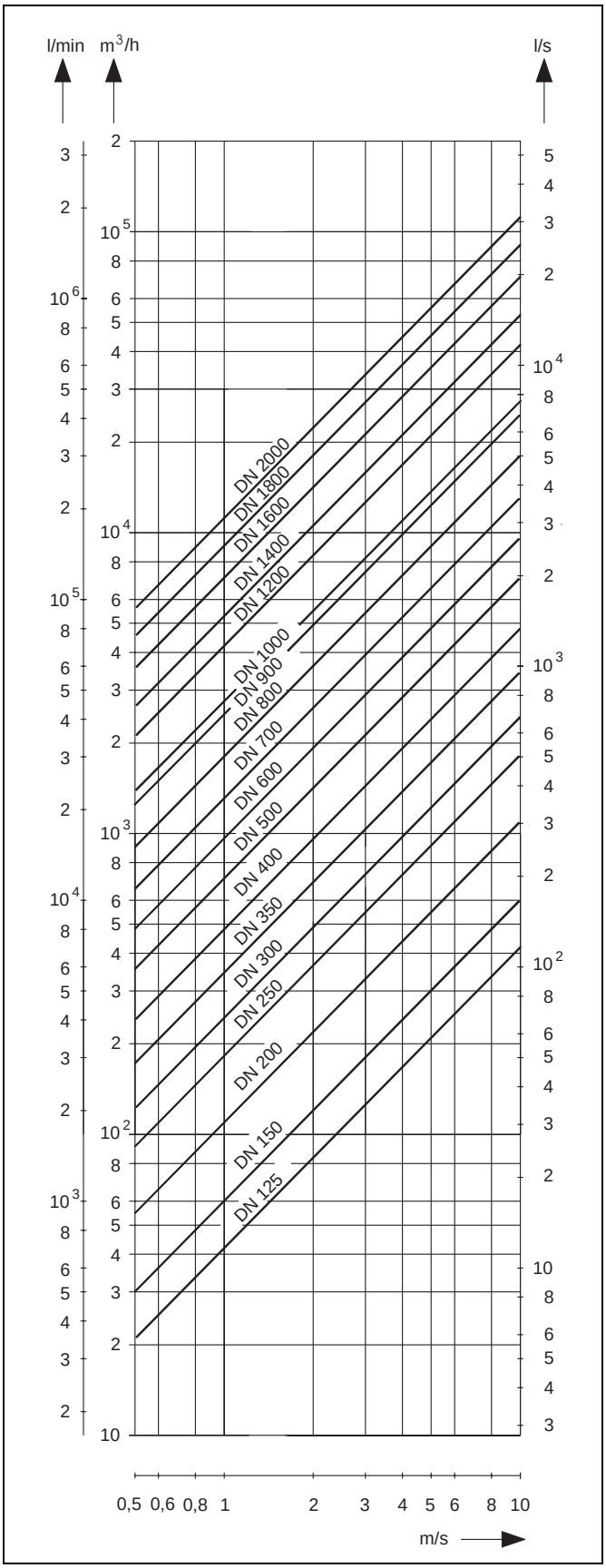


Fig.5 Flow nomograph DN 125 to DN 2000

Installation requirements and Grounding

In- and outlet pipe sections

The metering principle is independent of the velocity profile as long as swirls are not present in the metering section, e.g. after space bends, tangential flow entry into upstream pipe or after partially open valves. In sich cases measures should be employe to normalize the velocity profile. Experience has shown that in most cases an upstream and a downstream straight pipe section is sufficient. It also is recommended to install a flow control device downstream of the primary. The meter tube must be full with fluid during flow measurement.

Meter orientation

When installing the meter in a horizontal pipeline it has to be assured that none of the electrodes is located at the highest point. In order to achieve this, the terminal housing of the meter should be top oriented. This aligns the electrodes in a horizontal plane and eliminates the possibility of entrained air or gas acating as insulator between the fluid and the electrodes. The ideal installation is shown in Fig. 6.

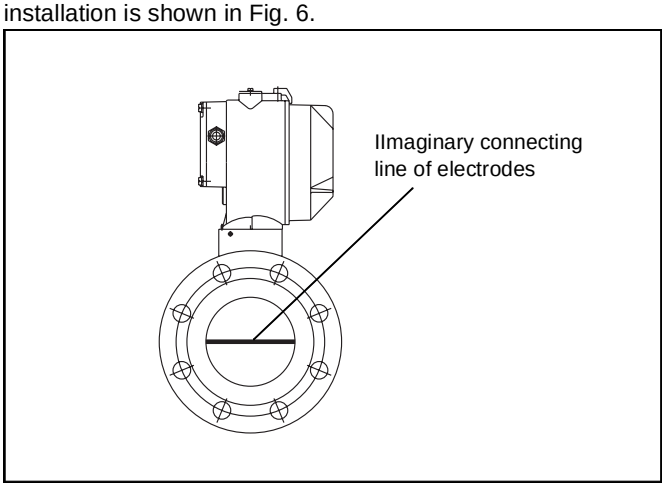


Fig.6 Imaginary connecting line of electrodes

Grounding

Proper grounding of the EMF system is significant for safety reasons as well as for optimum performance (e.g. acc. to VDE 0100, part 540). Connect primary to protective potential by means of grounding screws and bonding lead. For accurate flow measurement the fluid and pipe work should be at normal ground potential.

With plastic- or insulated lined pipe lines, grounding is made using one grounding ring or grounding electrodes. If the pipeline contains other stray potentials it is recommended that two grounding rings be used, one upstream and one downstream of the flowmeter.

Installation in larger pipe lines

The flowmeter may be installed without concern in pipelines larger than the flowmeter through use of double flanged reducers (e.g. per DIN 28545). The resultant pressure drop caused by the reducer can be determined from the diagram in Fig. 7. The following procedure is to be used to determine the pressure drop:

1. Established the diameter with ratio d/D.
2. Determine flow velocity from the flow rate and meter sizes:

   $$v = \frac{Q \text{ (flow rate)}}{\text{primary constant}}$$

   The flow velocity also can be determined from the flow rate nomographs Fig. 4 and Fig. 5.
3. In Fig. 7 at the intersection of diameter ratio d/D (X-axis) and the flow velocity value read the pressure drop on the Y-axis.

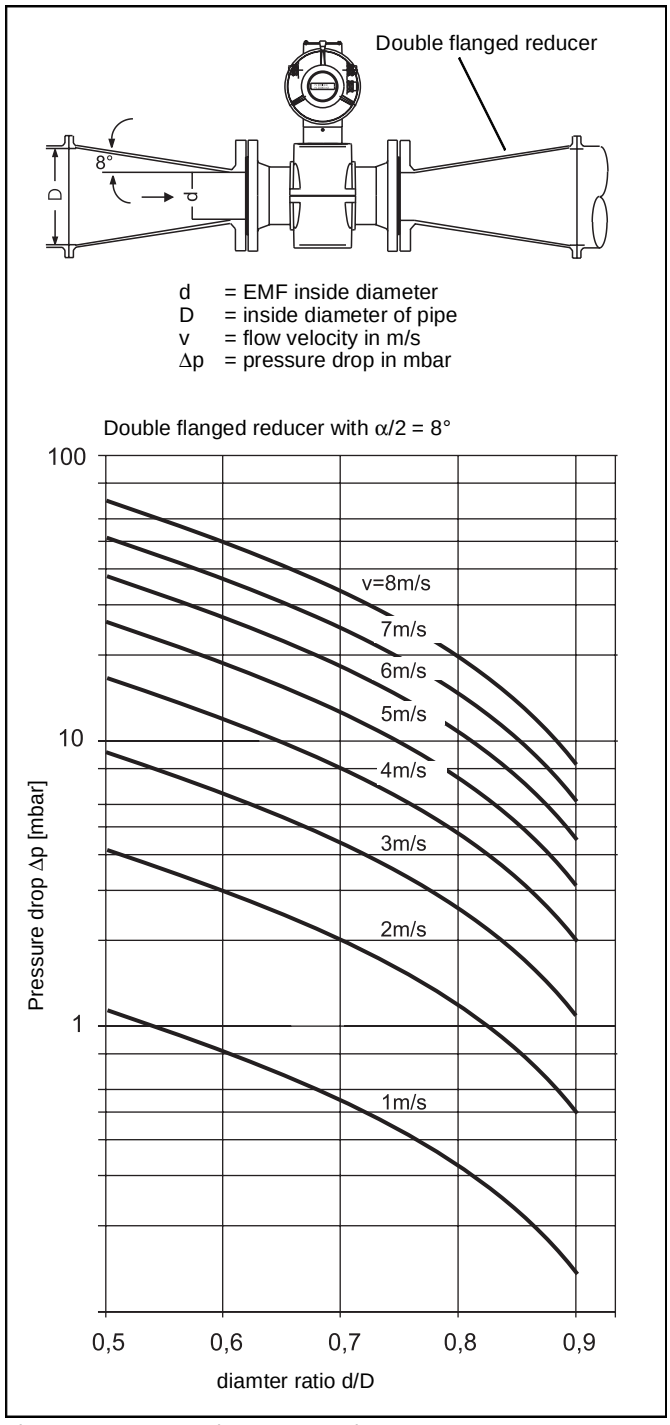


Fig.7 Pressure drop nomograph

Technical data
Primary flanged design

Max. allowable temperaure and pressure rating

Liner material	Meter size DN	$P_{Operation}$ bar	at	$T_{Operation}$ °C
Hard rubber KTW-approved	15 to 250	40	<	90
	300 to 1000	25	<	90
	1200 to 2000	16	<	90
Soft rubber KTW-zugelassen	50 to 250	40 10	< <	20 90
	300 to 1000	25 10	< <	20 90
	1200 to 2000	16 10	< <	20 90
PTFE	80 to 800	40 25	< <	20 130
PFA	3 to 250	40 25	< <	20 130

(other meter sizes, press. ratings, temperature classes upon request)

Max. allowable cleaning temperature

CIP Cleaning in place	Liner material	T_{max} °C	T_{max} minutes	$T_{Amb.}$ °C
Steam cleaning	PTFE/PFA	120	60	40
Liquid cleaning	PTFE/PFA	120	60	40

If ambient temperature is >25 °C (77 °F), deduct the difference of max. cleaning temperaure.
T_{max} - Δ °C, Δ °C = ($T_{Amb.}$ -25 °C)

Fluid temperature
-25 °C to +130 °C (-13 to +266 °F) depending on liner material (see table above)

Ambient temperature
-20 °C to +60 °C (-4 to +140 °F) (see temperature diagrams)

Enclosure classification
IP 67

Pipeline vibration
Max. allowable 15 m/s^2 (10-150 Hz)

Materials
Wetted parts

Parts	Standard	Others
Liner material	PTFE, PFA, Hard rubber, Soft rubber	Polyurethane
Electrode for liner material - Hard rubber - Soft rubber - PTFE PFA	 Stn. stl. 1.4571 Hast. C-4	 Hast. B-2, Hast. C-4, Titanium, Tantalum, Platinum-Iridium W.-Nr. 1.4571, 1.4539 Hast. B-2 Titanium, Tantalum, Platinum-Iridium
Grounding ring	Stn. stl. 1.4571	upon request
Protective flange	Stn. stl. 1.4571	upon request

Non-wetted parts

Parts	DN 3 to DN 300	DN 350 to DN 2000
Housing	Two-part housing, cast aluminum, painted, paint coat 60 µm thick, gray RAL 9006	Welded steel construction, painted, paint coat 60 µm thick, gray RAL 9006
Terminal box	Cast aluminum, painted, paint coat, 60 µm thick Frame: blue RAL 5012 Lid: gray RAL 9006	
Meter	Stn. stl. 1.4301	Stn. stl. 1.4301

Min. allowable absolute pressure

Liner material	Meter size DN	$P_{Operation}$ mbar abs	at	$T_{Operation}$ °C
Hard rubber	15 to 2000	0		< 90
Soft rubber	50 to 2000	0		< 50
PTFE	10 to 800	270 400 500		< 20 < 100 < 130
PFA	3 to 250	270 400 500		< 20 < 100 < 130

Types of design (flange per DIN 2501)

Laid length Series 3000 (short design)
Flowmeter sizes DN 15 - DN 400 of DIN-flanged design correspond with the specified laid length of VDE/VDI 2641 and with the DVGW worksheet W420 (water meter, type WP ISO 4064 short as well ISO 13359).

(DVGW = Deutscher Verein von Gas- und Wasserfachmännern e.V.)

Laid length Series 1000 (only for exchange).
DIN-flanged as model 10D1465 COPA-Exi

ANSI 150 lb/300 lb
Lay length equivalent to Series 1000
Protection flanges same as Series 1000, see page 23.

Technical data
Primary flanged design

Hazardous area, zone 1
Identification: EEx de [ib] IIC T3-T6
Certification: PTB-No. Ex-95.D.2059X
Model: 10DX3711

Temperature diagrams

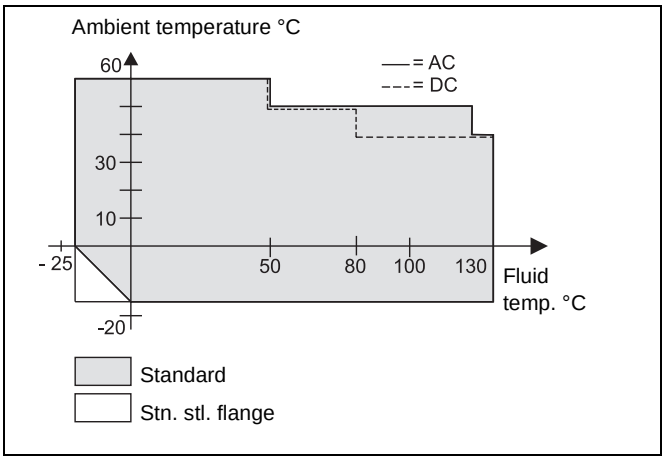


Fig.8 Fluid temperature as a function of ambient temperature DN 3 to DN 40

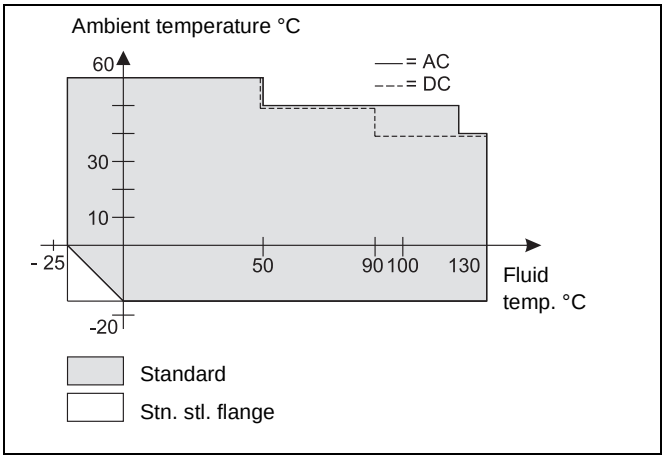


Fig.9 Fluid temperature as a function of ambient temperature DN 50 to DN 80

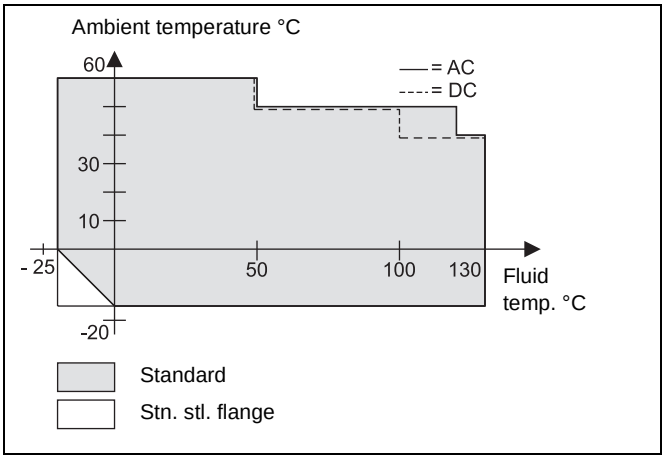


Fig.10 Fluid temperature as a function of ambient temperature DN 100 to DN 150

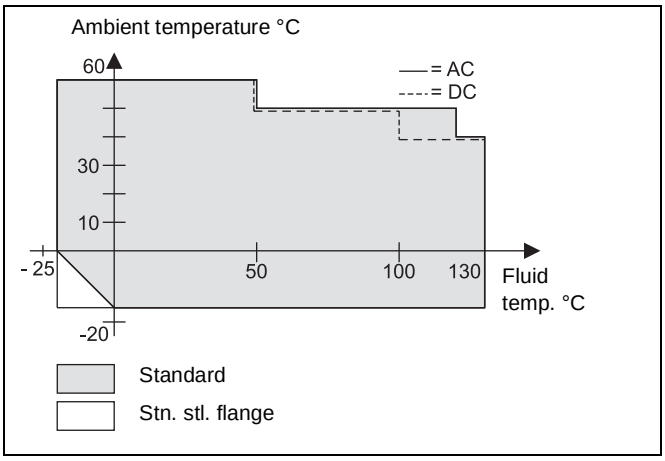


Fig.11 Fluid temperature as a function of ambient temperature DN 200 to DN 300

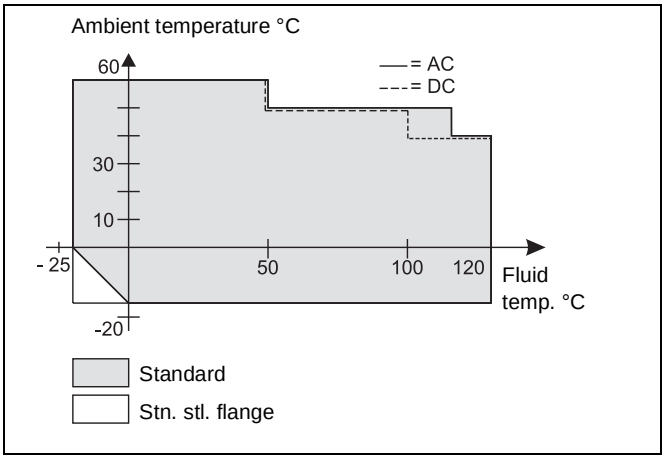


Fig.12 Fluid temperature as a function of ambient temperature DN 350 to DN 2000

Technical data
Primary flanged design

Max. ambient temperature, temperature class, max. fluid temperature
a) Power supply: Direct voltage DC

Max. ambient temperature (°C)	Temp.-Class	Liner material	Max. allowable fluid temperature (operating data)							
			DN 3-40	DN 50-80	DN 100	DN 125	DN 150	DN 200	DN 250-300	DN 350-2000
40 °C (104 °F)	T3	PTFE/PFA	130 °C	130 °C	130 °C	130 °C	130 °C	130 °C	130 °C	120 °C
	T4	PTFE/PFA	105 °C	120 °C	120 °C	115 °C	110 °C	115 °C	115 °C	95 °C
		Hard rubber	90 °C	90 °C	90 °C	90 °C	90 °C	90 °C	90 °C	90 °C
		Soft rubber	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C
	T5	PTFE/PFA	55 °C	90 °C	75 °C	70 °C	65 °C	75 °C	70 °C	50 °C
		Hard rubber	55 °C	90 °C	75 °C	70 °C	65 °C	75 °C	70 °C	50 °C
		Soft rubber	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C
	T6	PTFE/PFA	35 °C	75 °C	55 °C	50 °C	45 °C	55 °C	50 °C	30 °C
		Hard rubber	35 °C	75 °C	55 °C	50 °C	45 °C	55 °C	50 °C	30 °C
		Soft rubber	35 °C	50 °C	50 °C	50 °C	45 °C	55 °C	50 °C	30 °C
50 °C (122 °F)	T3	PTFE/PFA	–	–	–	–	–	–	–	100 °C
	T4	PTFE/PFA	80 °C	90 °C	100 °C	100 °C	100 °C	100 °C	100 °C	90 °C
		Hard rubber	80 °C	90 °C	90 °C	90 °C	90 °C	90 °C	90 °C	90 °C
		Soft rubber	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C
	T5	PTFE/PFA	50 °C	90 °C	75 °C	70 °C	60 °C	70 °C	70 °C	45 °C
		Hard rubber	50 °C	90 °C	75 °C	70 °C	60 °C	70 °C	70 °C	45 °C
		Soft rubber	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	40 °C
	T6	PTFE/PFA	30 °C	70 °C	55 °C	50 °C	45 °C	50 °C	50 °C	30 °C
		Hard rubber	30 °C	70 °C	55 °C	50 °C	45 °C	50 °C	50 °C	30 °C
		Soft rubber	30 °C	50 °C	50 °C	50 °C	45 °C	50 °C	50 °C	30 °C
60 °C*) (140 °F)	T4	PTFE/PFA	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C
		Hard rubber	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C
		Soft rubber	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C
	T5	PTFE/PFA	45 °C	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	45 °C
		Hard rubber	45 °C	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	45 °C
		Soft rubber	45 °C	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	45 °C
	T6	PTFE/PFA	25 °C	50 °C	50 °C	45 °C	40 °C	50 °C	50 °C	25 °C
		Hard rubber	25 °C	50 °C	50 °C	45 °C	40 °C	50 °C	50 °C	25 °C
		Soft rubber	25 °C	50 °C	50 °C	45 °C	40 °C	50 °C	50 °C	25 °C

*) Thermostability of the connecting leads must be at least 90 °C (194 °F):
Note: *A higher temperature class always includes the lower temp. classes.*

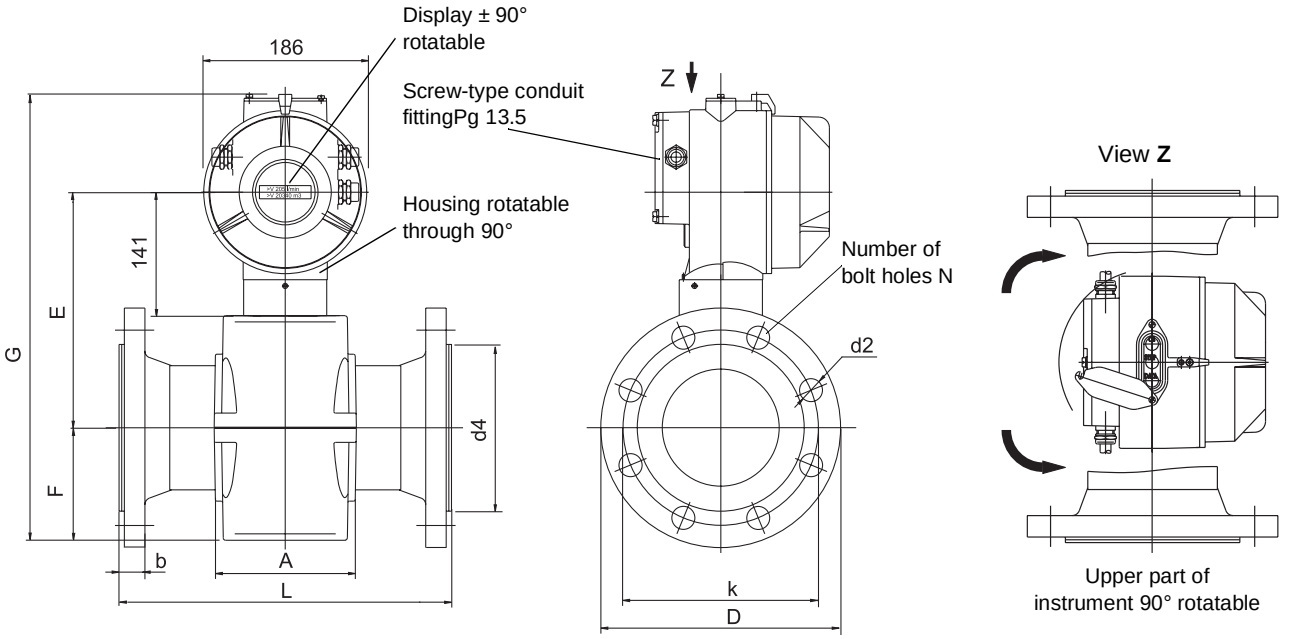
Technical data
Primary flanged design

Max. ambient temperature, temperature class, max. fluid temperature
b) Power supply: Alternating voltage AC

Max. ambient temperature (°C)	Temp.-Class	Liner material	Max. allowable fluid temperature (operating data)							
			DN 3-40	DN 50-80	DN 100	DN 125	DN 150	DN 200	DN 250-300	DN 350-2000
40 °C (104 °F)	T3	PTFE/PFA	130 °C	130 °C	130 °C	130 °C	130 °C	130 °C	130 °C	120 °C
	T4	PTFE/PFA	110 °C	120 °C	120 °C	115 °C	110 °C	115 °C	115 °C	95 °C
		Hard rubber	90 °C	90 °C	90 °C	90 °C	90 °C	90 °C	90 °C	90 °C
		Soft rubber	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C
	T5	PTFE/PFA	55 °C	90 °C	75 °C	70 °C	65 °C	75 °C	70 °C	50 °C
		Hard rubber	55 °C	90 °C	75 °C	70 °C	65 °C	75 °C	70 °C	50 °C
		Soft rubber	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C
	T6	PTFE/PFA	35 °C	70 °C	55 °C	50 °C	45 °C	55 °C	55 °C	30 °C
		Hard rubber	35 °C	70 °C	55 °C	50 °C	45 °C	55 °C	55 °C	30 °C
		Soft rubber	35 °C	50 °C	50 °C	50 °C	45 °C	50 °C	50 °C	30 °C
50 °C (122 °F)	T3	PTFE/PFA	120 °C	–	–	120 °C	120 °C	120 °C	120 °C	110 °C
	T4	PTFE/PFA	100 °C	120 °C	120 °C	110 °C	105 °C	115 °C	115 °C	90 °C
		Hard rubber	90 °C	90 °C	90 °C	90 °C	90 °C	90 °C	90 °C	90 °C
		Soft rubber	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C
	T5	PTFE/PFA	50 °C	90 °C	75 °C	70 °C	65 °C	70 °C	70 °C	50 °C
		Hard rubber	50 °C	90 °C	75 °C	70 °C	65 °C	70 °C	70 °C	50 °C
		Soft rubber	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C
	T6	PTFE/PFA	30 °C	70 °C	55 °C	50 °C	45 °C	50 °C	50 °C	30 °C
		Hard rubber	30 °C	70 °C	55 °C	50 °C	45 °C	50 °C	50 °C	30 °C
		Soft rubber	30 °C	50 °C	50 °C	50 °C	45 °C	50 °C	50 °C	30 °C
60 °C*) (140 °F)	T4	PTFE/PFA	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C
		Hard rubber	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C
		Soft rubber	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C
	T5	PTFE/PFA	45 °C	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	45 °C
		Hard rubber	45 °C	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	45 °C
		Soft rubber	45 °C	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	45 °C
	T6	PTFE/PFA	25 °C	50 °C	50 °C	45 °C	40 °C	50 °C	50 °C	25 °C
		Hard rubber	25 °C	50 °C	50 °C	45 °C	40 °C	50 °C	50 °C	25 °C
		Soft rubber	25 °C	50 °C	50 °C	45 °C	40 °C	50 °C	50 °C	25 °C

*) Thermostability of the connecting leads must be at least 80 °C (176 °F):
Note: *A higher temperature class always includes the lower tep. classes.*

Dimension drawings
Primary DN 3 to DN 300, DIN-flanged design



All dim. in mm ISO Projection Method E

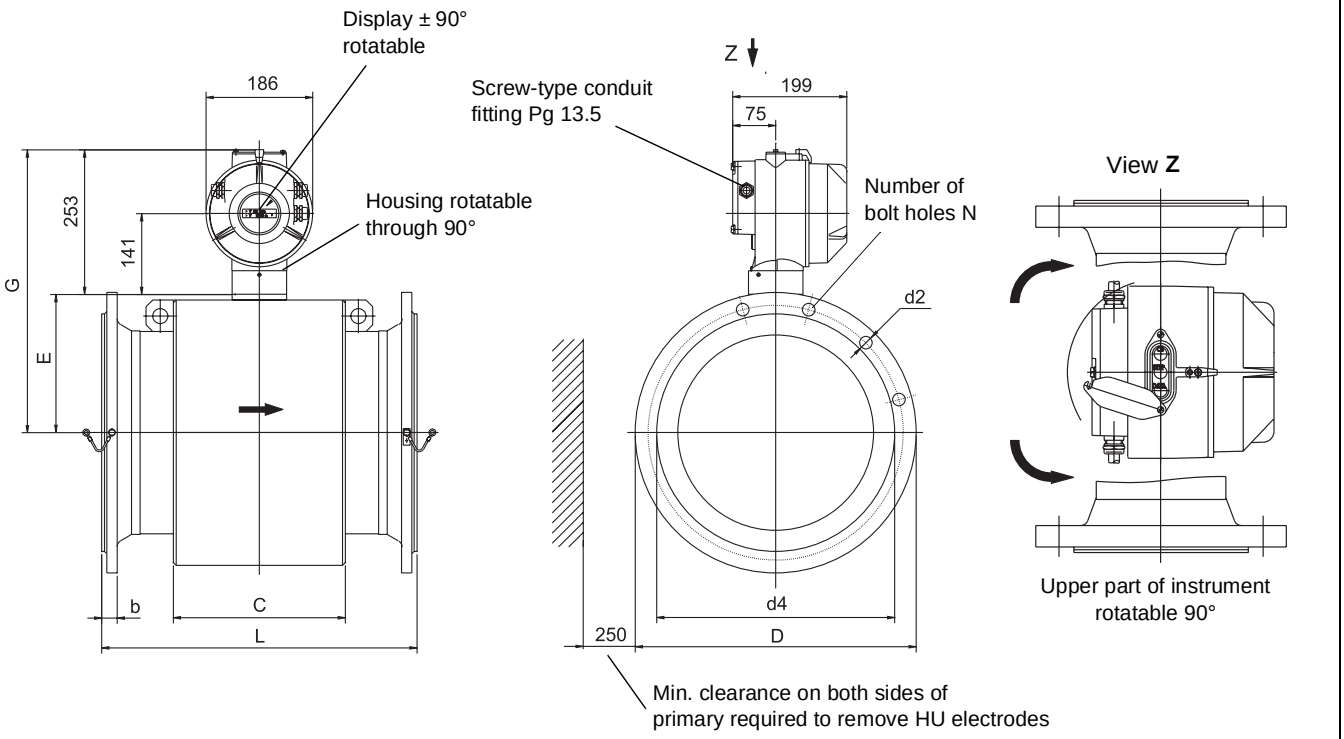
Flanges per DIN 2501

Flange dimensions								Instrument dimensions							Weight
DN	PN[1)]	D	d4	b	k	d2	N	A	L*)	L[2)]	L[3)]	E	F	G	kg
3-10	10-40	90	40	18	60	14	4	122	200	203	206	214	73	399	15
15	10-40	95	45	19	65	14	4	122	200	203	206	214	73	399	15,5
20	10-40	105	58	21	75	14	4	122	200	203	206	214	73	399	16
25	10-40	115	68	21	85	14	4	122	200	203	206	214	73	399	16,5
32	10-40	140	78	21	100	18	4	122	200	203	206	214	73	399	18
40	10-40	150	88	21	110	18	4	122	200	203	206	214	73	399	18,5
50	10-40	165	102	23	125	18	4	112	200	203	206	223	82	417	20
65	25-40	185	122	26	145	18	8	112	200	203	206	232	91	435	24
80	10-40	200	138	28	160	18	8	112	200	203	206	239	98	449	27
100	10-16	220	158	24	180	18	8	130	250	253	256	259	118	489	28
125	10-16	250	188	25	210	18	8	124	250	255	260	268	127	507	38
150	10-16	285	212	25	240	22	8	170	300	305	310	289	148	549	40
200	10	340	268	28	295	22	8	195	350	355	360	320	179	611	64
200	16	340	268	28	295	22	12	195	350	355	360	320	179	611	64
250	10	395	320	30	350	22	12	250	450	455	460	348	207	667	89
250	16	405	320	30	355	26	12	250	450	455	460	348	207	667	89
300	10	445	370	31	400	22	12	250	500	505	510	391	250	753	97
300	16	460	378	33	410	26	12	250	500	505	510	391	250	753	97

*) Primary with dimensions of Series 1000 w/o protection flanges (dimensions see page 23) available upon request.
1) Other pressure ratings upon request.
2) Standard with one grounding ring made of stn. stl. 1.4571 attached to flange on one side. Other materials upon request. Also refer to “Grounding”.
3) With protective rings. Protective rings also used for grounding. Grounding ring not required.

Fig.13 Primary DN 3 to DN 300

Dimension drawings
Primary DN 350 to DN 2000, DIN-flanged design



All dim. in mm ISO Projection Method E

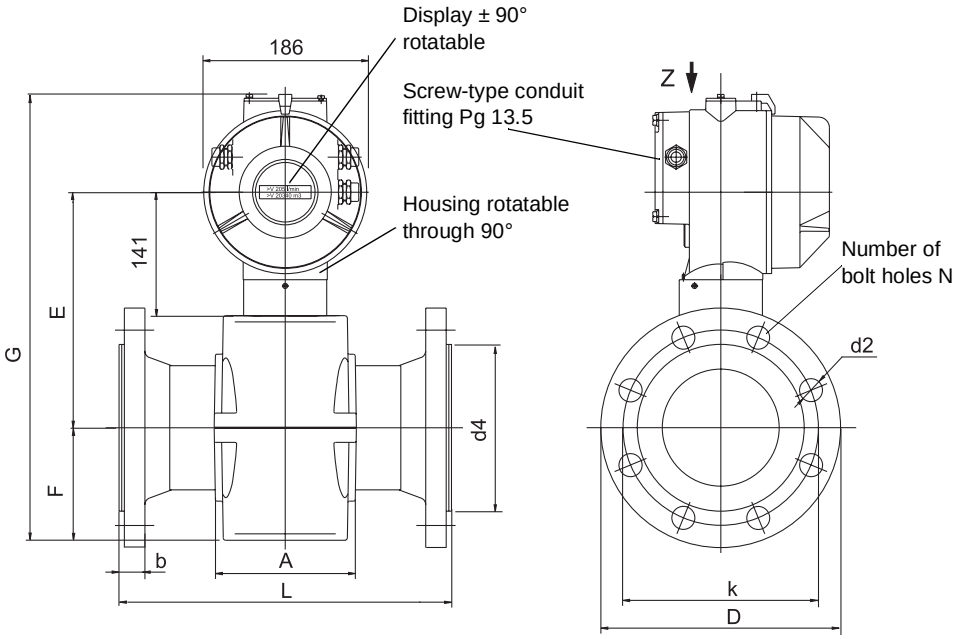
Flanges per DIN 2501

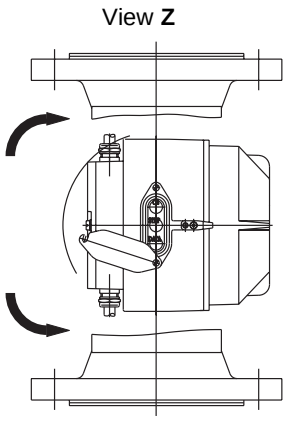
Flange dimensions								Instrument dimensions						Weight kg
									Protective flanges					
									w/o[3]	with[4]				
DN[1]	PN[2]	D	d4	b	k	d2	N	A	L	L	E	G	H	
350	10	505	430	31	460	22	16	322	550	560	259	512	620	152
400	10	565	482	31	515	26	16	370	600	610	285	538	671	174
350	16	520	438	35	470	26	16	322	550	560	259	512	620	152
400	16	580	490	37	525	30	16	370	600	610	285	538	671	181
500	10	670	585	33	620	26	20	416	650	660	321	514	743	220
600	10	780	685	33	725	30	20	480	780	790	371	624	844	291
700	10	895	800	35	840	30	24	540	910	920	415	668	932	402
800	10	1015	905	37	950	33	24	586	1040	1050	465	718	1032	449
900	10	1115	1005	39	1050	33	28	630	1170	–	515	768	1132	765
1000	10	1230	1110	39	1160	36	28	670	1300	–	565	818	1232	968

1) > DN 1000 w/o protection flanges upon request.
2) Standard pressure ratings. Others upon request.
3) Grounding ring ≥ DN 350 upon request. Also refer to “Grounding”.
4) Protective flanges also used for grounding. Grounding ring not required.

Fig.14 Primary DN 350 to DN 2000

Dimensions
Primary DN 3 to DN 500, ANSI- flanged design





Shown are primaries ≤ DN 300
Illustration of primary ≥ DN 350 upon request

All dim. in mm ISO Projection Method E

Meter size		Instrument dimensions ANSI 150 lb/300 lb							Flange dimensions ANSI 150 lb						Flange dimensions ANSI 300 lb					
DN	Inch	A	L	L[1)]	L[2)]	E	F	G	D	d4	b	k	d2	N	D	d4	b	k	d2	N
3-8	1/8, 5/16	122	200	203	206	115	73	141	89	35	14	60	16	4	96	35	17	67	16	4
10,15	3/8, 1/2	122	270	273	276	214	73	399	89	35	14	60	16	4	96	35	17	67	16	4
20	3/4	122	270	273	276	214	73	399	98	43	16	70	16	4	118	43	19	83	16	4
25	1	122	270	273	276	214	73	399	108	51	18	80	16	4	124	51	21	89	16	4
32	1 1/4	122	280	283	286	214	73	399	118	64	19	89	16	4	134	64	22	99	19	4
40	1 1/2	122	280	283	286	214	73	399	127	73	21	99	16	4	156	73	24	115	22	4
50	2	112	280	283	286	223	82	417	153	92	19	121	19	4	165	92	22	127	19	8
65	2 1/2	112	330	333	336	232	91	435	178	105	22	140	19	4	191	105	26	150	22	8
80	3	112	340	343	346	239	98	449	191	127	24	152	19	4	210	127	29	168	22	8
100	4	130	400	403	406	259	118	489	229	157	28	190	19	8	254	157	36	200	22	8
125	5	124	450	455	460	268	127	507	254	186	28	216	22	8	280	186	39	235	22	8
150	6	170	450	455	460	289	148	549	280	216	30	241	22	8	318	216	41	270	22	12
200	8	195	500	505	510	320	179	611	343	270	34	298	22	8	381	270	47	330	25	12
250	10	250	550	555	560	348	207	667	407	324	35	362	25	12	445	324	53	387	28	16
300	12	250	620	625	630	391	250	753	483	381	37	432	26	12	–	–	–	–	–	–
350	14	322	650	655	660	259	250	512	534	413	40	476	29	12	–	–	–	–	–	–
400	16	370	700	705	710	285	275	538	597	470	42	540	29	16	–	–	–	–	–	–
500	20	416	780	785	790	321	310	574	699	584	48	635	32	20	–	–	–	–	–	–

1) With one grounding ring made of stn. stl. 1.4571 attached to flange on one side. Other materials upon request. Also refer to “Grounding”.

2) With protective flanges. Protective flanges also used for grounding. Grounding ring not required. Also with protection flanges with the dimensions of Series 1000 available. Dimensions see page 23.

Fig.15 Primary DN 3 to DN 500

Technical data
COPA-XM “d” converter

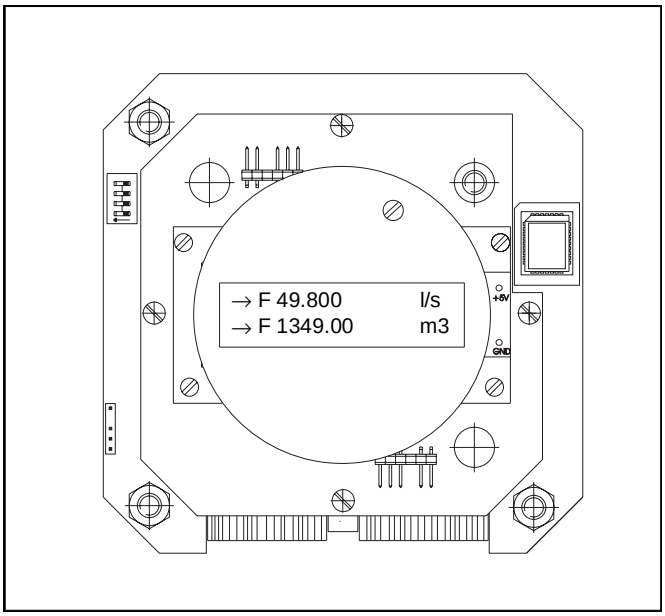


Fig.16 Converter unit with display, 3-button keyboard separate

Flow rate range
Continually configurable between 0.5 and 15 m/s

Accuracy
≤ 0.4 % of rate

Reproducibility
≤ 0.1 % of rate

Min. conductivity
50 µS/cm DN 3 - DN 6
5 µS/cm >DN 6

Response time
As a step function 0-99 % ≥ 1 s (= 5 τ) at
6 1/4, 7 1/2 Hz excitation
As step function 0-99 % ≥ 0.5 s (= 5 τ) at
12 1/2, 7 15 Hz excitation

Power supply
230 V, 115 V AC + 10/-15 %
24/48 V AC + 10/-15 %
50/60 Hz ± 6 %
24 V DC -30/+ 30 %, residual ripple ≤ 1.5 Vp

Magnet coil supply
Standard: 6 1/4, 7 1/2 Hz (50/60 Hz line)
Option: 12 1/2, 15 Hz (50/60 Hz line)

Power consumption
≤ 23 VA (primary and converter)

Ambient temperature
-20 to + 60 °C (see temperature diagrams page 9 and 10)

Electrical connection
Terminal strip, screw-type
DN 3 to DN 2000 screw-type conduit fitting Pg 13.5

Parameter input
Within the hazardous area the input is carried out by means of the 3-button keyboard. Instrument housing remains closed.

Forw.-/reverse flow measurement
An arrow in the display indicates the flow direction and a relay- or optocoupler contact provides for an external indication of flow direction.

Display
2x16-digit LCD dot matrix display with LED background lighting. The internal flow totalling is separate for both flow directions in 16 different units. The flow volume display is in percent or 45 different units or one free configurable unit.

The engineering units listed below are set by means of the arrow buttons. The unit refers to $Q_{max\ DN}$, Q_{max} forw.- and reverse flow and the flow volume indication, if these are displayed in engineering units.

In multiplex operation mode the flow volume in %, direct reading unit or bargraph, totalizer value, forw.- or reverse flow, tag number or current output value can be displayed in addition to the selection of the 1st and 2nd line of the display..

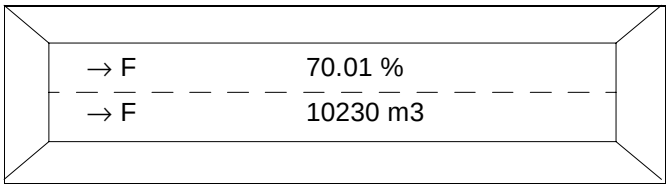
Unit	Second	Minute	Hour	Day
Milliliter	ml/s	ml/min	ml/h	
Liter	l/s	l/min	l/h	
Hectoliter	hl/s	hl/min	hl/h	
Megaliter		Ml/min	Ml/h	Ml/day
Cubicmeter	m^3/s	m^3/min	m^3/h	
Imperial-gallon per	igps	igpm	igph	
U.S.-mill.-gall. per/d				mgd
U.S.-gall. per		gpm	gph	
Barrel Brewery	bbl/s	bbl/min	bbl/h	
Barrel Petrochemistrye		bls/min	bls/h	bls/day
Gram	g/s	g/min	g/h	
U.S. Ton		uton/min	uton/h	uton/day
Kilogram	kg/s	kg/min	kg/h	
Ton (metric)	t/s	t/min	t/h	
Pound	lb/s	lb/min	lb/h	
Kilo-gallon per*	kgal/s	kgal/min	kgal/h	

* Free configurable unit, kgal factory set.

! Note:
The instrument meets the NAMUR recommendations, “EMC guidlines for manufacturer and user of electrical instruments and equipment” part 1, 5/93 and the CE regulations, 89/336/EWG (EN 50081-1, EN 50082).

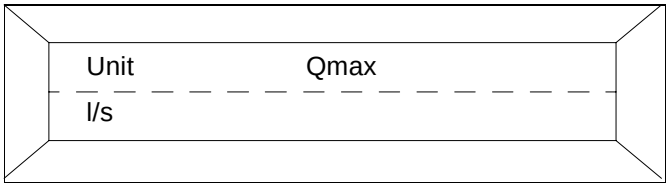
Data security means
At failure or cur-off of power supply all data are stored in a NV-RAM for a period of more than 10 years without requiring external power. Additional data security is offered by a serial EEPROM for the exchange or storage of process information. At exchange of the electronics and the memory module all parameters are accepted after pressing specific buttons, i.e. one time input of parameters at startup.

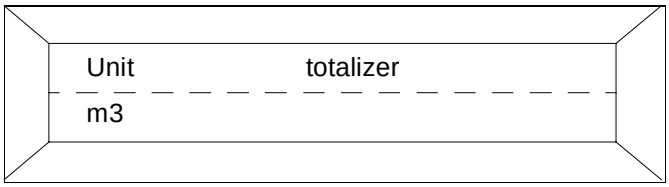
Display



In the 1st line the instantaneous forward flow rate in % or engineering units of the set flow rate range is displayed. In the 2nd line the integrated volume flow (incl. dimension) is displayed.

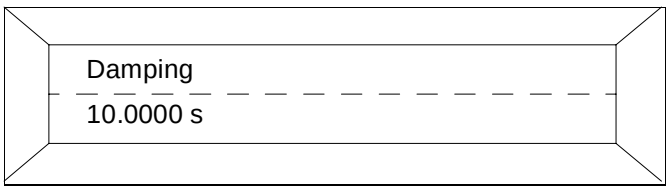
The display is equipped with a LED background lighting.



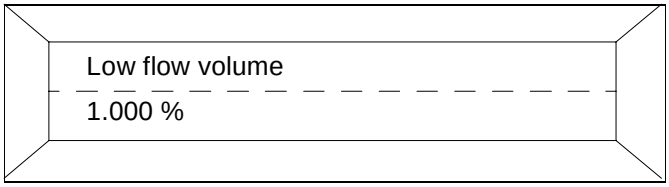


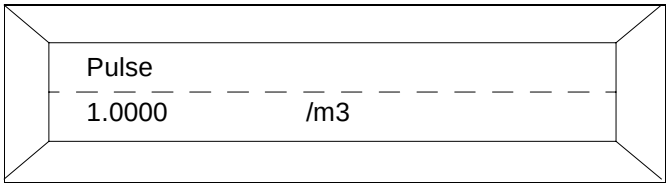
The flow indication is in percent or in 45 different engineering units. The flow totalling is displayed in 16 different engineering units e.g. Liter, Hectoliter, Cubic meter, Tons (at instantaneous entry of the density).

In addition there is the possibility to program an arbitrary unit.

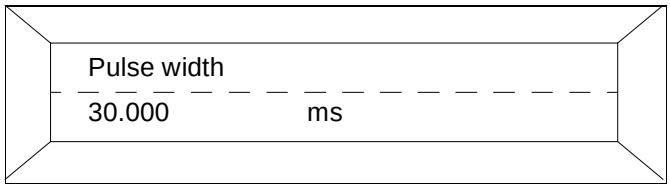


The damping is adjustable at an excitation frequency of 6 1/4 Hz from 1 s to 99 s. Low flow cut-off is adjustable from 0 to 10 % of rate (valid for current-/frequency- and pulse output).

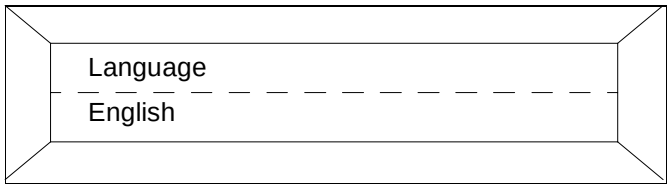




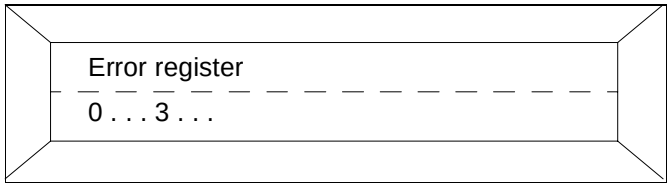
The pulse factor as a factor between 0.001 and 1000 can be multiplied with the displayed values.



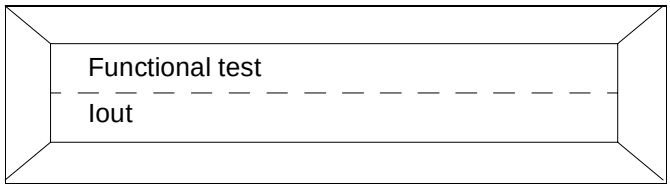
Pulse width adjustable between 0.100 ms and 2000 ms.



The entry of data is possible in one of nine languages.



Automatic self-monitoring with error diagnosis indication in the display and error message via contact output. All occurred errors are stored in the error register.

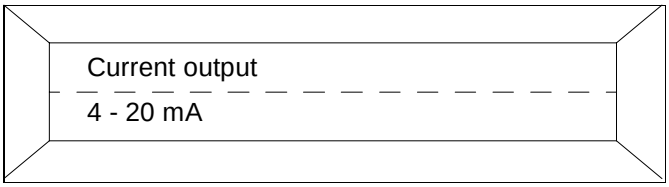


The functional test can be used the check the individual internal elements. All outputs can be simulated for start up and monitoring.

Technical data
COPA-XM “d” converter

Isolation in-/output
The current- and pulse output are galvanically isolated from the input circuit and from one another.

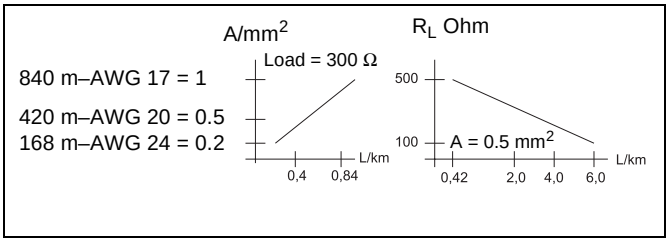
Output signals
Standard



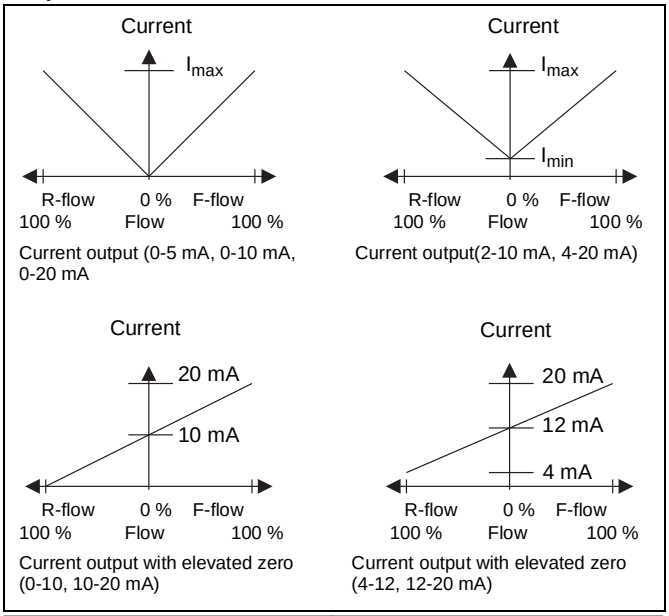
Current output, configurable via terminals +/–

Range	Load resistance
0 – 5 mA	≤ 1200 Ω
0/2 – 10 mA	≤ 600 Ω
0/4 – 20 mA	≤ 300 Ω

Load characteristic 0/4 to 20 mA



Output characteristic



Design	Max. data of safety
intrinsically safe	$U_Z \le 21,6$ V $I_K \le 100$ mA *) Li ≤ 300 µH Ci ≤ 1,2 nF L_A = 3,7 mH CA = 148 nF Linear characteristic
not intrinsically safe U_M = 60 V	(PELV) Rated current ≤ 26 mA passive equipments

*) other values upon request (see certificate of conformity)

Contact in- and outputs via terminals V8, V9
The type and function of the contact is selected through details for ordering..

Output/ input	Signalling	Type/function of contact	
		intrinsically safe	not intrinsically safe
System-alarm-output	General alarm incl. monitoring of a CPU failure. The contact is open at alarm	Optocoupler function E9/C9 Relay function 39, 40	Optocoupler function E9/C9
Selectable contact output	The following functions are software selectable: - **General alarm:** Selectable contact function[1)] - **Forw.flow signalling:** Contact is closed at signalling - **Limit value signalling:** Max-/Min-, or Max/Min Alarm selectable Contact function selectable[1)] - **Empty pipe signalling (≥ DN 10):** Signalling of empty pipe. Contact function selectable[1)] The current output is set to 0 % (3,6 mA at 4-20 mA or 130 % of upper range current value. The pulse totalling is interrupted. - **Flow rate range signalling:** Contact is closed with flow rate range 2 active. 1) Whether contact is closed or open at signalling is software selectable.	Optocoupler function P1, P2 Relay function P1, P2	Optocoupler function P1, P2
Contact input	The followig functions are software selectable: - **ext. output cut-off:** At empty pipe condition all output signals can be interrupted. - **ext. totalizer reset:** The internal totalizer values can be reset via an external NO contact. - **ext. flow rate range changeover:** Contact is closed with flow rate range 2 active.	Optocoupler function G2, X1	Optocoupler function G2, X1

Techn. data of **intrinsically** safe design of the system alarm and contact output:

Used as a “Namur contact” DIN 19234 (electrical position sensors) internal resistance approx 750 Ω. Resistance with openend contact >10 kΩ.

	Optocoupler (Namur)	Relay (Namur)
Operating data	5 V ≤ U_{CE} ≤ 30 V 5 mA ≤ I_{CE} ≤ 10 mA	U ≤ 30 V I < 110 mA
Max. data of safety U_M = 60 V	U = 32 V I = 50 mA Li = 600 µH Ci = 4 nF	U = 55 V I = 110 mA Li = 600 µH Ci = 4 nF

Technical data
COPA-XM “d” converter

Techn. data of the **not intrinsically safe** design of the system alarm and contact output:
Output for connection to PELV circuits per DIN/VDE 0160 (protection by functional extra-low voltages with protective seperation).

	Optocoupler (PELV)
Operating data	5 V ≤ U_{CE} ≤ 30 V 5 mA ≤ I_{CE} ≤ 220 mA
Max. data of safety U_M = 60 V	U = 30 V I = 220 mA

Techn. data of the **intrinsically safe** design of the contact input for the ext. output signal cut-off or ext. totalizer reset:.

	Optocoupler
Operating data	Terminal voltage: OFF 0 V ≤ U ≤ 2 V ON 16 V ≤ U ≤ 30 V
Max. data of safety U_M = 60 V	U = 55 V I = 50 mA L_i = 600 µH C_i = 4 nF

Techn. data of the **not intrinsically safe** design of the contact input for the ext. ouput signal cut-off or ext. totalizer reset:.

	Optocoupler (PELV)
Operating data	Terminal voltage: OFF 0 V ≤ U ≤ 2 V ON 16 V ≤ U ≤ 30 V
Max. data of safety U_M = 60 V	U = 30 V R_i = 2,49 kΩ

Output signals options via terminals V12, V13

Scaled pulse output
Scaled pulse output max. 5 kHz. Pulse factor can be multiplied with a factor between 0.001 and 1000 and the displayed values (1 pulse/m^3 x 1000). The pulse width is configurable from 0,100 ms to 2000 ms.

Design	Type of contact/function	
	intrinsically safe	not intrinsically safe
passive	Optocoupler function G2/61 Relay function G2/50	Optocoupler function G2/61
active	–	24 V pulses function 9/10

Techn. data of the **intrinsically safe** design of the pulse output:
Used as a “Namur contact” per DIN 19234 (electrical position sensors) internal resistance approx. 750 Ω. Resistance with opened contact >10 kΩ.

	Optocoupler (Namur)	Relay (Namur)
Operating data	5 V ≤ U_{CE} ≤ 30 V 5 mA ≤ I_{CE} ≤ 10 mA	U ≤ 30 V I ≤ 110 mA
Max. data of safety U_M = 60 V	U = 32 V I = 50 mA L_i = 600 µH C_i = 4 nF	U = 55 V I = 110 mA L_i = 600 µH C_i = 4 nF

Techn. data of the **not intrinsically safe** design of pulse output:
Outout for the connection to PELV circuits per DIN/VDE 0160 (protection by function extra-low voltages with protective separation).

	Optocoupler (PELV)	active 24 V (PELV)
Operating data	5 V ≤ U_{CE} ≤ 30 V 5 mA ≤ I_{CE} ≤ 220 mA	0 V ≤ U_L ≤ 2 V 16 V ≤ U_H ≤ 30 V 0 mA ≤ I_L ≤ 2 mA 20 mA ≤ I_H ≤ 220 mA Load ≥ 150 Ω
Max. data of safety U_M = 60 V	U = 30 V I = 220 mA	I = 220 mA passive operating equipment

Safety maximum voltage of power supply, for type of protection “increased-safety type of protection” EEx e II..

Terminal	Alaternating voltage supply	
	Power supply	Max. safety voltage
L, N	230 V (+10 ... -15 %) 120 V (+10 ... -15 %) 110 V (+10 ... -15 %)	Um = 253 V Um = 132 V Um = 121 V
1L1, 1L2	48 V (+10 ... -15 %) 24 V (+10 ... -15 %)	Um = 52,8 V Um = 26,4 V
Terminal	Direct voltage supply	
	Power supply	Max. safety voltage
L+, L-	24 V (+30 ... -30 %)	Um = 31,2 V

Technical data
COPA-XM “d” converter

HART-Protocol
The HART-Protocol provides a communication means between a process control system, hand-held terminal and the electromagnetic flowmeter EMF in the field. With selected HART-Protocol communication the serial data link is not available. The digital communication occurs through use of an alternating voltage superimposed on the current output. This voltage does not effect the connected evaluation devices. This version only is possible with a current output of 4 to 20 mA.

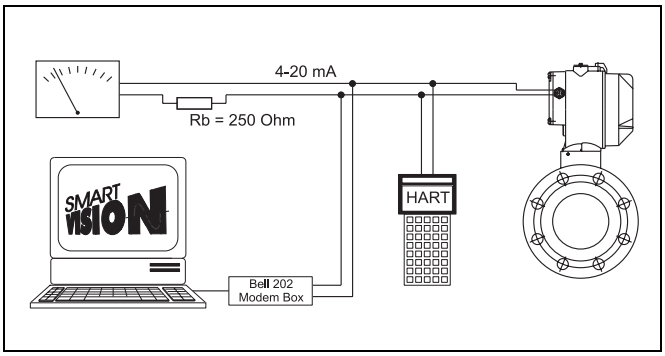


Fig.17 Communication with HART-Protocol

Communication mode
FSK modulation on current output 4-20 mA in accordance with Bell 202 standards. Max. signal amplitude 1.2 mA_{pp}.

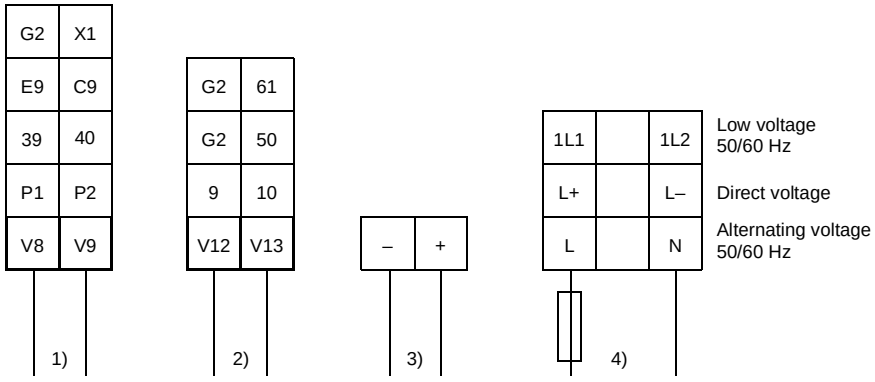
Current output load
Min.: 250 Ω, max.: 300 Ω

Signal cable
Length and type: (also see page 16)

Baud rate
1200 Baud
Log. 1: 1200 Hz; Log. 0: 2200 Hz

Limitation of parameters:
Submenu data link
Not available

Interconnection diagram COPA-XM “d”



1) Contact output/contact input, terminals V8/V9

a)* The function to be signalized via cotact output is software selectable:
General alarm, limit alarm, empty pipe, forw.-/reverse flow direction, 2 flow rate ranges autom. changeover, preset counter (start and stop by button)

Function	Type of contact	Operating data	
		intrinsically safe	not intrinsically safe
P1/P2	Relay contact	U ≤ 30 V, I ≤ 110 mA	–
	Optocoupler	5 V ≤ U_{CE} ≤ 30 V 5 mA ≤ I_{CE} ≤ 10 mA	5 V ≤ U_{CE} ≤ 30 V 5 mA ≤ I_{CE} ≤ 220 mA

b) System alarm via contact ouput

Function	Type of contact	Operating data	
		intrinsically safe	not intrinsically safe
39/40	Relay contact	U ≤ 30 V, I ≤ 110 mA	–
E9/C9	Optocoupler	5 V ≤ U_{CE} ≤ 30 V 5 mA ≤ I_{CE} ≤ 10 mA	5 V ≤ U_{CE} ≤ 30 V 5 mA ≤ I_{CE} ≤ 220 mA

c) Selectable contact input, terminals G2, X1
The function to be signalized via contact input is software selectable:
External output signal cut-off, ext. totalizer reset, ext. flow rate changeover

Function	Type of contact	Operating data	
		intrinsically safe	not intrinsically safe
G2/X1	active input	OFF 0 V ≤ U ≤ 2 V ON 16 V ≤ U ≤ 30 V R_i = 1,0 kΩ	OFF 0 V ≤ U ≤ 2 V ON 16 V ≤ U ≤ 30 V R_i = 2,49 kΩ

2) Scaled pulse output, active or passive, pulse width adjustable from 0.100 ms to 2000 ms, terminals V12/V13.

Function	Type of contact	Operating data	
		intrinsically safe	not intrinsically safe
G2/50	Relay	U ≤ 30 V I ≤ 110 mA	–
G2/61	Optocoupler, passive	5 V ≤ U_{CE} ≤ 30 V 5 mA ≤ I_{CE} ≤ 10 mA	5 V ≤ U_{CE} ≤ 30 V 5 mA ≤ I_{CE} ≤ 220 mA
9/10	24 V active	–	0 V ≤ U_L ≤ 2 V 16 V ≤ U_H ≤ 30 V 0 mA ≤ I_L ≤ 2 mA 20 mA ≤ I_H ≤ 220 mA load ≥ 150 Ω

3) Current output, settable, terminals +/–

Current output	Load
0 – 5 mA	≤ 1200 Ω
0/2 – 10 mA	≤ 600 Ω
0/4 – 20, 0–10–20 mA, 4–12–20 mA	≤ 300 Ω

4) Power supply: see nameplate

*) Forw. flow direction is selected.

Note: Safety data see page 16/17.

Fig.18 Interconnection diagram COPA-XM “d”

Allowable combinations

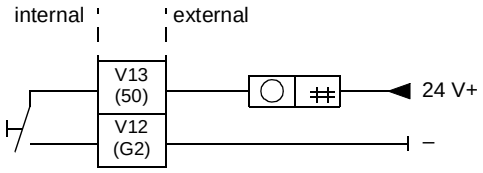
Type of explosion protection	Direct current output	**Contact input/output** terminals V8/V9	Pulse output terminals V12/V13
intrinsically safe	+ –	**Contact input** function G2/X1	without
			Relay contact, function G2/50 passive
			Optocoupler, function G2/61 passive
	+ –	**Contact output,** optocoupler function E9/C9 or function P1/P2	without
			Optocoupler, function G2/61 passive
	+ –	**Contact output,** relay contact function 39/40 or function P1/P2	without
			Relay contact, function G2/50 passive
not intrinsically safe	+ –	**Contact input** function G2/X1	without
			active 24 V, function 9/10
			Optocoupler, function G2/61 passive
	+ –	**Contact output** function E9/C9 or function P1/P2	without
			active 24 V, function 9/10
			Optocoupler, function G2/61 passive

! Note:

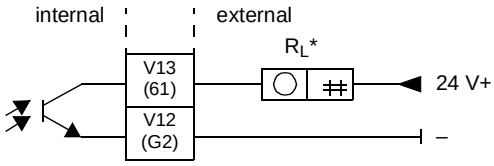
At ambient temperatures higher than 50 °C$_{(122\ °F)}$ the thermal stability of the connecting leads must be at leads 80 °C$_{(176\ °F)}$.

Connection examples (typical) of peripherals for explosion protected COPA-XM “d” design

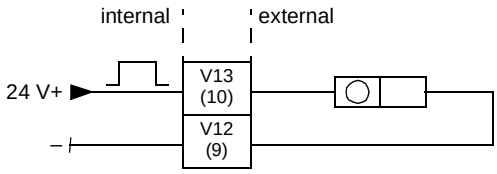
Scaled pulse output passive, relay (option)



Scaled pulse output passive, optocoupler (option)



Scaled pulse output active (option)

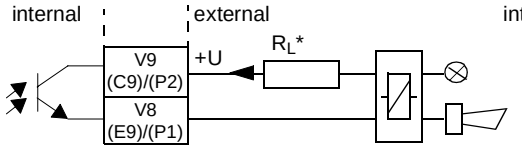


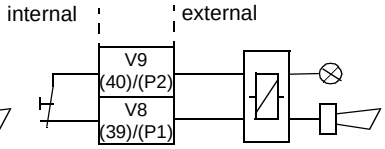
! Note:

According to the selected explosion-protected type the circuits are to carry out intrinsically safe or not intrinsically safe and the peripheral intruments must be accordingly selected and installed.

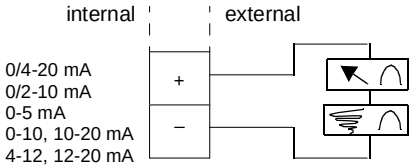
$$*R_L \geq \frac{U_{CE}}{I_{CE}}$$

Contact output optocoupler **or** **Contact output relay**





Direct current output



At system alarm (function E9/C9 opened.
At forw. flow-/flow rate range signalling, (flow rate range 2, function P1/P2) closed.

The circuit state at general alarm, limit alarm and empty pipe is software selectable.

At system alarm (function 39/40) opened.
At forw. flow-/flow rate range signalling, (flow rate range 2, function P1/P2) closed.

The circuit state at general alarm, limit alarm and empty pipe is software selectable.

Contact input
Ext. output signal cut-off
With closed contact the outputs are switched off.
Ext. totalizer reset:
With closed contact the internal totalizer value is set to zero.
Ext. flow rate range changeover:
With closed contact the flow rate range 2 is active.

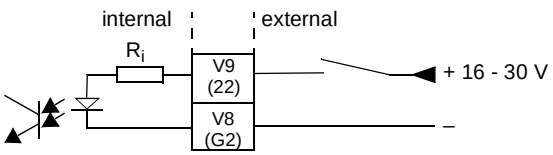


Fig.19 Connection examples for peripherals

Details for ordering COPA-XM “d” flanged design

In addition to the order number please supply the following information: Fluid, fluid temperature, operating pressure, flow rate range, type of pipeline (grounding ring, grounding electrodes)[1)]

Order number	10DX3711							
Conductivity ≥ 5 µS/cm								
Design level (specified by BFP)		*						
Laid length								
Series 3000 (short design) standard			A					
Series 1000 (only for replacement)			C					
Liner material								
Hard rubber	(DN 15 to DN 2000)			A				
Soft rubber	(DN 50 to DN 2000)			B				
PTFE	(DN 10 to DN 800)			E				
PFA	(DN 3 to DN 250)			K				
Others				Z				
Meter size	**(inch)**							
DN 3	1/10				01			
DN 4	5/32				02			
DN 6	1/4				04			
DN 8	5/16				05			
DN 10	3/8				06			
DN 15	1/2				07			
DN 20	3/4				08			
DN 25	1				09			
DN 32	1 1/4				10			
DN 40	1 1/2				11			
DN 50	2				12			
DN 65	2 1/2				13			
DN 80	3				14			
DN 100	4				15			
DN 125	5				16			
DN 150	6				17			
DN 200	8				18			
DN 250	10				19			
DN 300	12				20			
DN 350	14				21			
DN 400	16				22			
DN 500	20				23			
DN 600	24				24			
DN 700	28				25			
DN 800	32				26			
DN 900	36				27			
DN 1000	40				28			
DN 1200	48				30			
DN 1400	56				31			
DN 1600	64				32			
DN 1800	72				33			
DN 2000	80				34			
Pressure rating								
DIN PN 2.5						A		
DIN PN 6						B		
DIN PN 10						C		
DIN PN 16						D		
DIN PN 25						E		
DIN PN 40						F		
JIS K10 ≤ DN 1400						G		
ANSI 150 lb (laid length Series 1000)						P		
ANSI 300 lb (laid length Series 1000)						Q		
Flange material								
Steel							1	
Stn. stl. 1.4541 (≥ DN 150)							2	
Stn. stl. 1.4571							3	
Others upon request							9	

continued next page

1) If one grounding ring is required (see order no.). If grounding electrodes are required, please supply additional order information. The standard grounding ring material is stn. stl. 1.4571. The grounding ring material is stn. stl. 1.4401. Other materials upon request.

Details for ordering COPA-XM “d” flanged design

Order number	10DX3711																							
Flange accessory																								
None									A															
Protective rings stn. stl. 1.4571									B															
Grounding ring stn. stl. 1.4571[2]									C															
Protective flanges stn. stl. 1.4571 (only with DIN/ANSI flanges, laid length Series 1000)[3]									D															
Electrode design																								
Standard										2														
Removable (HU) only stn. stl. 1.4571[4]										4														
Electrode material																								
Stn. stl. 1.4571 (standard w. hard-/soft rubber lining)											B													
Hastelloy B-2											C													
Hastelloy C-4 (standard w. PTFE/PFA lining)											D													
Titaiumn											E													
Tantalum											F													
Platinum-Iridium											H													
Stn. stl. 1.4539[5]											R													
Others											Z													
Certification																								
EEx (standard)												D												
EEx and DIN 50049 3.1B[6]												G												
EEx and certified: Cold water/waste water												H												
Enclosure classification																								
IP 67													2											
Temperature range																								
Ambient temperature ≤ 40 °C														4										
Ambient teperature ≤ 50 °C														5										
Ambient temperature ≤ 60 °C														6										
Line frequency	**/ Excitation frequency**																							
50 Hz	/ 6 1/4 Hz (f/8)														1									
60 Hz	/ 7 1/2 Hz (f/8)														3									
Nameplate																								
German																1								
English																2								
French																3								
Others																9								
Software level																								
Generation																	D							
User in-/outputs:																								
Intrinsically safe “i” (Namur) terminals V8/V9	**+ terminals V12/V13**																							
Contact input selectable	+ pulse relay																	111						
Contact input selectable	+ pulse opto																	112						
Contact output alarm, relay	+ pulse relay																	131						
Contact output selectable, relay[7]	+ pulse relay																	141						
Contact output alarm, opto	+ pulse opto																	152						
Contact output selectable, opto [7]	+ pulse opto																	162						
User in-/outputs:																								
Not intrinsically safe “e” (PELV) terminals V8/V9	**+ terminals V12/V13**																							
Contact input selectable	+ pulse opto																	212						
Contact input selectable	+ pulse active																	213						
Contact output alarm, opto	+ pulse opto																	252						
Contact output selectable, opto[7]	+ pulse opto																	262						
Contact output alarm, opto	+ pulse active																	253						
Contact output selectable, opto[7]	+ pulse active																	263						
Operating mode																								
Continuous flow measurement																			A					
Additional feature																								
None																				A				
HART-Protocol																				C				
Power supply																								
230 V; 50/60 Hz																								B
115 V; 50/60 Hz																								C
48 V; 50/60 Hz																								E
24 V; 50/60 Hz																								F
24 V/48 V DC																								H

2) Grounding ring attached to one side of flange, >DN 800 and other materials upon request.
3) Protection flanges, dimensions L + 20 mm ≤ DN 80, L + 25 mm from DN 100 and up.
4) Only hard rubber lining ≥ DN 300.
5) Only CIP (cleaning in place).
6) Certificate for meter tube and flange, DN 3-300 without protective flange. For other meter sizes, please supply additional ordering details.
7) Selected is forward flow signalling.

Details for ordering
Test simulator, adaptor

Test simulator for converter unit
Additional operator unit (3 button keyboard) Part No. D674A612U01 upon request

Order number	55XC4						
Without (at order only of the adaptor)		0					
Setting of the flow signal							
With a 3-digit switch, in 1000 steps		1					
Others		9					
Power supply[1]							
Without (at order only of the adaptor)			0				
Grounding-type plug (Schuko)	110 V to 240 V 50/60 Hz		1				
Banana plug (4 mm) 24 V to 48 V	AC/DC		2				
USA-plug for 110 V to 240 V	60 Hz		3				
Others			9				
Additional feature							
None				0			
Adaptor for converter 50XM2000				1			
Others				9			
Design level (specified by BFP)					*		
Nameplate							
German						1	
English						2	
French						3	
Others						9	

1) Power supply is used to supply the converter

PC-Software

1.) Products selection program

Select the required EMF using the Bailey-Fischer & Porter **FlowSelect** program. The selection program for all flowmeters with all technical datas, includes **FlowCalc** a flow rate Calculation program.

PC-Requirements: 486, 8 MB RAM, 7 MB free hard drive, 256 colors, Windows 3.1, Windows 95 or Windows NT, 3 1/2”-Disk format at no charge.

2.) Smart Vision®

The PC-Operator level for HART-Communication.
Pricing upon request.

Bailey-Fischer & Porter GmbH
37070 Göttingen
Tel. 0551/905-0 – Fax 0551/90 57 77