



D184S071U02 Rev. 00 / 09.2000



The Electromagnetic Flowmeter (EMF) can be used to accurately measure the flowrate of liquids, pulps, slurries and sludges which have an electrical conductivity greater than  $5 \mu\text{S}/\text{cm}$ . The COPA-XE is a flow measurement system in a Compact Design, the flowmeter primary and converter form a single entity.

The MAG-XE flow measurement system consists of a flowmeter primary and a remote mounted  $\mu\text{P}$ -converter. This design series augmented by the COPA-XE (separately mounted design). In both of these designs the converter may be operated inside the Ex-Zone.

#### ■ Series 2000

The basic flowmeter primary assembly can be mated to most existing process connections with threaded adapters.

#### ■ Connections which are compatible:

- Weld stubs
- Pipe fittings per DIN 11851 and DIN 11864-1B
- Tri-Clamp
- APV-Flanges per DIN 11864-2B
- Female / male threads

- Wafer and fixed flanged flange designs (DIN/ANSI)  
Certifications granted by EHEDG, FML, 3A.
- PVC-Cement coupling, hose connectors
- SMS Fitting
- **Series 4000**
- DVGW Test Certificate
- Certified design for Cold- and Waste Water and Liquids other than Water.
- Flange and wafer designs
- **Converter**
- Communication: Profibus, HART-Protocol, ASCII-Protocol
- Wide supply power range
- Signal outputs Ex „i“ and Ex „e“
- Single converter, can be readily exchanged without requiring parameter reentry using EEPROM technology.
- Multifunction display  
Display up to 6 different flow parameters in multiplex operation.

# Flowmeter Overview Series 4000

Flowmeter Primary with Investment Cast Housing, Flanged and Wafer Designs

<b>Models</b>	<b>MAG-XE</b>	<b>COPA-XE</b>	<b>COPA-XE (Remote Converter Version in the Ex-Zone)</b>

### Flowmeter Primary

Model Number	DE46..	DE47..	DE48..
Accuracy	0.5 % of rate		
		Meter Size	Press. Rtg. (PN)
Flanged design	F	1/8" - 40"	DN 3 - 1000
Wafer design	W	1/8" - 4"	DN 3 - 100
Liner	Hard rubber, soft rubber, PTFE, PFA		
Conductivity	> 5 µS/cm		
Electrodes	SS 316Ti/.4571, 1.4539, Hastelloy B2/C4, Platinum-Iridium, Tantalum, Titanium		
Process connection material	Steel 316Ti/1.4571		
Protection Class	IP 67		
Fluid temperature	-25 to +130 °C		

### Converter

Supply power	85 - 253 Vac / 16.8 - 26.4 Vac / 16.8 - 31.2 Vdc
Current output	0/2-10 mA, 0-5 mA, 0/4-20 mA, 0/4-10/12-20 mA (Ex „I“ and Ex „e“ user selectable at meter site)
Pulse output	passive, optocoupler (Ex „I“ and Ex „e“ user selectable at meter site)
Contact output	passive, optocoupler (Ex „I“ and Ex „e“ user selectable at meter site)
Contact input	passive, optocoupler (Ex „I“ and Ex „e“ user selectable at meter site)
Local flow indicator/totalizer	yes, lighted display
Communication	HART-Protocol, (ASCII-Protocol, Profibus DP, Profibus PA only for Model DE46)

### Approvals

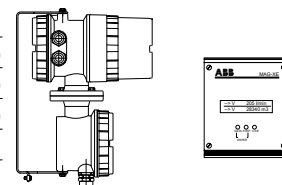
EEx-Design TÜV 97 ATEX 1173X	Primary II 2G EEx em [ib] IIC T3...T6	Primary II 2G EEx emd [ib] IIC T3...T6	Primary II 2G EEx em [ib] IIC T3...T6 Converter II 2G EEx ed IIC T6 or II 2G EEx ed [ib] IIC T6
Certifications	For Cold- and Waste Water and for Liquids other than Water		



# Overview Series 2000

## Stainless Steel Flowmeter Primary, Threaded Adapters for Variable Process Connections

<b>Models</b>	<b>MAG-XE</b>	<b>COPA-XE</b>	<b>COPA-XE Remote Converter Version in the Ex-Zone</b>
<b>Flowmeter Primary</b>			
Model Number	DE26..	DE27..	DE28..
Accuracy	0.5 % of rate		
	Meter Size		Press. Rtg. (PN)
Wafer design	W	1/8" – 4"	DN 3 – 100 10 – 40
Flanges DIN 2501 or ANSI 16.5	F	1/8" – 4"	DN 3 – 100 10 – 40
Flanges Type APV FAB1 DIN 11864-2B	L	1/8" – 4"	DN 3 – 100 10
Threaded fittings DIN 11864-1B	A	1/8" – 4"	DN 3 – 100 16
Threaded fittings DIN 11851	S	1/8" – 4"	DN 3 – 100 25/40
Threaded fittings per SMS 1145	D	1" – 4"	DN 25 – 100 16
Weld stubs per ISO 2037	P	1/8" – 4"	DN 3 – 100 40
Tri-Clamp DIN 32676	T	1/8" – 4"	DN 3 – 100 10
External threads ISO 228 / DIN 2999	E	1/8" – 1"	DN 3 – 25 10
Internal threads ISO 228 / DIN 2999	I	1/8" – 1"	DN 3 – 25 10
PVC-cement sleeve	G	1/8" – 1"	DN 3 – 25 10
Hose connector	H	1/8" – 1/2"	DN 3 – 15 10
Liner	PFA		
Conductivity	> 5 µS/cm		
Electrodes	SS 316Ti/1.4571, 1.4539, Hastelloy B2/C4, Platinum-Iridium, Tantalum, Titanium		
Process connection material	Steel 321/1.4541, 316Ti/1.4571		
Protection Class	IP 67		
Fluid temperature	-25°C to +130°C		
<b>Converter</b>			
Supply power	85 - 253 Vac / 16.8 - 26.4 Vac / 16.8 - 31.2 Vdc		
Current output	0/2-10 mA, 0-5 mA, 0/4-20 mA, 0/4-10/12-20 mA (Ex „I“ and Ex „e“ user selectable at meter site)		
Pulse output	passive optocoupler (Ex „I“ and Ex „e“ user selectable at meter)		
Contact input	passive optocoupler (Ex „I“ and Ex „e“ user selectable at meter)		
Contact output	passive optocoupler (Ex „I“ and Ex „e“ user selectable at meter)		
Local flow indicator/totalizer	yes, lighted display		
Housing designs	Field mount, 19" Insert, rear panel mount, rail mount		
Communication	HART-Protocol, (ASCII-Protocol, Profibus DP, Profibus PA only for Model DE26)		
<b>Approvals</b>			
EEx-Design TÜV 97 ATEX 1173X	Flowmeter primary II 2G EEx em [ib] IIC T3...T6	II 2G EEx emd [ib] IIC T3...T6	Primary II 2G EEx em [ib] IIC T3...T6 Converter II 2G EEx ed IIC T6 or II 2G EEx ed [ib] IIC T6
Certifications	For Cold- and Waste Water and for Liquids other than Water		
Others	3A, FML, EHEDG		



# Accuracy, Reference Conditions and Principles of Operation

## Reference Conditions per EN 29104:

### Fluid Temperature

20 °C ±2K

### Ambient Temperature

20 °C ±2K

### Supply Power

Nominal voltage per Instrument Tag  $U_{Nom} \pm 1 \%$

Frequency  $f \pm 1 \%$

### Installations Conditions

Upstream >10 x D straight pipe section,

Downstream >5 x D straight pipe section

D = Flowmeter primary meter size.

### Warm-Up Time

30 min

### Analog Output Effects

Same as pulse output plus ± 0.1 % of rate.

## Principles of Operation

The Faraday Laws of Induction, which state that a voltage is generated in a conductor when it moves through a magnetic field, form the basis for the electromagnetic flowmeter measurements.

This measurement principle is applied to a conductive fluid which flows in a pipe in which a magnetic field is generated perpendicular to the flow direction (see Schematic, Fig. 2 ).

The voltage which is induced in the fluid is measured at two electrodes located diametrically opposite to each other. This signal voltage  $U_E$  is proportional to the magnetic induction  $B$ , the electrode spacing  $D$  and the average fluid velocity  $v$ .

Since the magnetic induction  $B$  and the electrode spacing  $D$  are constant values, the signal voltage  $U_E$  is proportional to the average flow velocity  $v$ . The equation for calculating the volumetric flowrate shows that the signal voltage  $U_E$  is linear and proportional to the volumetric flowrate.

The induced signal voltage is converted into scaled, analog and digital output signals in the converter

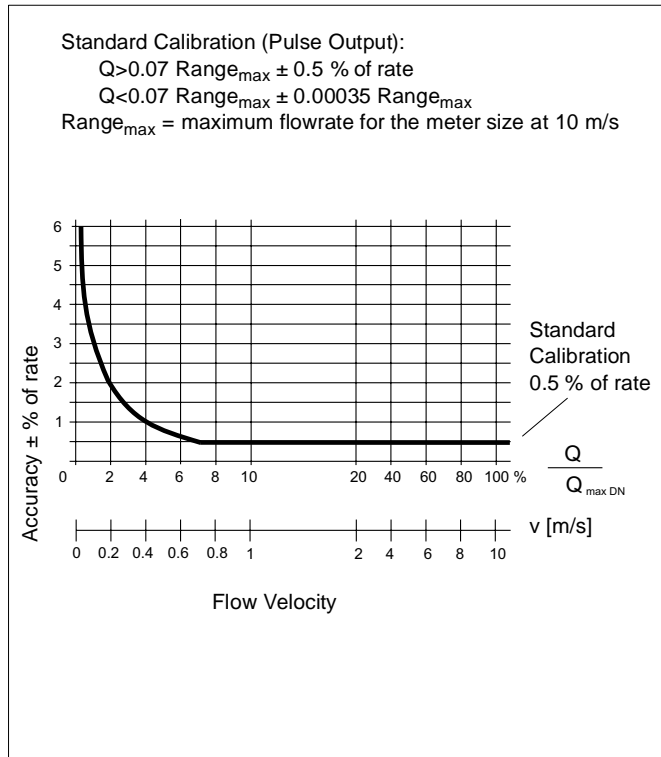


Fig. 1 Flowmeter System Accuracy COPA-XE/MAG-XE

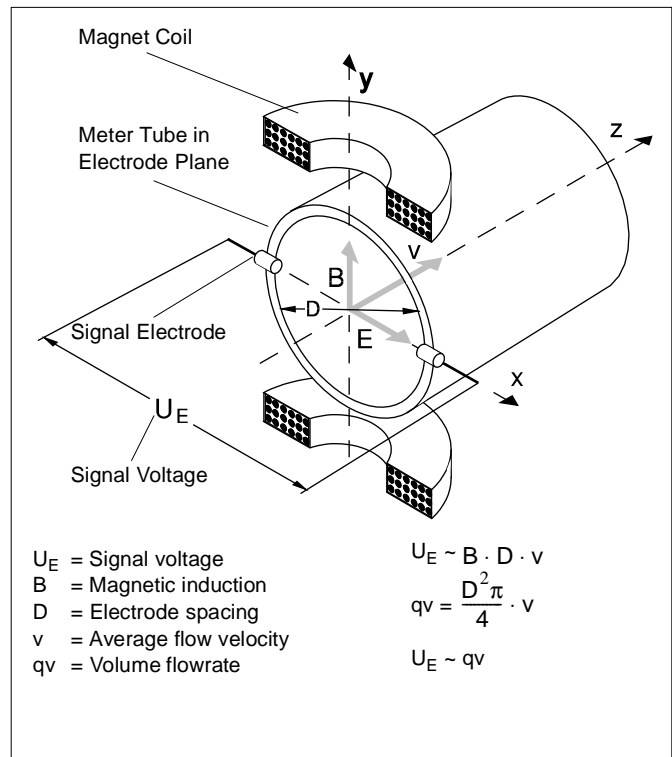


Fig. 2 Electromagnetic Flowmeter Schematic

# Flowmeter Sizes and Pressure Rating, Flow Ranges Flowrate Nomograph

Flowmeter Size		Std. Pressure Rating PN	Min. Flow Range Flow Velocity 0 to 0.5 m/s		max. Flow Range Flow Velocity 0 to 10 m/s	
Inch	DN		l/min	m <sup>3</sup> /h	l/min	m <sup>3</sup> /h
1/8	3	40	0 to 0.2	0 to 0.2	0 to 4	0 to 4
5/32	4	40	0 to 0.4	0 to 0.4	0 to 8	0 to 8
1/4	6	40	0 to 1	0 to 1	0 to 20	0 to 20
5/16	8	40	0 to 1.5	0 to 1.5	0 to 30	0 to 30
3/8	10	40	0 to 2.25	0 to 2.25	0 to 45	0 to 45
1/2	15	40	0 to 5.0	0 to 5.0	0 to 100	0 to 100
3/4	20	40	0 to 7.5	0 to 7.5	0 to 150	0 to 150
1	25	40	0 to 10	0 to 10	0 to 200	0 to 200
1-1/4	32	40	0 to 20	0 to 20	0 to 400	0 to 400
1-1/2	40	40	0 to 30	0 to 30	0 to 600	0 to 600
2	50	40	0 to 3	0 to 3	0 to 60	0 to 60
2-1/2	65	40	0 to 6	0 to 6	0 to 120	0 to 120
3	80	40	0 to 9	0 to 9	0 to 180	0 to 180
4	100	16	0 to 12	0 to 12	0 to 240	0 to 240
5	125	16	0 to 21	0 to 21	0 to 420	0 to 420
6	150	16	0 to 30	0 to 30	0 to 600	0 to 600
8	200	10/16	0 to 54	0 to 54	0 to 1080	0 to 1080
10	250	10/16	0 to 90	0 to 90	0 to 1800	0 to 1800
12	300	10/16	0 to 120	0 to 120	0 to 2400	0 to 2400
14	350	10/16	0 to 165	0 to 165	0 to 3300	0 to 3300
16	400	10/16	0 to 225	0 to 225	0 to 4500	0 to 4500
20	500	10	0 to 330	0 to 330	0 to 6600	0 to 6600
24	600	10	0 to 480	0 to 480	0 to 9600	0 to 9600
28	700	10	0 to 660	0 to 660	0 to 13200	0 to 13200
32	800	10	0 to 900	0 to 900	0 to 18000	0 to 18000
36	900	10	0 to 1200	0 to 1200	0 to 24000	0 to 24000
40	1000	10	0 to 1350	0 to 1350	0 to 27000	0 to 27000

## Flowrate Nomograph

The volumetric flowrate is a function of the flow velocity and the flowmeter size. The Flowrate Nomograph shows the flowrate range which can be metered with a specific flowmeter size and also which flowmeter sizes are suitable for a specific flowrate.

### Example:

Flowrate = 7 m<sup>3</sup>/h (maximum value = flow range end value).  
Suitable are flowmeter primary sizes 3/4" to 2-1/2" [DN 20 to DN 65] for flow velocities between 0.5 to 10 m/s.

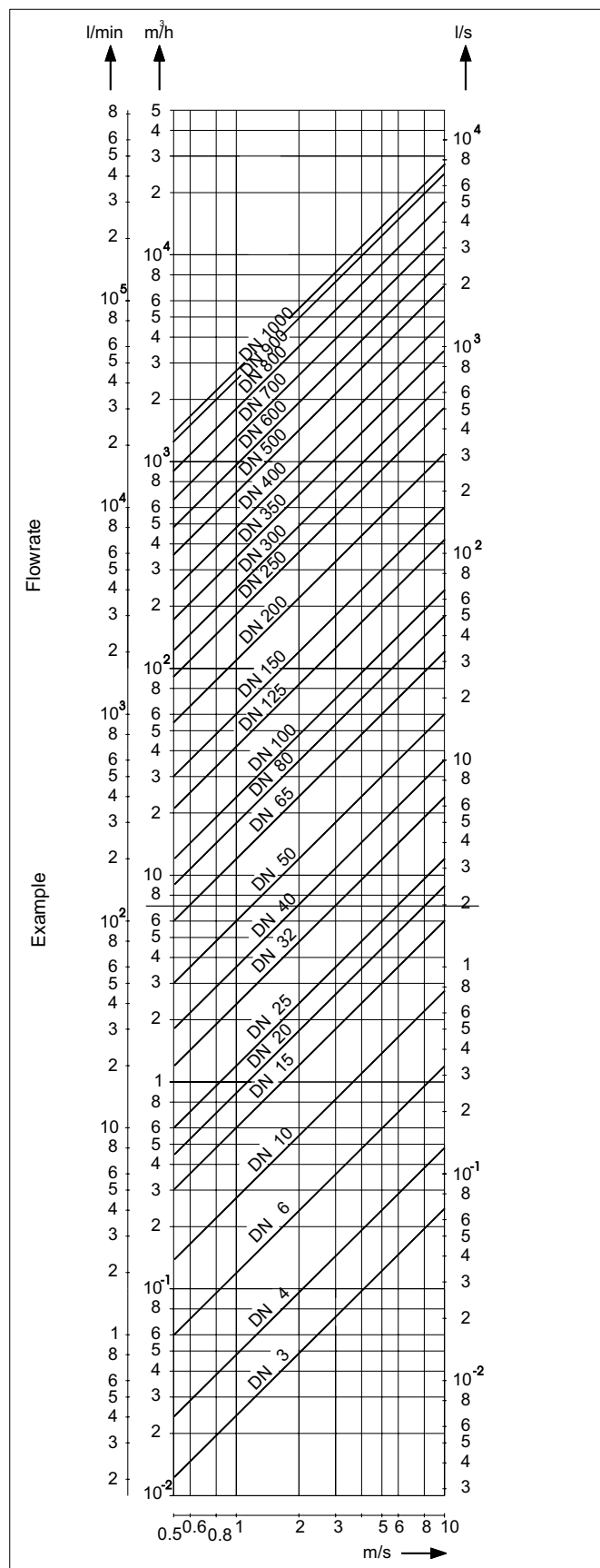


Fig. 3 Flowrate Nomograph 1/8" to 40" / DN 3 to DN 1000

## Installation Requirements and Grounding

### In- and Outlet Pipe Sections

The metering principle is independent of the flow profile as long as standing eddies do not extend into the metering section, such as may exist after double elbows, tangential inflow or partially open gate valves upstream of the flowmeter. It is recommended that the flow control devices be installed downstream from the flowmeter primary. It is essential to assure that the meter tube is always completely filled with fluid.

Our experience indicates, that in most cases, a straight inlet section  $3 \times D$  long and a straight outlet section  $2 \times D$  long is sufficient.

In test stands, the reference conditions defined in EN 29104 are to be maintained. For certified instruments special in- and outlet section requirements apply (see Page 7).

### Electrode Axis

The flowmeter can be installed in vertical, horizontal or sloped pipelines. The electrode axis should be horizontal if at all possible. A vertical electrode axis orientation should be avoided. An ideal installation is shown in Fig. 4 .

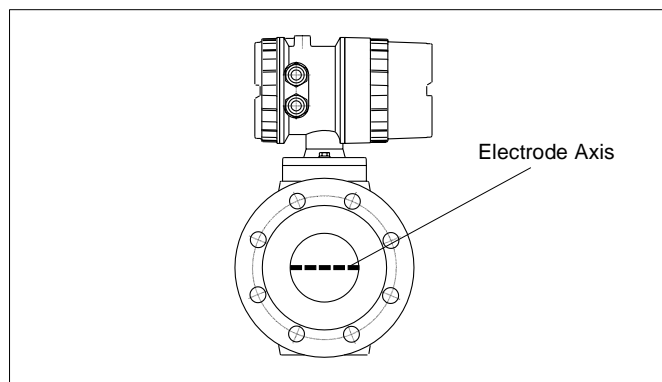


Fig. 4 Electrode Axis

### Grounding

The grounding of the flowmeter primary is not only essential for safety reasons but also of importance to assure trouble free operation of the electromagnetic flowmeter. The ground screws on the flowmeter primary are to be connected to the ground potential. For technical reasons this potential should be the same as the potential of the metering fluid if possible.

For plastic or insulated lined pipelines the fluid is grounded by installing grounding plates. When there are stray potentials present in the pipeline a grounding plate is recommended on both ends of the flowmeter primary.

For flowmeters with hard- or soft rubber liners a conductive element is integrated in the liner beginning at size 5" / DN 125. This provides a sure ground for the fluid.

### Installations in Larger Pipeline Sizes

The flowmeter primary can readily be installed in larger pipeline sizes using standard reducers. The pressure drop resulting from the size reduction can be determined from the Pressure Drop Nomograph Fig. 5 . The procedure for determining the pressure drop is as follows:

1. Calculate the diameter ratio  $d/D$ .
2. Determine the flow velocity from the Flowrate Nomograph Fig. 3 .
3. In Fig. 5 read the pressure drop on the Y-Axis.

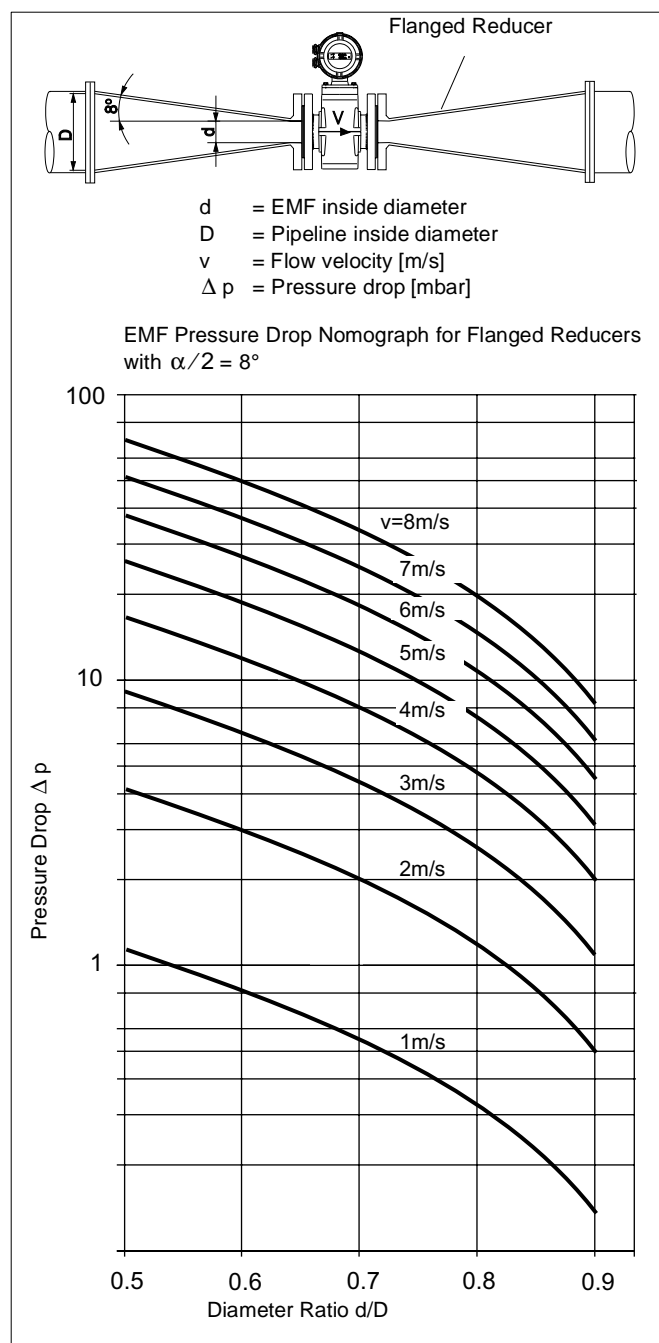


Fig. 5 Pressure Drop Nomograph for the EMF

## Agency Approved EMF

### Approvals

The design of the measurement instrument “Electromagnetic Volume Flowrate Totalizer with Electrical Counter” has been approved by the National Institute for Science and Technology (Physikalisch-Technischen Bundesanstalt) in Braunschweig, Germany. The following approvals have been granted for the Volume Flowrate Totalizer which consists of a flowmeter primary and a converter:

6.221	Electromagnetic Volume Flowrate Totalizer
87.12	with a Class “B” Electric Counter for Cold Water and Waste Water

5.721	Electromagnetic Volume Flowrate Totalizer
87.05	with a Electric Counter for Liquids other than Water

Appendix (EO6) or Appendix 5 (EO5) of the Certification Regulations of 1988 apply to the Electromagnetic Volume Flowrate Totalizer with Electrical Counter.

### Certification

The Electromagnetic Volume Flowrate Totalizer is certified on the test stands in Göttingen, Germany which have been approved for certification calibrations. After the calibration has been completed, the parameters which impact the Certification Regulations can only be changed in the presence of a Certification Agent.

### Approved Flowmeter Sizes for “Cold Water and Waste Water”

Meter Size Inch DN	Min. Allow. Flow Range End Value (appr. 2 m/s)	Max. Allow. Flow Range End Value (appr. 10 m/s)
1 25	0 to 2.4 m <sup>3</sup> /h	0 to 12 m <sup>3</sup> /h
1-1/4 32	0 to 5 m <sup>3</sup> /h	0 to 25 m <sup>3</sup> /h
1-1/2 40	0 to 9 m <sup>3</sup> /h	0 to 45 m <sup>3</sup> /h
2 50	0 to 14 m <sup>3</sup> /h	0 to 70 m <sup>3</sup> /h
2-1/2 65	0 to 24 m <sup>3</sup> /h	0 to 120 m <sup>3</sup> /h
3 80	0 to 36 m <sup>3</sup> /h	0 to 180 m <sup>3</sup> /h
4 100	0 to 56 m <sup>3</sup> /h	0 to 280 m <sup>3</sup> /h
5 125	0 to 84 m <sup>3</sup> /h	0 to 420 m <sup>3</sup> /h
6 150	0 to 128 m <sup>3</sup> /h	0 to 640 m <sup>3</sup> /h
8 200	0 to 220 m <sup>3</sup> /h	0 to 1100 m <sup>3</sup> /h
10 250	0 to 360 m <sup>3</sup> /h	0 to 1800 m <sup>3</sup> /h
12 300	0 to 500 m <sup>3</sup> /h	0 to 2500 m <sup>3</sup> /h
14 350	0 to 700 m <sup>3</sup> /h	0 to 3500 m <sup>3</sup> /h
16 400	0 to 900 m <sup>3</sup> /h	0 to 4500 m <sup>3</sup> /h
20 500	0 to 1420 m <sup>3</sup> /h	0 to 7100 m <sup>3</sup> /h
24 600	0 to 2000 m <sup>3</sup> /h	0 to 10000 m <sup>3</sup> /h
28 700	0 to 2800 m <sup>3</sup> /h	0 to 14000 m <sup>3</sup> /h
32 800	0 to 3600 m <sup>3</sup> /h	0 to 18000 m <sup>3</sup> /h
36 900	0 to 4600 m <sup>3</sup> /h	0 to 23000 m <sup>3</sup> /h
40 1000	0 to 5600 m <sup>3</sup> /h	0 to 28000 m <sup>3</sup> /h

### Approved Flowmeter Sizes for “Liquids other than Water”

Flowmeter Size and Max. Allowable Flowrate					
Inch	DN	Q <sub>max</sub> Liter/min			
1	25	selectable	60 to	200	in steps of 10
1-1/4	32	selectable	100 to	400	in steps of 10
1-1/2	40	selectable	150 to	750	in steps of 50
2	50	selectable	250 to	1000	in steps of 50
2-1/2	65	selectable	400 to	2000	in steps of 100
4	80	selectable	700 to	3000	in steps of 100
4	100	selectable	900 to	4500	in steps of 100
5	125	selectable	2000 to	10000	in steps of 500

Minimum Allowable Flowrate and Fluid			
DN	Minimum Allow. Flowrate l/min	Fluid	
1 25	8	beer, milk, syrup	
1-1/4 32	5	beer, milk, syrup	
1-1/2 40	20	beer, milk	
2 50	200	beer, wort	
2-1/2 65	500	milk, wort, beer	
4 80	500	milk, wort, beer	
4 100	2000	brine, wort	
5 125	2000	brine	

Min. flow range approx. 2.5 m/s.  
Max. flow range approx. 10 m/s.

The flow ranges are to be specified in accordance with the values listed in the tables. Subsequent flow ranges changes require a new calibration on an agency certified test stand.

### Installation Requirements for Volume Flow Integrators

The following installation requirements are to be observed: For “Cold- and Waste Water” a straight pipeline section with a length of at least 5 times the flowmeter size must be installed upstream of the flowmeter and a section 2 time the flowmeter size downstream. For “Liquids other than Water” (milk, beer, wort, brine) the values shown in parentheses in Fig. 6 apply. For flow metering in both directions (forward and reverse) the straight pipeline sections installed on both sides of the flowmeter must be at least 5 times the flowmeter size for “Cold- and Waste Water” approvals and at least 10 times the flowmeter size for “Liquids other than Water” approvals. The pipeline system must always be completely filled with fluid. The signal cable length may not exceed 50 m.

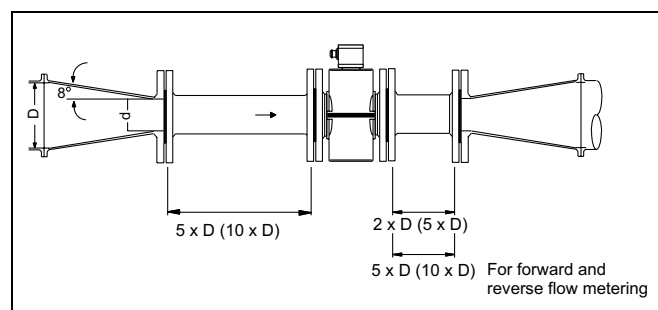


Fig. 6 Piping Installation, Reductions as Required



# Specifications, Stainless Steel Flowmeter Models DE26, DE27, DE28

## Ambient Requirements

### Ambient Temperature

-20 °C to +60 °C

### Fluid Temperature

-25 °C to 130 °C,

For flowmeter sizes 1" and 1-1/4" /DN25 and DN32 in Models DE47 and Model DE27: T<sub>Operate</sub> ≤ 125 °C (Ex-Specifications)

### Max. Allowable Cleaning Temperature

For steam or liquid cleaning the temperature specifications in the Ex-Approval must be observed! See Temperature Tables Pages 10, 11.

If the ambient temperature > 25°C, then the difference is to be deducted from the max. cleaning temperature. T<sub>max</sub> - Δ °C where Δ °C = (T<sub>amb</sub> - 25°C).

## Minimum Allowable Absolute Pressure as a Function of the Fluid Temperature

Liner	Meter Size Inch      DN	P <sub>Operate</sub> mbar abs	at	T <sub>Operate</sub> °C
PFA	1/8-4      3-100	0	≤	130

## Max. Allowable Fluid Temperature and Pressure

Process Connection Liner, PFA	Meter Size Inch      DN	P <sub>Oper</sub> bar	at	T <sub>Oper</sub> °C
Wafer design, Weld stubs Flanged DIN2501/ANSI	1/8-4      3-100	40	≤	20*
Flanged FAB1 DIN 11864-2B	1/8-4      3-100	10	≤	130*
Hygienic connection DIN 11864-1B	1/8-4      3-100	16	≤	130*
Food Industry fitting DIN 11851	1/8-1-1/2      3-40 2-4      50-100	40	≤	130*
Tri-Clamp DIN 32676	1/8-4      3-100	10	≤	130*
External/internal threads ISO 228	1/8-1      3-25	10	≤	130*
PVC-cement sleeve	1/8-1      3-25	10	≤	20 1 ≤ 60
Hose connector	1/8-1/2      3-15	10	≤	130
SMS fitting	1-4      25-100	10	≤	130*
		16	≤	20

\* For flowmeter sizes 1" and 1-1/4" /DN25 and DN32 in Model DE47 and Model DE27: T<sub>Operate</sub> ≤ 125 °C (Ex-Specifications)

## Maximum Allowable Temperature Shock

Liner	Temp.-Shock Max. Temp. Diff. °C	Temp.-Gradient °C/min
PFA	any	any

## Flowmeter Primary Materials

Liner Material	Electrode Material		Electrode Design	
	Standard	Others	Standard	Others
PFA	Hast.-C4 (SS No. 1.4539 for Food Ind. Fittings and Tri-Clamp)	Hast.-B2 SS No. 1.4539 316Ti [1.4571] Tantalum, Titanium, Platinum-Iridium	Flat head	Pointed head (≥ 3/8" [DN10])

## Process Connection Material

	Standard	Option
Flanges per DIN2501 Wafer Design	316Ti No. 1.4571 none	—
Weld stubs	304 No. 1.4301	316L No. 1.4404, 316Ti No. 1.4571
Food Ind. fitting per DIN 11851	304 No. 1.4301	316L No. 1.4404
Aseptic conn. per DIN 11864	316L No. 1.4404	—
Tri-Clamp per 32676	304 No. 1.4301	316L No. 1.4404
Tri-Clamp per ISO 2852	304 No. 1.4301	316L No. 1.4404
SMS fitting	304 No. 1.4301	316L No. 1.4404
Flanged per DIN 11864	316L No. 1.4404	—
External/internal threads	304 No. 1.4301	316L No. 1.4404, 316Ti No. 1.4571
Hose connector	304 No. 1.4301	316L No. 1.4404, 316Ti No. 1.4571
PVC-Cement sleeve	PVC	—

Connection Box	Standard	Option
COPA-XE	Alum alloy, Painted, Paint coat Frame: dark grey, RAL 7012 Cover: light gray, RAL 9002	
MAG-XE	Stainless steel	—
Meter tube	304 No. 1.4301	—
Pg-Connector	Polyamide	PVDF
Primary housing	Deep drawn housing Stn. Stl. 304 No.[1.4301]	

## Gasket Material

Process Connection	Gasket Material
Wafer design	none
Weld stubs, flanged, Food Ind. fitting, aseptic conn., Tri-Clamp, external/internal threads hose connector, PVC-Cement sleeve	EPDM (Ethylene-Propylene) std. with FDA-Approval Silicone with FDA-Approval (Option)
Flat housing gaskets	Silicone

## Protection Class per EN 60529

IP 67

## Pipeline Vibration

Maximum allowable: 15 m/s<sup>2</sup> (10 - 150 Hz)





## Specifications

### Flowmeter Primary, Flanged and Wafer Designs

Models DE46, DE47, DE48

#### Ambient Requirements

Ambient Temperature -20 to 60 °C

#### Fluid Temperature

-25 to +130 °C

For flowmeter sizes 1" and 1-1/4" /DN25 and DN32 in Model DE47 and Model DE27:  $T_{Operate} \leq 125$  °C (Ex-Specifications)

#### Maximum Allowable Cleaning Temperature

For steam or liquid cleaning the temperature specifications in the Ex-Approval must be observed! See Temperature Tables Pages 10, 11

If the ambient temperature  $> 25$ °C, then the difference is to be deducted from the max. cleaning temperature.  $T_{max} - \Delta$  °C where  $\Delta$  °C =  $(T_{amb} - 25)$ °C.

#### Minimum and Maximum Allowable Pressure as a Functions or the Fluid Temperature

Liner	Meter Sizes		$P_{Operate}$ mbar abs.	at	$T_{Operate}$ °C *
	Inch	DN			
Hard rubber KTW Approved	1/2 to 10	15 to 250	0	<	90
	12 to 40	300 to 1000	0	<	90
Soft rubber KTW Approved	2 to 10	50 to 250	0	<	90
	12 to 40	300 to 1000	0	<	90
PTFE	3/8 to 32	10 to 800	270	<	20
			500	<	130 <sup>1)</sup>
PFA	1/8 to 4	3 to 100	270	<	20
			500	<	130 <sup>1)</sup>

\*) At 40 °C ambient temperature and Temperature Class T3

1) For flowmeter sizes 1" and 1-1/4" /DN25 and DN32 in Model DE47 and Model DE27:  $T_{Oper.} \leq 125$  °C (Ex-Specifications)

#### Max. Allow. Fluid Temperature and Pressure

Liner	Meter Size		$P_{Operate}$	at	$T_{Operate}$ °C
	Inch	DN			
Hard rubber	1/2 – 10	15 – 250	40 bar	<	90
	12 – 40	300 – 1000	25 bar	<	90
Soft rubber	2 – 40	50 – 1000	16 bar	<	90
PTFE	3/8 – 32	10 – 800	40 bar	<	20
			25 bar	<	130*
PFA	1/8 – 10	3 – 250	40 bar	<	20
			25 bar	<	130*

\* For flowmeter sizes 1" and 1-1/4" /DN25 and DN32 in Models DE27 and Model DE47:  $T_{Oper.} \leq 125$  °C.

#### Flowmeter Primary Materials

Part	Standard	Others
Liner	PTFE, PFA, hard rubber soft rubber	—
Signal and ground electrodes for - Hard rubber, Soft rubber	SS 316Ti / No. 1.4571	Hast. B-2, Hast-2, C-4, Titanium, Tantalum, Platinum-Iridium
- PTFE PFA	Hast.-C4	SS 316Ti / No. 1.4571 Hast. B-2 Titanium, Tantalum Platinum-Iridium
Grounding plate for flanged and wafer design flowmeters	SS 316Ti / No. 1.4571	Upon request
Protection plate, only for flanged flowmeters	SS 316Ti / No. 1.4571	Upon request

#### Process Connection Materials

Part	Standard	Others
Flanges 1/8"-1/2" 3/4"-12"	DN 3 - 15 DN 20 - 300	316Ti / 1.4571 (standard) Steel (zinc plated)
	DN 350 - 1000	Steel (painted)
14"-40"	DN 350 - 1000	316Ti / 1.4571

#### Materials, Other Flowmeter Primary Parts

Part	Standard	Others
Housing 1/8"-12"	DN 3 - 300	Two clam shell housings Cast Alum., painted, paint coat, 60 µm thick RAL 9002
14" - 40"	DN 350 - 1000	Welded steel construction, painted, paint coat, 60 µm thick RAL 9002
Connection box	Alum alloy, painted, 60 µm thick Frame: dark gray, RAL 7012 Cover: light gray, RAL 9002	—
Meter tube	SS 304 / No. 1.4301	—
Pg-Connector	Polyamide	PVDF

#### Protection Class

IP 67

IP 68 (only for MAG-XE Primary, Model DE46)

#### Pipeline Vibrations

Max. allow.  $15 \text{ m/s}^2$  (10–150 Hz)

#### Design

The flanged instruments correspond to installation lengths defined in VDI/VDE 2641, ISO 13359 or DVGW (Working Paper W420, Design WP, ISO 4064 short).

## Specifications

### Max. Ambient Temperature, Temperature Classes, Max. Fluid Temperature

#### a) Models DE27, DE47 (COPA-XE)

Max. Ambient Temp. (°C)	Temperature Class	Liner	Max. Allow. Fluid Temperature (Operating Conditions)				
			1/8" - 1/4" DN 3-20	1" - 1-1/4" DN 25-32	1-1/2" - 4" DN 40-100	5" - 12" DN 125-300	14" - 40" DN 350-1000
40 °C	T3	PTFE/PFA	130	125	130	130	-
		Hard/soft rubber.	90	90	90	90	-
	T4	PTFE/PFA	110	110	115	125	130
		Hard/soft rubber.	90	90	90	90	90
	T5	PTFE/PFA	75	75	80	90	95
		Hard/soft rubber.	75	75	80	90	90
T6	PTFE/PFA	60	60	70	75	80	
	Hard/soft rubber.	60	60	70	75	80	
50 °C	T3	PTFE/PFA	130	125	125	130	-
		Hard/soft rubber.	90	90	90	90	-
	T4	PTFE/PFA	110	110	115	125	120
		Hard/soft rubber.	90	90	90	90	90
	T5	PTFE/PFA	75	75	80	90	95
		Hard/soft rubber.	75	75	80	90	90
T6	PTFE/PFA	60	60	70	75	80	
	Hard/soft rubber.	60	60	70	75	80	
60 °C	T3	PTFE/PFA	-	-	-	-	-
		Hard/soft rubber.	-	-	-	-	-
	T4	PTFE/PFA	85	85	-	-	-
		Hard/soft rubber.	85	85	-	-	-
	T5	PTFE/PFA	75	75	80	85	-
		Hard/soft rubber.	75	75	80	85	-
T6	PTFE/PFA	60	60	70	75	80	
	Hard/soft rubber.	60	60	70	75	80	

#### ! Note:

The higher Temperature Classes always include the lower ones. The lowest allowable fluid temperature is -25 °C. The max. allowable temperatures listed in the table are based on non-insulated pipelines. The max. temperature at the cable connector is 70 °C.



## Specifications

### Max. Ambient Temperature, Temperature Classes, Max. Fluid Temperature

#### b) Models DE26, DE46 (MAG-XE) DE28, DE48 (COPA-XE Remote Design)

Max. Ambient Temp. (°C)	Temperature Class	Liner	Max. Allow. Fluid Temperature (Operating Conditions)			
			1/8" - 1-1/4" DN 3-40	2" - 4" DN 50-100	5" - 12" DN 125-300	14" - 40" DN 350-1000
40 °C	T3	PTFE/PFA	130	130	130	-
		Hard/soft rubber	90	90	90	-
	T4	PTFE/PFA	110	115	125	130
		Hard/soft rubber	90	90	90	90
	T5	PTFE/PFA	75	85	90	100
		Hard/soft rubber	75	85	90	90
T6	PTFE/PFA	60	70	75	85	
	Hard/soft rubber	60	70	75	85	
50 °C	T3	PTFE/PFA	-	130	130	-
		Hard/soft rubber	-	90	90	-
	T4	PTFE/PFA	110	115	125	130
		Hard/soft rubber	90	90	90	90
	T5	PTFE/PFA	75	85	90	100
		Hard/soft rubber	75	85	90	90
T6	PTFE/PFA	60	70	75	85	
	Hard/soft rubber	60	70	75	85	
60 °C	T3	PTFE/PFA	-	120	-	-
		Hard/soft rubber	-	90	-	-
	T4	PTFE/PFA	90	115	120	105
		Hard/soft rubber	90	90	90	90
	T5	PTFE/PFA	75	85	90	100
		Hard/soft rubber	75	85	90	90
T6	PTFE/PFA	60	70	75	85	
	Hard/soft rubber	60	70	75	85	

### ! Note:

The higher Temperature Classes always include the lower ones. The lowest allowable fluid temperature is -25 °C. The max. allowable temperatures listed in the table are based on non-insulated pipelines. The max. temperature at the cable connector is 70 °C.

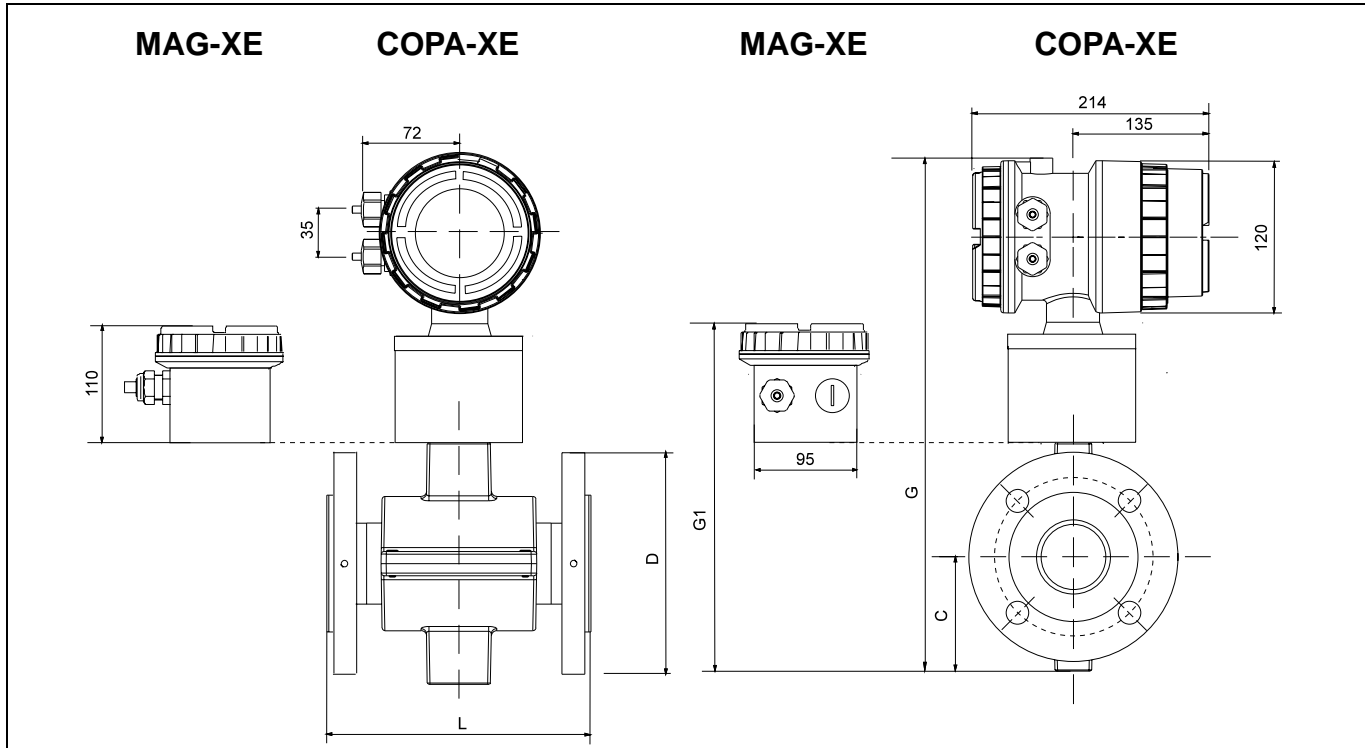
The converter for Models DE28 and DE48 (COPA-XE Remote Design) can only be used to a max. ambient temperature of 60 °C. The temperature class is T6.



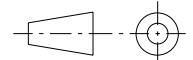
# Dimensions

## Flowmeter Primaries, 1/8" – 4" / DN 3 – 100, Flanges, DIN and ANSI

Models DE46, DE47 and DE48



1/8" ... 4" / DN 3 ... DN 100



All dim's in mm ISO Projection Method E

### DIN Flanges

Dimensions							Weight Compact Instrument	Weight Primary Only
DN	PN <sup>1)</sup>	D	L <sup>2)3)</sup>	G	G1	C	appr.kg	appr.kg.
3-8	10-40	90	130	346	234	62	5	4
10-15	10-40	95	200	346	234	62	5.5	4.5
20	10-40	105	200	368	256	73	6.0	5
25	10-40	115	200	368	256	73	6.5	5.5
32	10-40	140	200	378	266	78	8.0	7
40	10-40	150	200	386	274	82	8.5	7.5
50	10-40	165	200	402	290	90	10.0	9
65	10-40	185	200	430	318	104	14.0	13
80	10-40	200	200	442	330	110	18.0	16
100	10-16	250	250	482	370	130	17.0	17

### ANSI-Flanges

Dimensions					Weight Compact Instrument		Weight Primary Only	
DN	Inch	D	D	L <sup>3)4)</sup>	CL 150	CL 300	CL 150	CL 300
					appr.kg	appr.kg	appr.kg	appr.kg
3-8	1/2	89	96	130	5.5	5.5	4	4
10-15	1/2	89	96	270	5.5	5.5	4.5	4.5
20	3/4	98	118	270	6.0	6.0	5	5
25	1	108	124	270	6.5	6.5	5.5	5.5
32	1-1/4	118	134	280	8.0	8.0	7	7
40	1-1/2	127	156	280	8.5	8.5	7.5	7.5
50	2	153	165	280	10.0	10.0	9	9
65	2-1/2	178	191	330	14.0	14.0	13	13
80	3	191	210	340	18.0	18.0	16	16
100	4	229	254	400	17.0	17.0	17	17

For dimensions G, G1, C see Table DIN Flanges

- 1) Other pressure ratings upon request
- 2) If a grounding plate is installed (on one flange), dimension L increases as follows: 1/8" - 4" / DN 3 - 100 by 3 mm.
- 3) If protection plates are installed (on both flanges), dimension L increases as follows: 1/8" - 4" / DN 3 - 100 by 6 mm.
- 4) If protection flanges are installed (on both ANSI flanges, installation length Series 1000), dimension L increases as follows:  
 1/8" - 3" / DN 3 - DN 80 by 20 mm  
 4" / DN 100 and larger by 25 mm

Fig. 7 Flowmeter Primary 1/8" to 4" / DN 3 to DN 100

# Dimensions

## Flowmeter Primary 5"–12" / DN125 – 300, Flanges, DIN and ANSI

Models DE46, DE47 and DE48

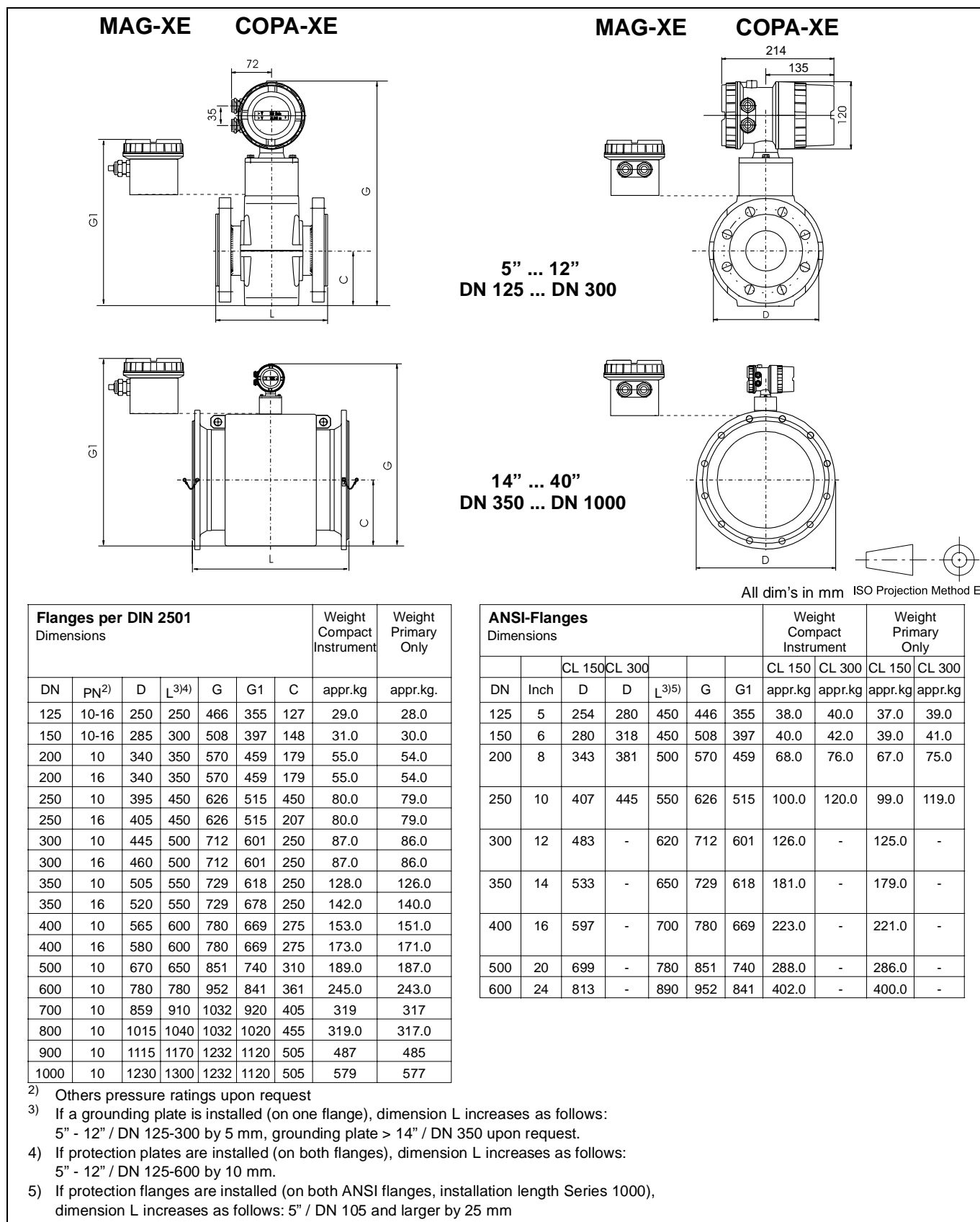


Fig. 8 Flowmeter Primary 5" to 12" / DN 125 to DN 300

Dimensions

Flowmeter Primary 1/8" to 4" / DN 3 to DN 100, Wafer Design

Models DE46, DE47, DE48

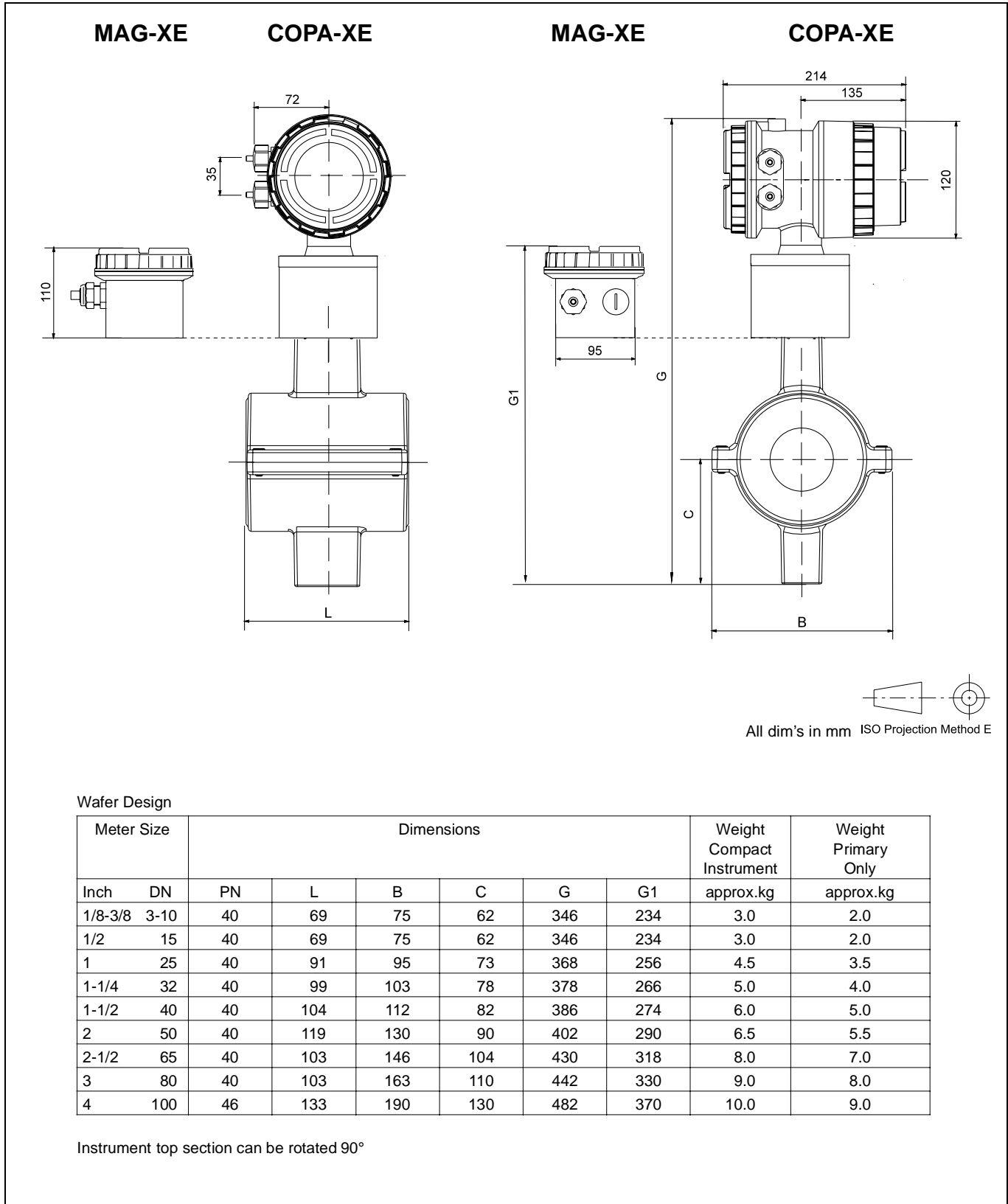


Fig. 9 Flowmeter Primary Wafer Design 1/8" to 4" / DN 3 to DN 100

# Dimensions

## Flowmeter Primary 1/8" to 4" / DN 3 to DN 100, Wafer Design

Models DE26, DE27, DE28

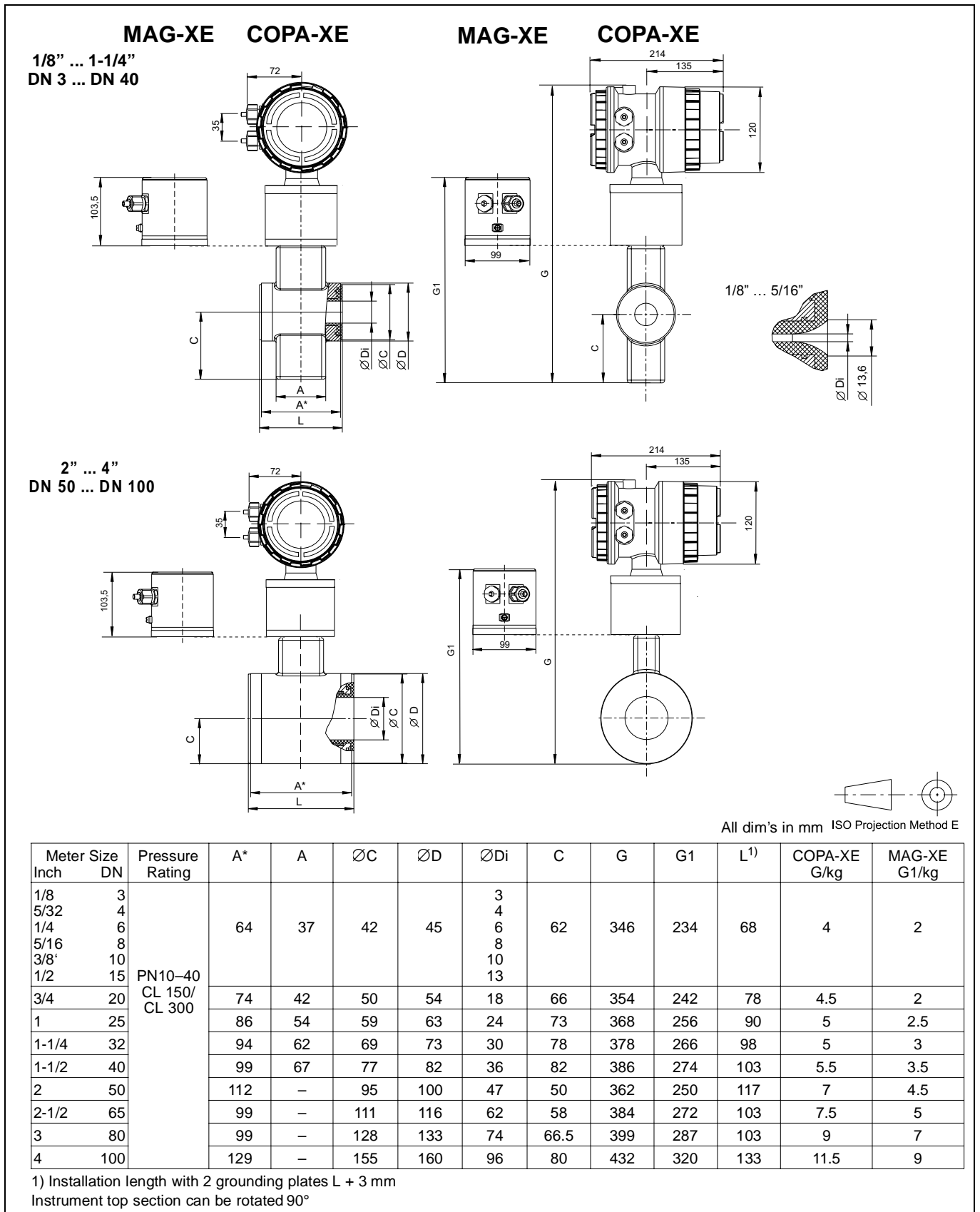


Fig. 10 Flowmeter Primary Wafer design 1/8" to 4" / DN 3 - DN 100



# Dimensions

## Flowmeter Primary 1/8" - 4"/DN3-100, Variable Process Connections

Models DE26, DE27 and DE28

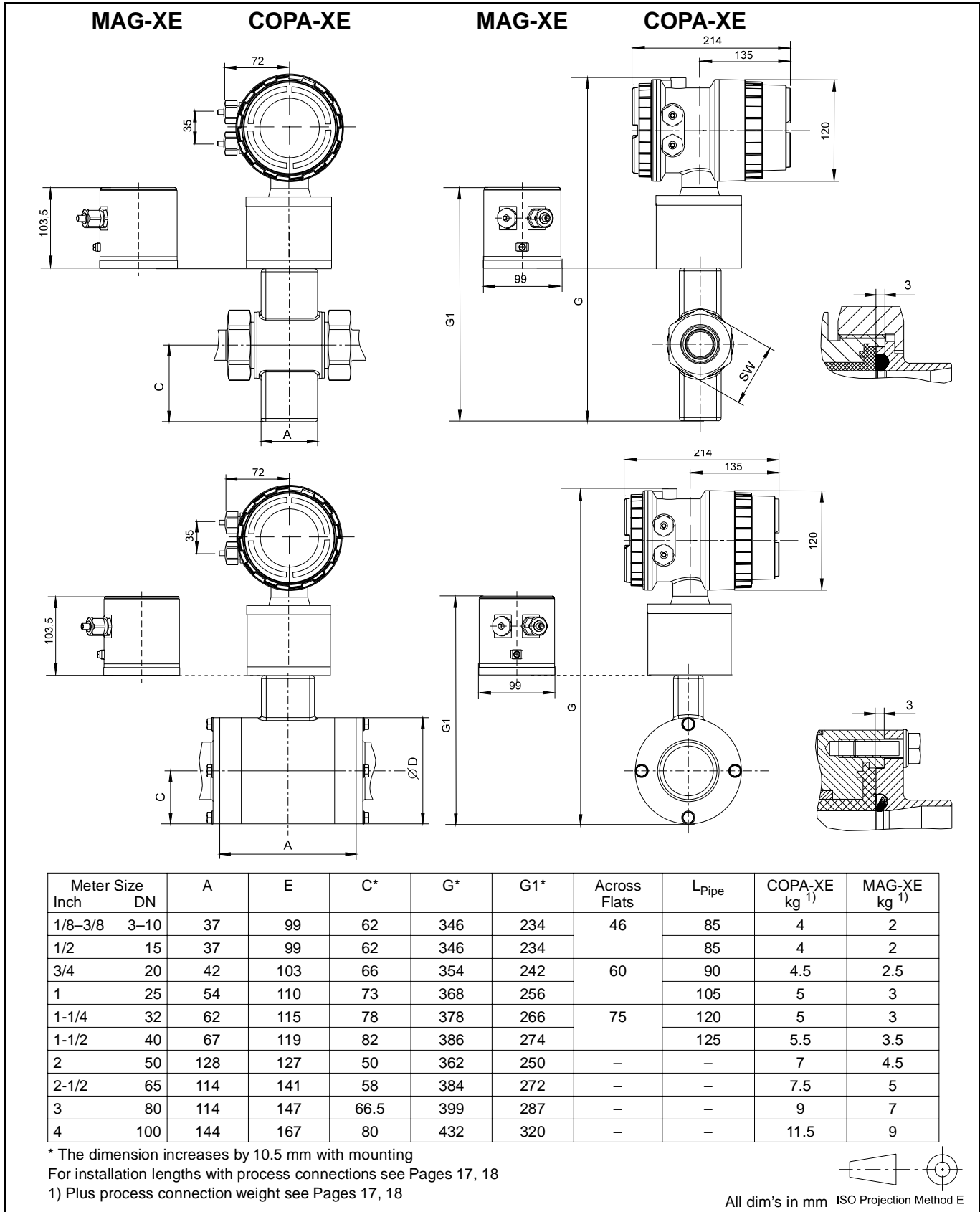


Fig. 11 Dimensions, Models DE26, DE27, DE28, 1/8" to 4" / DN 3 to DN 100, Variable Process Connections

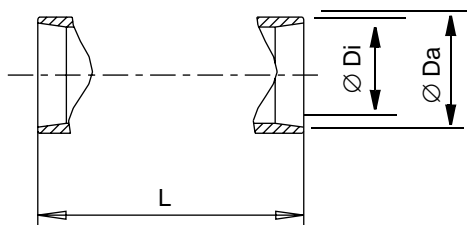


# Dimensions

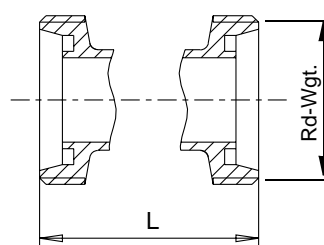
## Stainless Steel Flowmeter, Adapters for Variable Process Connections for Models DE26, DE27 and DE28

Meter Size		Weld Stubs											
		ISO 2037				DIN 11850				DIN 2463			
Inch	DN	∅ Di	∅ Da	L	Wgt./kg	∅ Di	∅ Da	L	Wgt./kg	∅ Di	∅ Da	L	Wgt./kg
1/8-3/8	3-10	-	-	-	-	10.0	13.0	127	0.4	10.3	13.5	127	0.4
1/2	15	-	-	-	-	16.0	19.0	127	0.4	18.1	21.3	127	0.4
3/4	20	-	-	-	-	20.0	23.0	132	0.7	23.7	26.9	132	0.7
1	25	22.6	25.0	149	0.7	26.0	29.0	149	0.7	25	28	149	0.7
1-1/4	32	31.3	33.7	166	1.0	32.0	34.0	166	1.0	32	35	166	1.0
1-1/2	40	35.6	38.0	171	1.0	38.0	41.0	171	1.0	36.8	40	171	1.0
2	50	48.6	51.0	173	1.0	50.0	54.0	173	1.0	49	52	173	1.0
2-1/2	65	60.3	63.5	165	1.4	66.0	70.0	165	1.4	66	70	165	1.4
3	80	72.9	76.1	169	2.0	81.0	85.0	169	2.0	81	85	169	2.0
4	100	97.6	101.6	199	2.6	100.0	104.0	199	2.6	100	104	227	3.0

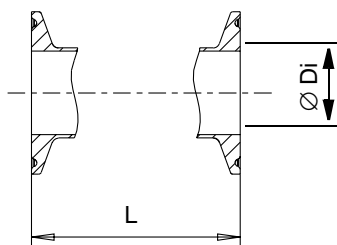
Meter Size		Pipe Fittings						Tri-Clamp						SMS Fitting		
		DIN 11851			DIN11864-1 (Form B)			DIN 32676			ISO 2852			1145		
Inch	DN	Rd. Thds.	L	Wgt./kg	Rd. Thds.	L	Wgt./kg	∅ Di	L	Wgt./kg	∅ Di	L	Wgt./kg	Rd. Thds.	L	Wgt./kg
1/8-3/8	3-10	28 x 1/8"	169	0.5	34 x 1/8"	161	0.5	10.0	163	0.5	-	-	-	-	-	-
1/2	15	34 x 1/8"	169	0.5	44 x 1/6"	161	0.5	16.0	163	0.5	-	-	-	-	-	-
3/4	20	44 x 1/6"	180	0.9	44 x 1/6"	170	0.9	20.0	168	0.7	-	-	-	-	-	-
1	25	52 x 1/6"	207	0.9	52 x 1/6"	197	0.9	26.0	192	0.8	22.6	192	0.8	40 x 1/6"	180	0.7
1-1/4	32	58 x 1/6"	230	1.4	58 x 1/6"	220	1.4	32.0	209	1.5	-	-	-	48 x 1/6"	201	1.0
1-1/2	40	65 x 1/6"	237	1.4	65 x 1/6"	227	1.4	38.0	214	1.4	35.6	214	1.4	60 x 1/6"	212	1.0
2	50	78 x 1/6"	243	1.4	78 x 1/6"	233	1.4	50.0	216	1.2	48.6	216	1.2	70 x 1/6"	214	1.0
2-1/2	65	95 x 1/6"	245	2.2	95 x 1/6"	233	2.2	66.0	221	1.6	60.3	221	1.6	85 x 1/6"	226	1.4
3	80	110 x 1/4"	259	3.2	110 x 1/4"	245	3.2	81.0	225	2.4	72.9	225	2.4	98 x 1/6"	230	2.0
4	100	130 x 1/4"	307	4.4	130 x 1/4"	291	4.4	100.0	255	3.1	97.6	225	3.1	132 x 1/6"	282	3.0



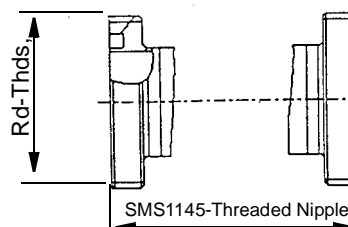
Weld Stubs per  
DIN 11850, ISO 2037 or DIN 2463



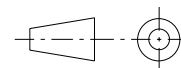
Pipe Fittings per  
DIN 11851 or 11864-1 Form B



Tri-Clamp per  
DIN 32676 or ISO 2852



SMS Fittings



All dim's in mm ISO Projection Method E

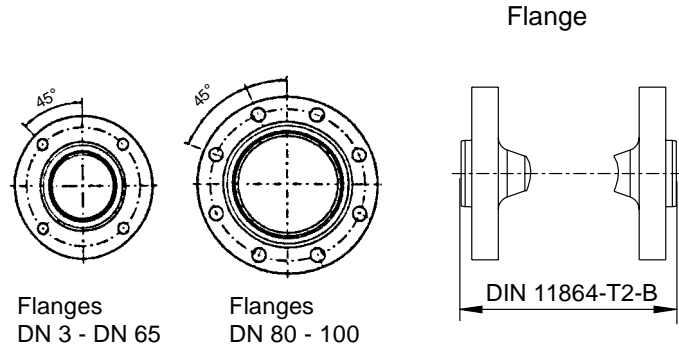
Fig. 12 Dimensions, 1/8" - 4" / DN 3 to DN 100, Adapters for Variable Process Connections

# Dimensions

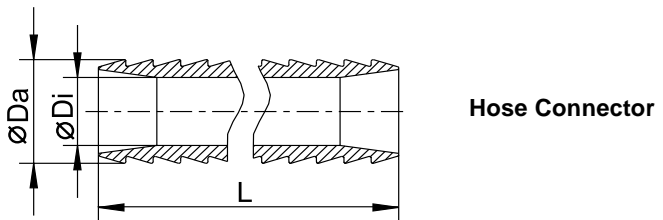
## Adapters for Variable Process Connections 1/8" – 4" / DN 3 – 100

Models DE26, DE27 and DE28

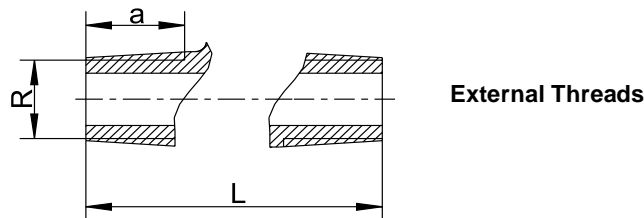
Flanges		
DN	DIN 11864-T2-B	Weight kg <sup>1)</sup>
10	183	0.9
15	183	1.0
20	188	1.3
25	207	1.6
40	229	1.8
50	231	2.2
65	223	3.0
80	227	4.0
100	257	5.0



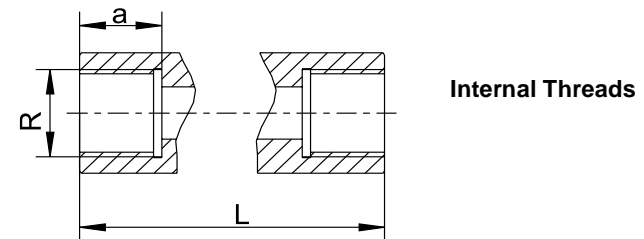
Hose Connector						
Meter Size	Inch	DN	Di	Da	L	Weight kg <sup>1)</sup>
1/8-3/8	3-10		10	14.5	159	0.4
1/2	15		16	21	159	0.4



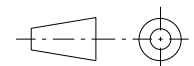
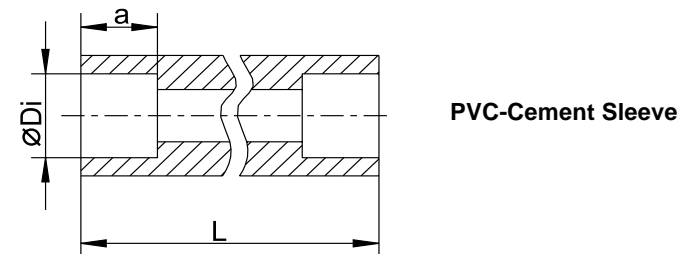
External Threads ISO 228 / DIN 2999						
Meter Size	Inch	DN	R	a	L	Weight kg <sup>1)</sup>
1/8-3/8	3-10		3/8"	18	139	0.4
1/2	15		1/2"	18	139	0.4
3/4	20		3/4"	25	164	0.8
1	25		1"	25	179	0.8



Internal Threads ISO 228 / DIN 2999						
Meter Size	Inch	DN	R	a	L	Weight kg <sup>1)</sup>
1/8-3/8	3-10		3/8"	15	139	0.5
1/2	15		1/2"	15	139	0.5
3/4	20		3/4"	22	164	0.9
1	25		1"	22	179	0.8



PVC-Cement Sleeve						
Meter Size	Inch	DN	Di	a	L	Weight kg <sup>1)</sup>
1/8-3/8	3-10		16	14	143	0.4
1/2	15		20	16	159	0.4
3/4	20		25	19	164	0.6
1	25		32	22	199	0.6



All dim's in mm ISO Projection Method E

Fig. 13 Dimensions, 1/8" to 4" / DN 3 to DN 100, Adapters for Variable Process Connections



# Dimensions Stainless Steel Flowmeter Primary Fixed Flanges 1/8" to 4" / DN 3 to DN 100 per DIN/ANSI

Models DE26, DE27 and DE28

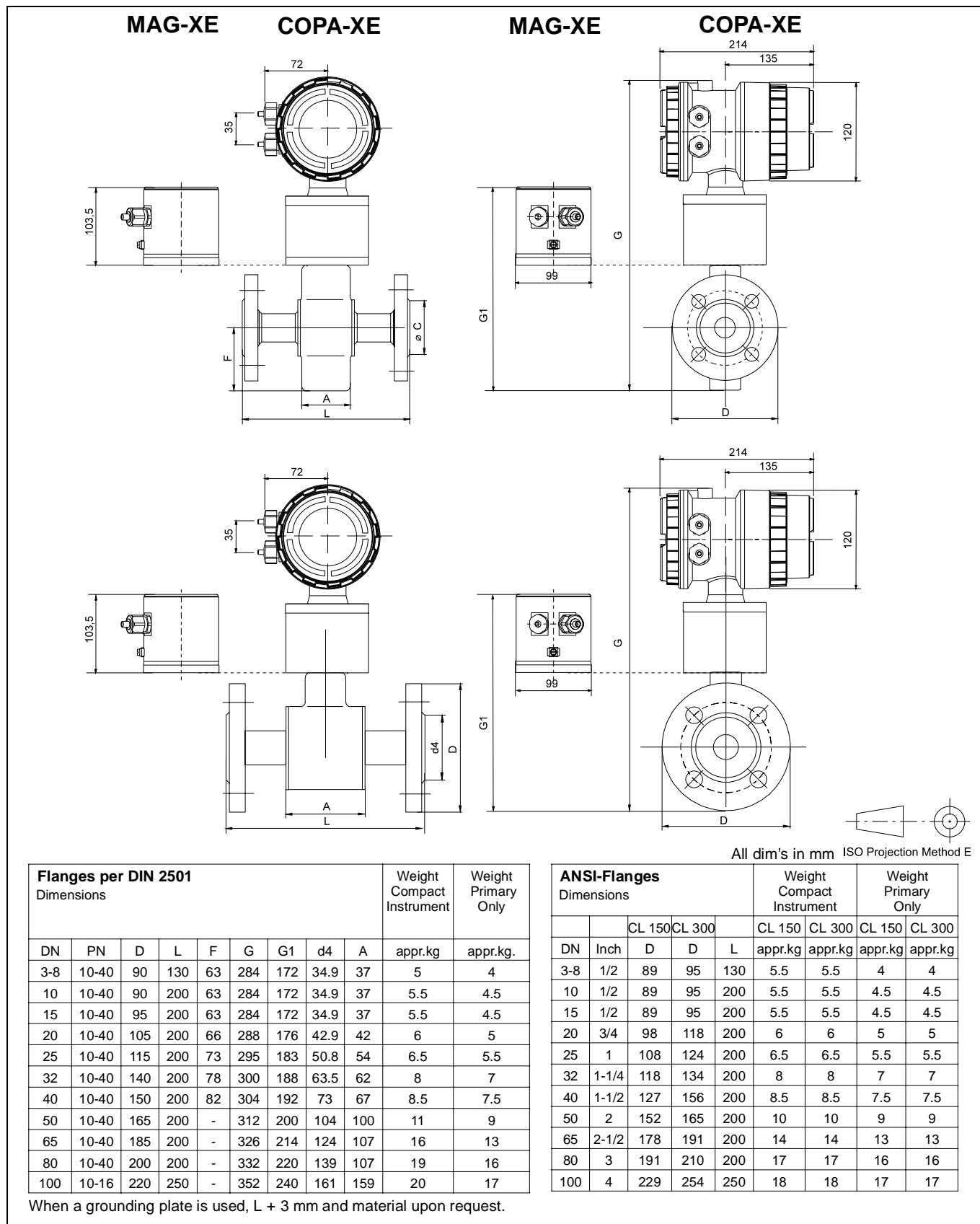


Fig. 14 Flowmeter Primary, Stainless Steel, Flanged 1/8" to 4" / DN 3 to DN 100



# Ordering Information

## Flange Flowmeter Series 4000, 1/8" to 40" / DN 3 to DN 1000

In addition to the Ordering Number please supply the following information: Fluid, fluid temperature, operating pressure, flow range, pipeline type (grounding plate, grounding electrodes)

**COPA-XE/COPA-XE Remote**

**MAG-XE**

<b>Ordering Number</b>							
<b>Compact COPA-XE</b>		<b>DE47F</b>					
<b>Remote COPA-XE</b>		<b>DE48F</b>					
<b>Liner</b>							
Hard rubber	1/2" - 40"	DN 15 - 1000	<b>H</b>				
Soft rubber	2" - 40"	DN 50 - 1000	<b>S</b>				
PTFE	3/8" - 32"	DN 10 - 800	<b>T</b>				
PFA	1/8" - 4"	DN 3 - 100	<b>P</b>				
<b>Meter Size</b>							
1/8"	DN 3		<b>03</b>				
5/32"	DN 4		<b>04</b>				
1/4"	DN 6		<b>06</b>				
5/16"	DN 8		<b>08</b>				
3/8"	DN 10		<b>10</b>				
1/2"	DN 15		<b>15</b>				
3/4"	DN 20		<b>20</b>				
1"	DN 25		<b>25</b>				
1-1/4"	DN 32		<b>32</b>				
1-1/2"	DN 40		<b>40</b>				
2"	DN 50		<b>50</b>				
2-1/2"	DN 65		<b>65</b>				
3"	DN 80		<b>80</b>				
4"	DN 100		<b>1H</b>				
5"	DN 125		<b>1Q</b>				
6"	DN 150		<b>1F</b>				
8"	DN 200		<b>2H</b>				
10"	DN 250		<b>2F</b>				
12"	DN 300		<b>3H</b>				
14"	DN 350		<b>3F</b>				
16"	DN 400		<b>4H</b>				
20"	DN 500		<b>5H</b>				
24"	DN 600		<b>6H</b>				
28"	DN 700		<b>7H</b>				
32"	DN 800		<b>8H</b>				
36"	DN 900		<b>9H</b>				
40"	DN 1000		<b>1T</b>				
<b>Signal Electrode Material / Ground Electrode<sup>1)</sup></b>							
SS 316Ti / 1.4571	/ none (standard)			<b>S</b>			
Hastelloy B-2	/ none			<b>B</b>			
Hastelloy C-4	/ none (standard)			<b>H</b>			
Titanium	/ none			<b>M</b>			
Tantalum	/ none			<b>T</b>			
Stn. stl. No. 1.4539	/ none			<b>F</b>			
Platinum-Iridium	/ none			<b>P</b>			
SS 316Ti / 1.4571	/ with (standard)			<b>E</b>			
Hastelloy B-2	/ with			<b>N</b>			
Hastelloy C-4	/ with (standard)			<b>O</b>			
Titanium	/ with			<b>I</b>			
Tantalum	/ with			<b>Q</b>			
Stn. stl. No. 1.4539	/ with			<b>R</b>			
Platinum-Iridium	/ with			<b>G</b>			
<b>Pressure Rating</b>							
	PN 10			<b>C</b>			
	PN 16			<b>D</b>			
	PN 25			<b>E</b>			
	PN 40			<b>F</b>			
	JIS K10			<b>K</b>			
	ANSI CL 150 (Installation Length Series 1000)			<b>P</b>			
	ANSI CL 300 (Installation Length Series 1000)			<b>Q</b>			
<b>Process Connection Material</b>							
Steel	(std. from 3/4" / DN 20)			<b>1</b>			
316Ti / 1.4571	(std. for 1/8"-1/2" / DN 3- 15)			<b>3</b>			
	(option from 3/4" / DN 20)						

		<b>DE46F</b>					
<b>Liner</b>							
						<b>H</b>	
						<b>S</b>	
						<b>T</b>	
						<b>P</b>	
<b>Meter Size</b>							
							<b>03</b>
							<b>04</b>
							<b>06</b>
							<b>08</b>
							<b>10</b>
							<b>15</b>
							<b>20</b>
							<b>25</b>
							<b>32</b>
							<b>40</b>
							<b>50</b>
							<b>65</b>
							<b>80</b>
							<b>1H</b>
							<b>1Q</b>
							<b>1F</b>
							<b>2H</b>
							<b>2F</b>
							<b>3H</b>
							<b>3F</b>
							<b>4H</b>
							<b>5H</b>
							<b>6H</b>
							<b>7H</b>
							<b>8H</b>
							<b>9H</b>
							<b>1T</b>
<b>Signal Electrode Material / Ground Electrode<sup>1)</sup></b>							
							<b>S</b>
							<b>B</b>
							<b>H</b>
							<b>M</b>
							<b>T</b>
							<b>F</b>
							<b>P</b>
							<b>E</b>
							<b>N</b>
							<b>O</b>
							<b>I</b>
							<b>Q</b>
							<b>R</b>
							<b>G</b>
<b>Pressure Rating</b>							
							<b>C</b>
							<b>D</b>
							<b>E</b>
							<b>F</b>
							<b>K</b>
							<b>P</b>
							<b>Q</b>
<b>Process Connection Material</b>							
							<b>1</b>
							<b>3</b>

Continued on next page



# Flanged Flowmeters

## COPA-XE/COPA-XE Remote

<b>Ordering Number</b>									
<b>Compact COPA-XE</b>		<b>DE47F</b>							
<b>Remote COPA-XE</b>		<b>DE48F</b>							
<b>Accessories</b>	None Protection plate 316Ti/1.4571 (both sides) Grounding plate 316Ti/1.4571 (one side <sup>2</sup> ) Protection flange 316Ti/1.4571 (both sides <sup>3</sup> )	A B C D							
<b>Certificates</b>	None Inspection Certificate per EN 10204 3.1B 4)	A D							
<b>Calibration Certificates</b>	None Certified Cold/Waste Water (1"-40"/DN 25-1000) Certified Liquids other than Water	A B C							
<b>Protection Class</b>	IP 67 (Thread size see Section "Application")						2		
<b>Supply Power</b>	High voltage 85 - 253Vac Low voltage 16.8 - 26.4Vac/16. - 31.2 Vdc							G K	
<b>Display</b>	Magnet Stick operation and lighted display								G
<b>In-/Output Options</b>									
Current output + pulse output passive + contact input + contact output									03
Current output + pulse output passive + contact input + contact output + HART-Protocol									04
<b>Application</b>									
Converter housing with threads for cable connector M 20 x 1.5 (standard)									0

## MAG-XE

<b>Ordering Number</b>									
<b>DE46F</b>									
<b>Accessories</b>								A B C D	
<b>Certificates</b>								A D	
<b>Calibration Certificates</b>	None Certified Cold/Waste Water (1"-40"/DN25-1000) Certified Liquids other than Water								A B C
<b>Protection Class</b>	IP 67 (Threads for cable connector M20 x1.5), standard IP 68								2 3

- 1) Ground electrodes available in flowmeter sizes 1/8" - 12" / DN 3 - 300  
For instruments with hard/soft rubber liners 5" - 40" / DN 125 - 1000 a conductive element is integrated in the liners as standard, ground electrodes are not required.
- 2) Grounding plate mounted to the flange on one side (only for flowmeter sizes ≤ 12" / DN 300)
- 3) Only in conjunction with ANSI flanges
- 4) Certificates for meter tube and process connections

**Note:**  
The converter can be converted at the site between Ex „e“ output (standard) and Ex „i“ output (NAMUR-Contact configuration).  
Configuration as shipped is Ex „e“.

**In addition to the Ordering Number the following can be furnished in writing:**

Instrument Tag	Excitation Frequency	Electrode Design
German	6 1/4 Hz	Standard
English	12 1/2 Hz 7 1/2 Hz (60 Hz line) 15 Hz (60 Hz line)	Pointed head (from 3/8" / DN 10, SS No. 1.4539), for fluids with a high grease content



# Ordering Information

## Wafer Design Flowmeters, Series 4000, 1/8" to 4" / DN 3 to DN 100

In addition to the Ordering Number please supply the following information: Fluid, fluid temperature, operating pressure, flow range, pipeline type (grounding plate, grounding electrodes)

### COPA-XE/COPA-XE Remote

### MAG-XE

Ordering Number							
Compact COPA-XE	DE47W						
Remote COPA-XE	DE48W						
<b>Liner</b>							
PTFE		T					
PFA (DN 3 - 8)		P					
<b>Meter Size</b>							
1/8" DN 3			03				
5/32" DN 4			04				
1/4" DN 6			06				
5/16" DN 8			08				
3/8" DN 10			10				
1/2" DN 15			15				
1" DN 25			25				
1-1/4" DN 32			32				
1-1/2" DN 40			40				
2" DN 50			50				
2-1/2" DN 65			65				
3" DN 80			80				
4" DN 100			1H				
<b>Signal Electrode Material / Ground Electrodes<sup>1)</sup></b>							
SS 316Ti / 1.4571 / none (standard)			S				
Hastelloy B-2 / none			B				
Hastelloy C-4 / none (standard)			H				
Titanium / none			M				
Tantalum / none			T				
Stn. stl. No. 1.4539 / none			F				
Platinum-Iridium / none			P				
SS 316Ti / 1.4571 / with			E				
Hastelloy B-2 / with			N				
Hastelloy C-4 / with			O				
Titanium / with			I				
Tantalum / with			Q				
Stn. stl. No. 1.4539 / with			R				
Platinum-Iridium / with			G				
<b>Pressure Rating</b>	PN 16		D				
	PN 40		F				
	ANSI CL 150		P				
	ANSI CL 300		Q				
<b>Certificates</b>	None					A	
	Inspection Certificate per EN 10204 3.1B <sup>2)</sup>					D	
<b>Calibration Certificate</b>	None					A	
	Certified Cold/Waste Water (DN 25 - 100)					B	
	Certified Liquids other than Water					C	
<b>Protection Class</b>	IP 67 (Thread size see Section "Application")				2		
<b>Supply power</b>	High voltage 85 - 253Vac					G	
	Low voltage 16.8 - 26.4Vac / 16. - 31.2 Vdc					K	
<b>Display</b>	Magnet Stick operation and lighted display					G	
<b>In-/Output Options</b>							
Current output + pulse output passive + contact input + contact output							03
Current output + pulse output passive + contact input + contact output +HART-Protocol							04
<b>Application</b>	Converter housing with cable connector M 20 x 1.5 (standard)						0

Ordering Number							
	DE46W						
<b>Liner</b>							
PTFE		T					
PFA		P					
<b>Meter Size</b>							
1/8" DN 3			03				
5/32" DN 4			04				
1/4" DN 6			06				
5/16" DN 8			08				
3/8" DN 10			10				
1/2" DN 15			15				
1" DN 25			25				
1-1/4" DN 32			32				
1-1/2" DN 40			40				
2" DN 50			50				
2-1/2" DN 65			65				
3" DN 80			80				
4" DN 100			1H				
<b>Signal Electrode Material / Ground Electrodes<sup>1)</sup></b>							
SS 316Ti / 1.4571 / none (standard)			S				
Hastelloy B-2 / none			B				
Hastelloy C-4 / none (standard)			H				
Titanium / none			M				
Tantalum / none			T				
Stn. stl. No. 1.4539 / none			F				
Platinum-Iridium / none			P				
SS 316Ti / 1.4571 / with			E				
Hastelloy B-2 / with			N				
Hastelloy C-4 / with			O				
Titanium / with			I				
Tantalum / with			Q				
Stn. stl. No. 1.4539 / with			R				
Platinum-Iridium / with			G				
<b>Pressure Rating</b>	PN 16						D
	PN 40						F
	ANSI CL 150						P
	ANSI CL 300						Q
<b>Certificates</b>	None						A
	Inspection Certificate per EN 10204 3.1B <sup>2)</sup>						D
<b>Calibration Certificate</b>	None						A
	Certified Cold/Waste Water (DN 25 - 100)						B
	Certified Liquids other than Water						C
<b>Protection Class</b>	IP 67 (Threads for cable connector M20 x1.5), std.						2
	IP 68						3

1) Ground electrodes available in flowmeter sizes 1/8" - 4" / DN 3 - 100  
 2) Certificates for meter tube

**Note:**  
 The converter can be converted at the site between Ex „e" output (standard) and Ex „i" output (NAMUR-Contact configuration).  
 Configuration as shipped is Ex „e".

In addition to the Ordering Number the following can be furnished in writing.

Instrument Tag	Excitation Frequency	Electrode Design
German	6 1/4 Hz	Standard
English	12 1/2 Hz	Pointed head (from 3/8" / DN 10, SS No. 1.4539), for fluids with a high grease content
	7 1/2 Hz, 60 Hz line	
	15 Hz (60 Hz line)	



# Ordering Information

## Stn. Stl. Flanged Flowmeters Series 2000, 1/8" - 4" / DN 3 - DN 100

In addition to the Ordering Number please supply the following information: Fluid, fluid temperature, operating pressure, flow range, pipeline type (grounding plate, grounding electrodes)

### COPA-XE/COPA-XE Remote

### MAG-XE

<b>Ordering Number</b>																
<b>Compact COPA-XE</b>		<b>DE27F</b>														
<b>Remote COPA-XE</b>		<b>DE28F</b>														
<b>Liner Material</b>	PFA	<b>P</b>														
<b>Meter Sizes</b>	1/8"	DN 3	<b>03</b>													
	5/32"	DN 4	<b>04</b>													
	1/4"	DN 6	<b>06</b>													
	5/16"	DN 8	<b>08</b>													
	3/8"	DN 10	<b>10</b>													
	1/2"	DN 15	<b>15</b>													
	3/4"	DN 20	<b>20</b>													
	1"	DN 25	<b>25</b>													
	1-1/4"	DN 32	<b>32</b>													
	1-1/2"	DN 40	<b>40</b>													
	2"	DN 50	<b>50</b>													
	2-1/2"	DN 65	<b>65</b>													
	3"	DN 80	<b>80</b>													
	4"	DN 100	<b>1H</b>													
<b>Signal Electrode Material</b>	<b>/Ground Electrode <sup>1)</sup></b>															
SS 316Ti / 1.4571	/none			<b>S</b>												
Hastelloy B-2	/none			<b>H</b>												
Hastelloy C-4	/none			<b>M</b>												
Titanium	/none			<b>T</b>												
Tantalum	/none			<b>F</b>												
Stn. stl. No. 1.4539	/none (for Food Ind. applications)			<b>P</b>												
Platinum-Iridium	/none			<b>E</b>												
SS 316Ti / 1.4571	/with			<b>N</b>												
Hastelloy B-2	/with			<b>O</b>												
Hastelloy C-4	/with			<b>I</b>												
Titanium	/with			<b>Q</b>												
Tantalum	/with			<b>R</b>												
Stn. stl. No. 1.4539	/with (for Food Ind. applications)			<b>G</b>												
Platinum-Iridium	/with															
<b>Pressure Rating</b>																
PN 16				<b>D</b>												
PN 40				<b>F</b>												
JIS K10				<b>K</b>												
ANSI CL 150				<b>P</b>												
ANSI CL 300				<b>Q</b>												
<b>Process Connection Material</b>																
SS 316Ti / 1.4571			<b>3</b>													
<b>Accessories</b>																
none				<b>A</b>												
Protection plate 316Ti/1.4571 (both sides)				<b>B</b>												
Grounding plate 316Ti/1.4571 (one side)				<b>C</b>												
<b>Certificates:</b>																
none				<b>A</b>												
Inspection Certificate per EN 10204 3.1 B <sup>2)</sup>				<b>D</b>												
<b>Calibration Certificates</b>																
none				<b>A</b>												
Certified Cold/Waste Water (DN 25 - 100)				<b>B</b>												
Certified Liquids other than Water				<b>C</b>												
<b>Protection Class</b>																
IP 67 (Thread size see Section Application)			<b>2</b>													
<b>Supply power</b>																
High voltage 85 - 253Vac				<b>G</b>												
Low voltage 16.8 - 26.4Vac/16. - 31.2 Vdc				<b>K</b>												
<b>Display</b>																
Magnet Stick operation and lighted display				<b>G</b>												
<b>In-/Output Options</b>																
Current output + pulse output passive + contact input + contact output			<b>03</b>													
Current output + pulse output passive + contact input + contact output +HART-Protocol			<b>04</b>													
<b>Application</b>																
Aluminum converter housing with threads for cable connector M20 x 1.5			<b>0</b>													

<b>DE26F</b>																
<b>P</b>																
	<b>03</b>															
	<b>04</b>															
	<b>06</b>															
	<b>08</b>															
	<b>10</b>															
	<b>15</b>															
	<b>20</b>															
	<b>25</b>															
	<b>32</b>															
	<b>40</b>															
	<b>50</b>															
	<b>65</b>															
	<b>80</b>															
	<b>1H</b>															
	<b>S</b>															
	<b>H</b>															
	<b>M</b>															
	<b>T</b>															
	<b>F</b>															
	<b>P</b>															
	<b>E</b>															
	<b>N</b>															
	<b>O</b>															
	<b>I</b>															
	<b>Q</b>															
	<b>R</b>															
	<b>G</b>															
	<b>D</b>															
	<b>F</b>															
	<b>K</b>															
	<b>P</b>															
	<b>Q</b>															
	<b>3</b>															
	<b>A</b>															
	<b>Q</b>															
	<b>R</b>															
	<b>A</b>															
	<b>D</b>															
	<b>A</b>															
	<b>B</b>															
	<b>C</b>															
	<b>2</b>															

<sup>1)</sup> Ground electrodes available for flowmeter sizes 1/8" - 4" / DN 3 - DN 100

<sup>2)</sup> Certificates for meter tube and process connections

**Note:**

The converter can be converted at the site between Ex „e“ output (standard) and Ex „i“ output (NAMUR-Contact configuration). Configuration as shipped is Ex „e“.

In addition to the Ordering Number the following can be furnished in writing.

<b>Instrument Tag</b>	<b>Excitation Frequency</b>	<b>Electrode Design</b>
German	6 1/4 Hz	Standard
English	12 1/2 Hz	Pointed head (from 3/8" / DN 10, SS No. 1.4539), for fluids with a high grease content
	7 1/2 Hz, 60 Hz line	
	15 Hz (60 Hz line)	



# Ordering Information

## Stainless Steel Flowmeter Series 2000, 1/8" - 4" / DN 3 - DN 100

COPA-XE/COPA-XE Remote

MAG-XE

<b>Ordering Number</b>							
<b>Compact COPA-XE</b>							
<b>Remote COPA-XE</b>		DE27					
		DE28					
<b>Process Connections:</b>							
Wafer design						W	
Without adapter (replacement part)						V	
Weld stubs per ISO 2037	(only 1"-4"/DN25-100)					P	
Weld stubs per DIN2463						Q	
Weld stubs per DIN 11850						R	
Pipe fittings per DIN 11851						S	
Tri-Clamp per DIN 32676						T	
Tri-Clamp per ISO 2852	(only 1"-4"/DN25-100, not 1 1/4" DN32)					U	
Pipe fittings per SMS 1145	(only 1"-4"/DN25-100, not 1 1/4" DN32)					D	
Hygienic pipe fittings per DIN 11864-1						A	
Flange Type APV FAB1 per DIN 11864 -2						L	
External threads ISO 228	(only 1/8"-1" / DN3 - 25)					E	
Internal threads ISO 228	(only 1/8"-1" / DN3 - 25)					I	
PVC-cement sleeve <sup>1)</sup>	(only 1/8"-1" / DN3 - 25)					G	
Hose connector	(only 1/8"-1/2" / DN3 - 15)					H	
Others						Z	
<b>Liner Material</b>	PFA						P
<b>Meter Sizes</b>	1/8" DN 3						03
	5/32" DN 4						04
	1/4" DN 6						06
	5/16" DN 8						08
	3/8" DN 10						10
	1/2" DN 15						15
	3/4" DN 20						20
	1" DN 25						25
	1-1/4" DN 32						32
	1-1/2" DN 40						40
	2" DN 50						50
	2-1/2" DN 65						65
	3" DN 80						80
	4" DN 100						1H
<b>Signal E</b>	<b>L</b>	<b>Electrode Material</b>	<b>/Ground Electrode<sup>2)</sup></b>				
SS 316Ti / 1.4571		/none				S	S
Hastelloy B-2		/none				B	B
Hastelloy C-4		/none (standard)				H	H
Titanium		/none				M	M
Tantalum		/none				T	T
Stn. stl. No. 1.4539		/none (for Food Ind. applications)				F	F
Platinum-Iridium		/none				P	P
SS 316Ti / 1.4571		/with				E	E
Hastelloy B-2		/with				N	N
Hastelloy C-4		/with (standard)				O	O
Titanium		/with				I	I
Tantalum		/with				Q	Q
Stn. stl. No. 1.4539		/with (for Food Ind. applications)				R	R
Platinum-Iridium						G	G
<b>Pressure Rating</b>							
PN 10	Standard for Tri-Clamp, external/internal threads, PVC-cement sleeve, hose connector					C	C
PN 16						D	D
PN 25						E	E
PN 40						F	F
ANSI CL 150						P	P
ANSI CL 300						Q	Q

<b>Ordering Number</b>							
<b>Compact MAG-XE</b>							
<b>Remote MAG-XE</b>		DE26					
<b>Process Connections:</b>							
Wafer design						W	
Without adapter (replacement part)						V	
Weld stubs per ISO 2037	(only 1"-4"/DN25-100)					P	
Weld stubs per DIN2463						Q	
Weld stubs per DIN 11850						R	
Pipe fittings per DIN 11851						S	
Tri-Clamp per DIN 32676						T	
Tri-Clamp per ISO 2852	(only 1"-4"/DN25-100, not 1 1/4" DN32)					U	
Pipe fittings per SMS 1145	(only 1"-4"/DN25-100, not 1 1/4" DN32)					D	
Hygienic pipe fittings per DIN 11864-1						A	
Flange Type APV FAB1 per DIN 11864 -2						L	
External threads ISO 228	(only 1/8"-1" / DN3 - 25)					E	
Internal threads ISO 228	(only 1/8"-1" / DN3 - 25)					I	
PVC-cement sleeve <sup>1)</sup>	(only 1/8"-1" / DN3 - 25)					G	
Hose connector	(only 1/8"-1/2" / DN3 - 15)					H	
Others						Z	
<b>Liner Material</b>	PFA						P
<b>Meter Sizes</b>	1/8" DN 3						03
	5/32" DN 4						04
	1/4" DN 6						06
	5/16" DN 8						08
	3/8" DN 10						10
	1/2" DN 15						15
	3/4" DN 20						20
	1" DN 25						25
	1-1/4" DN 32						32
	1-1/2" DN 40						40
	2" DN 50						50
	2-1/2" DN 65						65
	3" DN 80						80
	4" DN 100						1H
<b>Signal E</b>	<b>L</b>	<b>Electrode Material</b>	<b>/Ground Electrode<sup>2)</sup></b>				
SS 316Ti / 1.4571		/none				S	S
Hastelloy B-2		/none				B	B
Hastelloy C-4		/none (standard)				H	H
Titanium		/none				M	M
Tantalum		/none				T	T
Stn. stl. No. 1.4539		/none (for Food Ind. applications)				F	F
Platinum-Iridium		/none				P	P
SS 316Ti / 1.4571		/with				E	E
Hastelloy B-2		/with				N	N
Hastelloy C-4		/with (standard)				O	O
Titanium		/with				I	I
Tantalum		/with				Q	Q
Stn. stl. No. 1.4539		/with (for Food Ind. applications)				R	R
Platinum-Iridium						G	G
<b>Pressure Rating</b>							
PN 10	Standard for Tri-Clamp, external/internal threads, PVC-cement sleeve, hose connector					C	C
PN 16						D	D
PN 25						E	E
PN 40						F	F
ANSI CL 150						P	P
ANSI CL 300						Q	Q

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Continued on next page

<sup>1)</sup> Specify ground electrodes  
<sup>2)</sup> Ground electrodes available in flowmeter sizes 1/8" - 4" / DN 3 - 100





## Ordering Information

## Stainless Steel Flowmeter Series 2000, 1/8" - 4" / DN 3 - DN 100

## COPA-XE/COPA-XE Remote

Ordering Number							
Compact COPA-XE	DE27						
Remote COPA-XE	DE28						
<b>Process Connection Material <sup>5)</sup></b>							
None	(only wafer design)	0					
SS 316Ti / 1.4571	(only weld stubs)	3					
SS 316L / 1.4404		4					
SS 304 / 1.4301		6					
PVC	(only PVC-cement sleeve)	7					
Others		9					
<b>Accessories</b>							
none			A				
with mounting			C				
<b>Certificates</b>							
none			A				
Inspection Certificate per EN 10204 3.1 B <sup>3)</sup>			D				
<b>Calibration Certificates</b>							
none			A				
Certified Cold/Waste Water (DN 25 - 100)			B				
Certified Liquids other than Water			C				
<b>Protection Class</b>							
IP 67 (Thread size see Section "Application")		2					
<b>Supply power</b>							
High voltage 85 - 253 Vac			G				
Low voltage 16.8 - 26.4 Vac / 16. - 31.2 Vdc			K				
<b>Display</b>							
Magnet Stick operation and lighted display			G				
<b>In-/Output Options</b>							
Current output + pulse output passive + contact input + contact output							03
Current output + pulse output passive + contact input + contact output +HART-Protocol							04
<b>Application</b>							
Aluminum converter housing with threads for cable connection M20 x 1.5 (standard)							0

## MAG-XE

Ordering Number							
MAG-XE	DE26						
<b>Process Connection Material <sup>5)</sup></b>							
None	(only wafer design)	0					
SS 316Ti / 1.4571	(only weld stubs)	3					
SS 316L / 1.4404		4					
SS 304 / 1.4301		6					
PVC	(only PVC-cement sleeve)	7					
Others		9					
<b>Accessories</b>							
none			A				
with mounting			C				
<b>Certificates</b>							
none			A				
Inspection Certificate per EN 10204 3.1 B <sup>3)</sup>			D				
<b>Calibration Certificates</b>							
none			A				
Certified Cold/Waste Water (DN 25 - 100)			B				
Certified Liquids other than Water			C				
<b>Protection Class</b>							
IP 67		2					

1) Specify ground electrodes

2) Certificates for meter tube

**Note:**

The converter can be converted at the site between Ex „e“ output (standard) and Ex „i“ output (NAMUR-Contact configuration). Configuration as shipped is Ex „e“.

In addition to the Ordering Number the following can be furnished in writing.

Instrument Tag	Excitation Frequency	Electrode Design
German	6 1/4 Hz	Standard
English	12 1/2 Hz	Pointed head (from 3/8" / DN 10, SS No. 1.4539), for fluids with a high grease content
	7 1/2 Hz, 60 Hz line	
	15 Hz (60 Hz line)	

## Specifications

### Converter for COPA-XE and MAG-XE

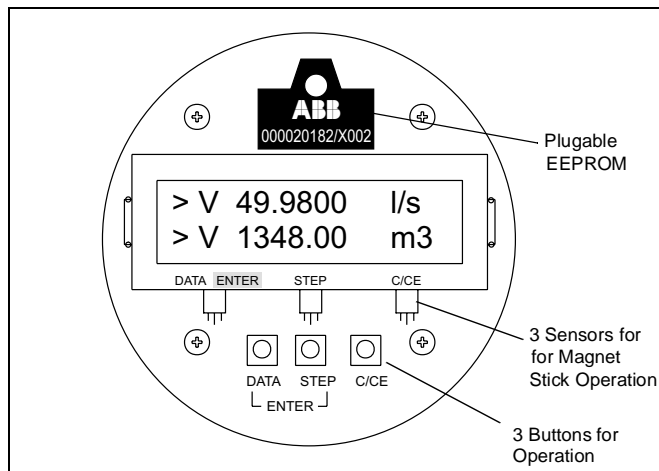


Fig. 15 Converter Keypad and Display

#### Measurement Range

Continuous between 0.5 and 10 m/s

#### Accuracy

≤ 0.5 % of rate

#### Reproducibility

≤ 0.15 % of rate

#### Minimum Conductivity

5 μS/cm

#### Response Time

For 0-99 % step change (corresp. to  $5\tau$ ) ≥ 1 s at  
6 1/4, 7 1/2 Hz excitation

#### Supply Power

High voltage AC 85-253 V  
Low voltage AC 16.8-26.4 V  
Low voltage DC 16.8-31.2 V  
Ripple: 5%

#### Magnetic Field Supply

6 1/4, 7 1/2 Hz 12½ Hz, 15 Hz, 25 Hz, 30 Hz  
(50/60 Hz supply power)

#### Power

≤ 14 VA (flowmeter primary incl. converter) for AC supply  
≤ 6 W for DC supply (flowmeter primary incl. converter)

#### Allowable Ambient Temperatures per Ex-Approval

-20 to +60 °C

#### Electrical Connections

Screw terminals and screwless spring loaded terminals,  
cable connector (see Ordering Information)

#### Protection Class per EN 60529

IP 67

#### Forward/Reverse Flowrate Metering

The flow direction is indicated by an arrow in the display and by a signal over an optocoupler output (ext. signal). The direction signal is actuated for the forward flow direction.

#### Display

The display is lighted and the data is entered using the 3 button keypad on the converter or using the Magnet Stick without opening the converter housing.

2x16-Character LC-Dot Matrix-Display. The internal flow totalization is integrated separately for each flow direction in 16 different engineering units. The flowrate can be displayed in percent or in 45 different direct reading engineering units. The converter housing can be rotated 90° and the display can be plugged into 3 orientations so that the optimal readability is assured. In multiplex operation the flowrate indication in %, engineering units or as a bar graph, totalizer values, forward or reverse flow direction, TAG No. or current output value can be displayed in the 1<sup>st</sup> or 2<sup>nd</sup> line of the display.

#### Converter Housing Design Options

##### For Model COPA XE

Compact flowmeter with cast light metal converter housing, painted, paint coat 60 μm thick, center section RAL 7012 dark gray, front and rear sections (cover) RAL 9002 light gray.

##### Housing Options for flowmeters with Remote Converter

##### Model E for Models DE26, DE46

Cast light metal field mount housing, painted<sup>1)</sup>,  
19" Insert  
Rear panel mount housing  
Rail mount housing

##### For Models DE28 and DE48

Cast light metal field mount housing, painted<sup>1)</sup>

1) Paint coat 60 μm thick, center section RAL 7012 dark gray,  
front and rear section (cover) RAL 9002 light gray

#### Signal Cable (MAG-XE only)

The maximum cable length between the flowmeter primary and the converter is 50 m. A 10 m long cable is supplied with each meter. If a cable longer than 10 m is required, order using Part Number D173D018U02.

#### Data Protection

All data is stored when the power is turned off or interrupted in an EEPROM in the converter.

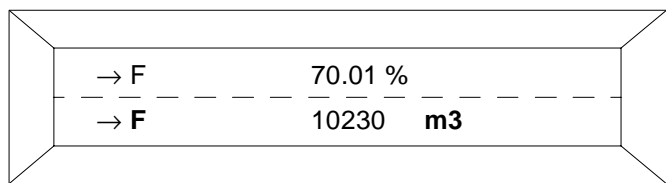


#### Note:

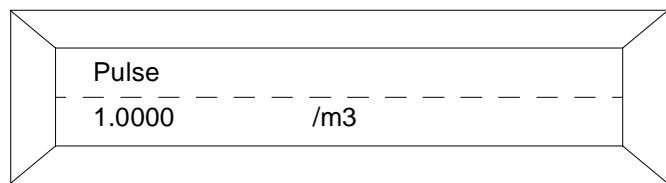
The instrument conforms to the NAMUR-Recommendation NE21, Electromagnetic Compatibility of Industrial Instruments in Process and Laboratory Applications 5/93 and EMC Guideline 89/336/EWG (EN 50081-1, EN 50082-2) and the Low Voltage Guidelines 73/23/EWG (EN 61010-1).

**Warning:** The explosion protection is not applicable when the housing cover is removed.

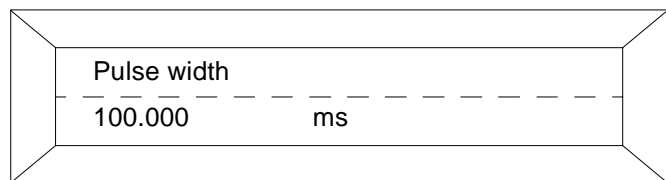
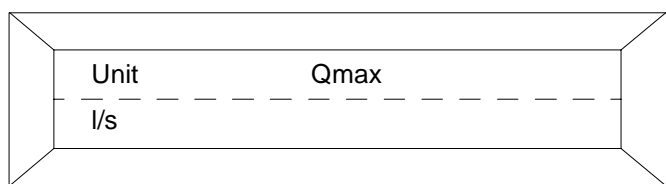
## Display



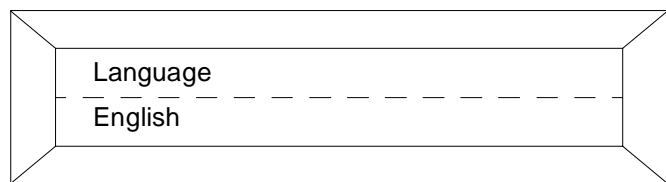
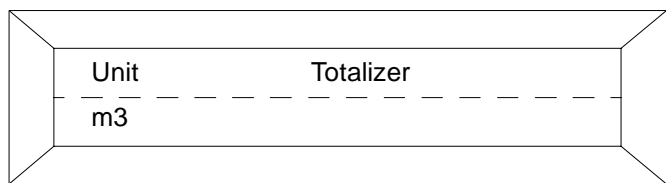
The value of the instantaneous flowrate in % of the flow range setting or in engineering units is displayed in the 1<sup>st</sup> line. The totalized flow volume value is displayed in the 2<sup>nd</sup> line (including units).



A pulse factor between 0.001 and 1000 can be used as a multiplier for the displayed totalizer values.

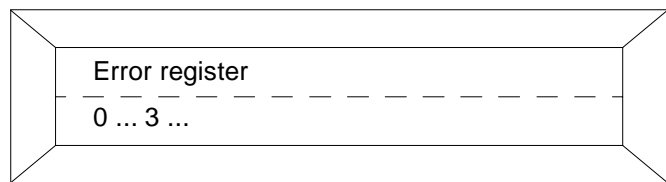
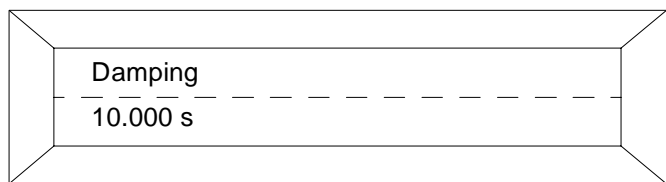


The pulse width can be set between 0.1 ms and 2000 ms with automatic compatibility checking.



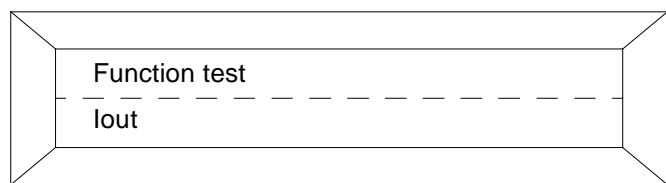
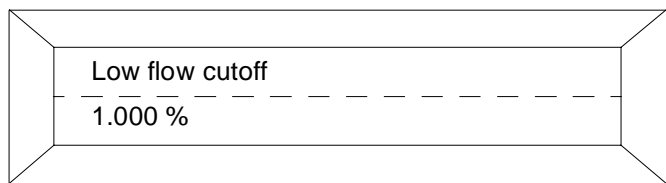
The flowrate value can be displayed in percent or one of 45 different engineering units. There are 16 different engineering units available for the display of the totalized flow value, including, liter, hectoliter, cubic meters, tons (when a density value has been entered). It is also possible to program any user desired units.

Data entry is possible in 9 different languages.



Automatic self-monitoring with error diagnostics on the display and an error signal over the contact output. All errors detected are stored in the error register.

The damping can be set between 1 s and 99 s.



The internal subassemblies can be tested with the function test routines. All outputs can be simulated for start-up and checking.

The low flow cutoff value can be set between 0 and 10 % of max. (applies to the current and pulse outputs and to the indication in the display).

## Specifications

### Converter for COPA-XE and MAG-XE

#### Description of the In-/Outputs in the Intrinsic Safe Design

##### a) Outputs

###### Current output (+/-)

For connection to a passive, intrinsically safe circuit  
Test voltage  $U_T = 60 \text{ V}$

###### Ignition Protection Type

EEx ib IIC / IIB

###### Idle Voltage

$U_o = 20 \text{ V}$

###### Short Circuit Current

$I_o = 100 \text{ mA}$

###### Current Output, selectable

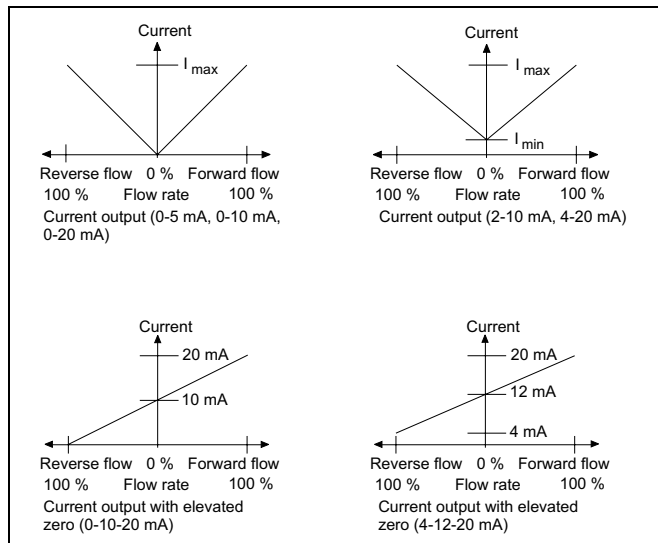
0/4 - 20 mA load  $\leq 300 \Omega$

0/2 - 10 mA load  $\leq 800 \Omega$

0 - 5 mA load  $\leq 1800 \Omega$

0-10-20 mA load  $\leq 300 \Omega$

4-12-20 mA load  $\leq 300 \Omega$



##### Recommended Transmitter Power Supplies

- ABB Automation Products  
PEA 61-Ex (60 mA or 90 mA,  $R_i = 50 \Omega$ )
- Foxboro Eckardt  
TV80, TV924, TV925 ( $R_i = 50 \Omega$ )
- Apparatebau Hundsbach  
AH MS 270 ( $R_i = 80 \Omega$ )
- Knick  
IsoTrans 36 A7 ( $R_i = 250 \Omega$ )

##### Pulse Output (Terminals V8 V9)

Passive, optocoupler,  
Pulse factor, selectable,  
Pulse width, selectable from 0.1 ms to 2000 ms

For connection to a passive, intrinsically safe circuit with the following maximum values:

$U_i = 15 \text{ V}$ ,  $I_i = 30 \text{ mA}$ ,  $P_i = 115 \text{ mW}$

###### Ignition Protection Type

EEx ib IIC / IIB

Configured as a NAMUR-Contact for connection to a switch amplifier per DIN 19234.

##### Contact Output (Terminals P7, G2)

Passive, optocoupler,

For connection to a passive, intrinsically safe circuit with the following maximum values:

$U_i = 30 \text{ V}$ ,  $I_i = 250 \text{ mA}$ ,  $P_i = 1.1 \text{ W}$

###### Ignition Protection Type

EEx ib IIC / IIB

Configured as a NAMUR-Contact for connection to a switch amplifier per DIN 19234.

The following functions can be selected in the software:

System monitor, empty pipe, forward/reverse flow direction signal, min. alarm, max. alarm

##### Recommended Switch Amplifiers (DIN 19234)

ABB Automation Products V17131-51...53  
ABB Automation Products V17131-54...56  
ABB Digitale Ci 1/941, Ci 1/942  
Apparatebau Hundsbach  
AH TS 920, AH 90 924  
P+F various types

##### b) Inputs

###### Contact Input (Terminals X1, G2)

Passive, optocoupler

For connection to a passive, intrinsically safe circuit with the following maximum values:

$U_i = 30 \text{ V}$ ,  $I_i = 250 \text{ mA}$ ,  $P_i = 1.1 \text{ W}$

###### Ignition Protection Type

EEx ib IIC / IIB

The following functions are available for selection in the software:

External zero return, external totalizer reset, external totalizer stop

##### Recommended Valve Control Blocks

ABB Automation Products V17132-51...56  
Knick IsoTrans 37 A7  
ABB Digitale Ka 2/915, Ka 4/915  
P+F various types

# Specifications

## Converter for COPA-XE and MAG-XE

### Description of the In-/Outputs in the Non-Intrinsically Safe Design

#### Isolation In- / Outputs

The current and pulse outputs are galvanically isolated from the input circuit and each other.

#### a) Outputs

##### Current Output

Terminals +/-

Test voltage  $U_T = 60 \text{ V}$

##### Current Output, selectable

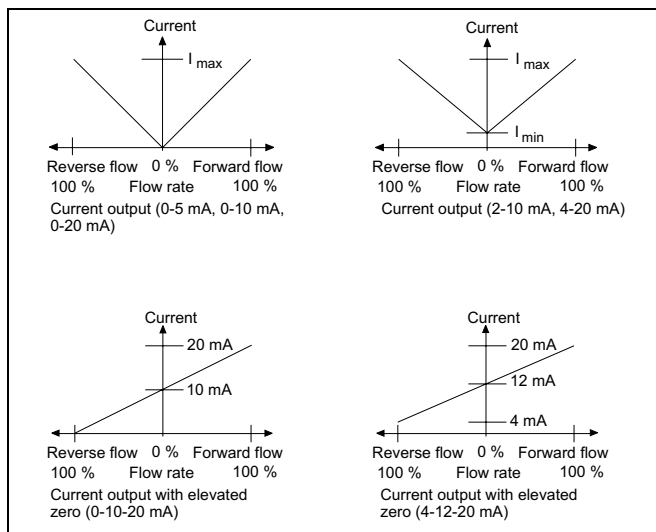
0/4 - 20 mA load  $\leq 300 \Omega$

0/2 - 10 mA load  $\leq 800 \Omega$

0 - 5 mA load  $\leq 1800 \Omega$

0-10-20 mA load  $\leq 300 \Omega$

4-12-20 mA load  $\leq 300 \Omega$



#### Pulse Output (Terminals V8, V9)

1. Passive, optocoupler, Pulse factor, selectable, Pulse width, can be set from 0.1 ms to 2000 ms Max. frequency 5 kHz

or

2. Active, 24 Vdc - pulse (Terminals Ux, V8). The active pulse output is only available in Models DE26, DE46 with remote converter E4. In these models the pulse output selection, „passive, optocoupler“ or „active, 24 Vdc-impulse“ can be made at the meter site using jumpers.

Pulse Output Design	Optocoupler Passive	Active
Terminals	V8/V9	Ux, V8
Operating voltage	$0 \text{ V} \leq U_{CEL} \leq 2 \text{ V}$ $16 \text{ V} \leq U_{CEH} \leq 30 \text{ V}$	$16 \text{ V} \leq U \leq 30 \text{ V}$
Operating current and frequency	$0 \text{ mA} \leq I_{CEH} \leq 0.2 \text{ mA}$ $5 \text{ mA} \leq I_{CEL} \leq 220 \text{ mA}$ $f_{max} \leq 5 \text{ kHz}$	$20 \text{ mA} \leq I \leq 150 \text{ mA}$ $f_{max} = 4 \text{ Hz}$ Pulse width: $\leq 50 \text{ ms}$ Pulse: $16 \text{ V} \leq 25 \text{ ms}$ On/off ratio: $\geq 1:4$ (Ton : Toff)
		$2 \text{ mA} \leq I \leq 20 \text{ mA}$ $f_{max} = 5 \text{ kHz}$ $16 \text{ V} \leq U \leq 30 \text{ V}$

#### Contact Output

The following functions are available for selection in the software:

**System monitor:** normally closed or normally open contact

**Empty pipe:** normally closed or normally open contact

**Forward/Reverse:** closed for forward flow pulse output

**Max or Min alarm:** normally closed or normally open contact

**Max and Min alarm:** normally closed or normally open contact

**Direction signal:** closed for forward flow direction signal

#### Optocoupler, (Terminals P7, G2 or Ux, P7)

$16 \text{ V} \leq U_{CEH} < 30 \text{ V}$ ,  $0 \text{ V} \leq U_{CEL} < 2 \text{ V}$

$0 \text{ mA} \leq I_{CEH} < 0.2 \text{ mA}$ ,  $2 \text{ mA} < I_{CEL} < 220 \text{ mA}$

Test voltage  $U_T = 60 \text{ V}$

#### b) Inputs

##### Contact Input (Terminals X1, G2 or Ux, P7)

„On“  $16 \text{ V} \leq U_{CE} \leq 30 \text{ V}$

„Off“  $0 \text{ V} \leq U_{CE} \leq 2 \text{ V}$

$I \leq 10 \text{ mA}$

Test voltage  $U_T = 60 \text{ V}$

The following functions are available for selection in the software:

- **Ext. Zero Return:** When the pipeline is empty all the output signals are turned off.

- **Ext. Totalizer Rest:** The internal totalizers can be reset from an external contact.

- **Ext. Totalizer Stop:** Regardless of the instantaneous flowrate value, the flow integration can be stopped

#### Empty Pipe Signal

If the "Automatic Empty Pipe Detector" is installed, the message – empty pipe – can also be signalled.

Additionally, when the pipe is empty, the current output can be set to "low" or "high" and the pulses being transmitted stopped.

Conductivity  $\geq 20 \mu\text{S/cm}$ ,  $\geq 3/8" / \text{DN } 10$

For specifications see Contact Output

# Specifications

## Converter for COPA-XE and MAG-XE

### Digital Communication

There are a number of digital communication options available in the converter:

#### a) HART-Protocol

The digital communication utilizes an ac signal superimposed on the current output. (For detailed information, see below)

#### b) ASCII-Protocol (only for Models DE26, DE46 with Converter E4)

The digital communication utilizes a RS485 data link.

#### c) Profibus DP Protocol (only for Models DE26, DE46 with Converter E4)

The digital communication utilizes a RS485 data link.

#### d) Profibus PA-Protocol (only for Models DE26, DE46 with Converter E4)

The digital communication utilizes the IEC1158-2 protocol. The instrument can be configured using the three buttons on the converter or it can be configured using the Configuration and Operator Software Smart-Vision®! Prices upon request.

#### a) HART® -Protocol

The HART®-Protocol provides for communication between a process control system, a handheld terminal and the field instrument. The digital communication utilizes an alternating current signal superimposed on the current output, which does not affect any instruments connected to the output. This option is only available with the 4-20 mA current output option. Terminals: +/-.

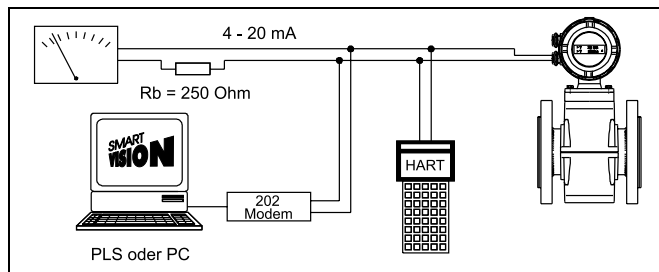


Fig. 16 Communication with HART-Protocol

#### Transmission Mode

FSK Modulation of the current output 4-20 mA per Bell 202 standard.

- Max. signal amplitude: 1.2 mApp
- Current output load: min. 250Ω  
max. < 600 Ω
- Cable: AWG 24 twisted
- Max. cable length: 1500 m

#### b) ASCII-Protocol

This communication mode is presently only available for Models DE26 and DE46 with the remote converter E4, which is installed outside of the Ex-Zone!

- Transmission Mode: RS485 data link
- V pp = 5V.
- Input impedance: ≥12 kOhm,
- Max. cable length: ≥1200 m.
- Baudrate: 1200-9600 Baud.

Max. 32 instruments in parallel on a single bus. A shielded data cable with individually twisted pairs is recommended. Terminals: A and B

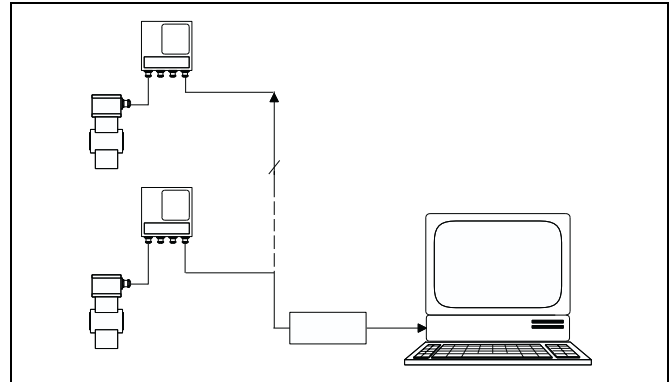


Fig. 17 ASCII Communication Over RS485 Data Link

#### c) Profibus DP Protocol

This communication mode is presently only available for Models DE26 and DE46 with the remote converter E4, which is installed outside of the Ex-Zone!

- Transmission mode RS 485 data link
- Communication speed 9.6 to 1500 KBit/s
- Protocol per EN 50170
- Ident-No. 6666 HEX

**Cyclic** (Output variables, see separate Data Link Description for COPA/MAG-XE)

Terminal	Function	Reference
+VD	VP	Supply voltage +5V
A	RxD/TxD-N	Receive/send-data-N
B	RxD/TxD-P	Receive/send-data-P
GND	C DGND	Data reference potential M5V

#### Cable

- A shielded and twisted data cable is recommended.
- Max. cable length 1200 m (cable type A)
- Characteristic impedance 135-165Ω
- Max. 32 Instruments on one bus
- Baudrate: 9.6-1500 kbit/s
- Distributed capacitance: <30 pF/m, loop resistance: 110 Ω/km
- Tap line length: <1 m.
- Input and output cables on the same terminals.

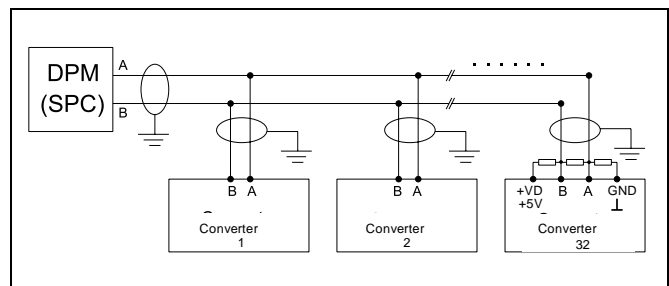


Fig. 18 Bus Connections

# Specifications

## Converter for COPA-XE and MAG-XE

### d) Profibus PA Protocol

This communication mode is presently only available for Models DE26 and DE46 with the remote converter E4, which is installed outside of the Ex-Zone!

Transmission mode	per IEC 1158-2
Communication speed	31.25 KByte/s
Protocol	per EN 50170
Ident-No.	6668 HEX

#### Cyclic (Output variables "Out" and "Out\_Total")

The variable "OUT" contains the instantaneous flowrate value in engineering units (% , l/s, m3/h...) and its corresponding status.

The variable "Out\_Total" contains the instantaneous totalizer value in engineering units (m3, l...) and its corresponding status.

#### Acyclic

- Meter size of the flowmeter primary ("NOMINAL\_SIZE")
- Units for the instantaneous flowrate ("FLOWRATE\_UNITS")
- Self test on/off ("SELF\_CHECKING")
- Flow direction normal/reverse ("FLOW\_DIRECTION")
- Excitation frequency ("SAMPLE\_RATE")
- Low flow cutoff value in % ("LOW\_FLOW\_CUTOFF")
- and additional values, see separate Data Link Description

The stored data is saved when the power is turned off.

#### Cable

A two conductor shielded, twisted Cu-cable per EN 50170 Type A is recommended:

Conductor cross section (nominal):	0.8 mm <sup>2</sup> (AWG 18)
Loop resistance (dc)	44 Ω/km
Distributed capacitance at 31.25 kHz	100 Ω +/- 20 %
Wave attenuation at 39 kHz	3 dB/km
Capacitive asymmetry	2 nF/km

Max. cable length 1900 m when using a standard Transmitter Power Supply Type IV (segment coupler) in a non-intrinsically safe configuration.

(U = 24 V, I<sub>max</sub> = 500 mA, P<sub>max</sub> = 12 W)

Tap line: Max. 30 - 60 m from T-connector or from a distributor.

Participants: Max. 32 Instruments on a single circuit segment, maximum 126 total

Bus topology: Tree and/or linear structure

Bus termination: Passive at both circuit ends of the main bus (RC-element R = 100 Ω, C = 1 μF)

No in-/output galvanic isolation exists between the current output (terminals +/-) and the Profibus PA connection (terminals PA+/PA-)!

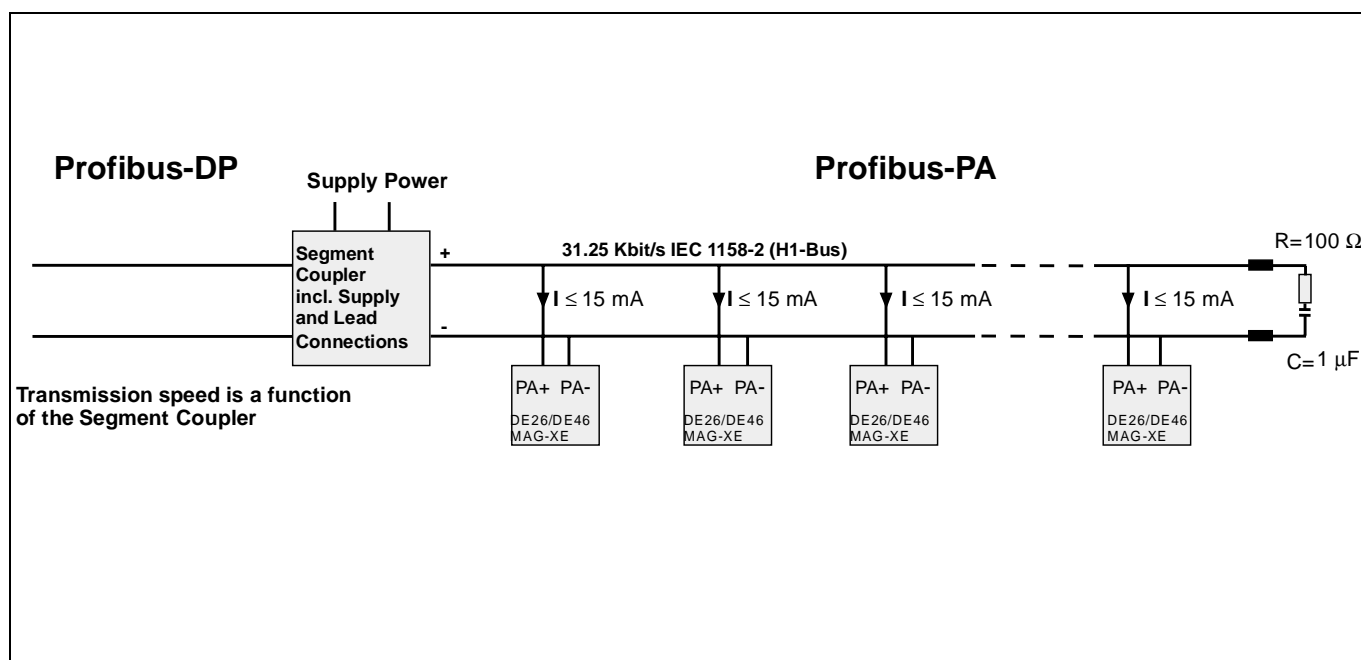


Fig. 19 Profibus



# Interconnection Diagram for COPA-XE with „i“ or „e“ Outputs Models DE27.. or DE47..

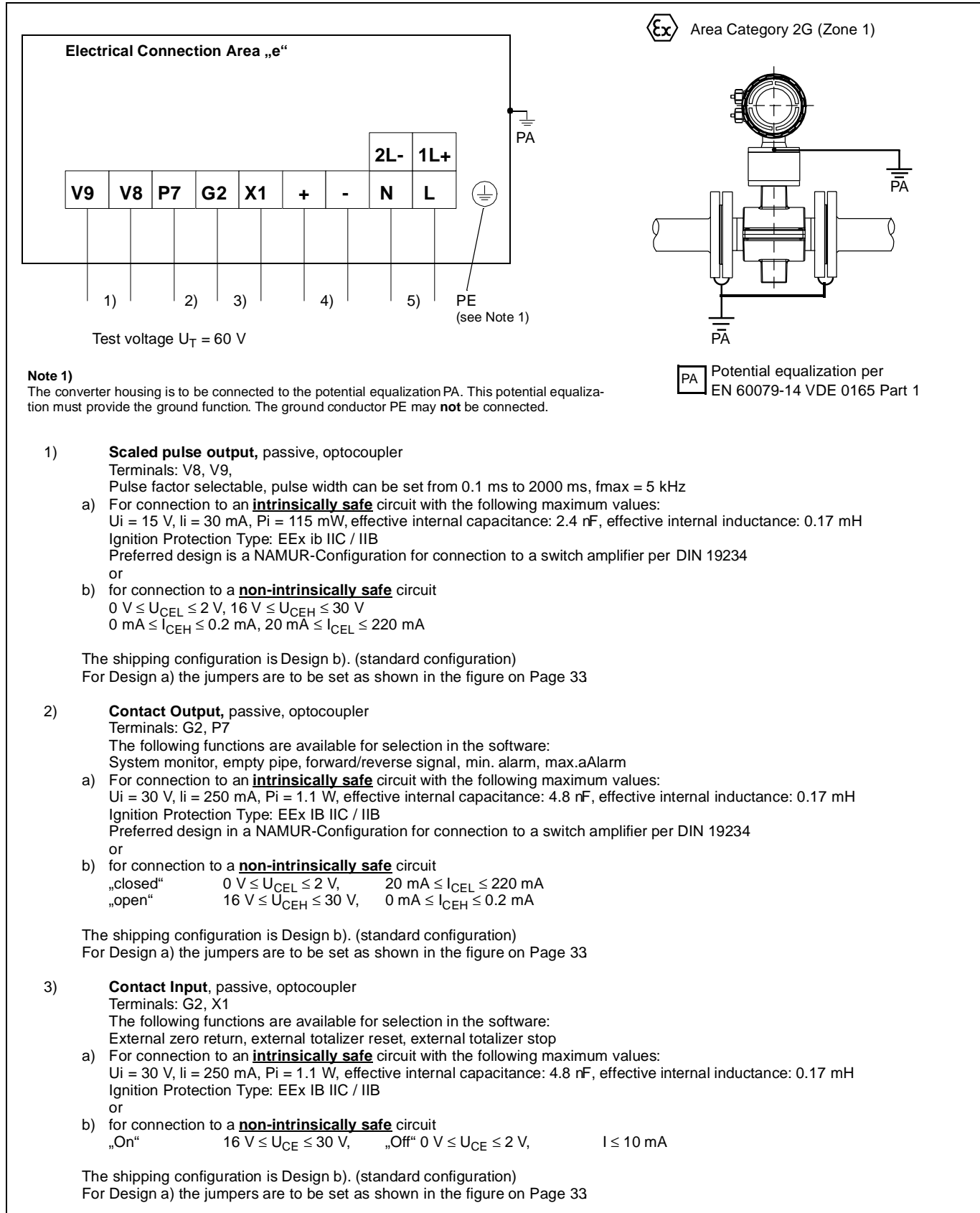


Fig. 20 Interconnection Diagram for COPA-XE with „i“ or „e“ Outputs



# Interconnection Diagram for COPA-XE with „i“ or „e“ Outputs Models DE27.. or DE47..

- 4) **Current Output** selectable  
 Terminals: +/- terminal - is connected internally to PA  
 Load  $\leq 300$  Ohm for 0/4 to 20 mA, load  $\leq 800$  Ohm for 0/2 to 10 mA, load  $\leq 1800$  Ohm for 0 to 5 mA,  
 load  $\leq 300$  Ohm for 0-10-20 mA or 4-12-20 mA  
 Ignition Protection Type: EEx IB IIC / IIB  
 The values for  $I_o$ ,  $P_o$  as well as the maximum allowable capacitance  $C_o$  and the maximum allowable inductance  $L_o$   
 are listed in the table on Page 38.  
 Option: HART-Protocol, Specifications see Page 30.

- 5) **Supply Power**, see Instrument Tag

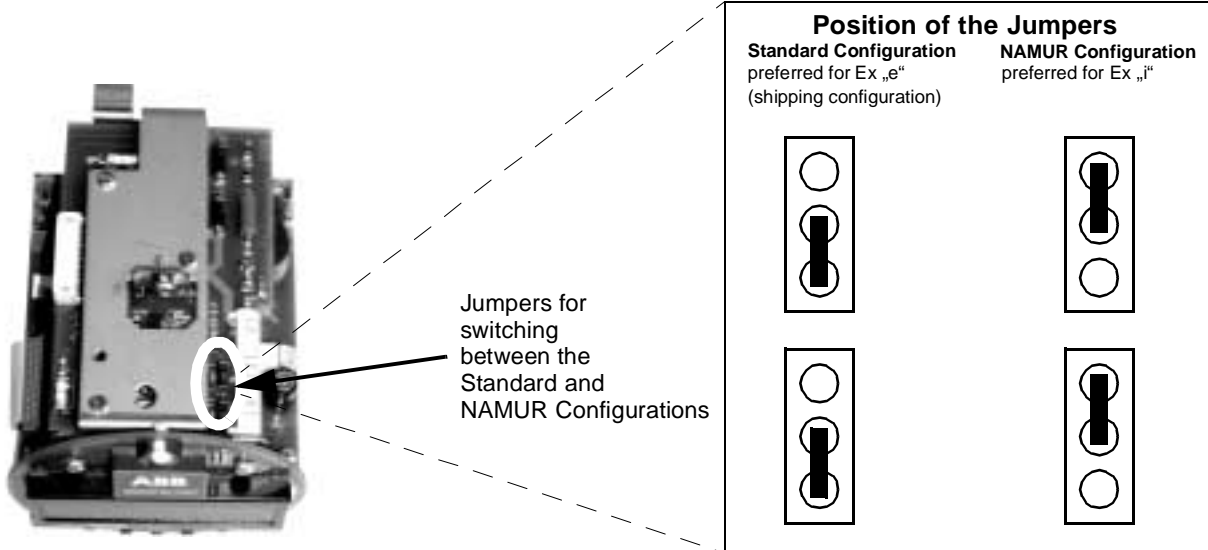


**Note:**

The ground conductor may not be connected inside the Ex-Zone.  
 For technical reasons PA should be identical to the pipeline potential. An  
 additional connection to PE at the connection terminals may not be made.

**Internal switching between the standard (shipping configuration) and the NAMUR configurations**

It is possible to switch internally between the standard and the NAMUR configurations. The Ignition Protection Type of the outputs remains unchanged. The instruments connected to these circuits must comply with the applicable Ex requirements.





# Interconnection Diagram for COPA-XE with Remote Converter with „i“ or „e“ Outputs Models DE28.. or DE48..

(Converter installed in the Ex-Zone)

- 3) **Contact Input**, passive, optocoupler  
 Terminals: G2, X1  
 The following functions are available for selection in the software:  
 External zero return, external totalizer reset, external totalizer stop
- a) For connection to an **intrinsically safe** circuit with the following maximum values:  
 $U_i = 30\text{ V}$ ,  $I_i = 250\text{ mA}$ ,  $P_i = 1.1\text{ W}$ , effective internal capacitance: 4.8 nF, effective internal inductance: 0.17 mH  
 Ignition Protection Type: EEx IB IIC / IIB  
 or
- b) for connection to a **non-intrinsically safe** circuit  
 „On“  $16\text{ V} \leq U_{CE} \leq 30\text{ V}$ , „Off“  $0\text{ V} \leq U_{CE} \leq 2\text{ V}$ ,  $I \leq 10\text{ mA}$

The shipping configuration is Design b). (standard configuration)  
 For Design a) the jumpers are to be set as shown in the figure below.

- 4) **Current Output** selectable  
 Terminals: +/- terminal – is connected internally to PA  
 $\text{load} \leq 300\text{ Ohm}$  for 0/4 to 20 mA,  $\text{load} \leq 800\text{ Ohm}$  for 0/2 to 10 mA,  $\text{load} \leq 1800\text{ Ohm}$  for 0 to 5 mA,  
 $\text{load} \leq 300\text{ Ohm}$  for 0-10-20 mA or 4-12-20 mA  
 Ignition Protection Type: EEx IB IIC / IIB  
 The values for  $I_o$ ,  $P_o$  as well as the maximum allowable capacitance  $C_o$  and the maximum allowable inductance  $L_o$  are listed in the table on Page 38.  
 Option: HART-Protocol, Specifications see Page 30
- 5) **Supply Power**, see Instrument Tag
- 6) Shielded signal and excitation cable, Part No. D173D018U02,  
 10 m long cable included with shipment.

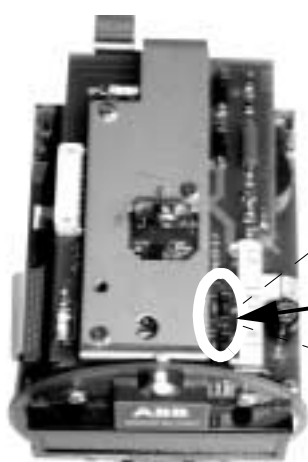


### Note:

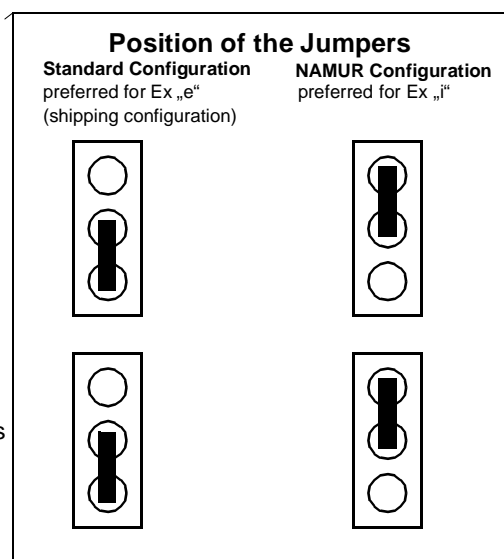
The ground conductor may not be connected inside the Ex-Zone.  
 For technical reasons PA should be identical to the pipeline potential. An additional ground to the PE connection terminals may not be made.

### Internal switching between the standard (shipping configuration) and the NAMUR configurations

It is possible to switch internally between the standard and the NAMUR configurations. The Ignition Protection Type of the outputs remains unchanged. The instruments connected to these circuits must comply with the applicable Ex requirements.



Jumpers for switching between Standard – and NAMUR Configurations



# Interconnection Diagram for MAG-XE Model DE46 or DE26 with Remote Converter Model E4

(Converter installed outside of the Ex-Zone)

Connection options for analog communication (incl. HART)

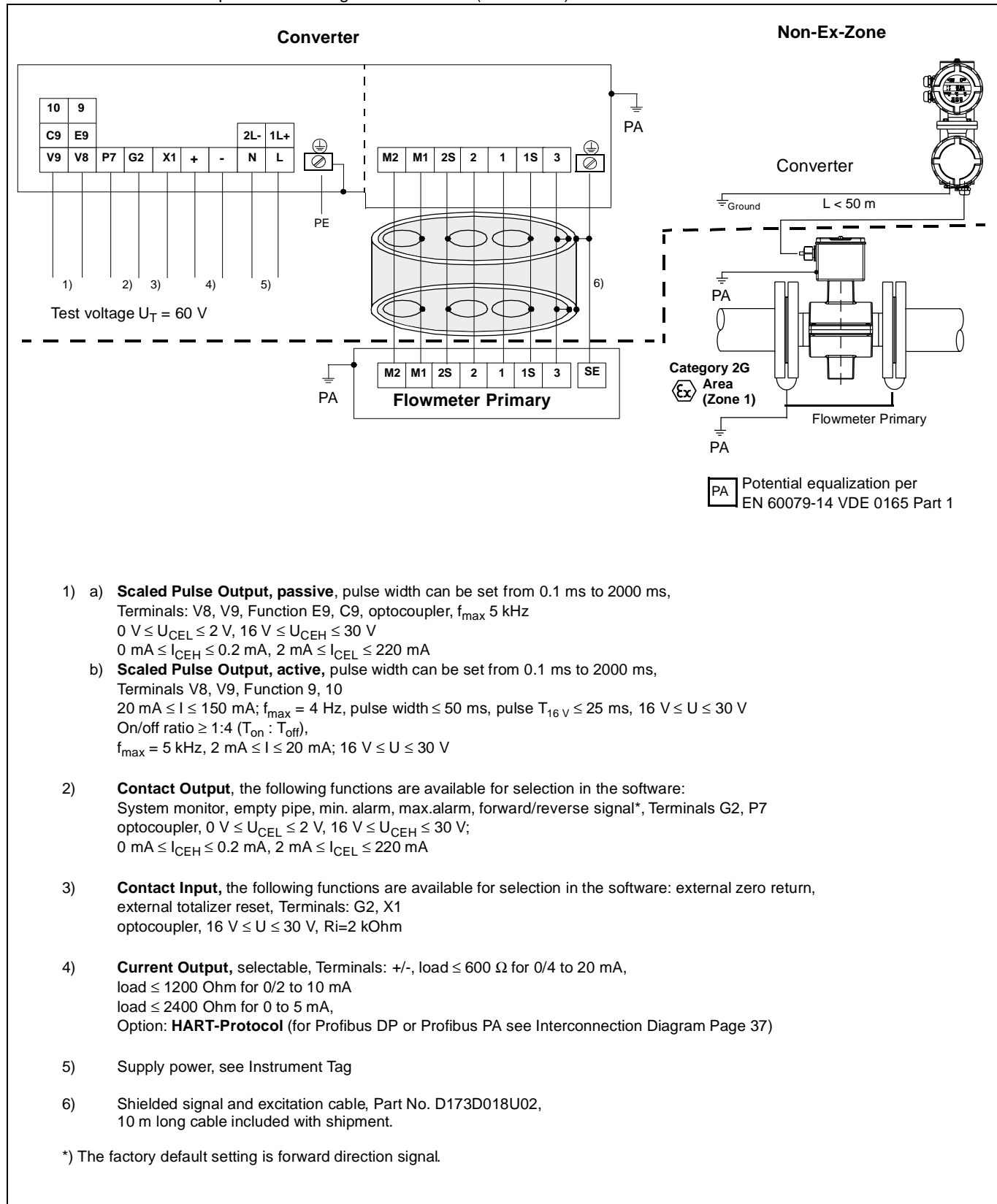
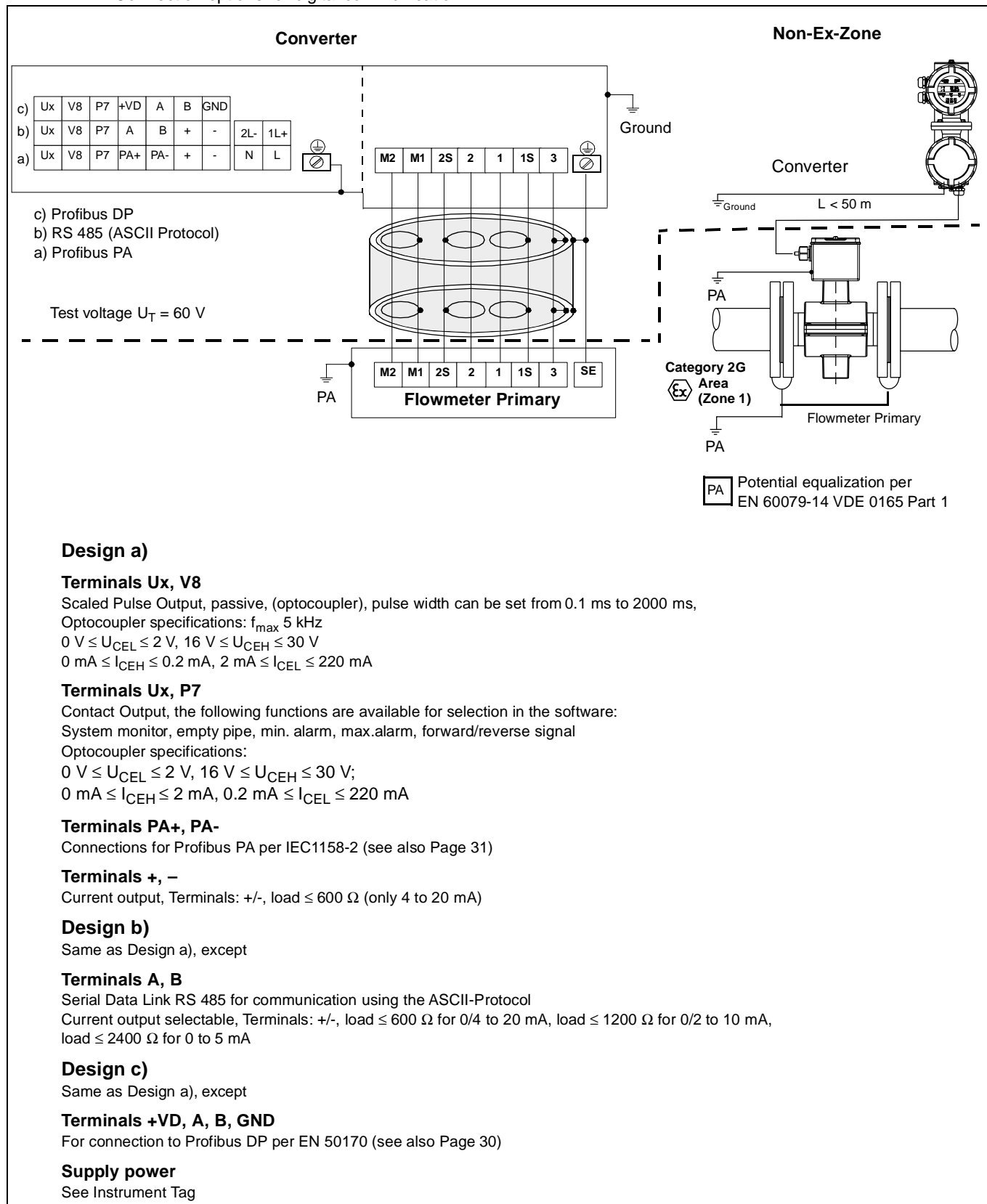


Fig. 22 Interconnection Diagram for MAG-XE for Analog Communication

# Interconnection Diagram for MAG-XE Model DE46 or DE26 with Remote Converter Model E4

(Converter installed outside of the Ex-Zone)

Connection options for digital communication



## Design a)

### Terminals Ux, V8

Scaled Pulse Output, passive, (optocoupler), pulse width can be set from 0.1 ms to 2000 ms,  
Optocoupler specifications:  $f_{max} 5\text{ kHz}$   
 $0\text{ V} \leq U_{CEL} \leq 2\text{ V}$ ,  $16\text{ V} \leq U_{CEH} \leq 30\text{ V}$   
 $0\text{ mA} \leq I_{CEH} \leq 0.2\text{ mA}$ ,  $2\text{ mA} \leq I_{CEL} \leq 220\text{ mA}$

### Terminals Ux, P7

Contact Output, the following functions are available for selection in the software:  
System monitor, empty pipe, min. alarm, max.alarm, forward/reverse signal  
Optocoupler specifications:  
 $0\text{ V} \leq U_{CEL} \leq 2\text{ V}$ ,  $16\text{ V} \leq U_{CEH} \leq 30\text{ V}$ ;  
 $0\text{ mA} \leq I_{CEH} \leq 2\text{ mA}$ ,  $0.2\text{ mA} \leq I_{CEL} \leq 220\text{ mA}$

### Terminals PA+, PA-

Connections for Profibus PA per IEC1158-2 (see also Page 31)

### Terminals +, -

Current output, Terminals: +/-, load  $\leq 600\ \Omega$  (only 4 to 20 mA)

## Design b)

Same as Design a), except

### Terminals A, B

Serial Data Link RS 485 for communication using the ASCII-Protocol  
Current output selectable, Terminals: +/-, load  $\leq 600\ \Omega$  for 0/4 to 20 mA, load  $\leq 1200\ \Omega$  for 0/2 to 10 mA,  
load  $\leq 2400\ \Omega$  for 0 to 5 mA

## Design c)

Same as Design a), except

### Terminals +VD, A, B, GND

For connection to Profibus DP per EN 50170 (see also Page 30)

### Supply power

See Instrument Tag

Fig. 23 Interconnection Diagram for MAG-XE for Digital Communication

## Safety Specifications for the In- and Outputs

Output Circuits	in Ignition Protection Type Intrinsic Safety EEx ib IIC / IIB						For Increased Safety, $U_T = 60 \text{ V}$ , $I_T = 35 \text{ A}$
Current output active Terminals +/-  The - terminal is connected to PA	$U_o = 20 \text{ V}$						Operating values: $U = 30 \text{ V}$ $I = 30 \text{ mA}$
	$I_o$ [mA]	$P_o$ [mW]	EEx ib IIC		EEx ib IIB		
			$C_o$ [nF]	$L_o$ [mH]	$C_o$ [nF]	$L_o$ [mH]	
	100	500	218	3.8	1400	14.8	
Curve: linear Effective internal capacitance $C_i = 1.2 \text{ nF}$ Effective internal inductance $L_i = 0.082 \text{ mH}$ For connection to passive, intrinsically safe circuits or intrinsically safe circuits with max. values: $U_i = 60 \text{ V}$ The - terminal is connected to PA							
Pulse output Terminals V8/V9 (V9 → Plus)	$U_i = 15 \text{ V}$ $I_i = 30 \text{ mA}$ $P_i = 115 \text{ mW}$			$C_i = 2.4 \text{ nF}$ $L_i = 0.17 \text{ mH}$		Operating values: $U = 30 \text{ V}$ $I = 220 \text{ mA}$	
Contact output Terminals P7/G2 (P7 → Plus)	$U_i = 30 \text{ V}$ $I_i = 250 \text{ mA}$ $P_i = 1.1 \text{ W}$			$C_i = 4.8 \text{ nF}$ $L_i = 0.17 \text{ mH}$		Operating values: $U = 30 \text{ V}$ $I = 10 \text{ mA}$	
Contact input Terminals X1/G2 (X1 → Plus)	$U_i = 30 \text{ V}$ $I_i = 250 \text{ mA}$ $P_i = 1.1 \text{ W}$			$C_i = 4.8 \text{ nF}$ $L_i = 0.17 \text{ mH}$		Operating values: $U = 30 \text{ V}$ $I = 10 \text{ mA}$	

### Special Requirements:

The output circuits are designed so that they can be connected to intrinsically safe as well as non-intrinsically safe circuits. A combination of intrinsically safe and non-intrinsically safe circuits is not permissible. For intrinsically safe circuits, potential equalization is to be maintained along the length of the circuit. The test voltage for the non-intrinsically safe circuits is  $U_T = 60 \text{ V}$ .

The contact and pulse outputs can be configured internally (terminals V8, V9 / P7, G2) in a NAMUR-Configuration for connection to a NAMUR-Amplifier.

The factory default configuration is not the NAMUR Configuration. Black cable connectors are installed on the flowmeters at shipment. If the signal outputs are to be connected to intrinsically safe circuits the light blue caps, included in the shipment, should be installed on the appropriate connectors.

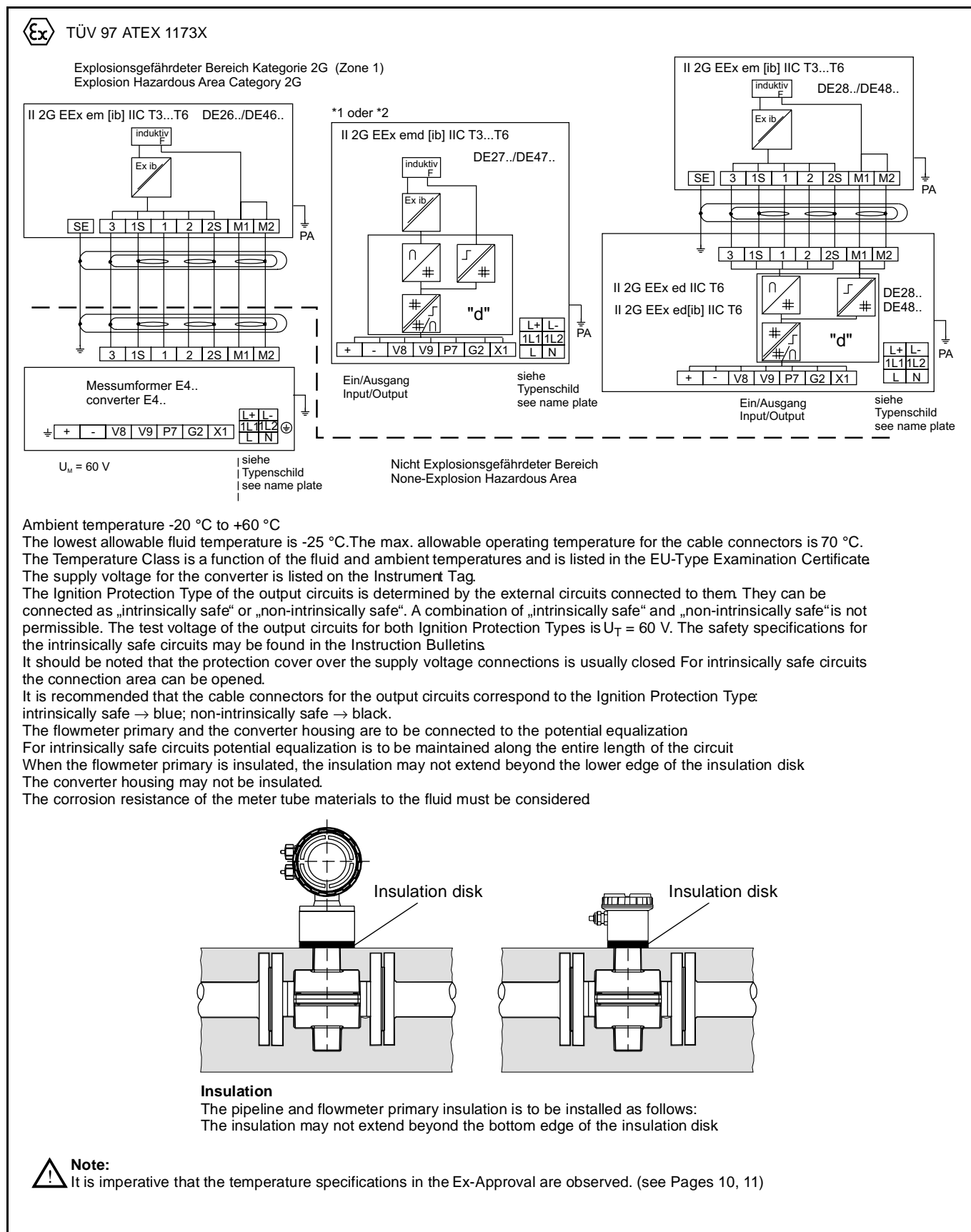
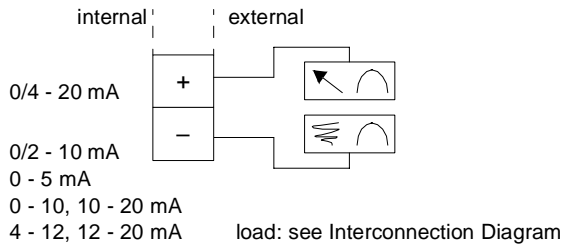
**Note for Safe Operation in the Ex-Zone**


Fig. 24 Notes for Safe Operation in the Ex-Zone

Interconnection Examples for Peripherals, Models DE27, DE28, DE47, DE48

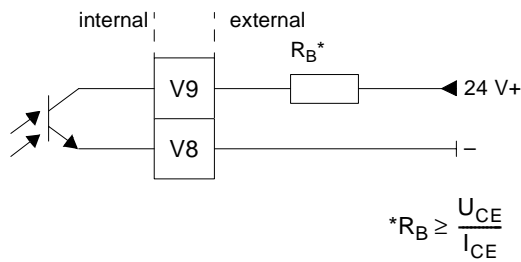
**Current output**



**Note**

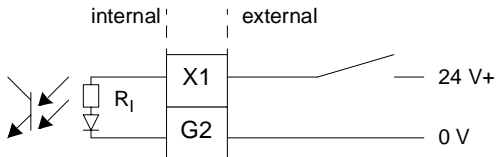
The circuits are connected as intrinsically safe or non-intrinsically dependent on the selected Ex-Protection Class ("i" or "e") and the peripheral instruments are to be selected or installed accordingly.

**Scaled pulse output, passive, optocoupler**



**Contact Input for external zero return**

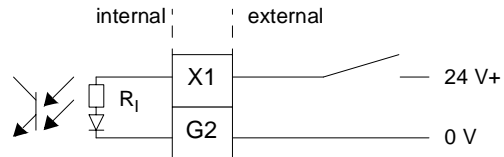
Function can be selected in the software



Contact function:  
Output is turned off when contact is closed.

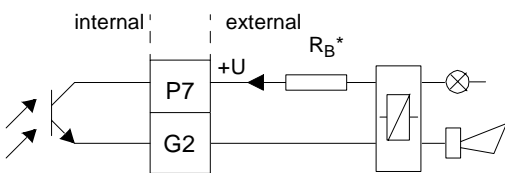
or

**External totalizer reset**



Contact function:  
Internal totalizer set to zero when contact is closed.

**Contact output** for system monitor, max. alarm, min. alarm, empty pipe or forward/reverse signal  
Function can be selected in the software



**Pulse output**, passive optocoupler, separate forward and reverse pulses selected by contact

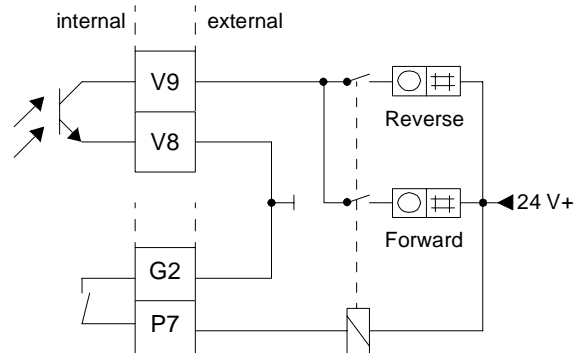


Fig. 25 Interconnection Examples for Peripherals

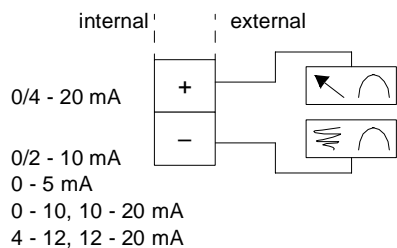


## Interconnection Examples for Peripherals for Model DE26, DE46 with Remote Converter Model E4

(Converter installed outside of the Ex-Zone)

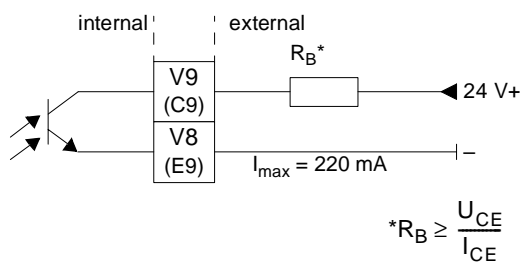
### Interconnection examples for analog communication (incl. HART)

#### Current output

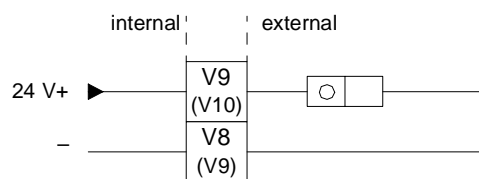


0/4 - 20 mA load: max. 600 Ohm  
 0/2 - 10 mA load: max. 1200 Ohm  
 0 - 5 mA load: max. 2400 Ohm

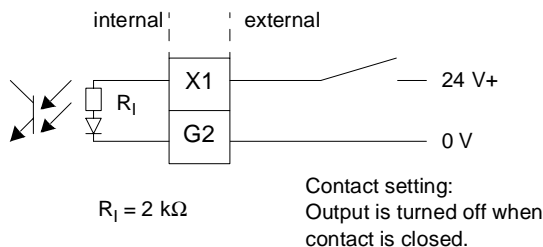
#### Pulse output (optocoupler)



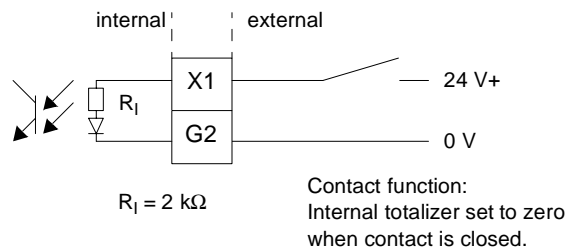
#### Pulse output, active



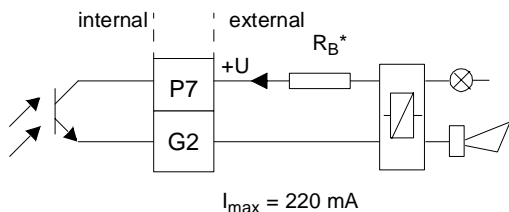
#### Contact input for external zero return Function can be selected in the software



or External totalizer reset



#### Contact output for system monitor, max. alarm, min. alarm, empty pipe or forward/reverse signal Function can be selected in the software



#### Pulse output, passive optocoupler, separate forward and reverse pulses selected by contact

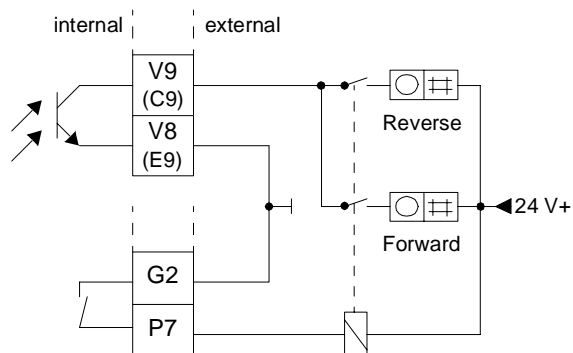


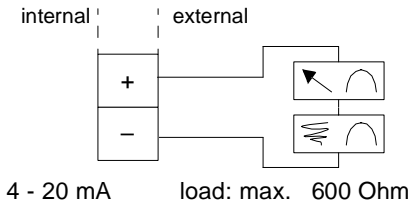
Fig. 26 Interconnection Examples for Peripherals

### Interconnection Examples for Peripherals, Models DE26, DE46 with Remote Converter Model E4

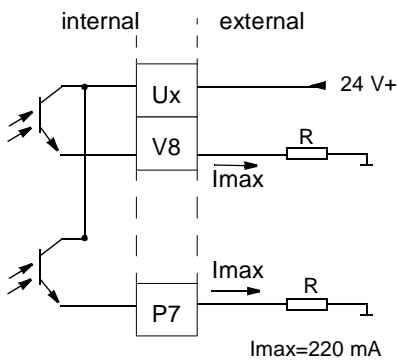
(Converter installed outside the Ex-Zone)

#### Interconnection examples for digital communication

**Current output (not available with Profibus DP)**  
(For Profibus PA only 4-20 mA)

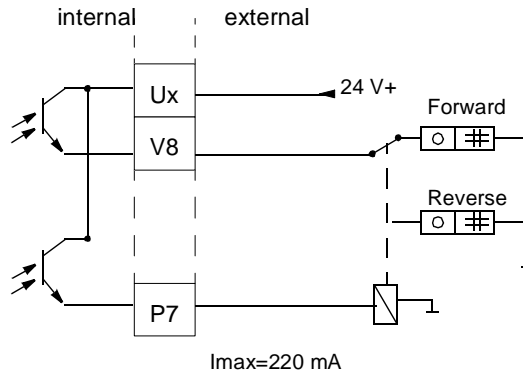


#### Pulse output and contact output



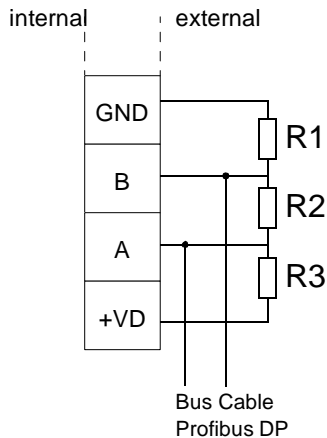
**Contact output Ux / P7** for system monitor, max. & min. alarm, empty pipe or forward/reverse direction signal  
Function can be selected in the software  
**Pulse output, optocoupler Ux/V8**

#### Connection example for separate forward and reverse flow direction pulses using the contact output.



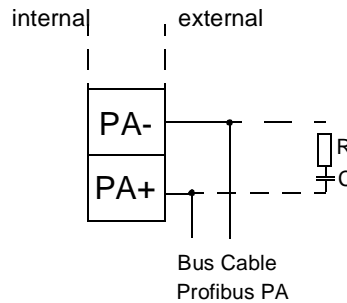
#### Profibus DP

The resistors R1, R2, R3 are bus termination resistors. They are to be installed when the instrument is the end instrument connected to the bus cable.  
R1 = 390 Ω; R2 = 220 Ω; R3 = 390 Ω



#### Profibus PA

The resistor R and the capacitor C form the bus termination. They are to be installed when the instrument is the end instrument connected to the bus cable.  
R = 100 Ω; C = 1 μF



#### Data Link RS485

Two wire data link, half duplex, max. cable length: 1200 m, max. 32 instruments in parallel on a single individual twisted pair bus cable.

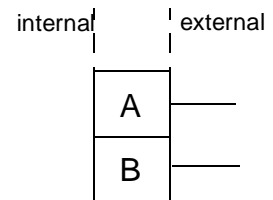


Fig. 27 Interconnection Examples for Digital Peripherals

# Dimensions Converter

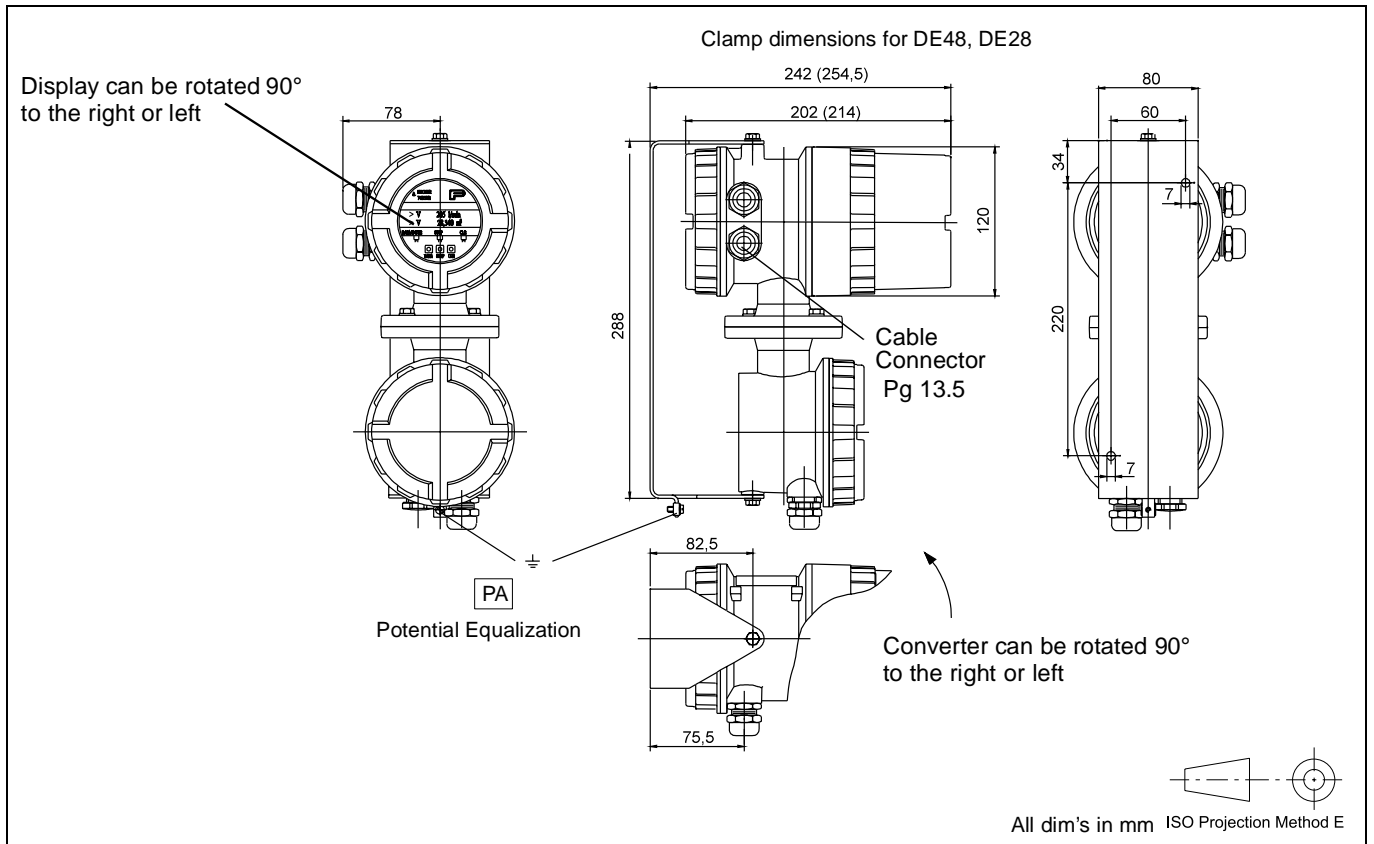


Fig. 28 Dimensions, Converter MAG-XE in Field Mount Housing Model DE48, DE28 installed inside the Ex-Zone.  
For Models DE46 and DE26 the converter E4 is to be installed outside the Ex-Zone

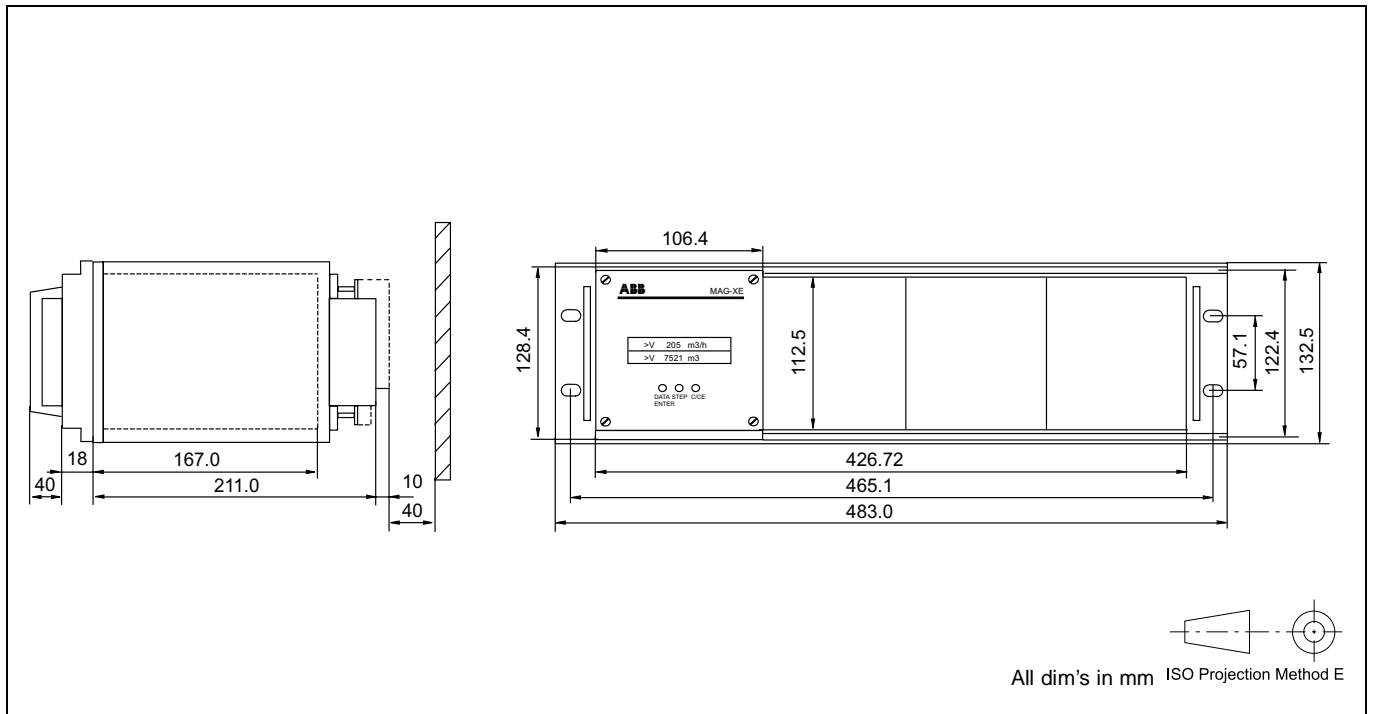


Fig. 29 Dimensions, 19" Converter MAG-XE in Rack Mount Frame  
for Operation with Flowmeter Primaries Models DE46, DE26

# Dimensions Converter MAG-XE

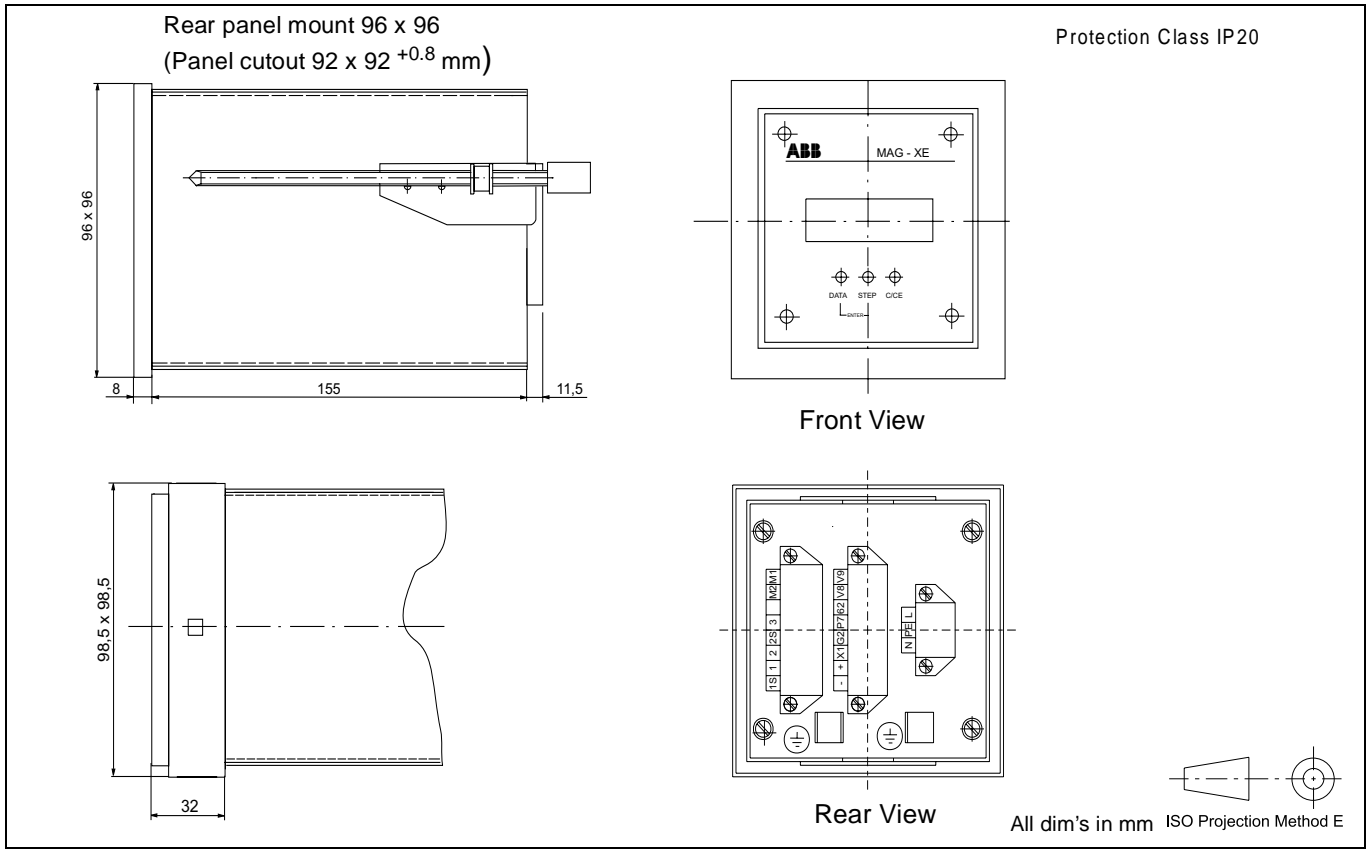


Fig. 30 Dimensions, Converter E4 in Rear Panel Mount Housing for Operation with Flowmeter Primary Models DE46, DE26

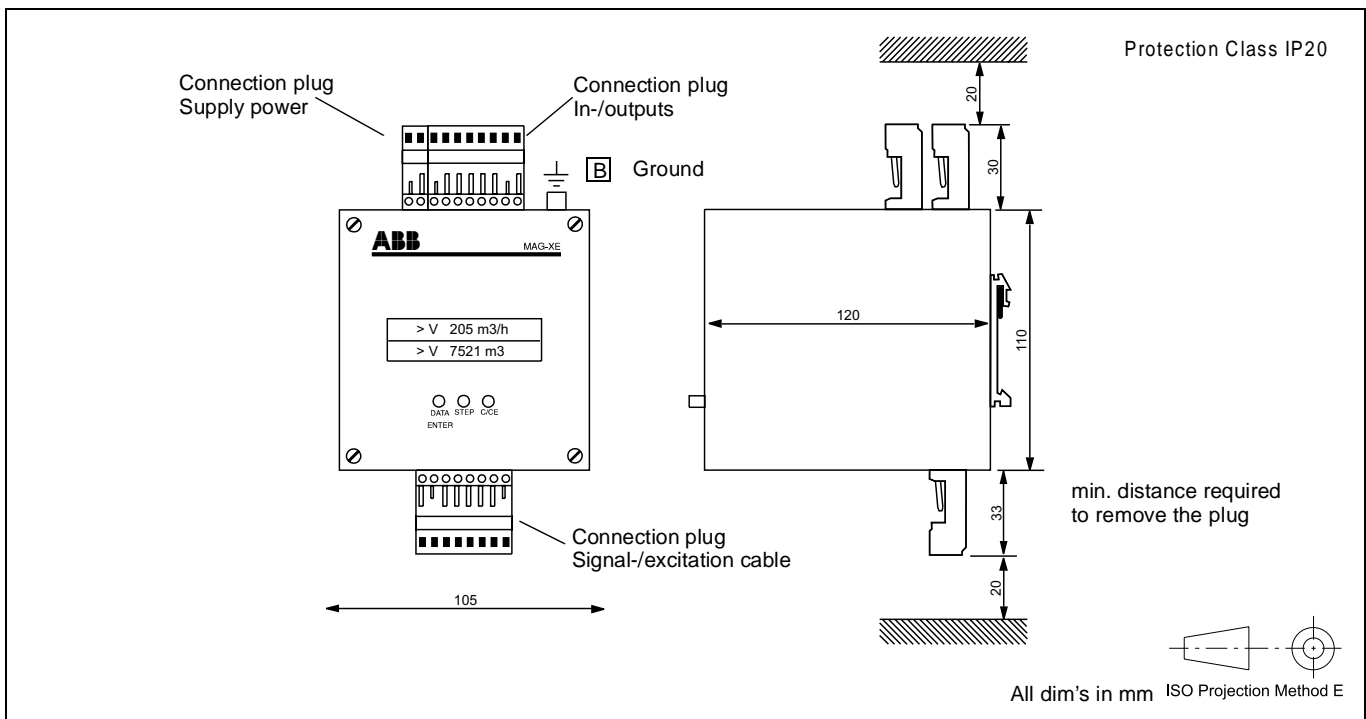


Fig. 31 Dimensions, Converter E4 in Rail Mount Housing for Operation with Flowmeter Primary Models DE46, DE26



# Ordering Information for Converter MAG-XE

Accuracy: ≤ 0.5 % of rate

<b>Remote Converter MAG-XE</b>			<b>E4</b>																	
<b>Housing</b>																				
Field mount housing (threads for cable connector M20x1.5), standard			<b>B</b>																	
Field mount housing (threads for cable connector NPT 1/2")			<b>D</b>																	
19" Insert cassette			<b>M</b>																	
Rail Mount Housing			<b>O</b>																	
Rear panel mount housing 96 x 96 mm with hasp and lock			<b>T</b>																	
Without a housing (only converter module, replacement part)			<b>X</b>																	
<b>Supply power</b>																				
High voltage 85 - 253Vac																				<b>G</b>
Low voltage 16.8 - 26.4Vac/16.8 - 31.2 Vdc																				<b>K</b>
<b>Display</b>																				
Magnet Stick operation and lighted display																				<b>D</b>
<b>In-/output options</b>																				
Current output + pulse output active	+ contact input	+ contact output																		<b>01</b>
Current output + pulse output active	+ contact input	+contact output + HART																		<b>02</b>
Current output + pulse output passive	+ contact input	+ contact output																		<b>03</b>
Current output + pulse output passive	+ contact input	+ contact output + HART																		<b>04</b>
Current output + pulse output passive		+ contact output + RS485																		<b>05</b>
Current output + pulse output passive	+ pulse output passive	+ contact output + Profibus DP																		<b>06</b>
Current output + pulse output passive		+ contact output + Profibus PA																		<b>07</b>
<b>Flowmeter primary design</b>																				
Standard																				<b>0</b>
<b>Application</b>																				
Standard																				<b>0</b>
<b>Approvals</b>																				
None																				<b>0</b>
Certified for Cold/Waste Water																				<b>1</b>
Certified for Liquids other than Water																				<b>2</b>
<b>Instrument Tag</b>																				
German																				<b>G</b>
English																				<b>E</b>
French																				<b>F</b>
<b>Design level</b>																				
<b>Software level</b>																				

Shielded signal/excitation cable (part No. D173D018U02), (10 m included with shipment)

**Note:**  
This converter is for installation outside of the Ex-Zone.



# Ordering Information

## Test Simulator, Adapter, PC-Software

### Test Simulator for XE-Converter

Ordering Number	D55CX4						
<b>Flowrate settings</b>							
3-Digital switches in 1000 steps	1						
Others	9						
<b>Supply Power<sup>1)</sup></b>							
Schuko plug 110 V - 240 V 50/60 Hz	1						
Banana plug (4mm) 24 - 48 Vac/Vdc	2						
USA plug for 110 V - 240 V 60 Hz	3						
Others	9						
<b>Accessories</b>							
None	0						
Adapter for converter E4000	1						
Adapter for operation with older Simulator 55XC2000	2						
<b>Design level</b> (specified by ABB-Automaton Products) *							
<b>Instrument Tag</b>							
German						1	
English						2	
French						3	
Others						9	

<sup>1)</sup> Supply power used to supply the converter

### PC-Software

#### 1.) Product Selection Program

The software program „FlowSelect“ from ABB Automation Products can be used to select the most suitable EMF and its specifications. FlowSelect also includes the „FlowCalc“ program which can be used to convert the flowrate values.

#### PC-Requirements:

**FlowSelect**, the selection program for all flowmeter instruments includes **FlowCalc** (conversion program)  
 PC-Requirements 486, 8 MB RAM, 7 MB free hard drive, 256 colors, Windows 3.1, Windows 95 or Windows NT, CD-ROM at no cost.

#### 2. Smart Vision®

The communication software developed by ABB Automation Products for diagnostics and configuration of intelligent field instruments using HART-Protocol-Communication.



