



- **The Electromagnetic Flowmeter (EMF) can be used to accurately measure the flowrate of liquids which have an electrical conductivity greater than 5 $\mu\text{S}/\text{cm}$ (20 $\mu\text{S}/\text{cm}$ for demineralized water). The COPA-XE is a flow measurement system in a Compact Design. The MAG-XE flow measurement system consists of a flowmeter primary and a remote mounted converter**

- **Flowmeter primary for hygienic processes**
 - The basic flowmeter body is installed using threaded adapters which are matched to the respective pipeline connections. The following connections are available:
 - Weld stubs
 - Food industry fittings per DIN 11851
 - Tri-Clamp
 - Wafer and fixed flange designs
 - Certificates EHEDG, FML, 3A

- **Flowmeter primary for the process industry and water/waste water**
 - Flange and wafer designs
 - DVGW Test Report
 - Certifiable for cold and waste water and fluids other than water

- **Converter**
 - Communication PROFIBUS DP, HART-Protocol, FOUNDATION Fieldbus, PROFIBUS PA
 - Pulse output, configurable (active/passive)
 - Data secured in a plug-in EEPROM
 - Graphic display
 - Self-monitoring functions
 - Comprehensive test and simulation functions



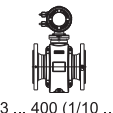
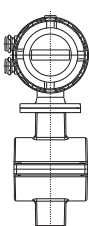
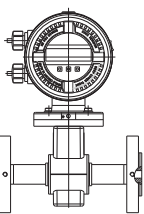

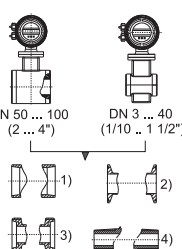
**Intelligent
Compact and Effective**



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1 FXE4000 (COPA-XE): Overview, Flowmeter Primary and Converter Designs:

Housing Material	Aluminum Housing Series 4000		Stainless Steel Housing Series 2000		
	 DN 3 ... 400 (1/10 ... 16")	 DN 3 ... 100 (1/10 ... 4")	 DN 3 ... 100 (1/10 ... 4")	 DN 3 ... 40 (1/10 ... 1 1/2")	 DN 50 ... 100 (2 ... 4") DN 3 ... 40 (1/10 ... 1 1/2")
	Fixed Flange	Wafer Design	Fixed Flange	Wafer Design	Variable Connections

Flowmeter Primary

Model Number	DE43F		DE43W		DE23F		DE23W		DE23-R,-S,-T,-E	
Accuracy	0.5 % of rate, Optional 0.25% of rate									
	DN	PN	DN	PN	DN	PN	DN	PN	DN	PN
Wafer Design	-	-	3 ... 100	16	-	-	3 ... 100	10 ... 40	-	-
Flange DIN 2501/ EN 1092-1	3 ... 1000	10 ... 40	-	-	3 ... 100	10 ... 40	-	-	-	-
Flange ASME B16.5 / B16.47	1/8 ... 40"	CL 150 ... 300	-	-	1/8 ... 4"	CL 150 ... 300	-	-	-	-
Food Ind. Fitting DIN 11851	-	-	-	-	-	-	-	-	3 ... 100	10 ... 40 (1/10... 4")
Weld stubs	-	-	-	-	-	-	-	-	3 ... 100	10 ... 40 (1/10... 4")
Tri-Clamp per DIN 32676	-	-	-	-	-	-	-	-	3 ... 100	10 ... 40 (1/10... 4")
Tri-Clamp per ASME BPE	-	-	-	-	-	-	-	-	3 ... 100	10 ... 40 (1/10... 4")
External threads ISO 228	-	-	-	-	-	-	-	-	3 ... 25	10 (1/10... 1")
Liner	Hard/soft rubber PTFE, PFA		PFA (DN 3 ... 8) PTFE (DN 10 ... 100)		PFA (vacuum tight)		PFA (vacuum tight)		PFA (vacuum tight)	
Conductivity	> 5 µS/cm (20 µS/cm for demineralized water)		> 5 µS/cm (20 µS/cm for demineralized water)		> 5 µS/cm (20 µS/cm for demineralized water)		> 5 µS/cm (20 µS/cm for demineralized water)		> 5 µS/cm (20 µS/cm for demineralized water)	
Electrodes	SS 1.4571[316Ti], 1.4539, Hastelloy B2/C4, Platinum-Iridium, Tantalum, Titanium									
Process Connection Material	Steel, 1.4571[316Ti]		-		1.4571 [316Ti]		-		1.4404 [316L]	
Protection Class	IP 67		IP 67		IP 67		IP 67		IP 67	
Fluid Temperature *	-25 ... +130 °C -13 ... +266 °F		-25 ... +130 °C -13 ... +266 °F		-25 ... +130 °C -13 ... +266 °F		-25 ... +130 °C -13 ... +266 °F		-25 ... +130 °C -13 ... +266 °F	

Approvals

EEx Design	TÜV 97, ATEX 1173X (see separate data sheet)
Certifiable	Cold- and Waste Water, Liquids other than Water
Press. Equip. Dir. 97/23/EG	With Conformity Evaluation per Category III, Fluid Group 1 Without Approval
CRN (Canadian Registration Number)	Approval Upon Request

Certificates

	-	-	-	-	3A, EHEDG (Cleanability)
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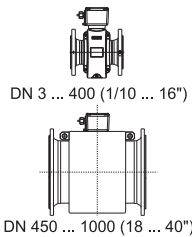
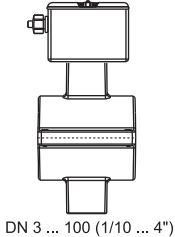
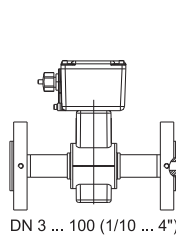
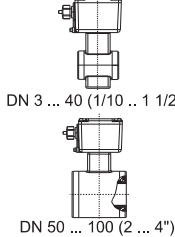
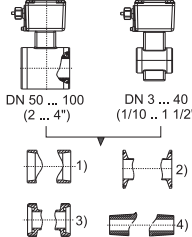
Converter

Supply Power	AC 100-230 V (-15/+10 %) / AC 16.8-26.4 V / DC 16.8-31.2 V
Current Output	0/2-10 mA, 0-5 mA, 0/4-20 mA, 0/4-10/12-20 mA
Pulse Output	Active 24 V DC pulse or passive optocoupler
Ext. Zero Return	Optocoupler input
Ext. Totalizer Reset	Optocoupler input
Forward/Reverse Flow Metering	Signal over optocoupler output
Empty Pipe Detector	from DN 10, Signal over optocoupler output
Self Monitor	yes
Local Display / Totalization	yes
Housing	Converter housing made of Aluminum (standard), converter made of stainless steel (option)
Communication	PROFIBUS DP, PROFIBUS PA, HART-Protocol, FOUNDATION Fieldbus, ASCII-Protocol (RS485)

*) -25 °C if the process connection is made of stainless steel / -10 °C if the process connection is made of steel

1) Weld stubs, 2) Tri-Clamp, 3) Food Ind. Fittings, 4) External Threads

2 FXE4000 (MAG-XE): Overview, Flowmeter Primary and Converter Designs

Housing Material	Aluminum Housing Series 4000		Stainless Steel Housing Series 2000		
	 DN 3 ... 400 (1/10 ... 16") DN 450 ... 1000 (18 ... 40")	 DN 3 ... 100 (1/10 ... 4")	 DN 3 ... 100 (1/10 ... 4")	 DN 3 ... 40 (1/10 ... 1 1/2") DN 50 ... 100 (2 ... 4")	 DN 50 ... 100 (2 ... 4") DN 3 ... 40 (1/10 ... 1 1/2") 1) 2) 3) 4)
	Fixed Flange	Wafer Design	Fixed Flange	Wafer Design	Variable Connections

Flowmeter Primary

Model Number	DE41F		DE41W		DE21F		DE21W		DE21-R,-S,-T,-E	
Accuracy	0.5 % of rate, Optional 0.25 % of rate									
	DN	PN	DN	PN	DN	PN	DN	PN	DN	PN
Wafer Design	-	-	3 ... 100	16	-	-	3 ... 100	10 ... 40	-	-
Flange DIN 2501/ EN 1092-1	3 ... 1000	10 ... 40	-	-	3 ... 100	10 ... 40	-	-	-	-
Flange ASME B16.5 / B16.47	1/8 ... 40" CL 150 ... 300	-	-	-	1/8 ... 4" CL 150 ... 300	-	-	-	-	-
Food Ind. Fitting DIN 11851	-	-	-	-	-	-	-	-	3 ... 100 (1/10 ... 4")	10 ... 40
Weld stubs	-	-	-	-	-	-	-	-	3 ... 100 (1/10 ... 4")	10 ... 40
Tri-Clamp per DIN 32676	-	-	-	-	-	-	-	-	3 ... 100 (1/10 ... 4")	10 ... 40
Tri-Clamp per ASME 32676	-	-	-	-	-	-	-	-	3 ... 100 (1/10 ... 4")	10 ... 40
External threads ISO 228	-	-	-	-	-	-	-	-	3 ... 25 (1/10 ... 1")	10
Liner	Hard/soft rubber PTFE, PFA		PFA (DN 3 ... 8) PTFE (DN 10 ... 100)		PFA (vacuum tight)		PFA (vacuum tight)		PFA (vacuum tight)	
Conductivity	> 5 µS/cm (20 µS/cm for demineralized water)		> 5 µS/cm (20 µS/cm for demineralized water)		> 5 µS/cm (20 µS/cm for demineralized water)		> 5 µS/cm (20 µS/cm for demineralized water)		> 5 µS/cm (20 µS/cm for demineralized water)	
Electrodes	SS 1.4571[316Ti], 1.4539, Hastelloy B3/C4, Platinum-Iridium, Tantalum, Titanium									
Process Connection Material	Steel, 1.4571[316Ti]		-		1.4571 [316Ti]		-		1.4404 [316L]	
Protection Class	IP 67		IP 67		IP 67		IP 67		IP 67	
	IP 68 (Option)		IP 68 (Option)		IP 68 (Option)		IP 68 (Option)		IP 68 (Option)	
Fluid Temperature *	-25 ... +130 °C -13 ... +266 °F		-25 ... +130 °C -13 ... +266 °F		-25 ... +130 °C -13 ... +266 °F		-25 ... +130 °C -13 ... +266 °F		-25 ... +130 °C -13 ... +266 °F	

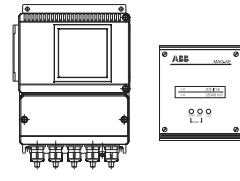
Approvals

EEx Design	TÜV 97, ATEX 1173X (see separate data sheet)
Certifiable	Cold- and Waste Water, Liquids other than Water
Press. Equip. Dir. 97/23/EG	With Conformity Evaluation per Category III, Fluid Group 1 Without Approval
CRN (Canadian Registration Number)	Approval Upon Request

Certificates

	-	-	-	-	3A, EHEDG (Cleanability)
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Converter

Supply Power	AC 100-230 V (-15/+10 %) / AC 16.8-26.4 V / DC 16.8-31.2 V	
Current Output	0/2-10mA, 0-5 mA, 0/4-20 mA, 0/4-10/12-20 mA	
Pulse Output	Active 24 V DC pulse or passive optocoupler	
Ext. Zero Return	Optocoupler input	
ext. Totalizer Reset	Optocoupler input	
Forward/Reverse Flow Metering	Signal over optocoupler output	
Empty Pipe Detector	from DN 10, Signal over optocoupler output	
Self Monitor	yes	
Local Display / Totalization	yes	
Housing	Field mount housing, Panel mount housing, Rail mount housing	
Communication	PROFIBUS DP, PROFIBUS PA, HART-Protocol, FOUNDATION Fieldbus, ASCII-Protocol (RS485)	

*) -25 °C if the process connection is made of stainless steel / -10 °C if the process connection is made of steel

1) Weld stubs, 2) Tri-Clamp, 3) Food Ind. Fittings, 4) External Threads

3 General information

3.1 Measuring Accuracy

3.1.1 Reference Conditions per EN 29104

Fluid Temperatures	20 °C (68 °F) ± 2 K
Ambient Temperature	20 °C (68 °F) ± 2 K
Supply Power	Line voltage per name plate UN ± 1 % and Frequency f ± 1 %
Installation Conditions	- Upstream >10xDN straight section - Downstream >5xDN straight section
Warm Up Phase	30 min

3.1.2 Maximum Measurement error

Pulse Output (Standard Calibration; 0.5% of rate):

- $Q > 0.07 \text{ Range}_{\text{max}} \pm 0.5 \% \text{ of rate}$
- $Q < 0.07 \text{ Range}_{\text{max}} \pm 0.00035 \text{ Range}_{\text{max}}$

$\text{Range}_{\text{max}}$ = maximum flowrate for the flowmeter size 10 m/s

Pulse Output (Optional Calibration; 0.25 % of rate):

- $Q > 0.14 \text{ Range}_{\text{max}} \pm 0.25 \% \text{ of rate}$
- $Q < 0.14 \text{ Range}_{\text{max}} \pm 0.00035 \text{ Range}_{\text{max}}$

$\text{Range}_{\text{max}}$ = maximum flowrate for the flowmeter size 10 m/s

Analog Output Effects

Same as pulse output plus ± 0.1 % of rate.

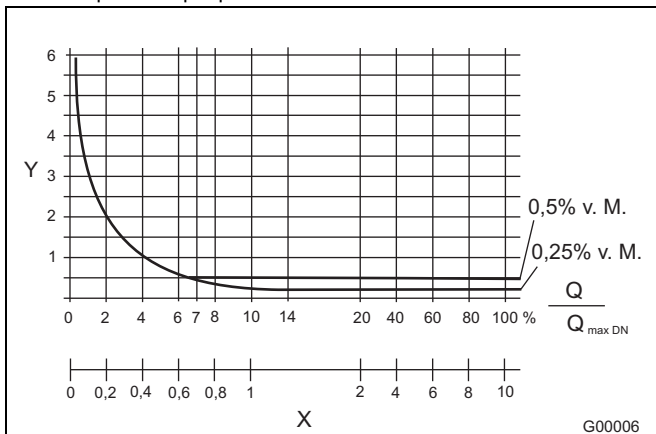


Fig. 1

Y Accuracy ± of rate in [%]
X Flow velocity v in [m/s]

3.2 Grounding

The grounding of the flowmeter primary is essential for both safety reasons, and to ensure trouble-free operation of the electromagnetic flowmeter. The ground screws on the flowmeter primary are to be brought to ground potential. For technical reasons, this potential should be identical to the potential of the metering fluid, if possible.

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

To comply with the EMC- and Low Voltage Regulations the connection box/converter must be grounded in addition to the meter tube of the flowmeter primary.

3.3 Installation Requirements

The following points must be observed for the installation:

- The meter tube must always be completely full.
- The flow direction must correspond to the identification if present.
- The maximum torque for all flange connections must be complied with.
- The devices must be installed without mechanical tension (torsion, bending).
- Flanged/wafer design flowmeters with coplanar counter flanges may only be installed with suitable seals.
- Use flange seals made from a compatible material for the fluid and fluid temperatures.
- Seals must not extend into the flow area since possible turbulence could influence the device accuracy.
- The pipeline may not exert any unallowable forces and torques on the device.
- Do not remove the plugs in the cable connectors until you are ready to install the electrical cable.
- Install the separate converter (MAG-XE) at a largely vibration-free location.
- Do not expose the converter to direct sunlight or provide for appropriate sun protection where necessary.

3.3.1 Electrode axis

Electrode axis (1) should be horizontal if at all possible or no more than 45° from horizontal.

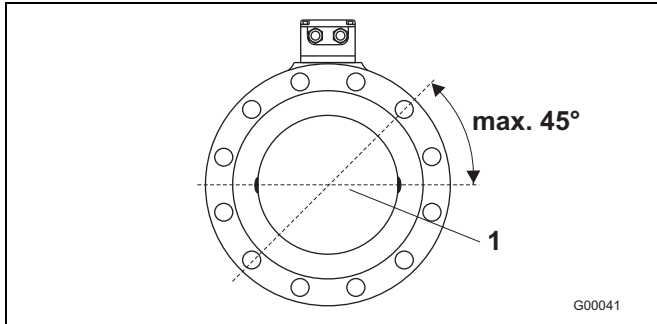


Fig. 2

3.3.2 In- and outlet pipe sections

Straight inlet section	Straight outlet section
≥ 3 x DN	≥ 2 x DN

DN = Flowmeter primary size

- Notice: For devices subject to calibration for commercial use, special conditions apply, see chapter "Approved EMF for custody transfer".
- Do not install fittings, manifolds, valves etc. directly in front of the meter tube (1).
- Butterfly valves must be installed so that the valve plate does not extend into the flowmeter primary.
- Valves or other turn-off components should be installed in the outlet pipe section (2).
- For compliance with the measuring accuracy, observe the inlet and outlet pipe sections.

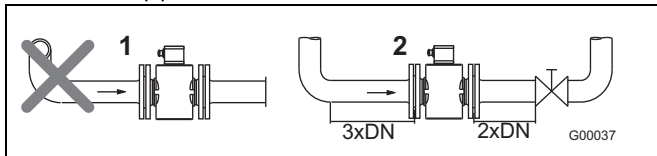


Fig. 3

3.3.3 Vertical connections

- Vertical installation for measurement of abrasive fluids, flow preferably from below to above.

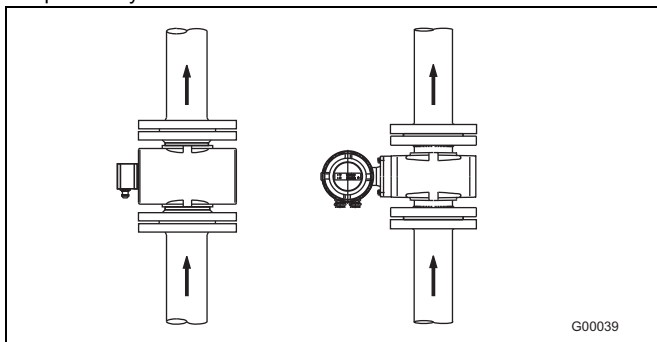


Fig. 4

3.3.4 Horizontal connections

- Meter tube must always be completely full.
- Provide for a slight incline of the connection for degassing.

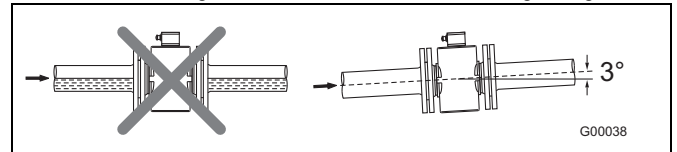


Fig. 5

3.3.5 Free inlet or outlet

- Do not install the flowmeter at the highest point or in the draining-off side of the pipeline, flowmeter runs empty, air bubbles can form (1).
- Provide for a siphon fluid intake for free inlets or outlets so that the pipeline is always full (2).

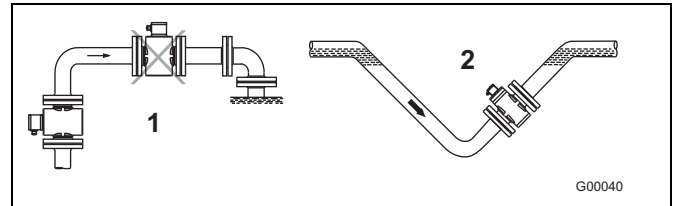


Fig. 6

3.3.6 Strongly contaminated fluids

- For strongly contaminated fluids, a bypass connection according to the figure is recommended so that operation of the system can continue to run without interruption during the mechanical cleaning.

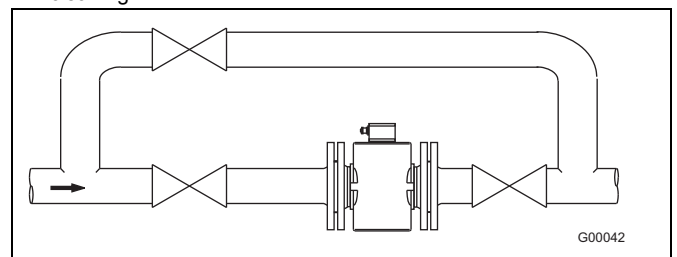


Fig. 7

3.3.7 Installation in the vicinity of pumps

- For flowmeter primaries which are to be installed in the vicinity of pumps or other vibration generating equipment, the utilization of mechanical snubbers is advantageous.

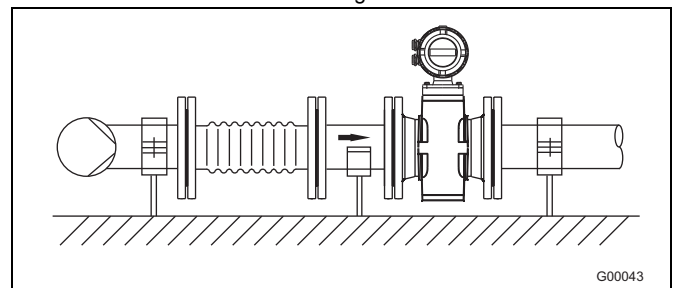


Fig. 8

3.3.8 Installation in larger size pipelines

Determine the arising pressure loss for use of flanged reducers (1):

1. Calculate the diameter ratio d/D .
2. Determine the flow velocity from the flow range nomograph (Fig. 10).
3. Read the pressure drop on the Y-axis in Fig. 10.

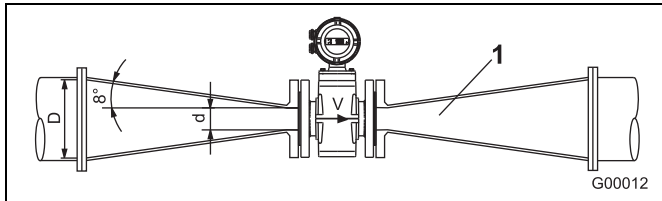


Fig. 9

- d = Inside diameter of the flowmeter
- v = Flow velocity [m/s]
- Δp = Pressure drop [mbar]
- D = Inside diameter of the pipeline

Nomograph for pressure drop determinations

For adaptor with $\alpha/2 = 8^\circ$

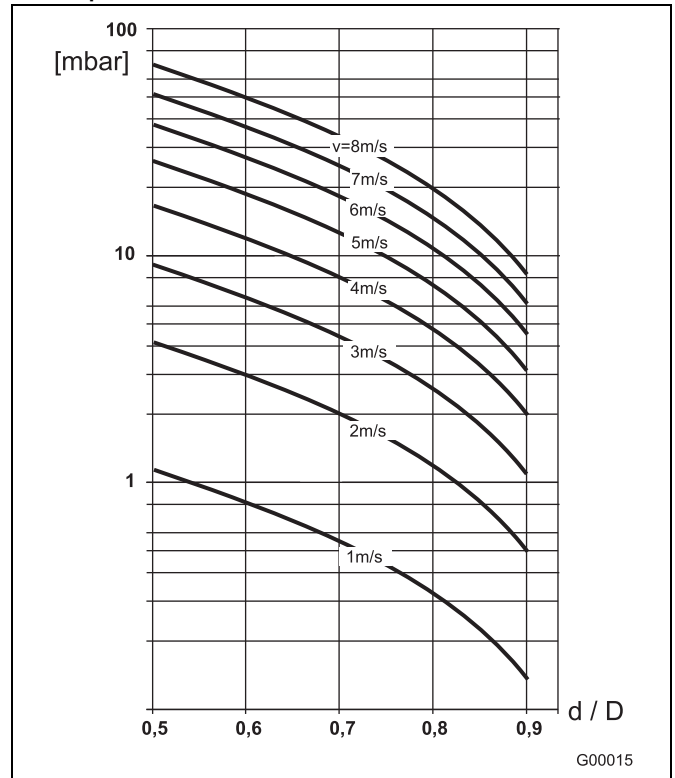


Fig. 10

3.4 Flowmeter Sizes, Pressure Ratings, Flow Range

Meter Size	Std. Press. Rating PN	Min. Flow Range Flow Velocity				Max. Flow Range Flow Velocity			
		0 ... 0.5 m/s				0 ... 10 m/s			
3 1/10	40	0 ... 0.2	l/min	0.1	US gal/min	0 ... 4	l/min	1.1	US gal/min
4 5/32	40	0 ... 0.4	l/min	0.1	US gal/min	0 ... 8	l/min	2.1	US gal/min
6 1/4	40	0 ... 1	l/min	0.3	US gal/min	0 ... 20	l/min	5.3	US gal/min
8 5/16	40	0 ... 1.5	l/min	0.4	US gal/min	0 ... 30	l/min	7.9	US gal/min
10 3/8	40	0 ... 2.25	l/min	0.6	US gal/min	0 ... 45	l/min	12	US gal/min
15 1/2	40	0 ... 5.0	l/min	1.3	US gal/min	0 ... 100	l/min	36	US gal/min
20 3/4	40	0 ... 7.5	l/min	2.0	US gal/min	0 ... 150	l/min	40	US gal/min
25 1	40	0 ... 10	l/min	2.6	US gal/min	0 ... 200	l/min	53	US gal/min
32 1 1/4	40	0 ... 20	l/min	5.3	US gal/min	0 ... 400	l/min	106	US gal/min
40 1 1/2	40	0 ... 30	l/min	7.9	US gal/min	0 ... 600	l/min	159	US gal/min
50 2	40	0 ... 3	m ³ /h	13	US gal/min	0 ... 60	m ³ /h	264	US gal/min
65 2 1/2	40	0 ... 6	m ³ /h	26	US gal/min	0 ... 120	m ³ /h	528	US gal/min
80 3	40	0 ... 9	m ³ /h	40	US gal/min	0 ... 180	m ³ /h	793	US gal/min
100 4	16	0 ... 12	m ³ /h	53	US gal/min	0 ... 240	m ³ /h	1057	US gal/min
125 5	16	0 ... 21	m ³ /h	92	US gal/min	0 ... 420	m ³ /h	1849	US gal/min
150 6	16	0 ... 30	m ³ /h	132	US gal/min	0 ... 600	m ³ /h	2642	US gal/min
200 8	10/16	0 ... 54	m ³ /h	238	US gal/min	0 ... 1080	m ³ /h	4755	US gal/min
250 10	10/16	0 ... 90	m ³ /h	396	US gal/min	0 ... 1800	m ³ /h	7925	US gal/min
300 12	10/16	0 ... 120	m ³ /h	528	US gal/min	0 ... 2400	m ³ /h	10567	US gal/min
350 14	10/16	0 ... 165	m ³ /h	726	US gal/min	0 ... 3300	m ³ /h	14529	US gal/min
400 16	10/16	0 ... 225	m ³ /h	991	US gal/min	0 ... 4500	m ³ /h	19813	US gal/min
450 18	10/16	0 ... 300	m ³ /h	1321	US gal/min	0 ... 6000	m ³ /h	26417	US gal/min
500 20	10	0 ... 330	m ³ /h	1453	US gal/min	0 ... 6600	m ³ /h	29059	US gal/min
600 24	10	0 ... 480	m ³ /h	2113	US gal/min	0 ... 9600	m ³ /h	30380	US gal/min
700 28	10	0 ... 660	m ³ /h	2906	US gal/min	0 ... 13200	m ³ /h	58118	US gal/min
800 32	10	0 ... 900	m ³ /h	3963	US gal/min	0 ... 18000	m ³ /h	79252	US gal/min
900 36	10	0 ... 1200	m ³ /h	5283	US gal/min	0 ... 24000	m ³ /h	105669	US gal/min
1000 40	10	0 ... 1350	m ³ /h	5944	US gal/min	0 ... 27000	m ³ /h	118877	US gal/min

Flanged design and pressure ratings

Meter Size	Flange ¹⁾	Material	PN	DGRL
3 ... 25 (1/10 ... 1")	DIN ASME JIS	SS1.4571[316Ti] or steel	40 bar CL150, CL300 10 bar	SEP Art.3 Abs.3
32 (1 1/4")	DIN ASME JIS	SS1.4571[316Ti] or steel	40 bar CL150, CL300 10 bar	Selectively with or without conformity evaluation per Category III, Module B1+D, Fluid Group 1
40 (1 1/2")	DIN ASME JIS	SS1.4571[316Ti] or steel	40 bar CL150, CL300 10 bar	
50 (2")	DIN ASME JIS	SS1.4571[316Ti] or steel	40 bar CL150, CL300 10 bar	
65 (2 1/2")	DIN ASME JIS	SS1.4571[316Ti] or steel	16, 40 bar CL150, CL300 10 bar	
80 (3")	DIN ASME JIS	SS1.4571[316Ti] or steel	40 bar CL150, CL300 10 bar	
100 (4")	DIN ASME JIS	SS1.4571[316Ti] or steel	16, 40 bar CL150, CL300 10 bar	
125 (5")	DIN ASME	SS1.4571[316Ti] or steel	16, 40 bar CL150, CL300	
150 (6")	DIN ASME	SS1.4571[316Ti] or steel	16, 40 bar CL150, CL300	
200 (8")	DIN ASME	SS1.4571[316Ti] or steel	10, 16, 25, 40 bar CL150, CL300	
250 (10")	DIN ASME	SS1.4571[316Ti] or steel	10, 16, 25, 40 bar CL150, CL300	
300 (12")	DIN ASME	SS1.4571[316Ti] or steel	10, 16, 25, 40 bar CL150, CL300	
350 ... 600 (14 ... 24")	DIN ASME	SS1.4571[316Ti] or steel	10, 16, 25 bar CL150	
700 ... 1000 (28 ... 40")	DIN ASME	SS1.4571[316Ti] or steel	10, 16, 25 bar CL150	

¹⁾ Connection dimensions for flange according to DIN2501 / EN1092-1 or ASME or JIS respectively.

3.5 Flowrate nomograph

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

Example:

Flowrate = 7 m³/h (maximum value = flow range end value). Suitable are flowmeter primary sizes DN 20 : 3/4" to DN 65 : 2-1/2" for flow velocities between 0.5 and 10 m/s.

Flowrange nomograph DN 3 ... 1000 (1/10 ... 40")

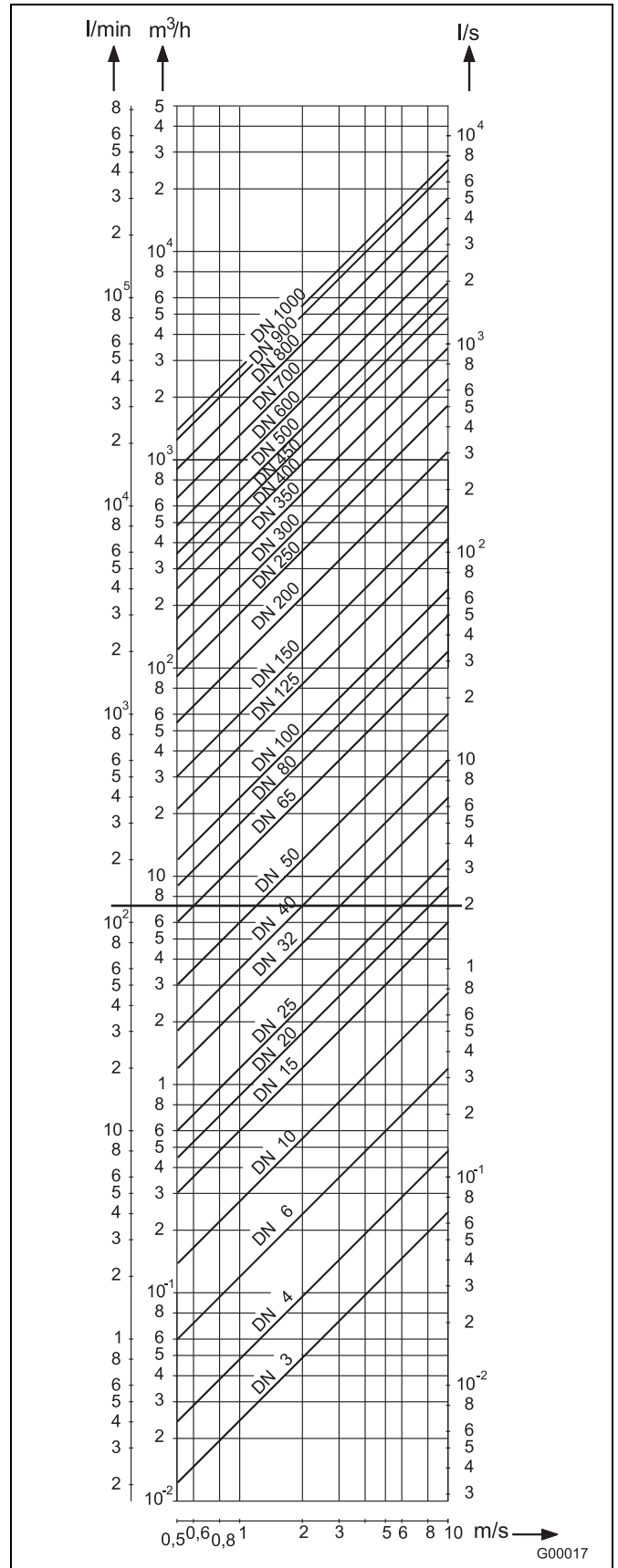


Fig. 11

3.6 Approved EMF for custody transfer

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 with a Class "A and B" electrical counter for cold water and waste water
87.12	
5.721	Electromagnetic volume flowrate totalizer with electrical counter for liquids other than water
87.05	

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.

3.6.1 Approved flowmeter sizes for "cold water and waste water"

DN	Min. Allow. Flow Range End Value (approx. 2 m/s)		Max. Allow. Flow Range End Value (approx. 10 m/s)	
25	2,4	m ³ /h	12	m ³ /h
32	5	m ³ /h	25	m ³ /h
40	9	m ³ /h	45	m ³ /h
40	14	m ³ /h	70	m ³ /h
65	24	m ³ /h	120	m ³ /h
80	36	m ³ /h	180	m ³ /h
100	56	m ³ /h	280	m ³ /h
125	84	m ³ /h	420	m ³ /h
150	128	m ³ /h	640	m ³ /h
000	220	m ³ /h	1100	m ³ /h
250	360	m ³ /h	1800	m ³ /h
300	500	m ³ /h	2500	m ³ /h
350	700	m ³ /h	3500	m ³ /h
400	900	m ³ /h	4500	m ³ /h
500	1420	m ³ /h	7100	m ³ /h
600	2000	m ³ /h	10000	m ³ /h
700	2800	m ³ /h	14000	m ³ /h
800	3600	m ³ /h	18000	m ³ /h
900	4600	m ³ /h	23000	m ³ /h
1000	5600	m ³ /h	28000	m ³ /h

3.6.2 Approved flowmeter sizes for "liquids other than water and chemical fluids"

Flowmeter Size and Maximum Allowable Flowrates				
DN	Q _{max} Liter/min			
25	Selectively	60 ... 200	In steps of	10
32	Selectively	100 ... 400	In steps of	20
40	Selectively	150 ... 750	In steps of	50
50	Selectively	250 ... 1000	In steps of	50
65	Selectively	400 ... 2000	In steps of	100
80	Selectively	700 ... 3000	In steps of	100
100	Selectively	900 ... 4500	In steps of	100
150	Selectively	2000 ... 10000	In steps of	500

Minimum Flowrates and Fluids		
DN	Minimum Flowrate Liter	Fluid
25	20	Beer
32	20	Beer
40	20	Beer, Milk
50	200	Beer, Wort
65	500	Milk, Wort, Beer
80	500	Milk, Wort, Beer
100	2000	Brine, Wort
150	2000	Brine

Min. flow range: approx. 2.5 m/s. Max. flow range approx. 10 m/s. The actual flow ranges must be in accord with the values listed in the tables. Subsequent range changes require a new calibration on an agency certified test stand.

3.6.3 Installation requirements for volume flowrate totalizers

The following installation requirements are to be observed in each case:

For flow metering in one flow direction:

Cold/Waste Water	
In front of flowmeter primary	After flowmeter primary
5 x DN	2 x DN
Other Fluids (other than water)	
10 x DN	5 x DN

For flow metering in both flow directions:

Cold/Waste Water	
In front of flowmeter primary	After flowmeter primary
5 x DN	5 x DN
Other Fluids (other than water)	
10 x DN	10 x DN

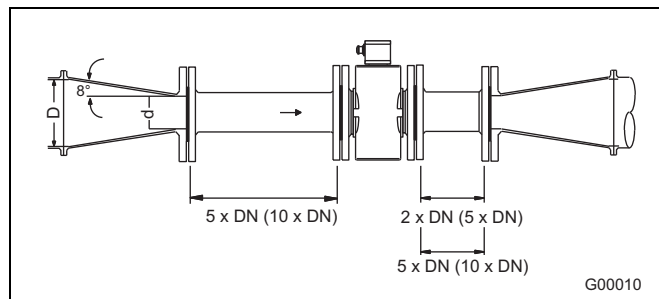


Fig. 12

4 Specifications:

4.1 Model DE41F, DE41W, DE43F, DE43W

4.1.1 General specifications

Min. allow. Pressure as a function of Fluid Temperature

Liner	Meter Size	P _{Operation} mbar abs.	at T _{Operation} *
Hard rubber	15 ... 250 (1/2 ... 10")	0	< 90 °C (194 °F)
	300 ... 1000 (12 ... 40")	0	< 90 °C (194 °F)
Soft rubber	50 ... 250 (2 ... 10")	0	< 70 °C (158 °F)
	300 ... 1000 (12 ... 40")	0	< 70 °C (158 °F)
PTFE KTW approved	10 ... 600 (3/8 ... 24")	270	< 20 °C (68 °F)
		400	< 100 °C (212 °F)
		500	< 130 °C (266 °F)
PFA	3 ... 100 (1/10 ... 4")	0	< 130 °C (266 °F)

* Higher temperatures are allowed for CIP/SIP cleaning for limited time periods, see Table „Maximum Allowable Cleaning Temperature“.

Max. Allowable-Cleaning Temperature

CIP-Cleaning	Liner	T _{max}	T _{max} - minutes	T _{Amb.}
Steam-cleaning	PTFE, PFA	150 °C (302 °F)	60	25 °C (77 °F)
Liquid-cleaning	PTFE, PFA	140 °C (284 °F)	60	25 °C (77 °F)

f the ambient temperature is > 25°C, then the difference must be subtracted from the max. cleaning temperature. T_{max} - Δ °C. Δ °C = T_{Amb.} - 25 °C).

Min. Allowable Ambient Temperature as a function of Fluid Temperature

For flowmeters with carbon steel flangers

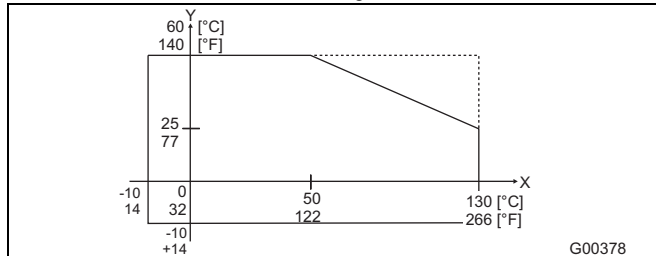


Fig. 13

For flowmeter with stainless steel flangers

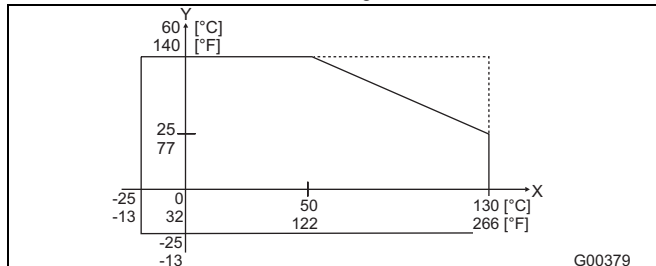


Fig. 14

- Y = Ambient temperature °C/°F
- X = Fluid temperature °C/°F
- Temperature range for COPA-XE
- - - - - Temperature range for MAG-XE

Notes regarding min./max. measuring temperature

Liner	Flange material	min. temp	max. temp
Hard-rubber	steel	-10 °C (14°F)	90 °C (194 °F)
Hard-rubber	stainless steel 1.4571	-15 °C (5 °F)	90 °C (194 °F)
Soft-rubber	steel	-10 °C (14°F)	70 °C (158 °F)
Soft-rubber	stainless steel 1.4571	-15 °C (5 °F)	70 °C (158 °F)
PTFE / PFA	steel	-10 °C (14°F)	130 °C (266 °F)
PTFE / PFA	stainless steel 1.4571	-25 °C (-13 °F)	130 °C (266 °F)

Materials, Flowmeter Primary

Part	Standard	Options
Liner	PTFE, PFA, hard rubber, soft rubber	-
Signal and ground electrodes for - Hard rubber, soft rubber	SS 1.4571 [316Ti]	Hast. B-3 (2.4600), Hast. C-4 (2.4610), Titanium, Tantalum, Platinum-Iridium, 1.4539 [904L]
- PTFE, PFA	Hast. C-4 (2.4610)	SS1.4571[316Ti] Hast. B-3 (2.4600) Titanium, Tantalum, Platinum-Iridium, 1.4539 [904L]
Ground plate	SS 1.4571 [316Ti]	Upon request
Protection plate	SS 1.4571 [316Ti]	Upon request

Process Connection Materials

Part	Standard	Options
Flange DN 3 ... 15 (1/10 ... 1/2") DN 20 ... 400 (3/4 ... 16")	SS 1.4571 [316Ti] (standard) Steel (galvanized)	SS1.4571-[316Ti]
DN 450 ... 1000 (18 ... 40")	Steel (painted)	SS1.4571-[316Ti]

Part	Standard	Options
Housing DN 3 ... 400(1/10 ... 16")	Two-piece cast aluminum housing, painted, paint coat 60 µm thick, RAL 9002	-
DN 450 ... 1000 (18 ... 40")	Welded steel construction, painted, paint coat 60 µm thick, RAL 9002	-
Connection box	Cast alum., painted, 60 µm thick, frame: dark gray, RAL7012, cover: light gray, RAL 9002	-
Meter tube	SS 1.4301 [304]	-
PG-Connector	Polyamide	-

Storage Temperature

-20 °C (-4 °F) ... 70 °C (158 °F)

Protection Class per EN 60529

IP 67

IP 68 (only for MAG-XE flowmeter primary)

Pipeline Vibration Following EN 60068-2-6

The following applies for compact design FXE4000 (COPA-XE):

- In the range of 10 - 55 Hz max. 0.15 mm deflection
- In the range of 55 -150 Hz max. 2 g acceleration

The following applies for separate converter (MAG-XE):

Converter

- In the range of 10 - 55 Hz max. 0.15 mm deflection

Flowmeter primary

- In the range of 10 - 55 Hz max. 0.15 mm deflection
- In the range of 55 -150 Hz max. 2 g acceleration

Designs

The flanged flowmeters comply with the installation lengths defined in VDI/VDE 2641, ISO 13359 or DVGW (W420, Design WP, ISO 4064 short).

4.1.2 Material load for flanged design model DE41F / DE43F

Limits for the allowable fluid temperature (TS) and allowable pressure (PS) are a function of the liner and flange materials of the flowmeter (see instrument name plate).

Temperature limits

Liner	Flange material	min. temp	max. temp
Hard-rubber	Steel	-10 °C (14°F)	90 °C (194 °F)
Hard-rubber	Stainless steel 1.4571	-15 °C (5 °F)	90 °C (194 °F)
Soft-rubber	Steel	-10 °C (14°F)	70 °C (158 °F)
Soft-rubber	Stainless steel 1.4571	-15 °C (5 °F)	70 °C (158 °F)
PTFE / PFA	Steel	-10 °C (14°F)	130 °C (266 °F)
PTFE / PFA	Stainless steel 1.4571	-25 °C (-13 °F)	130 °C (266 °F)

DIN-Flange SS 1.4571 [316Ti] to DN 600 (24")

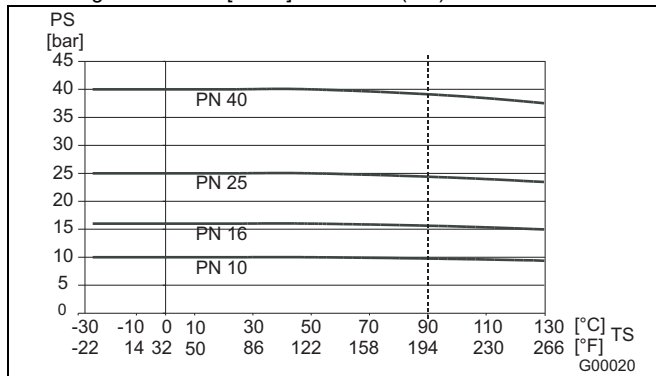


Fig. 15

ASME Flange SS1.4571[316Ti] to DN 300 (12") (CL150/300) to DN 1000 (40") (CL150)

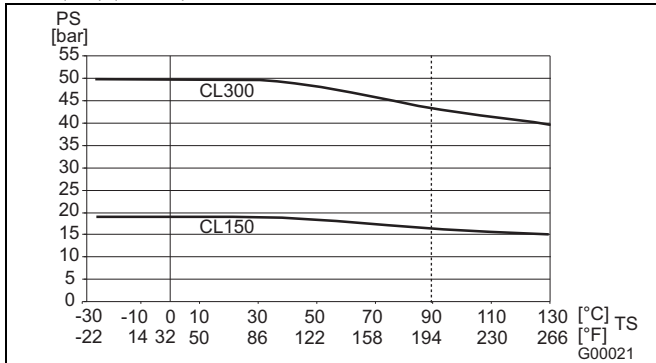


Fig. 16

DIN-Flange Steel to DN 600 (24")

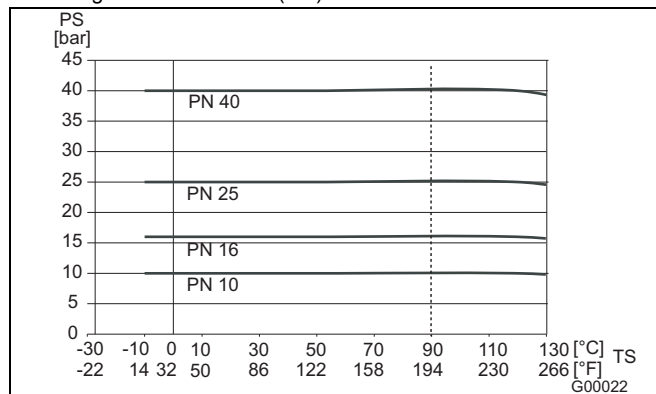


Fig. 17

ASME flange carbon steel to DN 300 (12") (CL150/300) to DN 1000 (40") (CL150)

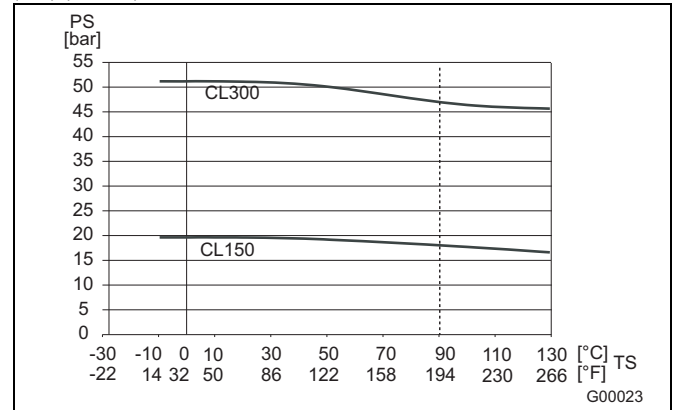


Fig. 18

JIS 10K-B2210 flange

Meter Size	Material	PN	TS	PS [bar]
32 ... 100 (1¼ ... 4")	SS1.4571 [316Ti]	10	-25 ... +130 °C (-13 ... +266 °F)	10
32 ... 100 (1¼ ... 4")	Carbon Steel	10	-25 ... +130 °C (-13 ... +266 °F)	10

DIN-Flange SS 1.4571 DN 700 (28") to DN 1000 (40")

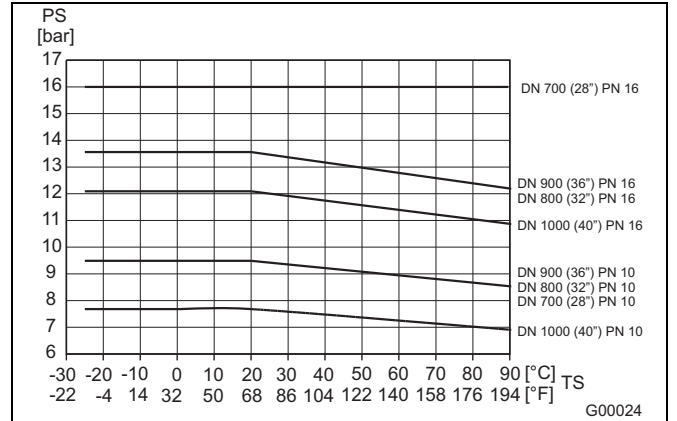


Fig. 19

DIN-Flange carbon steel DN 700 (28") to DN 1000 (40")

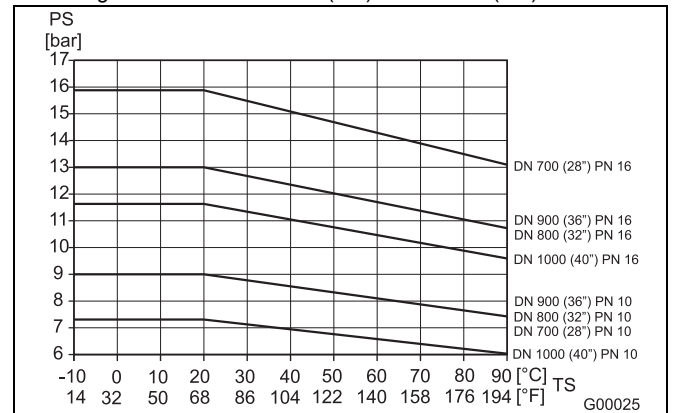


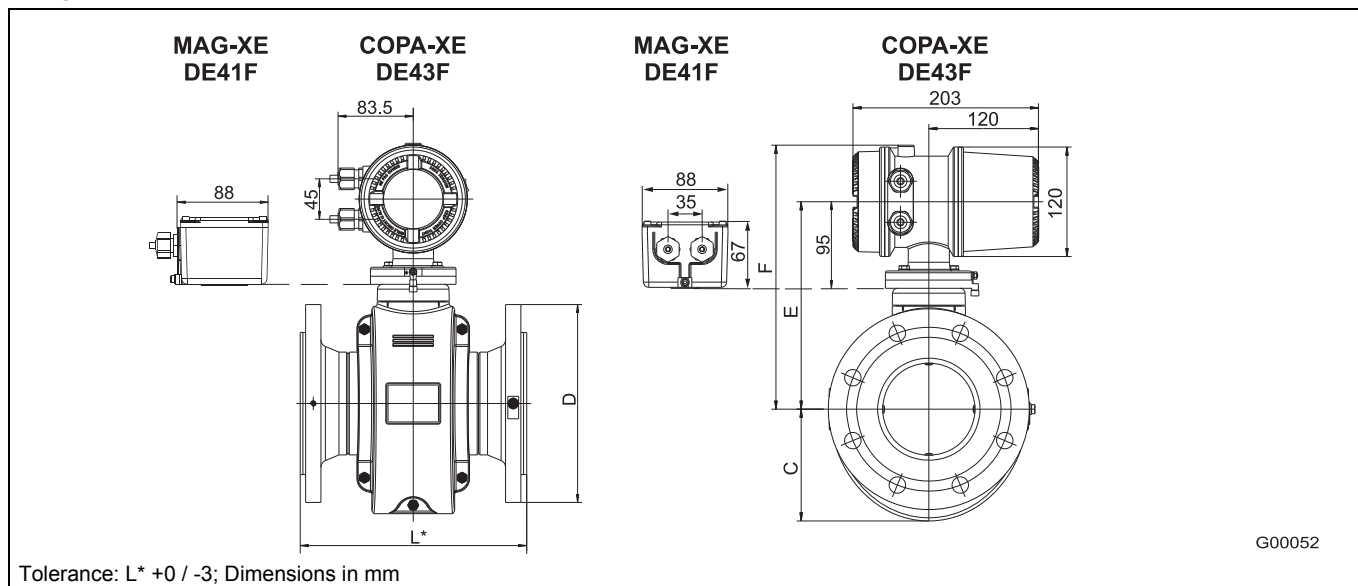
Fig. 20

**4.1.3 Material load for wafer design models
DE41W/DE43W**

Meter Size	TS_{max}	TS_{min}	PS_{max} [bar]
3-100 (1/10 ... 4")	130 °C (266 °F)	-10 °C (14 °F)	16 (CL 150)

4.1.4 Flowmeter scale drawings for Model DE41F and DE43F

Flange DN 3 ... 125 (1/10 ... 5")



Tolerance: L* +0 / -3; Dimensions in mm

Fig. 21

Flanges according to DIN/EN 1092-1 ⁸⁾

Dimensions [mm]							Weight approx. [kg]	
DN	PN ¹⁾	D	L ²⁾³⁾	F	C	E	COPA-XE	MAG-XE
3-8 ⁵⁾	10 ... 40	90	130	219	62	157	6	5
10	10 ... 40	90	200	243	82	181	6	5
15	10 ... 40	95	200	243	82	181	6,5	5,5
20	10 ... 40	105	200	243	82	181	7	6
25	10 ... 40	115	200	243	82	181	8	6,5
32	10 ... 40	140	200	250	92	188	9	8
40	10 ... 40	150	200	250	92	188	10	9
50	10 ... 40	165	200	256	97	194	12	10
65	10 ... 40	185	200	267	108	205	16	15
80	10 ... 40	200	200	267	108	205	19	18
100	10 ... 16	220	250	289	122	227	22	20
125	10 ... 16	250	250	299	130	237	29	28

Flanges according to ASME B16.5 (for the dimensions F, C, E see table DIN flanges)

Dimensions [mm]						Weight approx. [kg]	
DN	Zoll	CL150 D	CL300 D	L ³⁾⁴⁾		COPA-XE	MAG-XE
				ISO 13359 ⁷⁾	ABB (old installation length)		
3-8	1/8 ... 5/16 ⁵⁾	89	96	130	130	6	5
10	3/8 ⁶⁾	89	96	200	270	6	5
15	1/2	89	96	200	270	6,5	5,5
20	3/4	98	118	200	270	7	6
25	1	108	124	200	270	8	6,5
32	1 1/4	118	134	200	280	9	8
40	1 1/2	127	156	200	280	10	9
50	2	153	165	200	280	12	10
65	2 1/2	178	191	200	330	16	15
80	3	191	210	200	340	19	18
100	4	229	254	250	400	28	27
125	5	254	280	250	450	36	35

1) Other press. ratings upon request.

2) If a ground ring (mounted on one side of the meter) is installed, the L dimension increases as follows: DN 3 ... 100 by 3 mm.

3) If protection rings (mounted on both sides of the meter) are installed, the L dimension increases as follows: DN 3 ... 100 by 6 mm.

4) If protection flanges (mounted on each ASME flange, old installation length) are installed, the L dimension increases as follows:

- DN 3 ... 80 by 20 mm
- DN 100 and larger by 25 mm

5) Connection flange DN 10

6) Connection flange 1/2"

7) For PFA liner and ASME flanges, only ISO installation lengths.

8) Connection dimensions according to EN 1092-1. For DN 65, PN 16 according to EN 1092-1 please order PN 40.

Flange DN 150 ... 400 (6 ... 16")

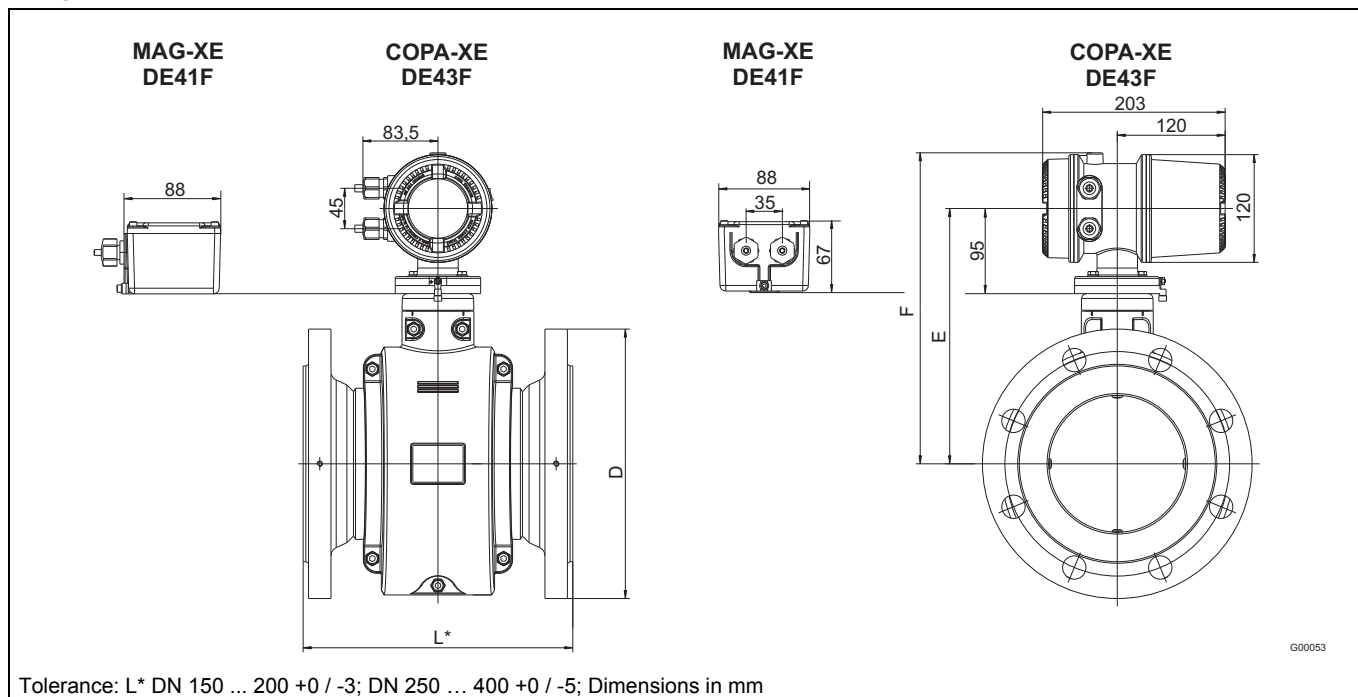


Fig. 22

Flanges according to DIN/EN 1092-1

Dimensions [mm]						Weight approx. [kg]	
DN	PN ¹⁾	D	L	F	E	COPA-XE	MAG-XE
150	10-16	285	300	346	265	40	38
200	10	340	350	372	310	66	64
200	16	340	350	372	310	66	64
250	10	395	450	401	339	105	103
250	16	405	450	401	339	105	103
300	10	445	500	424	362	120	118
300	16	460	500	424	362	120	118
350	10	505	550	466	404	145	143
350	16	520	550	466	404	145	143
400	10	565	600	466	404	179	177
400	16	580	600	466	404	179	177

Flanges according to ASME B16.5 (for the dimensions F, E see table DIN flanges)

Dimensions [mm]						Weight approx. [kg]	
DN	Zoll	CL150 D	CL300 D	L ^{2) 3) 4)}		COPA-XE	MAG-XE
				ISO 13359	ABB (old installation length)		
150	6	280	318	300	450	47	45
200	8	343	381	350	500	71	69
250	10	407	445	450	550	103	101
300	12	483	521	500	620	140	138
350	14	533	-	550	650	190	188
400	16	597	-	600	700	231	229

¹⁾ Other press. ratings upon request.

²⁾ If a ground ring (mounted on one side of the meter) is installed, the L dimension increases by 5 mm.

³⁾ If protection rings (mounted on both sides of the meter) are installed, the L dimension increases by 10 mm.

⁴⁾ If protection flanges (mounted on each ASME flange, old installation length) are installed, the L dimension by 25 mm.

Flange DN 450 ... 1000 (18 ... 40")

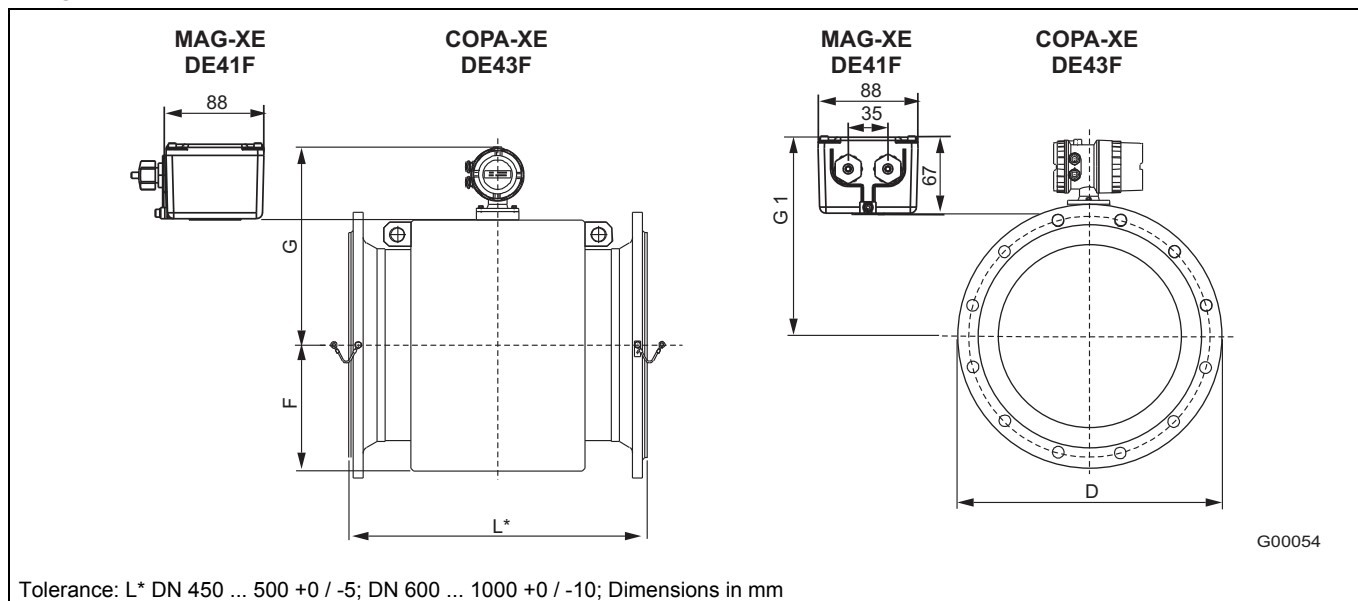


Fig. 23

Flanges according to DIN/EN 1092-1

Dimensions [mm]							Weight approx. [kg]	
DN	PN ¹⁾	D	L	F	G	G1	COPA-XE	MAG-XE
500	10	670	650	310	492	403	196,0	191,0
600	10	780	780	361	543	454	276,0	243,0
700	10	895	910	448	570	495	319,0	315,0
800	10	1015	1040	508	620	545	409,0	405,0
900	10	1115	1170	558	670	595	487,0	483,0
1000	10	1230	1300	615	720	645	579,0	575,0

Flanges up to DN600 (24") according to ASME B16.5 (for the dimensions F see table DIN flanges)

Flanges DN700 – 1000 (28" – 40") according to ASME B16.47 Serie B (for the dimensions F see table DIN flanges)

Dimensions [mm]						Weight approx. [kg]			
DN	Inch	CL150 D	CL300 D	L ^{2) 3) 4)}		COPA-XE		MAG-XE	
				ISO 13359	ABB (old installation length)	approx. kg	approx. kg	approx. kg	approx. kg
450	18	635	-	686	-	235	-	230	-
500	20	699	-	762	780	268	-	263	-
600	24	813	-	914	850	295	-	293	-
700	28	837	-	-	910	387	-	385	-
800	32	942	-	-	1040	515	-	513	-
900	36	1057	-	-	1170	664	-	552	-
1000	40	1380	-	-	1300	1134	-	1132	-

- 1) Other press. ratings upon request.
- 2) If a ground ring (mounted on one side of the meter) is installed, the L dimension increases by 5 mm.
- 3) If protection rings (mounted on both sides of the meter) are installed, the L dimension increases by 10 mm.
- 4) If protection flanges (mounted on each ASME flange, old installation length) are installed, the L dimension by 25 mm.

4.1.5 Flowmeter scale drawings for Model DE41W and DE43W

Wafer Design DN 3 ... 100 (1/10 ... 4")

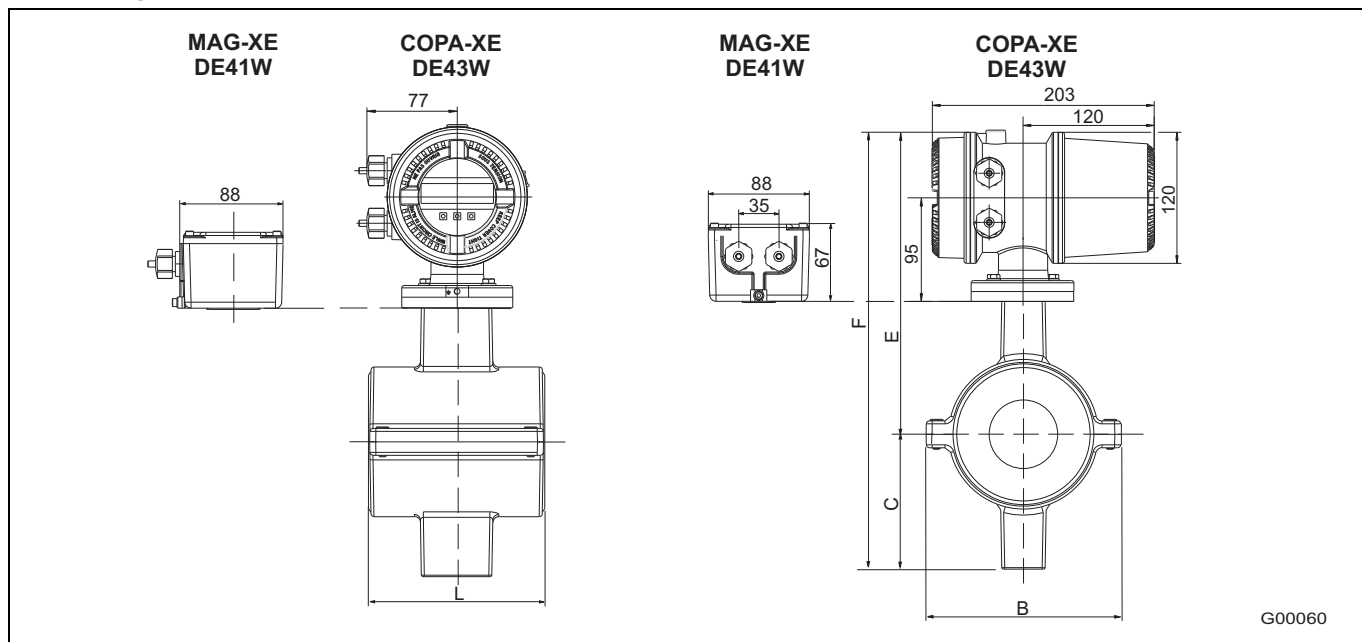


Fig. 24 Dimensions in mm

Dimensions [mm]							Weight approx. [kg]	
DN	PN	L	B	C	E	F	COPA-XE	MAG-XE
3-10	16	69	75	62	157	281	3,0	2,0
15	16	69	75	62	157	281	3,0	2,0
25	16	91	95	73	168	292	4,5	3,5
32	16	99	103	78	173	297	5,0	4,0
40	16	104	112	82	177	301	6,0	5,0
50	16	119	130	90	185	337	6,5	5,5
65	16	103	146	104	199	365	8,0	7,0
80	16	103	163	110	205	377	9,0	8,0
100	16	133	190	130	225	417	10,0	9,0

4.1.6 Ordering Information

Electromagnetic Flowmeter FXE4000-DE43F (COPA-XE) compact with welded flange		Variant digit No. Catalog No.	1 - 6	7	8	9	10	11	12	13	14	15	16	17			
		DE43F-															
Liner Material	Meter Size																
PFA	DN 3 1/10 in.	1) 3)	P	0	3												
PFA	DN 4 5/32 in.	1) 3)	P	0	4												
PFA	DN 6 1/4 in.	1) 3)	P	0	6												
PFA	DN 8 5/16 in.	1) 3)	P	0	8												
PFA	DN 10 3/8 in.	1)	P	1	0												
PFA	DN 15 1/2 in.	1)	P	1	5												
PFA	DN 20 3/4 in.	1)	P	2	0												
PFA	DN 25 1 in.	1)	P	2	5												
PFA	DN 32 1-1/4 in.	1)	P	3	2												
PFA	DN 40 1-1/2 in.	1)	P	4	0												
PFA	DN 50 2 in.	1)	P	5	0												
PFA	DN 65 2-1/2 in.	1)	P	6	5												
PFA	DN 80 3 in.	1)	P	8	0												
PFA	DN 100 4 in.	1)	P	1	H												
PTFE	DN 10 3/8 in.		T	1	0												
PTFE	DN 15 1/2 in.		T	1	5												
PTFE	DN 20 3/4 in.		T	2	0												
PTFE	DN 25 1 in.		T	2	5												
PTFE	DN 32 1-1/4 in.		T	3	2												
PTFE	DN 40 1-1/2 in.		T	4	0												
PTFE	DN 50 2 in.		T	5	0												
PTFE	DN 65 2-1/2 in.		T	6	5												
PTFE	DN 80 3 in.		T	8	0												
PTFE	DN 100 4 in.		T	1	H												
PTFE	DN 125 5 in.		T	1	Q												
PTFE	DN 150 6 in.		T	1	F												
PTFE	DN 200 8 in.		T	2	H												
PTFE	DN 250 10 in.		T	2	F												
PTFE	DN 300 12 in.		T	3	H												
PTFE	DN 350 14 in.		T	3	F												
PTFE	DN 400 16 in.		T	4	H												
PTFE (only ASME CL 150)	DN 450 18 in.		T	4	F												
PTFE	DN 500 20 in.		T	5	H												
PTFE	DN 600 24 in.		T	6	H												
Measuring Electrodes Material	Grounding Electrodes	2)															
Hastelloy C-4 (2.4610)	Without		H														
Hastelloy B-3 (2.4600)	Without		B														
SST 1.4571 (316Ti)	Without		S														
Titanium	Without		M														
Tantalum	Without		T														
SST 1.4539 (904L)	Without		F														
Platinum-Iridium	Without		P														
Hastelloy C-4 (2.4610)	With		O														
Hastelloy B-3 (2.4600)	With		N														
SST 1.4571 (316Ti)	With		E														
Titanium	With		I														
Tantalum	With		Q														
SST 1.4539 (904L)	With		R														
Platinum-Iridium	With		G														

Continued on next page

1) PFA with ASME flanges only ISO-laid length (see pressure rating)

2) Grounding electrodes available only for meter size DN 3 ... DN 300

3) DN 3 ... DN 8 new laid length: 200 mm (for replacement with old laid length 130 mm please use model DE23F)

Note to the 3A conformity:

If 3A conformity is desired, please order model DE23

Electromagnetic Flowmeter		Variant digit No.	1 - 6	11	12	13	14	15	16	17	18	19	20	21			
FXE4000-DE43F (COPA-XE)		Catalog No.	DE43F-														
compact with welded flange																	
Pressure Rating			3)														
PN 10	ISO laid length			C													
PN 16	ISO laid length		4)	D													
PN 25	ISO laid length			E													
PN 40	Standard for DN 3 ... DN 80	ISO laid length		F													
JIS K10	ISO laid length			K													
ASME CL 150	<= DN 600 (24 in.)	old laid length, only for replacement		P													
ASME CL 300	<= DN 300 (12 in.)	old laid length, only for replacement		Q													
ASME CL 150	<= DN 600 (24 in.)	ISO laid length		R													
ASME CL 300	<= DN 400 (16 in.)	ISO laid length		S													
Material of Process Connection																	
Steel	from DN 20				1												
SST 1.4571 (316Ti)	Standard for DN 3 ... DN 15, option from DN 20				3												
Accessories																	
Without																	
Protection rings 1.4571 (316Ti) (on both sides)			5)	A													
Grounding ring 1.4571 (316Ti) (fastened on one side)			5)	B													
Protection flanges 1.4571 (316Ti) (on both sides)			6)	C													
Temperature Range																	
Standard design <= 130 °C (266 °F)					S												
Certificates																	
PED Standard																	
Material certificate per EN 10204 3.1 + pressure test per AD 2000																	
Pressure test per AD 2000																	
Inspection certificate per EN 10204 3.1																	
without DGRL certificate			7)	A													
Calibration Certificates																	
Standard																	
Custody transfer, cold water / waste water (DN 25 ... DN 600 / 1 in. ... 24 in.)																	
Custody transfer, fluids except water (DN 25 ... DN 150 / 1 in. ... 6 in.)																	
Type of Protection																	
IP 67																	
Power Supply																	
100 ... 230 V AC																	
16.8 ... 26.4 V AC / 16.8 ... 31.2 V DC																	
Display																	
Illuminated, with magnetic stick operation																	
Input / Output Options																	
Current output active + Pulse output active + Contact input + Contact output																0	1
Current output active + Pulse output active + Contact input + Contact output + HART																0	2
Current output active + Pulse output passive + Contact input + Contact output																0	3
Current output active + Pulse output passive + Contact input + Contact output + HART																0	4
Current output active + Pulse output passive + Contact output + RS 485																0	5
Pulse output passive + Contact output + PROFIBUS DP																0	6
PROFIBUS PA 3.0																1	4
FOUNDATION Fieldbus not with Custody Transfer																1	5
PROFIBUS PA 3.0 with M12 plug																1	6

Continued on next page

- 3) Connection dimensions for flanges acc. to DIN 2501 or ASME B16.5 or JIS B2210-10K
- 4) DN 65 / PN 16 with connection dimensions acc. EN 1092-1: Please order PN 40
- 5) Protection rings on both and grounding ring fastened on one side to flange, only possible for primary <= DN 300 and PTFE / PFA lining
- 6) Only possible with ASME flanges old laid length (pressure rating codes P, Q) and primary with PTFE / PFA lining
- 7) possible from DN 500 (20 in.)

Electromagnetic Flowmeter		Variant digit No.	1 - 6	15	16	17	18	19	20	21	22	23	24	25			
FXE4000-DE43F (COPA-XE)		Catalog No.	DE43F-														
compact with welded flange																	
Converter																	
Housing Material	Cable Entry																
Aluminium	M20 x 1.5									0							
Aluminium	1/2 in. NPT									2							
Aluminium	PF 1/2 in.									3							
Name Plate																	
German																	
English																	
French																	
Design Level		(Specified by ABB)															
Electrode Design																	
Standard																	
Excitation Frequency																	
6-1/4 Hz	(DN 3 ... DN 600	1/10 in. ... 24 in.)															
12-1/2 Hz	(DN 3 ... DN 100	1/10 in. ... 4 in.)															
7-1/2 Hz	(DN 3 ... DN 600	1/10 in. ... 24 in.)															
15 Hz	(DN 3 ... DN 100	1/10 in. ... 4 in.)															
25 Hz	(DN 3 ... DN 20	1/10 in. ... 3/4 in.)															

8) not with Custody Transfer

Electromagnetic Flowmeter		Variant digit No.	1 - 6	7	8	9	10	11	12	13	14	15					
FXE4000-DE43F (COPA-XE)		Catalog No.	DE43F-														
compact with welded flange																	
Liner Material	Meter Size																
Hard rubber	DN 15	1/2 in.															
Hard rubber	DN 20	3/4 in.	H	1	5												
Hard rubber	DN 25	1 in.	H	2	0												
Hard rubber	DN 32	1-1/4 in.	H	2	5												
Hard rubber	DN 40	1-1/2 in.	H	3	2												
Hard rubber	DN 50	2 in.	H	4	0												
Hard rubber	DN 50	2 in.	H	5	0												
Hard rubber	DN 65	2-1/2 in.	H	6	5												
Hard rubber	DN 80	3 in.	H	8	0												
Hard rubber	DN 100	4 in.	H	1	H												
Hard rubber	DN 125	5 in.	H	1	Q												
Hard rubber	DN 150	6 in.	H	1	F												
Hard rubber	DN 200	8 in.	H	2	H												
Hard rubber	DN 250	10 in.	H	2	F												
Hard rubber	DN 300	12 in.	H	3	H												
Hard rubber	DN 350	14 in.	H	3	F												
Hard rubber	DN 400	16 in.	H	4	H												
Hard rubber	(only ASME CL 150)	DN 450	18 in.	H	4	F											
Hard rubber	DN 500	20 in.	H	5	H												
Hard rubber	DN 600	24 in.	H	6	H												
Hard rubber	DN 700	28 in.	H	7	H												
Hard rubber	DN 800	32 in.	H	8	H												
Hard rubber	DN 900	36 in.	H	9	H												
Hard rubber	DN 1000	40 in.	H	1	T												
Soft rubber	DN 50	2 in.	S	5	0												
Soft rubber	DN 65	2-1/2 in.	S	6	5												
Soft rubber	DN 80	3 in.	S	8	0												
Soft rubber	DN 100	4 in.	S	1	H												
Soft rubber	DN 125	5 in.	S	1	Q												
Soft rubber	DN 150	6 in.	S	1	F												
Soft rubber	DN 200	8 in.	S	2	H												
Soft rubber	DN 250	10 in.	S	2	F												
Soft rubber	DN 300	12 in.	S	3	H												
Soft rubber	DN 350	14 in.	S	3	F												
Soft rubber	DN 400	16 in.	S	4	H												
Soft rubber	(only ASME CL 150)	DN 450	18 in.	S	4	F											
Soft rubber	DN 500	20 in.	S	5	H												
Soft rubber	DN 600	24 in.	S	6	H												
Soft rubber	DN 700	28 in.	S	7	H												
Soft rubber	DN 800	32 in.	S	8	H												
Soft rubber	DN 900	36 in.	S	9	H												
Soft rubber	DN 1000	40 in.	S	1	T												

Continued on next page

Note to the 3A conformity:
If 3A conformity is desired, please order model DE23

Electromagnetic Flowmeter		Variant digit No.	1 - 6	10	11	12	13	14	15	16	17	18						
FXE4000-DE43F (COPA-XE)		Catalog No.	DE43F-															
compact with welded flange																		
Measuring Electrodes Material		Grounding Electrodes																
SST 1.4571 (316Ti)		Without		S														
Hastelloy C-4 (2.4610)		Without			H													
Hastelloy B-3 (2.4600)		Without			B													
Titanium		Without			M													
Tantalum		Without			T													
SST 1.4539 (904L)		Without			F													
Platinum-Iridium		Without		P														
SST 1.4571 (316Ti)		With		E														
Hastelloy C-4 (2.4610)		With			O													
Hastelloy B-3 (2.4600)		With			N													
Titanium		With			I													
Tantalum		With			Q													
SST 1.4539 (904L)		With			R													
Platinum-Iridium		With		G														
Pressure Rating																		
PN 10		ISO laid length		1)	C													
PN 16		ISO laid length		2)		D												
PN 25		ISO laid length				E												
PN 40		Standard for DN 15 ... DN 80		ISO laid length		F												
JIS K10		ISO laid length				K												
ASME CL 150		<= DN 600 (24 in.)		old laid length, only for replacement		P												
ASME CL 300		<= DN 300 (12 in.)		old laid length, only for replacement		Q												
ASME CL 150		<= DN 600 (24 in.)		ISO laid length		R												
ASME CL 300		<= DN 400 (16 in.)		ISO laid length	S													
Material of Process Connection																		
Steel		from DN 20				1												
SST 1.4571 (316Ti)		Standard for DN 15, option from DN 20				3												
Accessories																		
Without						A												
Temperature Range																		
Standard design <= 90 °C (194 °F)						S												
Certificates																		
PED Standard																		
Material certificate per EN 10204 3.1 + pressure test per AD 2000																		
Pressure test per AD 2000																		
Inspection certificate per EN 10204 3.1																		
Without DGRL certificate																		
Calibration Certificates																		
Standard																		
Custody transfer, cold water / waste water		(DN 25 ... DN 600 / 1 in. ... 24 in.)																
Custody transfer, fluids except water		(DN 25 ... DN 150 / 1 in. ... 6 in.)																
Type of Protection																		
IP 67																		
Power Supply																		
100 ... 230 V AC																		
16.8 ... 26.4 V AC / 16.8 ... 31.2 V DC																		

Continued on next page

- 1) Connection dimensions for flanges acc. to DIN 2501 / EN 1092-1 or ASME B16.5 or JIS B2210-10K
- 2) DN 65 / PN 16 with connection dimensions acc. EN 1092-1: Please order PN 40
- 3) possible from DN 500 (20 in.)

Electromagnetic Flowmeter		Variant digit No.	1	6	18	19	20	21	22	23	24	25	26			
FXE4000-DE43F (COPA-XE)		Catalog No.	DE43F-													
compact with welded flange																
Display																
Illuminated, with magnetic stick operation			D													
Input / Output Options																
Current output active + Pulse output active + Contact input + Contact output			0	1												
Current output active + Pulse output active + Contact input + Contact output + HART			0	2												
Current output active + Pulse output passive + Contact input + Contact output			0	3												
Current output active + Pulse output passive + Contact input + Contact output + HART			0	4												
Current output active + Pulse output passive + Contact output + RS 485			0	5												
Pulse output passive + Contact output + PROFIBUS DP			0	6												
PROFIBUS PA 3.0			1	4												
FOUNDATION Fieldbus not with Custody Transfer			1	5												
PROFIBUS PA 3.0 with M12 plug			1	6												
Converter																
Housing Material	Cable Entry															
Aluminium	M20 x 1.5		0													
Aluminium	1/2 in. NPT		2													
Aluminium	PF 1/2 in.		3													
Name Plate																
German									G							
English			4)						E							
French			4)						F							
Design Level (Specified by ABB)									*							
Electrode Design																
Standard										1						
Excitation Frequency																
6-1/4 Hz	(DN 3 ... DN 1000 1/10 in. ... 40 in.)												1			
12-1/2 Hz	(DN 3 ... DN 100 1/10 in. ... 4 in.)												2			
7-1/2 Hz	(DN 3 ... DN 1000 1/10 in. ... 40 in.)												3			
15 Hz	(DN 3 ... DN 100 1/10 in. ... 4 in.)												4			
25 Hz	(DN 3 ... DN 20 1/10 in. ... 3/4 in.)												5			

4) not with Custody Transfer

Electromagnetic Flowmeter			Variant digit No.	1 - 6	7	8	9	10	11	12	13	14	15	16	17			
FXE4000-DE41F remote with welded flange			(MAG-XE) Catalog No.	DE41F-														
Liner Material	Meter Size																	
PFA	DN 3	1/10 in.	1) 3)	P	0	3												
PFA	DN 4	5/32 in.	1) 3)	P	0	4												
PFA	DN 6	1/4 in.	1) 3)	P	0	6												
PFA	DN 8	5/16 in.	1) 3)	P	0	8												
PFA	DN 10	3/8 in.	1)	P	1	0												
PFA	DN 15	1/2 in.	1)	P	1	5												
PFA	DN 20	3/4 in.	1)	P	2	0												
PFA	DN 25	1 in.	1)	P	2	5												
PFA	DN 32	1-1/4 in.	1)	P	3	2												
PFA	DN 40	1-1/2 in.	1)	P	4	0												
PFA	DN 50	2 in.	1)	P	5	0												
PFA	DN 65	2-1/2 in.	1)	P	6	5												
PFA	DN 80	3 in.	1)	P	8	0												
PFA	DN 100	4 in.	1)	P	1	H												
PTFE	DN 10	3/8 in.		T	1	0												
PTFE	DN 15	1/2 in.		T	1	5												
PTFE	DN 20	3/4 in.		T	2	0												
PTFE	DN 25	1 in.		T	2	5												
PTFE	DN 32	1-1/4 in.		T	3	2												
PTFE	DN 40	1-1/2 in.		T	4	0												
PTFE	DN 50	2 in.		T	5	0												
PTFE	DN 65	2-1/2 in.		T	6	5												
PTFE	DN 80	3 in.		T	8	0												
PTFE	DN 100	4 in.		T	1	H												
PTFE	DN 125	5 in.		T	1	Q												
PTFE	DN 150	6 in.		T	1	F												
PTFE	DN 200	8 in.		T	2	H												
PTFE	DN 250	10 in.		T	2	F												
PTFE	DN 300	12 in.		T	3	H												
PTFE	DN 350	14 in.		T	3	F												
PTFE	DN 400	16 in.		T	4	H												
PTFE (only ASME CL 150)	DN 450	18 in.		T	4	F												
PTFE	DN 500	20 in.		T	5	H												
PTFE	DN 600	24 in.		T	6	H												
Measuring Electrodes Material	Grounding Electrodes		2)	H														
Hastelloy C-4 (2.4610)	Without			B														
Hastelloy B-3 (2.4600)	Without			S														
SST 1.4571 (316Ti)	Without			M														
Titanium	Without			T														
Tantalum	Without			F														
SST 1.4539 (904L)	Without			P														
Platinum-Iridium	Without																	
Hastelloy C-4 (2.4610)	With			O														
Hastelloy B-3 (2.4600)	With			N														
SST 1.4571 (316Ti)	With			E														
Titanium	With			I														
Tantalum	With			Q														
SST 1.4539 (904L)	With			R														
Platinum-Iridium	With			G														

Continued on next page

- 1) PFA with ASME flanges only ISO-laid length (see pressure rating)
- 2) Grounding electrodes available only for meter size DN 3 ... DN 300
- 3) DN 3 ... DN 8 new laid length: 200 mm (for replacement with old laid length 130 mm please use model DE23F)

Note to the 3A conformity:
If 3A conformity is desired, please order model DE21

Electromagnetic Flowmeter		Variant digit No.	1 - 6	11	12	13	14	15	16	17	18	19	20	21			
FXE4000-DE41F	(MAG-XE)	Catalog No.	DE41F-														
remote	with welded flange																
Pressure Rating			3)														
PN 10	ISO laid length		C														
PN 16	ISO laid length	4)	D														
PN 25	ISO laid length		E														
PN 40	Standard for DN 3 ... DN 80	ISO laid length	F														
JIS K10	ISO laid length		K														
ASME CL 150	<= DN 600 (24 in.)	old laid length, only for replacement	P														
ASME CL 300	<= DN 300 (12 in.)	old laid length, only for replacement	Q														
ASME CL 150	<= DN 600 (24 in.)	ISO laid length	R														
ASME CL 300	<= DN 400 (16 in.)	ISO laid length	S														
Material of Process Connection																	
Steel	from DN 20			1													
SST 1.4571 (316Ti)	Standard for DN 3 ... DN 15, option from DN 20			3													
Accessories																	
without			A														
Protection rings 1.4571 (316Ti) (on both sides)			B														
Grounding ring 1.4571 (316Ti) (fastened on one side)			C														
Protection flanges 1.4571 (316Ti) (on both sides)			D														
Temperature Range																	
Standard design <= 130 °C (266 °F)			S														
Certificates																	
PED Standard			A														
Material certificate per EN 10204 3.1 + pressure test per AD 2000			D														
Pressure test per AD 2000			G														
Inspection certificate per EN 10204 3.1			F														
Without DGRL certificate	possible from DN 500 (20 in.)		K														
Calibration Certificates																	
Standard			A														
Custody transfer, cold water / waste water	(DN 25 ... DN 600 / 1 in. ... 24 in.)		B														
Custody transfer, fluids except water	(DN 25 ... DN 150 / 1 in. ... 6 in.)		C														
Type of Protection Cable Entry																	
IP 67	Thread for screw-type conduit fitting M20 x 1.5									2							
IP 67	Thread for screw-type conduit fitting NPT 1/2 in.									4							
IP 67	Thread for screw-type conduit fitting PF 1/2 in.									5							
IP 68	Thread for screw-type conduit fitting M20 x 1.5	7)								7							
IP 68	Cable connected and Connection box potted									8							
Name Plate																	
German										G							
English										E							
French										F							
Design Level																	
(Specified by ABB)											*						
Electrode Design																	
Standard													1				
Excitation Frequency																	
6-1/4 Hz	(DN 3 ... DN 600	1/10 in. ... 24 in.)													1		
12-1/2 Hz	(DN 3 ... DN 100	1/10 in. ... 4 in.)													2		
7-1/2 Hz	(DN 3 ... DN 600	1/10 in. ... 24 in.)													3		
15 Hz	(DN 3 ... DN 100	1/10 in. ... 4 in.)													4		
25 Hz	(DN 3 ... DN 20	1/10 in. ... 3/4 in.)													5		

3) Connection dimensions for flanges acc. to DIN 2501 / EN 1092-1 or ASME B16.5 or JIS B2210-10K

4) DN 65 / PN 16 with connection dimensions acc. EN 1092-1: Please order PN 40

5) Protection rings on both and grounding ring fastened on one side to flange, only possible for primary <= DN 300 and PTFE / PFA lining

6) Only possible with ASME flanges old laid length (pressure rating codes P, Q) and primary with PTFE / PFA lining

Related Converter FXE4000-E4

7) Sealing compound (optionally)

D141B038U01

Electromagnetic Flowmeter			Variant digit No.	1 - 6	7	8	9	10	11	12	13			
FXE4000-DE41F remote (MAG-XE) with welded flange			Catalog No.	DE41F-										
Liner Material	Meter Size													
Hard rubber	DN 15	1/2 in.	H	1	5									
Hard rubber	DN 20	3/4 in.	H	2	0									
Hard rubber	DN 25	1 in.	H	2	5									
Hard rubber	DN 32	1-1/4 in.	H	3	2									
Hard rubber	DN 40	1-1/2 in.	H	4	0									
Hard rubber	DN 50	2 in.	H	5	0									
Hard rubber	DN 65	2-1/2 in.	H	6	5									
Hard rubber	DN 80	3 in.	H	8	0									
Hard rubber	DN 100	4 in.	H	1	H									
Hard rubber	DN 125	5 in.	H	1	Q									
Hard rubber	DN 150	6 in.	H	1	F									
Hard rubber	DN 200	8 in.	H	2	H									
Hard rubber	DN 250	10 in.	H	2	F									
Hard rubber	DN 300	12 in.	H	3	H									
Hard rubber	DN 350	14 in.	H	3	F									
Hard rubber	DN 400	16 in.	H	4	H									
Hard rubber	(only ASME CL 150) DN 450	18 in.	H	4	F									
Hard rubber	DN 500	20 in.	H	5	H									
Hard rubber	DN 600	24 in.	H	6	H									
Hard rubber	DN 700	28 in.	H	7	H									
Hard rubber	DN 800	32 in.	H	8	H									
Hard rubber	DN 900	36 in.	H	9	H									
Hard rubber	DN 1000	40 in.	H	1	T									
Soft rubber	DN 50	2 in.	S	5	0									
Soft rubber	DN 65	2-1/2 in.	S	6	5									
Soft rubber	DN 80	3 in.	S	8	0									
Soft rubber	DN 100	4 in.	S	1	H									
Soft rubber	DN 125	5 in.	S	1	Q									
Soft rubber	DN 150	6 in.	S	1	F									
Soft rubber	DN 200	8 in.	S	2	H									
Soft rubber	DN 250	10 in.	S	2	F									
Soft rubber	DN 300	12 in.	S	3	H									
Soft rubber	DN 350	14 in.	S	3	F									
Soft rubber	DN 400	16 in.	S	4	H									
Soft rubber	(only ASME CL 150) DN 450	18 in.	S	4	F									
Soft rubber	DN 500	20 in.	S	5	H									
Soft rubber	DN 600	24 in.	S	6	H									
Soft rubber	DN 700	28 in.	S	7	H									
Soft rubber	DN 800	32 in.	S	8	H									
Soft rubber	DN 900	36 in.	S	9	H									
Soft rubber	DN 1000	40 in.	S	1	T									

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Electromagnetic Flowmeter		Variant digit No.	1 - 6	10	11	12	13	14	15	16				
FXE4000-DE41F remote		(MAG-XE) with welded flange	DE41F-											
Measuring Electrodes Material		Grounding Electrodes												
SST 1.4571 (316Ti)		Without		S H B M T F P										
Hastelloy C-4 (2.4610)		Without												
Hastelloy B-3 (2.4600)		Without												
Titanium		Without												
Tantalum		Without												
SST 1.4539 (904L)		Without												
Platinum-Iridium		Without												
SST 1.4571 (316Ti)		With		E O N I Q R G										
Hastelloy C-4 (2.4610)		With												
Hastelloy B-3 (2.4600)		With												
Titanium		With												
Tantalum		With												
SST 1.4539 (904L)		With												
Platinum-Iridium		With												
Pressure Rating														
PN 10		ISO laid length		1)	C D E F K P Q R S									
PN 16		ISO laid length		2)										
PN 25		ISO laid length												
PN 40		Standard for DN 15 ... DN 80		ISO laid length										
JIS K10		ISO laid length												
ASME CL 150		<= DN 600 (24 in.)		old laid length, only for replacement										
ASME CL 300		<= DN 300 (12 in.)		old laid length, only for replacement										
ASME CL 150		<= DN 600 (24 in.)		ISO laid length										
ASME CL 300		<= DN 400 (16 in.)		ISO laid length										
Material of Process Connection														
Steel		from DN 20			1									
SST 1.4571 (316Ti)		Standard for DN 15, option from DN 20			3									
Accessories														
Without					A									
Temperature Range														
Standard design <= 90 °C (194 °F)					S									
Certificates														
PED Standard														
Material certificate per EN 10204 3.1 + pressure test per AD 2000														
Pressure test per AD 2000														
Inspection certificate per EN 10204 3.1														
Without DGRL certificate				3)										
Calibration Certificates														
Standard														
Custody transfer, cold water / waste water		(DN 25 ... DN 1000 / 1 in. ... 40 in.)												
Custody transfer, fluids except water		(DN 25 ... DN 150 / 1 in. ... 6 in.)												

Continued on next page

- 1) Connection dimensions for flanges acc. to DIN 2501 / EN 1092-1 or ASME B16.5 or JIS B2210-10K
- 2) DN 65 / PN 16 with connection dimensions acc. EN 1092-1: Please order PN 40
- 3) possible from DN 500 (20 in.)

Note to the 3A conformity:
If 3A conformity is desired, please order model DE21

Electromagnetic Flowmeter		Variant digit No.	1 - 6	15	16	17	18	19	20	21			
FXE4000-DE41F		(MAG-XE)	Catalog No.	DE41F-									
remote		with welded flange											
Type of Protection	Cable Entry												
IP 67	Thread for screw-type conduit fitting M20 x 1.5												
IP 67	Thread for screw-type conduit fitting NPT 1/2 in.												
IP 67	Thread for screw-type conduit fitting PF 1/2 in.												
IP 68	Thread for screw-type conduit fitting M20 x 1.5		4)										
IP 68	Cable connected and Connection box potted												
Name Plate													
German													
English													
French													
Design Level		(Specified by ABB)											
Electrode Design													
Standard													
Excitation Frequency													
6-1/4 Hz	(DN 3 ... DN 1000	1/10 in. ... 40 in.)											
12-1/2 Hz	(DN 3 ... DN 100	1/10 in. ... 4 in.)											
7-1/2 Hz	(DN 3 ... DN 1000	1/10 in. ... 40 in.)											
15 Hz	(DN 3 ... DN 100	1/10 in. ... 4 in.)											
25 Hz	(DN 3 ... DN 20	1/10 in. ... 3/4 in.)											

Related Converter FXE4000-E4

4) Sealing compound (optionally)

D141B038U01

Electromagnetic Flowmeter FXE4000-DE43W (COPA-XE) compact wafer type		Variant digit No.	1 - 6	7	8	9	10	11	12	13	14	15	16	17			
		Catalog No.	DE43W-														
Liner Material		Meter Size															
PFA	DN 3	1/10 in.	P	0	3												
PFA	DN 4	5/32 in.	P	0	4												
PFA	DN 6	1/4 in.	P	0	6												
PFA	DN 8	5/16 in.	P	0	8												
PTFE	DN 10	3/8 in.	T	1	0												
PTFE	DN 15	1/2 in.	T	1	5												
PTFE	DN 25	1 in.	T	2	5												
PTFE	DN 32	1-1/4 in.	T	3	2												
PTFE	DN 40	1-1/2 in.	T	4	0												
PTFE	DN 50	2	T	5	0												
PTFE	DN 65	2-1/2 in.	T	6	5												
PTFE	DN 80	3 in.	T	8	0												
PTFE	DN 100	4 in.	T	1	H												
Measuring Electrodes Material		Grounding Electrodes		1)													
Hastelloy C-4 (2.4610)	Without																
Hastelloy B-3 (2.4600)	Without																
SST 1.4571 (316Ti)	Without																
Titanium	Without																
Tantalum	Without																
SST 1.4539 (904L)	Without																
Platinum-Iridium	Without																
Hastelloy C-4 (2.4610)	With																
Hastelloy B-3 (2.4600)	With																
SST 1.4571 (316Ti)	With																
Titanium	With																
Tantalum	With																
SST 1.4539 (904L)	With																
Platinum-Iridium	With																
Pressure Rating				2)													
PN 16																	
ASME CL 150																	
JIS K10																	
Certificates																	
PED Standard																	
Material certificate per EN 10204 3.1 + pressure test per AD 2000																	
Pressure test per AD 2000																	
Inspection certificate per EN 10204 3.1																	
Calibration Certificates																	
Standard																	
Custody transfer, cold water / waste water	(DN 25 ... DN 100 / 1 in. ... 4 in.)																
Custody transfer, fluids except water	(DN 25 ... DN 100 / 1 in. ... 4 in.)																
Type of Protection																	
IP 67																	
Power Supply																	
100 ... 230 V AC																	
16.8 ... 26.4 V AC / 16.8 ... 31.2 V DC																	
Display																	
Illuminated, with magnetic stick operation																	

Continued on next page

1) Grounding electrodes available only for meter size DN 3 ... DN 300

2) Connection dimensions for flanges acc. to DIN 2501 / EN 1092-1 or ASME B16.5 or JIS B2210-10K

Accessories see table H

Electromagnetic Flowmeter		Variant digit No.	1	6	7	8	9	10	11	12	13	14	15	16			
FXE4000-DE41W		Catalog No.	DE41W-														
remote		(MAG-XE) wafer type															
Liner Material		Meter Size															
PFA	DN 3	1/10 in.	P	0	3												
PFA	DN 4	5/32 in.	P	0	4												
PFA	DN 6	1/4 in.	P	0	6												
PFA	DN 8	5/16 in.	P	0	8												
PTFE	DN 10	3/8 in.	T	1	0												
PTFE	DN 15	1/2 in.	T	1	5												
PTFE	DN 25	1 in.	T	2	5												
PTFE	DN 32	1-1/4 in.	T	3	2												
PTFE	DN 40	1-1/2 in.	T	4	0												
PTFE	DN 50	2	T	5	0												
PTFE	DN 65	2-1/2 in.	T	6	5												
PTFE	DN 80	3 in.	T	8	0												
PTFE	DN 100	4 in.	T	1	H												
Measuring Electrodes Material		Grounding Electrodes		1)													
Hastelloy C-4 (2.4610)	Without		H														
Hastelloy B-3 (2.4600)	Without		B														
SST 1.4571 (316Ti)	Without		S														
Titanium	Without		M														
Tantalum	Without		T														
SST 1.4539 (904L)	Without		F														
Platinum-Iridium	Without		P														
Hastelloy C-4 (2.4610)	With		O														
Hastelloy B-3 (2.4600)	With		N														
SST 1.4571 (316Ti)	With		E														
Titanium	With		I														
Tantalum	With		Q														
SST 1.4539 (904L)	With		R														
Platinum-Iridium	With		G														
Pressure Rating				2)													
PN 16			D														
ASME CL 150			P														
JIS K10			K														
Certificates																	
PED Standard			A														
Material certificate per EN 10204 3.1 + pressure test per AD 2000			D														
Pressure test per AD 2000			G														
Inspection certificate per EN 10204 3.1			F														
Calibration Certificates																	
Standard			A														
Custody transfer, cold water / waste water	(DN 25 ... DN 100 / 1 in. ... 4 in.)		B														
Custody transfer, fluids except water	(DN 25 ... DN 100 / 1 in. ... 4 in.)		C														

Continued on next page

1) Grounding electrodes available only for meter size DN 3 ... DN 300

2) Connection dimensions for flanges acc. to DIN 2501 / EN 1092-1 or ASME B16.5 or JIS B2210-10K

Accessories see table H

Related Converter FXE4000-E4

Electromagnetic Flowmeter		Variant digit No.	1 - 6	9	10	11	12	13	14	15	16	17	18			
FXE4000-DE41W remote		(MAG-XE) wafer type	Catalog No. DE41W-													
Type of Protection	Cable Entry															
IP 67	Thread for screw-type conduit fitting M20 x 1.5											2				
IP 67	Thread for screw-type conduit fitting NPT 1/2 in.											4				
IP 67	Thread for screw-type conduit fitting PF 1/2 in.											5				
IP 68	Thread for screw-type conduit fitting M20 x 1.5	3)										7				
IP 68	Cable connected and Connection box potted											8				
Name Plate																
German											G					
English											E					
French											F					
Design Level (Specified by ABB)											*					
Electrode Design																
Standard											1					
Excitation Frequency																
6-1/4 Hz	(DN 3 ... DN 100	1/10 in. ... 4 in.)									1					
12-1/2 Hz	(DN 3 ... DN 100	1/10 in. ... 4 in.)									2					
7-1/2 Hz	(DN 3 ... DN 100	1/10 in. ... 4 in.)									3					
15 Hz	(DN 3 ... DN 100	1/10 in. ... 4 in.)									4					
25 Hz	(DN 3 ... DN 15	1/10 in. ... 1/2 in.)									5					

3) Sealing compound (optionally)

D141B038U01

4.2 Model DE 21, DE21F, DE23, DE23F

4.2.1 General specifications

Minimum Allowable Absolute Pressure

Liner	Meter Size	mbar abs.	at	T _{Operation} *
PFA	3 ... 100 (1/10 ... 4")	0		< 130 °C (266 °F)

*) Higher temperatures are allowed for CIP/SIP cleaning for limited time periods, see Table „Maximum Allowable Cleaning Temperature“.

Max. Allowable Cleaning Temperature

CIP-Cleaning	Liner:	T _{max}	minutes	T _{Amb.}
Steam cleaning	PFA	150 °C (302 °F)	60	25 °C (77 °F)
Liquid cleaning	PFA	140 °C (284 °F)	60	25 °C (77 °F)

If the ambient temperature is > 25, then the difference must be subtracted from the max. cleaning temperature.

T_{max} - Δ °C. Δ °C = T_{Amb.} - 25 °C).

Maximum Allowable Temperature Shock

Liner	Temp Shock max. Temp. Diff. °C	°C/min
PFA	any	any

Min. Allowable Ambient Temperature as a function of Fluid Temperature

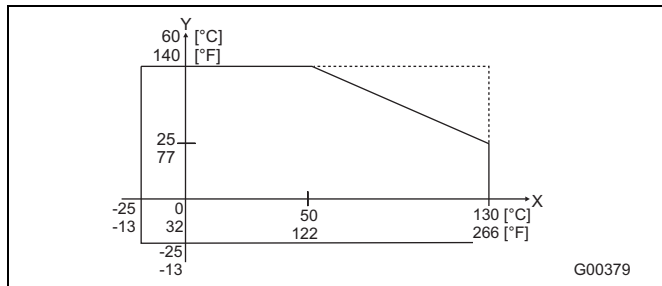


Fig. 25

- Y = Ambient temperature °C/°F
- X = Fluid temperature °C/°F
- Temperature range for COPA-XE
- - - - Temperature range for MAG-XE

Materials, Flowmeter Primary

Liner	Electrode Material		Electrodes Design	
	Standard	Options	Standard	Options
PFA	Hast.-C4 (1.4539 for food ind. fittings & Tri-Clamp)	Hast.-B3 W.-Nr. 1.4539 W.-Nr. 1.4571 tantalum, titanium, platinum-iridium	Flat head	Pointed head (≥ DN 10)

Process Connection Materials

Process Connection	Standard
Flange	SS 1.4571 [316Ti]
Wafer design	None
Weld stubs	SS 1.4404 [316L]
Food ind. fitting	SS 1.4404 [316L]
Tri-Clamp	SS 1.4404 [316L]
External threads	SS 1.4404 [316L]

Connection Box	Standard	Option
COPA-XE	Cast alum., painted, frame paint coat: dark gray, RAL7012, cover: light gray, RAL 9002	Converter housing made completely of Stn. Stl. SS 1.4301 [304]
MAG-XE	SS 1.4301 [304]	-
Meter tube	SS 1.4301 [304]	-
PG-Connector	Polyamide	-
Flowmeter primary housing	Deep drawn housing SS 1.4301 [304]	

Gasket Material

Process Connection	Gasket Material
Wafer design	None
Weld stubs, food ind. fittings, Tri-Clamp, external threads	EPDM (Ethylene-Propylene) with FDA approval, silicone with FDA approval
Housing gasket	Silicone

Storage Temperature

-20 °C (-4 °F) ... 70 °C (158 °F)

Protection Class per EN 60529

- IP 67
- IP 68 (only for MAG-XE flowmeter primary)

Pipeline Vibration Following EN 60068-2-6

The following applies for compact design FXE4000 (COPA-XE):

- In the range of 10 - 55 Hz max. 0.15 mm deflection
- In the range of 55 -150 Hz max. 2 g acceleration

The following applies for separate converter (MAG-XE):

- Converter
 - In the range of 10 - 55 Hz max. 0.15 mm deflection
- Flowmeter primary
 - In the range of 10 - 55 Hz max. 0.15 mm deflection
 - In the range of 55 -150 Hz max. 2 g acceleration

4.2.2 Material load for devices with variable process connections DN 3 ... 100 (1/10 ... 4") Model DE21_/DE23_

Process Connection Liner PFA	Meter-Size	PS _{max} [bar]	TS _{min}	TS _{max}
Wafer design	3 ... 50 (1/10 ... 2")	40	-25 °C (-13 °F)	130 °C (266 °F)
	65 ... 100 (2 1/2 ... 4")	16		
Weld stubs	3 ... 40 (1/10 ... 1 1/2")	40	-25 °C (-13 °F)	130 °C (266 °F)
	50, 80 (2", 3")	16		
	65, 100 (2 1/2", 4")	10		
Food ind. fittings per DN 11851	3 ... 40 (1/10 ... 1 1/2")	40	-25 °C (-13 °F)	130 °C (266 °F)
	50, 80 (2", 3")	16		
	65, 100 (2 1/2", 4")	10		
Tri-Clamp DIN 32676	3 ... 50 (1/10 ... 2")	16	-25 °C (-13 °F)	121 °C (250 °F)
	65 ... 100 (2 1/2 ... 4")	10		
Tri-Clamp ASME BPE	3 ... 100 (1/10 ... 4")	10	-25 °C (-13 °F)	130 °C (266 °F)
External threads ISO 228	3 ... 25 (1/10 ... 1")	16	-25 °C (-13 °F)	130 °C (266 °F)

JIS 10K-B2210 Flange

Meter Size	Material	PN	TS	PS [bar]
25 ... 100 (1 ... 4")	SS1.4571-[316Ti]	10	-25 ... +130 °C (-13 ... +266 °F)	10
25 ... 100 (1 ... 4")	Carbon Steel	10	-10 ... +130 °C (14 ... +266 °F)	10

4.2.4 Material load for wafer design models DE21W / DE 23W

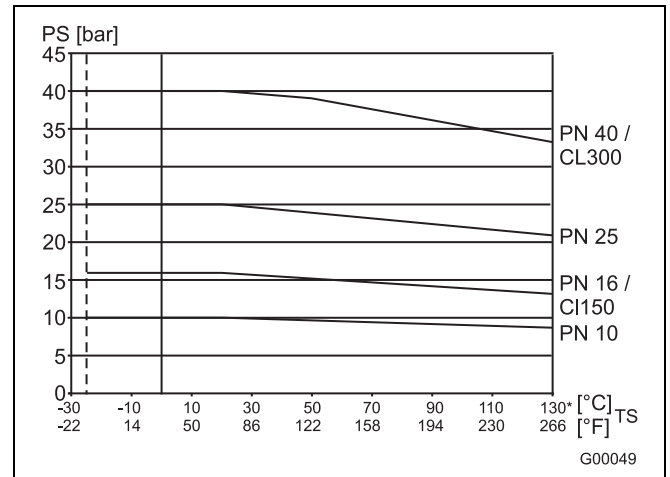


Fig. 28

*) Higher temperatures are allowed for CIP/SIP cleaning for limited time periods, see table "Maximum Allowable Cleaning Temperature".

4.2.3 Material load for flanged design Model DE21F / DE23F

DIN-Flange SS 1.4571 [316Ti] to DN 100 (4")

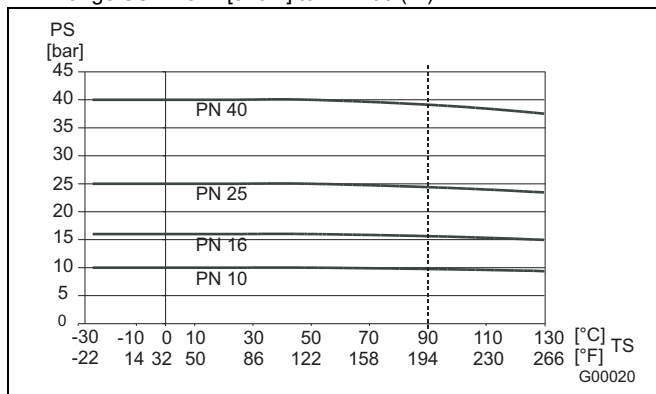


Fig. 26

ASME-Flange SS 1.4571 [316Ti] to DN 100 (4")

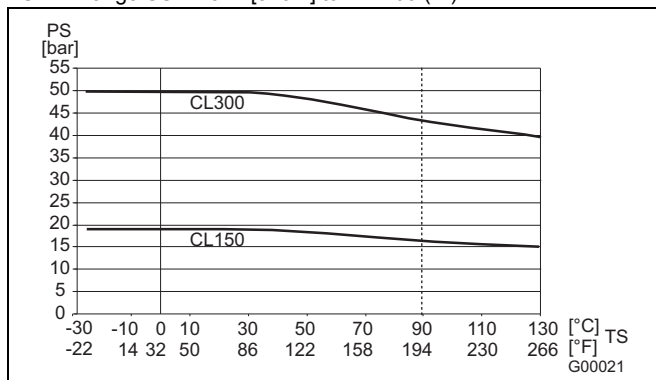


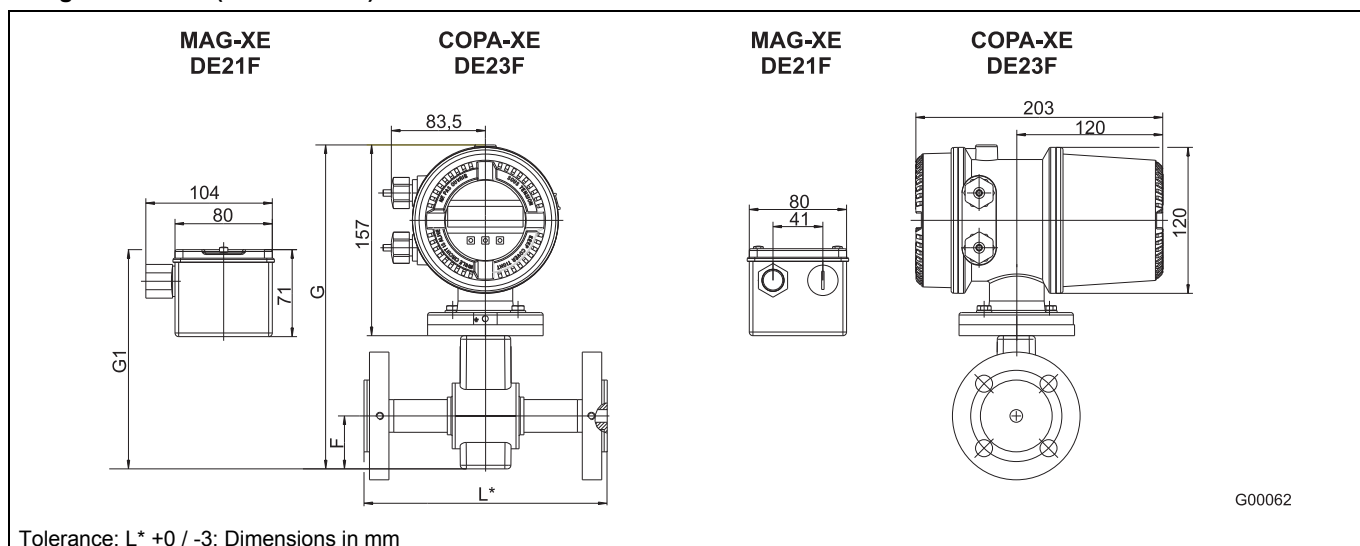
Fig. 27

JIS 10K-B2210 Wafer Design

Meter Size	Material	PN	TS [°C]	PS [bar]
32-100 (1 ¼ ... 4")	W.-Nr. 1.4404	10	-25 ... 130 °C -13 ... 266 °F	10
	W.-Nr. 1.4435			
	W.-Nr. 1.4301			

4.2.5 Flowmeter scale drawings for Model DE21F and DE23F

Flange DN 3 ... 40 (1/10 ... 1 1/2")



Flanges according to DIN/EN 1092-1

Dimensions [mm]							Weight approx. [kg]	
DN	PN	D	L	F	G	G1	COPA-XE	MAG-XE
3-8 ¹⁾	10-40	90	130	39	258	172	3,5	1,5
10	10-40	90	200	39	258	172	3,5	1,5
15	10-40	95	200	39	258	172	3,5	1,5
20	10-40	105	200	43	266	180	4	1,5
25	10-40	115	200	48	278	192	4,5	2,0
32	10-40	140	200	53	288	202	4,5	2,5
40	10-40	150	200	57	296	210	5	3

Flanges according to ASME B16.5 (for the dimensions F, G and G1 see table DIN flanges)

Dimensions [mm]							Weight approx. [kg]			
							COPA-XE		MAG-XE	
DN	Inch	CL150	CL300	L	G	G1	CL150	CL300	CL150	CL300
		D	D				approx. kg	approx. kg	approx. kg	approx. kg
3-8 ¹⁾	1/8-5/16 ²⁾	89	95	130	258	172	3,5	3,5	1,5	1,5
10	3/8 ²⁾	89	95	200	258	172	3,5	3,5	1,5	1,5
15	1/2	89	95	200	258	172	3,5	3,5	1,5	1,5
20	3/4	98	118	200	266	180	4	4	1,5	1,5
25	1	108	124	200	278	192	4,5	4,5	2,0	2,0
32	1 1/4	118	134	200	288	202	4,5	4,5	2,5	2,5
40	1 1/2	127	156	200	296	210	5	5	3	3

¹⁾ Connection flange DN 10

)

²⁾ Connection flange 1/2"

)

If a ground ring is required, L +3 mm material upon request. The dimensions stated above for COPA-XE refer to the design with diecast aluminum converter housing. Dimensions for stainless steel converter housing see page 41.

Flange DN 50 ... 100 (2 ... 4")

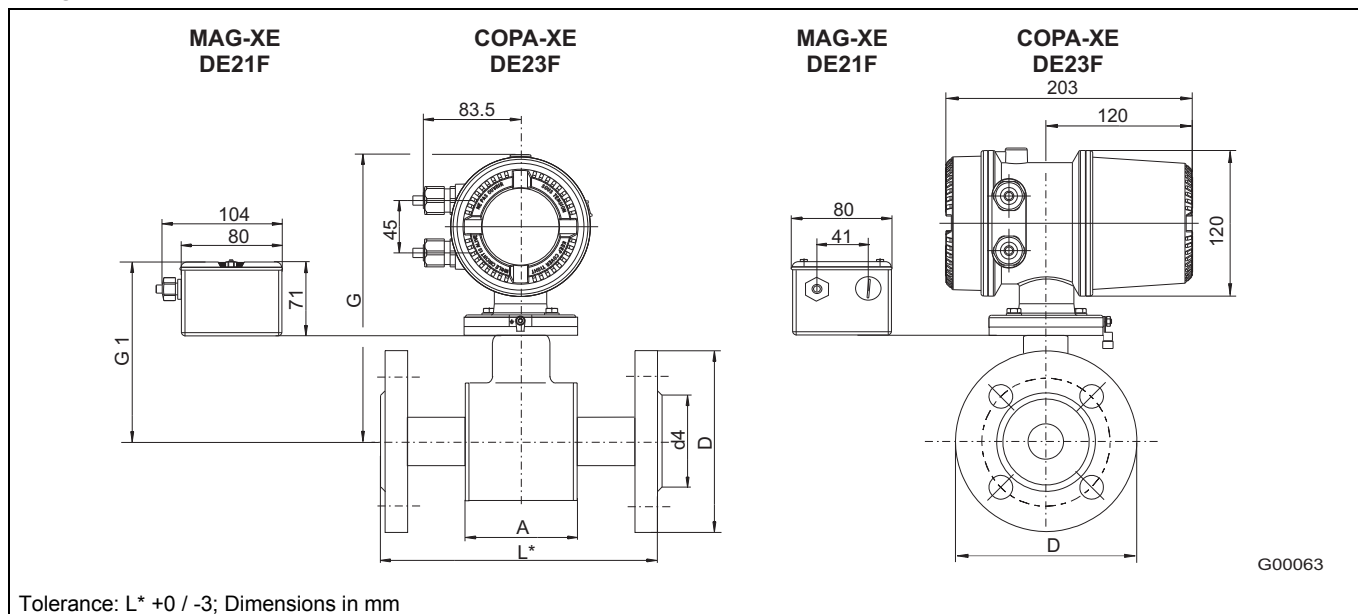


Fig. 30

Flanges according to DIN/EN 1092-1

Dimensions [mm]									Weight approx. [kg]	
DN	PN	D	L	F	G	G1	d4	A	COPA-XE	MAG-XE
50	10-40	165	200	-	207	161	104	100	10,0	8,0
65	10-40	185	200	-	215	175	124	107	13,0	10,0
80	10-40	200	200	-	224	181	139	107	15,0	12,0
100	10-16	220	250	-	237	201	161	159	21,0	18,0

Flanges according to ASME B16.5 (for the dimensions F, d4 and A see table DIN flanges)

Dimensions [mm]							Weight approx. [kg]			
DN	Inch	CL		L	G	G1	COPA-XE		MAG-XE	
		150	300				CL150	CL300	CL150	CL300
		D	D				approx. kg	approx. kg	approx. kg	approx. kg
50	2	152	165	200	207	161	10,0	10,0	8,0	8,0
65	2 1/2	178	191	200	215	175	13,0	13,0	10,0	10,0
80	3	191	210	200	224	181	15,0	15,0	12,0	12,0
100	4	229	254	250	237	201	21,0	21,0	18,0	18,0

If a ground ring is required, L +3 mm material upon request. The dimensions stated above for COPA-XE refer to the design with diecast aluminum converter housing. Dimensions for stainless steel converter housing see page 41.

4.2.6 Flowmeter scale drawings for Model DE21W and DE23W

Wafer Design DN 3 ... 40 (1/10 ... 1 1/2")

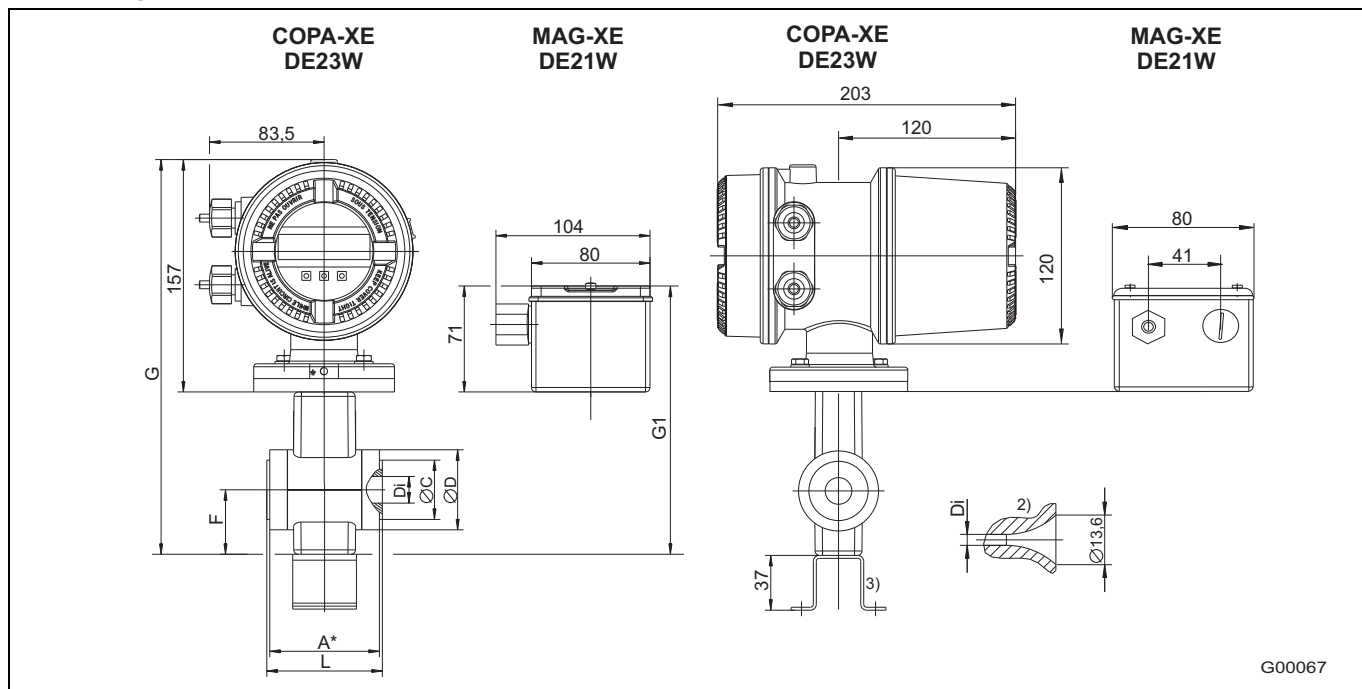


Fig. 31 (Dimensions in mm)

		Dimensions [mm]								Weight approx. [kg]	
DN	PN	L ¹⁾	A*	C	Di	D	F	G	G1	COPA-XE	MAG-XE
3	10-40 CL150/300	68	64	50	3	45	39	258	172	3,5	1,5
4											
6											
8											
10											
15											
20		78	74	50	18	54	43	266	180	4,0	1,5
25		90	86	70	24	63	48	278	192	4,5	2,0
32	98	94	70	30	73	53	288	202	4,5	2,5	
40	103	99	70	36	82	57	296	210	5,0	3,0	

¹⁾ Installation lengths with 2 ground rings L + 3 mm

²⁾ only DN 3 ... 8

³⁾ Bracket (option)

The dimensions stated above for COPA-XE refer to the design with diecast aluminum converter housing. Dimensions for stainless steel converter housing see page 41.

Wafer Design DN 50 ... 100 (2 ... 4")

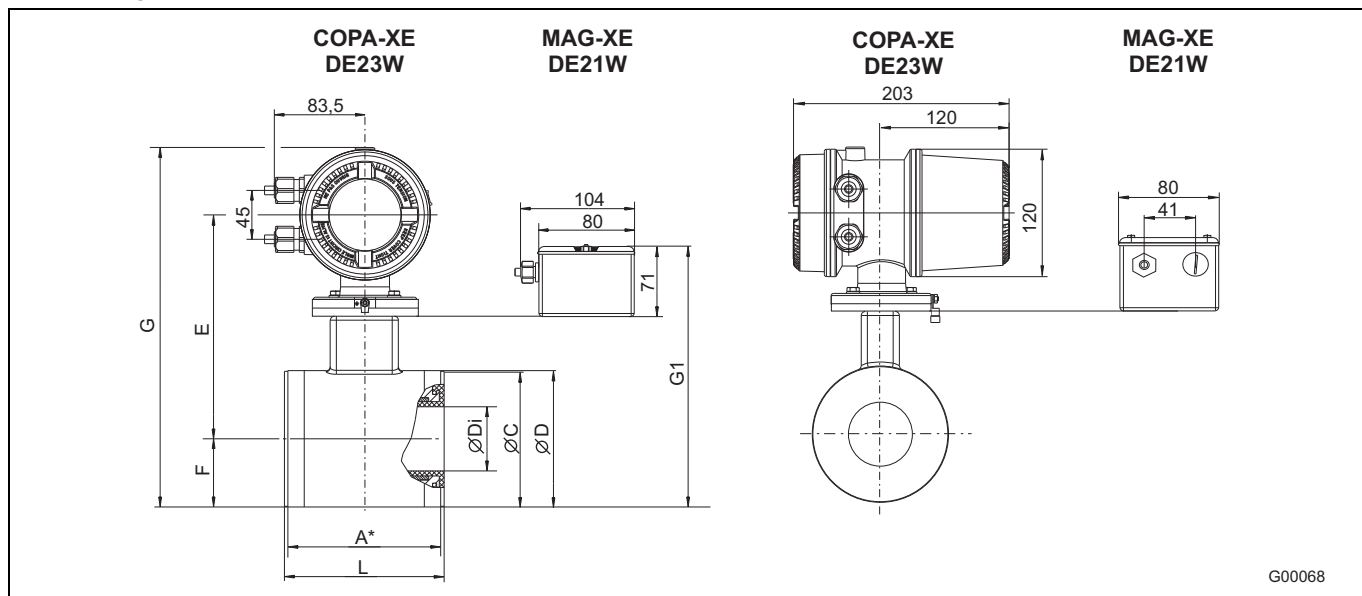


Fig. 32 (Dimensions in mm)

DN	PN	Dimensions [mm]										Weight approx. [kg]	
		L ¹⁾	A*	A	C	Di	D	E	F	G	G1	COPA-XE	MAG-XE
50	10-40 CL150/300	117	112	-	95	47	100	185	50	297	214	6,5	4,0
65	16 CL150	103	99	-	111	62	116	199	58	319	236	7,0	4,5
80		103	99	-	128	74	133	205	66,5	334	251	8,5	6,5
100		133	129	-	155	96	160	225	80	367	284	11,0	8,5

¹⁾ Installation lengths with 2 ground rings L + 3 mm

The dimensions stated above for COPA-XE refer to the design with diecast aluminum converter housing. Dimensions for stainless steel converter housing see page 41.

4.2.7 Flowmeter scale drawings for Model DE21_ and DE23_

Variable Process connections DN 3 ... 40 (1/10 ... 1 1/2")

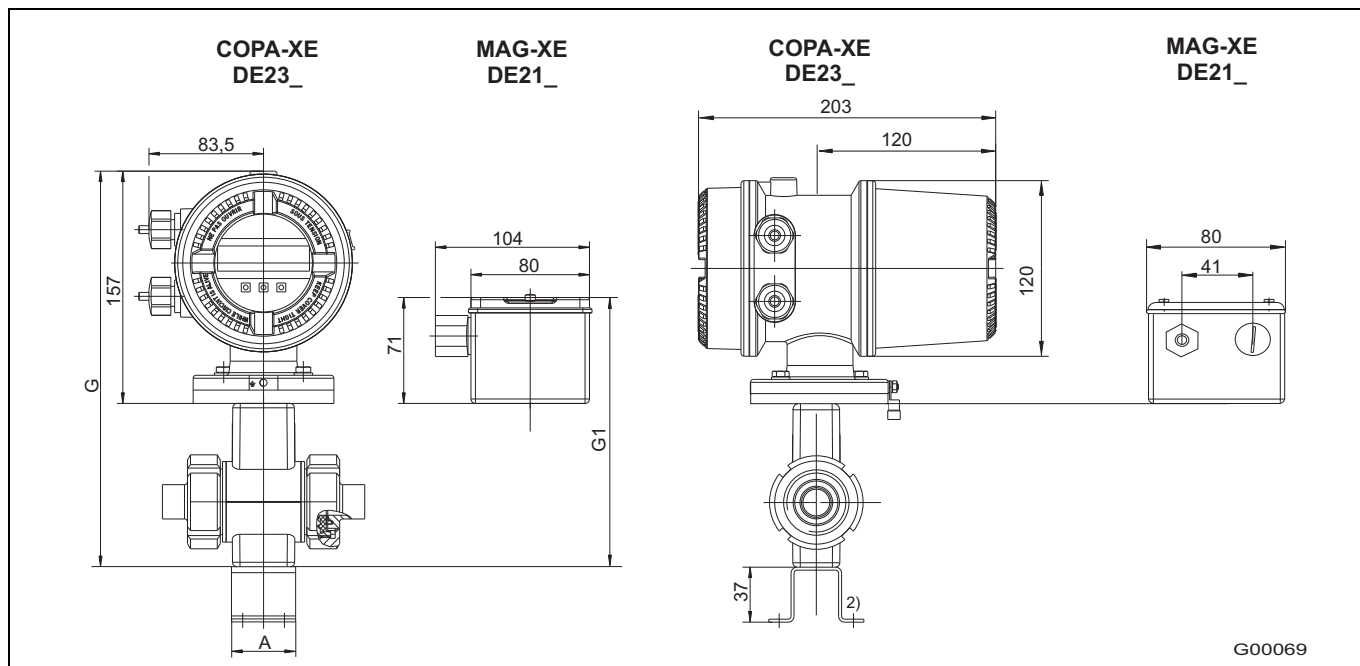


Fig. 33 (Dimensions in mm)

Dimensions [mm]							Weight approx. [kg] ¹⁾	
DN	PN	A	Ø D	F*	G*	G1*	COPA-XE	MAG-XE
3-10	10	37	44	39	258	172	3,5	1,5
15	10	37	44	39	258	172	3,5	1,5
20	10	42	63	43	266	180	4	2
25	10	54	63	48	378	192	4,5	2,5
32	10	62	78	53	388	202	4,5	2,5
40	10	67	78	57	396	210	5	3

* With the mounting element, the dimension G, G1 and F increase by 10.5 mm, installation lengths with process connection see page 39.

¹⁾ plus process connection weights see page 39.

²⁾ Bracket (option)

The dimensions stated above for COPA-XE refer to the design with diecast aluminum converter housing Dimensions for stainless steel converter housing see page 41.

Variable Process connections DN 50 ... 100 (2 ... 4")

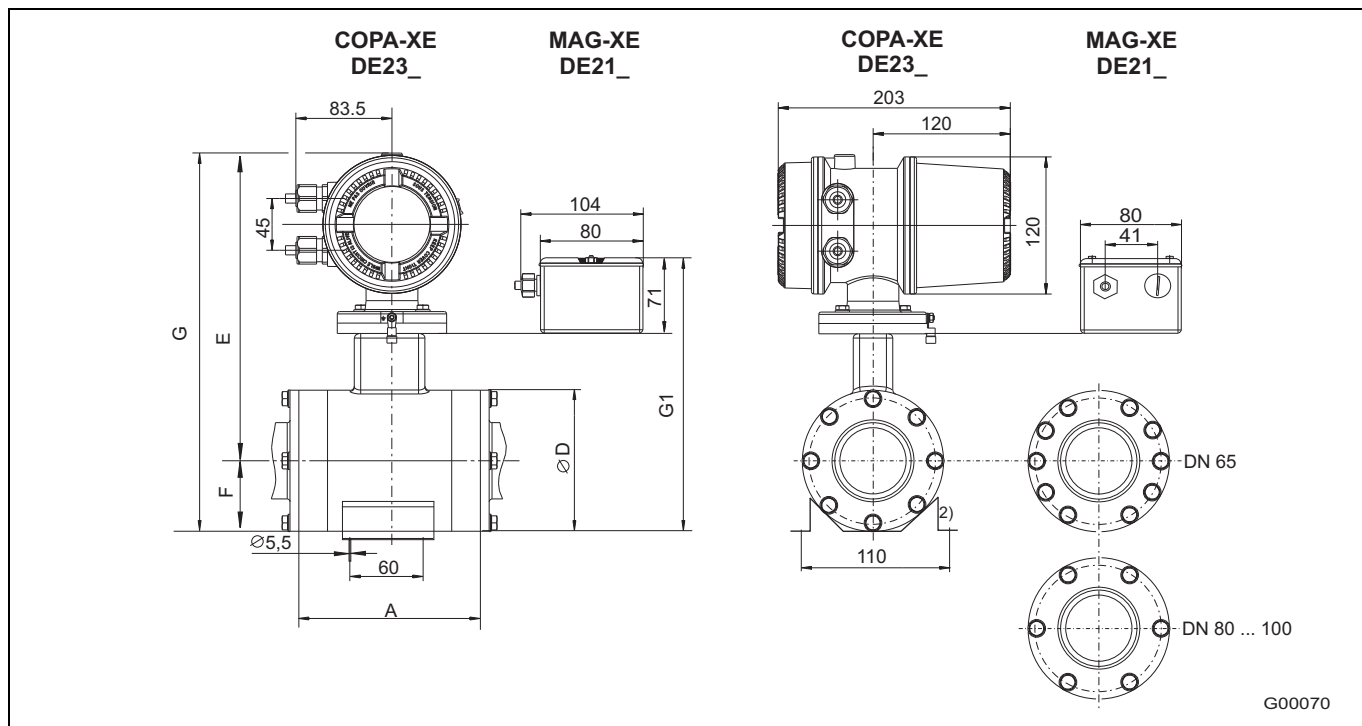


Fig. 34 (Dimensions in mm)

Dimensions [mm]								Weight approx. [kg] ¹⁾	
DN	PN	A	Ø D	E	F*	G*	G1* MAG-XE	COPA-XE	MAG-XE
50	10	128	100	185	50	297	214	6,5	4
65	10	114	116	199	58	319	236	7	4,5
80	10	114	133	205	67	334	251	9	6,5
100	10	114	160	225	80	367	284	11	8,5

* With the mounting element, the dimension G, G1 and F increase by 10.5 mm, installation lengths with process connection see page 39.

¹⁾ plus process connection weights see page 39.

²⁾ Mounting element (option)

The dimensions stated above for COPA-XE refer to the design with diecast aluminum converter housing. Dimensions for stainless steel converter housing see page 41.

4.2.8 Adapter for variable process connections DN 3 ... DN 100 (1/10 ... 4")

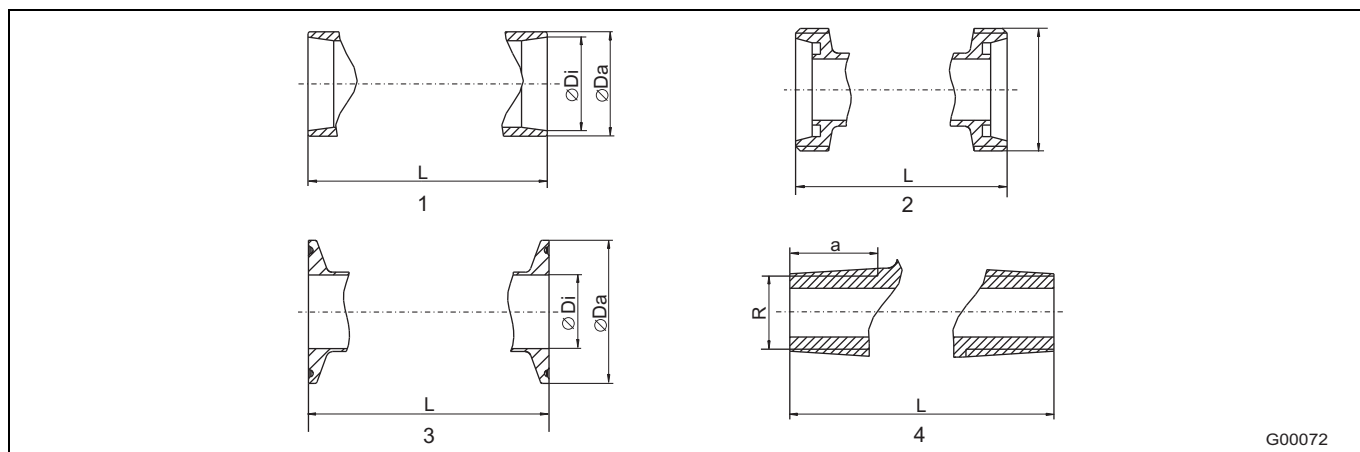


Fig. 35

- 1 Weld stubs
- 2 Threaded pipe connection DIN 11851
- 3 Tri-Clamp
- 4 External threads

DN (inch)	Weld stubs													Weight
	mm													kg
	ISO 2037		DIN 11850			SMS		DIN 2463		ISO 1127			L	
Ø Di	Ø Da	Ø Di	Ø Da	Series	Ø Di	Ø Da	Ø Di	Ø Da	Ø Di	Ø Da	Series	L		
3 ... 10 (1/10 ... 3/8)	10.0	12.0	10	13	2	-	-	10.3	13.5	10.3	13.5	1	127	0.4
15 (1/2)	15.2	17.2	16	19	2	-	-	18.1	21.3	18.1	21.3	1	127	0.4
20 (3/4)	19.3	21.3	20	23	2	-	-	23.7	26.9	23.7	26.9	1	132	0.7
25 (1)	22.6	25.0	26	29	2	22.6	25.0	25.0	28.0	23.7	26.9	1	149	0.7
32 (1 1/4)	31.3	33.7	32	34	1	-	-	32.0	35.0	30.5	33.7	1	166	1.0
40 (1 1/2)	35.6	38.0	38	41	2	35.6	38.0	36.8	40.0	39.0	42.2	1	171	1.0
50 (2)	48.6	51.0	50	54	3	48.6	51.0	49.0	52.0	47.8	51.0	2	173	1.0
65 (2 1/2)	60.3	63.5	66	70	2	60.3	63.5	66.0	70.0	66.0	70.0	2	165	1.4
80 (3)	72.9	76.1	81	85	2	72.9	76.1	81.0	85.0	72.9	76.1	1	169	2
100 (4)	97.6	101.6	100	104	2	100.0	104.0	100.0	104.0	97.6	101.6	2	199	3
DN (inch)	inch													lb
	ISO 2037		DIN 11850			SMS		DIN 2463		ISO 1127			L	
	Ø Di	Ø Da	Ø Di	Ø Da	Series	Ø Di	Ø Da	Ø Di	Ø Da	Ø Di	Ø Da	Series		
3 ... 10 (1/10 ... 3/8)	0.39	0.47	0.39	0.51	2	-	-	0.41	0.53	0.41	0.53	1	5.00	0.9
15 (1/2)	0.60	0.68	0.63	0.75	2	-	-	0.71	0.84	0.71	0.84	1	5.00	0.9
20 (3/4)	0.76	0.84	0.79	0.91	2	-	-	0.93	1.06	0.93	1.06	1	5.20	1.5
25 (1)	0.89	0.98	1.02	1.14	2	0.89	0.98	0.98	1.10	0.93	1.06	1	5.87	1.5
32 (1 1/4)	1.23	1.33	1.26	1.34	1	-	-	1.26	1.38	1.20	1.33	1	6.54	2.2
40 (1 1/2)	1.40	1.50	1.50	1.61	2	1.40	1.50	1.45	1.57	1.54	1.66	1	6.73	2.2
50 (2)	1.91	2.01	1.97	2.13	3	1.91	2.01	1.93	2.05	1.88	2.01	2	6.81	2.2
65 (2 1/2)	2.37	2.50	2.60	2.76	2	2.37	2.50	2.60	2.76	2.60	2.76	2	6.50	3.1
80 (3)	2.87	3.00	3.19	3.35	2	2.87	3.00	3.19	3.35	2.87	3.00	1	6.65	4.4
100 (4)	3.84	4.00	3.94	4.09	2	3.94	4.09	3.94	4.09	3.84	4.00	2	7.83	6.6

DN (inch)	Threaded pipe connection			Tri-Clamp									
	DIN 11851			DIN 32676					ASME BPE				
	mm			mm					mm				
	Rd. thd.	L	Weight /kg	Ø Di	Ø Da	Series	L	Weight /kg	Tri-Clamp	Ø Di	Ø Da	L	Weight kg
3 ... 10 (1/10 ... 3/8)	28 x 1/8"	169	0.5	10	34.0	3	163	0.5	1/2"	9.4	25.0	143	0.5
15 (1/2)	34 x 1/8"	169	0.5	16	34.0	3	163	0.5	3/4"	15.7	25.0	143	0.5
20 (3/4)	44 x 1/6"	180	0.9	20	34.0	3	168	0.7	1"	22.1	50.4	143	0.7
25 (1)	52 x 1/6"	207	0.9	26	50.5	3	192	0.8	1"	22.1	50.4	143	1.2
32 (1 1/4)	58 x 1/6"	230	1.4	32	50.5	3	209	1.5	-	-	-	-	-
40 (1 1/2)	65 x 1/6"	237	1.4	38	50.5	3	214	1.4	1 1/2"	34.8	50.4	277	1.8
50 (2)	78 x 1/6"	243	1.4	50	64.0	3	216	1.2	2"	47.5	63.9	277	1.8
65 (2 1/2)	96 x 1/6"	245	2.2	66	91.0	1	221	1.6	2 1/2"	60.2	77.4	277	2.0
80 (3)	110 x 1/4"	259	3.2	81	106.0	1	225	2.4	3"	72.9	90.9	337	3.6
100 (4)	130 x 1/4"	307	4.4	100	119.0	1	255	3.1	4"	97.4	118.9	337	4.1
DN (inch)	inch			inch					inch				
	Rd. thd.	L	Weight /lb	Ø Di	Ø Da	Series	L	Weight /lb	Tri-Clamp	Ø Di	Ø Da	L	Weight lb
3 ... 10 (1/10 ... 3/8)	28 x 1/8"	6.65	1.1	0.39	1.34	3	6.42	1.1	1/2"	0.37	0.98	5.63	1.1
15 (1/2)	34 x 1/8"	6.65	1.1	0.63	1.34	3	6.42	1.1	3/4"	0.62	0.98	5.63	1.1
20 (3/4)	44 x 1/6"	7.09	2.0	0.79	1.34	3	6.61	1.5	1"	0.87	1.98	5.63	1.5
25 (1)	52 x 1/6"	8.15	2.0	1.02	1.99	3	7.56	1.8	1"	0.87	1.98	5.63	2.6
32 (1 1/4)	58 x 1/6"	9.06	3.1	1.26	1.99	3	8.23	3.3	-	-	-	-	-
40 (1 1/2)	65 x 1/6"	9.33	3.1	1.50	1.99	3	8.43	3.1	1 1/2"	1.37	1.98	10.91	4.0
50 (2)	78 x 1/6"	9.57	3.1	1.97	2.52	3	8.50	2.6	2"	1.87	2.52	10.91	4.0
65 (2 1/2)	96 x 1/6"	9.65	4.9	2.60	3.58	1	8.70	3.5	2 1/2"	2.37	3.05	10.91	4.4
80 (3)	110 x 1/4"	10.20	7.1	3.19	4.17	1	8.86	5.3	3"	2.87	3.58	13.27	7.9
100 (4)	130 x 1/4"	12.09	9.7	3.94	4.69	1	10.04	6.8	4"	3.83	4.68	13.27	9.0

DN (inch)	External threads ISO 228 / DIN 2999, tapered			Weight kg
	mm			
	R	a	L	
3 ... 10 (1/10 ... 3/8)	3/8"	18	139	0.4
15 (1/2)	1/2"	18	139	0.4
20 (3/4)	3/4"	25	164	0.8
25 (1)	1"	25	179	0.8
DN (inch)	inch			Weight lb
	R	a	L	
3 ... 10 (1/10 ... 3/8)	3/8"	0.71	5.47	0.88
15 (1/2)	1/2"	0.71	5.47	0.88
20 (3/4)	3/4"	0.98	6.46	1.76
25 (1)	1"	0.98	7.05	1.76

4.2.9 Converter stainless steel design COPA-XE (model DE23)

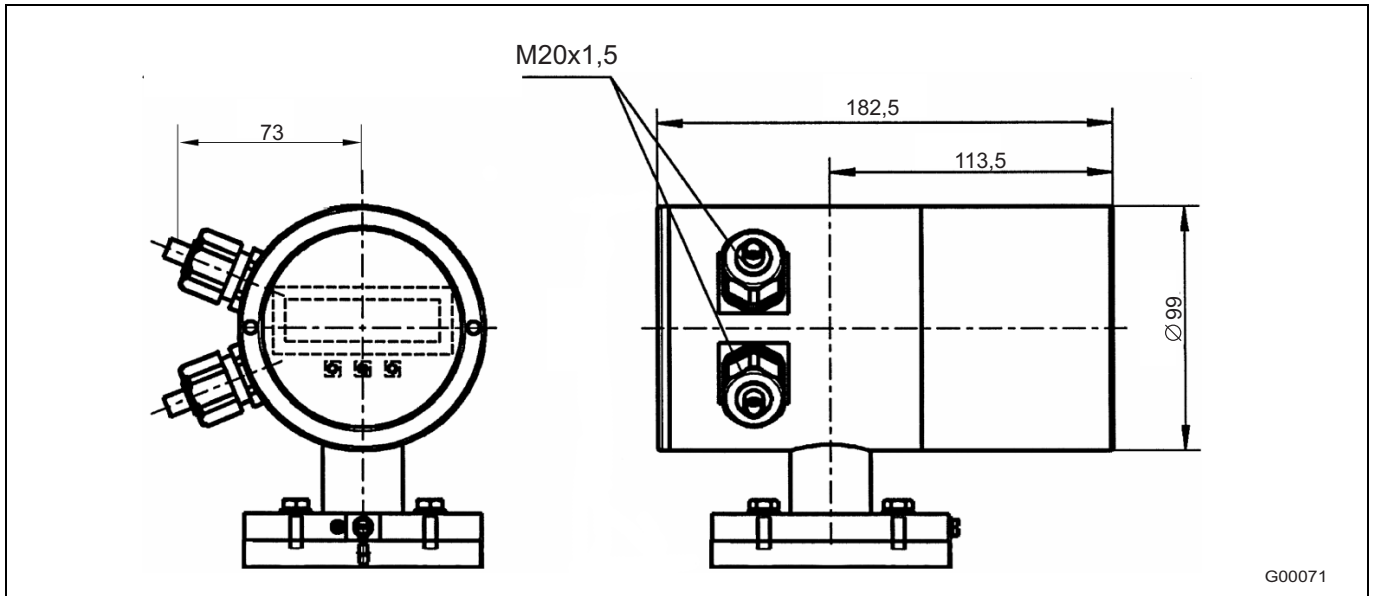


Fig. 36 (Dimensions in mm)

4.2.10 Ordering Information

Electromagnetic Flowmeter		Variant digit No.	1	5	6	7	8	9	10	11	12	13	14	15	16				
FXE4000-DE23 (COPA-XE) compact		Catalog No.	DE23-																
Process Connection																			
Wafer type																			1)
Without adapter	Spare primary, for replacement only																		W
Weld stubs	ISO 1127																		V
Weld stubs	ISO 2037 (only DN 10 ... DN 100)																		J
Weld stubs	DIN 2463																		P
Weld stubs	DIN 11850																		Q
Weld stubs	SMS (only DN 25, DN 40 ... 100)																		R
Pipe connection	DIN 11851																		X
Tri-Clamp	DIN 32676																		S
Welded flange	DIN 2501 / ASME																		T
Male thread	ISO 228 / DIN 2999 conical (only DN 3 ... DN 25)																		F
Tri-Clamp	ASME BPE (DN 3 ... DN 25, DN 40 ... DN 100)																		E
Others																			K
																			Z
Liner Material																			
Meter Size																			
PFA	DN 3 (1/10 in.)																		P
PFA	DN 4 (5/32 in.)																		0
PFA	DN 6 (1/4 in.)																		3
PFA	DN 8 (5/16 in.)																		4
PFA	DN 10 (3/8 in.)																		6
PFA	DN 15 (1/2 in.)																		8
PFA	DN 20 (3/4 in.)																		0
PFA	DN 25 (1 in.)																		5
PFA	DN 32 (1-1/4 in.)																		2
PFA	DN 40 (1-1/2 in.)																		5
PFA	DN 50 (2 in.)																		0
PFA	DN 65 (2-1/2 in.)																		5
PFA	DN 80 (3 in.)																		0
PFA	DN 100 (4 in.)																		1
																			H
Measuring Electrodes Material																			
Grounding Electrodes																			
Hastelloy C-4 (2.4610)	Without																		H
Hastelloy B-3 (2.4600)	Without																		B
SST 1.4571 (316Ti)	Without																		S
Titanium	Without																		M
Tantalum	Without																		T
SST 1.4539 (904L)	Without																		F
Platinum-Iridium	Without																		P
Hastelloy C-4 (2.4610)	With																		O
Hastelloy B-3 (2.4600)	With																		N
SST 1.4571 (316Ti)	With																		E
Titanium	With																		I
Tantalum	With																		Q
SST 1.4539 (904L)	With																		R
Platinum-Iridium	With																		G
Pressure Rating																			
PN 10	Tri-Clamp (DN 65 ... DN 100), pipe connection / welded stub ends / w/o adapter (DN 65, DN 100)																		2)
PN 16	Wafer type (DN 65 ... DN 100), Tri-Clamp (DN 3 ... DN 50), pipe connection / welded stub ends / w/o adapter (DN 50, DN 80), welded flange (DN 65, DN 100), male thread																		3)
PN 40	Wafer type (DN 3 ... DN 50), pipe connection / welded stub ends / w/o adapter (DN 3 ... DN 40), welded flange (DN 3 ... DN 80)																		F
ASME CL 150	Wafer type (DN 3 ... DN 100), welded flange (DN 3 ... DN 100)																		P
ASME CL 300	Wafer type (DN 3 ... DN 50), welded flange (DN 3 ... DN 100)																		Q

1) Accessories see table H

2) Connection dimensions for flanges acc. to DIN 2501 / EN 1092-1 or ASME B16.5

3) DN 65 / PN 16 with connection dimensions acc. EN 1092-1: Please order PN 40

Continued on next page

Electromagnetic Flowmeter		Variant digit No.	1 - 5	12	13	14	15	16	17	18	19	20	21	22			
FXE4000-DE23 (COPA-XE) compact		Catalog No.	DE23-														
Material of Process Connection																	
Without	only with wafer type or spare primary		0														
SST 1.4571 (316Ti)	only with welded flange		3														
SST 1.4404 (316L)	not with welded flange, wafer type or spare primary		4														
Others			9														
Accessories not with welded flange																	
Without			A														
With fastening element	4)		C														
Accessories only with welded flange																	
Without			A														
Protection rings SST 1.4571 (316Ti)	5)		B														
Grounding ring SST 1.4571 (316Ti)	5)		C														
Temperature Range																	
Standard design <= 130 °C (266 °F)			S														
Certificates																	
PED Standard			A														
Material certificate per EN 10204 3.1 + pressure test per AD 2000			D														
Pressure test per AD 2000			G														
Inspection certificate per EN 10204 3.1			F														
PMO approval (for US only)			P														
Calibration Certificates																	
Standard			A														
Custody transfer, cold water / waste water	(DN 25 ... DN 100 / 1 in. ... 4 in.)		B														
Custody transfer, fluids except water	(DN 25 ... DN 100 / 1 in. ... 4 in.)		C														
Type of Protection																	
IP 67			2														
Power Supply																	
100 ... 230 V AC			N														
16.8 ... 26.4 V AC / 16.8 ... 31.2 V DC			K														
Display																	
Illuminated			D														
Input / Output Options																	
Current output active + Pulse output active + Contact input + Contact output			0	1													
Current output active + Pulse output active + Contact input + Contact output + HART			0	2													
Current output active + Pulse output passive + Contact input + Contact output			0	3													
Current output active + Pulse output passive + Contact input + Contact output + HART			0	4													
Current output active + Pulse output passive + Contact output + RS485			0	5													
Pulse output passive + Contact output + PROFIBUS DP			0	6													
PROFIBUS PA 3.0			1	4													
FOUNDATION Fieldbus not with Custody Transfer			1	5													
PROFIBUS PA 3.0 with M12 plug			1	6													
Converter																	
Housing Material	Cable Entry																
Aluminium	M20 x 1.5		0														
SST	M20 x 1.5 not with PROFIBUS PA 3.0 with M12 plug		1														
Aluminium	1/2 in. NPT		2														
Aluminium	PF 1/2 in.		3														

4) Not with 3A Certificate

5) Protection rings on both and grounding ring fastened on one side to flange

Continued on next page

Electromagnetic Flowmeter		Variant digit No.	1 - 5	16	17	18	19	20	21	22	23	24	25	26			
FXE4000-DE23 (COPA-XE) compact		Catalog No.	DE23-														
Name Plate																	
German											G						
English											6)	E					
French											6)	F					
Design Level (Specified by ABB)													*				
Gasket Material (not with welded flange)																	
EPDM (with FDA certificate)											not with wafer type or spare primary		E				
Without											only with wafer type or spare primary		A				
Silicone (with FDA certificate)											not with wafer type or spare primary		S				
Electrode Design																	
Standard													1				
Conical head, SST 1.4539 (904L)											(from DN 10 and not with Grounding Electrodes)		7)	2			

- 6) not with Custody Transfer
- 7) For application e.g. with high fat contents

Note to the 3A conformity:
 Order this option in clear text. Mounting parts are obsolete then.
 Please observe the special installation conditions - see Operating Instruction

3A Certificate (not with welded flange, wafer type or male thread)
 (only with accessories code A) ==>

Electromagnetic Flowmeter		Variant digit No.	1	5	6	7	8	9	10	11	12	13	14	15			
FXE4000-DE21 (MAG-XE) remote		Catalog No.	DE21-														
Process Connection																	
Wafer type		1)	W														
Without adapter	Spare primary, for replacement only		V														
Weld stubs	ISO 1127		J														
Weld stubs	ISO 2037 (only DN 10 ... DN 100)		P														
Weld stubs	DIN 2463		Q														
Weld stubs	DIN 11850		R														
Weld stubs	SMS (only DN 25, DN 40 ... 100)		X														
Pipe connection	DIN 11851		S														
Tri-Clamp	DIN 32676		T														
Welded flange	DIN 2501 / ASME		F														
Male thread	ISO 228 / DIN 2999 conical (only DN 3 ... DN 25)		E														
Tri-Clamp	ASME BPE (DN 3 ... DN 25, DN 40 ... DN 100)		K														
Others			Z														
Liner Material																	
Meter Size																	
PFA	DN 3	1/10 in.	P	0	3												
PFA	DN 4	5/32 in.	P	0	4												
PFA	DN 6	1/4 in.	P	0	6												
PFA	DN 8	5/16 in.	P	0	8												
PFA	DN 10	3/8 in.	P	1	0												
PFA	DN 15	1/2 in.	P	1	5												
PFA	DN 20	3/4 in.	P	2	0												
PFA	DN 25	1 in.	P	2	5												
PFA	DN 32	1-1/4 in.	P	3	2												
PFA	DN 40	1-1/2 in.	P	4	0												
PFA	DN 50	2 in.	P	5	0												
PFA	DN 65	2-1/2 in.	P	6	5												
PFA	DN 80	3 in.	P	8	0												
PFA	DN 100	4 in.	P	1	H												
Measuring Electrodes Material																	
Grounding Electrodes																	
Hastelloy C-4 (2.4610)	Without																
Hastelloy B-3 (2.4600)	Without																
SST 1.4571 (316Ti)	Without																
Titanium	Without																
Tantalum	Without																
SST 1.4539 (904L)	Without																
Platinum-Iridium	Without																
Hastelloy C-4 (2.4610)	With																
Hastelloy B-3 (2.4600)	With																
SST 1.4571 (316Ti)	With																
Titanium	With																
Tantalum	With																
SST 1.4539 (904L)	With																
Platinum-Iridium	With																
Pressure Rating																	
PN 10	Tri-Clamp (DN 65 ... DN 100), pipe connection / welded stub ends / w/o adapter (DN 65, DN 100)																
PN 16	Wafer type (DN 65 ... DN 100), Tri-Clamp (DN 3 ... DN 50), pipe connection / welded stub ends / w/o adapter (DN 50, DN 80), welded flange (DN 65, DN 100), male thread																
PN 40	Wafer type (DN 3 ... DN 50), pipe connection / welded stub ends / w/o adapter (DN 3 ... DN 40), welded flange (DN 3 ... DN 80)																
ASME CL 150	Wafer type (DN 3 ... DN 100), welded flange (DN 3 ... DN 100)																
ASME CL 300	Wafer type (DN 3 ... DN 50), welded flange (DN 3 ... DN 100)																

Continued on next page

- 1) Accessories see table H
- 2) Grounding electrodes >= DN 3
- 3) Connection dimensions for flanges acc. to DIN 2501 / EN 1092-1 or ASME B16.5
- 4) DN 65 / PN 16 with connection dimensions acc. EN 1092-1: Please order PN 40

Electromagnetic Flowmeter		Variant digit No.	1 - 5	12	13	14	15	16	17	18	19	20	21			
FXE4000-DE21 (MAG-XE) remote		Catalog No.	DE21-													
Material of Process Connection																
Without		only with wafer type or spare primary														
SST 1.4571 (316Ti)		only with welded flange														
SST 1.4404 (316L)		not with welded flange, wafer type or spare primary														
Others																
Accessories																
Without		not with welded flange														
With fastening element		6)														
Accessories																
Without		only with welded flange														
Protection rings SST 1.4571 (316Ti)		5)														
Grounding ring SST 1.4571 (316Ti)		5)														
Temperature Range																
Standard design <= 130 °C (266 °F)		S														
Certificates																
PED Standard		A														
Material certificate per EN 10204 3.1 + pressure test per AD 2000		D														
Pressure test per AD 2000		G														
Inspection certificate per EN 10204 3.1		F														
PMO approval (for US only)		P														
Calibration Certificates																
Standard		A														
Custody transfer, cold water / waste water (DN 25...DN 100 1 in...4 in)		B														
Custody transfer, fluids except water (DN 25...DN 100 1 in...4 in)		C														
Type of protection																
IP 67		Cable Entry														
IP 67		Thread for screw-type conduit fitting M20 x 1.5														
IP 68		Thread for screw-type conduit fitting NPT 1/2 in.														
IP 68		Thread for screw-type conduit fitting M20 x 1.5														
IP 68		Cable connected and Connection box potted														
Name Plate																
German		G														
English		E														
French		F														
Design Level (Specified by ABB)																
*																
Gasket Material																
EPDM		(with FDA certificate)														
Without		(wafer type and welded flange only)														
Silicone		(with FDA certificate)														
Electrode Design																
Standard		1														
Conical head, SST 1.4539 (904L) (>= DN 10)		7) 2														

5) Protection rings on both and grounding ring fastened on one side to flange

6) Not with 3A Certificate

7) For application e.g. with high fat contents

Related Converter FXE4000-E4

Note to the 3A conformity

Order this option in clear text. Mounting parts are void then.

Please observe the special installation conditions - see Operating Instruction

3A Certificate (not with welded flange, wafer type or male thread)
(only with accessories code A) ==>

8) Sealing compound (optionally)

D141B038U01

5 Transmitter

5.1 Specifications:

Flow range	Continuously adjustable between 0.5 and 10 m/s
Max. accuracy	≤ 0.5 % of rate ≤ 0.25 % of rate (option)
Reproducibility	≤ 0.15 % of rate
Minimum conductivity	5 µS/cm (20 µS/cm for demineralized water)
Response time	For a step change 0-99 % (corresponds to 5 τ) ≥ 1 s for 6 1/2 Hz exciter frequency
Supply power	High voltage AC: 100 - 230 V (- 15/+10 %) Low voltage AC: 16.8 - 26.4 V Low voltage DC: 16.8 - 31.2 V, ripple: < 5 %
Supply frequency	47 - 63 Hz
Magnetic field supply	6¼ Hz, 7½ Hz 12½ Hz, 15 Hz, 25 Hz, 30 Hz (50/60 Hz supply power)
Power	≤ 14 VA for AC supply power (flowmeter primary incl. converter) For AC supply power ≤ 6 W for DC supply power DC (flowmeter primary incl. converter)
Ambient temperature	-20 °C to +60 °C
Electrical connections	Spring loaded screwless terminals
Forward/Reverse flow metering	Flow direction is indicated by direction arrows in the display and signaled over the optocoupler output (ext. contact output).

5.2 Housing Variants

COPA XE

Compact design with converter housing made of cast light metal, painted, paint coat 60 µm thick, rear section RAL 7012 dark gray, front section (cover) RAL 9002 light gray

Option

Converter housing made of stainless steel [304]

MAG-XE

- Field mount housing made of cast light metal, painted, paint coat 60 µm thick, rear section RAL 7012 dark gray, front section (cover) RAL 9002 light gray
- Panel installation housing
- Housing for rail mounting

Weight

COPA-XE: see Data Sheet

MAG-XE (converter):

- Field mount housing: 4.5 kg
- Rail mount housing: 1.2 kg
- Panel installation housing 1.2 kg

Signal Cable (only for MAG-XE)

Max. cable length between flowmeter primary and converter: 50 m.

Scope of delivery: 10 m.

If more than 10 m is required, the cable can be ordered under the order number D173D025U01.

5.3 In- / Outputs

Isolation in- / outputs

The current output and the pulse output are isolated from the flowmeter primary circuit/ input circuit and from each other.

Current output (Terminals +/-)

0/4-20 mA load ≤ 600 Ω; 0/2-10 mA, load ≤ 1200 Ω; 0-5 mA, load ≤ 2400 Ω selectable. Terminals: +/-

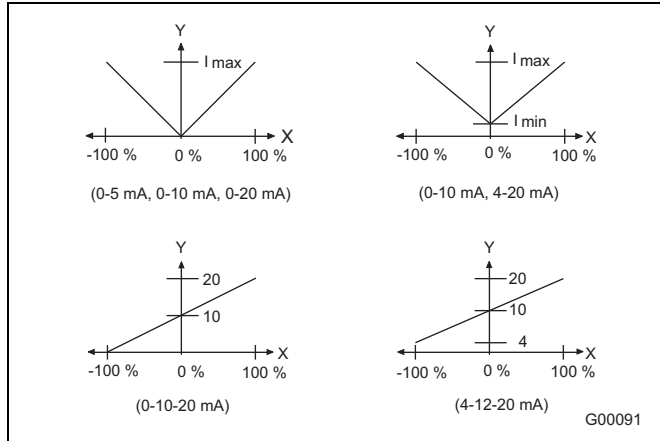


Fig. 37

Y = Current [mA]
X = Flow direction/flowrate

Scaled Pulse Output (Terminals V8, V9 or Ux, V8)

Scaled pulse output max. 5 kHz, pulse factor which can be set between 0.001 and 1000 is a multiplier for the value displayed (1 pulse/m³ x 1000). The pulse width can be set between 0.1 ms and 2000 ms.

A change between an “active” or “passive” configuration can be made using jumpers.

Design	Optocoupler Passive	Active
Function	E9, C9	9, 10
Operating voltage	U _{CEL} = 0 ... 2 V U _{CEH} = 16 ... 30 V	U = 16 V ... 30 V
Operating current and frequency	I _{CEH} = 0 ... 0.2 mA I _{CEL} = 5 ... 220 mA f _{max} ≤ 5 kHz	I = 20 ... 150 mA f _{max} = 4 Hz Pulse width: ≤ 50 ms Pulse: 16 V ≤ 25 ms On/off ratio: ≥ 1:4 (T _{on} : T _{off})
		I = 2 ... 20 mA f _{max} = 5 kHz U = 16 ... 30 V

Contact output

The following functions can be assigned via the software:

System monitor	Normally opened or closed contact
Empty pipe	Normally opened or closed contact
Forward/Reverse	Contact closes for forward flow direction
Max-Alarm, Min-Alarm	Normally opened or closed contact
MAX-MIN-Alarm	Normally opened or closed contact
VR-Signal	Closed contact for forward direction signal

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

U_{CEH} = 16 ... 30 V, U_{CEL} = 0 ... 2 V
I_{CEH} = 0 ... 0.2 mA, I_{CEL} = 2 ... 220 mA

Contact input

The following functions can be assigned via the software:

- **Ext. Zero Return**
When the pipeline empties all the outputs can be turned off.
- **Ext. Totalizer Reset**
The internal totalizer values can be reset via an external contact. Optocoupler, Terminals X1, G2
U = 16 ... 30 V, R_i 2 kΩ
- **Ext. Totalizer Stop**
The flow integration can be stopped independently of the instantaneous flowrate.

Empty pipe signal

If the “automatic empty pipe detector” is enabled, a signal can be transmitted for an – empty pipe – condition.

In addition, the current output can be set to “low” or “high”, and the pulse totalization is interrupted.

The “empty pipe detector” option requires a conductivity ≥20 μS/cm, and a meter size ≥ DN 10.

For the optocoupler specifications, see Contact Output.

5.4 Digital Communication

The converter offers the following digital communication options.

5.4.1 HART-Protocol

The flowmeter is registered with the HART Communication Foundation.

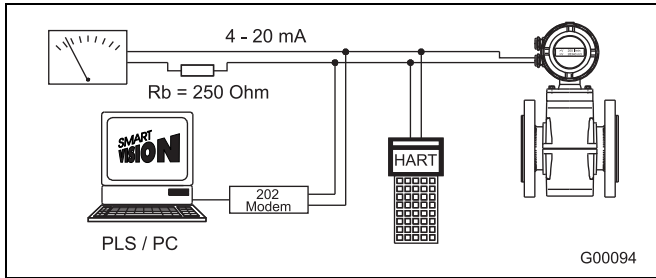


Fig. 38

HART-Protocol	
Configuration	<ul style="list-style-type: none"> Directly on the device Software SMART VISION® (+HART DTM)
Transmission	FSK Modulation on the current output 4-20 mA per Bell 202 Standard
Max. Signal-amplitude	1.2 mA _{pp}
Current output load:	min. 250 Ω, max. < 600 Ω
Cable	
Cable	AWG 24 twisted
Max. cable length	1500 m

For more detailed information see the separate Data Link Description

5.4.2 PROFIBUS PA Protocol

The data link conforms to Profile 3.0 (Standard PROFIBUS, EN 50170, DIN 19245 [PRO91]).

PROFIBUS PA Ident-No.:	0691 hex.
Alternative Standard-Ident-No.	9700 or 9740
Configuration	Directly on the device Software SMART VISION® (+PROFIBUS PA DTM)
Transmission signal	per IEC 61158-2
Cable	Shielded, twisted (Type A or B cables are preferred as defined in IEC 61158-2)

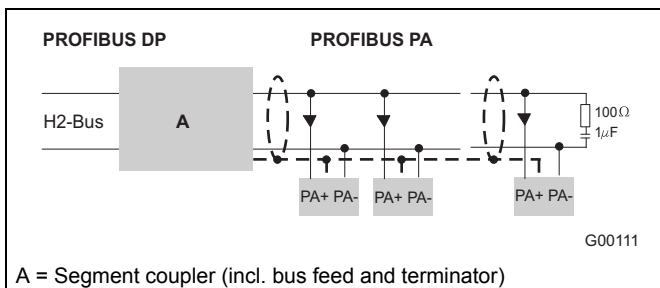


Fig. 39 Example for PROFIBUS PA connection

Bus topology

- Tree and/or linear structure
- Bus termination: Passive at both ends of the main bus cable (RC-component R = 100 Ω, C = 1 μF)

Voltage / Current values

- Average current draw: 13 mA.
 - During a fault condition, the current is limited to max. 17 mA by the FDE function (=Fault Disconnection Electronic) integrated in the instrument.
 - The upper limit of the current is electronically limited.
 - The voltage on the bus must be within the range 9-32 V DC.
- For more detailed information see the separate Data Link Description

5.4.3 FOUNDATION Fieldbus (FF)

FF data link	Conforms to FF standard 890/ 891 and FF-902/90
Interoperability Test campaign no.	IT 019500
Manufacturer ID	0x000320
Device ID	0x0016
Configuration	<ul style="list-style-type: none"> Directly on the device Via services integrated in the system National Configurator
Transmission signal	per IEC 61158-2

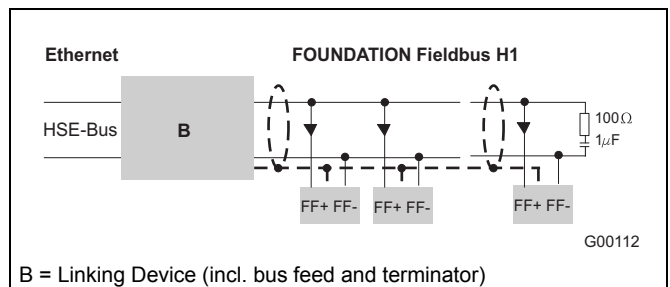


Fig. 40 Example for FOUNDATION Fieldbus connection

Bus topology

- Tree and/or linear structure
- Bus termination: Passive at both ends of the main bus cable (RC-component R = 100 Ω, C = 1 μF)

Voltage / Current values

- Average current draw: 13 mA.
- During a fault condition, the current is limited to max. 17 mA by the FDE function (=Fault Disconnection Electronic) integrated in the instrument.
- Upper limit of the current: electronically limited.
- The voltage on the bus must be within the range 9-32 V DC.

Bus Address

The bus address is automatically assigned or it can be set manually in the system.

The address recognition is made by a unique combination of the Manufacturer-ID, Device-ID and Instrument Series-No.

System Connection

Required are:

- DD-File (Device Description), which contains the device description.
- CFF-File (Common File Format), required to engineer the segment. The engineering can be accomplished on- or offline.

Both files as well as the interface description are located on the supplied CD (part no.: D699D002U01). If required, it can be ordered from ABB at no cost.

The files required for operation can also be downloaded from the website <http://www.fieldbus.org>.

For more detailed information see the separate Data Link Description Part No. D184B093U17.

5.4.4 ASCII-Protocol

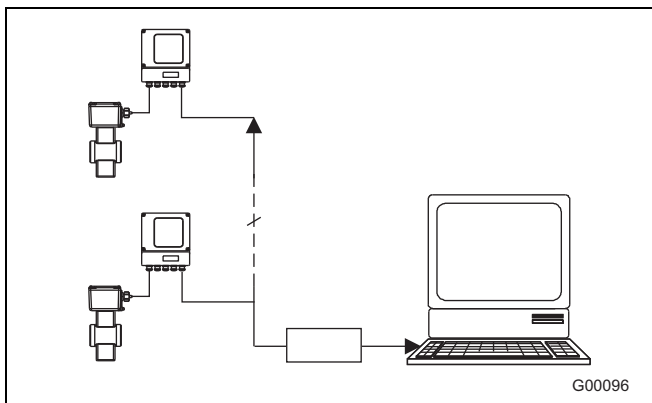


Fig. 41

ASCII-Protocol	
Transmission	RS485 data link
V _{pp} = 5 V. Input impedance:	≥ 12 kΩ
Cable	
Cable	Shielded, twisted pair
Max. cable length	≥1200 m
Baudrate	1200-9600
Terminals	A and B
Max. 32 Instruments on a single bus	

For more detailed information see the separate Data Link Description

5.4.5 PROFIBUS DP Protocol

The digital communication utilizes a PROFIBUS DP connection board.

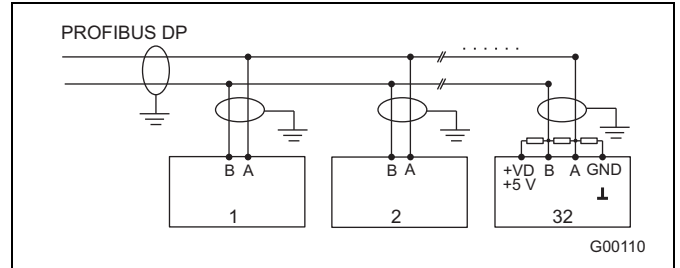


Fig. 42

Configuration	<ul style="list-style-type: none"> • Directly on the device • Software SMART VISION ®
Transmission	RS485 data link
Transmission speed	9.6 – 1500 Kbit/s
Protocol	per EN 50170
Ident-No.	6666 HEX
Cyclic (Output variables, see separate data link description for COPA/MAG-XE)	
Cable	Shielded, twisted pair
Max. cable length	1200 m (cable type A)
Baudrate	9.6 – 1500 Kbit/s
Characteristic resistance	135 – 165 Ω
Distributed capacitance	< 30 pF/m
Loop resistance	110 Ω/km

The max. tap line length is a function of the baudrate and the number of instruments.

Send and receive signals on the same terminal.

For more detailed information see the separate Data Link Description

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

5.4.6 Interconnection Diagrams

5.4.6.1 FXE4000 (COPA-XE), analog communication (incl. HART)

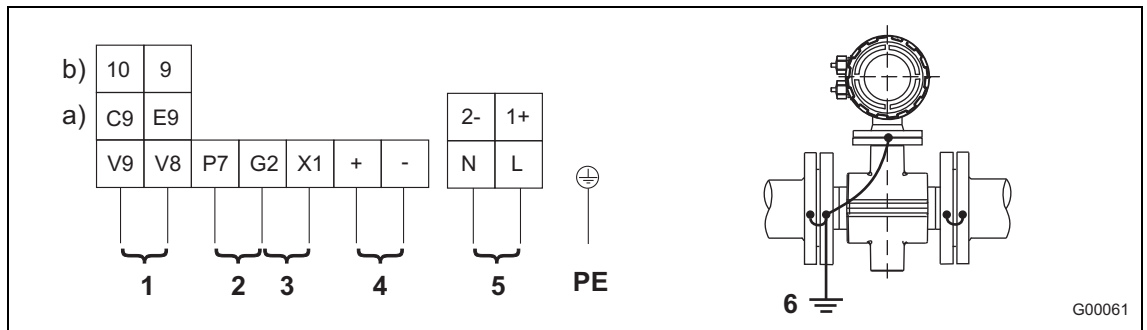


Fig. 43

1 a) Scaled pulse output, passive:

Pulse width adjustable from 0.1 to 2000 ms, terminals V8, V9, function E9, C9
 Optocoupler specifications: $f_{\max} 5 \text{ kHz}$, $0 \text{ V} \leq U_{\text{CEL}} \leq 2 \text{ V}$, $16 \text{ V} \leq U_{\text{CEH}} \leq 30 \text{ V}$,
 $0 \text{ mA} \leq I_{\text{CEH}} \leq 0.2 \text{ mA}$, $2 \text{ mA} \leq I_{\text{CEL}} \leq 220 \text{ mA}$

b) Scaled pulse output, active:

Pulse width adjustable from 0.1 to 2000 ms, terminals V8, V9, function 9, 10
 $20 \text{ mA} < I \leq 150 \text{ mA}$, $f_{\max} \leq 4 \text{ Hz}$, pulse width $\leq 50 \text{ ms}$, pulse $T_{16\text{V}} \leq 25 \text{ ms}$; on/off ratio: 1:4
 ($T_{\text{on}} : T_{\text{off}}$), $f_{\max} 5 \text{ kHz}$, $2 \text{ mA} \leq I \leq 20 \text{ mA}$; $16 \text{ V} \leq U \leq 30 \text{ V}$

2 Contact output:

Function selectable via software to system monitor, empty pipe, max.-min.-alarm or V/R contact output*, terminals G2, P7

Optocoupler specifications: $f_{\max} 5 \text{ kHz}$,
 $0 \text{ V} \leq U_{\text{CEL}} \leq 2 \text{ V}$, $16 \text{ V} \leq U_{\text{CEH}} \leq 30 \text{ V}$;
 $0 \text{ mA} \leq I_{\text{CEH}} \leq 0.2 \text{ mA}$, $2 \text{ mA} \leq I_{\text{CEL}} \leq 220 \text{ mA}$

3 Contact input:

Function selectable via software as external zero return, external totalizer reset, external totalizer stop, terminals G2, X1

Optocoupler specifications: $16 \text{ V} \leq U \leq 30 \text{ V}$, $R_i = 2 \text{ k}\Omega$

4 Current output:

Adjustable, terminals +/-, Current $\leq 600 \Omega$ for 0/4 ... 20 mA,
 Current $\leq 1200 \Omega$ for 0/2 ... 10 mA, Current $\leq 2400 \Omega$ for 0 ... 5 mA,
 Option: HART-Protocol

5 Supply Power:

See name plate

6 Functional ground

*) The default factory setting is the "forward direction" signal.

5.4.6.2 FXE4000 (COPA-XE), digital communication

Valid for PROFIBUS DP, PROFIBUS PA, FOUNDATION Fieldbus, ASCII

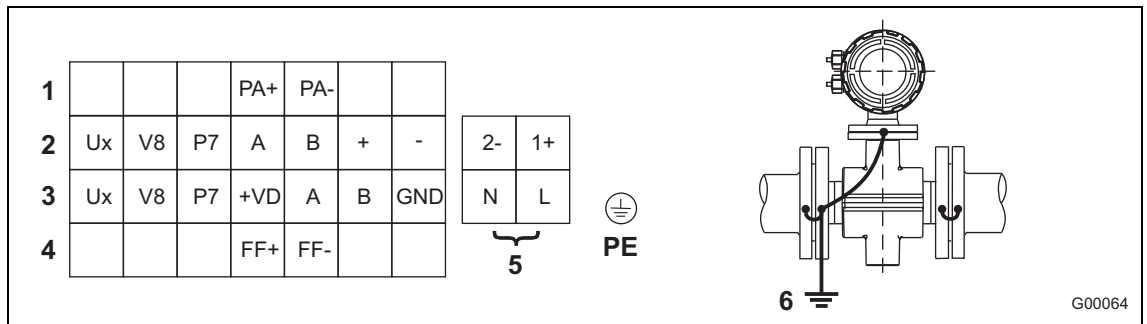


Fig. 44

1 **PROFIBUS PA:**

Terminals PA+, PA-: Connection for PROFIBUS PA according to IEC 61158-2 (Profile 3.0), U = 9 - 32 V, I = 13 mA (normal operation); 17 mA (fault condition / FDE)

2 **ASCII-Protocol (RS485):**

Terminals Ux, V8: Scaled pulse output, passive (Optocoupler), pulse width adjustable between 0.1 ms to 2000 ms,

Optocoupler specifications: $f_{max} \leq 5 \text{ kHz}$, $0 \text{ V} \leq U_{CEL} \leq 2 \text{ V}$, $16 \text{ V} \leq U_{CEH} \leq 30 \text{ V}$, $0 \text{ mA} \leq I_{CEH} \leq 0.2 \text{ mA}$, $2 \text{ mA} \leq I_{CEL} \leq 220 \text{ mA}$

Terminals Ux, P7: Contact output, function selectable via software e.g. to system monitor, empty pipe, max. – min. –alarm or V/R contact output

Optocoupler specifications: $f_{max} \leq 5 \text{ kHz}$, $0 \text{ V} \leq U_{CEL} \leq 2 \text{ V}$, $16 \text{ V} \leq U_{CEH} \leq 30 \text{ V}$, $0 \text{ mA} \leq I_{CEH} \leq 0.2 \text{ mA}$, $2 \text{ mA} \leq I_{CEL} \leq 220 \text{ mA}$

Terminals A, B: Serial data link RS485 for communication using ASCII-Protocol

Terminals +, -: Current output, terminals: +/-, current $\leq 600 \Omega$ for 0/4 to 20 mA

3 **PROFIBUS DP:**

Like design 2 but terminals +VD, A, B, GND connection for PROFIBUS DP according to EN 50170

4 **FOUNDATION Fieldbus:**

Terminals FF+, FF-: Connection for FOUNDATION Fieldbus (H1) according to IEC 61158-2, U = 9 ... 32 V, I = 13 mA (normal operation); 17 mA (fault condition / FDE)

5 **Supply Power:**

See name plate

6 **Functional ground**

5.4.6.3 FXE4000 MAG-XE, analog communication (incl. HART)

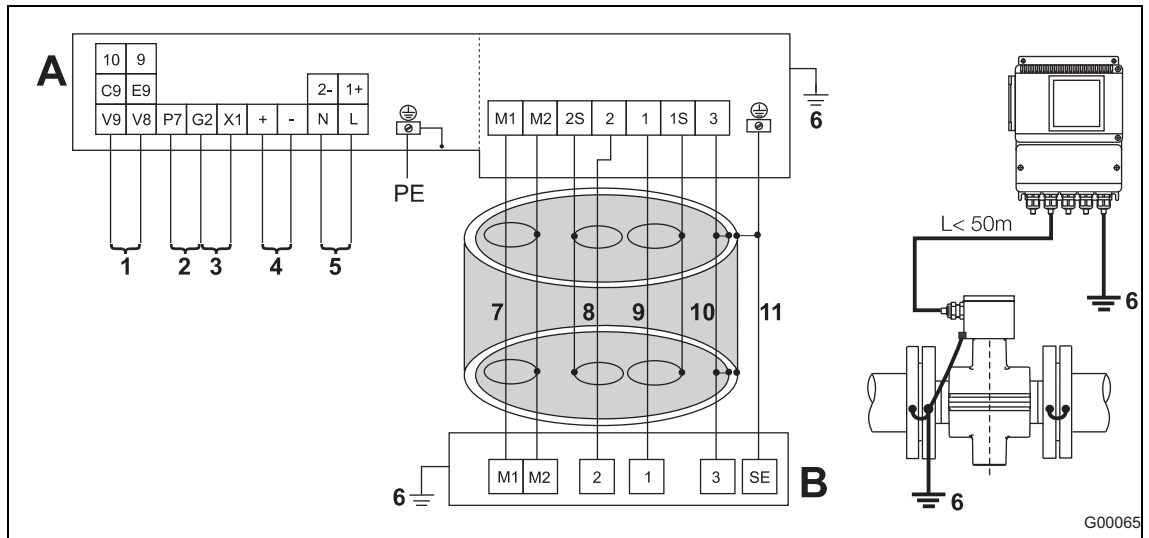


Fig. 45

1 a) Scaled pulse output, passive:

Pulse width adjustable from 0.1 to 2000 ms, terminals V8, V9, function E9, C9
 Optocoupler specifications: $f_{max} \leq 5 \text{ kHz}$, $0 \text{ V} \leq U_{CEL} \leq 2 \text{ V}$, $16 \text{ V} \leq U_{CEH} \leq 30 \text{ V}$,
 $0 \text{ mA} \leq I_{CEH} \leq 0.2 \text{ mA}$, $2 \text{ mA} \leq I_{CEL} \leq 220 \text{ mA}$

b) Scaled pulse output, active:

Pulse width adjustable from 0.1 to 2000 ms, terminals V8, V9, function 9, 10
 $20 \text{ mA} < I \leq 150 \text{ mA}$, $f_{max} \leq 4 \text{ Hz}$, pulse width $\leq 50 \text{ ms}$, pulse $T_{16V} \leq 25 \text{ ms}$; on/off ratio: 1:4
 ($T_{on} : T_{off}$), $f_{max} \leq 5 \text{ kHz}$, $2 \text{ mA} \leq I \leq 20 \text{ mA}$; $16 \text{ V} \leq U \leq 30 \text{ V}$

2 Contact output:

Function selectable via software to system monitor, empty pipe, max.-min.-alarm or V/R contact output*, terminals G2, P7

Optocoupler specifications: $f_{max} \leq 5 \text{ kHz}$, $0 \text{ V} \leq U_{CEL} \leq 2 \text{ V}$, $16 \text{ V} \leq U_{CEH} \leq 30 \text{ V}$,
 $0 \text{ mA} \leq I_{CEH} \leq 0.2 \text{ mA}$, $2 \text{ mA} \leq I_{CEL} \leq 220 \text{ mA}$

3 Contact input:

Function selectable via software as external zero return, external totalizer reset, external totalizer stop, terminals G2, X1

Optocoupler specifications: $16 \text{ V} \leq U \leq 30 \text{ V}$, $R_i = 2 \text{ k}\Omega$

4 Current output:

Adjustable, terminals +/-, Current $\leq 600 \Omega$ for 0/4 ... 20 mA,
 Current $\leq 1200 \Omega$ for 0/2 ... 10 mA, Current $\leq 2400 \Omega$ for 0 ... 5 mA,
 Option: HART-Protocol

5 Supply Power:

See name plate

6 Functional ground

7 White | 9 Red | 11 Steel shielding

8 Blue | 10 Yellow

A Converter | B Flowmeter primary

*) The default factory setting is the "forward direction" signal.

5.4.6.4 FXE4000 (MAG-XE), digital communication

Valid for PROFIBUS DP, PROFIBUS PA, FOUNDATION Fieldbus, ASCII

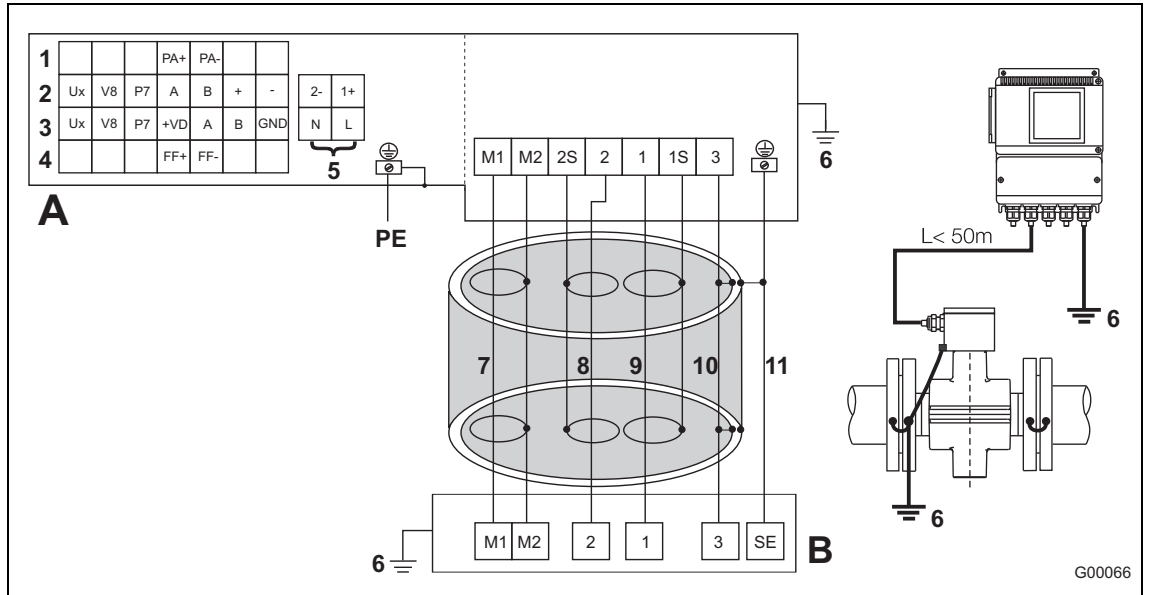


Fig. 46

1 PROFIBUS PA:

Terminals PA+, PA-: Connection for PROFIBUS PA according to IEC 61158-2 (Profile 3.0), U = 9 - 32 V, I = 13 mA (normal operation); 17 mA (fault condition / FDE)

2 ASCII-Protocol (RS485):

Terminals Ux, V8: Scaled pulse output, passive (optocoupler), Pulse width adjustable between 0.1 ms to 2000 ms,

Optocoupler specifications: $f_{max} \leq 5 \text{ kHz}$, $0 \text{ V} \leq U_{CEL} \leq 2 \text{ V}$, $16 \text{ V} \leq U_{CEH} \leq 30 \text{ V}$, $0 \text{ mA} \leq I_{CEH} \leq 0.2 \text{ mA}$, $2 \text{ mA} \leq I_{CEL} \leq 220 \text{ mA}$

Terminals Ux, P7: Contact output, function selectable via software e.g. to system monitor, empty pipe, max. - min. -alarm or V/R contact output

Optocoupler specifications: $f_{max} \leq 5 \text{ kHz}$, $0 \text{ V} \leq U_{CEL} \leq 2 \text{ V}$, $16 \text{ V} \leq U_{CEH} \leq 30 \text{ V}$, $0 \text{ mA} \leq I_{CEH} \leq 0.2 \text{ mA}$, $2 \text{ mA} \leq I_{CEL} \leq 220 \text{ mA}$

Terminals A, B: Serial data link RS485 for communication using ASCII-Protocol

Terminals +, -: Current output, terminals: +/-, current $\leq 600 \Omega$ for 0/4 to 20 mA

3 PROFIBUS DP:

Like design 2 but terminals +VD, A, B, GND connection for PROFIBUS DP according to EN 50170

4 FOUNDATION Fieldbus:

Terminals FF+, FF-: Connection for FOUNDATION Fieldbus (H1) according to IEC 61158-2, U = 9 ... 32 V, I = 13 mA (normal operation); 17 mA (fault condition / FDE)

5 Supply Power:

See name plate

6 Functional ground

7 White	9 Red	11 Steel shielding
8 Blue	10 Yellow	
A Converter	B Flowmeter primary	

5.4.6.5 Interconnection examples for the peripherals with analog communication (incl. HART)

Current Output

I = internal, E = external

0/4 - 20 mA Load ≤ 600 Ω

0/2 - 10 mA Load ≤ 1200 Ω

0 - 5 mA Load ≤ 2400 Ω

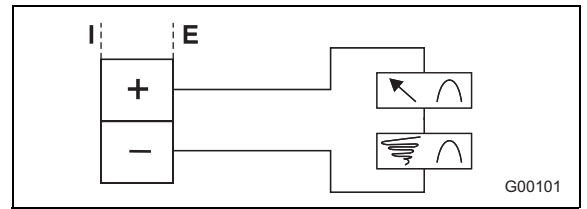


Fig. 47

Pulse Output (Optocoupler)

Pulse Output active

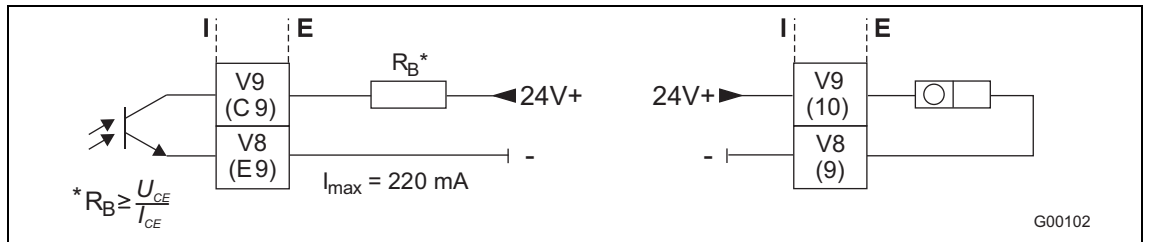


Fig. 48

Contact Input for External Zero Return (Function assigned in software)

External Totalizer Reset

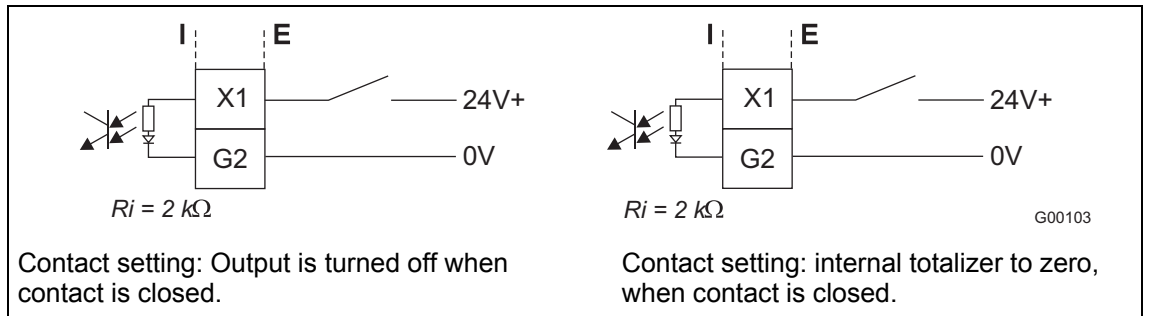


Fig. 49

Contact Output for System Monitor, Max.-Min.-Alarm, Empty Pipe or Forward/Reverse Direction Signal (Function assigned in software)

Pulse Output passive Optocoupler, Separate Forward and Reverse Pulses on Contact Output

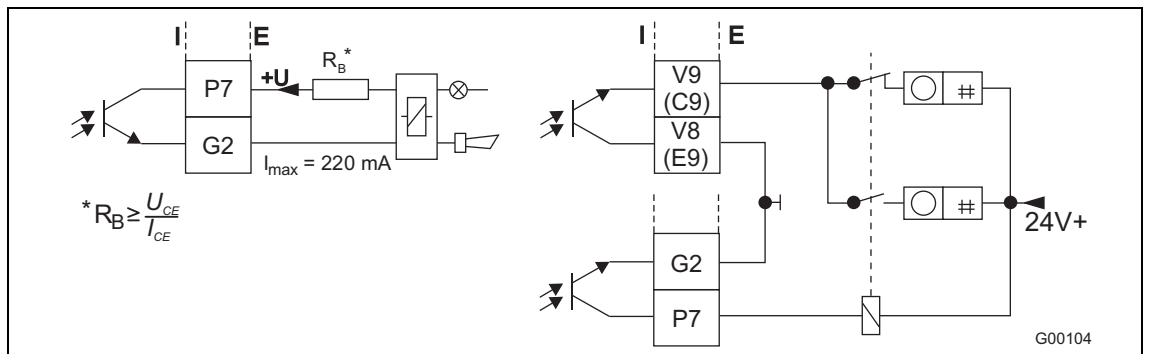


Fig. 50

5.4.6.6 Interconnection examples for the peripherals with digital communication

Current Output (only for ASCII-Communication)

0/4 - 20 mA load: max. 600 Ω

I = internal
E = external

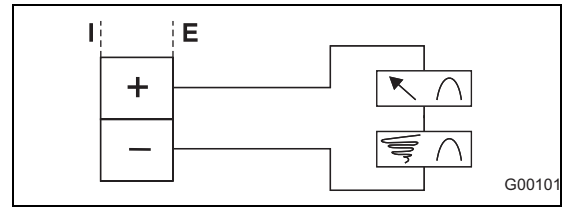


Fig. 51

Pulse Output and Contact Output

(only available for PROFIBUS DP or ASCII-Protocol)

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

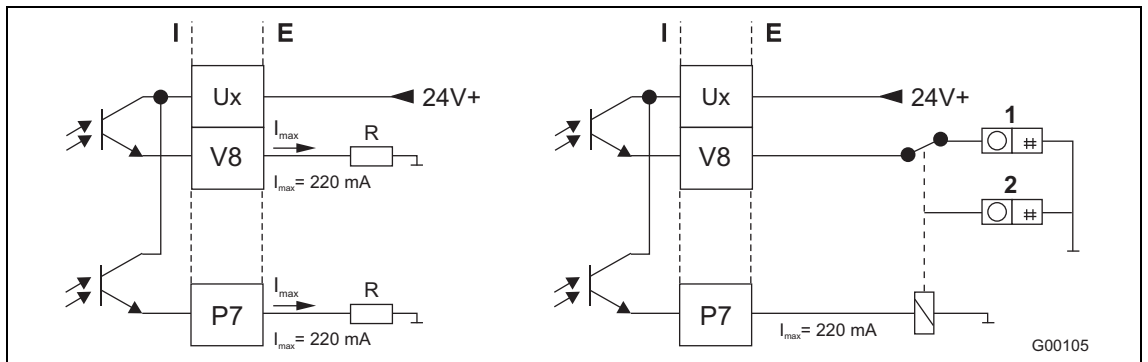


Fig. 52

Contact Output Ux / P7 (for System Monitor, Max.-Min.-Alarm, Empty Pipe or Forward/Reverse Direction Signal ,Function assigned in software)

Pulse Output Ux/V8 (Optocoupler)

- 1 Forward
- 2 Reverse
- I = internal
- E = external

Data Link RS485 (ASCII Protocol)

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

I = internal
E = external

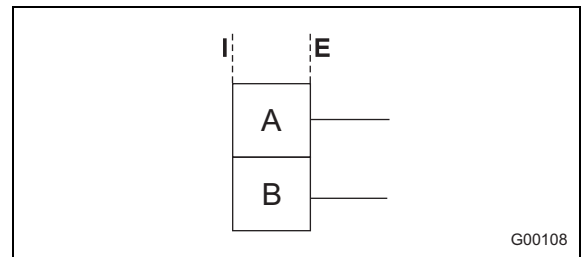


Fig. 53

PROFIBUS DP

The resistors R1, R2, R3 are bus termination resistors. They are to be installed when the instrument is connected at an end of the bus cable.

R1 = 390 Ω; R2 = 220 Ω; R3 = 390 Ω

- 1 PROFIBUS DP Cable (e.g. CDN110: 636469890140), max. Length 20 cm
- 2 Plug for T-Box (e.g. Manuf. Weidmüller 1784790000)

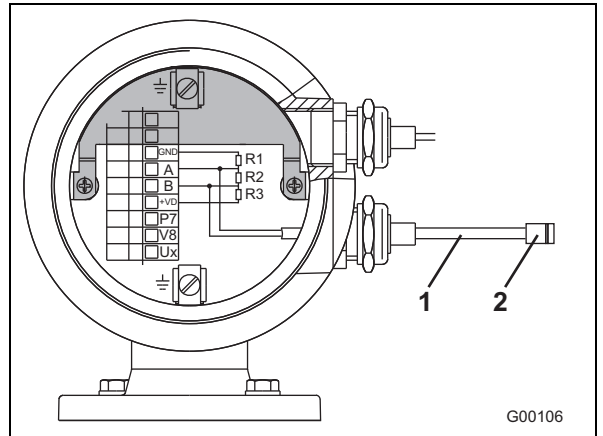


Fig. 54

PROFIBUS PA / FOUNDATION Fieldbus

The resistor R and the capacitor C form the bus termination. They are to be installed when the instrument is connected to the end of the bus cable.

R = 100 Ω; C = 1 μF

- 1 PROFIBUS PA
- 2 FOUNDATION Fieldbus

I = internal

E = external

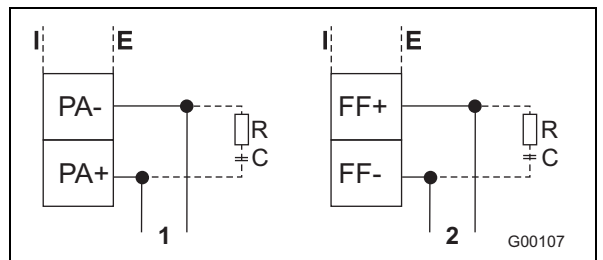


Fig. 55

Connection example using M12 Plug (only for PROFIBUS PA)

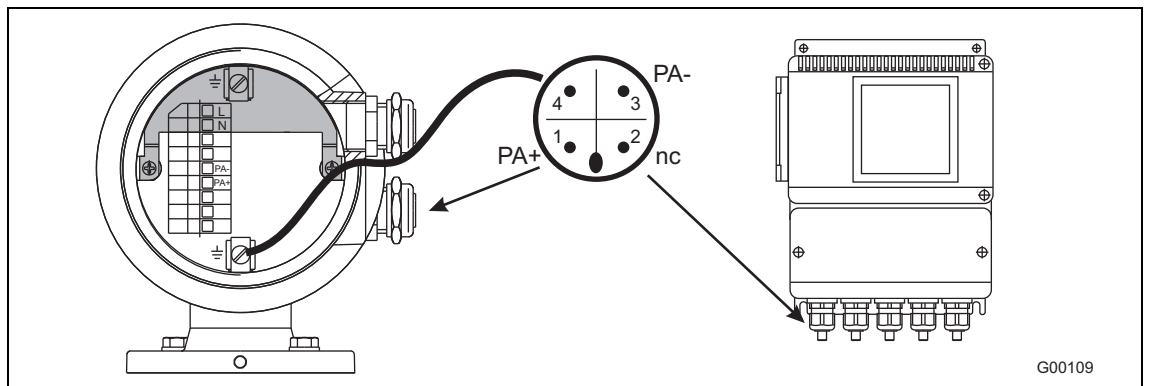


Fig. 56

As an option, the bus cable can be connected using a M12 plug instead of PG connectors (see Ordering Information for the instrument). The instrument is then shipped completely wired. Suitable sockets (Type EPG300) together with additional accessories may be found in the List Sheet 10/63.6.44 DE.

5.5 Converter scale drawing FXE 4000-E4 (MAG-XE)

5.5.1 Transmitter housing and mounting arrangements

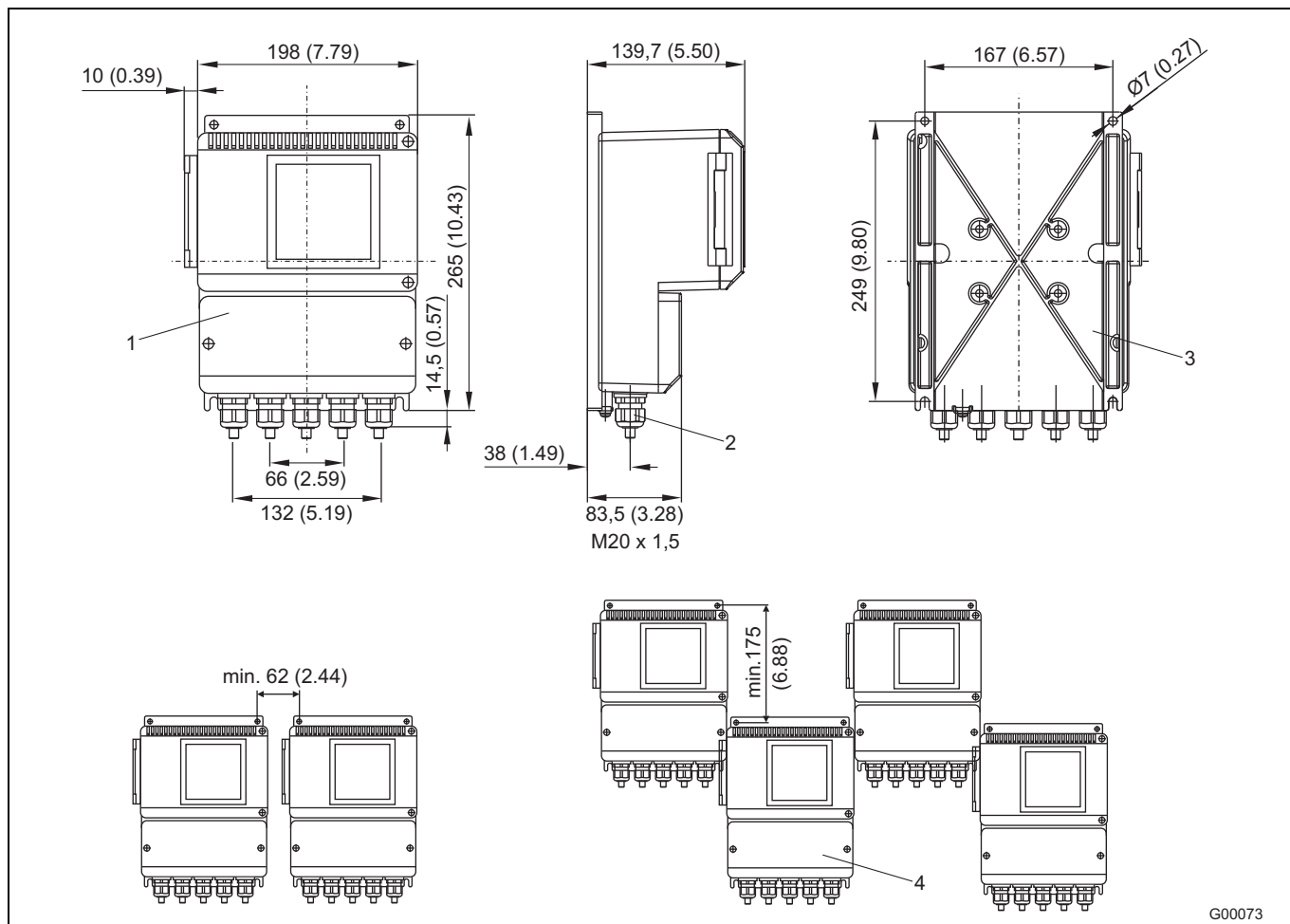


Fig. 57: (Dimensions in mm)

- 1 Field mount housing with window
- 2 Cable connector M20 x 1.5
- 3 Mounting holes for pipe mounting set for a 2" – pipe installation; mounting set upon request (order no. 612B091U07)
- 4 Protection class IP 67

5.5.2 Converter as panel mount housing

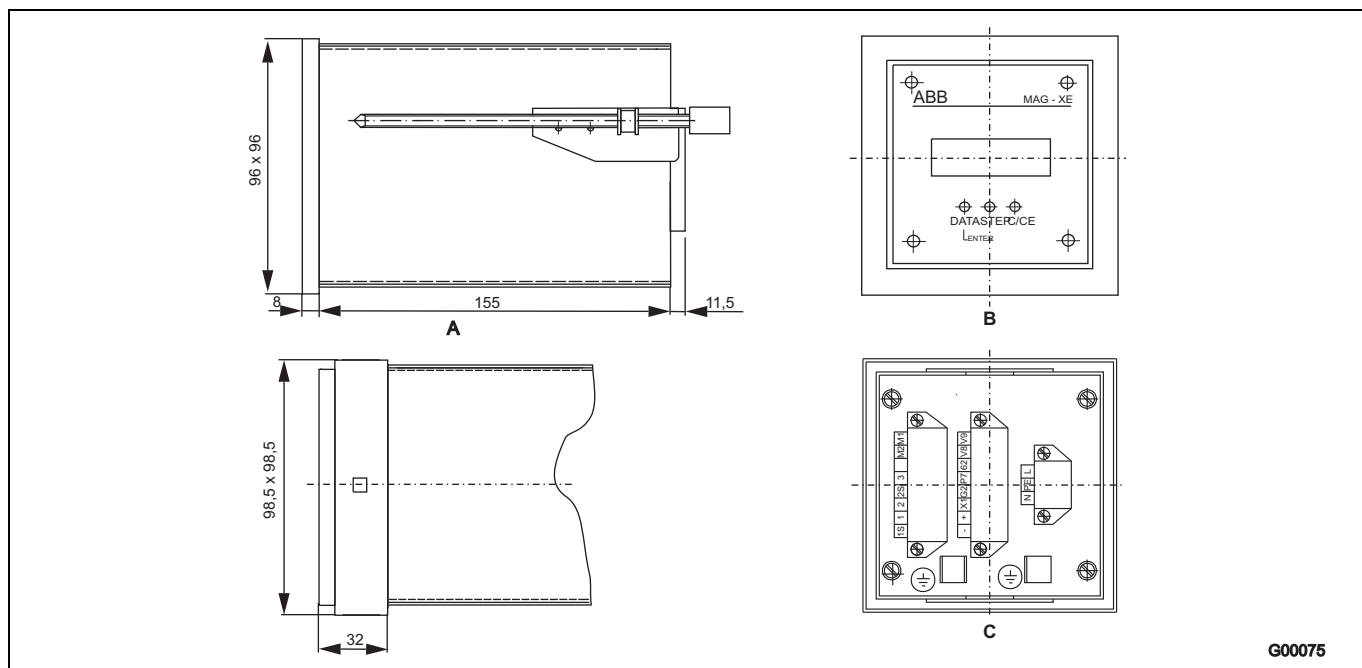


Fig. 58 (Dimensions in mm)

A Panel mount 96 x 96 (panel cutout) 92 x 92^{+0.8} mm)

B Front view

C Rear view

Protection class IP 20

5.5.3 Rail mount housing

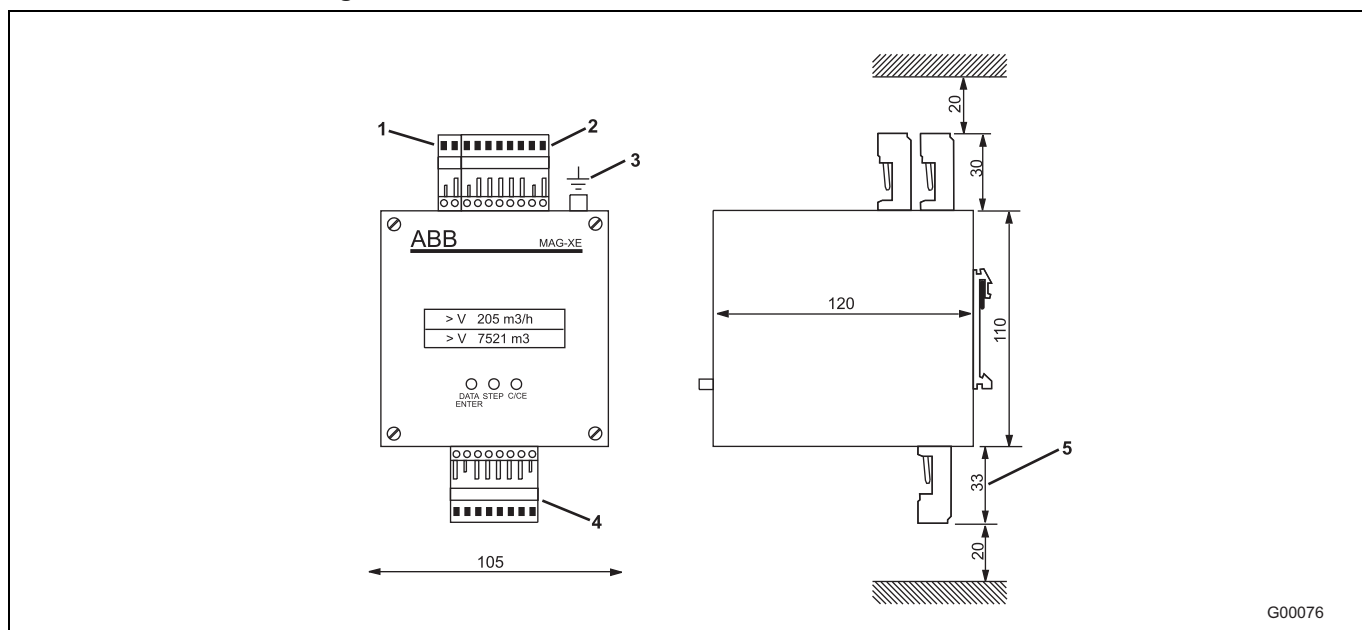


Fig. 59 (Dimensions in mm)

1 Supply power connection plug

2 Connection plug in- / outputs

3 Station ground

4 Signal/ activation cable connection plug

5 Min. distance to remove plug

5.5.4 Ordering Information

External Converter		Variant digit No.	1-3	4	5	6	7	8	9	10	11	12	13	14			
FXE4000-E4 (MAG-XE)		Catalog No.	E4-														
Housing																	
Field housing,	(Thread for screw-type conduit fitting M20 x 1.5)	Q															
rectangular	(Thread for screw-type conduit fitting 1/2 in. NPT)																
	(Thread for screw-type conduit fitting PF 1/2 in.)																
Housing for rail mounting design		R															
Panel 96 mm x 96 mm with front door and look		S															
Without housing (only plug-in, e.g. for replacement)		O															
Power Supply																	
100 ... 230 V AC		N															
16.8 ... 26.4 V AC / 16.8 ... 31.2 V DC			K														
Display																	
Magnetic stick operation and display illuminated		D															
Input / Output Options																	
Current output active + Pulse output active + Contact input + Contact output			0	1													
Current output active + Pulse output active + Contact input + Contact output + HART			0	2													
Current output active + Pulse output passive + Contact input + Contact output			0	3													
Current output active + Pulse output passive + Contact input + Contact output + HART			0	4													
Current output active + Pulse output passive + Contact output + RS 485			0	5													
Pulse output passive + Contact output + PROFIBUS DP			0	6													
PROFIBUS PA 3.0			1	4													
FOUNDATION Fieldbus			1	5													
not with Custody Transfer			1	5													
PROFIBUS PA 3.0 with M12 plug			1	6													
For Primary																	
Non-Ex type			0														
Application																	
Standard			0														
Certificates																	
Standard				0													
Custody transfer, cold water / waste water				1													
Custody transfer, fluids except water				2													
Name Plate																	
German																	
English																	
French																	
Design Level (Specified by ABB)																	
Software Level (Specified by ABB)																	
Accessories																	
		Catalog No.															
Shielded signal / excitation cable (10 m included in base price)		D173D025U01															
Accessories for 2 in. pipe mounting		612B091U07															

1) not with Custody Transfer

6 Ordering Information Wafer Accessories (Table H)

FX / FSM	Meter Size	Pressure Rating	Catalog No.			
Material: SST	DN 3 ... DN 10	1/10 ... 3/8 in.	PN 10 ... PN 40 ASME CL 150 ASME CL 300	D614L265U03 D614L265U03 D614L265U04		
	DN 15	1/2 in.	PN 10 ... PN 40 ASME CL 150 ASME CL 300	D614L265U03 D614L266U05 D614L266U06		
	DN 20	3/4 in.	PN 10 ... PN 40 ASME CL 150 ASME CL 300	D614L267U04 D614L267U05 D614L267U06		
	DN 25	1 in.	PN 10 ... PN 40 ASME CL 150 ASME CL 300	D614L268U04 D614L268U05 D614L268U06		
	DN 32	1-1/4 in.	PN 10 ... PN 40 ASME CL 150 ASME CL 300	D614L269U04 D614L269U05 D614L269U06		
	DN 40	1-1/2 in.	PN 10 ... PN 40 ASME CL 150 ASME CL 300	D614L270U04 D614L270U05 D614L270U06		
	DN 50	2 in.	PN 10 ... PN 40 ASME CL 150 ASME CL 300	D614L296U04 D614L296U05 D614L296U06		
	DN 65	2-1/2 in.	PN 10 ... PN 16 PN 25 ... PN 40 ASME CL 150 ASME CL 300	D614L297U08 D614L297U09 D614L297U10 D614L297U11		
	DN 80	3 in.	PN 10 ... PN 40 ASME CL 150 ASME CL 300	D614L298U08 D614L298U09 D614L298U10		
	DN 100	4 in.	PN 10 ... PN 16 PN 25 ... PN 40 ASME CL 150	D614L299U07 D614L299U08 D614L299U09		

Fitting Piece for welding						
FX / FSM	Meter Size		Catalog No.			
	DN 3 ... DN 10	1/10 ... 3/8 in.	D413C470U01			
	DN 15	1/2 in.	D413C471U01			
	DN 20	3/4 in.	D413C472U01			
	DN 25	1 in.	D413C473U01			
	DN 32	1-1/4 in.	D413C474U01			
	DN 40	1-1/2 in.	D413C475U01			
	DN 50	2 in.	D413C488U03			
	DN 65	2-1/2 in.	D413C461U09			
	DN 80	3 in.	D413C496U03			
DN 100	4 in.	D413C498U03				

This fitting piece is an aid for primaries with weld stubs process connection
It allows these weld stubs to be welded coplanar into the pipe

7 Ordering Information Flowmeter Primary Simulator FXC 4000

Flowmeter Primary Simulator FXC4000		Variant digit No.		1 - 6		7	8	9	10	11			
		1)		Catalog No.		55XC4-							
Flow Signal Setting													
Without (adapter only)				0									
3-position digitswitch with 1000 steps				1									
Others				9									
Power Supply													
Without (adapter only)				0									
With Schuko plug		110 ... 240 V AC 50 / 60 Hz		1									
With 4 mm plug		24 ... 48 V AC / DC		2									
With US plug		110 ... 240 V AC 50 / 60 Hz		3									
Others				9									
Accessories													
Without				0									
Adapter for converter type		FXE4000-E4, FXM2000-XM2, FXF2000-DF23		1									
Adapter plate for converter		FSM4000-S4		5									
Others				9									
Design Level		(Specified by ABB)											
Without										*			
Name Plate													
German											1		
English											2		
French											3		
Others											9		

1) Also older product models 50XM1000, 50XH1000, 50XO1000, 50SM1000 can be tested with test simulator type FXC4000

2) Power supply is for converter supplying

ABB has Sales & Customer Support expertise in over 100 countries worldwide.

www.abb.com/flow

The Company's policy is one of continuous product improvement and the right is reserved to modify the information contained herein without notice.

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