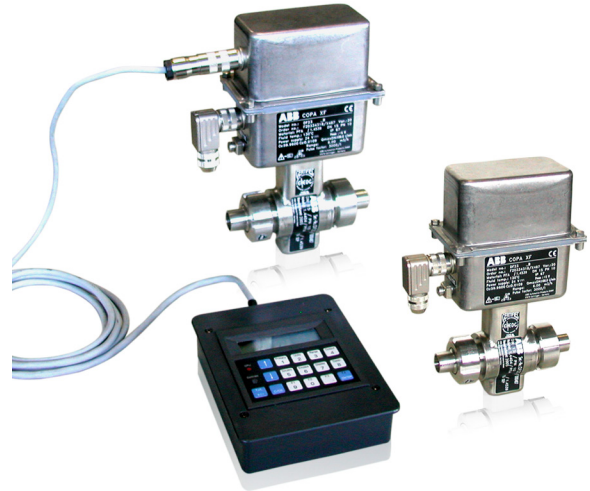


# FXF2000 (COPA-XF) Electromagnetic Flowmeter

„All in one“-Flowmeter



## With pulsed DC field excitation in a compact design

### Function

- Electromagnetic flowmeter can be used to accurately measure the flowrate of liquids, pulps, slurries and sludges with a minimum fluid conductivity of  $\geq 5 \mu\text{S}/\text{cm}$

### Applications

- Suitable for flow measurements in batch and fill operations as well as for continuous flow metering
- The compact design allows cluster mounting where minimal space requirements exist
- Compact design made completely of stainless steel
- Reproducibility  $\pm 0.2 \%$  of rate
- The supply power and the output signal connections of the transmitter are made using a single cable with plug
- Easy cleaning and sterilization – including automated CIP/SIP-systems – require a smooth, unrestricted meter pipe in the flowmeter sensor
- Certifications per FDA, EHEDG, 3A

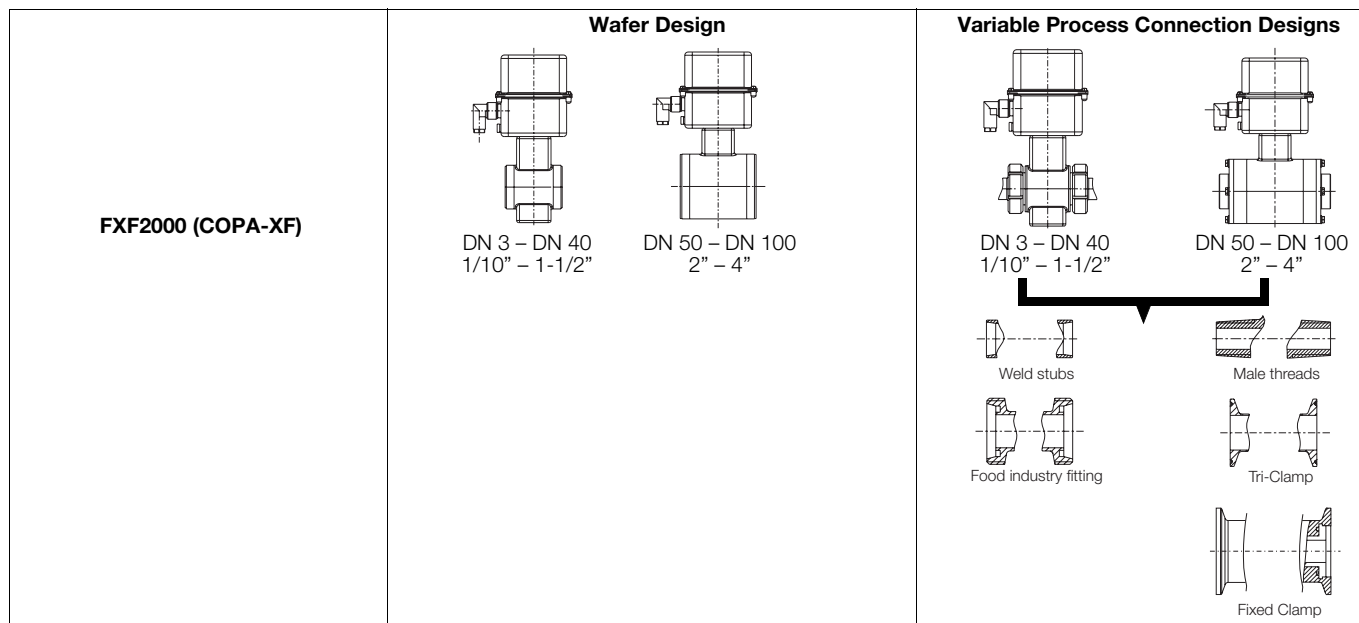
### Communication

- Optional 2nd communication plug
- ASCII-Protocol (RS 485)

### Multiple Operating Modes

- Continuous flow metering with current/pulse output
- Flowmeter sensor with a frequency output
- Stand-Alone batch and fill system operation

**Overview of the Flowmeter Sensor and Transmitter Designs**  
**Overview, Process Connections**



**Flowmeter Sensor Specifications**

**Accuracy**

Flow measurement accuracy	0.5 % of rate	0.5 % of rate
Reproducibility	0.2 % of rate	0.2 % of rate

**Flowmeter Sensor**

Model Number	DF23W			DF23_*		
Process Connections	DN	PN	DN	PN	*	
Wafer Design	3 - 100 (1/10 - 4")	3 - 50 (1/10 - 2") 65 - 100 (2 1/2 - 4")	10 - 40 10 - 16	-	-	
Pipe connection DIN 11851	-	-	3 - 40 (1/10 - 1 1/2") 50, 80 (2", 3") 65, 100 (2 1/2", 4")	40 16 10	S S S	
Weld stubs DIN 11850	-	-	3 - 40 (1/10 - 1 1/2") 50, 80 (2", 3") 65, 100 (2 1/2", 4")	40 16 10	R R R	
Weld stubs DIN 2463 / ISO 1127	-	-	3 - 40 (1/10 - 1 1/2") 50, 80 (2", 3") 65, 100 (2 1/2", 4")	40 16 10	Q/J Q/J Q/J	
Weld stubs ISO 2037 / SMS	-	-	25 - 40 (1 - 1 1/2") 50, 80 (2", 3") 65, 100 (2 1/2", 4")	40 16 10	P/X P/X P/X	
Tri-Clamp DIN 32676 / ASME BPE	-	-	3 - 50 (1/10 - 2") 65, 100 (2 1/2", 4")	16/10 10/10	T T	
Fixed-Clamp	-	-	10 - 40 (3/8 - 1 1/2")	10	C	
External Threads ISO 228 / DIN 2999	-	-	3 - 25 (1/10 - 1")	10	E	
Liner	PFA			PFA		
Conductivity	≥ 5 μS/cm			≥ 5 μS/cm		
Electrodes	SS 1.4571[316Ti], 1.4539, Hastelloy C4, Platinum-Iridium, Tantalum, Titanium			SS 1.4571[316Ti], 1.4539, Hastelloy C4, Platinum-Iridium, Tantalum, Titanium		
Process Connection Materials	without			SS 1.4404 [316L], option 1.4435 [316L]		
Protection Class	IP 67, option climate protection			IP 67, option climate protection		
Hygienic Approval	FDA			3A (28-03), FDA, EHEDG		

**Accuracy, Reference Conditions and Operating Principle**

**Design**

The Electromagnetic Flowmeters in the Compact Design occupy a special niche. In this design, the transmitter is mounted directly on the flowmeter sensor. This appreciably decreases installation costs because a signal cable is no longer required between the flowmeter sensor and the transmitter.

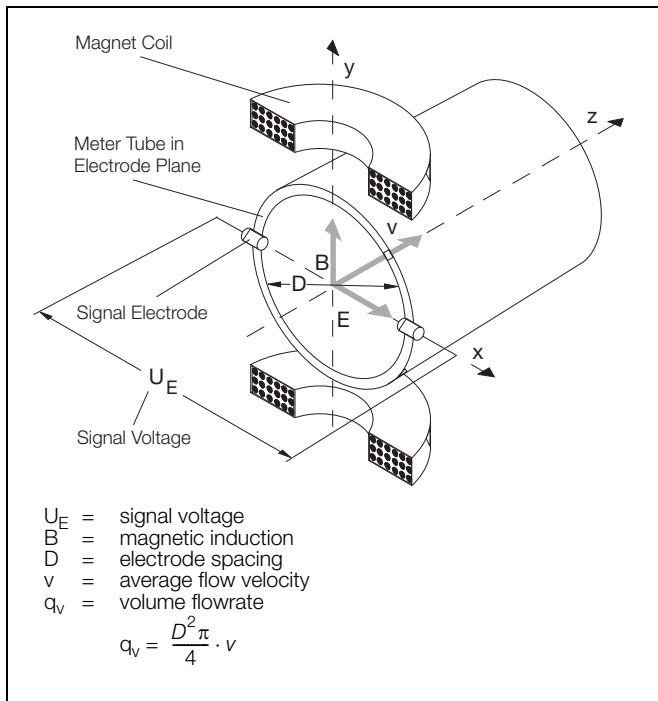
**Operating Principle**

The operation of the electromagnetic flowmeter is based on Faraday's Laws of Induction. A voltage is generated in a conductor as it moves through a magnetic field.

This measurement principle is applied to a conductive fluid which flows in a pipe through which a magnetic field is generated perpendicular to the flow direction (see Schematic Fig. 1: ).

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

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



**Fig. 1:** Electromagnetic Flowmeter Schematic

**Reference Conditions per EN 29104**

**Fluid**

Water, conductivity 200  $\mu\text{S}/\text{cm} \pm 10 \%$

**Fluid Temperature**

20 °C  $\pm 2$  K

**Ambient Temperature**

20 °C  $\pm 2$  K

**Supply Power**

Nominal voltage  $U_N \pm 1 \%$

**Installation Requirements, Straight Pipe Sections**

Upstream >10xD  
 Downstream >5xD  
 D = Flowmeter sensor size

**Warm Up Time**

$\geq 30$  Minutes

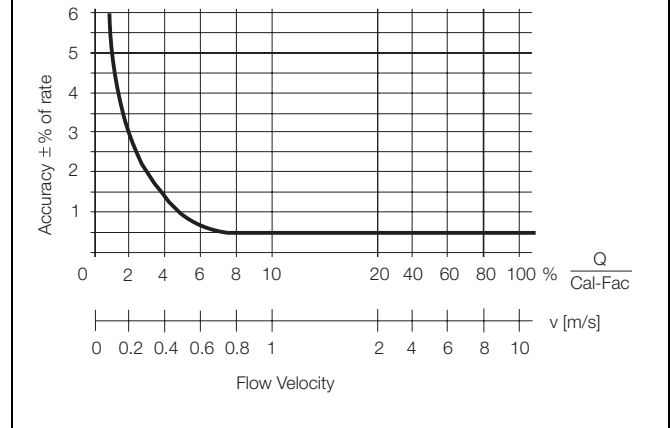
**Effect on Analog Output**

Same as pulse output plus  $\pm 0.1 \%$  of rate

**Pulse Output**

For pulse output  
 $Q > 0.07$  Cal-Fac  $\pm 0.5 \%$  of rate  
 $Q < 0.07$  Cal-Fac  $\pm 0.00035$  Cal-Fac

Cal-Fac = maximum flowrate for the meter size at 10 m/s



**Fig. 2:** Accuracy

**Reproducibility – Fill Operations**

The constant boundary conditions which exist for these applications allow replacing the above instrument/system accuracy ( $\pm 0.5 \%$  of rate) Fig. 2: , with fill operation accuracies of:

- $\pm 0.2 \%$  for  $T_{Fill} \geq 4$  s
- $\pm 0.4 \%$  for  $2 \text{ s} \leq T_{Fill} \leq 4$  s
- (standard accuracy)

**Reproducibility – Continuous Flow Metering**

$\pm 0.2 \%$  of rate

**Transmitter Specifications/Operating Modes**  
**50XF4000**

**Supply Power**  
24 V DC

**Contact Outputs - Optocoupler** (see specific Variant)

- Pulse/frequency output
- Alarm contact
- Forward/reverse direction signal
- Synchronized output
- End contact

**Analog Output**

- Current output

**Contact Inputs - Optocoupler** (see specific Variant)

- Ext. zero return
- System zero
- Synchronized input
- Start/stop input

**Data Link/ Protocol**

- RS 485 / ASCII
- RS 485 / ASCII 2w

**Detector Empty Pipe**

**Operating Modes**

- Standard continuous.
- Conti 1 kHz
- Conti 2 kHz
- Conti 5 kHz
  
- Standard batch
- Batch 1 kHz
- Batch 2 kHz
- Batch 5 kHz
  
- Fill 5 kHz

**Plug Connections**

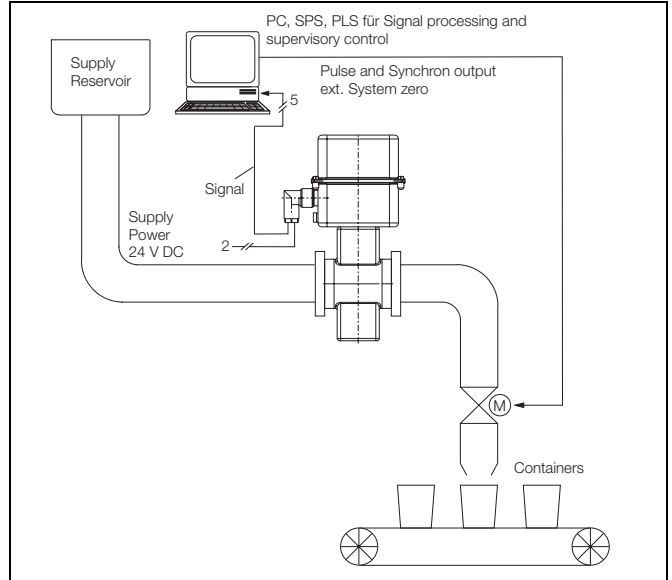
**Configure Using**

- Operator Unit 55BE1000
- Handheld Terminal 55HT4000

**Operating Modes, FFX2000 (COPA-XF)**

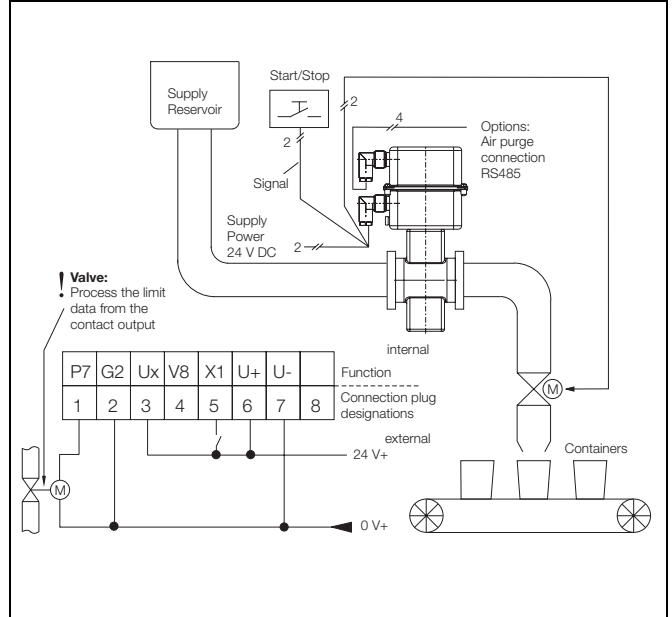
In addition to continuous flow metering with current and pulse outputs, the following operating modes are available.

**Batch: Variant 07/20**



**Fig. 3:** Fill System Schematic with FFX2000 (COPA-XF) as the Flow Sensor for a Higher Level Fill Control System

**Fill: -Variant 02**



**Fig. 4:** Schematic and Elec. Connections for FFX2000 (COPA-XF) as a Stand-Alone "Filler" with integrated Fill-Software

## Meter Size Table, Flow Ranges, Flowrate Nomograph

### Meter Size, Pressure Rating (Weld Stubs) and Flow Ranges

Meter size		Std. Press. Rating PN <sup>1)</sup>	min.Flow Range Flow Velocity 0 to 0.5 m/s		min.Flow Range Flow Velocity 0 to 10 m/s	
DN	Inch					
3	1/10	40	0 to	0.2 l/min	0 to	4 l/min
4	5/32	40	0 to	0.4 l/min	0 to	8 l/min
6	1/4	40	0 to	1 l/min	0 to	20 l/min
8	5/16	40	0 to	1.5 l/min	0 to	30 l/min
10	3/8	40	0 to	2.25 l/min	0 to	45 l/min
15	1/2	40	0 to	5 l/min	0 to	100 l/min
20	3/4	40	0 to	7.5 l/min	0 to	150 l/min
25	1	40	0 to	10 l/min	0 to	200 l/min
32	1¼	40	0 to	20 l/min	0 to	400 l/min
40	1½	40	0 to	30 l/min	0 to	600 l/min
50	2	16	0 to	3 m <sup>3</sup> /h	0 to	60 m <sup>3</sup> /h
65	2½	10	0 to	6 m <sup>3</sup> /h	0 to	120 m <sup>3</sup> /h
80	3	16	0 to	9 m <sup>3</sup> /h	0 to	180 m <sup>3</sup> /h
100	4	10	0 to	12 m <sup>3</sup> /h	0 to	240 m <sup>3</sup> /h

1) Values for other process connections see Page 2

### Effective Flow Velocity, Variable Process Connections, PFA

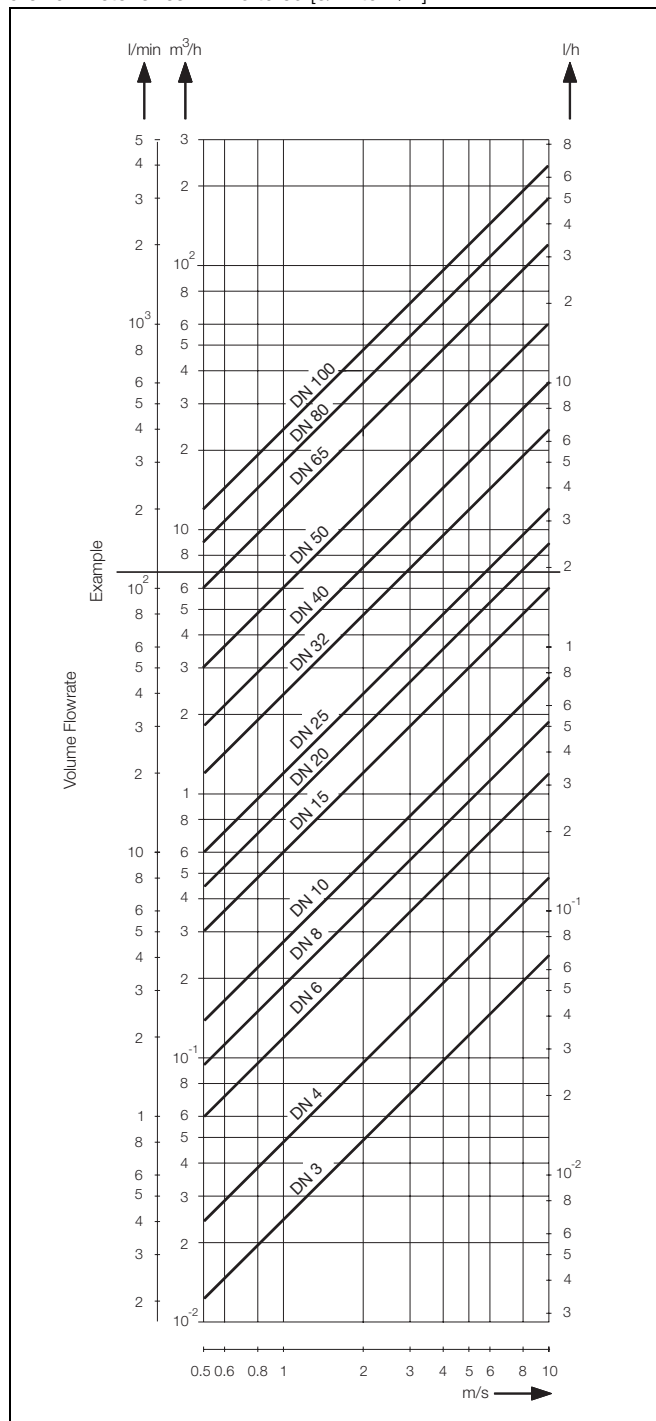
Meter Size		Cal-Fac [l/min]	d <sub>eff</sub> [mm]	Q d <sub>eff</sub> [l/min]	V <sub>eff</sub> [m/s]
DN	Inch				
3	1/10	4	3	4.2	9.4
4	5/32	8	4	7.5	10.6
6	1/4	20	6	17.0	11.8
8	5/16	30	8	30.2	9.9
10	3/8	45	10	47.1	9.5
15	1/2	100	13	79.6	12.6
20	3/4	150	18	152.7	9.8
25	1	200	24	271.4	7.4
32	1¼	400	30	424.1	9.4
40	1½	600	36	610.7	9.8
50	2	1000	47	1041.0	9.6
65	2½	2000	62	1811.4	11.0
80	3	3000	74	2580.5	11.6
100	4	4000	96	4342.9	9.2

### Flowrate Nomograph

The volume flowrate is a function of both the flow velocity and the flowmeter size. The Flowrate Nomograph, Fig. 5 shows the flow range applicable to each flowmeter size as well as the flowmeter sizes suitable for a specific flowrate.

#### Example:

Flowrate = 120 l/min (maximum value = flow range end value). Suitable are flowmeter sizes DN 20 to 65 [3/4" to 2½"].



**Fig. 5:** Flowrate Nomograph DN 3 to DN 100 [1/10" to 4"]

## Installation Requirements, Flowmeter Sensor DF23

### In-/Outlet Straight Sections

The measurement principle is independent of the velocity profile as long as standing eddies do not extend into the measurement zone, e.g., after double elbows, tangential inflow or partially opened gate valves upstream of the flowmeter sensor. In such situations measures should be employed to normalize the flow profile.

Straight sections with the same diameter as the flowmeter sensor should be installed upstream and downstream. The straight length upstream of the flowmeter sensor should be of at least 10 times the diameter of the flowmeter sensor and downstream at least 5 times.

Experience has indicated that in most of the installations a straight inlet section of 3xD and a straight outlet section of 2xD is sufficient.

### Installation of the Flowmeter Sensor

The flow direction should be considered during installation (fluid flows into the plug connection socket), because the flowmeter should be operated in the forward direction if possible. The flow direction for the measurements can be reversed using the software, if required. Generally, the connection plug socket should point downward for vertical installations. The flowmeter must be installed so that the meter pipe is always completely filled with fluid. Valves or other shut off devices should be installed downstream to prevent the flowmeter sensor from draining.

### Grounding

Grounding the electromagnetic flowmeter sensor is not only essential for safety reasons but also to assure proper operation. The ground screw on the flowmeter sensor, for measurement reasons, is to be connected to earth. An additional ground to the connection plug is not required.

For plastic or lined (with electrically insulating liners) pipelines the ground is made using a grounding plate or grounding electrode. If stray currents are present in the pipeline, it is recommended that grounding plates be installed up- and downstream of the flowmeter sensor.

### Connection Cables



#### Attention

The flowmeter sensor should not be installed near equipment with strong electromagnetic fields. A shielded interconnection cable is recommended. It is beneficial to route the cables in metal conduit, in which a number of cables of the same type can be installed together in a single conduit. Extra cable should not be coiled.

Appropriate noise reduction measures should be employed, e.g., protection diodes, varistors or R-C combinations (VDE 0580) for valves or control switches located in the vicinity of the flowmeter system.



#### Information

The instrument conforms to the requirements in the EMC-Directive and the NAMUR-Recommendations NE 21 3/93 "Electromagnetic Compatibility of Equipment in Processes and Laboratories".



#### Information

When installing the cable to the flowmeter sensor, a water trap should be provided.

## Output Signals

The flowrate proportional frequency / scaled pulse output can be connected to an electronic counter, a SPC, a PC or a process control system. Therefore it is possible to integrate the flowmeter sensor in a batch or fill system as well as utilize it in continuous flow processes.

The pulse output in batch and fill operations must be processed by other peripheral instruments. This includes the control of the system, integrating the flow, actuating the valves when the batch quantity is reached, calculating the second stage flow and monitoring the over- or under fills. A low flow cutoff feature can be turned on if required. Optionally, the integrated batch software can be used for single stage fill operations.

Additionally, in the operating modes "Conti", a 0/4–20 mA current output is available.

## Electrode Axis

For horizontal installations assure that neither of the two electrodes are located at the highest point. Any gas bubbles present in the fluid could accumulate and interrupt the electrical connection between the electrode and the fluid. The ideal installation for an EMF is assured in vertical pipelines. Fig. 6 shows the two preferred installations.

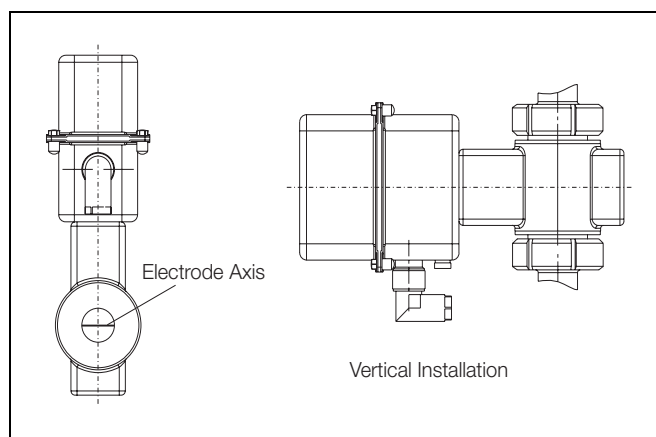


Fig. 6: Electrode Axis

### Installations in Larger Size Pipelines

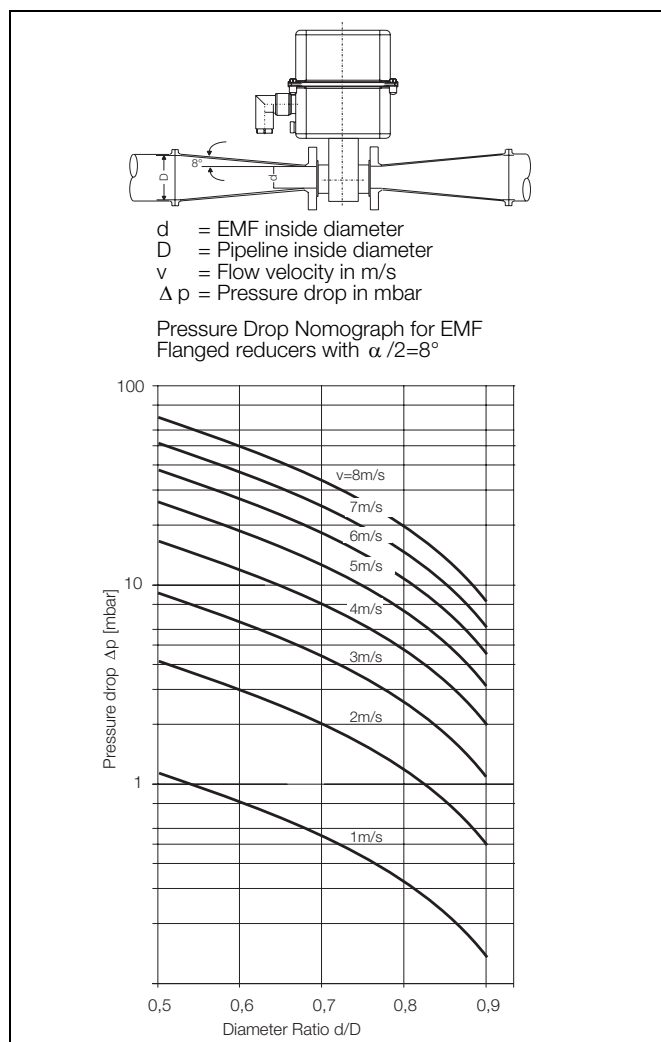
The flowmeter sensor can readily be installed in larger pipeline sizes by utilizing reducers (e.g. flanged reducers EN 545). The pressure drop which results from the reduction can be determined from the Nomograph Fig. 7: The pressure drop is determined in the following manner:

1. Calculate the diameter ratio  $d/D$ .
2. Calculate the flow velocity as a function of the flowmeter size and the flowrate :

$$v = \frac{Q \text{ (instantaneous flowrate)}}{\text{PrimaryConstant}}$$

The flow velocity can also be determined from the Flowrate Nomograph Fig. 5:

3. In Fig. 7: the "Pressure Drop" can be read on the Y-axis at the intersection of the flow velocity value and the "Diameter Ratio" (X-axis) value.



**Fig. 7:** Nomograph for Pressure Drop Determinations

### Specifications, Flowmeter Sensor DF23

#### Min. Allowable Absolute Pressure as a Function of the Fluid Temperature

Liner	Meter Size DN	Inch	$P_{\text{Operate}}$ mbar abs	at	$T_{\text{Operate}}$ °C
PFA	3 - 100	1/10 - 4	0	≤	130

#### Materialload for Meters with variable process connections / wafer flange DN 3 - DN 100 (1/10 - 4")

Process connection	Meter Size DN	Inch	$PS_{\text{max}}$ bar	$TS_{\text{min}}$	$TS_{\text{max}}$ <sup>1)</sup>
Wafer Design	3 - 50	1/10 - 2"	40	-25 °C	130 °C
	65 - 100	2 1/2 - 4"	16		
Weld stubs	3 - 40	1/10-1 1/2"	40	-25 °C	130 °C
	50, 80	2", 3"	16		
	65, 100	2 1/2", 4"	10		
Threaded pipe connection DIN 11851	3 - 40	1/10-1 1/2"	40	-25 °C	130 °C
	50, 80	2", 3"	16		
	65, 100	2 1/2", 4"	10		
Tri-Clamp DIN 32676	3 - 50	1/10 - 2"	16	-25 °C	121 °C
	65 - 100	2 1/2 - 4"	10		
Fixed-Clamp	10 - 40	3/8 - 1 1/2"	10	-25 °C	130 °C
Tri-Clamp ASME BPE	3 - 100	1/10 - 4"	10	-25 °C	130 °C
External threads ISO 228/DIN 2999	3 - 25	1/10 - 1"	16	-25 °C	130 °C

<sup>1)</sup> Higher temperatures are allowed for CIP/SIP cleaning for limited time periods, see Table "Maximum Allowable Cleaning Temperature".

#### Max. Allowable Cleaning Temperature PFA-Design

CIP-Cleaning	Liner	$T_{\text{max}}$ °C	$T_{\text{max}}$ minutes	$T_{\text{amb}}$ °C
Steam cleaning or Liquid cleaning	PFA	150	60	25
		140	60	25

If the ambient temperature  $>25$  °C, the difference is to be subtracted from the max. cleaning temperature.

$$T_{\text{max}} - \Delta \text{ °C, where } \Delta \text{ °C} = (T_{\text{amb}} - 25 \text{ °C}).$$

#### Max. Allowable Shock Temperature

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

### Ambient Requirements

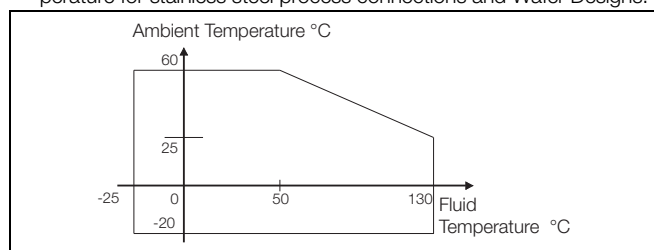
#### Ambient Temperature

-20 °C to 60 °C

#### Fluid Temperature

-25 °C to 130 °C, CIP-cleanable, see Temperature Diagram and max. allowable cleaning temperature.

Maximum allowable ambient temperature as a function of the fluid temperature for stainless steel process connections and Wafer Designs.



**Fig. 8:** Temperature Diagram

#### Storage Temperature

-25 °C to +70 °C

**Variant Overview Series 2000 (Stainless Steel Design)**

Model:		DF23							
		E	T/K	R	Q/J	P/X	S	F	W
Meter Size	Process Conn's	External threads ISO 228 / DIN 2999	Tri-Clamp DIN 32676 / ASME BPE	Weld stubs DIN 11850	Weld stubs DIN 2463 / ISO1127	Weld stubs ISO 2037 / SMS	Food Ind. fitting DIN 11851	Fixed Clamp	Water Design
	DN	Inch							
3	1/10	x	x	x	x		x	x	x
4	5/32	x	x	x	x		x	x	x
6	1/4	x	x	x	x		x	x	x
8	5/16	x	x	x	x		x	x	x
10	3/8	x	x	x	x		x	x	x
15	1/2	x	x	x	x		x	x	x
20	3/4	x	x	x	x		x	x	x
25	1	x	x	x	x	x	x	x	x
32	1-1/4		x	x	x	x	x	x	x
40	1-1/2		x	x	x	x	x	x	x
50	2		x	x	x	x	x		x
65	2-1/2		x	x	x	x	x		x
80	3		x	x	x	x	x		x
100	4		x	x	x	x	x		x

SEP Sect. 3, Par. 3

Conformity per Category III, Module B1+D, Fluid Group 1

**Material Load Curves for Wafer Design Instrument Model DF23**

Liner: PFA Wafer Design

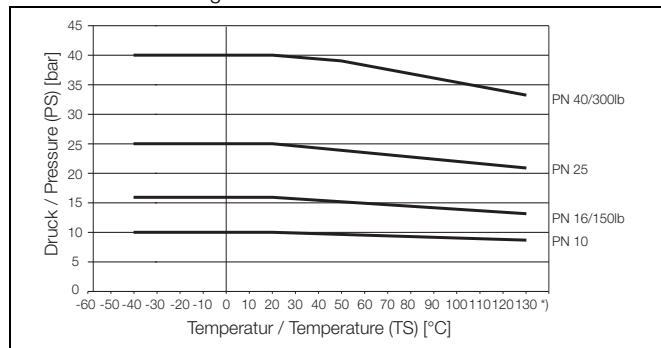


Fig. 9:

**Materials, Flowmeter Sensor**

Liner Material	Electrode Material		Electrode Design	
	Standard	Others	Standard	Others
PFA	Hast.-C4 (1.4539 for weld stubs, Food Ind. fittings & Tri-Clamp)	SS 1.4539 SS 1.4571[316Ti] Tantalum, Titanium	Flat head	Pointed head (≥ DN10 [3/8"])

**Process Connection Material**

	Standard	Option
Wafer Design	None	-
Weld stubs	SS 1.4404 [316L]	on request
Food Ind. fitting DIN 11851	SS 1.4404 [316L]	on request
Tri-Clamp	SS 1.4404 [316L]	on request
Fixed-Clamp	SS 1.4404 [316L]	on request
External threads	SS 1.4404 [316L]	on request

**Gasket Materials, Electrical Connections, Weight and Design**

Process Connection Materials	Gasket Materials
Wafer Design	none
Weld stubs Food Ind. fitting Tri-Clamp Fixed-Clamp External threads	EPDM (Ethylene-Propylene) std. with FDA-Approval Silicone with FDA-Approval (option)
Flat housing gasket	Silicone

**Supply Power**

From transmitter

**Weight**

See Dimensions Pages 9 – 13

**Design**

Flowmeter sensor with integrated µP-transmitter  
Flowmeter sensor and transmitter housing in stn. stl. 1.4301 [304]

**Process Connections DN 3 - 100 [1/10" - 4"]**

See Page 2 and Pages 9 - 13

**Protection Class**

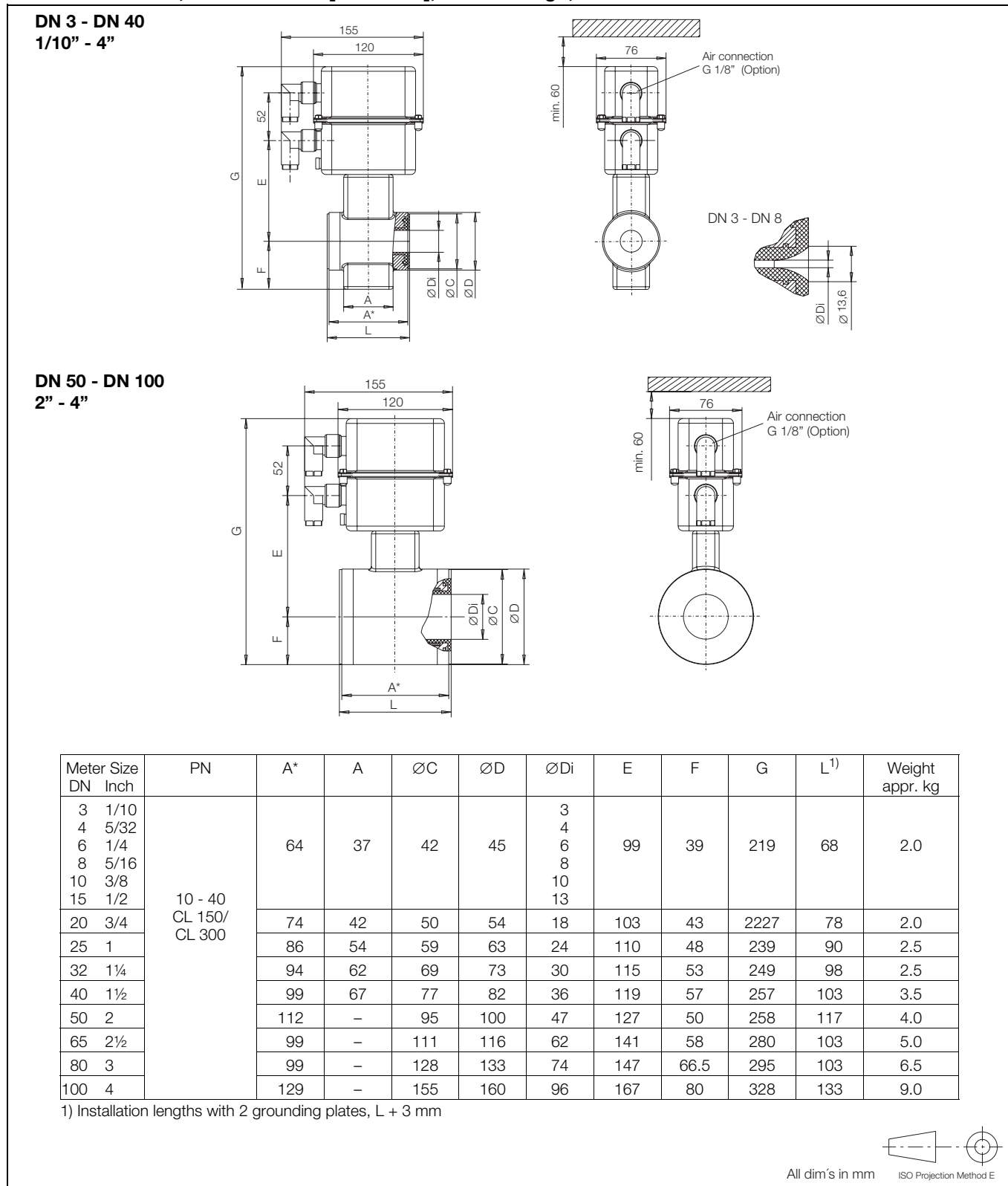
Standard IP 67, option climate protection

**Max. Pipeline Vibration**

15 m/s<sup>2</sup> (1.5 g) for f = 10 - 150 Hz

**Dimensions**

**Flowmeter Sensor, DN 3 - DN 100 [1/10" - 4"], Wafer Design, PFA**

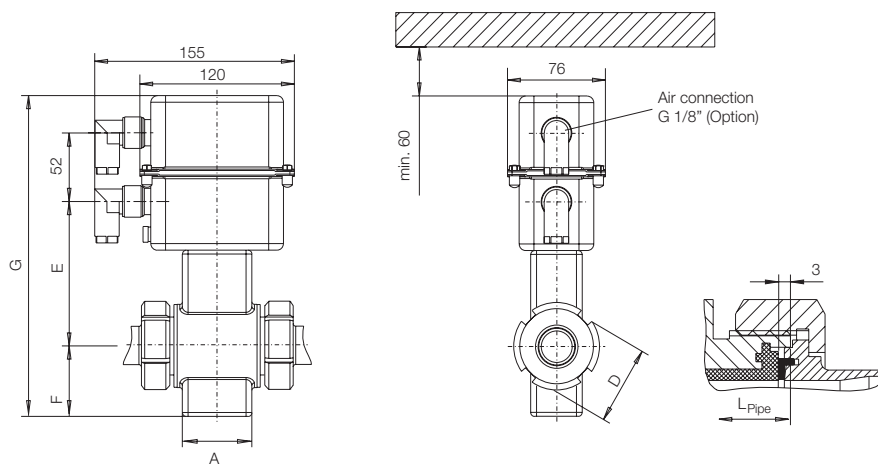


**Fig. 10:** Dimensions, Model DF23, DN 3 - DN 100 [1/10" - 4"], Wafer Design

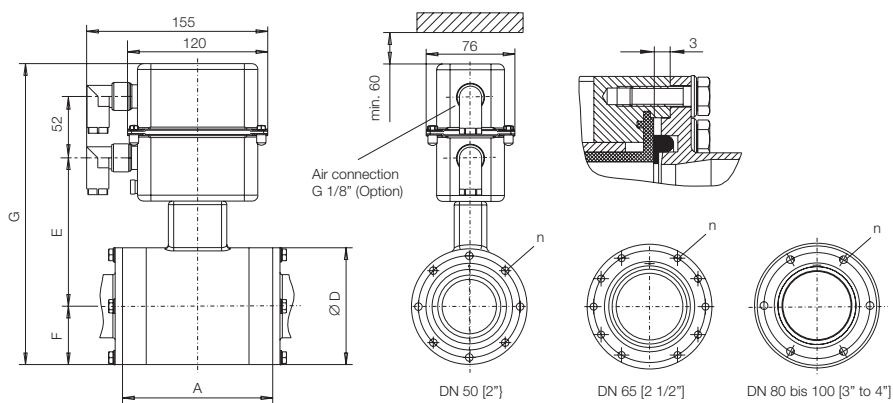
**Dimensions**

**Flowmeter Sensor, Variable Process Connections, PFA**

**DN 3 - DN 40**  
**1/10" - 1½"**



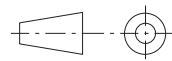
**DN 50 - DN 100**  
**2" - 4"**



Meter Size DN Inch	A	E	F	G	D	L <sub>pipe</sub>	n	Weight appr. kg <sup>1)</sup>
3-10 1/10-3/8	37	99	39	219	44	85	–	2.0
15 1/2	37	99	39	219	44	85	–	2.0
20 3/4	42	103	43	227	63	90	–	2.0
25 1	54	110	48	239	63	105	–	2.5
32 1¼	62	115	53	249	78	120	–	2.5
40 1½	67	119	57	257	78	125	–	3.5
50 2	128	127	50	258	100	–	8	5.0
65 2½	114	141	58	280	116	–	10	5.5
80 3	114	147	66.5	295	133	–	6	7.0
100 4	144	167	80	328	160	–	6	9.0

Installation lengths for process connections see Pages 11 to 13

1) Plus process connector weight see Pages 11 to 13



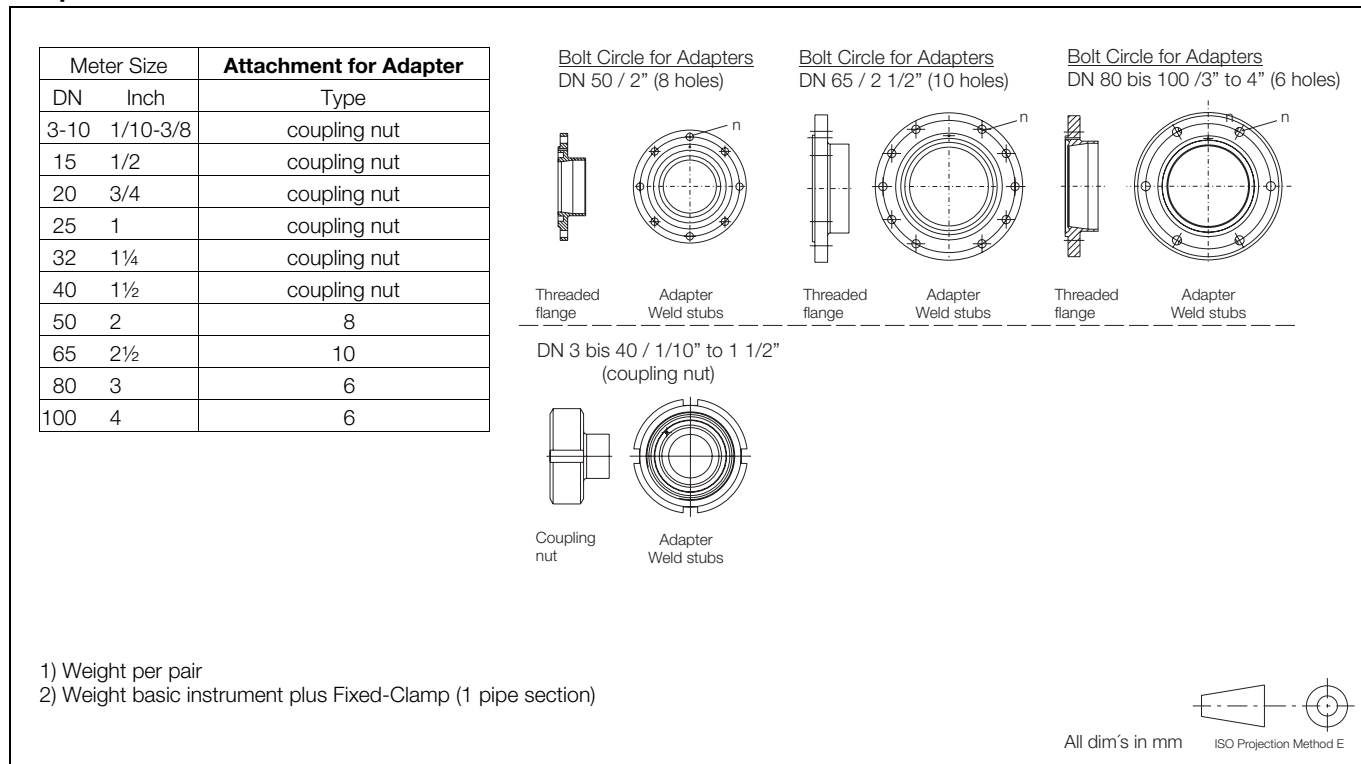
All dim's in mm ISO Projection Method E

**Fig. 11:** Dimensions, Model DF23, DN 3 - DN 100, Variable Process Connections, Basic Dimensions Apply to all Process Connections



## Dimensions

### Adapters for Variable Process Connections



**Fig. 12:** Dimensions, DN 3 - DN 100, Adapter for variable Process Connections

## Accessories

<b>Wafer Accessories</b>						
<b>FX / FSM</b>	<b>Meter Size</b>		<b>Pressure Rating</b>	<b>Catalog No.</b>		
<b>Material: SST</b>	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		

**Note:**

Depending on the nominal width and nominal pressure, the following accessories are available: bolts, nuts, lock washers, centering elements. Seals are not included in the accessories.

<b>Fitting Piece for welding</b>						
<b>FX / FSM</b>	<b>Meter Size</b>			<b>Catalog No.</b>		
	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

However, the weld connections cannot be used for securely closing and sealing the pipe.

## Specifications, Transmitter

### Flow Range

Selectable between 0.05 - 1\* Cal-Fac

### Reproducibility

0.2 % for  $T_{Fill} \geq 4$  s  
0.4 % for  $2 \text{ s} \leq T_{Fill} \leq 4$  s

### Flow Direction

Forward/reverse

### Minimum Conductivity

$\geq 5 \mu\text{S/cm}$ ,  $\geq 20 \mu\text{S/cm}$  DN 3 - 8 [1/10" - 3/16"],  
 $\geq 20 \mu\text{S/cm}$  deionized water

### Electrical Connections

8-pin plug (supply power, signals)  
4-pin plug (data link RS485 - option)

#### Materials

Pin contact	brass
Socket contact	bronze
Contact plating	silver / gold
Male insert	PBT (UL 94 V-0)
Female Insert	PBT (UL 94 V-0)
Housing cable connector	PA 66 (UL 94 HB)
Ring nut	brass, black chromium-plated
Socket	zinc diecasting, nickel plated

### Supply Power

24 V DC, allowable voltage deviations +/- 30 %  
Ripple  $\leq 5$  %

### Power

DN 3 to DN 100 [1/10" to 4"]  $\leq 6$  W (flowmeter sensor incl. transmitter)

### Magnetic Field Excitation

12.5 Hz / 25 Hz

### Ambient Temperature

-20 °C to +60 °C (see also Temperature Diagram Fig. 8: )

### Response Time for Pulse-/Frequency Outputs

Min. response time  $T_{0/99} = \frac{1}{\text{MagneticFieldExcitation}}$

Min. fill time  $T_{Fill} = 2$  s

### Low Flow Cutoff

Selectable from 0 to 10 % of max.

## Output Signals

- Scaled pulse output, passive, optocoupler  
 $0 \leq U_{CEL} \leq 2$  V;  $16$  V  $\leq U_{CEH} \leq 30$  V  
 $2$  mA  $\leq I_{CEL} \leq 220$  mA;  $0.2$  mA  $\leq I_{CEH} \leq 2$  mA  
Setting range: 0.001 - 1000 pulses per selected unit  
Pulse width: 100  $\mu$ s - 2000 ms  
fmax : 5 kHz  
PIN 3 and 4
- Flowrate proportional frequency output  
1.2 or 5 kHz for flowrate = 100 %  
passive, optocoupler  
 $0 \leq U_{CEL} \leq 2$  V;  $16$  V  $\leq U_{CEH} \leq 30$  V  
 $2$  mA  $\leq I_{CEL} \leq 220$  mA;  $0.2$  mA  $\leq I_{CEH} \leq 2$  mA  
PIN 3 and 4
- Current output (selectable)  
Load  $\leq 600 \Omega$  for 0/4-20 mA, 0-10- 20 mA, 4-12-20 mA  
Load  $\leq 1200 \Omega$  for 0/2-10 mA  
Load  $\leq 2400 \Omega$  for 0-5 mA  
PIN 5 and 8
- Data link RS 485  
Max. cable length 1200 m  
Max. no. of instruments: 32 Instruments in parallel  
Max. baudrate: 9600 Baud  
Communication-Protocol: ASCII 2W  
"Communication plug" PIN 3 and 4  
Connection to Handheld-Terminal or SPC, PCS, PC
- Handheld Terminal 55HT4000  
Plug into "Communication Plug Socket"  
Supply power 24 V DC over PIN 1 and 2
- Contact output (function of operating mode)  
Alarm, forward/reverse, synchronized or end contact  
passive, optocoupler  
 $0 \leq U_{CEL} \leq 2$  V;  $16$  V  $\leq U_{CEH} \leq 30$  V  
 $0$  mA  $\leq I_{CEH} \leq 0.2$  mA,  $2$  mA  $\leq I_{CEL} \leq 220$  mA  
PIN 1 and 3
- Contact input (function of operating mode)  
Ext. zero return, system zero, synchronized input,  
Start/stop input  
Optocoupler  
 $16$  V  $\leq U \leq 30$  V,  $R_i = 2$  kOhm  
PIN 5 and 2 at variant 02, 21, 23; Pin 3 and 2 at variant 07

## Overview, Possible Transmitter Variants

Design Level B	Variant		
	02	07	20
<b>Hardware</b>			
Contact output	x	x	x
Contact input	x	x	–
Pulse passive	x	x	x
Current output		x	x
RS 485	x		x
<b>Menus</b>			
<b>Operating mode</b>			
Standard conti. K	x	x	x
Standard Batch B	o	o	o
Batch 1 kHz B1	o	o	o
Batch 2 kHz B2	o	o	o
Batch 5 kHz B5	o	o	o
Filler 5 kHz A	o	o	–
Conti 1 kHz K1	o	o	o
Conti 2 kHz K2	o	o	o
Conti 5 kHz K5	o	o	o
<b>Contact output</b>			
Alarm	x	x	x
Fwd./Rev.	o	o	o
Synchronized	o	o	o
End contact	A	A	–
<b>Contact input</b>			
Ext. zero return	x	x	–
System zero	o	o	–
Start	A	A	–
<b>Current output</b>			
		K	K
		K1	K1
		K2	K2
		K5	K5
<b>Data link</b>			
ASCII	x		x
ASCII2w	o		o
DEP	K	K	K

**Legends:**

- x Default setting
- o Selectable
- A, B, K Only selectable for specific operating mode.
- not applicable

Plug Type Variant	PIN-Assignments for the Standard Plug FXF2000								Assignments Communication Plug			
	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8	PIN 1	PIN 2	PIN 3	PIN 4
2	P7	G2	Ux	V8	X1	U+	U-	../..	⊥	+ 25 V	B	A
7	P7	X1	Ux	V8	+	U+	U-	–	../..	../..	../..	../..
20	P7	../..	Ux	V8	+	U+	U-	–	⊥	+ 25 V	B	A
<b>Customer Specific Variant</b>												
21	P7	G2	Ux	V8	X1	U+	U-	../..	../..	../..	../..	../..
22	P7	Vc	Ux	V8	+	U+	U-	–	../..	../..	../..	../..
23	P7	G2	Ux	V8	X1	U+	U-	Air	../..	../..	../..	../..

**Interconnection Diagram FXF2000, High-Side Switching, Model DF23, Design Level B**

**Design High-Side Switching**

(Pulse output, current output, contact input, contact output, supply power, data link, supply power, handheld terminal)

Assignment PIN-No.	Connection Plug								Communication (Plug)			
	1	2	3	4	5	6	7	8	1	2	3	4
Legends	Functions (PIN-Assignments)								Functions (PIN-Assignments)			
a)			Ux	V8								
b)					+			-				
c)	P7		Ux									
d)		G2			X1							
e)		X1	Ux									
f)						U+	U-					
g)										B	A	
h)									⊥	+25V	B	A

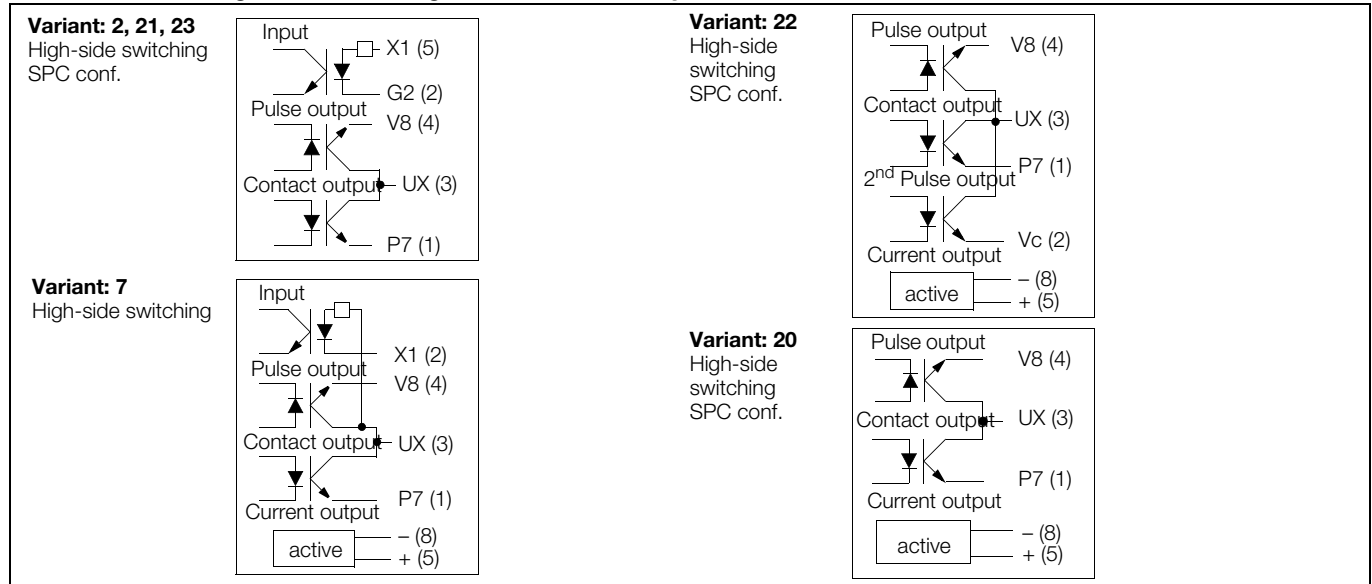
- a) Scaled pulse output, passive optocoupler, pulse width selectable from 0.100 ms to 2000 ms  
 $f_{max} \leq 5 \text{ kHz}$  as a function of the selection in the submenu "Operating mode",  
 $0 \text{ V} \leq U_{CEL} \leq 2 \text{ V}$ ,  $16 \text{ V} \leq U_{CEH} \leq 30 \text{ V}$   
 $2 \text{ mA} \leq I_{CEL} \leq 220 \text{ mA}$ ;  $0.2 \text{ mA} \leq I_{CEH} \leq 2 \text{ mA}$   
 Connection plug assignments PIN 3, 4; Function Ux, V8
- b) Current output (selectable)  
 $Load \leq 600 \Omega$  for 0/4–20 mA, 0–10–20 mA, 4–12–20 mA  
 $Load \leq 1200 \Omega$  for 0/2–10 mA;  $load \leq 2400 \Omega$  for 0–5 mA  
 Connection plug assignments PIN 5 and 8; Function +, –
- c) Contact output, function selectable dependent upon the selection in the submenu "Operating mode",  
 Synchronized signal (output signal synchronized to the excitation), F/R signal or end contact,  
 passive optocoupler,  $0 \text{ V} \leq U_{CEL} \leq 2 \text{ V}$ ,  $16 \text{ V} \leq U_{CEH} \leq 30 \text{ V}$  /  $0 \text{ mA} \leq I_{CEH} \leq 0.2 \text{ mA}$ ,  $2 \text{ mA} \leq I_{CEL} \leq 220 \text{ mA}$   
 Connection plug assignments PIN 1, 3; Function P7, Ux
- d) Contact input, (variant 2, 21, 23), function selectable dependent upon the selection in the submenu "Operating mode",  
 Start/Stop, external totalizer reset, system zero<sup>1)</sup>, no function,  
 passive optocoupler,  $16 \text{ V} \leq U \leq 30 \text{ V}$ ,  $R_i = 2 \text{ k}\Omega$   
 Connection plug assignments PIN 2, 5; Function G2, X1
- e) Contact input, (variant 7), function selectable dependent upon the selection in the submenu "Operating mode",  
 Start/Stop, external totalizer reset, system zero<sup>1)</sup>, no function, passive optocoupler,  $16 \text{ V} \leq U \leq 30 \text{ V}$ ,  $R_i = 2 \text{ k}\Omega$   
 Connection plug assignments PIN 2, 3; Function X1, Ux
- f) Supply power 24 V DC  $\pm 30 \%$ , ripple  $\leq 5 \%$   
 Connection plug assignments PIN 6, 7; Function U+, U-
- g) Data link RS 485, 2-Wire,  $V_{PP} = 5 \text{ V}$ , input resistance  $\geq 12 \text{ k}\Omega$   
 max. cable length  $\leq 1200 \text{ m}$ , shielded cable with twisted pairs required,  
 Baudrate 110 - 9600 Baud, max. 32 instruments in parallel,  
 Communication plug assignments PIN 3, 4; Function B, A (RS 485)
- h) Connection for Handheld Terminal 55HT4000  
 Communication plug assignments PIN 3, 4; Function B, A (RS 485);  
 Communication plug assignments PIN 1, 2; Function ⊥, +25 V (supply power for 55HT4000)

<sup>1)</sup> Initiates a system zero adjustment procedure.  
 The fluid must be at absolute zero flowrate and the meter pipe must be completely filled.

Comment: To maintain the EMC-Requirements the instrument must be connected to earth.  
 When the housing is opened the EMC-Protection is voided.

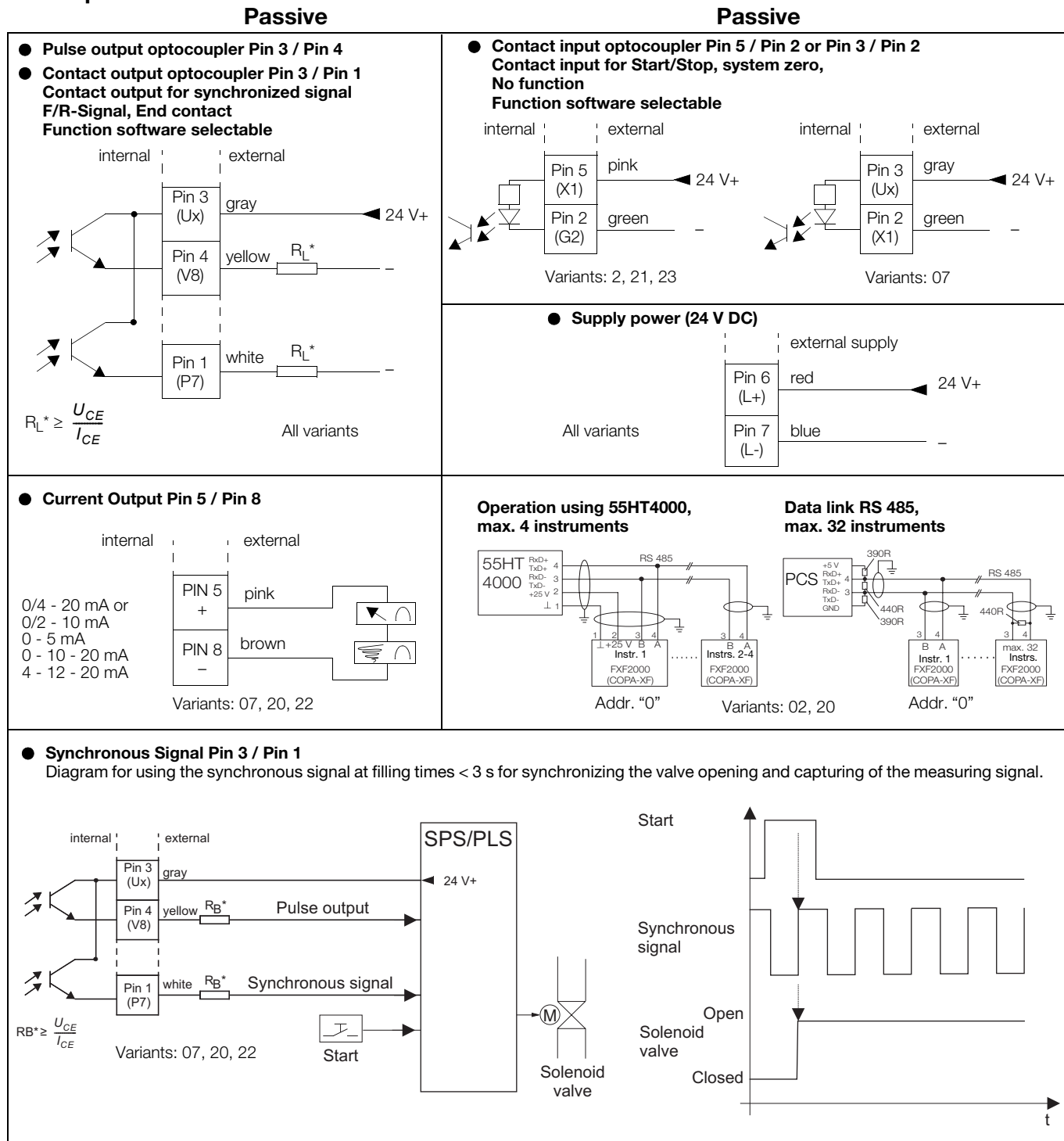
**Fig. 13:** Interconnection Diagram, High-Side Switching, In-/Outputs with PIN-Assignments for the Connection and Communication Plugs

**Variant Overview High-Side Switching and SPC-Conformity**



**Fig. 14:** Variant Overview High-Side Switching and SPC-Conformity

**Interconnection Examples for Peripherals FXF2000 (COPA-XF), Model DF23, High-Side Switching, In-/Outputs/Data Link**



**Fig. 15:** Interconnection Examples for Peripherals, High-Side Switching, In-/Outputs/Data Link

### Interconnection Diagram FXF2000, High-Side Switching/Plug with Installed Cable, Model DF23, Design Level B

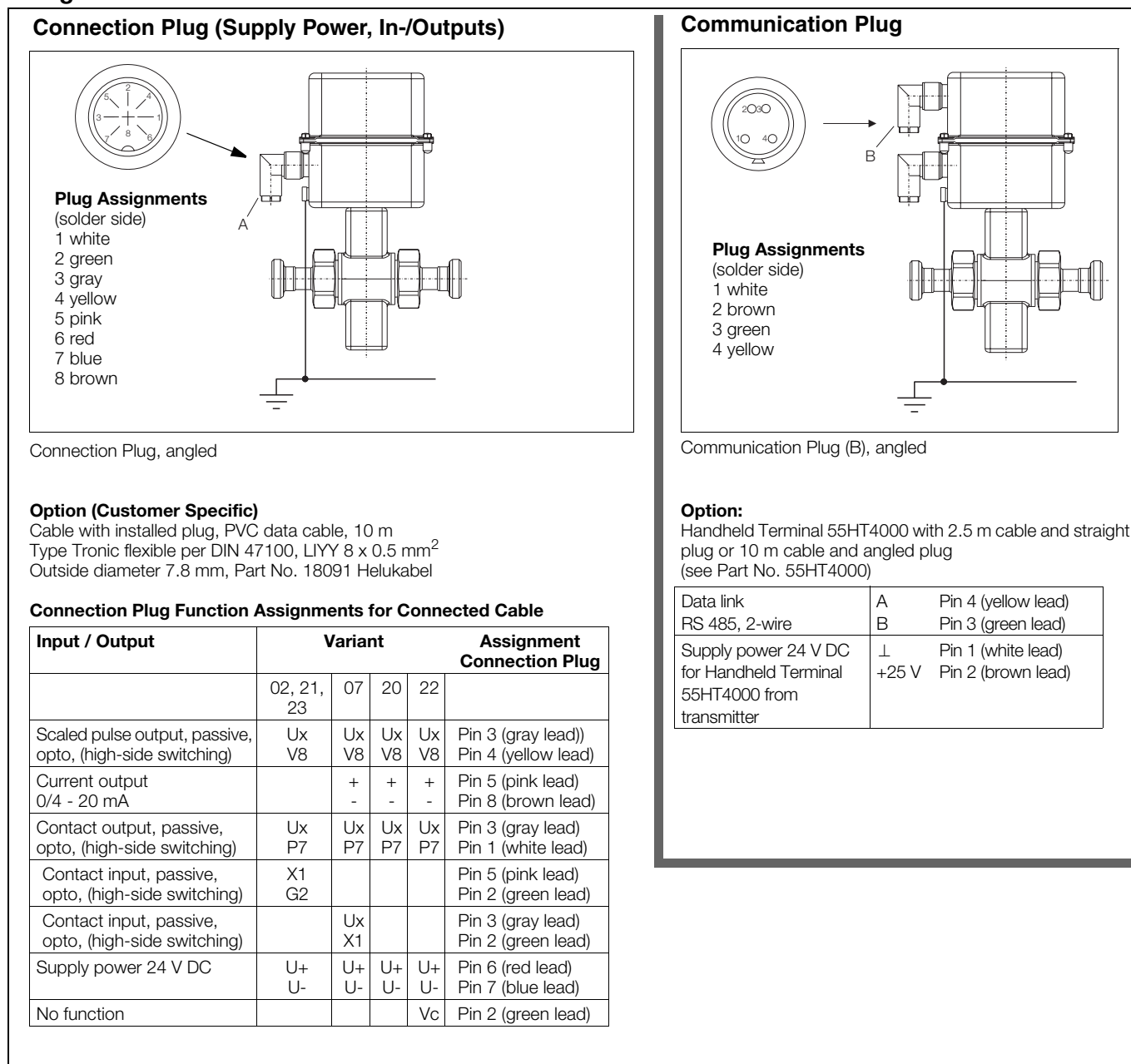


Fig. 16: Interconnection Diagram, Supply Power, High-Side Switching, In-/Outputs, Communication



<b>Compact Dsg. FXF2000 (COPA-XF) DF23</b>																				
<b>Certifications</b>																				
None (standard)																				
Material Traceability Certificate 3.1 per EN 10204 and Pressure Test per AD-2000																				
Inspection Report per EN 10204 3.1																				
Pressure Test per AD-2000																				
<b>Protection Class</b>																				
Climate protection																				
IP 67 Standard)																				
<b>Supply Power</b>																				
24 V DC																				
<b>External Connections</b>																				
Connection plug (angled)		(standard)																		
Connection plug (angled)		with 10 m cable																		
Connection plug (angled)		with 10 m cable plus communication socket and plug																		
Connection plug (angled),		plus communication socket and plug																		
<b>In-/Outputs (Variant) <sup>3)</sup></b>																				
Contact output /pulse passive, opto /contact input/RS 485 (2nd plug)		see External Connections																		
		6																		
Contact output /pulse passive, opto /contact input/current output (standard)		1																		
Contact output /pulse passive, opto /contact input/RS 485 (2nd plug)		6																		
<b>Application</b>																				
Standard																				
<b>Factory Plate</b>																				
German																				
English																				
<b>Design Level</b>																				
<b>Gasket Materials</b>																				
EPDM with FDA-Approval (standard)																				
Silicone with FDA-Approval (option)																				
None (only Wafer Design)																				
<b>Electrode Design</b>																				
Standard																				
Pointed head <sup>4)</sup> (from DN 10 [3/8"])																				

3) Variant No. ≥ 20: customer specific Variant  
4) For use in applications with high grease content

Accessories	Ordering Number
Connection plug (angled)	D172J003U07
Connection plug (angled) with 10 m cable	D677A342U03
communication plug (angled)	D172J003U05



**Attention**

To configure the transmitter the Operator Unit 55BE1000 is required and the housing cover must be removed.

**ATTENTION! When the housing cover is removed the EMC-Protection is limited.**

If a data link option is included in the transmitter, the transmitter can be configured without removing the cover from a Handheld Terminal 55HT4000, PCS-System or PC using the ASCII-Protocol.

## Ordering Information Operator Unit 55BE1000

Ordering Number: D803D043U02

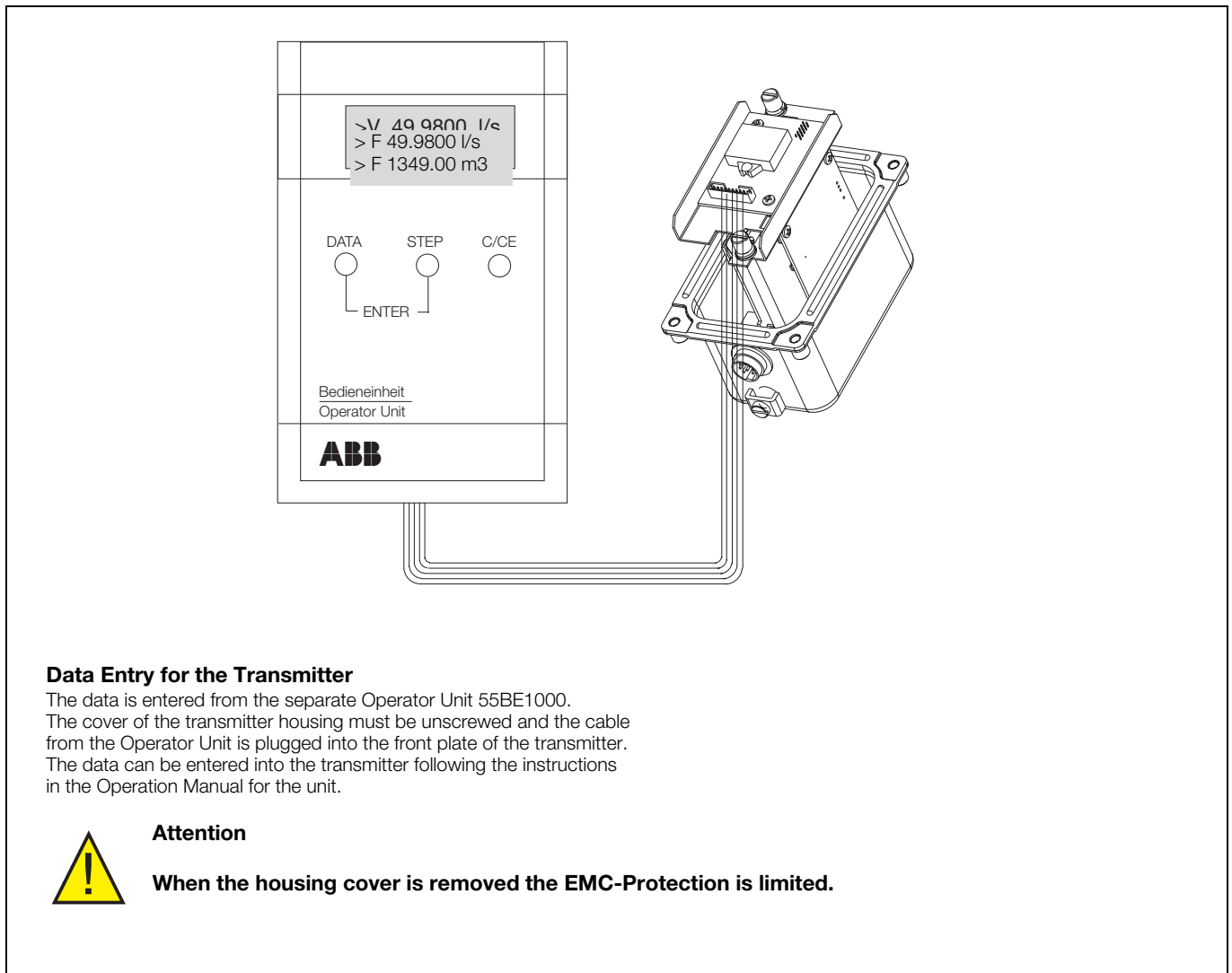
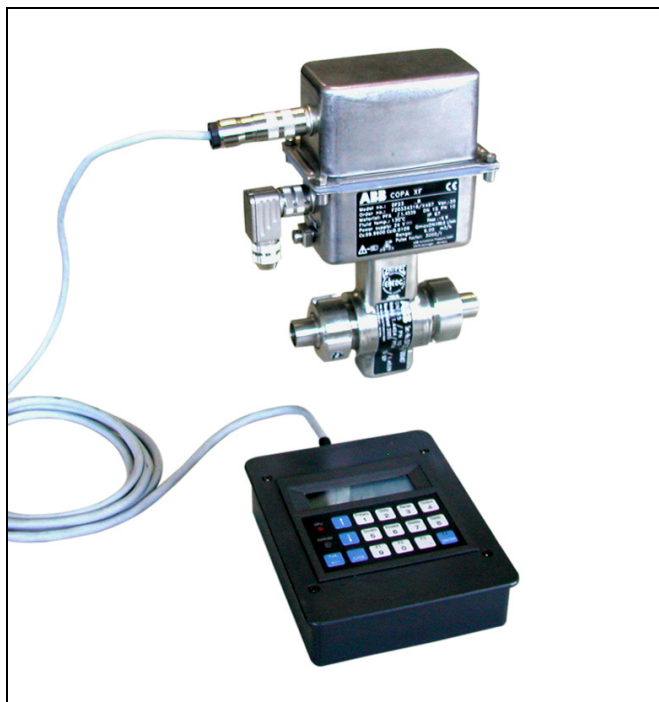


Fig. 17: Operator Unit 55BE1000 for Data Entry

## Ordering Information Handheld Terminal 55HT4000

Ordering Number	55HT4				
<b>Keyboard Layout</b> Standard	1				
<b>Power supply</b> 24 V AC/DC	1				
<b>Cable Connection</b> 2.5 m with straight plug, Handheld Terminal	1				
10 m with angle plug, for panel mounting	2				
<b>Design level</b> (specified by ABB)					*
<b>Name Plate</b> German					1
English					2



**Fig. 18:** Handheld Terminal 55HT4000 for Data Entry.  
A prerequisite is a FXF2000 design which includes a data link RS 485 and a communication plug socket

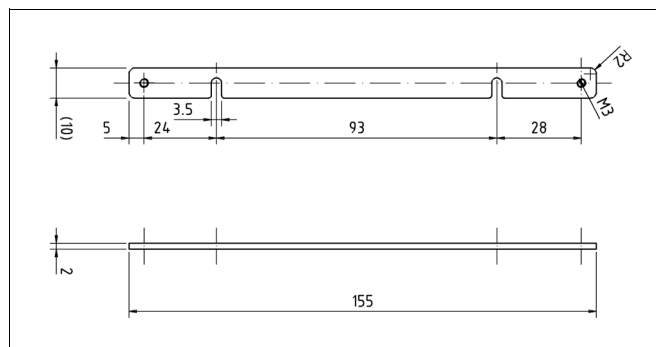
## Ordering Information Flowmeter Sensor Simulator FXC4000

Bestellnummer	55XC4				
<b>Flow signal setting</b> None (adapter only)	0				
3-digit switch in 1,000 increments	1				
Other	9				
<b>Power supply<sup>1)</sup></b> None (adapter only)	0				
Grounding plug for 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				
Other	9				
<b>Additional equipment</b> None	0				
Adapter for FXE4000-E4, FXM2000-XM2, FXF2000-DF23 transmitter	1				
Adapter board for FSM4000-S4 transmitter	5				
Adapter board for FET321, FET325 transmitter	6				
Other	9				
<b>Design level</b> (specified by ABB)					*
<b>Name plate</b> German					1
English					2
French					3
Other					9

1) Power supply for transmitter.

## Ordering Information Wall Bracket for 55HT4000

Ordering Number: D614L653U01



**Specification Help: FXF2000, 50XF4000, Design-Level B, Variant 02**

Order Number:		Name:		
Customer:		Date:		
Parameter	Selection/Entry	Default	Range	Comments
Variant	<input type="checkbox"/> 02			
Meter Size	<input type="checkbox"/> DN 3      1/10" <input type="checkbox"/> DN 4      5/32" <input type="checkbox"/> DN 6      1/4" <input type="checkbox"/> DN 8      5/16" <input type="checkbox"/> DN 10     3/8" <input type="checkbox"/> DN 15     1/2" <input type="checkbox"/> DN 20     3/4" <input type="checkbox"/> DN 25     1" <input type="checkbox"/> DN 32     1¼" <input type="checkbox"/> DN 40     1½" <input type="checkbox"/> DN 50     2" <input type="checkbox"/> DN 65     2½" <input type="checkbox"/> DN 80     3" <input type="checkbox"/> DN 100    4"			Excitation freq. for DN 3 - 40 [1/10" - 1½"]: 25 Hz  Excitation freq. for DN 50 - 100 [2" - 4"]: 12 1/2 Hz
Flow Range Qmax		1*Cal-fact	0.05 to 1*Cal-fact	
Unit Qmax	<input type="checkbox"/> ml/s <input type="checkbox"/> l/s <input type="checkbox"/> ml/min <input type="checkbox"/> l/min <input type="checkbox"/> Others:	l/min From DN 50[ 2"]; m3/h		
Unit Totalizer	<input type="checkbox"/> ml <input type="checkbox"/> l <input type="checkbox"/> Others:	l From DN 50 2"}: m3		
Density		1 g/cm3	0.1 to 5 g/cm3	Only for mass units
Operating Mode (OM)	<input type="checkbox"/> Standard conti. <input type="checkbox"/> Conti. 1 kHz <input type="checkbox"/> Conti. 2 kHz <input type="checkbox"/> Conti. 5 kHz <input type="checkbox"/> Standard Batch <input type="checkbox"/> Batch 1 kHz <input type="checkbox"/> Batch 2 kHz <input type="checkbox"/> Batch 5 kHz <input type="checkbox"/> Filler 5 kHz	Standard conti.		
Pulse Factor		1/Unit	0.001 to 1000	Only for OM „Standard...“
Pulse Width		30 ms	0.1 to 1000 ms	Only for OM „Standard...“
Damping		5 s	0.125 to 20 s	Only for „conti.“ OM
Low Flow Cutoff		1 %	0 to 10 %	
Flow indication	<input type="checkbox"/> normal <input type="checkbox"/> inverse	normal		
Flow Direction	<input type="checkbox"/> F/R <input type="checkbox"/> forward	Forward/reverse		
Prog. Output P7	<input type="checkbox"/> No function <input type="checkbox"/> General Alarm norm. closed <input type="checkbox"/> General Alarm norm. open <input type="checkbox"/> F/R-Signal <input type="checkbox"/> Synchronous Signal	General Alarm norm. closed		For OM „Filler“ always „End Contact“
Protocol	<input type="checkbox"/> ASCII <input type="checkbox"/> ASCII2w	ASCII		If more than one instru- ment, ASCII2w must be selected
Baudrate	<input type="checkbox"/> 1200 Bd <input type="checkbox"/> 2400 Bd <input type="checkbox"/> 4800 Bd <input type="checkbox"/> 9600 Bd	1200 Bd		
Address		0	0 to 99	
Language	<input type="checkbox"/> German <input type="checkbox"/> English	German		

**Specification Help: FXF2000, 50XF4000, Design-Level B, Variant 07**

Order Number:		Name:		
Customer:		Date:		
Parameter	Selection/Entry	Default	Range	Comments
Variant	<input type="checkbox"/> 07			
Meter Size	<input type="checkbox"/> DN 3      1/10" <input type="checkbox"/> DN 4      5/32" <input type="checkbox"/> DN 6      1/4" <input type="checkbox"/> DN 8      5/16" <input type="checkbox"/> DN 10     3/8" <input type="checkbox"/> DN 15     1/2" <input type="checkbox"/> DN 20     3/4" <input type="checkbox"/> DN 25     1" <input type="checkbox"/> DN 32     1¼" <input type="checkbox"/> DN 40     1½" <input type="checkbox"/> DN 50     2" <input type="checkbox"/> DN 65     2½" <input type="checkbox"/> DN 80     3" <input type="checkbox"/> DN 100    4"			Excitation freq. for DN 3 - 40 [1/10" - 1½"]: 25 Hz  Excitation freq. for DN 50 - 100 [2" - 4"]: 12 1/2 Hz
Flow Range Qmax		1*Cal-fact	0.05 to 1*Cal-fact	
Unit Qmax	<input type="checkbox"/> ml/s <input type="checkbox"/> l/s <input type="checkbox"/> ml/min <input type="checkbox"/> l/min <input type="checkbox"/> Others:	l/min From DN 50 [2"]: m3/h		
Unit Totalizer	<input type="checkbox"/> ml <input type="checkbox"/> l <input type="checkbox"/> Others:	l From DN 50 [2"]: m3		
Density		1 g/cm3	0.1 to 5 g/cm3	Only for mass units
Operating Mode (OM)	<input type="checkbox"/> Standard conti. <input type="checkbox"/> Conti. 1 kHz <input type="checkbox"/> Conti. 2 kHz <input type="checkbox"/> Conti. 5 kHz <input type="checkbox"/> Standard Batch <input type="checkbox"/> Batch 1 kHz <input type="checkbox"/> Batch 2 kHz <input type="checkbox"/> Batch 5 kHz <input type="checkbox"/> Filler 5 kHz	Standard conti.		
Pulse Factor		1/Unit	0.001 to 1000	Only for OM "Standard..."
Pulse Width		30 ms	0.1 to 1000 ms	Only for OM "Standard..."
Damping		5 s	0.125 to 20 s	Only for "conti." OM
Low Flow Cutoff		1 %	0 to 10 %	
Flow indication	<input type="checkbox"/> normal <input type="checkbox"/> inverse	Normal		
Flow Direction	<input type="checkbox"/> F/R <input type="checkbox"/> forward	Forward/reverse		
Prog. Input X1	<input type="checkbox"/> No function <input type="checkbox"/> Ext. Zero Return	Ext. Zero Return		For OM „Filler“ always „Start-Input“
Prog. Output P7	<input type="checkbox"/> No function <input type="checkbox"/> General Alarm norm. closed <input type="checkbox"/> General Alarm norm. open <input type="checkbox"/> F/R-Signal <input type="checkbox"/> Synchronous Signal	General Alarm norm. closed		For OM "Filler" always "End Contact"
Current Output	<input type="checkbox"/> 0 - 20 mA <input type="checkbox"/> 4 - 20 mA <input type="checkbox"/> Others:	0-20 mA		Only for "conti." Operating Mode
Out at Alarm	<input type="checkbox"/> 0 % <input type="checkbox"/> 130 % <input type="checkbox"/> 3.6 mA	0 %		Only for "conti." Operating Mode
Language	<input type="checkbox"/> German <input type="checkbox"/> English	German		

**Specification Help: FXF2000, 50XF4000, Design-Level B, Variant 20**

Order Number:		Name:		
Customer:		Date:		
Parameter	Selection/Entry	Default	Range	Comments
Variant	<input type="checkbox"/> 20			
Meter Size	<input type="checkbox"/> DN 3      1/10" <input type="checkbox"/> DN 4      5/32" <input type="checkbox"/> DN 6      1/4" <input type="checkbox"/> DN 8      5/16" <input type="checkbox"/> DN 10     3/8" <input type="checkbox"/> DN 15     1/2" <input type="checkbox"/> DN 20     3/4" <input type="checkbox"/> DN 25     1" <input type="checkbox"/> DN 32     1¼" <input type="checkbox"/> DN 40     1½" <input type="checkbox"/> DN 50     2" <input type="checkbox"/> DN 65     2½" <input type="checkbox"/> DN 80     3" <input type="checkbox"/> DN 100    4"			Excitation freq. for DN 3 - 40 [1/10" - 1½"]: 25 Hz  Excitation freq. for DN 50 - 100 [2" - 4"]: 12 1/2 Hz
Flow Range Qmax		1*Cal-fact	0.05 to 1*Cal-fact	
Unit Qmax	<input type="checkbox"/> ml/s <input type="checkbox"/> l/s <input type="checkbox"/> ml/min <input type="checkbox"/> l/min <input type="checkbox"/> Others:	l/min From DN 50[ 2"]: m3/h		
Unit Totalizer	<input type="checkbox"/> ml <input type="checkbox"/> l <input type="checkbox"/> Others:	l From DN 50 2"): m3		
Density		1 g/cm3	0.1 to 5 g/cm3	Only for mass units
Operating Mode (OM)	<input type="checkbox"/> Standard conti. <input type="checkbox"/> Conti. 1 kHz <input type="checkbox"/> Conti. 2 kHz <input type="checkbox"/> Conti. 5 kHz <input type="checkbox"/> Standard Batch <input type="checkbox"/> Batch 1 kHz <input type="checkbox"/> Batch 2 kHz <input type="checkbox"/> Batch 5 kHz	Standard conti.		
Pulse Factor		1/Unit	0.001 to 1000	Only for OM „Standard...“
Pulse Width		30 ms	0.1 to 1000 ms	Only for OM „Standard...“
Damping		5 s	0.125 to 20 s	Only for „conti.“ OM
Low Flow Cutoff		1 %	0 to 10 %	
Flow indication	<input type="checkbox"/> normal <input type="checkbox"/> inverse	normal		
Flow Direction	<input type="checkbox"/> F/R <input type="checkbox"/> forward	Forward/reverse		
Prog. Output P7	<input type="checkbox"/> No function <input type="checkbox"/> General Alarm norm. closed <input type="checkbox"/> General Alarm norm. open <input type="checkbox"/> F/R-Signal <input type="checkbox"/> Synchronous Signal	General Alarm norm. closed		
Protocol	<input type="checkbox"/> ASCII <input type="checkbox"/> ASCII2w	ASCII		If more than one instrument, ASCII2w must be selected
Baudrate	<input type="checkbox"/> 1200 Bd <input type="checkbox"/> 2400 Bd <input type="checkbox"/> 4800 Bd <input type="checkbox"/> 9600 Bd	1200 Bd		
Address		0	0 to 99	
Current Output	<input type="checkbox"/> 0 - 20 mA <input type="checkbox"/> 4 - 20 mA <input type="checkbox"/> other	0 - 20 mA		Only for "conti." Operating Mode
Out bei Alarm	<input type="checkbox"/> 0 % <input type="checkbox"/> 130 % <input type="checkbox"/> 3.6 mA	0 %		Only for "conti." Operating Mode
Language	<input type="checkbox"/> German <input type="checkbox"/> English	German		



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