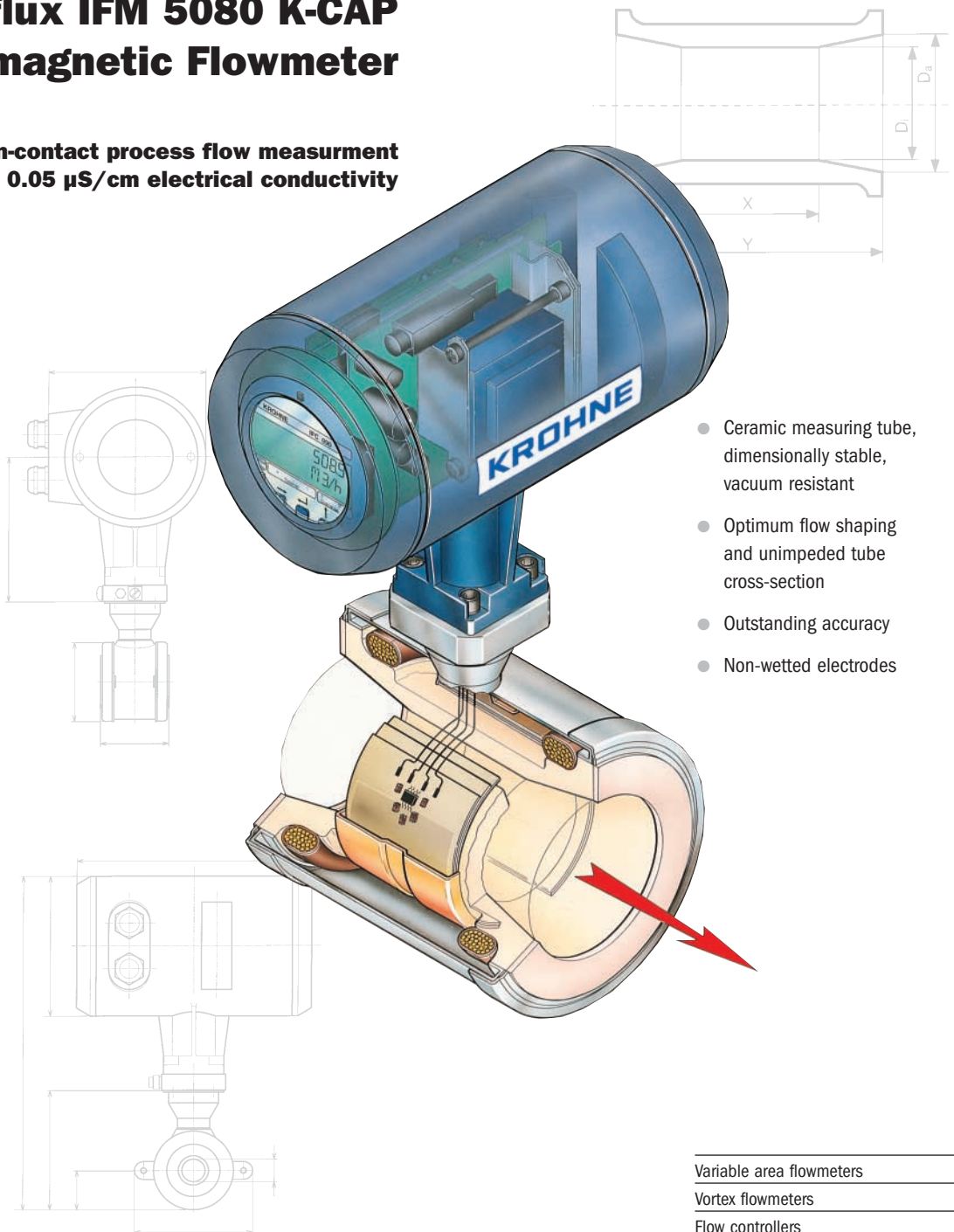


## Capaflux IFM 5080 K-CAP Electromagnetic Flowmeter

... non-contact process flow measurement  
from 0.05  $\mu\text{S/cm}$  electrical conductivity



- Ceramic measuring tube, dimensionally stable, vacuum resistant
- Optimum flow shaping and unimpeded tube cross-section
- Outstanding accuracy
- Non-wetted electrodes

Variable area flowmeters

Vortex flowmeters

Flow controllers

**Electromagnetic flowmeters**

Ultrasonic flowmeters

Mass flowmeters

Level measuring instruments

Communications technology

Engineering systems & solutions

Switches, counters, displays and recorders

Heat metering

Pressure and temperature



## Capaflux IFM 5080 K-CAP Electromagnetic Flowmeter

... non-contact process flow measurement  
from 0.05  $\mu\text{S}/\text{cm}$  electrical conductivity

### No restrictions ...

- ... through insulating products with a film-forming tendency:  
**asphalt, latex suspensions**
- ... through low electrical conductivity:  
**ultrahigh-purity water, alcohols, glycerins, glycols**
- ... through high solids contents:  
**fruit pieces, pulps, concrete**
- ... for sterile processes:  
**chemical and food industries**
- ... when used in hazardous areas:  
**ATEX approval**  
**FM certification** pending
- ... through electrode materials:  
the capacitive electrodes are located behind the ceramic tube, i.e. **non-contact measurement, no contact with the process product.**

Calibrated on **EN 17 025**  
accredited calibration rigs,  
accuracy of calibration better  
than 99.97% of the measured value.



### non-contact flow measurement

### no electrodes

### easy to specify

### unimpeded flow cross-sectional area

### optimum flow shaping

### resistant to abrasion

### ceramic measuring tube

### dimensionally stable vacuum-resistant

### outstanding accuracy

### Special advantages

- capacitive electrodes for non-contact measurement.
- the measuring section is resistant to abrasion from even high solids contents.
- the ceramic measuring tube is dimensionally stable and vacuum-resistant.
- the special shape of the measuring tube helps to optimize the flow profile, even with minimum pressure drop, refer to diagram on page 3.
- the measuring error is less than 0.5% of the measured value.
- the integral design ensures easy installation, safe and reliable operation.
- the crevice-free measuring tube has no blind spots and conforms to food requirements, the ceramic surface is ultrasmooth,  $R_a < 0,8 \mu\text{m}$  surface finish.

### ATEX approval

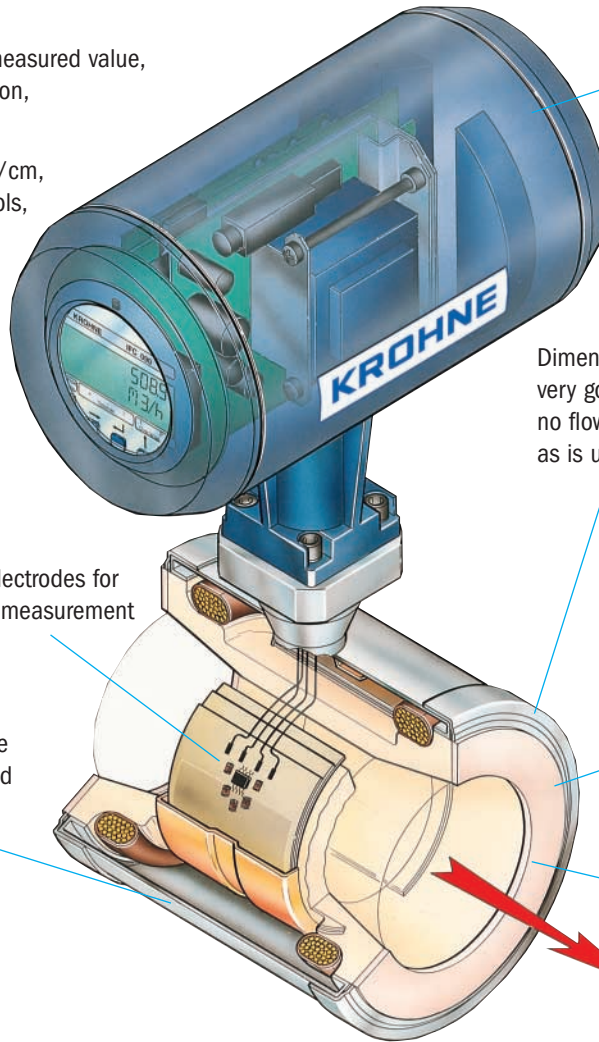
Ex II 2 GD **KEMA 01 ATEX 2232X**

- CAPAFLUX IFM 5080 K/CAP-EE:  
EEx d IIC T6 ... T4  
EEx de IIC T6 ... T4
- CAPAFLUX IFM 5080 K/CAP/i-EE:  
with outputs intrinsic safety  
EEx d [ia] IIC T6 ... T4  
EEx de [ia] IIC T6 ... T4

**Highlights**

Measuring error  $\leq 0.5\%$  of the measured value, 'sandwich' design, easy installation, reliable and safe operation

Electrical conductivity  $\geq 0.05 \mu\text{S/cm}$ , e.g. ultrahigh-purity water, alcohols, glycerols, glycols, etc.



Hazardous-duty version, flameproof enclosure

Dimensionally stable measuring tube, very good thermal and long-time stability, no flow, creep and no abrasion, as is usually the case with plastic liners

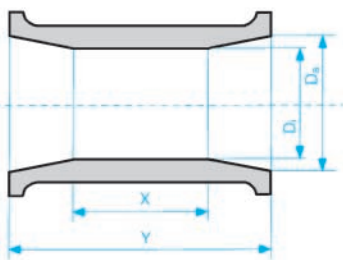
Capacitive electrodes for non-contact measurement

Meter sizes DN 25-100 or 1"-4"

No crevices, no blind spots in the measuring tube, conforms to food standards, extremely smooth, surface roughness  $< 0.8 \mu\text{m}$

Self-supporting ceramics measuring tube, press-fitted into stainless steel housing

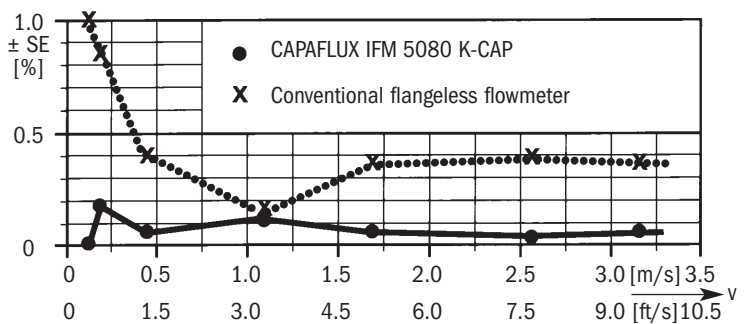
**Design**



Meter size		Dimensions in mm (inches)			
DN mm	inches	D <sub>a</sub>	D <sub>i</sub>	X	Y
25	1	24 (0.95)	20 (0.79)	26 (1.02)	55 (2.17)
40	1½	37 (1.46)	30 (1.18)	36 (1.42)	80 (3.15)
50	2	49 (1.92)	40 (1.57)	51 (2.01)	100 (3.94)
80	3	78 (3.06)	60 (2.36)	70 (2.76)	150 (5.91)
100	4	98 (3.84)	80 (3.15)	103 (4.06)	200 (7.87)

**Flow profile influence**  
(± SE) as % of measured value

Example for DN80 (3") with quarter bend, straight inlet run  $5 \times \text{DN}$  (= 400 mm = 16") from quarter bend to electrode plane



**Pressure drop:**

$$\Delta P = \frac{\rho \times v^2}{800} \text{ (in mbar)}$$

$$\Delta P = \frac{\rho \times v^2}{550} \text{ (in psig)}$$

$\rho$  = product density in (kg/m<sup>3</sup>)  
 $v$  = flow velocity in m/s

$\rho$  = specific gravity (e.g. water = 1)  
 $v$  = flow velocity in ft/s

**Measuring ranges and error limits**

Meter size <sup>1)</sup>		Electrical conductivity		Error limits <sup>2)</sup>		Full-scale range Q <sub>100%</sub>				
mm	inches	0.05-0.2 µS/cm	> 0.2 µS/cm	v > 1 m/s	v ≤ 1 m/s	in m <sup>3</sup> /h			in US gal/min	
		(water 1-2.5 µS/cm)	(water > 2.5 µS/cm)	> 3 ft/s	≤ 3 ft/s	v = 0.3 m/s (minimum)	v = 1 m/s	v = 12 m/s (maximum)	v = 1 ft/s (minimum)	v = 40 ft/s (maximum)
DN 25	1	depending on product and application condition, please consult your local KROHNE office	for all applications	< ± 0.5 % of measured value	< ± 5 mm/s < ± 0.20 inches/s	0.5302	1.767	21.20	2.334	93.34
DN 40	1 1/2					1.358	4.524	54.28	5.979	239.0
DN 50	2					2.121	7.069	84.82	9.339	373.5
DN 80	3					5.429	18.10	217.1	23.900	955.6
DN 100	4					8.483	28.27	339.2	37.350	1493.0

1) Where low electrical conductivities are concerned, the meter size should be such that flow velocity v < 1 m/s (< 3 ft/s).

2) Error limits for display, pulse output, digital values

**Calibrated on EN 17025 accredited calibration rigs by direct comparison of volumes**

**Reference conditions similar to EN 29104**

Product	water at 10 - 30°C / 50 - 86°F
Electrical conductivity	> 300 µS/cm
Power supply (rated voltage)	U <sub>N</sub> (± 2%)
Ambient temperature	20 - 22°C / 68 - 71.6°F
Warm-up time	60 min
Inlet/outlet runs	10 x DN / 2 x DN (DN = meter size)
Primary head	properly grounded and centered

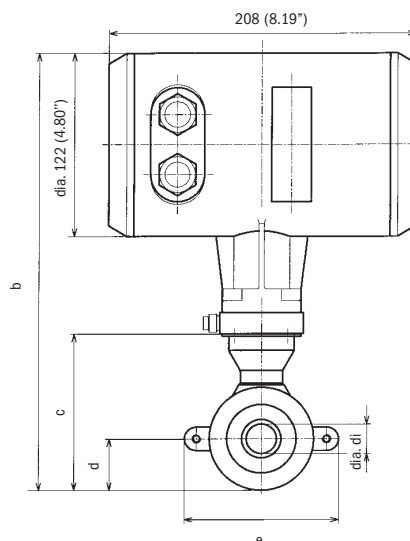
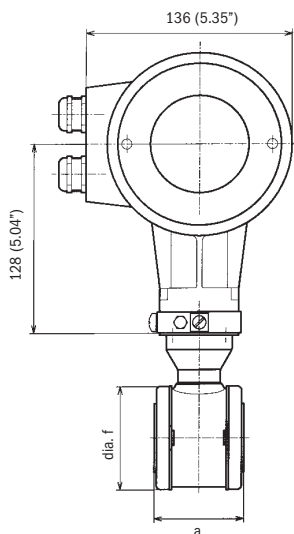
<b>Current output</b>	same error limits as above, additionally ± 10 µA	
<b>Reproducibility or repeatability</b>	0.1 % of MV, minimum 1 mm/s / 0.04 inches/s at constant flow, measuring time > 100 s	
<b>External influences</b>	typical values	maximum values
<u>Ambient temperature</u>		
Pulse output	0.003% of MV (3)	0.01% of MV (3)
Current output	0.01% of MV (3)	0.025% of MV (3)
	} at 1 K / 1.8°F variation	
<u>Power supply</u>	< 0.02% of MV	0.05% of MV at 10 % variation
<u>Load</u>	< 0.01% of MV	0.02% of MV at max. permissible load, see pages 5 and 6

(3) All KROHNE signal converters undergo burn-in tests, duration minimum 20 hours at varying ambient temperatures - 20 to + 60 °C / - 4 to + 140 °F. The tests are controlled by computers.

**Dimensions and weights**

- all dimensions in mm and (inches)
- **without** grounding rings: Dimension a incl. gaskets between primary head and pipe flanges
- **with** groundings rings: Dimension a + 10 mm or a + 0.4", incl. 2 gaskets between measuring tube and grounding rings and 2 between grounding rings and pipe flanges

Meter size		Dimensions in mm and (inches)								approx. weight
DN mm	inches	a	b	c	d	e	Ø f	Ø di	in kg (lb)	
25	1	58 (2.28)	302 (11.89)	113 (4.45)	34 (1.34)	102 (4.02)	68 (2.68)	20 (0.79)	3.9 (8.6)	
40	1 1/2	83 (3.27)	318 (12.52)	129 (5.08)	42 (1.65)	117 (4.61)	83 (3.27)	30 (1.18)	4.7 (10.4)	
50	2	103 (4.06)	336 (13.23)	147 (5.79)	51 (2.01)	135 (5.31)	101 (3.98)	40 (1.57)	5.2 (11.5)	
80	3	153 (6.02)	368 (14.49)	179 (7.05)	67 (2.64)	167 (6.57)	133 (5.24)	60 (2.36)	7.7 (17.0)	
100	4	203 (7.99)	392 (15.43)	203 (7.99)	79 (3.11)	192 (7.56)	158 (6.22)	80 (3.15)	11.1 (24.5)	



The responsibility as to the suitability, intended use and corrosion-resistance of the materials used in their construction rests solely with the purchaser.

**Technical data**

**CAPAFUX Primary head**

<b>Meter size</b>	DN 25, 40, 50, 80, 100 and 1", 1½", 2", 3", 4", flangeless version	
<b>Operating data</b>		
Temperatures	Ambient temperature - 25 to + <b>60 °C</b> / - 13 to + <b>140 °F</b> - 25 to + <b>40 °C</b> / - 13 to + <b>104 °F</b>	Product temperature - 25 to + <b>60 °C</b> / - 13 to + <b>140 °F</b> - 25 to + <b>100 °C</b> / - 13 to + <b>212 °F</b> ● non Ex : + <b>140 °C/+284 °F</b> for max. 30 min ● Ex version : + <b>115 °C/+239 °F</b>
Pressure	DN 25 - 80: DN 100: 1" - 4": 1" - 3": 4":	40 bar / 580 psig 16 bar / 230 psig (option 25 bar) 16 bar / 230 psig for 150 lb 40 bar / 580 psig for 300 lb 25 bar / 360 psig for 300 lb } pipe flanges
Vacuum	0 mbar abs. / 0 psia	
<b>Temperature change</b>		
Temperature rising	in 10 minutes: for sudden change:	$\Delta T = 125 \text{ °C}$ , or $257 \text{ °F}$ $\Delta T = 120 \text{ °C}$ , or $248 \text{ °F}$
Temperature falling	in 10 minutes: for sudden change:	$\Delta T = 100 \text{ °C}$ , or $212 \text{ °F}$ $\Delta T = 180 \text{ °C}$ , or $176 \text{ °F}$
<b>Insulation class of field coils</b>	H	
<b>Electrode design</b>	capacitive signal pickup, electrodes not in contact with the product	
<b>Protection category</b> (IEC 529 / EN 60 529)	IP 67 equivalent to NEMA 6	
<b>Items included with supply</b>		
for pipe flanges	Standard DN 25 - 80 / PN 40 DN 100 / PN 16 1" - 4" / 150 lb	Option DN 100 / PN 25 1" - 4" / 300 lb
Centering material	yes	-
Stud bolts	steel	stainless steel
Grounding rings	-	yes
Gaskets	2 (without grounding rings)	4 (with grounding rings)
Ex versions:	European standard FM approval	- EEx d IIC T6-T4 in preparation
<b>Materials</b>		
<u>Measuring section</u>		
DN 25, 1"	zirconium oxide, ZrO <sub>2</sub>	
DN 40 - 100, 1½" - 4"	fused aluminium oxid, 99.7 % Al <sub>2</sub> O <sub>3</sub>	
<u>Housing</u> (with polyurethane finish)	stainless steel 1.4301 / SS 304 - AISI	
<u>Gaskets</u>	Gylon 3500 (beige) gaskets (application range similar to that of PTFE), optionally Chemotherm (graphite) gaskets	
Grounding rings (option)	stainless steel 1.4571/ SS 316 Ti - AISI, others on request	
<u>Centering material</u>		
DN 25, 1"	EPDM rings	
DN 40 - 100, 1½" - 4"	rubber sleeves	
<u>Stud bolts</u>	steel electrogalvanized, optionally stainless steel 1.4301 / SS 304 - AISI	

**IFC 090 K-CAP Signal converter**

**Versions**

IFC 090 K/B (Standard)  
 IFC 090 K/D (Option)  
 IFC 090 K/D-EEEx  
 Interfaces (option)

Basic version, **without** local display and control elements  
 Display version, **with** local display and control elements  
 Ex version with "Increased Safety" outputs  
 - HART®  
 - RS 485/PROFIBUS/FIELDBUS (switch-selectable add-on module)  
 CONFIG-Software and adapter for operator control via MS-DOS PC,  
 connection to internal IMoCom interface (equipment bus)

Add-on equipment (option)

**Current output**

Function

- all operating data configurable  
 - galvanically isolated from current output and all input circuits  
 - for active or passive mode

Current: fixed ranges  
 variable ranges

0 - 20 mA and 4 - 20 mA  
 for Q = 0%  $I_{0\%} = 0 - 16 \text{ mA}$   
 for Q = 100%  $I_{100\%} = 4 - 20 \text{ mA}$   
 for Q > 100%  $I_{\text{max}} = 22 \text{ mA}$  } adjustable in 1 mA increments

Active mode

max. 500 Ω load

Passive mode

external voltage: 15 ... 20V DC 20 ... 32V DC  
 load: min ... max. 0 ... 500Ω 250 ... 750Ω

Error identification

0/22 mA and variable

Forward/reverse flow measurement

direction identified via status output

**Pulse output**

Function

- all operating data configurable  
 - galvanically isolated from all input and output circuits  
 - digital pulse division, interpulse period non-uniform, therefore if frequency and cycle meters connected allow for minimum counting interval:

$$\text{gate time, totalizer} \geq \frac{1000}{P_{100\%} [\text{Hz}]}$$

Active mode

connection: electronic totalizers  
 voltage: approx. 15 V DC, from current output  
 load:  $I_{\text{max}} < 23 \text{ mA}$ , operation without current output  
 load:  $I_{\text{max}} < 3 \text{ mA}$ , operation with current output

Passive mode

connection: electronic or electromechanical totalizers  
 voltage: external,  $U_{\text{ext}} \leq 30 \text{ V DC} / \leq 24 \text{ V AC}$   
 load:  $I_{\text{max}} \leq 150 \text{ mA}$

Pulse width

automatic: pulse duty cycle 1:1, max 1000 pulses/s = 1 kHz  
 variable: 10 ms - 2 s  $P_{100\%} [\text{pulses/s}] = f_{\text{max}} [\text{Hz}] = \frac{1}{2 \times \text{pulse width}}$

Forward/reverse flow measurement

flow direction identified via status output

**Status output (passive)**

Function

configurable as measuring range identification for BA mode,  
 indicator for flow direction, errors or trip point

Connection

voltage: external,  $U_{\text{ext}} \leq 30 \text{ V DC} / \leq 24 \text{ V AC}$   
 load current:  $I_{\text{max}} \leq 150 \text{ mA}$

**Control input (passive)**

Function

- configurable for range change, totalizer reset, error reset,  
 set actual output values  
 - initiate function by "low" or "high" control signals

Control signals

$U_{\text{max}}$ : 24 V AC 32 V DC (any polarity)  
 low:  $\leq 1.4 \text{ V}$   $\leq 2 \text{ V}$   
 high:  $\geq 3 \text{ V}$   $\geq 4 \text{ V}$

**Output/input combinations**

**I** = current output **P** = pulse output **S** = status output **C** = control input  
 The following combinations can be set:

- 1) I P S
- 2) I P C
- 3) I C S
- 4) I S1 S2
- 5) I C1 C2

**Time constant**

0.2 - 99.9 s, adjustable in increments of 0.1 second

**Low-flow cutoff**

Cutoff "on" value: 1 - 19%  
 Cutoff "off" value: 2 - 20% } of  $Q_{100\%}$ , adjustable in 1% increments

<b>Local display</b>		3-field LCD
Display function		actual flowrate, forward, reverse and sum totalizers (7-digit), or 25-character bar graph with percentage indication and status messages
Units:	Actual flowrate	m <sup>3</sup> /h, liters, US gallons/min or user-defined unit, e.g. hecto-liters/day
Totalizer		m <sup>3</sup> , liters, US gallons or user-defined unit, e.g. hecto-liters or US million gallons (adjustable count duration up to overflow)
Language of plain texts		English, German, French, others on request
Display:	Top field	8-character, 7-segment numeral and sign display, and symbols for key acknowledgement
	Middle field	10-character, 14-segment text display
	Bottom field	4 markers to identify display in measuring mode

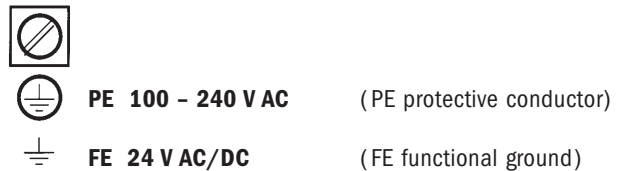
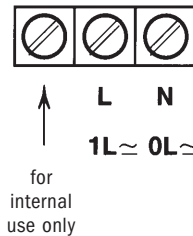
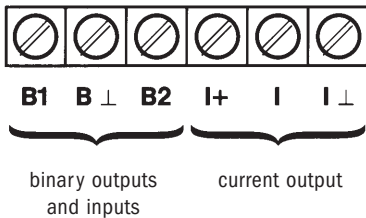
<b>Power supply</b>	<b>1. AC Version</b> Standard	<b>2. AC Version</b> Option	<b>AC/DC-Version</b> Option	
1. Rated voltage	230 / 240 V	200 V	24 V AC	24 V DC
Tolerance band	200 – 260 V	170 – 220 V	20 – 27 V AC	18 – 32 V DC
2. Rated voltage	115 / 120 V	100 V	-	-
Tolerance band	100 – 130 V	85 – 110 V	-	-
Frequency	48 – 63 Hz		48 – 63 Hz	-
Power consumption (incl. primary head)	approx. 10 VA		approx. 10 VA	approx. 8 W

When connected to functional extra-low voltage, 24 V, safety separation (PELV) is essential (to VDE 0100 / VDE 0106 and IEC 364 / IEC 536 or equivalent national standard.)

**Housing**

Material	die-cast aluminium with polyurethane finish
Ambient temperature	- 25 to + 60 °C (- 13 to + 140 °F)
Protection category (IEC 529 / EN 60 529)	IP 67, equivalent to NEMA 6

**Electrical connection**

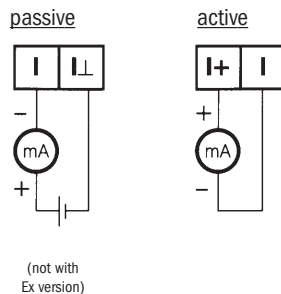


- B1** pulse output (P), status output (S) or control input (C)
- B2** status output (S) or control input (C)

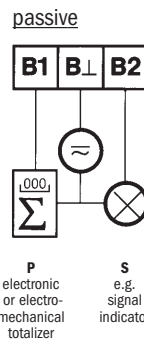
Electrical connection in conformity with VDE 0100 "Regulations governing heavy-current installations with mains voltages up to 1000 V" or equivalent national standard.

If to be connected to a functional extra-low voltage source (24 V), protective separation in conformity with VDE 0100, Part 410, or equivalent national standard, must be ensured.

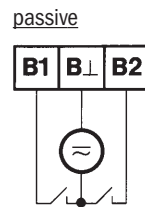
**Current output (I)**



**Pulse output (P) status output (S)**



**Control input (C)**



Operating data of receiver instruments, outputs and inputs, see pages 6 and 7.