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Küppers Elektromechanik GmbH

Certified according to DIN EN ISO 9001

Technical Datasheet

C-Flow

Coriolis Mass Flow Meter

Description

The coriolis mass flow meters measure simultaneously mass flow, volume flow, temperature and density and consequently can replace different measuring instruments.

Due to a construction free of dead spots the meters are well flushable and can be easily sterilized.

The C-flow mass flow meters do not contain any moving parts and consequently are suited for polluted media as well.

According to the requirements the C-flow mass flow meters are available as compact version with on site display and remote version with electronis in a wall mount or panel mount housing.

For the compact version an additional remote display (KRD 8001) is available, designed for cable lengths up to 1 km.

Application

- Flow measurement of PU components and paints
- Flow measurement of aggressive and contaminated media
- Measurement of mass flow, density, temperature and volume flow

Features

- Pmax. 350 bar
- Short response time
- DKD calibration
- Excellent puring and sterilization qualities due to a construction free of dead spots
- Up to +125°C medium temperature
- Individual 5-point-calibration including report
- Ex protected as per ATEX and EMC tested

Principle

Two parallel flow tubes inside the KCM flow meter are vibrating at their resonant frequency in opposite direction. Any mass flow passing through the tubes will delay the vibration at the incoming side and accelerate the vibration at the outgoing side. This causes a small time delay between both ends of the tube. This time delay is measured and used to calculate the mass flow through the tubes.

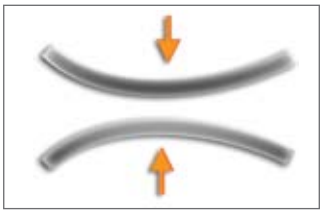
By measuring the resonant frequency of the tubes the mass of the medium and - given a constant volume inside the tubes - the specific gravity of the medium can be calculated.

As both effects are temperature dependent, the temperature is measured via a precise sensor for correcting the temperature effects of flow and density measurement.

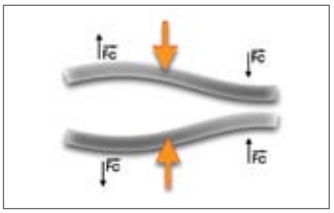
As a consequence a coriolis mass flow meter directly measures mass flow, density and temperature of the medium. The volume flow gets calculated automatically from mass flow and density.

Cycle of excursion (simplified)

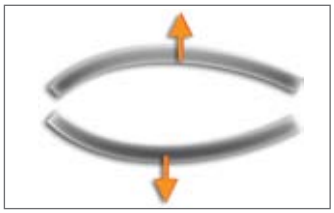
Rotation and deformation of two parallel looped pipes by the coriolis force Fc.



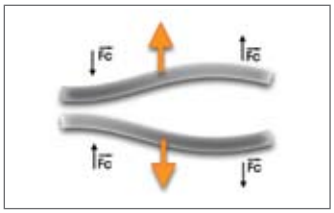
Movement to the inside
no flow



Movement to the inside
with flow



Movement to the ouside
no flow



Movement to the outside
with flow

Overview

Compact version with KCE 8000

Remote display KRD 8001

KCE 8000 with Exd-housing for wall-mounting (separated version)

KCE 8000 Remote panel-mounted housing (separated version)

Compact version with KCE 6000 and KRD 8001

Compact version with KCE 8000 Exd-version

Technical Data - KCM Transducer

	KCM0300	KCM0600	KCM1500	KCM3000
Max. flow (kg/h)	300	600	1500	3000
Min. flow (kg/h)	3	6	15	30
Max. flow (lb/min)	11.0	22.1	55.2	110
Min. flow (lb/min)	0.11	0.22	0.55	1.10
Basic Accuracy (% of flow reading)	0.5	0.5	0.2	0.2
Zero Stability (% of full scale)	0.02	0.02	0.01	0.01
Zero Drift (% f.s. per °C)	0.002	0.002	0.001	0.001
Repeatability (% of flow)	0.2	0.2	0.1	0.1
Density measuring range	0 - 4500 kg/m³			
Density accuracy	± 0.002 kg/ltr			
Temperature accuracy	±1°C ±0.5% of reading			
Process and Ambient				
Process connections	female thread 1/2" adaptors for flanges, diary and tri-clamp			
Max. pressure	200 bar			
Max. pressure (Option)	350 bar			
Pressure Drop at max. flow H_20	see diagramm			
Operating Density range	100 - 2500 kg/m³ (lower densities on request)			
Process temperature	-40 ... +125°C			
Ambient temperture	-20 ... +70°C			
Storage temperature	-40 ... +100°C			
Electr. connections remote	screw type terminals			
Electr. connections compact.	none (internally connected to the electronics)			
Ingress Protection	IP67			
General				
Tube arrangement	2 serial	2 parallel	2 serial	2 parallel
tube inner diameter	4mm	4mm	8mm	8mm
tube material	stainless steel DIN 1.4571			
housing material	stainless steel DIN 1.4571			
Dimensions	see drawings			

Technical Data - KCE 8000 Transmitter

General	
Display	Graphic, 132 x 32 dot
Supply votage	24 VDC, ±20% and/ or 100 - 240V AC (version-dependent)
Programming	via front keyboard
Interface	RS 485, Option HART®, Option Foundation Fieldbus
EMC	according to EN 61000-6-4 and EN 61000-6-2
Power consumption	max. 4 W
Exd housing	
Dimensions	see drawing
Connections	internal clamp terminals, cable gland for 7 - 13 mm cables
Material	aluminium diecast
Protection class	IP 67
Weight	approx. 2 kg
Temperature	operating: - 20 up to 70°C storage and transport: -40 up to 80°C
Panel-mounted housing	
Dimensions (h x w x d)	96 x 96 x 83 mm^3 / Ex version: 96 x 144 x 83 mm^3
Connections	rear clamp terminals
Material	Noryl
Protection class	front: IP 40, rear: IP 30
Weight	approx. 500g
Temperature	operation: 0 to 60°C storage and transport: -20 up to 70°C
Analog Outputs	
Two current outputs	4-20 mA passive, two-wire isolated
Resolution	14 bit
Linearity	± 0.05% of reading
Temperature drift	0.05% per 10K
Load	< 800 Ω
Output value	programmable: flow, total, density or temperature
Pulse Output	
Frequency range	0.5-10,000 Hz
Output signal	active push pull output for flow rate
Status In-and Output	
Status output	push pull programmable
Control input	programmable

Technical Data - KCE 6000 Transmitter

General	
Supply voltage	24 VDC, ±20%
Programming	via interface
Interface	RS485, USB (option)
EMC	according to EN 61000-6-4 and EN 61000-6-2
Power consumption	max. 4 W
Connections	connectors M12
Material	aluminium diecast
Temperature	operation: -20 to +70°C storage: -40 to +80°C
Ingress protection	IP 65
Analog Outputs	
Current output	4-20 mA active
Resolution	14 bit
Linearity	± 0.05%
Temperature drift	0.05% per 10K
Load	< 800 Ω
Output value	programmable: flow, total, density, temperature
Pulse Output	
Frequency range:	0.5-10,000 Hz
Output signal:	active push pull output for flow rate
Status In-and Outpu	
Status output	Push Pull programmable (option)
Control input	programmable (standard: 1 input / option: 2 inputs)

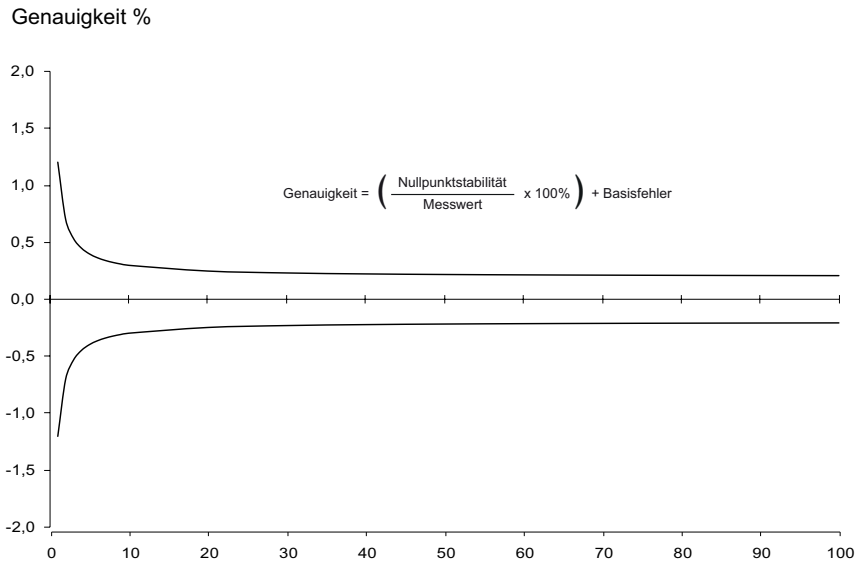
Technical Data - KRD 8001 Remote Display

Display	Graphic, 132 x 32 dot
Supply voltage	via interface
Programming	via front keyboard
Interface to KCE	RS 485
EMC	according to EN 61000-6-4 and EN 6100-6-2
Dimensions	90 x 120 x 50 mm^3 (h x w x d)
Connections	connector M12, B coded
Material	ABS-FR
Protection class	IP 64
Weight	approx. 500g
Temperature	operation: 0 to 60°C storage and transport: -20 up to +80°C
Wall mount	hidden screws

Pressure drop in bar

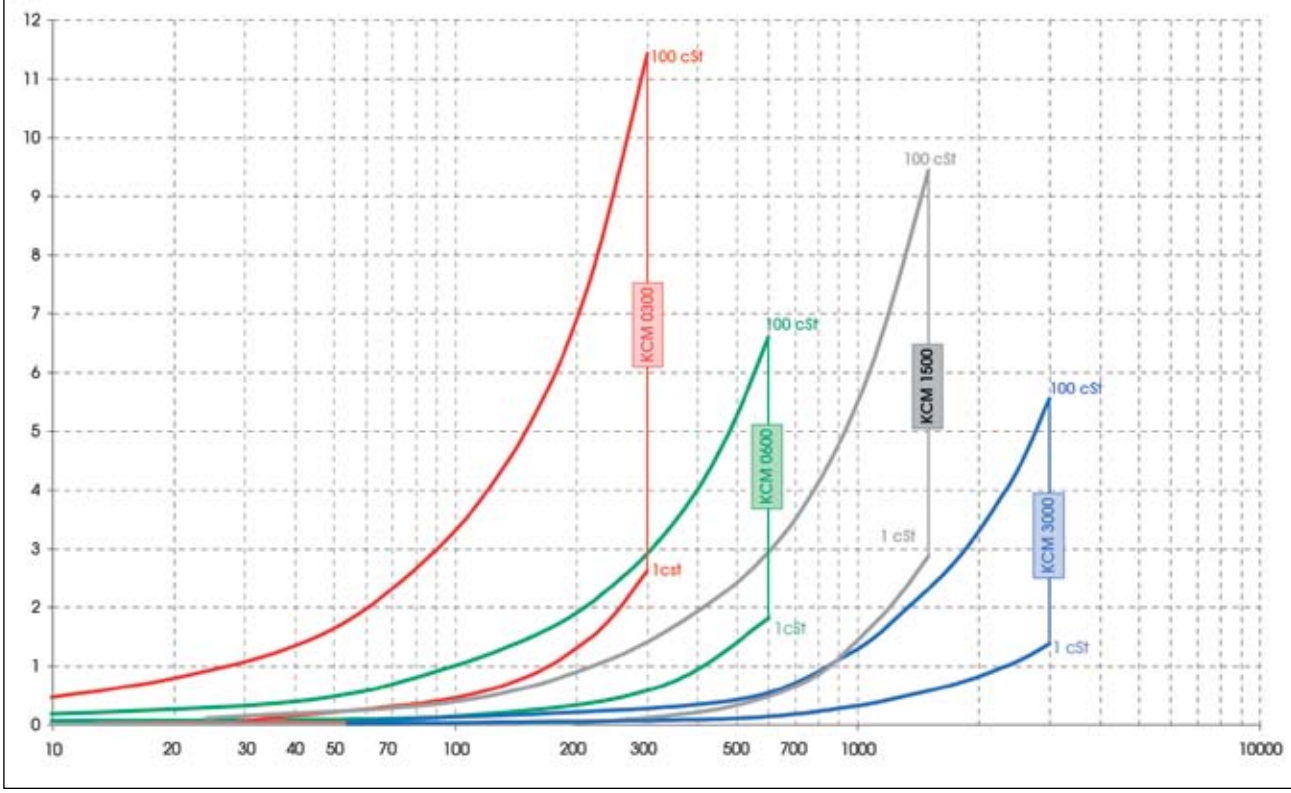
ATEX: *Zone 1:* different versions Ex d or Ex i (only KCM**** with KCE 8000)
Zone 2: available for all versions

IEC Ex: in preparation

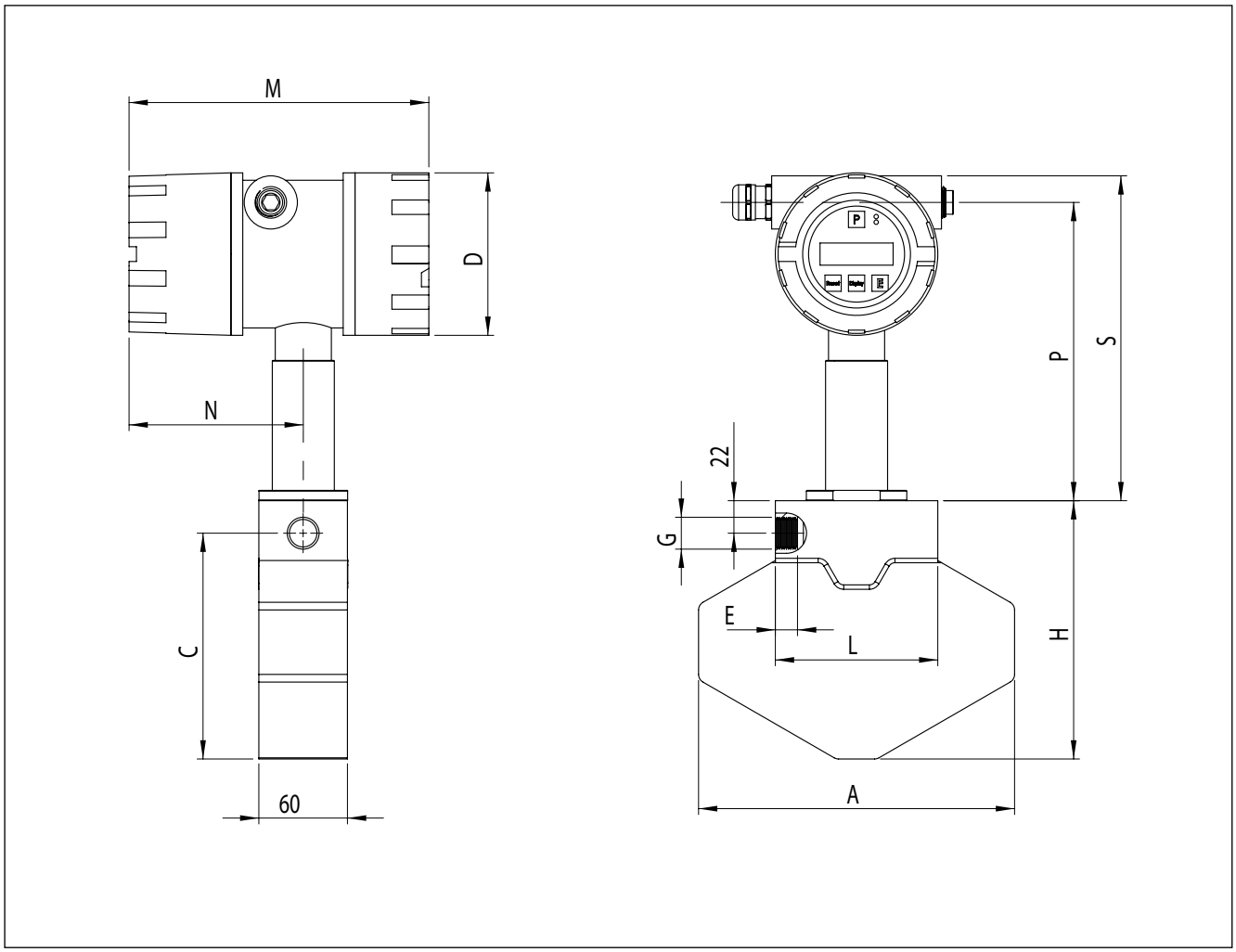


The diagram shows typical values. Individual values may be taken from the calibration records supplied with each meter.

Druckverlust in bar



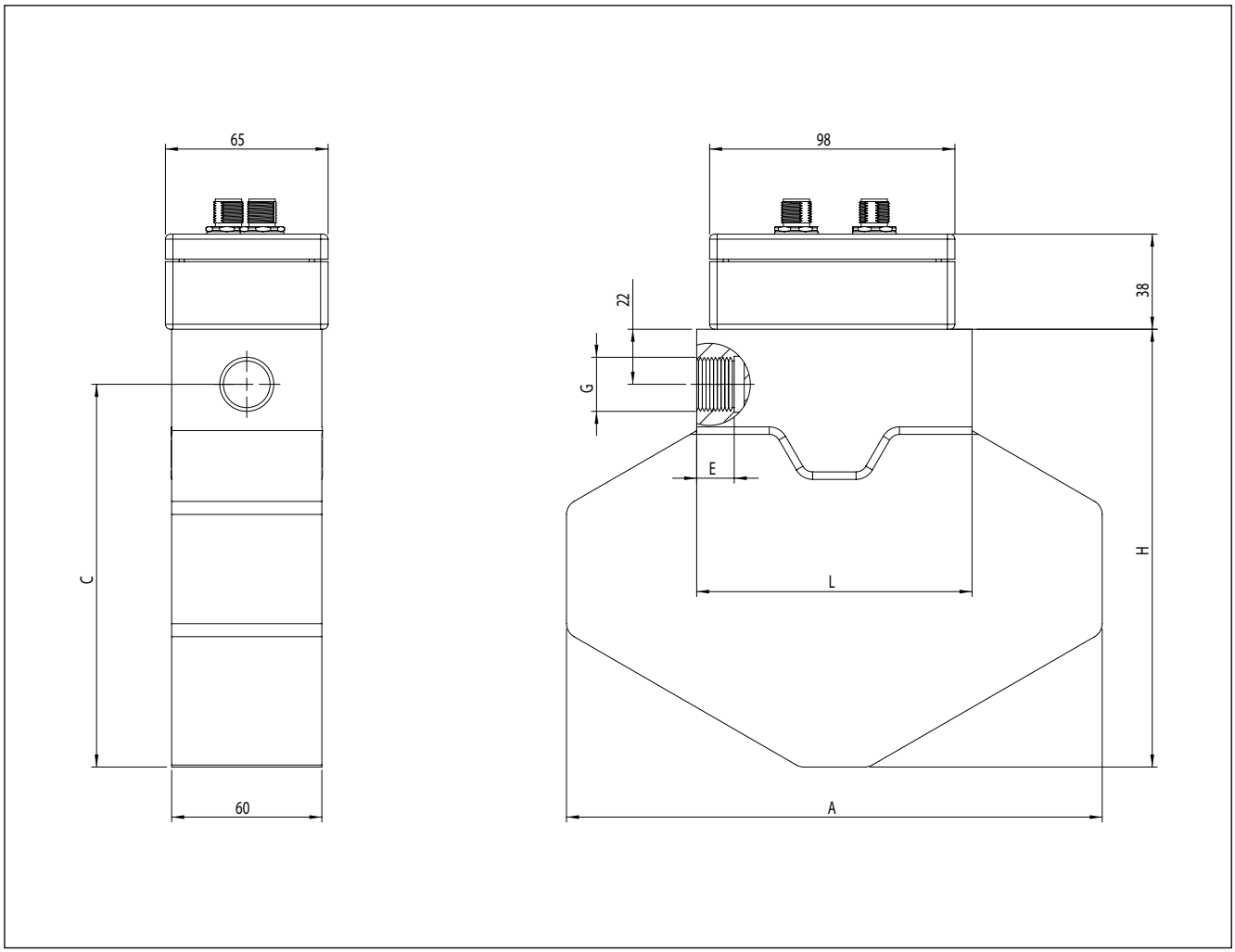
Dimensional drawing (mm) KCM 0300 to KCM 3000 with KCE 8000



Type	A	H	C	E	L	G
KCM 0300	214	182	160	15	110	1/2“
KCM 0600	214	182	160	15	110	1/2“
KCM 1500	350	280	258	18	140	1/2“
KCM 3000	350	280	258	18	140	1/2“

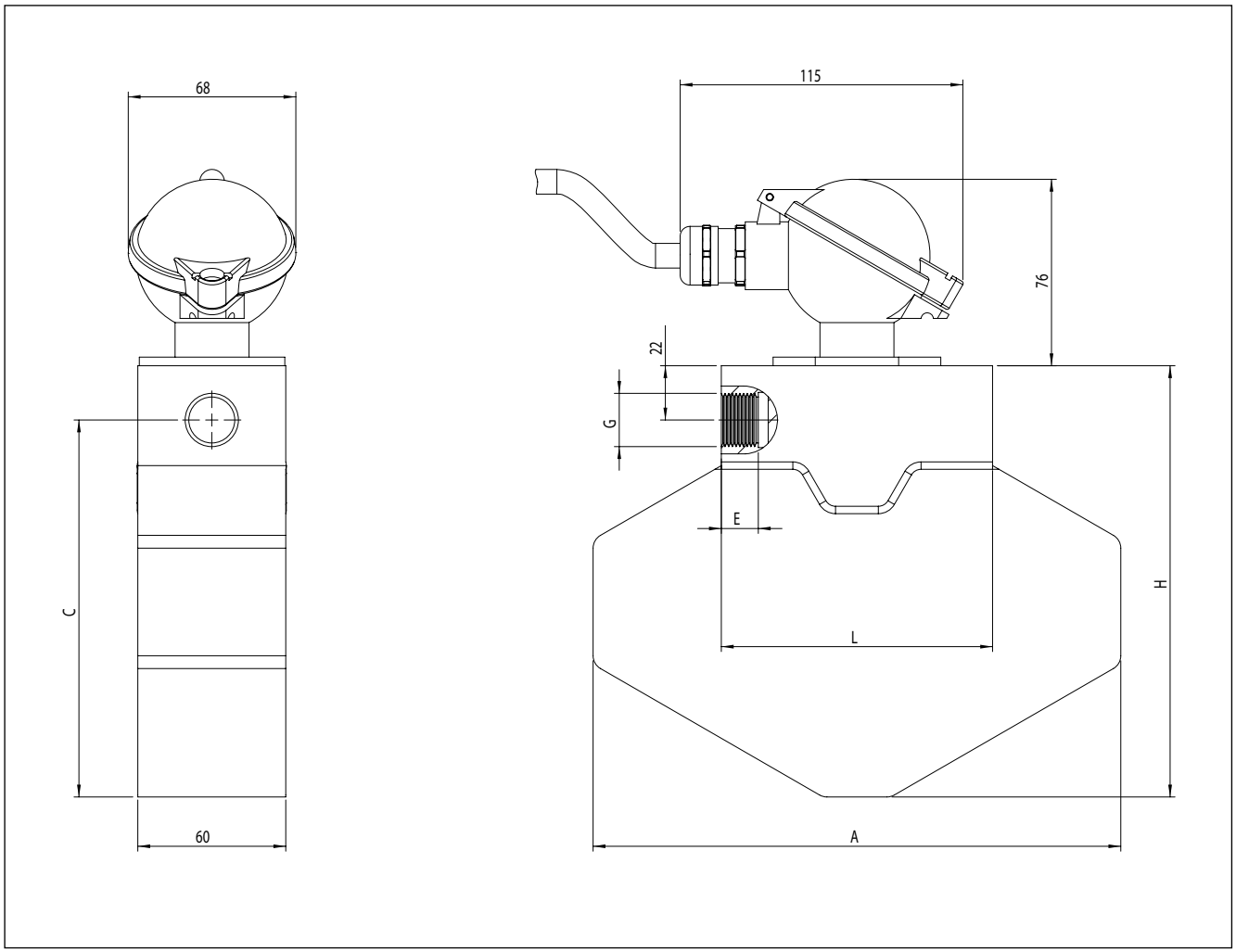
Type	D	M	N	P	S	-
KCM ****.Cx	110	205	118	188	218	-
KCM ****.Ex	130	240	111	217	243	-

Dimensional drawing (mm) KCM 0300 to KCM 3000 with KCE 6000



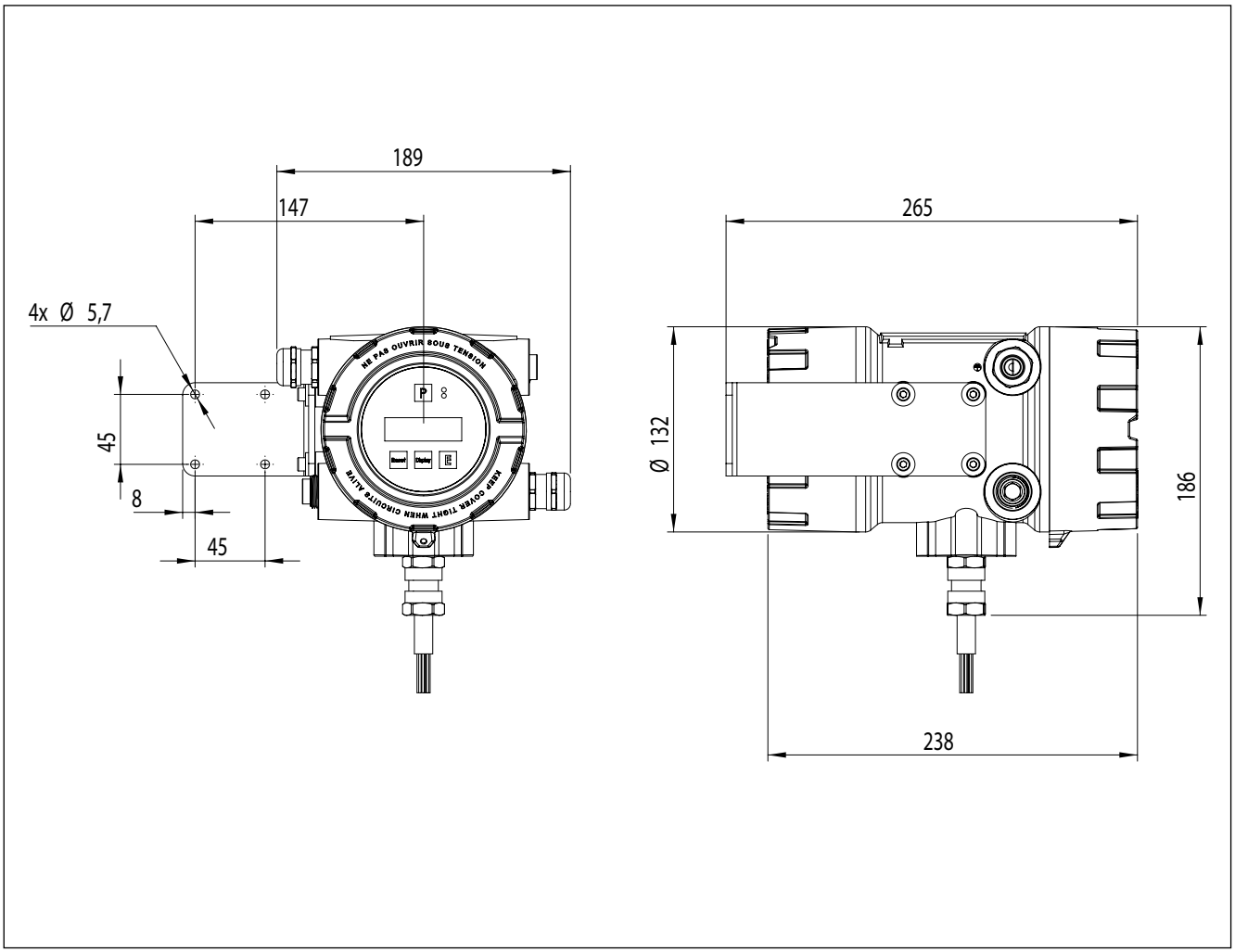
Type	A	H	C	E	L	G
KCM 0300	214	182	160	15	110	1/2“
KCM 0600	214	182	160	15	110	1/2“
KCM 1500	350	280	258	18	140	1/2“
KCM 3000	350	280	258	18	140	1/2“

Dimensional drawing (mm) KCM 0300 to KCM 3000 Remote Version

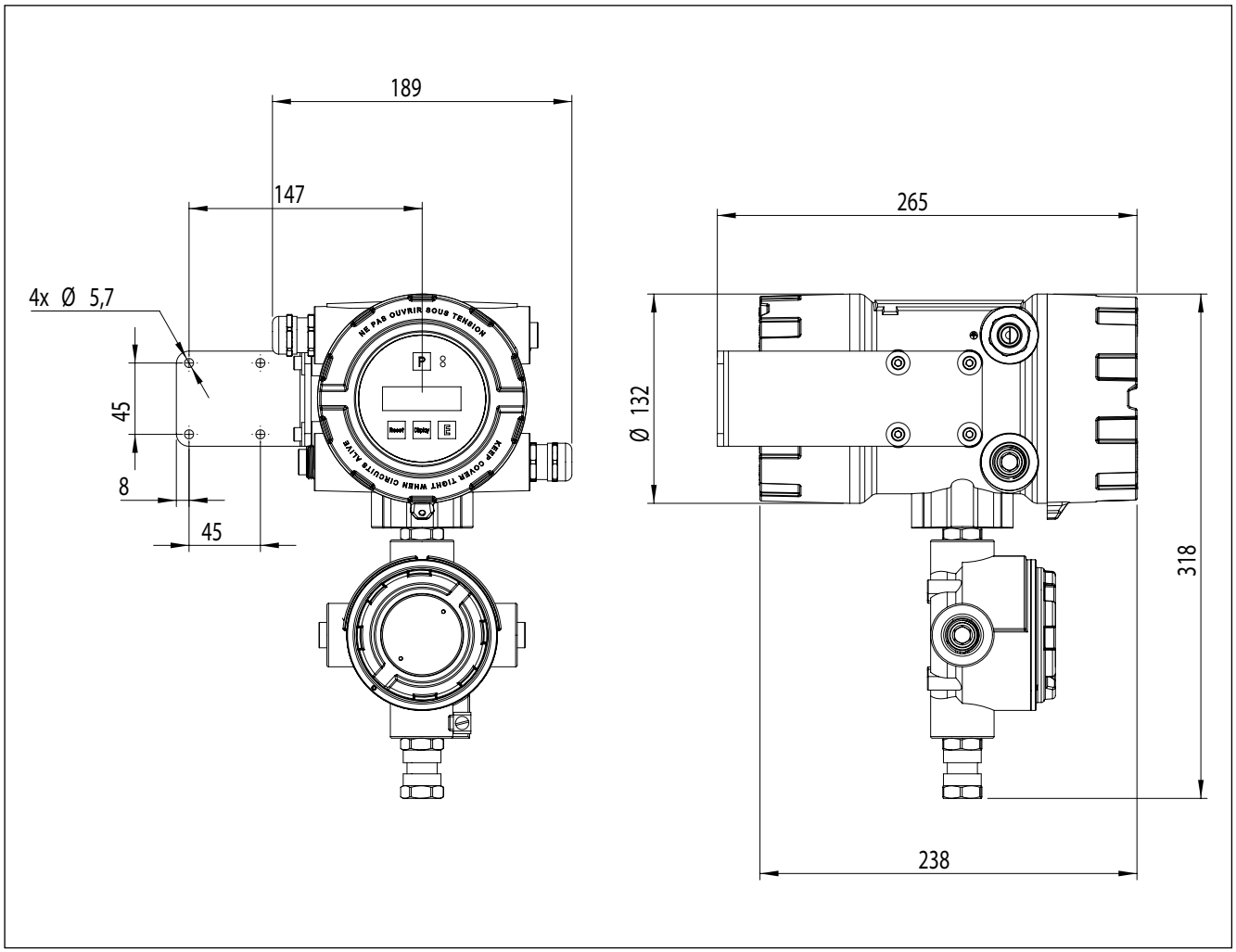


Type	A	H	C	E	L	G
KCM 0300	214	182	160	15	110	1/2“
KCM 0600	214	182	160	15	110	1/2“
KCM 1500	350	280	258	18	140	1/2“
KCM 3000	350	280	258	18	140	1/2“

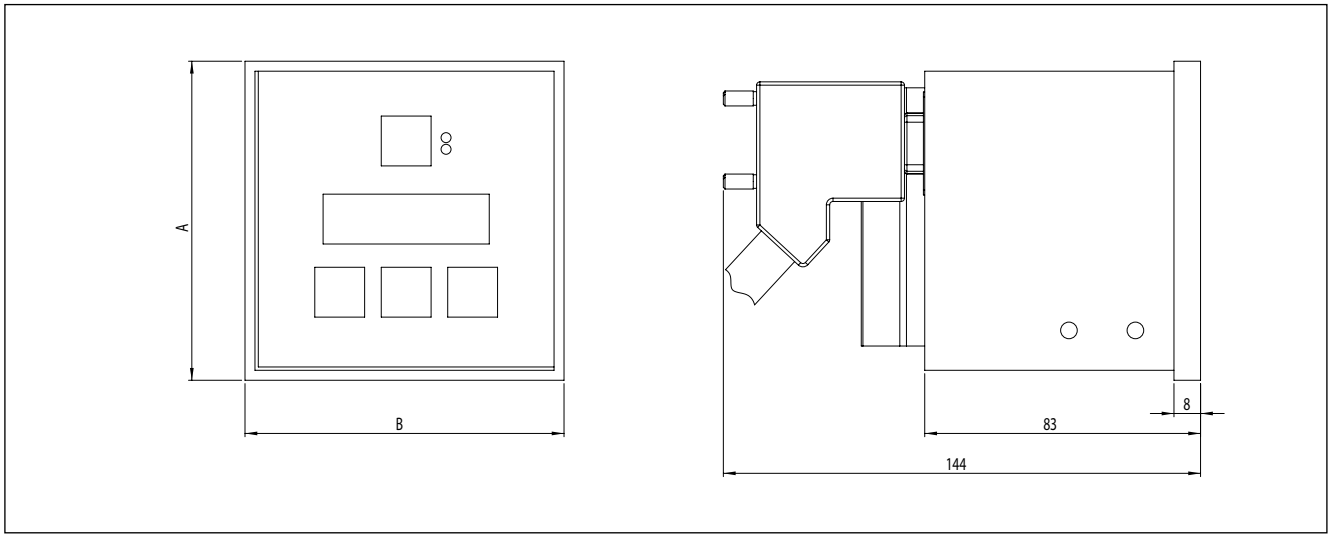
Dimensional drawing (mm) KCE 80xx - WE with cable connection



Dimensional drawing (mm) KCE 80xx - WE with Junction Box

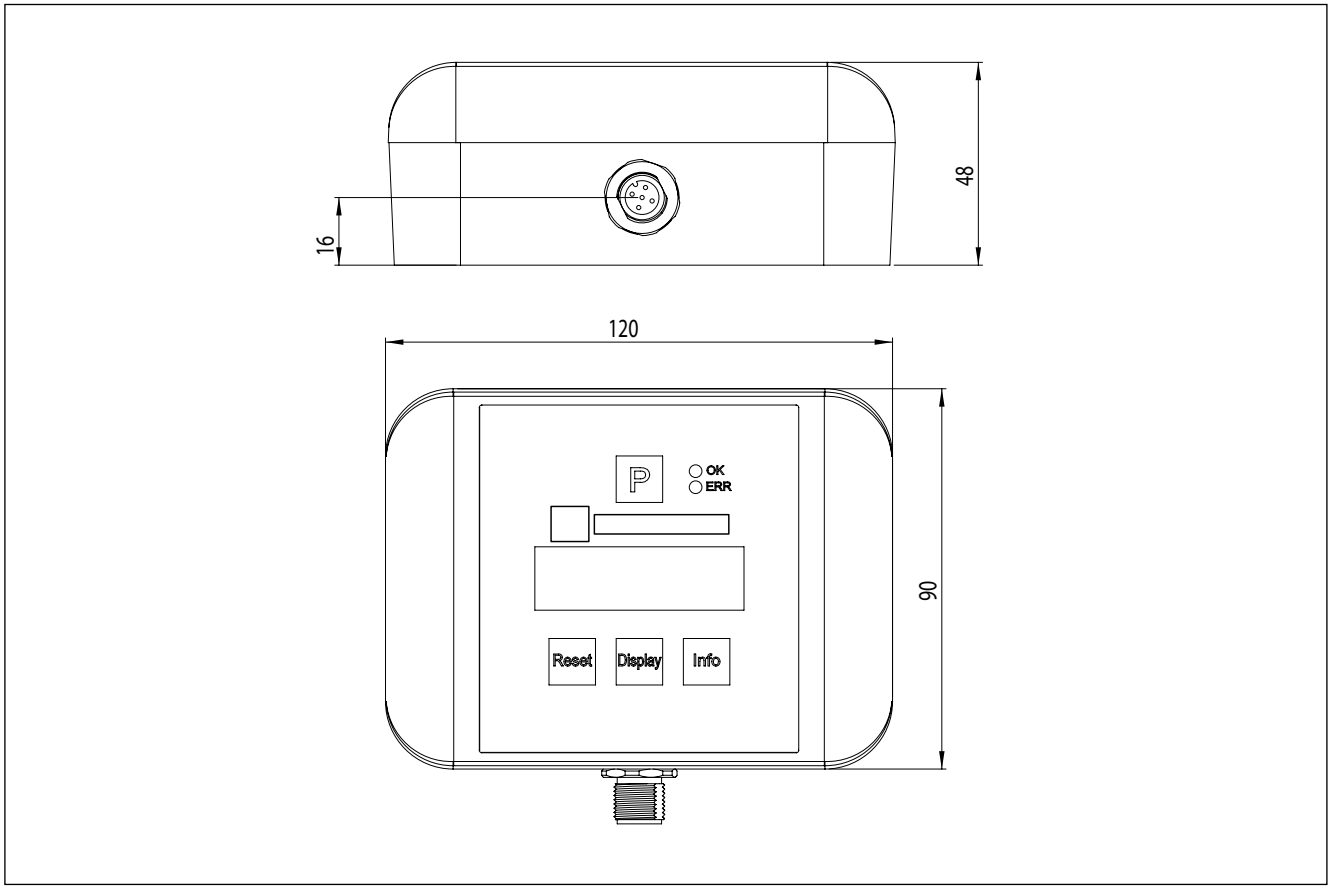


Dimensional drawing (mm) Panel-Mounted Housing (drawing not to scale)



Type	A	B	-	-	-	-	-
KCE 80** - SG	96	96	-	-	-	-	-
KCE 80** - SE	96	144	-	-	-	-	-

Dimensional drawing (mm) Remote Display KRD 8001



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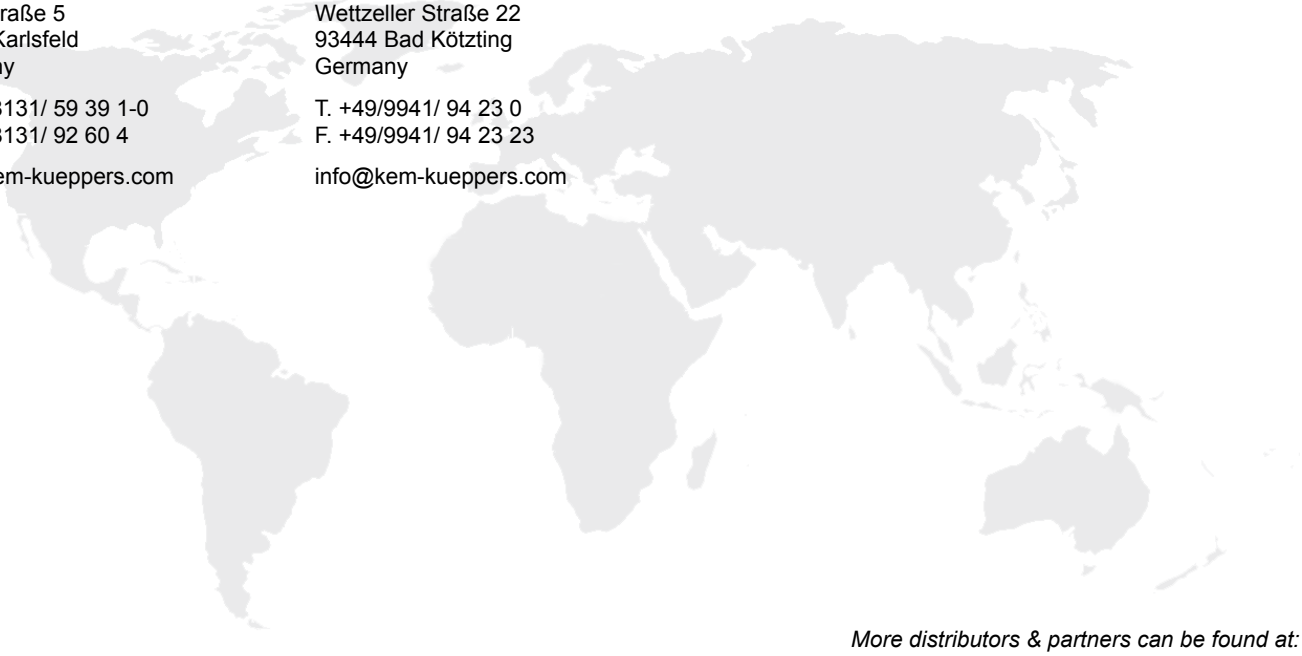

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