www.kem-kueppers.com
info@kem-kueppers.com

Küppers Elektromechanik GmbH

Certified according to DIN EN ISO 9001

Technical Datasheet

TRICOR Series

Mass Flow Meters

TRICOR
Coriolis Technology

Description

The Tricor 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 Tricor Mass Flow Meters do not contain any moving parts and consequently are suited for polluted media as well.

According to the requirements the Tricor 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 (TRD 8001) is available, designed for cable lengths up to 1 km.

Principle

Two parallel flow tubes inside the TCM 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 density 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 Tricor Mass Flow Meter directly measures mass flow, density and temperature of the medium. Knowing the mass flow and the specific cravity, also the volume flow can be calculated.

Application

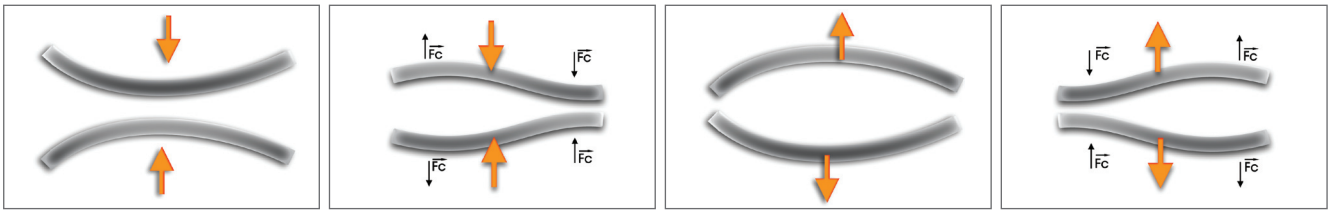
- Flow measurement of PU components and paints
- Flow measurement of aggressive and contaminated media
- Measurement of mass flow, density, temperature and volume flow

Besonderheiten

- Pmax. 350 bar
- Short response time
- DKD calibration
- Excellent puring and sterilization qualities due to a construction free of dead spots
- Up to +150°C medium temperature
- Individual 8-point-calibration including report
- Ex protected as per ATEX and EMC tested

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

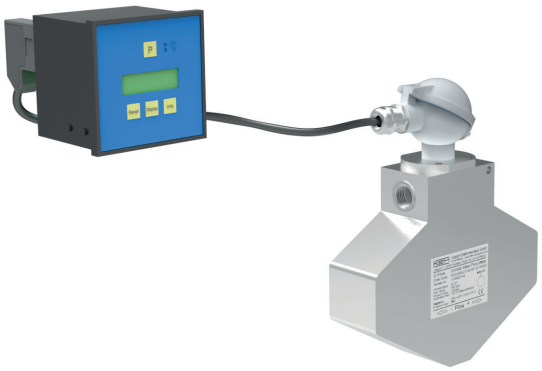
Overview

Compact version

Remote Display TRD 8001

Exd housing for wall-mounting
(separated version, also with flange ends)

Remote panel-mounted housing
(separated version, also with flange ends)



Technical Data - TCM Transducer

	TCM0325	TCM0650	TCM1550	TCM3100	TCM5500	TCM7900	TCM28k	TCM65k
Max. flow (kg/h)	300	600	1500	3,000	5,500	7,900	28,800	65,000
Min. flow (kg/h)	3	6	15	30	55	79	288	650
Max. flow (lb/min)	11.0	22.0	55.0	110	203	291	1030	2,390
Min. flow (lb/min)	0.11	0.22	0.55	1.10	2.03	2.91	10.3	23.9
Basic Accuracy (% of flow reading)	0.1							
Zero Stability (% of full scale)	0.01							
Zero Drift (% f.s. per °C)	0.001							
Repeatability (% of flow)	0.1							
Density measuring range	0 - 4,500 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				flanges EN1092, ANSI B16.5, DIN2512			
Max. pressure	200 bar				350 bar	100 bar		
Max. pressure (Option)	350 bar							
Pressure Drop at max. flow H_20	see diagramm							
Operating Density range	500 - 2,500 kg/m³							
Process temperature	-20 ... +100°C (standard) / -100 ... +150°C (upon request)							
Ambient temperture	-20 ... +170°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	2 parallel	2 parallel	2 parallel	2 parallel
Tube inner diameter	4mm	4mm	8mm	8mm	7mm	9mm	16mm	28mm
Tube material	stainless steel DIN 1.4571							
Housing material	stainless steel DIN 1.4571							
Dimensions	see drawings							

Technical Data - TCE 8000 Transmitter

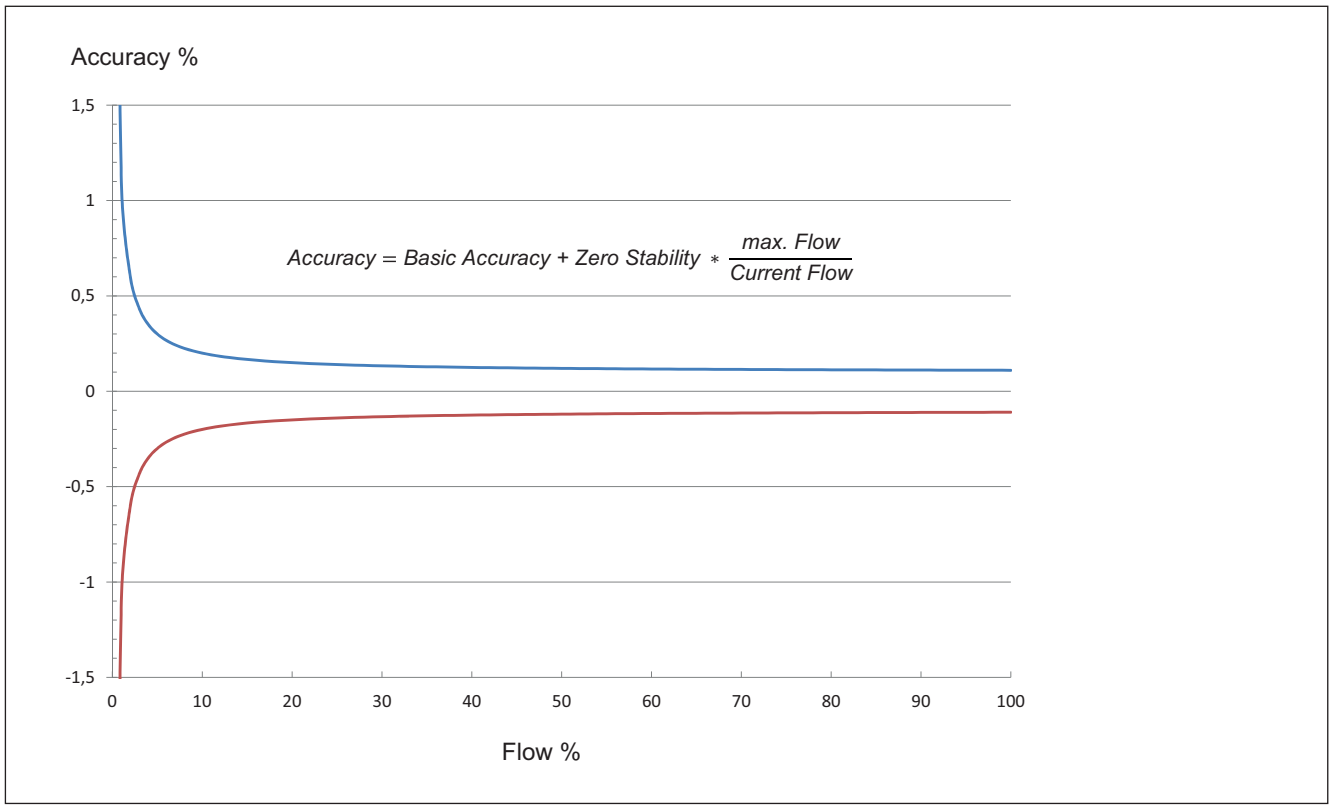
General	
Display:	Graphic, 132 x 32 dot
Supply votage:	24 VDC, ± 20% and / or 100 - 240 VAC (version dependent)
Programming:	via front keyboard
Interface:	RS 485, Option HART®, option Foundation Fieldbus
EMC:	according to EN 61000-6-4 und 61000-6-2
Power consumption:	max. 4 W
Exd housing:	
Dimensions:	see drawing
Connections:	internal clamp terminals cable gland for 7 - 13 mm cables
Material:	aluminium diecast
Protection class	IP 65, on request up to IP 68
Weight:	approx. 2 kg
Temperature:	operating: - 20 up to 70°C (up to + 80°C on request) storage and transport: -40 up to 80°C
Panel-mounted housing:	
Dimensions:	96 x 96 x 83mm (h x w x d)
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 full scale
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 Output	
Status output	push pull programmable
Control input	programmable

Technical Data - TRD 8001 Remote Display

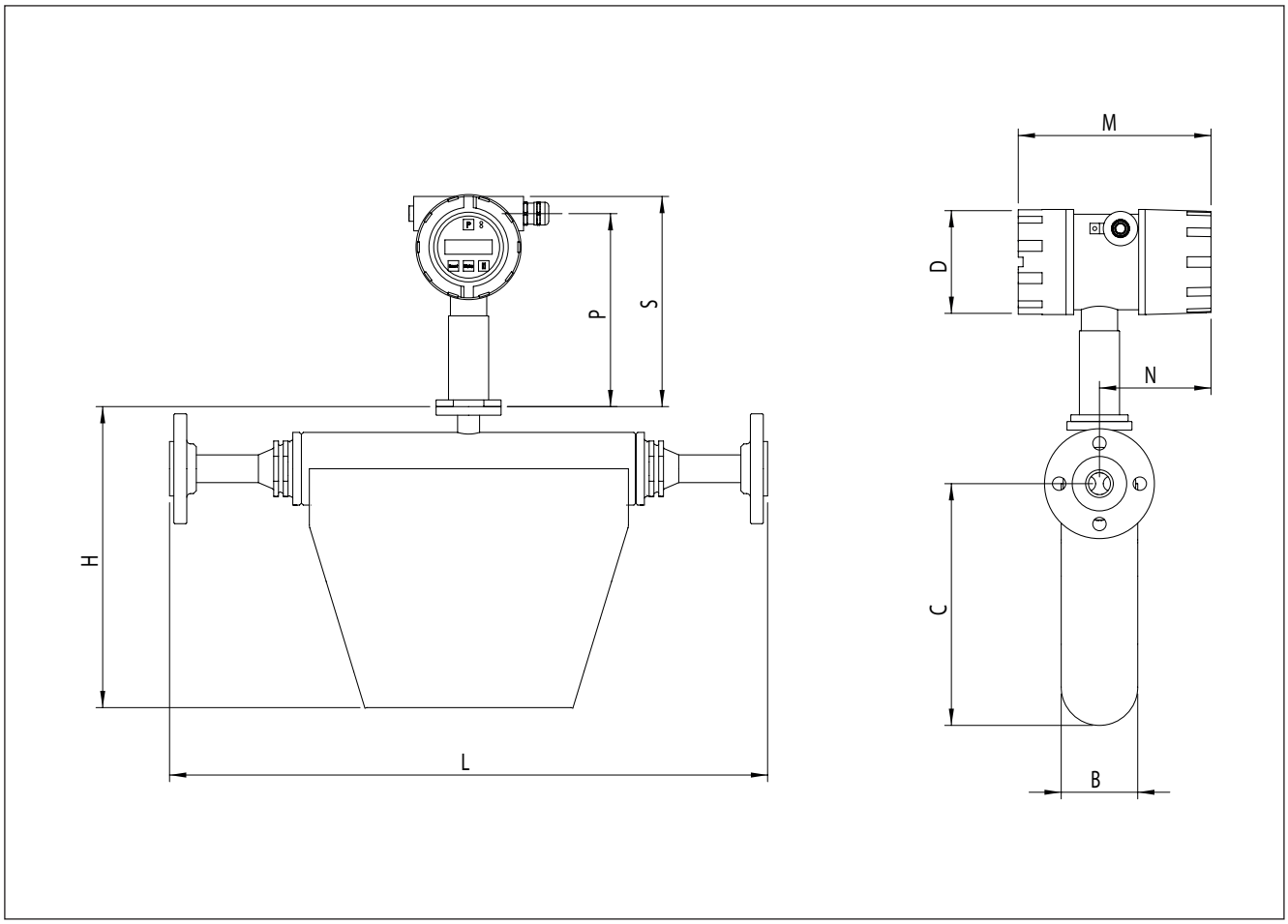
Display	Graphic, 132 x 32 dot
Supply voltage:	via interface
Programming:	via front keyboard
Interface to TCM:	RS 485
EMC:	according to EN 61000-6-4 und 61000-6-2
Dimensions:	90 x 120 x 50 mm3 (h x w x d)
Connections:	connector M12, B coded
Material:	ABS-FR
Protection class:	IP 64
Weight:	approx. 500g
Temperature:	operation: 0 to 60°C storage and transport: -20 up to 80°C
Wall mount	hidden screws

Ex Certifications

ATEX	Zone 1: different versions Ex d or Ex i Zone 2: available
IECEx	pending
CSA Ex	pending



Dimensional drawing (mm) TCM 5500 to TCM 65k

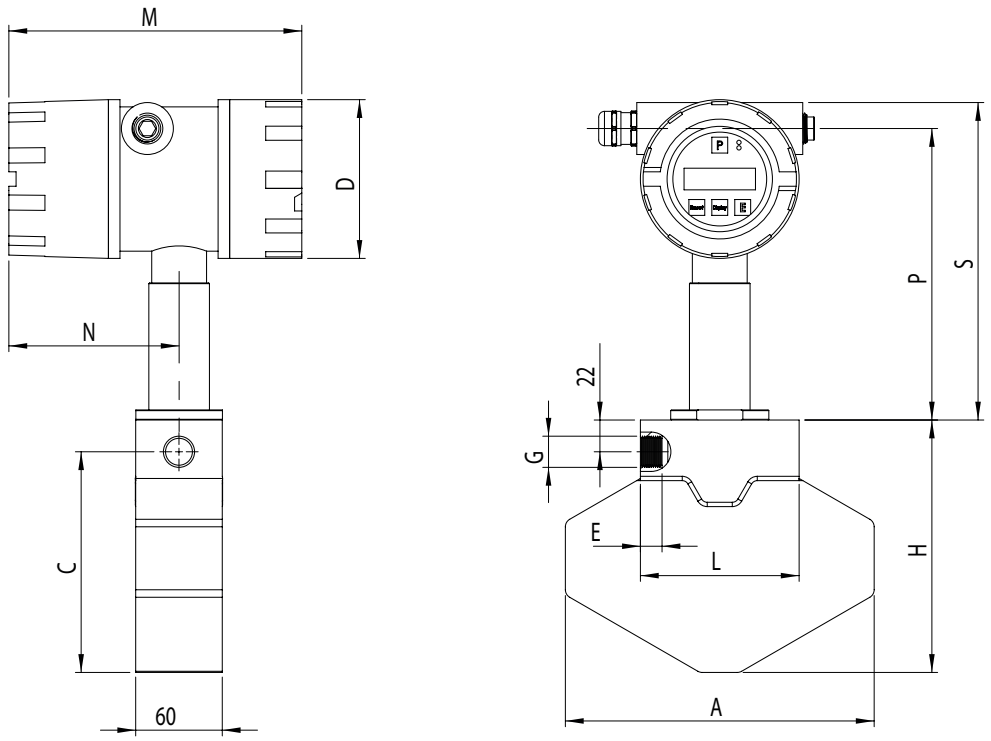


Sensor Type	A	B	C	H	L*	Connection**
TCM 5500, 7900	197	61	204	260	460	a. N.
TCM 28k	218	80	253	315	625	a. N.
TCM 65k	360	151	387	480	830	a. N.

* further lengths on request
** flange types on request

Elektronic Type	D	M	N	P	S	-
Housing C	110	205	118	188	218	-
Housing E	130	240	111	217	243	-

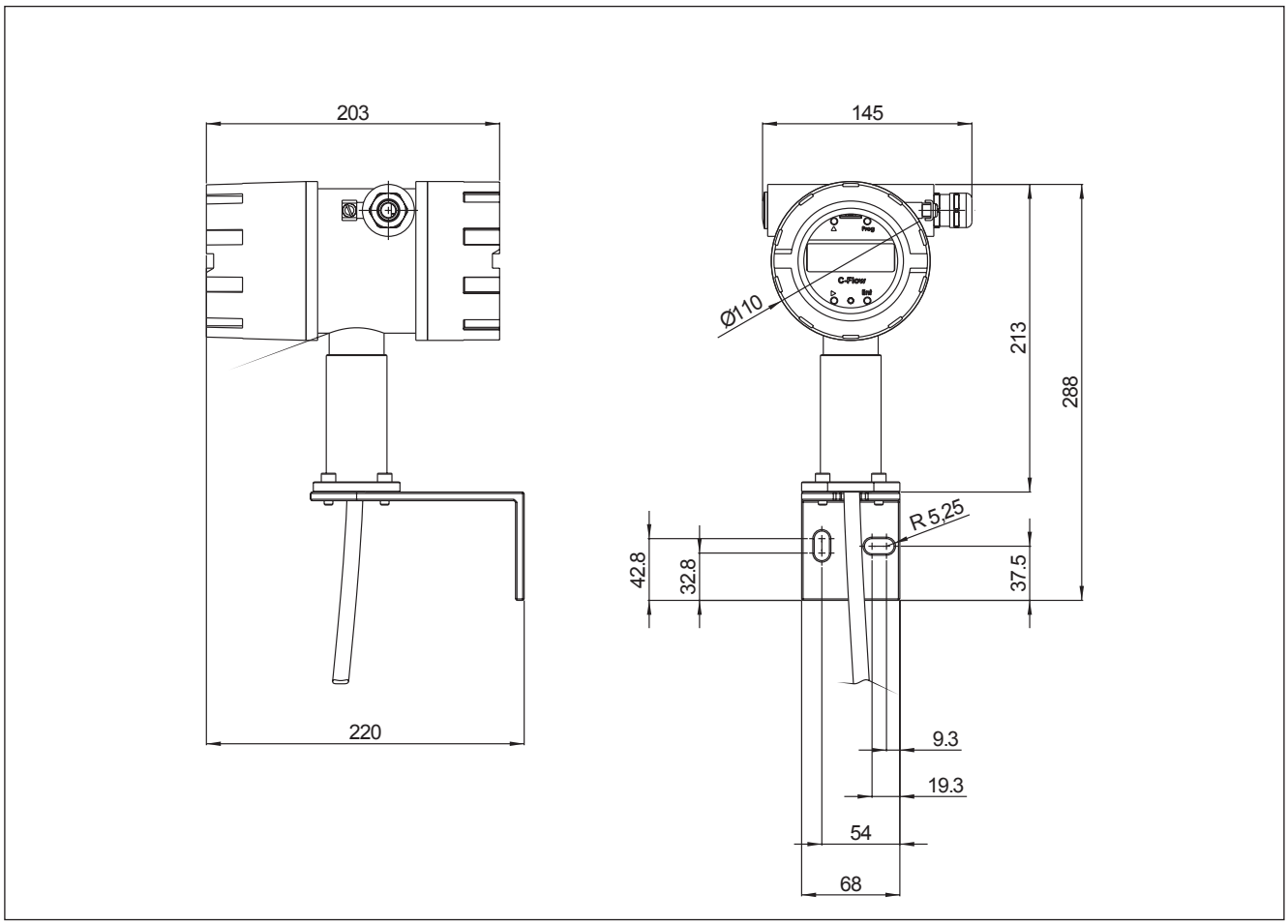
Dimensional drawing (mm) TCM 0325 to TCM 3100



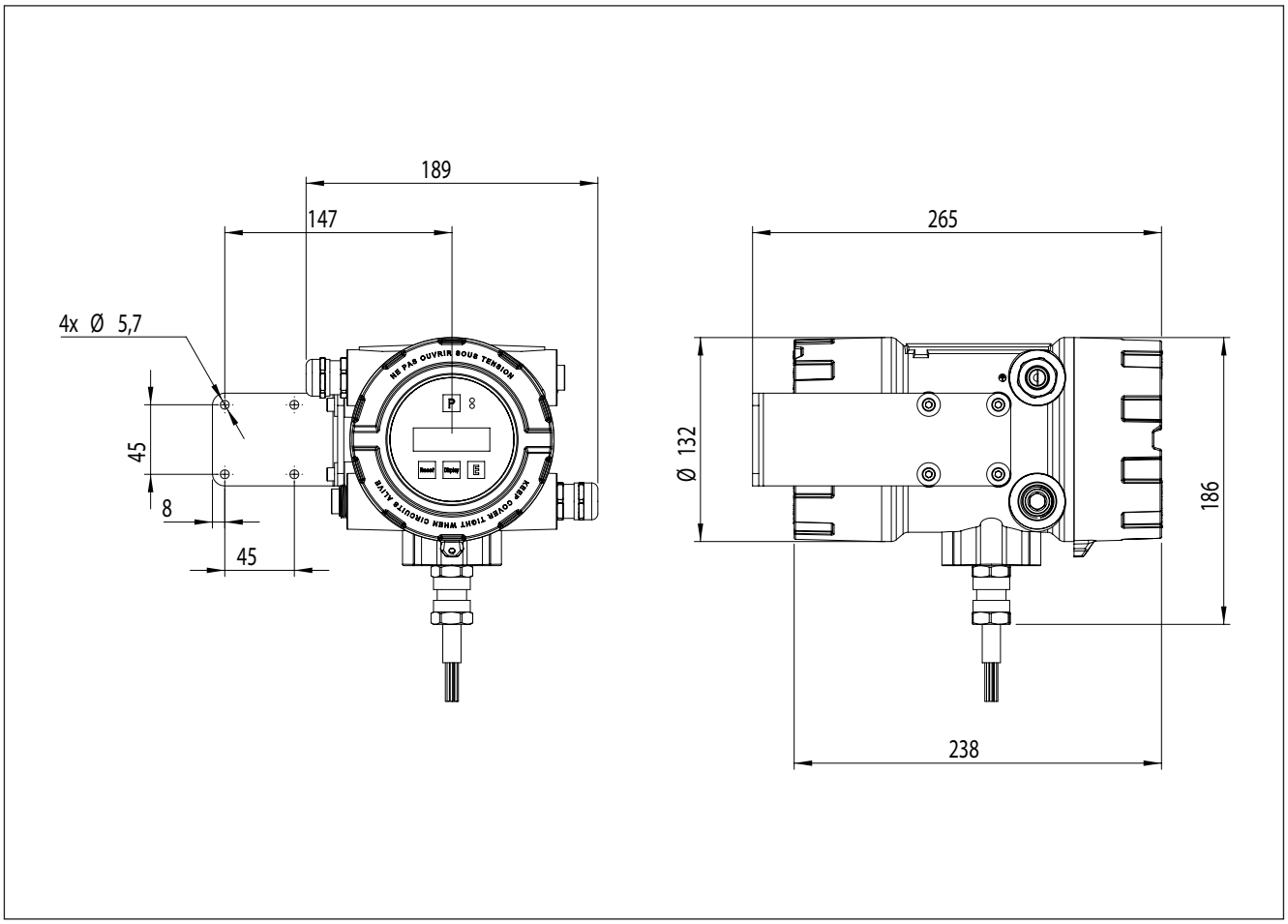
Sensor Type	A	C	E	H	L	G
TCM 0325	214	160	15	182	110	G ½“
TCM 0650	214	160	15	182	87	G ½“
TCM 1150	350	258	18	280	140	G ½“
TCM 3100	350	258	18	280	140	G ½“

Elektronic Type	D	M	N	P	S	-
Housing C	110	205	118	188	218	-
Housing E	130	240	111	217	243	-

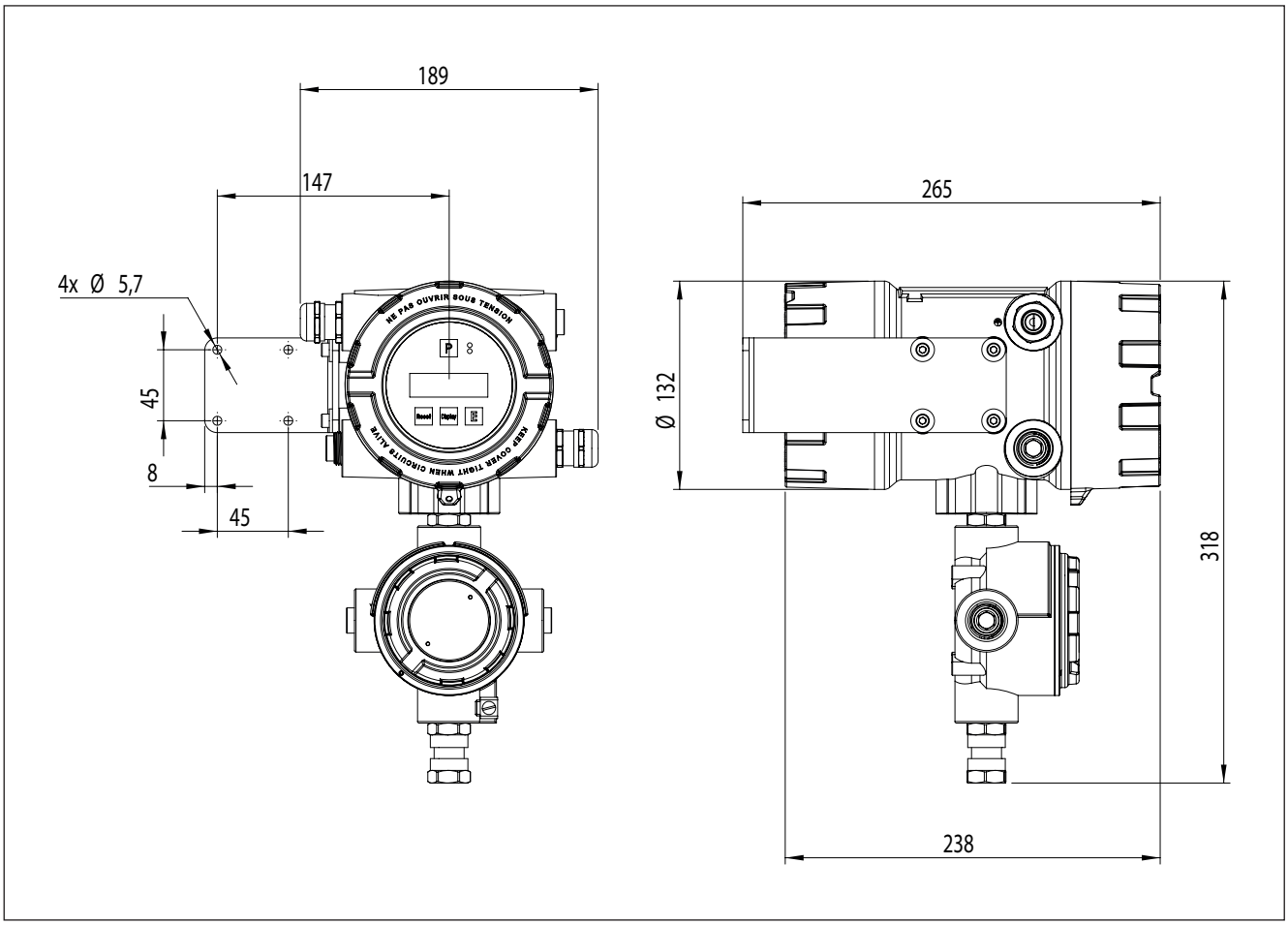
Dimensional drawing (mm) TCE 80xx - W



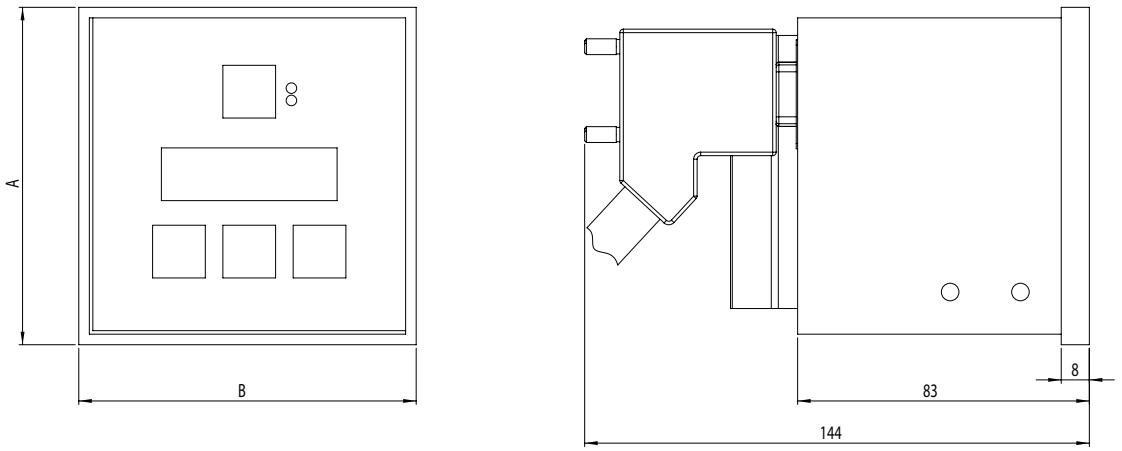
Dimensional drawing (mm) TCE 80xx - E with cable connection



Dimensional drawing (mm) TCE 80xx - E with Junction Box

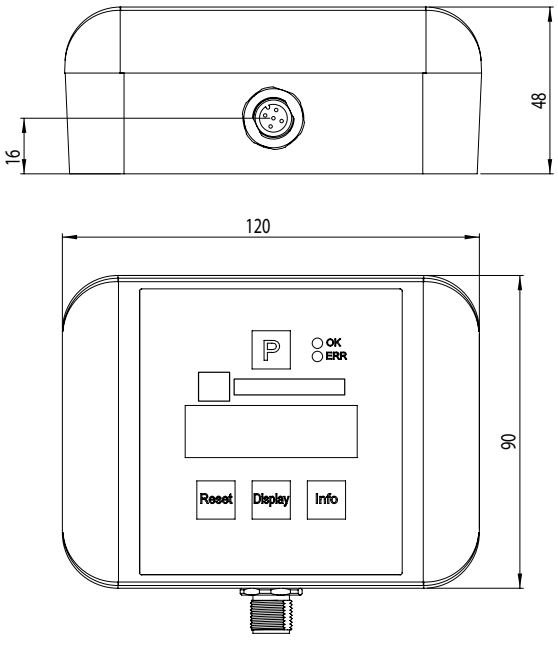


Dimensional drawing (mm) Panel-Mounted Housing (drawing not to scale)



Type	A	B	-	-	-	-	-
TCE 80** - S	96	96	-	-	-	-	-
TCE 80** - L	96	144	-	-	-	-	-

Dimensional drawing (mm) Remote Display TRD 8001



KEM Headquarter

Liebigstraße 5
85757 Karlsfeld
Germany

T. +49 8131 59391-0
F. +49 8131 92604

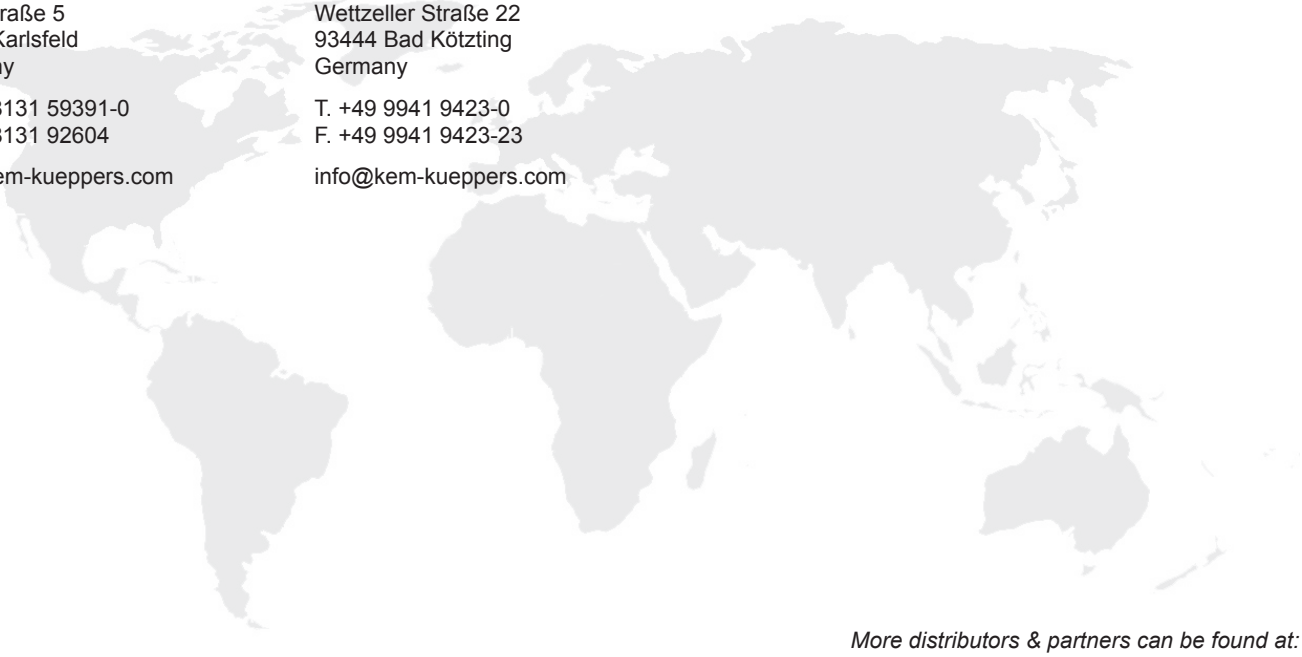
info@kem-kueppers.com

KEM Service & Repairs

Wettzeller Straße 22
93444 Bad Kötzting
Germany

T. +49 9941 9423-0
F. +49 9941 9423-23

info@kem-kueppers.com



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info@kem-kueppers.com