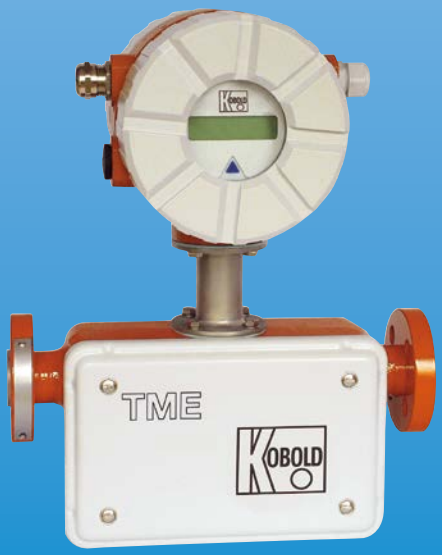
Zertifiziertes QM-System
DIN EN ISO 9001
Zertifikat-Nr. 01017

Coriolis Mass Flow Meter

for liquids and gases

measuring • monitoring • analysing

TME



- Measuring range: 0 - 60 kg/h … 0 - 60 000 kg/h water
- Accuracy: ±0.15 of reading ± zero-point stability
- p_{max}: PN40 t_{max}: -40 … +180 °C
- Connection: flange DN10 … DN80, ½" … 3" class 150
- Material: 1.4404 (316 L) / 1.4571 (316 Ti)
- Options: contacts, analogue output with HART®, Profibus-PA®, Fieldbus® Foundation™ or Modbus RTU

S5

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Description

The Kobold Mass Flow Meter type TME utilizes the Coriolis principle of operation to measure mass flow. Density and temperature are simultaneously monitored and volumetric flow is additionally calculated with these parameters. The TME Series is available with a direct mounted transmitter or in a remote mounted configuration.
The TME Series can be used to meter nearly all liquid or gaseous media and was especially designed to operate in many standard applications. It is applied in many different industrial branches. The TME Series is also used for precise dosing as well as in loading and unloading applications. Approvals for service in custody transfer (fiscal metering) applications are also available.
The TME is easy to install due to a rugged housing (cast iron). A superior efficient heating is optionally available.

Application Areas

- chemical industry
- petrochemical industry
- oil industry
- gas industry

Technical Details

Sensor

Measuring principle:	Coriolis
Measurable media:	liquids and gases
Material	
flow tubes, splitter, flanges:	stainless steel 1.4404 (316 L) / 1.4571 (316 Ti)
housing:	cast iron
Process connections:	flanges acc. EN 1092, ASME B16.5, DIN2512 special connections on request
Nominal pressure:	PN 40, ASME Cl 150/300
Process temperature:	-40 …+180 °C (-40 …+ 356 °F)
Ambient temperature:	-40 …+100 °C (-40 …+ 212 °F)
Protection class:	IP 65 (EN60529)
Certificates and approvals	
explosion protection:	sensor circuits: intrinsically safe DMT 01 ATEX E 149 X ⟨Ex⟩ II ½ G EEx ia IIC T6–T2 (approval for zone 0 inside flow tubes available)
PED:	pressure equipment directive 97/23/EC

Transmitter UMC3

Material:	
housing:	aluminium (painted)
display cover:	safety class
Mounting:	integrated or remote mounted (junction box or plug in connector)
Power supply:	19 - 36 V_{DC}, 24 V_{AC} +/-20%, 90 - 265 V_{AC}
Outputs:	galvanically isolated
Current:	2 x 0 (4) - 20 mA
Binary 1:	active, potential free 24 V_{DC}, max. 200 mA passive, optocoupler, U_i = 30 V, I_i = 200 mA, P_i = 3 W
Frequency:	1 kHz
Binary 2:	passive, optocoupler, U_i = 30 V, I_i = 200 mA, P_i = 3 W
Status:	passive, optocoupler, Ui = 30 V, Ii = 200 mA, Pi = 3 W
Input binary:	counter reset
Ambient temperature:	-20 … +60 °C (-4 …140 °F) integrated transmitter with approvals 0 to 4 -20 … +80 °C (-4 … +176 °F) remote mounted transmitter with approvals 5 and 6
Protection class:	IP 68 (EN60529)
Communication:	HART® Profibus-PA® Modbus RTU (RS 485)
Accuracy	
Liquid:	±0.15% of reading ±zero point stability
Gas:	±0.5% of reading ±zero point stability
Density (liquid):	±0.005 g/cm³ with density calibration ±0.003 g/cm³ with special density calibration
Volume:	±0.2% of reading ± zero point stability

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Transmitter UMC4

Power supply: 19 - 36 V_{DC}, 90 - 265 VA 50/60 Hz

Signal outputs: Galvanically isolated

Current outputs: 2 x 4-20 mA, passive (in hazardous applications intrinsically safe or non IS)

Communication: HART®

Current output 1: adjustable as mass flow, volume flow, density, temperature

Current output 2: adjustable as mass flow, volume flow, density, temperature

Binary output 1: adjustable as pulse or frequency output

-set as pulse output: pulse duration: standard 50 ms adjustable from 0.1... 2000 ms mark to space ratio 1:1 if the adjusted pulse duration is not reached

Pulse value: 1 pulse/unit adjustable from 0.001-100.0 (in decades increments)

-set as frequency output: max. 1 KHz passive, via opto coupler, U_{max}=30 V I_{max}=60 mA

Binary output 2:

-set as status output: adjustable as forward flow, reverse flow, MIN/MAX flow, MIN/MAX density, MIN/MAX temp., alarm 2nd pulse output (90° phase shifted) passive, via opto coupler, U_{max}=30 V I_{max}=60 mA,

Meas. Accuracy

Liquid: ± 0.15% of actual ± ZP-stability

Gas: ± 0.5% of actual ± ZP-stability

Density (liquid): ± 0.005 g/cm³ c/w density calibration ± 0.002(1) g/cm³ c/w special density calibration

Volume: ± 0.2% of actual ± ZP-stability

Ambient temperature: -20 °C ... +60 °C

Protection: IP 68 (EN60529)

CE-marking: EMV-guide line 2004/108/EC EN 61000-6-3:2001 emissions EN 61000-6-2:1999 immunity Explosion Protection Directive 94/9/EC

Approvals:

Explosion protection: BVS 10 ATEX E 110 X II (1)2 G Ex d [ia Ga] IIC T4-T3 Gb Ta -20 °C ... 60 °C

PED: pressure Equipment Directive 97/23/EC

Certifications and Approvals

Explosion protection: BVS 05 ATEX E 021 X

Increased safety EEx e (connection): ⟨Ex⟩ II (1)2G EEx de [ia] IIC/IIB T6–T3

Explosion proof EEx d (connection): ⟨Ex⟩ II (1)2G EEx d [ia] IIC/IIB T6–T3

Signal output/ input: Intrinsically safe or not intrinsically safe NEPSI approval cert. No. GYJ06477

CE-marking: Explosion protection directive 94/9/EC EMC-directive 2004/108/EC

Electromagnetic compatibility: EN 61000-6-3:2001 (emissions residential environments) EN 61000-6-2:1999 (immunity for industrial environments) EN 55011:1998+A1:1999 group1, class B (radio interference) EN 61000-4-2 to DIN EN 61000-4-6 EN 61000-4-8 EN 61000-4-11 EN 61000-4-29 EN 61326

Measuring Ranges

Model	Min. measuring range [kg/h (lbs/min)]	Max. measuring range [kg/h (lbs/min)]	Nominal (Δp=1bar) [kg/h (lbs/min)]	Zero point stability (of range) [kg/h (lbs/min)]
TME-S80	60 [2.2]	600 [22.0]	370 [13.6]	0.06 [0.00]
TME-S85	120 [4.4]	2500 [91.9]	1250 [45.9]	0.25 [0.01]
TME-S90	600 [22.0]	12000 [440.9]	6000 [220.5]	1.2 [0.0]
TME-S95	3000 [110.2]	30000 [1102.3]	19000 [698.1]	3 [0.1]
TME-S58	6000 [220.5]	60000 [2204.6]	60000 [2204.6]*	6 [0.2]

Reference condition: according to IEC 770: Water at 20 °C

* (Dp=0.89 bar)

Order Details Sensor (Example: **TME-S80 301B 0 U 1 0 0 0**)

Model	Material	Measuring range[1] (water)	Process connection[2]	Heating / Cooling element	Flow direction
TME-	**S** = stainless steel	**80** = 0 - 600 kg/h (min. 0 - 60 kg/h)	**301B** = flange DN10 PN40 form B1 DIN EN 1092-1 **201R** = flange ½" class 150 RF ASME B16.5-2003	**0** = without **1** = with connection Ermeto EO12 **2** = with connection DN 15 PN40 form B1 DIN EN 1092-1 **3** = with connection ½" class 150 RF ASME B16.5-2003	**U** = bottom to top **O** = top to bottom **L** = left to right **R** = right to left
		85 = 0 - 2500 kg/h (min. 0 - 120 kg/h)	**305B** = flange DN15 PN40 form B1 DIN EN 1092-1 **202R** = flange ¾" class 150 RF ASME B16.5-2003		
		90 = 0 - 12000 kg/h (min. 0 - 600 kg/h)	**309B** = flange DN25 PN40 form B1 DIN EN 1092-1 **203R** = flange 1" class 150 RF ASME B16.5-2003		
		95 = 0 - 30000 kg/h (min. 0 - 3000 kg/h)	**321B** = flange DN50 PN40 form B1 DIN EN 1092-1 **206R** = flange 2" class 150 RF ASME B16.5-2003		
		58 = 0 - 60000 kg/h (min. 0 - 6000 kg/h)	**331B** = flange DN80 PN40 form B1 DIN EN 1092-1 **208R** = flange 3" class 150 RF ASME B16.5-2003		

Order Details Sensor (continued)

Sensor	Approvals	Certificates	Special version
1 = integrated transmitter up to 100 °C **2** = integrated transmitter up to 150 °C **3**[3] = remote mounted transmitter up to 100 °C, M20 x 1.5 **4**[3] = remote mounted transmitter up to 180 °C, M20 x 1.5 **6**[3] = remote mounted transmitter up to 100 °C, ½" NPT **7**[3] = remote mounted transmitter up to 180 °C, ½" NPT	**0** = without **A** = Ⓔx II ½ G Eex ia IIC T6 - T2, FM/FMC CL I, DIV 1, GPS ABCD T **B** = NEPSI	**0** = without **1** = Certifcate of compliance with the order 2.1 **2** = Test report 2.2 **B** = Inspection certificate 3.1 incl. material certificate **C** = Inspection certificate 3.2 incl. material certificate	**0** = without **1** = density calibration 3-points (not for range '80') **X** = with (separate specification necessary)

[1] Measuring range for other liquids and gases on request
[2] Other flange-form on request
[3] Please order cable glands separately, see accessories

Necessary details for dimensioning the TME instrument

- Medium
- Process temperature min./max.
- Ambient temperature min./max.
- Measuring range
- Operating pressure
- Viscosity
- Density

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Order Details Transmitter UMC3 (Example: **UMC3 - A 0 1 A 0 0K**)

Model	Kind of mounting	Display / Interface Board	Power supply	Output
UMC3-	**A** = integrated transmitter, ½" NPT **B** = integrated transmitter, M20 x 1.5 **C**[1] = remote mounted transmitter with terminal block, ½" NPT **D**[1] = remote mounted transmitter with terminal block, M20 x 1.5 **E**[1] = remote mounted transmitter with plug-in connector, ½" NPT **F**[1] = remote mounted transmitter with plug-in connector, M20 x 1.5	**0** = without **1** = integrated in transmitter housing, ambient temperature up to 60 °C **2**[2] = remotable, separate board plus panel mounting adapter set	**1** = 90 - 265 V_{AC}, 50/60 Hz **2** = 19 - 36 V_{DC}, 24 V_{AC} (± 20%), 50/60 Hz	**A** = analogue output 0(4) - 20 mA with/without HART®, pulse output passive U_m = 30 V_{DC}, status output passive U_m = 30 V_{DC} **B**[3] = analogue output 0(4) - 20 mA with/ without HART®, pulse output active 24 V_{DC}, status output passive U_m = 30 V_{DC} **D**[4] = Profibus-PA® (EEx ia IIC), all analogue and binary outputs disabled **F**[5] = Modbus RTU (RS485) analogue output 0(4) - 20 mA **J** = Fieldbus® Foundation™

Order Details Transmitter UMC3 (continued)

Approvals	Protection (signal output)
0 = without	**0K** = without
1 = ⟨Ex⟩II(1)2G Eex de [ia] IIB/IIC T3-T6 for ambient temperature up to 60 °C **2** = ⟨Ex⟩II(1)2G Eex d [ia] IIB/IIC T3-T6 for ambient temperature up to 60 °C **4** = NEPSI for ambient temperature up to 60 °C **5** = ⟨Ex⟩II(1)2G Eex de [ia] IIB/IIC T3-T6 for ambient temperature up to 80 °C **6** = ⟨Ex⟩II(1)2G Eex d [ia] IIB/IIC T3-T6 for ambient temperature up to 80 °C	**1K** = EEX ia **2K** = EEx e (not intrinsically safe)

[1] - Includes wall mounting bracket, pipe mounting bracket must be ordered separately (see accessories)
- Connection cable (sensor to transmitter) and cable gland must be ordered separately (see accessories)
[2] Connection cable must be ordered separately
[3] Signal output in EEx ia not possible
[4] Not available with approval 4
[5] Not available with approval 4, 5, or 6 and not with signal output protection 2

Order Details Transmitter UMC4 (Example: **UMC4 - B 1 1 A 0 0K**)

Model	Kind of mounting	Display / interface board	Power supply	Outputs
UMC4-	**B** = integral mount, M20 x 1.5 **D**[1)2)] = remote mounted transmitter with terminal connection box, M20 x 1.5 **E**[1)2)] = remote mounted transmitter with 5 m cable, without connection box, M20 x 1.5	**1** = integrated in transmitter housing, ambient temperature up to 60 °C	**1** = 90 - 265 V_{AC}, 50/60 Hz **2** = 19 - 36 V_{DC}, 24 V_{AC} (± 5% - 20%), 50/60 Hz	**A** = analogue output 1: 4 - 20 mA with HART® analogue output 2: 4 - 20 mA pulse output: passive U_m = 30 V_{DC} status output: passive U_m = 30 V_{DC}

Order Details Transmitter UMC4 (continued)

Approvals	Protection (signal output)
0 = without	**0K** = without
2 = Ⓔx II(1)2G Ex d [ia Ga] IIC T3-T4 Gb (terminal compartment Ex d), ambient temperature up to 60 °C	**1K** = EX [ia ga] intrinsically safe **2K** = not intrinsically safe

[1)] Includes wall mounting bracket. Adapter for 2" pipe mounting bracket, select from accesories list
[2)] Cable gland to be ordered separately

Order Details Accessories (Example: **TMK - BL KK 005**)

Order number	Model	Version	Cable length/application area
			Cable length
TMK-	**BL** = connection cable	**KK** = sensor-transmitter with connection cable **SK** = sensor-transmitter cable end 1: plug (Harting Han® R23) cable end 2: cable connect **SS** = plug connection on both sides (Harting Han® R23) **UB** = transmitter-control unit plug connection	**005** = 5 m **010** = 10 m **015** = 15 m **030** = 30 m **075** = 75 m **150** = 150 m **300** = 300 m **XXX** = special length
			Application area
	V = cable gland set	**AU** = integrated transmitter **GU** = remote mounted transmitter	**NEM20** = not Ex, M20 x 1.5 **NENPT** = not Ex, ½" NPT **DEIAM20** = EEx de - EEx ia, M20 x 1.5 **DEIANPT** = EEx de - EEx ia, ½" NPT **DEEM20** = EEx de - EEx e, M20 x 1.5 **DEENPT** = EEx de - EEx e, ½" NPT
TM-	**ROHRMONT** = accessory for 2" pipe mounting		

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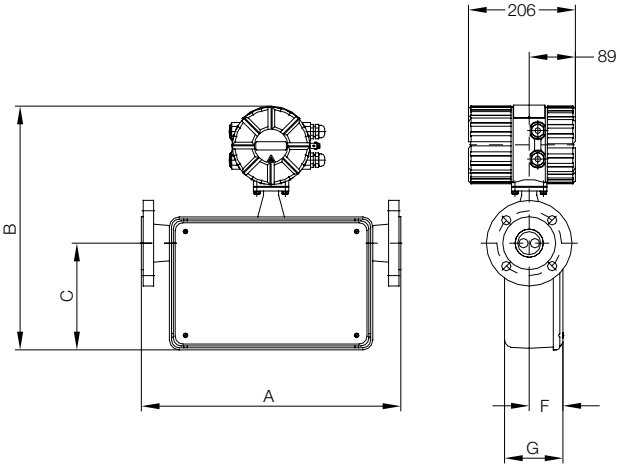
Dimensions

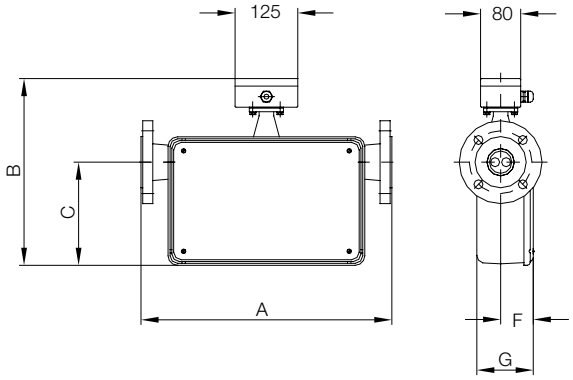
TME-UMC3

		A	B				C	F	G
			Integrated transmitter		Remote mounted transmitter				
			-40 ... 100 °C (-40 ... 212 °F)	-40 ... 150 °C (-40 ... 302 °F)	-40 ... 100 °C (-40 ... 212 °F)	-40 ... 180 °C (-40 ... 356 °F)			
Model	**Process connection**	[mm (inch)]	[mm (inch)]	[mm (inch)]	[mm (inch)]	[mm (inch)]	[mm (inch)]	[mm (inch)]	[mm (inch)]
TME-S80	DN10 PN40 ASME ½" Cl150/300	300 [11.8]	363 [14.3]	465 [18.3]	265 [10.4]	367 [14.4]	113 [4.4]	58 [2.3]	105 [4.1]
TME-S85	DN15 PN40 ASME ¾" Cl150/300	300 [11.8]	363 [14.3]	465 [18.3]	265 [10.4]	367 [14.4]	113 [4.4]	58 [2.3]	105 [4.1]
TME-S90	DN25 PN40 ASME 1" Cl150/300	400 [15.7]	430 [16.9]	532 [20.9]	332 [13.1]	434 [17.1]	173 [6.82]	65 [2.6]	113 [4.4]
TME-S95	DN50 PN40 ASME 2" Cl150/300	500 [19.7]	471 [18.5]	573 [22.6]	373 [14.7]	475 [18.7]	206 [8.1]	65 [2.6]	113 [4.4]
TME-S58	DN80 PN40 ASME 3" Cl150/300	600 [23.6]	557 [21.9]	659 [25.9]	459 [18.1]	561 [22.1]	290 [11.4]	77 [3.0]	137 [5.4]

Integrated Transmitter



Remote Mounted Transmitter

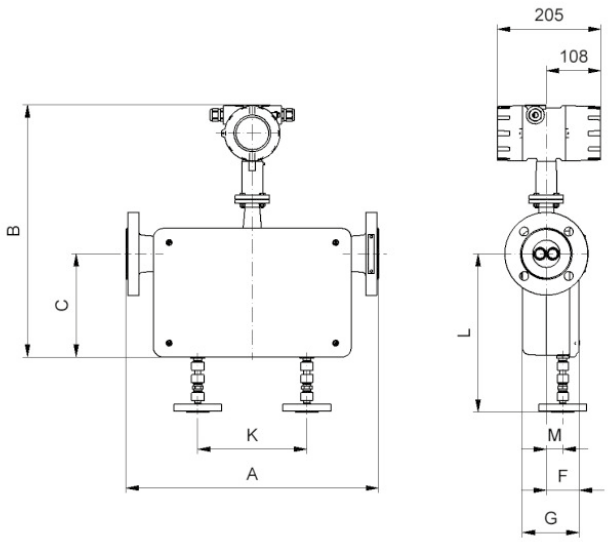


Dimensions

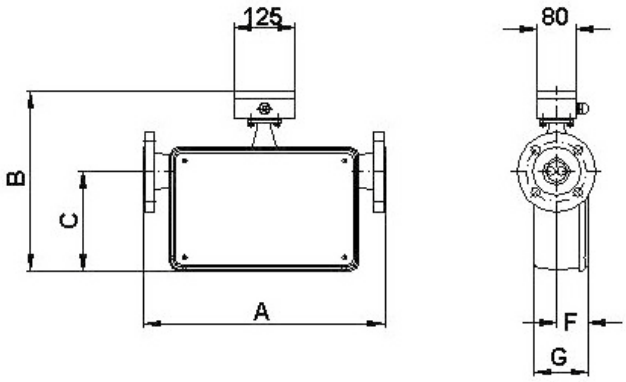
TME-UMC4

		A	B				C	F	G
			Integrated transmitter		Remote mounted transmitter				
			-40 ... 100 °C (-40 ... 212 °F)	-40 ... 150 °C (-40 ... 302 °F)	-40 ... 100 °C (-40 ... 212 °F)	-40 ... 180 °C (-40 ... 356 °F)			
Model	**End connection**	[mm (inch)]	[mm (inch)]	[mm (inch)]	[mm (inch)]	[mm (inch)]	[mm (inch)]	[mm (inch)]	[mm (inch)]
TME-S80	DN10 PN40 ASME ½" Cl150/300	300 [11.8]	394 [15.5]	496 [19.5]	265 [10.4]	367 [14.4]	113 [4.4]	58 [2.3]	105 [4.1]
TME-S85	DN15 PN40 ASME ¾" Cl150/300	300 [11.8]	394 [15.5]	496 [19.5]	265 [10.4]	367 [14.4]	113 [4.4]	58 [2.3]	105 [4.1]
TME-S90	DN25 PN40 ASME 1" Cl150/300	400 [15.7]	461 [18.1]	563 [22.2]	332 [13.1]	434 [17.1]	173 [6.8]	65 [2.6]	113 [4.4]
TME-S95	DN50 PN40 ASME 2" Cl150/300	500 [19.7]	502 [19.8]	604 [23.8]	373 [14.7]	475 [18.7]	206 [8.1]	65 [2.6]	113 [4.4]
TME-S58	DN80 PN40 ASME 3" Cl150/300	600 [23.6]	588 [23.1]	6590 [27.2]	459 [18.1]	561 [22.1]	290 [11.4]	77 [3.0]	137 [5.4]

Integrated Transmitter



Remote Mounted Transmitter



Weights

		Weight	
		Sensor	**Transmitter**
Model	**DN**	[kg (lbs)]	[kg (lbs)]
TME-S80	10	13 [28.7]	4.5 [9.9]
TME-S85	15	13 [28.7]	
TME-S90	25	20 [44.1]	
TME-S95	50	27 [59.5]	
TME-S58	80	50 [110.2]	

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