

## Coriolis Mass Flow Meter

### TMU

- Immune to vibration effects
- Immune to pipeline generated stresses
- Digital signal processing (DSP)

#### Function

The TMU Series Mass Flow Meter 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 TMU Series is available with a direct mounted transmitter or in a remote mounted configuration.

#### Application

The TMU Series can be used to meter nearly all liquid or gaseous media. Available in a variety of end connections, the TMU can be used in many applications common to chemical, petrochemical, oil and gas, food and pharmaceutical industries. The TMU 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.





## Technical Data

### Sensor

End connections:	Flanges acc. EN 1092, ANSI B16.5, DIN2512, special connections on request
Nominal pressure:	PN 40, ANSI 150 / 300 / 600 lbs (Standard) Higher pressure rates optional
Process temperature:	-40°C to +260°C (-40 to +500°F)
Ambient temperature:	-40°C to +60°C (-40 to +140°F)
Ingress protection:	IP 65 / IP 68 (EN60529) (NEMA 4X / 6)

### Materials

Flow tubes, splitter, flanges:	1.4404 (316 L) / 1.4571 (316 Ti) / Hastelloy C-22
Housing:	1.4301 (304 L) up to TMU040, St 37.2 / 1.4301 from TMU050
Explosion protection:	Sensor circuits: intrinsically safe DMT 01 ATEX E 149 X II 1/2G EEx ia IIC T6–T2, (Approval for Zone 0 inside flow tubes available)

### Transmitter

Power supply:	19 - 36 VDC, 24 VAC +/- 20%, 90 - 265 VAC
Outputs:	Galvanically isolated
Current:	2 x 0/4-20 mA
Binary 1:	active, potential free 24 V=, 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, $U_i=30$ V, $I_i=200$ mA, $P_i=3$ W
Input Binary:	Counter reset

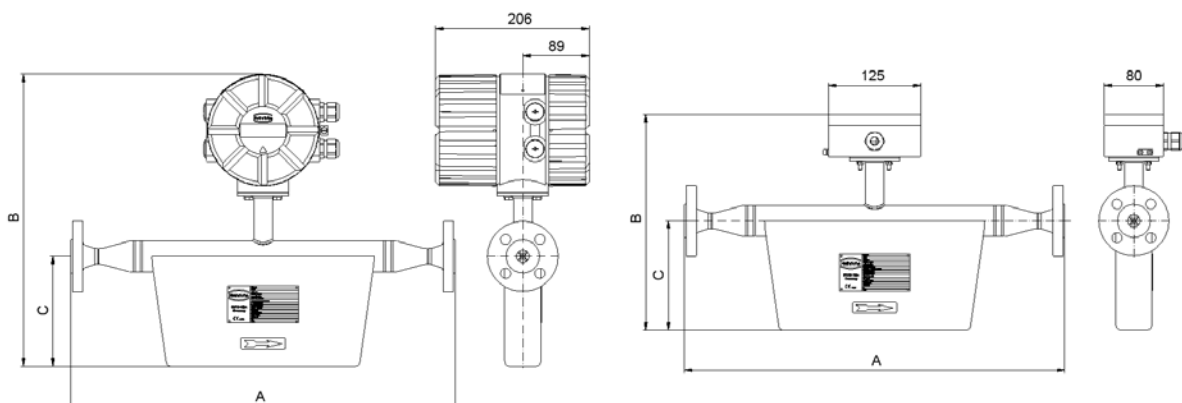
### Accuracy

Liquid:	$\pm 0,1\%$ of reading $\pm$ zero point stability up to TMU040 $\pm 0,15\%$ of reading $\pm$ zero point stability from TMU050
Gas:	$\pm 0,5\%$ of reading $\pm$ zero point stability
Density (liquid):	$\pm 0,005$ g/cm <sup>3</sup> with density calibration $\pm 0,001$ g/cm <sup>3</sup> with special density calibration up to TMU040 $\pm 0,002$ g/cm <sup>3</sup> with special density calibration from TMU050
Volume:	$\pm 0,2\%$ of reading $\pm$ zero point stability
Ambient temperature:	-20°C to +60°C (-4°F to +140°F)
Ingress protection:	IP 68 (EN60529) (NEMA 6)
Explosion protection:	BVS 05 ATEX E 021 X
Increased safety EEx e (connection area):	II (1)2G EEx de [ia] IIC/IIB T6–T3
Explosion proof EEx d (connection area):	II (1)2G EEx d [ia] IIC/IIB T6–T3
Intrinsically safe EEx i (signal output):	II (1)2G EEx de [ia] IIC/IIB T6–T3, II (1)2G EEx d [ia] IIC/IIB T6–T3
CE-Marking:	EMC-Directive 89/336/EEC, EN 61000-6-3:2001 (emissions residential environments) EN 61000-6-2:1999 (immunity for industrial environments) Pressure Equipment Directive 97/23/EC Explosion Protection Directive 94/9/EC
Communication:	HART® (Drivers for Sensor Port, AMS, EDD, PDM) Profibus-PA (EDD, PDM) RS 485-Modbus (in progress)

## Dimensions

Model	A											
	End connection	mm [inch]	End connection	mm [inch]	End connection	mm [inch]	End connection	mm [inch]	End connection	mm [inch]		
TMU008	SW10	--	SW12	--	DN10	360 [14,2]	½" NPT (f)	300 [11,8]	½" NPT (f)	300 [11,8]	½" 150lb ½" 600lb	366 [14,4] 375 [14,8]
TMU010	SW12	--	DN10	390 [15,4]	DN15	396 [15,6]	½" NPT (f)	300 [11,8]	½" 150lb ½" 600lb	416 [16,4] 425 [16,7]	¾" 150lb ¾" 600lb	350 [13,8] 360 [14,2]
TMU015	-	--	DN15	515 [20,3]	DN25	520 [20,5]	½" NPT (f)	--	½" 150lb ½" 600lb	535 [21,1] 546 [21,5]	¾" 150lb ¾" 600lb	546 [21,5] 556 [21,9]
TMU025	-	--	DN25	632 [24,9]	DN40	642 [25,3]	¾" 150lb ¾" 600lb	657 [25,9] 667 [26,3]	1" 150lb 1" 600lb	664 [26,1] 676 [26,6]	1½" 150lb 1½" 600lb	676 [26,6] 692 [27,2]
TMU040	-	--	DN40	770 [30,3]	DN50	776 [30,6]	-	--	1½" 150lb 1½" 600lb	804 [31,7] 820 [32,3]	2" 150lb 2" 600lb	810 [31,9] 828 [32,6]
TMU050	DN40	1018 [40,1]	DN50	1024 [40,3]	DN80	1044 [41,1]	1½" 150lb 1½" 600lb	1050 [41,3] 1066 [42,0]	2" 150lb 2" 600lb	1053 [41,5] 1072 [42,2]	3" 150lb 3" 600lb	1066 [42,0] 1091 [43,0]
TMU080	DN50	1176 [46,3]	DN80	1196 [47,1]	DN100	1184 [46,6]	2" 150lb 2" 600lb	1207 [47,5] 1226 [48,3]	3" 150lb 3" 600lb	1218 [48,0] 1243 [48,9]	4" 150lb 4" 300lb	1230 [48,4] 1250 [49,2]
TMU100	DN80	1370 [53,9]	DN100	1358 [53,5]	DN150	1090 [42,9]	3" 150lb 3" 600lb	1388 [54,6] 1413 [55,6]	4" 150lb 4" 300lb	1400 [55,1] 1420 [55,9]	6" 150lb 6" 300lb	1154 [45,4] 1173 [46,2]
TMU150	DN100	1726 [68,0]	DN150	1732 [68,2]	DN200	1448 [57,0]	4" 150lb 4" 300lb	1770 [69,7] 1790 [70,5]	6" 150lb 6" 300lb	1796 [70,7] 1815 [71,5]	8" 150lb 8" 300lb	1525 [60,0] 1545 [60,8]
TMU200	DN150	2184 [86,0]	DN200	2198 [86,5]	DN300	1864 [73,4]	6" 150lb 6" 300lb	2250 [88,6] 2270 [89,4]	8" 150lb 8" 300lb	2270 [89,4] 2287 [90,0]	10" 150lb 10" 300lb	1925 [75,8] 1957 [77,0]
TMU250	DN200	2268 [89,3]	DN250	2284 [89,9]	DN300	1900 [74,8]	8" 150lb 8" 300lb	2348 [92,4] 2363 [93,0]	10" 150lb 10" 300lb	2348 [92,4] 2375 [93,5]	12" 150lb 12" 300lb	1945 [76,6] 1977 [77,8]
TMU300	DN250	2913 [114,7]	DN300	2925 [115,2]	DN350	2933 [115,5]	10" 150lb 10" 300lb	2976 [117,2] 3008 [118,4]	12" 150lb 12" 300lb	2995 [117,9] 3030 [119,3]	14" 150lb 14" 300lb	3020 [118,9] 3050 [120,1]

Model	B					C	G
	Integral mount transmitter		Remote mount transmitter				
	-40°C - 100°C (-40°F to 212°F)	-40°C - 150°C (-40°F to 302°F)	-40°C - 100°C (-40°F to 212°F)	-40°C - 180°C (-40°F to 356°F)	-40°C - 260°C (-40°F to 500°F)		
mm [inch]	mm [inch]	mm [inch]	mm [inch]	mm [inch]	mm [inch]	mm [inch]	
TMU008	328 [12,9]	430 [16,9]	225 [8,9]	327 [12,9]	427 [16,8]	85 [3,3]	40 [1,6]
TMU010	343 [13,5]	445 [17,5]	240 [9,4]	342 [13,5]	442 [17,4]	100 [3,9]	40 [1,6]
TMU015	395 [15,6]	497 [19,6]	292 [11,5]	394 [15,5]	494 [19,4]	148 [5,8]	48 [1,9]
TMU025	460 [18,1]	562 [22,1]	357 [14,1]	459 [18,1]	559 [22,0]	200 [7,9]	74 [2,9]
TMU040	528 [20,8]	630 [24,8]	425 [16,7]	527 [20,7]	627 [24,7]	255 [10,0]	101 [4,0]
TMU050	1010 [39,8]	1112 [43,8]	907 [35,7]	1009 [39,7]	1109 [43,7]	615 [24,2]	230 [9,1]
TMU080	1210 [47,6]	1312 [51,7]	1107 [43,6]	1209 [47,6]	1309 [51,5]	800 [31,5]	250 [9,8]
TMU100	1230 [48,4]	1332 [52,4]	1127 [44,4]	1229 [48,4]	1329 [52,3]	815 [32,1]	270 [10,6]
TMU150	1560 [61,4]	1662 [65,4]	1457 [57,4]	1559 [61,4]	1659 [65,3]	1070 [42,1]	380 [15,0]
TMU200	1720 [67,7]	1822 [71,7]	1617 [63,7]	1719 [67,7]	1819 [71,6]	1210 [47,6]	400 [15,7]
TMU250	1860 [73,2]	1962 [77,2]	1757 [69,2]	1859 [73,2]	1959 [77,1]	1300 [51,2]	550 [21,7]
TMU300	1865 [73,4]	1967 [77,4]	1762 [69,4]	1864 [73,4]	1964 [77,3]	1400 [55,1]	510 [20,1]



## Ranges

Model	Min. measuring range	Max. measuring range	Nominal ( $\Delta p=1\text{bar}$ )	Zero point stability (of range)
	kg/h [lbs/min]	kg/h [lbs/min]	kg/h [lbs/min]	kg/h [lbs/min]
TMU008	60 [2,2]	600 [22,0]	330 [12,1]	0,06 [0,002]
TMU010	250 [9,2]	2500 [91,9]	1150 [42,3]	0,25 [0,01]
TMU015	1200 [44,1]	12000 [440,9]	5250 [192,9]	1,2 [0,04]
TMU025	3000 [110,2]	30000 [1102,3]	20000 [734,9]	3 [0,1]
TMU040	6000 [220,5]	60000 [2204,6]	55000 [2020,9]	6 [0,2]
TMU050	20000 [734,9]	80000 [2939,4]	74000 [2719,0]	8 [0,3]
TMU080	25000 [918,6]	120000 [4409,2]	118000 [4335,7]	12 [0,4]
TMU100	30000 [1102,3]	200000 [7348,6]	200000 [7348,6]	20 [0,7]
TMU150	60000 [2204,6]	460000 [16901,8]	460000 [16901,8]	46 [1,7]
TMU200	150000 [5511,5]	700000 [25720,2]	700000 [25720,2]*	70 [2,6]
TMU250	300000 [11022,9]	1500000 [55114,6]	1350000 [49603,2]	150 [5,5]
TMU300	400000 [14697,2]	2200000 [80834,8]	1900000 [69811,9]	220 [8,1]

\* ( $\Delta p=0,6\text{bar}$ )

## UMC 3 Connections

Designation	Terminal designation	Type of protection		Standard (Not Ex)
		EEx ia	EEx e	
<b>Signal outputs</b>				
Current 1, 0/4 to 20mA with HART®	11 and 12	x		x
	41 and 42		x	
Current 2, 0/4 to 20mA	13 and 14	x		x
	43 and 44		x	
Binary output 1 (passive pulse)	16 and 17	x		x
	46 and 47		x	
Binary output 1 (active pulse)	45 and 48		x	
	15 and 18			x
Binary output 2 (status or second passive pulse output for custody transfer operations)	19 and 20	x		x
	49 and 50		x	
Option Binary output 3 (status output during custody transfer operations)	33 and 34	x		x
	53 and 54		x	
Profibus PA option	39 (A) and 40 (B)	x		
Control unit BE	Shield, -, +	x		x
<b>Alternatives for current output 2</b>				
Binary input	21 and 22	x		x
	51 and 52		x	
Modbus/Profibus DP with RS 485-IS	35 (A) and 36 (B) (in progress)	x		x
Profibus DP	37 (A) and 38 (B) (in progress)		x	

For further information see device description TMU\_UMC3\_GB\_XX\_en



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Adinco bv

P.O.Box 90  
4190 CB Geldermalsen  
Netherlands

Tel. +31 (0) 345 59 60 00  
Fax +31 (0) 345 59 60 01

E-mail: [info@adinco.nl](mailto:info@adinco.nl)  
Internet: [www.adinco.nl](http://www.adinco.nl)