

# AXIOM

MMF

## CORIOLIS MASS FLOW METERS



# Metroval

Customized solutions in fluid measurement



# About the Coriolis Metroval Mass Flow Meter



Based on the Coriolis effect, the first mass flow meter appeared on the market in 1970, but it started to be intensively used in 1990. Since then, its manufacturing technology is in a process of constant evolution. These instruments directly measure the Mass Flow Rate (Figure 1) of a fluid, as well as Density and Temperature. Indirectly, they measure the Volumetric Flow Rate according to Mass Density.

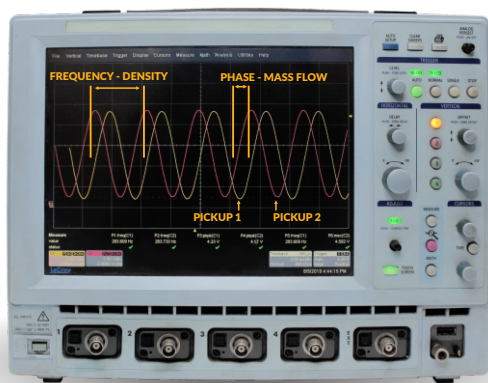


Figure 1. The phase difference is proportional to the Mass Flow rate and the vibration frequency is proportional to the fluid Density

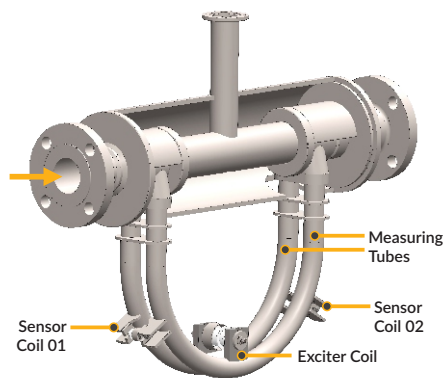


Figure 2. Components promoting the Coriolis effect in SMT-50 Sensor

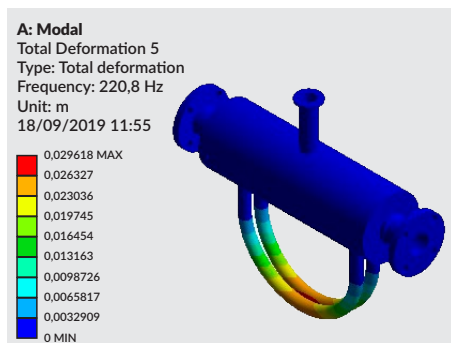
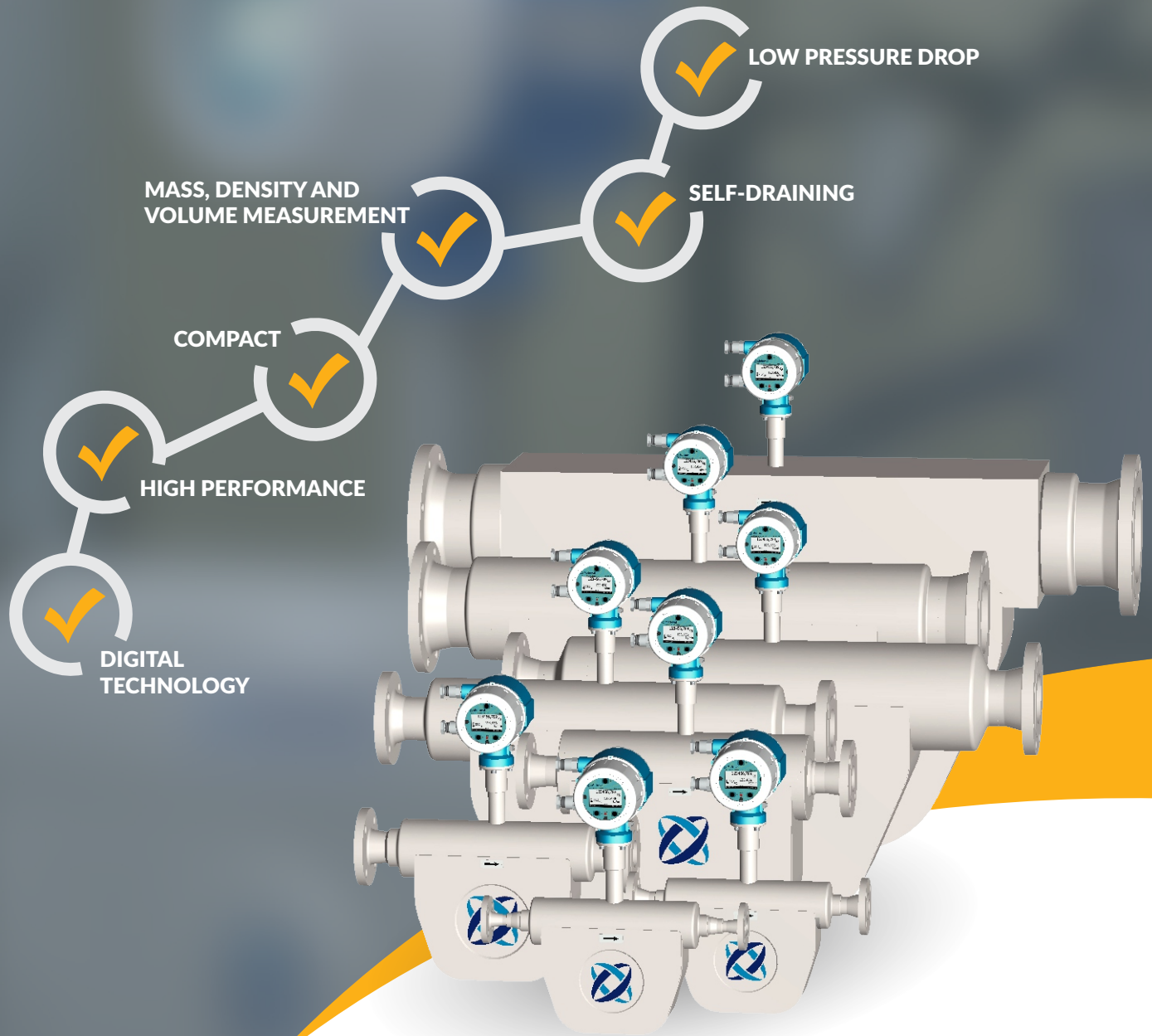


Figure 3. Modal Analysis of the SMT-50 Sensor.



Figure 4. SolidWorks CAD 3D design of the SMT-25 Sensor.

# Features



- Family of SMT sensors, with flow rates from 1kg/min to 17,300kg/min;
- Connections from ½" to 10" diameter;
- Process temperature from -20 °C to +120 °C (NT version) - Standard;
- Process temperature from -20 °C to +210 °C (ET version) - Optional;
- Calibration in accredited laboratory (ISO-17025) by INMETRO;
- Built-in diagnostics;
- Measurement of Mass Flow Rate, Volume Flow Rate, Density and Temperature;
- Measurement of concentration in °Brix, °Baumé and °INPM (Selectable);
- Approved for use in fiscal measurement and custody transfer according to OIML R 117 class 0.3 and INMETRO Ordinance n° 064-2003.



# Transmitter



MTM TRANSMITTER

**Ex NCC Certificate  
of Conformity No.:**  
**17.0215 X**

**REMOTE VERSION  
MTM-01 M**

Ex d [ia Ga] IIB T6 Gb  
Ex d [ia IIC Ga] IIB T6 Gb  
Ex d [ib] IIB T6 Gb  
(-20°C Tamb +60°C)

**BUILT-IN VERSION  
MTM-01\_M**

Ex d ib IIB T6 Gb

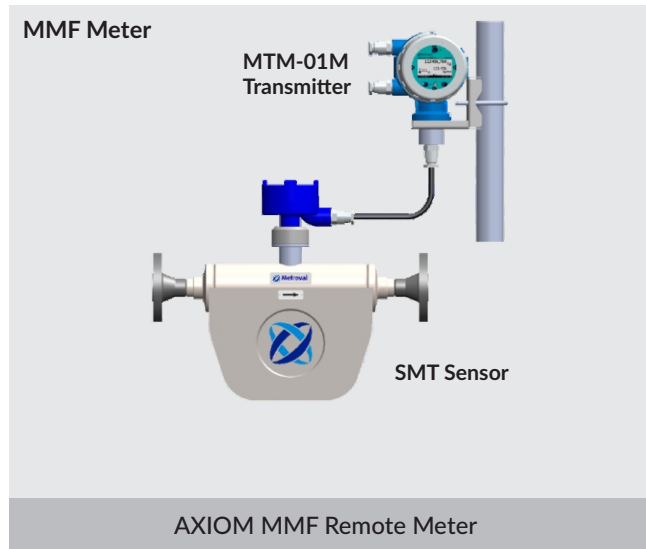
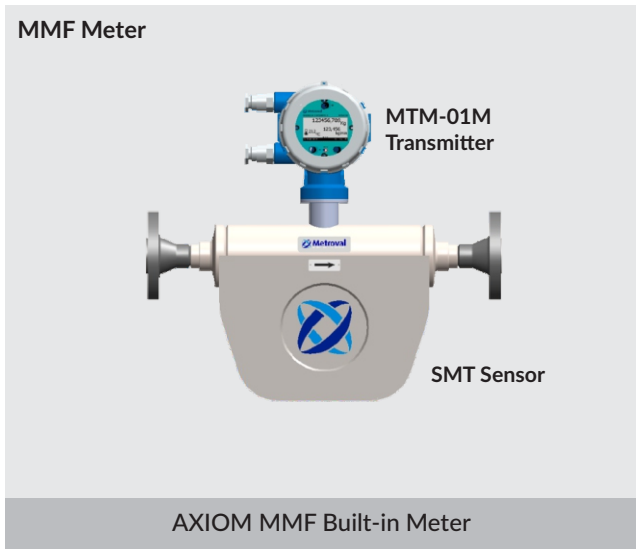


MTM TRANSMITTER

## TECHNICAL DATA

Supply voltage	24 to 240 VCC/VAC
Power	30 W
Display	Graph - 128 x 64 px
Operating temperature	-20 °C to +60 °C
Keyboard	Optical sensors
Serial communication	1x - RS-485 ( Modbus RTU Protocol)
Analog outputs	Two 4 to 20 mA outputs (active/passive)
HART communication	1x - HART Protocol (on an analog output)
Digital outputs	Two 10KHz (Open Collector) pulse/frequency transistor outputs
Digital inputs	Two passive inputs - configurable functions
Configuration	Via keyboard or communication, with username and password
EMC	In conformity with IEC-61000-4, OIML D11:2004
Vibration	In conformity with OIML D11:2004
Climatic	In conformity with OIML D11:2004
Classified area	Ex Conformity Certificate - IEC-60079 standard
Material	Aluminum
Electrical connections	2 ½" NPT-F connections
Dimensions (mm)	166 x 135 x 171

# Sensor

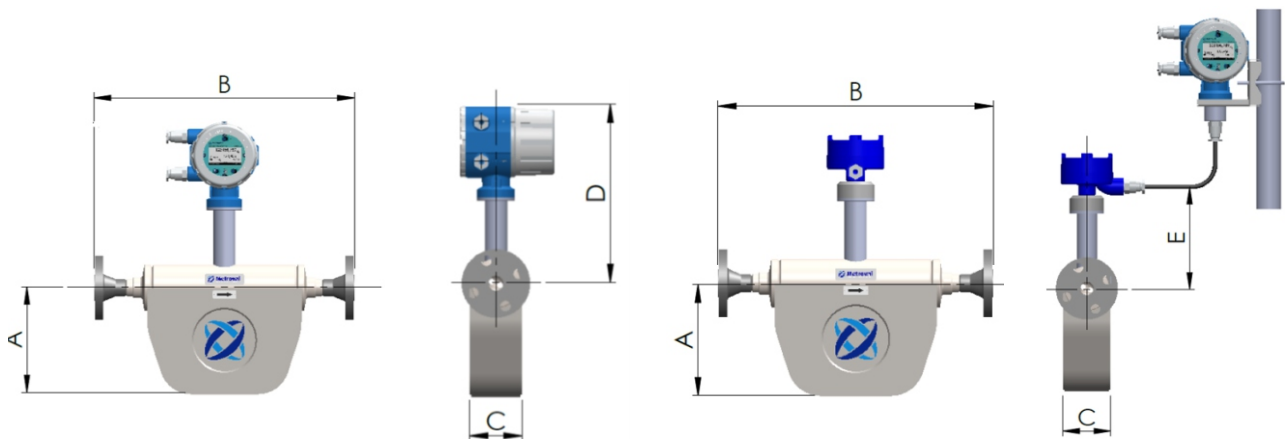


SENSOR	SMT-15	SMT-20	SMT-25	SMT-50	SMT-80	SMT-100	SMT-150	SMT-200	SMT-250
Max. Flow (kg/min)	90	120	330	1.000	3.000	4.300	8.000	11.500	17.300
Max. Flow(kg/h)	5.400	7.200	20.000	60.000	180.000	258.000	480.000	688.500	1.040.000
Nominal Flow (kg/h)	3.300	5.400	12.300	49.800	124.800	192.000	330.000	459.000	700.000
Error (%VM)	± 0,05% (1:5) ± 0,15% (1:10) ± 0,20% (1:20)								
Zero Stability (%FE)	± 0,01%								
Repeatability (%VM)	± 0,05%								
Density Range	0 to 2.000 kg/m <sup>3</sup> (other ranges upon request)								
Accuracy	± 1,0 kg/m <sup>3</sup>								
Repeatability	± 0,5 kg/m <sup>3</sup>								
Sensor temperature range	-20 °C to +117 °C (standard)				-20 °C to +210 °C (optional)				
Line diameter	½"	¾"	1"	1 ½"	2"	3"	4"	6"	8"
	¾"	1"	2"	2"	3"	4"	6"	8"	10"
Process connection	Female thread, flange and tri-clamp			Flange ANSI B16.5 or DIN					
Max. thread pressure (bar)	200 bar								
Max. pressure flange (bar)	Class 600 (100 bar)								
Tube material	AISI 316L (Other materials upon request)								
Degree of sensor protection	IP-67								
Certification	Ex ia IIC T6...T3 Ga								

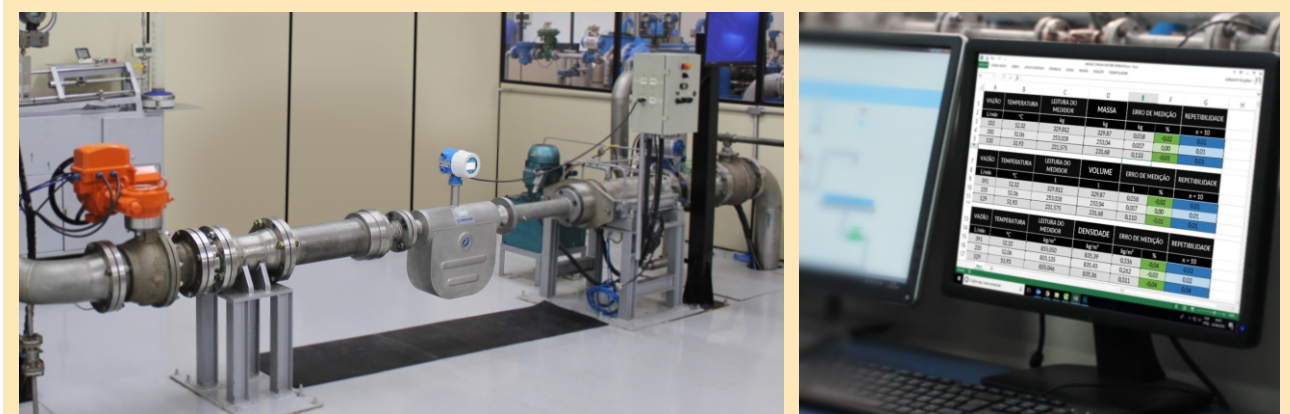


Figure 5. CNC machining of the SMT-20 connection block

# Dimensions



METER	WEIGHT	NOMINAL DIAMETER	DIMENSIONAL																																																																																
			A	B	C	D	E																																																																												
MMF-15	28 kg	½"	205	500	89	325	208																																																																												
		¾"		500				MMF-20	28 kg	¾"	205	500	89	325	208	1"	460	MMF-25	46 kg	1"	245	615	114	338	225	2"	543	MMF-50	69 kg	1 ½"	355	812	168	365	252	2"	663	MMF-80	76 kg	2"	410	980	168	365	252	3"	920	MMF-100	123 kg	3"	428	1166	219	390	278	4"	1094	MMF-150	190 kg	4"	540	1324	219	390	278	6"	1200	MMF-200	400 kg	6"	665	1670	275	420	305	8"	1550	MMF-250	763 kg	8"	733	1490	350
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Figures 6 and 7. Calibration of Axiom MMF-80 meter in the Metroval Flow Laboratory, which meets all the requirements of the NBR-ISO/IEC 17025 standard.







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Customized solutions in fluid measurement

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