



ATMF-IL

Thermal Mass Flowmeter

ATMF Inline Series

GENERAL

Inline mass flowmeters from SmartMeasurement are thermal dispersion type, utilizing the constant temperature difference method of measuring gas mass flow rate. They contain two reference grade platinum RTD sensors clad in a protective SS #316 sheath. Features include direct mass flow measurement for gases, wide rangeability, low pressure drop, excellent low end sensitivity, and no moving parts. The SMC ATMF series is microprocessor-based and does not have any potentiometers. Electronics may be integral style, or remote type with both making use of a rugged windowed dual compartment enclosure. Four models are available ranging from the low cost blind meters to the more advanced SP models.

Calibration Self Check: Each meter has built in diagnostics - a display of the calibration milliwatts (mw) can be used to check the sensor's operation by being compared to the original reported "zero flow" value noted on meter's Certificate of Conformance (last few lines) and metallic tag. This convenient field diagnostic procedure verifies that the original factory calibration hasn't drifted, shifted, or changed. This "Sensor Functionality and Zero Self Check" also verifies that the sensor is free from contamination, even without inspection.



FEATURES

- Direct mass flow measurement of any gas with actual gas calibration
- Opto-isolated outputs, with graphic display
- Tracking of overall gas consumption over a turn down ratio of at least 100:1
- Available in SP (CSA, UL) and NH (Non-Hazardous) configuration
- High contrast photo-emissive OLED display with rate, total, temperature and graphic display
- User-selectable engineering units, dynamically converts the flow rate and total flow
- Can measure higher velocity than any other thermal mass meter - up to 203 m/s
- Display calibration milliwatt (mw) for ongoing diagnostics
- Standard software available with multi-curve fit programs
- Low power dissipation; under 2W
- Flow conditioners included with all meters

SPECIFICATIONS

• Process Connection:	Threaded, Flanged	• Housing protection:	NEMA 4, Class 1, Div 1, Groups B, C, & D
• Process temperature:	300°F (149°C)	• Ex-protection:	II 2 GD EEx d IIC T2 or T3
• Operating pressure:	1000 PSIG (69 Barg)		
• Mass Flow rate:	See model selection guide section	• Cable Length (remote version):	up to 300 meters
• Flow units:	Kg/hr, Kg/mn, Kg/s Lb/hr, Lb/m Lb/s NCMH, SCFM, NLPM, SLPM Mt/s, F/mn, BTU/Hr, BTU/min	• Wetted materials:	SS# 316 (Hastelloy, others optional)
• Gas temperature effect:	0.01% /°C	• Weight (approximate):	
• Accuracy (and linearity):	±[1% of Reading + (0.5% FS)]	Integral Type:	
• Repeatability:	± 0.25% of Full Scale	¼" to 1"	2.2 - 8.8 Lb (1 - 4 Kg)
• Turn down ratio:	Over 100:1	1¼" to 2½"	8.81 - 22 Lb (4 - 5 Kg)
• Response time:	Less than one second	3" to 4"	13.2 - 17.6 Lb (6 - 8 Kg)
• Material:	316SS as per DIN 1.4571 (AISI 316 Ti)	Remote Type:	
• Linear signal output:	0-5 V _{DC} & 4-20 mA	¼" to 1"	6.6 - 13.2 Lb (3 - 6 Kg)
• Pulse output:	scalable	1¼" to 2½"	13.2 - 17.6 Lb (6 - 8 Kg)
• Relays:	Two 1-amp, SPDT	3" to 4"	17.6 - 22 Lb (8-10 Kg)
• Display units:	Flow, Total flow, Switch settings Temperature, Elapsed time	Notes: -weight +0.5 kg (1 Lb) for 150# flanges + 1kg (2.2Lb) for 300#	
• RAM Back-up:	Lithium Battery	• Power requirements:	115V _{AC} @ ½ A 230V _{AC} @ ¼ A 24 V _{DC} @ ¼ A
		• Power Consumption:	2 Watts or less
		• NIST traceable	Standard for all calibration
		• Signal Interface	RS232 & RS485, MODBUS
		• Data storage	EPROM storage up to 10 years

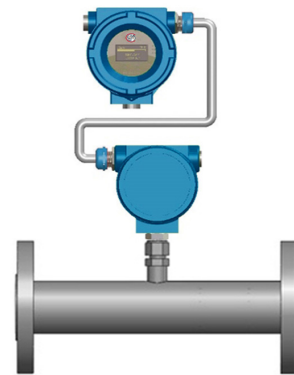


■ ATMFIL-SP

- Sizes ¼" - 4" (6.35-100mm)
- FM/CSA Class1, Div2, Groups B, C, D, T4
- Calibration milliwatt (mw) displayed for ongoing diagnostics
- Available in 12V_{DC}, 24V_{DC}, 115-230V_{AC} (2.5W)
- Calibration self-check (built in diagnostics)
- Available with MODBUS RS485-RTU or HART or BACnet
- Accuracy (and linearity) : ±[1% of Reading +(0.5% FS)]
- Separate power and output terminals
- 4 line OLED displays rate, total, temperature and graphical Flowrate,
- Remote electronics for both SP and NH with dual compartment option
- 6-conductor max loop resistance 10 ohms, over 1000 ft (300M)
- 4 line rate, total, temperature and graphical Flowrate SP version and 2 line displays rate, total, for NH versions

■ ATMFIL-NH

- Sizes ¼" - 4" (6.35-100mm)
- Designed for inexpensive non-hazardous use with Exd enclosure
- Low power dissipation, under 2.5 Watts (e.g., under 100 ma at 24 V_{DC})
- Accuracy (and linearity) : ±[1% of Reading +(0.5% FS)]
- Modbus[®] compliant RS485 RTU communications
- 24 V_{DC} or 115V_{AC}/230 V_{AC}
- Flow Rate, Totalizer
- Available with either high and low pressure ball valve retractor
- Field reconfigurability via optional software
- 2 line OLED displays rate, total
- Diagnostic & graphic display



■ SmartMeasurement Com[™]

- Reconfiguration of full scale, pipe size, engineering units, factors, or decimal points
- Verify that the flow meter is within original calibration and that the sensors are clean
- Confirmation of original factory calibration and that the linear output signal is correct
- Reconfiguration for new gas mix constituents which automatically corrects outputs
- Real-Time tab logs data which is easily exported to Excel; and print a validation report
- Verify 4-20 mA out by generating user input flow rates
- Diagnostic features such as linearity of various user input; up to 10 points
- Sensor drift validation with In-situ calibration verification under a no-flow condition
- Ability to check flow meter output versus expected value.
- Ability to do "loop check" by generating any desired 4-20 mA output to verify digital outputs
- And many more features

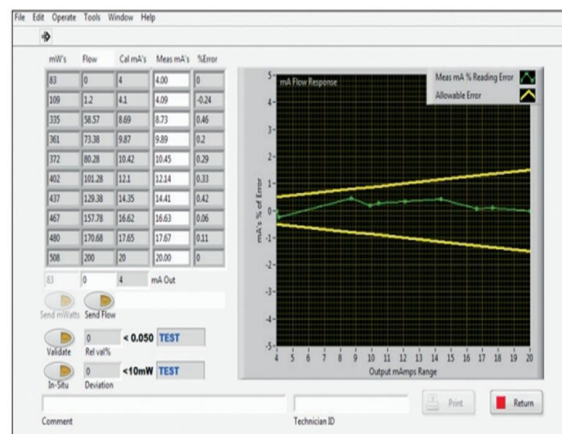
Flow Units: SCFM ATMF AndCom Report 1/22/2018
 Total Units: SCF Meter Serial# 115819 7:24:56 AM
 Temp Degrees: F ATMF Probe v2.24 Tag ID#
 Test report

Work performed by: R.P.

mW's	Flow	Cal mA's	Mass mA's	%Error
77.000	0.000	4.000	4.000	0.000
82.000	0.000	4.000	4.000	0.000
907.000	2.084774	9.000	9.000	-0.000
411.000	7.715476	9.400	9.400	0.000
444.000	21.12829	10.760	10.760	-0.000
485.000	24.965246	12.210	12.210	0.000
510.000	30.976162	13.880	13.880	-0.000
539.000	37.08660	15.480	15.480	0.000
568.000	43.022208	17.130	17.130	0.000
608.000	50.000000	20.000	20.000	0.000

- Min Flow = 0.000
 - Max Flow = 50.000
 - mW Zero = 80
 - mW Max = 907
 - Fitting = 0.000
 - K Factor = 1.000
 - Cal Var = 75.187

***** VALIDATION RESULTS *****
 - Sensor Relative Variance = 0.004% (< 0.050) SCORE = PASS ---
 ***** IN-SITU RESULTS *****
 - Sensor mW Deviation = 17.797 (> 10.000) INDICATION = FAIL ---
 - CONTAMINATION SUSPECTED

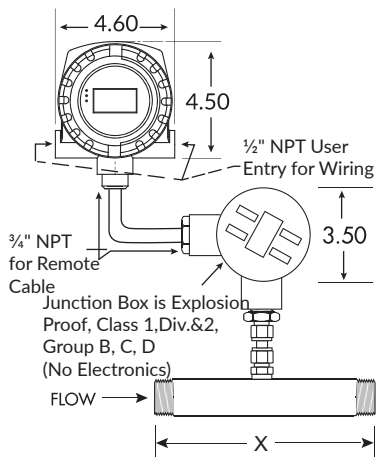
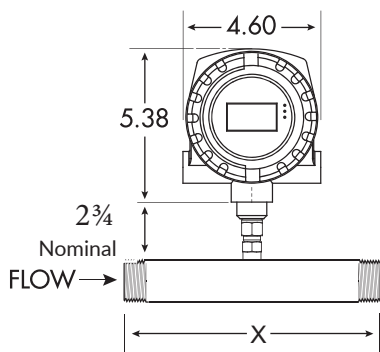


Flow Range, Dimensions and Weights

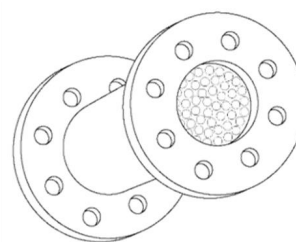
Diameter (size)	Length (X)	Weight Lb (KG) Integral	Weight Lb (KG) Remote	Range in Air (SCFM)	Range in Air (NCMH)	Range in Natural Gas (SCFM)	Range in Natural Gas (NCMH)
¼" (6.35mm)	6" (152.4mm)	2.2 (1)	6.6 (3)	0.3-30	0.51-51	0.23-23	0.391-39.1
⅜" (9.53mm)	6" (152.4mm)	3.3 (1.5)	7.7 (3.5)	0.5-50	0.85-85	0.4-40	0.68-68
½" (12.7MM)	7" (177.8mm)	4.4 (2)	8.8 (4)	0.7-70	1.19-119	0.5-50	0.85-85
¾" (19.05mm)	7" (177.8mm)	5.5 (2.5)	9.9 (4.5)	1.3-130	2.21-221	1-100	1.7-170
1" (25mm)	8" (203.2mm)	6.6 (3)	11 (5)	2.1-210	3.57-357	1.6-160	2.72-272
1 ¼" (31.75mm)	10" (254mm)	7.7 (3.5)	13 (6)	3.6-260	6.12-621	2.7-270	4.59-459
1 ½" (38.1mm)	12" (304.8mm)	8.81 (4)	14.33 (6.5)	4.90-490	8.33-833	3.7-370	6.29-629
2" (50mm)	12" (304.8mm)	9.9 (4.5)	15.5 (7)	8.2-820	13.94-1394	6.2-620	10.54-1054
2 ½" (63.5mm)	12" (304.8mm)	11 (5.5)	14.6 (8)	11.6-1160	19.72-1972	8.8-880	14.96-1496
3" (80mm)	12" (304.8mm)	14.33 (6.5)	19.8 (9)	18.0-1800	30.6-3060	13.7-1370	23.29-2329
4" (100mm)	12" (304.8mm)	17.6 (8)	22 (10)	31-3100	52.7-5270	23-2350	39.1-3910

Note: • Weight +0.5 kg (1 Lb) for 150# flanges + 1kg (2.2Lb) for 300#
 • Rates for air, O2 and N2 similar
 • Flow rate based on schd40 pipe @ 1bar and 0oC
 • Flow rates for H2 and He much less than natural gas, others similar (contact factory)

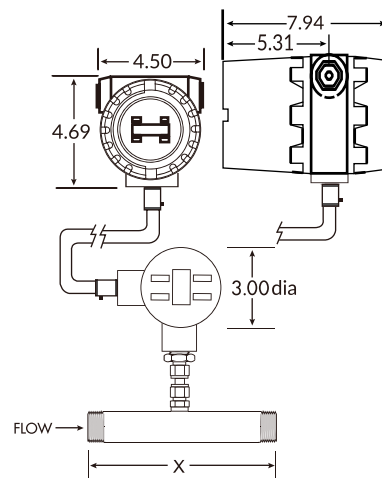
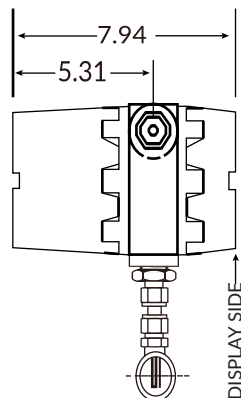
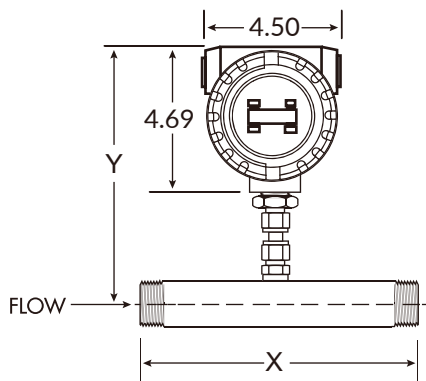
ATMFIL-SP



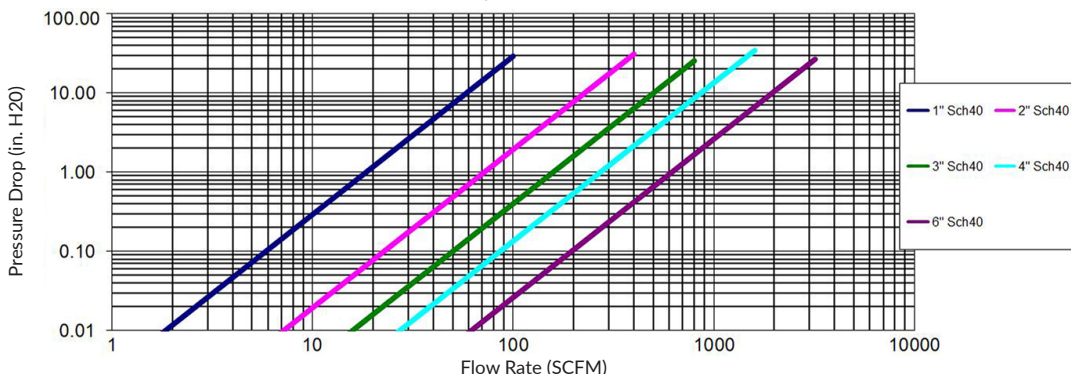
Flow conditioner included for SP and NH



ATMFIL-NH



Pressure Drop through Flow Sections @ Atmospheric Conditions



Procedures to specify our inline mass meters

You also need to provide the following information:

GAS COMPOSITION	NIST certified calibration is done with actual or equivalent gas - gas type or mixture MUST be given
FULL SCALE FLOW	Maximum and minimum flow rates and units MUST be provided
LINE SIZE	Line size and connection MUST be provided (see selection guide below for options)
GAS PRESSURE AND TEMPERATURE	Calibration is done at operating or maximum pressure and temperature
ELECTRONICS TEMPERATURE	Temperature of the environment surrounding the flowmeter electronics.
POWER REQUIREMENTS	Specify requirements such as 12, 24 V _{DC} or 115 V _{AC} or 230 V _{AC}
CONFIGURATION	See below transmitter styles

ATMF SERIES INLINE METERS

EXAMPLE ATMFIL-SP-I-100-NPT-24VDC-AIR-NN (40 NCMH , 40C AND 12 BARG)

		**	**	**	**	**	**	**	**	DESCRIPTION
Ex proof with graphical display & advanced features	SP									Transmitter
Non-hazardous type	NH									
Integral	I									Style
Remote	R									
¼" X 6"L inline flowbody**		025								Connection
⅜" X 6"L inline flowbody		030								
½" X 7"L inline flowbody		050								
¾" X 7"L inline flowbody w/ Flow Conditioners		075								
1" X 8"L inline flowbody w/ Flow Conditioners		100								
1¼" X 10"L inline flowbody w/ Flow Conditioners		125								
1½" X 12"L inline flowbody w/ Flow Conditioners		150								
2" X 12"L inline flowbody w/ Flow Conditioners		200								
2½" X 12"L inline flowbody w/ Flow Conditioners		250								
3" X 12"L inline flowbody w/ Flow Conditioners		300								
4" X 12"L inline flowbody w/ Flow Conditioners		400								
Tube versus pipe (To Advise)	TUBE									
150 LB ANSI raised flanged ends		S150FLG								
300 LB ANSI raised flanged ends		S300FLG								
12 V _{DC}			12VDC							Power Supply
24V _{DC}			24VDC							
110-115 V _{AC}			115 VAC							
220-240V _{AC}			230VAC							
Specify gas type and max velocity				Gas					Gas	
Options (please contact SmartMeasurement for others not included here)										
Non-std cable length for remote meters									CBL xxx	Options
After-cal data and certificate									CACERT	
Hastelloy sensor									HSILS	
High temp operation (gasses from 200 - 350° F- 93°C to 177°C)									HTO1	
Very high temperature operation (gasses from 350 - 450°F 177°C to 232°C)									HTO2	
Extra ranges (up to four) for SE and SG models only									RG2	
Oxygen scrubbing (with Certificate)									OFC	

