



# ATMF-IS

Insertion Thermal Mass Flowmeter

ATMF Series

## GENERAL

**SmartMeasurement** insertion mass flowmeters are thermal dispersion type, utilizing the constant temperature difference method of measuring gas mass. flow rate. It contains 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 SmartMeasurement ATMF series is microprocessor based and does not have any potentiometers. Electronics can be integral style, or remote mount with a rugged windowed dual compartment enclosure. Four models are available from the low cost blind meters to the more exotic featured SP models.


**Calibration Self Check:** The flow 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 in-situ 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
- Actual gas calibration
- Optically-isolated outputs, with graphic display
- Tracking of overall gas consumption over a turndown ratio of at least 100:1
- Isolated 4-20 mA output and pulse output for totalized flows
- High contrast photo-emissive OLED display with rate, total, temperature and graphic display
- 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 multi-curve fit programs
- Low power dissipation under; 2W
- Available with FM/CSA approved or non-hazardous

## SPECIFICATIONS

• Process Connection:	Threaded, Flanged, Ball valve	• Ex-protection:	II 2 GD EEx d IIC T2 or T3
• Process temperature:	32 to 575°F (0 to 300°C)		
• Operating pressure:	Up to 69 Bar (1000 PSIG)	• Cable (remote version):	Up to 300m
• Mass Velocity:	0.025-203 m/s (5-40,000 FPM)	• Wetted materials:	316 SSS (Hastelloy and Monel optional)
• 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	• Weight:	
• Accuracy (and linearity):	1%RD +(0.5% FS)	Integral Ex proof:	9 lbs (4.0 kg)
• Repeatability:	± 0.25% of Full Scale	Remote Ex proof:	15 lbs (7.0 kg)
• Turn down ratio:	100:1, and up to 1200:1	Integral Non-Ex proof:	3 lbs (1.5 kg)
• Response time:	Less than one second	Remote Non Ex proof:	7 lbs (3.0 kg)
• Material:	316SS as per DIN 1.4571 (AISI 316 Ti)	• Linear signal output:	0-5 V <sub>DC</sub> & 4-20 mA
• Display units:	Flow, total flow, switch settings temperature, elapsed time	• Pulse output:	Scalable
• RAM Back-up:	Lithium battery	• Relays	Two 1-amp, SPDT User-selectable alarm functions
• Data storage:	EPROM storage up to 10 years	• Signal Interface	RS232 & RS485, MODBUS,etc..
• Display units:	Flow, total flow, switch settings	• Power requirements:	115V <sub>AC</sub> @ 1/8 A 230V <sub>AC</sub> @ 1/16 A 24 V <sub>DC</sub> @ 1/4 A, 12 V <sub>DC</sub>
• Housing protection:	NEMA 4,Class 1, Div 1, Groups B, C, & D	• Power Consumption:	2.5 Watts (Standard), or less 6W other models
• NIST traceable calibration:	Standard	• Self diagnostics functions:	ADC, DAC Alarm relay for EMI impulse noise

### ■ ATMFIS-SP



- FM/CSA Class1, Div2, Groups BCD T4
- Calibration milliwatt (mw) displayed for ongoing diagnostics
- Available in 12V<sub>DC</sub>, 24V<sub>DC</sub>, 115-230V<sub>AC</sub> (2.5W)
- Calibration self-check (built in diagnostics)
- Available with MODBUS RS485-RTU or HART or BACnet
- Accuracy (and linearity) :  $\pm 1\%RD + (0.5\% FS)$
- Separate power and output terminals
- Optional programmable USB dongle to adjust electronics
- 4 line OLED displays rate, total, temperature and graphical flowrate,
- Available with either high or low pressure ball valve retractor
- Remote electronics for both SP and NH with dual compartment option
- 6-conductor max loop resistance 10 ohms, over 1000 ft (300M)
- 4 line OLED rate, total, temperature and graphical flowrate (SP version) and 2 line OLED displays rate, total, for NH versions

### ■ ATMFIS-NH

- Designed for inexpensive non-hazardous use with Exd enclosure
- Low power dissipation, under 2.5 Watts (e.g., under 100 mA at 24 V<sub>DC</sub>)
- Accuracy:  $\pm 1\%RD + (0.5\% FS)$
- Modbus® compliant RS485 RTU communications
- 24 V<sub>DC</sub> or 115V<sub>AC</sub> / 230 V<sub>AC</sub>
- Flow Rate, Totalizer
- Available with either high or low pressure ball valve retractor
- Field reconfigurability via optional software
- 2 line OLED displays rate, total
- Diagnostic & graphic display



### ■ SMC 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 max.
- 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 analog outputs
- And many more

Flow Units: SCFM	ATMF AtrCom Report	1/23/2016
Total Units: SCF	Meter Serial#: 115619	7:34:56 AM
Temp Degrees: F	ATMF Prime v2.34	Tag ID#
Test report		
Work performed by: R.P.		

mW's	Flow	Cal mA's	Meas mA's	%Error
77.000	0.000	4.000	4.000	0.000
82.000	6.000	4.000	4.000	0.000
367.000	1256.774	8.000	8.000	-0.000
411.000	1715.476	9.490	9.490	0.000
444.000	2112.909	10.760	10.760	-0.000
485.000	2690.046	12.610	12.610	0.000
510.000	3067.932	13.880	13.880	-0.000
536.000	3656.660	15.480	15.480	0.000
566.000	4102.008	17.130	17.130	0.000
608.000	5000.000	20.000	20.000	0.000

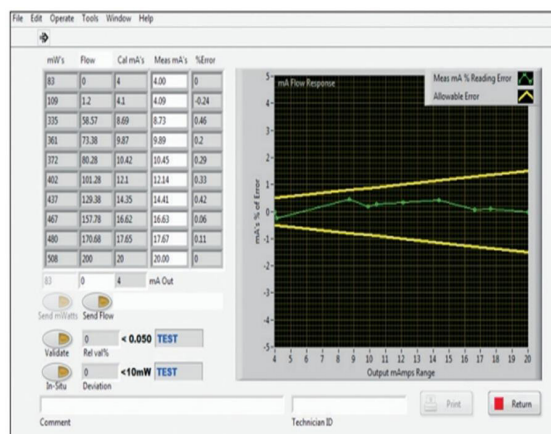
- Min Flow = 0.050
- Max Flow = 50.000
- mW Zero = 80
- mW Max = 607
- Filtering = 0.500
- K Factor = 1.000
- Cal Val = 76.187

\*\*\*\*\* VALIDATION RESULTS \*\*\*\*\*

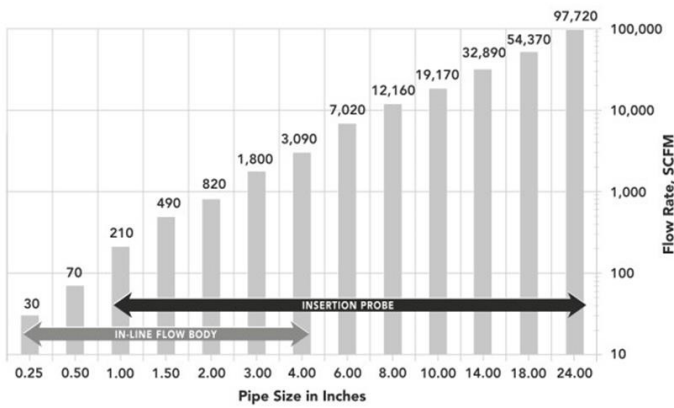
- Sensor Relative Variance = 0.004% (< 0.050) SCORE = PASS <--

\*\*\*\*\* IN-SITU RESULTS \*\*\*\*\*

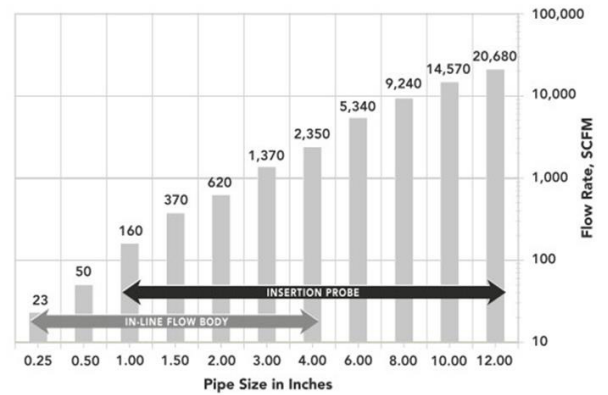
- Sensor mW Deviation = 17.797 (< 10.000) INDICATION = FAIL <--
- CONTAMINATION SUSPECTED




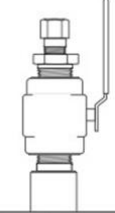
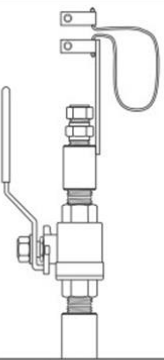
## ■ Air flow rate versus pipe size (note: 1 SCFM=1.7 NCMH)



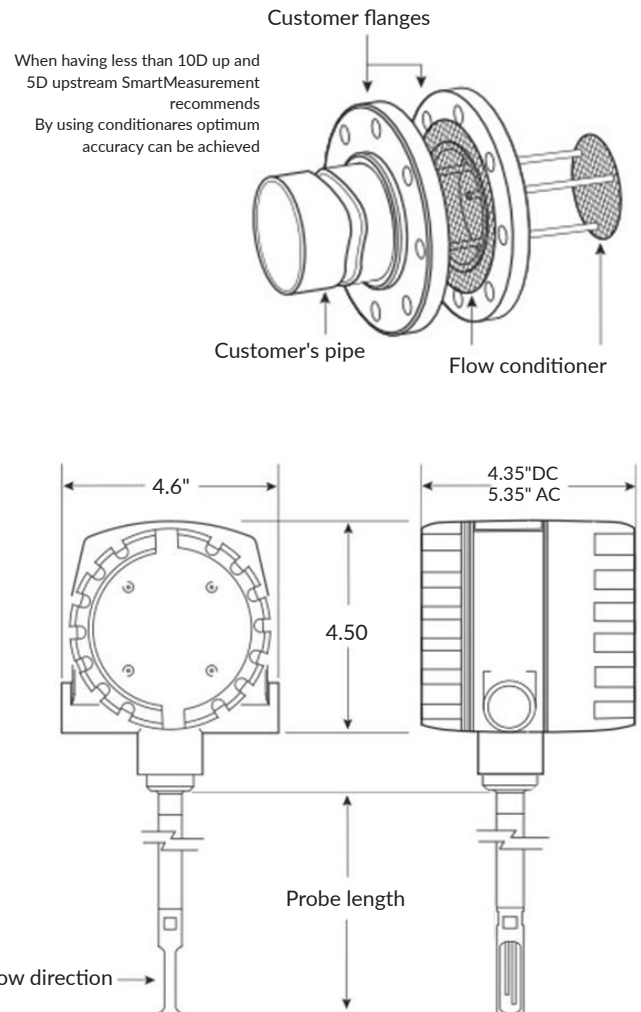
## ■ Natural flow rate versus pipe size (note: 1 SCFM=1.7 NCMH)



## ■ Connections options versus pipe size and probe Length

			
	<b>STCF05</b> Compression Fitting	<b>SVA05LP</b> Isolation Valve Low Pressure	<b>SVA05</b> Isolation Valve High Pressure
<b>PIPE SIZE</b>	<b>&lt;125 PSIG</b>	<b>&lt;50 PSIG</b>	<b>&lt;250 PSIG</b>
1" – 3.5"	6"	12"	15"
4" – 12"	12"	15"	18"
14" – 24"	15"	18"	24"
30"	18"	24"	30"
36"	24"	30"	36"

## ■ Flow Conditioner option for ATMF-IS



Procedures to specify our inline mass meters

**\*\* Please contact your local SmartMeasurement application engineer\*\***

You also need to provide the following information:

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

ATMF SERIES INSERTION METERS											
EXAMPLE ATMFIS-SP-I-05-15"-TFC05-DC24-O2 (40 NMPS, 40C AND 12 BARG)											
ATMFIS-		**	**	**	**	**	**	DESCRIPTION			
Integral industrial mass flow meter (includes graphical display) (CSA Exd-Approved)	SP							Transmitter			
Integral industrial mass flow meter (includes graphical display) (CSA Exd-Approved)	NH										
½" probe diameter		050						Probe-Diameter			
¾" probe diameter		075									
Integral			I						Style		
Remote			R								
Put insertion length in inches				##"						Insertion length	
1" ANSI 150 #					10A150					Connection	
½" ANSI 150 #					15A150						
2" ANSI 150 #					20A150						
1" ANSI 300 #					10A300						
½" ANSI 300 #					15A300						
2" ANSI 300 #					20A300						
½" Tube X ½" compression fitting - SS ferrule (>650 psi or 45 bar)					SSCF05						
¾" Tube X ¾" compression fitting - SS ferrule (>650 psi or 45 bar)					SCF07						
½" Tube X ½" compression fitting - teflon ferrule (>125 psi or 9 bar)					STCF05						
¾" Tube X ¾" compression fitting - teflon ferrule (>125 psi or 9 bar)					STCF07						
½" Tube X ¾" isolation valve assembly (650 psi or 45 bar)					SVL05						
½" Tube X ¾" isolation valve assembly (50 psi or 3.5 bar)					SVA05LP						
¾" Tube X 1" isolation valve assembly (350 psi or 24 bar)					SVA07						
12 V <sub>DC</sub>						12VDC				Power Supply	
24V <sub>DC</sub>						24VDC					
110-115 V <sub>AC</sub>						115VAC					
220-240V <sub>AC</sub>						230VAC					
Specify gas type and max velocity								Gas?		Gas	
Process gas (Please indicate gas type, flow rate, line size, pressure and temperature)					Process Data (T,P flow, etc)						
For larger flanges sizes, probe material (Hastelloy C, Monel) and other options contact SmartMeasurement											

