

MF100AEX Series

Explosion Proof Thermal Mass Flow Meter

Feature & Application

- Imbedded micro-processor controller
- Watch-dog software
- Wide turn-down ratio 300 : 1
- Accuracy $\pm 1.0\%$ reading
- Repeatability $\pm 0.15\%$ FS
- 16 x 2 Backlit LCD display
- Data logger (flow rate, total, trend graph)
- 24 VDC/VAC, 85-265 VAC power supply
- 4-20mA, alarm, pulse, Modbus RTU, ASCII output
- HART, Foundation Fieldbus, Profibus PA (option)
- Programing using IR sw (without cover opened)
- Programing using Tact sw or PC
- Field recalibration (within factory calibration range)
- Built-in surge protection, EMI-RFI immunity
- Non-heat convection sensor
- Moisturized compressed air measurement



General

The model MF100AEx series Thermal Mass Flow Meter is the instrument of choice for reliable and accurate gas mass flow measurement, which is based on constant temperature differential technology for air and other process gases in range from 0 – 250 NMPS. Because neither temperature nor pressure measurement are required. MF100AEx series reduces installation cost and vastly improves system accuracy.

The meter is easily installed or retrofitted with minimum down time and provides superior long term process reproducibility and easy serviceability. MF100AEx inline type flow meters are available in probe sizes from 1/4" to 6" with either NPT or flange connection, and insertion type flow meters are available in probe sizes from 4" to 36" with either compression fitting or flange connection. The transmitter provides a 4-20 mA linear output signal and optionally an RS485 serialized digital output signal. Other analog outputs are also available.

MF100AEx series flow meter utilizes a constant temperature differential (dT) technology. The sensor has two elements. The reference RTD measures the gas temperature.

The electronics heats the heated element above the gas temperature. It is the job of the electronics to maintain a constant dT between the gas temperature and the heated element.

As the mass flow increases, the increased number of gas molecules remove more heat from the heated element. The electronics senses this temperature reduction and adds additional power in order to maintain a constant dT. The amount of power delivered to the heated element, therefore, is just proportional to the mass flow rate.

Performance Specs

- Accuracy
 - ±1.0 % Reading
 - Straight pipe run 10 x ID (Up-stream) for Insertion meter
 - 5. x ID (Down-stream) for Insertion meter
- Repeatability
 - ±0.15 % Full Scale
- Response time
 - 0.9 sec (one time constant)
- Gas
 - Air, Argon, Nitrogen, Oxygen, Methane, Propane, Butan
 - Carbon Dioxide, Butane, Natural Gas, Digester Gas
 - Hydrogen, Ammonia, Mixed Gas, Others
- Temperature
 - Standard sensor : -40 ~ 121 °C
 - High temp sensor : - 0 ~ 204 °C
 - Ultra high temp sensor : - 0 ~ 370 °C
 - Enclosure :-40~70°C without LCD display
 - 0~60°C with LCD display
- Power supply
 - Standard : 24 VDC 0.25 Amp
 - Option : 85 ~ 265 VAC 50/60 Hz 10 watts
 - Built-In Surge Protection
 - DC reverse polarity protection-operation
- Output
 - 4-20 mA, ModBus 485, Alarm, Pulse
 - HART,Foundation Fieldbus,Profibus PA/DP

Operating Specs

- Flow units
 - Nm3/hr, Nm3/min, Kg/day, Kg/hr, Kg/min, Kg/sec
 - SCFM, SCFH, Lb/day, Lb/hr, Lb/min, Lb/sec
 - NLPH, NLPM, SLPM, SMPS, NMPS, SFPM , Others
- Flow Velocity
 - 0 ~ 150 NMPS (standard)-based on Air at 0°C 1 atm
 - 0 ~ 250 NMPS (option)-based on Air at 0°C 1 atm

Pipe Size	Nm3/hr	SCFM
0.25 inch	0 - 27	0 - 16
0.5 inch	0 - 82	0 - 48
0.75 inch	0 - 204	0 - 120
1.0 inch	0 - 326	0 - 192
1.25 inch	0 - 564	0 - 332
1.5 inch	0 - 760	0 - 450
2.0 inch	0 - 1280	0 - 750
2.5 inch	0 - 1855	0 - 1090
3.0 inch	0 - 2720	0 - 1600
4.0 inch	0 - 4893	0 - 2880
6.0 inch	0 - 10870	0 - 6400
note : reference gas Air		
Std condition Nm3/hr : 0°C 1 atm , SCFM : 70°F 1 atm		

- Gas Pressure (Maximum)
 - NPT 500 psig (34.5 barg)
 - 150# Flange 230 psig (16 barg)

Physical Specs

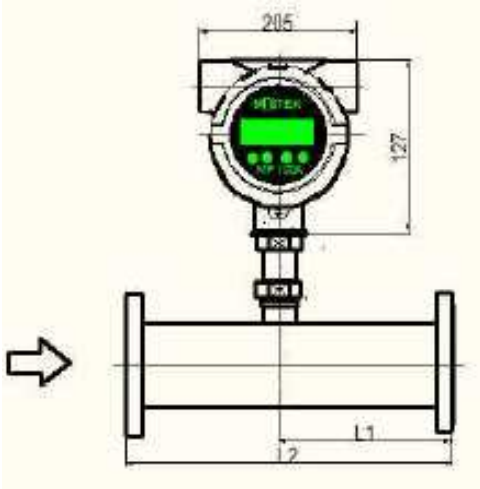
- Sensor material
 - Standard : 316 Stainless Steel
 - Optional : Hastelloy-C 276
- Enclosure (NEMA 4X IP66)
 - ATEX : Ex d IIC Gb, Ex t IIIC Db
 - Type : XD-ID100win (Limatherm)
- Remote cable
 - 3 conductor w/ shield 2.0 sq (100 M max)

Dimensional Specs

In-Line Flow Meter Dimension in cm (inch)			
Size	L2	C	HH
0.25 in	14.7(5.80)	25.0 (9.8)	20.0 (7.9)
0.5 in	30.5(12.0)	25.0 (9.8)	20.0 (7.9)
0.75 in	30.5(12.0)	25.0 (9.8)	20.0 (7.9)
1.0 in	30.5(12.0)	25.0 (9.8)	20.0 (7.9)
1.25 in	30.5(12.0)	25.0 (9.8)	20.0 (7.9)
1.5 in	30.5(12.0)	25.0 (9.8)	20.0 (7.9)
2.0 in	30.5(12.0)	25.0 (9.8)	20.0 (7.9)
2.5 in	45.7(18.0)	27.0 (10.6)	22.0 (8.7)
3.0 in	45.7(18.0)	27.0 (10.6)	22.0 (8.7)
4.0 in	45.7(18.0)	27.0 (10.6)	22.0 (8.7)
6.0 in	61.0(24.0)	30.0(11.8)	25.0 (9.8)

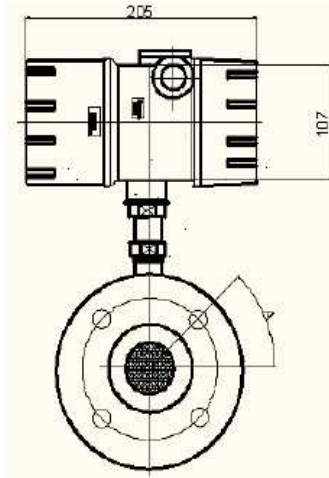
FRONT VIEW

ANSI 150# RF FLANGE 1/2-inch ~ 8-inch



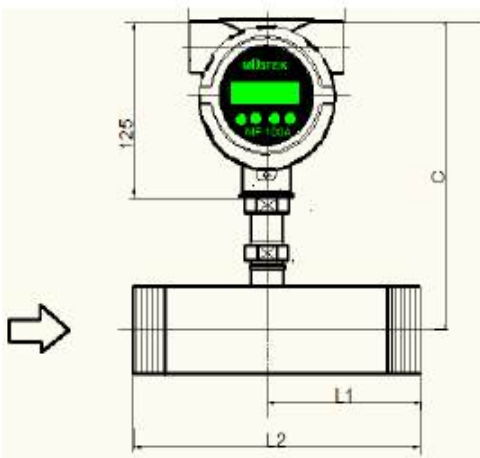
SIDE VIEW

ANSI 150# RF FLANGE 1/2-inch ~ 8-inch



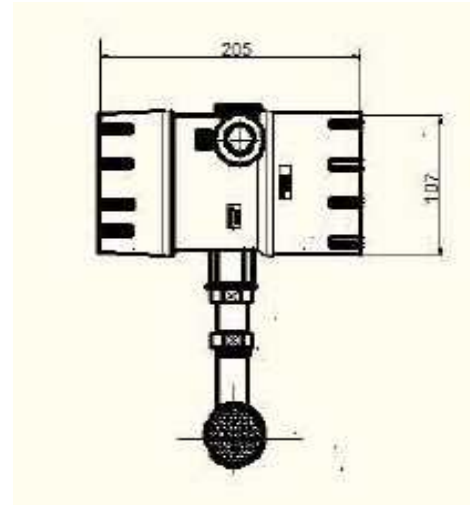
FRONT VIEW

(NPT MALE FITTING 1/4-inch ~8-inch)



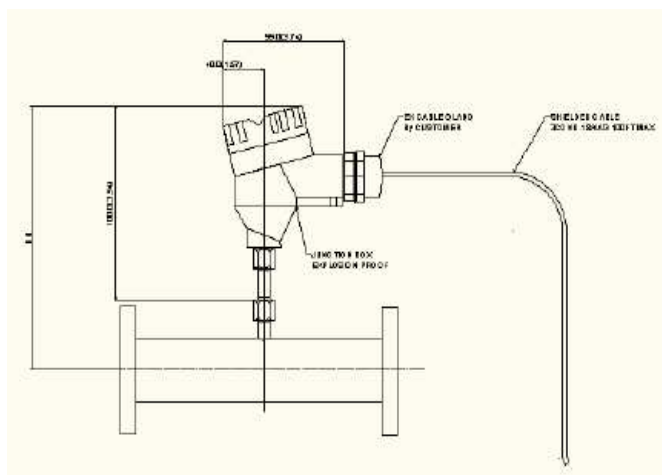
SIDE VIEW

NPT MALE FITTING 1/4-inch ~ 8-inch



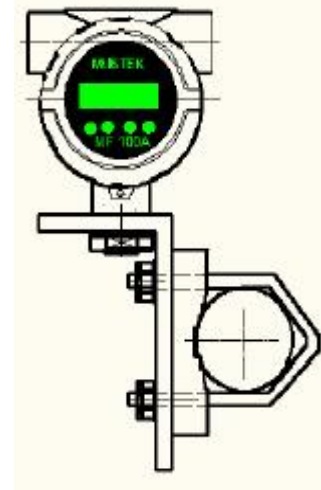
JUNCTION BOX WITH REMOTE CABLE

ANSI 150# RF FLANGE 1/2-inch ~ 8-inch



SIDE VIEW OF REMOTE ENCLOSURE

MOUNTING BRACKET

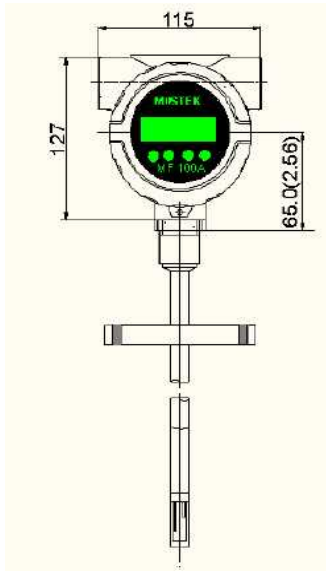


REMOTE ENCLOSURE - MOUNTING BRACKET

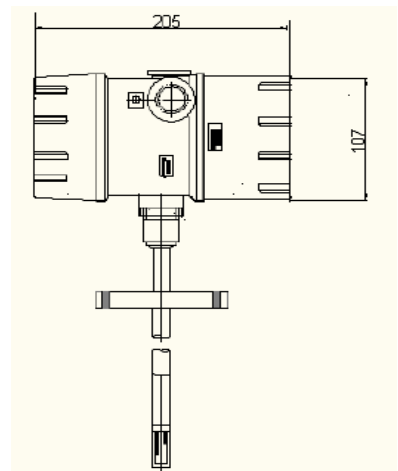
NEMA 4X EXPLOSION-PROOF

• Mostek reserves the right to make changes without further notice to any products to improve reliability, function, or design.

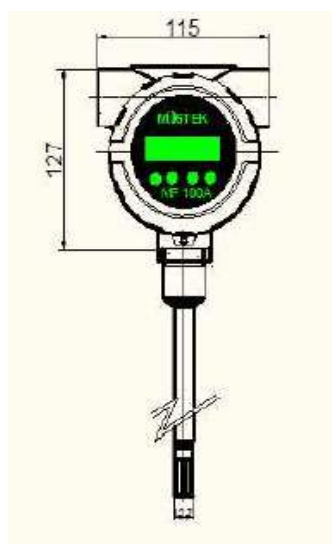
FRONT VIEW
ANSI 150# RF FLANGE TYPE



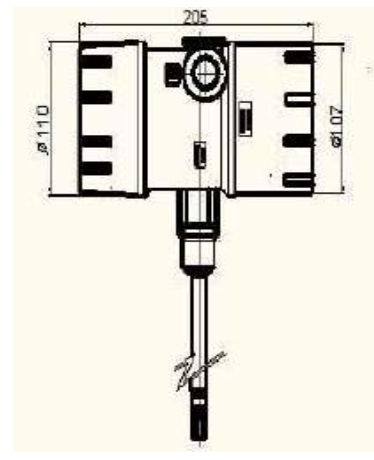
SIDE VIEW
ANSI 150# RF FLANGE TYPE



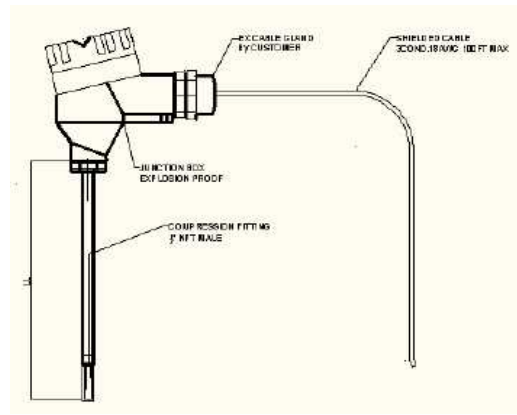
FRONT VIEW
COMPRESSION FITTING TYPE



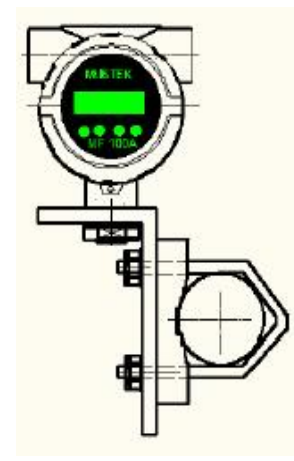
SIDE VIEW
COMPRESSION FITTING TYPE



JUNCTION BOX WITH REMOTE CABLE
COMPRESSION FITTING TYPE



SIDE VIEW OF REMOTE ENCLOSURE
MOUNTING BRACKET



REMOTE ENCLOSURE - MOUNTING BRACKET

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Parent Model Code		MF100AEx		Thermal Mass Flow Meter for In-Line Pipe	
Feature 1	Flow Body Size (Standard Sch 40) On request for above 8"	025F	025P	1/4" 316S ANSI 150# RF	1/4" 316SST PIPE NPT MALE
		050F	050P	1/2" 316S ANSI 150# RF	1/2" 316SST PIPE NPT MALE
		075F	075P	3/4" 316S ANSI 150# RF	3/4" 316SST PIPE NPT MALE
		100F	100P	1" 316S ANSI 150# RF	1" 316SST PIPE NPT MALE
		150F	150P	1-1/2" 316S ANSI 150# RF	1-1/2" 316SST PIPE NPT MALE
		200F	200P	2" 316S ANSI 150# RF	2" 316SST PIPE NPT MALE
		250F	250P	2-1/2" 316S ANSI 150# RF	2-1/2" 316SST PIPE NPT MALE
		300F	300P	3" 316S ANSI 150# RF	3" 316SST PIPE NPT MALE
		400F	400P	4" 316S ANSI 150# RF	4" 316SST PIPE NPT MALE
		600F	600P	6" 316S ANSI 150# RF	6" 316SST PIPE NPT MALE
800F	800P	8" 316S ANSI 150# RF	8" 316SST PIPE NPT MALE		
Feature 2	Sensor and Flow Body Material	SM1		316 Stainless Steel	
		SM2		Hastelloy C-276	
Feature 3	Sensor Temperature	ST1		Standard Sensor -40 ~ 121°C (-40 ~ 250 °F)	
		ST2		High Temperature Sensor 0 ~ 204°C (32 ~ 400 °F)	
		ST3		Ultra High Temperature Sensor 0 ~ 343°C (32 ~ 650 °F)	
Feature 4	Electronic Enclosure	E1		Local NEMA 4X enclosure , 24 VDC Powered	
		E2		Local NEMA 4X enclosure , 85 ~ 250 VAC Powered	
		E3		Remote NEMA 4X enclosure , 24 VDC Powered, no cable	
		E4		Remote NEMA 4X enclosure , 85~250 VAC Powered, no cable	
Feature 5	Local Display	D0		None	
		D1		16 x 2 Alphanumeric Backlit LCD Display	
Feature 6	Remote Enclosure Mounting Brackrt (E3, E4 Option Only)	RM0		None	
		RM1		2-Inch Pipe Mounting	
		RM2		Flat Surface Mounting	
Feature 7	Output	OP1		4~20 mA, Mosbus 485 RTU, Pulse, Hi-Lo Alarm	
		OP2		4~20 mA, HART, Pulse, Hi-Lo Alarm	
		OP3		Foundation Fieldbus	
		OP4		Profibus PA	
		OP5		Profibus DP	
Feature 8	Calibration	GC1		Air, N2 : MF less than 2040 NM3H (1200 SCFM)	
		GC2		Air, N2 : MF above than 2040 NM3H (1200 SCFM)	
		GC3		Ar,CO2, H2, CH4, Natural Gas, O2: MF < 1700 NM3H	
		GC4		Ar,CO2, H2, CH4, Natural Gas, O2: MF > 1700 NM3H	
		GC5		CO,He, Ammonia, Propane, Digester gas : MF < 1700 NM3H	
		GC6		CO,He, Ammonia, Propane, Digester gas : MF > 1700 NM3H	
		GC7		All other gases	
Feature 8	Option	1010		Remote Cable 3 conductor w/ shield 2.0 sq (100 meter max)	
		1020		Flow meter cleaning for Oxygen Service	

Parent Model Code		MF100AEx	Thermal Mass Flow Meter for Insertion Type
Feature 1	Probe Length (On request above 125L)	10L	Insertion Meter with 10 cm 316 SST material
		20L	Insertion Meter with 20 cm 316 SST material
		30L	Insertion Meter with 30 cm 316 SST material
		50L	Insertion Meter with 50 cm 316 SST material
		80L	Insertion Meter with 80 cm 316 SST material
		100L	Insertion Meter with 100 cm 316 SST material
		125L	Insertion Meter with 125 cm 316 SST material
Feature 2	Sensor and Probe & Fitting Material	SM1	316 Stainless Steel
		SM2	Hastelloy C-276
Feature 3	Sensor Temperature	ST1	Standard Sensor -40 ~ 121°C (-40 ~ 250 °F)
		ST2	High Temperature Sensor 0 ~ 204°C (32 ~ 400 °F)
		ST3	Ultra High Temperature Sensor 0 ~ 373°C (32 ~ 700 °F)
Feature 4	Enclosure	E1	Local NEMA 4X enclosure , 24 VDC Powered
		E2	Local NEMA 4X enclosure , 85 ~ 250 VAC Powered
		E3	Remote NEMA 4X enclosure , 24 VDC Powered, no cable
		E4	Remote NEMA 4X enclosure ,85~ 250 VAC Powered, no cable
Feature 5	Local Display	D0	None
		D1	16 x 2 Alphanumeric Backlit LCD Display
Feature 6	Output	OP1	4~20 mA, Mosbus 485, Pulse, Hi-Lo Alarm
		OP2	4~20 mA, HART, Pulse, Hi-Lo Alarm
		OP3	Foundation Fieldbus
		OP4	Profibus PA
		OP5	Profibus DP
Feature 7	Mounting Accessory	M0	None
		M1	1/2-inch 316 SST compression fitting
		M2	3/4-inch 316 SST compression fitting
		M3	1-inch ANSI 150# RF flange
		M9	On request
Feature 8	Remote Enclosure Mounting Brackrt (E3, E4 Option Only)	RM0	None
		RM1	2-Inch Pipe Mounting
		RM2	Flat Surface Mounting
Feature 9	Calibration	GC1	Air, N2 : MF less than 2040 NM3H (1200 SCFM)
		GC2	Air, N2 : MF above than 2040 NM3H (1200 SCFM)
		GC3	Ar,CO2, H2, CH4, Natural Gas, O2: MF < 1700 NM3H
		GC4	Ar,CO2, H2, CH4, Natural Gas, O2: MF > 1700 NM3H
		GC5	CO,He, Ammonia, Propane, Digester gas : MF < 1700 NM3H
		GC6	CO,He, Ammonia, Propane, Digester gas : MF > 1700 NM3H
		GC7	All other gases
Feature 10	Options	1010	Remote Cable 3 conductor w/ shield 2.0 sq (100 meter max)
		1020	Flow meter cleaning for Oxygen Service

Weather-Proof Thermal Mass Flow Meter for Pipe - Duct

Feature & Application

- Accuracy $\pm 1.0\%$ reading
- Watch-dog software
- Wide turn-down ratio 300 : 1
- Repeatability $\pm 0.15\%$ FS
- 16 x 2 Backlit LCD display
- 8 Digits for flow, 10 Digits for totalizer
- 24 VDC/VAC, 85-265 VAC power supply
- 4-20mA, Pulse, Hi-Lo Alarm, Modbus 485 Output
- Smart field-programmable using key or PC
- Reverse DC power polarity protection
- Display, Enclosure, Sensor rotatable for any angle 360°
- Data Acquisition and logging software MIP200
- Status LED for Modbus 485, Pulse, Alarm
- Hinged cover for easy installation, wiring



General

The model MF200A series Thermal Mass Flow Meter is the instrument of choice for reliable and accurate gas mass flow measurement, which is based on constant temperature differential technology for air and other process gases in range from 0 – 250 NMPS. Because neither temperature nor pressure measurement are required. MF200 series reduces installation cost and vastly improves system accuracy.

The meter is easily installed or retrofitted with minimum down time and provides superior long term process reproducibility and easy serviceability. MF200A inline type flow meters are available in probe sizes from 1/4” to 6” with either NPT or flange connection, and insertion type flow meters are available in probe sizes from 4” to 36” with either compression fitting or flange connection. The transmitter provides a 4-20 mA linear output signal and optionally an RS485 serialized digital output signal. Other analog outputs are also available.

MF200A series flow meter utilizes a constant temperature differential (ΔT) technology.

The sensor has two elements. The reference RTD measures the gas temperature. The electronics heats the heated element above the gas temperature. It is the job of the electronics to maintain a constant ΔT between the gas temperature and the heated element. As the mass flow increases, the increased number of gas molecules remove more heat from the heated element. The electronics senses this temperature reduction and adds additional power in order to maintain a constant ΔT .

The amount of power delivered to the heated element, therefore, is just proportional to the mass flow rate.

Performance Specs

- Accuracy
 - ±1.0 % Reading
 - Straight pipe run 10 x ID (Up-stream) for Insertion meter
 - 5. x ID (Down-stream) for Insertion meter
- Repeatability
 - ±0.15 % Full Scale
- Response time
 - 0.9 sec (one time constant)
- Gases
 - Air, Argon, Nitrogen, Oxygen, Methane, Propane, Butan
 - Carbon Dioxide, Butane, Natural Gas, Digester Gas
 - Hydrogen, Ammonia, Mixed Gas, Others
- Temperature
 - Standard sensor : -40 ~ 121 °C
 - High temp sensor : - 0 ~ 204 °C
 - Ultra high temp sensor : - 0 ~ 370 °C
 - Enclosure : -40 ~70°C without display
 - 0 ~ 60°C with display
- Power supply
 - Standard : 24 VDC 0.25 Amp
 - Option : 85~250 VAC 50/60 Hz
 - Built-In Surge Protection
 - DC reverse polarity protection
- Output
 - 4-20 mA DC, Alarm, Pulse, Modbus 485

Operating Specs

- Flow units
 - Nm3/hr, Nm3/min, Kg/day, Kg/hr, Kg/min, Kg/sec
 - SCFM, SCFH, Lb/day, Lb/hr, Lb/min, Lb/sec
 - NLPH, NLPM, SLPM, SMPS, NMPS, SFPM
- Flow Velocity
 - 0 ~ 150 NMPS (standard)-based on Air at 0°C 1 atm
 - 0 ~ 250 NMPS (option)-based on Air at 0°C 1 atm

Pipe Size	Nm3/hr	SCFM
0.25 inch	0 - 27	0 - 16
0.5 inch	0 - 82	0 - 48
0.75 inch	0 - 204	0 - 120
1.0 inch	0 - 326	0 - 192
1.25 inch	0 - 564	0 - 332
1.5 inch	0 - 760	0 - 450
2.0 inch	0 - 1280	0 - 750
2.5 inch	0 - 1855	0 - 1090
3.0 inch	0 - 2720	0 - 1600
4.0 inch	0 - 4893	0 - 2880
6.0 inch	0 - 10870	0 - 6400

note : reference gas Air

Stda condition Nm3/hr : 0°C 1 atm , SCFM : 70°F 1 atm

- Gas Pressure (Maximum)
 - NPT 500 psig (34.5 barg)
 - 150# Flange 230 psig (16 barg)
 - For high pressure, consult factory

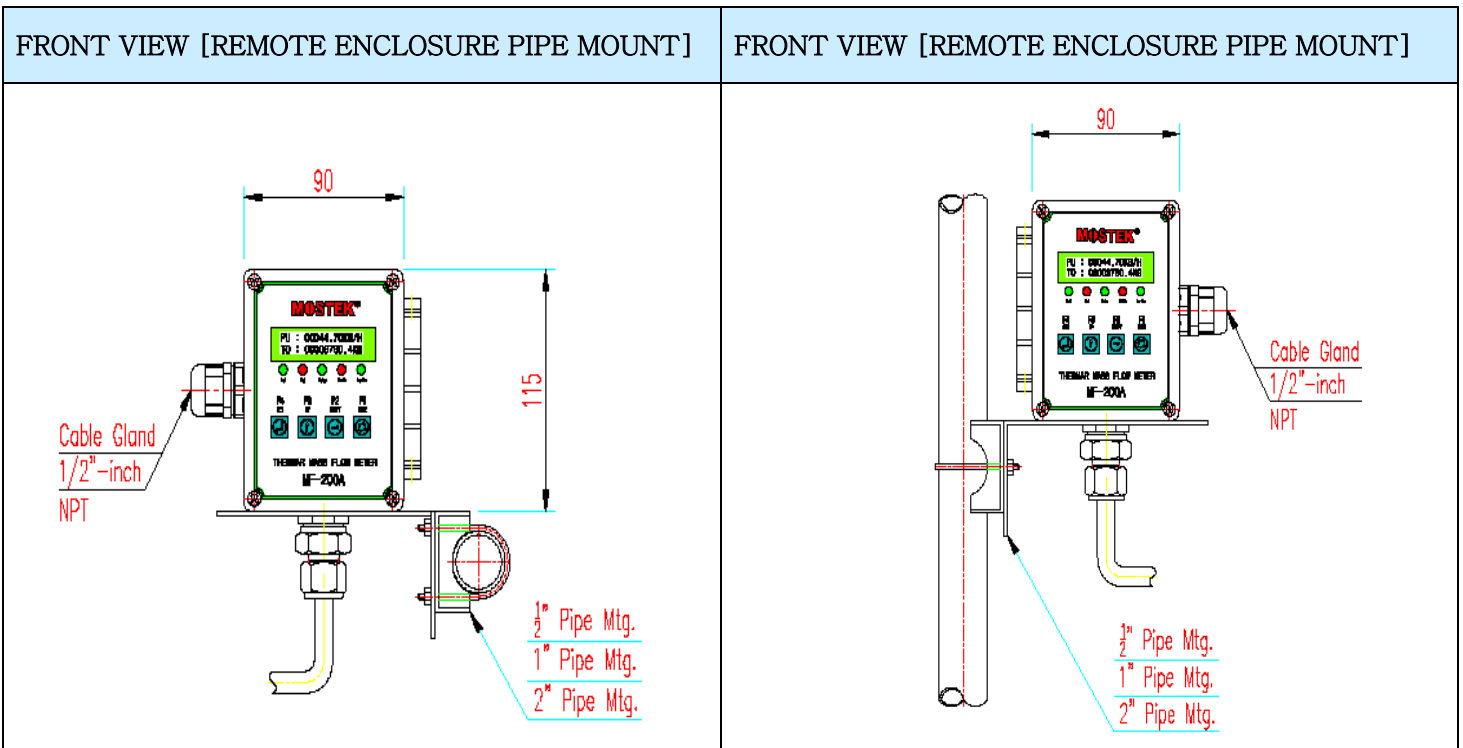
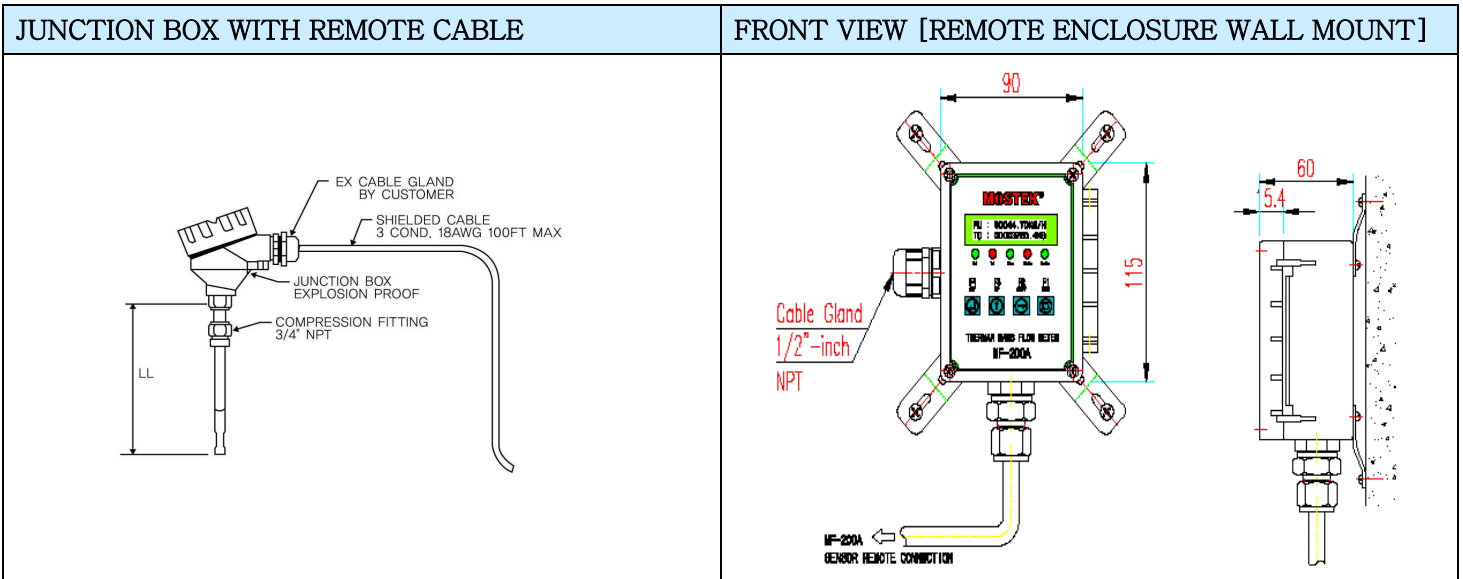
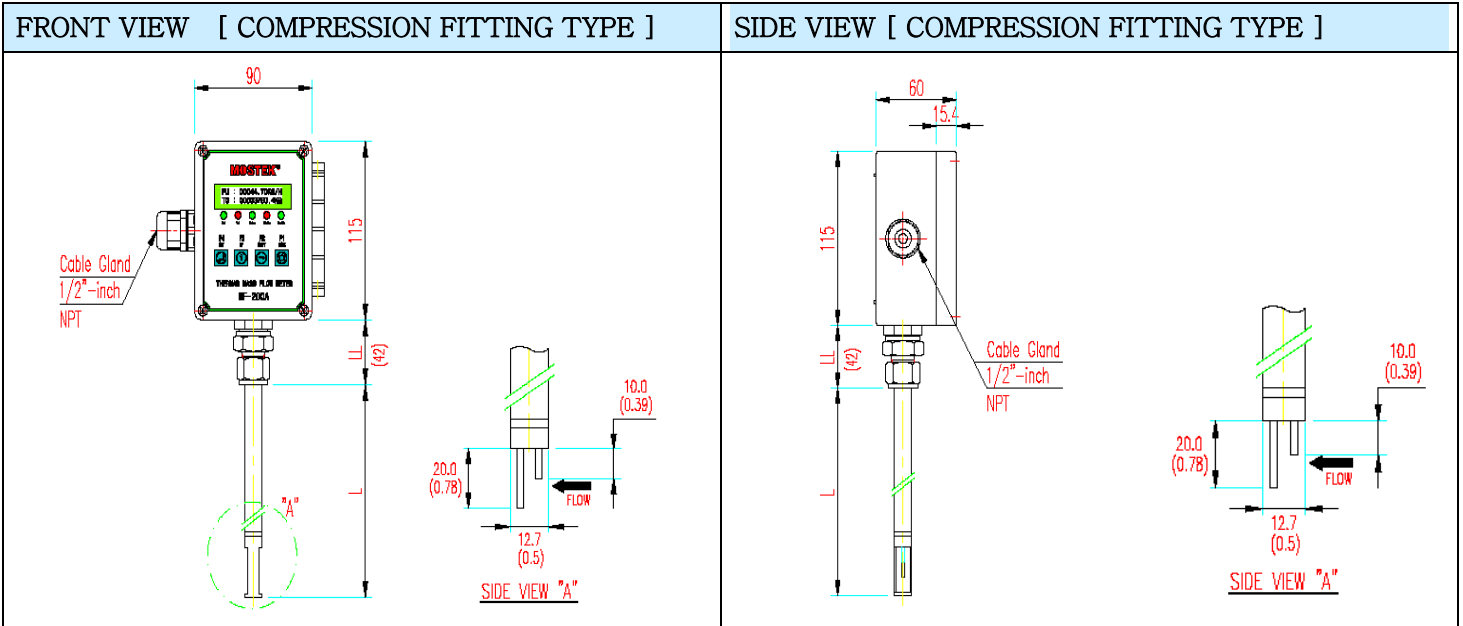
Note : pressure rating based on 38°C (100°F)

Physical Specs

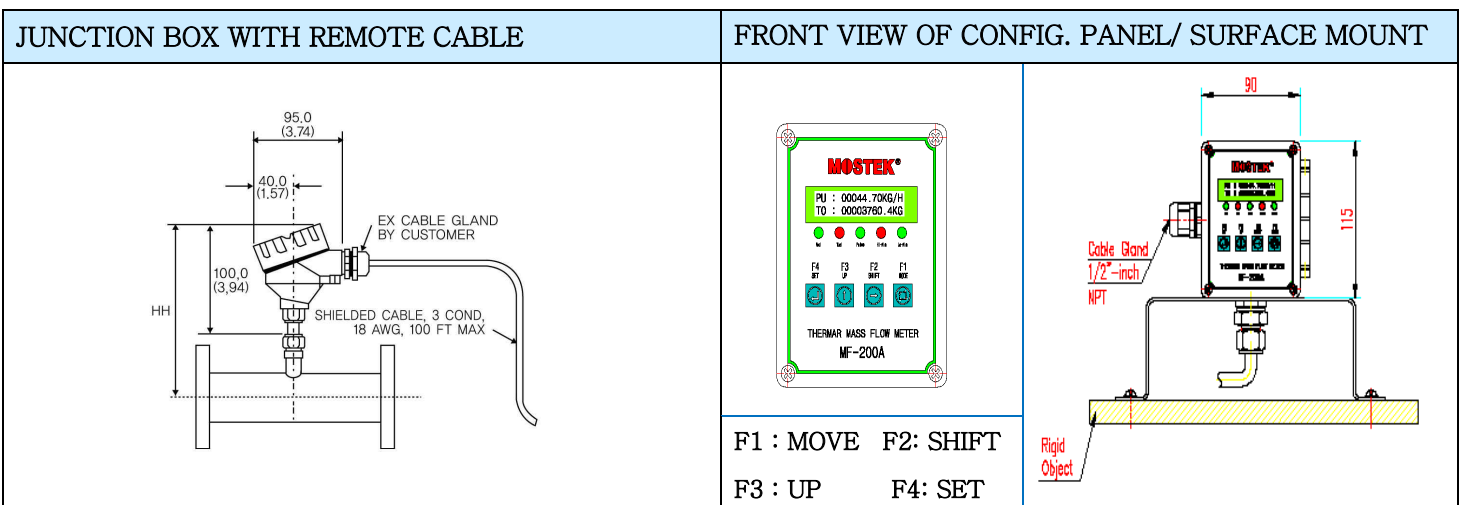
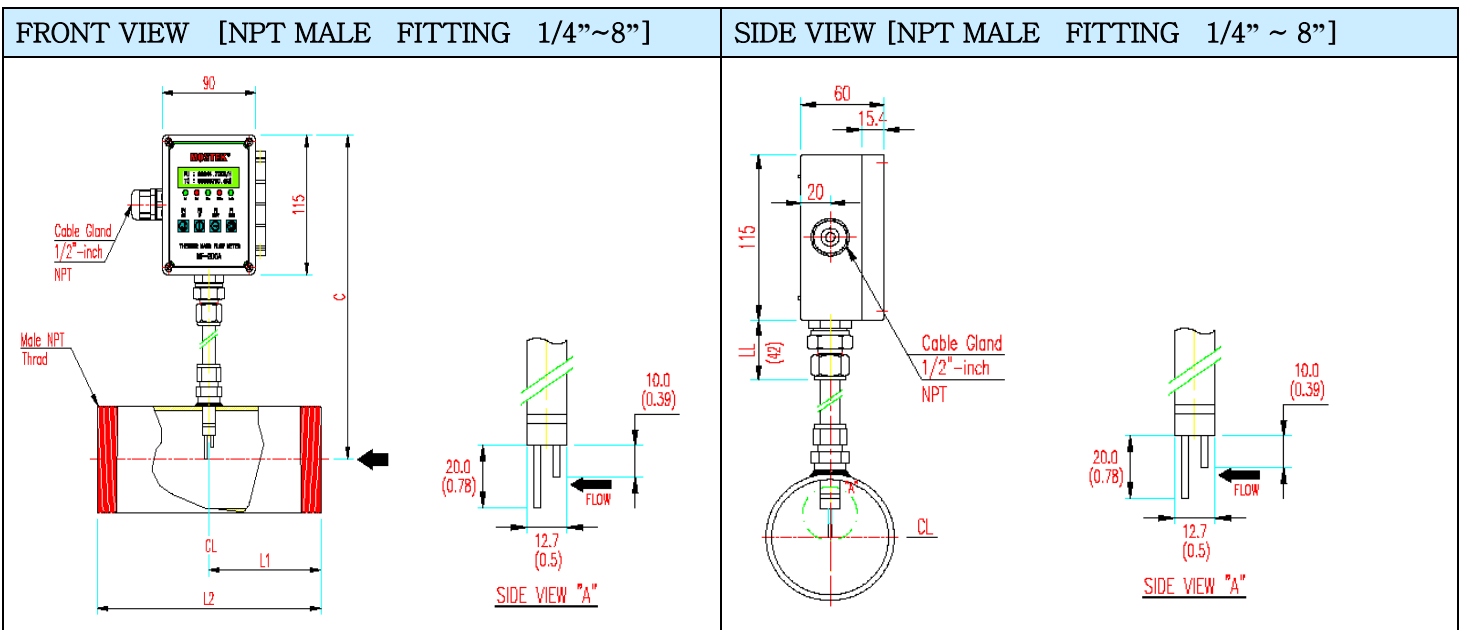
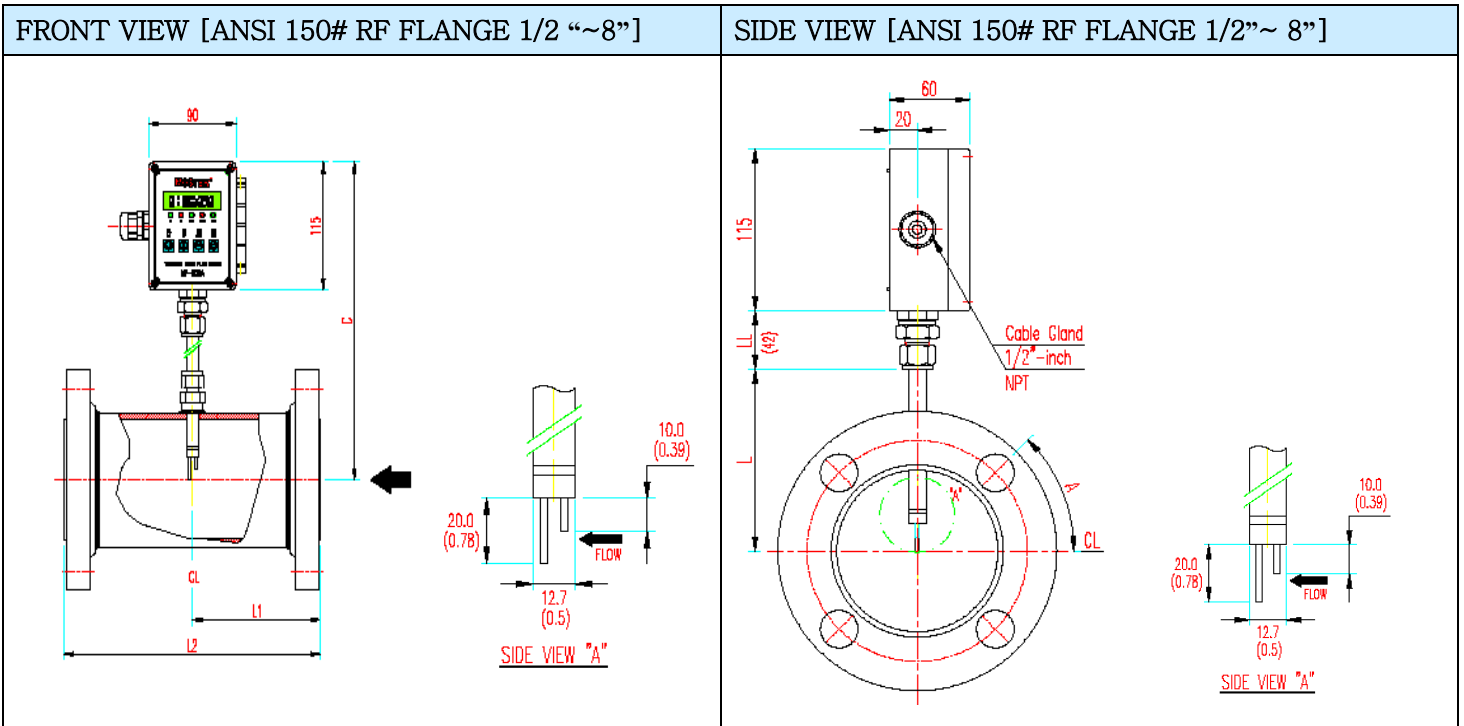
- Sensor material
 - Standard : 316 Stainless Steel
 - Optional : Hastelloy-C 276
- Enclosure
 - Weather-Proof, NEMA 4X, IP66
 - Non-hazardous area location
 - Option : remote NEMA 4X, J-box
- Remote cable
 - 3 conductor w/ shield 2.0 sq (100 M max)

Dimensional Specs

In-Line Flow Meter Dimension in cm (inch)			
Size	L2	C	HH
0.25 in	14.7(5.80)	25.0 (9.8)	20.7 (7.9)
0.5 in	30.5(12.0)	25.0 (9.8)	20.7 (7.9)
0.75 in	30.5(12.0)	25.0 (9.8)	20.7 (7.9)
1.0 in	30.5(12.0)	25.0 (9.8)	20.7 (7.9)
1.25 in	30.5(12.0)	25.0 (9.8)	20.7 (7.9)
1.5 in	30.5(12.0)	25.0 (9.8)	20.7 (7.9)
2.0 in	30.5(12.0)	25.0 (9.8)	20.7 (7.9)
2.5 in	45.7(18.0)	27.0(10.6)	22.0 (8.7)
3.0 in	45.7(18.0)	27.0(10.6)	22.0 (8.7)
4.0 in	45.7(18.0)	27.0(10.6)	22.0 (8.7)
6.0 in	61.0(24.0)	30.0(11.8)	25.0 (9.8)



Dimension



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Parent Model Code		MF200A	Thermal Mass Flow Meter for In-Line Pipe		
Feature 1	Flow Body Size (Standard Sch 40) On request for above 4"	025F	025P	1/4" 316S ANSI 150# RF	1/4" 316SST PIPE NPT MALE
		050F	050P	1/2" 316S ANSI 150# RF	1/2" 316SST PIPE NPT MALE
		075F	075P	3/4" 316S ANSI 150# RF	3/4" 316SST PIPE NPT MALE
		100F	100P	1" 316S ANSI 150# RF	1" 316SST PIPE NPT MALE
		150F	150P	1-1/2" 316S ANSI 150# RF	1-1/2" 316SST PIPE NPT MALE
		200F	200P	2" 316S ANSI 150# RF	2" 316SST PIPE NPT MALE
		250F	250P	2-1/2" 316S ANSI 150# RF	2-1/2" 316SST PIPE NPT MALE
		300F	300P	3" 316S ANSI 150# RF	3" 316SST PIPE NPT MALE
		400F	400P	4" 316S ANSI 150# RF	4" 316SST PIPE NPT MALE
		600F	600P	6" 316S ANSI 150# RF	6" 316SST PIPE NPT MALE
		800F	800P	8" 316S ANSI 150# RF	8" 316SST PIPE NPT MALE
Feature 2	Sensor and Flow Body Material	SM1	316 Stainless Steel		
		SM2	Hastelloy-C 276		
Feature 3	Sensor Temperature	ST1	Standard Sensor -40 ~ 121°C (-40 ~ 250 °F)		
		ST2	High Temp Sensor 0 ~ 204°C (32 ~ 400 °F) <i>E3, E4 Only</i>		
		ST3	Ultra High Temp Sensor 0 ~ 343°C (32~650 °F) <i>E3,E4 Only</i>		
Feature 4	Electronic Enclosure	E1	Local NEMA 4X enclosure , 24 VDC Powered		
		E2	Local NEMA 4X enclosure , 85 ~ 250 VAC Powered		
		E3	Remote NEMA 4X enclosure , 24 VDC Powered, no cable		
		E4	Remote NEMA 4X enclosure , 85~250 VAC Powered,no cable		
Feature 5	Local Display	D0	None		
		D1	16 x 2 Alphanumeric Backlit LCD Display		
Feature 6	Outputs	OP1	4~20 mA, Mosbus 485, Pulse, Hi-Lo Alarm		
		OP2	4~20 mA, HART, Pulse, Hi-Lo Alarm		
		OP3	Foundation Fieldbus		
		OP4	Profibus PA		
		OP5	Profibus DP		
Feature 7	Remote Enclosure Mounting Bracket (<i>E3, E4 Option Only</i>)	MW000	Wall Mounting Bracket	MS000	Top Surface Mounting
		MPH05	1/2" Pipe-Horizontal	MPV05	1/2" Pipe-Vertical
		MPH10	1" Pipe-Horizontal	MPV10	1" Pipe-Vertical
		MPH20	2" Pipe-Horizontal	MPV20	2" Pipe-Vertical
Feature 8	Calibration	GC1	Air, N2 : MF less than 2040 NM3H (1200 SCFM)		
		GC2	Air, N2 : MF above than 2040 NM3H (1200 SCFM)		
		GC3	Ar,CO2, H2, CH4, Natural Gas, O2: MF < 1700 NM3H		
		GC4	Ar,CO2, H2, CH4, Natural Gas, O2: MF > 1700 NM3H		
		GC5	CO,He, Ammonia, Propane, Digester gas : MF < 1700 NM3H		
		GC6	CO,He, Ammonia, Propane, Digester gas : MF > 1700 NM3H		
		GC7	All other gases		
Feature 9	Option	1010	Remote Cable 3 conductor w/ shield 2.0 sq (100 meter max)		

Parent Model Code		MF200A	Thermal Mass Flow Meter for Insertion Type		
Feature 1	Probe Length On request for above 125L	10L	Insertion Meter with 10 cm 316 SST material		
		20L	Insertion Meter with 20 cm 316 SST material		
		30L	Insertion Meter with 30 cm 316 SST material		
		40L	Insertion Meter with 40 cm 316 SST material		
		50L	Insertion Meter with 50 cm 316 SST material		
		60L	Insertion Meter with 60 cm 316 SST material		
		80L	Insertion Meter with 80 cm 316 SST material		
		100L 125L	Insertion Meter with 100 cm 316 SST material Insertion Meter with 125 cm 316 SST material		
Feature 2	Sensor and Probe & Fitting Material	SM1	316 Stainless Steel		
		SM2	Hastelloy-C 276		
Feature 3	Sensor Temperature	ST1	Standard Sensor -40 ~ 121°C (-40 ~ 250 °F)		
		ST2	High Temp Sensor 0 ~ 204°C (32 ~ 400 °F) <i>E3, E4 Only</i>		
		ST3	Ultra High Temp Sensor 0 ~ 343°C (32~650 °F) <i>E3,E4 Only</i>		
Feature 4	Enclosure	E1	Local NEMA 4X enclosure , 24 VDC Powered		
		E2	Local NEMA 4X enclosure , 85 ~ 250 VAC Powered		
		E3	Remote NEMA 4X enclosure , 24 VDC Powered, no cable		
		E4	Remote NEMA 4X enclosure , 85~250 VAC Powered,no cable		
Feature 5	Local Display	D0	None		
		D1	16 x 2 Alphanumeric Backlit LCD Display		
Feature 6	Outputs	OP1	4~20 mA, Mosbus 485, Pulse, Hi-Lo Alarm		
		OP2	4~20 mA, HART, Pulse, Hi-Lo Alarm		
		OP3	Foundation Fieldbus		
		OP4	Profibus PA		
		OP5	Profibus DP		
Feature 7	Probe Mounting Fitting	MA	1/2”(ID)-1/2”(OD)316 SST Compression Fitting		
		MB	1/2”(ID)-3/4”(OD)316 SST Compression Fitting		
		MC	2” Flange Mounting		
Feature 8	Remote Enclosure Mounting Bracket (<i>E3, E4 Option Only</i>)	MW000	Wall Mounting Bracket	MS000	Top Surface Mounting
		MPH05	1/2” Pipe-Horizontal	MPV05	1/2” Pipe-Vertical
		MPH10	1” Pipe-Horizontal	MPV10	1” Pipe-Vertical
		MPH20	2” Pipe-Horizontal	MPV20	2” Pipe-Vertical
Feature 9	Calibration	GC1	Air, N2 : MF less than 2040 NM3H (1200 SCFM)		
		GC2	Air, N2 : MF above than 2040 NM3H (1200 SCFM)		
		GC3	Ar,CO2, H2, CH4, Natural Gas, O2: MF < 1700 NM3H		
		GC4	Ar,CO2, H2, CH4, Natural Gas, O2: MF > 1700 NM3H		
		GC5	CO,He, Ammonia, Propane, Digester gas : MF < 1700 NM3H		
		GC6	CO,He, Ammonia, Propane, Digester gas : MF > 1700 NM3H		
		GC7	All other gases		
Feature 10	Options	1010	Remote Cable 3 conductor w/ shield 2.0 sq (100 meter max)		

Feature & Application

- Imbedded micro-processor controller
- Watch-dog software
- Wide turn-down ratio 300 : 1
- Accuracy $\pm 1.0\%$ reading
- Repeatability $\pm 0.15\%$ FS
- 16 x 2 Backlit LCD display
- 8 Digits for flow, 10 Digits for totalizer
- 24 VDC/VAC, 85-265 VAC power supply
- 4-20mA, 0-5 VDC, alarm, pulse, RS-485 output
- Smart field-programmable using key or PC
- Reverse DC power polarity protection
- Built-in surge protection, EMI-RFI immunity
- Non-heat convection sensor
- Data Logger by PC (Flow, Total, Trend Graph)
- NIST Traceable and/or KTL certificate



General

The model MF210A series Thermal Mass Flow Meter is the instrument of choice for reliable and accurate gas mass flow measurement, which is based on constant temperature differential technology for air and other process gases in range from 0 – 250 NMPS. Because neither temperature nor pressure measurement are required. MF210A series reduces installation cost and vastly improves system accuracy.

The meter is easily installed or retrofitted with minimum down time and provides superior long term process reproducibility and easy serviceability. MF210A inline type flow meters are available in probe sizes from 1/4" to 6" with either NPT or flange connection, and insertion type flow meters are available in probe sizes from 4" to 36" with either compression fitting or flange connection. The transmitter provides a 4-20 mA linear output signal and optionally an RS485 serialized digital output signal. Other analog outputs are also available.

MF210A series flow meter utilizes a constant temperature differential (dT) technology.

The sensor has two elements. The reference RTD measures the gas temperature. The electronics heats the heated element above the gas temperature. It is the job of the electronics to maintain a constant dT between the gas temperature and the heated element.

As the mass flow increases, the increased number of gas molecules remove more heat from the heated element. The electronics senses this temperature reduction and adds additional power in order to maintain a constant dT.

The amount of power delivered to the heated element, therefore, is just proportional to the mass flow rate.

- Accuracy
 - ±1.0 % Reading
 - Straight pipe run 10 x ID (Up-stream) for Insertion meter
 - 5. x ID (Down-stream) for Insertion meter
- Repeatability
 - ±0.15 % Full Scale
- Response time
 - 0.9 sec (one time constant)
- Gases
 - Air, Argon, Nitrogen, Oxygen, Methane, Propane, Butan
 - Carbon Dioxide, Butane, Natural Gas, Digester Gas
 - Hydrogen, Ammonia, Mixed Gas, Others
- Temperature
 - Standard sensor : -40 ~ 121 °C
 - High temp sensor : - 0 ~ 204 °C
 - Ultra high temp sensor : - 0 ~ 370 °C
 - Enclosure :-40~70°C without LCD display
 - 0~60°C with LCD display
- Power supply
 - Standard : 24 VDC 0.25 Amp
 - Option : 85~250 VAC 50/60 Hz 10 watts
 - Built-In Surge Protection
 - DC reverse polarity protection
- Output
 - 4-20 mA DC, Modbus 485, Alarm, Pulse

Operating Specs

- Flow units
 - Nm3/hr, Nm3/min, Kg/day, Kg/hr, Kg/min, Kg/sec
 - SCFM, SCFH, Lb/day, Lb/hr, Lb/min, Lb/sec
 - NLPH, NLPM, SLPM, SMPS, NMPS, SFPM
- Flow Velocity
 - 0 ~ 150 NMPS (standard)-based on Air at 0°C 1 atm
 - 0 ~ 250 NMPS (option)-based on Air at 0°C 1 atm

Pipe Size	Nm3/hr	SCFM
0.25 inch	0 - 27	0 - 16
0.5 inch	0 - 82	0 - 48
0.75 inch	0 - 204	0 - 120
1.0 inch	0 - 326	0 - 192
1.25 inch	0 - 564	0 - 332
1.5 inch	0 - 760	0 - 450
2.0 inch	0 - 1280	0 - 750
2.5 inch	0 - 1855	0 - 1090
3.0 inch	0 - 2720	0 - 1600
4.0 inch	0 - 4893	0 - 2880
6.0 inch	0 - 10870	0 - 6400
note : reference gas Air		
Stda condition Nm3/hr : 0°C 1 atm , SCFM : 70°F 1 atm		

- Gas Pressure (Maximum)
 - NPT 500 psig (34.5 barg)
 - 150# Flange 230 psig (16 barg)
 - For high pressure, consult factory
 - Note : pressure rating based on 38°C (100°F)

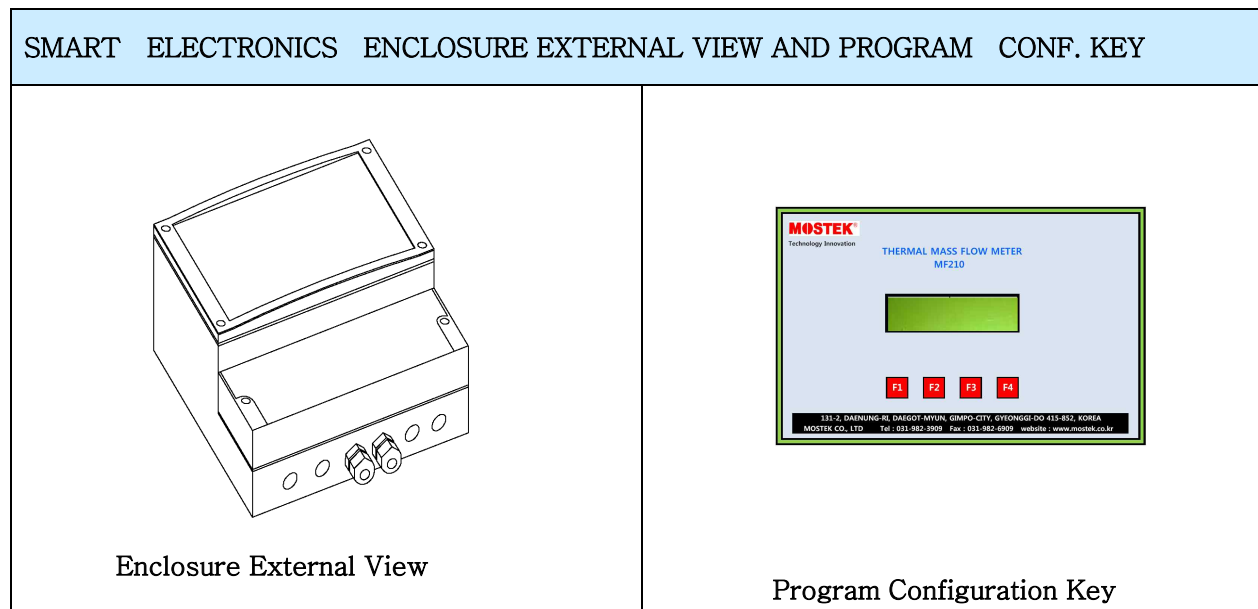
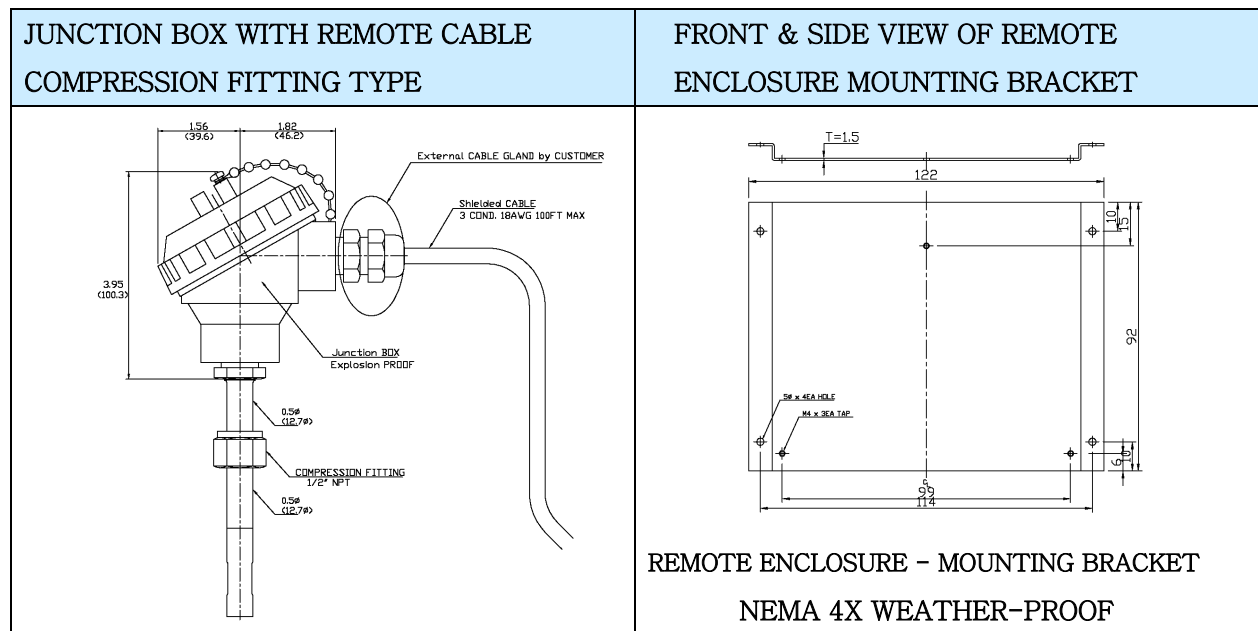
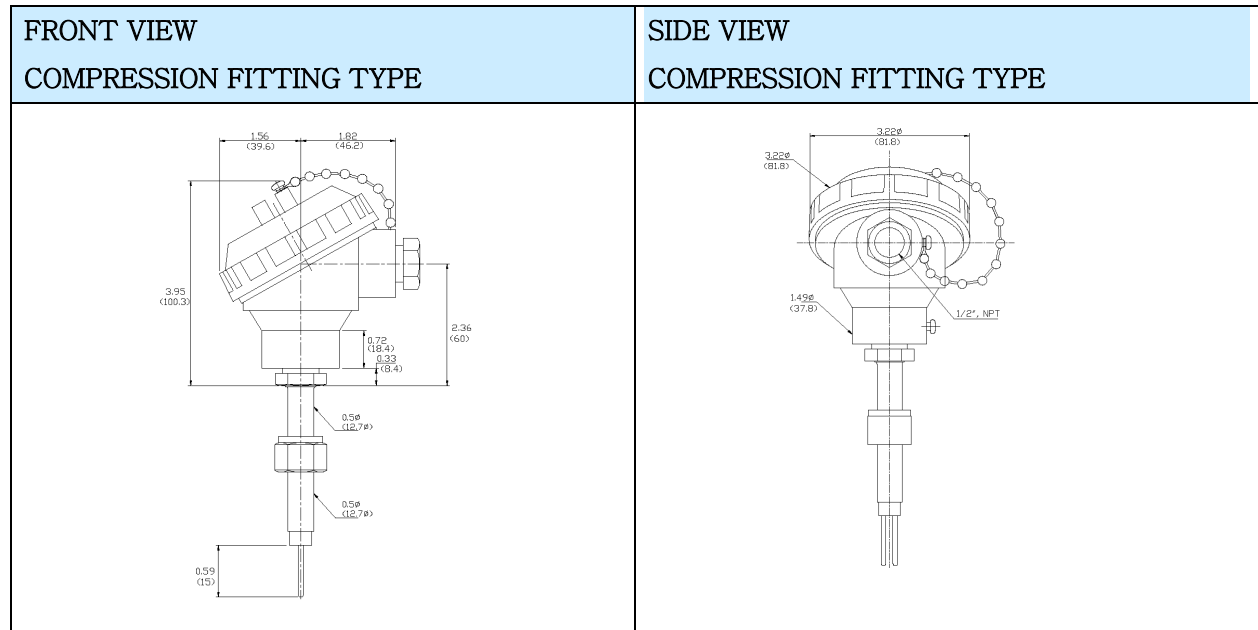
Physical Specs

- Sensor material
 - Standard : 316 Stainless Steel
 - Optional : Hastelloy-C 276
- Enclosure
 - Weather-Proof, NEMA 4X, IP66
 - Non-hazardous area location
 - Option : remote NEMA 4X, J-box
- Remote cable
 - 3 conductor w/ shield 2.0 sq (100 M max)

Dimensional Specs

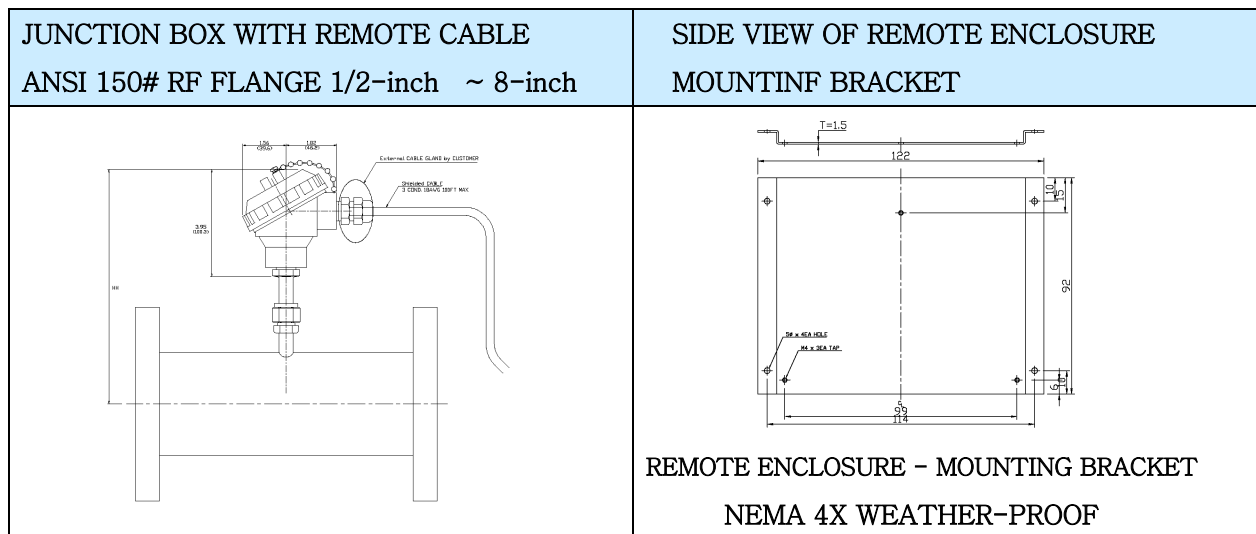
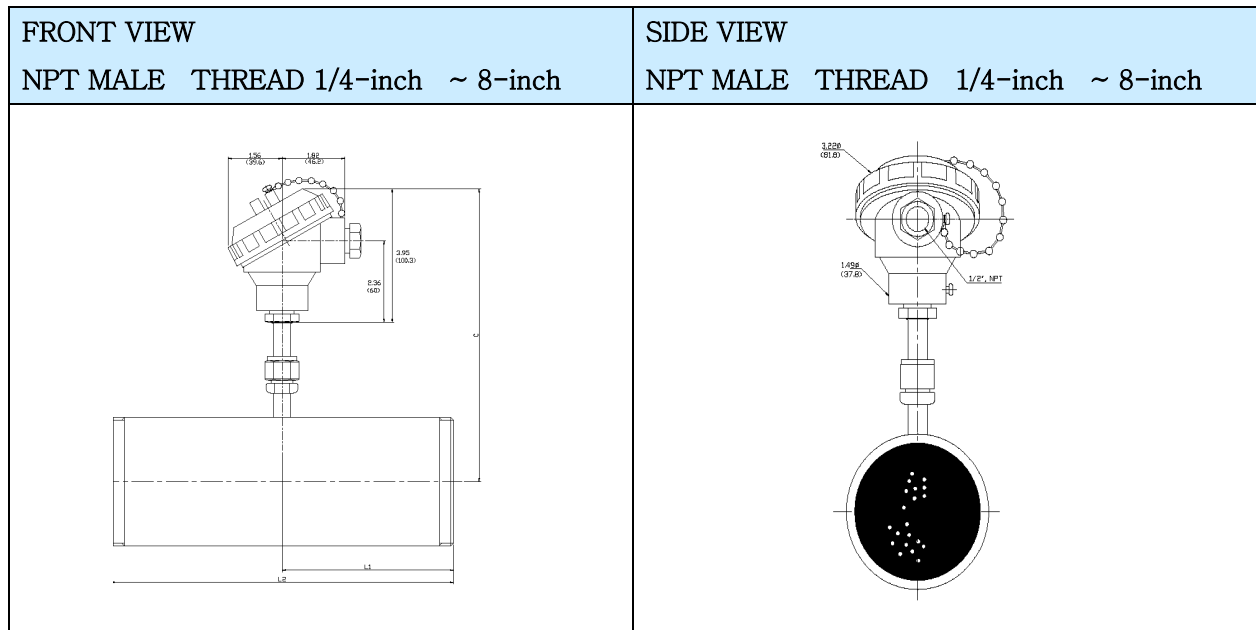
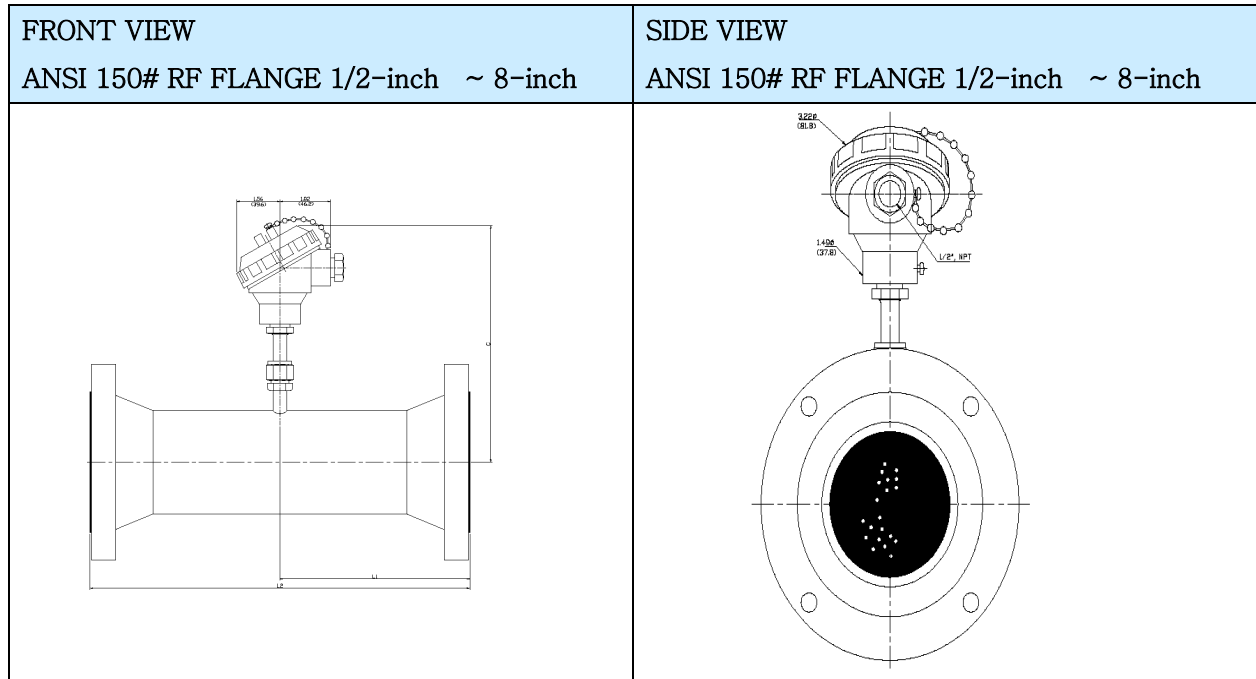
In-Line Flow Meter Dimension in cm (inch)			
Size	L2	C	HH
0.25 in	14.7(5.80)	25.0 (9.8)	20.7 (7.9)
0.5 in	30.5(12.0)	25.0 (9.8)	20.7 (7.9)
0.75 in	30.5(12.0)	25.0 (9.8)	20.7 (7.9)
1.0 in	30.5(12.0)	25.0 (9.8)	20.7 (7.9)
1.25 in	30.5(12.0)	25.0 (9.8)	20.7 (7.9)
1.5 in	30.5(12.0)	25.0 (9.8)	20.7 (7.9)
2.0 in	30.5(12.0)	25.0 (9.8)	20.7 (7.9)
2.5 in	45.7(18.0)	27.0(10.6)	22.0 (8.7)
3.0 in	45.7(18.0)	27.0(10.6)	22.0 (8.7)
4.0 in	45.7(18.0)	27.0(10.6)	22.0 (8.7)
6.0 in	61.0(24.0)	30.0(11.8)	25.0 (9.8)

INSERTION METER



• Mostek reserves the right to make changes without further notice to any products to improve reliability, function, or design.

IN-LINE METER



• Mostek reserves the right to make changes without further notice to any products to improve reliability, function, or design.

Parent Model Code		MF210A	Thermal Mass Flow Meter for In-Line Pipe
Feature 1	Flow Body Size	025F 025P	1/4" 316S ANSI 150# RF 1/4" 316SST PIPE NPT MALE
		050F 050P	1/2" 316S ANSI 150# RF 1/2" 316SST PIPE NPT MALE
		075F 075P	3/4" 316S ANSI 150# RF 3/4" 316SST PIPE NPT MALE
		100F 100P	1" 316S ANSI 150# RF 1" 316SST PIPE NPT MALE
		150F 150P	1-1/2" 316S ANSI 150# RF 1-1/2" 316SST PIPE NPT MALE
		200F 200P	2" 316S ANSI 150# RF 2" 316SST PIPE NPT MALE
		250F 250P	2-1/2" 316S ANSI 150# RF 2-1/2" 316SST PIPE NPT MALE
		300F 300P	3" 316S ANSI 150# RF 3" 316SST PIPE NPT MALE
		400F 400P	4" 316S ANSI 150# RF 4" 316SST PIPE NPT MALE
		600F 600P	6" 316S ANSI 150# RF 6" 316SST PIPE NPT MALE
800F 800P	8" 316S ANSI 150# RF 8" 316SST PIPE NPT MAL		
Feature 2	Sensor and Flow Body Material	SM1	316 Stainless Steel
		SM2	Hastelloy C-276
Feature 3	Sensor Temperature	ST1	Standard Sensor -40 ~ 121°C (-40 ~ 250 °F)
		ST2	High Temperature Sensor 0 ~ 204°C (32 ~ 400 °F)
		ST3	Ultra High Temperature Sensor 0 ~ 343°C (32 ~ 650 °F)
Feature 4	Electronic Enclosure	E3	Remote NEMA 4X enclosure , 24 VDC Powered, no cable
		E4	Remote NEMA 4X enclosure , 85~250 VAC Powered, no cable
Feature 5	Display	D0	None
		D1	16 x 2 Alphanumeric Backlit LCD Display
Feature 6	Output	OP1	4~20 mA, Mosbus 485, Pulse, Hi-Lo Alarm
		OP2	4~20 mA, HART, Pulse, Hi-Lo Alarm
		OP3	Foundation Fieldbus
		OP4	Profibus PA
		OP5	Profibus DP
Feature 7	Calibration	GC1	Air, N2 : MF less than 2040 NM3H (1200 SCFM)
		GC2	Air, N2 : MF above than 2040 NM3H (1200 SCFM)
		GC3	Ar,CO2, H2, CH4, Natural Gas, O2: MF < 1700 NM3H
		GC4	Ar,CO2, H2, CH4, Natural Gas, O2: MF > 1700 NM3H
		GC5	CO,He, Ammonia, Propane, Digester gas : MF < 1700 NM3H
		GC6	CO,He, Ammonia, Propane, Digester gas : MF > 1700 NM3H
		GC7	All other gases
Feature 8	Option	1010	Remote Cable 3 conductor w/ shield 2.0 sq (100 meter max)
		1020	Flow meter cleaning for Oxygen Service
		1030	KTL certificate

Parent Model Code		MF210A	Thermal Mass Flow Meter for Insertion Type
Feature 1	Probe Length	10L	Insertion Meter with 10 cm 316 SST material
		20L	Insertion Meter with 20 cm 316 SST material
		30L	Insertion Meter with 30 cm 316 SST material
		50L	Insertion Meter with 50 cm 316 SST material
		80L	Insertion Meter with 80 cm 316 SST material
		100L	Insertion Meter with 100 cm 316 SST material
		150L	Insertion Meter with 150 cm 316 SST material
		SPL	Special on request
Feature 2	Probe Diameter	050	1/2 inch OD with SST316
		075	3/4 inch OD with SST316
Feature 3	Sensor and Probe Material	SM1	316 Stainless Steel
		SM2	Hastelloy C-276 sensor w/ 316SS probe & fitting
Feature 4	Sensor Temperature	ST1	Standard Sensor -40 ~ 121°C (-40 ~ 250 °F)
		ST2	High Temperature Sensor 0 ~ 204°C (32 ~ 400 °F)
		ST3	Ultra High Temperature Sensor 0 ~ 373°C (32 ~ 700 °F)
Feature 5	Enclosure	E3	Remote NEMA 4X enclosure , 24 VDC Powered, no cable
		E4	Remote NEMA 4X enclosure , 85~250 VAC Powered, no cable
Feature 6	Display	D0	None
		D1	16 x 2 Alphanumeric Backlit LCD Display
Feature 7	Output	OP1	4~20 mA, Mosbus 485, Pulse, Hi-Lo Alarm
		OP2	4~20 mA, HART, Pulse, Hi-Lo Alarm
		OP3	Foundation Fieldbus
		OP4	Profibus PA
		OP5	Profibus DP
Feature 8	Mounting Accessory	M0	None
		M1	316 SST compression fitting
		M2	316 SST compression fitting with Teflon ferrule
		M3	1-inch ANSI 150# RF flange
		M9	On request
Feature 9	Calibration	GC1	Air, N2 : MF less than 2040 NM3H (1200 SCFM)
		GC2	Air, N2 : MF above than 2040 NM3H (1200 SCFM)
		GC3	Ar,CO2, H2, CH4, Natural Gas, O2: MF < 1700 NM3H
		GC4	Ar,CO2, H2, CH4, Natural Gas, O2: MF > 1700 NM3H
		GC5	CO,He, Ammonia, Propane, Digester gas : MF < 1700 NM3H
		GC6	CO,He, Ammonia, Propane, Digester gas : MF > 1700 NM3H
		GC7	All other gases
Feature 10	Options	1010	Remote Cable 3 conductor w/ shield 2.0 sq (100 meter max)
		1020	Flow meter cleaning for Oxygen Service

Feature & Application

- Low Cost and Fast Delivery
- High accuracy $\pm 1.0\%$ Reading
- Output : 4~20 mA, Pulse, Hi-Lo Alm, Modbus 485 RTU
- Display : 16x2 Backlit LCD for Flow and Totalizer
- Field Programmable Parameters
- Low Flow Cutoff Adjustment
- Damping Time Adjustment
- Alarm Output : High, Low
- Status Indication LED for Tx, Rx, Pulse , Hi-Alm, Lo-Alm
- Easy to Installation & Maintenance with a hinged cover

General

The model MF250A series is designed with full digitally featuring for the measurement of gases, air, compressed air which is based on constant temperature differential technology for air and other process gases in range from 0 – 250 NMPS.

Because neither temperature nor pressure measurement are required. MF250A series reduces installation cost and vastly improves system accuracy. The meter is easily installed or retrofitted with minimum down time and provides superior long term process reproducibility and easy serviceability.

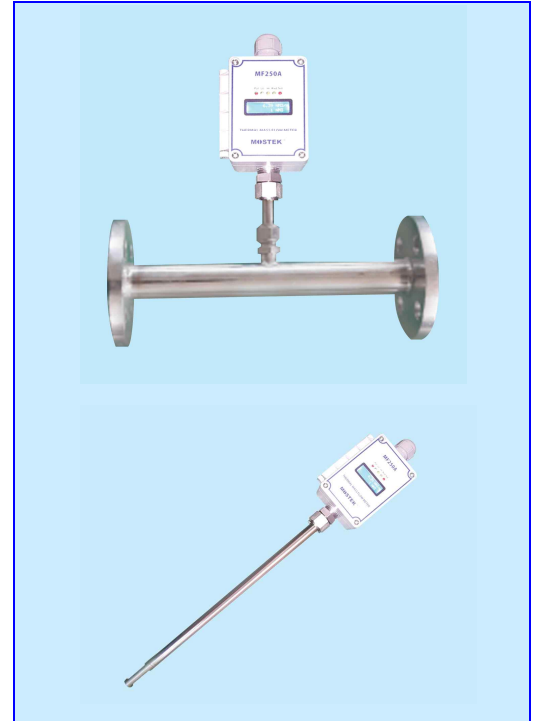
MF250A inline type flow meters are available in probe sizes from 1/4” to 8” with either NPT or flange connection, and insertion type flow meters are available in probe sizes from 4” to 36” with either compression fitting or flange connection. The MF250A provides a 4-20 mA output signal, pulse, and Modbus485 as a serialized digital output signal.

MF250A series flow meter utilizes a constant temperature differential (dT) technology. The sensor has two RTD elements. One is the velocity sensor and the other one is gas temperature sensor. The electronics heats the velocity sensor above the gas temperature as constant differential temperature.

It is the job of the electronics to maintain a constant ΔT between the gas temperature and the heated element.

As the mass flow increases, the increased number of gas molecules remove more heat from the heated element. The electronics senses this temperature reduction and adds additional power in order to maintain a constant ΔT .

The amount of power delivered to the heated element, therefore, is just proportional to the mass flow rate.



- Accuracy
 - ±1.0 % Reading
 - Straight pipe run 10 x ID (Up-stream) for Insertion meter
 - 5. x ID (Down-stream) for insertion meter
- Repeatability
 - ±0.2 % Full Scale
- Response time
 - 0.9 sec (63% one time constant)
- Gases
 - Air, Argon, Nitrogen, Oxygen, Methane, Propane, Butane
 - Carbon Dioxide, Butane, Natural Gas, Digester Gas
 - Hydrogen, Ammonia, Mixed Gas, Others
- Temperature
 - Standard sensor : -40 ~ 121 °C
 - High temp sensor : - 0 ~ 204 °C
 - Ultra high temp sensor : - 0 ~ 343 °C
 - Enclosure : -40 ~70°C without display
 - 0 ~ 60°C with display
- Power supply
 - Standard : 24 VDC 0.2 Amp
 - Built-In Surge Protection
 - DC reverse polarity protection
- Output
 - 4-20 mA DC, Pulse, Modbus 485
 - Alarm : High - Low

Operating Specs

- Flow units
 - Nm3/hr, Nm3/min, Kg/day, Kg/hr, Kg/min, Kg/sec
 - SCFM, SCFH, Lb/day, Lb/hr, Lb/min, Lb/sec
 - NLPH, NLPM, SLPM, SMPS, NMPS, SFPM
- Flow Velocity
 - 0 ~ 100 NMPS (standard)-based on Air at 0°C 1 atm
 - 0 ~ 250 NMPS (option)-based on Air at 0°C 1 atm

To determine if insertion flow meter will operate, properly divide the maximum flow rate by the pipe area.

Here are the flow rates for common pipe sizes.

Pipe size	Nm3/hr	SCFM
1-1/2 inch	0 - 760	0 - 16
2 inch	0 - 1280	0 - 48
3 inch	0 - 2720	0 - 120
6 inch	0 - 10870	0 - 192
8 inch	0 - 18860	0 - 332
10 inch	0 - 30920	0 - 450
12 inch	0 - 42300	0 - 750
note : reference gas Air		
Stda condition Nm3/hr : 0°C 1 atm , SCFM : 70°F 1 atm		

- Gas pressure (maximum)
 - 500 psig (34.5 barg)
 - Note : pressure rating based on 38°C (100°F)

Physical Specs

- Sensor material
 - Standard : 316 Stainless Steel
 - Optional : Hastelloy-C 276
- Enclosure
 - Weather-Proof, NEMA 4X, IP66
 - Non-Hazardous area
 - Option : remote NEMA 4X, J-box
- Remote cable
 - 3 conductor w/ shield 2.0 sq (100 M max)

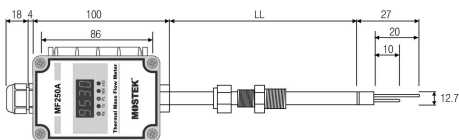
Dimensional Specs

- Probe diameter : 1/2-inch with insulation
 - Coupling 1/2-inch NPT

Equation for select insertion probe length
 Probe length = 1/2 pipe ID + thickness of insulation + diameter of retractor or, ball valve , or fitting , or flange.
 Round up to the the next standard probe available.

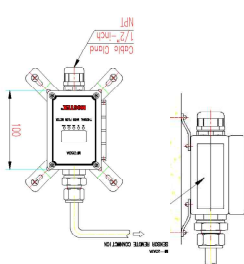
Remote Enclosure Mounting Bracket

[Unit : mm L:100 H:50 W:68]

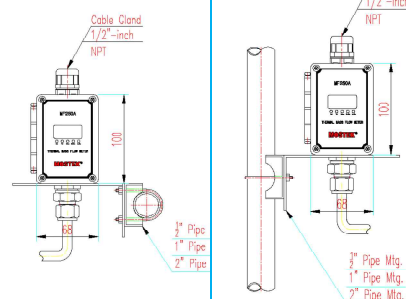


[Fig. 1 MF250A Front View]

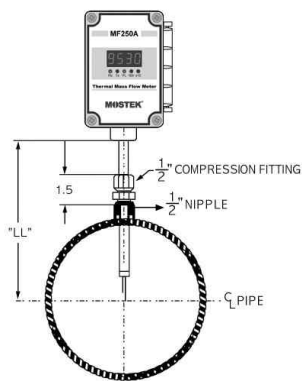
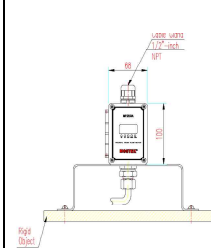
Wall mounting



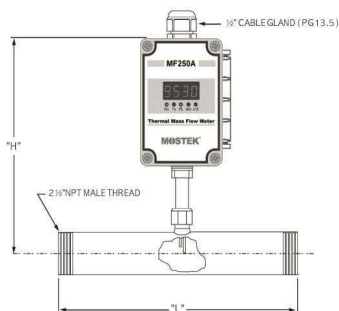
Pipe (Horizontal/Vertical)



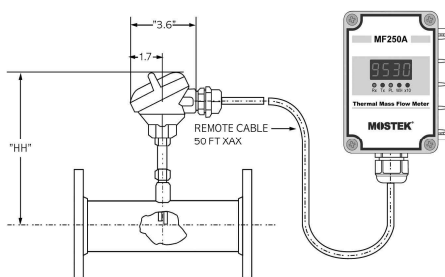
Surface Mounting



[Fig. 2. Installation on Pipe]



[Fig. 3. Sensor Placement]



[Fig. 4. Remote Installation]

INSERTION TYPE PROBE LENGTH

Note : Dimensions are in cm (in parenthese are inch)

PROBE SIZE	DIMENSION "LL±1.0 cm"
10 L	10.0 (3.93)
20 L	20.0 (7.87)
30 L	30.0 (11.81)
40 L	40.0 (15.74)
50 L	50.0 (19.68)
80 L	80.0 (31.49)
100 L	100.0 (39.30)
150 L	150.0 (60.00)
180 L	180.0 (70.87)

IN-LINE AND REMOTE ENCLOSURE

Note : Dimensions are in cm (in parenthese are inch)

BODY SIZE	DIMENSION		
	" L "	" H "	" HH "
1/4-INCH	14.7 (5.8)	25.0 (9.8)	20.9 (7.9)
1/2-INCH	30.5 (12.0)	25.0 (9.8)	20.9 (7.9)
3/4-INCH	30.5 (12.0)	25.0 (9.8)	20.9 (7.9)
1-INCH	30.5 (12.0)	25.0 (9.8)	20.9 (7.9)
1-1/2-INCH	30.5 (12.0)	25.0 (9.8)	20.9 (7.9)
2-INCH	30.5 (12.0)	25.0 (9.8)	20.9 (7.9)
2-1/2-INCH	45.7 (18.0)	27.0 (10.6)	22.0 (8.7)
3-INCH	45.7 (18.0)	27.0 (10.6)	22.0 (8.7)
4-INCH	45.7 (18.0)	27.0 (10.6)	22.0 (8.7)
6-INCH	61.0 (24.0)	30.0 (11.8)	25.0 (9.8)

• Mostek reserves the right to make changes without further notice to any products to improve reliability , function, or design.

Parent Model Code		MF250A	Thermal Mass Flow Meter for Pipe – Duct		
Feature 1	Probe Length	25L SPL	25 Cm On request (Customer Specifies the probe length)		
	Flow Body (Standard Sch 40) <i>On request for Above 6"</i>	025F 025P	1/4" 316S ANSI 150# RF	1/4" 316SST PIPE NPT MALE	
		050F 050P	1/2" 316S ANSI 150# RF	1/2" 316SST PIPE NPT MALE	
		075F 075P	3/4" 316S ANSI 150# RF	3/4" 316SST PIPE NPT MALE	
		100F 100P	1" 316S ANSI 150# RF	1" 316SST PIPE NPT MALE	
		150F 150P	1-1/2" 316S ANSI 150# RF	1-1/2" 316SST PIPE NPT MALE	
		200F 200P	2" 316S ANSI 150# RF	2" 316SST PIPE NPT MALE	
		250F 250P	2-1/2" 316S ANSI 150# RF	2-1/2" 316SST PIPE NPT MALE	
		300F 300P	3" 316S ANSI 150# RF	3" 316SST PIPE NPT MALE	
		400F 400P	4" 316S ANSI 150# RF	4" 316SST PIPE NPT MALE	
600F 600P	6" 316S ANSI 150# RF	6" 316SST PIPE NPT MALE			
Feature 2	Sensor and Flow Body(Probe) Material	SM1 SM2	316 Stainless Steel Hastelloy-C 276		
Feature 3	Sensor Temperature	ST1 ST2 ST3	Standard Temperature Sensor -40 ~ 120°C (-40 ~ 250°F) High Temperature Sensor 0 ~ 204°C (32 ~ 400°F) <i>E3 Only</i> Ultra High Temperature Sensor 0 ~ 343°C (-32 ~ 650°F) <i>E3 Only</i>		
Feature 4	Enclosure	E1 E3	Integral Enclosure NEMA 4X , 24 VDC Powered Remote Enclosure NEMA 4X , 24 VDC Powered		
Feature 5	Outputs	OP1	4-20 mA, Pulse, Hi-Lo Alarm, Modbus RS485		
Feature 6	Display	D0 D1	None 16x2 AlphaNumeric LCD Local Indicator for Flow and Total		
Feature 7	Probe Mounting Fitting (Insertion Only)	MA MB MC MD MZ	1/2"(ID)-1/2"(OD) 316 SST Compression Fitting 1/2"(ID)-3/4"(OD) 316 SST Compression Fitting 2" Flange Mounting 3" Flange Mounting On Request		
Feature 8	Remote Enclosure Mounting Bracket (<i>E3 Option Only</i>)	MW000 MPH05 MPH10 MPH20	Wall Mounting Bracket 1/2" Pipe-Horizonatl 1" Pipe-Horizonatl 2" Pipe-Horizonatl	MS000 MPV05 MPV10 MPV20	Top Surface Mounting 1/2" Pipe-Vertical 1" Pipe-Vertical 2" Pipe-Vertical
Feature 9	Calibration	GC1 GC2 GC3 GC4 GC5 GC6 GC7	Air, N2 : MF less than 2040 NM3H (1200 SCFM) Air, N2 : MF above than 2040 NM3H (1200 SCFM) Ar,CO2, H2, CH4, Natural Gas, O2: MF < 1700 NM3H Ar,CO2, H2, CH4, Natural Gas, O2: MF > 1700 NM3H CO,He, Ammonia, Propane, Digester gas : MF < 1700 NM3H CO,He, Ammonia, Propane, Digester gas : MF > 1700 NM3H All other gases		
Feature 10	Options	1010	Remote Cable 3 conductor w/ shield 2.0 sq (100 meter max)		

MF260A HVAC-ROTA Series

Thermal Mass Flow Meter for Air and Gas

Feature & Application

- Low Cost and Compact, Easy installation & Maintenance free
- Flow Monitoring & Control for BAS & HVAC System
- Replacement with ROTA meter with Electronic Signal
- High Accuracy $\pm 1.0\%$ FS
- Output: 4~20 mA, Modbus 485 RTU Digital Communication
- Response Time : 0.9 sec, Repeatability : $\pm 0.2\%$ FS
- Local Display : 16x2 Backlit LCD – Instant Flow & Totalization
- Field Programming with parameter change by Built-In 4-Key
- Low Flow Cutoff Adjustment

General

The model MF260A series is designed with full digitally featuring for the measurement of gases, air, compressed air which is based on constant temperature differential technology for air and other process gases. The model MF260A is very suitable for BAS & HVAC as well as ROTA flow which gives simultaneously 4–20mA and Modbus 485 RTU digital communication signal.

Because neither temperature nor pressure measurement are required. MF260A series reduces installation cost and vastly improves system accuracy. The meter is easily installed or retrofitted with minimum down time and provides superior long term process reproducibility and easy serviceability.

MF260A inline type ROTA flow meters are available in probe sizes from 1/4" to 1" with NPTF fitting connection, and insertion type flow meter HVAC is available in probe sizes from 20" up to 150" with flange connection. The MF260A provides a 4–20 mA output signal, and Modbus 485 as a digital communication.

MF260A series flow meter utilizes a constant temperature differential (dT) technology. The sensor has two RTD elements. One is the velocity sensor and the other one is gas temperature sensor. The electronics heats the velocity sensor above the gas temperature as constant differential temperature.

It is the job of the electronics to maintain a constant ΔT between the gas temperature and the heated element.

As the mass flow increases, the increased number of gas molecules remove more heat from the heated element. The electronics senses this temperature reduction and adds additional power in order to maintain a constant ΔT .

The amount of power delivered to the heated element, therefore, is just proportional to the mass flow rate.



Performance Specs

- Accuracy
 - ±1.0% Full Scale
 - Straight Pipe Run 10 x ID (U/S), 5 x ID (D/S)
- Repetability
 - ±0.2% Full Scale
- Response Time
 - 0.9 sec (63% one time constant of final value)
- Gases
 - Air, Argon, Nitrogen, Oxygen, Methane, Propane, Butan, Carbon Dioxide, Butane, Natural Gas, Digester Gas, Hydrogen, Ammonia, Mixed Gas, Others

Operating Specs

- Measuring Flow Units
 - Nm3/hr, Nm3/min, Kg/day, Kg/hr, Kg/min, Kg/sec
 - SCFM, SCFH, Lb/day, Lb/hr, Lb/min, Lb/sec
 - NLPH, NLPM, SLPM, SMPS, NMPS, SFPM
- Measuring Flow Velocity
 - 0 ~ 50 NMPS (standard)-based on air @0°C 1 atm
 - 0 ~ 100 NMPS (option)-based on air @0°C 1 atm

To determine if insertion flow meter will operate, properly divide the maximum flow rate by the duct area. Here are the flow rates for common pipe sizes.

Duct(square)	Nm3/hr	SCFM
20 inch	0 - 45000	0 - 28600
40 inch	0 - 185000	0 - 77800
60 inch	0 - 418000	0 - 266200
80 inch	0 - 743000	0 - 473000
100 inch	0 - 1161000	0 - 739400
120 inch	0 - 1673000	0 - 1065600
150 inch	0 - 2612000	0 - 1663600

note : reference gas Air

Standard condition Nm3/hr: 0°C 1 atm , SCFM : 70°F 1 atm

- Temperature
 - Standard Sensor : -40 ~ 80 °C
 - High Temp Sensor : 0 ~ 120 °C
 - Enclosure: -40 ~70°C without display
 - 0 ~ 60°C with display
- Power Supply
 - Standard : 24 VDC 0.2 Amp
 - Built-in Surge Protection
 - DC reverse polarity Protection
- Output
 - 4-20 mA DC, Modbus 485 RTU

Physical Specs

- Sensor Material
 - Standard : 316 Stainless Steel
 - Option : Hastelloy-C 276
- Enclosure
 - Weather-proof, NEMA 4X, IP66
 - Non-hazardous area installation

Dimensional Specs

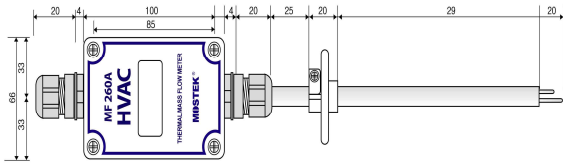
- Probe Diameter : 1/2-inch (12.7 mm)
- Process Connection : 1" Plastic Flange or on request (insertion type)

To determine if inline flow meter will operate, properly divide the max flow rate by the pipe area. Refer to the flow table below

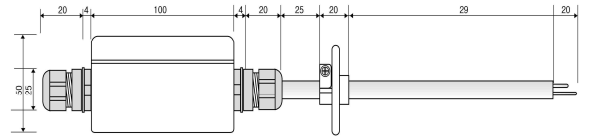
파이프(sch40)	Nm3/hr	SCFM
1/4 inch	0 - 13	0 - 8
1/2 inch	0 - 37	0 - 24
3/4 inch	0 - 65	0 - 42
1 inch	0 - 105	0 - 67
1-1/2 inch	0 - 240	0 - 152
2 inch	0 - 394	0 - 250
2-1/2 inch	0 - 614	0 - 390

note : reference gas Air

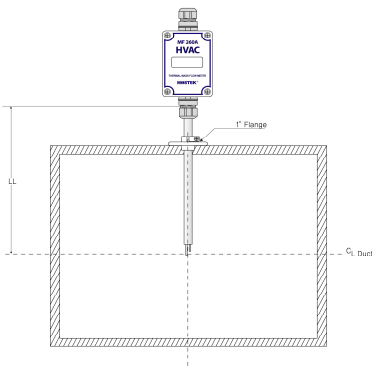
Standard condition Nm3/hr: 0°C 1 atm , SCFM : 70°F 1 atm



[Fig 1 MF260A Front-View] Insertion Type



[Fig 2 MF260A Side-View] Insertion-Type

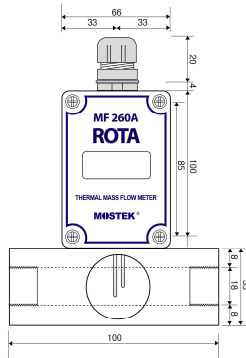


[Fig 3 Duct HVAC installinstion]

Probe Length (Insertion type Flow Meter)

Note: Dimensions are in cm (in parenthese are inch)

Probe Length	Dimension "LL±1.0 cm"
10 L	10.0 (3.93)
20 L	20.0 (7.87)
30 L	30.0 (11.81)
40 L	40.0 (15.74)
50 L	50.0 (19.68)
80 L	80.0 (31.49)
100 L	100.0 (39.30)
150 L	150.0 (60.00)
180 L	180.0 (70.87)

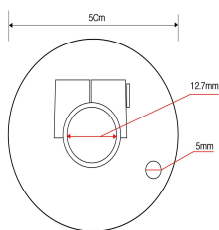


[Fig 4 In-line ROTA Installation]

Flow Body Size (In-line type Flow meter)

Note: Dimensions are in cm (in parenthese are inch)

Flow Body Size	Dimension	
	" L "	" H "
1/4-INCH	10.0 (4.0)	14.0 (5.5)
1/2-INCH	10.0 (4.0)	14.0 (5.5)
3/4-INCH	15.0 (6.0)	14.8 (5.8)
1-INCH	20.0 (8.0)	15.6 (6.1)
1-1/2-INCH	25.0 (10.0)	16.4 (6.5)
2-INCH	30.0 (12.0)	17.2 (6.8)



[Fig 5 ABS Mounting Flange]

• Mostek reserves the right to make changes without further notice to any products to improve reliability , function, or design.

Parent Model Code		MF260A	HVAC-ROTA Thermal Mass Flow Meter
Feature 1	Probe Length (insertion Type)	25L SPL	25 Cm On request (Customer specify) example : 1m=100L
	Flow Body Size (in-line type)	025P 050P 075P 100P 150P 200P	1/4" NPTF Acetal Threaded 1/2" NPTF Acetal Threaded 3/4" NPTF Acetal Threaded 1" NPTF Acetal Threaded 1-1/2" NPTF Acetal Threaded 2" NPTF Acetal Threaded
	Sensor & Probe Mat'l (insertion type)	SM1 SM9	316 Stainless Steel On Request
	Flow Body Material	BM1 BM9	Acetal On Request
	Sensor Temperature	ST1 ST2	Standard Temperature Sensor -40 ~ 80°C (-40 ~ 145°F) High Temperature Sensor 0 ~ 120°C (32 ~ 216 °F)
	Enclosure	E1 E9	Integral Enclosure NEMA 4X , 24 VDC Powered On Request
Feature 6	Output	OP1	4-20 mA, Modbus RS485 RTU
Feature 7	Local Display	D0 D1	None 16x2 AlphaNumeric LCD Local Indicator for Flow and Total
Feature 8	Mounting Accessory (insertion type)	PM1 PM9	1" ABS Flange On request
Feature 9	Calibration	GC1 GC2 GC3 GC4 GC5 GC6 GC7	Air, N2 : MF less than 2040 NM3H (1200 SCFM) Air, N2 : MF above than 2040 NM3H (1200 SCFM) Ar,CO2, H2, CH4, Natural Gas, O2: MF < 1700 NM3H Ar,CO2, H2, CH4, Natural Gas, O2: MF > 1700 NM3H CO,He, Ammonia, Propane, Digester gas : MF < 1700 NM3H CO,He, Ammonia, Propane, Digester gas : MF > 1700 NM3H All other gases

Multi-Point Averaging Thermal Mass Flow Meter

Feature & Application

- Measures gas flow in NM³/Hr, Kg/Hr etc
- Analog output 4-20 mA DC
- RS485 communication
- Watch-dog software
- Suitable for Stack CEMS
- Factory calibration point input program
- Built-in Surge Protection
- High accuracy $\pm 1.0\%$ Reading
- 316 SST for all wetted parts (H-C option)
- 4000 ft Remote transmission
- Max 4 sensing points a single probe
- Microprocessor based, field programmable



General

The model MF300 series Thermal Mass Flow Meter is the instrument of choice for reliable and accurate gas mass flow measurement, which is based on constant temperature differential technology for air and other process gases in range from 0 – 100 NMPS. Because neither temperature nor pressure measurement are required. MF300 series reduces installation cost and vastly improves system accuracy.

MF300 is very suitable for a large stack for CEMS (Continuous Emission Monitoring System) application.

The meter is easily installed or retrofitted with minimum down time and provides superior long term process reproducibility and easy serviceability. MF300 multi-point averaging insertion thermal mass flow meter is available in probe size up to 18 ft with either flange or truss -probe connection. The multiple transducers provide each

4-20 mA linear output signal and then controller board averages every sensor outputs. Averaged 4-20 mA output can be remotely transmitted as long as up to 4000 ft away via RS485 to the data logger and controller system.

MF300 multi-point averaging thermal mass flow meter utilizes a constant temperature differential (dT) technology. The sensor has two elements. The reference RTD measures the gas temperature.

The electronics heats the heated element above the gas temperature. It is the job of the electronics to maintain a constant dT between the gas temperature and the heated element.

As the mass flow increases, the increased number of gas molecules remove more heat from the heated element. The electronics senses this temperature reduction and adds additional power in order to maintain a constant dT.

The amount of power delivered to the heated element, therefore, is just proportional to the mass flow rate.

▶ Performance Specs

- Accuracy
 - ±1.0 % Reading
 - Straight pipe run 10 x ID (Up-stream)
 - 5. x ID (Down-stream)
- Repeatability
 - ±0.2 % Full Scale
- Response time
 - 0.9 sec (one time constant)
- Gases
 - Air, Flue Gas, Stack Gas for CEMS

▶ Operating Specs

- Flow units
 - Nm³/hr, Nm³/min, Kg/day, Kg/hr, Kg/min, Kg/sec
 - SCFM, SCFH, Lb/day, Lb/hr, Lb/min, Lb/sec
 - NLPH, NLPM, SLPM, SMPS, NMPS, SFPM
- Flow Velocity
 - 0 ~ 50 NMPS (standard)-based on Air at 0°C 1 atm

To determine if multi-point averaging thermal mass flow meter insertion flow meter will operate, properly divide the maximum flow rate by the stack area.
- Gas Pressure (Maximum)
 - 50 psig (3.45 barg)
 - Note : pressure rating based on 38°C (100°F)
- Temperature
 - Standard sensor : -40 ~ 121 °C
 - High temp sensor : - 0 ~ 204 °C
 - Ultra high temp sensor : - 0 ~ 370 °C
 - Collector Box : -40 ~ 70°C (-40 ~ 158°F)

- Power supply
 - 85 ~ 250 VAC 50/60 Hz 20 watts
 - Built-In Surge Protection

▶ Physical Specs

- Sensor material
 - Standard sensor : 316 Stainless Steel
 - Optional Sensor : Hastelloy-C
- Probe & Flange material
 - Standard Material : 316 Stainless Steel
 - Optional Material : Hastelloy-C
- Electronics Enclosure
 - Standard Enclosure : ABS Plastic
 - Optional Enclosure : Fiber Glass . Plastic
 - Weather-proof, IP65, NEMA 4X

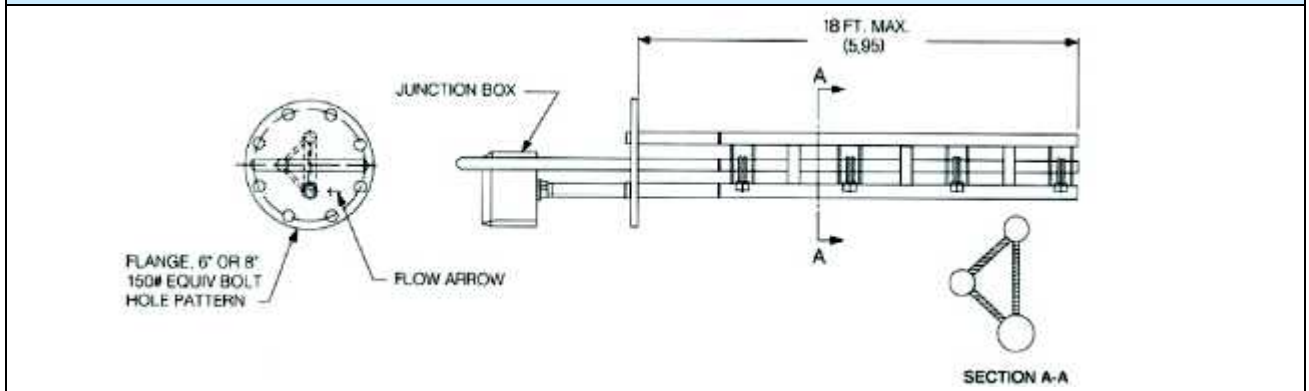
▶ Sensor , Probe, Collector Box

- Number of max sensor per probe
 - 4 sensors
- Number of max probe per collector box
 - 2 probes
- Cable length (probe box <->collector box)
 - 4000 ft max (if longer distance, consult)
- Display
 - Alpha-Numeric 32-character 2 row LCD
- Auto Sensor Cleaning
 - 1 time (Overheating blow-out) per day
- LED Indicator
 - Power-on, RS485 , Sensor Fault

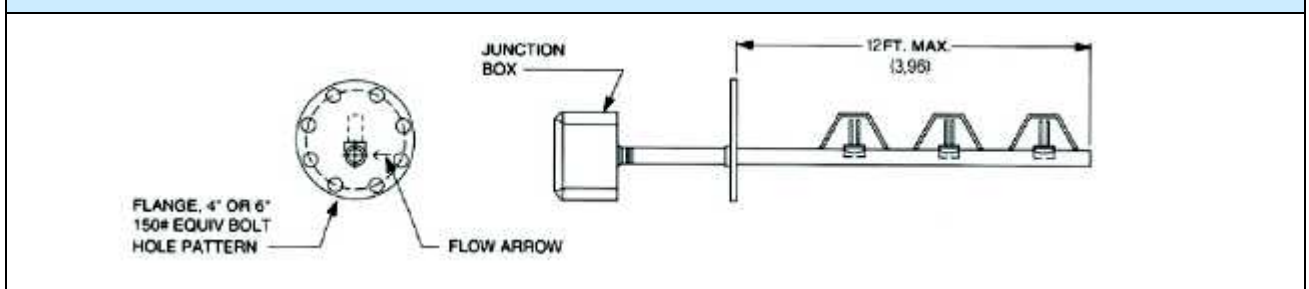
▶ Sensor , Probe

- Probe Type
 - Truss Type, & Non-Truss Type
 - Flange type
- Probe Specification
 - 3/4-inch probe outer diameter
 - Probe length (truss) 6 meter
 - Probe length
- Flange Specification
 - 2-inch ANSI 150# FF
 - 4-inch ANSI 150# FF

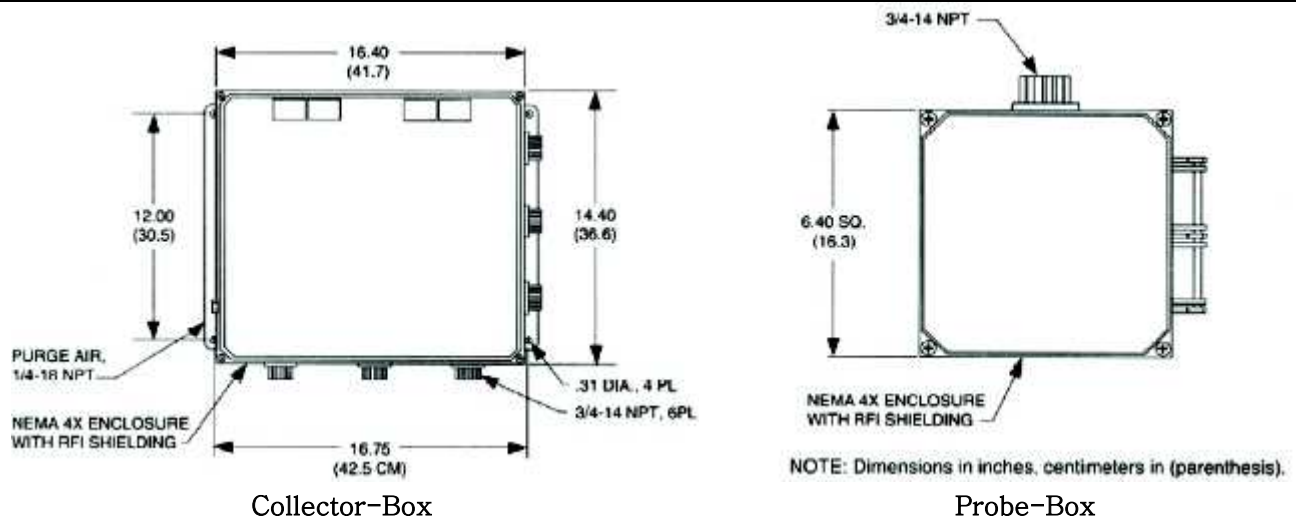
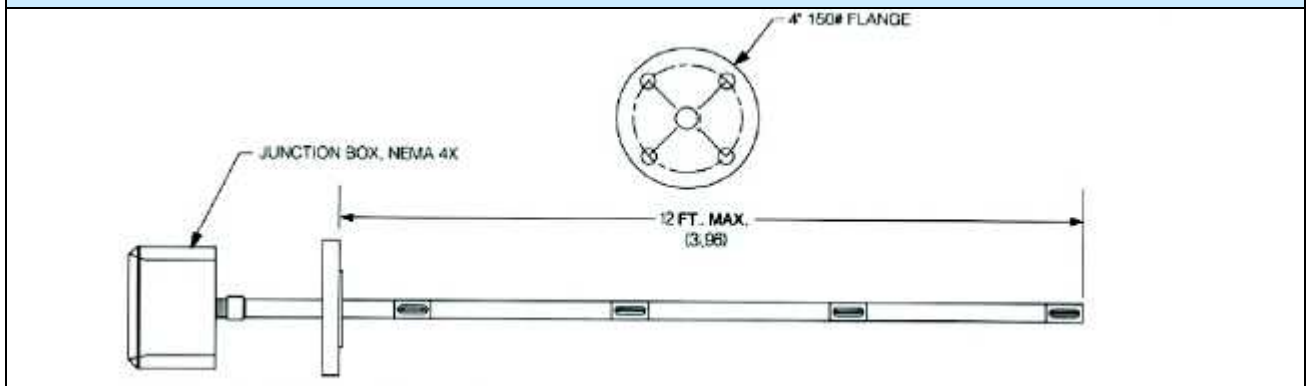
TRUSS TYPE PROBE ASSEMBLY AND FLANGE



NON-TRUSS TYPE PROBE ASSEMBLY AND FLANGE



STRAIGHT PROBE ASSEMBLY AND FLANGE



• Mostek reserves the right to make changes without further notice to any products to improve reliability , function, or design.

Parent Model Code		MF300	Multi-Point Averaging Thermal Mass Flow Meter
Feature 1	Number of Probe	1P 2P	One Probe Two Probe
Feature 2	Numbe of Sensor per Probe No 1	1S 2S 3S 4S	One Point Sensor Two Point Sensor Three Point Sensor Four Point Sensor
Feature 3	Numbe of Sensor per Probe No 1	1S 2S 3S 4S	One Point Sensor Two Point Sensor Three Point Sensor Four Point Sensor
Feature 4	Probe Style	TP NP SP	Truss Probe Non-truss Probe Straight Probe
Feature 5	Probe Length	PL()TP PL()NP PL()SP	Truss-Probe Specify a probe length in centi meter in () Non-truss-Probe Specify a probe length in centi meter in () Standard-Probe Specify a probe length in centi meter in ()
Feature 6	Probe & Flange Material	SS HC	316 Stainless Steel Hastelloy C- 276
Feature 7	Sensor Material	SS HC	316 Stainless Steel Hastelloy C- 276
Feature 8	Remote Cable Length for probe No 1	RC1()	Specify a cable length in meter in () – between probe box #1 and collector box
Feature 9	Remote Cable Length for probe No 2	RC2()	Specify a cable length in meter in () – between probe box #2 and collector box
Feature 10	Output	OP1 OP2	4-20 mA Averaging 4-20 mA Averaging + RS485
Feature 11	Display	D0 D1 D2	None Flow Rate Per Probe Flow Rate & Totalizer Per Probe
Feature 12	Options	1010 1020 1030 1040 1050	KTL certificate Extra Instruction Manual RS485 Transmission Board (max 8 ch) Blank Tag Electro-Polishing