

# INSERTION TYPE THERMAL MASS FLOWMETERS & CONTROLLERS

MTMFM-Series

## Introduction:

MTMFM series of flowmeters/controllers are available in more than 100 different modes, virtually offering solutions to flow measurement/control for any liquid in varied flow range i.e. 1.0 micro grams per minutes to 100 kilograms per minutes. These flow meters are offered in material like SS-316 (ceramic/Teflon coating), polypropylene, derelin etc to make up with corrosion, thermodynamical and other pertinent physical parameters of fluid/gas under measurement. On account of above, these flow meters are first choice for medical diagnostic, agro, biomedical, petrochemical, automobile, organic/inorganic chemical, milk plant, sugar, textiles, beverages, water management/treatment, academic and defense.

## Operating Principle:

Fluid Gases passing through the insertion type thermal - flowmeter removes certain heat from constant temperature heating element depending upon its density, mass flow rate, ambient temperature and surface area of heater., under steady state, Mass flow rate of gas is proportional to power of heater. As explained under.....

Heat removed by moving gas

$$H = f (\rho U \times T) \text{ Where } H: \text{Lost heat } \rho: \text{Density, } U: \text{Velocity } T: \text{Differential temperature gas and heated tubule}$$

Heat generated by heater element is ....

$W = f (V \times I)$ , W: Generated heat: Supplied voltage I: Supplied current, Under balance condition.....

$\rho U = f (V \times I)$  and as The total flow rate is calculated from the velocity and the cross section area of flow path:

$$Q = \rho U \times A \text{ Where } Q: \text{Flow rate } U: \text{Average velocity } A: \text{Cross section area of flow path}$$

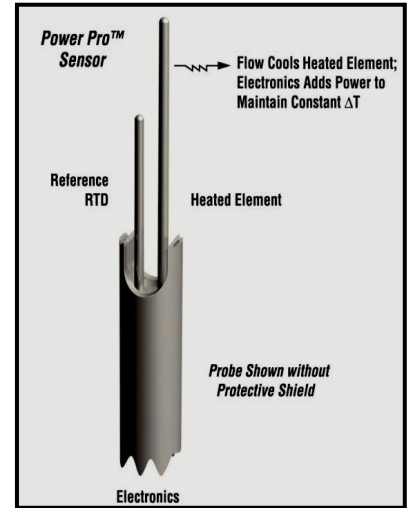
$$M = K1.T_d + K4.T_i^2 - K3T_d^3 + K2T_d^4$$



MTMFM- 500



MTMFM-050



Schematic of insertion type thermal mass flowmeter  
FLOW RANGE <100,000.0 LPH(S.T.P.)

## ELECTRICAL/MECHANICAL SPECIFICATIONS OF MASS FLOW METER

model	Flow range (LPH)	Size(inch)	Accuracy	Repeatability	Flow tube-Liner	O.D.P.	leak rate	Output signal VOLT/D.C.
MTMFM-0001	1000.0	½	99.5	100	Ceramic/PP	2000	<1.8x10	0.0-5.0
MTMFM-0002	2000.0	¾	99.5	100	Ceramic/PP	2000	<1.8x10	0.0-5.0
MTMFM-0004	4800.0	1.0	99.5	100	Ceramic/PP	2000	<1.8x10	0.0-5.0
MTMFM-0007	7000.0	1.5	99.5	100	Ceramic/PP	2000	<1.8x10	0.0-5.0
MTMFM-0010	10,000.0	2.0	99.5	100	Ceramic/PP	2000	<1.8x10	0.0-5.0
MTMFM-0020	20,000.0	3.0	99.5	100	Ceramic/PP	2000	<1.8x10	0.0-5.0
MTMFM-0050	50,000.0	4.0	99.5	100	Ceramic/PP	2000	<1.8x10	0.0-5.0
MTMFM-0100	100,000.0	6.0	99.5	100	Ceramic/PP	2000	<1.8x10	0.0-5.0
MTMFM-0200	200,000.0	8.0	99.5	100	Ceramic/PP	2000	<1.8x10	0.0-5.0
MTMFM-0500	500,000.0	10.0	99.5	100	Ceramic/PP	2000	<1.8x10	0.0-5.0
MTMFM-0800	800,000.0	12.0	99.5	100	Ceramic/PP	2000	<1.8x10	0.0-5.0
MTMFM-1000	1000,000.0	14.0	99.5	100	Ceramic/PP	2000	<1.8x10	0.0-5.0

## DIGITAL INSERTION TYPE THERMAL FLOW CONTROLLER SPECIFICATION:

Operating voltage	220 volts/28 volts D.C.
Excitation frequency	2.5/7.5/15.0/25.0 Hz
Accuracy	98% of set point
Repeatability	100 percent
Response time	0.5 -1.1 milli-seconds
Interface Signal	0.0-12.0 volts D.C.(proportional to flow range)
Flow range	10.0 LPM - 100.0 kilo LPM
Step down ratio	1:50(1:100)
Flow tube material	SS-316/Brass/DERELIN with option of flange coupling
Electrode material	SS-316/Has-alloy
Control option	Flow rate/totalization control against set point Multi flow synchronized control (interactively)
Display	3½ & 4½ digit red glow LED/LCD display
Controller size	48x48x96, 72x72x96, 96x96x192



FLOW COMPUTER-MTMFM-0800

## MOTORON SEMICONDUCTORS CORPORATION

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MTMFM-Series

ELECTRICAL/MECHANICAL SPECIFICATIONS OF MASS FLOW METER MTMFM SERIES FLOW RANGE <20,000 LPMX10<sup>-4</sup>

model	Flow range (LPM)X10 <sup>-4</sup>	Size(inch)	Accuracy	Repeatability	Flow tube-Liner	O.D.P.	leak rate	Output signal
MTMFM-00013	1000.0	1/8	99.5	100	Ceramic/PP	2000	<1.8x10	0.0-12.0/5.0
MTMFM-00023	2000.0	1/8	99.5	100	Ceramic/PP	2000	<1.8x10	0.0-12.0/5.0
MTMFM-00043	4800.0	1/8	99.5	100	Ceramic/PP	2000	<1.8x10	0.0-12.0/5.0
MTMFM-00073	7000.0	¼	99.5	100	Ceramic/PP	2000	<1.8x10	0.0-12.0/5.0
MTMFM-00103	10,000.0	¼	99.5	100	Ceramic/PP	2000	<1.8x10	0.0-12.0/5.0
MTMFM-00203	20,000.0	¼	99.5	100	Ceramic/PP	2000	<1.8x10	0.0-12.0/5.0

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