MaxiFlo™ MST series Thermal Mass Flow Meter is the instrument of choice for reliable and accurate measurement of mass flows for various gases. It measures the mass flow of gas based on constant temperature differential technology and is able to measure gas flow in the range between 0 and 250 NMPS.

Because neither temperature nor pressure measurement is required, MST series reduces installation cost and vastly improves system accuracy.

The meter is easily installed or retrofitted with minimum downtime and provides superior, long-term process producibility and easy serviceability.

MST series can have either inline sensor or insertion sensor. The inline sensor size ranges from 1/4” (8mm) to 6” (150mm) with either NPT thread connection or flange connection. The insertion sensors are available from 2” (50 mm) and above with the sensor mounting option of either compression fitting or flange fitting.

The indicator/transmitter provides a 4-20 mA linear output signal and optionally an RS485/232 serial interface, Fieldbus, etc. And for models with totalizer function, the pulse output is also available.

Main Features

- Can measure gas/air flow without pressure or temperature compensation
- It can measure mass flow and also volume flow.
- No moving parts
- High accuracy of ±1.0% of reading
- Wide turndown ratio of 100:1
- Field-programming capability available
- SUS 316 stainless steel material for sensor body and sensing elements
- Lightening protection

Measuring Principle

MST series 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 removes 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.
INDICATORS AND SENSORS
MST Series Thermal Mass Flowmeter

Indicator/Transmitter Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MST100</td>
<td>Field-Programmable, Ex-Proof, Graphic Backlight LCD Indicator with Totalizer</td>
</tr>
<tr>
<td>MST200</td>
<td>Field-Programmable, Weather-Proof, Graphic Backlight LCD Indicator with Totalizer</td>
</tr>
<tr>
<td>MST210</td>
<td>Low-cost, Weather-Proof, FND Indicator with Totalizer</td>
</tr>
<tr>
<td>MST250</td>
<td>Low-cost, Weather-Proof, FND Indicator without Totalizer</td>
</tr>
<tr>
<td>MST300</td>
<td>Multi-Point Averaging Thermal Mass Flowmeter for CEMS (Continuous Emission Monitoring Systems)</td>
</tr>
</tbody>
</table>

The above model distinctions are based mainly on the configuration and capability of the indicator/converter. Except for MST-300, the same sensors whether inline (with threaded connection or with flanged connection) or insertion type can be used for any model.

The indicator/transmitter can be mounted integrated with the sensor or mounted separately by option.

Sensors

<table>
<thead>
<tr>
<th>Division</th>
<th>Description</th>
<th>Connection/Fitting</th>
<th>Pipe Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inline</td>
<td>NPT Thread</td>
<td>1/4” ~ 6” (8mm ~ 150mm)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flange</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insertion</td>
<td>Compression Fitting</td>
<td>2&quot; (50mm) or larger</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flange Fitting</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For insertion type sensors, mounting accessories (such as compression fitting and flange fitting) are supplied upon request.
**MAXIFLO™ Thermal Mass Flowmeter**

## Technical Specifications (MST-100, MST-200, MST-210, MST-250)

### Model Denominator
- **MST-100**: Ex-Proof, Graphic Backlight LCD Indicator with Totalizer Field Programmable
- **MST-200**: Weather-Proof, Graphic Backlight LCD Indicator with Totalizer Field Programmable
- **MST-210**: Low-cost, Weather-Proof, FND Indicator with Totalizer Field Programmable
- **MST-250**: Low-cost, Weather-Proof, FND Indicator without Totalizer

### Indicator/Converter
- **MST-100**: Flow Rate & Totalizer 16 x 2 Alphanumeric LCD
- **MST-200**: Flow Rate & Totalizer 16 x 2 Alphanumeric LCD
- **MST-210**: Flow Rate & Totalizer 3-1/2-digit (Flow Rate) 6-digit FND (Total) 3-1/2-digit FND
- **MST-250**: Flow Rate only 4-20mA

### Key
- **MST-100**: 4-keys
- **MST-200**: 4-keys
- **MST-210**: None
- **MST-250**: None

### Output
- **MST-100**: 4-20mA, Pulse, RS-232, Fieldbus, Alarm
- **MST-200**: 4-20mA, Pulse, RS-485 & Alarm (Fieldbus optional)
- **MST-210**: 4-20mA, Pulse
- **MST-250**: 4-20mA

### Flow Rate Units
- **MST-100**: Nm³/h, Nm³/m, Kg/d, Kg/hr, Kg/m, Kg/s, SCFM, SCFH, Lb/d, Lb/h, Lb/m, Lb/s, NLPH, NLPM, SLPM, SMPS, NMPS, SFPM
- **MST-200**: Nm³/h, Nm³/m, Kg/d, Kg/hr, Kg/m, Kg/s, SCFM, SCFH, Lb/d, Lb/h, Lb/m, Lb/s, NLPH, NLPM, SLPM, SMPS, NMPS, SFPM
- **MST-210**: Nm³/h, Nm³/m, Kg/d, Kg/hr, Kg/m, Kg/s, SCFM, SCFH, Lb/d, Lb/h, Lb/m, Lb/s, NLPH, NLPM, SLPM, SMPS, NMPS, SFPM
- **MST-250**: Nm³/h, Nm³/m, Kg/d, Kg/hr, Kg/m, Kg/s, SCFM, SCFH, Lb/d, Lb/h, Lb/m, Lb/s, NLPH, NLPM, SLPM, SMPS, NMPS, SFPM

### Material
- **MST-100**: Indicator Housing – Cast Aluminum
- **MST-200**: Sensor – SUS316 (Optionally Hastelloy-C)
- **MST-210**: Insertion Type: 360 psig (25 barg)
- **MST-250**: Threaded Connection: 500 psig (34.5 barg)

### Max. Temperature
- **MST-100**: Standard: -40 ~ 121℃
- **MST-200**: High-Temperature: 0 ~ 204℃
- **MST-210**: Ultra-high Temperature: 0 ~ 370℃
- **MST-250**: -20 ~ 60℃

### Enclosure
- **MST-100**: Ex-proof, weather proof (NEMA 4x), IP-65
- **MST-200**: Sensor – SUS316 (Optionally Hastelloy-C)
- **MST-210**: Insertion Type: 360 psig (25 barg)
- **MST-250**: Threaded Connection: 500 psig (34.5 barg)

### Power Supply
- **MST-100**: Standard: 24VDC, ±0.75A, Optional: 85~250VAC, 50/60Hz, 20 watts
- **MST-200**: 24VDC, ±0.75A
- **MST-210**: Weather proof (NEMA 4x), IP-65
- **MST-250**: 24VDC, ±0.75A

### Response Time
- **MST-100**: 0.9 sec
- **MST-200**: 0.9 sec
- **MST-210**: 0.9 sec
- **MST-250**: 0.9 sec

### Accuracy
- **MST-100**: ±1.0% of Reading
- **MST-200**: ±1.0% of Reading
- **MST-210**: ±1.0% of Reading
- **MST-250**: ±0.2%, Full Scale

### Repeatability
- **MST-100**: ±0.2%, Full Scale
- **MST-200**: ±0.2%, Full Scale
- **MST-210**: ±0.2%, Full Scale
- **MST-250**: ±0.2%, Full Scale

---

### Flow Rates and Lengths of Inline Sensors (MST-100, MST-200, MST-210)

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Flow Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>inch/mm</td>
<td>Nm³/h</td>
</tr>
<tr>
<td></td>
<td>Length (L2)</td>
</tr>
<tr>
<td></td>
<td>mm</td>
</tr>
<tr>
<td>1/4 8</td>
<td>0 ~ 27</td>
</tr>
<tr>
<td>1/2 15</td>
<td>0 ~ 82</td>
</tr>
<tr>
<td>3/4 20</td>
<td>0 ~ 204</td>
</tr>
<tr>
<td>1 25</td>
<td>0 ~ 326</td>
</tr>
<tr>
<td>1-1/4 32</td>
<td>0 ~ 564</td>
</tr>
<tr>
<td>1-1/2 40</td>
<td>0 ~ 760</td>
</tr>
<tr>
<td>2 50</td>
<td>0 ~ 1280</td>
</tr>
<tr>
<td>2-1/2 65</td>
<td>0 ~ 1855</td>
</tr>
<tr>
<td>3 80</td>
<td>0 ~ 2720</td>
</tr>
<tr>
<td>4 100</td>
<td>0 ~ 4893</td>
</tr>
<tr>
<td>6 150</td>
<td>0 ~ 10870</td>
</tr>
</tbody>
</table>

Standard Conditions: 0℃, 1 atm for Nm³/h, 70°F and 1 atm for SCFM (Gas: Air)

* The above data is the same for threaded connection and flanged connection.
DIMENSIONS – MST100

**In-Line Type**

**Insertion Type**

**Flange Fitting**

**Compression Fitting**

**Remote Configuration**
DIMENSIONS – MST200 & MST210

In-Line Type

Flange Connection

Screw Connection

Remote Configuration

Insertion Type

Compression Fitting

Smart Electronics Device

Inside cover

Function Up

Function Down

Inside cover

Smart Electronics

Remote Configuration

Cable Gland by Customer

Shielded Cable, 5 cond.
18 GA, 100 Ft, max.

Compression Fitting, 1/4" NPT
### Flow Rates and Lengths of Inline Sensors (MST250)

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Flow Rate</th>
<th>Length (L2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nm³/h</td>
<td>SCFM</td>
</tr>
<tr>
<td>inch</td>
<td>mm</td>
<td></td>
</tr>
<tr>
<td>1/4</td>
<td>8</td>
<td>0 ~ 27</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>0 ~ 82</td>
</tr>
<tr>
<td>3/4</td>
<td>20</td>
<td>0 ~ 204</td>
</tr>
<tr>
<td>1</td>
<td>25</td>
<td>0 ~ 326</td>
</tr>
<tr>
<td>1-1/4</td>
<td>32</td>
<td>0 ~ 564</td>
</tr>
<tr>
<td>1-1/2</td>
<td>40</td>
<td>0 ~ 760</td>
</tr>
<tr>
<td>2</td>
<td>50</td>
<td>0 ~ 1280</td>
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<tr>
<td>2-1/2</td>
<td>65</td>
<td>0 ~ 1855</td>
</tr>
<tr>
<td>3</td>
<td>80</td>
<td>0 ~ 2720</td>
</tr>
<tr>
<td>4</td>
<td>100</td>
<td>0 ~ 4893</td>
</tr>
<tr>
<td>6</td>
<td>150</td>
<td>0 ~ 10870</td>
</tr>
</tbody>
</table>

Standard Conditions: 0°C, 1 atm for Nm³/h, 70°F and 1 atm for SCFM (Gas: Air)

*The above data is the same for threaded connection and flanged connection.*
# Model Selection Guide

<table>
<thead>
<tr>
<th>Model Designator</th>
<th>MST###-###-#######-Options</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ex-Proof, Graphic Backlight LCD Indicator with Totalizer</td>
<td>MST100</td>
<td></td>
</tr>
<tr>
<td>Weather-Proof, Graphic Backlight LCD Indicator with Totalizer</td>
<td>MST200</td>
<td></td>
</tr>
<tr>
<td>Low-cost, Weather-Proof, FND Indicator with Totalizer</td>
<td>MST210</td>
<td></td>
</tr>
<tr>
<td>Low-cost, Weather-Proof, FND Indicator without Totalizer</td>
<td>MST250</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pipe Size in mm</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>D0</td>
</tr>
<tr>
<td>Integral</td>
<td>D1</td>
</tr>
<tr>
<td>Remote</td>
<td>D2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inline Type</td>
<td></td>
</tr>
<tr>
<td>Threaded (NPT Male)</td>
<td>FT</td>
</tr>
<tr>
<td>Flanged (ANSI 150#)</td>
<td>FF</td>
</tr>
<tr>
<td>Insertion Type</td>
<td></td>
</tr>
<tr>
<td>Compression Fitting (1/2&quot; or 3/4&quot; NPT)</td>
<td>IC</td>
</tr>
<tr>
<td>Flanged Fitting</td>
<td>IF</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power Supply</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>85~250VAC, 50/60Hz, 20 watts</td>
<td>P1</td>
</tr>
<tr>
<td>24VDC, ±0.75A</td>
<td>P2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Options</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td></td>
</tr>
<tr>
<td>RS-232</td>
<td>232</td>
</tr>
<tr>
<td>RS-485</td>
<td>485</td>
</tr>
<tr>
<td>Fieldbus</td>
<td>FF</td>
</tr>
<tr>
<td>Sensor Material</td>
<td></td>
</tr>
<tr>
<td>Hastelloy-C</td>
<td>HC</td>
</tr>
<tr>
<td>Remote Cable</td>
<td></td>
</tr>
<tr>
<td>C_</td>
<td>C_</td>
</tr>
<tr>
<td>Flow Meter Cleaning for Oxygen</td>
<td>CL</td>
</tr>
</tbody>
</table>

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Seil Enterprise Co.
Seoul Korea
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