High performance Liquid Source Vaporization Control Systems

Digital Liquid Mass Flow Meter
**XF-100 Series**

Mixed Injection System
**MV-2000 Series**

New Technology
For faster and more efficient liquid source vaporization

New models in the liquid source vaporization system lineup
The differential-pressure measurement method and tornado enable the new model to achieve even faster response and

High performance Liquid Source Vaporization Control Systems

As semiconductor devices offer increased performance and a wider range of functions, new processes are developed every day to improve productivity while achieving miniaturization of design rules using larger wafer diameters. As a result, the development of new materials and an expansion of the range of liquid material used. Along with this comes the need for increasingly large vaporization flows for liquid materials used in semiconductor manufacturing processes. HORIBA STEC has added a new line of liquid material vaporization systems featuring higher performance and efficiency by taking the advantage of the vaporization and flow control technologies it has obtained through years of experience. With this new lineup using our wealth of experience and proven track record we will continue to meet our customers needs.

XF-100 Series
Digital Liquid Mass Flow Meter

High-speed response achieved by using differential-pressure measurement method

High-speed response time of 100 msec (or less than 0.8 sec when it is used in combination with a piezo valve) thanks to the differential-pressure sensor system. Flow is stabilized in a shorter time due to its high speed response, contributing to reduction in liquid materials usage.

Measurement principle

In the flow rate measurement (differential-pressure measurement method) of the XF-100 Series, the pressure difference detected by pressure sensors installed up and down stream of the flow restrictor, this is converted to a flow rate using Hagen-Poiseuille law. The sensor does no heat the liquid, which allows for accurate flow rate measurement without being affected by the re-emission of dissolved gases (bubbles) or damaging materials that easily thermally decompose. Additionally, thanks to the through flow design inherited from the LF Series, the construction ensures that bubble can not build up inside the unit.

Features

- High Accuracy ±0.8% F.S. (20% improvement compared to a Legacy model)
- Ultra clean.

[Internal structure]
**MV-2000 Series**

Mixed injection

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**Stable vaporization using the tornado flow method**

The tornado flow method ensures that stable, high-efficiency vaporization is achieved, even at low temperatures. This improved vaporization performance allows even liquid materials that easily thermally decompose to be vaporized.

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**Measurement principle**

What is the tornado flow method?

The MV-2000 Series is equipped with a spiral element (Tornado Flow element) inside the vaporization section. This allows for a larger vaporization area than previous models, ensuring improved vaporization efficiency.

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**High flow rate vaporization using the tornado flow method**

The high-efficiency vaporization system enables higher flow rate vaporization than our previous models, whilst maintaining the same temperature conditions. There is no need to change the layout since this higher flow rate is achieved with the same footprint as the previous MV series.

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**Features**

1. Stable vaporization using the tornado flow method
2. High flow rate vaporization using the tornado flow method

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**Test Flow**

- Liquid: TEOS 10g/min
- Carrier Gas: He 1.5SLM
- MFC
- MV
- MFM
- Heating piping: 150 °C

- Gas-liquid mixing section Temperature: 80 °C
- Vaporizing section temperature: 80 °C

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- Allows you to build a compact vaporization system
### MV-2000 Series

**Model**

<table>
<thead>
<tr>
<th>Model</th>
<th>MV-2000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Liquid Material</td>
</tr>
<tr>
<td></td>
<td>All liquids except those corrosive to stainless steel (e.g. HCl, HF)</td>
</tr>
</tbody>
</table>

### MV-2000 Specifications

**Pressure Resistance**
1MPa (G)

**Flow Rate Signal**

- Analog: 0-5 VDC or 4-20 mA
- Digital: DeviceNET or PROFINET

**Power Supply**

- Digital: ±15V±5% 200mA
- Analog: 5VDC, 12VDC, 24VDC

**Leak Integrity**

≤ 1 x 10⁻⁹ Pa·m³/s (He)

**Materials**

- Wetted parts: SUS316L, SPRON510, Ni-Co alloy
- Standard Fitting: 1/4 inch VCR type Male, 1/8 inch VCR type Male

**Dimensions**

#### XF-100 Series

**Mass Flow Meter**

<table>
<thead>
<tr>
<th>Model</th>
<th>XF-122</th>
<th>XF-132</th>
<th>XF-124</th>
<th>XF-134</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow Range (g/min)*1</td>
<td>0.25, 0.5/1</td>
<td>0.25, 0.5/1</td>
<td>0.25, 0.5/1</td>
<td>0.25, 0.5/1</td>
</tr>
<tr>
<td>Measurement Range</td>
<td>0.25, 0.5/1</td>
<td>0.25, 0.5/1</td>
<td>0.25, 0.5/1</td>
<td>0.25, 0.5/1</td>
</tr>
<tr>
<td>Temperature Sensor</td>
<td>Thermocouple type K (CA)</td>
<td>Thermocouple type K (CA)</td>
<td>Thermocouple type K (CA)</td>
<td>Thermocouple type K (CA)</td>
</tr>
<tr>
<td>Pressure Resistance</td>
<td>1MPa (G)</td>
<td>1MPa (G)</td>
<td>1MPa (G)</td>
<td>1MPa (G)</td>
</tr>
<tr>
<td>Pressure Drop</td>
<td>MAX 50Pa (G)</td>
<td>MAX 50Pa (G)</td>
<td>MAX 50Pa (G)</td>
<td>MAX 50Pa (G)</td>
</tr>
<tr>
<td>Power Supply</td>
<td>≤ 15V±5% 200mA</td>
<td>≤ 15V±5% 200mA</td>
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<td>≤ 15V±5% 200mA</td>
</tr>
<tr>
<td>Leak Integrity</td>
<td>≤ 1 x 10⁻⁹ Pa·m³/s (He)</td>
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<td>≤ 1 x 10⁻⁹ Pa·m³/s (He)</td>
</tr>
<tr>
<td>Wetted Material</td>
<td>SUS316L, PFA</td>
<td>SUS316L, PFA</td>
<td>SUS316L, PFA</td>
<td>SUS316L, PFA</td>
</tr>
</tbody>
</table>

*1: Full scale flow rate when IPA is used. Please contact us for figures for when real liquid is used.

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