Flow Control System

FCS®
Thermal Series

We welcome customer feedback for all of our products and services.
A Mass Flow Controller is a device that controls the mass flow rate. In the past, a volume flow meter was used to measure and control the flow of fluids. However, because the volume flow rate is influenced by pressure and temperature, precise measurement and control of flow is difficult to obtain with a mass flowmeter. FCS®-Thermal Series provides Mass Flow Controllers (MFC) that match a range of customer needs.

**What is a Mass Flow Controller?**

The temperature of the Thermal Mass Flow Sensor is constant when the gas is not flowing, $TA = TB$. When the gas is flowing, $TA < TB$.

**Operating Principles**

Thermal Mass Flow Sensor

As fluid runs, a temperature difference (impedance value change) occurs in the heating element between the upstream side (A) and downstream side (B) of the Thermal Mass Flow Sensor. The difference is in the rate at which the heating element is cooled, depending on the kind of gas. The mass flow rate is measured according to the principle that the rate of cooling is related to the mass flow rate.

**Flow Control Valve**

- Input/Output Connector (D-Sub 9 Pin)
- RS485 Interface (except analog model)
- Bridge Circuit
- Output Indication
- Input Power Command Signal
- Comparative Control Circuit
- Amplifier Circuit
- Thermal Mass Flow Sensor

Both Metal and Elastomer Seals are available.

**Bypass**

Flow Accuracy

The flow accuracy of FCS® mass flow controllers in general is $\pm 1\%$ F.S. ($\pm 1\%$ within 1% of maximal flow). If higher accuracy is needed, FCS® offers products that guarantee accuracy to within $\pm 1\%$ of the set value.

<table>
<thead>
<tr>
<th>Set Value (%)</th>
<th>Precision (%) F.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than $\pm 1%$ F.S.</td>
<td>$\pm 0.25$</td>
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<tr>
<td>$+1%$ to $+0.75$</td>
<td>$+0.5$</td>
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<tr>
<td>$-0.75$ to $-0.5$</td>
<td>$-0.75$</td>
</tr>
<tr>
<td>$-0.5$ to $-0.25$</td>
<td>$-1%$</td>
</tr>
</tbody>
</table>

**Global Support and Services**

The FCS® series (Flow Control System) is leading the way in flow control technology.
**FCS® (Flow Control System) Series**

Fujikin’s FCS® Series is gas flow rate control equipment for all industries. The FCS® Series includes FCS®-Pressure Series (pressure control type) and FCS®-Thermal Series (thermal flow sensor control type), two product line-ups offering two methods of control. This catalog covers the FCS®-Thermal Series, also known more generally as a Mass Flow Controller (MFC).

**What is a Mass Flow Controller?**

A Mass Flow Controller is a device that controls the mass flow rate. In the past, a volume flow meter was used to measure and control the flow of fluids. However, because the volume flow rate is influenced by pressure and temperature, precise measurement and control of flow is difficult to obtain with a mass flowmeter. Fujikin’s FCS®-Thermal Series provides Mass Flow Controllers (MFC) that match a range of customer needs.

**Operating Principles**

When gas flows through a Mass Flow Controller (MFC), temperature changes are detected by the thermal sensor. This temperature gradient is used to compute the mass flow rate. Because each gas has a specific ability to transfer heat (i.e. heat capacity), dictated by the physical structure of the gas molecules, the MFC can proportionally control the flow rate to a given flow set point.

A range of digital control devices (RS485, DeviceNet™, EtherCAT®, PROFIBUS), as well as an analog control product (0-5VDC, 4-20mA), are part of the line-up in Fujikin’s FCS®-Thermal Series.

**Thermal Mass Flow Sensor**

As fluid runs, a temperature difference (impedance value change) occurs in the heating element between the upstream side (A) and downstream side (B) of the Thermal Mass Flow Sensor. The difference is in the rate at which the heating element is cooled, depending on the kind of gas. The mass flow rate is measured according to the principle that the rate of cooling is related to the mass flow rate.

**Flow Accuracy**

The flow accuracy of Fujikin’s mass flow controllers in general is ±1% F.S. (± within 1% of maximal flow). If higher accuracy is needed, Fujikin offers products that guarantee accuracy to within ±1% of the set value.
### FCS®-Thermal Series

#### Product Line-UP

<table>
<thead>
<tr>
<th>Features</th>
<th>PI Function Model</th>
<th>MGMR Model</th>
<th>Standard Digital Model</th>
<th>High Flow Rate Model</th>
<th>High Temperature Model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>equipped with Pressure Sensor</td>
<td>insensitive to sudden pressure fluctuations (Pressure Insensitive)</td>
<td>With MGMR Function</td>
<td>-Flow Accuracy: ±1% F.S.</td>
<td>-Max. Flow Rate 500SLM</td>
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<tr>
<td></td>
<td>1/3 flow of the specified full scale flow</td>
<td>-Corrosion Resistant Hastelloy Sensor</td>
<td>-All Flow Rate Areas</td>
<td>-Flow Rate Accuracy: ±1% F.S.</td>
<td>-Flow Rate Accuracy: ±1% F.S.</td>
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<tr>
<td></td>
<td>+Flow Accuracy: ±1% S.P.</td>
<td>24V Function Model</td>
<td>Response Time ±1sec</td>
<td>-Response Time: ±0.5sec</td>
<td>-Response Time: ±0.5sec</td>
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<td></td>
<td>-4V Function Model</td>
<td>-Corresponds to EtherCAT®, PROFIBUS</td>
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<td>-</td>
<td>-</td>
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<tr>
<td></td>
<td>-CC-Link</td>
<td>-Correspond to the special Specification</td>
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<tr>
<td></td>
<td>1.125 Cseal</td>
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<td></td>
<td>1.5 Wseal®</td>
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<table>
<thead>
<tr>
<th>Series Name</th>
<th>FCS-T1000MP</th>
<th>FCS-T1000Z</th>
<th>FCS-T1000F</th>
<th>FCS-T1200F</th>
<th>FCS-T1200MF-HT</th>
<th>FCS-T1000M/Z/F-HT</th>
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<tbody>
<tr>
<td>Flow Range (N₂ Equivalent)</td>
<td>10SCCM – 50SLM</td>
<td>10SCCM – 50SLM</td>
<td>10SCCM – 50SLM</td>
<td>51 – 500SLM</td>
<td>10SCCM – 150SLM</td>
<td>10SCCM – 150SLM</td>
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<td>Seal Material</td>
<td>Metal</td>
<td>Metal</td>
<td>Rubber</td>
<td>Metal</td>
<td>Rubber</td>
<td>Metal</td>
</tr>
<tr>
<td>Flow Accuracy</td>
<td>±1% S.P. (25 –100%)</td>
<td>±0.25% F.S. (2 –25%)</td>
<td>±1% S.P. (25 –100%)</td>
<td>±0.25% F.S. (2 –25%)</td>
<td>±1% F.S. (-12000~</td>
<td>±0.25% F.S. (2 –25%)</td>
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<tr>
<td>Response Time</td>
<td>±1sec</td>
<td>±0.5sec</td>
<td>±1sec</td>
<td>±0.5sec</td>
<td>±1sec</td>
<td>±0.5sec</td>
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<tr>
<td>PI Function</td>
<td>PI</td>
<td>PI</td>
<td>MR</td>
<td>MR</td>
<td>MG</td>
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<td>MGMR Function</td>
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<td>MG</td>
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<td>Communication</td>
<td>Analog</td>
<td>RS485</td>
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<td>RS485</td>
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<td>Digital</td>
<td>DeviceNet™</td>
<td>RS485</td>
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<td>EtherCAT®</td>
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<td>PROFIBUS</td>
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<tr>
<td>CC-Link</td>
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<td>CC-Link</td>
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<tr>
<td>Union Gasket Type (UJR Type)</td>
<td>1/4 UJR</td>
<td>1/4 UJR</td>
<td>1/4 UJR</td>
<td>1/4 UJR</td>
<td>1/4 UJR</td>
<td>1/4 UJR</td>
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<td>Double Compression Ring Type (F900 Type)</td>
<td>1/4 F900</td>
<td>1/4 F900</td>
<td>1/4 F900</td>
<td>1/4 F950</td>
<td>1/4 F950</td>
<td>1/4 F950</td>
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<tr>
<td>Integrated System Type (IGS Type)</td>
<td>1.5 Wease® 1.125 Wease® 1.125 Cseal</td>
<td>1.5 Wease® 1.125 Wease® 1.125 Cseal</td>
<td>1.5 Wease® 1.125 Wease® 1.125 Cseal</td>
<td>1.5 Wease® 1.125 Wease® 1.125 Cseal</td>
<td>1.5 Wease® 1.125 Wease® 1.125 Cseal</td>
<td>1.5 Wease® 1.125 Wease® 1.125 Cseal</td>
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<td>Surface Finish</td>
<td>Option</td>
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<td>Option</td>
</tr>
<tr>
<td>Connector for RoHS</td>
<td>RoHS</td>
<td>RoHS</td>
<td>RoHS</td>
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<tr>
<td>Page</td>
<td>P.5~6</td>
<td>P.7~8</td>
<td>P.9~10</td>
<td>P.11</td>
<td>P.12</td>
<td></td>
</tr>
</tbody>
</table>

*1: MR Specifications: Changeable to 1/3 flow of the specified full scale flow. MG Specifications: up to four kinds of gases and flow rates can be registered.

*2: Analog Interface: D-sub 9 pin. With the proviso, TCS® HRs-made HRT0A–7R–6P. UPC, UPCUS has half pitch 20P.

*3: Digital Interface: for RS485 communications, FCS-T1000 Series has RJ11 connector; FCS-T2000 Series has RJ45 connector.
## Mass Flow Controller

<table>
<thead>
<tr>
<th>FCS-T1000L</th>
<th>FCS-G2000</th>
<th>FCS-T2000</th>
<th>FCS-TM39</th>
<th>PCS-T1000F</th>
<th>UPC®</th>
<th>UPCUS®</th>
<th>FRC-T1000MF</th>
</tr>
</thead>
<tbody>
<tr>
<td>10SCCM – 50SLM</td>
<td>10SCCM – 50SLM</td>
<td>5SCCM – 150SLM</td>
<td>10SCCM – 100SLM</td>
<td>10SCCM – 50SLM</td>
<td>–</td>
<td>10SCCM – 50SLM</td>
<td>–</td>
</tr>
<tr>
<td>Metal</td>
<td>Rubber</td>
<td>Metal</td>
<td>Rubber</td>
<td>Metal</td>
<td>Rubber</td>
<td>Metal</td>
<td>Metal</td>
</tr>
<tr>
<td>±1% F.S. (10SCCM – 30SLM)</td>
<td>±12% F.S. (15SCCM – 100SLM)</td>
<td>±2% F.S. (25 – 100%)</td>
<td>±2% F.S. (10SCCM – 20SLM)</td>
<td>±2% F.S. (21 – 100SLM)</td>
<td>±1% F.S.</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>±1sec (10SCCM – 30SLM)</td>
<td>±2sec (31 – 50SLM)</td>
<td>±1sec (Representative value)</td>
<td>±1sec (Representative value)</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>±4sec</td>
</tr>
</tbody>
</table>

### Features
- **Flow Rate Accuracy:** ±1% S.P.
- **Low temperature thermal sensor**
- **Corresponds to the minute flow rate**
- **Corresponds to SDS**
- **Economy Model**

### Quick Response/Analog Economy Model
- 0-5V Input / Output
- 4-20mA Input / Output
- 0-5V Input / Output

### Analog Economy Model
- 0-5V Input / Output
- 4-20mA Input / Output
- 0-5V Input / Output

### High Precision Model with Piezo Actuator
- Flow Rate Accuracy: ±1% S.P.
- Optional Needle Valve can be included
- Flow Rate Accumulation
- High and Low Alarm Output
- Output Flow Rate

### Mass Flow Meter with Integrated Indicator
- Pressure control at the upstream side or downstream side by a signal from the external pressure sensor
- High Temperature Specification
- With Mass Flow meter (Option)

### Gas Distribution Ratio Control Model
- Corrosion Resistant Hastelloy Sensor

### Note 2:
Please inquire regarding use under other conditions.

### Note 4:
PROFIBUS is a registered trademark of the PROFIBUS Organization.

### Note 5:
EtherCAT® is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.
PI (PressureInsensitive)
FCS-T1000MP Series

Main Function·Specifications

<table>
<thead>
<tr>
<th>Model Number</th>
<th>FCST1005MPF(C)</th>
<th>FCST1030MPF(C)</th>
<th>FCST1050MPF(C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow Rate Range (N₂ Equivalent)</td>
<td>Bin1: 10 - 30SCCM</td>
<td>Bin6: 3,001 - 10,000SCCM</td>
<td>Bin8: 30,001 - 50,000SCCM</td>
</tr>
<tr>
<td></td>
<td>Bin2: 31 - 100SCCM</td>
<td>Bin7: 10,001 - 30,000SCCM</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bin3: 101 - 300SCCM</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Bin4: 301 - 1,000SCCM</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Bin5: 1,001 - 3,000SCCM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seal</td>
<td>Metal Seal</td>
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</tr>
<tr>
<td>Valve Type</td>
<td>N/O: Normally Open, N/C: Normally Closed</td>
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</tr>
<tr>
<td>Controlled Volume Range</td>
<td>2 - 100% F.S.</td>
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<td></td>
</tr>
<tr>
<td>Flow Accuracy</td>
<td>±1% S.P. (25 - 100%), ±0.25% F.S. (2 - 25%) (Accuracy guaranteed between: 15 - 35 °C)</td>
<td></td>
<td></td>
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<tr>
<td>Repeatability</td>
<td>±0.2% F.S.</td>
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<td></td>
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<tr>
<td>Response Time</td>
<td>≤1sec</td>
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<tr>
<td>Required Pressure Difference</td>
<td>50 - 300kPa (Ar: 100 - 300kPa)</td>
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<td></td>
</tr>
<tr>
<td>MAX. Operating Pressure</td>
<td>N/O 100 - 300kPa (Bin6)</td>
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<td></td>
</tr>
<tr>
<td>Guaranteed Operating Temperature Range</td>
<td>200 - 300kPa (Bin7)</td>
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<td></td>
</tr>
<tr>
<td>Guaranteed Operating Temperature Range</td>
<td>N/C 100 - 300kPa (Bin6-7)</td>
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</tr>
<tr>
<td>Guaranteed Operating Temperature Range</td>
<td>(Ar: 200 - 350kPa)</td>
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<tr>
<td>Guaranteed Operating Temperature Range</td>
<td>200 - 300kPa (Ar: 250 - 450kPa)</td>
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<tr>
<td>Guaranteed Operating Temperature Range</td>
<td>400kPaG (Ar: 500kPaG)</td>
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<tr>
<td>Guaranteed Operating Temperature Range</td>
<td>5 - 50 °C</td>
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<tr>
<td>Communication</td>
<td>Analog: 0 - 5VDC (Supply Power Voltage: ±15VDC)</td>
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<tr>
<td>Communication</td>
<td>Digital: RS485, DeviceNet, EtherCAT</td>
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<td></td>
</tr>
</tbody>
</table>

Note: Not correspond to the specification of the XXX mark.

- **PI (PressureInsensitive)**
  - Built-in pressure sensor eliminates influence of inlet pressure fluctuations to actual flow by the original control algorithm.

- **Multi Gas / Multi Range (MGMR)**
  - Users may change gas and full scale flow rate easily with 8 flow rates ranging from 10 SCCM to 50 SLM.

- **Hastelloy Sensor**
  - Improved corrosion resistance against halogen gas.

- **High Flow Rate Accuracy**
  - ±1% S.P. (25 - 100%)

Note 1: At 5Atm, flow rates (SCCM, SLM) are converted to values at 0 °C and 101.3kPa abs. (1 atm) for calibration.
**PI (Pressure Insensitive) Function Equipped**

The FCS-T1005MPFC MFC is equipped with the PI Function. MFCs that aren’t equipped with the PI Function can be connected in parallel and cross talk is reduced.

**Downsizing & Cost Reduction**

By omitting the pressure system equipment from the gas system, footprint size and costs are reduced.

**Product Code**

**FCST 1005 MP F C - 4J2 - F10 - N2 - R1 - U *** - EP**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
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<tbody>
<tr>
<td>FCS, Thermal</td>
<td>FCST: Mass Flow Controller</td>
<td>F10: 10SCCM</td>
<td>F10L: 10SLM</td>
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<tr>
<td>Flow Range</td>
<td>1005: 10 – 3,000SCCM</td>
<td>1030: 3,001 – 30,000SCCM</td>
<td>1050: 30,001 – 50,000SCCM</td>
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<td>Sealing Function</td>
<td>MP: Metal Seal-PI Type</td>
<td>D: DeviceNet™</td>
<td>E: EtherCAT®</td>
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<td>Communication</td>
<td>F: Analog / Digital</td>
<td>D: DeviceNet™</td>
<td>E: EtherCAT®</td>
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<td>Valve Mode</td>
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<td>Fittings</td>
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<td>4WS2: 1.5 Wseal® (92mm)</td>
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<td>4CW2: 1.125 Wseal® (92mm)</td>
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<td>MGR</td>
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<td>Example: O2</td>
<td>Flow Rate Unit: CCM, LM</td>
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<td>Valve Mode</td>
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</table>

**With a display**

- Temperature (°C/°F)
- Pressure (kPa / psi)
- Flow Rate (Setting Pressure % / Output Flow Rate %)

**With a display**

- Temperature (°C/°F)
- Pressure (kPa / psi)
- Flow Rate (Setting Pressure % / Output Flow Rate %)
MGMR Model
FCS-T1000Z Series

Main Function Specifications

Features

- **Multi Gas / Multi Range (MGMR)**
  Users may change gas and full scale flow rate easily with 8 flow rates ranging from 10 SCCM to 50 SLM.

- **Hastelloy Sensor**
  Improved corrosion resistance against halogen gas.

- **High Flow Rate Accuracy**
  ±1% S.P. (25 ~ 100%)

Specifications

<table>
<thead>
<tr>
<th>Model Number</th>
<th>FCST1005 (M) ZF (C)</th>
<th>FCST1030 (M) ZF (C)</th>
<th>FCST1050 (M) ZF (C)</th>
</tr>
</thead>
</table>
| Flow Rate Range (N₂ Equivalent) | Bin1: 10 ~ 30SCCM  
Bin2: 31 ~ 100SCCM  
Bin3: 101 ~ 300SCCM  
Bin4: 301 ~ 1,000SCCM  
Bin5: 1,001 ~ 3,000SCCM | Bin6: 3,001 ~ 10,000SCCM  
Bin7: 10,001 ~ 30,000SCCM | Bin8: 30,001 ~ 50,000SCCM |
| Seal | Metal Seal, Rubber Seal |
| Valve Type | N/O: Normally Open, N/C: Normally Closed |
| Controlled Volume Range | 2 ~ 100% F.S. |
| Flow Accuracy | ±1% S.P., (25 ~ 100%), ±0.25% F.S. (2 ~ 25%) (Accuracy guaranteed between: 15 ~ 35 °C) |
| Repeatability | ±0.2% F.S. |
| Response Time | ≤1sec |
| Required Pressure Difference | 50 ~ 300kPa (Ar: 100 ~ 300kPa)  
N/O 100 ~ 300kPa (Bin6)  
150 ~ 300kPa (Bin7)  
N/C 100 ~ 300kPa (Bin6-7)  
(Ar: 200 ~ 350kPa) | 200 ~ 300kPa (Ar: 250 ~ 450kPa) |
| Maximum Operating Pressure | 400kPaG (Ar: 500kPaG) |
| Guaranteed Operating Temperature Range | 5 ~ 50 °C |
| Communication | Analog: 0 ~ 5VDC (Supply Power Voltage: ±15VDC), 0 ~ 5VDC (Supply Power Voltage: ±24VDC), 4 ~ 20mA (Supply Power Voltage: ±24VDC)  
Digital: RS485, DeviceNet™, EtherCAT™ (For Metal Seal only) |

*Note: Not correspond to the specification of the XXX mark.*

You can download the latest catalogue from URL http://www.fujikin.co.jp/go/c75101E

---

**Note 1:** Specifications are for MFC. Please inquire for the specifications of the Mass Flow Meter.

**Note 2:** At 7°C, flow rates (SCCM, SLM) are converted to values at 0 °C and 101.3kPa abs. (1 atm) for calibration.
MGMR (Multi Gas / Multi Range) Functions

Users can optionally change the gas and the full scale flow rate in the flow rate range that corresponds to the specified Bin number. Choose from 8 bin numbers to match gas with flow rate range.

### Configuration Software

Configuration software allows for changing gas and full scale flow rate.

### Product Code

**FCST 1005 M ZF C - 4J2 - F10 - N2 - R1 - CR - U *** - EP**

- **FCS,- Thermal**
  - FCST: Mass Flow Controller
  - FCSTM: Mass Flow Meter
- **Flow Range**
  - 1005: 10~3,000SCCM
  - 1030: 3,001~30,000SCCM
  - 1050: 30,001~50,000SCCM
- **Seal Material**
  - Blank: Rubber
  - M: Metal
- **Communication**
  - ZF: Analog / Digital
  - ZD: DeviceNet™ (Horizontal Connection)
  - ZDT: DeviceNet™ (Above Connection)
  - ZE: EtherCAT®
- **Valve Mode**
  - Blank: Normally Open
  - C: Normally Closed
- **Fittings (Face to face dimension)**
  - 4J2: 1/4 UJR(124mm)
  - 4J1: 1/4 UJR(106mm)
  - 4F2: 1/4 F900(27mm)
  - 4CW1: 1.125 Wseal®(79.8mm)
  - 4CW2: 1.125 Wseal®(92mm)
  - 4WS1: 1.5 Wseal®(79.8mm)
  - 4WS2: 1.5 Wseal®(92mm)
  - 4CL2: 1.125 Cseal(92mm)

---

*Corresponds only to metal seal type*
### Main Function Specifications

<table>
<thead>
<tr>
<th>Model Number</th>
<th>FCST1005 (M) (F) (C)</th>
<th>FCST1030 (M) (F) (C)</th>
<th>FCST1050 (M) (F) (C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow Rate Range (N₂ Equivalent)</td>
<td>10SCCM – 5SLM</td>
<td>6 – 30SLM</td>
<td>31 – 50SLM</td>
</tr>
<tr>
<td>Seal</td>
<td>Metal Seal, Rubber Seal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valve Type</td>
<td>N/O: Normally Open, N/C: Normally Closed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Controlled Volume Range</td>
<td>2 – 100% F.S.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flow Accuracy</td>
<td>±1% F.S. (Accuracy guaranteed between 15 – 35 °C)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeatability</td>
<td>±0.2% F.S.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response Time</td>
<td>≤1sec</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Required Pressure Difference</td>
<td>50 – 300kPa</td>
<td>N/O 100 – 300kPa (6 – 10SLM)</td>
<td>200 – 300kPa</td>
</tr>
<tr>
<td>N/C 150 – 300kPa (11 – 30SLM)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAX. Operating Pressure</td>
<td>400kPaG</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guaranteed Operating Temperature Range</td>
<td>5 – 50 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td>Analog: 0 – 5VDC (Supply Power Voltage: ±15VDC), 0 – 5VDC (Supply Power Voltage: +24VDC)</td>
<td>Digital: RS485, DeviceNet™, EtherCAT®, PROFIBUS, CC-Link</td>
<td></td>
</tr>
</tbody>
</table>

Note: Not correspond to the specification of the XXX mark.

### Features

- **High Speed Response**
  Response time: 1 sec for any given set point

- **Flow Rate Control, Monitoring Software**
  Connection to PC allows digital control up to 9 channels.

- **Corresponds to Various Communication Modes**

- **Corresponds to Special Specifications**
  Example
  - The high-pressure specification
  - The low differential pressure specification
  - The high differential pressure specification

### Specifications

- **Product Code**
  - Blank: Normally Open
  - C: Normally Closed

- **Valve Mode**
  - Blank: Rubber
  - Metal

- **D-sub 9pin Connector Screw**
  - Blank: Machined Finish
  - EP: Electro-Polished
  - Blank: FKM

- **Gas Type Example**
  - N₂

- **Surface Finish**
  - Blank: M3
  - EP: Electro-Polished

- **Dimensions**
  - 23x318 to 350x695

- **Flow Ratio Controller**
- **Pressure Controller**
- **Flow Control Equipment**

- **Note 1:** Specifications are for MFC. Please inquire for the specifications of the Mass Flow Meter.

- **Note 2:** At °C and 101.3kPa abs. (1 atm) for calibration.
### High Speed Response
Response Time $\leq$ 1 sec for any given set point
Progressive PID Technology

![Image of flow rate controller](Image)

#### Application

- **1ch Monitoring software for DeviceNet™**
- **9ch Monitoring software Corrugated Chart**

#### Corresponds to Various Communication Modes

- RS485
- DeviceNet™
- EtherCAT®
- PROFIBUS

#### Single Gas Model, Multi Range Model, Multi Gas Model

<table>
<thead>
<tr>
<th>Control System</th>
<th>Specifications</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital / Analog Model</td>
<td>Single specification</td>
<td>Customer specifies gas and flow rate.</td>
</tr>
<tr>
<td></td>
<td>MR (Multi Range) specification</td>
<td>Flow rate may be changed to even 1/3 of the specified rate.</td>
</tr>
<tr>
<td></td>
<td>MG (Multi Gas) specification</td>
<td>It’s possible to register up to 4 kinds of gas table. (Gas, flowrate)</td>
</tr>
</tbody>
</table>

#### Product Code

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 FCST: Mass Flow Controller</td>
<td>F10: 10SCCM</td>
</tr>
<tr>
<td>2 FCSTM: Mass Flow Meter</td>
<td>F10L: 10SLM</td>
</tr>
<tr>
<td>3 FCS, – Thermal</td>
<td>EP: Electro-Polished</td>
</tr>
<tr>
<td>4 Flow Range</td>
<td>○ corresponds only to metal seal type.</td>
</tr>
<tr>
<td>5 Seal Material</td>
<td>○ corresponds only to metal seal type.</td>
</tr>
<tr>
<td>6 Communication</td>
<td>○ corresponds only to metal seal type.</td>
</tr>
<tr>
<td>7 Valve Mode</td>
<td>○ corresponds only to metal seal type.</td>
</tr>
<tr>
<td>8 Fittings Face to face dimension</td>
<td>○ corresponds only to metal seal type.</td>
</tr>
<tr>
<td>9 O-Ring Material</td>
<td>○ corresponds only to metal seal type.</td>
</tr>
<tr>
<td>10 Seal Spin Connector Screw</td>
<td>○ corresponds only to metal seal type.</td>
</tr>
<tr>
<td>11 User Specifications</td>
<td>○ corresponds only to metal seal type.</td>
</tr>
<tr>
<td>12 Surface Finish</td>
<td>○ corresponds only to metal seal type.</td>
</tr>
</tbody>
</table>

- ○ corresponds only to metal seal type.
High Flow Rate Model
FCS-T1200F, FCS-T1500F Series

Main Function Specifications

Flow Control Equipment

Features

- **High Flow Rate Model**
  Even a maximum flow rate of 500 SLM (converted by N₂ gas) is applicable.

- **Flow Accuracy**
  ±1% F.S. (less than F.S. 200SLM)

- **Response Time**
  Less than 3 sec

Specifications

<table>
<thead>
<tr>
<th>Model Number</th>
<th>FCST1200MF (C)</th>
<th>FCST1200F (C)</th>
<th>FCST1500FC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow Rate Range (N₂ Equivalent)</td>
<td>51 – 150SLM</td>
<td>51 – 200SLM</td>
<td>201 – 500 SLM</td>
</tr>
<tr>
<td>Seal</td>
<td>Metal Seal</td>
<td>Rubber Seal</td>
<td></td>
</tr>
<tr>
<td>Valve Type</td>
<td>N/O: Normally Open, N/C: Normally Closed</td>
<td>N/C: Normally Closed</td>
<td></td>
</tr>
<tr>
<td>Controlled Volume Range</td>
<td>2 - 100% F.S.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flow Accuracy</td>
<td>±1% F.S. (Accuracy guaranteed between 15 - 35 °C)</td>
<td>±2% F.S. (Accuracy guaranteed between: 15-35 °C)</td>
<td></td>
</tr>
<tr>
<td>Repeatability</td>
<td>±0.2% F.S.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response Time</td>
<td>≤3sec</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Required Pressure Difference</td>
<td>100 - 300kPa (T1200MF 101 - 150SLM: 150 - 300kPa)</td>
<td>150 - 300kPa</td>
<td></td>
</tr>
<tr>
<td>MAX. Operating Pressure</td>
<td>700kPaG</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guaranteed Operating Temperature Range</td>
<td>5 – 45 °C</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Not correspond to the specification of the XXX mark.

Product Code


1. **FCS – Thermal**
2. **Flow Range/Seal**
3. **Communication**
4. **Valve Mode**
5. **Fittings Flow to face dimension**
6. **O-Ring Material**
7. **Gas Type**
8. **Surface Finish**
9. **User Specifications**
10. **Option**
11. **Full Scale**

*Note: Corresponds only to metal seal type.*

You can download the latest catalogue from URL: [http://www.fujikin.co.jp/go/c75101E](http://www.fujikin.co.jp/go/c75101E)
High Temperature Model
FCS-T1000M(Z)F-HT, FCS-T1200MF-HT Series

Main Function Specifications

<table>
<thead>
<tr>
<th>Model Number</th>
<th>FCST1005MF (C) - HT</th>
<th>FCST1030MF (C) - HT</th>
<th>FCST1050MF (C) - HT</th>
<th>FCST1200MF (C) - HT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow Rate Range (N₂ Equivalent)</td>
<td>10 - 3,000SCCM</td>
<td>3,001 - 30,000SCCM</td>
<td>30,001 - 50,000SCCM</td>
<td>10 SCCM - 5SLM</td>
</tr>
<tr>
<td>Seal</td>
<td>Metal Seal</td>
<td>Metal Seal</td>
<td>Metal Seal</td>
<td>Metal Seal</td>
</tr>
<tr>
<td>Valve Type</td>
<td>N/O: Normally Open, N/C: Normally Closed</td>
<td>N/O: Normally Open, N/C: Normally Closed</td>
<td>N/O: Normally Open, N/C: Normally Closed</td>
<td>N/O: Normally Open, N/C: Normally Closed</td>
</tr>
<tr>
<td>Flow Accuracy</td>
<td>±1% S.P. (25 - 100%)</td>
<td>±0.25% F.S. (2 - 25%)</td>
<td>±1% F.S.</td>
<td>±0.2% F.S.</td>
</tr>
<tr>
<td>Repeatability</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response Time (s)</td>
<td>≤1sec</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Required Pressure Difference</td>
<td>2 - 100% F.S.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td>Analog: 0 - 5VDC (Supply Power Voltage: ±15VDC)</td>
<td>Digital Multi Gas Model Based on FCS - T1000MF Series</td>
<td>Digital Standard Model Based on FCS - T1000MF Series</td>
<td>Digital High Flow Rate Model Based on FCS - T1200MF Series</td>
</tr>
<tr>
<td>MAX. Operating Pressure</td>
<td>400kPaG (Ar: 500kPaG)</td>
<td>400kPaG</td>
<td>700kPaG</td>
<td></td>
</tr>
<tr>
<td>Guaranteed Operating Temperature Range</td>
<td>50 - 80°C (We can calibrate the customer-specified temperature.)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Not correspond to the specification of the XXX mark.

Features

Corresponding to High Temperature
Guaranteed Operating Temperature Range 50 - 80°C
(Consult for use at temperatures of 80°C or higher.)

Specifications

Flow Range: It’s based upon each model.

Gas Type: Example: N₂

Seal type: Metal Seal / Analog / Digital

Valve Type: Blank: Normally Open / C: Normally Closed

Fittings: It’s based upon each model.

Product Code
FCST 1005 MF C - 4J2 - F10 - N2 - U *** - HT - EP

Note: Not correspond to the specification of the XXX mark.

Required Pressure Difference
2% F.S. (Setting Flow Rate)
Fast Response and Analog Economy Model
FCS-T1000L Series

### Specifications

<table>
<thead>
<tr>
<th>Model Number</th>
<th>FCST1005 (M/L/C)</th>
<th>FCST1030 (M/L/C)</th>
<th>FCST1050 (M/L/C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow Rate Range (N₂ Equivalent)</td>
<td>10SCCM – 5SLM</td>
<td>6 – 30SLM</td>
<td>31 – 50SLM</td>
</tr>
<tr>
<td>Seal</td>
<td>Metal Seal, Rubber Seal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valve Type</td>
<td>N/O: Normally Open, N/C: Normally Closed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Controlled Volume Range</td>
<td>2 – 100% F.S.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flow Accuracy</td>
<td>±1% F.S. (Guaranteed Operating Temperature Range: 15 – 35 °C)</td>
<td>±2% F.S. (Accuracy guaranteed between 15 – 35 °C)</td>
<td></td>
</tr>
<tr>
<td>Repeatability</td>
<td>±0.2% F.S.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response Time</td>
<td>≤1sec</td>
<td></td>
<td>≤2sec</td>
</tr>
<tr>
<td>Required Pressure Difference</td>
<td>50 – 300kPa</td>
<td>100 – 300kPa (6 – 10SLM)</td>
<td>200 – 300kPa</td>
</tr>
<tr>
<td>MAX. Operating Pressure</td>
<td>400kPaG</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guaranteed Operating Temperature Range</td>
<td>5 – 50 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td>Analog: 0 – 5VDC (Supply Power Voltage: ±15VDC)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note: Response time refers to the time to reach from minimum flow rate to ±2% F.S. of setting flow rate. Note 1: Specifications are for MFC. Please inquire for the specifications of the Mass Flow Meter. Note 2: All flow rates (SCCM, SLM) are converted to values at 0 °C and 101.3kPa abs. (1 atm) for calibration. Note 3: Please inquire separately when converting to 20 (25) °C and 101.3kPa (1 atm) for calibration.*

### Features

- **Flow Accuracy**
  ±1% F.S. (less than F.S. 30SLM)
- **Input/Output**
  Analog (0 – 5VDC)
- **Fast Response**
  Less than 1sec (less than F.S. 30SLM)

### Main Function Specifications

<table>
<thead>
<tr>
<th></th>
<th>Metal</th>
<th>EP</th>
<th>S.P.</th>
<th>M3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anodized Type</td>
<td>Blank: Rubber</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M3</td>
<td>Blank: EP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O-Ring Material</td>
<td>Blank: FKM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N/O</td>
<td>Blank: M</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4J2</td>
<td>1/4 UJR(124mm)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4WS</td>
<td>1:5 Wseal(92mm)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1005</td>
<td>10SCCM – 20SLM</td>
<td>(     )</td>
<td>(     )</td>
<td></td>
</tr>
<tr>
<td>1030</td>
<td>6 – 30SLM</td>
<td>(     )</td>
<td>(     )</td>
<td></td>
</tr>
<tr>
<td>1050</td>
<td>31 – 50SLM</td>
<td>(     )</td>
<td>(     )</td>
<td></td>
</tr>
</tbody>
</table>

*Note: Not correspond to the specification of the _EP_ mark.*

### Product Code

<table>
<thead>
<tr>
<th>FCST 1005</th>
<th>M</th>
<th>L</th>
<th>C</th>
<th>4J2</th>
<th>F10</th>
<th>N2</th>
<th>CR</th>
<th>U</th>
<th>***</th>
<th>EP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
</tbody>
</table>

- FCS: Thermal
- FCST: Mass Flow Controller
- FCSTM: Mass Flow Meter
- Flow Range
- 1005: 10SCCM – 5SLM
- 1030: 6 – 30SLM
- 1050: 31 – 50SLM
- Seal Material
- Blank: Rubber
- M: Metal
- Communication
- L: Analog
- Valve Mode
- Blank: Normally Open
- C: Normally Closed
- Fittings (Face to face dimension)
- 4J2: 1/4 UJR(124mm)
- 4F2: 1/4 F900(127mm)
- 4CW1: 1.125 Wseal(79.8mm)
- 4CW2: 1.125 Wseal(92mm)
- 4WS1: 1.5 Wseal(92.8mm)
- 4WS2: 1.5 Wseal(92mm)
- 4CL2: 1.125 Cseal(92mm)

*Blank corresponds only to metal seal type.*
Analog Economy Model
FCS-G200 Series

Main Function・Specifications

<table>
<thead>
<tr>
<th>Model Number</th>
<th>FC-SG205</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prac. Gasses</td>
<td>N₂, Ar, He, Air, O₂, SF₆, H₂</td>
</tr>
<tr>
<td>Row Rate Range (N₂ Equivalent)</td>
<td>10SCCM - 5SLM</td>
</tr>
<tr>
<td>Seal</td>
<td>Rubber Seal</td>
</tr>
<tr>
<td>Valve Type</td>
<td>N/O: Normally Open</td>
</tr>
<tr>
<td>Controlled Volume Range</td>
<td>5 - 100% F.S. (Accuracy guaranteed between 15 - 35 °C)</td>
</tr>
<tr>
<td>Flow Accuracy</td>
<td>±2% F.S.</td>
</tr>
</tbody>
</table>

Note: Not correspond to the specification of the XXX mark.

Features

- Allows flow rate measurement by analog signal and the control function.
- Supports integrated power supply source.

Specifications

<table>
<thead>
<tr>
<th>Model Number</th>
<th>TM39 (V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow Rate Range (N₂ Equivalent)</td>
<td>10SCCM - 20SLM</td>
</tr>
<tr>
<td>Seal</td>
<td>Rubber Seal</td>
</tr>
<tr>
<td>Flow Accuracy</td>
<td>±2% F.S. (Accuracy guaranteed between: 15 - 35 °C)</td>
</tr>
<tr>
<td>Operating Pressure</td>
<td>0.001 - 0.5MPa(G)</td>
</tr>
<tr>
<td>Guaranteed Operating Temperature Range</td>
<td>0 - 50 °C</td>
</tr>
<tr>
<td>Communication</td>
<td>Analog: 1 - 5VDC (Supply Power Voltage: +24VDC), 4 - 20mA (Supply Power Voltage: +24VDC)</td>
</tr>
</tbody>
</table>

Note: Not correspond to the specification of the XXX mark.

Features

- Indicater
- Flow Rate Output
- Needle valve model is also available.
- Flow Rate Estimate and High/ Low Alarm Output

Product Code

<table>
<thead>
<tr>
<th>Model Number</th>
<th>TM39 (V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow Rate Range (N₂ Equivalent)</td>
<td>10SCCM - 20SLM</td>
</tr>
<tr>
<td>Seal</td>
<td>Rubber Seal</td>
</tr>
<tr>
<td>Flow Accuracy</td>
<td>±2% F.S. (Accuracy guaranteed between: 15 - 35 °C)</td>
</tr>
<tr>
<td>Operating Pressure</td>
<td>0.001 - 0.5MPa(G)</td>
</tr>
<tr>
<td>Guaranteed Operating Temperature Range</td>
<td>0 - 50 °C</td>
</tr>
<tr>
<td>Communication</td>
<td>Analog: 1 - 5VDC (Supply Power Voltage: +24VDC), 4 - 20mA (Supply Power Voltage: +24VDC)</td>
</tr>
</tbody>
</table>

You can download the latest catalogue from URL http://www.fujikin.co.jp/go/c75101E
High Precision Model with Piezo Actuator

FCS-T2000 Series

Main Functions

- **Piezo Actuator**
- **Low Temperature Heat System Flow Rate Sensor**
- **Corresponds to the Minute Flow Rate.**

Specifications

<table>
<thead>
<tr>
<th>Model Number</th>
<th>FCST2005(C)</th>
<th>FCST2020(C)</th>
<th>FCST2050(C)</th>
<th>FCST2150(C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow Rate Range (N₂ Equivalent)</td>
<td>5SCCM - 5SLM</td>
<td>6 - 20SLM</td>
<td>21 - 50SLM</td>
<td>51 - 150SLM</td>
</tr>
<tr>
<td>Valve Type</td>
<td>N/O: Normally Open, N/C: Normally Closed</td>
<td></td>
<td>N/O: Normally Open</td>
<td>N/O: Normally Open, N/C: Normally Closed</td>
</tr>
<tr>
<td>Controlled Volume Range</td>
<td>2 - 100% F.S.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flow Accuracy</td>
<td>±1% S.P.(25 - 100%), ±0.25% F.S. (2 - 25%)</td>
<td></td>
<td>±2% F.S.</td>
<td></td>
</tr>
<tr>
<td>Repeatability</td>
<td>±0.2% F.S.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response Time</td>
<td>≤1 sec (Typical Value)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Required Pressure Difference</td>
<td>50 - 300kPa</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAX. Operating Pressure</td>
<td>300kPa</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guaranteed Operating Temperature Range</td>
<td>5 - 50 °C</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Features

- **Piezo Actuator**
- **Low Temperature Heat System Flow Rate Sensor** Effective with High Reaction and Low Stability Gases
- **Corresponds to the Minute Flow Rate.** Special Model: 1, 2, 3 SCCM F.S.

Product Code

FCST2005 DC - 4J2 - F10 - N2 - U - ***
SDS™ (Safe Delivery Source) Model

FCSDS-T2000 Series

Specifications

<table>
<thead>
<tr>
<th>Model Number</th>
<th>FCSDST2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>The kind of practicable gas</td>
<td>AsH₃, BF₃, PH₃, SiF₄, PF₅</td>
</tr>
<tr>
<td>Flow Rate Range (N₂ Equivalent)</td>
<td>2 - 30 SCCM</td>
</tr>
<tr>
<td>Seal</td>
<td>Metal Seal</td>
</tr>
<tr>
<td>Valve Type</td>
<td>N/O: Normally Open, N/C: Normally Closed</td>
</tr>
<tr>
<td>Controlled Volume Range</td>
<td>2 - 100% F.S. (Accuracy guaranteed between: 15 - 35 °C)</td>
</tr>
<tr>
<td>Flow Accuracy</td>
<td>±1% F.S.</td>
</tr>
<tr>
<td>Repeatability</td>
<td>±0.2% F.S.</td>
</tr>
<tr>
<td>Response Time</td>
<td>2sec (Typical Value)</td>
</tr>
<tr>
<td>Required Pressure Difference</td>
<td>1.33kPa (10 Torr) - 133.3kPa (1000 Torr)</td>
</tr>
<tr>
<td>MAX Operating Pressure</td>
<td>133.3kPa (1000 Torr)</td>
</tr>
<tr>
<td>Guaranteed Operating Temperature Range</td>
<td>5 - 50 °C</td>
</tr>
<tr>
<td>Communication</td>
<td>Analog: 0 - 5VDC (Supply Power Voltage: ±15VDC)</td>
</tr>
</tbody>
</table>

Note: Not correspond to the specification of the XXX mark.

Features

- Applicable Gases: AsH₃, BF₃, PH₃, SiF₄, PF₅
- Multi-gas model includes a rotary switch for changing gas

Economy Model with Piezo Actuator

FCS-G300 Series

Specifications

<table>
<thead>
<tr>
<th>Model Number</th>
<th>FCSSG305(C)</th>
<th>FCSSG320(C)</th>
<th>FCSSG350(C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Row Rate Range (N₂ Equivalent)</td>
<td>10 SCCM - 5 SLM</td>
<td>6 - 20 SLM</td>
<td>21 - 50 SLM</td>
</tr>
<tr>
<td>Seal</td>
<td>Metal Seal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valve Type</td>
<td>N/O: Normally Open, N/C: Normally Closed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Controlled Volume Range</td>
<td>2 - 100% F.S. (Accuracy guaranteed between: 15 - 35 °C)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flow Accuracy</td>
<td>±1% F.S.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeatability</td>
<td>±0.2% F.S.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response Time</td>
<td>1sec (Central Value)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Required Pressure Difference</td>
<td>50 - 300kPa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAX Operating Pressure</td>
<td>300kPaG</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guaranteed Operating Temperature Range</td>
<td>5 - 50 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td>Analog: 0 - 5VDC (Supply Power Voltage: ±15VDC)</td>
<td>Digital: RS485</td>
<td></td>
</tr>
</tbody>
</table>

Note 1: At FujiKIN, flow rates (SCCM, SLM) are converted to values at 0 °C and 101.3kPa abs. (1 atm) for calibration.
Note 2: Flow rate precision guaranteed 100pcm or over.
Note 3: Please specify the installation direction when placing an order.

Features

- Flow Rate Accuracy ±1% F.S.
- Piezo Actuator
Automatic Pressure Control Controller (Outside Pressure Signal Control)

PCS-T1000F Series

Main Function–Specifications

- Pressure control at the upstream side or downstream side by a signal from the external pressure sensor
- Flow Rate Output
  0–5VDC

Specifications

<table>
<thead>
<tr>
<th>Model Number</th>
<th>PCST1005 (M) F (C)</th>
<th>PCST1030 (M) F (C)</th>
<th>PCST1050 (M) F (C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow Rate Range (L/Equivalent)</td>
<td>10SCCM – 5SLM</td>
<td>6 – 30SLM</td>
<td>31 – 50SLM</td>
</tr>
<tr>
<td>Seal</td>
<td>Metal Seal, Rubber Seal</td>
<td>N/C Normally Closed</td>
<td>N/C Normally Closed</td>
</tr>
<tr>
<td>Valve Type</td>
<td>C: Normally Closed</td>
<td>F: Analog / Digital</td>
<td>F: Analog / Digital</td>
</tr>
<tr>
<td>Pressure Signal Input Level</td>
<td>0 – 10VDC F.S.</td>
<td>2 – 100% F.S.</td>
<td>2 – 100% F.S.</td>
</tr>
<tr>
<td>Pressure Control Range</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pressure Accuracy</td>
<td>±1% F.S. (Accuracy guaranteed between 15–35 °C)</td>
<td>±1% F.S. (Accuracy guaranteed between 15–35 °C)</td>
<td>±1% F.S. (Accuracy guaranteed between 15–35 °C)</td>
</tr>
<tr>
<td>Flow Accuracy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flow Rate Output Signal</td>
<td>0–5VDC</td>
<td>≤3sec</td>
<td></td>
</tr>
<tr>
<td>Response Time</td>
<td>*2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAX Operating Pressure</td>
<td>400kPaG</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guaranteed Operating Temperature Range</td>
<td>5–50 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td>Analog: 0 – 10VDC (Supply Power Voltage: ±15VDC)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Digital: RS485</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Not corresponding to the specification of the *** mark.

Features

- Pressure control at the upstream side or downstream side by a signal from the external pressure sensor
- Flow Rate Output
  0–5VDC

Application Examples

For wafer adhesion in plasma devices and He gas back pressure control.

Product Code


- 1: Full Scale
- 2: Gas Type
- 3: Flow Range
- 4: PVC: Pressure Controller
- 5: Seal Material
- 6: O-Ring Material
- 7: Communication
- 8: Valve Mode
- 9: Surface Finish
- 10: User Specifications
- 11: Type of Connection
- 12: Full Scale

Note: Please consult Fujikin separately if you use in case of pressure range of F.S. 13.3kPa abs (100 Torr).

For more information, you can download the latest catalogue from URL http://www.fujikin.co.jp/go/75101E

Note: *1: The precision of the pressure value depends on the precision of the pressure sensor.
*2: Response Time, in the case of controlling upstream pressure, is the time it takes to reach 25% F.S. of the target pressure from the highest control pressure.

Guaranteed Operating Temperature Range

250 °C

Pressure Setting Signal

Full Scale Pressure Range

F.S. 150/300/500 kPa abs

Pressure Control Signal

0–10VDC

Flow Rate Output Signal

F.S. 13.3kPa abs (100Torr)

Flow Rate Output

0–5VDC

Pressure Control Valve Cv Value

±0.03

Pressure Setting

±0.011

O-Ring Material

- Blank: PFM
- CR: Chloroprene Rubber
- Blank: M3
- L: inch

User Specifications

Example: 006 25

D-sub 9pin Connector Screw

Blank: 15-35

Blank: Analog

Features

- Pressure control at the upstream side or downstream side by a signal from the external pressure sensor
- Flow Rate Output
  0–5VDC

Application Examples

For wafer adhesion in plasma devices and He gas back pressure control.

Product Code


- 1: Full Scale
- 2: Gas Type
- 3: Flow Range
- 4: PVC: Pressure Controller
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Guaranteed Operating Temperature Range

250 °C

Pressure Setting Signal

Full Scale Pressure Range

F.S. 150/300/500 kPa abs

Pressure Control Signal

0–10VDC

Flow Rate Output Signal

F.S. 13.3kPa abs (100Torr)

Flow Rate Output

0–5VDC

Pressure Control Valve Cv Value

±0.03

Pressure Setting

±0.011

O-Ring Material

- Blank: PFM
- CR: Chloroprene Rubber
- Blank: M3
- L: inch

User Specifications

Example: 006 25

D-sub 9pin Connector Screw

Blank: 15-35

Blank: Analog

Features

- Pressure control at the upstream side or downstream side by a signal from the external pressure sensor
- Flow Rate Output
  0–5VDC

Application Examples

For wafer adhesion in plasma devices and He gas back pressure control.

Product Code


- 1: Full Scale
- 2: Gas Type
- 3: Flow Range
- 4: PVC: Pressure Controller
- 5: Seal Material
- 6: O-Ring Material
- 7: Communication
- 8: Valve Mode
- 9: Surface Finish
- 10: User Specifications
- 11: Type of Connection
- 12: Full Scale

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*2: Response Time, in the case of controlling upstream pressure, is the time it takes to reach 25% F.S. of the target pressure from the highest control pressure.

Guaranteed Operating Temperature Range

250 °C

Pressure Setting Signal

Full Scale Pressure Range

F.S. 150/300/500 kPa abs

Pressure Control Signal

0–10VDC

Flow Rate Output Signal

F.S. 13.3kPa abs (100Torr)

Flow Rate Output

0–5VDC

Pressure Control Valve Cv Value

±0.03

Pressure Setting

±0.011

O-Ring Material

- Blank: PFM
- CR: Chloroprene Rubber
- Blank: M3
- L: inch

User Specifications

Example: 006 25

D-sub 9pin Connector Screw

Blank: 15-35

Blank: Analog

Features

- Pressure control at the upstream side or downstream side by a signal from the external pressure sensor
- Flow Rate Output
  0–5VDC

Application Examples

For wafer adhesion in plasma devices and He gas back pressure control.

Product Code


- 1: Full Scale
- 2: Gas Type
- 3: Flow Range
- 4: PVC: Pressure Controller
- 5: Seal Material
- 6: O-Ring Material
- 7: Communication
- 8: Valve Mode
- 9: Surface Finish
- 10: User Specifications
- 11: Type of Connection
- 12: Full Scale

Note: *1: The precision of the pressure value depends on the precision of the pressure sensor.
*2: Response Time, in the case of controlling upstream pressure, is the time it takes to reach 25% F.S. of the target pressure from the highest control pressure.

Guaranteed Operating Temperature Range

250 °C

Pressure Setting Signal

Full Scale Pressure Range

F.S. 150/300/500 kPa abs

Pressure Control Signal

0–10VDC

Flow Rate Output Signal

F.S. 13.3kPa abs (100Torr)

Flow Rate Output

0–5VDC

Pressure Control Valve Cv Value

±0.03

Pressure Setting

±0.011

O-Ring Material

- Blank: PFM
- CR: Chloroprene Rubber
- Blank: M3
- L: inch

User Specifications

Example: 006 25

D-sub 9pin Connector Screw

Blank: 15-35

Blank: Analog

Features

- Pressure control at the upstream side or downstream side by a signal from the external pressure sensor
- Flow Rate Output
  0–5VDC

Application Examples

For wafer adhesion in plasma devices and He gas back pressure control.

Product Code


- 1: Full Scale
- 2: Gas Type
- 3: Flow Range
- 4: PVC: Pressure Controller
- 5: Seal Material
- 6: O-Ring Material
- 7: Communication
- 8: Valve Mode
- 9: Surface Finish
- 10: User Specifications
- 11: Type of Connection
- 12: Full Scale

Note: *1: The precision of the pressure value depends on the precision of the pressure sensor.
*2: Response Time, in the case of controlling upstream pressure, is the time it takes to reach 25% F.S. of the target pressure from the highest control pressure.

Guaranteed Operating Temperature Range

250 °C

Pressure Setting Signal

Full Scale Pressure Range

F.S. 150/300/500 kPa abs

Pressure Control Signal

0–10VDC

Flow Rate Output Signal

F.S. 13.3kPa abs (100Torr)

Flow Rate Output

0–5VDC

Pressure Control Valve Cv Value

±0.03

Pressure Setting

±0.011

O-Ring Material

- Blank: PFM
- CR: Chloroprene Rubber
- Blank: M3
- L: inch

User Specifications

Example: 006 25

D-sub 9pin Connector Screw

Blank: 15-35

Blank: Analog

Features

- Pressure control at the upstream side or downstream side by a signal from the external pressure sensor
- Flow Rate Output
  0–5VDC

Application Examples

For wafer adhesion in plasma devices and He gas back pressure control.
Automatic Pressure Control Controller (with pressure sensor)

**UPC, UPCUS Series**

### Main Function·Specifications

<table>
<thead>
<tr>
<th>UPCs (Downstream pressure controller)</th>
<th>UPCUS (Upstream pressure controller)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure Range</td>
<td>F.S. 13.3kPa abs (100Torr)</td>
</tr>
<tr>
<td>Control Pressure Range</td>
<td>1 ~ 100%</td>
</tr>
<tr>
<td>Control Valve Cv Value</td>
<td></td>
</tr>
<tr>
<td>Accuracy (after auto zero operation)</td>
<td>1 ~ 40%: ±0.2% F.S.</td>
</tr>
<tr>
<td></td>
<td>40 ~ 100%: ±0.5% S.P.</td>
</tr>
<tr>
<td>Max. Operation Pressure</td>
<td>200kPaG</td>
</tr>
<tr>
<td>Guaranteed Operating Temperature Range</td>
<td>0 ~ 50°C (Accuracy guaranteed between: 15 ~ 35°C) +2</td>
</tr>
<tr>
<td>Pressure Setting/Output Signal</td>
<td>Analog: 0.1 ~ 10VDC/0 ~ 10VDC (Supply Power Voltage: ±15VDC) Digital: DeviceNet™</td>
</tr>
<tr>
<td></td>
<td>Analog: 0.05 ~ 5VDC/0 ~ 5VDC (Supply Power Voltage: ±15VDC) Digital: DeviceNet™</td>
</tr>
</tbody>
</table>

Note: Not correspond to the specification of the XXX mark.

### Features

- Built-in pressure sensor controls pressure at the upstream or downstream sides.
- High temperature model applicable 150°C ~ 250°C
- UPC with Mass Flow Meter (UPCM Series)

### Specifications

- Flow Ratio Controller
- Mass Flow Meter
- Flow Control Equipment
- Dimensions
- Accessory Additional Contacts/Gauge

### Application Examples

- **Downstream Control by UPCs**
  - Control pressure across gas supply branched lines

- **Upstream Control by UPCUS**
  - Maintain constant pressure in a liquid source tank and improve stability of the vaporized gas

### Product Code

**UPC D ~ HT50 ~ 4J2C ~ C150 ~ L**

- **UPC D**: UPC: Downstream control
- **HT50**: UPCUS: Upstream control
- **4J2C**: Fittings (Face to face dimension)
- **C150**: Full Scale Pressure Range
- **L**: Control Valve Cv

Note: Please consult Fujikin separately if you use in case of pressure range of F.S. 13.3kPa abs (100 Torr).
Gas Distribution Ratio Control Model

FRC-T1000MF Series

Main Function·Specifications

- **Product Code (In case of 2 branches)**

<table>
<thead>
<tr>
<th>Model Number</th>
<th>FRCT1005MF</th>
<th>FRCT1030MF</th>
<th>FRCT1050MF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow Rate Range (L, Equivalent)</td>
<td>10 - 3,000SCCM</td>
<td>3,001 - 30,000SCCM</td>
<td>30,001 - 50,000SCCM</td>
</tr>
<tr>
<td>Seal</td>
<td>Metal Seal</td>
<td>Metal Seal</td>
<td>Metal Seal</td>
</tr>
<tr>
<td>Valve Type</td>
<td>N/O: Normally Open</td>
<td>N/O: Normally Open</td>
<td>N/O: Normally Open</td>
</tr>
<tr>
<td>Valve Flow Rate Branching Ratio</td>
<td>5 - 95% (The setting range differs depending on the number of branches and amount of gas.)</td>
<td>5 - 95% (The setting range differs depending on the number of branches and amount of gas.)</td>
<td>5 - 95% (The setting range differs depending on the number of branches and amount of gas.)</td>
</tr>
<tr>
<td>Repeatability</td>
<td>±0.2% F.S.</td>
<td>±0.2% F.S.</td>
<td>±0.2% F.S.</td>
</tr>
<tr>
<td>Response Time</td>
<td>≤4sec</td>
<td>≤4sec</td>
<td>≤4sec</td>
</tr>
<tr>
<td>Guaranteed Operating Temperature Range</td>
<td>10 - 40°C</td>
<td>10 - 40°C</td>
<td>10 - 40°C</td>
</tr>
<tr>
<td>Max. Inlet Pressure</td>
<td>20kPaG</td>
<td>20kPaG</td>
<td>20kPaG</td>
</tr>
</tbody>
</table>

Note: Not correspond to the specification of the XXX mark.

Features

- **Correct Distribution Performance**
  Control the introduction of gas by the correct flow distribution ratio.

- **Hastelloy Sensor**
  Improved corrosion resistance against halogen gas.

- **Splits the flow from 2 branches to 6 branches.**

You can download the latest catalogue from URL [http://www.fujikin.co.jp/go/c75101E](http://www.fujikin.co.jp/go/c75101E)

*Note: Please inquire regarding the dimensions of the Mass Flow Meter.
Note 2: Flow Rate Control System and Pressure Control System are fixed with 4 Cap Bolts.
Note 3: Pin9 can be designated "Valve Test PT" by special specification.
Note 4: Please inquire separately about connector specifications of digital communication.
Note 5: Please inquire separately when you use IGS type short face-to-face dimension connection (face-to-face dimension 79.8mm).

Specifications

- **FRCT1000MF**
  - Flow Rate Setting Voltage: 0 - 5VDC
  - Flow Rate Setting Voltage: 0.1 - 5VDC
  - Electric Source: ±12VDC
  - Shutting Input: 124mm

- **FRCT1030MF**
  - Flow Rate Setting Voltage: 0 - 5VDC
  - Flow Rate Setting Voltage: 0.1 - 5VDC
  - Electric Source: ±12VDC
  - Shutting Input: 124mm

- **FRCT1050MF**
  - Flow Rate Setting Voltage: 0 - 5VDC
  - Flow Rate Setting Voltage: 0.1 - 5VDC
  - Electric Source: ±12VDC
  - Shutting Input: 124mm

Specifications

- **FRCT: Flow Ratio Controller**
- **Flow Control Equipment**
- **Flow Rate**
  - **FRCT1000MF**
    - 1005: 10SCCM
    - 1030: 6 - 30SLM
    - 1050: 10 - 30SLM
- **Sealing Function**
  - **Metal**
- **Communication**
  - **F: Analog / Digital**
  - **FD: DeviceNet™**
- **Fittings (Face to face dimension)**
  - 4J2: 1/4 UJR(124mm)

- **Flow Ratio Controller**
- **Flow Control Equipment**
- **Flow Rate**
  - **FRCT1000MF**
    - 1005: 100SCCM
  - **Sealing Function**
    - **Metal**
  - **Communication**
    - **F: Analog / Digital**
    - **FD: DeviceNet™**
  - **Fittings (Face to face dimension)**
    - 4J2: 1/4 UJR(124mm)
### Dimensions

#### Fittings UJR/F900 Type

<table>
<thead>
<tr>
<th>Model Number</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>FCST1000MP</td>
<td>92</td>
<td>105</td>
<td>127</td>
<td>82.5</td>
<td>39</td>
<td>28.6</td>
<td>25.4</td>
<td>30</td>
<td>21.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FCST1000Z/I</td>
<td>92</td>
<td>105</td>
<td>127</td>
<td>82.5</td>
<td>39</td>
<td>28.6</td>
<td>25.4</td>
<td>30</td>
<td>21.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FCST1000ZMF/ML</td>
<td>92</td>
<td>105</td>
<td>127</td>
<td>82.5</td>
<td>39</td>
<td>28.6</td>
<td>25.4</td>
<td>30</td>
<td>21.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FCST1000ZMF/I</td>
<td>92</td>
<td>105</td>
<td>127</td>
<td>82.5</td>
<td>39</td>
<td>28.6</td>
<td>25.4</td>
<td>30</td>
<td>21.8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Fittings IGS Type

**Note:** Please inquire separately regarding the external dimensions of digital communication models other than RS485.

### Mass Flow Controller Signal Connector

**Pin Numbers**

<table>
<thead>
<tr>
<th>D-sub 9 pin Male Connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td>8</td>
</tr>
</tbody>
</table>

**Pin Description**

<table>
<thead>
<tr>
<th>Pin Numbers</th>
<th>Signal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>N.C.</td>
<td>Unused Pin (Please don't connect.)</td>
</tr>
<tr>
<td>2</td>
<td>N.C.</td>
<td>Unused Pin (Please don't connect.)</td>
</tr>
<tr>
<td>3</td>
<td>N.C.</td>
<td>Unused Pin (Please don't connect.)</td>
</tr>
<tr>
<td>4</td>
<td>N.C.</td>
<td>Unused Pin (Please don't connect.)</td>
</tr>
<tr>
<td>5</td>
<td>N.C.</td>
<td>Unused Pin (Please don't connect.)</td>
</tr>
<tr>
<td>6</td>
<td>N.C.</td>
<td>Unused Pin (Please don't connect.)</td>
</tr>
</tbody>
</table>

**RJ11 Digital Communications Connector**

**Pin Numbers**

<table>
<thead>
<tr>
<th>Pin Numbers</th>
<th>Signal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>N.C.</td>
<td>Unused Pin (Please don't connect.)</td>
</tr>
<tr>
<td>2</td>
<td>N.C.</td>
<td>Unused Pin (Please don't connect.)</td>
</tr>
<tr>
<td>3</td>
<td>Signal+Txd/Rxd</td>
<td>RS-485 2 Line System Send and Receive Minus</td>
</tr>
<tr>
<td>4</td>
<td>Signal+Txd/Rxd</td>
<td>RS-485 2 Line System Send and Receive Plus</td>
</tr>
<tr>
<td>5</td>
<td>N.C.</td>
<td>Unused Pin (Please don't connect.)</td>
</tr>
<tr>
<td>6</td>
<td>N.C.</td>
<td>Unused Pin (Please don't connect.)</td>
</tr>
</tbody>
</table>

**RJ45 Digital Communications Connector**

**Pin Numbers**

<table>
<thead>
<tr>
<th>Pin Numbers</th>
<th>Signal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Signal+Txd/Rxd</td>
<td>RS-485 2 Line System Send and Receive Minus</td>
</tr>
<tr>
<td>2</td>
<td>Signal+Txd/Rxd</td>
<td>RS-485 2 Line System Send and Receive Plus</td>
</tr>
<tr>
<td>3</td>
<td>N.C.</td>
<td>Unused Pin (Please don't connect.)</td>
</tr>
<tr>
<td>4</td>
<td>N.C.</td>
<td>Unused Pin (Please don't connect.)</td>
</tr>
<tr>
<td>5</td>
<td>N.C.</td>
<td>Unused Pin (Please don't connect.)</td>
</tr>
<tr>
<td>6</td>
<td>N.C.</td>
<td>Unused Pin (Please don't connect.)</td>
</tr>
</tbody>
</table>

*1: Signal Connector of FCS-T1000 Series
*2: Pin7 and Pin8 are connected inside FCS.
*3: Pin9 is designated "Valve Test PT" by special specification.
*4: Please inquire separately about connector specifications of digital communication.
**FCS®-Thermal Series**

**Accesaries**

- **Power Supply for 6 Units**
  Part Number: FCS-T1000-PS 3/6/9

- **Digital Panelmeter**
  Part Number: FCS-DPM-05-L100

- **Control Potentiometer**
  Part Number: FCS-SET-02-L100

- **Power Supply Meter**
  Part Number: FCS-PM1000A-SP

- **Connector Change Cable**
  Wide range of connectors supported
  Note: Specifications are subject to change without prior notice.

**Connection Examples**

### Single Analog Control
- Power Supply for 6 Units
- Digital Panelmeter
- Control Potentiometer
- Power Supply Meter
- Connector Change Cable

### Multiple Analog Control
- Power Supply for 6 Units
- Digital Panelmeter
- Control Potentiometer
- Power Supply Meter
- Connector Change Cable

### Single Digital Control
- PC
- Power Supply Meter
- AC Electric cable

### Dimensions

**Control Source**

Integrated-type Unit Flow Module®

You can download the latest catalogue from URL http://www.fujikin.co.jp/go/c75101E
Flow Control Systems (FCS®-Pressure Series)

FCS-P7000 Series
2007 Encouragement Award

FCS® Body Corresponding to hotness (250°C)
2010 Machinery Component Award

FALVS® (Advanced Liquid Vaporize System)
2015 Cho Monodzukuri [super manufacturing] Encouragement Award

Integrated Gas System IGS

IGS
2005 Encouragement Award

Stop Valves

NEW MEGA® Series
Metal Diaphragm

Ball Valves Series

Filters

FUFL Sires
Wetted parts are perfectly oil-free. 0.1, 0.5, 2, 5, 10 μm are applicable as element sizes.