**GENERAL**

The **FA4000** series is a local indicating flowmeter with an alarm output for liquid measurement. It covers a wide range of applications from as small as 0.1 to 1 L/min to as large as 13 to 130 L/min in measuring range, from 10 mm to 40 mm in size.

**FEATURES**

- **COMPACT AND LIGHT DESIGN**
  FA4000 Series is very much suitable for assembling onto equipment and devices due to its compact and light design.

- **WATERPROOF CONSTRUCTION**
  Suitable for opaque liquids or hot pressurized water.

- **WIDE APPLICATION**
  Opaque liquid or pressurization hot water is available.

- **ALARM SET POINT**
  The alarm set point can be set at the front of the FA4000 Series using the alarm setting pointer in its housing.

- **QUICK DELIVERY AND COMPETITIVE PRICE**
  The standardized specification allows reasonable quick delivery time.

**STANDARD SPECIFICATION**

- **Measuring fluid**: Water or Low viscosity liquids
- **Measuring range**:
  - (Min.) 0.1 to 1 L/min
  - (Max.) 13 to 130 L/min
- **Flow temp.**:
  - 0 to 100°C
  - It is general data, and the maximum temperature may change by terms of use and environment.
  - (When fluid temperature exceeds 80°C, the material of O-ring is FPM.)
- **Fluid press.**: Max. 1.0MPa
- **Flow direction**: Bottom to Top, Left to Right, Right to Left, Top to Bottom
- **Connection size**: 10mm (3/8") to 40mm (1 1/2")
- **Process connection**: Rc, NPT, JIS10K FF, JIS10K RF, ANSI150Lb RF, JPI150Lb RF
- **Indication accuracy**: ±5% F.S.
- **Alarm setting accuracy**: ±2% F.S.(Against flow calibration)
- **Alarm setting range**: 10 to 100% (F.S.)
- **Alarm contact**: 1 point (High or Low)
- **Alarm reset span**: Less than 15% F.S. (Against flow calibration)
- **Alarm switch**: Self holding type
- **Contact capacity**: 100 V DC/10W, 125 V AC / 10VA
- **Insulation resistance**: 100MΩ or higher at 500 V DC megger
- **Withstand voltage**: 1500 V AC (1 min.)
- **Alarm setting**: Set by screw (Freely adjustable from housing front)
- **Finishing painted**: Metallic silver (Except Stainless steel material)
- **Cable entry**: G1/2 (Female thread)
- **Wiring connection**: M3 screw terminal
- **Housing construction**: Equivalent to IP65 Intrinsically safe (Supplied with safety barrier)
- **Installation**: Piping support

**RECOMMENDED APPLICATION**

- Cooling water line
- Monitoring of leakage of sealing liquids
- Cooling fluids lines in injection moulding machines

**BEFORE OPERATING**

1) The FA4000 Series has a magnet coupling to indicate flow rate. Provide a magnet strainer which is supplied on request in the upstream of the piping to remove the ferrous materials like iron powders if they are contained in the fluid.
2) Add the relay driver to increase the contact capacity if more than the allowable contact capacity of the FA4000 Series is required.
3) Use an intrinsically safe relay if the FA4000 Series with the alarm output is used in the hazardous area.

The magnet strainer, relay driver and intrinsically safety relay mentioned above are available on request. See “OPTIONAL UNIT” at the last page for detail specifications.
### EXTERNAL DIMENSIONS AND MATERIAL

#### DIMENSION

- **Screw connection without alarm FA4 □□ R(N) - □□□ 0 - A**
- **Flange connection without alarm FA4 □□ A to D - □□□ 0 - A**
- **Screw connection with alarm FA4 □□ R(N) - □□□ 1 to 4 - A**
- **Flange connection with alarm FA4 □□ A to D - □□□ 1 to 4 - A**

#### Approx. pressure loss

<table>
<thead>
<tr>
<th>Flow rate (L/min)</th>
<th>Pressure loss (kPa)</th>
<th>Connection size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
<td>15 mm (1/2&quot;)</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td>20 mm (3/4&quot;)</td>
</tr>
<tr>
<td>3</td>
<td>25</td>
<td>25 mm (1&quot;)</td>
</tr>
<tr>
<td>4</td>
<td>30</td>
<td>30 mm (1&quot;)</td>
</tr>
<tr>
<td>5</td>
<td>35</td>
<td>40 mm (1-1/4&quot;)</td>
</tr>
<tr>
<td>6</td>
<td>40</td>
<td>40 mm (1-1/2&quot;)</td>
</tr>
<tr>
<td>7</td>
<td>45</td>
<td>50 mm (1-1/4&quot;)</td>
</tr>
<tr>
<td>8</td>
<td>50</td>
<td>50 mm (1&quot;)</td>
</tr>
<tr>
<td>9</td>
<td>55</td>
<td>60 mm (1&quot;)</td>
</tr>
<tr>
<td>10</td>
<td>60</td>
<td>70 mm (1&quot;)</td>
</tr>
<tr>
<td>11</td>
<td>65</td>
<td>80 mm (1&quot;)</td>
</tr>
<tr>
<td>12</td>
<td>70</td>
<td>90 mm (1&quot;)</td>
</tr>
<tr>
<td>13</td>
<td>75</td>
<td>100 mm (1&quot;)</td>
</tr>
<tr>
<td>14</td>
<td>80</td>
<td>120 mm (1&quot;)</td>
</tr>
<tr>
<td>15</td>
<td>85</td>
<td>130 mm (1&quot;)</td>
</tr>
</tbody>
</table>

- When fluid temperature exceeds 80°C, the material of O-ring is FPM.
- The material of connecting fittings may be replaced by SUS316.

#### MATERIAL

<table>
<thead>
<tr>
<th>No.</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tapered tube SUS316 SUS316 SUS316</td>
</tr>
<tr>
<td>2</td>
<td>Float SUS316 SUS316 SUS316</td>
</tr>
<tr>
<td>3</td>
<td>O-ring NBR<em>1 NBR</em>1 NBR*1</td>
</tr>
<tr>
<td>4</td>
<td>Connecting fitting SCS14A²² SCS14A²² SCS14A²²</td>
</tr>
<tr>
<td>5</td>
<td>Housing ADC12 ADC12 ADC12</td>
</tr>
<tr>
<td>6</td>
<td>Flange SS400 SUS304 SUS316</td>
</tr>
</tbody>
</table>

*1 When fluid temperature exceeds 80°C, the material of O-ring is FPM.
*2 The material of connecting fittings may be replaced by SUS316.

#### INDICATION DISPLAY DIRECTION (FLOW DIRECTION)

- Left to Right
- Right to Left
- Bottom to Top
- Top to Bottom

#### WIRING

![Wiring Diagram]
### MODEL CODE

<table>
<thead>
<tr>
<th>MODEL CODE</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FA4</td>
<td></td>
</tr>
<tr>
<td>1   1</td>
<td>0.1 to 1 L/min (Applicable when flow direction is bottom to top)</td>
</tr>
<tr>
<td>2   2</td>
<td>0.2 to 2 L/min</td>
</tr>
<tr>
<td>3   5</td>
<td>0.5 to 5 L/min</td>
</tr>
<tr>
<td>4   10</td>
<td>1.0 to 10 L/min</td>
</tr>
<tr>
<td>5   15</td>
<td>1.5 to 15 L/min</td>
</tr>
<tr>
<td>6   20</td>
<td>2.0 to 20 L/min</td>
</tr>
<tr>
<td>7   30</td>
<td>3.0 to 30 L/min</td>
</tr>
<tr>
<td>8   50</td>
<td>5.0 to 50 L/min</td>
</tr>
<tr>
<td>9   60</td>
<td>6.0 to 60 L/min</td>
</tr>
<tr>
<td>A   70</td>
<td>7.0 to 70 L/min</td>
</tr>
<tr>
<td>B   80</td>
<td>8.0 to 80 L/min</td>
</tr>
<tr>
<td>C   100</td>
<td>10.0 to 100 L/min</td>
</tr>
<tr>
<td>D   120</td>
<td>12.0 to 120 L/min</td>
</tr>
<tr>
<td>E   130</td>
<td>13.0 to 130 L/min</td>
</tr>
<tr>
<td>Z   -</td>
<td>Consult us for other flow ranges</td>
</tr>
</tbody>
</table>

#### Measuring range

- FA4
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- A
- B
- C
- D
- E
- Z

#### Connection size

- 10 mm (3/8”)
- 15 mm (1/2”)
- 20 mm (3/4”)
- 25 mm (1”)
- 32 mm (1-1/4”)
- 40 mm (1-1/2”)

#### Process connection

- Rc
- NPT (Female)
- JIS 10K FF
- JIS 10K RF
- ANSI Class 150 RF
- JPI Class 150 RF
- Others

#### Material

- Material 1
- Material 2
- Material 3
- Material 1
- Material 2
- Material 3
- Others

#### Flow direction

- Bottom to Top
- Left to Right
- Right to Left
- Top to Bottom

#### Alarm function

- No alarm contact
- High alarm (High CLOSE)
- High alarm (High OPEN)
- Low alarm (Low CLOSE)
- Low alarm (Low OPEN)

#### Version

- A
- DEG
- EXn
- RED
- MnR
- Mna

#### Option *

- IS relay (Code “n” indicates the number of contacts)
  - n=1 (for 1 contact), n=2 (for 2 contacts), n=3 (for 3 contacts)
- Relay driver (RD-1000)
- Magnet strainer
  - n=1: Size 10 mm (3/8”)
  - n=2: Size 15 mm (1/2”)
  - n=3: Size 20 mm (3/4”)
  - n=4: Size 25 mm (1”)
  - n=5: Size 32 mm (1-1/4”)
  - n=6: Size 40 mm (1-1/2”)

#### Special

- Blank
- Provided

**Note:** Insert “/” between each code when the plural codes are selected.

Code example: Flow range 5 to 50 L/min, size 25 mm, Rating JIS 10K FF, Material 2 (O ring : NBR), Flow direction : Left to Right, Low alarm CLOSE, Magnet strainer 25 mm, JIS 10K FF, IS relay for 2 contacts, “FA4B4A-2N63-A/M4A/EX2”
### Optional Unit

#### Magnet Strainer

<table>
<thead>
<tr>
<th>Fluid pressure</th>
<th>Max. 1.5MPa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid temp.</td>
<td>Max. 200°C</td>
</tr>
<tr>
<td>Filter</td>
<td>80 mesh</td>
</tr>
<tr>
<td>Material (Body)</td>
<td>SCS13 or SCS14, Others</td>
</tr>
<tr>
<td>Filter</td>
<td>SUS304 or SUS316</td>
</tr>
<tr>
<td>Packing</td>
<td>PTFE</td>
</tr>
</tbody>
</table>

**Magnet strainer dimension (mm)**

<table>
<thead>
<tr>
<th>Nominal diameter</th>
<th>10 (3/8&quot;)</th>
<th>15 (1/2&quot;)</th>
<th>20 (3/4&quot;)</th>
<th>25 (1&quot;)</th>
<th>32 (11/4&quot;)</th>
<th>40 (11/2&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screw L</td>
<td>70</td>
<td>85</td>
<td>100</td>
<td>115</td>
<td>135</td>
<td>150</td>
</tr>
<tr>
<td>Flange L</td>
<td></td>
<td></td>
<td>120</td>
<td>130</td>
<td>150</td>
<td>170</td>
</tr>
</tbody>
</table>

**Notes on Magnet Strainer**

Above figures and dimensions of magnet strainers are those of JIS 10K FF and Rc threads in connection and SCS13 or SCS14 in body material. The dimensions or appearance may differ if connection or material is different from above.

#### Relay Driver (RD-1000)

The contact output of FA4000 Series is reed switch contact. In case the contact capacity is not sufficient for the operation, use RD-1000 type RELAY DRIVER for capacity increment. (Separate TECHNICAL GUIDANCE for RD-1000 RELAY DRIVER is available on request.

This is not intrinsically safety relay for intrinsically safe circuit.

**Specifications (RD-1000)**

- **Power supply**: 100 V AC or 200 V AC ±10%, 50 / 60Hz
- **Ambient Temp.**: -10 to 50°C
- **Max. supply voltage**: 12 V DC (Terminal 7-8 or 9-10)
- **Max. supply current**: 3 mA DC (Terminal 7-8 or 9-10)
- **Max. contact voltage**: 250 V AC, 125 V DC (Terminal 4-5 or 4-6)
- **Max. contact current**: 5 A (Terminal 4-5 or 4-6)
- **Max. value of switch capacity**: 1100 VA AC (Load resistance)
- **Insulation resistance**: 100MΩ at 500 V DC megger
- **Withstand voltage**: 1500 V AC (1 min.)
- **Power consumption**: Less than 2 VA

**Wiring**

<table>
<thead>
<tr>
<th>Switch action (Terminal 9-10)</th>
<th>Relay action</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>NO (Terminal 4-5)</td>
</tr>
<tr>
<td>OFF</td>
<td>NC (Terminal 4-6)</td>
</tr>
<tr>
<td>OFF</td>
<td>ON</td>
</tr>
</tbody>
</table>

#### Intrinsically Safe Relay (EB3C)

Intrinsically safe relay is to be inserted into the contact loop of FA4000 Series.

- **General specification**
  - **General specification**: 100 V to 240 V AC, 24 V DC
  - **Acceptable variation rate**: -15 to +10%
  - **Rated frequency**: 50/60Hz (Allowable range: 47 to 63Hz)
  - **Inrush current**: 10 A (100 V AC), 20 A (200 V AC)
  - **Insulation resistance**: 10MΩ or more (500 V DC megger)

- **Flameproof specification**
  - **Type of protection**: Intrinsically safe (Ex ia IIC)
  - **Rated operation voltage**: 12 V DC ±10%
  - **Rated operation current**: 10 mA DC ±20%
  - **Protection class**: IP20 (IEC60529)

- **Non-intrinsically circuit (Relay output)**
  - **Contact configuration**: 1a contact
  - **Rated insulating voltage**: 250 V AC / 125 V DC
  - **Rated turning on electricity current**: 3A
  - **Contact allowable power**: 750 VA AC / 72 W DC (Resistance load)
  - **Rated load**: 250 V AC, 3A / 24 V DC, 3 A (Resistance load)

**Model code**

```
<table>
<thead>
<tr>
<th>Model code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>Relay output</td>
</tr>
<tr>
<td>01</td>
<td>1 point use</td>
</tr>
<tr>
<td>02</td>
<td>2 point use</td>
</tr>
<tr>
<td>03</td>
<td>3 point use</td>
</tr>
<tr>
<td>A</td>
<td>100 V to 240 V AC, 50/60Hz</td>
</tr>
<tr>
<td>B</td>
<td>24 V DC</td>
</tr>
</tbody>
</table>
```

**Applicable crimping terminal**

Terminal screw size: M3