Minimizes installation time and cost
Reduces the mounting height and enables compact machinery design. Effective area is larger than the former model.

Tube swivels 360°
Universal type permits 360° piping swivel.

ø2 size added to applicable tubing sizes
- Metric size (Release button: White color) ø2, ø3.2, ø4, ø6, ø8, ø10, ø12

Maximum operating pressure 1 MPa max.

Applicable tubing materials
Nylon, soft nylon, and polyurethane tubing are applicable.

Retainer prevents accidental loss of needle.

Option
Nickel plated option

---

### Specifications

**Flow Rate and Sonic Conductance**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Metric size</td>
<td>ø2, ø3.2, ø4</td>
<td>ø3.2, ø4, ø5</td>
<td>ø3.2, ø4, ø5</td>
<td>ø3.2, ø4, ø5</td>
<td>ø3.2, ø4, ø5</td>
<td>ø3.2, ø4, ø5</td>
</tr>
<tr>
<td>Controlled flow (Free flow)</td>
<td>20</td>
<td>100</td>
<td>180</td>
<td>230</td>
<td>260</td>
<td>390</td>
</tr>
<tr>
<td>Critical pressure ratio</td>
<td>0.2</td>
<td>0.2</td>
<td>0.25</td>
<td>0.25</td>
<td>0.25</td>
<td>0.25</td>
</tr>
</tbody>
</table>

---

**Flow Direction Symbols on Body**

- Meter-out type: "\( \uparrow \)"
- Meter-in type: "\( \downarrow \)"

---

**Caution**

Be sure to read this before handling the products.

Refer to back page 50 for Safety Instructions and pages 543 to 546 for Flow Control Equipment Precautions.
### Needle Valve/Flow Rate Characteristics

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inlet pressure:</strong> 0.5 MPa</td>
<td><strong>Inlet pressure:</strong> 0.5 MPa</td>
<td><strong>Inlet pressure:</strong> 0.5 MPa</td>
</tr>
<tr>
<td><strong>Flow rate (L/min (ANR))</strong></td>
<td><strong>Flow rate (L/min (ANR))</strong></td>
<td><strong>Flow rate (L/min (ANR))</strong></td>
</tr>
<tr>
<td>Number of needle rotations</td>
<td>Number of needle rotations</td>
<td>Number of needle rotations</td>
</tr>
</tbody>
</table>

### Flow Rate Characteristics

- **Note:** The flow rate characteristics are representative values.

### Made to Order

- **Symbol Specifications**
  - X12: Lubricant: Vaseline
  - X21: Grease-Free Seal, Flute-coated + Throttle valve (Without check valve)
  - X214: Throttle valve (Without check valve)
  - X250: Fixed throttle (No needle function)

- **AS Series**
  - Made to Order
    - (Refer to page 582 for details.)

- **Option**
  - Nil: None
  - S: With seal
  - N: Electroless nickel plated

- **Lock nut option**
  - Nil: Hexagon lock nut
  - J: Round lock nut

### Applicable tubing O.D. (Note)

<table>
<thead>
<tr>
<th>Metric size</th>
<th>Inch size</th>
</tr>
</thead>
<tbody>
<tr>
<td>02 ø2</td>
<td>01 ø1/8&quot;</td>
</tr>
<tr>
<td>23 ø3.2</td>
<td>03 ø5/32&quot;</td>
</tr>
<tr>
<td>04 ø4</td>
<td>05 ø3/16&quot;</td>
</tr>
<tr>
<td>06 ø6</td>
<td>07 ø1/4&quot;</td>
</tr>
<tr>
<td>08 ø8</td>
<td>09 ø5/16&quot;</td>
</tr>
<tr>
<td>10 ø10</td>
<td>11 ø3/8&quot;</td>
</tr>
<tr>
<td>12 ø12</td>
<td>13 ø1/2&quot;</td>
</tr>
</tbody>
</table>

- **Note:** For applicable tubing O.D. selection, refer to the Model on page 576.
- Use ø1/8" tube.

### How to Order

- **AS 2 2 0 1F**
- **06 S**
- **Type**
  - Elbow
  - Universal
- **Control type**
  - Meter-out
  - Meter-in
- **Thread type**
  - Metric thread (M3, M5)
  - Unified thread (10-32 UNF)
  - N: NPT
- **Port size**
  - M3 x 0.5
  - M5 x 0.8
  - 10-32 UNF
  - 01 1/8"
  - 02 1/4"
  - 03 3/8"
  - 04 1/2"

### Needle Valve/Flow Rate Characteristics

- **Note:** The flow rate characteristics are representative values.
**Construction**

**Elbow type**  
Meter-out type  AS3201F-02

**Universal type**  
Meter-out type  AS3301F-02

**Component Parts**

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Body A</td>
<td>PBT</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Handle</td>
<td>PBT (1)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Body B</td>
<td>Brass (2)</td>
<td>Electroless nickel plated</td>
</tr>
<tr>
<td>4</td>
<td>Needle</td>
<td>Brass</td>
<td>Electroless nickel plated</td>
</tr>
<tr>
<td>5</td>
<td>Needle guide</td>
<td>Brass</td>
<td>Electroless nickel plated</td>
</tr>
<tr>
<td>6</td>
<td>Seat ring</td>
<td>Brass (3)</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Lock nut</td>
<td>Steel (4)</td>
<td>Meter-out Zinc chromate plated</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Meter-in Black zinc chromate plated</td>
</tr>
<tr>
<td>8</td>
<td>U-packing</td>
<td>HNBR</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Cassette</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Seal</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>O-ring</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>O-ring</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>O-ring</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>O-ring</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Gasket</td>
<td>NBR, Stainless steel</td>
<td></td>
</tr>
</tbody>
</table>

**Note**

1) AS12□1F-M3 and AS12□1F-M5-02 are made of electroless nickel plated brass.
2) AS12□1F-M3 is made of stainless steel.
3) AS22□1F, AS32□1F: Electroless nickel plated.
4) Excluding applicable tubing O.D. 3/8”
5) The material of the lock nut option-J (round type) is brass.
6) However, note that only the AS22□1F uses steel.

**Component Parts**

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Body A</td>
<td>PBT</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Elbow body</td>
<td>PBT</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Handle</td>
<td>PBT (1)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Body B</td>
<td>Brass (2)</td>
<td>Electroless nickel plated</td>
</tr>
<tr>
<td>5</td>
<td>Needle</td>
<td>Brass</td>
<td>Electroless nickel plated</td>
</tr>
<tr>
<td>6</td>
<td>Needle guide</td>
<td>Brass</td>
<td>Electroless nickel plated</td>
</tr>
<tr>
<td>7</td>
<td>Seat ring</td>
<td>Brass (3)</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Lock nut</td>
<td>Steel (4)</td>
<td>Meter-out Zinc chromate plated</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Meter-in Black zinc chromate plated</td>
</tr>
<tr>
<td>9</td>
<td>U seal</td>
<td>HNBR</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Cassette</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Seal</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>O-ring</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>O-ring</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>O-ring</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Gasket</td>
<td>NBR, Stainless steel</td>
<td></td>
</tr>
</tbody>
</table>

**Note**

1) AS13□1F-M3 is made of electroless nickel plated brass.
2) AS13□1F-M3 is made of stainless steel.
3) AS23□1F, AS33□1F: Electroless nickel plated.
4) Excluding applicable tubing O.D. 3/8”
5) The material of the lock nut option-J (round type) is brass.
6) However, note that only the AS23□1F uses steel.
7) The surface treatment of the lock nut option-J (round type) is electroless nickel plating.
Note 2) Reference thread dimensions after installation.

<table>
<thead>
<tr>
<th>Metric Size</th>
<th>Inch Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>T</td>
</tr>
<tr>
<td>AS12: 1F-M3-02</td>
<td>2</td>
</tr>
<tr>
<td>AS12: 1F-M5-02</td>
<td>7</td>
</tr>
<tr>
<td>AS12: 1F-M12-33</td>
<td>3.2</td>
</tr>
<tr>
<td>AS12: 1F-M6-04</td>
<td>4</td>
</tr>
<tr>
<td>AS12: 1F-M5-25</td>
<td>3.2</td>
</tr>
<tr>
<td>AS12: 1F-M5-32-2</td>
<td>4</td>
</tr>
<tr>
<td>AS12: 1F-M5-45</td>
<td>5</td>
</tr>
<tr>
<td>AS12: 1F-M5-56</td>
<td>6</td>
</tr>
</tbody>
</table>

Note 1) ( ) are the dimensions of NPT thread.
Note 2) Reference dimensions after installation.
Note 3) Reference dimensions
### Universal Type

**Note 1)** ( ) are the dimensions of NPT thread

**AS Series**

#### Metric Size

<table>
<thead>
<tr>
<th>Model</th>
<th>T</th>
<th>H (1)</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>LS (2)</th>
<th>A (3)</th>
<th>M1</th>
<th>M2</th>
<th>Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS13:1/F-M3-33 3/2</td>
<td>5.5</td>
<td>6.4</td>
<td>7.2</td>
<td>7.2</td>
<td>10.1</td>
<td>17.6</td>
<td>17.4</td>
<td>26.5</td>
<td>24.1</td>
<td>24.1</td>
<td>12.3</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AS13:1/F-M3-04 4</td>
<td>5.5</td>
<td>6.4</td>
<td>7.2</td>
<td>7.2</td>
<td>10.1</td>
<td>17.6</td>
<td>17.4</td>
<td>26.5</td>
<td>24.1</td>
<td>24.1</td>
<td>12.3</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AS13:1/F-M5-33 3</td>
<td>5</td>
<td>6.4</td>
<td>7.2</td>
<td>7.2</td>
<td>10.1</td>
<td>17.6</td>
<td>17.4</td>
<td>26.5</td>
<td>24.1</td>
<td>24.1</td>
<td>12.3</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AS13:1/F-U10/22 3/2</td>
<td>5</td>
<td>6.4</td>
<td>7.2</td>
<td>7.2</td>
<td>10.1</td>
<td>17.6</td>
<td>17.4</td>
<td>26.5</td>
<td>24.1</td>
<td>24.1</td>
<td>12.3</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AS23:1/F-M3-06 6</td>
<td>5</td>
<td>6.4</td>
<td>7.2</td>
<td>7.2</td>
<td>10.1</td>
<td>17.6</td>
<td>17.4</td>
<td>26.5</td>
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<td>24.1</td>
<td>12.3</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AS23:1/F-U10/25 3/2</td>
<td>5</td>
<td>6.4</td>
<td>7.2</td>
<td>7.2</td>
<td>10.1</td>
<td>17.6</td>
<td>17.4</td>
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<td>24.1</td>
<td>12.3</td>
<td>4</td>
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</table>

#### Inch Size

<table>
<thead>
<tr>
<th>Model</th>
<th>T</th>
<th>H (1)</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>LS (2)</th>
<th>A (3)</th>
<th>M1</th>
<th>M2</th>
<th>Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS13:1/F-M3-01 1/8</td>
<td>5</td>
<td>6.4</td>
<td>7.2</td>
<td>7.2</td>
<td>10.1</td>
<td>17.6</td>
<td>17.4</td>
<td>26.5</td>
<td>24.1</td>
<td>24.1</td>
<td>12.3</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AS13:1/F-M3-03 5/32</td>
<td>5</td>
<td>6.4</td>
<td>7.2</td>
<td>7.2</td>
<td>10.1</td>
<td>17.6</td>
<td>17.4</td>
<td>26.5</td>
<td>24.1</td>
<td>24.1</td>
<td>12.3</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AS13:1/F-M3-01 1/8</td>
<td>5</td>
<td>6.4</td>
<td>7.2</td>
<td>7.2</td>
<td>10.1</td>
<td>17.6</td>
<td>17.4</td>
<td>26.5</td>
<td>24.1</td>
<td>24.1</td>
<td>12.3</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AS13:1/F-U10/22 3/2</td>
<td>5</td>
<td>6.4</td>
<td>7.2</td>
<td>7.2</td>
<td>10.1</td>
<td>17.6</td>
<td>17.4</td>
<td>26.5</td>
<td>24.1</td>
<td>24.1</td>
<td>12.3</td>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Note

1) ( ) are the dimensions of NPT thread
2) Reference thread dimensions after installation.
3) Reference dimensions

---

### Speed Controller with One-touch Fitting

**Elbow Type/Universal Type**

**ASR**

- **AS**
- **AS-F**
- **ASD**
- **AS-FE**
- **KE**
- **AS-FG**
- **AS-FP**
- **ASD**
- **AS-T**
- **ASV**
- **AQ**
- **AV**
- **VCHC**
- **ASR**
- **ASQ**

---

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**AS Series**

**Made to Order Specifications:**
Please contact SMC for detailed dimensions, specifications and lead times.

1. **Lubricant:** Vaseline
   - Ex.) AS2201F-01-04S-X12

2. **Grease-free (Seal: Fluorine Coating) + Throttle Valve (Without Check Valve)**
   - Ex.) AS2201F-01-04S-X21
   - **Note 1:** Not particle-free
   - **Note 2:** This product is a restrictor without a check valve (no control direction). Be aware that all part numbers are for a meter-out type; there is no part number for a meter-in type.

3. **Throttle Valve (Without Check Valve)**
   - Ex.) AS2201F-01-04S-X214
   - **Note:** This product is a restrictor without a check valve (no control direction). Be aware that all part numbers are for a meter-out type; there is no part number for a meter-in type.

4. **Fixed Throttle (No needle function)**
   - Ex.) AS2201F-01-04S-X250

**How to Order**

**AS**
- **2**
- **2**
- **01F**
- **06**
- **S**
- **1**
- **X250**

**Body size**
- 1: M3, M5 standard
- 2: 1/8, 1/4 standard

**Elbow**
- **Control type**
  - 0: Meter-out
  - 1: Meter-in

**Port size**
- M3: M3 x 0.5
- M5: M5 x 0.8
- 01: R 1/8
- 02: R 1/4

**With One-touch fitting**
- Nil
- S: With seal

**Option**
- Nil
- None
- S: With seal

**Applicable tubing O.D.**
- 04: ø4
- 06: ø6

**Applicable model**
- AS121F-M3-04
- AS121F-M5-04
- AS121F-M5-06
- AS221F-01-04
- AS221F-01-06
- AS221F-02-06

**Fixed orifice**
- ø0.1
- ø0.2
- ø0.3
- ø0.4
- ø0.5
- ø0.6
- ø0.7
- ø0.8
- ø0.9
- ø1.0

The graph below shows the relationship between orifices for each cylinder bore and cylinder speed. Please refer to it during selection. The cylinder speeds on the graph are theoretical values. Actual values may differ depending on the piping conditions or sliding friction, so please use this graph as a guideline only.
Metal Knob

Speed Controller with One-touch Fitting Elbow Type

- Knob material changed from resin to metal
- Applicable tubing O.D.: ø4, ø6, ø8, ø10, ø12

![Flow Direction Symbols on Body](image)

### Related Product

**Metal Knob**

- In-line Type
- Applicable tubing O.D.: ø3.2, ø4, ø6, ø8, ø10, ø12

* Please contact SMC for details.

### Specifications

<table>
<thead>
<tr>
<th>Fluid</th>
<th>Air</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proof pressure</td>
<td>1.5 MPa</td>
</tr>
<tr>
<td>Max. operating pressure</td>
<td>1 MPa</td>
</tr>
<tr>
<td>Min. operating pressure</td>
<td>0.1 MPa</td>
</tr>
<tr>
<td>Ambient and fluid temperatures</td>
<td>−5 to 60°C (No freezing)</td>
</tr>
<tr>
<td>Applicable tubing materials</td>
<td>Nylon, Soft nylon, Polyurethane*¹, FEP, PFA</td>
</tr>
</tbody>
</table>

*¹ Use caution when operating at the max. operating pressure when using soft nylon or polyurethane tubing. (Refer to the Web Catalog for details on tubing.)

* Brass parts are electroless nickel plated.

<table>
<thead>
<tr>
<th>Model</th>
<th>Port size</th>
<th>Applicable tubing O.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS12...F-M5-X242-J</td>
<td>M5 x 0.8</td>
<td>4 6 8 10 12</td>
</tr>
<tr>
<td>AS22...F-01-X242-J</td>
<td>R1/8</td>
<td>4 6 8 10 12</td>
</tr>
<tr>
<td>AS22...F-02-X242-J</td>
<td>R1/4</td>
<td>4 6 8 10 12</td>
</tr>
<tr>
<td>AS32...F-03-X242-J</td>
<td>R3/8</td>
<td>4 6 8 10 12</td>
</tr>
<tr>
<td>AS42...F-04-X242-J</td>
<td>R1/2</td>
<td>4 6 8 10 12</td>
</tr>
</tbody>
</table>
**AS-X242-J**

**Safety Instructions**
Be sure to read the “Handling Precautions for SMC Products” (M-E03-3) and “Operation Manual” before use.

- **Construction**
  - **Dimensions**
- **Component Parts**
  - **Applicable tubing O.D.**
- **Model**
  - **Applicable tubing O.D.**
- **Lock nut**: Round lock nut
- **Seal method**: With sealant (AS22□1F to AS32□1F) and With sealant (AS42□1F only)
- **Control type**: Meter-out, Meter-in
- **Applicable tubing O.D.**: 04 ø4, 06 ø6, 08 ø8, 10 ø10, 12 ø12
- **Body size**: M5 x 0.8
- **Port size**: R1/8, R1/4, R3/8, R1/2
- **Material**: PBT, Brass, Brass, Brass, Brass, Brass, Brass, Brass, Brass, CNBR, NBR, NBR, NBR, NBR, NBR, Stainless steel
- **Note**: *1 To select the applicable tubing O.D., refer to the “Model” chart on the cover page.
- **Reference dimensions**
- **Reference dimensions of threads after installation**
- **Caution**
  - Be sure to read this before handling the products. For safety instructions and flow control equipment precautions, refer to the “Handling Precautions for SMC Products” and the “Operation Manual” on the SMC website: https://www.smcworld.com