# Speed Controller with One-touch Fitting
# Elbow Type/Universal Type
# *Series AS*

## 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
- **Inch size** (Release button: Orange color)
  ø1/8", ø5/32", ø3/16", ø1/4", ø5/16", ø3/8", ø1/2"

**Maximum operating pressure 1 MPa max.**

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

**Retainer prevents accidental loss of needle.**

**Option**
**Hexagonal lock nut, Nickel plated option**

**Number of needle rotations has been increased (8 to 10 turns)**
The increased number of needle rotations (8 to 10 turns) permits easy control at low speeds.

## Model

| Elbow type | Universal type | Port size | Applicable tubing O.D. | | | | | | | | | | | | | | Applicable cylinder bore size (mm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Metric size | | | | | | | Inch size | | | | | | | |
| | | | 2 | 3.2 | 4 | 6 | 8 | 10 | 12 | 1/8" | 5/32" | 3/16" | 1/4" | 5/16" | 3/8" | 1/2" | |
| **AS12□1F-M3** | **AS13□1F-M3** | M3 x 0.5 | ◉(2) | ◉ | ◉ | | | | | ◉ | ◉ | | | | | | 2.5, 4, 6 |
| **AS12□1F-M5** | **AS13□1F-M5** | M5 x 0.8 | ◉(2) | ◉ | ◉ | ◉ | | | | ◉ | ◉ | ◉ | ◉ | | | | 6, 10, 16, 20 (1) |
| **AS12□1F-U10/32** | **AS13□1F-U10/32** | 10-32 UNF | | ◉ | ◉ | ◉ | | | | ◉ | ◉ | ◉ | ◉ | | | | 6, 10, 16, 20 |
| **AS22□1F-01** | **AS23□1F-01** | R 1/8 | | ◉ | ◉ | ◉ | ◉ | ◉(2) | | ◉ | ◉ | ● | ◉ | ◉ | | | 20, 25, 32 |
| **AS22□1F-02** | **AS23□1F-02** | R 1/4 | | | ◉ | ◉ | ◉ | ◉ | | | ◉ | ● | ◉ | ◉ | ● | | 20, 25, 32, 40 |
| **AS32□1F-02** | **AS33□1F-02** | R 1/4 | | | | ◉ | ◉ | ◉ | ◉ | | | | ◉ | ◉ | ● | | 40, 50, 63 |
| **AS32□1F-03** | **AS33□1F-03** | R 3/8 | | | | ● | ● | ● | ● | | | | ● | ● | ● | | 40, 50, 63 |
| **AS42□1F-04** | **AS43□1F-04** | R 1/2 | | | | | | ● | ● | | | | | | ● | ● | 63, 80, 100 |

Note 1) AS12□1F-M5-02 applicable cylinder bore sizes are 2.5, 4, 6.
Note 2) Elbow type only
Note 3) Meter-out and meter-in types can be visually differentiated by the lock nut. The lock nut on the meter-out type is electroless nickel plated, while the meter-in type is black zinc chromate plated.
Note 4) ◉ Marking is electroless nickel plated, provided as standard. (N specificaitons)

## Specifications

| | |
|---|---|
| **Fluid** | Air |
| **Proof pressure** | 1.5 MPa (1.05 MPa (1)) |
| **Max. operating pressure** | 1 MPa (0.7 MPa (1)) |
| **Mini. operating pressure** | 0.1 MPa |
| **Ambient and fluid temperature** | –5 to 60°C (No freezing) |
| **Number of needle rotations** | 10 turns (8 turns (2)) |
| **Applicable tubing material** (3) | Nylon, Soft nylon, Polyurethane (4) |
| **Option** | With seal, Hexagon lock nut (5), Electroless nickel plated (6) |

Note 1) In case of AS12□1F-M3-02, AS12□1F-M5-02
Note 2) In case of AS12□1F-M5 and AS12□1F-U10/32 types.
In case of AS13□1F-M5 and AS13□1F-U10/32
AS12□1F-M5-02: 10 turns.
Note 3) Use caution regarding the max. operating pressure when soft nylon or polyurethane tubing is used. (Refer to pages 371 and 372 for details.)
Note 4) In case of AS12□1F-M3-02 and AS12□1F-M5-02, polyurethane only.
Note 5) M3, M5, 10-32UNF type ports are not available with seals.
Note 6) Brass parts are all electroless nickel plated.

## Flow Rate and Effective Area

| Model | | AS12□1F-M3<br>AS13□1F-M3<br>AS12□1F-M5-02 | AS12□1F-M5<br>AS13□1F-M5 | AS22□1F-01<br>AS23□1F-01 | | AS22□1F-02<br>AS23□1F-02 | | | AS32□1F<br>AS33□1F | | | AS42□1F<br>AS43□1F | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tubing O.D. | Metric size | ø2, ø3.2, ø4 | ø3.2, ø4, ø6 | ø3.2, ø4 | ø6, ø8, ø10 | ø4 | ø6 | ø8, ø10 | ø6 | ø8 | ø10, ø12 | ø10 | ø12 |
| | Inch size | ø1/8",<br>ø5/32" | ø1/8", ø3/16"<br>ø1/4", ø5/32" | ø1/8",<br>ø5/32" | ø3/16", ø1/4",<br>ø5/16" | ø5/32" | ø3/16" | ø1/4", ø5/16",<br>ø3/8" | ø1/4" | ø5/16" | ø3/8" | ø3/8" | ø1/2" |
| Controlled flow (Free flow) | Flow rate ℓ/min (ANR) | 20 | 100 | 180 | 230 | 260 | 390 | 460 | 660 | 790 | 920 | 1580 | 1710 |
| | Effective area (mm²) | 0.3 | 1.5 | 2.7 | 3.5 | 4 | 6 | 7 | 10 | 12 | 14 | 24 | 26 |

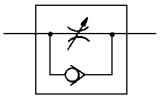
Note 1) Flow rate values are measured at 0.5 MPa and 20°C.
Note 2) U10/32 has the same specification as M5.

**Elbow type**

Applicable tubing O.D. ø2

**Universal type**

**JIS Symbol**



**Flow Direction Symbols on Body**

| | Meter-out type | Meter-in type |
|---|---|---|
| Symbol |  |  |
| JIS Symbol |  |  |

**⚠Caution**

**Be sure to read before handling.**
**Refer to front matters 58 and 59 for Safety Instructions and pages 412 to 414 for Flow Control Equipment Precautions.**

**Made to Order**
(Refer to page 422 for details.)

## How to Order

**AS** [2] [2] [0] **1F** – [ ] [01] – [06] [S] – [ ]

**Body size**

| | |
|---|---|
| 1 | M3, M5 standard |
| 2 | 1/8, 1/4 standard |
| 3 | 3/8 standard |
| 4 | 1/2 standard |

**Type**

| | |
|---|---|
| 2 | Elbow |
| 3 | Universal |

**Control type**

| | |
|---|---|
| 0 | Meter-out |
| 1 | Meter-in |

**With One-touch fitting**

**Thread type**

| | |
|---|---|
| Nil | Metric thread (M3, M5) |
| | Unified thread (10-32 UNF) |
| | R |
| N | NPT |

**Port size**

| | |
|---|---|
| M3 | M3 x 0.5 |
| M5 | M5 x 0.8 |
| U10/32 | 10-32 UNF |
| 01 | 1/8 |
| 02 | 1/4 |
| 03 | 3/8 |
| 04 | 1/2 |

**Applicable tubing O.D.**

| Metric size | | Inch size | |
|---|---|---|---|
| 02 | ø2 | 01 | ø1/8" |
| 23 | ø3.2* | 03 | ø5/32" |
| 04 | ø4 | 05 | ø3/16" |
| 06 | ø6 | 07 | ø1/4" |
| 08 | ø8 | 09 | ø5/16" |
| 10 | ø10 | 11 | ø3/8" |
| 12 | ø12 | 13 | ø1/2" |

*Use ø1/8" tube.

**Option**

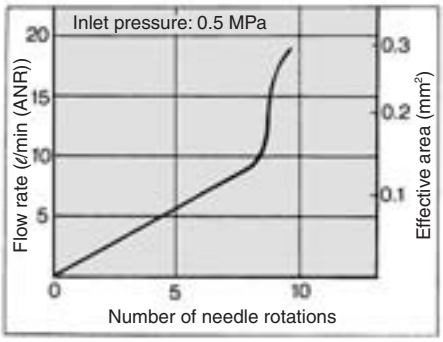
| | |
|---|---|
| Nil | None |
| S | With seal |
| K | Hexagonal lock nut |
| N | Electroless nickel plated |

*1 If more than one option is required, write option part numbers in the order of "S", "K", "N".
*2 M3, M5, and U10/32 are not available with seals.

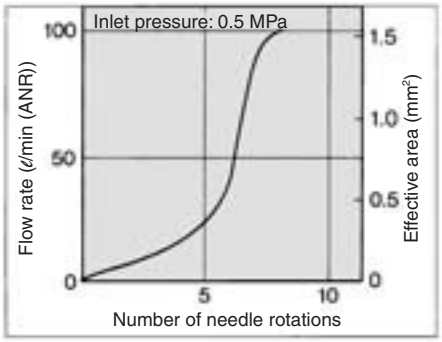
**Made to Order**
(Refer to page 422 for details.)

## Needle Valve/Flow Characteristics

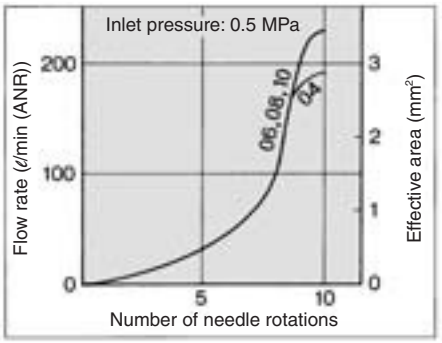
**AS1201F-M3, AS1211F-M3**
**AS1301F-M3, AS1311F-M3**
**AS1201F-M5-02, AS1211F-M5-02**




**AS1201F-M5, AS1211F-M5**
**AS1301F-M5, AS1311F-M5**

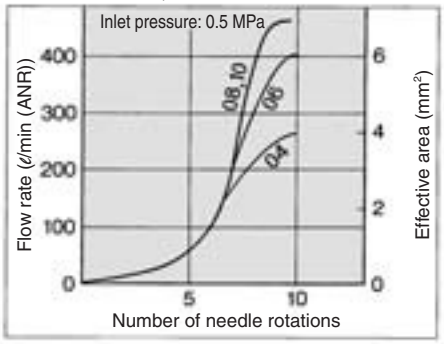



**AS2201F-01, AS2211F-01**
**AS2301F-01, AS2311F-01**

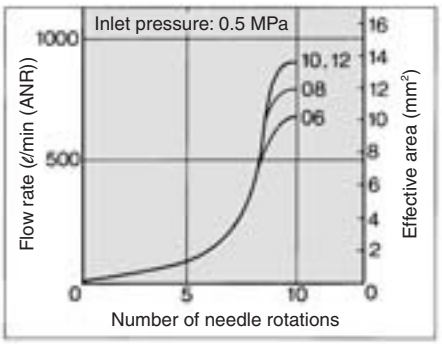



Note) "-U10/32" is the same as "M5".

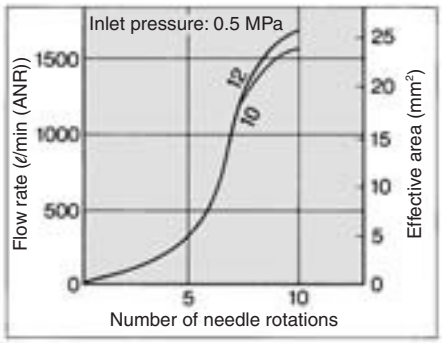
**AS2201F-02, AS2211F-02**
**AS2301F-02, AS2311F-02**




**AS3201F, AS3211F**
**AS3301F, AS3311F**



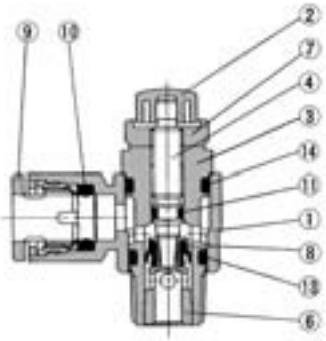

**AS4201F, AS4211F**
**AS4301F, AS4311F**



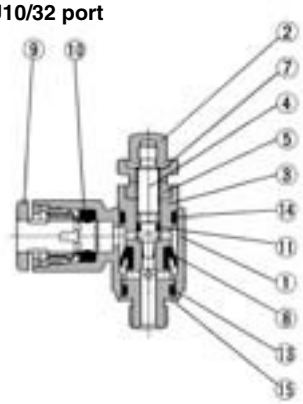
## Construction

### Elbow type

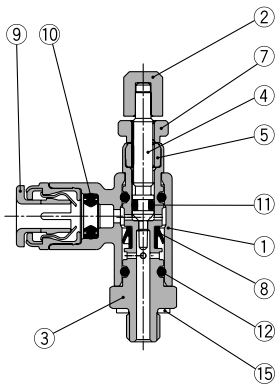
**Meter-out type**



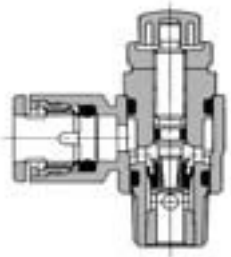
**M3 port**
**M5 port**
**U10/32 port**



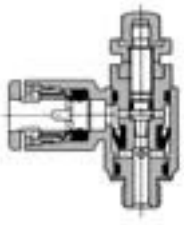
**ø2 tubing type**



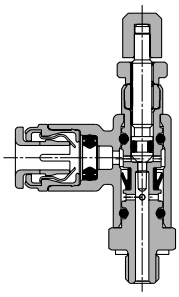
**Meter-in type**



**M3 port**
**M5 port**
**U10/32 port**

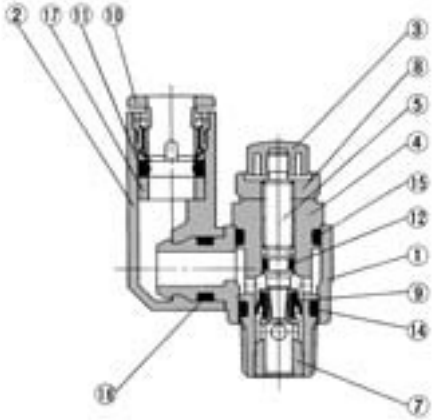


**ø2 tubing type**

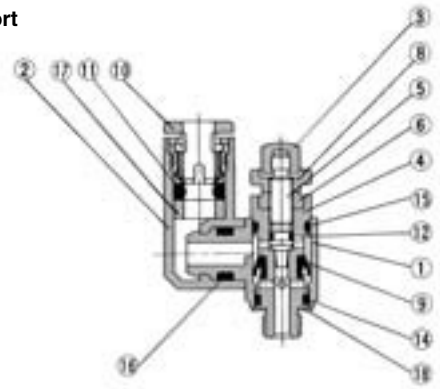


### Universal type

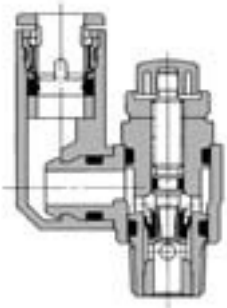
**Meter-out type**



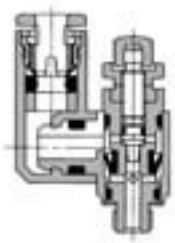
**M3 port**
**M5 port**
**U10/32 port**



**Meter-in type**



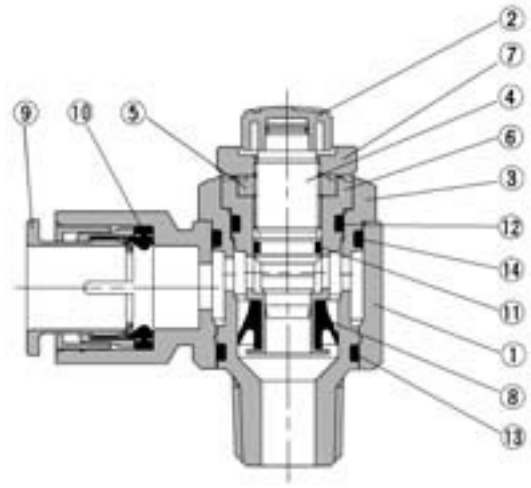
**M3 port**
**M5 port**
**U10/32 port**



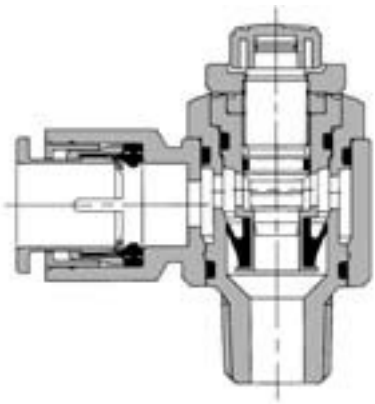
## Construction

### Elbow type

**Meter-out type AS3201F-02**




**Meter-in type AS3211F-02**



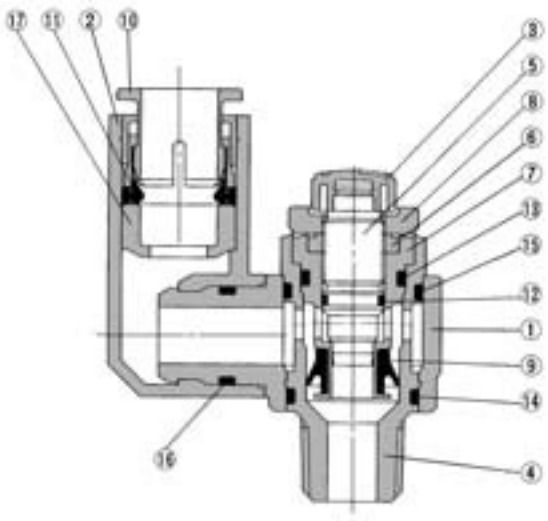
### Component Parts

| No. | Description | Material | Note |
|---|---|---|---|
| 1 | **Body A** | PBT | |
| 2 | **Handle** | PBT (1) | |
| 3 | **Body B** | Brass (2) | Electroless nickel plated |
| 4 | **Needle** | Brass | Electroless nickel plated |
| 5 | **Needle guide** | Brass | Electroless nickel plated |
| 6 | **Seat ring** | Brass | (3) |
| 7 | **Lock nut** | Brass (4) | Electroless nickel plated (5) |
| 8 | **U-packing** | HNBR | |
| 9 | **Cassette** | — | |
| 10 | **Seal** | NBR | |
| 11 | **O-ring** | NBR | |
| 12 | **O-ring** | NBR | |
| 13 | **O-ring** | NBR | |
| 14 | **O-ring** | NBR | |
| 15 | **Gasket** | NBR, Stainless steel | |

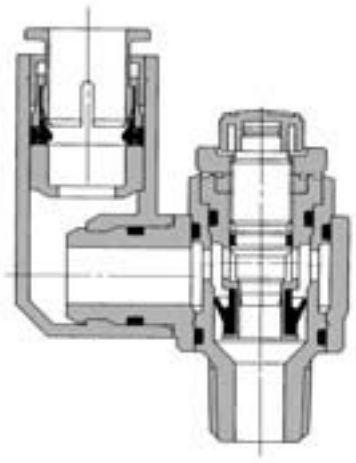
Note 1) AS12□1F-M3-02 and AS12□1F-M5-02 are made of electroless nickel plated brass.
Note 2) AS12□1F-M3 is made of stainless steel.
Note 3) AS22□1F, AS32□1F-02: Electroless nickel plated.
Note 4) AS2□□1F type is made of steel.
Note 5) Meter-in type is black zinc chromate plated.

### Universal type

**Meter-out type AS3301F-02**




**Meter-in type AS3311F-02**



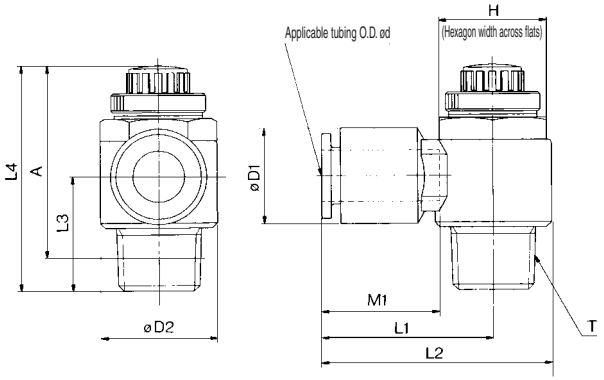
### Component Parts

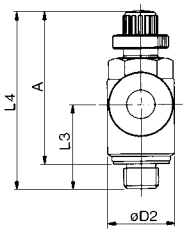
| No. | Description | Material | Note |
|---|---|---|---|
| 1 | **Body A** | PBT | |
| 2 | **Elbow body** | PBT | |
| 3 | **Handle** | PBT | |
| 4 | **Body B** | Brass (1) | Electroless nickel plated |
| 5 | **Needle** | Brass | Electroless nickel plated |
| 6 | **Needle guide** | Brass | Electroless nickel plated |
| 7 | **Seat ring** | Brass | (2) |
| 8 | **Lock nut** | Brass (3) | Electroless nickel plated (4) |
| 9 | **U seal** | HNBR | |
| 10 | **Cassette** | — | |
| 11 | **Seal** | NBR | |
| 12 | **O-ring** | NBR | |
| 13 | **O-ring** | NBR | |
| 14 | **O-ring** | NBR | |
| 15 | **O-ring** | NBR | |
| 16 | **O-ring** | NBR | |
| 17 | **Spacer** | — | |
| 18 | **Gasket** | NBR, Stainless steel | |

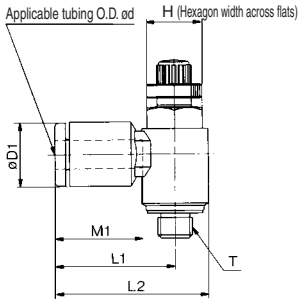
Note 1) AS13□1F-M3 is made of stainless steel.
Note 2) AS23□1F, AS33□1F-02: Electroless nickel plated.
Note 3) AS2□□1F type is made of steel.
Note 4) Meter-in type is black zinc chromate plated.

## Elbow Type

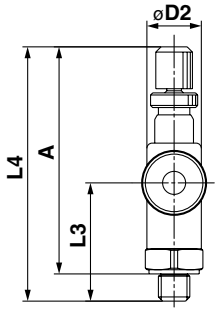
### M3 port
### M5 port
### U10/32 port

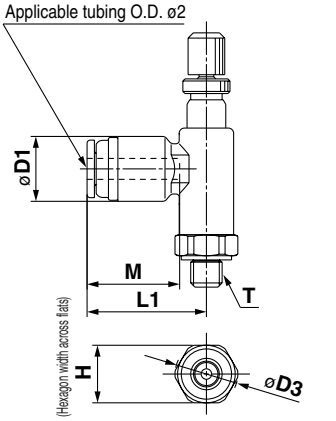



### ø2 tubing type
### AS12□1F-M3-02
### AS12□1F-M5-02




## Metric Size

| Model | Applicable tubing O.D. ød | T | H (1) | D1 | D2 | D3 | L1 | L2 | L3 | L4 (3) Max. | L4 (3) Min. | A (2) Max. | A (2) Min. | M1 | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AS12□1F-M3-02** | 2 | M3 x 0.5 | 5.5 | 6 | 5.2 | 6 | 11.4 | — | 11 | 26.8 | 24.3 | 24.3 | 21.8 | 8.8 | 2.4 |
| **AS12□1F-M5-02** | | M5 x 0.8 | 7 | | | 7.5 | | | 11.5 | 27.3 | 24.8 | | | | 3 |
| **AS12□1F-M3-23** | 3.2 | M3 x 0.5 | 5.5 | 8.4 | 7.2 | — | 16.1 | 19.7 | 10.5 | 26.6 | 24.1 | 24 | 21.5 | 12.7 | 4 |
| **AS12□1F-M3-04** | 4 | | | 9.3 | | | | | 10 | | | | | | |
| **AS12□1F-M5-23** | 3.2 | M5 x 0.8 | 8 | 8.4 | 9.6 | — | 17.3 | 22.1 | 12.3 | 28.6 | 25.8 | 25 | 22.2 | 12.7 | 7 |
| **AS12□1F-U10/32-23** | | 10-32UNF | | | | | | | | | | | | | |
| **AS12□1F-M5-04** | 4 | M5 x 0.8 | | 9.3 | | | 17.3 | 22.1 | | | | | | | |
| **AS12□1F-U10/32-04** | | 10-32UNF | | | | | | | | | | | | | |
| **AS12□1F-M5-06** | 6 | M5 x 0.8 | | 11.6 | | | 18.1 | 22.9 | 11.7 | | | | | 13.5 | |
| **AS12□1F-U10/32-06** | | 10-32UNF | | | | | | | | | | | | | |
| **AS22□1F-01-23** | 3.2 | 1/8 | 12 (12.7) | 9.3 | 14.2 | — | 20.4 | 27.5 | 13.4 | 35.2 | 30.2 | 32.1 | 27.1 | 12.7 | 16 |
| **AS22□1F-01-04** | 4 | | | 9.3 | | | 20.4 | 27.5 | | | | | | | 17 |
| **AS22□1F-01-06** | 6 | | | 11.6 | | | 20.4 | 27.5 | | | | | | 13.5 | |
| **AS22□1F-01-08** | 8 | | | 15.2 | | | 25.3 | 32.4 | | | | | | 18.5 | 19 |
| **AS22□1F-01-10** | 10 | | | 18.5 | | | 32.1 | 39.2 | 14.1 | | | | | 21 | 21 |
| **AS22□1F-02-04** | 4 | 1/4 | 17 (17.5) | 10.4 | 18.5 | — | 25.2 | 34.4 | 17.7 | 39.9 | 34.9 | 34.4 | 29.4 | 16 | 32 |
| **AS22□1F-02-06** | 6 | | | 12.8 | | | 25.2 | 34.4 | | | | | | 17 | |
| **AS22□1F-02-08** | 8 | | | 15.2 | | | 27.2 | 36.4 | | | | | | 18.5 | 34 |
| **AS22□1F-02-10** | 10 | | | 18.5 | | | 35.3 | 44.5 | 19.5 | | | | | 21 | 36 |
| **AS32□1F-02-06** | 6 | | 19 | 12.8 | 23 | — | 27.8 | 39.3 | 21.3 | 48.3 | 43.3 | 42.8 | 37.8 | 17 | 60 |
| **AS32□1F-02-08** | 8 | | | 15.2 | | | 29.5 | 41 | | | | | | 18.5 | 63 |
| **AS32□1F-02-10** | 10 | | | 18.5 | | | 31.8 | 43.3 | | | | | | 21 | 67 |
| **AS32□1F-02-12** | 12 | | | 20.9 | | | 32.8 | 44.3 | | | | | | 22 | 69 |
| **AS32□1F-03-06** | 6 | 3/8 | | 12.8 | 23 | | 27.8 | 39.3 | 19.8 | 45.4 | 40.4 | 40.2 | 35.2 | 17 | 55 |
| **AS32□1F-03-08** | 8 | | | 15.2 | | | 29.5 | 41 | | | | | | 18.5 | 57 |
| **AS32□1F-03-10** | 10 | | | 18.5 | | | 31.8 | 43.3 | | | | | | 21 | 59 |
| **AS32□1F-03-12** | 12 | | | 20.9 | | | 32.8 | 44.3 | | | | | | 22 | 61 |
| **AS42□1F-04-10** | 10 | 1/2 | 24 (23.8) | 18.5 | 28.6 | — | 33.6 | 47.9 | 24.5 | 56.7 | 49.2 | 49.6 | 42.1 | 21 | 100 |
| **AS42□1F-04-12** | 12 | | | 20.9 | | | 34.6 | 48.9 | | | | | | 22 | 101 |

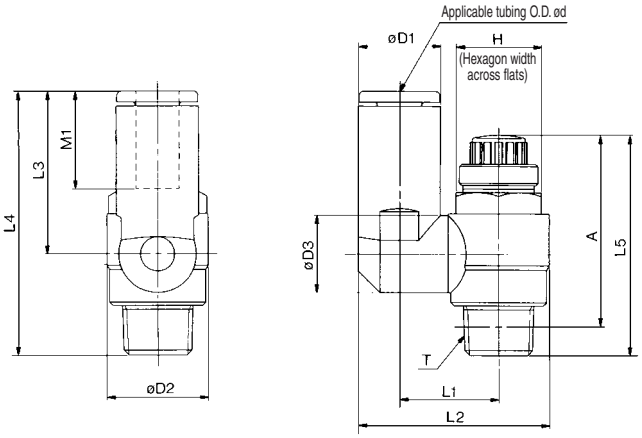
Note 1) ( ) are the dimensions of NPT thread.
Note 2) Reference thread dimensions after installation.
Note 3) Reference dimensions

## Inch Size

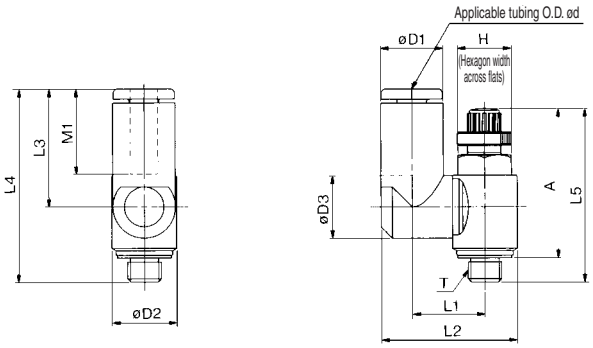
| Model | Applicable tubing O.D. ød | T | H (1) | D1 | D2 | L1 | L2 | L3 | L4 (3) Max. | L4 (3) Min. | A (2) Max. | A (2) Min. | M1 | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AS12□1F-M3-01** | 1/8" | M3 x 0.5 | 5.5 | 8.4 | 7.2 | 16.1 | 19.7 | 10.5 | 26.6 | 24.1 | 24 | 21.5 | 12.7 | 4 |
| **AS12□1F-M3-03** | 5/32" | | | 9.3 | | | | 10 | | | | | | |
| **AS12□1F-M5-01** | 1/8" | M5 x 0.8 | 8 | 8.4 | 9.6 | 17.3 | 22.1 | 12.3 | 28.6 | 25.8 | 25 | 22.2 | 12.7 | 7 |
| **AS12□1F-U10/32-01** | 1/8" | 10-32UNF | | | | | | | | | | | | |
| **AS12□1F-M5-03** | 5/32" | M5 x 0.8 | | 9.3 | | 17.3 | 22.1 | | | | | | | |
| **AS12□1F-U10/32-03** | 5/32" | 10-32UNF | | | | | | | | | | | | |
| **AS12□1F-M5-05** | 3/16" | M5 x 0.8 | 8 | 11.4 | 9.6 | 21.3 | 26.1 | 11.7 | 28.6 | 25.8 | 25 | 22.2 | 16.5 | 7 |
| **AS12□1F-U10/32-05** | 3/16" | 10-32UNF | | | | | | | | | | | | |
| **AS12□1F-M5-07** | 1/4" | M5 x 0.8 | | 12 | | 18.3 | 23.1 | | | | | | 13.5 | 7 |
| **AS12□1F-U10/32-07** | 1/4" | 10-32UNF | | | | | | | | | | | | |
| **AS22□1F-01-01** | 1/8" | 1/8 | 12 (12.7) | 9.3 | 14.2 | 20.4 | 27.5 | 13.4 | 35.2 | 30.2 | 32.1 | 27.1 | 12.7 | 16 |
| **AS22□1F-01-03** | 5/32" | | | 9.3 | | 20.4 | 27.5 | | | | | | | 17 |
| **AS22□1F-01-05** | 3/16" | | | 11.4 | | 23.1 | 30.2 | | | | | | 16.5 | 17 |
| **AS22□1F-01-07** | 1/4" | | | 13.2 | | 23.9 | 31 | | | | | | 18.5 | 19 |
| **AS22□1F-01-09** | 5/16" | | | 15.2 | | 25.3 | 32.4 | 14.1 | | | | | 21 | 21 |
| **AS22□1F-02-03** | 5/32" | 1/4 | 17 (17.5) | 10.4 | 18.5 | 25.2 | 34.4 | 17.7 | 39.9 | 34.9 | 34.4 | 29.4 | 16 | 32 |
| **AS22□1F-02-05** | 3/16" | | | 11.4 | | 24.9 | 34.2 | | | | | | 17 | |
| **AS22□1F-02-07** | 1/4" | | | 13.2 | | 25.2 | 34.5 | | | | | | 18.5 | 34 |
| **AS22□1F-02-09** | 5/16" | | | 15.2 | | 27.2 | 36.4 | 19.5 | | | | | 21 | 36 |
| **AS22□1F-02-11** | 3/8" | | | 17.9 | | 35.3 | 44.5 | | | | | | 21 | 36 |
| **AS32□1F-02-07** | 1/4" | 19 | | 13.2 | 23 | 27.8 | 39.3 | 21.3 | 48.3 | 43.3 | 42.8 | 37.8 | 17 | 60 |
| **AS32□1F-02-09** | 5/16" | | | 15.2 | | 29.5 | 41 | | | | | | 18.5 | 63 |
| **AS32□1F-02-11** | 3/8" | | | 17.9 | | 31.8 | 43.3 | | | | | | 21 | 67 |
| **AS32□1F-03-07** | 1/4" | 3/8 | | 13.2 | 23 | 27.8 | 39.3 | 19.8 | 45.4 | 40.4 | 40.2 | 35.2 | 17 | 55 |
| **AS32□1F-03-09** | 5/16" | | | 15.2 | | 29.5 | 41 | | | | | | 18.5 | 57 |
| **AS32□1F-03-11** | 3/8" | | | 17.9 | | 31.8 | 43.3 | | | | | | 21 | 59 |
| **AS42□1F-04-11** | 3/8" | 1/2 | 24 (23.8) | 17.9 | 28.6 | 33.6 | 47.9 | 24.5 | 56.7 | 49.2 | 49.6 | 42.1 | 21 | 100 |
| **AS42□1F-04-13** | 1/2" | | | 21.7 | | 35.2 | 49.5 | | | | | | 22 | 101 |

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

## Universal Type




**M3 port**
**M5 port**
**U10/32 port**




### Metric Size

| Model | Applicable tubing O.D. ød | T | H (1) | D1 | D2 | D3 | L1 | L2 | L3 | L4 | L5 (3) Max. | L5 (3) Min. | A (2) Max. | A (2) Min. | M1 | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AS13□1F-M3-23** | 3.2 | M3 x 0.5 | 5.5 | 8.4 | 7.2 | 7.2 | 10.1 | 17.9 | 17.6 | 28.3 | 26.6 | 24.1 | 24 | 21.5 | 12.7 | 4 |
| **AS13□1F-M3-04** | 4 | | | 9.3 | | | | 18.3 | 17.9 | 28.6 | | | | | | 5 |
| **AS13□1F-M5-23** | 3.2 | M5 x 0.8 | 8 | 8.4 | 9.6 | 9.3 | 10.8 | 19.8 | 17.5 | 28.7 | 28.6 | 25.8 | 25 | 22.2 | 12.7 | 7 |
| **AS13□1F-U10/32-23** | | 10-32UNF | | | | | | | | | | | | | | |
| **AS13□1F-M5-04** | 4 | M5 x 0.8 | | 9.3 | | | | 20.3 | | | | | | | | |
| **AS13□1F-U10/32-04** | | 10-32UNF | | | | | | | | | | | | | | |
| **AS13□1F-M5-06** | 6 | M5 x 0.8 | | 11.6 | | | | 21.4 | 20.6 | 31.8 | | | | | 13.5 | |
| **AS13□1F-U10/32-06** | | 10-32UNF | | | | | | | | | | | | | | |
| **AS23□1F-01-23** | 3.2 | 1/8 | 12 (12.7) | 8.4 | 14.2 | 9.3 | 13.1 | 24.4 | 17.5 | 30.9 | 35.2 | 30.2 | 32.1 | 27.1 | 12.7 | 17 |
| **AS23□1F-01-04** | 4 | | | 9.3 | | | | 24.9 | | | | | | | | 18 |
| **AS23□1F-01-06** | 6 | | | 11.6 | | 10.9 | 14 | 26.9 | 22.9 | 36.3 | | | | | 13.5 | |
| **AS23□1F-01-08** | 8 | | | 15.2 | | 12.9 | 16.2 | 30.9 | 28.2 | 40.8 | | | | | 18.5 | 21 |
| **AS23□1F-02-04** | 4 | 1/4 | 17 (17.5) | 10.4 | 18.5 | 10.9 | 16.2 | 30.6 | 21.9 | 39.6 | 39.9 | 34.9 | 34.4 | 29.4 | 16 | 32 |
| **AS23□1F-02-06** | 6 | | | 12.8 | | 12.9 | 18.4 | 34 | 25.2 | 42.1 | | | | | 17 | 33 |
| **AS23□1F-02-08** | 8 | | | 15.2 | | 12.9 | 18.3 | 35.2 | 28.2 | 45.1 | | | | | 18.5 | 36 |
| **AS23□1F-02-10** | 10 | | | 18.5 | | | 20.2 | 38.7 | 31 | 47.9 | | | | | 21 | 40 |
| **AS33□1F-02-06** | 6 | | 19 | 12.8 | 23 | 12.9 | 20.6 | 38.5 | 25.2 | 46.5 | 48.3 | 43.3 | 42.8 | 37.8 | 17 | 60 |
| **AS33□1F-02-08** | 8 | | | 15.2 | | 12.9 | 20.6 | 39.7 | 28.2 | 49.5 | | | | | 18.5 | 63 |
| **AS33□1F-02-10** | 10 | | | 18.5 | | 16.2 | 23 | 43.7 | 32.6 | 53.9 | | | | | 21 | 67 |
| **AS33□1F-02-12** | 12 | | | 20.9 | | | 23 | 44.9 | 34.4 | 55.7 | | | | | 22 | 69 |
| **AS33□1F-03-06** | 6 | 3/8 | | 12.8 | 23 | 12.9 | 20.6 | 38.5 | 25.2 | 45 | 45.4 | 40.4 | 40 | 35 | 17 | 56 |
| **AS33□1F-03-08** | 8 | | | 15.2 | | 12.9 | 20.6 | 39.7 | 28.2 | 48 | | | | | 18.5 | 59 |
| **AS33□1F-03-10** | 10 | | | 18.5 | | 16.2 | 23 | 43.7 | 32.6 | 52.4 | | | | | 21 | 63 |
| **AS33□1F-03-12** | 12 | | | 20.9 | | | 23 | 44.9 | 34.4 | 54.2 | | | | | 22 | 65 |
| **AS43□1F-04-10** | 10 | 1/2 | 24 (23.8) | 18.5 | 28.6 | 16.2 | 25.8 | 49.4 | 32.6 | 57.1 | 56.7 | 49.2 | 49.6 | 42.1 | 21 | 104 |
| **AS43□1F-04-12** | 12 | | | 21.7 | | 19.4 | 26.8 | 52 | 36.3 | 60.8 | | | | | 22 | 106 |

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

### Inch Size

| Model | Applicable tubing O.D. ød | T | H (1) | D1 | D2 | D3 | L1 | L2 | L3 | L4 | L5 (3) Max. | L5 (3) Min. | A (2) Max. | A (2) Min. | M1 | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AS13□1F-M3-01** | 1/8" | M3 x 0.5 | 5.5 | 8.4 | 7.2 | 7.2 | 10.1 | 17.9 | 17.6 | 28.3 | 26.6 | 24.1 | 24 | 21.5 | 12.7 | 4 |
| **AS13□1F-M3-03** | 5/32" | | | 9.3 | | | | 18.3 | 17.9 | 28.6 | | | | | | 5 |
| **AS13□1F-M5-01** | 1/8" | M5 x 0.8 | 8 | 8.4 | 9.6 | 9.3 | 10.8 | 19.8 | 17.5 | 28.7 | 28.6 | 25.8 | 25 | 22.2 | 12.7 | 7 |
| **AS13□1F-U10/32-01** | 1/8" | 10-32UNF | | | | | | | | | | | | | | |
| **AS13□1F-M5-03** | 5/32" | M5 x 0.8 | | 9.3 | | | | 20.3 | | | | | | | | |
| **AS13□1F-U10/32-03** | 5/32" | 10-32UNF | | | | | | | | | | | | | | |
| **AS13□1F-M5-05** | 3/16" | M5 x 0.8 | 8 | 11.4 | 9.6 | 9.3 | 10.8 | 21.3 | 23.3 | 34.5 | 28.6 | 25.8 | 25 | 22.2 | 16.5 | 8 |
| **AS13□1F-U10/32-05** | 3/16" | 10-32UNF | | | | | | | | | | | | | | |
| **AS13□1F-M5-07** | 1/4" | M5 x 0.8 | | 12 | | | | 21.6 | 20.7 | 31.9 | | | | | 13.7 | |
| **AS13□1F-U10/32-07** | 1/4" | 10-32UNF | | | | | | | | | | | | | | |
| **AS23□1F-01-01** | 1/8" | 1/8 | 12 (12.7) | 8.4 | 14.2 | 9.3 | 13.1 | 24.4 | 17.5 | 30.9 | 35.2 | 30.2 | 32.1 | 27.1 | 12.7 | 17 |
| **AS23□1F-01-03** | 5/32" | | | 9.3 | | | | 24.9 | | | | | | | | 18 |
| **AS23□1F-01-05** | 3/16" | | | 11.6 | | 10.9 | 14 | 26.8 | 23.9 | 37.3 | | | | | 16.5 | |
| **AS23□1F-01-07** | 1/4" | | | 13.2 | | 12.9 | 16.2 | 29.9 | 25.6 | 38.2 | | | | | 17 | 19 |
| **AS23□1F-01-09** | 5/16" | | | 15.2 | | 12.9 | 16.2 | 30.9 | 28.2 | 40.8 | | | | | 18.5 | 21 |
| **AS23□1F-02-03** | 5/32" | 1/4 | 17 (17.5) | 10.4 | 18.5 | 10.9 | 16.2 | 30.6 | 21.9 | 39.6 | 39.9 | 34.9 | 34.4 | 29.4 | 16 | 32 |
| **AS23□1F-02-05** | 3/16" | | | 11.6 | | 10.9 | 16.2 | 31.1 | 23.9 | 42.1 | | | | | 16.5 | 33 |
| **AS23□1F-02-07** | 1/4" | | | 13.2 | | 12.9 | 18.3 | 34.2 | 25.6 | 45.1 | | | | | 17 | 36 |
| **AS23□1F-02-09** | 5/16" | | | 15.2 | | | 18.3 | 35.2 | 28.2 | 47.9 | | | | | 18.5 | 39 |
| **AS23□1F-02-11** | 3/8" | | | 18.5 | | | 20.2 | 38.7 | 31 | 46.5 | | | | | 21 | 40 |
| **AS33□1F-02-07** | 1/4" | 19 | | 13.2 | 23 | 12.9 | 20.6 | 38.7 | 25.6 | 46.9 | 48.3 | 43.3 | 42.8 | 37.8 | 17 | 60 |
| **AS33□1F-02-09** | 5/16" | | | 15.2 | | 12.9 | 20.6 | 39.7 | 28.2 | 49.5 | | | | | 18.5 | 63 |
| **AS33□1F-02-11** | 3/8" | | | 18.5 | | 16.2 | 23 | 43.7 | 32.6 | 53.9 | | | | | 21 | 69 |
| **AS33□1F-03-07** | 1/4" | 3/8 | | 13.2 | 23 | 12.9 | 20.6 | 38.7 | 25.6 | 45.4 | 45.4 | 40.4 | 40.2 | 35.2 | 17 | 56 |
| **AS33□1F-03-09** | 5/16" | | | 15.2 | | 12.9 | 20.6 | 39.7 | 28.2 | 48 | | | | | 18.5 | 59 |
| **AS33□1F-03-11** | 3/8" | | | 18.5 | | 16.2 | 23 | 43.7 | 32.6 | 52.4 | | | | | 21 | 65 |
| **AS43□1F-04-11** | 3/8" | 1/2 | 24 (23.8) | 18.5 | 28.6 | 16.2 | 25.8 | 49.4 | 32.6 | 57.1 | 56.7 | 49.2 | 49.6 | 42.1 | 21 | 104 |
| **AS43□1F-04-13** | 1/2" | | | 21.7 | | 19.4 | 26.8 | 52 | 36.3 | 60.8 | | | | | 22 | 106 |

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

# Made to Order Specifications:

Please contact SMC for detailed dimensions, specifications, and delivery.

## 1 Lubricant: Vaseline — X12

**Ex.) AS2201F-01-04S-X12**

## 2 Grease-free (Seal: Fluorine Coating) + Throttle Valve (Without Check Valve) — X21

**Ex.) AS2201F-01-04S-X21**

Note 1) Not particle-free
Note 2) Throttle valve is only compatible with the part no. of the meter-out type.

## 3 Throttle Valve (Without Check Valve) — X214

**Ex.) AS2201F-01-04S-X214**

Note) Throttle valve is only compatible with the part no. of the meter-out type.

## 4 Fixed Throttle (No needle function) — X250

### How to Order

**AS 2 2 0 1F – 01 – 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 |

**With One-touch fitting**

**Port size**

| | |
|---|---|
| M3 | M3 x 0.5 |
| M5 | M5 x 0.8 |
| 01 | R 1/8 |
| 02 | R 1/4 |

**Applicable tubing O.D.**

| | |
|---|---|
| 04 | ø4 |
| 06 | ø6 |

**Option***

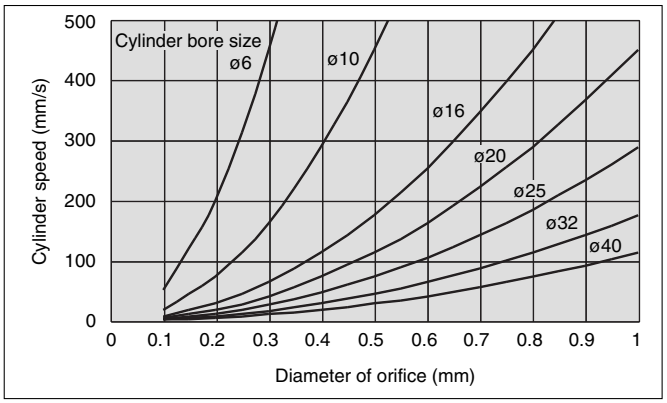
| | |
|---|---|
| Nil | None |
| S | With seal |

* M3 and M5 are not available with seals.

**Fixed orifice**

| Symbol | Fixed orifice | Applicable model | | | |
|---|---|---|---|---|---|
| | | AS12□1F-M3-04 | AS12□1F-M5-04<br>AS12□1F-M5-06 | AS22□1F-01-04<br>AS22□1F-01-06 | AS22□1F-02-06 |
| 1 | ø0.1 | ○ | ○ | ○ | ○ |
| 2 | ø0.2 | ○ | ○ | ○ | ○ |
| 3 | ø0.3 | ○ | ○ | ○ | ○ |
| 4 | ø0.4 | ○ | ○ | ○ | ○ |
| 5 | ø0.5 | ○ | ○ | ○ | ○ |
| 6 | ø0.6 | ○ | ○ | ○ | ○ |
| 7 | ø0.7 | ○ | ○ | ○ | ○ |
| 8 | ø0.8 | ○ | ○ | ○ | ○ |
| 9 | ø0.9 | | ○ | ○ | ○ |
| 10 | 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.



# Speed Controller with One-touch Fittings In-line Type

# *Series AS*

## Minimizes installation time and cost

Reduce the mounting height and enables compact machinery design. Effective area is larger than the former model.

**ø2 size added to applicable tubing sizes**

- **Metric size** (Release button: White color)
  ø2, ø3.2, ø4, ø6, ø8, ø10, ø12
- **Inch size** (Release button: Orange color)
  ø1/8", ø5/32", ø3/16", ø1/4", ø5/16", ø3/8", ø1/2"

**Maximum operating pressure**
**1 MPa max.**

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

**Retainer prevents accidental loss of needle.**

**Option**
**Hexagonal lock nut,**
**Nickel plated option**

**Number of needle rotations has been increased**
**(8 to 10 turns)**
The increased number of needle rotations (8 to 10 turns) permits easy control at low speeds.

**In-line type**

Applicable tubing O.D. ø2

**Made to Order**
(Refer to page 431 for details.)

**Flow Direction Symbols on Body**

| Symbol | JIS Symbol |
|---|---|
| ⇔ |  |

## Model

| Model | Applicable tubing O.D. | | | | | | | | | | | | | Applicable cylinder bore size (mm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Metric size | | | | | | | Inch size | | | | | | |
| | 2 | 3.2 | 4 | 6 | 8 | 10 | 12 | 1/8" | 5/32" | 3/16" | 1/4" | 5/16" | 3/8" | 1/2" | |
| **AS1001F** | ◉ | ◉ | ◉ | ◉ | | | | ◉ | ◉ | ● | ◉ | | | | 6, 10, 16, 20 (1) |
| **AS2001F** | | | ◉ | ◉ | | | | | ◉ | ● | ◉ | | | | 20, 25, 32 |
| **AS2051F** | | | | ◉ | ◉ | | | | | ● | ◉ | ◉ | | | 20, 25, 32, 40 |
| **AS3001F** | | | | ◉ | ◉ | ◉ | ◉ | | | | ◉ | ◉ | ● | | 40, 50, 63 |
| **AS4001F** | | | | | | ◉ | ◉ | | | | | | ● | ● | 63, 80, 100 |

Note 1) AS1001F-02 applicable cylinder bore sizes are 2.5, 4, 6.
Note 2) ◉Marking is electroless nickel plated, provided as standard. (N specifications)

## Specifications

| | |
|---|---|
| **Fluid** | Air |
| **Proof pressure** | 1.5 MPa (1.05 MPa (1)) |
| **Max. operating pressure** | 1 MPa (0.7 MPa (1)) |
| **Min. operating pressure** | 0.1 MPa |
| **Ambient and fluid temperature** | –5 to 60°C (No freezing) |
| **Number of needle rotations** | 10 turns (8 turns (2)) |
| **Applicable tubing material** (3) | Nylon, Soft nylon, Polyurethane (4) |
| **Option** | Hexagonal lock nut, Electroless nickel plated (5) |

Note 1) In case of AS1001F-02
Note 2) In case of AS1001F type. AS1001F-02: 10 turns.
Note 3) Use caution regarding the max. operating pressure when soft nylon or polyurethane tubing is used. (Refer to pages 371 and 372 for details.)
Note 4) In case of AS1001F-02, polyurethane only.
Note 5) Brass parts are all electroless nickel plated.

## Flow Rate and Effective Area

| Model | | AS1001F | | AS2001F | | AS2051F | | AS3001F | | | AS4001F | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tubing O.D. | Metric size | ø2 | ø3.2, ø4, ø6 | ø4 | ø6 | ø6 | ø8 | ø6 | ø8 | ø10, ø12 | ø10 | ø12 |
| | Inch size | — | ø1/8", ø5/32" ø3/16", ø1/4" | ø5/32" | ø3/16", ø1/4" | ø3/16" | ø1/4", ø5/16" | ø1/4" | ø5/16" | ø3/8" | ø3/8" | ø1/2" |
| Controlled flow (Free flow) | Air flow ℓ/min (ANR) | 20 | 100 | 130 | 230 | 290 | 460 | 420 | 660 | 920 | 1050 | 1390 |
| | Effective area (mm²) | 0.3 | 1.5 | 2 | 3.5 | 4.5 | 7 | 6.5 | 10 | 14 | 16 | 21 |

Note) Flow rate values are measured at 0.5 MPa and 20°C.

## How to Order

**AS 400 1F – 12 [ ] – [ ]**

**Body size**

| | |
|---|---|
| **100** | M5 standard |
| **200** | 1/8 standard |
| **205** | 1/4 standard |
| **300** | 3/8 standard |
| **400** | 1/2 standard |

**With One-touch fittings**

**Option***

| | |
|---|---|
| **Nil** | None |
| **K** | Hexagonal lock nut |
| **N** | Electroless nickel plated |

* If more than one option is required, write option part numbers in the order of "K", "N".

**Applicable tubing O.D.**

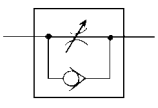
| Metric size | |
|---|---|
| **02** | ø2 |
| **23** | ø3.2* |
| **04** | ø4 |
| **06** | ø6 |
| **08** | ø8 |
| **10** | ø10 |
| **12** | ø12 |

| Inch size | |
|---|---|
| **01** | ø1/8" |
| **03** | ø5/32" |
| **05** | ø3/16" |
| **07** | ø1/4" |
| **09** | ø5/16" |
| **11** | ø3/8" |
| **13** | ø1/2" |

* Use ø1/8" tube.

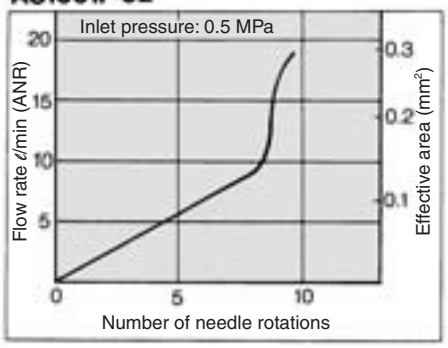
**Made to Order**
Refer to page 431 for details.

**JIS Symbol**

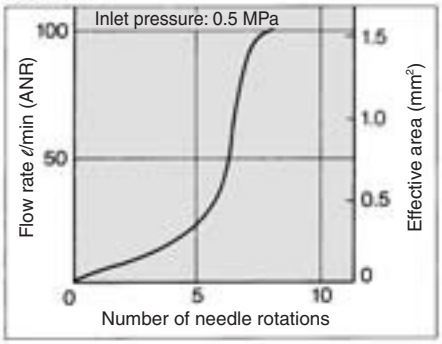


## Needle Valve/Flow Characteristics

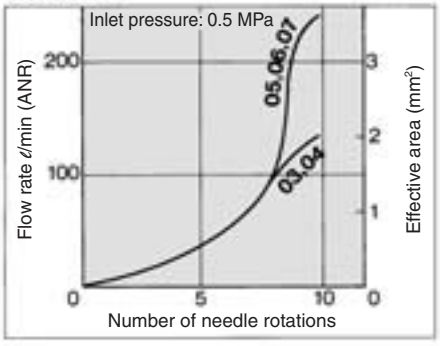
**AS1001F-02**



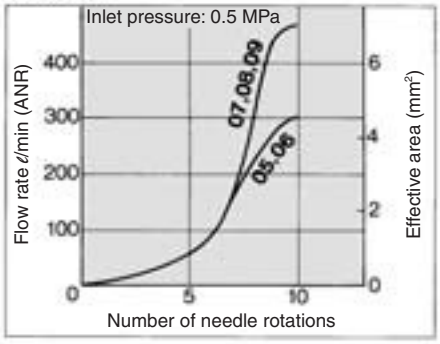

**AS1001F**



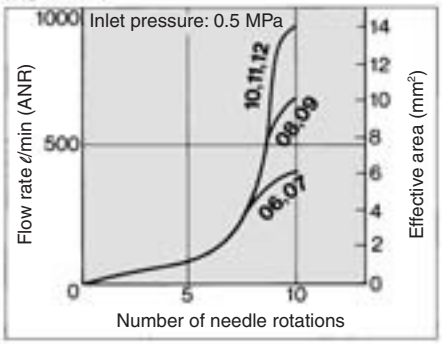

**AS2001F**



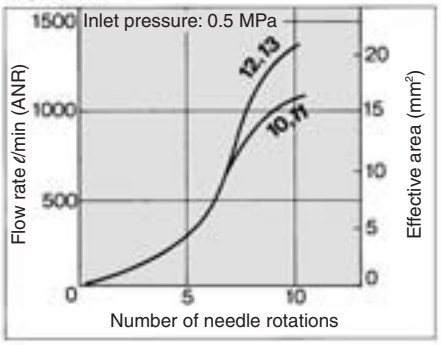

**AS2051F**




**AS3001F**




**AS4001F**




### ⚠Caution

**Be sure to read before handling.**
**Refer to front matters 58 and 59 for Safety Instructions and pages 412 to 414 for Flow Control Equipment Precautions.**

## Made to Order

Made to Order

**Lubricant: Vaseline** **X12**

**Ex.) AS2001F-04-X12**

**Throttle Valve (Without Check Valve)** **X214**

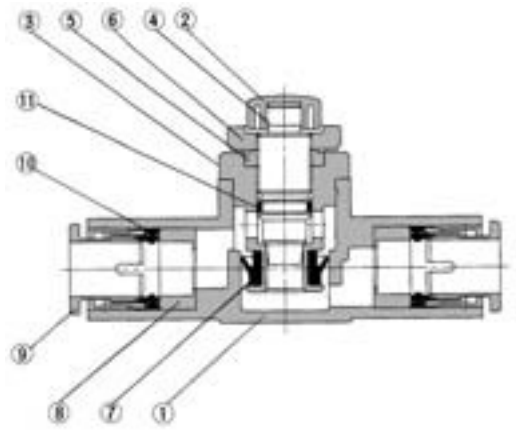
**Ex.) AS2001F-04-X214**

**Grease-free (Seal: Fluorine Coating) + Throttle Valve (Without Check Valve)** **X21**

**Ex.) AS2001F-04-X21**

Note) Not particle-free

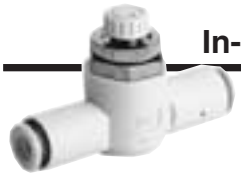
## Construction



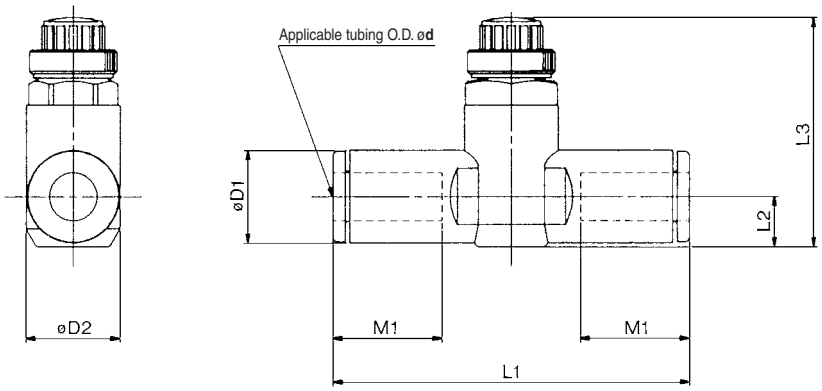

### Component Parts

| No. | Description | Material | Note |
|---|---|---|---|
| 1 | Body A | PBT | |
| 2 | Handle | PBT (1) | |
| 3 | Body B | Brass | Electroless nickel plated |
| 4 | Needle | Brass | Electroless nickel plated |
| 5 | Needle guide | Brass | Electroless nickel plated |
| 6 | Lock nut | Brass (2) | Electroless nickel plated |
| 7 | U seal | HNBR | |
| 8 | Spacer | — | |
| 9 | Cassette | — | |
| 10 | Packing | NBR | |
| 11 | O-ring | NBR | |

Note 1) AS1001F-02 is made of electroless nickel plated brass.
Note 2) AS□□1F type is made of steel.



## In-line Type




### Metric Size

| Model | Applicable tubing O.D. ød | D1 | D2 | L1 | L2 | L3 (1) Max. | L3 (1) Min. | M1 | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|
| AS1001F-02 | 2 | 6 | 6 | 25.4 | 3.4 | 20.9 | 18.4 | 8.8 | 3 |
| AS1001F-23 | 3.2 | 8.4 | 10 | 38.0 | 4.5 | 23.5 | 20.7 | 12.7 | 6 |
| AS1001F-04 | 4 | 9.3 | | 39.2 | 5.2 | 24.2 | 21.4 | | 7 |
| AS1001F-06 | 6 | 11.6 | | 40.7 | 6.2 | 25.2 | 22.4 | 13.5 | 8 |
| AS2001F-04 | 4 | 9.3 | 11.8 | 40.7 | 5.2 | 32.6 | 27.6 | 12.7 | 12 |
| AS2001F-06 | 6 | 11.6 | | 44.8 | 6.3 | 33.7 | 28.7 | 13.5 | 13 |
| AS2051F-06 | 6 | 12.8 | 14.8 | 53.2 | 6.7 | 35.2 | 30.2 | 17 | 22 |
| AS2051F-08 | 8 | 15.2 | | 59.8 | 8.1 | 36.5 | 31.5 | 18 | 25 |
| AS3001F-06 | 6 | 12.8 | 19.8 | 59 | 7.4 | 38.3 | 33.3 | 17 | 36 |
| AS3001F-08 | 8 | 15.2 | | 64.4 | 8.2 | 39.1 | 34.1 | 18 | 40 |
| AS3001F-10 | 10 | 18.5 | | 71.6 | 9.8 | 40.6 | 35.6 | 21 | 44 |
| AS3001F-12 | 12 | 20.9 | | 76 | 11 | 41.8 | 36.8 | 22 | 48 |
| AS4001F-10 | 10 | 18.5 | 26.5 | 77.7 | 11.3 | 51.1 | 43.6 | 21 | 85 |
| AS4001F-12 | 12 | 20.9 | | 82.1 | | 52.1 | 44.6 | 22 | 89 |

Note 1) Reference dimensions

### Inch Size

| Model | Applicable tubing O.D. ød | D1 | D2 | L1 | L2 | L3 (1) Max. | L3 (1) Min. | M1 | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|
| AS1001F-01 | 1/8" | 8.4 | 10 | 38 | 4.5 | 23.5 | 20.7 | 12.7 | 6 |
| AS1001F-03 | 5/32" | 9.3 | | 39.2 | 5.2 | 24.2 | 21.4 | | 7 |
| AS1001F-05 | 3/16" | 11.4 | 10 | 48.7 | 6.2 | 25.2 | 22.4 | 16.5 | 12 |
| AS1001F-07 | 1/4" | 12 | | 40.7 | | | | 13.7 | 9 |
| AS2001F-03 | 5/32" | 9.3 | 11.8 | 40.7 | 5.2 | 32.6 | 27.6 | 12.7 | 12 |
| AS2001F-05 | 3/16" | 11.4 | | 50 | 6.2 | 33.6 | 28.6 | 16.5 | 18 |
| AS2001F-07 | 1/4" | 13.2 | | 52.2 | 7.1 | 34.5 | 29.5 | 17 | 16 |
| AS2051F-05 | 3/16" | 11.4 | 14.8 | 52.2 | 6.2 | 34.6 | 29.6 | 16.5 | 24 |
| AS2051F-07 | 1/4" | 13.2 | | 54.4 | 7.1 | 35.5 | 30.5 | 17 | 22 |
| AS2051F-09 | 5/16" | 15.2 | | 59.8 | 8.1 | 36.5 | 31.5 | 18 | 25 |
| AS3001F-07 | 1/4" | 13.2 | 19.8 | 59 | 7.4 | 38.3 | 33.3 | 17 | 36 |
| AS3001F-09 | 5/16" | 15.2 | | 64.4 | 8.2 | 39.1 | 34.1 | 18 | 40 |
| AS3001F-11 | 3/8" | 17.9 | | 70.8 | 9.5 | 40.3 | 35.3 | 21 | 52 |
| AS4001F-11 | 3/8" | 17.9 | 26.5 | 76.9 | 10.3 | 51 | 43.5 | 21 | 93 |
| AS4001F-13 | 1/2" | 21.7 | | 83.1 | 11.6 | 52.4 | 44.9 | 22 | 106 |

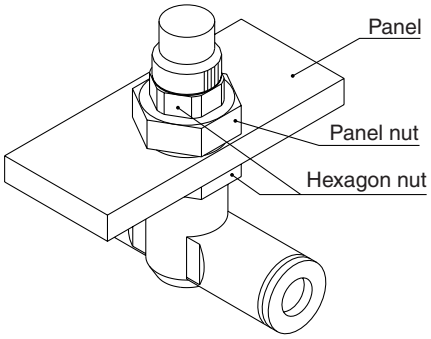
Note 1) Reference dimensions

# Speed Controller with One-touch Fittings
# In-line Type/Panel Mount Type
# Series AS□□□1F-3

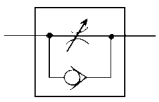
## Panel mount thickness: 3.5 mm at the maximum

### Easy installation and removal

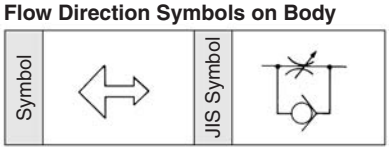
Installment of hexagon nuts on panel nuts up and down in two locations enables user to mount or remove it depending upon the situation.




**JIS Symbol**



**Flow Direction Symbols on Body**




**Made to Order**
(Refer to page 435 for details.)

## Model

| Model | Applicable tubing O.D. | | | | | | | | | | | | Applicable cylinder bore size (mm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Metric size | | | | | | Inch size | | | | | | |
| | 3.2 | 4 | 6 | 8 | 10 | 12 | 1/8" | 5/32" | 3/16" | 1/4" | 5/16" | 3/8" | 1/2" | |
| **AS1001F** | ● | ● | ● | | | | ● | ● | ● | ● | | | | 6, 10, 16, 20 |
| **AS2001F** | | ● | ● | | | | | ● | ● | ● | | | | 20, 25, 32 |
| **AS2051F** | | | ● | ● | | | | | ● | ● | ● | | | 20, 25, 32, 40 |
| **AS3001F** | | | ● | ● | ● | ● | | | | ● | ● | ● | | 40, 50, 63 |
| **AS4001F** | | | | | ● | ● | | | | | | ● | ● | 63, 80, 100 |

## Specifications

| | |
|---|---|
| **Fluid** | Air |
| **Proof pressure** | 1.5 MPa |
| **Max. operating pressure** | 1 MPa |
| **Min. operating pressure** | 0.1 MPa |
| **Ambient and fluid temperature** | –5 to 60°C (No freezing) |
| **Number of needle rotations** | 10 turns (8 turns (1)) |
| **Applicable tubing material** (2) | Nylon, Soft nylon, Polyurethane |

Note 1) In the case of AS1001F type
Note 2) Use caution regarding the max. operating pressure when soft nylon or polyurethane tubing is used. (Refer to pages 371 and 372 for details.)
Note 3) Brass parts are all electroless nickel plated.

## Flow Rate and Effective Area

| Model | | AS1001F | AS2001F | | AS2051F | | AS3001F | | | AS4001F | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Tubing O.D. | Metric size | ø3.2, ø4, ø6 | ø4 | ø6 | ø6 | ø8 | ø6 | ø8 | ø10, ø12 | ø10 | ø12 |
| | Inch size | ø1/8", ø5/32" ø3/16", ø1/4" | ø5/32" | ø3/16", ø1/4" | ø3/16" | ø1/4", ø5/16" | ø1/4" | ø5/16" | ø3/8" | ø3/8" | ø1/2" |
| Controlled flow (Free flow) | Flow rate (ℓ/min(ANR) | 100 | 130 | 230 | 290 | 460 | 420 | 660 | 920 | 1050 | 1390 |
| | Effective area (mm²) | 1.5 | 2 | 3.5 | 4.5 | 7 | 6.5 | 10 | 14 | 16 | 21 |

Note) Flow rate values are measured at 0.5 MPa and 20°C.

## How to Order

**AS 200 1 F – 06 – 3 –** ☐

**Body size**

| | |
|---|---|
| **100** | M5 standard |
| **200** | 1/8 standard |
| **205** | 1/4 standard |
| **300** | 3/8 standard |
| **400** | 1/2 standard |

**With One-touch fittings**

**Applicable tubing O.D.**

| Metric size | | Inch size | |
|---|---|---|---|
| **23** | ø3.2* | **01** | ø1/8" |
| **04** | ø4 | **03** | ø5/32" |
| **06** | ø6 | **05** | ø3/16" |
| **08** | ø8 | **07** | ø1/4" |
| **10** | ø10 | **09** | ø5/16" |
| **12** | ø12 | **11** | ø3/8" |
| | | **13** | ø1/2" |

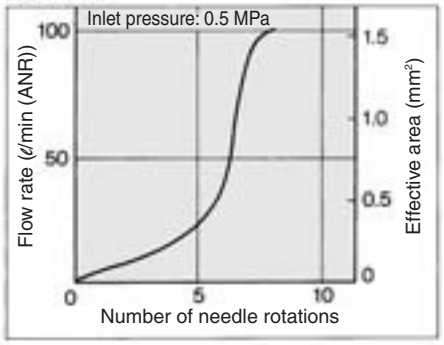
* Use ø1/8" tube.

**Panel mount type**

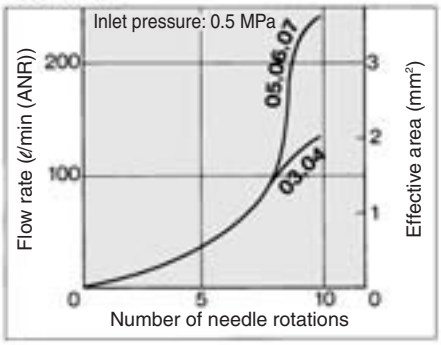
**Made to Order**
Refer to page 435 for details.

## Needle Valve/Flow Characteristics

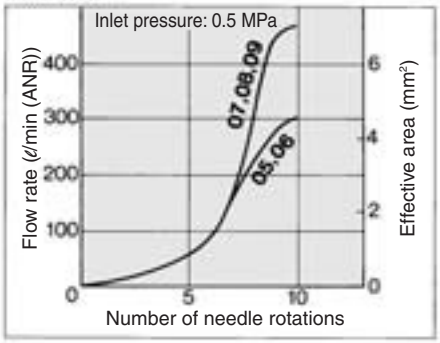
**AS1001F**



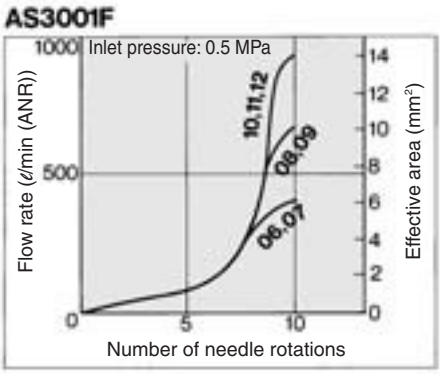

**AS2001F**



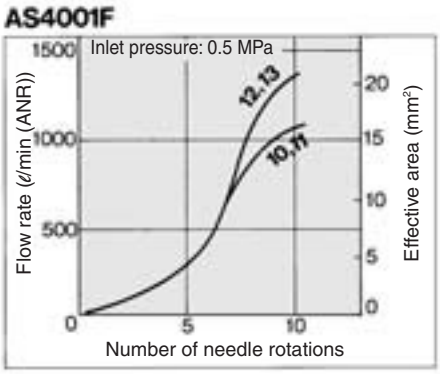

**AS2051F**




**AS3001F**




**AS4001F**




### ⚠Caution

**Be sure to read before handling.**
**Refer to front matters 58 and 59 for Safety Instructions and pages 412 to 414 for Flow Control Equipment Precautions.**

## Made to Order

Made to Order

**Lubricant: Vaseline** **X12**

**Ex.) AS2001F-04-3-X12**

**Grease-free (Seal: Fluorine Coating) + Throttle Valve (Without Check Valve)** **X21**

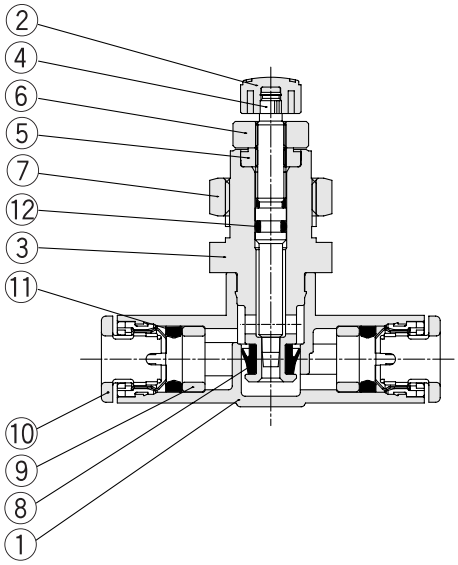
**Ex.) AS2001F-04-3-X21**

Note) Not particle-free

**Throttle Valve (Without Check Valve)** **X214**

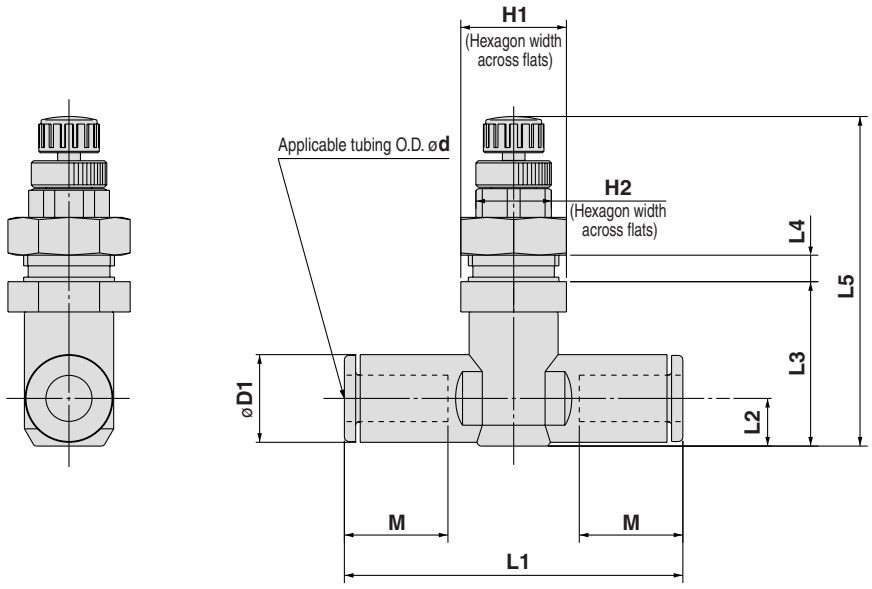
**Ex.) AS2001F-04-3-X214**

## Construction




| No. | Description | Material | Note |
|---|---|---|---|
| 1 | Body A | PBT | |
| 2 | Handle | PBT | |
| 3 | Body B | Brass | Electroless nickel plated |
| 4 | Needle | Brass | Electroless nickel plated |
| 5 | Needle guide | Brass | Electroless nickel plated |
| 6 | Lock nut | Brass | Electroless nickel plated |
| 7 | Panel nut | Brass | Electroless nickel plated |
| 8 | U seal | HNBR | |
| 9 | Spacer | — | |
| 10 | Cassette | — | |
| 11 | Packing | NBR | |
| 12 | O-ring | NBR | |

## Dimensions




### Metric Size

| Model | d | D1 | H1 | H2 | L1 | L2 | L3 | L4 Max. | L5 (1) Max. | L5 (1) Min. | M | Panel-cut dimensions | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS1001F-23-3 | 3.2 | 8.4 | 12 | 8 | 38 | 4.5 | 16.8 | 3.5 | 37.6 | 34.4 | 12.7 | 10.5 | 18 |
| AS1001F-04-3 | 4 | 9.3 | | | 39.2 | 5.2 | 17.4 | | 38.2 | 35 | | | 19 |
| AS1001F-06-3 | 6 | 11.6 | | | 40.7 | 6.2 | 18.5 | | 39.3 | 36.1 | 13.5 | | 20 |
| AS2001F-04-3 | 4 | 9.3 | 14 | 10 | 40.7 | 5.2 | 20.7 | 3.5 | 48 | 42.5 | 12.7 | 12.5 | 28 |
| AS2001F-06-3 | 6 | 11.6 | | | 44.8 | 6.3 | 21.8 | | 49.1 | 43.6 | 13.5 | | 29 |
| AS2051F-06-3 | 6 | 12.8 | 17 | 13 | 53.2 | 6.7 | 25.7 | 3.5 | 53.5 | 48.1 | 17 | 15.5 | 49 |
| AS2051F-08-3 | 8 | 15.2 | | | 59.8 | 8.1 | 27 | | 54.8 | 49.4 | 18 | | 54 |
| AS3001F-06-3 | 6 | 12.8 | 21 | 16 | 59 | 7.4 | 31.3 | 3.5 | 60.1 | 54.7 | 17 | 18.5 | 85 |
| AS3001F-08-3 | 8 | 15.2 | | | 64.4 | 8.2 | 32.1 | | 60.9 | 55.5 | 18 | | 88 |
| AS3001F-10-3 | 10 | 18.5 | | | 71.6 | 9.8 | 33.7 | | 62.5 | 57.1 | 21 | | 99 |
| AS3001F-12-3 | 12 | 20.9 | | | 76 | 11 | 34.9 | | 63.7 | 58.3 | 22 | | 100 |
| AS4001F-10-3 | 10 | 18.5 | 27 | 21 | 77.7 | 11.3 | 35 | 3.5 | 69.3 | 61 | 21 | 24.5 | 167 |
| AS4001F-12-3 | 12 | 20.9 | | | 82.1 | | 36 | | 70.3 | 62 | 22 | | 171 |

Note 1) Reference dimensions

### Inch Size

| Model | d | D1 | H1 | H2 | L1 | L2 | L3 | L4 Max. | L5 (1) Max. | L5 (1) Min. | M | Panel-cut dimensions | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS1001F-01-3 | 1/8" | 8.4 | 12 | 8 | 38 | 4.5 | 16.8 | 3.5 | 37.6 | 34.4 | 12.7 | 10.5 | 18 |
| AS1001F-03-3 | 5/32" | 9.3 | | | 39.2 | 5.2 | 17.4 | | 38.2 | 35 | | | 19 |
| AS1001F-05-3 | 3/16" | 11.4 | | | 48.7 | 6.2 | 18.5 | | 39.3 | 36.1 | 16.5 | | 24 |
| AS1001F-07-3 | 1/4" | 12 | | | 40.7 | | | | | | 13.7 | | 21 |
| AS2001F-03-3 | 5/32" | 9.3 | 14 | 10 | 40.7 | 5.2 | 20.7 | 3.5 | 48 | 42.5 | 12.7 | 12.5 | 28 |
| AS2001F-05-3 | 3/16" | 11.4 | | | 50 | 6.2 | 21.6 | | 48.9 | 43.4 | 16.5 | | 34 |
| AS2001F-07-3 | 1/4" | 13.2 | | | 52.2 | 7.1 | 22.5 | | 49.8 | 44.3 | 17 | | 37 |
| AS2051F-05-3 | 3/16" | 11.4 | 17 | 13 | 52.2 | 6.2 | 25.2 | 3.5 | 53 | 47.6 | 16.5 | 15.5 | 47 |
| AS2051F-07-3 | 1/4" | 13.2 | | | 54.4 | 7.1 | 26 | | 53.8 | 48.4 | 17 | | 49 |
| AS2051F-09-3 | 5/16" | 15.2 | | | 59.8 | 8.1 | 27 | | 54.8 | 49.4 | 18 | | 54 |
| AS3001F-07-3 | 1/4" | 13.2 | 21 | 16 | 59 | 7.4 | 31.3 | 3.5 | 60.1 | 54.7 | 17 | 18.5 | 84 |
| AS3001F-09-3 | 5/16" | 15.2 | | | 64.4 | 8.2 | 32.1 | | 60.9 | 55.5 | 18 | | 88 |
| AS3001F-11-3 | 3/8" | 17.2 | | | 70.8 | 9.5 | 33.3 | | 62.1 | 56.7 | 21 | | 95 |
| AS4001F-11-3 | 3/8" | 17.9 | 27 | 21 | 76.9 | 10.3 | 34.9 | 3.5 | 69.2 | 60.9 | 21 | 24.5 | 175 |
| AS4001F-13-3 | 1/2" | 21.7 | | | 83.1 | 11.6 | 36.3 | | 70.6 | 62.3 | 22 | | 188 |

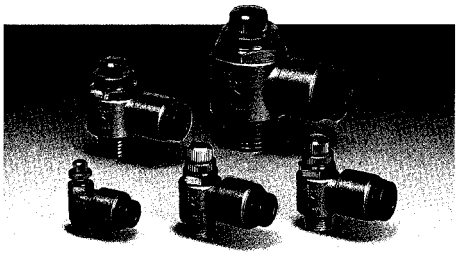
Note 1) Reference dimensions

# Speed Controller with One-touch Fitting Elbow Type (Metal Body)

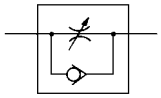
# *Series AS*

## Speed controller with One-touch fittings for metal body specifications

- Uses flame resistant resin as standard. (UL standard V-0)



JIS Symbol



**Made to Order**
(Refer to page 428 for details.)

### Model

| Model | Port size | Applicable tubing O.D. | | | | | Applicable cylinder bore size (mm) |
|---|---|---|---|---|---|---|---|
| | | 4 | 6 | 8 | 10 | 12 | |
| **AS12□1-M5** | M5 x 0.8 | ◉ | ◉ | | | | 6, 10, 16, 20 |
| **AS22□1-01** | R 1/8 | | ◉ | ◉ | | | 20, 25, 32 |
| **AS22□1-02** | R 1/4 | | ◉ | ◉ | | | 20, 25, 32, 40 |
| **AS32□1-03** | R 3/8 | | | ● | ● | | 40, 50, 63 |
| **AS42□1-04** | R 1/2 | | | | ● | ● | 63, 80, 100 |

Note) ◉ marking is electroless nickel plated, provided as standard. (N specifications)

### Specifications

| | |
|---|---|
| **Fluid** | Air |
| **Proof pressure** | 1.5 MPa |
| **Max. operating pressure** | 1 MPa |
| **Min. operating pressure** | 0.1 MPa |
| **Ambient and fluid temperature** | – 5 to 60°C (No freezing) |
| **Number of needle rotations** | 10 turns (8 turns (1)) |
| **Applicable tubing material** | Nylon, Soft nylon, Polyurethane |
| **Option** | Hexagon lock nut, Electroless nickel plated (2) |

Meter-out and meter-in types can be visually differentiated by the lock nut.
The lock nut on the meter-out type is electroless nickel plated while the meter-in type is black zinc chromate plated.
Note 1) M5 size
Note 2) Brass parts are all electroless nickel plated.

## How to Order

**AS 3 2 0 1 – 03 – F 06 S [ ] – [ ]**

**Speed controller**

**Body size**

| | |
|---|---|
| **1** | M5 standard |
| **2** | 01, 02 standard |
| **3** | 03 standard |
| **4** | 04 standard |

**Elbow**

**Control method**

| | |
|---|---|
| **0** | Meter-out |
| **1** | Meter-in |

**Thread size**

| | |
|---|---|
| **M5** | M5 x 0.8 |
| **01** | R 1/8 |
| **02** | R 1/4 |
| **03** | R 3/8 |
| **04** | R 1/2 |

Note 1) M5 size: S (with seal) is not necessary.

**With One-touch fitting**

**Tube size**

| | |
|---|---|
| **04** | ø4 |
| **06** | ø6 |
| **08** | ø8 |
| **10** | ø10 |
| **12** | ø12 |

**With seal**

**Option**

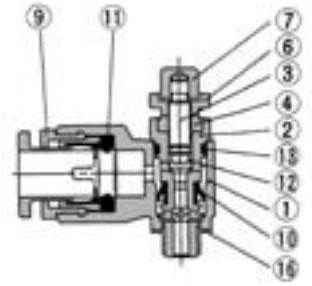
| | |
|---|---|
| **Nil** | None |
| **K** | Hexagon lock nut |
| **N** | Electroless nickel plated |

* If more than one option is required, write option part numbers in the order of "K", "N".

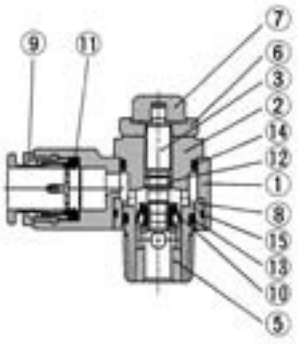
**Made to Order**
Refer to page 428 for details.

## Construction

**AS1201-M5**




**AS2201/3201/4201**




### Component Parts

| No. | Description | Material | Note |
|---|---|---|---|
| 1 | **Body A** | Zinc alloy | Chromate plated |
| 2 | **Body B** | Brass | Electroless nickel plated |
| 3 | **Needle** | Brass | Electroless nickel plated |
| 4 | **Needle guide** | Brass | Electroless nickel plated only with M5 |
| 5 | **Seat ring** | Brass | (1) |
| 6 | **Lock nut** | Brass (2) | Electroless nickel plated (3) |
| 7 | **Handle** | Brass | Electroless nickel plated |
| 8 | **Bushing** | PBT | |
| 9 | **Cassette** | PBT/Stainless steel | |
| 10 | **U-packing** | HNBR | |
| 11 | **Seal** | NBR | |
| 12 | **O-ring** | NBR | |
| 13 | **O-ring** | NBR | |
| 14 | **O-ring** | NBR | |
| 15 | **O-ring** | NBR | |
| 16 | **Gasket** | NBR/Stainless steel | M5 port only |

Note 1) "AS22□1": Electroless nickel plated
Note 2) "AS22□1": Steel
Note 3) Meter-in type: Black zinc chromated

## Made to Order


### 1 Lubricant: Vaseline — X12

**Ex.) AS1201-M5-F04-X12**

### 2 Grease-free (Seal: Fluorine Coating) + Throttle Valve (Without Check Valve) — X21

**Ex.) AS1201-M5-F04-X21**

Note 1) Not particle-free
Note 2) Throttle valve is only compatible with the part no. of the meter-out type.

### 3 Throttle Valve (Without Check Valve) — X214

**Ex.) AS1201-M5-F04-X214**

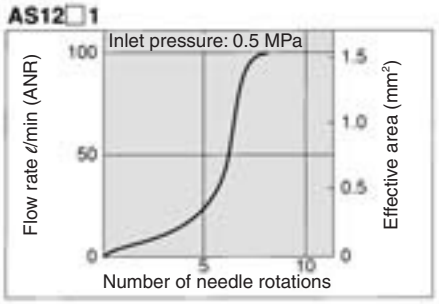
Note) Throttle valve is only compatible with the part no. of the meter-out type.

## Flow Rate and Effective Area

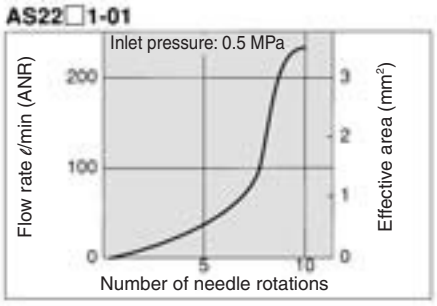
| Model | | AS12□1-M5 | AS22□1-01 | AS22□1-02 | | AS32□1-03 | | AS42□1-04 | |
|---|---|---|---|---|---|---|---|---|---|
| Tubing O.D. | | ø4, ø6 | ø6, ø8 | ø6 | ø8 | ø8 | ø10 | ø10 | ø12 |
| Controlled (Free) flow | Flow rate (ℓ/min (ANR)) | 100 | 230 | 390 | 460 | 790 | 920 | 1580 | 1710 |
| | Effective area ($mm^2$) | 1.5 | 3.5 | 6 | 7 | 12 | 14 | 24 | 26 |

## Needle Valve/Flow Characteristics

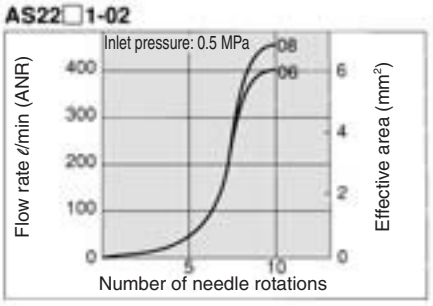
**AS12□1**



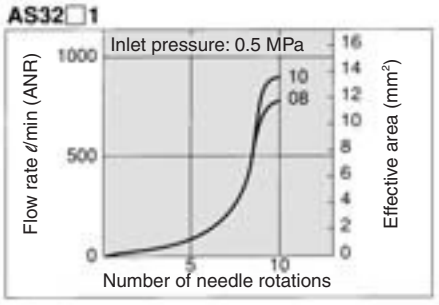

**AS22□1-01**



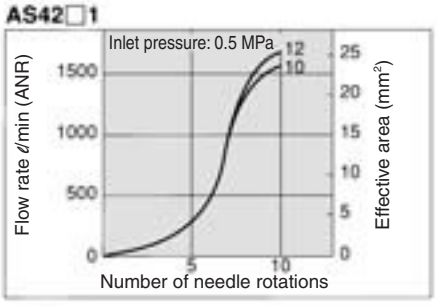

**AS22□1-02**



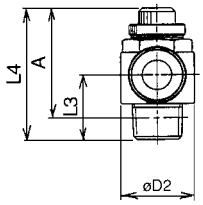

**AS32□1**

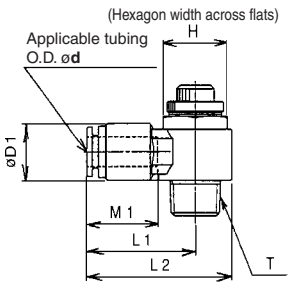


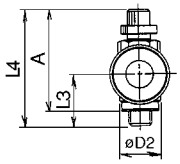

**AS42□1**

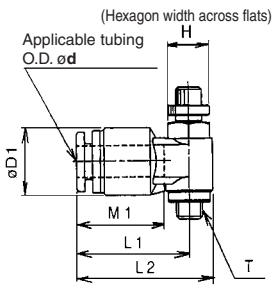



## Dimensions




| Model | Applicable tubing O.D. ød | T | H | D1 | D2 | L1 | L2 | L3 | L4 (1) Max. | L4 (1) Min. | A (2) Max. | A (2) Min. | M1 | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AS12□1-M5-F04** | 4 | M5 x 0.8 | 8 | 13 | 9 | 21 | 25.5 | 11.2 | 28.3 | 25.5 | 25 | 22.2 | 16 | 13 |
| **AS12□1-M5-F06** | 6 | | | | | 21.5 | 26 | | | | | | 17 | 13 |
| **AS22□1-01-F06S** | 6 | R 1/8 | 12 | 15.5 | 14.6 | 26.6 | 33.9 | 13.8 | 35.5 | 30.5 | 32.4 | 27.4 | 17 | 34 |
| **AS22□1-01-F08S** | 8 | | | | | | | | | | | | 18.5 | 31 |
| **AS22□1-02-F06S** | 6 | R 1/4 | 17 | 15.5 | 19.5 | 28.7 | 38.5 | 17.2 | 40.3 | 35.3 | 34.8 | 29.8 | 17 | 56 |
| **AS22□1-02-F08S** | 8 | | | | | | | | | | | | 18.5 | 52 |
| **AS32□1-03-F08S** | 8 | R 3/8 | 19 | 18.2 | 24.3 | 32.7 | 44.9 | 19 | 45.8 | 40.8 | 40.6 | 35.6 | 18.5 | 93 |
| **AS32□1-03-F10S** | 10 | | | | | 33.3 | 45.5 | | | | | | 21 | 88 |
| **AS42□1-04-F10S** | 10 | R 1/2 | 24 | 22.3 | 28.5 | 36.1 | 50.4 | 24.6 | 54.7 | 49.7 | 47.4 | 42.4 | 21 | 154 |
| **AS42□1-04-F12S** | 12 | | | | | | | | | | | | 22 | 146 |

Note 1) Reference dimensions
Note 2) Reference dimensions of thread M5, R after installation.

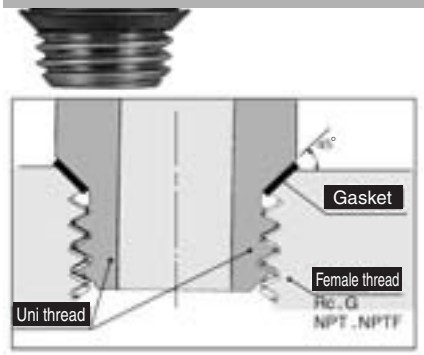
### ⚠Caution

**Be sure to read before handling.
Refer to front matters 58 and 59 for Safety Instructions and pages 412 to 414 for Flow Control Equipment Precautions.**

# Speed Controller with Uni One-touch Fitting

# *Series AS*

## New-stand male threads for piping that reduces the screw-in time by 1/3.



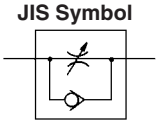

### Shape of Uni thread ridge

Use of the chamfered surface of the famale thread as the seat surface and adoption of gaskets made by laminating NBR on both surfaces of stainless steel plates achieve secure sealing regardless of the difference of diameters due to the female thread type, deviations due to the tolerance, or the size of the chamfered corner.
(Any standard chamfered female thread can be used.)

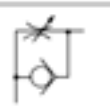
**A ridge shape has been created as a Uni thread for common applications for Rc, G, NPT and NPTF.**

**The male thread for piping drastically cuts piping man-hours.**

**JIS Symbol**



**Flow Direction Symbols on Body**

| | Meter-out type | Meter-in type |
|---|---|---|
| Symbol |  |  |
| JIS Symbol |  |  |

### Model

| Model | | Connection thread Uni thread | Applicable tubing O.D. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Metric size | | | | | | Inch size | | | | | |
| Elbow type | Universal type | | 3.2 | 4 | 6 | 8 | 10 | 12 | 1/8" | 5/32" | 3/16" | 1/4" | 5/16" | 3/8" | 1/2" |
| **AS22□IF-U01** | **AS23□IF-U01** | 1/8 | ◉ | ◉ | ◉ | ◉ | ◉※ | | ◉ | ◉ | ● | ◉ | ◉ | | |
| **AS22□IF-U02** | **AS23□IF-U02** | 1/4 | | ● | ● | ● | ● | | | ● | ● | ● | ● | ● | |
| **AS32□IF-U02** | **AS33□IF-U02** | 1/4 | | | ◉ | ◉ | ◉ | ◉ | | | | ◉ | ◉ | ● | |
| **AS32□IF-U03** | **AS33□IF-U03** | 3/8 | | | ● | ● | ● | ● | | | | ● | ● | ● | |
| **AS42□IF-U04** | **AS43□IF-U04** | 1/2 | | | | | ● | ● | | | | | | ● | ● |

Note 1) ∗ Elbow type only
Note 2) □ indicates the control type ("0" for meter-out and "1" for meter-in).
Note 3) Meter-out and meter-in types can be visually differentiated by the lock nut.
The lock nut on the meter-out type is electroless nickel plated, while that on the meter-in type is black zinc chromate plated.
Note 4) Models marked with "◉" are nickel plated as standard.

### Specifications

| | |
|---|---|
| **Fluid** | Air |
| **Max. operating pressure** | 1 MPa |
| **Min. operating pressure** | 0.1 MPa |
| **Proof pressure** | 1.5 MPa |
| **Ambient and fluid temperature** | –5 to 60°C (No freezing) |
| **Number of needle rotations** | 10 turns |
| **Applicable tubing material** (1) | Nylon, Soft-nylon, Polyurethane |
| **Mounting thread** | Uni-thread |
| **Thread seal** | Gasket |
| **Option** | Hexagon lock nut, Electroless nickel plated (2) |

Note 1) Use caution regarding the max. operating pressure when soft nylon or polyurethane tubing is used. (Refer to pages 371 and 372 for details.)
Note 2) Brass parts are all electroless nickel plated.

### Flow Rate and Effective Area

| Model | | AS22□IF-U01 AS23□IF-U02 | | AS22□IF-U02 AS23□IF-U02 | | | AS32□IF AS33□IF | | | AS42□IF-U04 AS43□IF-U04 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Tubing O.D. | Metric size | ø3.2, ø4 | ø6, ø8, ø4 | ø4 | ø6 | ø8, ø10 | ø6 | ø8 | ø10, ø12 | ø10 | ø12 |
| | Inch size | 1/8", 5/32" | 3/16", 1/4", 5/16" | 5/32" | 3/16" | 1/4", 5/16", 3/8" | 1/4" | 5/16" | 3/8" | 3/8" | 1/2" |
| Controlled flow (Free flow) | Flow rate (ℓ/min (ANR)) | 180 | 230 | 260 | 390 | 460 | 660 | 790 | 920 | 1580 | 1710 |
| | Effective area ($mm^2$) | 2.7 | 3.7 | 4 | 6 | 7 | 10 | 12 | 14 | 24 | 26 |

Note 1) Flow rate values are measured at 0.5 MPa and 20°C.
Note 2) □ indicates the control type ("0" for meter-out and "1" for meter-in).

## How to Order

AS [2] [2] [1] 1F – [U02] – [06] [ ] – [ ]

**Body size**

| | |
|---|---|
| 2 | 1/8, 1/4 standard |
| 3 | 3/8 standard |
| 4 | 1/2 standard |

**Type**

| | |
|---|---|
| 2 | Elbow |
| 3 | Universal |

**Control type**

| | |
|---|---|
| 0 | Meter-out |
| 1 | Meter-in |

**With One-touch fitting**

**Bore size**

| | |
|---|---|
| U01 | Uni 1/8 |
| U02 | Uni 1/4 |
| U03 | Uni 3/8 |
| U04 | Uni 1/2 |

**Applicable tubing O.D.**

| Metric size | | Inch size | |
|---|---|---|---|
| 23 | ø3.2* | 01 | 1/8" |
| 04 | ø4 | 03 | 5/32" |
| 06 | ø6 | 05 | 3/16" |
| 08 | ø8 | 07 | 1/4" |
| 10 | ø10 | 09 | 5/16" |
| 12 | ø12 | 11 | 3/8" |
| | | 13 | 1/2" |

* Use ø1/8" tube.

**Option***

| | |
|---|---|
| Nil | None |
| K | Hexagonal lock nut |
| N | Electroless nickel plated |

* If more than one option is required, write option part numbers in the order of "K", "N".

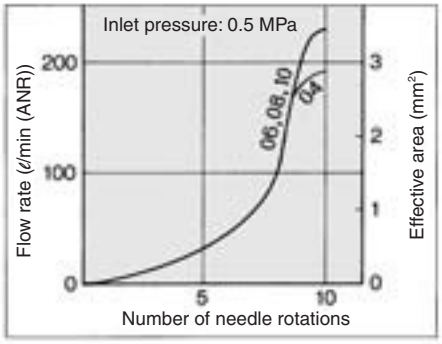
**Made to Order**

| | |
|---|---|
| X260 | Antistatic type |

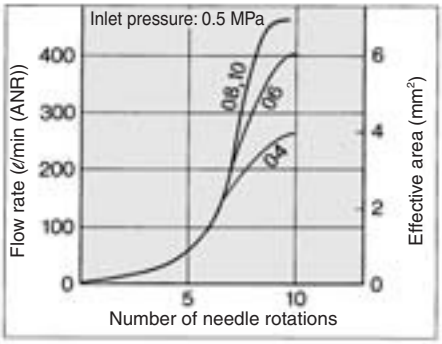
Refer to page 450 for details.

## Needle Valve/Flow Characteristics

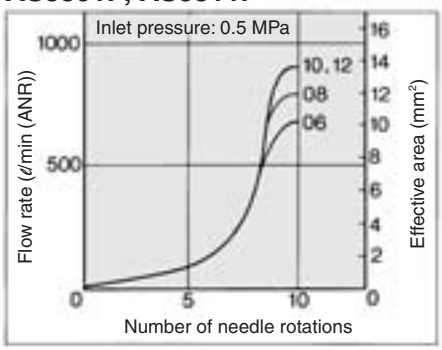
**AS2201F-U01, AS2211F-U01**
**AS2301F-U01, AS2311F-U01**



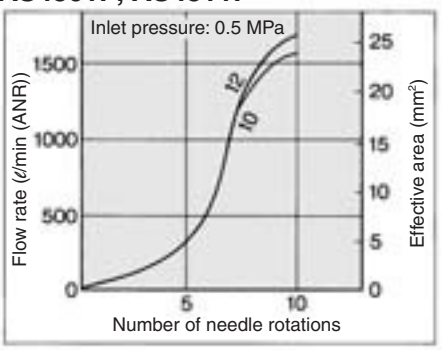

**AS2201F-U02, AS2211F-U02**
**AS2301F-U02, AS2311F-U02**




**AS3201F, AS3211F**
**AS3301F, AS3311F**

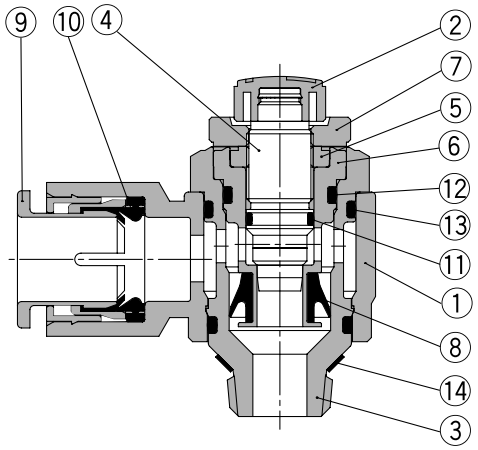



**AS4201F, AS4211F**
**AS4301F, AS4311F**

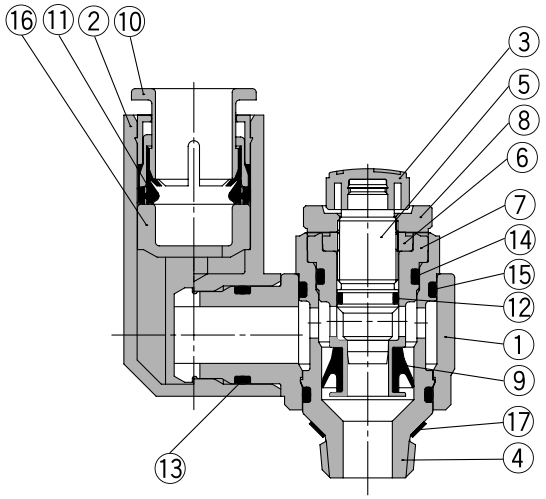


## Construction/Component Parts

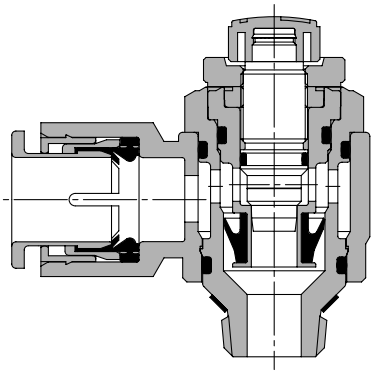
### Elbow type
### Meter-out type



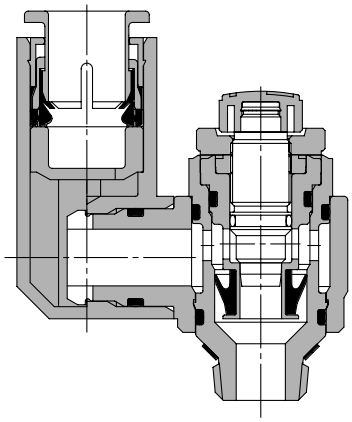

### Universal type
### Meter-out type




### Meter-in type



### Meter-in type



### Component Parts: Elbow Type

| No. | Description | Material | Note |
|---|---|---|---|
| 1 | **Body A** | PBT | |
| 2 | **Handle** | PBT | |
| 3 | **Body B** | Brass | Electroless nickel plated |
| 4 | **Needle** | Brass | Electroless nickel plated |
| 5 | **Needle guide** | Brass | Electroless nickel plated |
| 6 | **Seat ring** | Brass | (1) |
| 7 | **Lock nut** | Brass (2) | Electroless nickel plated (3) |
| 8 | **U seal** | HNBR | |
| 9 | **Cassette** | — | |
| 10 | **Seal** | NBR | |
| 11 | **O-ring** | NBR | |
| 12 | **O-ring** | NBR | |
| 13 | **O-ring** | NBR | |
| 14 | **Gasket** | NBR, Stainless steel | |

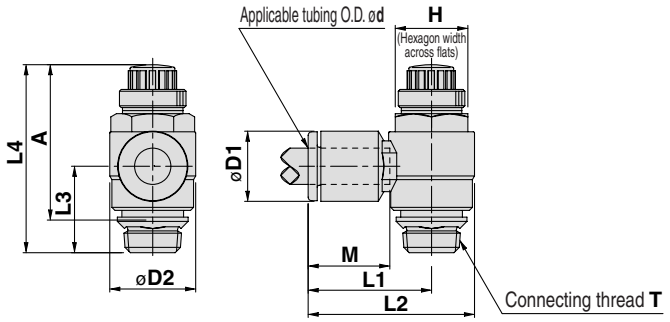
Note 1) Only AS22□1F-U01 and AS32□1F-U02 are electroless nickel plated.
Note 2) AS22□1F type is made of steel.
Note 3) Meter-in type is black zinc chromate plated.

### Component Parts: Universal Type

| No. | Description | Material | Note |
|---|---|---|---|
| 1 | **Body A** | PBT | |
| 2 | **Elbow body** | PBT | |
| 3 | **Handle** | PBT | |
| 4 | **Body B** | Brass | Electroless nickel plated |
| 5 | **Needle** | Brass | Electroless nickel plated |
| 6 | **Needle guide** | Brass | Electroless nickel plated |
| 7 | **Seat ring** | Brass | (1) |
| 8 | **Lock nut** | Brass (2) | Electroless nickel plated (3) |
| 9 | **U seal** | HNBR | |
| 10 | **Cassette** | — | |
| 11 | **Seal** | NBR | |
| 12 | **O-ring** | NBR | |
| 13 | **O-ring** | NBR | |
| 14 | **O-ring** | NBR | |
| 15 | **O-ring** | NBR | |
| 16 | **Spacer** | — | |
| 17 | **Gasket** | NBR, Stainless steel | |

Note 1) Only AS22□1F-U01 and AS32□1F-U02 are electroless nickel plated.
Note 2) AS22□1F type is made of steel.
Note 3) Meter-in type is black zinc chromate plated.

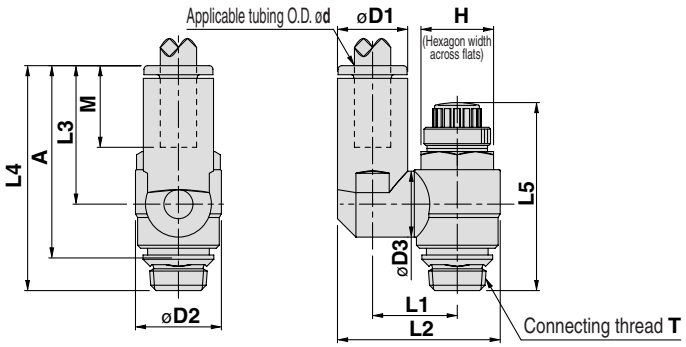
## Elbow Type/Metric Size




| Model | Applicable tubing O.D. ød | T Uni thread | H | øD1 | øD2 | L1 | L2 | L3 | L4 (1) Max. | L4 (1) Min. | A (2) Max. | A (2) Min. | M | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AS22□1F-U01-23** | 3.2 | 1/8 | 12 | 7.8 | 14.2 | 20.8 | 27.9 | 14.3 | 36.1 | 31.1 | 30.5 | 25.5 | 14.5 | 17 |
| **AS22□1F-U01-04** | 4 | | | 8.9 | | 21.1 | 28.2 | | | | | | | 17 |
| **AS22□1F-U01-06** | 6 | | | 11.0 | | 22.5 | 29.6 | | | | | | 15.5 | 17 |
| **AS22□1F-U01-08** | 8 | | | 15.2 | | 25.3 | 32.4 | | | | | | 18.5 | 19 |
| **AS22□1F-U01-10** | 10 | | | 18.5 | | 33.1 | 40.2 | 15.0 | | | | | 21.0 | 21 |
| **AS22□1F-U02-04** | 4 | 1/4 | 17 | 8.9 | 18.5 | 23.3 | 32.5 | 17.2 | 39.4 | 34.4 | 32.0 | 26.6 | 14.5 | 32 |
| **AS22□1F-U02-06** | 6 | | | 11.0 | | 23.9 | 33.1 | | | | | | 15.5 | 32 |
| **AS22□1F-U02-08** | 8 | | | 15.2 | | 27.2 | 36.4 | | | | | | 18.5 | 34 |
| **AS22□1F-U02-10** | 10 | | | 18.5 | | 35.3 | 44.5 | 19 | | | | | 21.0 | 36 |
| **AS32□1F-U02-06** | 6 | 1/4 | 19 | 11.0 | 23.0 | 26.4 | 37.9 | 20.3 | 45.9 | 40.9 | 38.1 | 33.1 | 15.5 | 53 |
| **AS32□1F-U02-08** | 8 | | | 15.2 | | 29.5 | 41.0 | | | | | | 18.5 | 55 |
| **AS32□1F-U02-10** | 10 | | | 18.5 | | 31.8 | 43.3 | | | | | | 21.0 | 57 |
| **AS32□1F-U02-12** | 12 | | | 20.9 | | 32.8 | 44.3 | | | | | | 22.0 | 59 |
| **AS32□1F-U03-06** | 6 | 3/8 | 19 | 11.0 | 23.0 | 26.4 | 37.9 | 19.4 | 45.0 | 40.0 | 37.6 | 32.6 | 15.5 | 53 |
| **AS32□1F-U03-08** | 8 | | | 15.2 | | 29.5 | 41.0 | | | | | | 18.5 | 55 |
| **AS32□1F-U03-10** | 10 | | | 18.5 | | 31.8 | 43.3 | | | | | | 21.0 | 57 |
| **AS32□1F-U03-12** | 12 | | | 20.9 | | 32.8 | 44.3 | | | | | | 22.0 | 59 |
| **AS42□1F-U04-10** | 10 | 1/2 | 24 | 18.5 | 28.6 | 33.6 | 47.9 | 22.4 | 54.6 | 47.1 | 44.5 | 37.0 | 21.0 | 94 |
| **AS42□1F-U04-12** | 12 | | | 20.9 | | 34.6 | 48.9 | | | | | | 22.0 | 95 |

Note 1) Reference dimensions
Note 2) Reference dimensions of Uni thread after installation.

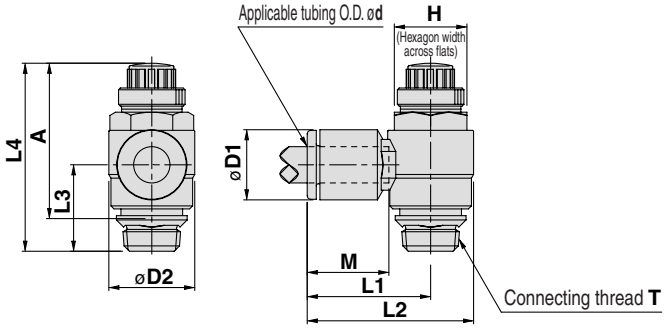
## Universal Type/Metric Size




| Model | Applicable tubing O.D. ød | T Uni thread | H | øD1 | øD2 | øD3 | L1 | L2 | L3 | L4 | L5 (1) Max. | L5 (1) Min. | A (2) Max. | A (2) Min. | M | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AS23□1F-U01-23** | 3.2 | 1/8 | 12 | 7.8 | 14.2 | 9.3 | 13.4 | 24.8 | 18.9 | 33.2 | 36.1 | 31.1 | 30.5 | 25.5 | 14.5 | 17 |
| **AS23□1F-U01-04** | 4 | | | 8.9 | | | | | | | | | | | | 17 |
| **AS23□1F-U01-06** | 6 | | | 11.0 | | 10.9 | 14.5 | 27.1 | 20.6 | 34.9 | | | | | 15.5 | 18 |
| **AS23□1F-U01-08** | 8 | | | 15.2 | | 12.9 | 16.2 | 30.9 | 24.7 | 38.2 | | | | | 18.5 | 21 |
| **AS23□1F-U02-04** | 4 | 1/4 | 17 | 8.9 | 18.5 | 9.3 | 15.6 | 29.2 | 18.9 | 36.1 | 39.4 | 34.4 | 32.0 | 26.6 | 14.5 | 32 |
| **AS23□1F-U02-06** | 6 | | | 11.0 | | 10.9 | 16.7 | 31.4 | 20.6 | 37.8 | | | | | 15.5 | 33 |
| **AS23□1F-U02-08** | 8 | | | 15.2 | | 12.9 | 18.3 | 35.2 | 24.4 | 40.8 | | | | | 18.5 | 36 |
| **AS23□1F-U02-10** | 10 | | | 18.5 | | | 19.6 | 38.1 | 26.8 | 43.2 | | | | | 21.0 | 40 |
| **AS33□1F-U02-06** | 6 | 1/4 | 19 | 11.0 | 23.0 | 10.9 | 18.9 | 35.9 | 20.6 | 42.5 | 45.9 | 40.9 | 38.1 | 33.1 | 15.5 | 54 |
| **AS33□1F-U02-08** | 8 | | | 15.2 | | 12.9 | 20.6 | 39.7 | 24.4 | 43.7 | | | | | 18.5 | 57 |
| **AS33□1F-U02-10** | 10 | | | 18.5 | | 16.2 | 22.5 | 43.3 | 28.3 | 48.6 | | | | | 21.0 | 61 |
| **AS33□1F-U02-12** | 12 | | | 20.9 | | | 23.5 | 45.5 | 29.3 | 49.6 | | | | | 22.0 | 63 |
| **AS33□1F-U03-06** | 6 | 3/8 | 19 | 11.0 | 23.0 | 10.9 | 18.9 | 35.9 | 20.6 | 41.6 | 45.0 | 40.0 | 37.6 | 32.6 | 15.5 | 54 |
| **AS33□1F-U03-08** | 8 | | | 15.2 | | 12.9 | 20.6 | 39.7 | 24.4 | 42.8 | | | | | 18.5 | 57 |
| **AS33□1F-U03-10** | 10 | | | 18.5 | | 16.2 | 22.5 | 43.3 | 28.3 | 47.7 | | | | | 21.0 | 61 |
| **AS33□1F-U03-12** | 12 | | | 20.9 | | | 23.5 | 45.5 | 29.3 | 48.7 | | | | | 22.0 | 63 |
| **AS43□1F-U04-10** | 10 | 1/2 | 24 | 18.5 | 28.6 | 16.2 | 25.3 | 48.9 | 28.3 | 50.7 | 54.6 | 47.1 | 44.5 | 37.0 | 21.0 | 98 |
| **AS43□1F-U04-12** | 12 | | | 20.9 | | 19.4 | 26.8 | 51.6 | 30.8 | 53.2 | | | | | 22.0 | 100 |

Note 1) Reference dimensions
Note 2) Reference dimensions of Uni thread after installation.

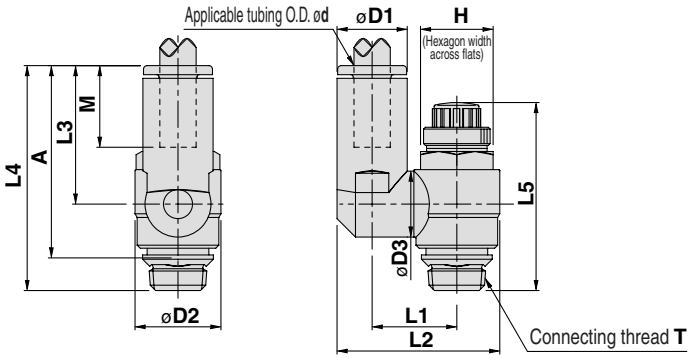
## Elbow Type/Inch Size




| Model | Applicable tubing O.D. ød | T Uni thread | H | øD1 | øD2 | L1 | L2 | L3 | L4 (1) | | A (2) | | M | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Max. | Min. | Max. | Min. | | |
| **AS22□1F-U01-01** | 1/8" | 1/8 | 12 | 7.8 | 14.2 | 20.8 | 27.9 | 14.3 | 36.1 | 31.1 | 30.5 | 25.5 | 14.5 | 17 |
| **AS22□1F-U01-03** | 5/32" | | | 8.9 | | 21.1 | 28.2 | | | | | | | 17 |
| **AS22□1F-U01-05** | 3/16" | | | 11.4 | | 23.1 | 30.2 | | | | | | 16.5 | 18 |
| **AS22□1F-U01-07** | 1/4" | | | 13.2 | | 23.9 | 31.0 | | | | | | 17.0 | 19 |
| **AS22□1F-U01-09** | 5/16" | | | 15.2 | | 25.3 | 32.4 | | | | | | 18.5 | 19 |
| **AS22□1F-U02-03** | 5/32" | 1/4 | 17 | 8.9 | 18.5 | 23.3 | 32.5 | 17.2 | 39.4 | 34.4 | 32.0 | 26.6 | 14.5 | 32 |
| **AS22□1F-U02-05** | 3/16" | | | 11.4 | | 24.9 | 34.2 | | | | | | 16.5 | 33 |
| **AS22□1F-U02-07** | 1/4" | | | 13.2 | | 25.2 | 34.5 | | | | | | 17.0 | 33 |
| **AS22□1F-U02-09** | 5/16" | | | 15.2 | | 27.2 | 36.4 | | | | | | 18.5 | 34 |
| **AS22□1F-U02-11** | 3/8" | | | 17.9 | | 35.3 | 44.5 | 19 | | | | | 21.0 | 36 |
| **AS32□1F-U02-07** | 1/4" | 1/4 | 19 | 13.2 | 23.0 | 27.8 | 39.3 | 20.3 | 45.9 | 40.9 | 38.1 | 33.1 | 17.0 | 54 |
| **AS32□1F-U02-09** | 5/16" | | | 15.2 | | 29.5 | 41.0 | | | | | | 18.5 | 55 |
| **AS32□1F-U02-11** | 3/8" | | | 17.9 | | 31.8 | 43.3 | | | | | | 21.0 | 57 |
| **AS32□1F-U03-07** | 1/4" | 3/8 | 19 | 13.2 | 23.0 | 27.8 | 39.3 | 19.4 | 45.0 | 40.0 | 37.6 | 32.6 | 17.0 | 54 |
| **AS32□1F-U03-09** | 5/16" | | | 15.2 | | 29.5 | 41.0 | | | | | | 18.5 | 55 |
| **AS32□1F-U03-11** | 3/8" | | | 17.9 | | 31.8 | 43.3 | | | | | | 21.0 | 57 |
| **AS42□1F-U04-11** | 3/8" | 1/2 | 24 | 17.9 | 18.6 | 33.6 | 47.9 | 22.4 | 54.6 | 47.1 | 44.5 | 37.0 | 21.0 | 94 |
| **AS42□1F-U04-13** | 1/2" | | | 21.4 | | 35.2 | 49.5 | | | | | | 22.0 | 96 |

Note 1) Reference dimensions
Note 2) Reference dimensions of Uni thread after installation.

## Universal Type/Inch Size




| Model | Applicable tubing O.D. ød | T Uni thread | H | øD1 | øD2 | øD3 | L1 | L2 | L3 | L4 | L5 (1) | | A (2) | | M | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Max. | Min. | Max. | Min. | | |
| **AS23□1F-U01-01** | 1/8" | 1/8 | 12 | 7.8 | 14.2 | 9.3 | 13.4 | 24.8 | 18.9 | 33.2 | 36.1 | 31.1 | 30.5 | 25.5 | 14.5 | 17 |
| **AS23□1F-U01-03** | 5/32" | | | 8.9 | | | | | | | | | | | | 17 |
| **AS23□1F-U01-05** | 3/16" | | | 11.4 | | 10.3 | 14.2 | 27.0 | 21.5 | 35.9 | | | | | 16.5 | 19 |
| **AS23□1F-U01-07** | 1/4" | | | 13.2 | | 11.4 | 15.2 | 28.9 | 22.3 | 36.3 | | | | | 17.0 | 20 |
| **AS23□1F-U01-09** | 5/16" | | | 15.2 | | 12.9 | 16.2 | 30.9 | 24.7 | 38.2 | | | | | 18.5 | 21 |
| **AS23□1F-U02-03** | 5/32" | 1/4 | 17 | 8.9 | 18.5 | 9.3 | 15.6 | 29.2 | 18.9 | 36.1 | 39.4 | 34.4 | 32.0 | 26.6 | 14.5 | 32 |
| **AS23□1F-U02-05** | 3/16" | | | 11.4 | | 10.3 | 16.4 | 31.1 | 21.5 | 38.8 | | | | | 16.5 | 34 |
| **AS23□1F-U02-07** | 1/4" | | | 13.2 | | 11.4 | 17.4 | 33.2 | 22.3 | 39.5 | | | | | 17.0 | 34 |
| **AS23□1F-U02-09** | 5/16" | | | 15.2 | | 12.9 | 18.3 | 35.2 | 24.4 | 40.8 | | | | | 18.5 | 36 |
| **AS23□1F-U02-11** | 3/8" | | | 17.9 | | | 19.6 | 38.1 | 26.8 | 43.2 | | | | | 29.4 | 39 |
| **AS33□1F-U02-07** | 1/4" | 1/4 | 19 | 13.2 | 23.0 | 11.4 | 19.6 | 37.7 | 22.3 | 44.2 | 45.9 | 40.9 | 38.1 | 33.1 | 17.0 | 56 |
| **AS33□1F-U02-09** | 5/16" | | | 15.2 | | 12.9 | 20.6 | 39.7 | 24.4 | 43.7 | | | | | 18.5 | 57 |
| **AS33□1F-U02-11** | 3/8" | | | 17.9 | | 16.2 | 22.5 | 42.9 | 28.3 | 48.6 | | | | | 21.0 | 61 |
| **AS33□1F-U03-07** | 1/4" | 3/8 | 19 | 13.2 | 23.0 | 11.4 | 19.6 | 37.7 | 22.3 | 43.3 | 45.0 | 40.0 | 37.6 | 32.6 | 17.0 | 56 |
| **AS33□1F-U03-09** | 5/16" | | | 15.2 | | 12.9 | 20.6 | 39.7 | 24.4 | 42.8 | | | | | 18.5 | 57 |
| **AS33□1F-U03-11** | 3/8" | | | 17.9 | | 16.2 | 22.5 | 42.9 | 28.3 | 47.7 | | | | | 21.0 | 61 |
| **AS43□1F-U04-11** | 3/8" | 1/2 | 24 | 17.9 | 28.6 | 16.2 | 25.3 | 48.6 | 28.3 | 50.7 | 54.6 | 47.1 | 44.5 | 37.0 | 21.1 | 97 |
| **AS43□1F-U04-13** | 1/2" | | | 21.7 | | 19.4 | 26.8 | 52.5 | 30.8 | 53.2 | | | | | 22.0 | 100 |

Note 1) Reference dimensions
Note 2) Reference dimensions of Uni thread after installation.

# Made to Order Specifications

**Please contact SMC for detailed dimensions, specifications, and delivery.**

## Antistatic Type — X260

### Model

| Model | Applicable tubing O.D. | | | |
|---|---|---|---|---|
| | Metric size | | | |
| | 4 | 6 | 8 | 10 |
| **AS22□1F-U01** | ● | ● | ● | ● |
| **AS22□1F-U02** | ● | ● | ● | ● |
| **AS32□1F-U03** | | ● | ● | |

Note 1) Electroless nickel plated

### How to Order

**AS 2 2 1 1F – U02 – 06 – X260**

**Body size**

| | |
|---|---|
| **2** | 1/8, 1/4 standard |
| **3** | 3/8 standard |

**Elbow type**

**Control type**

| | |
|---|---|
| **0** | Meter-out |
| **1** | Meter-in |

**With One-touch fitting**

**Port size**

| | |
|---|---|
| **U01** | Uni 1/8 |
| **U02** | Uni 1/4 |
| **U03** | Uni 3/8 |

**Applicable tubing O.D.**
**Metric size**

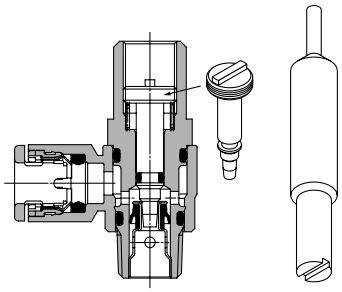
| | |
|---|---|
| **04** | ø4 |
| **06** | ø6 |
| **08** | ø8 |
| **10** | ø10 |

# Tamper Proof Speed Controller with One-touch Fitting Elbow Type/Universal Type

# Series AS□□□1F-T

**Able to adjust flow by a special tool**

**Prevention of an unnecessary manual operation**



**Special tool**
**Part number: AS-T-1**

## Model

| Elbow type | Universal type | Port size | Applicable tubing O.D. | | | | | | | | | | | | Applicable cylinder bore size (mm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Metric size | | | | | | Inch size | | | | | | |
| | | | 3.2 | 4 | 6 | 8 | 10 | 12 | 1/8" | 5/32" | 3/16" | 1/4" | 5/16" | 3/8" | 1/2" | |
| AS12□1F-M5 | AS13□1F-M5 | M5 x 0.8 | ● | ● | ● | | | | | | | | | | | 6, 10, 16, 20 |
| AS22□1F-01 | AS23□1F-01 | R 1/8 | ● | ● | ● | ● | ●* | | | | | | | | | 20, 25, 32 |
| AS22□1F-02 | AS23□1F-02 | R 1/4 | | ● | ● | ● | ● | | | | | | | | | 20, 25, 32, 40 |
| AS32□1F-02 | AS33□1F-02 | R 1/4 | | | ● | ● | ● | ● | | | | | | | | 40, 50, 63 |
| AS32□1F-03 | AS33□1F-03 | R 3/8 | | | ● | ● | ● | ● | | | | | | | | 40, 50, 63 |
| AS42□1F-04 | AS43□1F-04 | R 1/2 | | | | | ● | ● | | | | | | | | 63, 80, 100 |
| AS12□1F-U10/32 | AS13□1F-U10/32 | 10-32 UNF | | | | | | | ● | ● | ● | ● | | | | 6, 10, 16, 20 |
| AS22□1F-N01 | AS23□1F-N01 | NPT 1/8 | | | | | | | ● | ● | ● | ● | ● | | | 20, 25, 32 |
| AS22□1F-N02 | AS23□1F-N02 | NPT 1/4 | | | | | | | | ● | ● | ● | ● | ● | | 20, 25, 32, 40 |
| AS32□1F-N02 | AS33□1F-N02 | NPT 1/4 | | | | | | | | | | ● | ● | ● | | 40, 50, 63 |
| AS32□1F-N03 | AS33□1F-N03 | NPT 3/8 | | | | | | | | | | ● | ● | ● | | 40, 50, 63 |
| AS42□1F-N04 | AS43□1F-N04 | NPT 1/2 | | | | | | | | | | | | ● | ● | 63, 80, 100 |

Note 1) * Elbow type only
Note 2) Meter-out and meter-in types can be visually differentiated by the flow direction symbol on the resin body.

## Specifications

| | |
|---|---|
| **Fluid** | Air |
| **Proof pressure** | 1.5 MPa |
| **Max. operating pressure** | 1 MPa |
| **Min. operating pressure** | 0.1 MPa |
| **Ambient and fluid temperature** | –5 to 60°C (No freezing) |
| **Number of needle rotations** | 10 turns (8 turns (1)) |
| **Applicable tubing material** (2) | Nylon, Soft nylon, Polyurethane |

Note 1) In the case of AS12□1F-M5 and AS12□1F-U10/32 types AS13□1F-M5, AS13□1F-U10/32
Note 2) Use caution regarding the max. operating pressure when soft nylon or polyurethane tubing is used. (Refer to pages 371 and 372 for details.)
Note 3) Brass parts are all electroless nickel plated, provided as standard.

**Elbow type**

**Universal type**

## How to Order

AS [2] [2] [1] 1 F – [01] – [06] S T – [ ]

**Body size**

| | |
|---|---|
| 1 | M5 standard |
| 2 | 1/8, 1/4 standard |
| 3 | 3/8 standard |
| 4 | 1/2 standard |

**Type**

| | |
|---|---|
| 2 | Elbow |
| 3 | Universal |

**Control**

| | |
|---|---|
| 0 | Meter-out |
| 1 | Meter-in |

**With One-touch fitting**

**Port size**

| | |
|---|---|
| M5 | M5 x 0.8 |
| 01 | R 1/8 |
| 02 | R 1/4 |
| 03 | R 3/8 |
| 04 | R 1/2 |
| U10/32 | 10-32 UNF |
| N01 | NPT 1/8 |
| N02 | NPT 1/4 |
| N03 | NPT 3/8 |
| N04 | NPT 1/2 |

**Applicable tubing O.D.**

| Metric size | |
|---|---|
| 23 | ø3.2* |
| 04 | ø4 |
| 06 | ø6 |
| 08 | ø8 |
| 10 | ø10 |
| 12 | ø12 |

| Inch size | |
|---|---|
| 01 | ø1/8" |
| 03 | ø5/32" |
| 05 | ø3/16" |
| 07 | ø1/4" |
| 09 | ø5/16" |
| 11 | ø3/8" |
| 13 | ø1/2" |

* Use ø1/8" tube.

**With seal**
Note) In case that connecting port is either M5 or 10-32 UNF thread, it is not available with seal. With gasket is provided as standard.

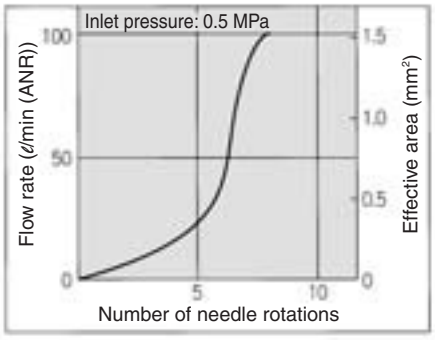
**Tamper proof**
Speed Controller requires a special tool for flow adjustment. Order separately with part number, AS-T-1.

**Made to Order**
Refer to page 535 for details.

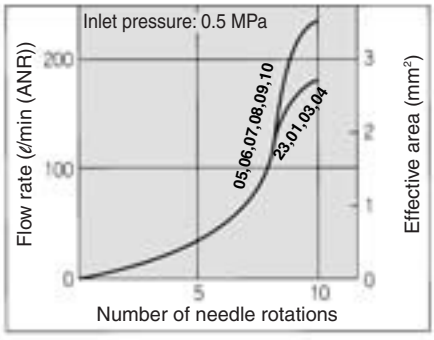
**Made to Order**
(Refer to page 535 for details.)

## Needle Valve/Flow Characteristics

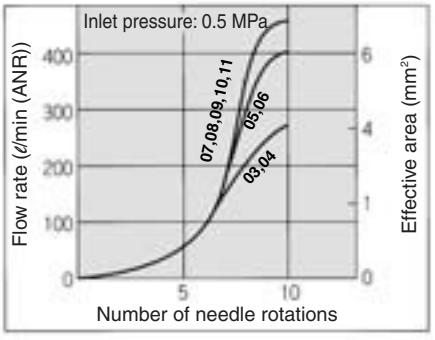
**AS12□1F**
**AS13□1F**



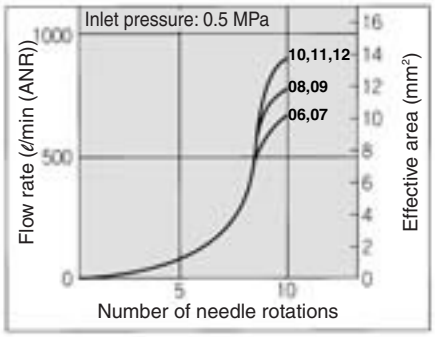

**AS22□1F-□01**
**AS23□1F-□01**



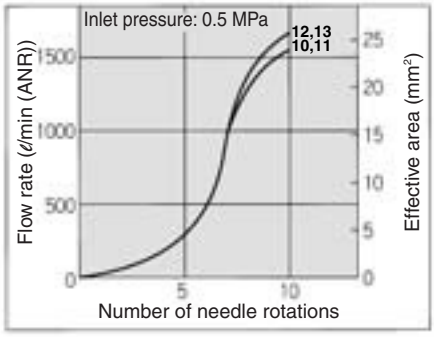

**AS22□1F-□02**
**AS23□1F-□02**



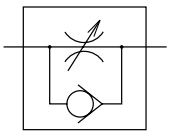

**AS32□1F**
**AS33□1F**



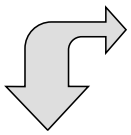
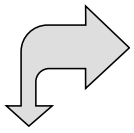
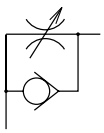
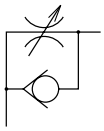

**AS42□1F**
**AS43□1F**




**JIS Symbol**



**Flow Direction Symbols on Body**

| | Meter-out type | Meter-in type |
|---|---|---|
| Symbol |  |  |
| JIS Symbol |  |  |

**⚠Caution**

**Be sure to read before handling.
Refer to front matters 58 and 59 for Safety Instructions and pages 412 to 414 for Flow Control Equipment Precautions.**

## Flow Rate and Effective Area

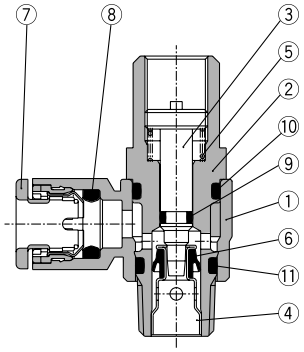
| Model | | AS12□1F AS13□1F | AS22□1F-□01 AS23□1F-□01 | | AS22□1F-□02 AS23□1F-□02 | | | AS32□1F AS33□1F | | | AS42□1F AS43□1F | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tubing O.D. | Metric size | ø3.2, ø4, ø6 | ø3.2, ø4 | ø6, ø8, ø10 | ø4 | ø6 | ø8, ø10 | ø6 | ø8 | ø10, ø12 | ø10 | ø12 |
| | Inch size | ø1/8", ø5/32" ø3/16", ø1/4" | ø1/8", ø5/32" | ø3/16", ø1/4", ø5/16" | ø5/32" | ø3/16" | ø1/4", ø5/16", ø3/8" | ø1/4" | ø5/16" | ø3/8" | ø3/8" | ø1/2" |
| Controlled flow (Free flow) | Flow rate (ℓ/min (ANR)) | 100 | 180 | 230 | 260 | 390 | 460 | 660 | 790 | 920 | 1580 | 1710 |
| | Effective area (mm²) | 1.5 | 2.7 | 3.5 | 4 | 6 | 7 | 10 | 12 | 14 | 24 | 26 |

Note) Flow rate values are at a pressure of 0.5 MPa and a temperature of 20°C.

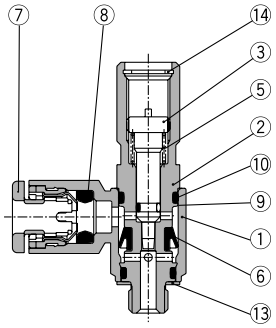
## Construction

### Elbow type

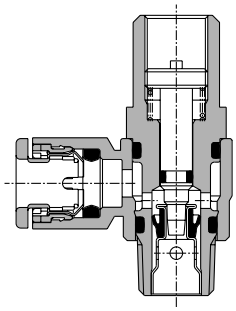
**Meter-out type**



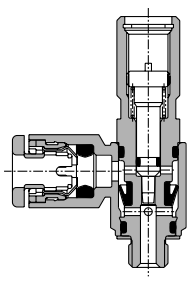

**M5 type**
**U10/32 type**




**Meter-in type**

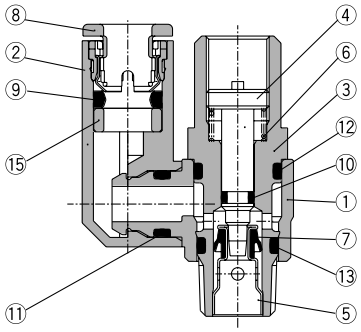


**M5 type**
**U10/32 type**

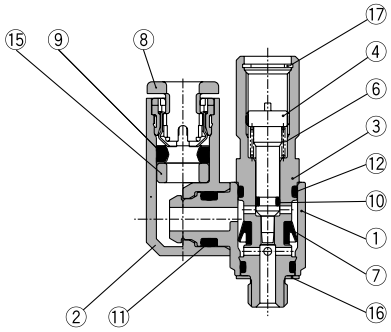


### Universal type

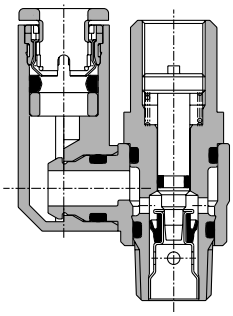
**Meter-out type**



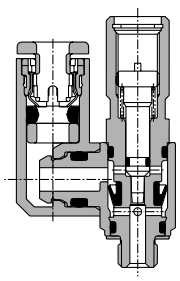

**M5 type**
**U10/32 type**




**Meter-in type**



**M5 type**
**U10/32 type**

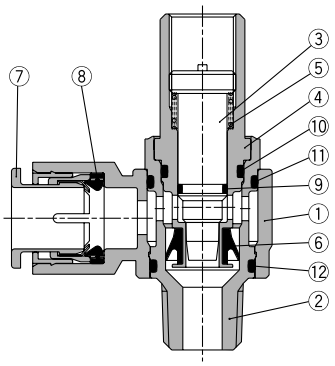


## Construction

### Elbow type

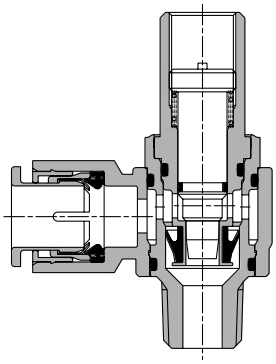
**Meter-out type**

**AS3201F-02**




**Meter-in type**

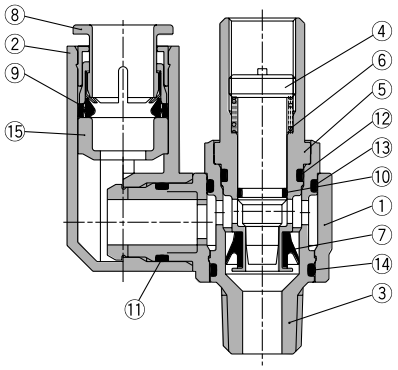
**AS3211F-02**



### Universal type

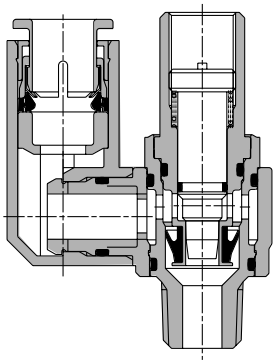
**Meter-out type**

**AS3301F-02**




**Meter-in type**

**AS3311F-02**



### Component Parts

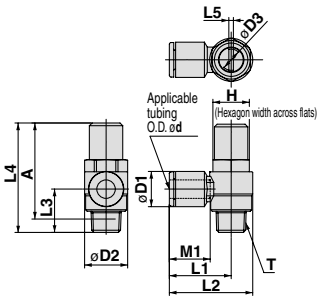
| No. | Description | Material | Note |
|---|---|---|---|
| 1 | **Body A** | PBT | |
| 2 | **Body B** | Brass | Electroless nickel plated |
| 3 | **Needle** | Brass | Electroless nickel plated |
| 4 | **Seat ring** | Brass | Electroless nickel plated |
| 5 | **Spring** | Steel wire | |
| 6 | **U seal** | HNBR | |
| 7 | **Cassette** | — | |
| 8 | **Seal** | NBR | |
| 9 | **O-ring** | NBR | |
| 10 | **O-ring** | NBR | |
| 11 | **O-ring** | NBR | |
| 12 | **O-ring** | NBR | |
| 13 | **Gasket** | NBR, Stainless steel | |
| 14 | **Retaining ring for hole type C** | Tool steel | |

### Component Parts

| No. | Description | Material | Note |
|---|---|---|---|
| 1 | **Body A** | PBT | |
| 2 | **Elbow body** | PBT | |
| 3 | **Body B** | Brass | Electroless nickel plated |
| 4 | **Needle** | Brass | Electroless nickel plated |
| 5 | **Seat ring** | Brass | Electroless nickel plated |
| 6 | **Spring** | Steel wire | |
| 7 | **U seal** | HNBR | |
| 8 | **Cassette** | — | |
| 9 | **Seal** | NBR | |
| 10 | **O-ring** | NBR | |
| 11 | **O-ring** | NBR | |
| 12 | **O-ring** | NBR | |
| 13 | **O-ring** | NBR | |
| 14 | **O-ring** | NBR | |
| 15 | **Spacer** | — | |
| 16 | **Gasket** | NBR, Stainless steel | |
| 17 | **Retaining ring for hole type C** | Tool steel | |

## Construction

### Elbow type




### Metric Size

| Model | d | T | H | D1 | D2 | D3 | L1 | L2 | L3 | L4 | L5 | A* | M1 | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS12□1F-M5-23T | 3.2 | M5 x 0.8 | 8 | 8.4 | 9.6 | 4.5 | 17.3 | 22.1 | 12.3 | 31 | 0.7 | 27.4 | 12.7 | 10 |
| AS12□1F-M5-04T | 4 | | | 9.3 | | | | | | | | | | |
| AS12□1F-M5-06T | 6 | | | 11.6 | | | 18.1 | 22.9 | 11.7 | | | | 13.5 | |
| AS22□1F-01-23ST | 3.2 | R 1/8 | 12 | 8.4 | 14.2 | 7 | 20.4 | 27.5 | 13.4 | 34.7 | 1.5 | 31.6 | 12.7 | 20 |
| AS22□1F-01-04ST | 4 | | | 9.3 | | | | | | | | | | 21 |
| AS22□1F-01-06ST | 6 | | | 11.6 | | | | | | | | | 13.5 | |
| AS22□1F-01-08ST | 8 | | | 15.2 | | | 25.3 | 32.4 | | | | | 18.5 | 23 |
| AS22□1F-01-10ST | 10 | | | 18.5 | | | 33.1 | 40.2 | 14.1 | | | | 21 | 25 |
| AS22□1F-02-04ST | 4 | R 1/4 | 17 | 10.4 | 18.5 | 7 | 25.2 | 34.4 | 17.7 | 40.2 | 1.5 | 34.7 | 16 | 40 |
| AS22□1F-02-06ST | 6 | | | 12.8 | | | | | | | | | 17 | |
| AS22□1F-02-08ST | 8 | | | 15.2 | | | 27.2 | 36.4 | | | | | 18.5 | 42 |
| AS22□1F-02-10ST | 10 | | | 18.5 | | | 35.3 | 44.5 | 19.5 | | | | 21 | 44 |
| AS32□1F-02-06ST | 6 | R 1/4 | 19 | 12.8 | 23 | 9.5 | 27.8 | 39.3 | 21.3 | 54.8 | 1.5 | 49.3 | 17 | 73 |
| AS32□1F-02-08ST | 8 | | | 15.2 | | | 29.5 | 41 | | | | | 18.5 | 76 |
| AS32□1F-02-10ST | 10 | | | 18.5 | | | 31.8 | 43.3 | | | | | 21 | 80 |
| AS32□1F-02-12ST | 12 | | | 20.9 | | | 32.8 | 44.3 | | | | | 22 | 82 |
| AS32□1F-03-06ST | 6 | R 3/8 | 19 | 12.8 | 23 | 9.5 | 27.8 | 39.3 | 19.8 | 52.6 | 1.5 | 47.4 | 17 | 77 |
| AS32□1F-03-08ST | 8 | | | 15.2 | | | 29.5 | 41 | | | | | 18.5 | 79 |
| AS32□1F-03-10ST | 10 | | | 18.5 | | | 31.8 | 43.3 | | | | | 21 | 81 |
| AS32□1F-03-12ST | 12 | | | 20.9 | | | 32.8 | 44.3 | | | | | 22 | 83 |
| AS42□1F-04-10ST | 10 | R 1/2 | 24 | 18.5 | 28.6 | 12 | 33.6 | 47.9 | 24.5 | 62.9 | 1.5 | 55.8 | 21 | 141 |
| AS42□1F-04-12ST | 12 | | | 20.9 | | | 34.6 | 48.9 | | | | | 22 | 142 |

* Reference dimensions of M5 x 0.8, R threads after installation.

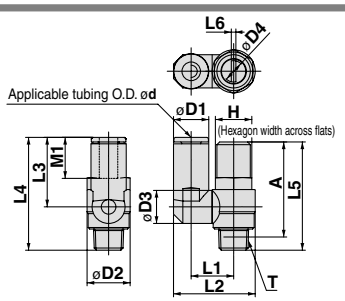
### Inch Size

| Model | d | T | H | D1 | D2 | D3 | L1 | L2 | L3 | L4 | L5 | A* | M1 | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS12□1F-U10/32-01T | 1/8" | 10-32 UNF | 8 | 8.4 | 9.6 | 4.5 | 17.3 | 22.1 | 12.3 | 31 | 0.7 | 27.4 | 12.7 | 10 |
| AS12□1F-U10/32-03T | 5/32" | | | 9.3 | | | | | | | | | | |
| AS12□1F-U10/32-05T | 3/16" | | | 11.4 | | | 21.3 | 26.1 | 11.7 | | | | 16.5 | |
| AS12□1F-U10/32-07T | 1/4" | | | 12 | | | 18.3 | 23.1 | | | | | 13.5 | |
| AS22□1F-N01-01ST | 1/8" | NPT 1/8 | 12.7 | 8.4 | 14.2 | 7 | 20.4 | 27.5 | 13.4 | 34.7 | 1.5 | 31.6 | 12.7 | 20 |
| AS22□1F-N01-03ST | 5/32" | | | 9.3 | | | | | | | | | | 21 |
| AS22□1F-N01-05ST | 3/16" | | | 13.2 | | | 24 | 31.1 | | | | | 16.5 | |
| AS22□1F-N01-07ST | 1/4" | | | 13.2 | | | 23.9 | 31 | | | | | 18.5 | 23 |
| AS22□1F-N01-09ST | 5/16" | | | 15.2 | | | 25.3 | 32.4 | | | | | 21 | 25 |
| AS22□1F-N02-03ST | 5/32" | NPT 1/4 | 17.5 | 10.4 | 18.5 | 7 | 25.2 | 34.4 | 17.7 | 40.2 | 1.5 | 34.7 | 16 | 40 |
| AS22□1F-N02-05ST | 3/16" | | | 12.8 | | | 25.2 | 34.5 | | | | | 17 | |
| AS22□1F-N02-07ST | 1/4" | | | 13.2 | | | 25.2 | 34.5 | | | | | 18.5 | 42 |
| AS22□1F-N02-09ST | 5/16" | | | 15.2 | | | 27.2 | 36.4 | | | | | 21 | 44 |
| AS22□1F-N02-11ST | 3/8" | | | 18.5 | | | 35.3 | 44.5 | 19.5 | | | | | |
| AS32□1F-N02-07ST | 1/4" | NPT 1/4 | 19 | 13.2 | 23 | 9.5 | 27.8 | 39.3 | 21.3 | 54.8 | 1.5 | 49.3 | 17 | 73 |
| AS32□1F-N02-09ST | 5/16" | | | 15.2 | | | 29.5 | 41 | | | | | 18.5 | 76 |
| AS32□1F-N02-11ST | 3/8" | | | 17.9 | | | 31.8 | 43.3 | | | | | 21 | 80 |
| AS32□1F-N03-07ST | 1/4" | NPT 3/8 | 19 | 13.2 | 23 | 9.5 | 27.8 | 39.3 | 19.8 | 52.6 | 1.5 | 47.4 | 17 | 77 |
| AS32□1F-N03-09ST | 5/16" | | | 15.2 | | | 29.5 | 41 | | | | | 18.5 | 79 |
| AS32□1F-N03-11ST | 3/8" | | | 17.9 | | | 31.8 | 43.3 | | | | | 21 | 81 |
| AS42□1F-N04-11ST | 3/8" | NPT 1/2 | 23.8 | 17.9 | 28.6 | 12 | 33.6 | 47.9 | 24.5 | 62.9 | 1.5 | 55.8 | 21 | 141 |
| AS42□1F-N04-13ST | 1/2" | | | 21.7 | | | 35.2 | 49.5 | | | | | 22 | 142 |

* Reference dimensions of 10-32 UNF and NPT threads after installation.

## Dimensions

### Universal type




### Metric Size

| Model | d | T | H | D1 | D2 | D3 | D4 | L1 | L2 | L3 | L4 | L5 | L6 | A* | M1 | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS13□1F-M5-23T | 3.2 | M5 x 0.8 | 8 | 8.4 | 9.6 | 9.3 | 4.5 | 10.8 | 19.8 | 17.5 | 28.7 | 31 | 0.7 | 27.4 | 12.7 | 10 |
| AS13□1F-M5-04T | 4 | | | 9.3 | | | | | 20.3 | | | | | | | |
| AS13□1F-M5-06T | 6 | | | 11.6 | | | | | 21.4 | 20.6 | 31.8 | | | | 13.5 | |
| AS23□1F-01-23ST | 3.2 | R 1/8 | 12 | 8.4 | 14.2 | 9.3 | 7 | 13.1 | 24.4 | 17.5 | 30.9 | 34.7 | 1.5 | 31.6 | 12.7 | 21 |
| AS23□1F-01-04ST | 4 | | | 9.3 | | | | | 24.9 | | | | | | | 22 |
| AS23□1F-01-06ST | 6 | | | 11.6 | | 10.9 | | 14 | 26.9 | 22.9 | 36.3 | | | | 13.5 | |
| AS23□1F-01-08ST | 8 | | | 15.2 | | 12.9 | | 16.2 | 30.9 | 28.2 | 40.8 | | | | 18.5 | 25 |
| AS23□1F-02-04ST | 4 | R 1/4 | 17 | 10.4 | 18.5 | 10.9 | 7 | 16.2 | 30.6 | 21.9 | 39.6 | 40.2 | 1.5 | 34.7 | 16 | 40 |
| AS23□1F-02-06ST | 6 | | | 12.8 | | 12.9 | | 18.4 | 34 | 25.2 | 42.1 | | | | 17 | 41 |
| AS23□1F-02-08ST | 8 | | | 15.2 | | | | 18.3 | 35.2 | 28.2 | 45.1 | | | | 18.5 | 44 |
| AS23□1F-02-10ST | 10 | | | 18.5 | | | | 20.2 | 38.7 | 31 | 47.9 | | | | 21 | 48 |
| AS33□1F-02-06ST | 6 | R 1/4 | 19 | 12.8 | 23 | 12.9 | 9.5 | 20.6 | 38.5 | 25.2 | 46.5 | 54.8 | 1.5 | 49.3 | 17 | 73 |
| AS33□1F-02-08ST | 8 | | | 15.2 | | | | | 39.7 | 28.2 | 49.5 | | | | 18.5 | 76 |
| AS33□1F-02-10ST | 10 | | | 18.5 | | 16.2 | | 23 | 43.7 | 32.6 | 53.9 | | | | 21 | 80 |
| AS33□1F-02-12ST | 12 | | | 20.9 | | | | | 44.9 | 34.4 | 55.7 | | | | 22 | 82 |
| AS33□1F-03-06ST | 6 | R 3/8 | 19 | 12.8 | 23 | 12.9 | 9.5 | 20.6 | 38.5 | 25.2 | 45 | 52.6 | 1.5 | 47.4 | 17 | 78 |
| AS33□1F-03-08ST | 8 | | | 15.2 | | | | | 39.7 | 28.2 | 48 | | | | 18.5 | 81 |
| AS33□1F-03-10ST | 10 | | | 18.5 | | 16.2 | | 23 | 43.7 | 32.6 | 52.4 | | | | 21 | 85 |
| AS33□1F-03-12ST | 12 | | | 20.9 | | | | | 44.9 | 34.4 | 54.2 | | | | 22 | 87 |
| AS43□1F-04-10ST | 10 | R 1/2 | 24 | 18.5 | 28.6 | 16.2 | 12 | 25.8 | 49.4 | 32.6 | 57.1 | 62.9 | 1.5 | 55.8 | 21 | 145 |
| AS43□1F-04-12ST | 12 | | | 20.9 | | 19.4 | | 26.8 | 52 | 36.3 | 60.8 | | | | 22 | 147 |

* Reference dimensions of M5 x 0.8, R threads after installation.

### Inch Size

| Model | d | T | H | D1 | D2 | D3 | D4 | L1 | L2 | L3 | L4 | L5 | L6 | A* | M1 | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS13□1F-U10/32-01T | 1/8" | 10-32 UNF | 8 | 8.4 | 9.6 | 9.3 | 4.5 | 10.8 | 19.8 | 17.5 | 28.7 | 31 | 0.7 | 27.4 | 12.7 | 10 |
| AS13□1F-U10/32-03T | 5/32" | | | 9.3 | | | | | 20.3 | | | | | | | |
| AS13□1F-U10/32-05T | 3/16" | | | 11.4 | | | | | 21.3 | 23.3 | 34.5 | | | | 16.5 | 11 |
| AS13□1F-U10/32-07T | 1/4" | | | 12 | | | | | 21.6 | 20.7 | 31.9 | | | | 13.7 | |
| AS23□1F-N01-01ST | 1/8" | NPT 1/8 | 12.7 | 8.4 | 14 | 9.3 | 7 | 13.1 | 24.4 | 17.5 | 30.9 | 34.7 | 1.5 | 31.6 | 12.7 | 21 |
| AS23□1F-N01-03ST | 5/32" | | | 9.3 | | | | | 24.9 | | | | | | | 22 |
| AS23□1F-N01-05ST | 3/16" | | | 11.4 | | 10.9 | | 14 | 26.8 | 23.9 | 37.3 | | | | 16.5 | |
| AS23□1F-N01-07ST | 1/4" | | | 13.2 | | 12.9 | | 16.2 | 29.9 | 25.6 | 38.2 | | | | 18.5 | 23 |
| AS23□1F-N01-09ST | 5/16" | | | 15.2 | | | | | 30.9 | 28.2 | 40.8 | | | | 21 | 25 |
| AS23□1F-N02-03ST | 5/32" | NPT 1/4 | 17.5 | 10.4 | 19 | 10.9 | 7 | 16.2 | 30.6 | 21.9 | 39.6 | 40.2 | 1.5 | 34.7 | 16 | 40 |
| AS23□1F-N02-05ST | 3/16" | | | 11.4 | | | | | 31.1 | 23.9 | 41.6 | | | | 17 | 41 |
| AS23□1F-N02-07ST | 1/4" | | | 13.2 | | 12.9 | | 18.3 | 34.2 | 25.6 | 42.5 | | | | 18.5 | 44 |
| AS23□1F-N02-09ST | 5/16" | | | 15.2 | | | | | 35.2 | 28.2 | 45.1 | | | | 21 | 47 |
| AS23□1F-N02-11ST | 3/8" | | | 17.9 | | | | 20.2 | 38.7 | 31 | 47.9 | | | | | 48 |
| AS33□1F-N02-07ST | 1/4" | NPT 1/4 | 19 | 13.2 | 23 | 12.9 | 9.5 | 20.6 | 38.7 | 25.6 | 46.9 | 54.8 | 1.5 | 49.3 | 17 | 73 |
| AS33□1F-N02-09ST | 5/16" | | | 15.2 | | | | | 39.7 | 28.2 | 49.5 | | | | 18.5 | 76 |
| AS33□1F-N02-11ST | 3/8" | | | 17.9 | | 16.2 | | 23 | 43.7 | 32.6 | 53.9 | | | | 21 | 82 |
| AS33□1F-N03-07ST | 1/4" | NPT 3/8 | 19 | 13.2 | 23 | 12.9 | 9.5 | 20.6 | 38.7 | 25.6 | 45.4 | 52.6 | 1.5 | 47.4 | 17 | 78 |
| AS33□1F-N03-09ST | 5/16" | | | 15.2 | | | | | 39.7 | 28.2 | 48 | | | | 18.5 | 81 |
| AS33□1F-N03-11ST | 3/8" | | | 17.9 | | 16.2 | | 23 | 43.7 | 32.6 | 52.4 | | | | 21 | 87 |
| AS43□1F-N04-11ST | 3/8" | NPT 1/2 | 23.8 | 17.9 | 29 | 16.2 | 12 | 25.8 | 49.4 | 32.6 | 57.1 | 62.9 | 1.5 | 55.8 | 21 | 145 |
| AS43□1F-N04-13ST | 1/2" | | | 21.7 | | 19.4 | | 26.8 | 52 | 36.3 | 60.8 | | | | 22 | 147 |

* Reference dimensions of 10-32 UNF and NPT threads after installation.

# Made to Order Specifications

**Please contact SMC for detailed dimensions, specifications and delivery.**

## Lubricant: Vaseline — X12

**Ex.) AS1201F-M5-23T-X12**

## Throttle Valve (Without Check Valve) — X214

**Ex.) AS1201F-M5-23T-X214**

Note) Throttle valve is only compatible with the product no. of the meter-out type.

## Grease-free (Seal: Fluorine coated) + Throttle Valve (Without Check Valve) — X21

**Ex.) AS1201F-M5-23T-X21**

Note 1) Not particle-free
Note 2) Throttle valve is only compatible with the part no. of the meter-out type.

# Tamper Proof Speed Controller with One-touch Fittings In-line Type

# Series AS□□□1F-T

## Model

| Model | Applicable tubing O.D. | | | | | | | | | | | | Applicable cylinder bore size (mm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Metric size | | | | | | Inch size | | | | | | |
| | 3.2 | 4 | 6 | 8 | 10 | 12 | 1/8" | 5/32" | 3/16" | 1/4" | 5/16" | 3/8" | 1/2" | |
| **AS1001F** | ● | ● | ● | | | | ● | ● | ● | ● | | | | 6, 10, 16, 20 |
| **AS2001F** | | ● | ● | | | | | ● | ● | ● | | | | 20, 25, 32 |
| **AS2051F** | | | ● | ● | | | | | ● | ● | ● | | | 20, 25, 32, 40 |
| **AS3001F** | | | ● | ● | ● | ● | | | | ● | ● | ● | | 40, 50, 63 |
| **AS4001F** | | | | | ● | ● | | | | | | ● | ● | 63, 80, 100 |

## Specifications

| | |
|---|---|
| **Fluid** | Air |
| **Proof pressure** | 1.5 MPa |
| **Max. operating pressure** | 1 MPa |
| **Min. operating pressure** | 0.1 MPa |
| **Ambient and fluid temperature** | –5 to 60°C (No freezing) |
| **Number of needle rotations** | 10 turns (8 turns (1)) |
| **Applicable tubing material** (2) | Nylon, Soft nylon, Polyurethane |

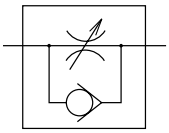
Note 1) In the case of AS1001F type
Note 2) Use caution regarding the max. operating pressure when soft nylon or polyurethane tubing is used. (Refer to pages 371 and 372 for details.)
Note 3) Brass parts are all electroless nickel plated.

## Flow Rate and Effective Area

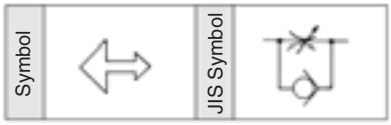
| Model | | AS1001F | AS2001F | | AS2051F | | AS3001F | | | AS4001F | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Tubing O.D. | Metric size | ø3.2, ø4, ø6 | ø4 | ø6 | ø6 | ø8 | ø6 | ø8 | ø10, ø12 | ø10 | ø12 |
| | Inch size | ø1/8", ø5/32" ø3/16", ø1/4" | ø5/32" | ø3/16", ø1/4" | ø3/16" | ø1/4", ø5/16" | ø1/4" | ø5/16" | ø3/8" | ø3/8" | ø1/2" |
| Controlled flow (Free flow) | Flow rate (ℓ/min (ANR)) | 100 | 130 | 230 | 290 | 460 | 420 | 660 | 920 | 1050 | 1390 |
| | Effective area (mm²) | 1.5 | 2 | 3.5 | 4.5 | 7 | 6.5 | 10 | 14 | 16 | 21 |

Note) Flow rate values are measured at 0.5 MPa and 20°C.

**JIS Symbol**



**Flow Direction Symbols on Body**




**Made to Order**
(Refer to page 538 for details.)

## How to Order

**AS 200 1F – 06 T –** ☐

**Body size**

| | |
|---|---|
| **100** | M5 standard |
| **200** | 1/8 standard |
| **205** | 1/4 standard |
| **300** | 3/8 standard |
| **400** | 1/2 standard |

**With One-touch fittings**

**Tamper proof**
Note) Speed controller requires a special tool for flow adjustment. Order separately with part number, AS-T-1.

**Applicable tubing O.D.**

| Metric size | | Inch size | |
|---|---|---|---|
| **23** | ø3.2 * | **01** | ø1/8" |
| **04** | ø4 | **03** | ø5/32" |
| **06** | ø6 | **05** | ø3/16" |
| **08** | ø8 | **07** | ø1/4" |
| **10** | ø10 | **09** | ø5/16" |
| **12** | ø12 | **11** | ø3/8" |
| | | **13** | ø1/2" |

* Use ø1/8" tube.

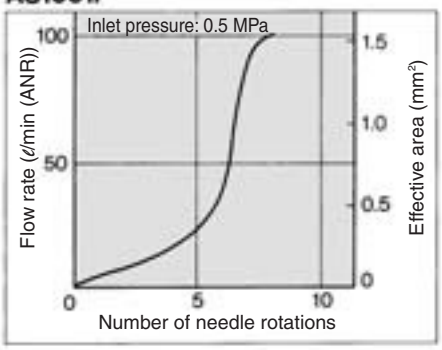
**Made to Order**
Refer to page 538 for details.

**⚠Caution**

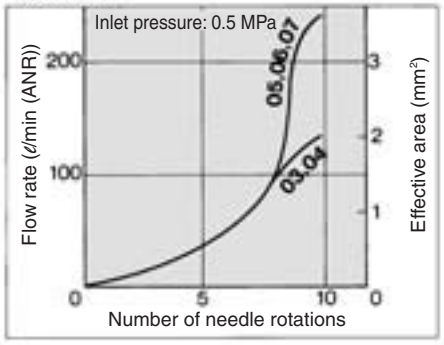
**Be sure to read before handling.**
**Refer to front matters 58 and 59 for Safety Instructions and pages 412 to 414 for Flow Control Equipment Precautions.**

## Needle Valve/Flow Characteristics

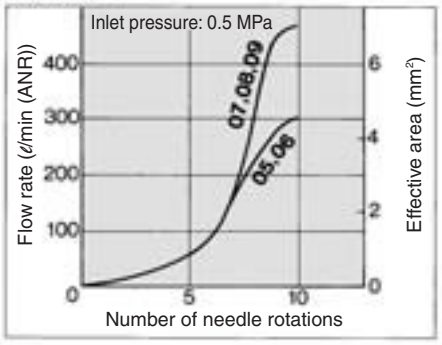
**AS1001F**



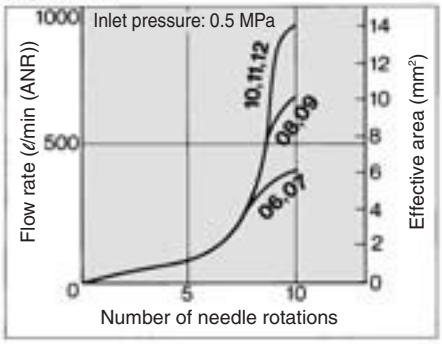

**AS2001F**



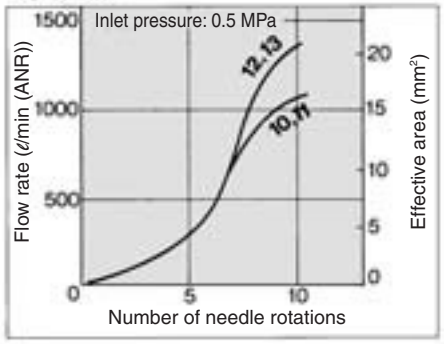

**AS2051F**




**AS3001F**

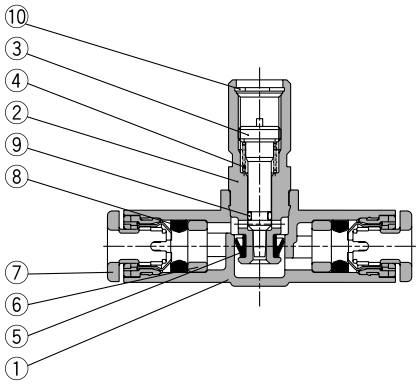



**AS4001F**

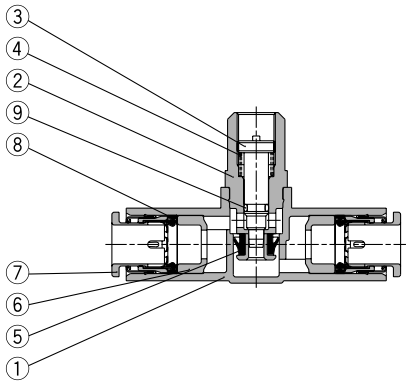



## Construction

**AS1001F**



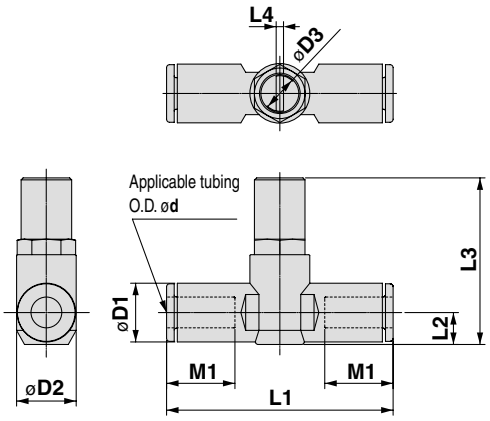

**AS2001F to AS4001F**




### Component Parts

| No. | Description | Material | Note |
|---|---|---|---|
| 1 | **Body A** | PBT | |
| 2 | **Body B** | Brass | Electroless nickel plated |
| 3 | **Needle** | Brass | Electroless nickel plated |
| 4 | **Spring** | Steel wire | |
| 5 | **U seal** | HNBR | |
| 6 | **Spacer** | — | |
| 7 | **Cassette** | — | |
| 8 | **Seal** | NBR | |
| 9 | **O-ring** | NBR | |
| 10 | **Retaining ring for hole type C** | Tool steel | |

## Dimensions




### Metric Size

| Model | d | D1 | D2 | D3 | L1 | L2 | L3 | L4 | M1 | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|---|
| **AS1001F-23T** | 3.2 | 8.4 | 10 | 4.5 | 38 | 4.5 | 26 | 0.7 | 12.7 | 8 |
| **AS1001F-04T** | 4 | 9.3 | | | 39.2 | 5.2 | 26.6 | | | 9 |
| **AS1001F-06T** | 6 | 11.6 | | | 40.7 | 6.2 | 27.7 | | 13.5 | 10 |
| **AS2001F-04T** | 4 | 9.3 | 11.8 | 7 | 40.7 | 5.2 | 31.9 | 1.5 | 12.7 | 15 |
| **AS2001F-06T** | 6 | 11.6 | | | 44.8 | 6.3 | 33 | | 13.5 | 16 |
| **AS2051F-06T** | 6 | 12.8 | 14.8 | 7 | 53.2 | 6.7 | 35.2 | 1.5 | 17 | 33 |
| **AS2051F-08T** | 8 | 15.2 | | | 59.8 | 8.1 | 36.5 | | 18 | 36 |
| **AS3001F-06T** | 6 | 12.8 | 19.8 | 9.5 | 59 | 7.4 | 45 | 1.5 | 17 | 56 |
| **AS3001F-08T** | 8 | 15.2 | | | 64.4 | 8.2 | 45.8 | | 18 | 60 |
| **AS3001F-10T** | 10 | 18.5 | | | 71.6 | 9.8 | 47.3 | | 21 | 64 |
| **AS3001F-12T** | 12 | 20.9 | | | 76 | 11 | 48.5 | | 22 | 68 |
| **AS4001F-10T** | 10 | 18.5 | 26.5 | 12 | 77.7 | 11.3 | 55.4 | 1.5 | 21 | 121 |
| **AS4001F-12T** | 12 | 20.9 | | | 82.1 | | 56.4 | | 22 | 125 |

### Inch Size

| Model | d | D1 | D2 | D3 | L1 | L2 | L3 | L4 | M1 | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|---|
| **AS1001F-01T** | 1/8" | 8.4 | 10 | 4.5 | 38 | 4.5 | 26 | 0.7 | 12.7 | 8 |
| **AS1001F-03T** | 5/32" | 9.3 | | | 39.2 | 5.2 | 26.6 | | | 9 |
| **AS1001F-05T** | 3/16" | 11.4 | | | 48.7 | 6.2 | 27.7 | | 16.5 | 14 |
| **AS1001F-07T** | 1/4" | 12 | | | 40.7 | | | | 13.7 | 11 |
| **AS2001F-03T** | 5/32" | 9.3 | 11.8 | 7 | 40.7 | 5.2 | 31.9 | 1.5 | 12.7 | 15 |
| **AS2001F-05T** | 3/16" | 11.4 | | | 50 | 6.2 | 32.8 | | 16.5 | 21 |
| **AS2001F-07T** | 1/4" | 13.2 | | | 52.2 | 7.1 | 33.7 | | 17 | 19 |
| **AS2051F-05T** | 3/16" | 11.4 | 14.8 | 7 | 52.2 | 6.2 | 34.9 | 1.5 | 16.5 | 35 |
| **AS2051F-07T** | 1/4" | 13.2 | | | 54.4 | 7.1 | 35.7 | | 17 | 33 |
| **AS2051F-09T** | 5/16" | 15.2 | | | 59.8 | 8.1 | 36.7 | | 18 | 36 |
| **AS3001F-07T** | 1/4" | 13.2 | 19.8 | 9.5 | 59 | 7.4 | 45.2 | 1.5 | 17 | 56 |
| **AS3001F-09T** | 5/16" | 15.2 | | | 64.4 | 8.2 | 46 | | 18 | 60 |
| **AS3001F-11T** | 3/8" | 17.9 | | | 70.8 | 9.5 | 47.2 | | 21 | 72 |
| **AS4001F-11T** | 3/8" | 17.9 | 26.5 | 12 | 76.9 | 10.3 | 55.5 | 1.5 | 21 | 129 |
| **AS4001F-13T** | 1/2" | 21.7 | | | 83.1 | 11.6 | 56.9 | | 22 | 142 |

## Made to Order


**Lubricant: Vaseline** **X12**

**Ex.) AS1001F-23T-X12**

**Throttle Valve (Without Check Valve)** **X214**

**Ex.) AS1001F-23T-X214**

**Grease-free (Seal: Fluorine coated) + Throttle Valve (Without Check Valve)** **X21**

**Ex.) AS1001F-23T-X21**

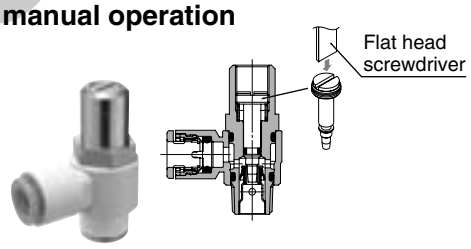
Note 1) Not particle-free

# Speed Controller Adjustable by Flat Head Screwdriver with One-touch Fitting Elbow Type/Universal Type

# Series AS□□□1F-D

**Flow adjustable by flat head screwdriver**

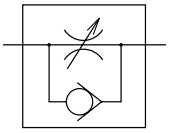
**Prevention of an unnecessary manual operation**



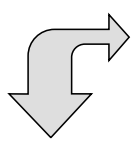
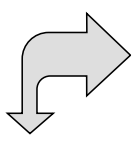
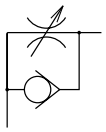
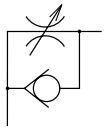

**Elbow type**

**Universal type**

**JIS Symbol**



**Flow Direction Symbols on Body**

| | Meter-out type | Meter-in type |
|---|---|---|
| Symbol |  |  |
| JIS Symbol |  |  |

**Made to Order**
(Refer to page 513 for details.)

## Model

| Elbow type | Universal type | Port size | Applicable tubing O.D. | | | | | | | | | | | | Applicable cylinder bore size (mm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Metric size | | | | | | Inch size | | | | | | |
| | | | 3.2 | 4 | 6 | 8 | 10 | 12 | 1/8" | 5/32" | 3/16" | 1/4" | 5/16" | 3/8" | 1/2" | |
| **AS12□1F-M5** | **AS13□1F-M5** | M5 x 0.8 | ● | ● | ● | | | | | | | | | | | 6, 10, 16, 20 |
| **AS22□1F-01** | **AS23□1F-01** | R 1/8 | ● | ● | ● | ● | ●* | | | | | | | | | 20, 25, 32 |
| **AS22□1F-02** | **AS23□1F-02** | R 1/4 | | ● | ● | ● | ● | | | | | | | | | 20, 25, 32, 40 |
| **AS32□1F-02** | **AS33□1F-02** | R 1/4 | | | ● | ● | ● | ● | | | | | | | | 40, 50, 63 |
| **AS32□1F-03** | **AS33□1F-03** | R 3/8 | | | ● | ● | ● | ● | | | | | | | | 40, 50, 63 |
| **AS42□1F-04** | **AS43□1F-04** | R 1/2 | | | | | ● | ● | | | | | | | | 63, 80, 100 |
| **AS12□1F-U10/32** | **AS13□1F-U10/32** | 10-32 UNF | | | | | | | ● | ● | ● | ● | | | | 6, 10, 16, 20 |
| **AS22□1F-N01** | **AS23□1F-N01** | NPT 1/8 | | | | | | | ● | ● | ● | ● | ● | | | 20, 25, 32 |
| **AS22□1F-N02** | **AS23□1F-N02** | NPT 1/4 | | | | | | | | ● | ● | ● | ● | ● | | 20, 25, 32, 40 |
| **AS32□1F-N02** | **AS33□1F-N02** | NPT 1/4 | | | | | | | | | | ● | ● | ● | | 40, 50, 63 |
| **AS32□1F-N03** | **AS33□1F-N03** | NPT 3/8 | | | | | | | | | | ● | ● | ● | | 40, 50, 63 |
| **AS42□1F-N04** | **AS43□1F-N04** | NPT 1/2 | | | | | | | | | | | | ● | ● | 63, 80, 100 |

Note 1) * Elbow type only
Note 2) Meter-out and meter-in types can be visually differentiated by the flow direction symbol on the resin body.

## Specifications

| | |
|---|---|
| **Fluid** | Air |
| **Proof pressure** | 1.5 MPa |
| **Max. operating pressure** | 1 MPa |
| **Min. operating pressure** | 0.1 MPa |
| **Ambient and fluid temperature** | –5 to 60°C (No freezing) |
| **Number of needle rotations** | 10 turns (8 turns (1)) |
| **Applicable tubing material** (2) | Nylon, Soft nylon, Polyurethane |

Note 1) In the case of AS12□1F-M5 and AS12□1F-U10/32 types
In the case of AS13□1F-M5 and AS13□1F-U10/32 types
Note 2) Use caution regarding the max. operating pressure when soft nylon or polyurethane tubing is used. (Refer to pages 371 and 372 for details.)
Note 3) Brass parts are all electroless nickel plated, provided as standard.

## Flow Rate and Effective Area

| Model | | AS12□1F AS13□1F | AS22□1F-□01 AS23□1F-□01 | | AS22□1F-□02 AS23□1F-□02 | | | AS32□1F AS33□1F | | | AS42□1F AS43□1F | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tubing O.D. | Metric size | ø3.2, ø4, ø6 | ø3.2, ø4 | ø6, ø8, ø10 | ø4 | ø6 | ø8, ø10 | ø6 | ø8 | ø10, ø12 | ø10 | ø12 |
| | Inch size | ø1/8", ø5/32" ø3/16", ø1/4" | ø1/8", ø5/32" | ø3/16", ø1/4", ø5/16" | ø5/32" | ø3/16" | ø1/4", ø5/16", ø3/8" | ø1/4" | ø5/16" | ø3/8" | ø3/8" | ø1/2" |
| Controlled flow (Free flow) | Flow rate (ℓ/min (ANR)) | 100 | 180 | 230 | 260 | 390 | 460 | 660 | 790 | 920 | 1580 | 1710 |
| | Effective area (mm²) | 1.5 | 2.7 | 3.5 | 4 | 6 | 7 | 10 | 12 | 14 | 24 | 26 |

Note) Flow rate values are measured at 0.5 MPa and 20°C.

## How to Order

**AS 2 2 1 1 F – 01 – 06 S D –** ☐

**Body size**

| | |
|---|---|
| 1 | M5 standard |
| 2 | 1/8, 1/4 standard |
| 3 | 3/8 standard |
| 4 | 1/2 standard |

**Type**

| | |
|---|---|
| 2 | Elbow |
| 3 | Universal |

**Control**

| | |
|---|---|
| 0 | Meter-out |
| 1 | Meter-in |

**With One-touch fitting**

**Port size**

| | |
|---|---|
| M5 | M5 x 0.8 |
| 01 | R 1/8 |
| 02 | R 1/4 |
| 03 | R 3/8 |
| 04 | R 1/2 |
| U10/32 | 10-32 UNF |
| N01 | NPT 1/8 |
| N02 | NPT 1/4 |
| N03 | NPT 3/8 |
| N04 | NPT 1/2 |

**Applicable tubing O.D.**

| Metric size | | Inch size | |
|---|---|---|---|
| 23 | ø3.2 * | 01 | ø1/8" |
| 04 | ø4 | 03 | ø5/32" |
| 06 | ø6 | 05 | ø3/16" |
| 08 | ø8 | 07 | ø1/4" |
| 10 | ø10 | 09 | ø5/16" |
| 12 | ø12 | 11 | ø3/8" |
| | | 13 | ø1/2" |

* Use ø1/8" tube.

**With seal**
Note) In the case that port size is either M5 or 10-32 UNF thread, it is not available with seal. Gasket is provided as standard.

**Type adjustable by flat head screwdriver**

**Made to Order**
Refer to the below for details.

## Made to Order

Made to Order

### Lubricant: Vaseline — X12

**Ex.) AS1201F-M5-23D-X12**

### Throttle Valve (Without Check Valve) — X214

**Ex.) AS1201F-M5-23D-X214**

Note) Throttle valve is only compatible with the part no. of the meter-out type.

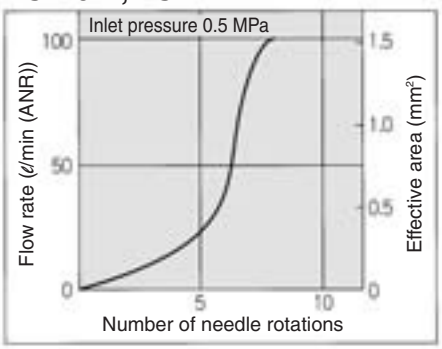
### Grease-free (Seal: Fluorine Coating) + Throttle Valve (Without Check Valve) — X21

**Ex.) AS1201F-M5-23D-X21**

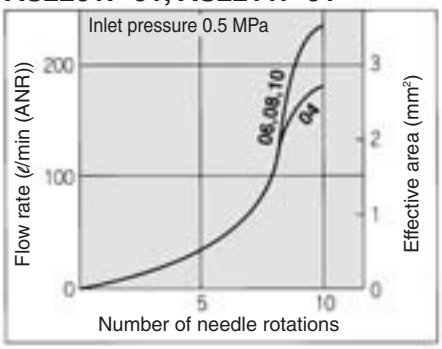
Note 1) Not particle-free
Note 2) Throttle valve is only compatible with the part no. of the meter-out type.

## Needle Valve/Flow Characteristics

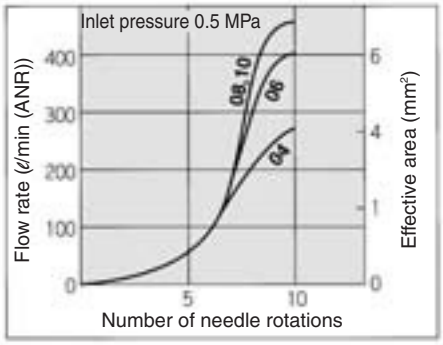
**AS1201F, AS1211F**



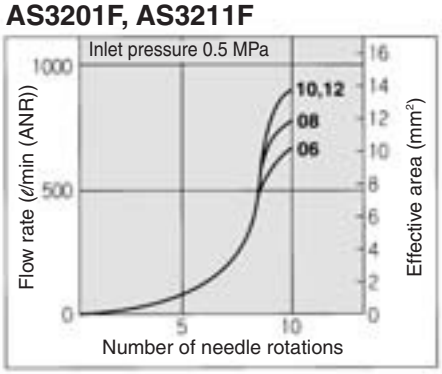

**AS2201F-01, AS2211F-01**



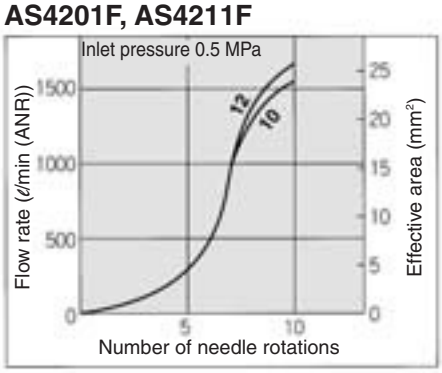

**AS2201F-02, AS2211F-02**




**AS3201F, AS3211F**



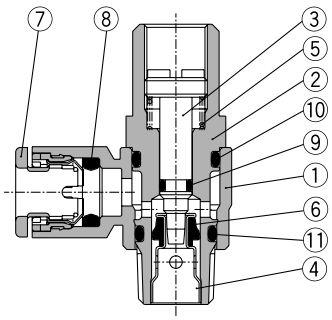

**AS4201F, AS4211F**



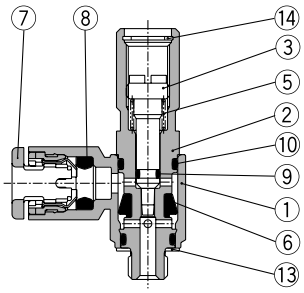
## Construction

### Elbow type

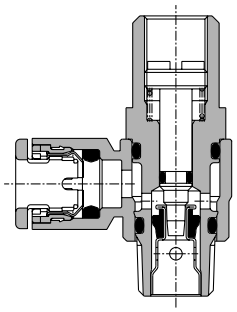
**Meter-out type**



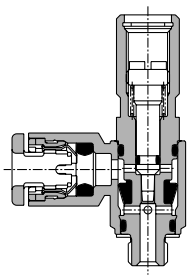

**M5 type**
**U10/32 type**




**Meter-in type**

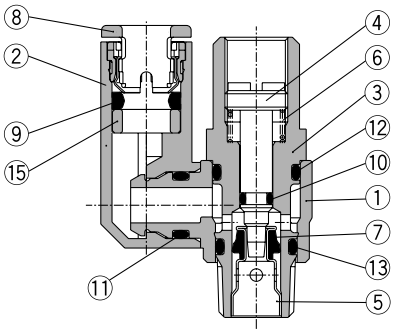


**M5 type**
**U10/32 type**

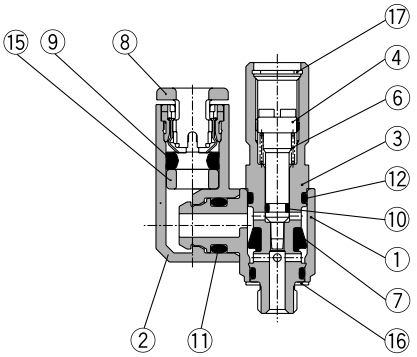


### Universal type

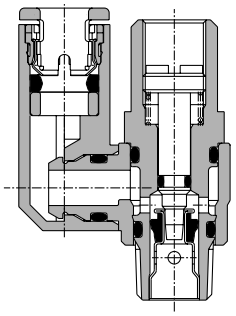
**Meter-out type**



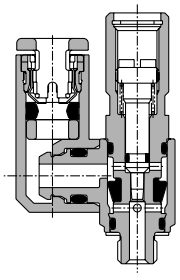

**M5 type**
**U10/32 type**




**Meter-in type**



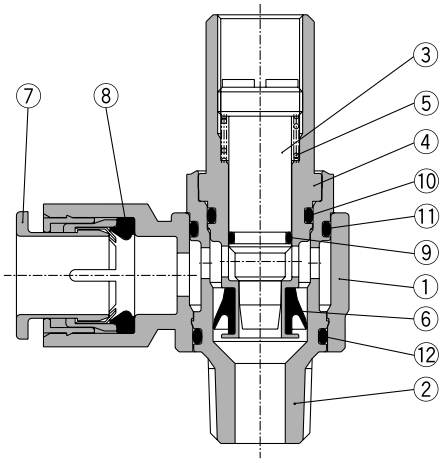
**M5 type**
**U10/32 type**



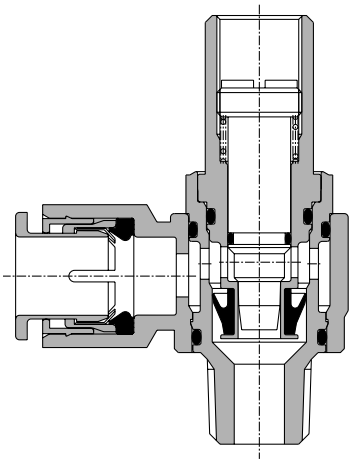
## Construction

### Elbow type

**Meter-out AS3201F-02**

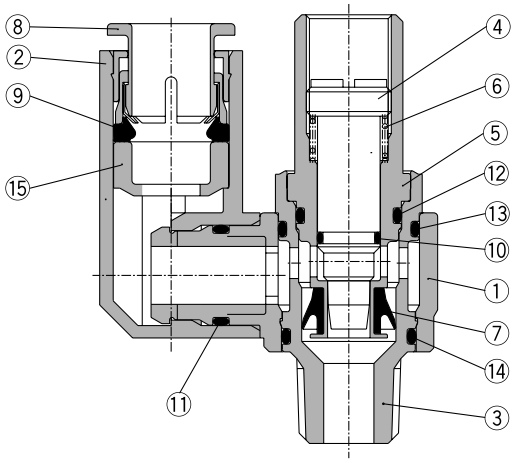



**Meter-in AS3211F-02**

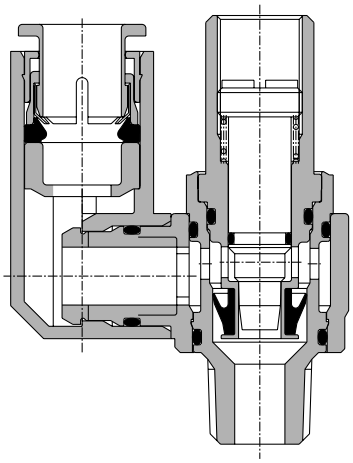


### Universal type

**Meter-out AS3301F-02**




**Meter-in AS3311F-02**



### Component Parts

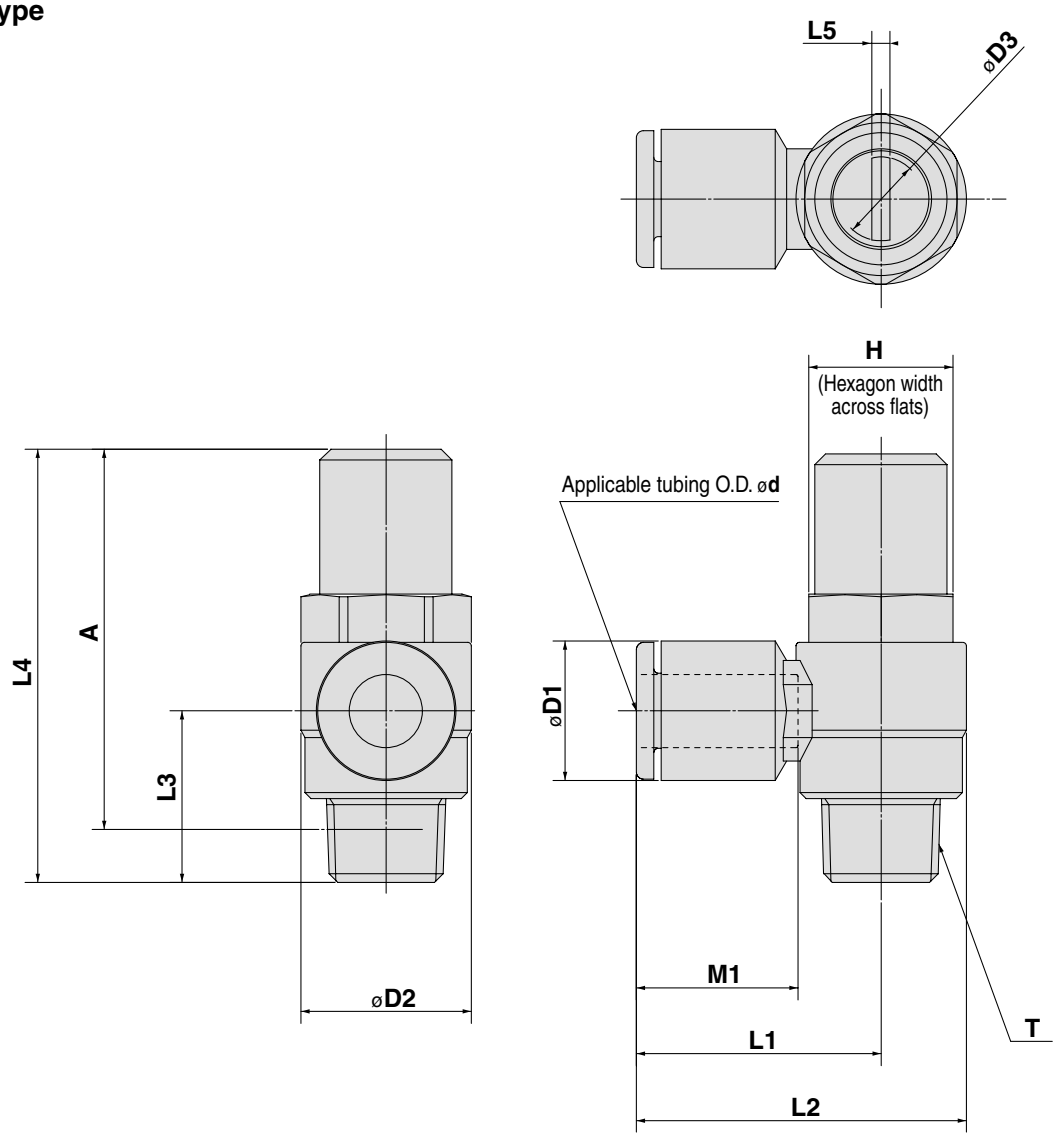
| No. | Description | Material | Note |
|---|---|---|---|
| 1 | **Body A** | PBT | |
| 2 | **Body B** | Brass | Electroless nickel plated |
| 3 | **Needle** | Brass | Electroless nickel plated |
| 4 | **Seat ring** | Brass | Electroless nickel plated |
| 5 | **Spring** | Steel wire | |
| 6 | **U seal** | HNBR | |
| 7 | **Cassette** | — | |
| 8 | **Seal** | NBR | |
| 9 | **O-ring** | NBR | |
| 10 | **O-ring** | NBR | |
| 11 | **O-ring** | NBR | |
| 12 | **O-ring** | POM | |
| 13 | **Gasket** | NBR, Stainless steel | |
| 14 | **Retaining ring for hole type C** | Tool steel | |

### Component Parts

| No. | Description | Material | Note |
|---|---|---|---|
| 1 | **Body A** | PBT | |
| 2 | **Elbow body** | PBT | |
| 3 | **Body B** | Brass | Electroless nickel plated |
| 4 | **Needle** | Brass | Electroless nickel plated |
| 5 | **Seat ring** | Brass | Electroless nickel plated |
| 6 | **Spring** | Steel wire | |
| 7 | **U seal** | HNBR | |
| 8 | **Cassette** | — | |
| 9 | **Seal** | NBR | |
| 10 | **O-ring** | NBR | |
| 11 | **O-ring** | NBR | |
| 12 | **O-ring** | NBR | |
| 13 | **O-ring** | NBR | |
| 14 | **O-ring** | NBR | |
| 15 | **Spacer** | — | |
| 16 | **Gasket** | NBR, Stainless steel | |
| 17 | **Retaining ring for hole type C** | Tool steel | |

## Dimensions

### Elbow type




### Metric Size

| Model | d | T | H | D1 | D2 | D3 | L1 | L2 | L3 | L4 | L5 | A* | M1 | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS12□1F-M5-23D | 3.2 | M5 x 0.8 | 8 | 8.4 | 9.6 | 4.7 | 17.3 | 22.1 | 12.3 | 31 | 0.7 | 27.4 | 12.7 | 10 |
| AS12□1F-M5-04D | 4 | | | 9.3 | | | | | | | | | | |
| AS12□1F-M5-06D | 6 | | | 11.6 | | | 18.1 | 22.9 | 11.7 | | | | 13.5 | |
| AS22□1F-01-23SD | 3.2 | R 1/8 | 12 | 8.4 | 14.2 | 7.2 | 20.4 | 27.5 | 13.4 | 34.7 | 1.2 | 31.6 | 12.7 | 20 |
| AS22□1F-01-04SD | 4 | | | 9.3 | | | | | | | | | | 21 |
| AS22□1F-01-06SD | 6 | | | 11.6 | | | | | | | | | 13.5 | |
| AS22□1F-01-08SD | 8 | | | 15.2 | | | 25.3 | 32.4 | | | | | 18.5 | 23 |
| AS22□1F-01-10SD | 10 | | | 18.5 | | | 35.3 | 44.5 | 14.1 | | | | 21 | 25 |
| AS22□1F-02-04SD | 4 | R 1/4 | 17 | 10.4 | 18.5 | 7.2 | 25.2 | 34.4 | 17.7 | 40.2 | 1.2 | 34.7 | 16 | 40 |
| AS22□1F-02-06SD | 6 | | | 12.8 | | | | | | | | | 17 | |
| AS22□1F-02-08SD | 8 | | | 15.2 | | | 27.2 | 36.4 | | | | | 18.5 | 42 |
| AS22□1F-02-10SD | 10 | | | 18.5 | | | 35.3 | 44.5 | 19.5 | | | | 21 | 44 |
| AS32□1F-02-06SD | 6 | R 1/4 | 19 | 12.8 | 23 | 9.8 | 27.8 | 39.3 | 21.3 | 54.8 | 1.2 | 49.3 | 17 | 73 |
| AS32□1F-02-08SD | 8 | | | 15.2 | | | 29.5 | 41 | | | | | 18.5 | 76 |
| AS32□1F-02-10SD | 10 | | | 18.5 | | | 31.8 | 43.3 | | | | | 21 | 80 |
| AS32□1F-02-12SD | 12 | | | 20.9 | | | 32.8 | 44.3 | | | | | 22 | 82 |
| AS32□1F-03-06SD | 6 | R 3/8 | 19 | 12.8 | 23 | 9.8 | 27.8 | 39.3 | 19.8 | 52.6 | 1.2 | 47.4 | 17 | 77 |
| AS32□1F-03-08SD | 8 | | | 15.2 | | | 29.5 | 41 | | | | | 18.5 | 79 |
| AS32□1F-03-10SD | 10 | | | 18.5 | | | 31.8 | 43.3 | | | | | 21 | 81 |
| AS32□1F-03-12SD | 12 | | | 20.9 | | | 32.8 | 44.3 | | | | | 22 | 83 |
| AS42□1F-04-10SD | 10 | R 1/2 | 24 | 18.5 | 28.6 | 12.4 | 33.6 | 47.9 | 24.5 | 62.9 | 1.2 | 55.8 | 21 | 141 |
| AS42□1F-04-12SD | 12 | | | 20.9 | | | 34.6 | 48.9 | | | | | 22 | 142 |

* Reference dimensions of M5 x 0.8, R threads after installation.

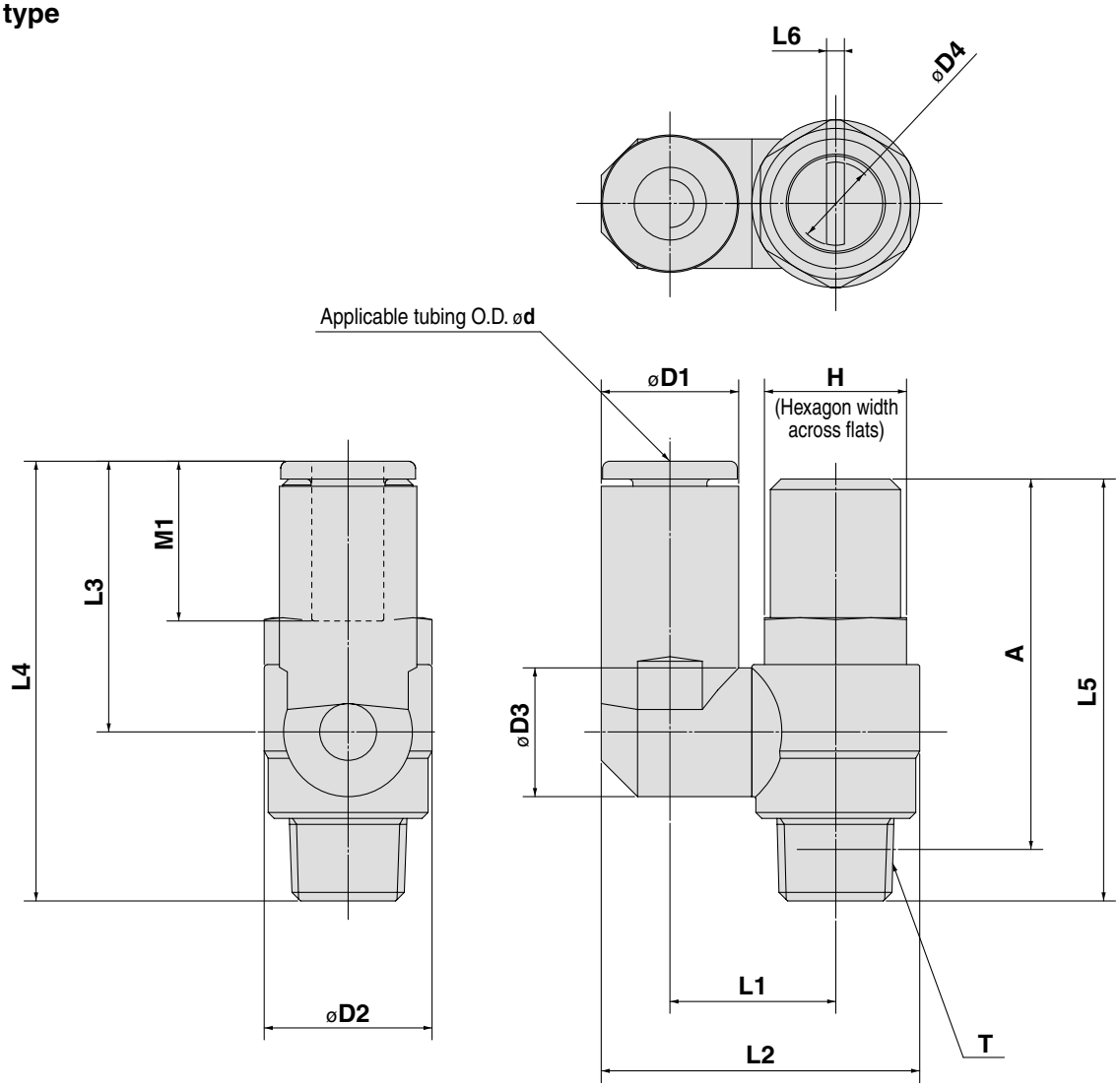
### Inch Size

| Model | d | T | H | D1 | D2 | D3 | L1 | L2 | L3 | L4 | L5 | A* | M1 | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS12□1F-U10/32-01D | 1/8" | 10-32 UNF | 8 | 8.4 | 9.6 | 4.7 | 17.3 | 22.1 | 12.3 | 31 | 0.7 | 27.4 | 12.7 | 10 |
| AS12□1F-U10/32-03D | 5/32" | | | 9.3 | | | | | | | | | | |
| AS12□1F-U10/32-05D | 3/16" | | | 11.4 | | | 21.3 | 26.1 | 11.7 | | | | 16.5 | |
| AS12□1F-U10/32-07D | 1/4" | | | 12 | | | 18.3 | 23.1 | | | | | 13.5 | |
| AS22□1F-N01-01SD | 1/8" | NPT 1/8 | 12.7 | 8.4 | 14.2 | 7.2 | 20.4 | 27.5 | 13.4 | 34.7 | 1.2 | 31.6 | 12.7 | 20 |
| AS22□1F-N01-03SD | 5/32" | | | 9.3 | | | | | | | | | | 21 |
| AS22□1F-N01-05SD | 3/16" | | | 13.2 | | | 24 | 31.1 | | | | | 16.5 | |
| AS22□1F-N01-07SD | 1/4" | | | 13.2 | | | 23.9 | 31 | | | | | 18.5 | 23 |
| AS22□1F-N01-09SD | 5/16" | | | 15.2 | | | 25.3 | 32.4 | | | | | 21 | 25 |
| AS22□1F-N02-03SD | 5/32" | NPT 1/4 | 17.5 | 10.4 | 18.5 | 7.2 | 25.2 | 34.4 | 17.7 | 40.2 | 1.2 | 34.7 | 16 | 40 |
| AS22□1F-N02-07SD | 3/16" | | | 12.8 | | | 25.2 | 34.5 | | | | | 17 | |
| AS22□1F-N02-07SD | 1/4" | | | 13.2 | | | 25.2 | 34.5 | | | | | 18.5 | 42 |
| AS22□1F-N02-09SD | 5/16" | | | 15.2 | | | 27.2 | 36.4 | | | | | 21 | 44 |
| AS22□1F-N02-11SD | 3/8" | | | 18.3 | | | 35.3 | 44.5 | 19.5 | | | | | |
| AS32□1F-N02-07SD | 1/4" | NPT 1/4 | 19 | 13.2 | 23 | 9.8 | 27.8 | 39.3 | 21.3 | 54.8 | 1.2 | 49.3 | 17 | 73 |
| AS32□1F-N02-09SD | 5/16" | | | 15.2 | | | 29.5 | 41 | | | | | 18.5 | 76 |
| AS32□1F-N02-11SD | 3/8" | | | 17.9 | | | 31.8 | 43.3 | | | | | 21 | 80 |
| AS32□1F-N03-07SD | 1/4" | NPT 3/8 | 19 | 13.2 | 23 | 9.8 | 27.8 | 39.3 | 19.8 | 52.6 | 1.2 | 47.4 | 17 | 77 |
| AS32□1F-N03-09SD | 5/16" | | | 15.2 | | | 29.5 | 41 | | | | | 18.5 | 79 |
| AS32□1F-N03-11SD | 3/8" | | | 17.9 | | | 31.8 | 43.3 | | | | | 21 | 81 |
| AS42□1F-N04-11SD | 3/8" | NPT 1/2 | 23.8 | 17.9 | 28.6 | 12.4 | 33.6 | 47.9 | 24.5 | 62.9 | 1.2 | 55.8 | 21 | 141 |
| AS42□1F-N04-13SD | 1/2" | | | 21.7 | | | 35.2 | 49.5 | | | | | 22 | 142 |

* Reference dimensions of 10-32 UNF and NPT threads after installation.

## Dimensions

### Universal type




### Metric Size

| Model | d | T | H | D1 | D2 | D3 | D4 | L1 | L2 | L3 | L4 | L5 | L6 | A* | M1 | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS13□1F-M5-23D | 3.2 | M5 x 0.8 | 8 | 8.4 | 9.6 | 9.3 | 4.7 | 10.8 | 19.8 | 17.5 | 28.7 | 31 | 0.7 | 27.4 | 12.7 | 10 |
| AS13□1F-M5-04D | 4 | | | 9.3 | | | | | 20.3 | | | | | | | |
| AS13□1F-M5-06D | 6 | | | 11.6 | | | | | 21.4 | 20.6 | 31.8 | | | | 13.5 | |
| AS23□1F-01-23SD | 3.2 | R 1/8 | 12 | 8.4 | 14.2 | 9.3 | 7.2 | 13.1 | 24.4 | 17.5 | 30.9 | 34.7 | 1.2 | 31.6 | 12.7 | 21 |
| AS23□1F-01-04SD | 4 | | | 9.3 | | | | | 24.9 | | | | | | | 22 |
| AS23□1F-01-06SD | 6 | | | 11.6 | | 10.9 | | 14 | 26.9 | 22.9 | 36.3 | | | | 13.5 | |
| AS23□1F-01-08SD | 8 | | | 15.2 | | 12.9 | | 16.2 | 30.9 | 28.2 | 40.8 | | | | 18.5 | 25 |
| AS23□1F-02-04SD | 4 | R 1/4 | 17 | 10.4 | 18.5 | 10.9 | 7.2 | 16.2 | 30.6 | 21.9 | 39.6 | 40.2 | 1.2 | 34.7 | 16 | 40 |
| AS23□1F-02-06SD | 6 | | | 12.8 | | 12.9 | | 18.4 | 34 | 25.2 | 42.1 | | | | 17 | 41 |
| AS23□1F-02-08SD | 8 | | | 15.2 | | | | 18.3 | 35.2 | 28.2 | 45.1 | | | | 18.5 | 44 |
| AS23□1F-02-10SD | 10 | | | 18.5 | | | | 20.2 | 38.7 | 31 | 47.9 | | | | 21 | 48 |
| AS33□1F-02-06SD | 6 | R 1/4 | 19 | 12.8 | 23 | 12.9 | 9.8 | 20.6 | 38.5 | 25.2 | 46.5 | 54.8 | 1.2 | 49.3 | 17 | 73 |
| AS33□1F-02-08SD | 8 | | | 15.2 | | | | | 39.7 | 28.2 | 49.5 | | | | 18.5 | 76 |
| AS33□1F-02-10SD | 10 | | | 18.5 | | 16.2 | | 23 | 43.7 | 32.6 | 53.9 | | | | 21 | 80 |
| AS33□1F-02-12SD | 12 | | | 20.9 | | | | | 44.9 | 34.4 | 55.7 | | | | 22 | 82 |
| AS33□1F-03-06SD | 6 | R 3/8 | 19 | 12.8 | 23 | 12.9 | 9.8 | 20.6 | 38.5 | 25.2 | 45 | 52.6 | 1.2 | 47.4 | 17 | 78 |
| AS33□1F-03-08SD | 8 | | | 15.2 | | | | | 39.7 | 28.2 | 48 | | | | 18.5 | 81 |
| AS33□1F-03-10SD | 10 | | | 18.5 | | 16.2 | | 23 | 43.7 | 32.6 | 52.4 | | | | 21 | 85 |
| AS33□1F-03-12SD | 12 | | | 20.9 | | | | | 44.9 | 34.4 | 54.2 | | | | 22 | 87 |
| AS43□1F-04-10SD | 10 | R 1/2 | 24 | 18.5 | 28.6 | 16.2 | 12.4 | 25.8 | 49.4 | 32.6 | 57.1 | 62.9 | 1.2 | 55.8 | 21 | 145 |
| AS43□1F-04-12SD | 12 | | | 20.9 | | 19.4 | | 26.8 | 52 | 36.3 | 60.8 | | | | 22 | 147 |

* Reference dimensions of M5 x 0.8, R threads after installation.

### Inch Size

| Model | d | T | H | D1 | D2 | D3 | D4 | L1 | L2 | L3 | L4 | L5 | L6 | A* | M1 | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS13□1F-U10/32-01D | 1/8" | 10-32 UNF | 8 | 8.4 | 9.6 | 9.3 | 4.7 | 10.8 | 19.8 | 17.5 | 28.7 | 31 | 0.7 | 37.4 | 12.7 | 10 |
| AS13□1F-U10/32-03D | 5/32" | | | 9.3 | | | | | 20.3 | | | | | | | |
| AS13□1F-U10/32-05D | 3/16" | | | 11.4 | | | | | 21.3 | 23.3 | 34.5 | | | | 16.5 | 11 |
| AS13□1F-U10/32-07D | 1/4" | | | 12 | | | | | 21.6 | 20.7 | 31.9 | | | | 13.7 | |
| AS23□1F-N01-01SD | 1/8" | NPT 1/8 | 12.7 | 8.4 | 14 | 9.3 | 7.2 | 13.1 | 24.4 | 17.5 | 30.9 | 34.7 | 1.2 | 31.6 | 12.7 | 21 |
| AS23□1F-N01-03SD | 5/32" | | | 9.3 | | | | | 24.9 | | | | | | | 22 |
| AS23□1F-N01-05SD | 3/16" | | | 11.4 | | 10.9 | | 14 | 26.8 | 23.9 | 37.3 | | | | 16.5 | |
| AS23□1F-N01-07SD | 1/4" | | | 13.2 | | 12.9 | | 16.2 | 29.9 | 25.6 | 38.2 | | | | 18.5 | 23 |
| AS23□1F-N01-09SD | 5/16" | | | 15.2 | | | | | 30.9 | 28.2 | 40.8 | | | | 21 | 25 |
| AS23□1F-N02-03SD | 5/32" | NPT 1/4 | 17.5 | 10.4 | 19 | 10.9 | 7.2 | 16.2 | 30.6 | 21.9 | 39.6 | 40.2 | 1.2 | 34.7 | 16 | 40 |
| AS23□1F-N02-05SD | 3/16" | | | 11.4 | | | | | 31.1 | 23.9 | 41.6 | | | | 17 | 41 |
| AS23□1F-N02-07SD | 1/4" | | | 13.2 | | 12.9 | | 18.3 | 34.2 | 25.6 | 42.5 | | | | 18.5 | 44 |
| AS23□1F-N02-09SD | 5/16" | | | 15.2 | | | | | 35.2 | 28.2 | 45.1 | | | | 21 | 47 |
| AS23□1F-N02-11SD | 3/8" | | | 17.9 | | | | 20.2 | 38.7 | 31 | 47.9 | | | | | 48 |
| AS33□1F-N02-07SD | 1/4" | NPT 1/4 | 19 | 13.2 | 23 | 12.9 | 9.8 | 20.6 | 38.7 | 25.6 | 46.9 | 54.8 | 1.2 | 49.3 | 17 | 73 |
| AS33□1F-N02-09SD | 5/16" | | | 15.2 | | | | | 39.7 | 28.2 | 49.5 | | | | 18.5 | 76 |
| AS33□1F-N02-11SD | 3/8" | | | 17.9 | | 16.2 | | 23 | 43.7 | 32.6 | 53.9 | | | | 21 | 82 |
| AS33□1F-N03-07SD | 1/4" | NPT 3/8 | 19 | 13.2 | 23 | 12.9 | 9.8 | 20.6 | 38.7 | 25.6 | 45.4 | 52.6 | 1.2 | 47.4 | 17 | 78 |
| AS33□1F-N03-09SD | 5/16" | | | 15.2 | | | | | 39.7 | 28.2 | 48 | | | | 18.5 | 81 |
| AS33□1F-N03-11SD | 3/8" | | | 17.9 | | 16.2 | | 23 | 43.7 | 32.6 | 52.4 | | | | 21 | 87 |
| AS43□1F-N04-11SD | 3/8" | NPT 1/2 | 23.8 | 17.9 | 29 | 16.2 | 12.4 | 25.8 | 49.4 | 32.6 | 57.1 | 62.9 | 1.2 | 55.8 | 21 | 145 |
| AS43□1F-N04-13SD | 1/2" | | | 21.7 | | 19.4 | | 26.8 | 52 | 36.3 | 60.8 | | | | 22 | 147 |

* Reference dimensions of 10-32 UNF and NPT threads after installation.

# Speed Controller Adjustable by Flat Head Screwdriver with One-touch Fittings In-line Type

# Series AS□□□1F-D

## Model

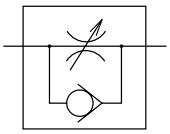
| Model | Applicable tubing O.D. | | | | | | | | | | | | Applicable cylinder bore size (mm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Metric size | | | | | | Inch size | | | | | | |
| | 3.2 | 4 | 6 | 8 | 10 | 12 | 1/8" | 5/32" | 3/16" | 1/4" | 5/16" | 3/8" | 1/2" | |
| **AS1001F** | ● | ● | ● | | | | ● | ● | ● | ● | | | | 6, 10, 16, 20 |
| **AS2001F** | | ● | ● | | | | | ● | ● | ● | | | | 20, 25, 32 |
| **AS2051F** | | | ● | ● | | | | | ● | ● | ● | | | 20, 25, 32, 40 |
| **AS3001F** | | | ● | ● | ● | ● | | | | ● | ● | ● | | 40, 50, 63 |
| **AS4001F** | | | | | ● | ● | | | | | | ● | ● | 63, 80, 100 |

## Specifications

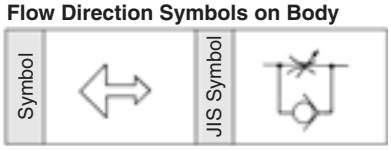
| | |
|---|---|
| **Fluid** | Air |
| **Proof pressure** | 1.5 MPa |
| **Max. operating pressure** | 1 MPa |
| **Min. operating pressure** | 0.1 MPa |
| **Ambient and fluid temperature** | –5 to 60°C (No freezing) |
| **Number of needle rotations** | 10 turns (8 turns (1)) |
| **Applicable tubing material** (2) | Nylon, Soft nylon, Polyurethane |

Note 1) In the case of AS1001F type
Note 2) Use caution regarding the max. operating pressure when soft nylon or polyurethane tubing is used. (Refer to pages 371 and 372 for details.)
Note 3) Brass parts are all electroless nickel plated.

**JIS Symbol**



**Flow Direction Symbols on Body**




## Flow Rate and Effective Area

| Model | | AS1001F | AS2001F | | AS2051F | | AS3001F | | | AS4001F | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Tubing O.D. | Metric size | ø3.2, ø4, ø6 | ø4 | ø6 | ø6 | ø8 | ø6 | ø8 | ø10, ø12 | ø10 | ø12 |
| | Inch size | ø1/8", ø5/32" ø3/16", ø1/4" | ø5/32" | ø3/16", ø1/4" | ø3/16" | ø1/4", ø5/16" | ø1/4" | ø5/16" | ø3/8" | ø3/8" | ø1/2" |
| Controlled flow (Free flow) | Flow rate (ℓ/min (ANR)) | 100 | 130 | 230 | 290 | 460 | 420 | 660 | 920 | 1050 | 1390 |
| | Effective area (mm²) | 1.5 | 2 | 3.5 | 4.5 | 7 | 6.5 | 10 | 14 | 16 | 21 |

Note) Flow rate values are measured at 0.5 MPa and 20°C

## How to Order

**AS 200 1F — 06 D —** [ ]

**Body size**

| | |
|---|---|
| **100** | M5 standard |
| **200** | 1/8 standard |
| **205** | 1/4 standard |
| **300** | 3/8 standard |
| **400** | 1/2 standard |

**With One-touch fittings**

**Applicable tubing O.D.**

| Metric size | | Inch size | |
|---|---|---|---|
| **23** | ø3.2 * | **01** | ø1/8" |
| **04** | ø4 | **03** | ø5/32" |
| **06** | ø6 | **05** | ø3/16" |
| **08** | ø8 | **07** | ø1/4" |
| **10** | ø10 | **09** | ø5/16" |
| **12** | ø12 | **11** | ø3/8" |
| | | **13** | ø 1/2" |

* Use ø1/8" tube.

**Type adjustable by flat head screwdriver**

**Made to Order**
Refer to page 521 for details.

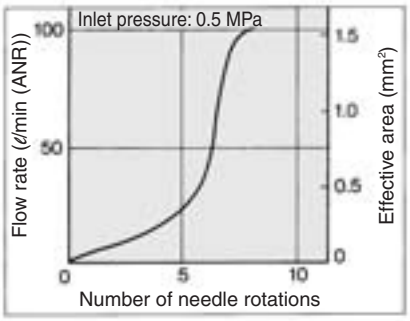
**Made to Order**
(Refer to page 521 for details.)

**⚠Caution**

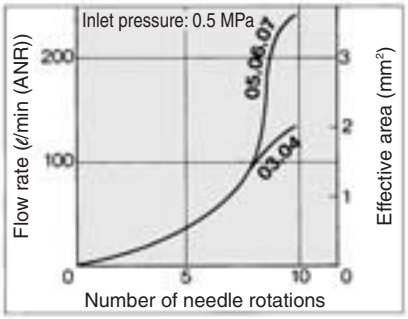
**Be sure to read before handling. Refer to front matters 58 and 59 for Safety Instructions and pages 412 to 414 for Flow Control Equipment Precautions.**

## Needle Valve/Flow Characteristics

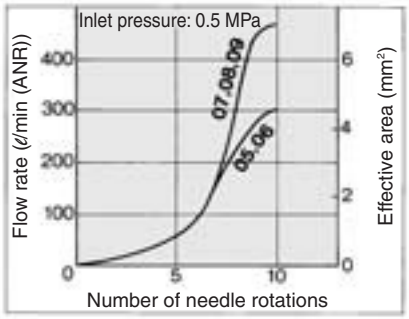
**AS1001F**



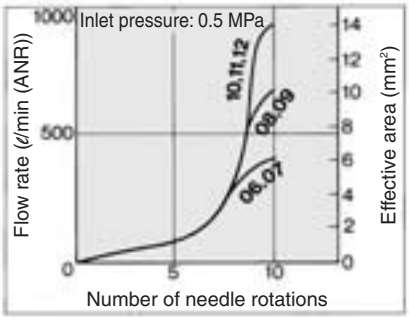

**AS2001F**



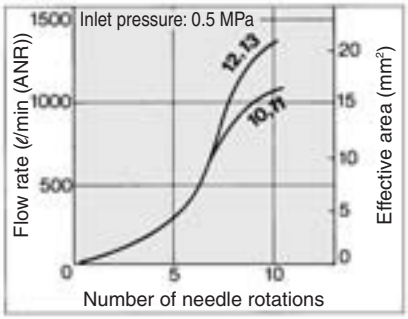

**AS2051F**




**AS3001F**

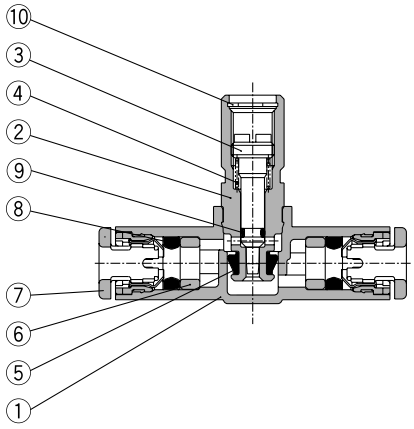



**AS4001F**

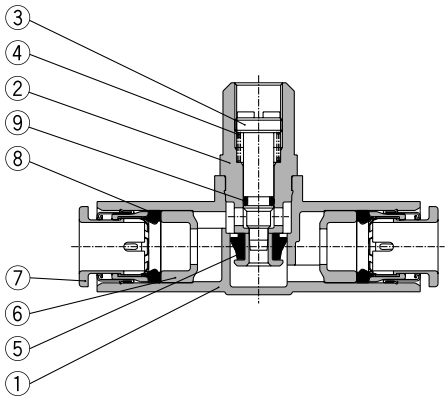



## Construction

**AS1001F**



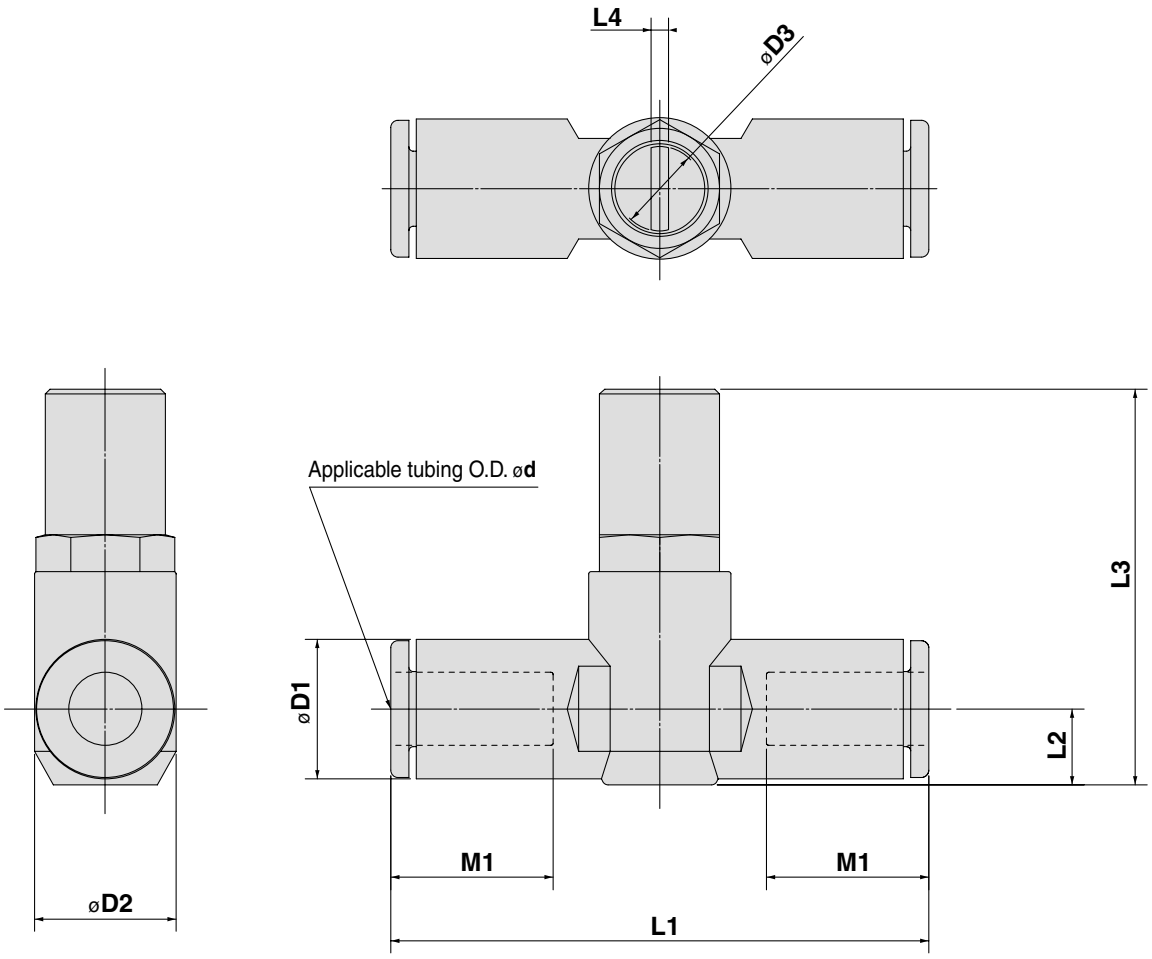

**AS2001F to AS4001F**




### Component Parts

| No. | Description | Material | Note |
|---|---|---|---|
| 1 | **Body A** | PBT | |
| 2 | **Body B** | Brass | Electroless nickel plated |
| 3 | **Needle** | Brass | Electroless nickel plated |
| 4 | **Spring** | Steel wire | |
| 5 | **U seal** | HNBR | |
| 6 | **Spacer** | — | |
| 7 | **Cassette** | — | |
| 8 | **Seal** | NBR | |
| 9 | **O-ring** | NBR | |
| 10 | **Retaining ring for hole type C** | Tool steel | |

## Dimensions




### Metric Size

| Model | d | D1 | D2 | D3 | L1 | L2 | L3 | L4 | M1 | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|---|
| **AS1001F-23D** | 3.2 | 8.4 | 10 | 4.7 | 38 | 4.5 | 26 | 0.7 | 12.7 | 8 |
| **AS1001F-04D** | 4 | 9.3 | | | 39.2 | 5.2 | 26.6 | | | 9 |
| **AS1001F-06D** | 6 | 11.6 | | | 40.7 | 6.2 | 27.7 | | 13.5 | 10 |
| **AS2001F-04D** | 4 | 9.3 | 11.8 | 7.2 | 40.7 | 5.2 | 31.9 | 1.2 | 12.7 | 15 |
| **AS2001F-06D** | 6 | 11.6 | | | 44.8 | 6.3 | 33 | | 13.5 | 16 |
| **AS2051F-06D** | 6 | 12.8 | 14.8 | 7.2 | 53.2 | 6.7 | 35.2 | 1.2 | 17 | 33 |
| **AS2051F-08D** | 8 | 15.2 | | | 59.8 | 8.1 | 36.5 | | 18 | 36 |
| **AS3001F-06D** | 6 | 12.8 | 19.8 | 9.8 | 59 | 7.4 | 45 | 1.2 | 17 | 56 |
| **AS3001F-08D** | 8 | 15.2 | | | 64.4 | 8.2 | 45.8 | | 18 | 60 |
| **AS3001F-10D** | 10 | 18.5 | | | 71.6 | 9.8 | 47.3 | | 21 | 64 |
| **AS3001F-12D** | 12 | 20.9 | | | 76 | 11 | 48.5 | | 22 | 68 |
| **AS4001F-10D** | 10 | 18.5 | 26.5 | 12.4 | 77.7 | 11.3 | 55.4 | 1.2 | 21 | 121 |
| **AS4001F-12D** | 12 | 20.9 | | | 82.1 | | 56.4 | | 22 | 125 |

### Inch Size

| Model | d | D1 | D2 | D3 | L1 | L2 | L3 | L4 | M1 | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|---|
| **AS1001F-01D** | 1/8" | 8.4 | 10 | 4.7 | 38 | 4.5 | 26 | 0.7 | 12.7 | 8 |
| **AS1001F-03D** | 5/32" | 9.3 | | | 39.2 | 5.2 | 26.6 | | | 9 |
| **AS1001F-05D** | 3/16" | 11.4 | | | 48.7 | 6.2 | 27.7 | | 16.5 | 14 |
| **AS1001F-07D** | 1/4" | 12 | | | 40.7 | | | | 13.7 | 11 |
| **AS2001F-03D** | 5/32" | 9.3 | 11.8 | 7.2 | 40.7 | 5.2 | 31.9 | 1.2 | 12.7 | 15 |
| **AS2001F-05D** | 3/16" | 11.4 | | | 50 | 6.2 | 32.8 | | 16.5 | 21 |
| **AS2001F-07D** | 1/4" | 13.2 | | | 52.2 | 7.1 | 33.7 | | 17 | 19 |
| **AS2051F-05D** | 3/16" | 11.4 | 14.8 | 7.2 | 52.2 | 6.2 | 34.9 | 1.2 | 16.5 | 35 |
| **AS2051F-07D** | 1/4" | 13.2 | | | 54.4 | 7.1 | 35.7 | | 17 | 33 |
| **AS2051F-09D** | 5/16" | 15.2 | | | 59.8 | 8.1 | 36.7 | | 18 | 36 |
| **AS3001F-07D** | 1/4" | 13.2 | 19.8 | 9.8 | 59 | 7.4 | 45.2 | 1.2 | 17 | 56 |
| **AS3001F-09D** | 5/16" | 15.2 | | | 64.4 | 8.2 | 46 | | 18 | 60 |
| **AS3001F-11D** | 3/8" | 17.9 | | | 70.8 | 9.5 | 47.2 | | 21 | 72 |
| **AS4001F-11D** | 3/8" | 17.9 | 26.5 | 12.4 | 76.9 | 10.3 | 55.5 | 1.2 | 21 | 129 |
| **AS4001F-13D** | 1/2" | 21.7 | | | 83.1 | 11.6 | 56.9 | | 22 | 142 |

## Series *AS□□□1F-D*

# Made to Order Specifications

**Please contact SMC for detailed dimensions, specifications and delivery.**

**Lubricant: Vaseline** **X12**

**Ex.) AS1001F-23D-X12**

**Throttle Valve (Without Check Valve)** **X214**

**Ex.) AS1001F-23D-X214**

**Grease-free (Seal: Fluorine coated) + Throttle Valve (Without Check Valve)** **X21**

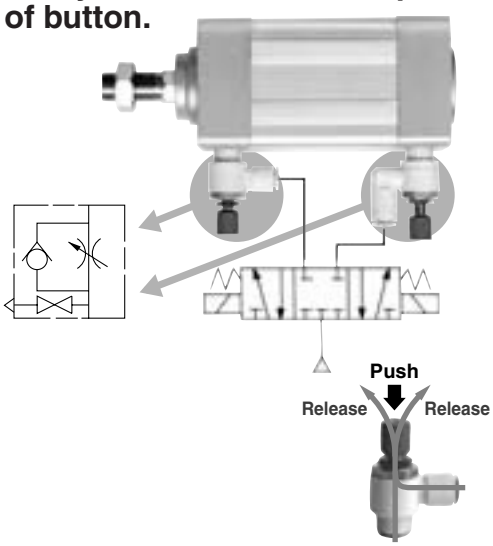
**Ex.) AS1001F-23D-X21**

Note 1) Not particle-free

# Speed Controller with Residual Pressure Release Valve with One-touch Fitting

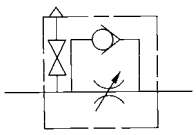
# Series AS□□□□FE

**Residual pressure can be easily released with one push of button.**

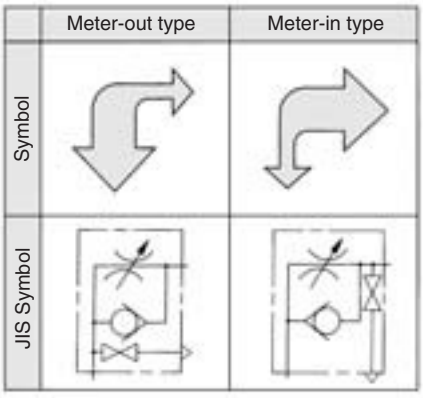



**Eye-catching red color release button.**

**JIS Symbol**



**Flow Direction Symbols on Body**




## Model

| Elbow type | Universal type | Port size in the cylinder side | Applicable tubing O.D. (mm) | | | | | Applicable cylinder bore size (mm) |
|---|---|---|---|---|---|---|---|---|
| | | | ø4 | ø6 | ø8 | ø10 | ø12 | |
| AS22□1FE-01 | AS23□1FE-01 | R 1/8 | ● | ● | ● | ●(1) | | 20, 25, 32 |
| AS22□1FE-02 | AS23□1FE-02 | R 1/4 | ● | ● | ● | ● | | 20, 25, 32, 40 |
| AS32□1FE-03 | AS33□1FE-03 | R 3/8 | | ● | ● | ● | ● | 40, 50, 63 |
| AS42□1FE-04 | AS43□1FE-04 | R 1/2 | | | | ● | ● | 63, 80, 100 |

Note 1) Elbow type only
Note 2) Distinction between meter-out/meter-in types by appearance
Those are distinguished by the lock nut. The meter-out type is electroless nickel plated, while the meter-in type is black zinc chromate plated.

## Specifications

| | |
|---|---|
| **Fluid** | Air |
| **Proof pressure** | 1.5 MPa |
| **Max. operating pressure** | 1.0 MPa |
| **Min. operating pressure** | 0.1 MPa |
| **Ambient and fluid temperature** | –5 to 60°C (No freezing) |
| **Number of needle rotations** | 10 turns |
| **Effective area of residual exhaust valve** | 0.8 mm² |
| **Applicable tubing material** | Nylon, Soft nylon, Polyurethane |

## Flow Rate and Effective Area

| Model | | AS22□1FE-01 AS23□1FE-01 | | AS22□1FE-02 AS23□1FE-02 | | | AS32□1FE AS33□1FE | | | AS42□1FE AS43□1FE | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Tubing O.D. | Metric size | ø4 | ø6 ø8 ø10 | ø4 | ø6 | ø8 ø10 | ø6 | ø8 | ø10 ø12 | ø10 | ø12 |
| Controlled flow (Free flow) | Flow rate (ℓ/min (ANR)) | 180 | 230 | 260 | 390 | 460 | 660 | 790 | 920 | 1580 | 1710 |
| | Effective area (mm²) | 2.7 | 3.5 | 4 | 6 | 7 | 10 | 12 | 14 | 24 | 26 |

Note) Flow rate values are measured at 0.5 MPa and 20°C.

## How to Order

**AS 2 2 1 1 F E – 01 – 06 S K –** ☐

**Body size**

| | |
|---|---|
| 2 | 1/8, 1/4 standard |
| 3 | 3/8 standard |
| 4 | 1/2 standard |

**Type**

| | |
|---|---|
| 2 | Elbow |
| 3 | Universal |

**Control type**

| | |
|---|---|
| 0 | Meter-out |
| 1 | Meter-in |

**With One-touch fitting**

**With residual pressure release valve**

**Port size**

| | |
|---|---|
| 01 | R 1/8 |
| 02 | R 1/4 |
| 03 | R 3/8 |
| 04 | R 1/2 |

**Applicable tubing O.D. (mm)**

| | |
|---|---|
| 04 | ø4 |
| 06 | ø6 |
| 08 | ø8 |
| 10 | ø10 |
| 12 | ø12 |

**With seal**

**Hexagonal lock nut**

**Made to Order**
Refer to page 465 for details.

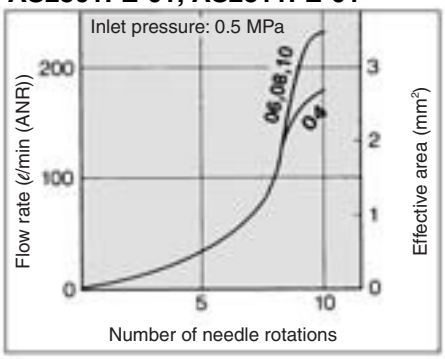
**Made to Order**
(Refer to page 465 for details.)



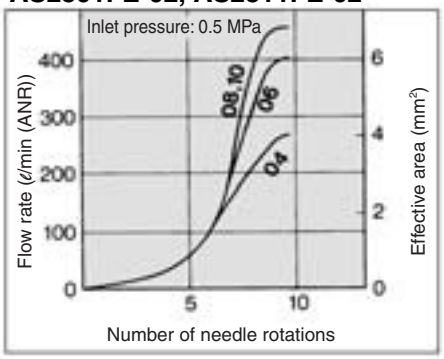
SMC

## Needle Valve/Flow Characteristics

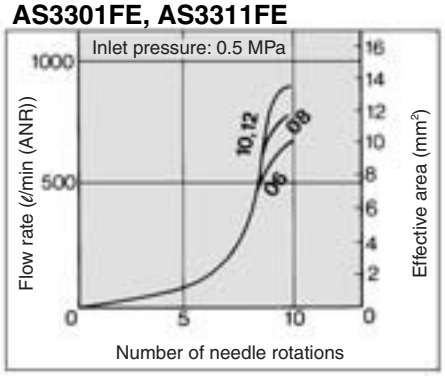
**AS2201FE-01, AS2211FE-01**
**AS2301FE-01, AS2311FE-01**



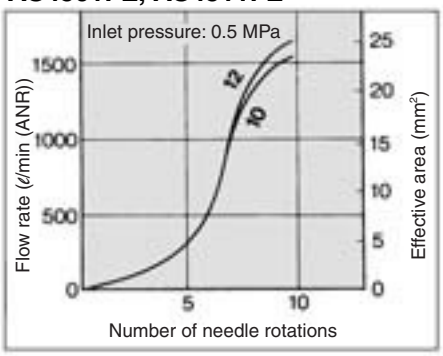

**AS2201FE-02, AS2211FE-02**
**AS2301FE-02, AS2311FE-02**




**AS3201FE, AS3211FE**
**AS3301FE, AS3311FE**




**AS4201FE, AS4211FE**
**AS4301FE, AS4311FE**




**⚠Caution**

**Be sure to read before handling.**
**Refer to front matters 58 and 59 for Safety Instructions and pages 412 to 414 for Flow Control Equipment Precautions.**

## Made to Order

Made to Order

**Lubricant: Vaseline** **X12**

**Ex.) AS2201FE-01-04SK-X12**

**Throttle Valve (Without Check Valve)** **X214**

**Ex.) AS2201FE-01-04SK-X214**

Note) Throttle valve is only compatible with the part no. of the meter-out type.

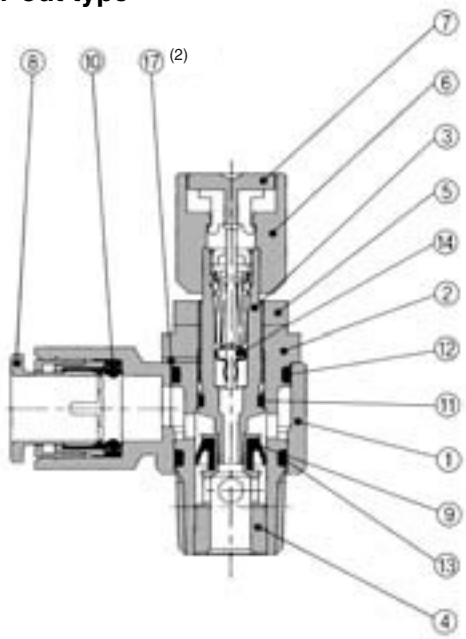
**Grease-free (Seal: Fluorine Coating) + Throttle Valve (Without Check Valve)** **X21**

**Ex.) AS2201FE-01-04SK-X21**

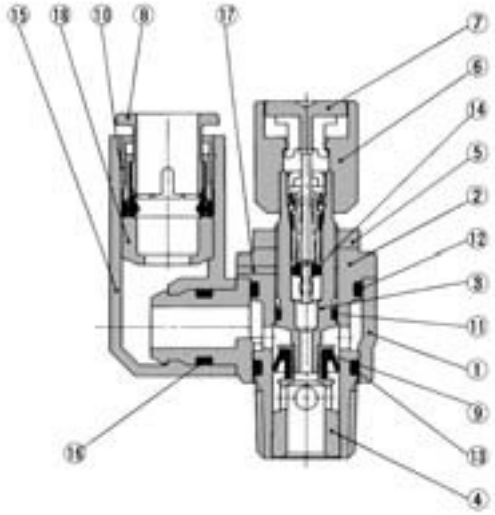
Note 1) Not particle-free
Note 2) Throttle valve is only compatible with the part no. of the meter-out type.

## Construction

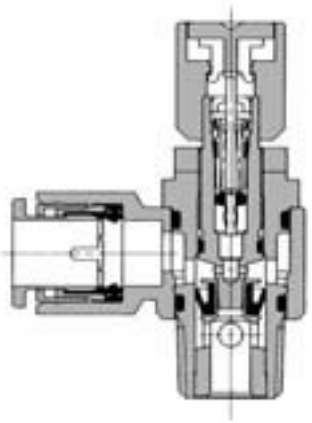
### Elbow type
### Meter-out type



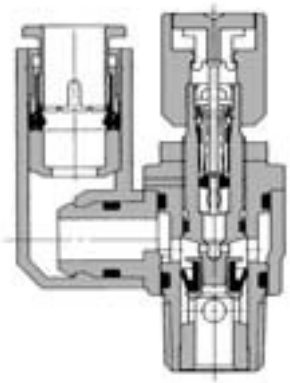

### Universal type
### Meter-out type




### Meter-in type



### Meter-in type



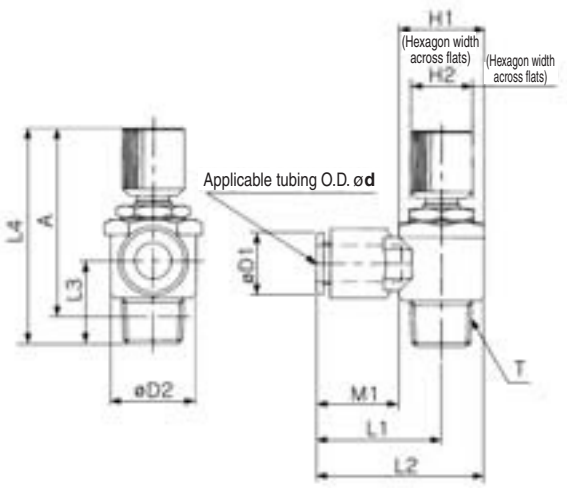
### Component Parts

| No. | Description | Material | Note |
|---|---|---|---|
| 1 | **Body A** | PBT | White |
| 2 | **Body B** | Brass | Electroless nickel plated |
| 3 | **Needle** | Brass | Electroless nickel plated |
| 4 | **Seat ring** | Brass | (1) |
| 5 | **Lock nut** | Brass | Electroless nickel plated (2) |
| 6 | **Handle** | Aluminum alloy | Red painted |
| 7 | **Push button** | POM | Red |
| 8 | **Cassette** | — | |
| 9 | **U seal** | HNBR | |
| 10 | **Seal** | NBR | |
| 11 | **O-ring** | NBR | |
| 12 | **O-ring** | NBR | |
| 13 | **O-ring** | NBR | |
| 14 | **Valve core** | — | |
| 15 | **Elbow body** | PBT | |
| 16 | **O-ring** | NBR | |
| 17 | **Accidental release prevention screw** | Stainless steel | AS2□□1FE-01 (3) |
| 18 | **Spacer** | — | |

Note 1) AS2□□1FE type is electroless nickel plated.
Note 2) Meter-in type is black zinc chromate plated.
Note 3) Only for AS2□□1FE-01.

## Dimensions

### Elbow type

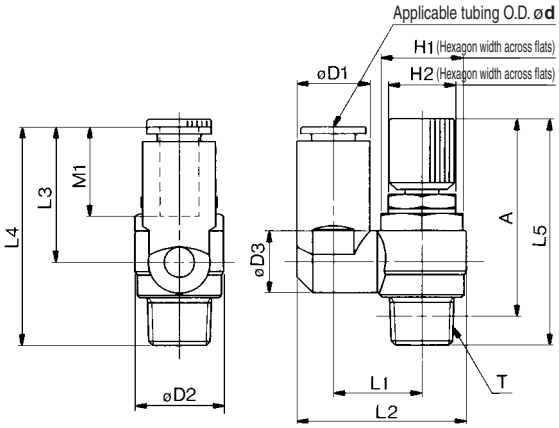



| Model | Applicable tubing O.D. ød | T | H1 | H2 | D1 | D2 | L1 | L2 | L3 | L4 (1) | | A (2) | | M1 | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Max. | Min. | Max. | Min. | | |
| AS22□1FE-01-04SK | 4 | R 1/8 | 12 | 12 | 9.3 | 14.2 | 20.4 | 27.5 | 13.4 | 53 | 48 | 49.9 | 44.9 | 12.7 | 26 |
| AS22□1FE-01-06SK | 6 | | | | 11.6 | | 20.4 | 27.5 | | | | | | 13.5 | 27 |
| AS22□1FE-01-08SK | 8 | | | | 15.2 | | 25.3 | 32.4 | | | | | | 18.5 | 29 |
| AS22□1FE-01-10SK | 10 | | | | 18.5 | | 33.1 | 40.2 | 14.1 | | | | | 21 | 31 |
| AS22□1FE-02-04SK | 4 | R 1/4 | 17 | 14 | 10.4 | 18.5 | 25.2 | 34.4 | 17.7 | 51.7 | 46.7 | 46.2 | 41.2 | 16 | 36 |
| AS22□1FE-02-06SK | 6 | | | | 12.8 | | 25.2 | 34.4 | | | | | | 17 | 37 |
| AS22□1FE-02-08SK | 8 | | | | 15.2 | | 27.2 | 36.4 | | | | | | 18.5 | 39 |
| AS22□1FE-02-10SK | 10 | | | | 18.5 | | 35.3 | 44.5 | 19.5 | | | | | 21 | 42 |
| AS32□1FE-03-06SK | 6 | R 3/8 | 19 | 14 | 12.8 | 23 | 27.8 | 39.3 | 19.8 | 56.7 | 51.7 | 51.5 | 46.5 | 16 | 57 |
| AS32□1FE-03-08SK | 8 | | | | 15.2 | | 29.5 | 41 | | | | | | 18.5 | 60 |
| AS32□1FE-03-10SK | 10 | | | | 18.5 | | 31.8 | 43.3 | | | | | | 21 | 62 |
| AS32□1FE-03-12SK | 12 | | | | 20.9 | | 32.8 | 44.3 | | | | | | 22 | 64 |
| AS42□1FE-04-10SK | 10 | R 1/2 | 24 | 17 | 18.5 | 28.6 | 33.6 | 47.9 | 24.5 | 63.8 | 58.8 | 56.5 | 51.5 | 21 | 103 |
| AS42□1FE-04-12SK | 12 | | | | 20.9 | | 34.6 | 48.9 | | | | | | 22 | 105 |

Note 1) Reference dimensions
Note 2) Reference dimensions of R thread after installation.

## Dimensions

### Universal type




| Model | Applicable tubing O.D. ød | T | H1 | H2 | D1 | D2 | D3 | L1 | L2 | L3 | L4 | L5 (1) | | A (2) | | M1 | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Max. | Min. | Max. | Min. | | |
| AS23□1FE-01-04SK | 4 | R 1/8 | 12 | 12 | 9.3 | 14.2 | 9.3 | 13.1 | 24.9 | 17.5 | 30.9 | 53 | 48 | 49.9 | 44.9 | 12.7 | 26 |
| AS23□1FE-01-06SK | 6 | | | | 11.6 | | 10.9 | 14 | 26.9 | 22.9 | 36.3 | | | | | 13.5 | 27 |
| AS23□1FE-01-08SK | 8 | | | | 15.2 | | 12.9 | 16.2 | 30.9 | 28.2 | 40.8 | | | | | 18.5 | 29 |
| AS23□1FE-02-04SK | 4 | R 1/4 | 14 | 14 | 10.4 | 18.5 | 10.9 | 16.2 | 30.6 | 21.9 | 39.6 | 51.7 | 46.7 | 46.2 | 41.2 | 16 | 36 |
| AS23□1FE-02-06SK | 6 | | | | 12.8 | | 12.9 | 18.4 | 34 | 25.2 | 42.1 | | | | | 17 | 37 |
| AS23□1FE-02-08SK | 8 | | | | 15.2 | | | 18.3 | 35.2 | 28.2 | 45.1 | | | | | 18.5 | 39 |
| AS23□1FE-02-10SK | 10 | | | | 18.5 | | | 20.2 | 38.7 | 31 | 47.9 | | | | | 21 | 42 |
| AS33□1FE-03-06SK | 6 | R 3/8 | 19 | 14 | 12.8 | 23 | 12.9 | 20.6 | 38.5 | 25.2 | 45 | 56.7 | 51.7 | 51.5 | 46.5 | 17 | 57 |
| AS33□1FE-03-08SK | 8 | | | | 15.2 | | | | 39.7 | 28.2 | 48 | | | | | 18.5 | 60 |
| AS33□1FE-03-10SK | 10 | | | | 18.5 | | 16.2 | 23 | 43.7 | 32.6 | 52.4 | | | | | 21 | 62 |
| AS33□1FE-03-12SK | 12 | | | | 20.9 | | | | 44.9 | 34.4 | 54.2 | | | | | 22 | 64 |
| AS43□1FE-04-10SK | 10 | R 1/2 | 24 | 17 | 18.5 | 28.6 | 16.2 | 25.8 | 49.4 | 32.6 | 57.1 | 63.8 | 58.8 | 56.5 | 51.5 | 21 | 103 |
| AS43□1FE-04-12SK | 12 | | | | 21.7 | | 19.4 | 26.8 | 52 | 36.3 | 60.8 | | | | | 22 | 105 |

Note 1) Reference dimensions
Note 2) Reference dimensions of R thread after installation.

# Speed Controller with One-touch Fitting
# Stainless Steel Series
# Elbow Type/Universal Type
# *Series AS-FG*

**Stainless specifications for use in corrosive environments. Stainless steel 303 used for metal parts.**

Suitable for use on CRT lines where copper ions can cause damage, for washing food processing equipment where there is exposure to water and salt water, etc., and in clean rooms where dust from discoloration and rusting of copper materials is unacceptable.

**Light colors to match equipment**

White resin parts are used for bodies and release buttons.

**Threads with and without seal are available as standard.**

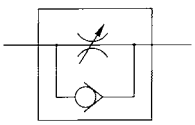
**Applicable tubing: Inch sizes standardized**

Inch sizes are now available for all models.

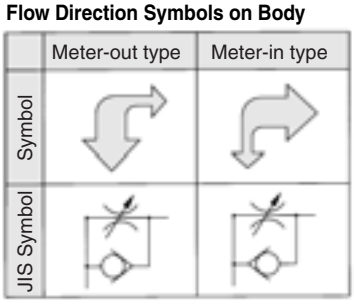
**Elbow type**

**Universal type**

**JIS Symbol**



**Flow Direction Symbols on Body**




## Model

| Elbow type | Universal type | Port size | Applicable tubing O.D. | | | | | | | | | | | | Applicable cylinder bore size (mm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Metric size | | | | | | Inch size | | | | | | |
| | | | 3.2 | 4 | 6 | 8 | 10 | 12 | 1/8" | 5/32" | 3/16" | 1/4" | 5/16" | 3/8" | 1/2" | |
| AS12□1FG-M5 | AS13□1FG-M5 | M5 x 0.8 | ● | ● | ● | | | | | | | | | | | 6, 10, 16, 20 |
| AS22□1FG-01 | AS23□1FG-01 | R 1/8 | ● | ● | ● | ● | ●* | | | | | | | | | 20, 25, 32 |
| AS22□1FG-02 | AS23□1FG-02 | R 1/4 | | ● | ● | ● | ● | | | | | | | | | 20, 25, 32, 40 |
| AS32□1FG-02 | AS33□1FG-02 | R 1/4 | | | ● | ● | ● | ● | | | | | | | | 40, 50, 63 |
| AS32□1FG-03 | AS33□1FG-03 | R 3/8 | | | ● | ● | ● | ● | | | | | | | | 40, 50, 63 |
| AS42□1FG-04 | AS43□1FG-04 | R 1/2 | | | | | ● | ● | | | | | | | | 63, 80, 100 |
| AS12□1FG-U10/32 | AS13□1FG-U10/32 | 10-32 UNF | | | | | | | ● | ● | ● | ● | | | | 6, 10, 16, 20 |
| AS22□1FG-N01 | AS23□1FG-N01 | NPT 1/8 | | | | | | | ● | ● | ● | ● | ● | | | 20, 25, 32 |
| AS22□1FG-N02 | AS23□1FG-N02 | NPT 1/4 | | | | | | | | ● | ● | ● | ● | ● | | 20, 25, 32, 40 |
| AS32□1FG-N02 | AS33□1FG-N02 | NPT 1/4 | | | | | | | | | | ● | ● | ● | | 40, 50, 63 |
| AS32□1FG-N03 | AS33□1FG-N03 | NPT 3/8 | | | | | | | | | | ● | ● | ● | | 40, 50, 63 |
| AS42□1FG-N04 | AS43□1FG-N04 | NPT 1/2 | | | | | | | | | | | | ● | ● | 63, 80, 100 |

Note 1) Meter-out and meter-in types can be visually differentiated by the flow direction symbol on the resin body.
Note 2) * Elbow type only

## Specifications

| | |
|---|---|
| **Fluid** | Air |
| **Proof pressure** | 1.5 MPa |
| **Max. operating pressure** | 1 MPa |
| **Min. operating pressure** | 0.1 MPa |
| **Ambient and fluid temperature** | –5 to 60°C (No freezing) |
| **Number of needle rotations** | 10 turns (8 turns (1)) |
| **Applicable tubing material** (2) | Nylon, Soft nylon, Polyurethane |

Note 1) In the case of AS12□1FG and AS13□1FG
Note 2) Use caution regarding the max. operating pressure when soft nylon or polyurethane tubing is used.
(Refer to pages 371 and 372 for details.)

## Flow Rate and Effective Area

| Model | | AS12□1FG AS13□1FG | AS22□1FG-□01 AS23□1FG-□01 | | AS22□1FG-□02 AS23□1FG-□02 | | | AS32□1FG AS33□1FG | | | AS42□1FG AS43□1FG | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tubing O.D. | Metric size | ø3.2 ø4 ø6 | ø3.2 ø4 | ø6 ø8 ø10 | ø4 | ø6 | ø8 ø10 | ø6 | ø8 | ø10 ø12 | ø10 | ø12 |
| | Inch size | ø1/8" ø5/32" ø3/16" ø1/4" | ø1/8" ø5/32" | ø3/16" ø1/4" ø5/16" | ø5/32" | ø3/16" | ø1/4" ø5/16" ø3/8" | ø1/4" | ø5/16" | ø3/8" | ø3/8" | ø1/2" |
| Controlled flow (Free flow) | Flow rate (ℓ/min (ANR)) | 100 | 180 | 230 | 260 | 390 | 460 | 660 | 790 | 920 | 1580 | 1710 |
| | Effective area (mm²) | 1.5 | 2.7 | 3.5 | 4 | 6 | 7 | 10 | 12 | 14 | 12 | 26 |

Note) Flow rate values are measured at 0.5 MPa and 20°C.

**Made to Order**
(Refer to page 473 for details.)

## How to Order

**AS 2 3 0 1 F G – □ 01 – 06 □ – □**

**Body size**

| | |
|---|---|
| 1 | M5 standard |
| 2 | 1/8, 1/4 standard |
| 3 | 3/8 standard |
| 4 | 1/2 standard |

**Control type**

| | |
|---|---|
| 0 | Meter-out |
| 1 | Meter-in |

**Type**

| | |
|---|---|
| 2 | Elbow |
| 3 | Universal |

**With One-touch fitting**

**Stainless steel specifications (SUS303)**

**Thread type**

| | |
|---|---|
| Nil | Metric thread (M5) |
| | Unified thread (10-32 UNF) |
| | R |
| N | NPT |

**Port size**

| | |
|---|---|
| M5 | M5 x 0.8 |
| U10/32 | 10-32 UNF |
| 01 | 1/8 |
| 02 | 1/4 |
| 03 | 3/8 |
| 04 | 1/2 |

**Applicable tubing O.D.**

**Metric size**

| | |
|---|---|
| 23 | ø3.2 * |
| 04 | ø4 |
| 06 | ø6 |
| 08 | ø8 |
| 10 | ø10 |
| 12 | ø12 |

* Use ø1/8" tube.

**Inch size**

| | |
|---|---|
| 01 | ø1/8" |
| 03 | ø5/32" |
| 05 | ø3/16" |
| 07 | ø1/4" |
| 09 | ø5/16" |
| 11 | ø3/8" |
| 13 | ø1/2" |

**Option**

| | |
|---|---|
| Nil | None |
| S | With seal* |

* M5 and U10/32 are not available with seal.

**Made to Order**
(Refer to the below for details.)

## Made to Order

**1 Lubricant: Vaseline** **X12**

**Ex.) AS1201FG-M5-23-X12**

**2 Grease-free (Seal: Fluorine Coating) + Throttle Valve (Without Check Valve)** **X21**

**Ex.) AS1201FG-M5-23-X21**

Note 1) Not particle-free
Note 2) Throttle valve is only compatible with the part no. of the meter-out type.

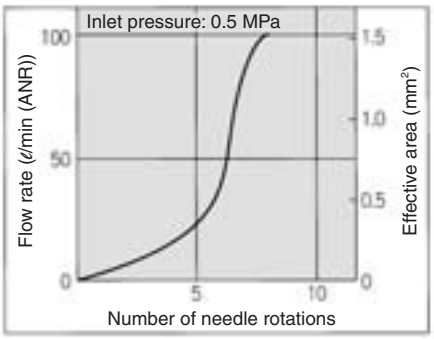
**3 Throttle Valve (Without Check Valve)** **X214**

**Ex.) AS1201FG-M5-23-X214**

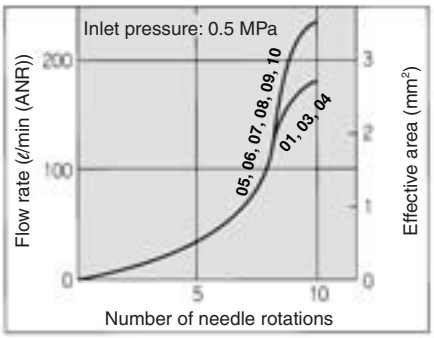
Note) Throttle valve is only compatible with the part no. of the meter-out type.

## Needle Valve/Flow Characteristics

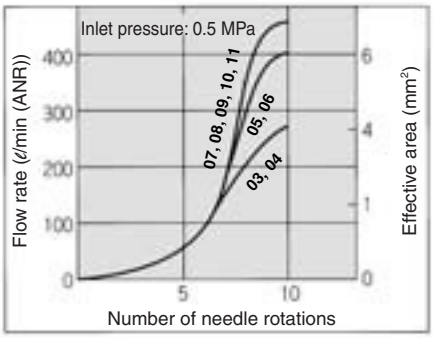
**AS12□1FG**
**AS13□1FG**



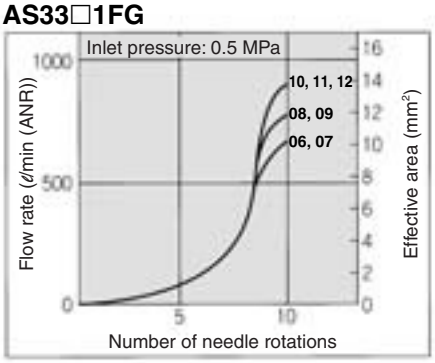

**AS22□1FG-□01**
**AS23□1FG-□01**



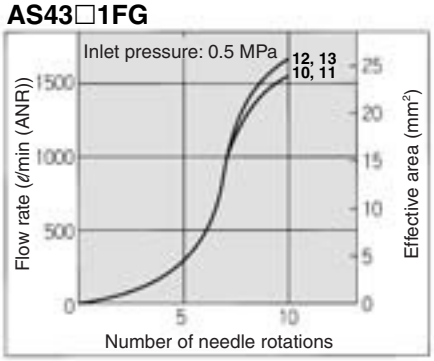

**AS22□1FG-□02**
**AS23□1FG-□02**




**AS32□1FG**
**AS33□1FG**



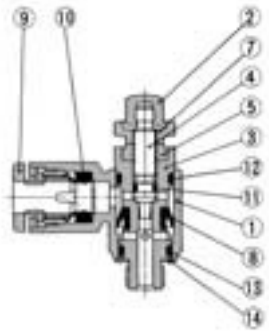

**AS42□1FG**
**AS43□1FG**

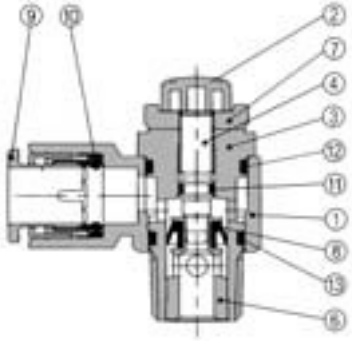


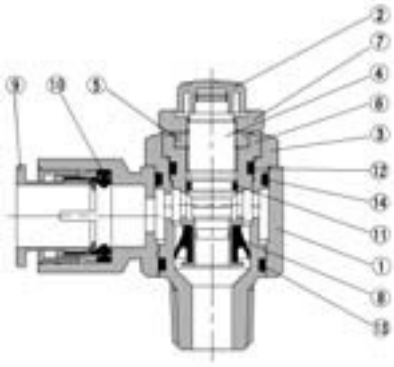
## Construction: Elbow Type

### Meter-out type
### M5 type
### U10/32 type

**AS3201FG-02**

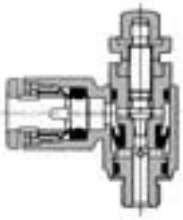


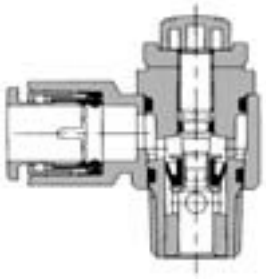


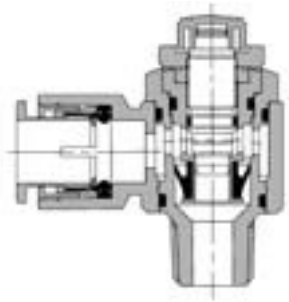


### Meter-in type
### M5 type
### U10/32 type

**AS3211FG-02**







**Component Parts**

| No. | Description | Material | Note |
|---|---|---|---|
| 1 | **Body A** | PBT | |
| 2 | **Handle** | PBT | |
| 3 | **Body B** | Stainless steel 303 | |
| 4 | **Needle** | Stainless steel 303 | |
| 5 | **Needle guide** | Stainless steel 303 | |
| 6 | **Seat ring** | Stainless steel 303 | |
| 7 | **Lock nut** | Stainless steel 303 | |
| 8 | **U seal** | HNBR | |
| 9 | **Cassette** | — | |
| 10 | **Seal** | NBR | |
| 11 | **O-ring** | NBR | |
| 12 | **O-ring** | NBR | |
| 13 | **O-ring** | NBR | |
| 14 | **O-ring** | NBR | |
| 15 | **Gasket** | NBR, Stainless steel | M5 type only |

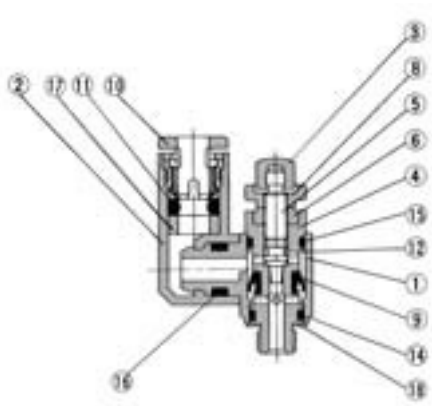
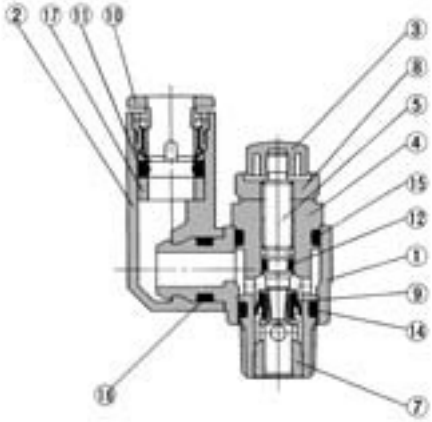
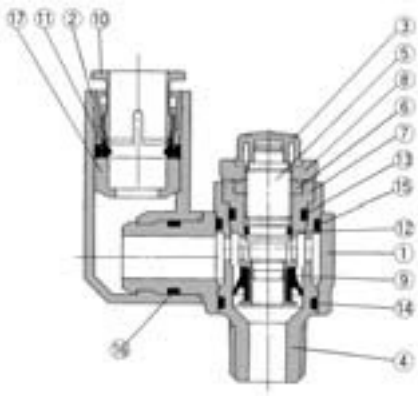
### ⚠Caution

**Be sure to read before handling.**
**Refer to front matters 58 and 59 for Safety Instructions and pages 412 to 414 for Flow Control Equipment Precautions.**

## Construction: Universal Type

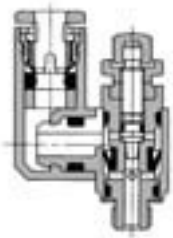
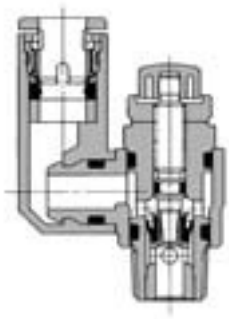
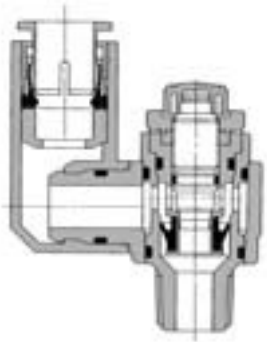
**Meter-out type**
**M5 type**
**U10/32 type**

**AS3301FG-02**

**Meter-in type**
**M5 type**
**U10/32 type**

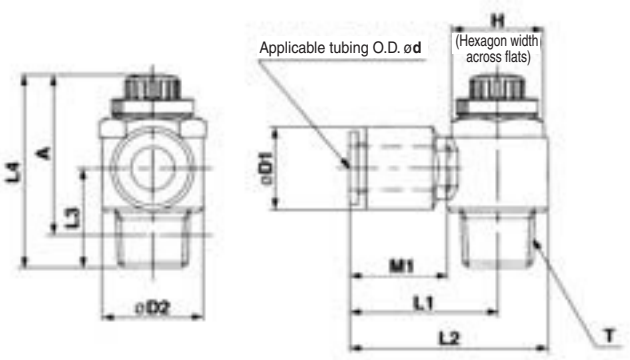
**AS3311FG-02**

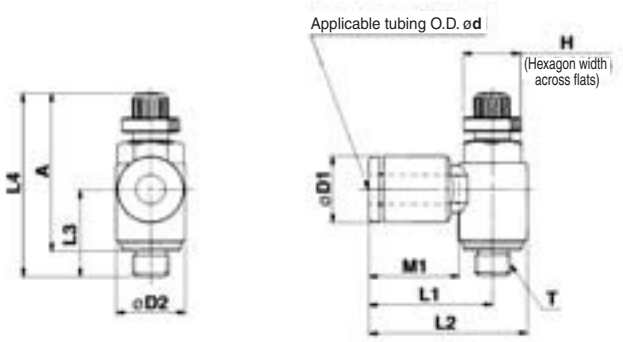
**Component Parts**

| No. | Description | Material | Note |
|---|---|---|---|
| 1 | **Body A** | PBT | |
| 2 | **Elbow body** | PBT | |
| 3 | **Handle** | PBT | |
| 4 | **Body B** | Stainless steel 303 | |
| 5 | **Needle** | Stainless steel 303 | |
| 6 | **Needle guide** | Stainless steel 303 | |
| 7 | **Seat ring** | Stainless steel 303 | |
| 8 | **Lock nut** | Stainless steel 303 | |
| 9 | **U seal** | HNBR | |
| 10 | **Cassette** | — | |
| 11 | **Seal** | NBR | |
| 12 | **O-ring** | NBR | |
| 13 | **O-ring** | NBR | |
| 14 | **O-ring** | NBR | |
| 15 | **O-ring** | NBR | |
| 16 | **O-ring** | NBR | |
| 17 | **Spacer** | — | |
| 18 | **Gasket** | NBR, Stainless steel | M5 type only |

## Dimensions: Elbow Type




**M5 type**
**U10/32 type**




### Metric Size

| Model | d | T | H | D1 | D2 | L1 | L2 | L3 | L4 (1) | | A* | | M1 | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Max. | Min. | Max. | Min. | | |
| **AS12□1FG-M5-23** | 3.2 | M5 x 0.8 | 8 | 8.4 | 9.6 | 17.3 | 22.1 | 12.3 | 28.6 | 25.8 | 25 | 22.2 | 12.7 | 7 |
| **AS12□1FG-M5-04** | 4 | M5 x 0.8 | 8 | 9.3 | 9.6 | 17.3 | 22.1 | 12.3 | 28.6 | 25.8 | 25 | 22.2 | 12.7 | 7 |
| **AS12□1FG-M5-06** | 6 | | | 11.6 | | 18.1 | 22.9 | 11.7 | | | | | 13.5 | |
| **AS22□1FG-01-23** | 3.2 | R 1/8 | 12 | 9.3 | 14.2 | 20.4 | 27.5 | 14.3 | 36.1 | 31.1 | 32.1 | 27.1 | 12.7 | 16 |
| **AS22□1FG-01-04** | 4 | R 1/8 | 12 | 9.3 | 14.2 | 20.4 | 27.5 | 13.4 | 35.2 | 30.2 | 32.1 | 27.1 | 12.7 | 17 |
| **AS22□1FG-01-06** | 6 | | | 11.6 | | 20.4 | 27.5 | | | | | | 13.5 | |
| **AS22□1FG-01-08** | 8 | | | 15.2 | | 25.3 | 32.4 | | | | | | 18.5 | 19 |
| **AS22□1FG-01-10** | 10 | | | 18.5 | | 32.1 | 39.2 | 14.1 | | | | | 21 | 21 |
| **AS22□1FG-02-04** | 4 | R 1/4 | 17 | 10.4 | 18.5 | 25.2 | 34.4 | 17.7 | 39.9 | 34.9 | 34.4 | 29.4 | 16 | 32 |
| **AS22□1FG-02-06** | 6 | | | 12.8 | | 25.2 | 34.4 | | | | | | 17 | |
| **AS22□1FG-02-08** | 8 | | | 15.2 | | 27.2 | 36.4 | | | | | | 18.5 | 34 |
| **AS22□1FG-02-10** | 10 | | | 18.5 | | 35.3 | 44.5 | 19.5 | | | | | 21 | 36 |
| **AS32□1FG-02-06** | 6 | R 1/4 | 19 | 12.8 | 23 | 27.8 | 39.3 | 21.3 | 48.3 | 43.3 | 42.8 | 37.8 | 17 | 60 |
| **AS32□1FG-02-08** | 8 | | | 15.2 | | 29.5 | 41 | | | | | | 18.5 | 63 |
| **AS32□1FG-02-10** | 10 | | | 18.5 | | 31.8 | 43.3 | | | | | | 21 | 67 |
| **AS32□1FG-02-12** | 12 | | | 20.9 | | 32.8 | 44.3 | | | | | | 22 | 69 |
| **AS32□1FG-03-06** | 6 | R 3/8 | 19 | 12.8 | 23 | 27.8 | 39.3 | 19.8 | 45.4 | 40.4 | 40.2 | 35.2 | 17 | 55 |
| **AS32□1FG-03-08** | 8 | | | 15.2 | | 29.5 | 41 | | | | | | 18.5 | 57 |
| **AS32□1FG-03-10** | 10 | | | 18.5 | | 31.8 | 43.3 | | | | | | 21 | 59 |
| **AS32□1FG-03-12** | 12 | | | 20.9 | | 32.8 | 44.3 | | | | | | 22 | 61 |
| **AS42□1FG-04-10** | 10 | R 1/2 | 24 | 18.5 | 28.6 | 33.6 | 47.9 | 24.5 | 56.7 | 49.2 | 49.6 | 42.1 | 21 | 100 |
| **AS42□1FG-04-12** | 12 | | | 20.9 | | 34.6 | 48.9 | | | | | | 22 | 101 |

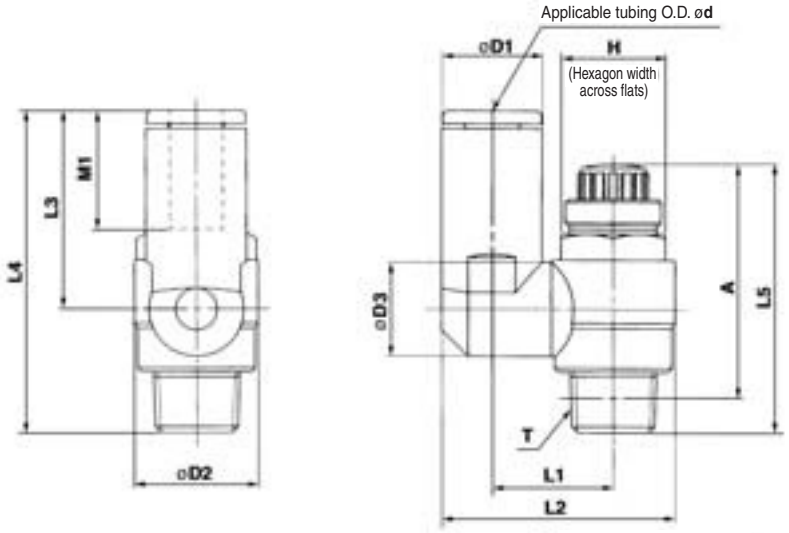
Note 1) Reference dimensions
Note 2) Reference dimensions of M5 x 0.8, R threads after installation.

### Inch Size

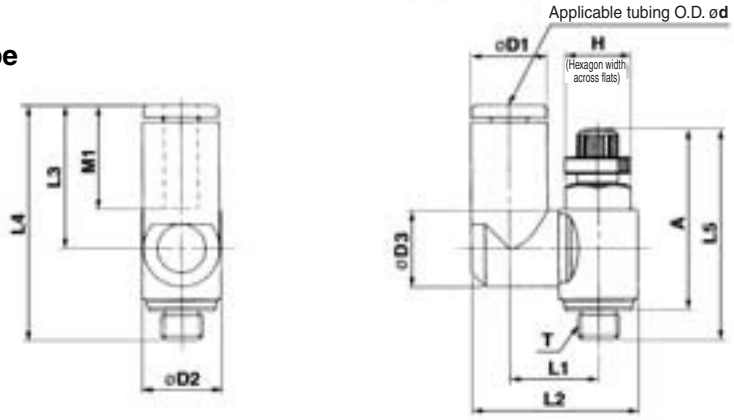
| Model | d | T | H | D1 | D2 | L1 | L2 | L3 | L4 (1) | | A* | | M1 | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Max. | Min. | Max. | Min. | | |
| **AS12□1FG-U10/32-01** | 1/8" | 10-32 UNF | 8 | 8.4 | 9.6 | 17.3 | 22.1 | 12.3 | 28.6 | 25.8 | 25 | 22.2 | 12.7 | 7 |
| **AS12□1FG-U10/32-03** | 5/32" | | | 9.3 | | | | | | | | | | |
| **AS12□1FG-U10/32-05** | 3/16" | | | 11.4 | | 21.3 | 26.1 | 11.7 | | | | | 16.5 | |
| **AS12□1FG-U10/32-07** | 1/4" | | | 12 | | 18.3 | 23.1 | | | | | | 13.5 | |
| **AS22□1FG-N01-01** | 1/8" | NPT 1/8 | 12.7 | 9.3 | 14.2 | 20.4 | 27.5 | 13.4 | 35.2 | 30.2 | 32.1 | 27.1 | 12.7 | 16 |
| **AS22□1FG-N01-03** | 5/32" | | | | | | | | | | | | | 17 |
| **AS22□1FG-N01-05** | 3/16" | | | 11.4 | | 23.1 | 30.2 | | | | | | 16.5 | |
| **AS22□1FG-N01-07** | 1/4" | | | 13.2 | | 23.9 | 31 | | | | | | 18.5 | 19 |
| **AS22□1FG-N01-09** | 5/16" | | | 15.2 | | 25.3 | 32.4 | 14.1 | | | | | 21 | 21 |
| **AS22□1FG-N02-03** | 5/32" | NPT 1/4 | 17.5 | 10.4 | 18.5 | 25.2 | 34.4 | 17.7 | 39.9 | 34.9 | 34.4 | 29.4 | 16 | 32 |
| **AS22□1FG-N02-05** | 3/16" | | | 11.4 | | 24.9 | 34.2 | | | | | | 17 | |
| **AS22□1FG-N02-07** | 1/4" | | | 13.2 | | 25.2 | 34.5 | | | | | | 18.5 | 34 |
| **AS22□1FG-N02-09** | 5/16" | | | 15.2 | | 27.2 | 36.4 | 19.5 | | | | | 21 | 36 |
| **AS22□1FG-N02-11** | 3/8" | | | 17.9 | | 35.3 | 44.5 | | | | | | | |
| **AS32□1FG-N02-07** | 1/4" | NPT 1/4 | 19 | 13.2 | 23 | 27.8 | 39.3 | 21.3 | 48.3 | 43.3 | 42.8 | 37.8 | 17 | 60 |
| **AS32□1FG-N02-09** | 5/16" | | | 15.2 | | 29.5 | 41 | | | | | | 18.5 | 63 |
| **AS32□1FG-N02-11** | 3/8" | | | 17.9 | | 31.8 | 43.3 | | | | | | 21 | 67 |
| **AS32□1FG-N03-07** | 1/4" | NPT 3/8 | 19 | 13.2 | 23 | 27.8 | 39.3 | 19.8 | 45.4 | 40.4 | 40.2 | 35.2 | 17 | 55 |
| **AS32□1FG-N03-09** | 5/16" | | | 15.2 | | 29.5 | 41 | | | | | | 18.5 | 57 |
| **AS32□1FG-N03-11** | 3/8" | | | 17.9 | | 31.8 | 43.3 | | | | | | 21 | 59 |
| **AS42□1FG-N04-11** | 3/8" | NPT 1/2 | 23.8 | 17.9 | 28.6 | 33.6 | 47.9 | 24.5 | 56.7 | 49.2 | 49.6 | 42.1 | 21 | 100 |
| **AS42□1FG-N04-13** | 1/2" | | | 21.7 | | 35.2 | 49.5 | | | | | | 22 | 101 |

Note 1) Reference dimensions
Note 2) Reference dimensions of 10-32 UNF and NPT threads after installation.

## Dimensions: Universal Type




**M5 type**
**U10/32 type**




### Metric Size

| Model | d | T | H | D1 | D2 | D3 | L1 | L2 | L3 | L4 | L5 (1) Max. | L5 (1) Min. | A* Max. | A* Min. | M1 | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS13□1FG-M5-23 | 3.2 | M5 x 0.8 | 8 | 8.4 | 9.6 | 9.3 | 10.8 | 19.8 | 17.5 | 28.7 | 28.6 | 28.6 | 25 | 22.2 | 12.7 | 7 |
| AS13□1FG-M5-04 | 4 | | | 9.3 | | | | 20.3 | | | | | | | | |
| AS13□1FG-M5-06 | 6 | | | 11.6 | | | | 21.4 | 20.6 | 31.8 | | | | | 13.5 | |
| AS23□1FG-01-23 | 3.2 | R 1/8 | 12 | 8.4 | 14.2 | 9.3 | 13.1 | 24.4 | 17.5 | 30.9 | 35.2 | 30.2 | 32.1 | 27.1 | 12.7 | 17 |
| AS23□1FG-01-04 | 4 | | | 9.3 | | | | 24.9 | | | | | | | | 18 |
| AS23□1FG-01-06 | 6 | | | 11.6 | | 10.9 | 14 | 26.9 | 22.9 | 36.3 | | | | | 13.5 | |
| AS23□1FG-01-08 | 8 | | | 15.2 | | 12.9 | 16.2 | 30.9 | 28.2 | 40.8 | | | | | 18.5 | 21 |
| AS23□1FG-02-04 | 4 | R 1/4 | 17 | 10.4 | 18.5 | 10.9 | 16.2 | 30.6 | 21.9 | 39.6 | 39.9 | 34.9 | 34.4 | 29.4 | 16 | 32 |
| AS23□1FG-02-06 | 6 | | | 12.8 | | 12.9 | 18.4 | 34 | 25.2 | 42.1 | | | | | 17 | 33 |
| AS23□1FG-02-08 | 8 | | | 15.2 | | | 18.3 | 35.2 | 28.2 | 45.1 | | | | | 18.5 | 36 |
| AS23□1FG-02-10 | 10 | | | 18.5 | | | 20.2 | 38.7 | 31 | 47.9 | | | | | 21 | 40 |
| AS33□1FG-02-06 | 6 | R 1/4 | 19 | 12.8 | 23 | 12.9 | 20.6 | 38.5 | 25.2 | 46.5 | 48.3 | 43.3 | 42.8 | 37.8 | 17 | 60 |
| AS33□1FG-02-08 | 8 | | | 15.2 | | | | 39.7 | 28.2 | 49.5 | | | | | 18.5 | 63 |
| AS33□1FG-02-10 | 10 | | | 18.5 | | 16.2 | 23 | 43.7 | 32.6 | 53.9 | | | | | 21 | 67 |
| AS33□1FG-02-12 | 12 | | | 20.9 | | | | 44.9 | 34.4 | 55.7 | | | | | 22 | 69 |
| AS33□1FG-03-06 | 6 | R 3/8 | 19 | 12.8 | 23 | 12.9 | 20.6 | 38.5 | 25.2 | 45 | 45.4 | 40.4 | 40 | 35 | 17 | 56 |
| AS33□1FG-03-08 | 8 | | | 15.2 | | | | 39.7 | 28.2 | 48 | | | | | 18.5 | 59 |
| AS33□1FG-03-10 | 10 | | | 18.5 | | 16.2 | 23 | 43.7 | 32.6 | 52.4 | | | | | 21 | 63 |
| AS33□1FG-03-12 | 12 | | | 20.9 | | | | 44.9 | 34.4 | 54.2 | | | | | 22 | 65 |
| AS43□1FG-04-10 | 10 | R 1/2 | 24 | 18.5 | 28.6 | 16.2 | 25.8 | 49.4 | 32.6 | 57.1 | 56.7 | 49.2 | 49.6 | 42.1 | 21 | 104 |
| AS43□1FG-04-12 | 12 | | | 20.9 | | 19.4 | 26.8 | 52 | 36.3 | 60.8 | | | | | 22 | 105 |

Note 1) Reference dimensions
Note 2) Reference dimensions of M5 x 0.8, R threads after installation.

### Inch Size

| Model | d | T | H | D1 | D2 | D3 | L1 | L2 | L3 | L4 | L5 (1) Max. | L5 (1) Min. | A* Max. | A* Min. | M1 | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS13□1FG-U10/32-01 | 1/8" | 10-32 UNF | 8 | 8.4 | 9.6 | 9.3 | 10.8 | 19.8 | 17.5 | 28.7 | 28.6 | 25.8 | 25 | 22.2 | 12.7 | 7 |
| AS13□1FG-U10/32-03 | 5/32" | | | 9.3 | | | | 20.3 | | | | | | | | |
| AS13□1FG-U10/32-05 | 3/16" | | | 11.4 | | | | 21.3 | 23.3 | 34.5 | | | | | 16.5 | 8 |
| AS13□1FG-U10/32-07 | 1/4" | | | 12 | | | | 21.6 | 20.7 | 31.9 | | | | | 13.7 | |
| AS23□1FG-N01-01 | 1/8" | NPT 1/8 | 12.7 | 8.4 | 14 | 9.3 | 13.1 | 24.4 | 17.5 | 30.9 | 35.2 | 30.2 | 32.1 | 27.1 | 12.7 | 17 |
| AS23□1FG-N01-03 | 5/32" | | | 9.3 | | | | 24.9 | | | | | | | | 18 |
| AS23□1FG-N01-05 | 3/16" | | | 11.4 | | 10.9 | 14 | 26.8 | 23.9 | | | | | | 16.5 | |
| AS23□1FG-N01-07 | 1/4" | | | 13.2 | | 12.9 | 16.2 | 29.9 | 25.6 | 36.3 | | | | | 18.5 | 19 |
| AS23□1FG-N01-09 | 5/16" | | | 15.2 | | | | 30.9 | 28.2 | 40.8 | | | | | 21 | 21 |
| AS23□1FG-N02-03 | 5/32" | NPT 1/4 | 17.5 | 10.4 | 19 | 10.9 | 16.2 | 30.6 | 21.9 | 39.6 | 39.9 | 34.9 | 34.4 | 29.4 | 16 | 32 |
| AS23□1FG-N02-05 | 3/16" | | | 11.4 | | | | 31.1 | 23.9 | 42.1 | | | | | 17 | 33 |
| AS23□1FG-N02-07 | 1/4" | | | 13.2 | | 12.9 | 18.3 | 34.2 | 25.6 | 45.1 | | | | | 18.5 | 36 |
| AS23□1FG-N02-09 | 5/16" | | | 15.2 | | | | 35.2 | 28.2 | 47.9 | | | | | 21 | 39 |
| AS23□1FG-N02-11 | 3/8" | | | 17.9 | | | 20.2 | 38.7 | 31 | 46.5 | | | | | | 40 |
| AS33□1FG-N02-07 | 1/4" | NPT 1/4 | 19 | 13.2 | 23 | 12.9 | 20.6 | 38.7 | 25.6 | 46.9 | 48.3 | 43.3 | 42.8 | 37.8 | 17 | 60 |
| AS33□1FG-N02-09 | 5/16" | | | 15.2 | | | | 39.7 | 28.2 | 49.5 | | | | | 18.5 | 63 |
| AS33□1FG-N02-11 | 3/8" | | | 17.9 | | 16.2 | 23 | 43.7 | 32.6 | 53.9 | | | | | 21 | 69 |
| AS33□1FG-N03-07 | 1/4" | NPT 3/8 | 19 | 13.2 | 23 | 12.9 | 20.6 | 38.7 | 25.6 | 45 | 45.4 | 40.4 | 40.2 | 35.2 | 17 | 56 |
| AS33□1FG-N03-09 | 5/16" | | | 15.2 | | | | 39.7 | 28.2 | 48 | | | | | 18.5 | 59 |
| AS33□1FG-N03-11 | 3/8" | | | 17.9 | | 16.2 | 23 | 43.7 | 32.6 | 52.4 | | | | | 21 | 65 |
| AS43□1FG-N04-11 | 3/8" | NPT 1/2 | 23.8 | 17.9 | 29 | 16.2 | 25.8 | 49.4 | 32.6 | 54.4 | 56.7 | 49.2 | 49.6 | 42.1 | 21 | 104 |
| AS43□1FG-N04-13 | 1/2" | | | 21.7 | | 19.4 | 26.8 | 52 | 36.3 | 57.1 | | | | | 22 | 106 |

Note 1) Reference dimensions
Note 2) Reference dimensions of 10-32 UNF and NPT threads after installation.

# Speed Controller with One-touch Fittings
# Stainless Steel Series
# In-line Type
# *Series AS-FG*

## Model

| Model | Applicable tubing O.D. | | | | | | | | | | | | Applicable cylinder bore size (mm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Metric size | | | | | | Inch size | | | | | | |
| | 3.2 | 4 | 6 | 8 | 10 | 12 | 1/8" | 5/32" | 3/16" | 1/4" | 5/16" | 3/8" | 1/2" | |
| **AS1001FG** | ● | ● | ● | | | | ● | ● | ● | ● | | | | 6, 10, 16, 20 |
| **AS2001FG** | | ● | ● | | | | | ● | ● | ● | | | | 20, 25, 32 |
| **AS2051FG** | | | ● | ● | | | | | ● | ● | ● | | | 20, 25, 32, 40 |
| **AS3001FG** | | | ● | ● | ● | ● | | | | ● | ● | ● | | 40, 50, 63 |
| **AS4001FG** | | | | | ● | ● | | | | | | ● | ● | 63, 80, 100 |

## Specifications

| | |
|---|---|
| **Fluid** | Air |
| **Proof pressure** | 1.5 MPa |
| **Max. operating pressure** | 1 MPa |
| **Min. operating pressure** | 0.1 MPa |
| **Ambient and fluid temperature** | –5 to 60°C (No freezing) |
| **Number of needle rotations** | 10 turns (8 turns (1)) |
| **Applicable tubing material** (2) | Nylon, Soft nylon, Polyurethane |

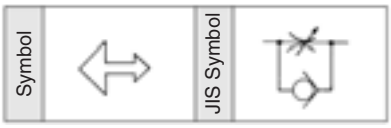
Note 1) In the case of AS1001FG type
Note 2) Use caution regarding the max. operating pressure when soft nylon or polyurethane tubing is used.
(Refer to pages 371 and 372 for details.)

## Flow Rate and Effective Area

| Model | | AS1001FG | AS2001FG | | AS2051FG | | AS3001FG | | | AS4001FG | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Tubing O.D. | Metric size | ø3.2<br>ø4<br>ø6 | ø4 | ø6 | ø6 | ø8 | ø6 | ø8 | ø10<br>ø12 | ø10 | ø12 |
| | Inch size | ø1/8"<br>ø5/32"<br>ø3/16" | ø5/32" | ø3/16"<br>ø1/4" | ø3/16" | ø1/4"<br>ø5/16" | ø1/4" | ø5/16" | ø3/8" | ø3/8" | ø1/2" |
| Controlled flow (Free flow) | Flow rate (ℓ/min (ANR)) | 100 | 130 | 230 | 290 | 460 | 420 | 660 | 920 | 1050 | 1390 |
| | Effective area ($mm^2$) | 1.5 | 2 | 3.5 | 4.5 | 7 | 6.5 | 10 | 14 | 16 | 21 |

Note) Flow rate values are measured at 0.5 MPa and 20°C.

**Flow Direction Symbols on Body**




**Made to Order**
(Refer to page 479 for details.)

## How to Order

**AS** [200] 1 F G – [06] – [ ]

**Body size**

| | |
|---|---|
| 100 | M5 standard |
| 200 | 1/8 standard |
| 205 | 1/4 standard |
| 300 | 3/8 standard |
| 400 | 1/2 standard |

**With One-touch fittings**

**Stainless steel specifications (Stainless steel 303)**

**Applicable tubing O.D.**

**Metric size**

| | |
|---|---|
| 23 | ø3.2 * |
| 04 | ø4 |
| 06 | ø6 |
| 08 | ø8 |
| 10 | ø10 |
| 12 | ø12 |

* Use ø1/8" tube.

**Inch size**

| | |
|---|---|
| 01 | ø1/8" |
| 03 | ø5/32" |
| 05 | ø3/16" |
| 07 | ø1/4" |
| 09 | ø5/16" |
| 11 | ø3/8" |
| 13 | ø1/2" |

**Made to Order**
(Refer to the below for details.)

## Made to Order

Made to Order

**Lubricant: Vaseline** **X12**

Ex.) AS1001FG-04-**X12**

**Grease-free (Seal: Fluorine Coating) + Throttle Valve (Without Check Valve)** **X21**

Ex.) AS1001FG-04-**X21**

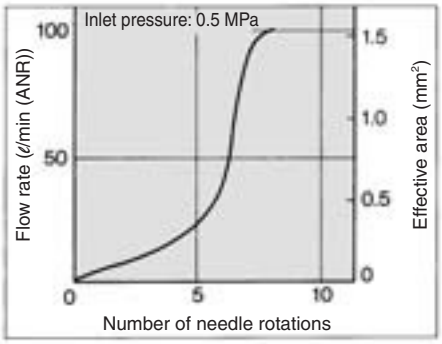
Note) Not particle-free

**Throttle Valve (Without Check Valve)** **X214**

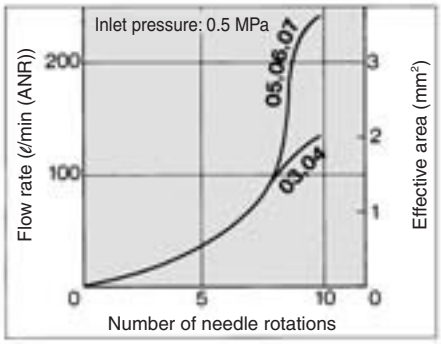
Ex.) AS1001FG-04-**X214**

## Needle Valve/Flow Characteristics

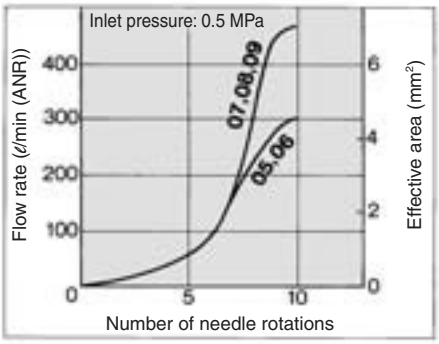
**AS1001FG**



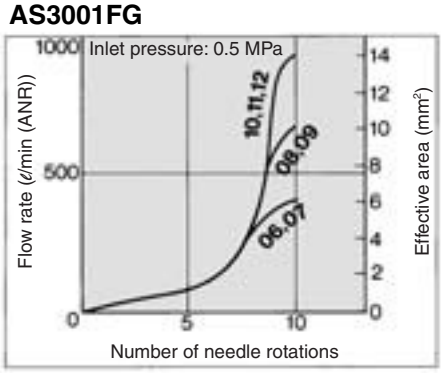

**AS2001FG**



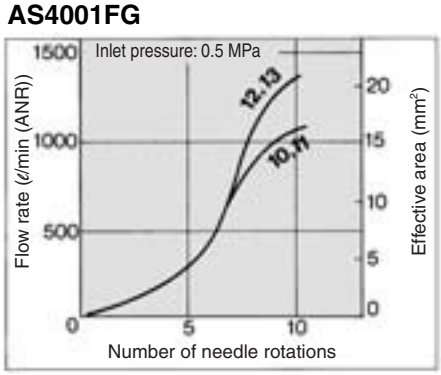

**AS2051FG**



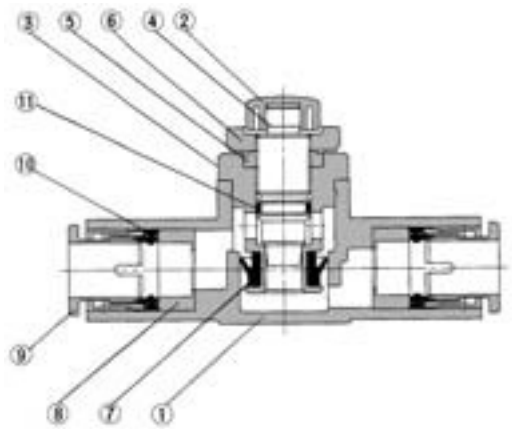

**AS3001FG**




**AS4001FG**



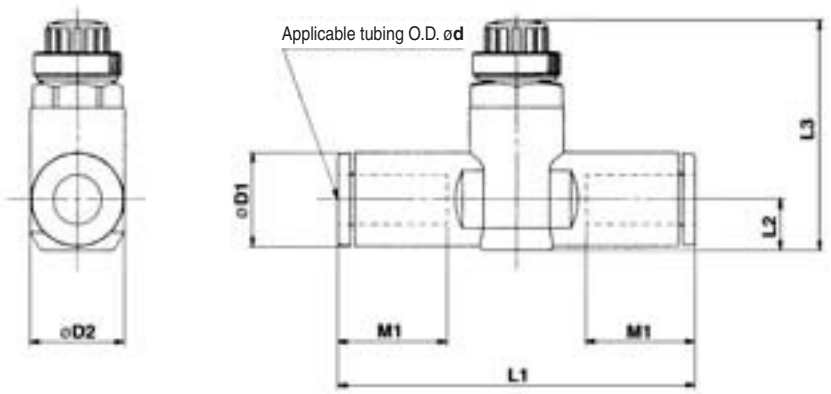
## Construction




### Component Parts

| No. | Description | Material | Note |
|---|---|---|---|
| 1 | **Body A** | PBT | |
| 2 | **Handle** | PBT | |
| 3 | **Body B** | Stainless steel 303 | |
| 4 | **Needle** | Stainless steel 303 | |
| 5 | **Needle guide** | Stainless steel 303 | |
| 6 | **Lock nut** | Stainless steel 303 | |
| 7 | **U seal** | HNBR | |
| 8 | **Spacer** | — | |
| 9 | **Cassette** | — | |
| 10 | **Seal** | NBR | |
| 11 | **O-ring** | NBR | |

## Dimensions




### Metric Size

| Model | d | D1 | D2 | L1 | L2 | L3 (1) | | M1 | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Max. | Min. | | |
| **AS1001FG-23** | 3.2 | 8.4 | 10 | 38 | 4.5 | 23.5 | 20.7 | 12.7 | 6 |
| **AS1001FG-04** | 4 | 9.3 | | 39.2 | 5.2 | 24.2 | 21.4 | | 7 |
| **AS1001FG-06** | 6 | 11.6 | | 40.7 | 6.2 | 25.2 | 22.4 | 13.5 | 8 |
| **AS2001FG-04** | 4 | 9.3 | 11.8 | 40.7 | 5.2 | 32.6 | 27.6 | 12.7 | 12 |
| **AS2001FG-06** | 6 | 11.6 | | 44.8 | 6.3 | 33.7 | 28.7 | 13.5 | 13 |
| **AS2051FG-06** | 6 | 12.8 | 14.8 | 53.2 | 6.7 | 35.2 | 30.2 | 17 | 22 |
| **AS2051FG-08** | 8 | 15.2 | | 59.8 | 8.1 | 32.6 | 27.6 | 18 | 25 |
| **AS3001FG-06** | 6 | 12.8 | 19.8 | 59 | 7.4 | 38.3 | 33.3 | 17 | 36 |
| **AS3001FG-08** | 8 | 15.2 | | 64.4 | 8.2 | 39.1 | 34.1 | 18 | 40 |
| **AS3001FG-10** | 10 | 18.5 | | 71.6 | 9.8 | 40.6 | 35.6 | 21 | 44 |
| **AS3001FG-12** | 12 | 20.9 | | 76 | 11 | 41.8 | 36.8 | 22 | 48 |
| **AS4001FG-10** | 10 | 18.5 | 26.5 | 77.7 | 11.3 | 51.1 | 43.6 | 21 | 85 |
| **AS4001FG-12** | 12 | 20.9 | | 82.1 | | 52.1 | 44.6 | 22 | 89 |

Note 1) Reference dimensions

### Inch Size

| Model | d | D1 | D2 | L1 | L2 | L3 (1) | | M1 | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Max. | Min. | | |
| **AS1001FG-01** | 1/8" | 8.4 | 10 | 38 | 4.5 | 23.5 | 20.7 | 12.7 | 6 |
| **AS1001FG-03** | 5/32" | 9.3 | | 39.2 | 5.2 | 24.2 | 21.4 | | 7 |
| **AS1001FG-05** | 3/16" | 11.4 | | 48.7 | 6.2 | 25.2 | 22.4 | 16.5 | 12 |
| **AS1001FG-07** | 1/4" | 12 | | 40.7 | | | | 13.7 | 9 |
| **AS2001FG-03** | 5/32" | 9.3 | 11.8 | 40.7 | 5.2 | 32.6 | 27.6 | 12.7 | 12 |
| **AS2001FG-05** | 3/16" | 11.4 | | 50 | 6.2 | 33.6 | 28.6 | 16.5 | 18 |
| **AS2001FG-07** | 1/4" | 13.2 | | 52.2 | 7.1 | 34.5 | 29.5 | 17 | 16 |
| **AS2051FG-05** | 3/16" | 11.4 | 14.8 | 52.2 | 6.2 | 34.6 | 29.6 | 16.5 | 24 |
| **AS2051FG-07** | 1/4" | 13.2 | | 54.4 | 7.1 | 35.5 | 30.5 | 17 | 22 |
| **AS2051FG-09** | 5/16" | 15.2 | | 59.8 | 8.1 | 32.6 | 27.6 | 18 | 25 |
| **AS3001FG-07** | 1/4" | 13.2 | 19.8 | 59 | 7.4 | 38.3 | 33.3 | 17 | 36 |
| **AS3001FG-09** | 5/16" | 15.2 | | 64.4 | 8.2 | 39.1 | 34.1 | 18 | 40 |
| **AS3001FG-11** | 3/8" | 17.9 | | 70.8 | 9.5 | 40.3 | 35.3 | 21 | 52 |
| **AS4001FG-11** | 3/8" | 17.9 | 26.5 | 76.9 | 10.3 | 51 | 43.5 | 21 | 93 |
| **AS4001FG-13** | 1/2" | 21.7 | | 83.1 | 11.6 | 52.4 | 44.9 | 22 | 106 |

Note 1) Reference dimensions

# Speed Controller for Low Speed Operation with One-touch Fitting Elbow Type/Universal Type (Resin Body)

# Series AS-FM

### Ideal for low speed control at 10 to 50 mm/sec

Since the effective area of the controlled flow is approximately 1/10 that of the standard model, it is ideal for speed control of low speed cylinders at 10 to 50 mm/sec.
The dual type is particularly suitable for low speed control of small bore cylinders.

### Low speed operating stroke and high speed return stroke drive

Effective area of free flow is the same as that of standard model.

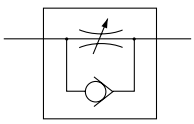
### 10 needle turns (20 turns for M5 type)

Speed control is easy, and uniform speed control is possible.

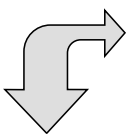
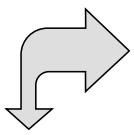
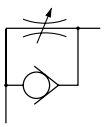
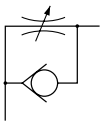
### Applicable tubing: Inch sizes standardized

Inch sizes are now available for all models.

**JIS Symbol**



**Flow Direction Symbols on Body**

| | Meter-out type | Meter-in type |
|---|---|---|
| Symbol |  |  |
| JIS Symbol |  |  |

**Made to Order**
(Refer to page 495 for details.)

## Model

| Elbow type | Universal type | Port size | Applicable tubing O.D. | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Metric size | | | | | Inch size | | | | | |
| | | | 3.2 | 4 | 6 | 8 | 10 | 1/8" | 5/32" | 3/16" | 1/4" | 5/16" | 3/8" |
| **AS12□1FM-M5** | **AS13□1FM-M5** | M5 x 0.8 | ● | ● | ● | | | | | | | | |
| **AS22□1FM-01** | **AS23□1FM-01** | R 1/8 | ● | ● | ● | ● | | | | | | | |
| **AS22□1FM-02** | **AS23□1FM-02** | R 1/4 | | ● | ● | ● | ● | | | | | | |
| **AS12□1FM-U10/32** | **AS13□1FM-U10/32** | 10-32 UNF | | | | | | ● | ● | ● | ● | | |
| **AS22□1FM-N01** | **AS23□1FM-N01** | NPT 1/8 | | | | | | ● | ● | ● | ● | ● | |
| **AS22□1FM-N02** | **AS23□1FM-N02** | NPT 1/4 | | | | | | | ● | ● | ● | ● | ● |

## Specifications

| | |
|---|---|
| **Fluid** | Air |
| **Proof pressure** | 1.5 MPa |
| **Max. operating pressure** | 1.0 MPa |
| **Mini. operating pressure** | 0.1 MPa |
| **Ambient and fluid temperature** | –5 to 60°C (No freezing) |
| **Number of needle rotations** | 10 turns (20 turns (1)) |
| **Applicable tubing material** (2) | Nylon, Soft nylon, Polyurethane |
| **Option** (3) | With seal |

Note 1) In the case of AS12□1FM and AS13□1FM types
Note 2) Use caution regarding the max. operating pressure when soft nylon or polyurethane, or soft polyurethane tubing is used.
(Refer to pages 371 and 372 for details.)
Note 3) M5 and 10-32UNF type ports are not available with seal.
Note 4) Brass parts are all electroless nickel plated. The handle of the M5 type and the lock nut of the meter-in type are black zinc chromate plated.

## Flow Rate and Effective Area

| Model | | AS12□1FM<br>AS13□1FM | AS22□1FM-□01<br>AS23□1FM-□01 | | AS22□1FM-□02<br>AS23□1FM-□02 | | |
|---|---|---|---|---|---|---|---|
| Tubing O.D. | Metric size | ø3.2, ø4, ø6 | ø3.2, ø4 | ø6, ø8 | ø4 | ø6 | ø8, ø10 |
| | Inch size | ø1/8", ø5/32", ø3/16"<br>ø1/4" | ø1/8", ø5/32" | ø3/16", ø1/4"<br>ø5/16" | ø5/32" | ø3/16" | ø1/4", ø5/16"<br>ø3/8" |
| Controlled flow | Air flow (ℓ/min(ANR)) | 7 | 12 | | 38 | | |
| | Effective area (mm²) | 0.1 | 0.2 | | 0.6 | | |
| Free flow | Flow rate (ℓ/min(ANR)) | 100 | 180 | 230 | 260 | 390 | 460 |
| | Effective area (mm²) | 1.5 | 2.7 | 3.5 | 4 | 6 | 7 |

Note) Flow rate values are measured at 0.5 MPa and 20°C.

### ⚠Caution

**Be sure to read before handling.
Refer to front matters 58 and 59 for Safety Instructions and pages 412 to 414 for Flow Control Equipment Precautions.**

## How to Order

**AS 2 2 0 1 F M – □ 01 – 06 □ – □**

**Made to Order**
Refer to the below for details.

**Body size**

| | |
|---|---|
| 1 | M5 standard |
| 2 | 1/8, 1/4 standard |

**Type**

| | |
|---|---|
| 2 | Elbow |
| 3 | Universal |

**Control type**

| | |
|---|---|
| 0 | Meter-out |
| 1 | Meter-in |

**With One-touch fitting**

**For low speed control**

**Thread type**

| | |
|---|---|
| Nil | Metric thread (M5) |
| | Unified thread (10-32 UNF) |
| | R |
| N | NPT |

**Port size**

| | |
|---|---|
| M5 | M5 x 0.8 |
| U10/32 | 10-32 UNF |
| 01 | 1/8 |
| 02 | 1/4 |

**Applicable tubing O.D.**

**Metric size**

| | |
|---|---|
| 23 | ø3.2 * |
| 04 | ø4 |
| 06 | ø6 |
| 08 | ø8 |
| 10 | ø10 |

* Use ø1/8" tube.

**Inch size**

| | |
|---|---|
| 01 | ø1/8" |
| 03 | ø5/32" |
| 05 | ø3/16" |
| 07 | ø1/4" |
| 09 | ø5/16" |
| 11 | ø3/8" |

**Option**

| | |
|---|---|
| Nil | None |
| S | With seal |

* M5 and U10/32 are not available with seal.

## Made to Order

**Lubricant: Vaseline** **X12**

**Ex.) AS1201FM-M5-23-X12**

**Grease-free (Seal: Fluorine coated) + Throttle Valve (Without Check Valve)** **X21**

**Ex.) AS1201FM-M5-23-X21**

Note 1) Not particle-free
Note 2) Throttle valve is only compatible with the part no. of the meter-out type.

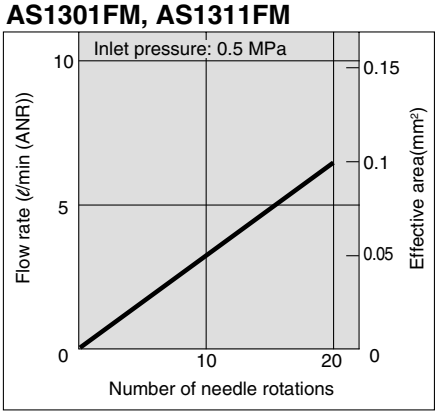
**Throttle Valve (Without Check Valve)** **X214**

**Ex.) AS1201FM-M5-23-X214**

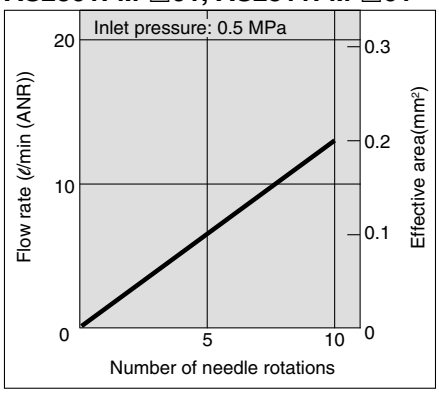
Note) Throttle valve is only compatible with the part no. of the meter-out type.

## Needle Valve/Flow Characteristics

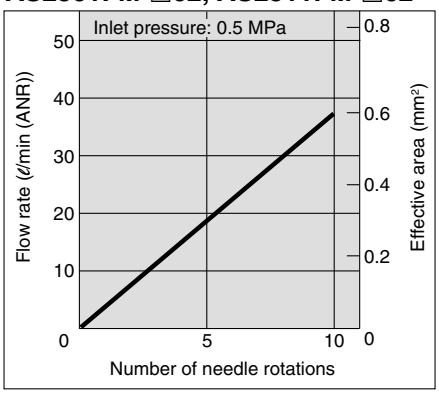
**AS1201FM, AS1211FM**
**AS1301FM, AS1311FM**




**AS2201FM-□01, AS2211FM-□01**
**AS2301FM-□01, AS2311FM-□01**



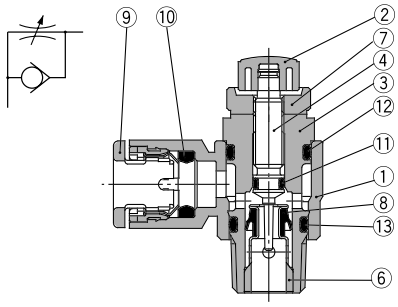

**AS2201FM-□02, AS2211FM-□02**
**AS2301FM-□02, AS2311FM-□02**



## Construction: Elbow Type

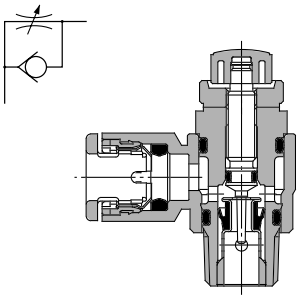
### Meter-out type

**JIS Symbol**

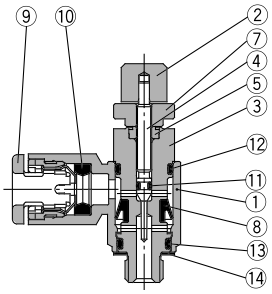



### Meter-in type

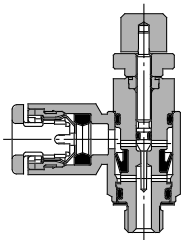
**JIS Symbol**



### M5 type
### U10/32 type




### M5 type
### U10/32 type



### Component Parts

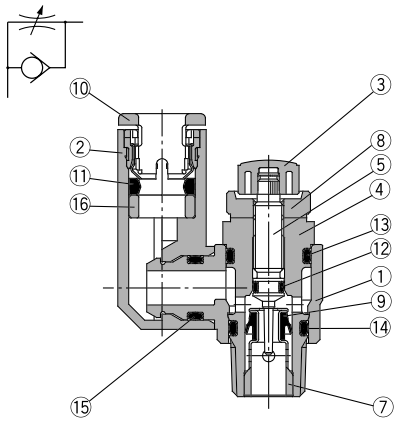
| No. | Description | Material | Note |
|---|---|---|---|
| 1 | **Body A** | PBT | White |
| 2 | **Handle** | PBT | Black (1) |
| 3 | **Body B** | Brass | Electroless nickel plated |
| 4 | **Needle** | Brass | Electroless nickel plated |
| 5 | **Needle guide** | Brass | Electroless nickel plated, M5 type only |
| 6 | **Seat ring** | Brass | Electroless nickel plated |
| 7 | **Lock nut** | Brass (2) | Electroless nickel plated (3) |
| 8 | **U seal** | HNBR | |
| 9 | **Cassette** | — | |
| 10 | **Seal** | NBR | |
| 11 | **O-ring** | NBR | |
| 12 | **O-ring** | NBR | |
| 13 | **O-ring** | NBR | |
| 14 | **Gasket** | NBR, Stainless steel | M5 type only |

Note 1) M5 and U10/32 types are black zinc chromate plated.
Note 2) AS22□1FM type is made of steel.
Note 3) Meter-in type is black zinc chromate plated.

## Construction: Universal Type

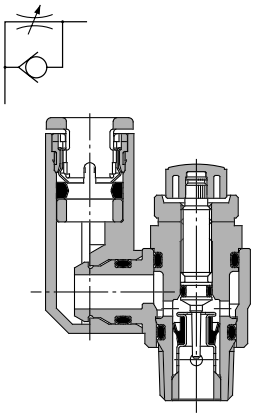
### Meter-out type

**JIS Symbol**

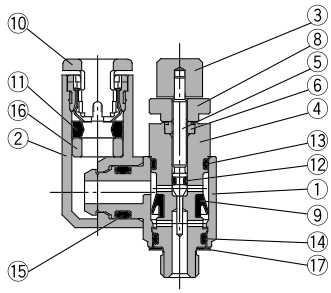



### Meter-in type

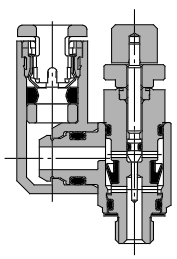
**JIS Symbol**



### M5 type
### U10/32 type




### M5 type
### U10/32 type

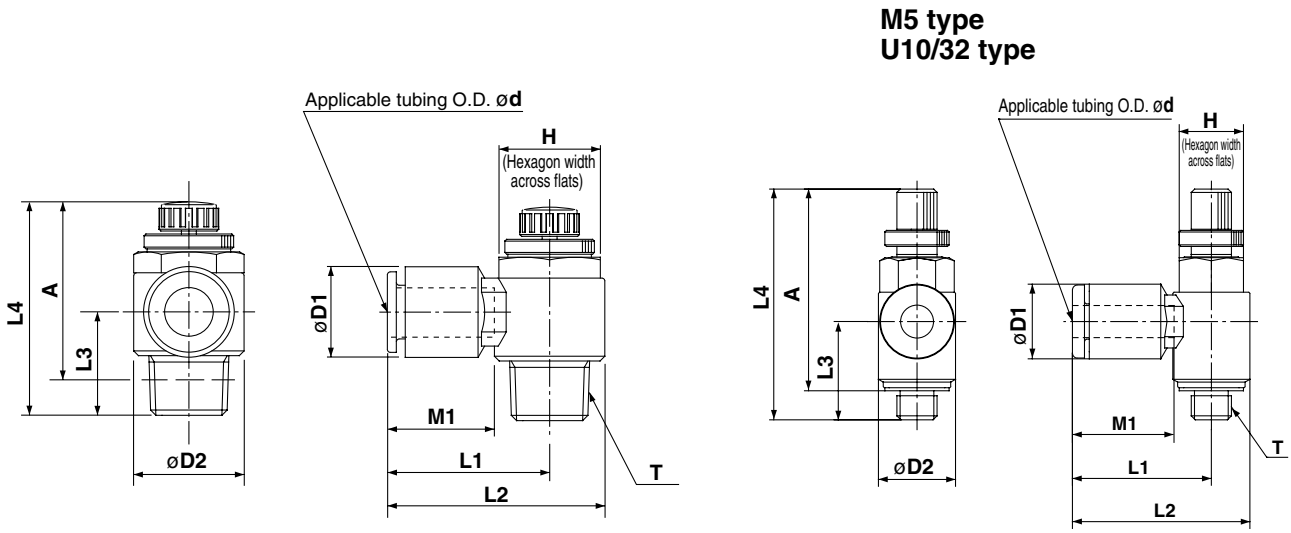


### Component Parts

| No. | Description | Material | Note |
|---|---|---|---|
| 1 | **Body A** | PBT | White |
| 2 | **Elbow body** | PBT | White |
| 3 | **Handle** | PBT | Black (1) |
| 4 | **Body B** | Brass | Electroless nickel plated |
| 5 | **Needle** | Brass | Electroless nickel plated |
| 6 | **Needle guide** | Brass | Electroless nickel plated, M5 type only |
| 7 | **Seat ring** | Brass | Electroless nickel plated |
| 8 | **Lock nut** | Brass (2) | Electroless nickel plated (3) |
| 9 | **U seal** | HNBR | |
| 10 | **Cassette** | — | |
| 11 | **Seal** | NBR | |
| 12 | **O-ring** | NBR | |
| 13 | **O-ring** | NBR | |
| 14 | **O-ring** | NBR | |
| 15 | **O-ring** | NBR | |
| 16 | **Spacer** | — | |
| 17 | **Gasket** | NBR, Stainless steel | M5 type only |

Note1) M5 and U10/32 types are black zinc chromate plated.
Note2) AS23□1FM type is made of steel.
Note3) Meter-in type is black zinc chromate plated.

## Dimensions: Elbow Type




### Metric Size

| Model | d | T | H | D1 | D2 | L1 | L2 | L3 | L4 (1) (2) | | A (1) (2) | | M1 | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Max. | Min. | Max. | Min. | | |
| **AS12□1FM-M5-23** | 3.2 | M5 x 0.8 | 8 | 8.4 | 9.6 | 17.3 | 22.1 | 12.3 | 33.8 | 28.8 | 30.1 | 25.1 | 12.7 | 7 |
| **AS12□1FM-M5-04** | 4 | | | 9.3 | | 17.3 | 22.1 | | | | | | | |
| **AS12□1FM-M5-06** | 6 | | | 11.6 | | 18.1 | 22.9 | 11.7 | | | | | 13.5 | |
| **AS22□1FM-01-23** | 3.2 | R 1/8 | 12 | 9.3 | 14.2 | 20.4 | 27.5 | 13.4 | 35.2 | 30.2 | 32.1 | 27.1 | 12.7 | 17 |
| **AS22□1FM-01-04** | 4 | | | 9.3 | | 20.4 | 27.5 | | | | | | | |
| **AS22□1FM-01-06** | 6 | | | 11.6 | | 20.4 | 27.5 | | | | | | 13.5 | |
| **AS22□1FM-01-08** | 8 | | | 15.2 | | 25.3 | 32.4 | | | | | | 18.5 | 19 |
| **AS22□1FM-02-04** | 4 | R 1/4 | 17 | 10.4 | 18.5 | 25.2 | 34.4 | 17.7 | 39.9 | 34.9 | 34.4 | 29.4 | 16 | 32 |
| **AS22□1FM-02-06** | 6 | | | 12.8 | | 25.2 | 34.4 | | | | | | 17 | |
| **AS22□1FM-02-08** | 8 | | | 15.2 | | 27.2 | 36.4 | | | | | | 18.5 | 34 |
| **AS22□1FM-02-10** | 10 | | | 18.5 | | 35.3 | 44.5 | 19.5 | | | | | 21.0 | 36 |

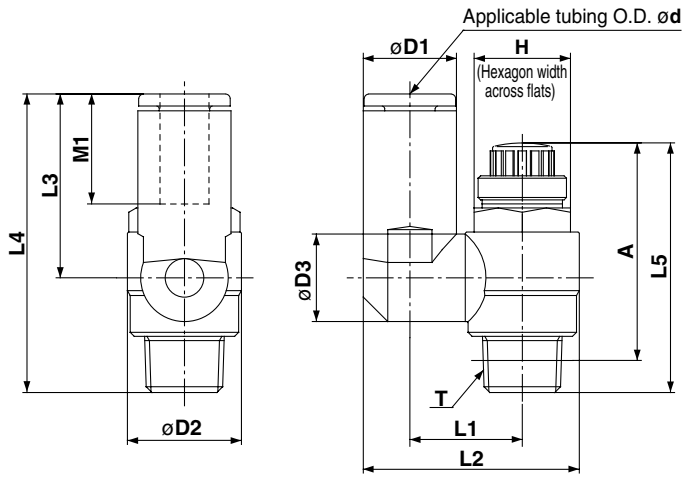
Note 1) Reference dimensions
Note 2) Reference dimensions of M5 and R threads after installation.

### Inch Size

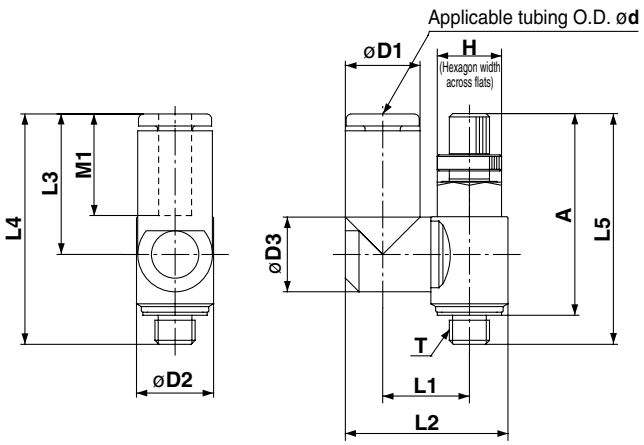
| Model | d | T | H | D1 | D2 | L1 | L2 | L3 | L4 (1) | | A (2) | | M1 | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Max. | Min. | Max. | Min. | | |
| **AS12□1FM-U10/32-01** | 1/8" | 10-32 UNF | 8 | 8.4 | 9.6 | 17.3 | 22.1 | 12.3 | 33.8 | 28.8 | 30.1 | 25.1 | 12.7 | 7 |
| **AS12□1FM-U10/32-03** | 5/32" | | | 9.3 | | | | | | | | | | |
| **AS12□1FM-U10/32-05** | 3/16" | | | 11.4 | | 21.3 | 26.1 | 11.7 | | | | | 16.5 | |
| **AS12□1FM-U10/32-07** | 1/4" | | | 12 | | 18.3 | 23.1 | | | | | | 13.5 | |
| **AS22□1FM-N01-01** | 1/8" | NPT 1/8 | 12.7 | 9.3 | 14.2 | 20.4 | 27.5 | 13.4 | 35.2 | 30.2 | 32.1 | 27.1 | 12.7 | 16 |
| **AS22□1FM-N01-03** | 5/32" | | | | | | | | | | | | | 17 |
| **AS22□1FM-N01-05** | 3/16" | | | 13.2 | | 24 | 31.1 | | | | | | 16.5 | |
| **AS22□1FM-N01-07** | 1/4" | | | 13.2 | | 23.9 | 31 | | | | | | 18.5 | 19 |
| **AS22□1FM-N01-09** | 5/16" | | | 15.2 | | 25.3 | 32.4 | 13.4 | | | | | 21 | 21 |
| **AS22□1FM-N02-03** | 5/32" | NPT 1/4 | 17.5 | 10.4 | 18.5 | 25.2 | 34.4 | 17.7 | 39.9 | 34.9 | 34.4 | 29.4 | 16 | 32 |
| **AS22□1FM-N02-05** | 3/16" | | | 12.8 | | 25.2 | 34.5 | | | | | | 17 | |
| **AS22□1FM-N02-07** | 1/4" | | | 13.2 | | 25.2 | 34.5 | | | | | | 18.5 | 34 |
| **AS22□1FM-N02-09** | 5/16" | | | 15.2 | | 27.2 | 36.4 | 17.7 | | | | | 21 | 36 |
| **AS22□1FM-N02-11** | 3/8" | | | 18.5 | | 35.3 | 44.5 | 19.5 | | | | | | |

Note 1) Reference dimensions
Note 2) Reference dimensions of 10-32 UNF and NPT threads after installation.

## Dimensions: Universal Type




**M5 type**




### Metric Size

| Model | d | T | H | D1 | D2 | D3 | L1 | L2 | L3 | L4 | L5 (1) | | A (2) | | M1 | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Max. | Min. | Max. | Min. | | |
| **AS13□1FM-M5-23** | 3.2 | M5 x 0.8 | 8 | 8.4 | 9.6 | 9.3 | 10.8 | 19.8 | 17.5 | 28.7 | 33.8 | 28.8 | 30.1 | 25.1 | 12.7 | 8 |
| **AS13□1FM-M5-04** | 4 | | | 9.3 | | | | 20.3 | | | | | | | | |
| **AS13□1FM-M5-06** | 6 | | | 11.6 | | | | 21.4 | 20.6 | 31.8 | | | | | 13.5 | |
| **AS23□1FM-01-23** | 3.2 | R 1/8 | 12 | 8.4 | 14.2 | 9.3 | 13.1 | 24.4 | 17.5 | 30.9 | 35.2 | 30.2 | 32.1 | 27.1 | 12.7 | 17 |
| **AS23□1FM-01-04** | 4 | | | 9.3 | | | | 24.9 | | | | | | | | |
| **AS23□1FM-01-06** | 6 | | | 11.6 | | 10.9 | 14 | 26.9 | 22.9 | 36.3 | | | | | 13.5 | 18 |
| **AS23□1FM-01-08** | 8 | | | 15.2 | | 12.9 | 16.2 | 30.9 | 28.2 | 40.8 | | | | | 18.5 | 21 |
| **AS23□1FM-02-04** | 4 | R 1/4 | 17 | 10.4 | 18.5 | 10.9 | 16.2 | 30.6 | 21.9 | 39.6 | 39.9 | 34.9 | 34.4 | 29.4 | 16 | 33 |
| **AS23□1FM-02-06** | 6 | | | 12.8 | | 12.9 | 18.4 | 34 | 25.2 | 42.1 | | | | | 17 | |
| **AS23□1FM-02-08** | 8 | | | 15.2 | | 12.9 | 18.3 | 35.2 | 28.2 | 45.1 | | | | | 18.5 | 36 |
| **AS23□1FM-02-10** | 10 | | | 18.5 | | | 20.2 | 38.7 | 31 | 47.9 | | | | | 21 | 40 |

Note 1) Reference dimensions
Note 2) Reference dimensions of M5 and R threads after installation.

### Inch Size

| Model | d | T | H | D1 | D2 | D3 | L1 | L2 | L3 | L4 | L5 (1) | | A (2) | | M1 | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Max. | Min. | Max. | Min. | | |
| **AS13□1FM-U10/32-01** | 1/8" | 10-32 UNF | 8 | 8.4 | 9.6 | 9.3 | 10.8 | 19.8 | 17.5 | 28.7 | 33.8 | 28.8 | 30.1 | 25.1 | 12.7 | 7 |
| **AS13□1FM-U10/32-03** | 5/32" | | | 9.3 | | | | 20.3 | | | | | | | | |
| **AS13□1FM-U10/32-05** | 3/16" | | | 11.4 | | | | 21.3 | 23.3 | 34.5 | | | | | 16.5 | 8 |
| **AS13□1FM-U10/32-07** | 1/4" | | | 12 | | | | 21.6 | 20.7 | 31.9 | | | | | 13.7 | |
| **AS23□1FM-N01-01S** | 1/8" | NPT 1/8 | 12.7 | 8.4 | 14.2 | 9.3 | 13.1 | 24.4 | 17.5 | 30.9 | 35.2 | 30.2 | 32.1 | 27.1 | 12.7 | 17 |
| **AS23□1FM-N01-03S** | 5/32" | | | 9.3 | | | | 24.9 | | | | | | | | 18 |
| **AS23□1FM-N01-05S** | 3/16" | | | 11.4 | | 10.9 | 14 | 26.8 | 23.9 | 37.3 | | | | | 16.5 | |
| **AS23□1FM-N01-07S** | 1/4" | | | 13.2 | | 12.9 | 16.2 | 29.9 | 25.6 | 38.2 | | | | | 18.5 | 19 |
| **AS23□1FM-N01-09S** | 5/16" | | | 15.2 | | | | 30.9 | 28.2 | 40.8 | | | | | 21 | 21 |
| **AS23□1FM-N02-03S** | 5/32" | NPT 1/4 | 17.5 | 10.4 | 18.5 | 10.9 | 16.2 | 30.6 | 21.9 | 39.6 | 39.9 | 34.9 | 34.4 | 29.4 | 16 | 32 |
| **AS23□1FM-N02-05S** | 3/16" | | | 11.4 | | | | 31.1 | 23.9 | 41.6 | | | | | 17 | 33 |
| **AS23□1FM-N02-07S** | 1/4" | | | 13.2 | | 12.9 | 18.3 | 34.2 | 25.6 | 42.5 | | | | | 18.5 | 36 |
| **AS23□1FM-N02-09S** | 5/16" | | | 15.2 | | | | 35.2 | 28.2 | 45.1 | | | | | 21 | 39 |
| **AS23□1FM-N02-11S** | 3/8" | | | 17.9 | | | 20.2 | 38.7 | 31 | 47.9 | | | | | | 40 |

Note 1) Reference dimensions
Note 2) Reference dimensions of 10-32 UNF and NPT threads after installation.

# Speed Controller for Low Speed Operation with One-touch Fitting In-line Type

# Series AS-FM

## Model

| Model | Applicable tubing O.D. | | | | | | | | | Applicable cylinder bore size (mm) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Metric size | | | | Inch size | | | | | |
| | 3.2 | 4 | 6 | 8 | 1/8" | 5/32" | 3/16" | 1/4" | 5/16" | |
| **AS1001FM** | ● | ● | ● | | ● | ● | ● | ● | | 6, 10, 16, 20 |
| **AS2001FM** | | ● | ● | | | ● | ● | ● | | 20, 25, 32 |
| **AS2051FM** | | | ● | ● | | | ● | ● | ● | 20, 25, 32, 40 |

## Specifications

| | |
|---|---|
| **Fluid** | Air |
| **Proof pressure** | 1.5 MPa |
| **Max. operating pressure** | 1 MPa |
| **Min. operating pressure** | 0.1 MPa |
| **Ambient and fluid temperature** | −5 to 60°C (No freezing) |
| **Number of needle rotations** | 10 turns (20 turns (1)) |
| **Applicable tubing material** (2) | Nylon, Soft nylon, Polyurethane |

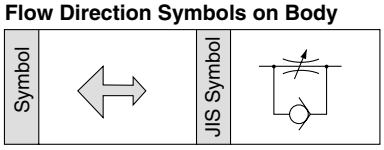
Note 1) In the case of AS1001FM type
Note 2) Use caution regarding the max. operating pressure when soft nylon or polyurethane tubing is used.
(Refer to pages 371 and 372 for details.)
Note 3) Brass parts are all electroless nickel plated. The handle of the M5 type is black zinc chromate plated.

## Flow Rate and Effective Area

| Model | | AS1001FM | AS2001FM | | AS2051FM | |
|---|---|---|---|---|---|---|
| Tubing O.D. | Metric size | ø3.2, ø4, ø6 | ø4 | ø6 | ø6 | ø8 |
| | Inch size | ø1/8", ø5/32", ø3/16", ø1/4" | ø5/32" | ø3/16", ø1/4" | ø3/16" | ø1/4", ø5/16" |
| Controlled flow | Flow rate (ℓ/min (ANR)) | 7 | 12 | | 38 | |
| | Effective area ($mm^2$) | 0.1 | 0.2 | | 0.6 | |
| Free flow | Flow rate(ℓ/min (ANR)) | 100 | 130 | 230 | 290 | 460 |
| | Effective area ($mm^2$) | 1.5 | 2 | 3.5 | 4.5 | 7 |

Note) Flow rate values are measured at 0.5 MPa and 20°C.

**Flow Direction Symbols on Body**




**Made to Order**
(Refer to page 503 for details.)

## ⚠Caution

**Be sure to read before handling.
Refer to front matters 58 and 59 for Safety Instructions and pages 412 to 414 for Flow Control Equipment Precautions.**

## How to Order

**AS** [200] **1** **F** **M** – [06] – [ ]

**Made to Order**
Refer to the below for details.

**Body size**

| | |
|---|---|
| **100** | M5 standard |
| **200** | 1/8 standard |
| **205** | 1/4 standard |

**With one-touch fitting**

**For low speed control**

**Applicable tubing O.D.**

| Metric size | | Inch size | |
|---|---|---|---|
| **23** | ø3.2* | 01 | ø1/8" |
| **04** | ø4 | 03 | ø5/32" |
| **06** | ø6 | 05 | ø3/16" |
| **08** | ø8 | 07 | ø1/4" |
| | | 09 | ø5/16" |

* Use ø1/8" tube.

## Made to Order

Made to Order

**Lubricant: Vaseline** **X12**

**Ex.) AS2001FM-04-X12**

**Grease-free (Seal: Fluorine coated) + Throttle Valve (Without Check Valve)** **X21**

**Ex.) AS2001FM-04-X21**

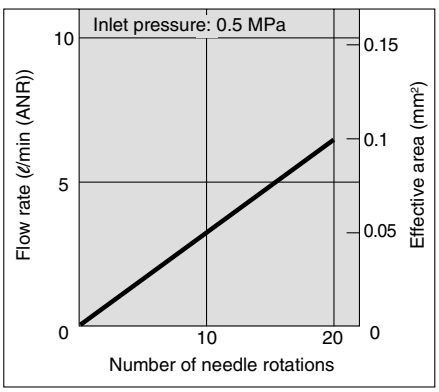
Note 1) Not particle-free

**Throttle Valve (Without Check Valve)** **X214**

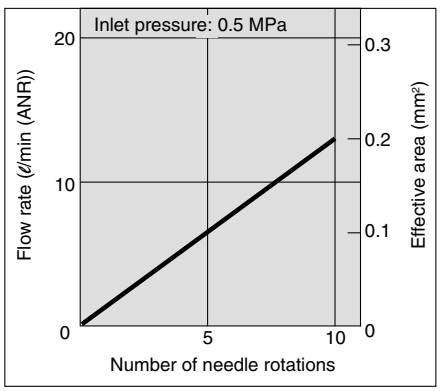
**Ex.) AS2001FM-04-X214**

## Needle Valve/Flow Characteristics

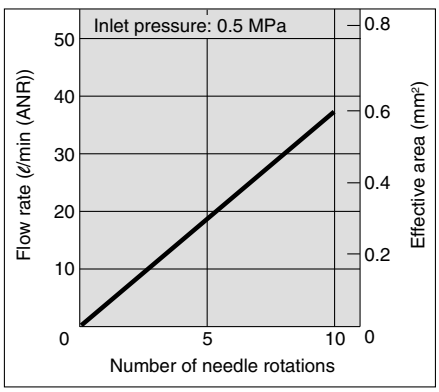
**AS1001FM**



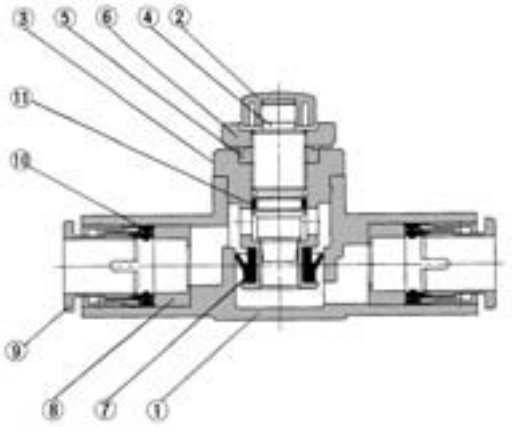

**AS2001FM**




**AS2051FM**



## Construction

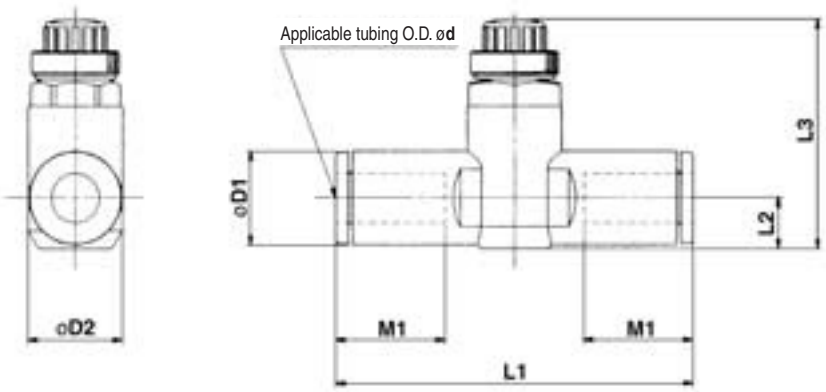



### Component Parts

| No. | Description | Material | Note |
|---|---|---|---|
| 1 | **Body A** | PBT | |
| 2 | **Handle** | PBT (1) | Black |
| 3 | **Body B** | Brass | Electroless nickel plated |
| 4 | **Needle** | Brass | Electroless nickel plated |
| 5 | **Needle guide** | Brass | Electroless nickel plated |
| 6 | **Lock nut** | Brass (2) | Electroless nickel plated |
| 7 | **U seal** | HNBR | |
| 8 | **Spacer** | — | |
| 9 | **Cassette** | — | |
| 10 | **Seal** | NBR | |
| 11 | **O-ring** | NBR | |

Note 1) AS1001FM type is made of brass (black zinc chromate plated).
Note 2) AS20□1FM type is made of steel.

## Dimensions




### Metric Size

| Model | d | D1 | D2 | L1 | L2 | L3 | | M1 | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Max. | Min. | | |
| **AS1001FM-23** | 3.2 | 8.4 | 10 | 38 | 4.5 | 27.7 | 24.9 | 12.7 | 6 |
| **AS1001FM-04** | 4 | 9.3 | | 39.2 | 5.2 | 28.5 | 25.5 | | 7 |
| **AS1001FM-06** | 6 | 11.6 | | 40.7 | 6.2 | 29.8 | 26.6 | 13.7 | 8 |
| **AS2001FM-04** | 4 | 9.3 | 11.8 | 40.7 | 5.2 | 32.6 | 27.6 | 12.7 | 12 |
| **AS2001FM-06** | 6 | 11.6 | | 44.8 | 6.3 | 33.7 | 28.7 | 13.7 | 13 |
| **AS2051FM-06** | 6 | 12.8 | 14.8 | 53.2 | 6.7 | 35.2 | 30.2 | 17 | 26 |
| **AS2051FM-08** | 8 | 15.2 | | 59.8 | 8.1 | 36.5 | 31.5 | 18 | 31 |

### Inch Size

| Model | d | D1 | D2 | L1 | L2 | L3 (1) | | M1 | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Max. | Min. | | |
| **AS1001FM-01** | 1/8" | 8.4 | 10 | 38 | 4.5 | 27.7 | 24.9 | 12.7 | 6 |
| **AS1001FM-03** | 5/32" | 9.3 | | 39.2 | 5.2 | 28.5 | 25.5 | | 7 |
| **AS1001FM-05** | 3/16" | 11.4 | | 48.7 | 6.2 | 27.7 | 24.7 | 16.5 | 8 |
| **AS1001FM-07** | 1/4" | 12 | | 40.7 | | | | 13.7 | 9 |
| **AS2001FM-03** | 5/32" | 9.3 | 11.8 | 40.7 | 5.2 | 32.6 | 29.6 | 12.7 | 12 |
| **AS2001FM-05** | 3/16" | 11.4 | | 50 | 6.2 | 33.6 | 28.6 | 16.5 | 18 |
| **AS2001FM-07** | 1/4" | 13.2 | | 52.2 | 7.1 | 34.5 | 29.5 | 17 | 21 |
| **AS2051FM-05** | 3/16" | 11.4 | 14.8 | 52.2 | 6.2 | 34.6 | 29.6 | 16.5 | 24 |
| **AS2051FM-07** | 1/4" | 13.2 | | 54.4 | 7.1 | 35.5 | 30.5 | 17 | 26 |
| **AS2051FM-09** | 5/16" | 15.2 | | 59.8 | 8.1 | 36.5 | 31.5 | 18 | 31 |

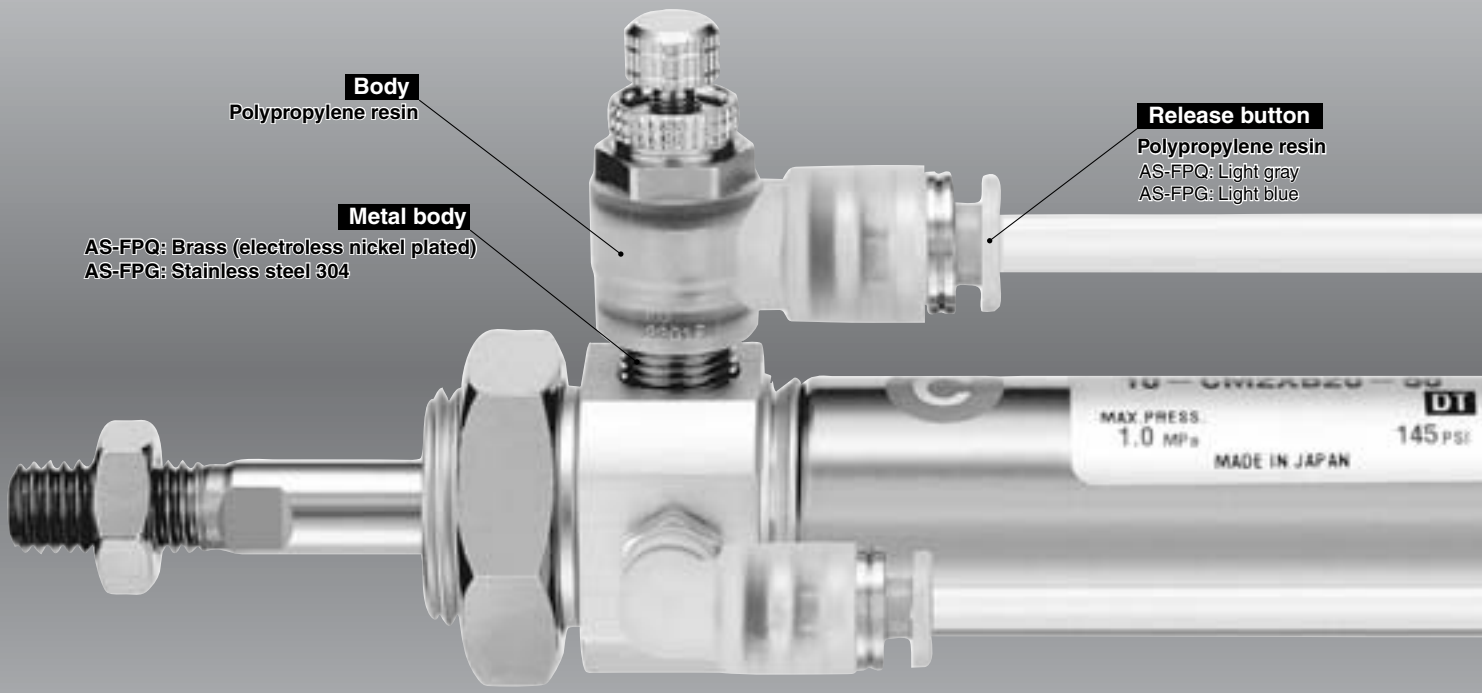
Note 1) Reference dimensions

# Clean Speed Controller with One-touch Fitting

## Series AS-FPQ/AS-FPG


**AS-FPQ: Brass (electroless nickel plated) and**
**AS-FPG: Stainless steel 304 are now available as a series.**

# Low particulate generating speed controllers designed for use in clean rooms



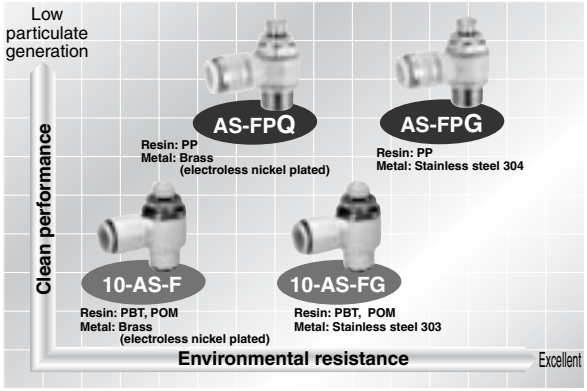

## Clean Speed Controller with One-touch Fitting

## *Series* AS-FPQ/FPG

***Series* AS-FPQ**
**Brass (electroless nickel plated)**

***Series* AS-FPG**
**Stainless steel 304**

| Elbow type | Port size | Applicable tube O.D. (mm) | | | | | Applicable cylinder bore size (mm) |
|---|---|---|---|---|---|---|---|
| | | 4 | 6 | 8 | 10 | 12 | |
| **AS12□1FP□-M5** | M5 x 0.8 | ● | ● | ● | | | 6, 10, 16, 20 |
| **AS22□1FP□-01** | R 1/8 | | ● | ● | ● | | 20, 25, 32 |
| **AS22□1FP□-02** | R 1/4 | | ● | ● | ● | | 20, 25, 32, 40 |
| **AS32□1FP□-03** | R 3/8 | | | ● | ● | ● | 40, 50, 63 |
| **AS42□1FP□-04** | R 1/2 | | | ● | ● | ● | 63, 80, 100 |



# Clean Speed Controller with One-touch Fitting Elbow Type

# *Series AS-FPQ/FPG*

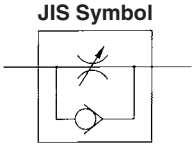
**AS-FPQ**/Brass (electroless nickel plated)

Release button color: Light gray

**AS-FPG**/Stainless steel 304

Release button color: Light blue

**JIS Symbol**



**Flow Direction Symbols on Body**

| | Meter-out type | Meter-in type |
|---|---|---|
| Symbol |  |  |
| JIS Symbol |  |  |

## Model

| Elbow type | Port size | Applicable tubing O.D. (mm) | | | | | Applicable cylinder bore size (mm) |
|---|---|---|---|---|---|---|---|
| | | 4 | 6 | 8 | 10 | 12 | |
| **AS12□1FP□-M5** | M5 x 0.8 | ● | ● | | | | 6, 10, 16, 20 |
| **AS22□1FP□-01** | R 1/8 | ● | ● | ● | | | 20, 25, 32 |
| **AS22□1FP□-02** | R 1/4 | ● | ● | ● | ● | | 20, 25, 32, 40 |
| **AS32□1FP□-03** | R 3/8 | | ● | ● | ● | ● | 40, 50, 63 |
| **AS42□1FP□-04** | R 1/2 | | | | ● | ● | 63, 80, 100 |

## Specifications

| | |
|---|---|
| **Fluid** | Air |
| **Particulate generation grade** | Grade 1 (1) |
| **Proof pressure (20°C)** | 1.5 MPa (2) |
| **Maximum operating pressure (20°C)** | 1 MPa (3) |
| **Minimum operating pressure** | 0.1 MPa |
| **Ambient and fluid temperature** | –5 to 60°C (No freezing) |
| **Number of needle rotations** | 10 rotations (8 rotations (4)) |
| **Oil** | Fluorine-based grease |

Note 1) Refer to particulate generation grade classifications.
Note 2) Proof pressure is 1.5 times higher than maximum operating pressure.
Note 3) The value of the maximum operating preasure is at a temperature of 20°C. In other cases, refer to "Relationship between Operating Temperature and Max. Operating Pressure" below.
Note 4) For AS12□1FP□

## Flow Rate and Effective Area

| Model | | AS12□1FP□-M5 | AS22□1FP□-01 | | AS22□1FP□-02 | | | AS32□1FP□-03 | | | AS42□1FP□-04 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tubing O.D. | Metric sizes | ø4<br>ø6 | ø4 | ø6<br>ø8 | ø4 | ø6 | ø8<br>ø10 | ø6 | ø8 | ø10<br>ø12 | ø10 | ø12 |
| Controlled (free) flow | Flow rate ℓ/min (ANR) | 100 | 180 | 230 | 260 | 390 | 460 | 660 | 790 | 920 | 1580 | 1710 |
| | Effective area mm² | 1.5 | 2.7 | 3.5 | 4 | 6 | 7 | 10 | 12 | 14 | 24 | 26 |

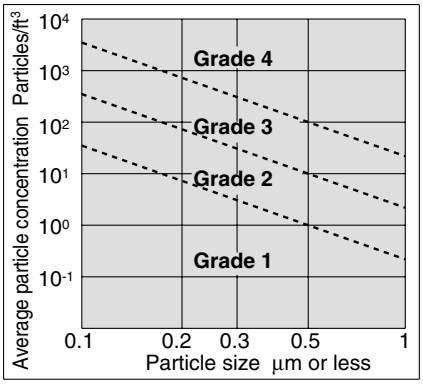
Note) Flow rate values are at a pressure of 0.5MPa, and temperature of 20°C.

## Recommended Applicable Tubing

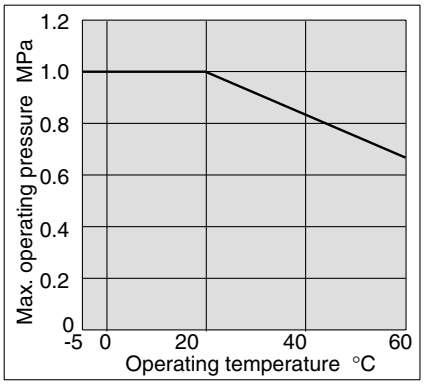
| | |
|---|---|
| Tubing material | Clean series polyurethane tubing: Series 10 |
| Tubing O.D. | ø4, ø6, ø8, ø10, ø12 |

Polyurethane tubing: Series TU, Nylon tubing: Series T and Soft nylon tubing: Series TS can also be used. However, the degree of clean performance will decline.

## Particulate Generation Grade Classifications




## Relation between Operating Temp. and Max. Operating Pressure




Note) Refer to back page 10 for details.

## How to Order

**AS 2 2 1 1 F P Q – 01 – 06**

**Body size**

| | |
|---|---|
| 1 | M5 standard |
| 2 | 1/8, 1/4 standard |
| 3 | 3/8 standard |
| 4 | 1/2 standard |

**Elbow**

**Control type**

| | |
|---|---|
| 0 | Meter-out |
| 1 | Meter-in |

**With One-touch fitting**

**Clean specifications**

**Metal parts material**

| | |
|---|---|
| Q | Brass (electoless nickel plated) |
| G | Stainless steel 304 |

**Port size**

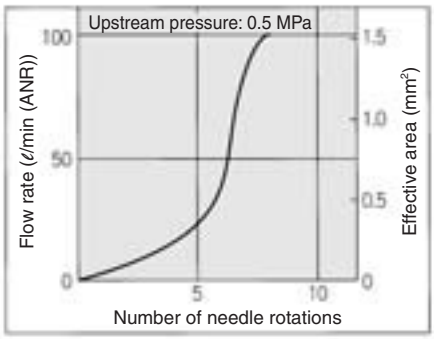
| | |
|---|---|
| M5 | M5 x 0.8 |
| 01 | R 1/8 |
| 02 | R 1/4 |
| 03 | R 3/8 |
| 04 | R 1/2 |

**Applicable tubing O.D.**
**Metric sizes**

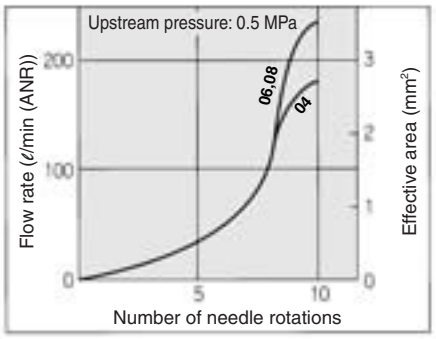
| | |
|---|---|
| 04 | ø4 |
| 06 | ø6 |
| 08 | ø8 |
| 10 | ø10 |
| 12 | ø12 |

## Needle Valve/Flow Characteristics

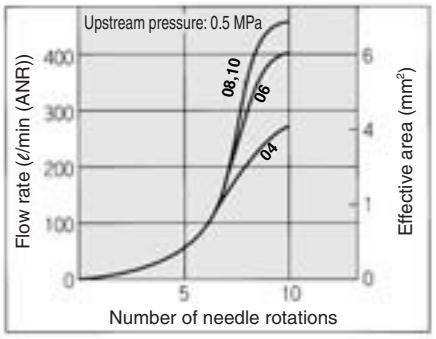
**AS12□1FP□-M5**



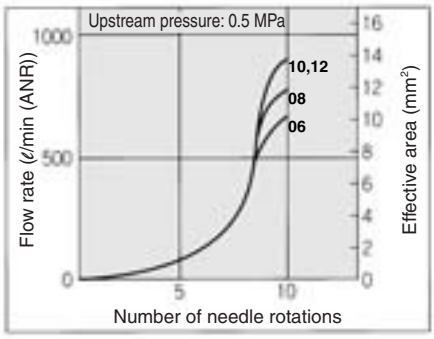

**AS22□1FP□-01**



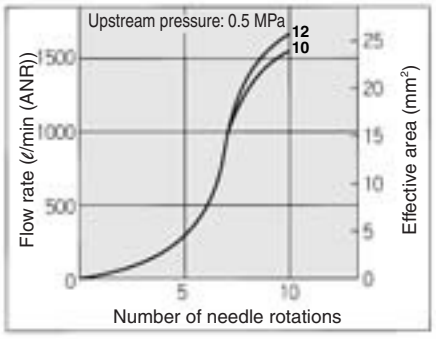

**AS22□1FP□-02**




**AS32□1FP□-03**

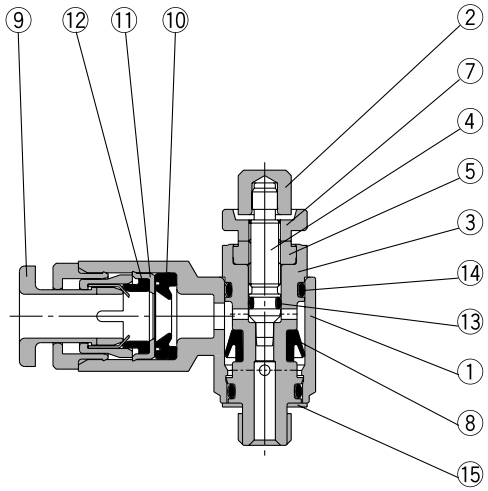


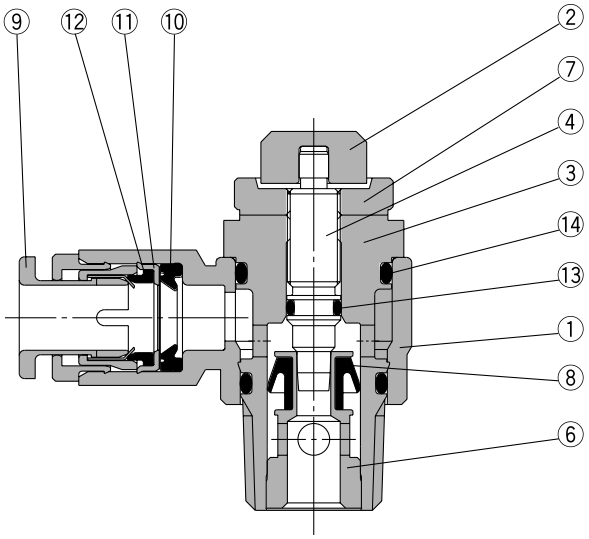

**AS42□1FP□-04**



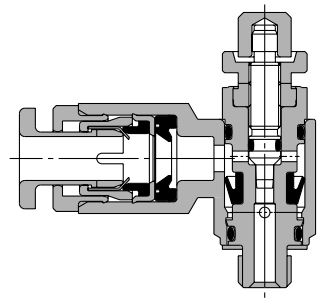
## Construction

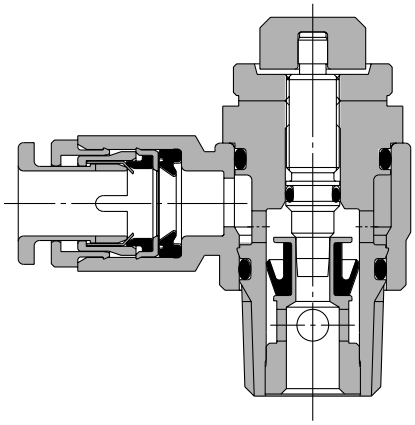
### Meter-out type
### M5 type




### Meter-in type
### M5 type

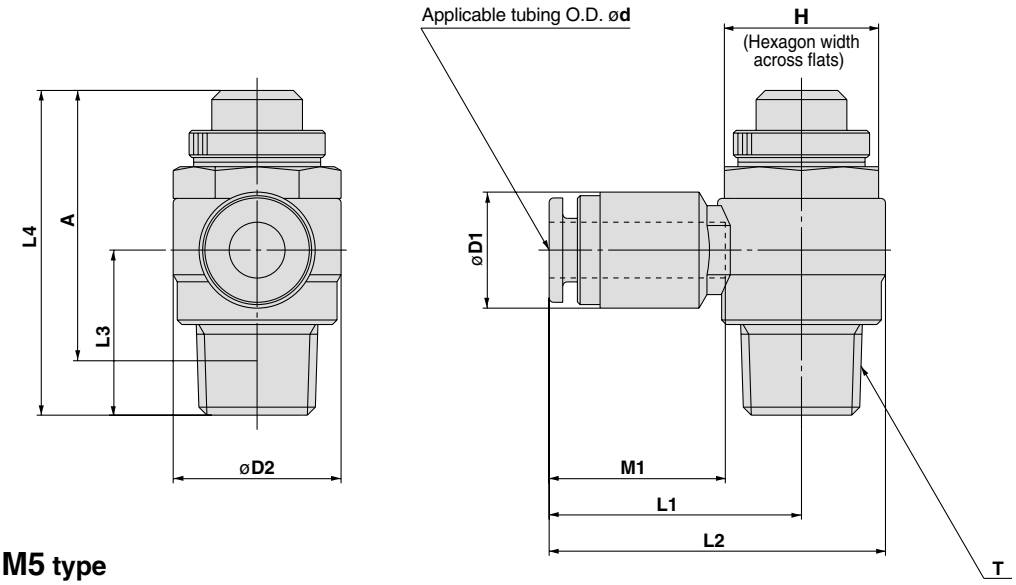




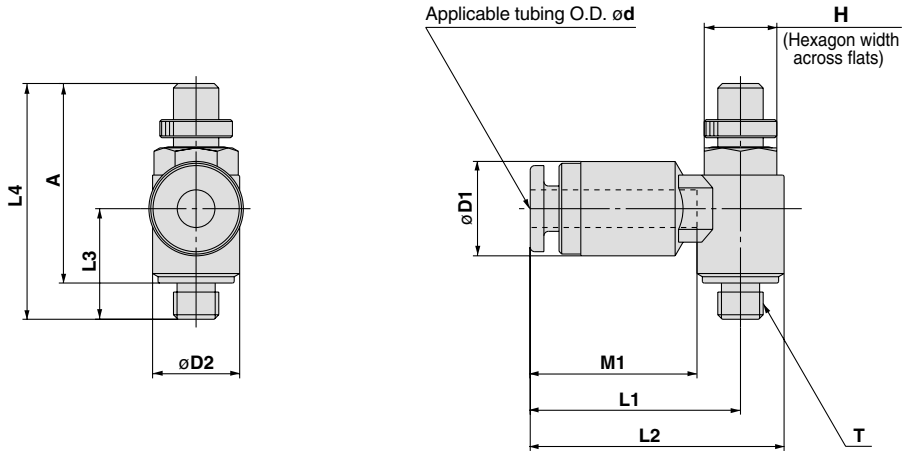
### Component Parts

| No. | Description | AS□□□1FPQ | | AS□□□1FPG | |
|---|---|---|---|---|---|
| | | Material | Note | Material | Note |
| 1 | **Body A** | Polypropylene resin | | Polypropylene resin | |
| 2 | **Knob** | Brass | Electroless nickel plated | Stainless steel 304 | |
| 3 | **Body B** | Brass | Electroless nickel plated | Stainless steel 304 | |
| 4 | **Needle** | Brass | Electroless nickel plated | Stainless steel 304 | |
| 5 | **Needle guide** | Brass | Electroless nickel plated | Stainless steel 304 | |
| 6 | **Seat ring** | Brass | Electroless nickel plated | Stainless steel 304 | |
| 7 | **Lock nut** | Brass | Electroless nickel plated | Stainless steel 304 | |
| 8 | **U seal** | HNBR | | HNBR | |
| 9 | **Cassette** | Polypropylene resin<br>Stainless steel 304, Brass | Brass parts are electroless nickel plated | Polypropylene resin<br>Stainless steel 304 | |
| 10 | **Seal** | NBR | | NBR | |
| 11 | **Stopper** | Stainless steel 304 | | Stainless steel 304 | |
| 12 | **Cushion** | NBR | | NBR | |
| 13 | **O-ring** | NBR | | NBR | |
| 14 | **O-ring** | NBR | | NBR | |
| 15 | **Gasket** | NBR, Stainless steel 304 | | NBR, Stainless steel 304 | |

## Dimensions




**M5 type**




| Model | Tubing O.D. d | T | H | D1 | D2 | L1 | L2 | L3 (4) | L4 (1) (4) | | A (2) | | M1 | Mass (g) (3) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Max. | Min. | Max. | Min. | | 1* | 2* |
| **AS12□1FP□-M5-04** | 4 | M5 x 0.8 | 8 | 10.4 | 9.6 | 22.2 | 27 | 12.2 | 28.8 | 26 | 25.2 | 22.4 | 17 | 7 | 7 |
| **AS12□1FP□-M5-06** | 6 | | | 12.8 | | 23.2 | 28 | (12.2) | (28.8) | (26) | | | 18.5 | 8 | 8 |
| **AS22□1FP□-01-04** | 4 | R 1/8 | 12 | 10.4 | 14.2 | 24.3 | 31.4 | 13.4 (14.3) | 35.5 (36.4) | 30.5 (31.4) | 32.4 | 27.4 | 17 | 17 | 17 |
| **AS22□1FP□-01-06** | 6 | | | 12.8 | | 25.3 | 32.4 | | | | | | 18.5 | 18 | 18 |
| **AS22□1FP□-01-08** | 8 | | | 15.2 | | 27.5 | 34.6 | | | | | | 20.5 | 20 | 20 |
| **AS22□1FP□-02-04** | 4 | R 1/4 | 17 | 10.4 | 18.5 | 26.8 | 36 | 17.7 (18.2) | 40.3 (40.8) | 35.3 (35.8) | 34.8 | 29.4 | 17 | 33 | 33 |
| **AS22□1FP□-02-06** | 6 | | | 12.8 | | 26.8 | 36 | | | | | | 18.5 | 33 | 33 |
| **AS22□1FP□-02-08** | 8 | | | 15.2 | | 29.4 | 38.6 | | | | | | 20.5 | 35 | 35 |
| **AS22□1FP□-02-10** | 10 | | | 18.5 | | 37.3 | 46.5 | 18.3 (18.8) | | | | | 23 | 38 | 38 |
| **AS32□1FP□-03-06** | 6 | R 3/8 | 19 | 12.8 | 23 | 29.4 | 40.9 | 19.8 (20.9) | 45.8 (46.9) | 40.8 (41.9) | 40.6 | 35.6 | 18.5 | 59 | 55 |
| **AS32□1FP□-03-08** | 8 | | | 15.2 | | 31.9 | 43.4 | | | | | | 20.5 | 61 | 57 |
| **AS32□1FP□-03-10** | 10 | | | 18.5 | | 33.6 | 45.1 | | | | | | 23 | 63 | 59 |
| **AS32□1FP□-03-12** | 12 | | | 20.9 | | 34.8 | 46.3 | | | | | | 24 | 65 | 61 |
| **AS42□1FP□-04-10** | 10 | R 1/2 | 24 | 18.5 | 28.6 | 35.6 | 49.9 | 24.5 (25.4) | 57.2 (58.1) | 49.7 (50.6) | 49.9 | 42.4 | 23 | 107 | 100 |
| **AS42□1FP□-04-12** | 12 | | | 20.9 | | 37.2 | 51.5 | | | | | | 24 | 109 | 102 |

Note 1) Reference dimensions
Note 2) Reference dimension for threads after installation
Note 3) 1* is the weight for type AS□2□1FPQ (brass + electroless nickel plated), 2* is the weight for type AS□2□1FPG (Stainless steel 304).
Note 4) Dimensions of AS□2□1FPQ, ( ): AS□2□1FPG

# *Series AS-FPQ/FPG*
# Specific Product Precautions

**Be sure to read before handling. Refer to front matters 58 and 59 for Safety Instructions and pages 412 to 414 for Flow Control Equipment Precautions.**

**Handling**

## ⚠Caution

1. **Store away from direct sunlight at 40°C or less.**
2. **Open the inner package of the double packaging in a clean room or other clean environment.**

**Piping**

## ⚠Caution

1. **Be sure to use sealant tape or liquid gasket at the taper thread part. Using without sealant tape or liquid gasket can cause air leakage.**

# Flame Resistant (Equivalent to UL-94 Standard V-0) Speed Controller with One-touch Fittings Elbow Type

# *Series AS*

## Minimizes installation time and cost

**Tube swivels 360°**

**Application to inch size tubing**
● **Metric size**
ø6, ø8, ø10, ø12

**Maximum operating pressure**
**1 MPa max.**

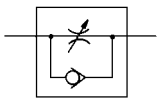
**Applicable tubing materials**
FR double layer, FR soft nylon

**Retainer prevents accidental loss of needle.**

**Comes standard with seal.**

**Elbow type**

**JIS Symbol**



**Flow Direction Symbols on Body**

| | Meter-out type | Meter-in type |
|---|---|---|
| Symbol |  |  |
| JIS Symbol |  |  |

## Model

| Elbow type | Port size | Applicable tubing O.D. (mm) | | | | Applicable cylinder bore size (mm) |
|---|---|---|---|---|---|---|
| | | 6 | 8 | 10 | 12 | |
| **AS22□1F-01-□W2** | R 1/8 | ◉ | ◉ | ◉ | | 20, 25, 32 |
| **AS22□1F-02-□W2** | R 1/4 | ◉ | ◉ | ◉ | | 20, 25, 32, 40 |
| **AS32□1F-02-□W2** | R 1/4 | ◉ | ◉ | ◉ | ◉ | 40, 50, 63 |
| **AS32□1F-03-□W2** | R 3/8 | ● | ● | ● | ● | 40, 50, 63 |
| **AS42□1F-04-□W2** | R 1/2 | | | ● | ● | 63, 80, 100 |

Note 1) Meter-out and meter-in types can be visually differentiated by the lock nut.
The lock nut on the meter-out type is electroless nickel plated, while the meter-in type is black zinc chromate plated.
Note 2) ◉Marking is electroless nickel plated, provided as standard. (N specificaitons)

## Specifications

| | |
|---|---|
| **Fluid** | Air |
| **Proof pressure** | 1.5 MPa |
| **Max. operating pressure** | 1 MPa |
| **Mini. operating pressure** | 0.1 MPa |
| **Ambient and fluid temperature** | –5 to 60°C (No freezing) |
| **Number of needle rotations** | 10 turns |
| **Applicable tubing material** Note) | FR double layer, FR soft nylon |

Note) Use caution regarding the max. tubing operating pressure.
(Refer to pages 379 and 380 for details.)

## Flow Rate and Effective Area

| Model | | AS22□1F-01 | AS22□1F-02 | | | AS32□1F | | | AS42□1F | |
|---|---|---|---|---|---|---|---|---|---|---|
| Tubing O.D. (mm) | | ø6, ø8, ø10 | ø4 | ø6 | ø8, ø10 | ø6 | ø8 | ø10, ø12 | ø10 | ø12 |
| Controlled flow (Free flow) | Flow rate ℓ/min (ANR) | 230 | 260 | 390 | 460 | 660 | 790 | 920 | 1580 | 1710 |
| | Effective area ($mm^2$) | 3.5 | 4 | 6 | 7 | 10 | 12 | 14 | 24 | 26 |

Note) Flow rate values are measured at 0.5 MPa and 20°C.

## ⚠Caution

**Be sure to read before handling.**
**Refer to front matters 58 and 59 for Safety Instructions and pages 412 to 414 for Flow Control Equipment Precautions.**

## How to Order

**AS 2 2 0 1F – 01 – 06 W2**

**Body size**

| | |
|---|---|
| **2** | 1/8, 1/4 standard |
| **3** | 3/8 standard |
| **4** | 1/2 standard |

**Elbow**

**Control type**

| | |
|---|---|
| **0** | Meter-out |
| **1** | Meter-in |

**With One-touch fitting**

**Port size**

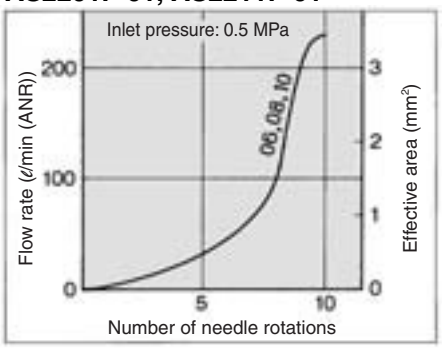
| | |
|---|---|
| **01** | R 1/8 |
| **02** | R 1/4 |
| **03** | R 3/8 |
| **04** | R 1/2 |

**Applicable tubing O.D.**
**Metric size**

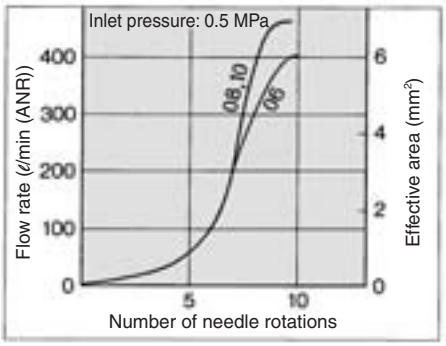
| | |
|---|---|
| **06** | ø6 |
| **08** | ø8 |
| **10** | ø10 |
| **12** | ø12 |

## Needle Valve/Flow Characteristics

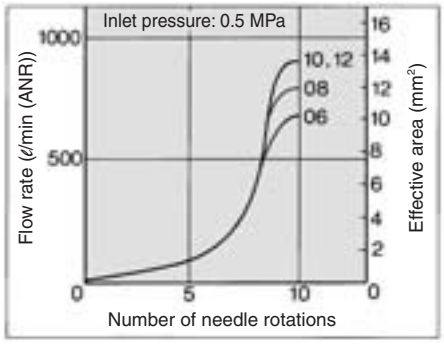
**AS2201F-01, AS2211F-01**



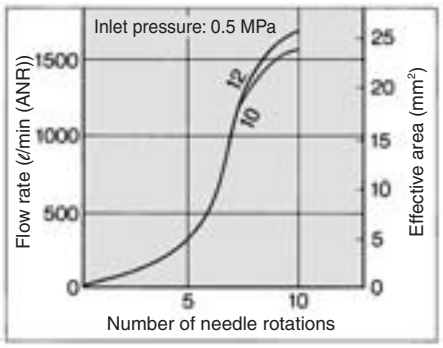

**AS2201F-02, AS2211F-02**




**AS3201F, AS3211F**

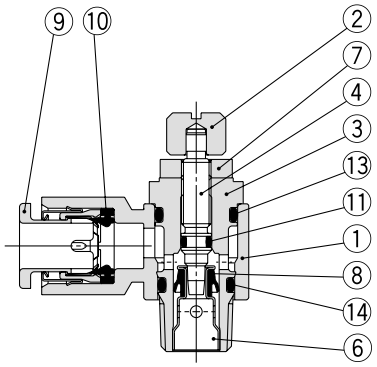



**AS4201F, AS4211F**

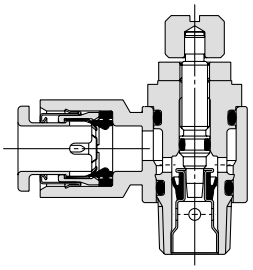


## Construction

**Meter-out type**

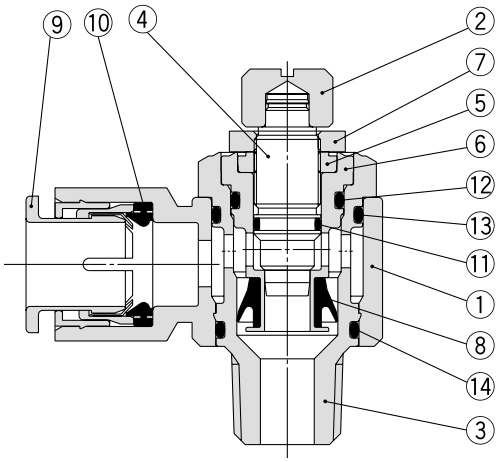



**Meter-in type**

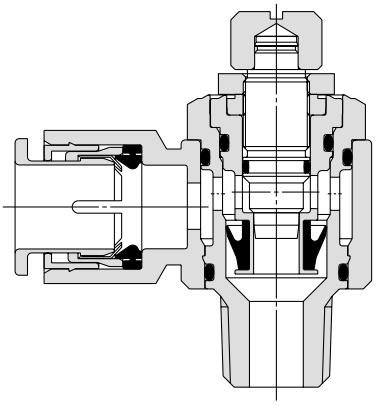


**AS32□1F-02**

**Meter-out type** AS3201F-02




**Meter-in type** AS3211F-02

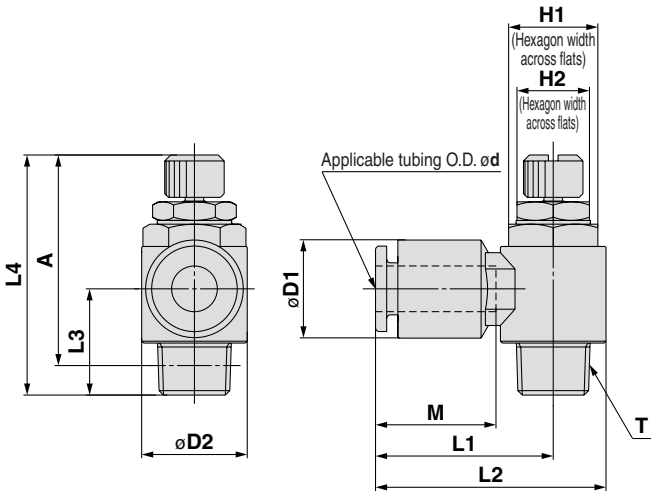


### Component Parts

| No. | Description | Material | Note |
|---|---|---|---|
| 1 | **Body A** | Flame-resistant PBT | |
| 2 | **Handle** | Brass | Electroless nickel plated |
| 3 | **Body B** | Brass | Electroless nickel plated |
| 4 | **Needle** | Brass | Electroless nickel plated |
| 5 | **Needle guide** | Brass | Electroless nickel plated |
| 6 | **Seat ring** | Brass | (1) |
| 7 | **Lock nut** | Brass | Electroless nickel plated (2) |
| 8 | **U-packing** | HNBR | |
| 9 | **Cassette** | — | |
| 10 | **Seal** | NBR | |
| 11 | **O-ring** | NBR | |
| 12 | **O-ring** | NBR | |
| 13 | **O-ring** | NBR | |
| 14 | **O-ring** | NBR | |

Note 1) AS22□1F, AS32□1F-02: Electroless nickel plated.
Note 2) Meter-in type is black zinc chromate plated.

## Elbow Type




### Metric Size

| Model | Applicable tubing O.D. ød | T | H1 | H2 | D1 | D2 | L1 | L2 | L3 | L4 (1) | | A (2) | | M | Mass (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Max. | Min. | Max. | Min. | | |
| **AS22□1F-01-06W2** | 6 | R 1/8 | 12 | 10 | 13.2 | 14.2 | 23.9 | 31 | 13.4 | 36.4 | 31.4 | 33.3 | 28.3 | 17 | 19 |
| **AS22□1F-01-08W2** | 8 | | | | 15.2 | | 25.3 | 32.4 | | | | | | 18.5 | 21 |
| **AS22□1F-01-10W2** | 10 | | | | 18.5 | | 32.1 | 39.2 | 15.2 | | | | | 21 | 23 |
| **AS22□1F-02-06W2** | 6 | R 1/4 | 17 | 12 | 13.2 | 18.5 | 25.2 | 34.4 | 17.7 | 41.1 | 36.1 | 35.6 | 30.6 | 17 | 34 |
| **AS22□1F-02-08W2** | 8 | | | | 15.2 | | 27.2 | 36.4 | | | | | | 18.5 | 36 |
| **AS22□1F-02-10W2** | 10 | | | | 18.5 | | 35.3 | 44.5 | 18.3 | | | | | 21 | 38 |
| **AS32□1F-02-06W2** | 6 | | 19 | 14 | 13.2 | 23 | 27.8 | 39.3 | 21.3 | 49.9 | 44.9 | 44.4 | 39.4 | 17 | 63 |
| **AS32□1F-02-08W2** | 8 | | | | 15.2 | | 29.5 | 41 | | | | | | 18.5 | 65 |
| **AS32□1F-02-10W2** | 10 | | | | 18.5 | | 31.5 | 43.1 | | | | | | 21 | 67 |
| **AS32□1F-02-12W2** | 12 | | | | 20.9 | | 32.8 | 44.3 | | | | | | 22 | 69 |
| **AS32□1F-03-06W2** | 6 | R 3/8 | | | 13.2 | | 27.8 | 39.3 | 19.8 | 47.4 | 42.4 | 42.4 | 37.4 | 17 | 58 |
| **AS32□1F-03-08W2** | 8 | | | | 15.2 | | 29.5 | 41 | | | | | | 18.5 | 60 |
| **AS32□1F-03-10W2** | 10 | | | | 18.5 | | 31.5 | 43.1 | | | | | | 21 | 62 |
| **AS32□1F-03-12W2** | 12 | | | | 20.9 | | 32.8 | 44.3 | | | | | | 22 | 64 |
| **AS42□1F-04-10W2** | 10 | R 1/2 | 24 | 17 | 18.5 | 28.6 | 33.6 | 47.9 | 24.5 | 58.7 | 51.2 | 51.4 | 43.9 | 21 | 101 |
| **AS42□1F-04-12W2** | 12 | | | | 20.9 | | 35.2 | 49.5 | | | | | | 22 | 107 |

Note 1) Reference dimensions
Note 2) Reference thread dimensions after installation.

# Speed Controller with One-touch Fittings

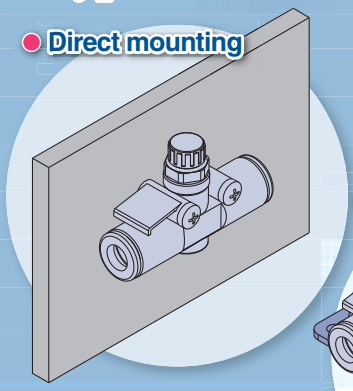
New

RoHS

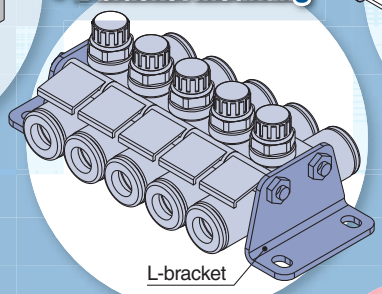
## In-line Type

***4 types of mounting variations***

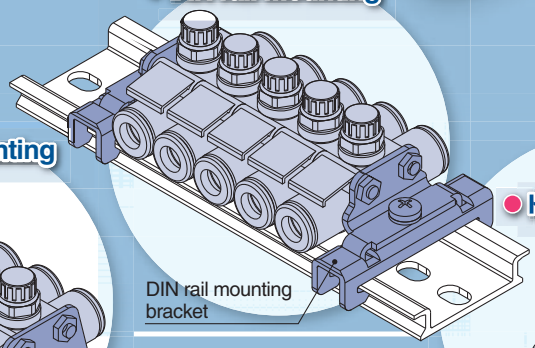
- Direct mounting



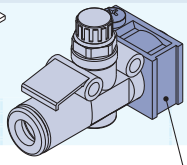
- L-bracket mounting




- DIN rail mounting

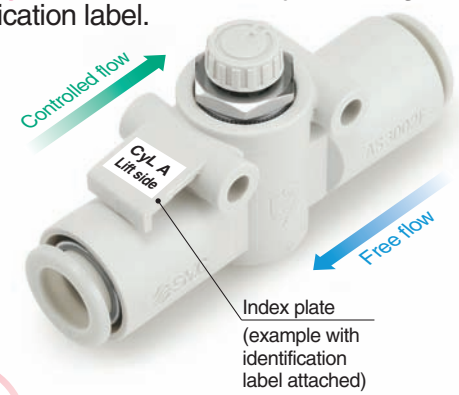



- Holder mounting




## Index plate

It is possible to **identify the product when multiple controllers are mounted** and **identify the flow direction** by attaching an identification label.



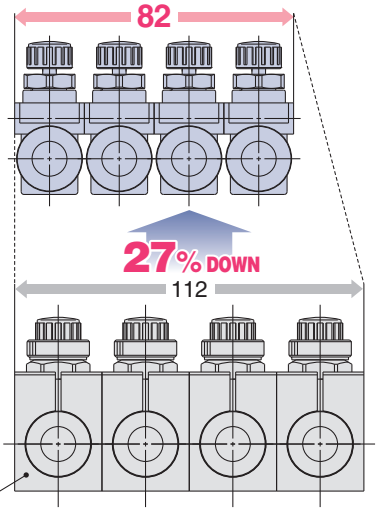

## Lightweight

Reduced by **30%** compared with the conventional product (AS2002F-04)

## Compact

**NEW**

Four AS3002F-10 controllers connected




Conventional

Four AS3001F-10 controllers connected with holders (TMH-10)

## Flow-rate characteristics are equivalent to the conventional product.

***Series AS***

SMC

CAT.NAS20-215B

## Series

| Series | Applicable tube O.D. | | | | | | | | | | | | | Applicable cylinder bore size | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Metric size | | | | | | | Inch size | | | | | | | |
| | 2 | 3.2 | 4 | 6 | 8 | 10 | 12 | 1/8" | 5/32" | 1/4" | 5/16" | 3/8" | 1/2" | (inch) | (mm) |
| **AS1002F** | ◉ | | | | | | | | | | | | | 1/4" | 2.5, 4, 6 |
| | | ◉ | ◉ | ◉ | | | | ◉ | ◉ | ◉ | | | | 1/4", 3/8", 5/8", 3/4" | 6, 10, 16, 20 |
| **AS2002F** | | | ◉ | ◉ | | | | | ◉ | ◉ | | | | 3/4", 1", 1 1/4" | 20, 25, 32 |
| **AS2052F** | | | | ◉ | ◉ | | | | | ◉ | ◉ | | | 3/4", 1", 1 1/4", 1 1/2" | 20, 25, 32, 40 |
| **AS3002F** | | | | ◉ | ◉ | ◉ | ◉ | | | ◉ | ◉ | ◉ | | 1 1/2", 2", 2 1/2" | 40, 50, 63 |
| **AS4002F** | | | | | | ◉ | ◉ | | | | | ◉ | ◉ | 2 1/2", 3 1/4", 4" | 63, 80, 100 |

## Specifications

| | |
|---|---|
| **Fluid** | Air |
| **Proof pressure** | 218 psi (1.5 MPa)<br>152 psi Note 1) (1.05 MPa Note 1)) |
| **Max. operating pressure** | 145 psi (1 MPa)<br>102 psi Note 1) (0.7 MPa Note 1)) |
| **Min. operating pressure** | 15 psi (0.1 MPa) |
| **Ambient and fluid temperature** | 23 to 140°F (–5 to 60°C) (No freezing) |
| **Applicable tube material** Note 2) | Nylon, Soft nylon, Polyurethane |

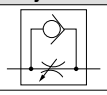
Note 1) In case of AS1002F-02
Note 2) Use caution at the max. operating pressure when using soft nylon or polyurethane tubing. (Refer to pages 371 and 372 of Best Pneumatics Vol. 6)
Note 3) Brass parts are all electroless nickel plated.

## Flow Rate and Flow Coefficient

| Series | | AS1002F | | AS2002F | | AS2052F | | AS3002F | | | AS4002F | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tube O.D. | Metric size | ø2 | ø3.2, ø4, ø6 | ø4 | ø6 | ø6 | ø8 | ø6 | ø8 | ø10, ø12 | ø10 | ø12 |
| | Inch size | — | ø1/8", ø5/32" ø1/4" | ø5/32" | ø1/4" | — | ø1/4" ø5/16" | ø1/4" | ø5/16" | ø3/8" | ø3/8" | ø1/2" |
| Controlled flow (Free flow) | Flow rate (scfm) | 0.7 | 3.5 | 4.6 | 8.1 | 10.2 | 16.3 | 13.8 | 23.3 | 32.5 | 32.5 | 55.8 |
| | Cv | 0.02 | 0.08 | 0.11 | 0.19 | 0.25 | 0.39 | 0.33 | 0.56 | 0.78 | 0.78 | 1.33 |

Note) Flow rate values are measured at 73 psi and 70°F.

**Flow Direction Symbol on Body**

| Symbol |
|---|
|  |

## How to Order

RoHS

**AS 400 2F – 12 – [ ] – [ ]**

**Body size**

| | |
|---|---|
| **100** | M3, M5 standard |
| **200** | 1/8 standard |
| **205** | 1/4 standard |
| **300** | 3/8 standard |
| **400** | 1/2 standard |

**With one-touch fittings**

**Applicable tube O.D.**

| Metric size | |
|---|---|
| **02** | ø2 |
| **23** | ø3.2* |
| **04** | ø4 |
| **06** | ø6 |
| **08** | ø8 |
| **10** | ø10 |
| **12** | ø12 |

| Inch size | |
|---|---|
| **01** | ø1/8" |
| **03** | ø5/32" |
| **07** | ø1/4" |
| **09** | ø5/16" |
| **11** | ø3/8" |
| **13** | ø1/2" |

* Use ø1/8" tube.

**Made to Order**

**Lock nut option**

| | |
|---|---|
| **Nil** | Hexagon lock nut |
| **J** | Round lock nut |

## Made to Order

Made to Order

**Lubricant: Vaseline** **-X12**

**Ex.) AS2002F-04-X12**

**Grease-free (Sealant: Fluoro coated) + Restrictor (Without Check Valve)** **-X21**

**Ex.) AS2002F-04-X21**

Note) Not particle-free

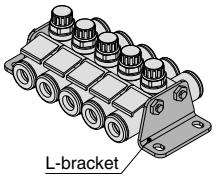
**Restrictor (Without Check Valve)** **-X214**

**Ex.) AS2002F-04-X214**

## Options

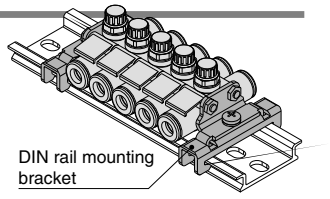
### L-bracket

| Part no. | Applicable series |
|---|---|
| **AS-12L** | AS1002F-02 |
| **AS-10L** | AS1002F |
| **AS-20L** | AS2002F |
| **AS-25L** | AS2052F |
| **AS-30L** | AS3002F |
| **AS-40L** | AS4002F |




### DIN rail mounting bracket

| Part no. | Applicable series |
|---|---|
| **AS-10D** | AS1002F |
| **AS-20D** | AS2002F |
| **AS-25D** | AS2052F |
| **AS-30D** | AS3002F |
| **AS-40D** | AS4002F |




* Bracket for AS1002F-02 is not available.
* Prepare DIN rail by user.

### Part no. list of threaded stud kit for manifold

| Model | | 4 stations | 6 stations | 8 stations | 10 stations |
|---|---|---|---|---|---|
| Metric size | Inch size | | | | |
| **AS1002F-02** | — | AS-31B | AS-32B | AS-33B | AS-34B |
| **AS1002F-23** | **AS1002F-01** | AS-32B | AS-33B | AS-34B | AS-36B |
| **AS1002F-04** | **AS1002F-03** | | | AS-35B | |
| **AS1002F-06** | — | | AS-34B | AS-36B | AS-37B |
| — | **AS1002F-07** | | | | AS-38B |
| **AS2002F-04** | **AS2002F-03** | AS-32B | AS-34B | AS-35B | AS-37B |
| **AS2002F-06** | — | | | AS-36B | |
| — | **AS2002F-07** | | | | AS-38B |
| **AS2052F-06** | — | AS-41B | AS-42B | AS-44B | AS-45B |
| — | **AS2052F-07** | | | | |
| **AS2052F-08** | **AS2052F-09** | | | | |
| **AS3002F-06** | — | AS-42B | AS-44B | AS-45B | AS-47B |
| — | **AS3002F-07** | | | | |
| **AS3002F-08** | **AS3002F-09** | | | | |
| **AS3002F-10** | — | | | | |
| — | **AS3002F-11** | | | AS-46B | |
| **AS3002F-12** | — | | | | |
| **AS4002F-10** | — | AS-43B | AS-45B | AS-47B | AS-48B |
| — | **AS4002F-11** | | | | |
| **AS4002F-12** | — | | | | |
| — | **AS4002F-13** | | | | |

### Details of threaded stud kit for manifold

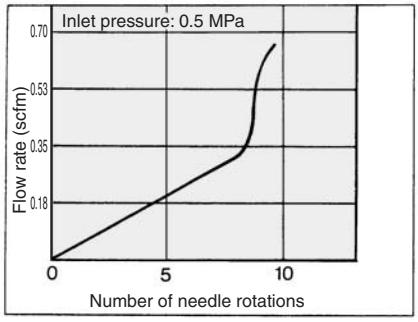
| Part no. | Threaded stud | | Accessories | | | |
|---|---|---|---|---|---|---|
| | Length (mm) | pcs. | Hexagon nut | pcs. | Flat washer | pcs. |
| **AS-31B** | 38 | 2 | M3 | 4 | M3 | 4 |
| **AS-32B** | 62 | 2 | | | | |
| **AS-33B** | 72 | 2 | | | | |
| **AS-34B** | 90 | 2 | | | | |
| **AS-35B** | 104 | 2 | | | | |
| **AS-36B** | 114 | 2 | | | | |
| **AS-37B** | 135 | 2 | | | | |
| **AS-38B** | 140 | 2 | | | | |
| **AS-41B** | 78 | 2 | M4 | 4 | M4 | 4 |
| **AS-42B** | 111 | 2 | | | | |
| **AS-43B** | 119 | 2 | | | | |
| **AS-44B** | 147 | 2 | | | | |
| **AS-45B** | 179 | 2 | | | | |
| **AS-46B** | 191 | 2 | | | | |
| **AS-47B** | 236 | 2 | | | | |
| **AS-48B** | 277 | 2 | | | | |

* Precautions when options are ordered
Threaded studs for manifold are not included when L-bracket and DIN rail mounting bracket are ordered. Please order them according to the number of stations.

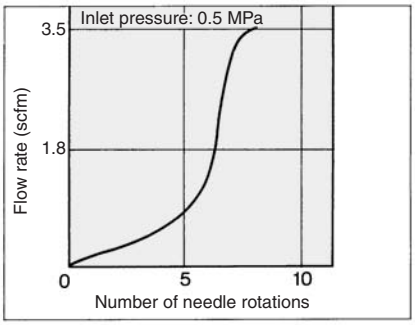
**Ex.) AS2002F-04** **When connecting 4 pcs. and mounting L-brackets on both sides**
- Speed controller **AS2002F-04** ·····4 pcs.
- L-bracket **AS-20L** ·····2 pcs.
- Threaded stud kit for manifold **AS-32B** ·····1 pc.

## Needle Valve/Flow-rate Characteristics

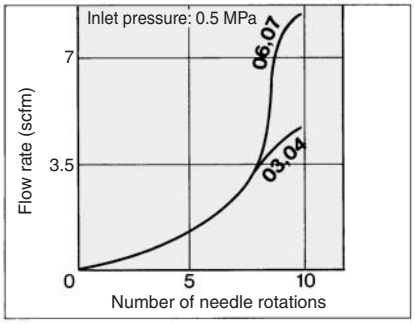
### AS1002F-02



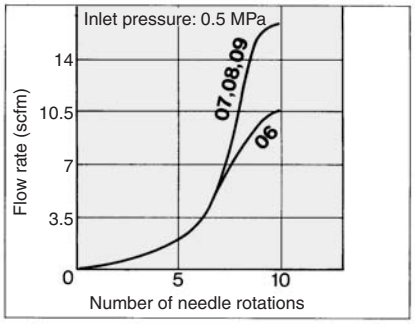

### AS1002F



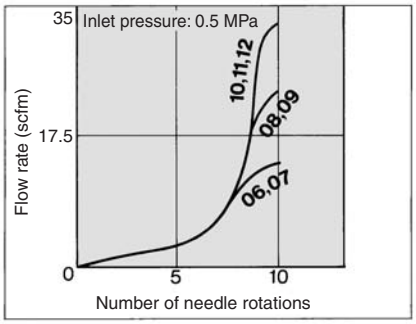

### AS2002F



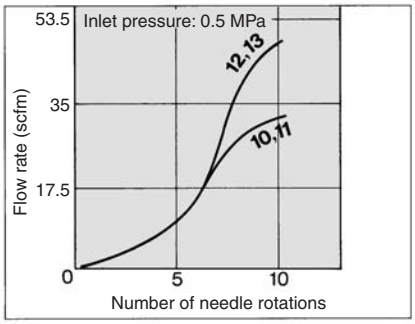

### AS2052F




### AS3002F

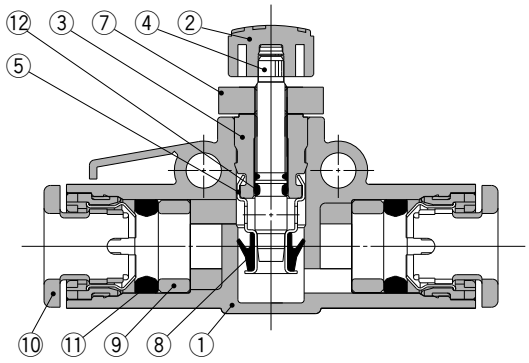



### AS4002F

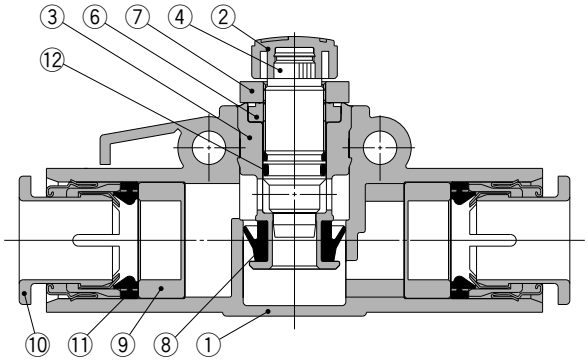



## Construction

### AS1002F, AS2002F, AS2052F




### AS1002F-02, AS3002F, AS4002F



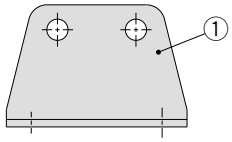

**Component Parts**

| No. | Description | Material | Note |
|---|---|---|---|
| **1** | **Body A** | PBT | |
| **2** | **Handle** | PBT | |
| **3** | **Body B** | Brass | Electroless nickel plated |
| **4** | **Needle** | Brass | Electroless nickel plated |
| **5** | **Seat ring** | Brass | Electroless nickel plated |
| **6** | **Needle guide** | Brass | Electroless nickel plated |

| No. | Description | Material | Note |
|---|---|---|---|
| **7** | **Lock nut** | Steel wire | Zinc chromated |
| **8** | **U-seal** | HNBR | |
| **9** | **Spacer** | POM Note) | |
| **10** | **Cassette** | — | |
| **11** | **Seal** | NBR | |
| **12** | **O-ring** | NBR | |

Note) AS2052F, AS3002F, AS4002F are made of PBT. AS3002F-11, AS4002F-11, AS4002F-13 are made of electroless nickel plated brass.

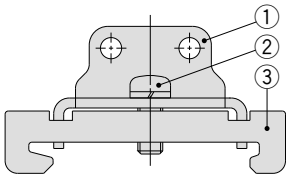
### L-bracket




**Component Part**

| No. | Description | Material |
|---|---|---|
| **1** | **Bracket** | Steel strip |

### DIN rail mounting bracket



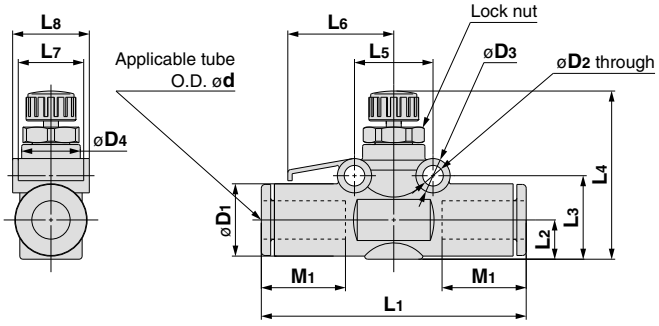

**Component Parts**

| No. | Description | Material |
|---|---|---|
| **1** | **Bracket** | Steel strip |
| **2** | **Cross recessed round head screw** | Steel wire |
| **3** | **Clasp** | Steel strip |

**⚠Caution**

**Be sure to read before handling. Refer to back cover for Safety Instructions and Best Pneumatics Vol. 6 for Flow Control Equipment Precautions.**

## Dimensions




### Metric Size

Unit: mm

| Model | Applicable tube O.D. ød | D1 | D2 | D3 | D4 | L1 | L2 | L3 | L4 Note) MAX. | L4 Note) MIN. | L5 | L6 | L7 | L8 | M1 | Weight (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AS1002F-02** | 2 | 6 | 3.2 | 5 | 6 | 25.4 | 3.4 | 7.9 | 20.9 | 18.4 | 11 | 9.8 | 5 | 6.7 | 8.8 | 3 |
| **AS1002F-23** | 3.2 | 8.4 | 3.3 | 5.5 | 9.1 | 36 | 4.4 | 11.1 | 23.8 | 21 | 11 | 15.4 | 8.8 | 9.8 | 12.7 | 5 |
| **AS1002F-04** | 4 | 9.3 | | | | 37 | 5.1 | 11.8 | 24.5 | 21.7 | | | | 10.1 | | 5.5 |
| **AS1002F-06** | 6 | 11.6 | | | | 39.5 | 6.1 | 12.8 | 25.5 | 22.7 | | | | 12.3 | 13.5 | 6.5 |
| **AS2002F-04** | 4 | 9.3 | 3.3 | 5.5 | 10 | 40.7 | 5.2 | 12.3 | 28.9 | 25.4 | 12.6 | 17 | 10.5 | 11.5 | 12.7 | 8.5 |
| **AS2002F-06** | 6 | 11.6 | | | | 42.5 | 6.3 | 13.4 | 30 | 26.5 | | | | 12.3 | 13.5 | 9.5 |
| **AS2052F-06** | 6 | 12.8 | 4.3 | 7.8 | 14 | 53.2 | 6.7 | 16.3 | 33.2 | 28.2 | 17 | 22.8 | 12 | 15.7 | 17 | 19 |
| **AS2052F-08** | 8 | 15.2 | | | | 57.2 | 8 | 17.6 | 34.5 | 29.5 | | | | 16.1 | 18 | 22 |
| **AS3002F-06** | 6 | 13.2 | 4.3 | 8 | 19.3 | 59 | 7.4 | 19.3 | 38.6 | 33.6 | 22 | 25 | 12 | 20.5 | 17 | 36 |
| **AS3002F-08** | 8 | 15.2 | | | | 65 | 8.2 | 20.1 | 39.4 | 34.4 | | | | | 18 | 38 |
| **AS3002F-10** | 10 | 18.5 | | | | 70.8 | 9.8 | 21.7 | 41 | 36 | | | | | 21 | 42 |
| **AS3002F-12** | 12 | 20.9 | | | | 76 | 10.9 | 22.8 | 42.1 | 37.1 | | | | 22.1 | 22 | 44 |
| **AS4002F-10** | 10 | 18.5 | 4.3 | 8 | 25 | 76.9 | 10.3 | 22.7 | 51.6 | 44.1 | 28 | 33 | 14 | 26.2 | 21 | 76 |
| **AS4002F-12** | 12 | 21.7 | | | | 81.3 | 11.3 | 23.7 | 52.6 | 45.1 | | | | | 22 | 82 |

Note) Reference dimensions

### Inch Size

Unit: mm

| Model | Applicable tube O.D. ød | D1 | D2 | D3 | D4 | L1 | L2 | L3 | L4 Note) MAX. | L4 Note) MIN. | L5 | L6 | L7 | L8 | M1 | Weight (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AS1002F-01** | 1/8" | 8.4 | 3.3 | 5.5 | 9.1 | 36 | 4.5 | 11.2 | 23.8 | 21 | 11 | 15.4 | 8.8 | 9.8 | 12.7 | 5 |
| **AS1002F-03** | 5/32" | 9.3 | | | | 37 | 5.2 | 11.9 | 24.5 | 21.7 | | | | 10.1 | | 5.5 |
| **AS1002F-07** | 1/4" | 12 | | | | 39.5 | 6.1 | 12.8 | 25.5 | 22.7 | | | | 12.8 | 13.7 | 6.5 |
| **AS2002F-03** | 5/32" | 9.3 | 3.3 | 5.5 | 10 | 40.7 | 5.2 | 12.3 | 28.9 | 25.4 | 12.6 | 17 | 10.5 | 11.5 | 12.7 | 8.5 |
| **AS2002F-07** | 1/4" | 12 | | | | 42.6 | 6.5 | 13.6 | 30.2 | 26.7 | | | | 12.8 | 13.7 | 9.5 |
| **AS2052F-07** | 1/4" | 13.2 | 4.3 | 7.8 | 14 | 53.4 | 6.9 | 16.5 | 33.4 | 28.4 | 17 | 22.8 | 12 | 15.7 | 17 | 19 |
| **AS2052F-09** | 5/16" | 15.2 | | | | 57.2 | 8 | 17.6 | 34.5 | 29.5 | | | | 16.1 | 18 | 22 |
| **AS3002F-07** | 1/4" | 13.2 | 4.3 | 8 | 19.3 | 59 | 7.4 | 19.3 | 38.6 | 33.6 | 22 | 25 | 12 | 20.5 | 17 | 35 |
| **AS3002F-09** | 5/16" | 15.2 | | | | 65 | 8.2 | 20.1 | 39.4 | 34.4 | | | | | 18 | 38 |
| **AS3002F-11** | 3/8" | 18.5 | | | | 69.8 | 9.8 | 21.7 | 41 | 36 | | | | | 21 | 52 |
| **AS4002F-11** | 3/8" | 18.5 | 4.3 | 8 | 25 | 76.9 | 10.3 | 22.7 | 51.6 | 44.1 | 28 | 33 | 14 | 26.2 | 21 | 86 |
| **AS4002F-13** | 1/2" | 21.7 | | | | 81.3 | 11.3 | 23.7 | 52.6 | 45.1 | | | | | 22 | 95 |

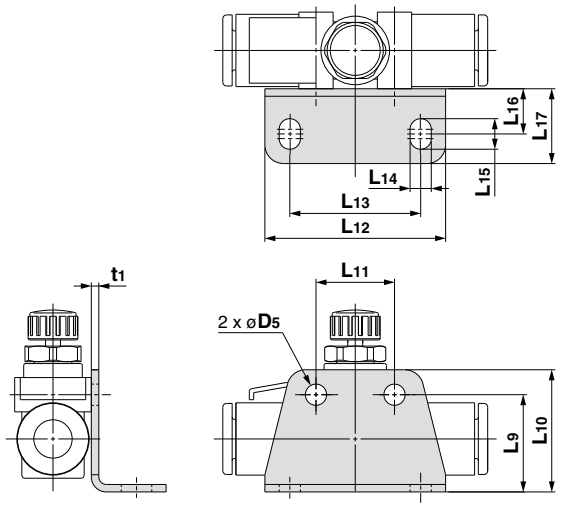
Note) Reference dimensions

It is possible to tighten the lock nut (hexagon) manually.
If the nut needs to be fixed more firmly, retighten it with a tool. When using a tool, the nut needs to be tightened to the recommended tightening torque shown in the table.
As a guide, it should be tightened by 15 to 30° with a tool after tightening it manually.
Be careful not to damage the lock nut by applying too much torque.

| Series | Proper tightening torque (ft·lb) |
|---|---|
| **AS1002F-02** | 0.05 |
| **AS1002F** | 0.15 |
| **AS2002F** | 0.22 |
| **AS2052F** | 0.74 |
| **AS3002F** | 1.5 |
| **AS4002F** | 3 |

## L-bracket

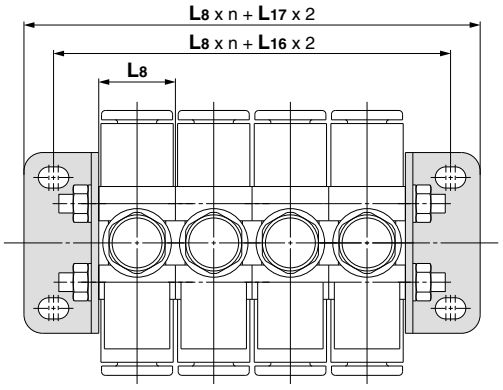
### Bracket on a single side




Unit: mm

| Part no. | Applicable series | D5 | L9 | L10 | L11 | L12 | L13 | L14 | L15 | L16 | L17 | t1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS-12L | AS1002F-02 | 3.4 | 9.9 | 13.4 | 11 | 27.5 | 19.5 | 3.4 | 4.9 | 7.3 | 12 | 1 |
| AS-10L | AS1002F | | 14.8 | 18.3 | | | | | | | | |
| AS-20L | AS2002F | | 15.6 | 19.6 | 12.6 | 29 | 21 | 4.5 | 6.5 | 9.5 | 15.5 | 1.2 |
| AS-25L | AS2052F | | 19.6 | 24.6 | 17 | 38 | 28 | | | | | |
| AS-30L | AS3002F | 4.5 | 24.8 | 29.8 | 22 | 43 | 33 | | | | | 1.4 |
| AS-40L | AS4002F | | 25.7 | 30.7 | 28 | 49 | 39 | | | | | |

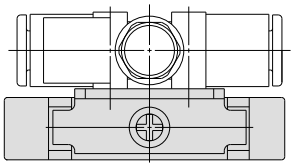
### Brackets on both sides



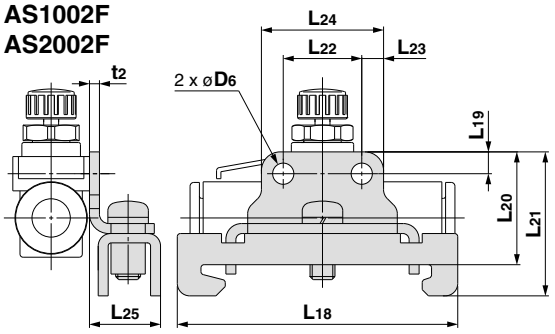

∗1 Refer to page 3 for L8.
∗2 The above figure shows the manifold with controllers connected using two L-brackets and a threaded stud kit for manifold. Refer to page 1 for threaded stud kits for manifold.

## DIN rail mounting bracket

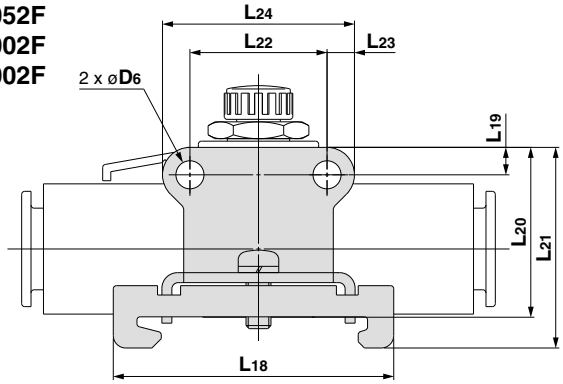
### Bracket on a single side



**AS1002F**
**AS2002F**



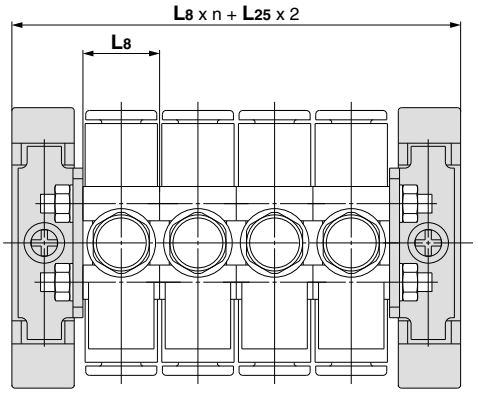

**AS2052F**
**AS3002F**
**AS4002F**




Unit: mm

| Part no. | Applicable series | D6 | L18 | L19 | L20 | L21 | L22 | L23 | L24 | L25 | t2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| AS-10D | AS1002F | 3.4 | 45 | 3.5 | 18.2 | 23.2 | 11 | 3.5 | 18 | 11.2 | 1.6 |
| AS-20D | AS2002F | | | | 18.6 | 23.6 | 12.6 | | 19.6 | | |
| AS-25D | AS2052F | | | | 22 | 27 | 17 | | 25.8 | | |
| AS-30D | AS3002F | 4.5 | | 4.4 | 27.2 | 32.2 | 22 | 4.4 | 30.8 | | |
| AS-40D | AS4002F | | | | 28.1 | 33.1 | 28 | | 36.8 | | |

### Brackets on both sides

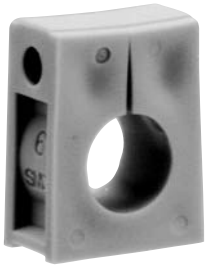



∗1 Refer to page 3 for L8.
∗2 The above figure shows the manifold with controllers connected using two DIN rail mounting brackets and a threaded stud kit for manifold. Refer to page 1 for threaded stud kits for manifold.

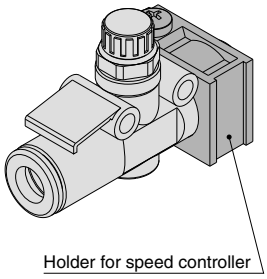
# Holder for Speed Controller
# *Series TMH*

**A holder for securing a speed controller with one-touch fittings (In-line type)**

**Possible to hold a single controller.**



● **Holder mounting**




## Specifications

| | |
|---|---|
| **Ambient temperature** | –4 to 140°F (–20 to 60°C) |
| **Material** | Polypropylene |
| **Color** | White |

## Accessory: Cross Recessed Round Head Screw for Mounting

| Model | | Size (Nominal x Length) | Piece |
|---|---|---|---|
| Metric size | Inch size | | |
| **TMH-23J** | **TMH-01J** | M3 x 15 | 1 |
| **TMH-04J** | **TMH-03J** | | |
| **TMH-06J** | **TMH-07J** | M3 x 20 | |
| **TMH-06** | **TMH-07** | M4 x 25 | |
| **TMH-08** | **TMH-09** | | |
| **TMH-10** | — | M4 x 35 | |
| **TMH-12** | **TMH-13** | | |

## Series

Select the applicable holder/TMH for each speed controller from the below table.

### Metric Size

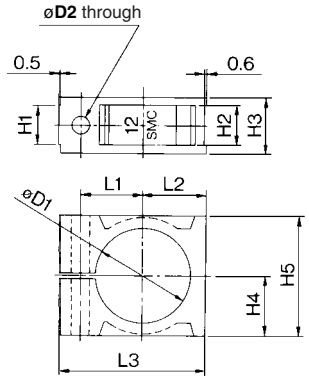
| Tube size / Applicable series | Applicable tube | | | | | |
|---|---|---|---|---|---|---|
| | 23 | 04 | 06 | 08 | 10 | 12 |
| | ø3.2 | ø4 | ø6 | ø8 | ø10 | ø12 |
| AS1002F | **TMH-23J** | **TMH-04J** | **TMH-06J** | | | |
| AS2002F | | | | | | |
| AS2052F | | | **TMH-06** | **TMH-08** | | |
| AS3002F | | | **TMH-07** | | **TMH-10** | **TMH-12** |
| AS4002F | | | | | | **TMH-13** |

Note) The applicable TMH for AS1002F-02 is not available.

### Inch Size

| Tube size / Applicable series | Applicable tube | | | | | |
|---|---|---|---|---|---|---|
| | 01 | 03 | 07 | 09 | 11 | 13 |
| | ø1/8" | ø5/32" | ø1/4" | ø5/16" | ø3/8" | ø1/2" |
| AS1002F | **TMH-01J** | **TMH-03J** | **TMH-07J** | | | |
| AS2002F | | | | | | |
| AS2052F | | | **TMH-07** | **TMH-09** | | |
| AS3002F | | | | | **TMH-10** | |
| AS4002F | | | | | | **TMH-13** |

## Dimensions




Unit: mm

| Model | | øD1 | øD2 | H1 | H2 | H3 | H4 | H5 | L1 | L2 | L3 | Symbol |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metric size | Inch size | | | | | | | | | | | |
| **TMH-23J** | **TMH-01J** | 8.5 | 3.3 | 4.5 | 4.6 | 7.5 | 6 | 12 | 7.2 | 6.6 | 18 | 1/8J |
| **TMH-04J** | **TMH-03J** | 9.4 | | | | | | | | | | 4 5/32J |
| **TMH-06J** | — | 11.7 | 3.3 | 6.3 | 6.4 | 9.3 | 7.7 | 15.4 | 8.5 | 8.3 | 21 | 6J |
| — | **TMH-07J** | 12.1 | | | | | | | | | | 1/4J |
| **TMH-06** | — | 13.1 | 4.3 | 7.1 | 7.2 | 11.1 | 10 | 20 | 11 | 10.6 | 26.5 | 6 |
| — | **TMH-07** | 13.5 | | | | | | | | | | 1/4 |
| **TMH-08** | **TMH-09** | 15.5 | | | | | | | | | | 8 5/16 |
| **TMH-10** | — | 18.8 | 4.3 | 9.5 | 9.6 | 13.5 | 14 | 28 | 14.2 | 14.6 | 34 | 10 |
| **TMH-12** | — | 21.2 | | | | | | | | | | 12 |
| — | **TMH-13** | 22 | | | | | | | | | | 1/2 |

# ⚠ Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of **"Caution," "Warning"** or **"Danger."** They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC), American National Standards Institute (ANSI)*1) and other safety regulations.

**⚠ Caution:** **Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

**⚠ Warning:** **Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

**⚠ Danger :** **Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

*1) ISO 4414: Pneumatic fluid power – General rules relating to systems.
ISO 4413: Hydraulic fluid power – General rules relating to systems.
IEC 60204-1: Safety of machinery – Electrical equipment of machines. (Part 1: General requirements)
ISO 10218-1: Manipulating industrial robots - Safety.
ANSI / (NFPA) T2.25.1 R2: Pneumatic fluid power - Systems standard for industrial machinery.
NFPA (Fluid) T2.24.1 R1: Hydraulic fluid power - Systems standard for stationary industrial machinery.
NF PA 79: Electrical Standard for Industrial Machinery.
ANSI / RIA / ISO 10218 -1: Robots for Industrial Environment - Safety Requirements - Part 1 - Robot.
etc.

## ⚠ Warning

**1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.**
Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

**2. Only personnel with appropriate training should operate machinery and equipment.**
The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

**3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.**
1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

**4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.**
1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

## ⚠ Caution

**1. The product is provided for use in manufacturing industries.**
The product herein described is basically provided for peaceful use in manufacturing industries.
If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.
If anything is unclear, contact your nearest sales branch.

# Limited warranty and Disclaimer/ Compliance Requirements

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements". Read and accept them before using the product.

## Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered.*2)
Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.
This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

***2) Vacuum pads are excluded from this 1 year warranty.**
A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.
Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

## Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

**Revision history**

| | | |
|---|---|---|
| Edition B | * Addition of round lock nut to lock nut option. | OZ |

**⚠ Safety Instructions** Be sure to read "Handling Precautions for SMC Products" (M-E03-3) before using.


**SMC Corporation of America**
10100 SMC Blvd., Noblesville, IN 46060 **www.smcusa.com**
**SMC Pneumatics (Canada) Ltd. www.pneumatics.ca**
**(800) SMC.SMC1 (762-7621)**
**e-mail: sales@smcusa.com**
**For International inquires: www.smcworld.com**

# Speed Controller with One-touch Fitting/Elbow Type

New

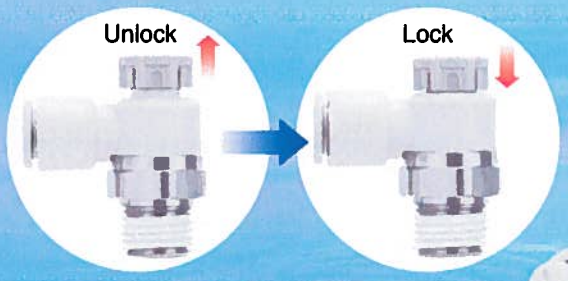
RoHS

## Reduces labor time!

Easy to use

### Push-lock type

- Easy to lock



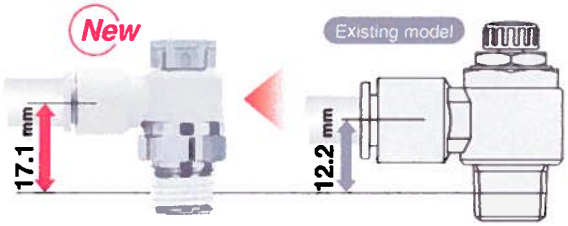

### Larger handle

| Body size | øD (mm) |
|---|---|
| 1 | 9 |
| 2 | 11.6 (Port size 1/8) |
| | 12.6 (Port size 1/4) |
| 3 | 15.6 |
| 4 | 17.6 |


### Improved tube insertion/removal


* Tube pulling out strength is ensured to be equivalent to existing model.

More space beneath the tube. Easier installation/removal of the tube.




AS22□1F-02-□SA

AS22□1F-02-□

## Series AS

SMC

CAT.ES20-220A

## Series Variations

| | Body size | Port size | | Seal method | Applicable tubing O.D. (Metric size: 2, 3.2, 4, 6, 8, 10, 12, 16 / Inch size: 1/8", 5/32", 1/4", 5/16", 3/8", 1/2") | Applicable tubing material |
|---|---|---|---|---|---|---|
|  | 1 | M5 x 0.8 | | Gasket seal | ● ● ● ● ● ● ● ● ● ● ● ● | Nylon (Series T, TIA)<br>Soft nylon (Series TS, TLS)<br>Polyurethane (Series T, TIU) |
| | | 10-32 UNF | | | | |
|  | 2 | R, NPT | 1/8 | Sealant*1 | ● ● ● ● ● ● ● ● ● ● ● ● | |
| | | | 1/4 | | | |
| | 3 | | 3/8 | | ● ● ● ● ● ● ● ● ● ● ● ● | |
| | 4 | | 1/2 | | ● ● ● ● ● ● ● ● ● ● ● ● (New) | |

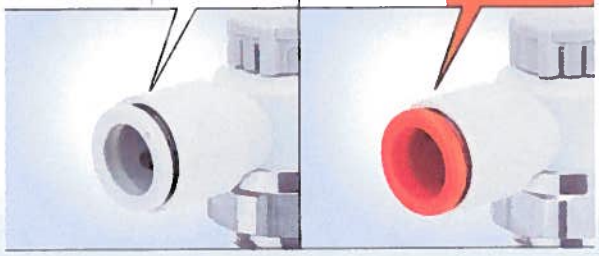
*1 Non-sealant type can be selected as a standard option.

## ◎Electroless nickel plated type is standard.

## Easy identification of product type

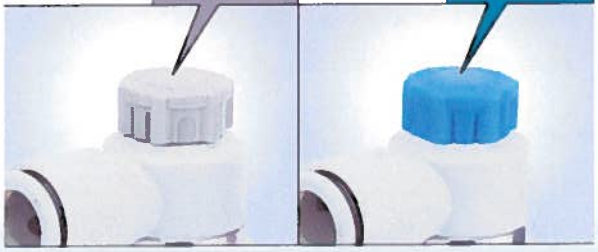
**Metric x Inch**

| Metric | White | Inch | Orange |
|---|---|---|---|



**Meter-out x Meter-in**

| Meter-out | Gray | Meter-in | Light blue |
|---|---|---|---|



# Speed Controller with One-touch Fitting
## Elbow Type
# *Series AS*

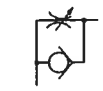
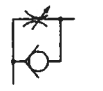
RoHS

## Model

| Model | Port size | | Seal method | Applicable tubing O.D. | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Metric size | | | | | | | | Inch size | | | | | |
| | | | | 2 Note 2) | 3.2 | 4 | 6 | 8 | 10 | 12 | 16 | 1/8" | 5/32" | 1/4" | 5/16" | 3/8" | 1/2" |
| AS12□1F-M5 | M5 x 0.8 | | Gasket seal | ● | ● | ● | ● | | | | | ● | ● | ● | | | |
| AS12□1F-U10/32 | 10-32 UNF | | | ● | ● | ● | ● | | | | | ● | ● | ● | | | |
| AS22□1F-□01 | R NPT | 1/8 | Sealant Note 1) | | ● | ● | ● | ● | ● | | | ● | ● | ● | ● | | |
| AS22□1F-□02 | | 1/4 | | | ● | ● | ● | ● | ● | | | ● | ● | ● | ● | ● | |
| AS32□1F-□03 | | 3/8 | | | | | ● | ● | ● | ● | | | | ● | ● | ● | |
| AS42□1F-□04 | | 1/2 | | | | | | | ● | ● | ● | | | | | ● | ● |

Note 1) Non-sealant type can be selected as a standard option.
Note 2) Only polyurethane tubing is applicable for ø2.

### Flow Direction Symbols on Body

| | Meter-out type | Meter-In type |
|---|---|---|
| Indication symbol |  |  |

## Specifications

| | |
|---|---|
| Fluid | Air |
| Proof pressure | 1.5 MPa |
| Max. operating pressure | 1 MPa |
| Min. operating pressure | 0.1 MPa |
| Ambient and fluid temperature | –5 to 60°C (No freezing) |
| Applicable tubing material | Nylon, Soft nylon, Polyurethane Note) |

Note) Use caution at the max. operating pressure when using soft nylon or polyurethane tubing. (Refer to Best Pneumatics No. 6 for details.)

## Flow Rate and Sonic Conductance

| Model | | AS12□1F-M5 | | AS22□1F-01 | | | AS22□1F-02 | | | AS32□1F-03 | | | AS42□1F-04 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tubing O.D. | Metric size | ø2 | ø3.2<br>ø4<br>ø6 | ø3.2 | ø4 | ø6<br>ø8<br>ø10 | ø4 | ø6 | ø8<br>ø10 | ø6 | ø8 | ø10<br>ø12 | ø10 | ø12<br>ø16 |
| | Inch size | — | ø1/8"<br>ø1/4"<br>ø5/32" | ø1/8" | ø5/32" | ø1/4"<br>ø5/16" | ø5/32" | — | ø1/4"<br>ø5/16"<br>ø3/8" | ø1/4" | ø5/16" | ø3/8" | ø3/8" | ø1/2" |
| C values: Sonic conductance dm³/(s·bar) | Free flow | 0.2 | 0.3 | 0.4 | 0.6 | 0.6 | 1.0 | 1.3 | 1.5 | 1.6 | 1.7 | 2.5 | 4.4 | 4.8 |
| | Controlled flow | 0.2 | 0.3 | 0.4 | 0.7 | 0.8 | 0.9 | 1.3 | | 2.1 | 2.4 | 3.3 | 4.4 | 4.9 |
| b values: Critical pressure ratio | Free flow | 0.3 | | 0.2 | | 0.3 | 0.3 | 0.4 | | 0.4 | | 0.3 | 0.3 | |
| | Controlled flow | 0.2 | 0.4 | 0.2 | | 0.3 | 0.3 | | | 0.3 | | | 0.3 | |

Note 1) 10-32 UNF has the same specification as M5.
Note 2) C values and b values for controlled flow direction are with the needle fully open, the values for free flow direction are with the needle fully closed.

### ⚠ Caution

**Be sure to read before handling. Refer to back cover for Safety Instructions and "Handling Precautions for SMC Products" (M-E03-3) for Flow Control Equipment Precautions.**

## How to Order

**Applicable tubing O.D.** Note 1)

| Metric size | | Inch size | |
|---|---|---|---|
| 02 | ø2 | 01 | ø1/8" |
| 23 | ø3.2 Note 2) | 03 | ø5/32" |
| 04 | ø4 | 07 | ø1/4" |
| 06 | ø6 | | |

Note 1) For selecting applicable tubing O.D., refer to Series Variations (Features 1). For metric size and inch size types can be visually identified by color of the release button.
Metric size: White
Inch size: Orange
Note 2) Use ø1/8" tubing.

**Port size**

| | |
|---|---|
| M5 | M5 x 0.8 |
| U10/32 | 10-32 UNF |

Body size 1: **AS 1 2 0 1 F - M5 - 06 A**

Body size 2/3/4: **AS 2 2 0 1 F - □ 01 - 06 S A**

**Body size**

| | |
|---|---|
| 1 | M5 x 0.8<br>10-32 UNF |
| 2 | 1/8, 1/4 |
| 3 | 3/8 |
| 4 | 1/2 |

**Thread type**

| | |
|---|---|
| Nil | R |
| N | NPT |

**Push-lock type**

**Port size**

| | |
|---|---|
| 01 | 1/8 |
| 02 | 1/4 |
| 03 | 3/8 |
| 04 | 1/2 |

**Seal method**

| | |
|---|---|
| Nil | Without sealant |
| S | With sealant |

**Elbow**

**Control type** Note)

| | |
|---|---|
| 0 | Meter-out |
| 1 | Meter-in |

Note) For meter-out and meter-in types can be visually identified by color of the handle.
Meter-out: Gray
Meter-in: Light blue

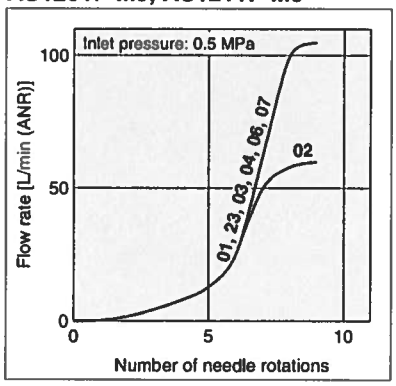
**Applicable tubing O.D.** Note 1)

| Metric size | | Inch size | |
|---|---|---|---|
| 23 | ø3.2 Note 2) | 01 | ø1/8" |
| 04 | ø4 | 03 | ø5/32" |
| 06 | ø6 | 07 | ø1/4" |
| 08 | ø8 | 09 | ø5/16" |
| 10 | ø10 | 11 | ø3/8" |
| 12 | ø12 | 13 | ø1/2" |
| 16 | ø16 | | |

Note 1) For selecting applicable tubing O.D., refer to Series Variations (Features 1).
Note 2) Use ø1/8" tubing.

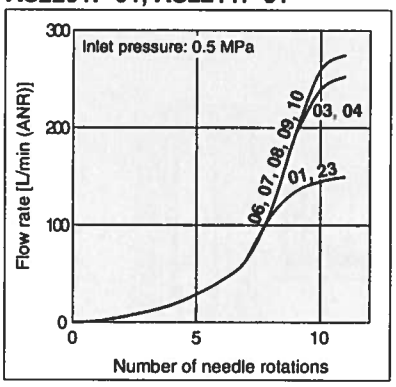
## Needle Valve/Flow-rate Characteristics

### AS1201F-M5, AS1211F-M5

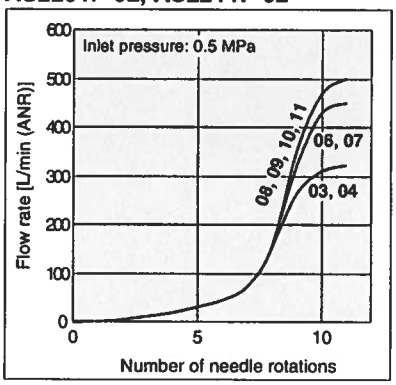



Note) -U10/32 has the same specification as M5.

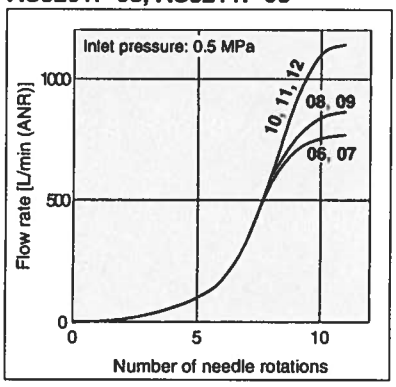
### AS2201F-01, AS2211F-01



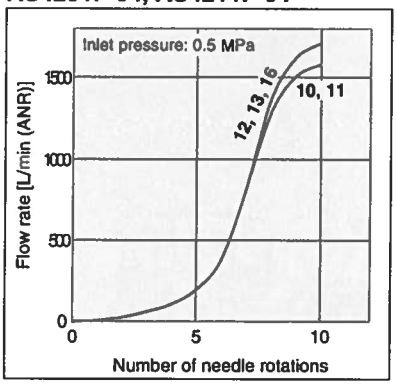

### AS2201F-02, AS2211F-02




### AS3201F-03, AS3211F-03



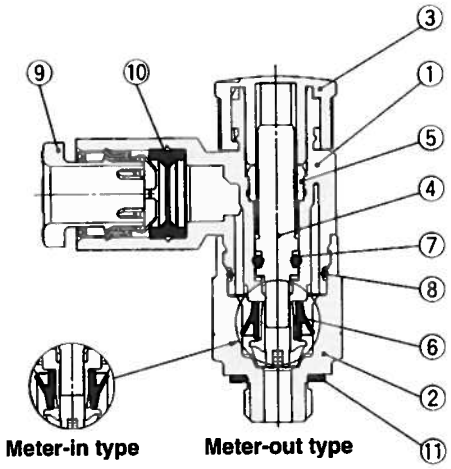

### AS4201F-04, AS4211F-04



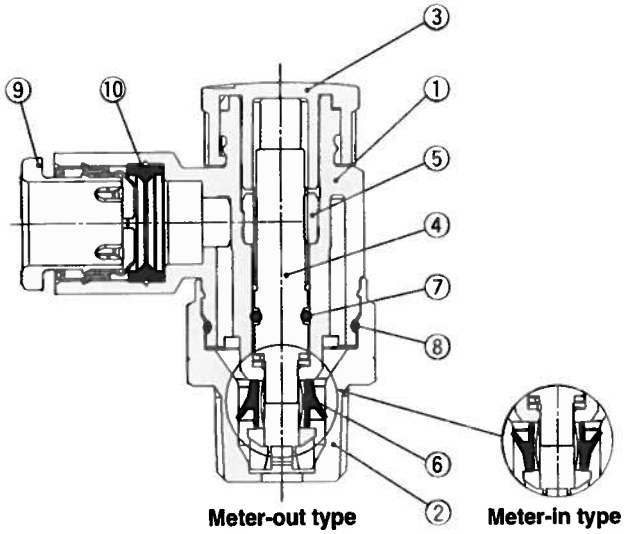

Note) The numbers above the flow-rate characteristic curves in the charts show the tubing diameter as defined by the product number.

## Construction

**Seal method: Gasket seal**
**Thread type: M5, 10-32 UNF**




**Seal method: Sealant**
**Thread type: R, NPT**

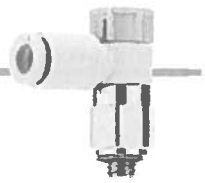


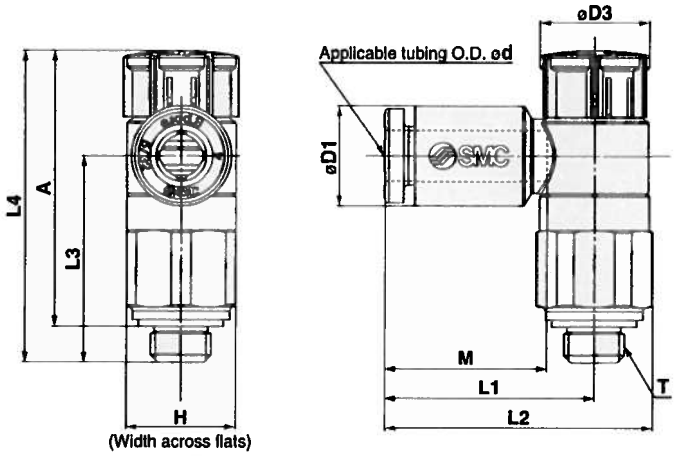

### Component Parts

| No. | Description | Material | Note |
|---|---|---|---|
| 1 | Body A | PBT | |
| 2 | Body B | Brass | Electroless nickel plated |
| 3 | Handle | POM | |
| 4 | Needle | PBT | |
| 5 | Needle guide | Steel wire | Zinc chromated |
| 6 | U-seal | HNBR | |
| 7 | O-ring | NBR | |
| 8 | O-ring | NBR | |
| 9 | Cassette | — | |
| 10 | Seal | NBR | |
| 11 | Gasket | NBR/Stainless steel | |

## Dimensions

**Seal method: Gasket seal**
**Thread type: M5, 10-32 UNF**






### Metric size

(mm)

| Model | d | T | H | D1 | D3 | L1 | L2 | L3 | L4 Note 1) | | A Note 2) | | M | Weight (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Unlock | Lock | Unlock | Lock | | |
| AS12□1F-M5-02A | 2 | M5 x 0.8 10-32 UNF | 9 | 5.8 | 9 | 15.8 | 20.6 | 16.9 | 26.5 | 25.4 | 23.5 | 22.4 | 11.9 | 5 |
| AS12□1F-U10/32-02A | | | | | | | | | | | | | | |
| AS12□1F-M5-23A | 3.2 | | | 7.2 | | 17.2 | 22 | | | | | | 13.3 | |
| AS12□1F-U10/32-23A | | | | | | | | | | | | | | |
| AS12□1F-M5-04A | 4 | | | 8.2 | | | | | | | | | | |
| AS12□1F-U10/32-04A | | | | | | | | | | | | | | |
| AS12□1F-M5-06A | 6 | | | 10.4 | | 18.6 | 23.4 | 16.5 | | | | | | 6 |
| AS12□1F-U10/32-06A | | | | | | | | | | | | | | |

Note 1) Reference dimensions
Note 2) Reference dimensions after installation of thread

### Inch size

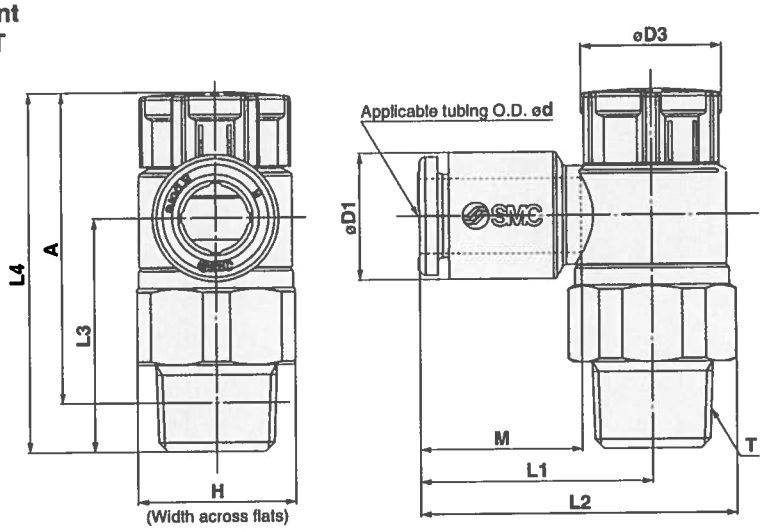
(mm)

| Model | d | T | H | D1 | D3 | L1 | L2 | L3 | L4 Note 1) | | A Note 2) | | M | Weight (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Unlock | Lock | Unlock | Lock | | |
| AS12□1F-M5-01A | 1/8" | M5 x 0.8 10-32 UNF | 9 | 7.2 | 9 | 17.2 | 22 | 16.9 | 26.5 | 25.4 | 23.5 | 22.4 | 13.3 | 5 |
| AS12□1F-U10/32-01A | | | | | | | | | | | | | | |
| AS12□1F-M5-03A | 5/32" | | | 8.2 | | | | | | | | | | |
| AS12□1F-U10/32-03A | | | | | | | | | | | | | | |
| AS12□1F-M5-07A | 1/4" | | | 11.2 | | 18.6 | 23.4 | 16.5 | | | | | | 6 |
| AS12□1F-U10/32-07A | | | | | | | | | | | | | | |

Note 1) Reference dimensions
Note 2) Reference dimensions after installation of thread

## Dimensions

**Seal method: Sealant**
**Thread type: R, NPT**




### Metric size

(mm)

| Model | d | T | H | D1 | D3 | L1 | L2 | L3 | L4 Note 1) Unlock | L4 Note 1) Lock | A Note 2) Unlock | A Note 2) Lock | M | Weight (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS22□1F-01-23(S)A | 3.2 | 1/8 | 13 (12.7) | 7.2 | 11.6 | 19.1 | 26.1 (26) | 19.1 | 30.6 | 29.2 | 27.5 | 26.1 | 13.3 | 9 (9) |
| AS22□1F-01-04(S)A | 4 | | | 8.2 | | | | | | | | | | 10 (9) |
| AS22□1F-01-06(S)A | 6 | | | 10.4 | | | | | | | | | | |
| AS22□1F-01-08(S)A | 8 | | | 13.2 | | 22.4 | 29.4 (29.3) | | | | | | 14.2 | 11 (10) |
| AS22□1F-01-10(S)A | 10 | | | 15.9 | | 25.3 | 32.3 (32.2) | | | | | | 15.6 | 12 (11) |
| AS22□1F-02-23(S)A | 3.2 | 1/4 | 17 (17.5) | 7.2 | 12.6 | 20.9 | 30 (30.3) | 22.6 | 36.6 | 35 | 31.1 | 29.5 | 13.3 | 18 (19) |
| AS22□1F-02-04(S)A | 4 | | | 8.2 | | | | | | | | | | |
| AS22□1F-02-06(S)A | 6 | | | 10.4 | | 23.4 | 32.5 (32.8) | | | | | | | |
| AS22□1F-02-08(S)A | 8 | | | 13.2 | | 23.9 | 33 (33.3) | | | | | | 14.2 | 19 (20) |
| AS22□1F-02-10(S)A | 10 | | | 15.9 | | 26.9 | 36 (36.3) | | | | | | 15.6 | 20 (21) |
| AS32□1F-03-06(S)A | 6 | 3/8 | 19 | 10.4 | 15.6 | 21.8 | 32.1 | 28.7 | 42.3 | 40.7 | 37.1 | 35.5 | 13.3 | 31 (32) |
| AS32□1F-03-08(S)A | 8 | | | 13.2 | | 22.7 | 33 | | | | | | 14.2 | |
| AS32□1F-03-10(S)A | 10 | | | 15.9 | | 26.7 | 37 | 28 | | | | | 15.6 | 32 (33) |
| AS32□1F-03-12(S)A | 12 | | | 18.5 | | 29.7 | 40 | 26.8 | | | | | 17 | 34 (35) |
| AS42□1F-04-10(S)A | 10 | 1/2 | 24 (23.8) | 15.9 | 17.6 | 27.4 | 40.3 (40.2) | 36.2 | 50.8 | 49.2 | 43.7 | 42.1 | 15.6 | 54 (53) |
| AS42□1F-04-12(S)A | 12 | | | 18.5 | | 30.8 | 43.7 (43.6) | 35.1 | | | | | 17 | 56 (55) |
| AS42□1F-04-16(S)A | 16 | | | 23.8 | | 34.8 | 47.7 (47.6) | 32.7 | | | | | 20.6 | 60 (59) |

Note 1) Reference dimensions Note 2) Reference dimensions after installation of thread Note 3) The values in ( ) are the dimensions of NPT thread.

### Inch size

(mm)

| Model | d | T | H | D1 | D3 | L1 | L2 | L3 | L4 Note 1) Unlock | L4 Note 1) Lock | A Note 2) Unlock | A Note 2) Lock | M | Weight (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS22□1F-01-01(S)A | 1/8" | 1/8 | 13 (12.7) | 7.2 | 11.6 | 19.1 | 26.1 (26) | 19.1 | 30.6 | 29.2 | 27.5 | 26.1 | 13.3 | 9 (9) |
| AS22□1F-01-03(S)A | 5/32" | | | 8.2 | | | | | | | | | | 10 (9) |
| AS22□1F-01-07(S)A | 1/4" | | | 11.2 | | 20.8 | 27.8 (27.7) | | | | | | | |
| AS22□1F-01-09(S)A | 5/16" | | | 13.2 | | 22.4 | 29.4 (29.3) | | | | | | 14.2 | 11 (10) |
| AS22□1F-02-01(S)A | 1/8" | 1/4 | 17 (17.5) | 7.2 | 12.6 | 20.9 | 30 (30.3) | 22.6 | 36.6 | 35 | 31.1 | 29.5 | 13.3 | 18 (19) |
| AS22□1F-02-03(S)A | 5/32" | | | 8.2 | | | | | | | | | | 19 (19) |
| AS22□1F-02-07(S)A | 1/4" | | | 11.2 | | 23.4 | 32.5 (32.8) | | | | | | | |
| AS22□1F-02-09(S)A | 5/16" | | | 13.2 | | 23.9 | 33 (33.3) | | | | | | 14.2 | 19 (20) |
| AS22□1F-02-11(S)A | 3/8" | | | 15.5 | | 26.4 | 35.5 (35.8) | | | | | | 15.6 | 20 (21) |
| AS32□1F-03-07(S)A | 1/4" | 3/8 | 19 | 11.2 | 15.6 | 21.8 | 32.1 | 28.7 | 42.3 | 40.7 | 37.1 | 35.5 | 13.3 | 31 (32) |
| AS32□1F-03-09(S)A | 5/16" | | | 13.2 | | 22.7 | 33 | | | | | | 14.2 | |
| AS32□1F-03-11(S)A | 3/8" | | | 15.5 | | 26.7 | 37 | 28.2 | | | | | 15.6 | 32 (33) |
| AS42□1F-04-11(S)A | 3/8" | 1/2 | 24 (23.8) | 15.5 | 17.6 | 27.4 | 40.3 (40.2) | 36.2 | 50.8 | 49.2 | 43.7 | 42.1 | 15.6 | 54 (53) |
| AS42□1F-04-13(S)A | 1/2" | | | 19.3 | | 30.9 | 43.8 (43.7) | 34.7 | | | | | 17 | 56 (55) |

Note 1) Reference dimensions Note 2) Reference dimensions after installation of thread Note 3) The values in ( ) are the dimensions of NPT thread.

# Series AS
# Specific Product Precautions 1

**Be sure to read this before handling.**
**Refer to back cover for Safety Instructions and "Handling Precautions for SMC Products" (M-E03-3) for Flow Control Equipment Precautions.**

## Design/Selection

### ⚠Warning

**1. Check the specifications.**

The products in this catalog are designed to be used in compressed air systems (including vacuum) only.

If the products are used in an environment where pressure or temperature is out of the specified range, damage and/or malfunction may result. Do not use under such conditions. (Refer to the specifications.)

Please contact SMC when using a fluid other than compressed air (including vacuum).

We do not guarantee against any damage if the product is used outside of the specification range.

**2. The products in this catalog are not designed for the use as stop valve with zero air leakage.**

A certain amount of leakage is allowed in the product's specifications.

Tightening the needle to reduce leakage to zero may result in equipment damage.

**3. Do not disassemble the product or make any modifications, including additional machining.**

It may cause human injury and/or an accident.

**4. The flow-rate characteristics for each product are representative values.**

The flow-rate characteristics are characteristics of each individual product. Actual values may differ depending on the piping, circuitry, pressure conditions, etc.

**5. Sonic conductance (C) and critical pressure ratio (b) values for products are representative values. For controlled flow direction values the needle is fully open. For free flow direction values the needle is fully closed.**

**6. Check if that PTFE can be used in application.**

PTFE powder (Polytetrafluoroethylene resin) is included in the seal material for piping taper thread of male thread type. Confirm that the use of it will not cause any adverse effect on the system.

Please contact SMC if the Material Safety Data Sheet (MSDS) is required.

## Mounting

### ⚠Warning

**1. Operation manual**

Install the products and operate them only after reading the operation manual carefully and understanding its contents. Also, keep the manual where it can be referred to as necessary.

**2. Ensure sufficient space for maintenance activities.**

When installing the products, allow access for maintenance.

**3. Tighten threads with the proper tightening torque.**

When installing the products, follow the listed proper torque.

## Mounting

### ⚠Warning

**4. After pushing the handle down to lock, check it is locked.**

It should not be possible to rotate the handle to the right or to the left. If the handle is pulled with force, it may break. Do not pull the handle with excessive force.

Lock Unlock

**5. Check the degree of rotation of the needle valve.**

The products in this catalog are retainer type so that the needle is not removed completely. Over rotation will cause damage.

**6. Do not use tools such as pliers to rotate the handle.**

It can cause idle rotation of the handle or damage.

**7. Verify the air flow direction.**

Mounting backwards is dangerous, because the speed adjustment needle will not work and the actuator may lurch suddenly.

**8. Adjust the needle by opening the needle slowly after having closed it completely.**

Loose needle valves may cause unexpected sudden actuator lurching.

When a needle valve is turned clockwise, it is closed and actuator speed decreases. When a needle valve is turned counterclockwise, it is open and actuator speed increases.

**9. Do not apply excessive force or shock to the body or fittings with an impact tool.**

It can cause damage or air leakage.

**10. This product has One-touch fittings, refer to the Fittings & Tubing Precautions of Best Pneumatics No. 6.**

**11. Tubing O.D. ø2**

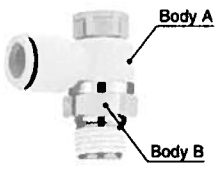
Tubing other than that from SMC cannot be used, because it may result in inability to connect the tube, air leakage after connecting the tube or disconnection of the tube.

**12. To install/remove the flow control equipment, use an appropriate wrench to tighten/loosen at the supplied nut are on body B, and as close to the thread as possible.**

Do not apply torque at other points as the product may be damaged. Rotate body A manually for positioning after installation.

**13. Do not use body A for applications involving continuous rotation.**

Body A and the fitting section may be damaged.



# Series AS
# Specific Product Precautions 2

**Be sure to read this before handling.**
**Refer to back cover for Safety Instructions and "Handling Precautions for SMC Products" (M-E03-3) for Flow Control Equipment Precautions.**

## Mounting

### ⚠Caution

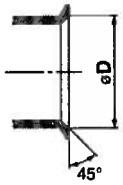
**1. Tightening of M5 and 10-32 UNF threads**

First, tighten it by hand, then give it an additional 1/6 turn to 1/4 turn with a wrench. A reference value for the tightening torque is 1 to 1.5 N·m.

Note) Excessive tightening may damage the thread portion or deform the gasket and cause air leakage.
If the screw is too shallowly screwed in, it may come loose or air may leak.

**2. Chamfer dimension for female thread of the connection thread M5, 10-32 UNF**

Confirming to ISO 16030 (air pressure fluid dynamics – connection – ports and stud ends), the chamfer dimensions shown below are recommended.




| Female thread size | Chamfer dimension øD (Recommended value) |
|---|---|
| M5 | 5.1 to 5.4 |
| 10-32 UNF | 5.0 to 5.3 |

**3. This product has a stopper for fully close in rotating direction. Excess torque may break the stopper. Table below shows the maximum allowable torque of the handle.**

| Body size | Maximum allowable adjusting torque (N·m) |
|---|---|
| M5 | 0.05 |
| 1/8 | 0.07 |
| 1/4 | 0.16 |
| 3/8 | 0.2 |
| 1/2 | 0.4 |

## Piping Threads with Sealant

### ⚠Caution

**1. The proper tightening torques of the fittings are as shown in the table below. As a guide, tighten by hand, then turn it two or three turns with a wrench. Check the dimensions of each product for the hexagon width across flats.**

| Connection thread size | Proper tightening torque (N·m) |
|---|---|
| NPT, R1/8 | 7 to 9 |
| NPT, R1/4 | 12 to 14 |
| NPT, R3/8 | 22 to 24 |
| NPT, R1/2 | 28 to 30 |

**2. If the fitting is tightened with excessive torque, a large amount of sealant will seep out. Remove the excess sealant.**

**3. Insufficient tightening may loosen the threads, or cause air leakage.**

**4. Reuse**

1) Normally, fittings with a sealant can be reused 2 to 3 times.
2) To prevent air leakage through the sealant, remove any loose sealant stuck to the fitting by blowing air over the threaded portion.
3) If the sealant no longer provides effective sealing, wrap sealing tape over the sealant before reusing. Do not use the sealant in any form other than a tape type.

**5. Once the fitting has been tightened, backing it out to its original position often causes the sealant to become defective. Air leakage will occur.**

**6. R threaded studs with Rc threaded ports and use NPT threaded studs with NPT threaded ports.**

## Piping

### ⚠Caution

**1. This product has One-touch fittings, refer to the Fittings & Tubing Precautions of Best Pneumatics No. 6.**

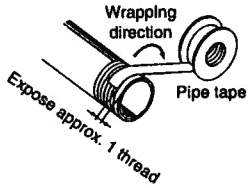
**2. Preparation before piping**

Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and other debris from inside the pipe.

**3. Wrapping of pipe tape**

When screwing together pipes and fittings, etc., be certain that chips from the pipe threads and sealing material do not get inside the pipe.

Also, when the pipe tape is used, leave approx. 1 thread ridges exposed at the end of the threads.



## ⚠ Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of **"Caution," "Warning"** or **"Danger."** They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)*1), and other safety regulations.

**⚠ Caution:** **Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

**⚠ Warning:** **Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

**⚠ Danger :** **Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

*1) ISO 4414: Pneumatic fluid power – General rules relating to systems.
ISO 4413: Hydraulic fluid power – General rules relating to systems.
IEC 60204-1: Safety of machinery – Electrical equipment of machines. (Part 1: General requirements)
ISO 10218-1: Manipulating industrial robots – Safety.
etc.

### ⚠ Warning

1. **The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.**
   Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.
2. **Only personnel with appropriate training should operate machinery and equipment.**
   The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.
3. **Do not service or attempt to remove product and machinery/equipment until safety is confirmed.**
   1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
   2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
   3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.
4. **Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.**
   1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
   2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
   3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
   4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

### ⚠ Caution

1. **The product is provided for use in manufacturing industries.**
   The product herein described is basically provided for peaceful use in manufacturing industries.
   If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.
   If anything is unclear, contact your nearest sales branch.

## Limited warranty and Disclaimer/ Compliance Requirements

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements".
Read and accept them before using the product.

### Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered.*2)
   Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.
   This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

*2) **Vacuum pads are excluded from this 1 year warranty.**
A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.
Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

### Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

| ⚠ Safety Instructions | Be sure to read "Handling Precautions for SMC Products" (M-E03-3) before using. |
|---|---|

**SMC Corporation**
Akihabara UDX 15F,
4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021, JAPAN
Phone: 03-5207-8249 Fax: 03-5298-5362
http://www.smcworld.com


Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.
D-SZ
1st printing QV printing QV 8150SZ Printed in Japan.

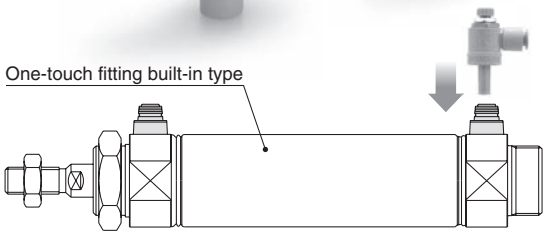
# SMC Information

**SMC Corporation**
Akihabara UDX 15F,
4-14-1, Sotokanda, Chiyoda-ku,
Tokyo 101-0021, JAPAN
http://www.smcworld.com


**12-E590**
D-SZ Printing QY 8150SZ

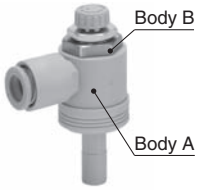
# Speed Controller with One-touch Fitting Plug-in Type
## *Series AS□□□□P*

- **Can be mounted directly to the One-touch fitting!**
- **No need for tools, reducing time required for mounting.**



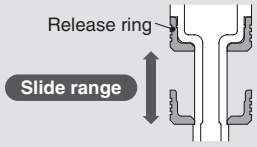

## ⚠Warning

**1. Do not use the body A in a continuously rotating place.**
It may damage the body A or fittings.




## ⚠Caution Release from One-touch fitting

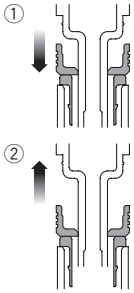
**The release ring slides up and down and does not come off from the body A with the drop prevention function.**




①Slide down the release ring, and push the release bushing to the end.

②Bring up the body, while holding it down.

③Take the finger off the release ring and remove the speed controller from the One-touch fitting.




## Model

| Model | | Rod and applicable tubing O.D. | | | |
|---|---|---|---|---|---|
| Meter-out type | Meter-in type | ø4 | ø6 | ø8 | ø10 |
| AS1000P-04-04 | AS1010P-04-04 | ● | — | — | — |
| AS2000P-04-04 | AS2010P-04-04 | ● | — | — | — |
| AS2000P-06-06 | AS2010P-06-06 | — | ● | — | — |
| AS2500P-06-06 | AS2510P-06-06 | — | ● | — | — |
| AS3000P-08-08 | AS3010P-08-08 | — | — | ● | — |
| AS3000P-10-10 | AS3010P-10-10 | — | — | — | ● |

<Visual identification between meter-out and meter-in types>
The lock nut provides identification. The lock nut of the meter-out type is zinc chromated (The round lock nut is electroless nickel plated), and the one of the meter-in type is black zinc chromated.

## Specifications

| | |
|---|---|
| **Fluid** | Air |
| **Proof pressure** | 1.5 MPa |
| **Max. operating pressure** | 1 MPa |
| **Min. operating pressure** | 0.1 MPa |
| **Ambient and fluid temperature** | –5 to 60°C (No freezing) |
| **Applicable tubing material** | Nylon, Soft nylon, Polyurethane |

## Flow Rate and Sonic Conductance

| Model | | AS10□0P | AS20□0P | | AS25□0P | AS30□0P | |
|---|---|---|---|---|---|---|---|
| Rod and applicable tubing O.D. (Metric size) | | ø4 | ø4 | ø6 | ø6 | ø8 | ø10 |
| Controlled flow Free flow | Flow rate [L/min (ANR)] | 100 | 130 | 230 | 290 | 660 | 920 |
| | Sonic conductance [dm³/(s·bar)] | 0.28 | 0.36 | 0.64 | 0.8 | 1.8 | 2.6 |
| Critical pressure ratio | Controlled flow | 0.2 | 0.2 | | 0.2 | 0.2 | |
| | Free flow | 0.25 | 0.25 | | 0.25 | 0.25 | |

Note) Flow rate values are measured at 0.5 MPa and 20°C.

## How to Order

**AS 20 0 0 P – 06 – 06 – □**

**Body size**

| | |
|---|---|
| 10 | M5 standard |
| 20 | 01 standard |
| 25 | 02 standard |
| 30 | 03 standard |

**Control type**

| | |
|---|---|
| 0 | Meter-out |
| 1 | Meter-in |

**Plug-in type**

**Rod O.D.—Applicable tubing O.D.**

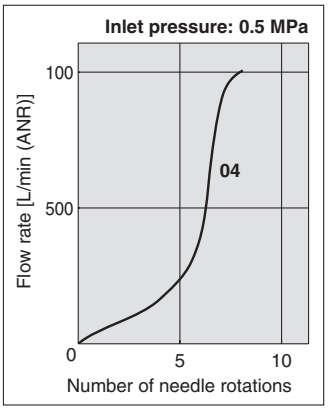
| | |
|---|---|
| 04-04 | ø4—ø4 |
| 06-06 | ø6—ø6 |
| 08-08 | ø8—ø8 |
| 10-10 | ø10—ø10 |

**Lock nut option**

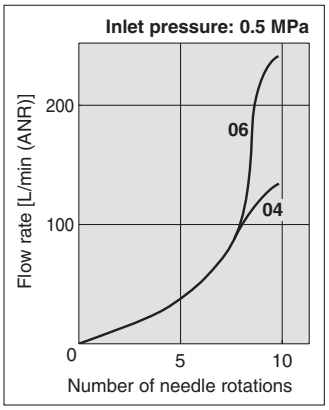
| | |
|---|---|
| Nil | Hexagon lock nut |
| J | Round lock nut |

## Needle Valve/Flow-rate Characteristics

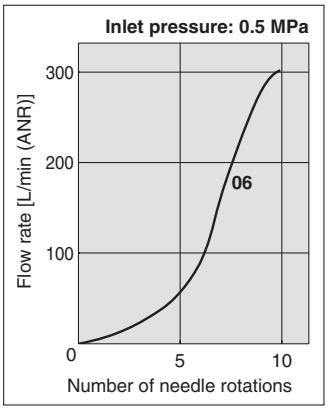
**AS10□0P-04-04**



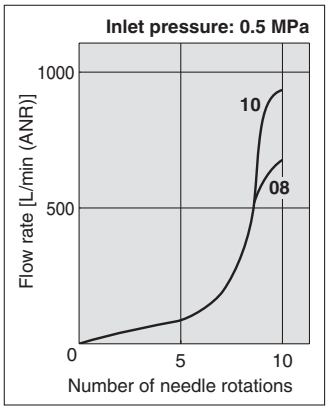

**AS20□0P-□-□**




**AS25□0P-06-06**



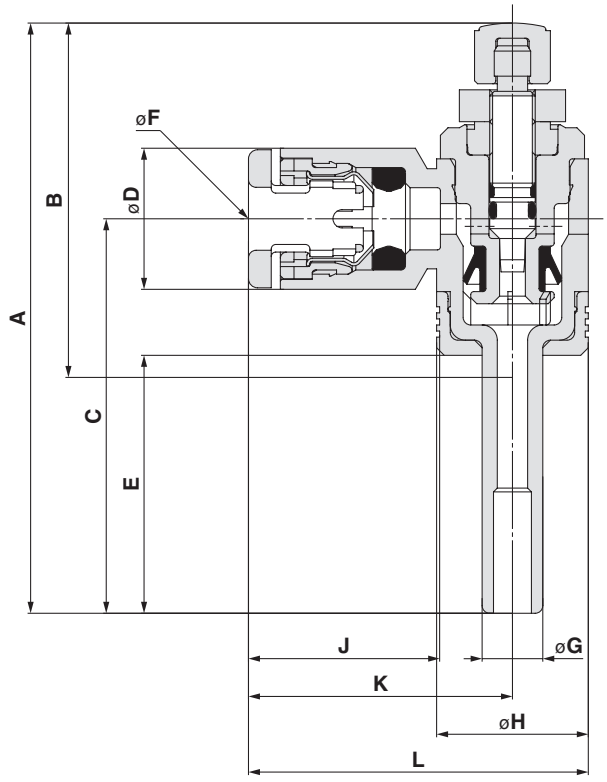

**AS30□0P-□-□**



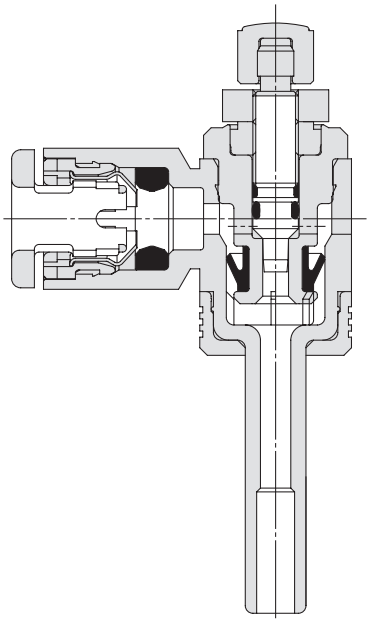

Note) The numbers above the flow-rate characteristic curves in the charts show the tubing diameter as defined by the product number.

## Dimensions

### Meter-out type




### Meter-in type



| Model | A | | B | | C | øD | E | øF | øG | øH | J | K | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MIN. | MAX. | MIN. | MAX. | | | | | | | | | |
| **AS10□0P-04-04** | 38.9 | 41.7 | 23.9 | 26.7 | 26 | 9.3 | 17 | 4 | 4 | 10 | 12.7 | 17.4 | 22.4 |
| **AS20□0P-04-04** | 46.4 | 51.4 | 31.4 | 36.4 | 30 | 9.3 | 17.1 | 4 | 4 | 13.6 | 12.7 | 18.9 | 25.7 |
| **AS20□0P-06-06** | 47.3 | 52.3 | 31.3 | 36.3 | 30 | 11.6 | 18 | 6 | 6 | 13.6 | 13.5 | 19.9 | 26.7 |
| **AS25□0P-06-06** | 49.6 | 54.6 | 33.6 | 38.6 | 32 | 12.8 | 18 | 6 | 6 | 17 | 16.8 | 24.1 | 32.6 |
| **AS30□0P-08-08** | 55.5 | 60.5 | 37 | 42 | 36 | 15.2 | 19 | 8 | 8 | 22 | 18.5 | 27 | 38 |
| **AS30□0P-10-10** | 58.5 | 63.5 | 37.5 | 42.5 | 39 | 18.5 | 22 | 10 | 10 | 22 | 21 | 30.5 | 41.5 |

# Speed Controller with One-touch Fitting/Elbow Type

New

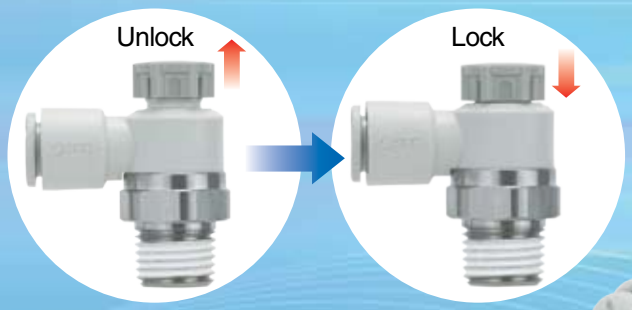
RoHS

## Reduces labor time!

Easy to use

## Push-lock type

- Easy to lock

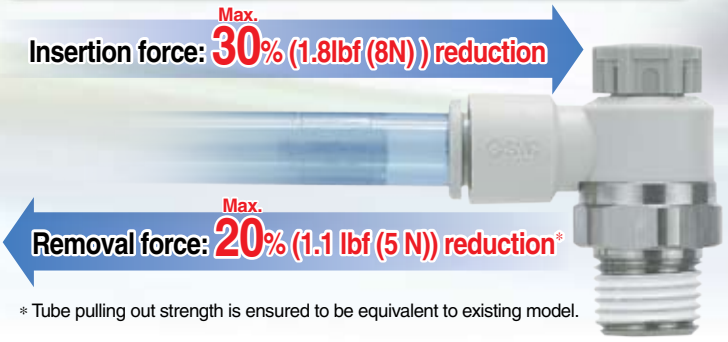



## Larger handle

| Body size | øD (mm) |
|---|---|
| 1 | **9** |
| 2 | **11.6** (Port size 1/8) |
| | **12.6** (Port size 1/4) |
| 3 | **15.6** |
| 4 | **17.6** |


## Improved tube insertion/removal

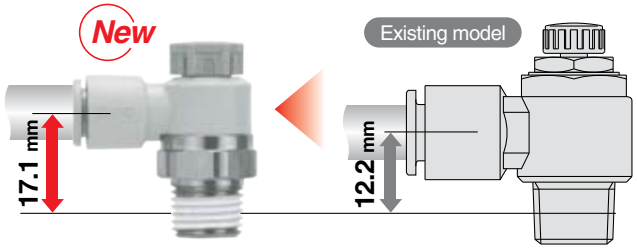
Max. **30**% (1.8lbf (8N) ) reduction



Max. **20**% (1.1 lbf (5 N)) reduction*

* Tube pulling out strength is ensured to be equivalent to existing model.

More space beneath the tube. Easier installation/removal of the tube.




AS22□1F-02-□SA

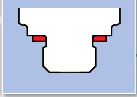
AS22□1F-02-□

# Series AS

SMC

CAT.NAS20-220A

## Series Variations

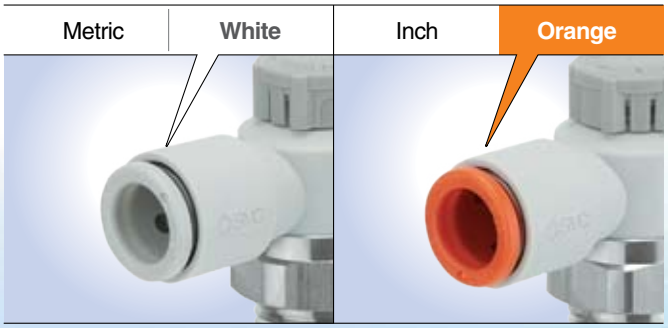
| | Body size | Port size | | Seal method | Applicable tubing O.D. | | | | | | | | | | | | | Applicable tubing material |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Metric size | | | | | | | | Inch size | | | | | |
| | | | | | 2 | 3.2 | 4 | 6 | 8 | 10 | 12 | 16 | 1/8" | 5/32" | 1/4" | 5/16" | 3/8" | 1/2" | |
|  | 1 | M5 x 0.8 | | Gasket seal  | ● | ● | ● | ● | | | | | ● | ● | ● | | | | Nylon (Series T, TIA)<br>Soft nylon (Series TS, TLS)<br>Polyurethane (Series T, TIU) |
| | | 10-32 UNF | | | ● | ● | ● | ● | | | | | ● | ● | ● | | | | |
|  | 2 | R, NPT | 1/8 | Sealant *1  | | | ● | ● | ● | ● | ● | | ● | ● | ● | ● | | | |
| | | | 1/4 | | | ● | ● | ● | ● | ● | ● | | ● | ● | ● | ● | ● | | |
| | 3 | | 3/8 | | | | | ● | ● | ● | ● | | | | ● | ● | ● | | |
| | 4 | | 1/2 | | | | | | | ● | ● | ● New | | | | | ● | ● | |

*1 Non-sealant type can be selected as a standard option.

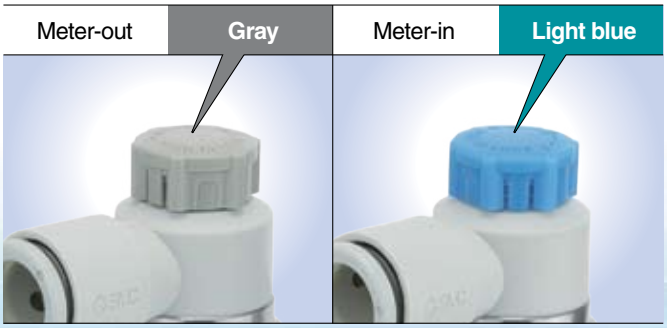
### ◎ Electroless nickel plated type is standard.

## Easy identification of product type

### Metric x Inch




### Meter-out x Meter-in




# Speed Controller with One-touch Fitting
## Elbow Type
# *Series* AS

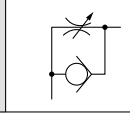
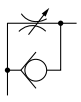
RoHS

## Model

| Model | Port size | | Seal method | Applicable tubing O.D. | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Metric size | | | | | | | | Inch size | | | | | |
| | | | | 2 Note 2) | 3.2 | 4 | 6 | 8 | 10 | 12 | 16 | 1/8" | 5/32" | 1/4" | 5/16" | 3/8" | 1/2" |
| **AS12□1F-M5** | M5 x 0.8 | | Gasket seal | ● | ● | ● | ● | | | | | ● | ● | ● | | | |
| **AS12□1F-U10/32** | 10-32 UNF | | | ● | ● | ● | ● | | | | | ● | ● | ● | | | |
| **AS22□1F-□01** | R NPT | 1/8 | Sealant Note 1) | | ● | ● | ● | ● | ● | | | ● | ● | ● | ● | | |
| **AS22□1F-□02** | | 1/4 | | | ● | ● | ● | ● | ● | | | ● | ● | ● | ● | ● | |
| **AS32□1F-□03** | | 3/8 | | | | | ● | ● | ● | ● | | | | ● | ● | ● | |
| **AS42□1F-□04** | | 1/2 | | | | | | | ● | ● | ● | | | | | ● | ● |

Note 1) Non-sealant type can be selected as a standard option.
Note 2) Only polyurethane tubing is applicable for ø2.

**Flow Direction Symbols on Body**

| | Meter-out type | Meter-in type |
|---|---|---|
| Indication symbol |  |  |

## Specifications

| | |
|---|---|
| **Fluid** | Air |
| **Proof pressure** | 218 psi (1.5 MPa) |
| **Max. operating pressure** | 145 psi (1 MPa) |
| **Min. operating pressure** | 14.5 psi (0.1 MPa) |
| **Ambient and fluid temperature** | 23 to 140°F (–5 to 60°C) (No freezing) |
| **Applicable tubing material** | Nylon, Soft nylon, Polyurethane Note) |

Note) Use caution at the max. operating pressure when using soft nylon or polyurethane tubing.
(Refer to Best Pneumatics No. 6 for details.)

## ⚠ Caution

**Be sure to read before handling. Refer to back cover for Safety Instructions and "Handling Precautions for SMC Products" (M-E03-3) for Flow Control Equipment Precautions.**

## Flow Rate and Sonic Conductance

| Model | | AS12□1F-M5 | | AS22□1F-01 | | | AS22□1F-02 | | | AS32□1F-03 | | | AS42□1F-04 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tubing O.D. | Metric size | ø2 | ø3.2<br>ø4<br>ø6 | ø3.2 | ø4 | ø6<br>ø8<br>ø10 | ø4 | ø6 | ø8<br>ø10 | ø6 | ø8 | ø10<br>ø12 | ø10 | ø12<br>ø16 |
| | Inch size | — | ø1/8"<br>ø1/4"<br>ø5/32" | ø1/8" | ø5/32" | ø1/4"<br>ø5/16" | ø5/32" | — | ø1/4"<br>ø5/16"<br>ø3/8" | ø1/4" | ø5/16" | ø3/8" | ø3/8" | ø1/2" |
| C values: Sonic conductance $dm^3/(s \cdot bar)$ | Free flow | 0.2 | 0.3 | 0.4 | 0.6 | 0.6 | 1.0 | 1.3 | 1.5 | 1.6 | 1.7 | 2.5 | 4.4 | 4.8 |
| | Controlled flow | 0.2 | 0.3 | 0.4 | 0.7 | 0.8 | 0.9 | 1.3 | | 2.1 | 2.4 | 3.3 | 4.4 | 4.9 |
| b values: Critical pressure ratio | Free flow | 0.3 | | 0.2 | | 0.3 | 0.3 | 0.4 | | 0.4 | | 0.3 | 0.3 | |
| | Controlled flow | 0.2 | 0.4 | 0.2 | | 0.3 | 0.3 | | | 0.3 | | | 0.3 | |

Note 1) 10-32 UNF has the same specification as M5.
Note 2) C values and b values for controlled flow direction are with the needle fully open, the values for free flow direction are with the needle fully closed.

## How to Order

**Body size 1** **AS 1 2 0 1 F – M5 – 06 A**

**Body size 2/3/4** **AS 2 2 0 1 F – □ 01 – 06 S A**

**Port size**

| | |
|---|---|
| **M5** | M5 x 0.8 |
| **U10/32** | 10-32 UNF |

**Applicable tubing O.D.** Note 1)

| Metric size | | Inch size | |
|---|---|---|---|
| **02** | ø2 | **01** | ø1/8" |
| **23** | ø3.2 Note 2) | **03** | ø5/32" |
| **04** | ø4 | **07** | ø1/4" |
| **06** | ø6 | | |

Note 1) For selecting applicable tubing O.D., refer to Series Variations (Features 1). For metric size and inch size types can be visually identified by color of the release button.
Metric size: White
Inch size: Orange
Note 2) Use ø1/8" tubing.

**Body size**

| | |
|---|---|
| **1** | M5 x 0.8<br>10-32 UNF |
| **2** | 1/8, 1/4 |
| **3** | 3/8 |
| **4** | 1/2 |

**Thread type**

| | |
|---|---|
| **Nil** | R |
| **N** | NPT |

**Port size**

| | |
|---|---|
| **01** | 1/8 |
| **02** | 1/4 |
| **03** | 3/8 |
| **04** | 1/2 |

**Elbow**

**Control type** Note)

| | |
|---|---|
| **0** | Meter-out |
| **1** | Meter-in |

Note) For meter-out and meter-in types can be visually identified by color of the handle.
Meter-out: Gray
Meter-in: Light blue

**Push-lock type**

**Seal method**

| | |
|---|---|
| **Nil** | Without sealant |
| **S** | With sealant |

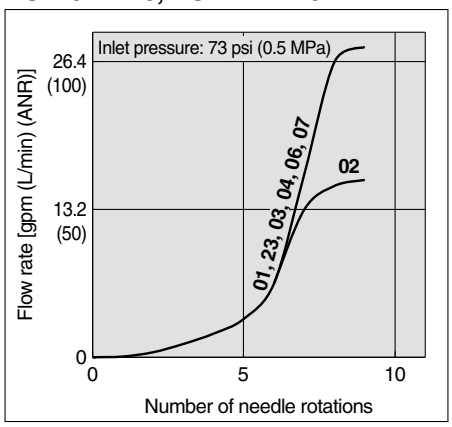
**Applicable tubing O.D.** Note 1)

| Metric size | | Inch size | |
|---|---|---|---|
| **23** | ø3.2 Note 2) | **01** | ø1/8" |
| **04** | ø4 | **03** | ø5/32" |
| **06** | ø6 | **07** | ø1/4" |
| **08** | ø8 | **09** | ø5/16" |
| **10** | ø10 | **11** | ø3/8" |
| **12** | ø12 | **13** | ø1/2" |
| **16** | ø16 | | |

Note 1) For selecting applicable tubing O.D., refer to Series Variations (Features 1).
Note 2) Use ø1/8" tubing.

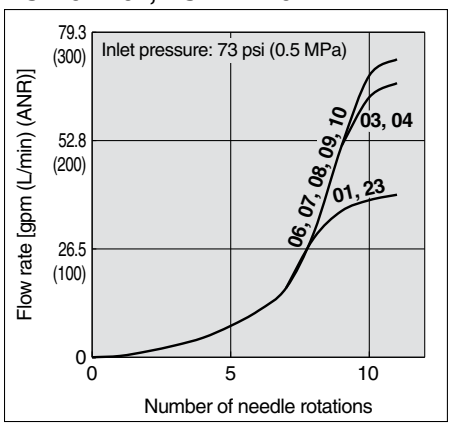
## Needle Valve/Flow-rate Characteristics

### AS1201F-M5, AS1211F-M5

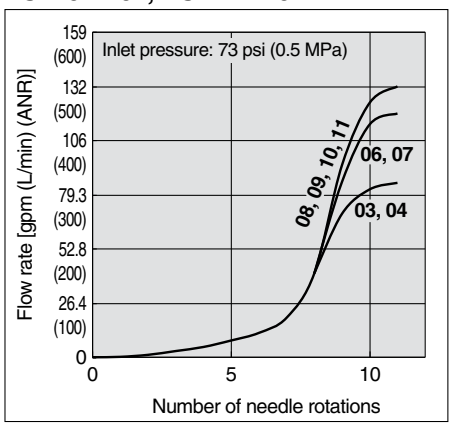



Note) -U10/32 has the same specification as M5.

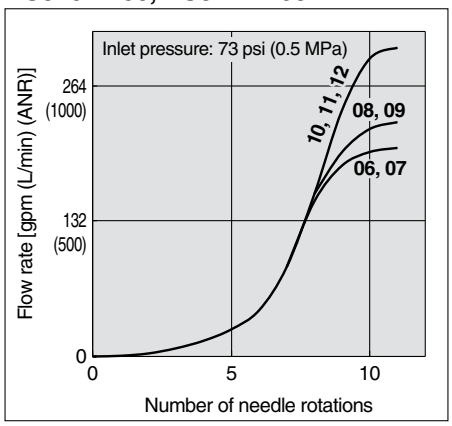
### AS2201F-01, AS2211F-01



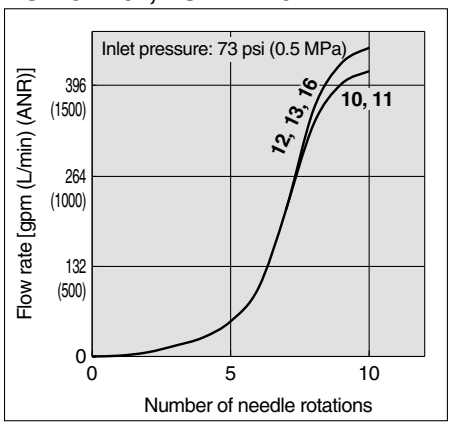

### AS2201F-02, AS2211F-02




### AS3201F-03, AS3211F-03



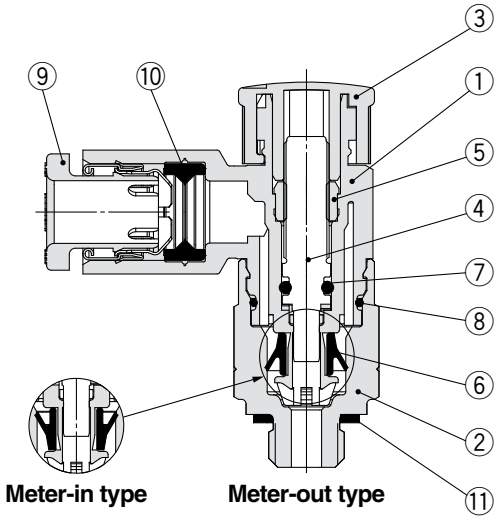

### AS4201F-04, AS4211F-04



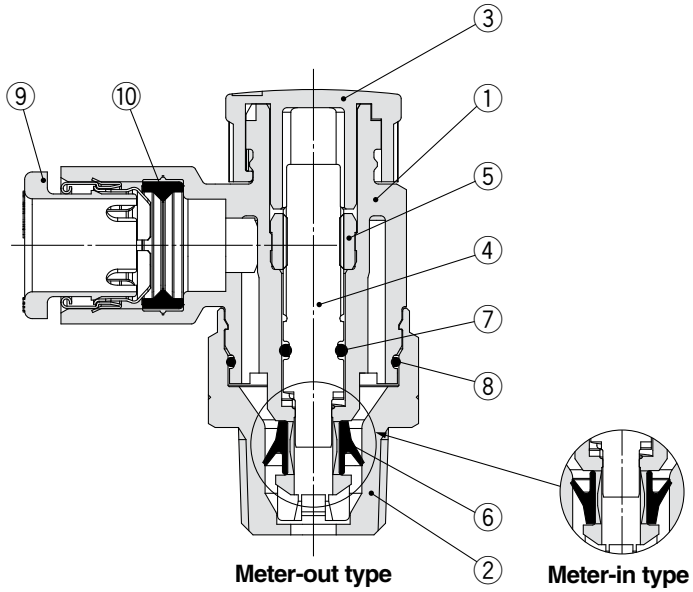

Note) The numbers above the flow-rate characteristic curves in the charts show the tubing diameter as defined by the product number.

## Construction

**Seal method: Gasket seal**
**Thread type: M5, 10-32 UNF**




**Seal method: Sealant**
**Thread type: R, NPT**

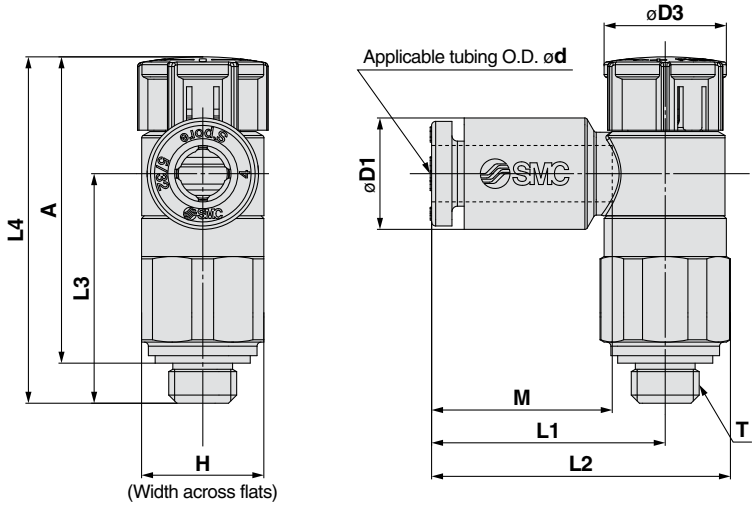



### Component Parts

| No. | Description | Material | Note |
|---|---|---|---|
| 1 | **Body A** | PBT | |
| 2 | **Body B** | Brass | Electroless nickel plated |
| 3 | **Handle** | POM | |
| 4 | **Needle** | PBT | |
| 5 | **Needle guide** | Steel wire | Zinc chromated |
| 6 | **U-seal** | HNBR | |
| 7 | **O-ring** | NBR | |
| 8 | **O-ring** | NBR | |
| 9 | **Cassette** | — | |
| 10 | **Seal** | NBR | |
| 11 | **Gasket** | NBR/Stainless steel | |

## Dimensions

**Seal method: Gasket seal**
**Thread type: M5, 10-32 UNF**




### Metric size

(mm)

| Model | d | T | H | D1 | D3 | L1 | L2 | L3 | L4 Note 1) | | A Note 2) | | M | Weight (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Unlock | Lock | Unlock | Lock | | |
| **AS12□1F-M5-02A** | 2 | M5 x 0.8 10-32 UNF | 9 | 5.8 | 9 | 15.8 | 20.6 | 16.9 | 26.5 | 25.4 | 23.5 | 22.4 | 11.9 | 5 |
| **AS12□1F-U10/32-02A** | | | | | | | | | | | | | | |
| **AS12□1F-M5-23A** | 3.2 | | | 7.2 | | 17.2 | 22 | | | | | | 13.3 | |
| **AS12□1F-U10/32-23A** | | | | | | | | | | | | | | |
| **AS12□1F-M5-04A** | 4 | | | 8.2 | | | | | | | | | | |
| **AS12□1F-U10/32-04A** | | | | | | | | | | | | | | |
| **AS12□1F-M5-06A** | 6 | | | 10.4 | | 18.6 | 23.4 | 16.5 | | | | | | 6 |
| **AS12□1F-U10/32-06A** | | | | | | | | | | | | | | |

Note 1) Reference dimensions
Note 2) Reference dimensions after installation of thread

### Inch size

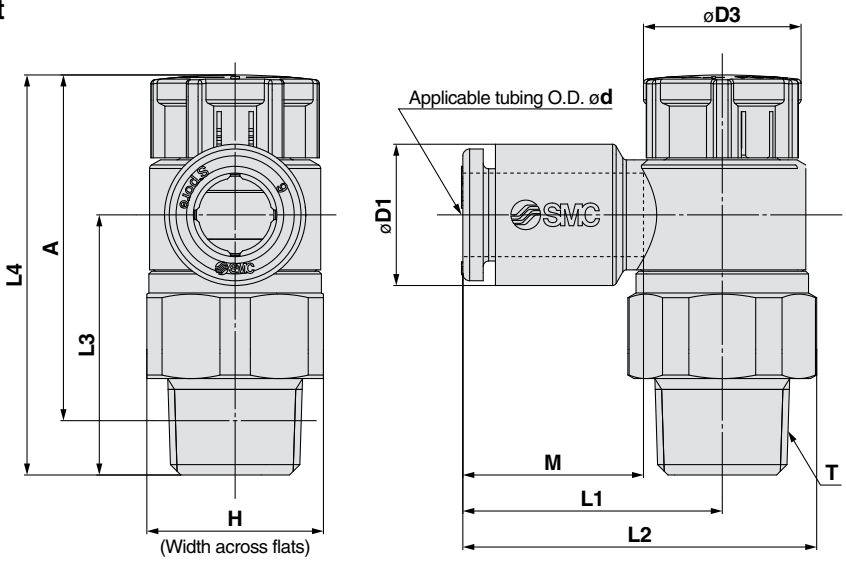
(mm)

| Model | d | T | H | D1 | D3 | L1 | L2 | L3 | L4 Note 1) | | A Note 2) | | M | Weight (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Unlock | Lock | Unlock | Lock | | |
| **AS12□1F-M5-01A** | 1/8" | M5 x 0.8 10-32 UNF | 9 | 7.2 | 9 | 17.2 | 22 | 16.9 | 26.5 | 25.4 | 23.5 | 22.4 | 13.3 | 5 |
| **AS12□1F-U10/32-01A** | | | | | | | | | | | | | | |
| **AS12□1F-M5-03A** | 5/32" | | | 8.2 | | | | | | | | | | |
| **AS12□1F-U10/32-03A** | | | | | | | | | | | | | | |
| **AS12□1F-M5-07A** | 1/4" | | | 11.2 | | 18.6 | 23.4 | 16.5 | | | | | | 6 |
| **AS12□1F-U10/32-07A** | | | | | | | | | | | | | | |

Note 1) Reference dimensions
Note 2) Reference dimensions after installation of thread

## Dimensions

### Seal method: Sealant
### Thread type: R, NPT




### Metric size

(mm)

| Model | d | T | H | D1 | D3 | L1 | L2 | L3 | L4 Note 1) | | A Note 2) | | M | Weight (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Unlock | Lock | Unlock | Lock | | |
| **AS22□1F-01-23(S)A** | 3.2 | 1/8 | 13 (12.7) | 7.2 | 11.6 | 19.1 | 26.1 (26) | 19.1 | 30.6 | 29.2 | 27.5 | 26.1 | 13.3 | 9 (9) |
| **AS22□1F-01-04(S)A** | 4 | | | 8.2 | | | | | | | | | | |
| **AS22□1F-01-06(S)A** | 6 | | | 10.4 | | | | | | | | | | 10 (9) |
| **AS22□1F-01-08(S)A** | 8 | | | 13.2 | | 22.4 | 29.4 (29.3) | | | | | | 14.2 | 11 (10) |
| **AS22□1F-01-10(S)A** | 10 | | | 15.9 | | 25.3 | 32.3 (32.2) | | | | | | 15.6 | 12 (11) |
| **AS22□1F-02-23(S)A** | 3.2 | 1/4 | 17 (17.5) | 7.2 | 12.6 | 20.9 | 30 (30.3) | 22.6 | 36.6 | 35 | 31.1 | 29.5 | 13.3 | 18 (19) |
| **AS22□1F-02-04(S)A** | 4 | | | 8.2 | | | | | | | | | | |
| **AS22□1F-02-06(S)A** | 6 | | | 10.4 | | 23.4 | 32.5 (32.8) | | | | | | | |
| **AS22□1F-02-08(S)A** | 8 | | | 13.2 | | 23.9 | 33 (33.3) | | | | | | 14.2 | 19 (20) |
| **AS22□1F-02-10(S)A** | 10 | | | 15.9 | | 26.9 | 36 (36.3) | | | | | | 15.6 | 20 (21) |
| **AS32□1F-03-06(S)A** | 6 | 3/8 | 19 | 10.4 | 15.6 | 21.8 | 32.1 | 28.7 | 42.3 | 40.7 | 37.1 | 35.5 | 13.3 | 31 (32) |
| **AS32□1F-03-08(S)A** | 8 | | | 13.2 | | 22.7 | 33 | | | | | | 14.2 | |
| **AS32□1F-03-10(S)A** | 10 | | | 15.9 | | 26.7 | 37 | 28 | | | | | 15.6 | 32 (33) |
| **AS32□1F-03-12(S)A** | 12 | | | 18.5 | | 29.7 | 40 | 26.8 | | | | | 17 | 34 (35) |
| **AS42□1F-04-10(S)A** | 10 | 1/2 | 24 (23.8) | 15.9 | 17.6 | 27.4 | 40.3 (40.2) | 36.2 | 50.8 | 49.2 | 43.7 | 42.1 | 15.6 | 54 (53) |
| **AS42□1F-04-12(S)A** | 12 | | | 18.5 | | 30.8 | 43.7 (43.6) | 35.1 | | | | | 17 | 56 (55) |
| **AS42□1F-04-16(S)A** | 16 | | | 23.8 | | 34.8 | 47.7 (47.6) | 32.7 | | | | | 20.6 | 60 (59) |

Note 1) Reference dimensions Note 2) Reference dimensions after installation of thread Note 3) The values in ( ) are the dimensions of NPT thread.

### Inch size

(mm)

| Model | d | T | H | D1 | D3 | L1 | L2 | L3 | L4 Note 1) | | A Note 2) | | M | Weight (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Unlock | Lock | Unlock | Lock | | |
| **AS22□1F-01-01(S)A** | 1/8" | 1/8 | 13 (12.7) | 7.2 | 11.6 | 19.1 | 26.1 (26) | 19.1 | 30.6 | 29.2 | 27.5 | 26.1 | 13.3 | 9 (9) |
| **AS22□1F-01-03(S)A** | 5/32" | | | 8.2 | | | | | | | | | | |
| **AS22□1F-01-07(S)A** | 1/4" | | | 11.2 | | 20.8 | 27.8 (27.7) | | | | | | | 10 (9) |
| **AS22□1F-01-09(S)A** | 5/16" | | | 13.2 | | 22.4 | 29.4 (29.3) | | | | | | 14.2 | 11 (10) |
| **AS22□1F-02-01(S)A** | 1/8" | 1/4 | 17 (17.5) | 7.2 | 12.6 | 20.9 | 30 (30.3) | 22.6 | 36.6 | 35 | 31.1 | 29.5 | 13.3 | 18 (19) |
| **AS22□1F-02-03(S)A** | 5/32" | | | 8.2 | | | | | | | | | | |
| **AS22□1F-02-07(S)A** | 1/4" | | | 11.2 | | 23.4 | 32.5 (32.8) | | | | | | | 19 (19) |
| **AS22□1F-02-09(S)A** | 5/16" | | | 13.2 | | 23.9 | 33 (33.3) | | | | | | 14.2 | 19 (20) |
| **AS22□1F-02-11(S)A** | 3/8" | | | 15.5 | | 26.4 | 35.5 (35.8) | | | | | | 15.6 | 20 (21) |
| **AS32□1F-03-07(S)A** | 1/4" | 3/8 | 19 | 11.2 | 15.6 | 21.8 | 32.1 | 28.7 | 42.3 | 40.7 | 37.1 | 35.5 | 13.3 | 31 (32) |
| **AS32□1F-03-09(S)A** | 5/16" | | | 13.2 | | 22.7 | 33 | | | | | | 14.2 | |
| **AS32□1F-03-11(S)A** | 3/8" | | | 15.5 | | 26.7 | 37 | 28.2 | | | | | 15.6 | 32 (33) |
| **AS42□1F-04-11(S)A** | 3/8" | 1/2 | 24 (23.8) | 15.5 | 17.6 | 27.4 | 40.3 (40.2) | 36.2 | 50.8 | 49.2 | 43.7 | 42.1 | 15.6 | 54 (53) |
| **AS42□1F-04-13(S)A** | 1/2" | | | 19.3 | | 30.9 | 43.8 (43.7) | 34.7 | | | | | 17 | 56 (55) |

Note 1) Reference dimensions Note 2) Reference dimensions after installation of thread Note 3) The values in ( ) are the dimensions of NPT thread.

# *Series* AS
# Specific Product Precautions 1

**Be sure to read this before handling.**
**Refer to back cover for Safety Instructions and "Handling Precautions for SMC Products" (M-E03-3) for Flow Control Equipment Precautions.**

## Design/Selection

### ⚠Warning

**1. Check the specifications.**

The products in this catalog are designed to be used in compressed air systems (including vacuum) only.

If the products are used in an environment where pressure or temperature is out of the specified range, damage and/or malfunction may result. Do not use under such conditions. (Refer to the specifications.)

Please contact SMC when using a fluid other than compressed air (including vacuum).

We do not guarantee against any damage if the product is used outside of the specification range.

**2. The products in this catalog are not designed for the use as stop valve with zero air leakage.**

A certain amount of leakage is allowed in the product's specifications.

Tightening the needle to reduce leakage to zero may result in equipment damage.

**3. Do not disassemble the product or make any modifications, including additional machining.**

It may cause human injury and/or an accident.

**4. The flow-rate characteristics for each product are representative values.**

The flow-rate characteristics are characteristics of each individual product. Actual values may differ depending on the piping, circuitry, pressure conditions, etc.

**5. Sonic conductance (C) and critical pressure ratio (b) values for products are representative values.**
**For controlled flow direction values the needle is fully open. For free flow direction values the needle is fully closed.**

**6. Check if that PTFE can be used in application.**

PTFE powder (Polytetrafluoroethylene resin) is included in the seal material for piping taper thread of male thread type. Confirm that the use of it will not cause any adverse effect on the system.

Please contact SMC if the Material Safety Data Sheet (MSDS) is required.

## Mounting

### ⚠Warning

**1. Operation manual**

Install the products and operate them only after reading the operation manual carefully and understanding its contents. Also, keep the manual where it can be referred to as necessary.

**2. Ensure sufficient space for maintenance activities.**

When installing the products, allow access for maintenance.

**3. Tighten threads with the proper tightening torque.**

When installing the products, follow the listed proper torque.

## Mounting

### ⚠Warning

**4. After pushing the handle down to lock, check it is locked.**

It should not be possible to rotate the handle to the right or to the left. If the handle is pulled with force, it may break. Do not pull the handle with excessive force.

**Lock**

**Unlock**

**5. Check the degree of rotation of the needle valve.**

The products in this catalog are retainer type so that the needle is not removed completely. Over rotation will cause damage.

**6. Do not use tools such as pliers to rotate the handle.**

It can cause idle rotation of the handle or damage.

**7. Verify the air flow direction.**

Mounting backwards is dangerous, because the speed adjustment needle will not work and the actuator may lurch suddenly.

**8. Adjust the needle by opening the needle slowly after having closed it completely.**

Loose needle valves may cause unexpected sudden actuator lurching.

When a needle valve is turned clockwise, it is closed and actuator speed decreases. When a needle valve is turned counterclockwise, it is open and actuator speed increases.

**9. Do not apply excessive force or shock to the body or fittings with an impact tool.**

It can cause damage or air leakage.

**10. This product has One-touch fittings, refer to the Fittings & Tubing Precautions of Best Pneumatics No. 6.**

**11. Tubing O.D. ø2**

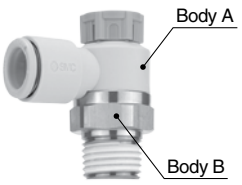
Tubing other than that from SMC cannot be used, because it may result in inability to connect the tube, air leakage after connecting the tube or disconnection of the tube.

**12. To install/remove the flow control equipment, use an appropriate wrench to tighten/loosen at the supplied nut are on body B, and as close to the thread as possible.**

Do not apply torque at other points as the product may be damaged. Rotate body A manually for positioning after installation.

**13. Do not use body A for applications involving continuous rotation.**

Body A and the fitting section may be damaged.



# Series AS
# Specific Product Precautions 2

**Be sure to read this before handling.**
**Refer to back cover for Safety Instructions and "Handling Precautions for SMC Products" (M-E03-3) for Flow Control Equipment Precautions.**

## Mounting

### ⚠Caution

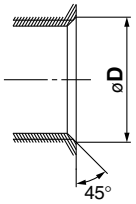
**1. Tightening of M5 and 10-32 UNF threads**

First, tighten it by hand, then give it an additional 1/6 turn to 1/4 turn with a wrench. A reference value for the tightening torque is 1 to 1.5 N·m.

Note) Excessive tightening may damage the thread portion or deform the gasket and cause air leakage.
If the screw is too shallowly screwed in, it may come loose or air may leak.

**2. Chamfer dimension for female thread of the connection thread M5, 10-32 UNF**

Confirming to ISO 16030 (air pressure fluid dynamics – connection – ports and stud ends), the chamfer dimensions shown below are recommended.




| Female thread size | Chamfer dimension ø**D** (Recommended value) |
|---|---|
| M5 | 5.1 to 5.4 |
| 10-32 UNF | 5.0 to 5.3 |

**3. This product has a stopper for fully close in rotating direction. Excess torque may break the stopper. Table below shows the maximum allowable torque of the handle.**

| Body size | Maximum allowable adjusting torque lbf ft (N·m) |
|---|---|
| M5 | 0.037 (0.05) |
| 1/8 | 0.051 (0.07) |
| 1/4 | 0.118 (0.16) |
| 3/8 | 0.148 (0.2) |
| 1/2 | 0.295 (0.4) |

## Piping Threads with Sealant

### ⚠Caution

**1. The proper tightening torques of the fittings are as shown in the table below. As a guide, tighten by hand, then turn it two or three turns with a wrench. Check the dimensions of each product for the hexagon width across flats.**

| Connection thread size | Proper tightening torque lbf·ft (N·m) |
|---|---|
| NPT, R1/8 | 5.2 to 6.6 (7 to 9) |
| NPT, R1/4 | 8.9 to 10.3 (12 to 14) |
| NPT, R3/8 | 16.2 to 17.7 (22 to 24) |
| NPT, R1/2 | 20.7 to 22.1 (28 to 30) |

**2. If the fitting is tightened with excessive torque, a large amount of sealant will seep out. Remove the excess sealant.**

**3. Insufficient tightening may loosen the threads, or cause air leakage.**

**4. Reuse**

1) Normally, fittings with a sealant can be reused 2 to 3 times.
2) To prevent air leakage through the sealant, remove any loose sealant stuck to the fitting by blowing air over the threaded portion.
3) If the sealant no longer provides effective sealing, wrap sealing tape over the sealant before reusing. Do not use the sealant in any form other than a tape type.

**5. Once the fitting has been tightened, backing it out to its original position often causes the sealant to become defective. Air leakage will occur.**

**6. R threaded studs with Rc threaded ports and use NPT threaded studs with NPT threaded ports.**

## Piping

### ⚠Caution

**1. This product has One-touch fittings, refer to the Fittings & Tubing Precautions of Best Pneumatics No. 6.**

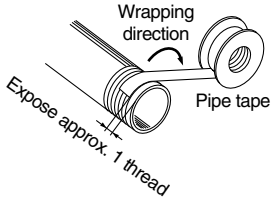
**2. Preparation before piping**

Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and other debris from inside the pipe.

**3. Wrapping of pipe tape**

When screwing together pipes and fittings, etc., be certain that chips from the pipe threads and sealing material do not get inside the pipe.

Also, when the pipe tape is used, leave approx. 1 thread ridges exposed at the end of the threads.



## ⚠ Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of **"Caution," "Warning"** or **"Danger."** They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)*1), and other safety regulations.

**⚠ Caution:** **Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

**⚠ Warning:** **Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

**⚠ Danger :** **Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

*1) ISO 4414: Pneumatic fluid power – General rules relating to systems.
ISO 4413: Hydraulic fluid power – General rules relating to systems.
IEC 60204-1: Safety of machinery – Electrical equipment of machines. (Part 1: General requirements)
ISO 10218-1: Manipulating industrial robots – Safety.
etc.

### ⚠ Warning

1. **The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.**
   Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.
2. **Only personnel with appropriate training should operate machinery and equipment.**
   The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.
3. **Do not service or attempt to remove product and machinery/equipment until safety is confirmed.**
   1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
   2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
   3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.
4. **Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.**
   1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
   2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
   3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
   4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

### ⚠ Caution

1. **The product is provided for use in manufacturing industries.**
   The product herein described is basically provided for peaceful use in manufacturing industries.
   If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.
   If anything is unclear, contact your nearest sales branch.

## Limited warranty and Disclaimer/ Compliance Requirements

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements".
Read and accept them before using the product.

### Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered.*2)
   Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.
   This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

***2) Vacuum pads are excluded from this 1 year warranty.**
A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.
Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

### Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

| ⚠ Safety Instructions | Be sure to read "Handling Precautions for SMC Products" (M-E03-3) before using. |
|---|---|

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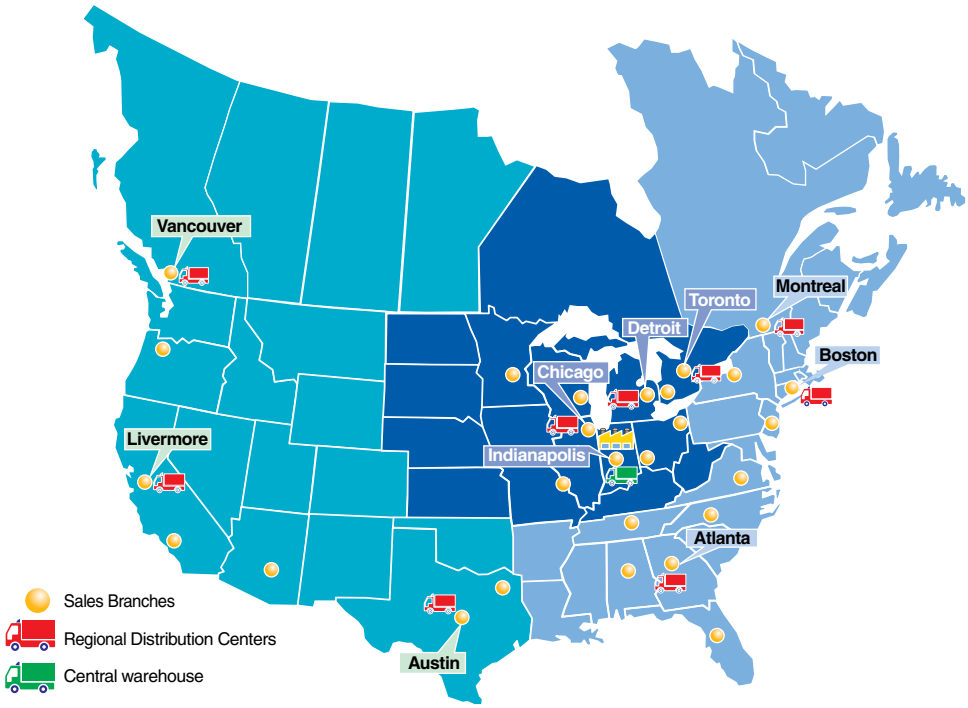



**SMC Corporation of America**
10100 SMC Blvd., Noblesville, IN 46060
**www.smcusa.com**
**SMC Pneumatics (Canada) Ltd.**
**www.smcpneumatics.ca**

**(800) SMC.SMC1 (762-7621)**
**e-mail: sales@smcusa.com**
**For International inquiries: www.smcworld.com**



QW-PR-5M

# Speed Controller with Indicator

New

RoHS

## Numerical indication of handle rotation for flow rate

## reduces flow setting time and setting errors!

Elbow

Brass
Electroless nickel plating

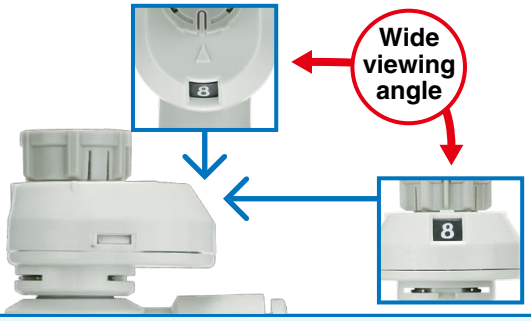
Stainless steel

### Indicator window


| Body size 1 | | Body size 2 or larger | |
|---|---|---|---|
| Indicator window | Number of needle rotations | Indicator window | Number of needle rotations |
| 1 | 1 | 1 | 1 |
| 2 | 2 | 2 | 2 |
| ⋮ | ⋮ | ⋮ | ⋮ |
| 8 | 8 | 10 | 10 |

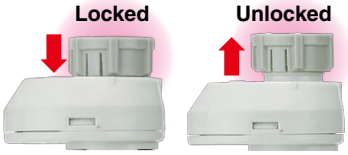
### Two indicator window directions available


Indicator direction: 0° Indicator direction: 180°

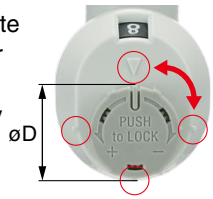



### Larger push-lock type handle

Easy to lock




Easy to operate with the larger handle and marking every 90° mark



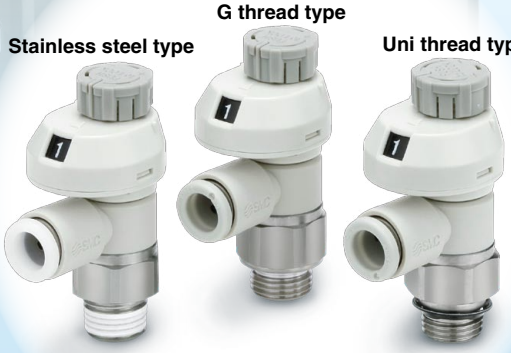

| Body size | øD (mm) |
|---|---|
| 1 | 9.4 |
| 2 | 12 (Port size 1/8)<br>13 (Port size 1/4) |
| 3 | 16.6 |
| 4 | 18.8 |


### New types added!

G thread type

Stainless steel type

Uni thread type



**Made to Order added**

- Vaseline/-X12
- Grease-free + Restrictor/-X21
- Restrictor/-X214
- Clean Series/10-

## Series AS-FS

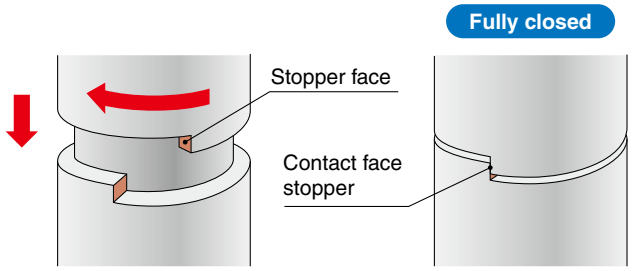
SMC

CAT.ES20-229B

## Flow rate reproducibility

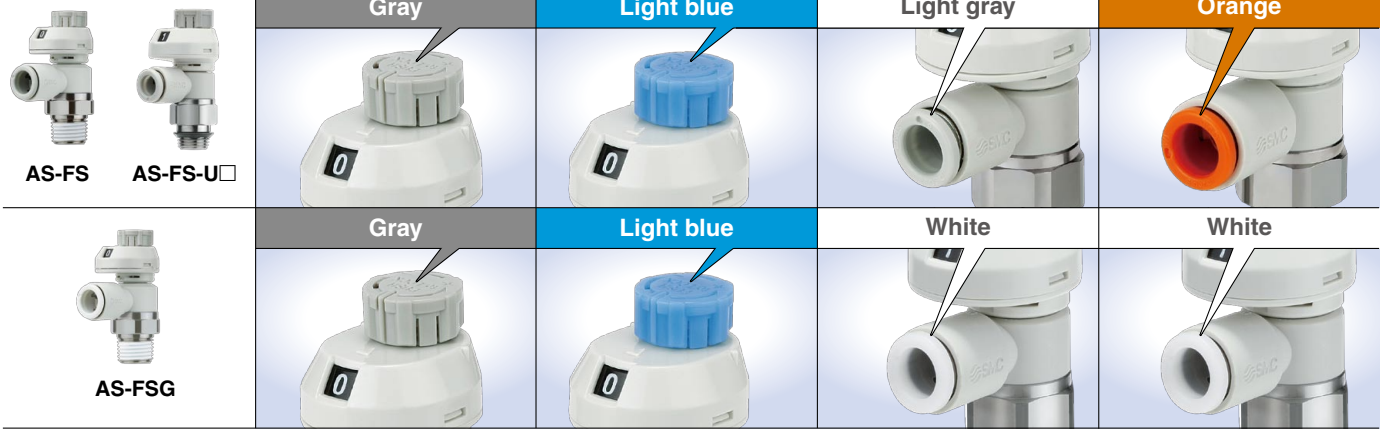
### Improved reproducibility of flow rate

Stable handle position when fully closed (no flow rate) onto the contact face stopper (rotating stopper). Small variations in flow rate depending on the number of handle rotations

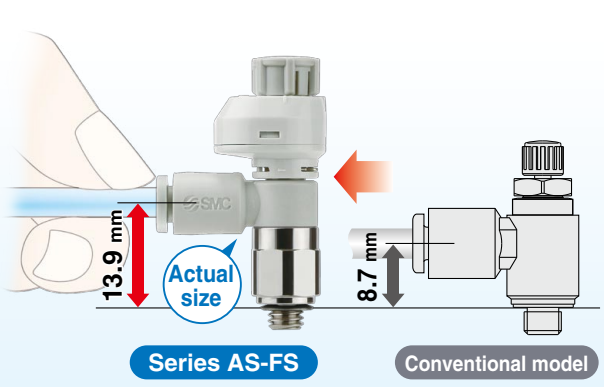



## Easy identification of product type

| Series | Release button color | | | |
|---|---|---|---|---|
| | Meter-out | Meter-in | Metric | Inch |
| AS-FS, AS-FS-U□ | Gray | Light blue | Light gray | Orange |
| AS-FSG | Gray | Light blue | White | White |

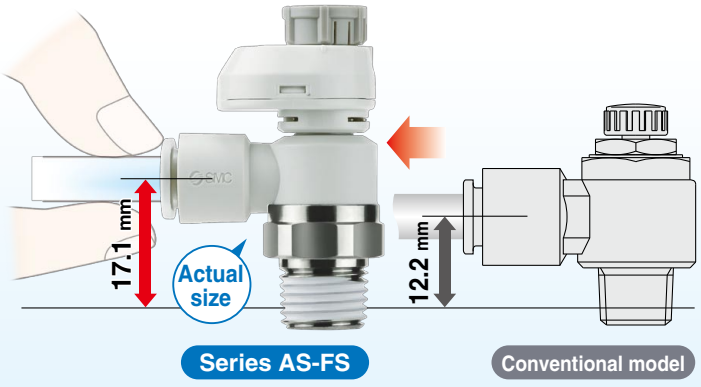


## Easier to insert and remove the tube!




| Tubing diameter | Thread | Model |
|---|---|---|
| ø4 | M5 | AS12□1FS-M5□-04 |

| Model |
|---|
| AS12□1F-M5-04 |




| Tubing diameter | Thread | Model |
|---|---|---|
| ø6 | 1/4 | AS22□1FS-02-06S |

| Model |
|---|
| AS22□1F-02-06 |

# Series Variations

| Seal method | Body size | Port size | Applicable tubing O.D. (Metric size: 2, 3.2, 4, 6, 8, 10, 12, 16 / Inch size: 1/8", 5/32", 1/4", 5/16", 3/8", 1/2") | Metal parts material | Applicable tubing material |
|---|---|---|---|---|---|
| Gasket seal | 1 | M5 x 0.8 | ● ● ● ● ● ● ● ● ● ● ● ● ● ● | ・Brass/ Steel wire<br>・Stainless steel | Nylon (Series T, TIA)<br>Soft nylon (Series TS, TISA)<br>Polyurethane (Series T, TIUB)<br>Fluoropolymer (Series TLM, TILM) (Series TH, TIH) |
| | | 10-32UNF | ● ● ● ● ● ● ● ● ● ● ● ● ● ● | | |
| Sealant*2 | 2 | R, NPT 1/8 | ● ● ● ● ● ● ● ● ● ● ● ● ● | | |
| | | R, NPT 1/4 | ● ● ● ● ● ● ● ● ● ● ● ● ● | | |
| | 3 | R, NPT 1/4 | ● ● ● ● ● ● ● ● ● ● ● | | |
| | | R, NPT 3/8 | ● ● ● ● ● ● ● ● ● ● ● | | |
| | 4 | R, NPT 1/2 | ● ● ● ● ● ● ● ● ● ● ● ● ● ● | | |
| Face seal | 2 | G*1 1/8 | ● ● ● ● ● ● ● ● ● | | |
| | | G*1 1/4 | ● ● ● ● ● ● ● ● ● | | |
| | 3 | G*1 1/4 | ● ● ● ● ● ● ● ● | | |
| | | G*1 3/8 | ● ● ● ● ● ● ● ● | | |
| | 4 | G*1 1/2 | ● ● ● ● ● ● ● ● ● ● ● ● ● ● | | |
| Gasket seal | 2 | Uni 1/8 | ● ● ● ● ● ● ● ● ● ● ● ● ● | ・Brass/ Steel wire | |
| | | Uni 1/4 | ● ● ● ● ● ● ● ● ● ● ● ● ● | | |
| | 3 | Uni 1/4 | ● ● ● ● ● ● ● ● ● ● ● | | |
| | | Uni 3/8 | ● ● ● ● ● ● ● ● ● ● ● | | |
| | 4 | Uni 1/2 | ● ● ● ● ● ● ● ● ● ● ● ● ● ● | | |

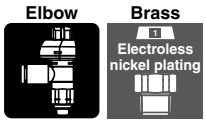
*1 Face seal type is applicable only to the G thread type. *2 "Without sealant" type can be selected as a standard option.

◎Electroless nickel plating type is standardized.
◎Stainless steel type is standardized.
◎G thread (Face seal) type is standardized.

# Speed Controller with Indicator/ Elbow Type

# *Series AS-FS*

RoHS




## Model

| Model / Elbow type | Port size | | Seal method | Applicable tubing O.D. | | | | | | | | | | | | | | Note 3) Max. number of rotations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Metric size | | | | | | | | Inch size | | | | | | |
| | | | | 2 Note 2) | 3.2 | 4 | 6 | 8 | 10 | 12 | 16 | 1/8" | 5/32" | 1/4" | 5/16" | 3/8" | 1/2" | |
| **AS12□1FS□-M5□** | M5 x 0.8 | | Gasket seal | ● | ● | ● | ● | | | | | ● | ● | ● | | | | 8 |
| **AS12□1FS□-U10/32□** | 10-32UNF | | | ● | ● | ● | ● | | | | | ● | ● | ● | | | | |
| **AS22□1FS□-□01** | R NPT | 1/8 | Note 1) Sealant | | ● | ● | ● | ● | ● | | | ● | ● | ● | ● | | | 10 |
| **AS22□1FS□-□02** | | 1/4 | | | ● | ● | ● | ● | ● | | | ● | ● | ● | ● | ● | | |
| **AS32□1FS□-□02** | | 1/4 | | | | | ● | ● | ● | ● | | | | ● | ● | ● | | |
| **AS32□1FS□-□03** | | 3/8 | | | | | ● | ● | ● | ● | | | | ● | ● | ● | | |
| **AS42□1FS□-□04** | | 1/2 | | | | | | | ● | ● | ● | | | | | ● | ● | |
| **AS22□1FS□-G01** | G | 1/8 | Face seal | | ● | ● | ● | ● | ● | | | | | | | | | |
| **AS22□1FS□-G02** | | 1/4 | | | ● | ● | ● | ● | ● | | | | | | | | | |
| **AS32□1FS□-G02** | | 1/4 | | | | | ● | ● | ● | ● | | | | | | | | |
| **AS32□1FS□-G03** | | 3/8 | | | | | ● | ● | ● | ● | | | | | | | | |
| **AS42□1FS□-G04** | | 1/2 | | | | | | | ● | ● | ● | | | | | | | |

Note 1) "Without sealant" type can be selected as a standard option.
Note 2) Only polyurethane tubing is applicable for ø2.
Note 3) There are differences in actual rate as by the indicator window over the maximum number of rotations depending on the individual product.

**Flow Direction Symbol on Body**

| | Meter-out | Meter-in |
|---|---|---|
| Symbol |  |  |

## Specifications

| | |
|---|---|
| **Fluid** | Air |
| **Proof pressure** | 1.5 MPa |
| **Max. operating pressure** | 1 MPa |
| **Min. operating pressure** | 0.1 MPa |
| **Ambient and fluid temperature** | –5 to 60°C (No freezing) |
| **Applicable tubing material** | Nylon, Soft nylon, Polyurethane Note), FEP, PFA |

Note) Use caution at the max. operating pressure when using soft nylon or polyurethane tubing. (Refer to **the WEB catalog** or Best Pneumatics No. 6 for details.)

## ⚠ Caution

**Be sure to read this before handling. Refer to the back cover for Safety Instructions. For Flow Control Equipment Precautions, refer to "Handling Precautions for SMC Products" and the Operation Manual on SMC website, http://www.smcworld.com**

## Flow-rate and Sonic Conductance

| Model | | AS12□1FS-M5□ | | AS22□1FS-01 | | | AS22□1FS-02 | | | | AS32□1FS | | | AS42□1FS | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tubing O.D. | Metric size | ø2 | ø3.2<br>ø4<br>ø6 | ø3.2 | ø4 | ø6<br>ø8<br>ø10 | ø3.2 | ø4 | ø6 | ø8<br>ø10 | ø6 | ø8 | ø10<br>ø12 | ø10 | ø12<br>ø16 |
| | Inch size | — | ø1/8"<br>ø1/4"<br>ø5/32" | ø1/8" | ø5/32" | ø1/4"<br>ø5/16" | ø1/8" | ø5/32" | — | ø1/4"<br>ø5/16"<br>ø3/8" | ø1/4" | ø5/16" | ø3/8" | ø3/8" | ø1/2" |
| C values: Sonic conductance dm³/(s·bar) | Free flow | 0.2 | 0.3 | 0.4 | 0.6 | 0.6 | 0.7 | 1.0 | 1.3 | 1.5 | 1.6 | 1.7 | 2.5 | 4.4 | 4.8 |
| | Controlled flow | 0.2 | 0.3 | 0.4 | 0.7 | 0.8 | 0.6 | 0.9 | 1.3 | | 2.1 | 2.4 | 3.3 | 4.4 | 4.9 |
| b values: Critical pressure ratio | Free flow | 0.3 | 0.4 | 0.2 | | 0.3 | 0.3 | | 0.4 | | 0.4 | | 0.3 | 0.3 | |
| | Controlled flow | 0.2 | | 0.2 | | 0.3 | 0.3 | | | | 0.3 | | | 0.3 | |

Note 1) 10-32UNF has the same specification as M5.
Note 2) C and b values are for controlled flow with the needle fully open and free flow with the needle fully closed.

Elbow | Brass (Electroless nickel plating)

## How to Order

**Body size 1**

**AS 1 2 0 1F S □ – M5 E – 06 – □**

**Body size 2/3/4**

**AS 2 2 0 1F S □ – □ 01 – 06 S – □**

**Body size**

| | |
|---|---|
| 1 | M5 x 0.8<br>10-32UNF |

**Port size**

| | |
|---|---|
| M5 | M5 x 0.8 |
| U10/32 | 10-32UNF |

**Width across flats (H)**

| | |
|---|---|
| E | 8 mm |
| Nil | 9 mm |

**Applicable tubing O.D.** Note 1)

| Metric size | | Inch size | |
|---|---|---|---|
| 02 | ø2 | 01 | ø1/8" |
| 23 | ø3.2 Note 2) | 03 | ø5/32" |
| 04 | ø4 | 07 | ø1/4" |
| 06 | ø6 | | |

Note 1) For selecting applicable tubing O.D., refer to the "Model" on page 3.
Metric size and inch size types can be visually identified by color of the release button.
Metric size: Light gray
Inch size: Orange
Note 2) Use ø1/8" tube.

**Body size**

| | |
|---|---|
| 2 | 1/8, 1/4 |
| 3 | 3/8 |
| 4 | 1/2 |

**With indicator**

**Type**

| | |
|---|---|
| 2 | Elbow |

**Control type** Note)

| | |
|---|---|
| 0 | Meter-out |
| 1 | Meter-in |

Note) Meter-out and meter-in types can be visually identified by color of the handle.
Meter-out: Gray
Meter-in: Light blue

**Indicator direction**

| | | |
|---|---|---|
| Nil | 0° |  |
| 1 | 180° |  |

Note) Orientation of indicator direction is fixed when manufacturing, and cannot be changed by the user.

**Port size**

| | |
|---|---|
| 01 | 1/8 |
| 02 | 1/4 |
| 03 | 3/8 |
| 04 | 1/2 |

**Thread type**

| | |
|---|---|
| Nil | R |
| N | NPT |
| G | G |

**Made to Order**
Refer to page 10 for details.

**Seal method**

| | |
|---|---|
| Nil | Without sealant |
| S | With sealant |

Note) Face seal type is used for the G thread type.
Select "Nil/Without sealant".
Example) AS2201FS-G01-06

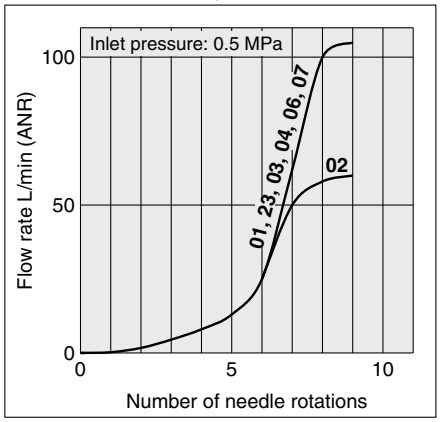
**Applicable tubing O.D.** Note 1)

| Metric size | | Inch size Note 3) | |
|---|---|---|---|
| 23 | ø3.2 Note 2) | 01 | ø1/8" |
| 04 | ø4 | 03 | ø5/32" |
| 06 | ø6 | 07 | ø1/4" |
| 08 | ø8 | 09 | ø5/16" |
| 10 | ø10 | 11 | ø3/8" |
| 12 | ø12 | 13 | ø1/2" |
| 16 | ø16 | | |

Note 1) For selecting applicable tubing O.D., refer to the "Model" on page 3.
Note 2) Use ø1/8" tube.
Note 3) Only the metric size is available for the G thread type.

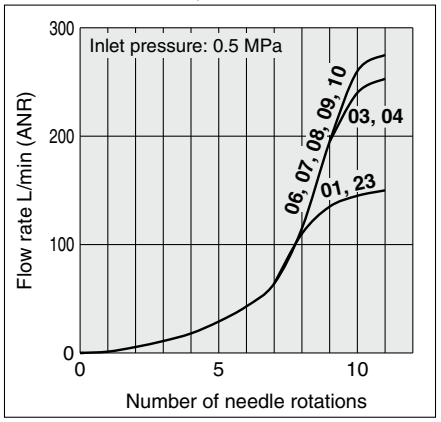
## Needle Valve/Flow-rate Characteristics

**AS1201FS□-M5□, AS1211FS□-M5□**

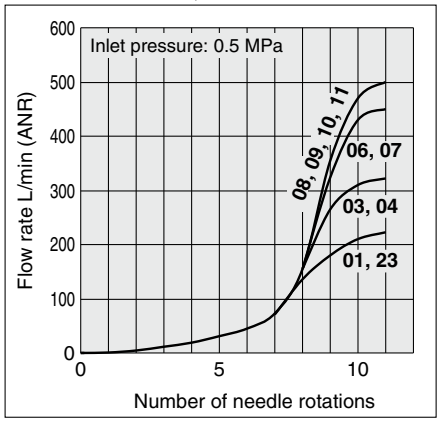



Note) -U10/32 has the same specification as M5.

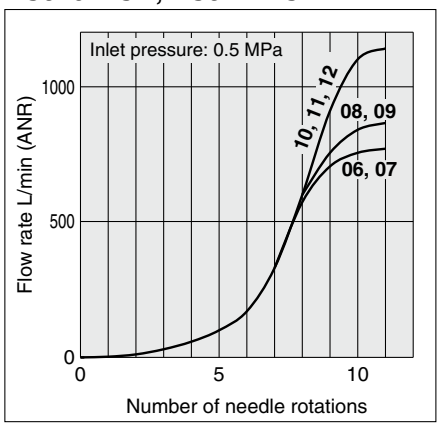
**AS2201FS□-01, AS2211FS□-01**



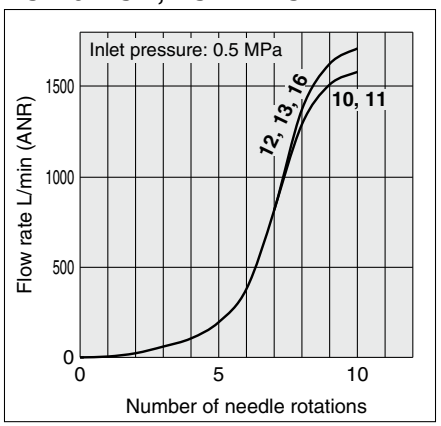

**AS2201FS□-02, AS2211FS□-02**




**AS3201FS□, AS3211FS□**



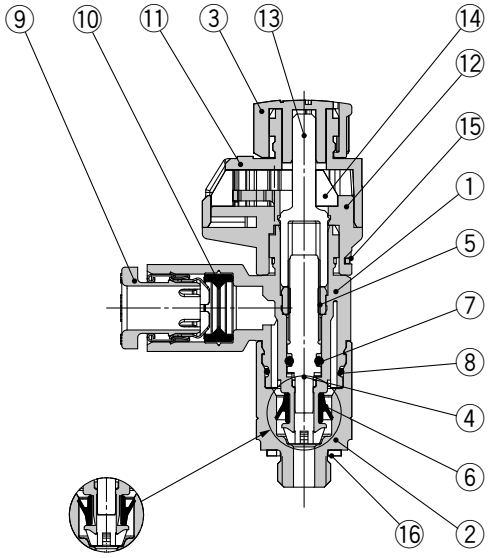

**AS4201FS□, AS4211FS□**




Note) The numbers above the flow-rate characteristic curves in the charts show the applicable tubing outside diameter as defined by the product number.

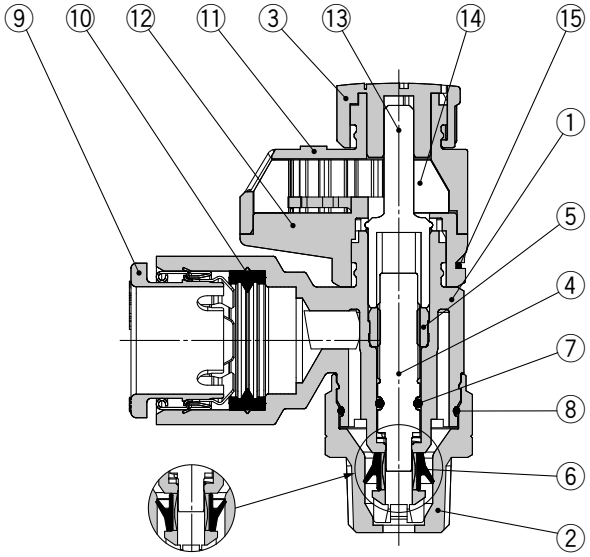
## Construction

**Seal method: Gasket seal**
**For M5, 10-32UNF**



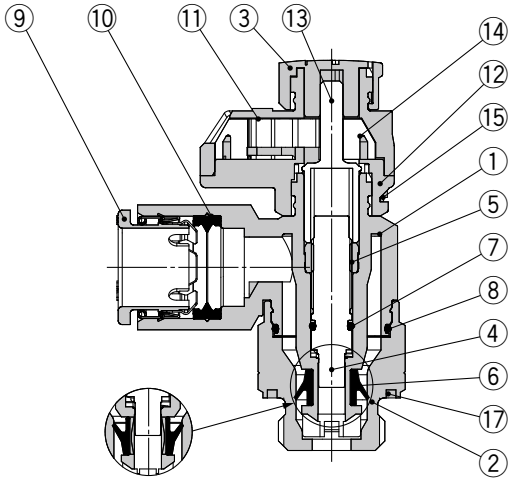

**Meter-in type** **Meter-out type**

**Seal method: Sealant**
**For R, NPT thread**




**Meter-in type** **Meter-out type**

**Seal method: Face seal**
**For G thread**



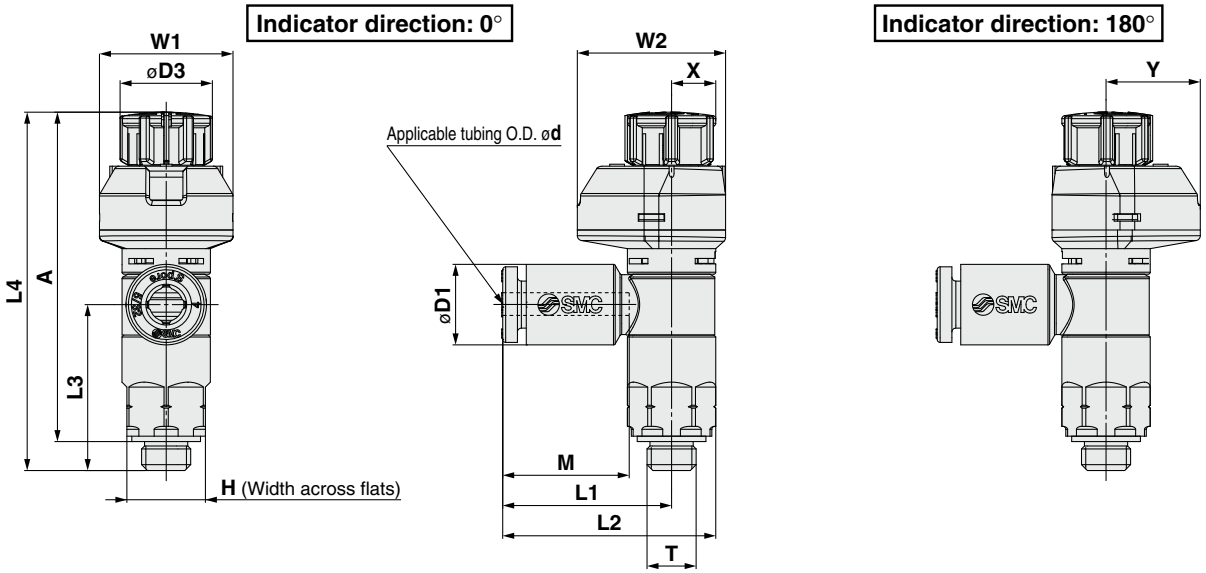

**Meter-in type** **Meter-out type**

### Component Parts

| No. | Description | Material | Note |
|---|---|---|---|
| 1 | **Body A** | PBT | |
| 2 | **Body B** | Brass | Electroless nickel plating |
| 3 | **Handle** | POM | |
| 4 | **Needle** | PBT | |
| 5 | **Needle guide** | Brass | Electroless nickel plating |
| 6 | **U seal** | HNBR | |
| 7 | **O-ring** | NBR | |
| 8 | **O-ring** | NBR | |
| 9 | **Cassette** | — | |
| 10 | **Seal** | NBR | |
| 11 | **Bonnet A** | POM | |
| 12 | **Bonnet B** | POM | |
| 13 | **Gear** | POM | |
| 14 | **Indicator gear** | POM | |
| 15 | **Clip** | Stainless steel | |
| 16 | **Gasket** | NBR/Stainless steel | |
| 17 | **Seal** | NBR | |

## Dimensions

**Seal method: Gasket seal**
**For M5, 10-32UNF**




### Metric Size

(mm)

| Model | d | T | H | D1 | D3 | L1 | L2 | L3 | L4 Note 1) | | A Note 2) | | M | W1 | W2 | X | Y | Weight g |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Unlocked | Locked | Unlocked | Locked | | | | | | |
| AS12□1FS□-M5E-02 | 2 | M5 x 0.8 10/32UNF | 8 | 5.8 | 9.4 | 15.8 | 20.3 | 16.9 | 39 | 36.5 | 35 | 33.5 | 11.9 | 13.6 | 15.1 | 5.5 | 9.6 | 7 |
| AS12□1FS□-U10/32E-02 | | | | | | | | | | | | | | | | | | |
| AS12□1FS□-M5E-23 | 3.2 | | | 7.2 | | 17.2 | 21.7 | | | | | | 13.3 | | | | | |
| AS12□1FS□-U10/32E-23 | | | | | | | | | | | | | | | | | | |
| AS12□1FS□-M5E-04 | 4 | | | 8.2 | | | | | | | | | | | | | | |
| AS12□1FS□-U10/32E-04 | | | | | | | | | | | | | | | | | | |
| AS12□1FS□-M5E-06 | 6 | | | 10.4 | | 18.6 | 23.1 | 16.5 | | | | | | | | | | 8 |
| AS12□1FS□-U10/32E-06 | | | | | | | | | | | | | | | | | | |

Note 1) Reference dimensions
Note 2) Reference dimensions of threads after installation

### Inch Size

(mm)

| Model | d | T | H | D1 | D3 | L1 | L2 | L3 | L4 Note 1) | | A Note 2) | | M | W1 | W2 | X | Y | Weight g |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Unlocked | Locked | Unlocked | Locked | | | | | | |
| AS12□1FS□-M5E-01 | 1/8" | M5 x 0.8 10/32UNF | 8 | 7.2 | 9.4 | 17.2 | 21.7 | 16.9 | 39.0 | 36.5 | 35 | 33.5 | 13.3 | 13.6 | 15.1 | 5.5 | 9.6 | 7 |
| AS12□1FS□-U10/32E-01 | | | | | | | | | | | | | | | | | | |
| AS12□1FS□-M5E-03 | 5/32" | | | 8.2 | | | | | | | | | | | | | | |
| AS12□1FS□-U10/32E-03 | | | | | | | | | | | | | | | | | | |
| AS12□1FS□-M5E-07 | 1/4" | | | 11.2 | | 18.6 | 23.1 | 16.5 | | | | | | | | | | 8 |
| AS12□1FS□-U10/32E-07 | | | | | | | | | | | | | | | | | | |

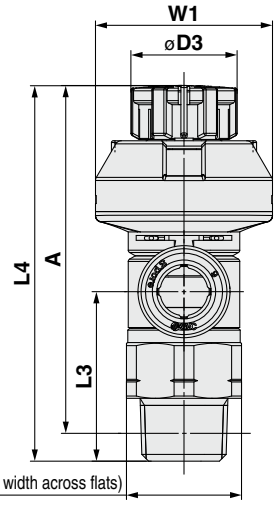
Note 1) Reference dimensions
Note 2) Reference dimensions of threads after installation

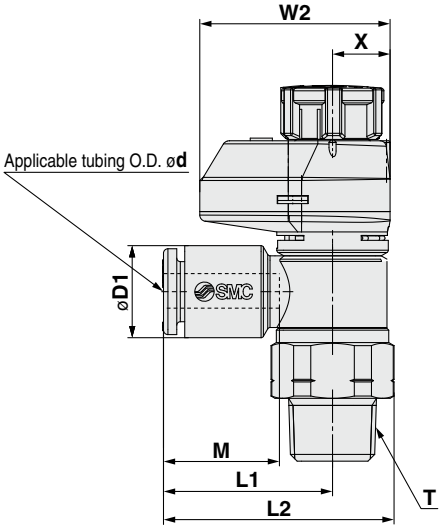


## Dimensions

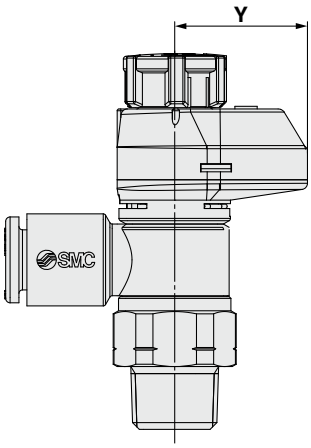
### Seal method: Sealant
### For R, NPT thread

**Indicator direction: 0°**




**Indicator direction: 180°**




### Metric Size

(mm)

| Model | d | T (R, NPT) | H | D1 | D3 | L1 | L2 | L3 | L4 Note 1) Unlocked | L4 Note 1) Locked | A Note 2) Unlocked | A Note 2) Locked | M | W1 | W2 | X | Y | Weight g |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AS22□1FS□-01-23(S)** | 3.2 | 1/8 | 13 (12.7) | 7.2 | 12 | 19.1 | 26.1 (26) | 19.1 | 43.9 | 42.4 | 40.8 | 39.3 | 13.3 | 20 | 21.5 | 6.5 | 15 | 13 (13) |
| **AS22□1FS□-01-04(S)** | 4 | | | 8.2 | | | | | | | | | | | | | | |
| **AS22□1FS□-01-06(S)** | 6 | | | 10.4 | | | | | | | | | | | | | | 14 (13) |
| **AS22□1FS□-01-08(S)** | 8 | | | 13.2 | | 22.4 | 29.4 (29.3) | | | | | | 14.2 | | | | | 15 (14) |
| **AS22□1FS□-01-10(S)** | 10 | | | 15.9 | | 25.3 | 32.3 (32.2) | | | | | | 15.6 | | | | | 16 (15) |
| **AS22□1FS□-02-23(S)** | 3.2 | 1/4 | 17 (17.5) | 7.2 | 13 | 20.9 | 30 (30.3) | 22.6 | 49.7 | 48.3 | 44.2 | 42.8 | 13.3 | 21.5 | 24 | 7.8 | 16.2 | 23 (24) |
| **AS22□1FS□-02-04(S)** | 4 | | | 8.2 | | | | | | | | | | | | | | |
| **AS22□1FS□-02-06(S)** | 6 | | | 10.4 | | 23.4 | 32.5 (32.8) | | | | | | | | | | | |
| **AS22□1FS□-02-08(S)** | 8 | | | 13.2 | | 23.9 | 33 (33.3) | | | | | | 14.2 | | | | | 24 (25) |
| **AS22□1FS□-02-10(S)** | 10 | | | 15.9 | | 26.9 | 36 (36.3) | | | | | | 15.6 | | | | | 25 (26) |
| **AS32□1FS□-02-06(S)** | 6 | 1/4 | 19 | 10.4 | 16.6 | 21.8 | 32.1 | 36.4 | 63.1 | 61.7 | 57.9 | 56.5 | 13.3 | 24.5 | 28.5 | 9.3 | 19.2 | 47 (48) |
| **AS32□1FS□-02-08(S)** | 8 | | | 13.2 | | 22.7 | 33 | | | | | | 14.2 | | | | | |
| **AS32□1FS□-02-10(S)** | 10 | | | 15.9 | | 26.7 | 37 | 35.7 | | | | | 15.6 | | | | | 38 (39) |
| **AS32□1FS□-02-12(S)** | 12 | | | 18.5 | | 29.7 | 40 | 34.5 | | | | | 17 | | | | | 50 (51) |
| **AS32□1FS□-03-06(S)** | 6 | 3/8 | 19 | 10.4 | 16.6 | 21.8 | 32.1 | 28.7 | 55.4 | 54 | 50.2 | 48.8 | 13.3 | 24.5 | 28.5 | 9.3 | 19.2 | 38 (39) |
| **AS32□1FS□-03-08(S)** | 8 | | | 13.2 | | 22.7 | 33 | | | | | | 14.2 | | | | | |
| **AS32□1FS□-03-10(S)** | 10 | | | 15.9 | | 26.7 | 37 | 28 | | | | | 15.6 | | | | | 29 (40) |
| **AS32□1FS□-03-12(S)** | 12 | | | 18.5 | | 29.7 | 40 | 26.8 | | | | | 17 | | | | | 41 (42) |
| **AS42□1FS□-04-10(S)** | 10 | 1/2 | 24 (23.8) | 15.9 | 18.8 | 27.4 | 40.3 (40.2) | 36.2 | 64.1 | 62.5 | 57 | 55.4 | 15.6 | 26 | 29 | 10 | 19 | 62 (61) |
| **AS42□1FS□-04-12(S)** | 12 | | | 18.5 | | 30.8 | 43.7 (43.6) | 35.1 | | | | | 17 | | | | | 64 (63) |
| **AS42□1FS□-04-16(S)** | 16 | | | 23.8 | | 34.8 | 47.7 (47.6) | 32.7 | | | | | 20.6 | | | | | 68 (67) |

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

### Inch Size

(mm)

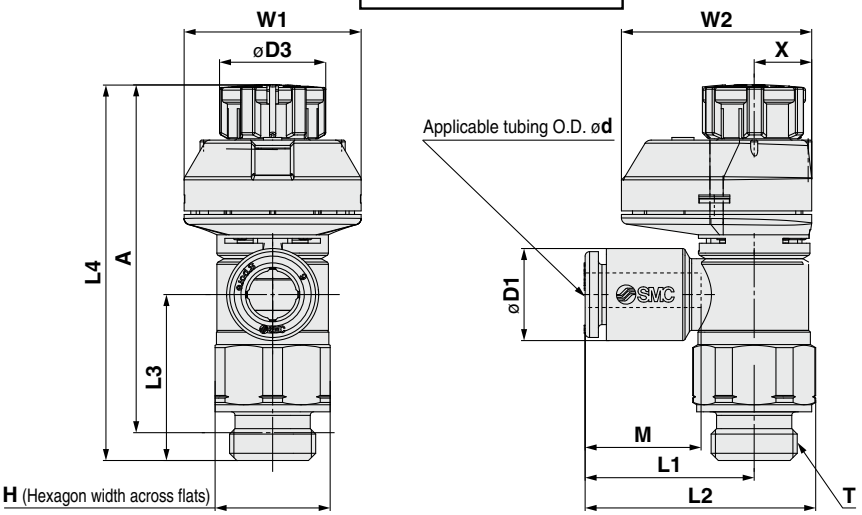
| Model | d | T (R, NPT) | H | D1 | D3 | L1 | L2 | L3 | L4 Note 1) Unlocked | L4 Note 1) Locked | A Note 2) Unlocked | A Note 2) Locked | M | W1 | W2 | X | Y | Weight g |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AS22□1FS□-01-01(S)** | 1/8" | 1/8 | 13 (12.7) | 7.2 | 12 | 19.1 | 26.1 (26) | 19.1 | 43.8 | 42.4 | 40.7 | 39.3 | 13.3 | 20 | 21.5 | 6.5 | 15 | 13 (13) |
| **AS22□1FS□-01-03(S)** | 5/32" | | | 8.2 | | | | | | | | | | | | | | |
| **AS22□1FS□-01-07(S)** | 1/4" | | | 11.2 | | 20.8 | 27.8 (27.7) | | | | | | | | | | | 14 (13) |
| **AS22□1FS□-01-09(S)** | 5/16" | | | 13.2 | | 22.4 | 29.4 (29.3) | | | | | | 14.2 | | | | | 15 (14) |
| **AS22□1FS□-02-01(S)** | 1/8" | 1/4 | 17 (17.5) | 7.2 | 13 | 20.9 | 30 (30.3) | 22.6 | 49.7 | 48.3 | 44.2 | 42.8 | 13.3 | 21.5 | 24 | 7.8 | 16.2 | 23 (24) |
| **AS22□1FS□-02-03(S)** | 5/32" | | | 8.2 | | | | | | | | | | | | | | |
| **AS22□1FS□-02-07(S)** | 1/4" | | | 11.2 | | 23.4 | 32.5 (32.8) | | | | | | | | | | | 24 (24) |
| **AS22□1FS□-02-09(S)** | 5/16" | | | 13.2 | | 23.9 | 33 (33.3) | | | | | | 14.2 | | | | | 24 (25) |
| **AS22□1FS□-02-11(S)** | 3/8" | | | 15.5 | | 26.4 | 35.5 (35.8) | | | | | | 15.6 | | | | | 25 (26) |
| **AS32□1FS□-02-07(S)** | 1/4" | 3/8 | 19 | 11.2 | 16.6 | 21.8 | 32.1 | 28.7 | 63.1 | 61.7 | 57.9 | 56.5 | 13.3 | 24.5 | 28.5 | 9.3 | 19.2 | 47 (48) |
| **AS32□1FS□-02-09(S)** | 5/16" | | | 13.2 | | 22.7 | 33 | | | | | | 14.2 | | | | | |
| **AS32□1FS□-02-11(S)** | 3/8" | | | 15.5 | | 26.7 | 37 | 28.2 | | | | | 15.6 | | | | | 48 (49) |
| **AS32□1FS□-03-07(S)** | 1/4" | 3/8 | 19 | 11.2 | 16.6 | 21.8 | 32.1 | 28.7 | 55.4 | 54 | 50.2 | 48.8 | 13.3 | 24.5 | 28.5 | 9.3 | 19.2 | 38 (39) |
| **AS32□1FS□-03-09(S)** | 5/16" | | | 13.2 | | 22.7 | 33 | | | | | | 14.2 | | | | | |
| **AS32□1FS□-03-11(S)** | 3/8" | | | 15.5 | | 26.7 | 37 | 28.2 | | | | | 15.6 | | | | | 39 (40) |
| **AS42□1FS□-04-11(S)** | 3/8" | 1/2 | 24 (23.8) | 15.5 | 18.8 | 27.4 | 40.3 (40.2) | 36.2 | 64.1 | 62.5 | 57 | 55.4 | 15.6 | 26 | 29 | 10 | 19 | 62 (61) |
| **AS42□1FS□-04-13(S)** | 1/2" | | | 19.3 | | 30.9 | 43.8 (43.7) | 34.7 | | | | | 17 | | | | | 64 (63) |

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

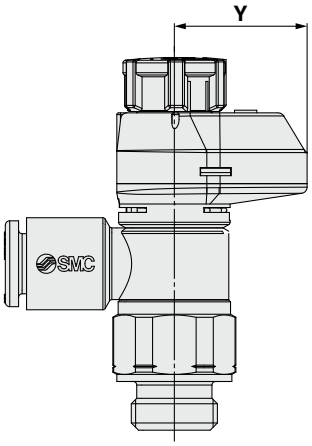
## Dimensions

### Seal method: Face seal
### For G thread

**Indicator direction: 0°**




**Indicator direction: 180°**




### Metric Size

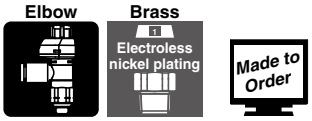
(mm)

| Model | d | T | H | D1 | D3 | L1 | L2 | L3 | L4 Note 1) | | A Note 2) | | M | W1 | W2 | X | Y | Weight g |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Unlocked | Locked | Unlocked | Locked | | | | | | |
| **AS22□1FS□-G01-23** | 3.2 | 1/8 | 13 | 7.2 | 12 | 19.1 | 26.1 | 18.8 | 43.8 | 42.4 | 38.3 | 36.9 | 13.3 | 20 | 21.5 | 6.5 | 15 | 14 |
| **AS22□1FS□-G01-04** | 4 | | | 8.2 | | | | | | | | | | | | | | |
| **AS22□1FS□-G01-06** | 6 | | | 10.4 | | | | | | | | | | | | | | |
| **AS22□1FS□-G01-08** | 8 | | | 13.2 | | 22.4 | 29.4 | | | | | | 14.2 | | | | | 15 |
| **AS22□1FS□-G01-10** | 10 | | | 15.9 | | 25.3 | 32.3 | | | | | | 15.6 | | | | | 16 |
| **AS22□1FS□-G02-23** | 3.2 | 1/4 | 17 | 7.2 | 13 | 20.9 | 30 | 22.6 | 49.7 | 48.3 | 43.2 | 41.8 | 13.3 | 21.5 | 24 | 7.8 | 16.2 | 26 |
| **AS22□1FS□-G02-04** | 4 | | | 8.2 | | | | | | | | | | | | | | |
| **AS22□1FS□-G02-06** | 6 | | | 10.4 | | 23.4 | 32.5 | | | | | | | | | | | |
| **AS22□1FS□-G02-08** | 8 | | | 13.2 | | 23.9 | 32.6 | | | | | | 14.2 | | | | | 27 |
| **AS22□1FS□-G02-10** | 10 | | | 15.9 | | 26.9 | 36 | | | | | | 15.6 | | | | | 28 |
| **AS32□1FS□-G02-06** | 6 | 1/4 | 21 | 10.4 | 16.6 | 21.8 | 33 | 28.7 | 63.1 | 61.7 | 54.6 | 53.2 | 13.3 | 24.5 | 28.5 | 9.3 | 19.2 | 55 |
| **AS32□1FS□-G02-08** | 8 | | | 13.2 | | 22.7 | 33.9 | | | | | | 14.2 | | | | | |
| **AS32□1FS□-G02-10** | 10 | | | 15.9 | | 26.7 | 37.9 | 28 | | | | | 15.6 | | | | | 57 |
| **AS32□1FS□-G02-12** | 12 | | | 18.5 | | 29.7 | 40.9 | 26.8 | | | | | 17 | | | | | 59 |
| **AS32□1FS□-G03-06** | 6 | 3/8 | 21 | 10.4 | 16.6 | 21.8 | 33 | 28.7 | 55.4 | 54 | 47.9 | 46.5 | 13.3 | 24.5 | 28.5 | 9.3 | 19.2 | 45 |
| **AS32□1FS□-G03-08** | 8 | | | 13.2 | | 22.7 | 33.9 | | | | | | 14.2 | | | | | 46 |
| **AS32□1FS□-G03-10** | 10 | | | 15.9 | | 26.7 | 37.9 | 28 | | | | | 15.6 | | | | | 47 |
| **AS32□1FS□-G03-12** | 12 | | | 18.5 | | 29.7 | 40.9 | 26.8 | | | | | 17 | | | | | 49 |
| **AS42□1FS□-G04-10** | 10 | 1/2 | 27 | 15.9 | 18.8 | 27.4 | 41.8 | 36.2 | 64.1 | 62.5 | 55.1 | 53.5 | 15.6 | 26 | 29 | 10 | 19 | 80 |
| **AS42□1FS□-G04-12** | 12 | | | 18.5 | | 30.8 | 45.2 | 35.1 | | | | | 17 | | | | | 82 |
| **AS42□1FS□-G04-16** | 16 | | | 23.8 | | 34.8 | 49.2 | 32.7 | | | | | 20.6 | | | | | 86 |

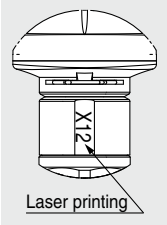
Note 1) Reference dimensions
Note 2) Reference dimensions of threads after installation

# Made to Order

Please contact SMC for detailed dimensions, specifications and delivery.

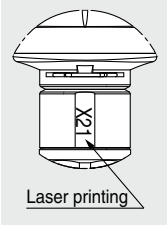



## 1 Lubricant: Vaseline -X12




**Example) AS2201FS-01-04S-X12**

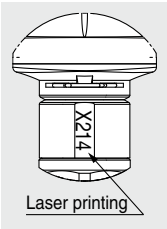
## 2 Grease-free (Seal: Fluorine-coated) + Restrictor (Without check valve) -X21




**Example) AS2201FS-01-04S-X21**

Note 1) Not particle-free
Note 2) The restrictor is only compatible with the part number of the meter-out type.
Note 3) Only the needle and O-ring are fluorine-coated.

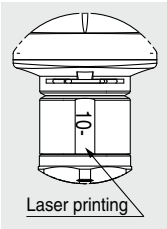
## 3 Restrictor (Without check valve) -X214




**Example) AS2201FS-01-04S-X214**

Note) The restrictor is only compatible with the part number of the meter-out type.

## 4 Clean Series 10-



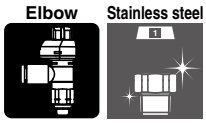

**Example) 10-AS2201FS-01-04S**

Note 1) Fluorine grease is used.
Note 2) The particulate generation grade is 3.

# Speed Controller with Indicator/ Elbow Type: Stainless Steel Type

# *Series* AS-FSG

RoHS




## Model

| Model / Elbow type | Port size | | Seal method | Applicable tubing O.D. | | | | | | | | | | | | | | Note 3) Max. number of rotations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Metric size | | | | | | | | Inch size | | | | | | |
| | | | | 2 Note 2) | 3.2 | 4 | 6 | 8 | 10 | 12 | 16 | 1/8" | 5/32" | 1/4" | 5/16" | 3/8" | 1/2" | |
| **AS12□1FSG□-M5** | M5 x 0.8 | | Gasket seal | ● | ● | ● | ● | | | | | ● | ● | ● | | | | 8 |
| **AS12□1FSG□-U10/32** | 10-32UNF | | | ● | ● | ● | ● | | | | | ● | ● | ● | | | | |
| **AS22□1FSG□-□01** | R NPT | 1/8 | Note 1) Sealant | | ● | ● | ● | ● | ● | | | ● | ● | ● | ● | | | 10 |
| **AS22□1FSG□-□02** | | 1/4 | | | ● | ● | ● | ● | ● | | | ● | ● | ● | ● | ● | | |
| **AS32□1FSG□-□02** | | 1/4 | | | | | ● | ● | ● | ● | | | | ● | ● | ● | | |
| **AS32□1FSG□-□03** | | 3/8 | | | | | ● | ● | ● | ● | | | | ● | ● | ● | | |
| **AS42□1FSG□-□04** | | 1/2 | | | | | | | ● | ● | ● | | | | | ● | ● | |
| **AS22□1FSG□-G01** | G | 1/8 | Face seal | | ● | ● | ● | ● | ● | | | | | | | | | |
| **AS22□1FSG□-G02** | | 1/4 | | | ● | ● | ● | ● | ● | | | | | | | | | |
| **AS32□1FSG□-G02** | | 1/4 | | | | | ● | ● | ● | ● | | | | | | | | |
| **AS32□1FSG□-G03** | | 3/8 | | | | | ● | ● | ● | ● | | | | | | | | |
| **AS42□1FSG□-G04** | | 1/2 | | | | | | | ● | ● | ● | | | | | | | |

Note 1) "Without sealant" type can be selected as a standard option.
Note 2) Only polyurethane tubing is applicable for ø2.
Note 3) There are differences in actual rate as by the indicator window over the maximum number of rotations depending on the individual product.

**Flow Direction Symbol on Body**

| | Meter-out | Meter-in |
|---|---|---|
| Symbol |  |  |

## Specifications

| | |
|---|---|
| **Fluid** | Air |
| **Proof pressure** | 1.5 MPa |
| **Max. operating pressure** | 1 MPa |
| **Min. operating pressure** | 0.1 MPa |
| **Ambient and fluid temperature** | –5 to 60°C (No freezing) |
| **Applicable tubing material** | Nylon, Soft nylon, Polyurethane Note), FEP, PFA |

Note) Use caution at the max. operating pressure when using soft nylon or polyurethane tubing. (Refer to **the WEB catalog** or Best Pneumatics No. 6 for details.)

## ⚠ Caution

**Be sure to read this before handling. Refer to the back cover for Safety Instructions. For Flow Control Equipment Precautions, refer to "Handling Precautions for SMC Products" and the Operation Manual on SMC website, http://www.smcworld.com**

## Flow-rate and Sonic Conductance

| Model | | AS12□1FSG□-M5 | | AS22□1FSG□-01 | | | AS22□1FSG□-02 | | | | AS32□1FSG□ | | | AS42□1FSG□ | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tubing O.D. | Metric size | ø2 | ø3.2<br>ø4<br>ø6 | ø3.2 | ø4 | ø6<br>ø8<br>ø10 | ø3.2 | ø4 | ø6 | ø8<br>ø10 | ø6 | ø8 | ø10<br>ø12 | ø10 | ø12<br>ø16 |
| | Inch size | — | ø1/8"<br>ø1/4"<br>ø5/32" | ø1/8" | ø5/32" | ø1/4"<br>ø5/16" | ø1/8" | ø5/32" | — | ø1/4"<br>ø5/16"<br>ø3/8" | ø1/4" | ø5/16" | ø3/8" | ø3/8" | ø1/2" |
| C values: Sonic conductance dm³/(s·bar) | Free flow | 0.2 | 0.3 | 0.4 | 0.6 | 0.6 | 0.7 | 1.0 | 1.3 | 1.5 | 1.6 | 1.7 | 2.5 | 4.4 | 4.8 |
| | Controlled flow | 0.2 | 0.3 | 0.4 | 0.7 | 0.8 | 0.6 | 0.9 | 1.3 | | 2.1 | 2.4 | 3.3 | 4.4 | 4.9 |
| b values: Critical pressure ratio | Free flow | 0.3 | 0.4 | 0.2 | | 0.3 | 0.3 | | 0.4 | | 0.4 | | 0.3 | 0.3 | |
| | Controlled flow | 0.2 | | 0.2 | | 0.3 | 0.3 | | | | 0.3 | | | 0.3 | |

Note 1) 10-32UNF has the same specification as M5.
Note 2) C and b values are for controlled flow with the needle fully open and free flow with the needle fully closed.

Elbow | Stainless steel

## How to Order

**Body size 1** AS 1 2 0 1F S G □ – M5 – 06 – □

**Body size 2/3/4** AS 2 2 0 1F S G □ – □ 01 – 06 S – □

**Body size**

| | |
|---|---|
| 1 | M5 x 0.8<br>10-32UNF |

**Port size**

| | |
|---|---|
| M5 | M5 x 0.8 |
| U10/32 | 10-32UNF |

**Applicable tubing O.D.** Note 1)

| Metric size | | Inch size | |
|---|---|---|---|
| 02 | ø2 | 01 | ø1/8" |
| 23 | ø3.2 Note 2) | 03 | ø5/32" |
| 04 | ø4 | 07 | ø1/4" |
| 06 | ø6 | | |

Note 1) For selecting applicable tubing O.D., refer to the "Model" on page 11.
Metric size and inch size types can be visually identified by color of the release button.
Stainless steel type: White
White is also used for inch size.
Note 2) Use ø1/8" tube.

**Body size**

| | |
|---|---|
| 2 | 1/8, 1/4 |
| 3 | 3/8 |
| 4 | 1/2 |

**Type**

| | |
|---|---|
| 2 | Elbow |

**With indicator**

**Control type** Note)

| | |
|---|---|
| 0 | Meter-out |
| 1 | Meter-in |

Note) Meter-out and meter-in types can be visually identified by color of the handle.
Meter-out: Gray
Meter-in: Light blue

**Stainless steel type**

**Indicator direction**

| | |
|---|---|
| Nil | 0°  |
| 1 | 180°  |

Note) Orientation of indicator direction is fixed when manufacturing, and cannot be changed by the user.

**Thread type**

| | |
|---|---|
| Nil | R |
| N | NPT |
| G | G |

**Port size**

| | |
|---|---|
| 01 | 1/8 |
| 02 | 1/4 |
| 03 | 3/8 |
| 04 | 1/2 |

**Applicable tubing O.D.** Note 1)

| Metric size | | Inch size Note 3) | |
|---|---|---|---|
| 23 | ø3.2 Note 2) | 01 | ø1/8" |
| 04 | ø4 | 03 | ø5/32" |
| 06 | ø6 | 07 | ø1/4" |
| 08 | ø8 | 09 | ø5/16" |
| 10 | ø10 | 11 | ø3/8" |
| 12 | ø12 | 13 | ø1/2" |
| 16 | ø16 | | |

Note 1) For selecting applicable tubing O.D., refer to the "Model" on page 11.
Note 2) Use ø1/8" tube.
Note 3) Only the metric size is available for the G thread type.

**Seal method**

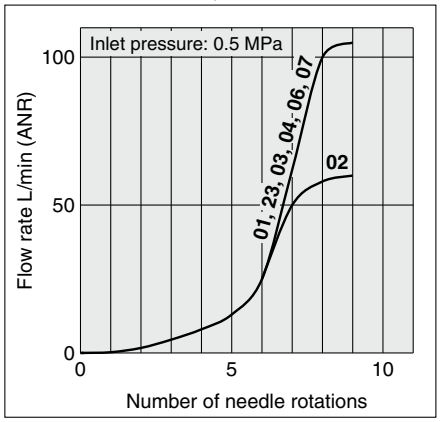
| | |
|---|---|
| Nil | Without sealant |
| S | With sealant |

Note) Face seal type is used for the G thread type.
Select "Nil/Without sealant".
Example) AS2201FSG-G01-06

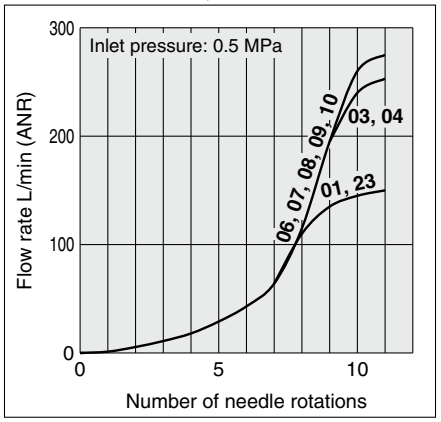
**Made to Order**
Refer to page 18 for details.

## Needle Valve/Flow-rate Characteristics

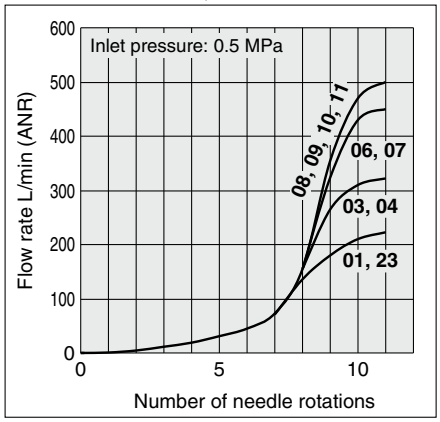
**AS1201FSG□-M5, AS1211FSG□-M5**




**AS2201FSG□-01, AS2211FSG□-01**

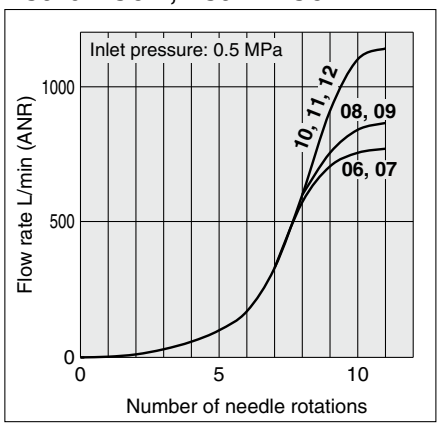



**AS2201FSG□-02, AS2211FSG□-02**

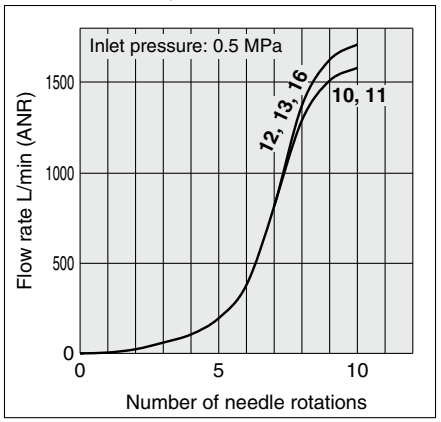



Note) -U10/32 has the same specification as M5.

**AS3201FSG□, AS3211FSG□**



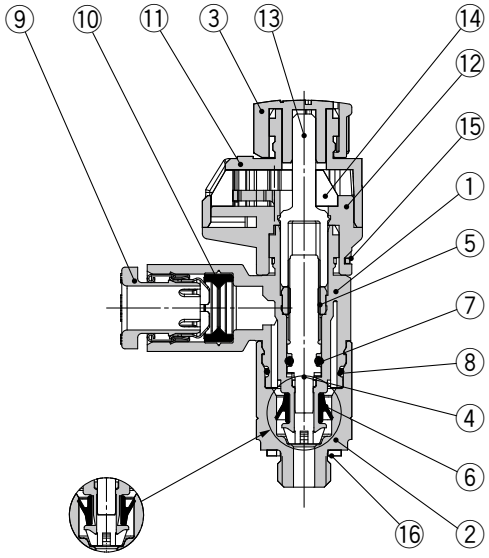

**AS4201FSG□, AS4211FSG□**




Note) The numbers above the flow-rate characteristic curves in the charts show the applicable tubing outside diameter as defined by the product number.

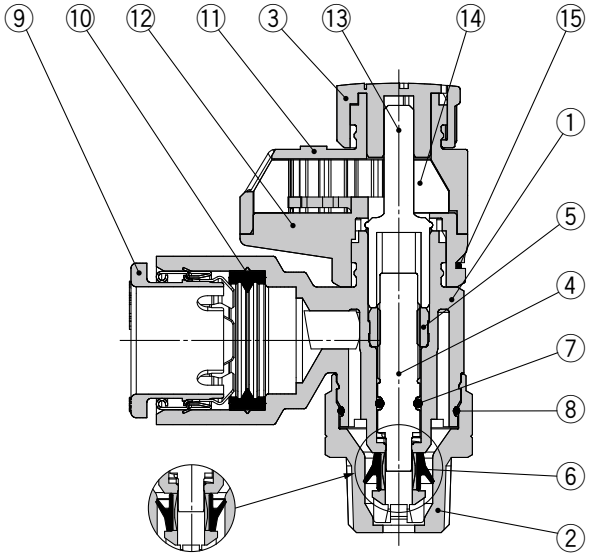
## Construction

### Seal method: Gasket seal
### For M5, 10-32UNF



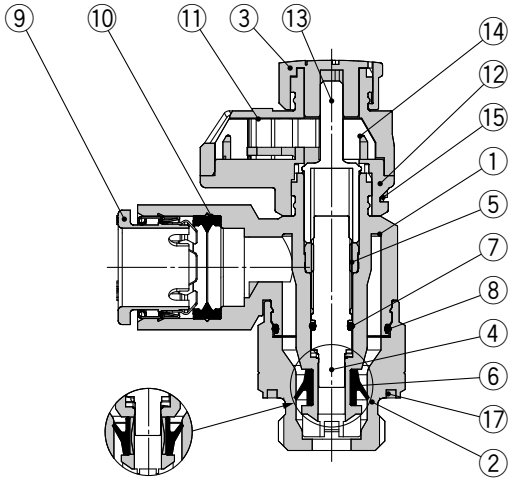

Meter-in type Meter-out type

### Seal method: Sealant
### For R, NPT thread




Meter-in type Meter-out type

### Seal method: Face seal
### For G thread



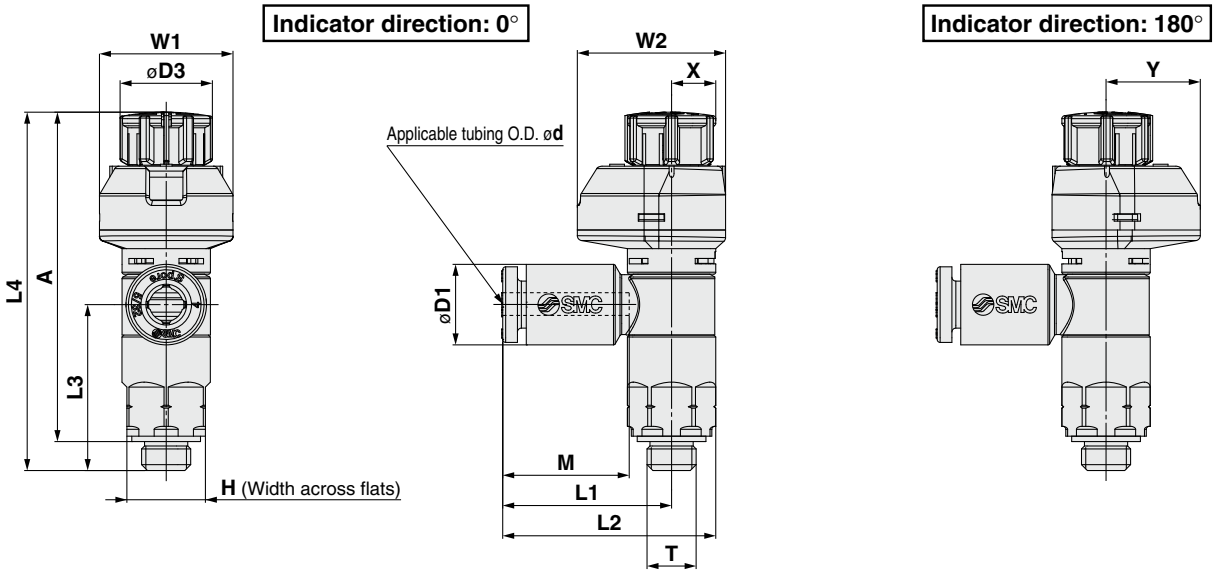

Meter-in type Meter-out type

### Component Parts

| No. | Description | Material | Note |
|---|---|---|---|
| 1 | **Body A** | PBT | |
| 2 | **Body B** | Stainless steel | |
| 3 | **Handle** | POM | |
| 4 | **Needle** | PBT | |
| 5 | **Needle guide** | Stainless steel | |
| 6 | **U seal** | HNBR | |
| 7 | **O-ring** | NBR | |
| 8 | **O-ring** | NBR | |
| 9 | **Cassette** | — | |
| 10 | **Seal** | NBR | |
| 11 | **Bonnet A** | POM | |
| 12 | **Bonnet B** | POM | |
| 13 | **Gear** | POM | |
| 14 | **Indicator gear** | POM | |
| 15 | **Clip** | Stainless steel | |
| 16 | **Gasket** | NBR/Stainless steel | |
| 17 | **Seal** | NBR | |

## Dimensions

**Seal method: Gasket seal**
**For M5, 10-32UNF**




### Metric Size

(mm)

| Model | d | T | H | D1 | D3 | L1 | L2 | L3 | L4 Note 1) | | A Note 2) | | M | W1 | W2 | X | Y | Weight g |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Unlocked | Locked | Unlocked | Locked | | | | | | |
| AS12□1FSG□-M5-02 | 2 | M5 x 0.8 10/32UNF | 8 | 5.8 | 9.4 | 15.8 | 20.3 | 16.9 | 39 | 36.5 | 35 | 33.5 | 11.9 | 13.6 | 15.1 | 5.5 | 9.6 | 7 |
| AS12□1FSG□-U10/32-02 | | | | | | | | | | | | | | | | | | |
| AS12□1FSG□-M5-23 | 3.2 | | | 7.2 | | 17.2 | 21.7 | | | | | | 13.3 | | | | | |
| AS12□1FSG□-U10/32-23 | | | | | | | | | | | | | | | | | | |
| AS12□1FSG□-M5-04 | 4 | | | 8.2 | | | | | | | | | | | | | | |
| AS12□1FSG□-U10/32-04 | | | | | | | | | | | | | | | | | | |
| AS12□1FSG□-M5-06 | 6 | | | 10.4 | | 18.6 | 23.1 | 16.5 | | | | | | | | | | 8 |
| AS12□1FSG□-U10/32-06 | | | | | | | | | | | | | | | | | | |

Note 1) Reference dimensions
Note 2) Reference dimensions of threads after installation

### Inch Size

(mm)

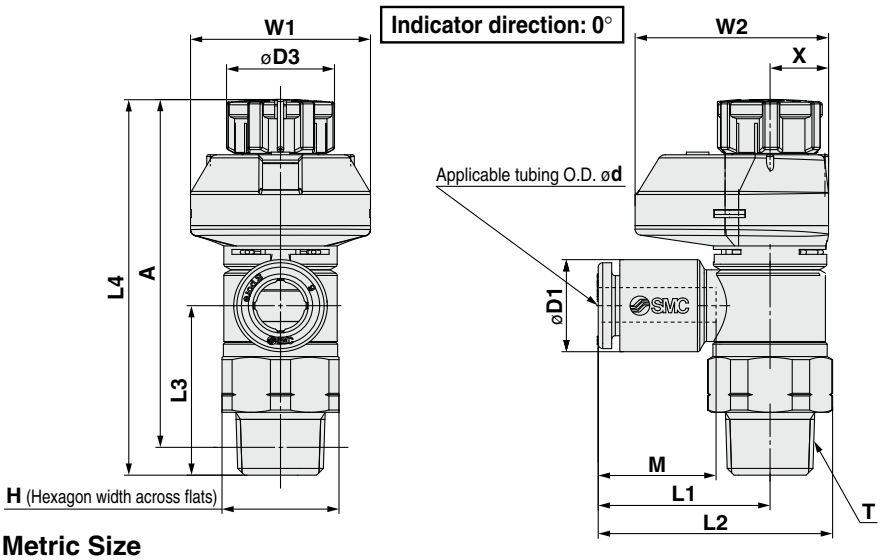
| Model | d | T | H | D1 | D3 | L1 | L2 | L3 | L4 Note 1) | | A Note 2) | | M | W1 | W2 | X | Y | Weight g |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Unlocked | Locked | Unlocked | Locked | | | | | | |
| AS12□1FSG□-M5-01 | 1/8" | M5 x 0.8 10/32UNF | 8 | 7.2 | 9.4 | 17.2 | 21.7 | 16.9 | 39.0 | 36.5 | 35 | 33.5 | 13.3 | 13.6 | 15.1 | 5.5 | 9.6 | 7 |
| AS12□1FSG□-U10/32-01 | | | | | | | | | | | | | | | | | | |
| AS12□1FSG□-M5-03 | 5/32" | | | 8.2 | | | | | | | | | | | | | | |
| AS12□1FSG□-U10/32-03 | | | | | | | | | | | | | | | | | | |
| AS12□1FSG□-M5-07 | 1/4" | | | 11.2 | | 18.6 | 23.1 | 16.5 | | | | | | | | | | 8 |
| AS12□1FSG□-U10/32-07 | | | | | | | | | | | | | | | | | | |

Note 1) Reference dimensions
Note 2) Reference dimensions of threads after installation



## Dimensions

### Seal method: Sealant
### For R, NPT thread




### Metric Size

(mm)

| Model | d | T (R, NPT) | H | D1 | D3 | L1 | L2 | L3 | L4 Note 1) Unlocked | L4 Note 1) Locked | A Note 2) Unlocked | A Note 2) Locked | M | W1 | W2 | X | Y | Weight g |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS22□1FSG□-01-23(S) | 3.2 | 1/8 | 13 (12.7) | 7.2 | 12 | 19.1 | 26.1 (26) | 19.1 | 43.9 | 42.4 | 40.8 | 39.3 | 13.3 | 20 | 21.5 | 6.5 | 15 | 13 (13) |
| AS22□1FSG□-01-04(S) | 4 | | | 8.2 | | | | | | | | | | | | | | |
| AS22□1FSG□-01-06(S) | 6 | | | 10.4 | | | | | | | | | | | | | | 14 (13) |
| AS22□1FSG□-01-08(S) | 8 | | | 13.2 | | 22.4 | 29.4 (29.3) | | | | | | 14.2 | | | | | 15 (14) |
| AS22□1FSG□-01-10(S) | 10 | | | 15.9 | | 25.3 | 32.3 (32.2) | | | | | | 15.6 | | | | | 16 (15) |
| AS22□1FSG□-02-23(S) | 3.2 | 1/4 | 17 (17.5) | 7.2 | 13 | 20.9 | 30 (30.3) | 22.6 | 49.7 | 48.3 | 44.2 | 42.8 | 13.3 | 21.5 | 24 | 7.8 | 16.2 | 23 (24) |
| AS22□1FSG□-02-04(S) | 4 | | | 8.2 | | | | | | | | | | | | | | |
| AS22□1FSG□-02-06(S) | 6 | | | 10.4 | | 23.4 | 32.5 (32.8) | | | | | | | | | | | |
| AS22□1FSG□-02-08(S) | 8 | | | 13.2 | | 23.9 | 33 (33.3) | | | | | | 14.2 | | | | | 24 (25) |
| AS22□1FSG□-02-10(S) | 10 | | | 15.9 | | 26.9 | 36 (36.3) | | | | | | 15.6 | | | | | 25 (26) |
| AS32□1FSG□-02-06(S) | 6 | 1/4 | 19 | 10.4 | 16.6 | 21.8 | 32.1 | 36.4 | 63.1 | 61.7 | 57.9 | 56.5 | 13.3 | 24.5 | 28.5 | 9.3 | 19.2 | 47 (48) |
| AS32□1FSG□-02-08(S) | 8 | | | 13.2 | | 22.7 | 33 | | | | | | 14.2 | | | | | |
| AS32□1FSG□-02-10(S) | 10 | | | 15.9 | | 26.7 | 37 | 35.7 | | | | | 15.6 | | | | | 38 (39) |
| AS32□1FSG□-02-12(S) | 12 | | | 18.5 | | 29.7 | 40 | 34.5 | | | | | 17 | | | | | 50 (51) |
| AS32□1FSG□-03-06(S) | 6 | 3/8 | 19 | 10.4 | 16.6 | 21.8 | 32.1 | 28.7 | 55.4 | 54 | 50.2 | 48.8 | 13.3 | 24.5 | 28.5 | 9.3 | 19.2 | 38 (39) |
| AS32□1FSG□-03-08(S) | 8 | | | 13.2 | | 22.7 | 33 | | | | | | 14.2 | | | | | |
| AS32□1FSG□-03-10(S) | 10 | | | 15.9 | | 26.7 | 37 | 28 | | | | | 15.6 | | | | | 29 (40) |
| AS32□1FSG□-03-12(S) | 12 | | | 18.5 | | 29.7 | 40 | 26.8 | | | | | 17 | | | | | 41 (42) |
| AS42□1FSG□-04-10(S) | 10 | 1/2 | 24 (23.8) | 15.9 | 18.8 | 27.4 | 40.3 (40.2) | 36.2 | 64.1 | 62.5 | 57 | 55.4 | 15.6 | 26 | 29 | 10 | 19 | 62 (61) |
| AS42□1FSG□-04-12(S) | 12 | | | 18.5 | | 30.8 | 43.7 (43.6) | 35.1 | | | | | 17 | | | | | 64 (63) |
| AS42□1FSG□-04-16(S) | 16 | | | 23.8 | | 34.8 | 47.7 (47.6) | 32.7 | | | | | 20.6 | | | | | 68 (67) |

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

### Inch Size

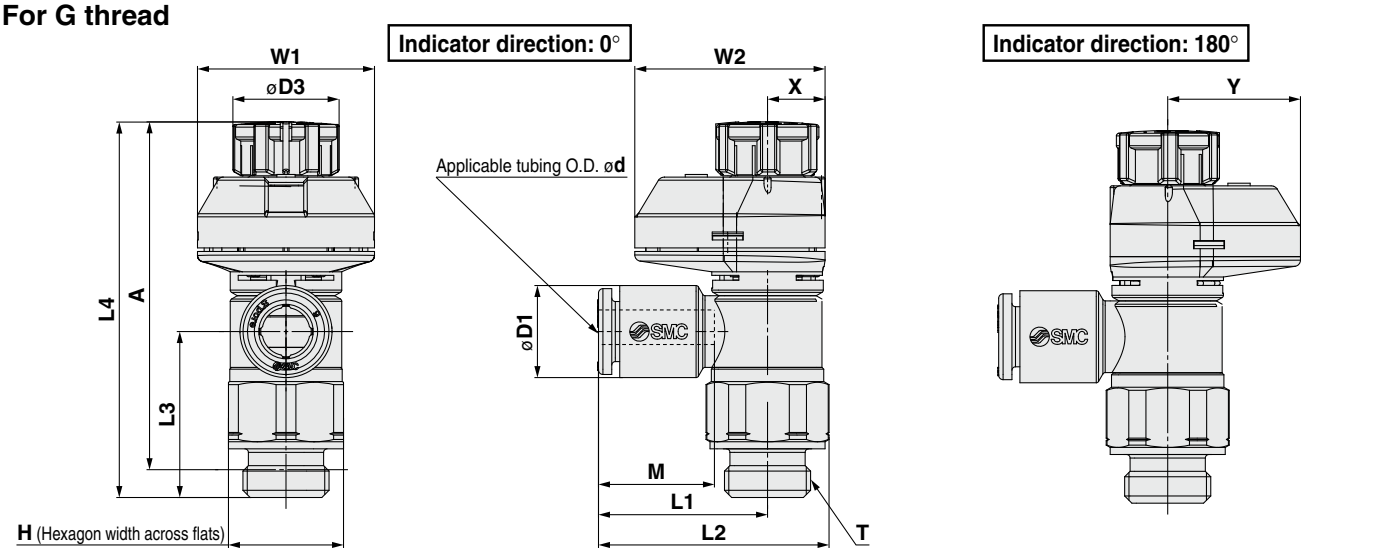
(mm)

| Model | d | T (R, NPT) | H | D1 | D3 | L1 | L2 | L3 | L4 Note 1) Unlocked | L4 Note 1) Locked | A Note 2) Unlocked | A Note 2) Locked | M | W1 | W2 | X | Y | Weight g |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS22□1FSG□-01-01(S) | 1/8" | 1/8 | 13 (12.7) | 7.2 | 12 | 19.1 | 26.1 (26) | 19.1 | 43.8 | 42.4 | 40.7 | 39.3 | 13.3 | 20 | 21.5 | 6.5 | 15 | 13 (13) |
| AS22□1FSG□-01-03(S) | 5/32" | | | 8.2 | | | | | | | | | | | | | | |
| AS22□1FSG□-01-07(S) | 1/4" | | | 11.2 | | 20.8 | 27.8 (27.7) | | | | | | | | | | | 14 (13) |
| AS22□1FSG□-01-09(S) | 5/16" | | | 13.2 | | 22.4 | 29.4 (29.3) | | | | | | 14.2 | | | | | 15 (14) |
| AS22□1FSG□-02-01(S) | 1/8" | 1/4 | 17 (17.5) | 7.2 | 13 | 20.9 | 30 (30.3) | 22.6 | 49.7 | 48.3 | 44.2 | 42.8 | 13.3 | 21.5 | 24 | 7.8 | 16.2 | 23 (24) |
| AS22□1FSG□-02-03(S) | 5/32" | | | 8.2 | | | | | | | | | | | | | | |
| AS22□1FSG□-02-07(S) | 1/4" | | | 11.2 | | 23.4 | 32.5 (32.8) | | | | | | | | | | | 24 (24) |
| AS22□1FSG□-02-09(S) | 5/16" | | | 13.2 | | 23.9 | 33 (33.3) | | | | | | 14.2 | | | | | 24 (25) |
| AS22□1FSG□-02-11(S) | 3/8" | | | 15.5 | | 26.4 | 35.5 (35.8) | | | | | | 15.6 | | | | | 25 (26) |
| AS32□1FSG□-02-07(S) | 1/4" | 3/8 | 19 | 11.2 | 16.6 | 21.8 | 32.1 | 28.7 | 63.1 | 61.7 | 57.9 | 56.5 | 13.3 | 24.5 | 28.5 | 9.3 | 19.2 | 47 (48) |
| AS32□1FSG□-02-09(S) | 5/16" | | | 13.2 | | 22.7 | 33 | | | | | | 14.2 | | | | | |
| AS32□1FSG□-02-11(S) | 3/8" | | | 15.5 | | 26.7 | 37 | 28.2 | | | | | 15.6 | | | | | 48 (49) |
| AS32□1FSG□-03-07(S) | 1/4" | 3/8 | 19 | 11.2 | 16.6 | 21.8 | 32.1 | 28.7 | 55.4 | 54 | 50.2 | 48.8 | 13.3 | 24.5 | 28.5 | 9.3 | 19.2 | 38 (39) |
| AS32□1FSG□-03-09(S) | 5/16" | | | 13.2 | | 22.7 | 33 | | | | | | 14.2 | | | | | |
| AS32□1FSG□-03-11(S) | 3/8" | | | 15.5 | | 26.7 | 37 | 28.2 | | | | | 15.6 | | | | | 39 (40) |
| AS42□1FSG□-04-11(S) | 3/8" | 1/2 | 24 (23.8) | 15.5 | 18.8 | 27.4 | 40.3 (40.2) | 36.2 | 64.1 | 62.5 | 57 | 55.4 | 15.6 | 26 | 29 | 10 | 19 | 62 (61) |
| AS42□1FSG□-04-13(S) | 1/2" | | | 19.3 | | 30.9 | 43.8 (43.7) | 34.7 | | | | | 17 | | | | | 64 (63) |

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

## Dimensions

### Seal method: Face seal
### For G thread




### Metric Size

(mm)

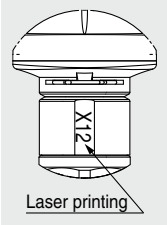
| Model | d | T | H | D1 | D3 | L1 | L2 | L3 | L4 Note 1) | | A Note 2) | | M | W1 | W2 | X | Y | Weight g |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Unlocked | Locked | Unlocked | Locked | | | | | | |
| **AS22□1FSG□-G01-23** | 3.2 | 1/8 | 13 | 7.2 | 12 | 19.1 | 26.1 | 18.8 | 43.8 | 42.4 | 38.3 | 36.9 | 13.3 | 20 | 21.5 | 6.5 | 15 | 14 |
| **AS22□1FSG□-G01-04** | 4 | | | 8.2 | | | | | | | | | | | | | | |
| **AS22□1FSG□-G01-06** | 6 | | | 10.4 | | | | | | | | | | | | | | |
| **AS22□1FSG□-G01-08** | 8 | | | 13.2 | | 22.4 | 29.4 | | | | | | 14.2 | | | | | 15 |
| **AS22□1FSG□-G01-10** | 10 | | | 15.9 | | 25.3 | 32.3 | | | | | | 15.6 | | | | | 16 |
| **AS22□1FSG□-G02-23** | 3.2 | 1/4 | 17 | 7.2 | 13 | 20.9 | 30 | 22.6 | 49.7 | 48.3 | 43.2 | 41.8 | 13.3 | 21.5 | 24 | 7.8 | 16.2 | 26 |
| **AS22□1FSG□-G02-04** | 4 | | | 8.2 | | | | | | | | | | | | | | |
| **AS22□1FSG□-G02-06** | 6 | | | 10.4 | | 23.4 | 32.5 | | | | | | | | | | | |
| **AS22□1FSG□-G02-08** | 8 | | | 13.2 | | 23.9 | 32.6 | | | | | | 14.2 | | | | | 27 |
| **AS22□1FSG□-G02-10** | 10 | | | 15.9 | | 26.9 | 36 | | | | | | 15.6 | | | | | 28 |
| **AS32□1FSG□-G02-06** | 6 | 1/4 | 21 | 10.4 | 16.6 | 21.8 | 33 | 28.7 | 63.1 | 61.7 | 54.6 | 53.2 | 13.3 | 24.5 | 28.5 | 9.3 | 19.2 | 55 |
| **AS32□1FSG□-G02-08** | 8 | | | 13.2 | | 22.7 | 33.9 | | | | | | 14.2 | | | | | |
| **AS32□1FSG□-G02-10** | 10 | | | 15.9 | | 26.7 | 37.9 | 28 | | | | | 15.6 | | | | | 57 |
| **AS32□1FSG□-G02-12** | 12 | | | 18.5 | | 29.7 | 40.9 | 26.8 | | | | | 17 | | | | | 59 |
| **AS32□1FSG□-G03-06** | 6 | 3/8 | 21 | 10.4 | 16.6 | 21.8 | 33 | 28.7 | 55.4 | 54 | 47.9 | 46.5 | 13.3 | 24.5 | 28.5 | 9.3 | 19.2 | 45 |
| **AS32□1FSG□-G03-08** | 8 | | | 13.2 | | 22.7 | 33.9 | | | | | | 14.2 | | | | | 46 |
| **AS32□1FSG□-G03-10** | 10 | | | 15.9 | | 26.7 | 37.9 | 28 | | | | | 15.6 | | | | | 47 |
| **AS32□1FSG□-G03-12** | 12 | | | 18.5 | | 29.7 | 40.9 | 26.8 | | | | | 17 | | | | | 49 |
| **AS42□1FSG□-G04-10** | 10 | 1/2 | 27 | 15.9 | 18.8 | 27.4 | 41.8 | 36.2 | 64.1 | 62.5 | 55.1 | 53.5 | 15.6 | 26 | 29 | 10 | 19 | 80 |
| **AS42□1FSG□-G04-12** | 12 | | | 18.5 | | 30.8 | 45.2 | 35.1 | | | | | 17 | | | | | 82 |
| **AS42□1FSG□-G04-16** | 16 | | | 23.8 | | 34.8 | 49.2 | 32.7 | | | | | 20.6 | | | | | 86 |

Note 1) Reference dimensions
Note 2) Reference dimensions of threads after installation

# Made to Order

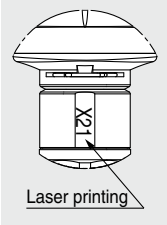
Please contact SMC for detailed dimensions, specifications and delivery.


## 1 Lubricant: Vaseline -X12




**Example) AS2201FSG-01-04S-X12**

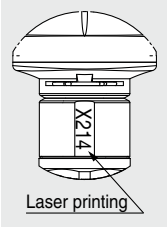
## 2 Grease-free (Seal: Fluorine-coated) + Restrictor (Without check valve) -X21




**Example) AS2201FSG-01-04S-X21**

Note 1) Not particle-free
Note 2) The restrictor is only compatible with the part number of the meter-out type.
Note 3) Only the needle and O-ring are fluorine-coated.

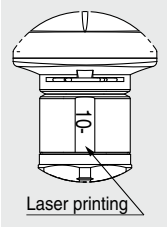
## 3 Restrictor (Without check valve) -X214




**Example) AS2201FSG-01-04S-X214**

Note) The restrictor is only compatible with the part number of the meter-out type.

## 4 Clean Series 10-




**Example) 10-AS2201FSG-01-04S**

Note 1) Fluorine grease is used.
Note 2) The particulate generation grade is 3.

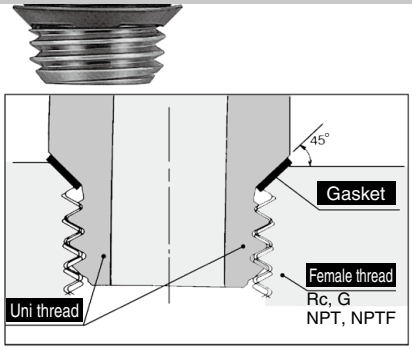
# Speed Controller with Indicator/ Elbow Type: Uni Thread Type

# *Series* AS-FS

Elbow

Brass


## New-stand male threads for piping that reduces the screw-in time by 1/3.



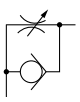
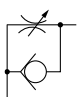

### Shape of Uni thread ridge

Use of the chamfered surface of the female thread as the seat surface and adoption of gaskets made by laminating NBR on both surfaces of stainless steel plates achieve secure sealing regardless of the difference of diameters due to the female thread type, deviations due to the tolerance, or the size of the chamfered corner.
(Any standard chamfered female thread can be used.)

### A ridge shape has been created as a Uni thread for common applications for Rc, G, NPT and NPTF.

### The male thread for piping drastically cuts piping man-hours.

**Flow Direction Symbol on Body**

| | Meter-out | Meter-in |
|---|---|---|
| Symbol |  |  |

### ⚠ Caution

**Be sure to read this before handling. Refer to the back cover for Safety Instructions. For Flow Control Equipment Precautions, refer to "Handling Precautions for SMC Products" and the Operation Manual on SMC website, http://www.smcworld.com**

## Model

| Model / Elbow type | Uni thread port size | Applicable tubing O.D. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Metric size | | | | | | | Inch size | | | | |
| | | 3.2 | 4 | 6 | 8 | 10 | 12 | 16 | 1/8" | 5/32" | 1/4" | 5/16" | 3/8" | 1/2" |
| **AS22□1FS□-U01** | 1/8 | ● | ● | ● | ● | ● | | | ● | ● | ● | ● | | |
| **AS22□1FS□-U02** | 1/4 | ● | ● | ● | ● | ● | | | ● | ● | ● | ● | ● | |
| **AS32□1FS□-U02** | 1/4 | | | ● | ● | ● | ● | | | | ● | ● | ● | |
| **AS32□1FS□-U03** | 3/8 | | | ● | ● | ● | ● | | | | ● | ● | ● | |
| **AS42□1FS□-U04** | 1/2 | | | | | ● | ● | ● | | | | | ● | ● |

## Specifications

| | |
|---|---|
| **Fluid** | Air |
| **Proof pressure** | 1.5 MPa |
| **Max. operating pressure** | 1 MPa |
| **Min. operating pressure** | 0.1 MPa |
| **Ambient and fluid temperature** | –5 to 60°C (No freezing) |
| **Applicable tubing material** | Nylon, Soft nylon, Polyurethane Note) |

Note) Use caution at the max. operating pressure when using soft nylon or polyurethane tubing. (Refer to **the WEB catalog** or Best Pneumatics No. 6 for details.)

## Flow-rate and Sonic Conductance

| Model | | AS22□1FS□-U01 | | | AS22□1FS□-U02 | | | | AS32□1FS□ | | | AS42□1FS□ | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tubing O.D. | Metric size | ø3.2 | ø4 | ø6<br>ø8<br>ø10 | ø3.2 | ø4 | ø6 | ø8<br>ø10 | ø6 | ø8 | ø10<br>ø12 | ø10 | ø12<br>ø16 |
| | Inch size | ø1/8" | ø5/32" | ø1/4"<br>ø5/16" | ø1/8" | ø5/32" | — | ø1/4"<br>ø5/16"<br>ø3/8" | ø1/4" | ø5/16" | ø3/8" | ø3/8" | ø1/2" |
| C values: Sonic conductance $dm^3/(s \cdot bar)$ | Free flow | 0.4 | 0.6 | 0.6 | 0.7 | 1.0 | 1.3 | 1.5 | 1.6 | 1.7 | 2.5 | 4.4 | 4.8 |
| | Controlled flow | 0.4 | 0.7 | 0.8 | 0.6 | 0.9 | 1.3 | | 2.1 | 2.4 | 3.3 | 4.4 | 4.9 |
| b values: Critical pressure ratio | Free flow | 0.2 | | 0.3 | 0.3 | | 0.4 | | 0.4 | | 0.3 | 0.3 | |
| | Controlled flow | 0.2 | | 0.3 | 0.3 | | | | 0.3 | | | 0.3 | |

Note) C and b values are for controlled flow with the needle fully open and free flow with the needle fully closed.

Elbow | Brass, Electroless nickel plating

## How to Order

**AS 2 2 0 1F S □ – U01 – 06**

**Body size**

| | |
|---|---|
| 2 | 1/8, 1/4 |
| 3 | 3/8 |
| 4 | 1/2 |

**Type**

| | |
|---|---|
| 2 | Elbow |

**With indicator**

**Control type** Note)

| | |
|---|---|
| 0 | Meter-out |
| 1 | Meter-in |

Note) Meter-out and meter-in types can be visually identified by color of the handle.
Meter-out: Gray
Meter-in: Light blue

**Indicator direction**

| | | |
|---|---|---|
| Nil | 0° |  |
| 1 | 180° |  |

Note) Orientation of indicator direction is fixed when manufacturing, and cannot be changed by the user.

**Port size**

| | |
|---|---|
| U01 | Uni 1/8 |
| U02 | Uni 1/4 |
| U03 | Uni 3/8 |
| U04 | Uni 1/2 |

**Applicable tubing O.D.** Note 1)

**Metric size**

| Tubing O.D. | |
|---|---|
| 23 | ø3.2 Note 2) |
| 04 | ø4 |
| 06 | ø6 |
| 08 | ø8 |
| 10 | ø10 |
| 12 | ø12 |
| 16 | ø16 |

**Inch size**

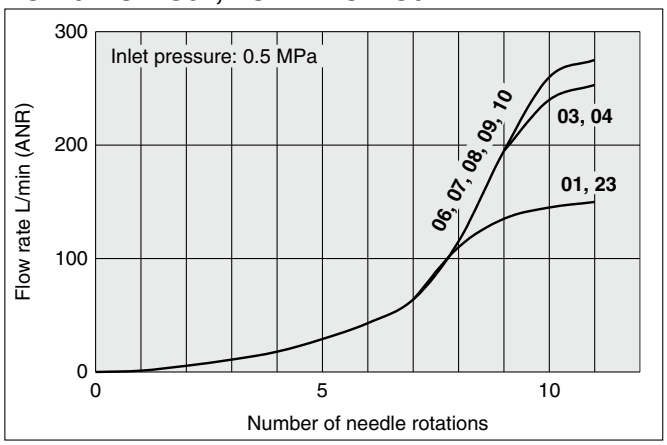
| Tubing O.D. | |
|---|---|
| 01 | ø1/8" |
| 03 | ø5/32" |
| 07 | ø1/4" |
| 09 | ø5/16" |
| 11 | ø3/8" |
| 13 | ø1/2" |

Note 1) For selecting applicable tubing O.D., refer to the "Model" on page 19.
Metric size and inch size types can be visually identified by color of the release button.
Metric size: Light gray
Inch size: Orange

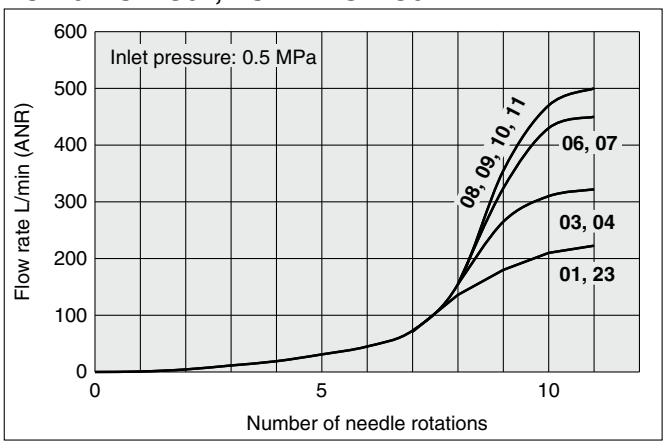
Note 2) Use ø1/8" tube.

## Needle Valve/Flow-rate Characteristics

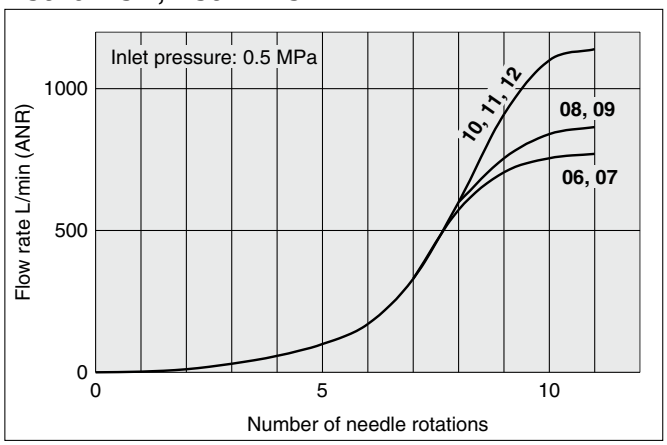
**AS2201FS□-U01, AS2211FS□-U01**



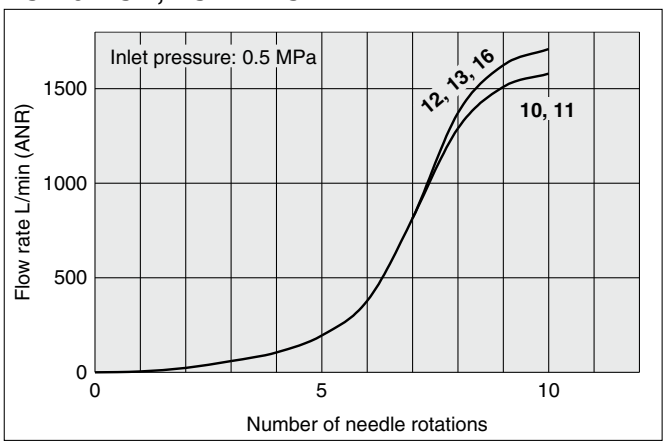

**AS2201FS□-U02, AS2211FS□-U02**




**AS3201FS□, AS3211FS□**




**AS4201FS□, AS4211FS□**

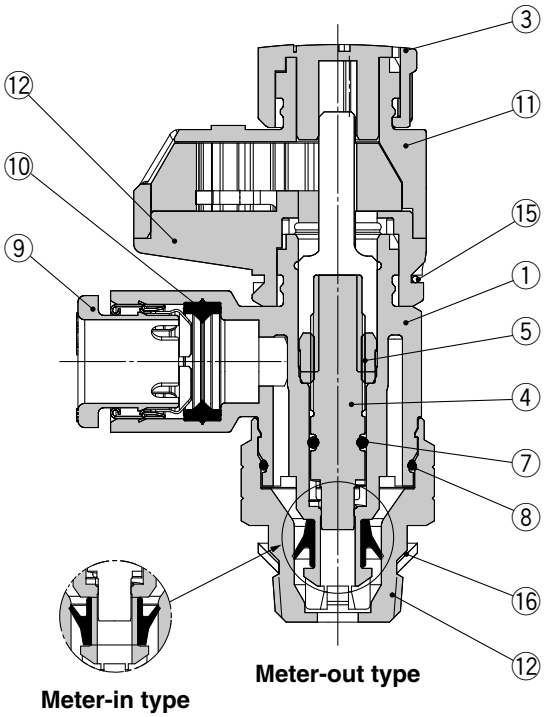



Note) The numbers above the flow-rate characteristic curves in the charts show the applicable tubing outside diameter as defined by the product number.

## Construction

### Elbow type

**AS22□1FS□-U01-06A**



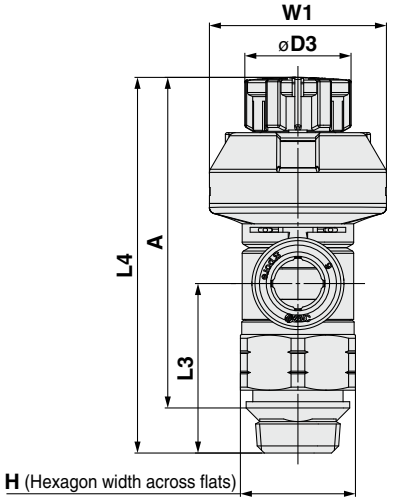

**Component Parts**

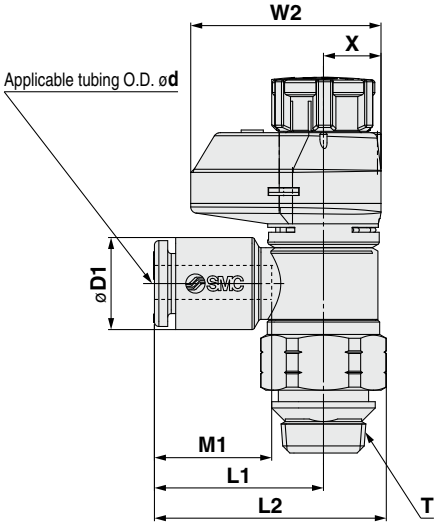
| No. | Description | Material | Note |
|---|---|---|---|
| 1 | **Body A** | PBT | |
| 2 | **Body B** | Brass | Electroless nickel plating |
| 3 | **Handle** | POM | |
| 4 | **Needle** | PBT | |
| 5 | **Needle guide** | Brass | Electroless nickel plating |
| 6 | **U seal** | HNBR | |
| 7 | **O-ring** | NBR | |
| 8 | **O-ring** | NBR | |
| 9 | **Cassette** | — | |
| 10 | **Seal** | NBR | |
| 11 | **Bonnet A** | POM | |
| 12 | **Bonnet B** | POM | |
| 13 | **Gear** | POM | |
| 14 | **Indicator gear** | POM | |
| 15 | **Clip** | Stainless steel | |
| 16 | **Gasket** | NBR/Stainless steel | |

## Dimensions

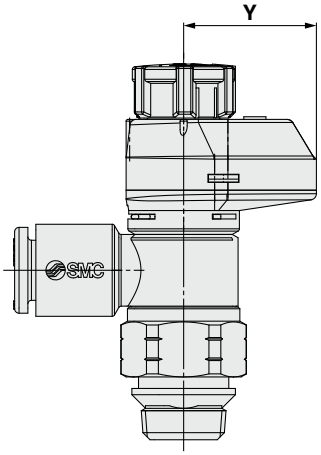
### Seal method: Gasket seal
### For Uni thread

**Indicator direction: 0°**




**Indicator direction: 180°**




### Metric Size

(mm)

| Model | d | T | H | D1 | D3 | L1 | L2 | L3 | L4 Note 1) | | A Note 2) | | M | W1 | W2 | X | Y | Weight g |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Unlocked | Locked | Unlocked | Locked | | | | | | |
| **AS22□1FS□-U01-23** | 3.2 | 1/8 | 13 (12.7) | 7.2 | 12 | 19.1 | 26.1 (26) | 19.1 | 43.9 | 42.4 | 40.8 | 39.3 | 13.3 | 20 | 21.5 | 6.5 | 15 | 13 (13) |
| **AS22□1FS□-U01-04** | 4 | | | 8.2 | | | | | | | | | | | | | | |
| **AS22□1FS□-U01-06** | 6 | | | 10.4 | | | | | | | | | | | | | | 14 (13) |
| **AS22□1FS□-U01-08** | 8 | | | 13.2 | | 22.4 | 29.4 (29.3) | | | | | | 14.2 | | | | | 15 (14) |
| **AS22□1FS□-U01-10** | 10 | | | 15.9 | | 25.3 | 32.3 (32.2) | | | | | | 15.6 | | | | | 16 (15) |
| **AS22□1FS□-U02-23** | 3.2 | 1/4 | 17 (17.5) | 7.2 | 13 | 20.9 | 30 (30.3) | 22.6 | 49.7 | 48.3 | 44.2 | 42.8 | 13.3 | 21.5 | 24 | 7.8 | 16.2 | 24 (25) |
| **AS22□1FS□-U02-04** | 4 | | | 8.2 | | | | | | | | | | | | | | |
| **AS22□1FS□-U02-06** | 6 | | | 10.4 | | 23.4 | 32.5 (32.8) | | | | | | | | | | | |
| **AS22□1FS□-U02-08** | 8 | | | 13.2 | | 23.9 | 33 (33.3) | | | | | | 14.2 | | | | | 25 (26) |
| **AS22□1FS□-U02-10** | 10 | | | 15.9 | | 26.9 | 36 (36.3) | | | | | | 15.6 | | | | | 26 (27) |
| **AS32□1FS□-U02-06** | 6 | 1/4 | 19 | 10.4 | 16.6 | 21.8 | 32.1 | 36.4 | 63.1 | 61.7 | 57.9 | 56.5 | 13.3 | 24.5 | 28.5 | 9.3 | 19.2 | 47 (48) |
| **AS32□1FS□-U02-08** | 8 | | | 13.2 | | 22.7 | 33 | | | | | | 14.2 | | | | | |
| **AS32□1FS□-U02-10** | 10 | | | 15.9 | | 26.7 | 37 | 35.7 | | | | | 15.6 | | | | | 48 (49) |
| **AS32□1FS□-U02-12** | 12 | | | 18.5 | | 29.7 | 40 | 34.5 | | | | | 17 | | | | | 50 (51) |
| **AS32□1FS□-U03-06** | 6 | 3/8 | 19 | 10.4 | 16.6 | 21.8 | 32.1 | 28.7 | 55.4 | 54 | 50.2 | 48.8 | 13.3 | 24.5 | 28.5 | 9.3 | 19.2 | 36 (37) |
| **AS32□1FS□-U03-08** | 8 | | | 13.2 | | 22.7 | 33 | 28 | | | | | 14.2 | | | | | |
| **AS32□1FS□-U03-10** | 10 | | | 15.9 | | 26.7 | 37 | | | | | | 15.6 | | | | | 39 (40) |
| **AS32□1FS□-U03-12** | 12 | | | 18.5 | | 29.7 | 40 | 26.8 | | | | | 17 | | | | | 41 (42) |
| **AS42□1FS□-U04-10** | 10 | 1/2 | 24 (23.8) | 15.9 | 18.8 | 27.4 | 40.3 (40.2) | 36.2 | 64.1 | 62.5 | 57 | 55.4 | 15.6 | 26 | 29 | 10 | 19 | 60 (59) |
| **AS42□1FS□-U04-12** | 12 | | | 18.5 | | 30.8 | 43.7 (43.6) | 35.1 | | | | | 17 | | | | | 62 (61) |
| **AS42□1FS□-U04-16** | 16 | | | 23.8 | | 34.8 | 47.7 (47.6) | 32.7 | | | | | 20.6 | | | | | 66 (65) |

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

### Inch Size

(mm)

| Model | d | T | H | D1 | D3 | L1 | L2 | L3 | L4 Note 1) | | A Note 2) | | M | W1 | W2 | X | Y | Weight g |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Unlocked | Locked | Unlocked | Locked | | | | | | |
| **AS22□1FS□-U01-01** | 1/8" | 1/8 | 13 (12.7) | 7.2 | 12 | 19.1 | 26.1 (26) | 19.1 | 43.8 | 42.4 | 40.7 | 39.3 | 13.3 | 20 | 21.5 | 6.5 | 15 | 13 (13) |
| **AS22□1FS□-U01-03** | 5/32" | | | 8.2 | | | | | | | | | | | | | | |
| **AS22□1FS□-U01-07** | 1/4" | | | 11.2 | | 20.8 | 27.8 (27.7) | | | | | | | | | | | 14 (13) |
| **AS22□1FS□-U01-09** | 5/16" | | | 13.2 | | 22.4 | 29.4 (29.3) | | | | | | 14.2 | | | | | 15 (14) |
| **AS22□1FS□-U02-01** | 1/8" | 1/4 | 17 (17.5) | 7.2 | 13 | 20.9 | 30 (30.3) | 22.6 | 49.7 | 48.3 | 44.2 | 42.8 | 13.3 | 21.5 | 24 | 7.8 | 16.2 | 23 (24) |
| **AS22□1FS□-U02-03** | 5/32" | | | 8.2 | | | | | | | | | | | | | | |
| **AS22□1FS□-U02-07** | 1/4" | | | 11.2 | | 23.4 | 32.5 (32.8) | | | | | | | | | | | 24 (24) |
| **AS22□1FS□-U02-09** | 5/16" | | | 13.2 | | 23.9 | 33 (33.3) | | | | | | 14.2 | | | | | 24 (25) |
| **AS22□1FS□-U02-11** | 3/8" | | | 15.5 | | 26.4 | 35.5 (35.8) | | | | | | 15.6 | | | | | 25 (26) |
| **AS32□1FS□-U02-07** | 1/4" | 3/8 | 19 | 11.2 | 16.6 | 21.8 | 32.1 | 28.7 | 63.1 | 61.7 | 57.9 | 56.5 | 13.3 | 24.5 | 28.5 | 9.3 | 19.2 | 47 (48) |
| **AS32□1FS□-U02-09** | 5/16" | | | 13.2 | | 22.7 | 33 | | | | | | 14.2 | | | | | |
| **AS32□1FS□-U02-11** | 3/8" | | | 15.5 | | 26.7 | 37 | 28.2 | | | | | 15.6 | | | | | 48 (49) |
| **AS32□1FS□-U03-07** | 1/4" | 3/8 | 19 | 11.2 | 16.6 | 21.8 | 32.1 | 28.7 | 55.4 | 54 | 50.2 | 48.8 | 13.3 | 24.5 | 28.5 | 9.3 | 19.2 | 36 (37) |
| **AS32□1FS□-U03-09** | 5/16" | | | 13.2 | | 22.7 | 33 | | | | | | 14.2 | | | | | |
| **AS32□1FS□-U03-11** | 3/8" | | | 15.5 | | 26.7 | 37 | 28.2 | | | | | 15.6 | | | | | 37 (38) |
| **AS42□1FS□-U04-11** | 3/8" | 1/2 | 24 (23.8) | 15.5 | 18.8 | 27.4 | 40.3 (40.2) | 36.2 | 64.1 | 62.5 | 57 | 55.4 | 15.6 | 26 | 29 | 10 | 19 | 60 (59) |
| **AS42□1FS□-U04-13** | 1/2" | | | 19.3 | | 30.9 | 43.8 (43.7) | 34.7 | | | | | 17 | | | | | 62 (61) |

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

# Series AS-FS
# Specific Product Precautions 1

**Be sure to read this before handling. Refer to the back cover for Safety Instructions. For Flow Control Equipment Precautions, refer to "Handling Precautions for SMC Products" and the Operation Manual on SMC website, http://www.smcworld.com**

## Design and Selection

### ⚠ Warning

**1. Check the specifications.**

The products in this catalog are designed to be used in compressed air systems (including vacuum) only.

If the products are used in an environment where pressure or temperature is out of the specified range, damage and/or malfunction may result. Do not use under such conditions. (Refer to the specifications.)

Please contact SMC when using a fluid other than compressed air (including vacuum).

We do not guarantee against any damage if the product is used outside of the specification range.

**2. The products in this catalog are not designed for the use as stop valve with zero air leakage.**

A certain amount of leakage is allowed in the product's specifications.

Tightening the needle to reduce leakage to zero may result in equipment damage.

**3. Do not disassemble the product or make any modifications, including additional machining.**

It may cause human injury and/or an accident.

**4. The flow-rate characteristics for each product are representative values.**

The flow-rate characteristics are characteristics of each individual product. Actual values may differ depending on the piping, circuitry, pressure conditions, etc.

**5. Sonic conductance (C) and critical pressure ratio (b) values for products are representative values.**
**The speed controller's controlled flow values are with the needle fully open and free flow with the needle fully closed.**

**6. Check if PTFE can be used in application.**

PTFE powder (Polytetrafluoroethylene resin) is included in the seal material for piping taper thread of male thread type. Confirm that the use of it will not cause any adverse effect on the system.

Please contact SMC if the Material Safety Data Sheet (MSDS) is required.

## Mounting

### ⚠ Warning

**1. Operation Manual**

Install the products and operate them only after reading the Operation Manual carefully and understanding its contents. Also, keep the Operation Manual where it can be referred to as necessary.

**2. Ensure sufficient space for maintenance activities.**

When installing the products, allow access for maintenance.

**3. Tighten threads with the proper tightening torque.**

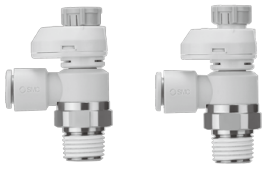
When installing the products, follow the listed proper torque.

## Mounting

### ⚠ Warning

**4. After pushing the handle down to lock, confirm that it is locked.**

It should not be possible to rotate the handle to the right or to the left. If the handle is pulled with force, it may break. Do not pull the handle with excessive force.



**Locked** **Unlocked**

**5. Check the degree of rotation of the needle valve.**

The products in this catalog are retainer type so that the needle is not removed completely. Over rotation will cause damage.

**6. Do not use tools such as pliers to rotate the handle.**

It can cause idle rotation of the handle or damage.

**7. Verify the air flow direction.**

Mounting backward is dangerous, because the speed adjustment needle will not work and the actuator may lurch suddenly.

**8. Adjust the speed by opening the needle slowly from the fully closed state.**

Loose needle valves may cause unexpected sudden actuator lurching.

When a needle valve is turned clockwise, it is closed and actuator speed decreases. When a needle valve is turned counterclockwise, it is open and actuator speed increases.

**9. Do not apply excessive force or shock to the body or fittings with an impact tool.**

It can cause damage or air leakage.

**10. Refer to the Fittings & Tubing Precautions in the Best Pneumatics No. 6 catalog for handling One-touch fittings.**

**11. Tubing O.D. ø2**

Tubing other than that from SMC cannot be used, because it may result in inability to connect the tube, air leakage after connecting the tube or disconnection of the tube.

**12. To install/remove the product, use an appropriate wrench to tighten/loosen at the supplied nut on body B.**

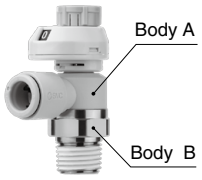
Do not apply torque at other points as the product may be damaged. Rotate body A manually for positioning after installation.

## Mounting

## ⚠Warning

**13. Do not use body A for applications involving continuous rotation.**

Body A and the fitting section may be damaged.




## ⚠Caution

### For M5, 10-32UNF

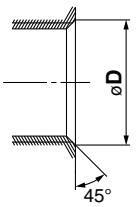
#### Tightening method

First, tighten it by hand, then give it an additional 1/6 turn to 1/4 turn with a wrench. A reference value for the tightening torque is 1 to 1.5 N·m.

Note) Excessive tightening may damage the thread portion or deform the gasket and cause air leakage.
If the screw is too shallowly screwed in, it may come loose or air may leak.

#### Chamfered area for female thread

1. Confirming to ISO 16030 (air pressure fluid dynamics – connection – ports and stud ends), the chamfered dimensions shown in the table below are recommended.




| Female thread port size | Chamfered dimension ø**D** (Recommended value) |
|---|---|
| M5 | 5.1 to 5.4 |
| 10-32UNF | 5.0 to 5.3 |

### For R, NPT Thread (With sealant)

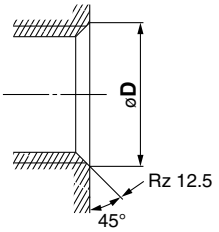
#### Tightening method

1. The proper tightening torques of the fittings are as shown in the table below. As a guide, tighten by hand, then turn it two or three turns with a wrench. Check the dimensions of each product for the hexagon width across flats.

| Connection thread port size | Proper tightening torque (N·m) |
|---|---|
| NPT, R1/8 | 3 to 5 |
| NPT, R1/4 | 8 to 12 |
| NPT, R3/8 | 15 to 20 |
| NPT, R1/2 | 20 to 25 |

#### Chamfered area for female thread

By chamfering as shown in the table below, machining of threads is easier and effective for burr prevention.




| Connection thread port size | Chamfered dimension ø**D** (Recommended value) | |
|---|---|---|
| | Rc | NPT, NPTF |
| 1/8 | 10.2 to 10.4 | 10.5 to 10.7 |
| 1/4 | 13.6 to 13.8 | 14.1 to 14.3 |
| 3/8 | 17.1 to 17.3 | 17.4 to 17.6 |
| 1/2 | 21.4 to 21.6 | 21.7 to 21.9 |

∗ For Uni thread, Rz 12.5 is necessary for sealing at the chamfered part.

# Specific Product Precautions 3

**Be sure to read this before handling. Refer to the back cover for Safety Instructions. For Flow Control Equipment Precautions, refer to "Handling Precautions for SMC Products" and the Operation Manual on SMC website, http://www.smcworld.com**

## Mounting

## ⚠Caution

### For G Thread (Face seal type)

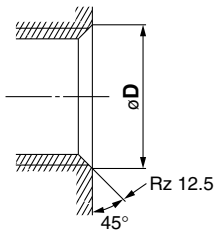
#### Tightening method

First, tighten the threaded portion by hand, then use a proper wrench, which could be suitable for the width across flats of the hexagon body, to tighten it further at a wrench tightening angle shown in the table below. For a tightening torque guide, refer to the table below. Check the dimensions of each product for the hexagon width across flats.

| Connection thread port size | Wrench tightening angle after tightened by hand (deg) | Proper tightening torque (N·m) |
|---|---|---|
| G1/8 | 10 to 20 | 3 to 4 |
| G1/4 | 15 to 35 | 4 to 5 |
| G3/8 | 15 to 35 | 8 to 9 |
| G1/2 | 15 to 35 | 14 to 15 |

#### Chamfered area for female thread (Recommended value)

1. Confirming to 16030-2001, the chamfered dimensions shown in the table below are recommended. By chamfering as shown in the table below, machining of threads is easier and effective for burr prevention.




| Nominal thread port size | Chamfered dimension ø**D** | |
|---|---|---|
| | Min. | Max. |
| 1/8 | 9.8 | 10.2 |
| 1/4 | 13.3 | 13.7 |
| 3/8 | 16.8 | 17.2 |
| 1/2 | 21.0 | 21.4 |

2. Use G external threads with G internal threads.

### For Uni Thread

#### Tightening method

1. First, tighten the threaded portion by hand, then use a proper wrench, which could be suitable for the width across flats of the hexagon body, to tighten it further at a wrench tightening angle shown in the table below. For a tightening torque guide, refer to the table below.

**Connection Female Thread: Rc, NPT, NPTF**

| Uni thread port size | Wrench tightening angle after tightened by hand (deg) | Tightening torque (N·m) |
|---|---|---|
| 1/8 | 30 to 60 | 3 to 5 |
| 1/4 | 30 to 60 | 8 to 12 |
| 3/8 | 15 to 45 | 14 to 16 |
| 1/2 | 15 to 30 | 20 to 22 |

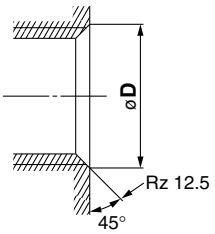
**Connection Female Thread: G**

| Uni thread port size | Wrench tightening angle after tightened by hand (deg) | Tightening torque (N·m) |
|---|---|---|
| 1/8 | 30 to 45 | 3 to 4 |
| 1/4 | 15 to 30 | 4 to 5 |
| 3/8 | 15 to 30 | 8 to 9 |
| 1/2 | 15 to 30 | 14 to 15 |

2. The gasket can be reused up to 6 to 10 times.

#### Chamfered area for female thread

By chamfering as shown in the table below, machining of threads is easier and effective for burr prevention.




| Connection thread port size | Chamfered dimension ø**D** (Recommended value) | | |
|---|---|---|---|
| | G | Rc | NPT, NPTF |
| 1/8 | 10.2 to 10.6 | 10.2 to 10.4 | 10.5 to 10.7 |
| 1/4 | 13.6 to 14.0 | 13.6 to 13.8 | 14.1 to 14.3 |
| 3/8 | 17.1 to 17.5 | 17.1 to 17.3 | 17.4 to 17.6 |
| 1/2 | 21.4 to 21.8 | 21.4 to 21.6 | 21.7 to 21.9 |

∗ For Uni thread, Rz 12.5 is necessary for sealing at the chamfered part.

# Series AS-FS
# Specific Product Precautions 4

**Be sure to read this before handling. Refer to the back cover for Safety Instructions. For Flow Control Equipment Precautions, refer to "Handling Precautions for SMC Products" and the Operation Manual on SMC website, http://www.smcworld.com**

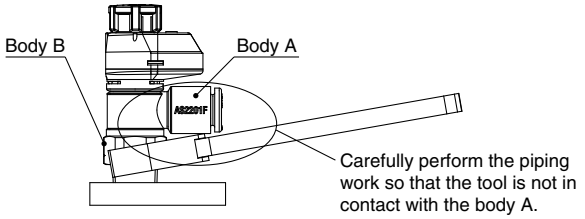
## Mounting

### ⚠Caution

**1. This product has a stopper for fully close in rotating direction. Excess torque may break the stopper. Table below shows the maximum allowable torque of the handle.**

| Body size | Maximum allowable torque (N·m) |
|---|---|
| M5 | 0.05 |
| 1/8 | 0.07 |
| 1/4 | 0.16 |
| 3/8 | 0.2 |
| 1/2 | 0.4 |

When performing the piping work, turn the tightening tool in the horizontal direction to the hexagon across flats of the body B so that any moment is not applied to the body A. If the tool is in contact with the body A, this may cause the body B to come off.




**2. Actuator speed needs to be checked each time the setting is changed.**

Individual product difference due to tolerance of the components, individual actuator difference, operating conditions and temperature, etc. may cause a large variation in the actuator speed, and for this reason, the final actuator speed needs to be checked every time the setting is changed.

**3. Force for lifting the handle is specified as shown in the table below.**

Larger lifting force than specified in the table below will cause removal of the handle, flow rate not according to the flow-rate characteristics curve, incorrect flow indication with the indicator or damage to the product.

| Port size | Handle lifting force |
|---|---|
| M5<br>10-32/UNF | 1 to 1.5 N |
| 1/8, 1/4, 3/8, 1/2 | 3.5 to 4 N |

**4. Do not rotate the product by the indicator part.**

Use a wrench for mounting the product.
Otherwise, it may cause damage to the product.

## Piping Threads with Sealant

### ⚠Caution

**1. If the fitting is tightened with excessive torque, a large amount of sealant will seep out. Remove the excess sealant.**

**2. Insufficient tightening may loosen the threads, or cause air leakage.**

**3. Reuse**

1) Normally, fittings with a sealant can be reused 2 to 3 times.
2) To prevent air leakage through the sealant, remove any loose sealant stuck to the fitting by blowing air over the threaded portion.
3) If the sealant no longer provides effective sealing, wrap sealing tape over the sealant before reusing. Do not use the sealant in any form other than a tape type.

**4. Once the fitting has been tightened, backing it out to its original position often causes the sealant to become defective. Air leakage will occur.**

**5. Use R external threads with Rc internal threads and NPT external threads with NPT internal threads.**

## Piping

### ⚠Caution

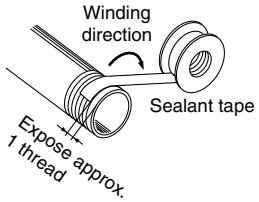
**1. Refer to the Fittings & Tubing Precautions in the Best Pneumatics No. 6 catalog for handling One-touch fittings.**

**2. Preparation before piping**

Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and other debris from inside the pipe.

**3. Wrapping of sealant tape**

When screwing together pipes and fittings, etc., be certain that chips from the pipe threads and sealing material do not get inside the pipe. Also, when the sealant tape is used, leave approx. 1 thread ridge exposed at the end of the threads.



## ⚠ Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of **"Caution," "Warning"** or **"Danger."** They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)*1), and other safety regulations.

**⚠ Caution:** **Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

**⚠ Warning:** **Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

**⚠ Danger :** **Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

*1) ISO 4414: Pneumatic fluid power – General rules relating to systems.
ISO 4413: Hydraulic fluid power – General rules relating to systems.
IEC 60204-1: Safety of machinery – Electrical equipment of machines.
(Part 1: General requirements)
ISO 10218-1: Manipulating industrial robots – Safety.
etc.

## ⚠Warning

**1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.**
Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

**2. Only personnel with appropriate training should operate machinery and equipment.**
The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

**3. Do not service or attempt to remove product and machinery/ equipment until safety is confirmed.**
1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

**4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.**
1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

## ⚠Caution

**1. The product is provided for use in manufacturing industries.**
The product herein described is basically provided for peaceful use in manufacturing industries.
If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.
If anything is unclear, contact your nearest sales branch.

# Limited warranty and Disclaimer/ Compliance Requirements

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements".
Read and accept them before using the product.

## Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.*2)
Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.
This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

***2) Vacuum pads are excluded from this 1 year warranty.**
A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.
Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

## Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

**Revision history**

Edition B
* Stainless steel type added.
* G thread/Uni thread types added.
* Made to Order added.
* Variation/AS32□1FS□-□02 added.
* Needle guide material changed.
* AS12□1FS-M5E, U10/32E added.
* Number of pages increased from 12 to 28. SR

# Speed Controller with One-touch Fitting

RoHS New

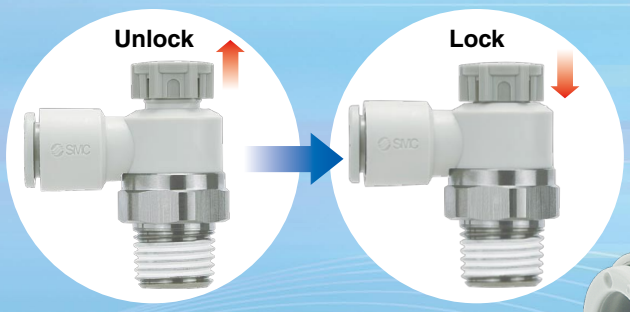
## Reduces labor time!

Elbow | Universal | Brass (Electroless nickel plated) | Stainless steel

Easy to use

## Push-lock type

- Easy to lock




## Larger knob

| Body size | ØD [mm] |
|---|---|
| 1 | 9.4 |
| 2 | 12 (Port size 1/8) |
| | 13 (Port size 1/4) |
| 3 | 16.6 |
| 4 | 18.8 |

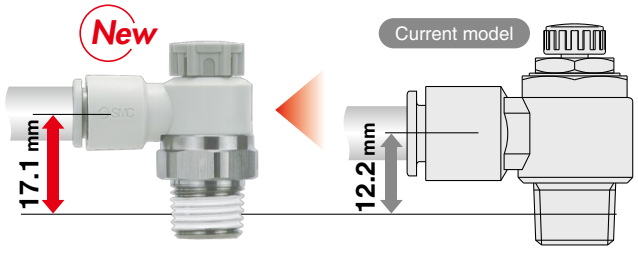

## Improved tube insertion/removal

Max. Insertion force: 30% (8 N) reduction

Max. Removal force: 20% (5 N) reduction*

* Tube pulling out strength is ensured to be equivalent to current model.

**More space beneath the tube. Easier installation/removal of the tube.**




AS22□1F-02-□SA | AS22□1F-02-□

| | Elbow | Universal | Brass (Electroless nickel plated) | Stainless steel |
|---|---|---|---|---|
| Sealant/Gasket seal M/UNF/R/NPT | P.5 | P.5 | P.5 | P.14 |
| Face seal R/NPT/G (New) | P.27 | P.27 * Only G thread | P.27 | P.14 * Only G thread |
| Gasket seal Uni | P.35 | P.35 | P.35 | |

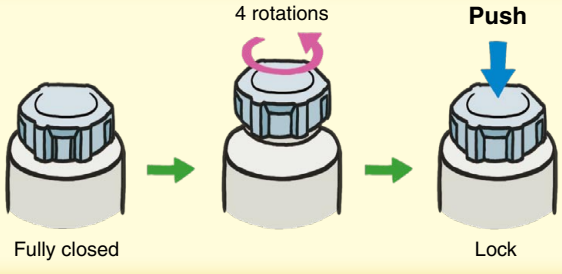
**Series AS**

SMC

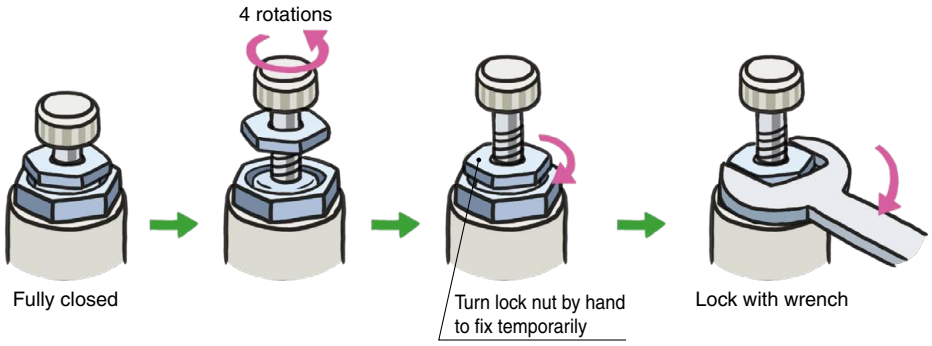
CAT.ES20-220D

## Easy tool-less one push-lock

**Push-lock type**

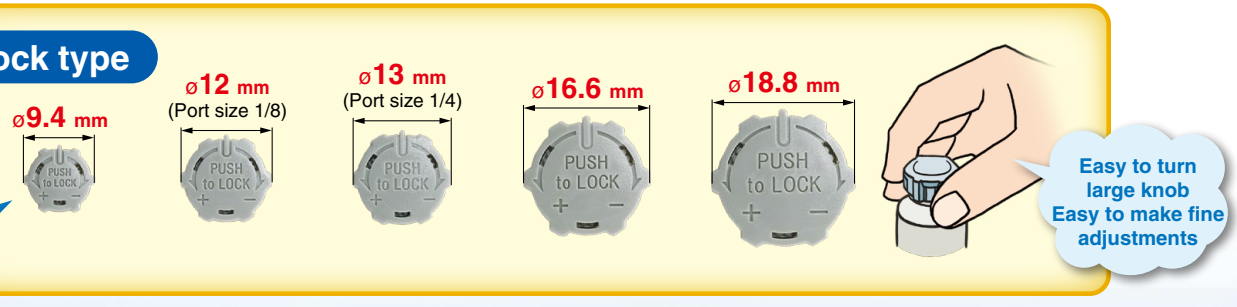



**Current model**

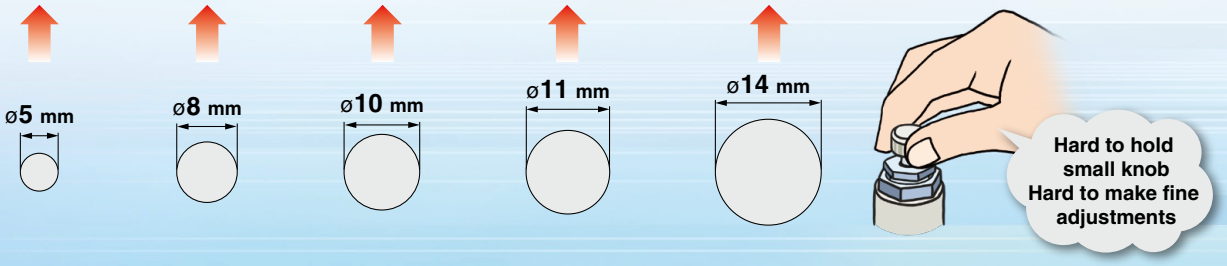



## Easy to turn large knob

**Push-lock type**



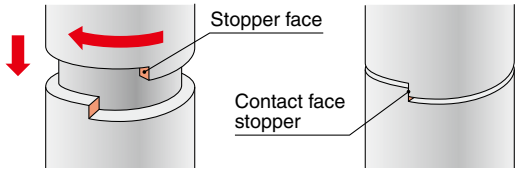

**Current model**




## Flow rate reproducibility

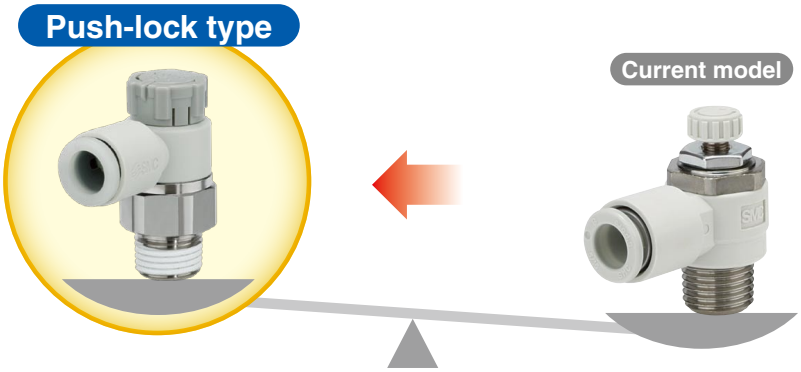
### Improved reproducibility of flow rate

Stable knob position when fully closed (no flow rate) onto the contact face stopper (rotating stopper). Small variations in flow rate depending on the number of knob rotations



# Lightweight

**Weight**
**Up to approx.**
**50% lighter**



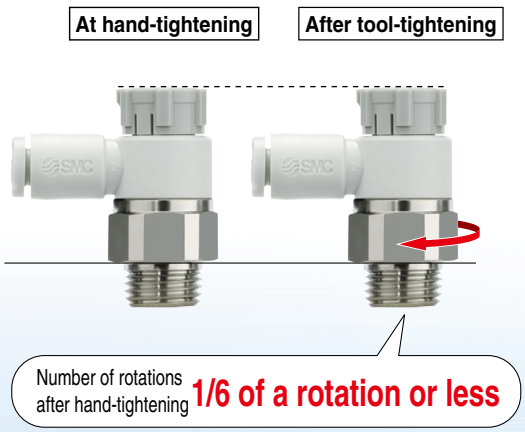

| Tubing O.D. | Thread | Part no. | Weight |
|---|---|---|---|
| ø6 | 1/4 | AS22□1F-02-06A | 18 g |
| ø12 | 1/2 | AS42□1F-04-12A | 56 g |

| Tubing O.D. | Thread | Part no. | Weight |
|---|---|---|---|
| ø6 | 1/4 | AS22□1F-02-06 | 32 g |
| ø12 | 1/2 | AS42□1F-04-12 | 101 g |

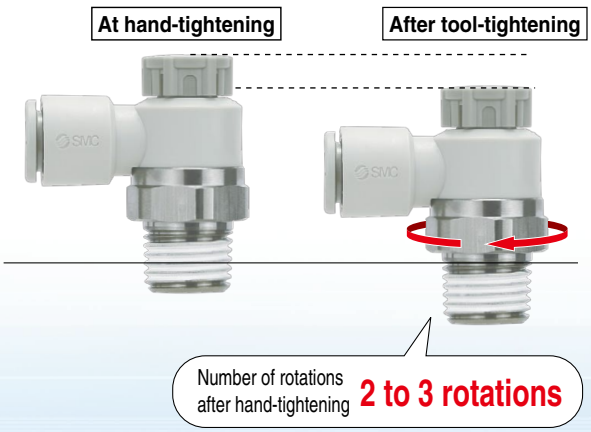
# New Face seal adopted for threading


## Improved installability (Reduced tool-tightening after hand-tightening)

■ **Face seal**




■ **Sealant**




## Prevention of sealant residue/protrusion

Current sealant type leaves residue and protrudes out from the threading when installing, making it necessary to clear away the residue using an air blower or similar. However, no residue is created when using a face seal.

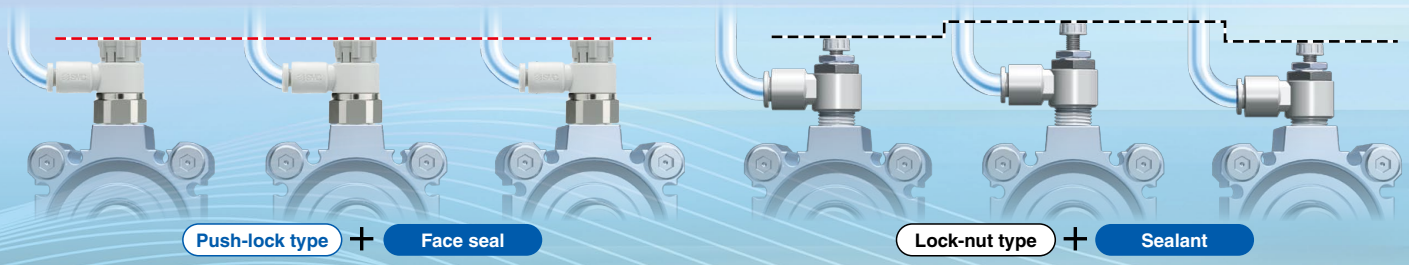
## Re-piping is possible.

**Face seal**
Repeated re-piping some 6 to 10 times is possible due to use of elastic sealant on seating.

**Sealant**
Sealant tape is necessary because sealant becomes separated with repeated installation.

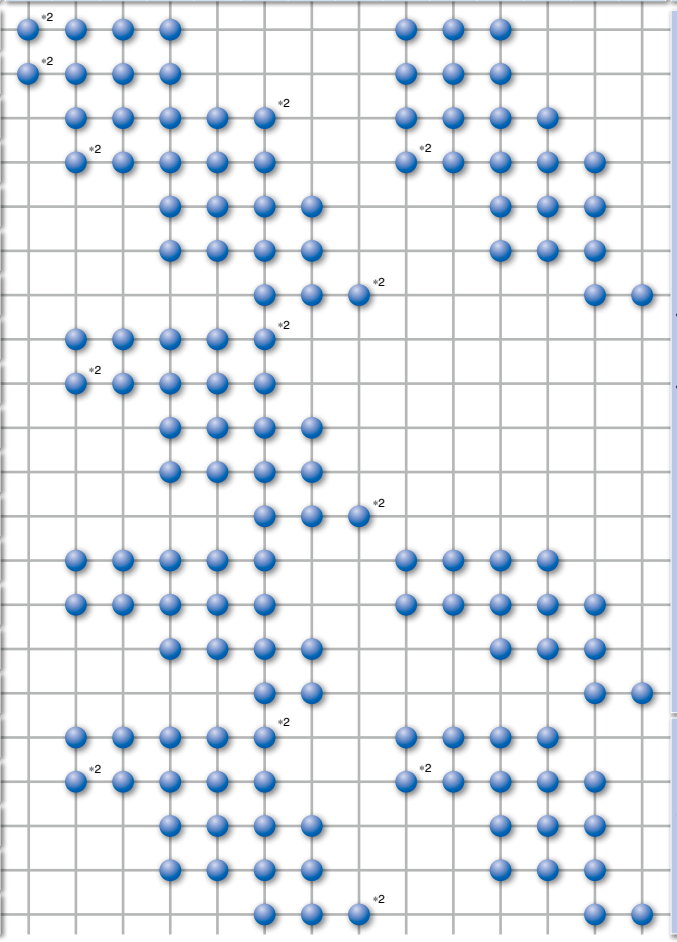
## Uniform height

Uneven heights due to thread and needle variations



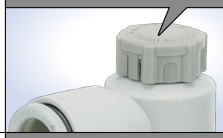
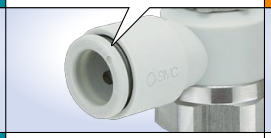
## Series Variations

◎Electroless nickel plating type is standardized. ◎Stainless steel type is standardized. ◎G thread (Face seal) is standardized.

| | Seal method | Body size | Port size | | Applicable tubing O.D. (Metric size: 2, 3.2, 4, 6, 8, 10, 12, 16 / Inch size: 1/8", 5/32", 1/4", 5/16", 3/8", 1/2") | Metal parts material | Applicable tubing material | Page |
|---|---|---|---|---|---|---|---|---|
|  | Gasket seal  | 1 | M5 x 0.8 | |  | ·Brass/ Steel wire<br>·Stainless steel | Nylon (Series T, TIA)<br>Soft nylon (Series TS, TISA)<br>Polyurethane (Series T, TIUB)<br>Fluororesin (Series TLM, TILM) (Series TH, TIH) | P.5 (Brass/ Steel wire)<br>P.14 (Stainless steel) |
| | | | 10-32UNF | | | | | |
|  | Sealant *1  | 2 | R NPT | 1/8 | | | | |
| | | | | 1/4 | | | | |
| | | 3 | | 1/4 | | | | |
| | | | | 3/8 | | | | |
| | | 4 | | 1/2 | | | | |
|  | Face seal  | 2 | G | 1/8 | | | | P.27 |
| | | | | 1/4 | | | | |
| | | 3 | | 1/4 | | | | |
| | | | | 3/8 | | | | |
| | | 4 | | 1/2 | | | | |
| | | 2 | R NPT | 1/8 | | | | |
| | | | | 1/4 | | | | |
| | | 3 | | 3/8 | | | | |
| | | 4 | | 1/2 | | | | |
|  | Gasket seal  | 2 | Uni | 1/8 | | ·Brass/ Steel wire | | P.35 |
| | | | | 1/4 | | | | |
| | | 3 | | 1/4 | | | | |
| | | | | 3/8 | | | | |
| | | 4 | | 1/2 | | | | |

*1 "Without sealant" type can be selected as a standard option. *2 Universal type is not available.

## Easy identification of product type

| Series | Release button color | | | |
|---|---|---|---|---|
| | Meter-out | Meter-in | Metric | Inch |
| Brass  | Gray  | Light blue  | Light gray  | Orange  |
| Stainless steel  | Gray  | Light blue  | White  | White  |

# Push-lock Series Variations

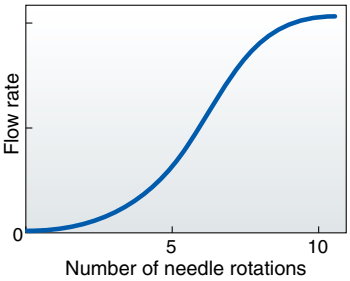
Refer to the **WEB catalog** for details.

## Speed Controller with Indicator/*Series* AS-FS

### Numerical indication of knob rotation for flow rate reduces flow setting time and setting errors!

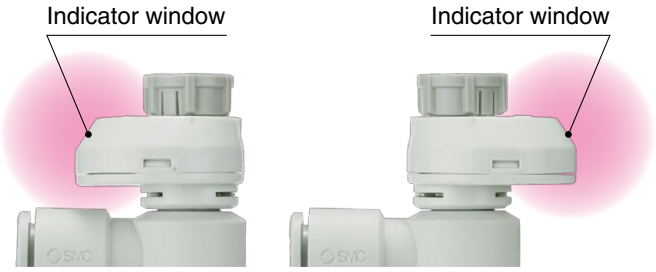
## Indicator window

Numerical indication of knob rotation

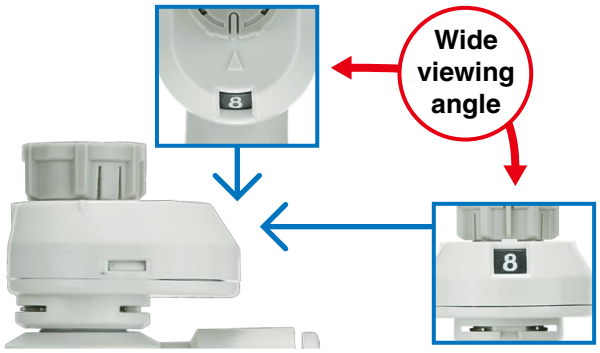



| Body size 1 | | Body size 2 or larger | |
|---|---|---|---|
| Indicator window | Number of needle rotations | Indicator window | Number of needle rotations |
| 1 | 1 | 1 | 1 |
| 2 | 2 | 2 | 2 |
| ⋮ | ⋮ | ⋮ | ⋮ |
| 8 | 8 | 10 | 10 |

## Two indicator window directions available




**Indicator direction: 0°** **Indicator direction: 180°**




| Body size | Port size | Applicable tubing O.D. | |
|---|---|---|---|
| | | Metric size | Inch size |
| 1 to 4 | M5 to 1/2 | ø2 to ø16 | ø1/8" to ø1/2" |

# Speed Controller with One-touch Fitting
# Elbow Type/Universal Type
# *Series AS*

RoHS


## Model

| Model | | Port size | | Seal method | Applicable tubing O.D. | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Metric size | | | | | | | | Inch size | | | | | |
| Elbow type | Universal type | | | | 2 Note 2) | 3.2 | 4 | 6 | 8 | 10 | 12 | 16 | 1/8" | 5/32" | 1/4" | 5/16" | 3/8" | 1/2" |
| **AS12□1F-M5□** | **AS13□1F-M5□** | M5 x 0.8 | | Gasket seal | ● Note 3) | ● | ● | ● | | | | | ● | ● | ● | | | |
| **AS12□1F-U10/32□** | **AS13□1F-U10/32□** | 10-32UNF | | | ● Note 3) | ● | ● | ● | | | | | ● | ● | ● | | | |
| **AS22□1F-□01** | **AS23□1F-□01** | R NPT | 1/8 | Sealant Note 1) | | ● | ● | ● | ● | ● Note 3) | | | ● | ● | ● | ● | | |
| **AS22□1F-□02** | **AS23□1F-□02** | | 1/4 | | | ● Note 3) | ● | ● | ● | ● | | | ● Note 3) | ● | ● | ● | ● | |
| **AS32□1F-□02** | **AS33□1F-□02** | | 1/4 | | | | | ● | ● | ● | ● | | | | ● | ● | ● | |
| **AS32□1F-□03** | **AS33□1F-□03** | | 3/8 | | | | | ● | ● | ● | ● | | | | ● | ● | ● | |
| **AS42□1F-□04** | **AS43□1F-□04** | | 1/2 | | | | | | | ● | ● | ● Note 3) | | | | | ● | ● |

Note 1) "Without sealant" type can be selected as a standard option.
Note 2) Only polyurethane tubing is applicable for ø2.
Note 3) Universal type is not available.

**Flow Direction Symbols on Body**

| | Meter-out | Meter-in |
|---|---|---|
| Symbol |  |  |

## Specifications

| | |
|---|---|
| **Fluid** | Air |
| **Proof pressure** | 1.5 MPa |
| **Max. operating pressure** | 1 MPa |
| **Min. operating pressure** | 0.1 MPa |
| **Ambient and fluid temperature** | –5 to 60°C (No freezing) |
| **Applicable tubing material** | Nylon, Soft nylon, Polyurethane Note), FEP, PFA |

Note) Use caution at the max. operating pressure when using soft nylon or polyurethane tubing.
(Refer to the **WEB catalog** or the Best Pneumatics No. 6 for details.)

## ⚠ Caution

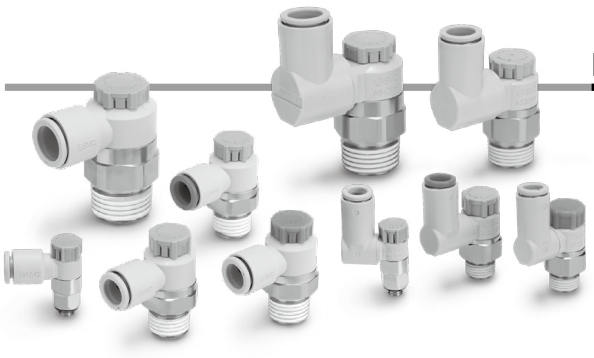
**Be sure to read this before handling. Refer to the back cover for Safety Instructions. For Flow Control Equipment Precautions, refer to "Handling Precautions for SMC Products" and the Operation Manual on SMC website, http://www.smcworld.com**

## Flow Rate and Sonic Conductance

| Model | | AS12□1F-M5□ AS13□1F-M5□ | | AS22□1F-□01 Note 3) AS23□1F-□01 Note 3) | | | AS22□1F-□02 AS23□1F-□02 | | | | AS32□1F AS33□1F | | | AS42□1F AS43□1F | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tubing O.D. | Metric size | ø2 | ø3.2<br>ø4<br>ø6 | ø3.2 | ø4 | ø6<br>ø8<br>ø10 | ø3.2 | ø4 | ø6 | ø8<br>ø10 | ø6 | ø8 | ø10<br>ø12 | ø10 | ø12<br>ø16 |
| | Inch size | — | ø1/8"<br>ø1/4"<br>ø5/32" | ø1/8" | ø5/32" | ø1/4"<br>ø5/16" | ø1/8" | ø5/32" | — | ø1/4"<br>ø5/16"<br>ø3/8" | ø1/4" | ø5/16" | ø3/8" | ø3/8" | ø1/2" |
| C values: Sonic conductance dm³/(s·bar) | Free flow | 0.2 | 0.3 | 0.4 | 0.6 | 0.6 | 0.7 | 1.0 | 1.3 | 1.5 | 1.6 | 1.7 | 2.5 | 4.4 | 4.8 |
| | Controlled flow | 0.2 | 0.3 | 0.4 | 0.7 | 0.8 | 0.6 | 0.9 | 1.3 | | 2.1 | 2.4 | 3.3 | 4.4 | 4.9 |
| b values: Critical pressure ratio | Free flow | 0.3 | 0.4 | 0.2 | | 0.3 | 0.3 | | 0.4 | | 0.4 | | 0.3 | 0.3 | |
| | Controlled flow | 0.2 | | 0.2 | | 0.3 | 0.3 | | | | 0.3 | | | 0.3 | |

Note 1) 10-32UNF has the same specification as M5.
Note 2) C and b values are for controlled flow with the needle fully open and free flow with the needle fully closed.
Note 3) The same specifications also apply to the AS-FG series (stainless steel type).

Elbow | Universal | Brass — Electroless nickel plated



## How to Order

**Applicable tubing O.D.** Note 1)

| Metric size | | Inch size | |
|---|---|---|---|
| **02** | ø2 | **01** | ø1/8" |
| **23** | ø3.2 Note 2) | **03** | ø5/32" |
| **04** | ø4 | **07** | ø1/4" |
| **06** | ø6 | | |

Note 1) For selecting applicable tubing O.D., refer to the "Model" on page 5. Metric size and inch size types can be visually identified by color of the release button.
Metric size: Light gray
Inch size: Orange
Note 2) Use ø1/8" tube.

**Width across flats (H)**

| | |
|---|---|
| **E** | 8 mm |
| **Nil** | 9 mm |

**Body size**

| | |
|---|---|
| **1** | M5 x 0.8<br>10-32UNF |

**Port size**

| | |
|---|---|
| **M5** | M5 x 0.8 |
| **U10/32** | 10-32UNF |

**Body size 1**

**AS 1 2 0 1 F – M5 E – 06 A –**

**Body size 2/3/4**

**AS 2 2 0 1 F – 01 – 06 S A –**

**Body size**

| | |
|---|---|
| **2** | 1/8, 1/4 |
| **3** | 3/8 |
| **4** | 1/2 |

**Type**

| | |
|---|---|
| **2** | Elbow |
| **3** | Universal |

**Control type** Note)

| | |
|---|---|
| **0** | Meter-out |
| **1** | Meter-in |

Note) Meter-out and meter-in types can be visually identified by color of the knob.
Meter-out: Gray
Meter-in: Light blue

**Thread type**

| | |
|---|---|
| **Nil** | R |
| **N** | NPT |

**Port size**

| | |
|---|---|
| **01** | 1/8 |
| **02** | 1/4 |
| **03** | 3/8 |
| **04** | 1/2 |

**Made to Order**
Refer to page 13 for details.

**Push-lock type**

**Seal method**

| | |
|---|---|
| **Nil** | Without sealant |
| **S** | With sealant |

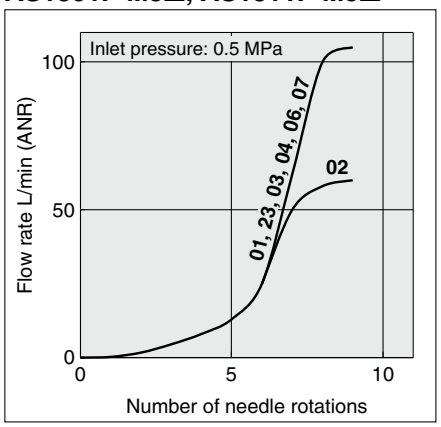
**Applicable tubing O.D.** Note 1)

| Metric size | | Inch size | |
|---|---|---|---|
| **23** | ø3.2 Note 2) | **01** | ø1/8" |
| **04** | ø4 | **03** | ø5/32" |
| **06** | ø6 | **07** | ø1/4" |
| **08** | ø8 | **09** | ø5/16" |
| **10** | ø10 | **11** | ø3/8" |
| **12** | ø12 | **13** | ø1/2" |
| **16** | ø16 | | |

Note 1) For selecting applicable tubing O.D., refer to the "Model" on page 5.
Note 2) Use ø1/8" tube.

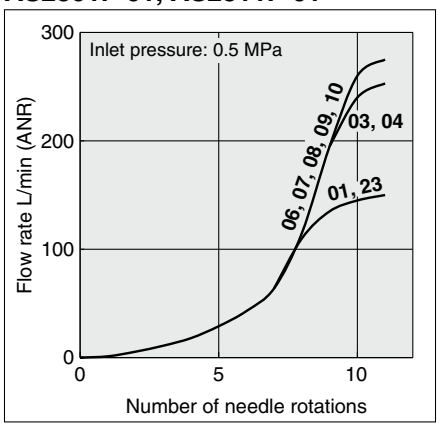
## Needle Valve/Flow-rate Characteristics

**AS1201F-M5□, AS1211F-M5□**
**AS1301F-M5□, AS1311F-M5□**

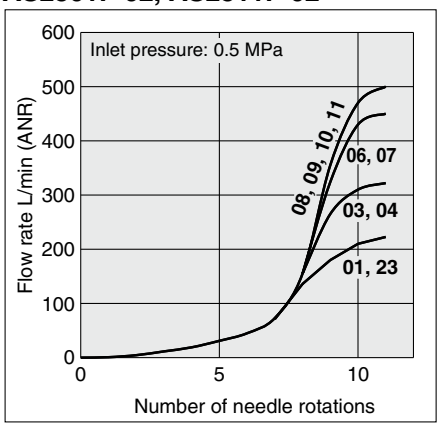



Note) -U10/32 has the same specification as M5.

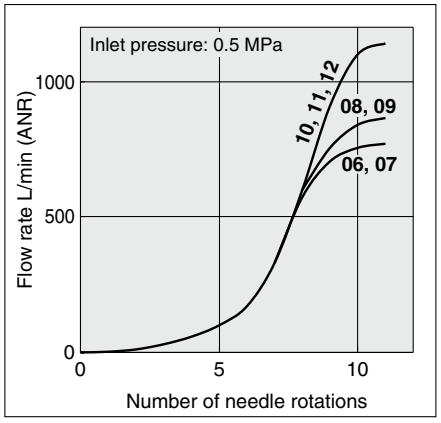
**AS2201F-01, AS2211F-01**
**AS2301F-01, AS2311F-01**



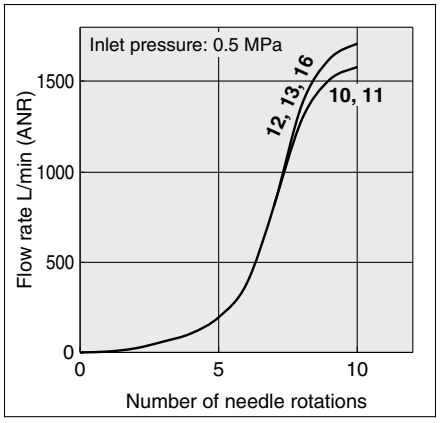

**AS2201F-02, AS2211F-02**
**AS2301F-02, AS2311F-02**




**AS3201F, AS3211F**
**AS3301F, AS3311F**




**AS4201F, AS4211F**
**AS4301F, AS4311F**

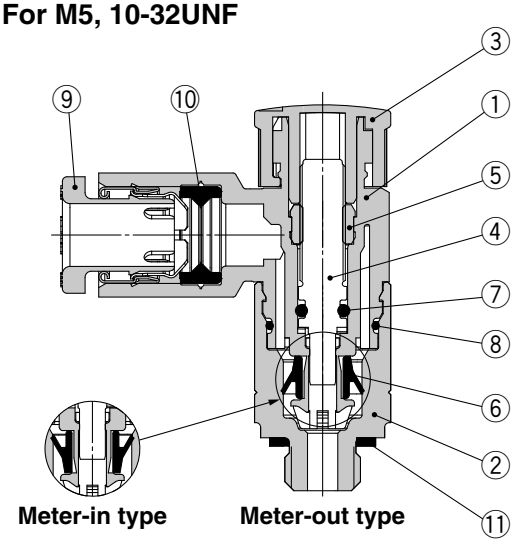



Note) The numbers above the flow-rate characteristic curves in the charts show the applicable tubing outside diameter as defined by the product number.

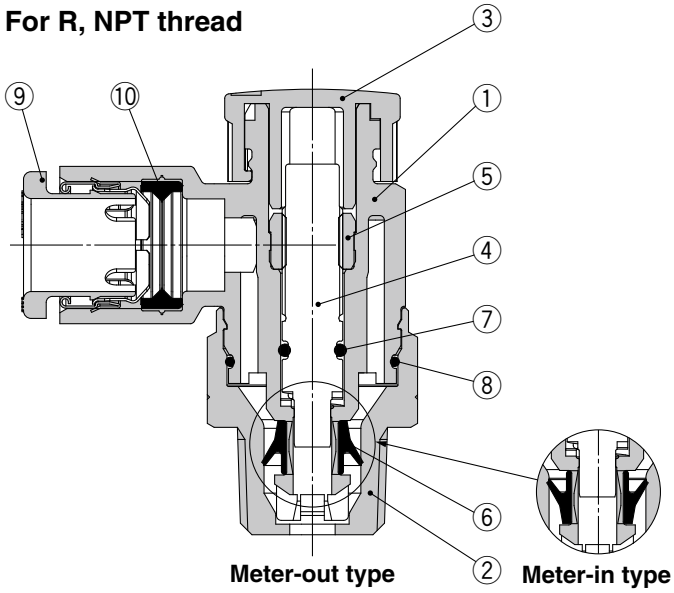
## Construction

### Elbow type

**Seal method: Gasket seal**
**For M5, 10-32UNF**




**Seal method: Sealant**
**For R, NPT thread**

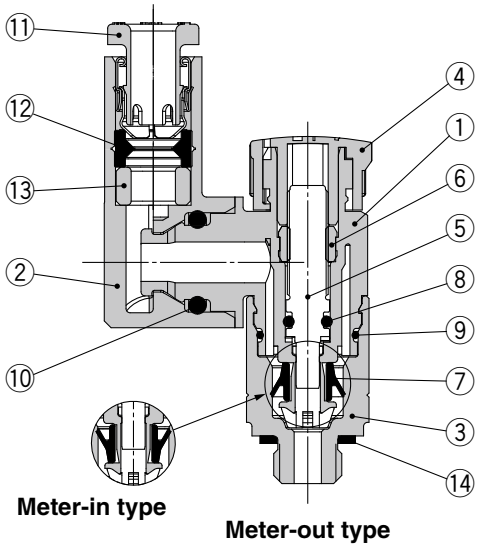



**Component Parts**

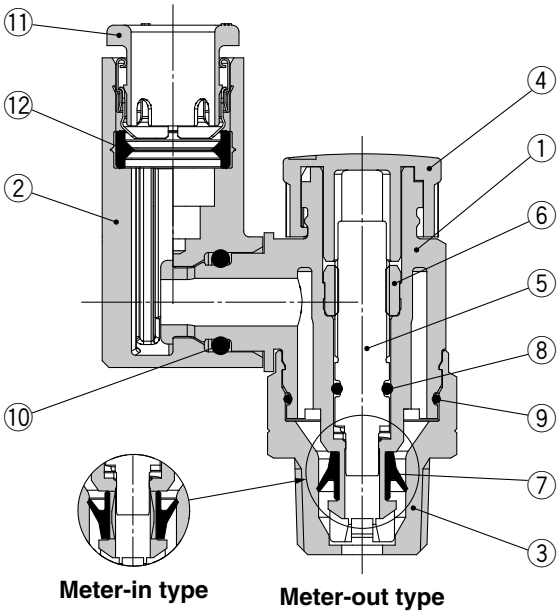
| No. | Description | Material | Note |
|---|---|---|---|
| 1 | **Body A** | PBT | |
| 2 | **Body B** | Brass | Electroless nickel plating |
| 3 | **Knob** | POM | |
| 4 | **Needle** | PBT | |
| 5 | **Needle guide** | Brass | Electroless nickel plating |
| 6 | **U-seal** | HNBR | |
| 7 | **O-ring** | NBR | |
| 8 | **O-ring** | NBR | |
| 9 | **Cassette** | — | |
| 10 | **Seal** | NBR | |
| 11 | **Gasket** | NBR/Stainless steel | |

### Universal type

**Seal method: Gasket seal**
**For M5, 10-32UNF**




**Seal method: Sealant**
**For R, NPT thread**



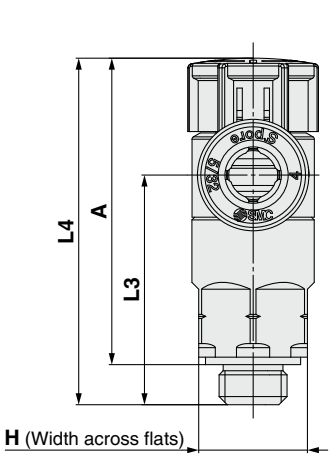

**Component Parts**

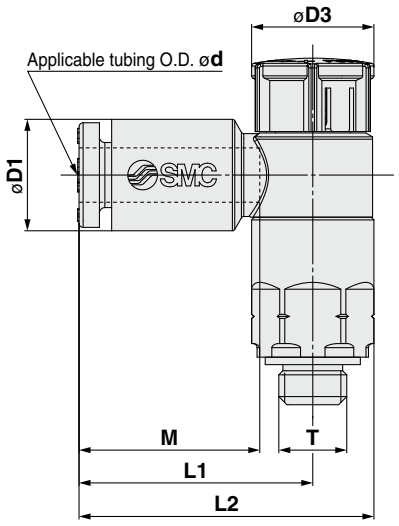
| No. | Description | Material | Note |
|---|---|---|---|
| 1 | **Body A** | PBT | |
| 2 | **Elbow body** | PBT | |
| 3 | **Body B** | Brass | Electroless nickel plating |
| 4 | **Knob** | POM | |
| 5 | **Needle** | PBT | |
| 6 | **Needle guide** | Brass | Electroless nickel plating |
| 7 | **U-seal** | HNBR | |
| 8 | **O-ring** | NBR | |
| 9 | **O-ring** | NBR | |
| 10 | **O-ring** | NBR | |
| 11 | **Cassette** | — | |
| 12 | **Seal** | NBR | |
| 13 | **Spacer** Note) | PBT | |
| 14 | **Gasket** | NBR/Stainless steel | |

Note) Spacer is included only for the applicable tubing O.D. ø3.2 and ø1/8".

## Dimensions/ Elbow type

**Seal method: Gasket seal**
**For M5, 10-32UNF**




### Metric Size

[mm]

| Model | d | T | H | D1 | D3 | L1 | L2 | L3 | L4 Note 1) | | A Note 2) | | M | Weight [g] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Unlocked | Locked | Unlocked | Locked | | |
| **AS12□1F-M5E-02A** | 2 | M5 x 0.8 10/32UNF | 8 | 5.8 | 9.4 | 15.8 | 20.3 | 16.9 | 26.5 | 25.4 | 23.5 | 22.4 | 11.9 | 5 |
| **AS12□1F-U10/32E-02A** | | | | | | | | | | | | | | |
| **AS12□1F-M5E-23A** | 3.2 | | | 7.2 | | 17.2 | 21.7 | | | | | | 13.3 | |
| **AS12□1F-U10/32E-23A** | | | | | | | | | | | | | | |
| **AS12□1F-M5E-04A** | 4 | | | 8.2 | | | | | | | | | | |
| **AS12□1F-U10/32E-04A** | | | | | | | | | | | | | | |
| **AS12□1F-M5E-06A** | 6 | | | 10.4 | | 18.6 | 23.1 | 16.5 | | | | | | 6 |
| **AS12□1F-U10/32E-06A** | | | | | | | | | | | | | | |

Note 1) Reference dimensions
Note 2) Reference dimensions of threads after installation

### Inch Size

[mm]

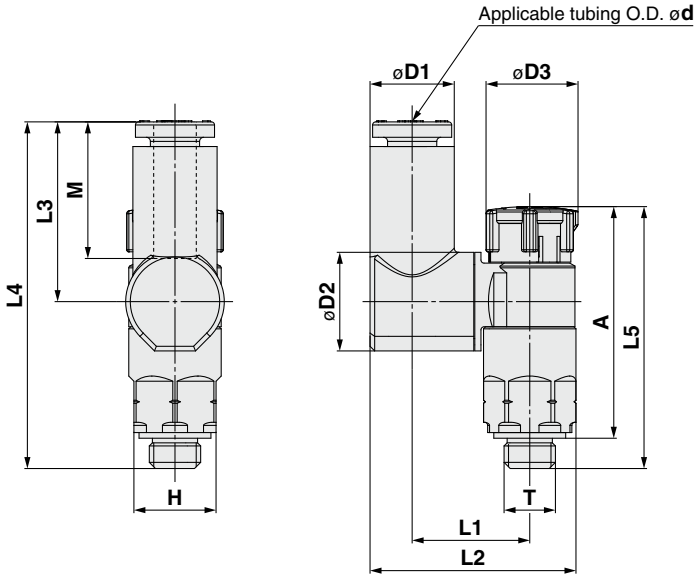
| Model | d | T | H | D1 | D3 | L1 | L2 | L3 | L4 Note 1) | | A Note 2) | | M | Weight [g] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Unlocked | Locked | Unlocked | Locked | | |
| **AS12□1F-M5E-01A** | 1/8" | M5 x 0.8 10/32UNF | 8 | 7.2 | 9.4 | 17.2 | 21.7 | 16.9 | 26.5 | 25.4 | 23.5 | 22.4 | 13.3 | 5 |
| **AS12□1F-U10/32E-01A** | | | | | | | | | | | | | | |
| **AS12□1F-M5E-03A** | 5/32" | | | 8.2 | | | | | | | | | | |
| **AS12□1F-U10/32E-03A** | | | | | | | | | | | | | | |
| **AS12□1F-M5E-07A** | 1/4" | | | 11.2 | | 18.6 | 23.1 | 16.5 | | | | | | 6 |
| **AS12□1F-U10/32E-07A** | | | | | | | | | | | | | | |

Note 1) Reference dimensions
Note 2) Reference dimensions of threads after installation



## Dimensions/ Universal type

**Seal method: Gasket seal**
**For M5, 10-32UNF**




### Metric Size

[mm]

| Model | d | T | H | D1 | D2 | D3 | L1 | L2 | L3 | L4 | L5 Note 1) | | A Note 2) | | M | Weight [g] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Unlocked | Locked | Unlocked | Locked | | |
| **AS13□1F-M5E-23A** | 3.2 | M5 x 0.8 10/32UNF | 8 | 7.2 | 9.6 | 9.4 | 11.6 | 19.4 | 17.5 | 33.8 | 26.5 | 25.4 | 23.5 | 22.4 | 13.3 | 6 |
| **AS13□1F-U10/32E-23A** | | | | | | | | | | | | | | | | |
| **AS13□1F-M5E-04A** | 4 | | | 8.2 | | | 11.5 | 19.8 | | | | | | | | |
| **AS13□1F-U10/32E-04A** | | | | | | | | | | | | | | | | |
| **AS13□1F-M5E-06A** | 6 | | | 10.4 | | | | 20.9 | 20.4 | 36.6 | | | | | | |
| **AS13□1F-U10/32E-06A** | | | | | | | | | | | | | | | | |

Note 1) Reference dimensions
Note 2) Reference dimensions of threads after installation

### Inch Size

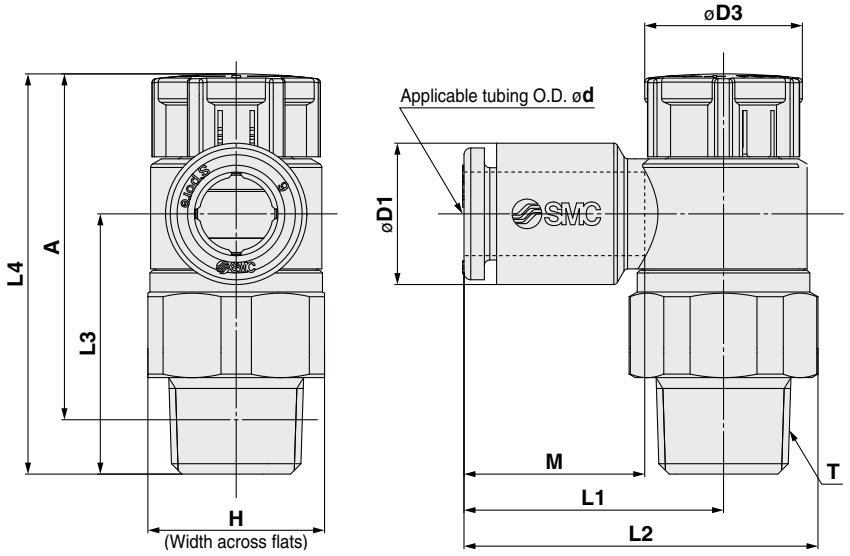
[mm]

| Model | d | T | H | D1 | D2 | D3 | L1 | L2 | L3 | L4 | L5 Note 1) | | A Note 2) | | M | Weight [g] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Unlocked | Locked | Unlocked | Locked | | |
| **AS13□1F-M5E-01A** | 1/8" | M5 x 0.8 10/32UNF | 8 | 7.2 | 9.6 | 9.4 | 11.6 | 19.4 | 17.5 | 33.8 | 26.5 | 25.4 | 23.5 | 22.4 | 13.3 | 6 |
| **AS13□1F-U10/32E-01A** | | | | | | | | | | | | | | | | |
| **AS13□1F-M5E-03A** | 5/32" | | | 8.2 | | | 11.5 | 19.8 | | | | | | | | |
| **AS13□1F-U10/32E-03A** | | | | | | | | | | | | | | | | |
| **AS13□1F-M5E-07A** | 1/4" | | | 11.2 | | | | 21.3 | 20.2 | 36.5 | | | | | | |
| **AS13□1F-U10/32E-07A** | | | | | | | | | | | | | | | | |

Note 1) Reference dimensions
Note 2) Reference dimensions of threads after installation

## Dimensions/ Elbow type

**Seal method: Sealant**
**For R, NPT thread**




### Metric Size

[mm]

| Model | d | T | H | D1 | D3 | L1 | L2 | L3 | L4 Note 1) | | A Note 2) | | M | Weight [g] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Unlocked | Locked | Unlocked | Locked | | |
| **AS22□1F-01-23(S)A** | 3.2 | 1/8 | 13 (12.7) | 7.2 | 12 | 19.1 | 26.2 | 19.1 | 30.6 | 29.2 | 27.5 | 26.1 | 13.3 | 9 (9) |
| **AS22□1F-01-04(S)A** | 4 | | | 8.2 | | | | | | | | | | |
| **AS22□1F-01-06(S)A** | 6 | | | 10.4 | | | | | | | | | | 10 (9) |
| **AS22□1F-01-08(S)A** | 8 | | | 13.2 | | 22.4 | 29.5 | | | | | | 14.2 | 11 (10) |
| **AS22□1F-01-10(S)A** | 10 | | | 15.9 | | 25.3 | 32.4 | | | | | | 15.6 | 12 (11) |
| **AS22□1F-02-23(S)A** | 3.2 | 1/4 | 17 (17.5) | 7.2 | 13 | 20.9 | 30.2 (30.3) | 22.6 | 36.6 | 35 | 31.1 | 29.5 | 13.3 | 18 (19) |
| **AS22□1F-02-04(S)A** | 4 | | | 8.2 | | | | | | | | | | |
| **AS22□1F-02-06(S)A** | 6 | | | 10.4 | | 23.4 | 32.7 (32.8) | | | | | | | |
| **AS22□1F-02-08(S)A** | 8 | | | 13.2 | | 23.9 | 33.2 (33.3) | | | | | | 14.2 | 19 (20) |
| **AS22□1F-02-10(S)A** | 10 | | | 15.9 | | 26.9 | 36.2 (36.3) | | | | | | 15.6 | 20 (21) |
| **AS32□1F-02-06(S)A** | 6 | 1/4 | 19 | 10.4 | 16.6 | 21.8 | 32.1 | 36.4 | 50 | 48.4 | 44.5 | 42.9 | 13.3 | 40 (40) |
| **AS32□1F-02-08(S)A** | 8 | | | 13.2 | | 22.7 | 33 | | | | | | 14.2 | 41 (41) |
| **AS32□1F-02-10(S)A** | 10 | | | 15.9 | | 26.7 | 37 | 35.7 | | | | | 15.6 | 42 (42) |
| **AS32□1F-02-12(S)A** | 12 | | | 18.5 | | 29.7 | 40 | 34.5 | | | | | 17 | 43 (43) |
| **AS32□1F-03-06(S)A** | 6 | 3/8 | 19 | 10.4 | 16.6 | 21.8 | 32.1 | 28.7 | 42.3 | 40.7 | 37.1 | 35.5 | 13.3 | 31 (32) |
| **AS32□1F-03-08(S)A** | 8 | | | 13.2 | | 22.7 | 33 | | | | | | 14.2 | |
| **AS32□1F-03-10(S)A** | 10 | | | 15.9 | | 26.7 | 37 | 28 | | | | | 15.6 | 32 (33) |
| **AS32□1F-03-12(S)A** | 12 | | | 18.5 | | 29.7 | 40 | 26.8 | | | | | 17 | 34 (35) |
| **AS42□1F-04-10(S)A** | 10 | 1/2 | 24 (23.8) | 15.9 | 18.8 | 27.4 | 40.3 (40.2) | 36.2 | 50.8 | 49.2 | 43.7 | 42.1 | 15.6 | 54 (53) |
| **AS42□1F-04-12(S)A** | 12 | | | 18.5 | | 30.8 | 43.7 (43.6) | 35.1 | | | | | 17 | 56 (55) |
| **AS42□1F-04-16(S)A** | 16 | | | 23.8 | | 34.8 | 47.7 (47.6) | 32.7 | | | | | 20.6 | 60 (59) |

Note 1) Reference dimensions Note 2) Reference dimensions of threads after installation Note 3) The values in ( ) are for NPT thread.

### Inch Size

[mm]

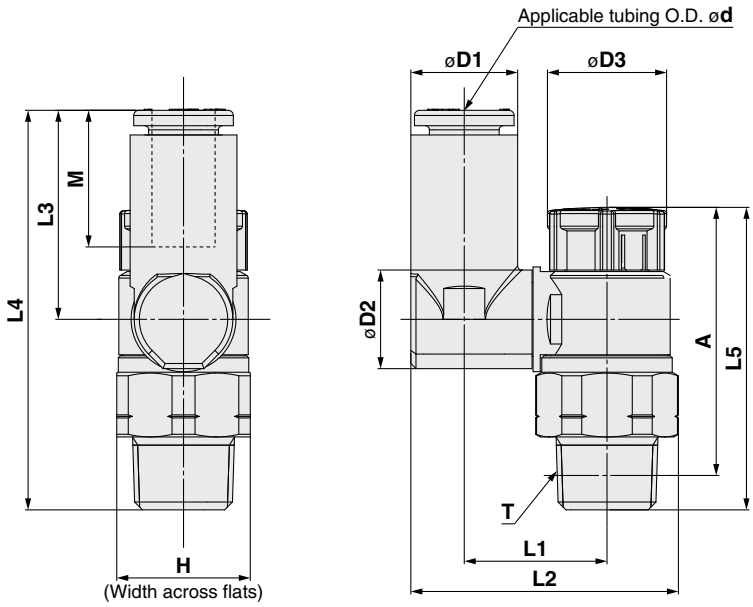
| Model | d | T | H | D1 | D3 | L1 | L2 | L3 | L4 Note 1) | | A Note 2) | | M | Weight [g] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Unlocked | Locked | Unlocked | Locked | | |
| **AS22□1F-01-01(S)A** | 1/8" | 1/8 | 13 (12.7) | 7.2 | 12 | 19.1 | 26.2 | 19.1 | 30.6 | 29.2 | 27.5 | 26.1 | 13.3 | 9 (9) |
| **AS22□1F-01-03(S)A** | 5/32" | | | 8.2 | | | | | | | | | | |
| **AS22□1F-01-07(S)A** | 1/4" | | | 11.2 | | 20.8 | 27.9 | | | | | | | 10 (9) |
| **AS22□1F-01-09(S)A** | 5/16" | | | 13.2 | | 22.4 | 29.5 | | | | | | 14.2 | 11 (10) |
| **AS22□1F-02-01(S)A** | 1/8" | 1/4 | 17 (17.5) | 7.2 | 13 | 20.9 | 30.2 (30.3) | 22.6 | 36.6 | 35 | 31.1 | 29.5 | 13.3 | 18 (19) |
| **AS22□1F-02-03(S)A** | 5/32" | | | 8.2 | | | | | | | | | | |
| **AS22□1F-02-07(S)A** | 1/4" | | | 11.2 | | 23.4 | 32.7 (32.8) | | | | | | | 19 (19) |
| **AS22□1F-02-09(S)A** | 5/16" | | | 13.2 | | 23.9 | 33.2 (33.3) | | | | | | 14.2 | 19 (20) |
| **AS22□1F-02-11(S)A** | 3/8" | | | 15.5 | | 26.4 | 35.7 (35.8) | | | | | | 15.6 | 20 (21) |
| **AS32□1F-02-07(S)A** | 1/4" | 1/4 | 19 | 11.2 | 16.6 | 21.8 | 32.1 | 36.4 | 50 | 48.4 | 44.5 | 42.9 | 13.3 | 40 (40) |
| **AS32□1F-02-09(S)A** | 5/16" | | | 13.2 | | 22.7 | 33 | | | | | | 14.2 | 41 (41) |
| **AS32□1F-02-11(S)A** | 3/8" | | | 15.5 | | 26.7 | 37 | 35.9 | | | | | 15.6 | |
| **AS32□1F-03-07(S)A** | 1/4" | 3/8 | 19 | 11.2 | 16.6 | 21.8 | 32.1 | 28.7 | 42.3 | 40.7 | 37.1 | 35.5 | 13.3 | 31 (32) |
| **AS32□1F-03-09(S)A** | 5/16" | | | 13.2 | | 22.7 | 33 | | | | | | 14.2 | |
| **AS32□1F-03-11(S)A** | 3/8" | | | 15.5 | | 26.7 | 37 | 28.2 | | | | | 15.6 | 32 (33) |
| **AS42□1F-04-11(S)A** | 3/8" | 1/2 | 24 (23.8) | 15.5 | 18.8 | 27.4 | 40.3 (40.2) | 36.2 | 50.8 | 49.2 | 43.7 | 42.1 | 15.6 | 54 (53) |
| **AS42□1F-04-13(S)A** | 1/2" | | | 19.3 | | 30.9 | 43.8 (43.7) | 34.7 | | | | | 17 | 56 (55) |

Note 1) Reference dimensions Note 2) Reference dimensions of threads after installation Note 3) The values in ( ) are for NPT thread.



## Dimensions/ Universal type

**Seal method: Sealant**
**For R, NPT thread**




### Metric Size

[mm]

| Model | d | T | H | D1 | D2 | D3 | L1 | L2 | L3 | L4 | L5 Note 1) Unlocked | L5 Note 1) Locked | A Note 2) Unlocked | A Note 2) Locked | M | Weight [g] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AS23□1F-01-23(S)A** | 3.2 | 1/8 | 13 (12.7) | 7.2 | 9.6 | 12 | 13.3 | 24 | 17.5 | 36 | 30.6 | 29.2 | 27.5 | 26.1 | 13.3 | 10 (10) |
| **AS23□1F-01-04(S)A** | 4 | | | 8.2 | | | 13.9 | 25.1 | | | | | | | | |
| **AS23□1F-01-06(S)A** | 6 | | | 10.4 | | | | 26.2 | 20.4 | 38.8 | | | | | | 11 (10) |
| **AS23□1F-01-08(S)A** | 8 | | | 13.2 | 10.2 | | 16.4 | 30.1 | 21.5 | 40 | | | | | 14.2 | 12 (12) |
| **AS23□1F-02-04(S)A** | 4 | 1/4 | 17 (17.5) | 8.2 | 12.9 | 13 | 16.5 | 29.9 (30) | 17.5 | 40.1 | 36.6 | 35 | 31.1 | 29.5 | 13.3 | 19 (20) |
| **AS23□1F-02-06(S)A** | 6 | | | 11.2 | | | 19 | 33.8 (33.9) | 21.4 | 43.9 | | | | | | 21 (22) |
| **AS23□1F-02-08(S)A** | 8 | | | 13.2 | | | | 34.9 (35) | 23.5 | 46 | | | | | 14.2 | 22 (22) |
| **AS23□1F-02-10(S)A** | 10 | | | 15.9 | | | 20.9 | 38.1 (38.2) | 24.7 | 47.3 | | | | | 15.6 | 23 (24) |
| **AS33□1F-02-06(S)A** | 6 | 1/4 | 19 | 11.2 | 12.9 | 16.6 | 20.2 | 36 | 21.4 | 57.8 | 50 | 48.4 | 44.5 | 42.9 | 13.3 | 42 (42) |
| **AS33□1F-02-08(S)A** | 8 | | | 13.2 | | | | 37.1 | 23.5 | 59.9 | | | | | 14.2 | 43 (43) |
| **AS33□1F-02-10(S)A** | 10 | | | 15.9 | 17.4 | | 23 | 41.2 | 26.1 | 62.5 | | | | | 15.6 | 46 (46) |
| **AS33□1F-02-12(S)A** | 12 | | | 18.5 | | | | 42.5 | 28.3 | 64.7 | | | | | 17 | 48 (48) |
| **AS33□1F-03-06(S)A** | 6 | 3/8 | 19 | 11.2 | 12.9 | 16.6 | 20.2 | 36 | 21.4 | 50.1 | 42.3 | 40.7 | 37.1 | 35.5 | 13.3 | 34 (35) |
| **AS33□1F-03-08(S)A** | 8 | | | 13.2 | | | | 37.1 | 23.5 | 52.2 | | | | | 14.2 | 35 (36) |
| **AS33□1F-03-10(S)A** | 10 | | | 15.9 | 17.4 | | 23 | 41.2 | 26.1 | 54.8 | | | | | 15.6 | 38 (39) |
| **AS33□1F-03-12(S)A** | 12 | | | 18.5 | | | | 42.5 | 28.3 | 57 | | | | | 17 | 40 (41) |
| **AS43□1F-04-10(S)A** | 10 | 1/2 | 24 (23.8) | 15.9 | 17.4 | 18.8 | 25.6 | 46.4 (46.3) | 26.1 | 61.2 | 50.8 | 49.2 | 43.7 | 42.1 | 15.6 | 61 (59) |
| **AS43□1F-04-12(S)A** | 12 | | | 18.5 | 21 | | 26.2 | 48.3 (48.2) | 28.3 | 63.4 | | | | | 17 | 64 (63) |

Note 1) Reference dimensions Note 2) Reference dimensions of threads after installation Note 3) The values in ( ) are for NPT thread.

### Inch Size

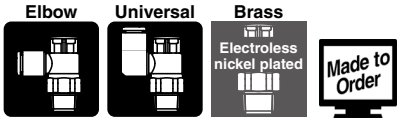
[mm]

| Model | d | T | H | D1 | D2 | D3 | L1 | L2 | L3 | L4 | L5 Note 1) Unlocked | L5 Note 1) Locked | A Note 2) Unlocked | A Note 2) Locked | M | Weight [g] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AS23□1F-01-01(S)A** | 1/8" | 1/8 | 13 (12.7) | 7.2 | 9.6 | 12 | 13.3 | 24 | 17.5 | 36 | 30.6 | 29.2 | 27.5 | 26.1 | 13.3 | 10 (10) |
| **AS23□1F-01-03(S)A** | 5/32" | | | 8.2 | | | 13.9 | 25.1 | | | | | | | | |
| **AS23□1F-01-07(S)A** | 1/4" | | | 11.2 | 10.2 | | 16.4 | 29.1 | 20.2 | 38.7 | | | | | | 11 (10) |
| **AS23□1F-01-09(S)A** | 5/16" | | | 13.2 | | | | 30.1 | 21.5 | 40 | | | | | 14.2 | 12 (12) |
| **AS23□1F-02-03(S)A** | 5/32" | 1/4 | 17 (17.5) | 8.2 | 12.9 | 13 | 16.5 | 29.9 (30) | 17.5 | 40.1 | 36.6 | 35 | 31.1 | 29.5 | 13.3 | 19 (20) |
| **AS23□1F-02-07(S)A** | 1/4" | | | 11.2 | | | 19 | 33.8 (33.9) | 21.4 | 43.9 | | | | | | 21 (22) |
| **AS23□1F-02-09(S)A** | 5/16" | | | 13.2 | | | | 34.9 (35) | 23.5 | 46 | | | | | 14.2 | 22 (22) |
| **AS23□1F-02-11(S)A** | 3/8" | | | 15.9 | | | 20.9 | 38.1 (38.2) | 24.7 | 47.3 | | | | | 15.6 | 23 (24) |
| **AS33□1F-02-07(S)A** | 1/4" | 3/8 | 19 | 11.2 | 12.9 | 16.6 | 20.2 | 36 | 21.4 | 57.8 | 50 | 48.4 | 44.5 | 42.9 | 13.3 | 42 (42) |
| **AS33□1F-02-09(S)A** | 5/16" | | | 13.2 | | | | 37.1 | 23.5 | 59.9 | | | | | 14.2 | 43 (43) |
| **AS33□1F-02-11(S)A** | 3/8" | | | 15.9 | 17.4 | | 23 | 41.2 | 26.1 | 62.5 | | | | | 15.6 | 46 (46) |
| **AS33□1F-03-07(S)A** | 1/4" | 3/8 | 19 | 11.2 | 12.9 | 16.6 | 20.2 | 36 | 21.4 | 50.1 | 42.3 | 40.7 | 37.1 | 35.5 | 13.3 | 34 (35) |
| **AS33□1F-03-09(S)A** | 5/16" | | | 13.2 | | | | 37.1 | 23.5 | 52.2 | | | | | 14.2 | 35 (36) |
| **AS33□1F-03-11(S)A** | 3/8" | | | 15.9 | 17.4 | | 23 | 41.2 | 26.1 | 54.8 | | | | | 15.6 | 38 (39) |
| **AS43□1F-04-11(S)A** | 3/8" | 1/2 | 24 (23.8) | 15.9 | 17.4 | 18.8 | 25.6 | 46.4 (46.3) | 26.1 | 61.2 | 50.8 | 49.2 | 43.7 | 42.1 | 15.6 | 61 (59) |
| **AS43□1F-04-13(S)A** | 1/2" | | | 18.5 | 21 | | 26.2 | 48.3 (48.2) | 28.3 | 63.4 | | | | | 17 | 64 (63) |

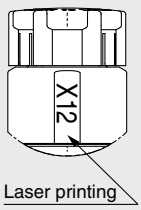
Note 1) Reference dimensions Note 2) Reference dimensions of threads after installation Note 3) The values in ( ) are for NPT thread.

# Made to Order

Please contact SMC for detailed dimensions, specifications and delivery.

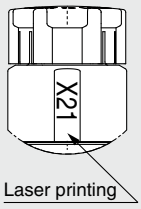



## 1 Lubricant: Vaseline -X12




**Example) AS2201F-01-04SA-X12**

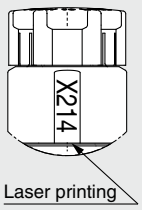
## 2 Grease-free (Seal: Fluorine-coated) + Restrictor (Without check valve) -X21




**Example) AS2201F-01-04SA-X21**

Note 1) Not particle-free
Note 2) The restrictor is only compatible with the part number of the meter-out type.
Note 3) Only the needle and O-ring are fluorine-coated.

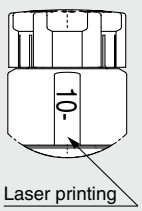
## 3 Restrictor (Without check valve) -X214




**Example) AS2201F-01-04SA-X214**

Note) The restrictor is only compatible with the part number of the meter-out type.

## 4 Clean Series 10-

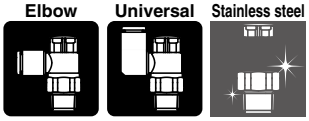



**Example) 10-AS2201F-01-04SA**

Note 1) Fluorine grease is used.
Note 2) The particulate generation grade is 3.
Note 3) Excluding G thread type.

# Speed Controller with One-touch Fitting
# Stainless Steel Type
# Elbow Type/Universal Type
# *Series AS-FG*

RoHS






## Model

| Model | | Port size | | Seal method | Applicable tubing O.D. | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Metric size | | | | | | | | Inch size | | | | | |
| Elbow type | Universal type | | | | 2 Note 2) | 3.2 | 4 | 6 | 8 | 10 | 12 | 16 | 1/8" | 5/32" | 1/4" | 5/16" | 3/8" | 1/2" |
| **AS12□1FG-M5** | **AS13□1FG-M5** | M5 x 0.8 | | Gasket seal | ● Note 3) | ● | ● | ● | | | | | ● | ● | ● | | | |
| **AS12□1FG-U10/32** | **AS13□1FG-U10/32** | 10-32UNF | | | ● Note 3) | ● | ● | ● | | | | | ● | ● | ● | | | |
| **AS22□1FG-□01** | **AS23□1FG-□01** | R NPT | 1/8 | Sealant Note 1) | | ● | ● | ● | ● | ● Note 3) | | | ● | ● | ● | ● | | |
| **AS22□1FG-□02** | **AS23□1FG-□02** | | 1/4 | | | ● Note 3) | ● | ● | ● | ● | | | ● Note 3) | ● | ● | ● | ● | |
| **AS32□1FG-□02** | **AS33□1FG-□02** | | 1/4 | | | | | ● | ● | ● | ● | | | | ● | ● | ● | |
| **AS32□1FG-□03** | **AS33□1FG-□03** | | 3/8 | | | | | ● | ● | ● | ● | | | | ● | ● | ● | |
| **AS42□1FG-□04** | **AS43□1FG-□04** | | 1/2 | | | | | | | ● | ● | ● Note 3) | | | | | ● | ● |
| **AS22□1FG-G01** | **AS23□1FG-G01** | G | 1/8 | Face seal | | ● | ● | ● | ● | ● Note 3) | | | | | | | | |
| **AS22□1FG-G02** | **AS23□1FG-G02** | | 1/4 | | | ● Note 3) | ● | ● | ● | ● | | | | | | | | |
| **AS32□1FG-G02** | **AS33□1FG-G02** | | 1/4 | | | | | ● | ● | ● | ● | | | | | | | |
| **AS32□1FG-G03** | **AS33□1FG-G03** | | 3/8 | | | | | ● | ● | ● | ● | | | | | | | |
| **AS42□1FG-G04** | **AS43□1FG-G04** | | 1/2 | | | | | | | ● | ● | ● Note 3) | | | | | | |

Note 1) "Without sealant" type can be selected as a standard option.
Note 2) Only polyurethane tubing is applicable for ø2.
Note 3) Universal type is not available.

**Flow Direction Symbols on Body**

| | Meter-out | Meter-in |
|---|---|---|
| Symbol |  |  |

## Specifications

| | |
|---|---|
| **Fluid** | Air |
| **Proof pressure** | 1.5 MPa |
| **Max. operating pressure** | 1 MPa |
| **Min. operating pressure** | 0.1 MPa |
| **Ambient and fluid temperature** | –5 to 60°C (No freezing) |
| **Applicable tubing material** | Nylon, Soft nylon, Polyurethane Note), FEP, PFA |

Note) Use caution at the max. operating pressure when using soft nylon or polyurethane tubing.
(Refer to the **WEB catalog** or the Best Pneumatics No. 6 for details.)

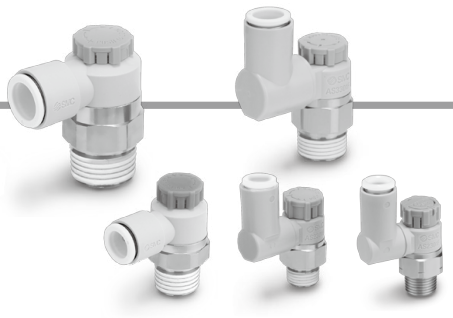
## ⚠ Caution

**Be sure to read this before handling. Refer to the back cover for Safety Instructions. For Flow Control Equipment Precautions, refer to "Handling Precautions for SMC Products" and the Operation Manual on SMC website, http://www.smcworld.com**

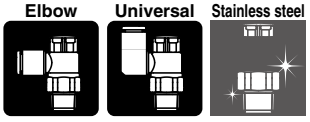
## Flow Rate and Sonic Conductance

| Model | | AS12□1FG-M5 AS13□1FG-M5 | AS22□1FG-□01 AS23□1FG-□01 | | | AS22□1FG-□02 AS23□1FG-□02 | | | | AS32□1FG AS33□1FG | | | AS42□1FG AS43□1FG | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tubing O.D. | Metric size | ø2 | ø3.2 | ø4 | ø6 | ø3.2 | ø4 | ø6 | ø8 | ø6 | ø8 | ø10 | ø10 | ø12 |
| | | | ø4 | | ø8 | | | | ø10 | | | ø12 | | ø16 |
| | | | ø6 | | ø10 | | | | | | | | | |
| | Inch size | — | ø1/8" | ø1/8" | ø5/32" | ø1/4" | ø1/8" | ø5/32" | — | ø1/4" | ø1/4" | ø3/8" | ø3/8" | ø1/2" |
| | | | ø1/4" | | | ø5/16" | | | | ø5/16" | ø5/16" | | | |
| | | | ø5/32" | | | ø3/8" | | | | | | | | |
| C values: Sonic conductance dm³/(s·bar) | Free flow | 0.2 | 0.3 | 0.4 | 0.6 | 0.6 | 0.7 | 1.0 | 1.3 | 1.5 | 1.6 | 1.7 | 2.5 | 4.4 | 4.8 |
| | Controlled flow | 0.2 | 0.3 | 0.4 | 0.7 | 0.8 | 0.6 | 0.9 | 1.3 | | 2.1 | 2.4 | 3.3 | 4.4 | 4.9 |
| b values: Critical pressure ratio | Free flow | 0.3 | 0.4 | 0.2 | | 0.3 | 0.3 | | 0.4 | | 0.4 | | 0.3 | 0.3 | |
| | Controlled flow | 0.2 | | 0.2 | | 0.3 | 0.3 | | | | 0.3 | | | 0.3 | |

Note 1) 10-32UNF has the same specification as M5.
Note 2) C and b values are for controlled flow with the needle fully open and free flow with the needle fully closed.



Elbow | Universal | Stainless steel



## How to Order

**Applicable tubing O.D.** Note1)

| Metric size | | Inch size | |
|---|---|---|---|
| 02 | ø2 | 01 | ø1/8" |
| 23 | ø3.2 Note 2) | 03 | ø5/32" |
| 04 | ø4 | 07 | ø1/4" |
| 06 | ø6 | | |

Note 1) For selecting applicable tubing O.D., refer to the "Model" on page 14. The color of the release button is white (metric, inch).
Note 2) Use ø1/8" tube.

**Body size**

| | |
|---|---|
| 1 | M5 x 0.8<br>10-32UNF |

**Port size**

| | |
|---|---|
| M5 | M5 x 0.8 |
| U10/32 | 10-32UNF |

**Body size 1**

AS 1 2 0 1 F G – M5 – 06 A –

**Body size 2/3/4**

AS 2 2 0 1 F G – 01 – 06 S A –

**Body size**

| | |
|---|---|
| 2 | 1/8, 1/4 |
| 3 | 3/8 |
| 4 | 1/2 |

**Type**

| | |
|---|---|
| 2 | Elbow |
| 3 | Universal |

**Control type** Note)

| | |
|---|---|
| 0 | Meter-out |
| 1 | Meter-in |

Note) Meter-out and meter-in types can be visually identified by color of the knob.
Meter-out: Gray
Meter-in: Light blue

**Stainless steel type (Stainless steel 303)**

Note 1) The material can be visually identified by color of the release button.
Stainless steel type: White
Note 2) White is also used for inch size.

**Thread type**

| | |
|---|---|
| Nil | R |
| N | NPT |
| G | G |

**Port size**

| | |
|---|---|
| 01 | 1/8 |
| 02 | 1/4 |
| 03 | 3/8 |
| 04 | 1/2 |

**Made to Order**
Refer to page 25 for details.

**Push-lock type**

**Seal method**

| | |
|---|---|
| Nil | Without sealant |
| S | With sealant |

Note) Face seal method is used for the G thread type.
Select "Nil/Without sealant."
Example) AS2201FG-G01-06A

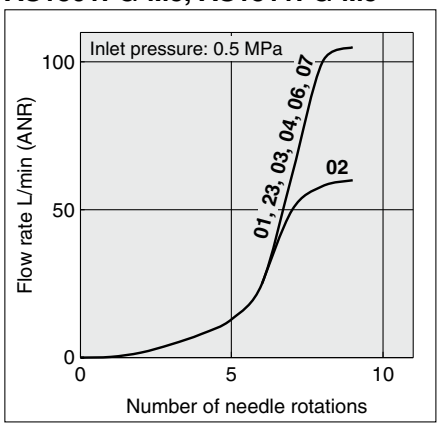
**Applicable tubing O.D.** Note1)

| Metric size | | Inch size Note 3) | |
|---|---|---|---|
| 23 | ø3.2 Note 2) | 01 | ø1/8" |
| 04 | ø4 | 03 | ø5/32" |
| 06 | ø6 | 07 | ø1/4" |
| 08 | ø8 | 09 | ø5/16" |
| 10 | ø10 | 11 | ø3/8" |
| 12 | ø12 | 13 | ø1/2" |
| 16 | ø16 | | |

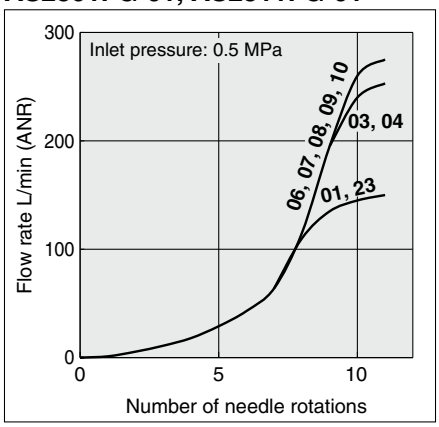
Note 1) For selecting applicable tubing O.D., refer to the "Model" on page 14. The color of the release button is white (metric, inch).
Note 2) Use ø1/8" tube.
Note 3) Only the metric size is available for the G thread type.

## Needle Valve/Flow-rate Characteristics

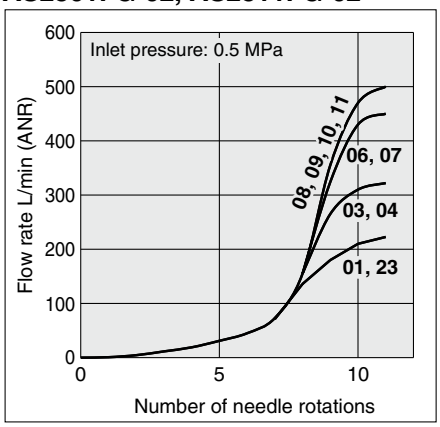
**AS1201FG-M5, AS1211FG-M5**
**AS1301FG-M5, AS1311FG-M5**




**AS2201FG-01, AS2211FG-01**
**AS2301FG-01, AS2311FG-01**

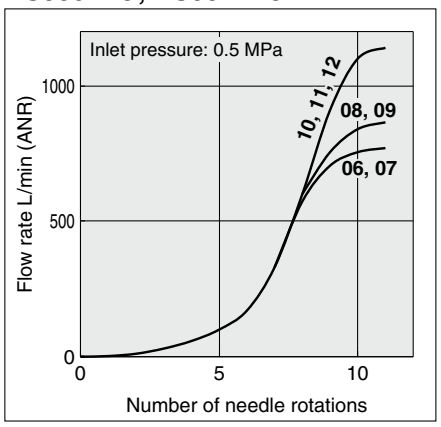



**AS2201FG-02, AS2211FG-02**
**AS2301FG-02, AS2311FG-02**

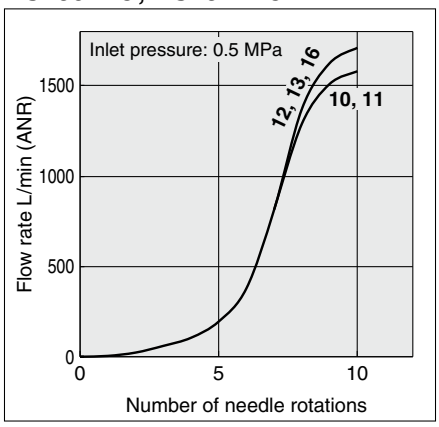



Note) -U10/32 has the same specification as M5.

**AS3201FG, AS3211FG**
**AS3301FG, AS3311FG**




**AS4201FG, AS4211FG**
**AS4301FG, AS4311FG**

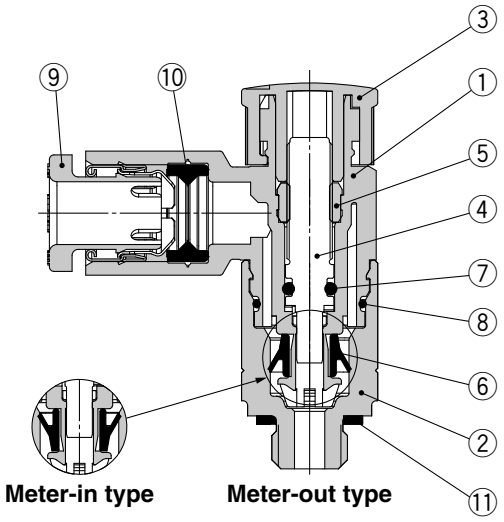



Note) The numbers above the flow-rate characteristic curves in the charts show the applicable tubing outside diameter as defined by the product number.

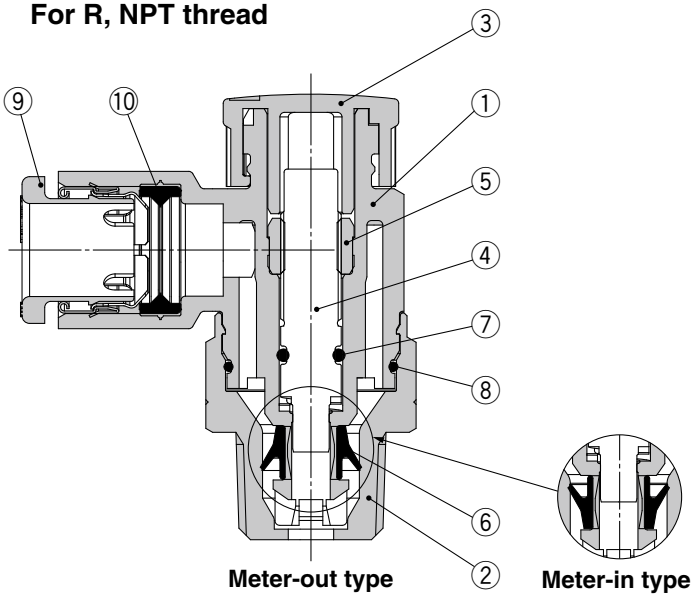
## Construction

### Elbow type

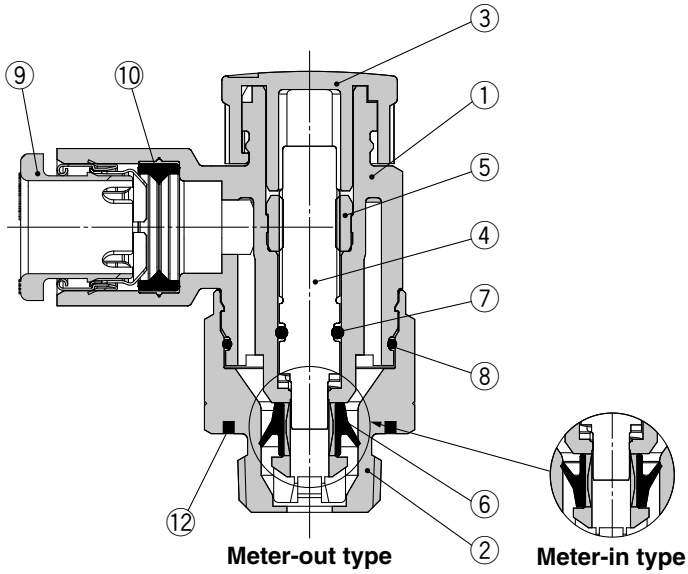
**Seal method: Gasket seal**
**For M5, 10-32UNF**




**Seal method: Sealant**
**For R, NPT thread**




**Seal method: Face seal**
**For G thread**



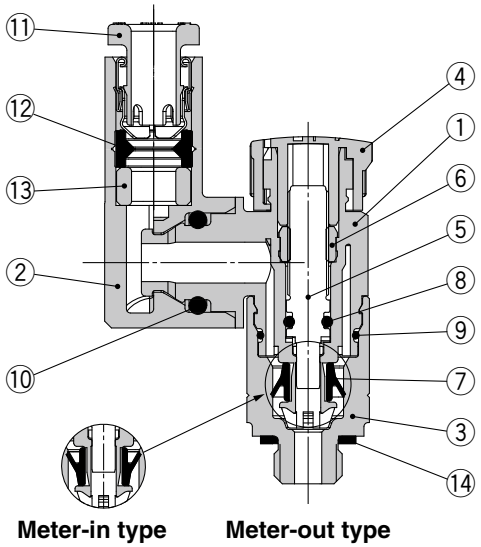

**Component Parts**

| No. | Description | Material | Note |
|---|---|---|---|
| 1 | **Body A** | PBT | |
| 2 | **Body B** | Stainless steel | |
| 3 | **Knob** | POM | |
| 4 | **Needle** | PBT | |
| 5 | **Needle guide** | Stainless steel | |
| 6 | **U-seal** | HNBR | |
| 7 | **O-ring** | NBR | |
| 8 | **O-ring** | NBR | |
| 9 | **Cassette** | — | |
| 10 | **Seal** | NBR | |
| 11 | **Gasket** | NBR/Stainless steel | |
| 12 | **Seal** | NBR | |

## Construction

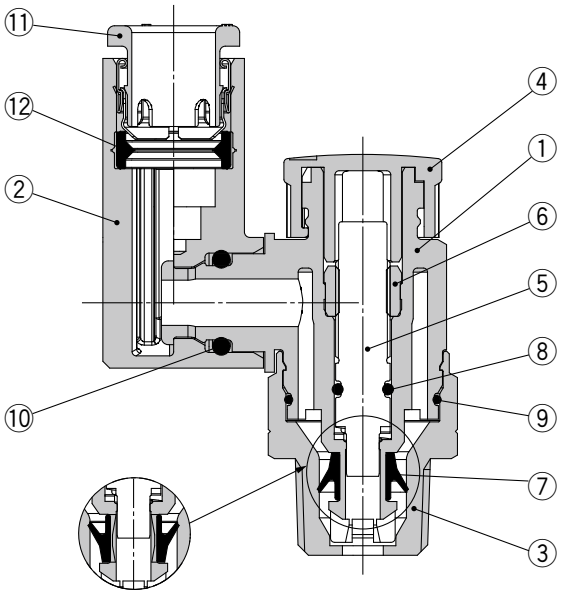
### Universal type

**Seal method: Gasket seal**
**For M5, 10-32UNF**



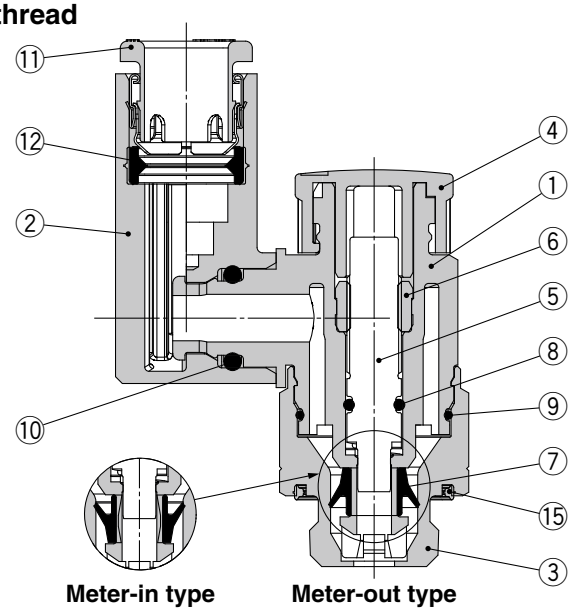

Meter-in type Meter-out type

**Seal method: Sealant**
**For R, NPT thread**




Meter-in type Meter-out type

**Seal method: Face seal**
**For G thread**




Meter-in type Meter-out type

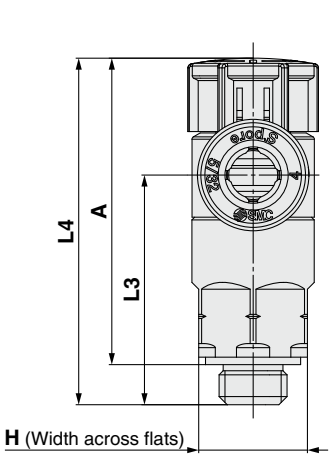
**Component Parts**

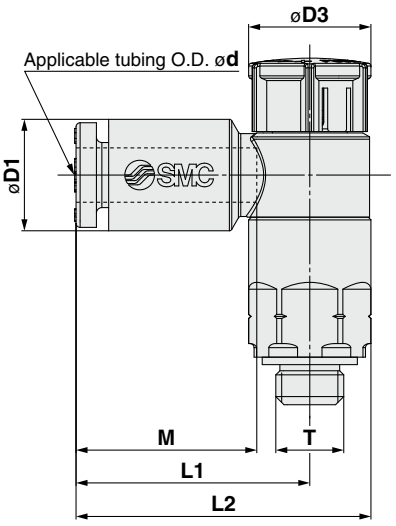
| No. | Description | Material | Note |
|---|---|---|---|
| 1 | **Body A** | PBT | |
| 2 | **Elbow body** | PBT | |
| 3 | **Body B** | Stainless steel | |
| 4 | **Knob** | POM | |
| 5 | **Needle** | PBT | |
| 6 | **Needle guide** | Stainless steel | |
| 7 | **U-seal** | HNBR | |
| 8 | **O-ring** | NBR | |
| 9 | **O-ring** | NBR | |
| 10 | **O-ring** | NBR | |
| 11 | **Cassette** | — | |
| 12 | **Seal** | NBR | |
| 13 | **Spacer** Note) | PBT | |
| 14 | **Gasket** | NBR/Stainless steel | |
| 15 | **Seal** | NBR | |

Note) Spacer is included only for the applicable tubing O.D. ø3.2 and ø1/8".

## Dimensions/ Elbow type

**Seal method: Gasket seal**
**For M5, 10-32UNF**




### Metric Size

[mm]

| Model | d | T | H | D1 | D3 | L1 | L2 | L3 | L4 Note 1) | | A Note 2) | | M | Weight [g] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Unlocked | Locked | Unlocked | Locked | | |
| **AS12□1FG-M5-02A** | 2 | M5 x 0.8 10/32UNF | 8 | 5.8 | 9.4 | 15.8 | 20.3 | 16.9 | 26.5 | 25.4 | 23.5 | 22.4 | 11.9 | 5 |
| **AS12□1FG-U10/32-02A** | | | | | | | | | | | | | | |
| **AS12□1FG-M5-23A** | 3.2 | | | 7.2 | | 17.2 | 21.7 | | | | | | 13.3 | |
| **AS12□1FG-U10/32-23A** | | | | | | | | | | | | | | |
| **AS12□1FG-M5-04A** | 4 | | | 8.2 | | | | | | | | | | |
| **AS12□1FG-U10/32-04A** | | | | | | | | | | | | | | |
| **AS12□1FG-M5-06A** | 6 | | | 10.4 | | 18.6 | 23.1 | 16.5 | | | | | | 6 |
| **AS12□1FG-U10/32-06A** | | | | | | | | | | | | | | |

Note 1) Reference dimensions
Note 2) Reference dimensions of threads after installation

### Inch Size

[mm]

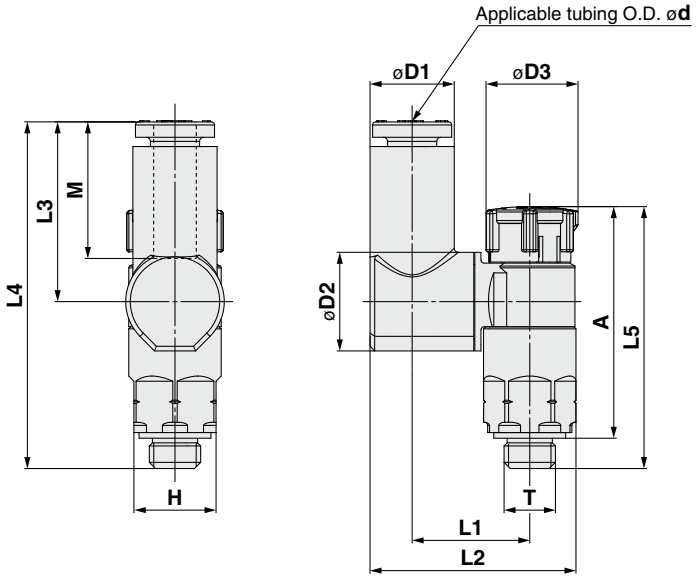
| Model | d | T | H | D1 | D3 | L1 | L2 | L3 | L4 Note 1) | | A Note 2) | | M | Weight [g] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Unlocked | Locked | Unlocked | Locked | | |
| **AS12□1FG-M5-01A** | 1/8" | M5 x 0.8 10/32UNF | 8 | 7.2 | 9.4 | 17.2 | 21.7 | 16.9 | 26.5 | 25.4 | 23.5 | 22.4 | 13.3 | 5 |
| **AS12□1FG-U10/32-01A** | | | | | | | | | | | | | | |
| **AS12□1FG-M5-03A** | 5/32" | | | 8.2 | | | | | | | | | | |
| **AS12□1FG-U10/32-03A** | | | | | | | | | | | | | | |
| **AS12□1FG-M5-07A** | 1/4" | | | 11.2 | | 18.6 | 23.1 | 16.5 | | | | | | 6 |
| **AS12□1FG-U10/32-07A** | | | | | | | | | | | | | | |

Note 1) Reference dimensions
Note 2) Reference dimensions of threads after installation



## Dimensions/ Universal type

**Seal method: Gasket seal**
**For M5, 10-32UNF**




### Metric Size

[mm]

| Model | d | T | H | D1 | D2 | D3 | L1 | L2 | L3 | L4 | L5 Note 1) | | A Note 2) | | M | Weight [g] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Unlocked | Locked | Unlocked | Locked | | |
| **AS13□1FG-M5-23A** | 3.2 | M5 x 0.8 10/32UNF | 8 | 7.2 | 9.6 | 9.4 | 11.6 | 19.7 | 17.5 | 33.8 | 26.5 | 25.4 | 23.5 | 22.4 | 13.3 | 6 |
| **AS13□1FG-U10/32-23A** | | | | | | | | | | | | | | | | |
| **AS13□1FG-M5-04A** | 4 | | | 8.2 | | | 11.5 | 20.1 | | | | | | | | |
| **AS13□1FG-U10/32-04A** | | | | | | | | | | | | | | | | |
| **AS13□1FG-M5-06A** | 6 | | | 10.4 | | | | 21.2 | 20.4 | 36.6 | | | | | | |
| **AS13□1FG-U10/32-06A** | | | | | | | | | | | | | | | | |

Note 1) Reference dimensions
Note 2) Reference dimensions of threads after installation

### Inch Size

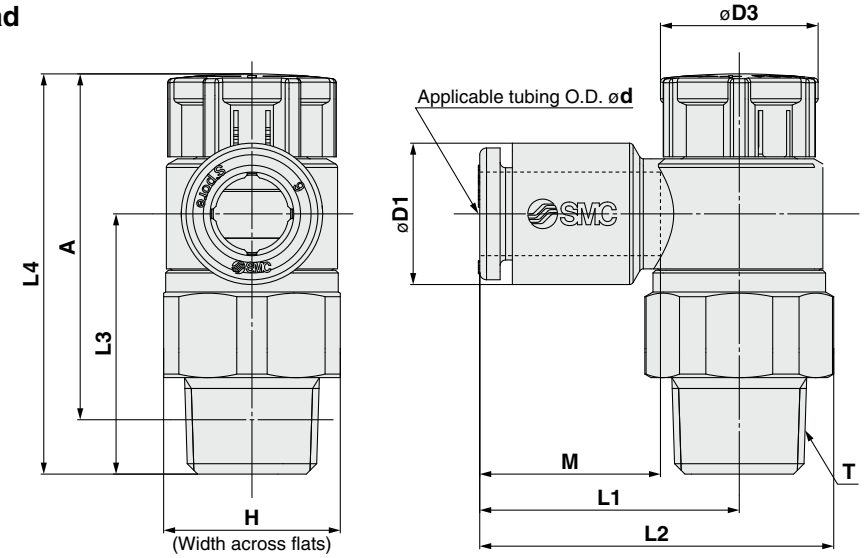
[mm]

| Model | d | T | H | D1 | D2 | D3 | L1 | L2 | L3 | L4 | L5 Note 1) | | A Note 2) | | M | Weight [g] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Unlocked | Locked | Unlocked | Locked | | |
| **AS13□1FG-M5-01A** | 1/8" | M5 x 0.8 10/32UNF | 8 | 7.2 | 9.6 | 9.4 | 11.6 | 19.7 | 17.5 | 33.8 | 26.5 | 25.4 | 23.5 | 22.4 | 13.3 | 6 |
| **AS13□1FG-U10/32-01A** | | | | | | | | | | | | | | | | |
| **AS13□1FG-M5-03A** | 5/32" | | | 8.2 | | | 11.5 | 20.1 | | | | | | | | |
| **AS13□1FG-U10/32-03A** | | | | | | | | | | | | | | | | |
| **AS13□1FG-M5-07A** | 1/4" | | | 11.2 | | | | 21.6 | 20.2 | 36.5 | | | | | | |
| **AS13□1FG-U10/32-07A** | | | | | | | | | | | | | | | | |

Note 1) Reference dimensions
Note 2) Reference dimensions of threads after installation

## Dimensions/ Elbow type

**Seal method: Sealant**
**For R, NPT thread**




### Metric Size

[mm]

| Model | d | T | H | D1 | D3 | L1 | L2 | L3 | L4 Note 1) | | A Note 1) | | M | Weight [g] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Unlocked | Locked | Unlocked | Locked | | |
| **AS22□1FG-01-23(S)A** | 3.2 | 1/8 | 13 (12.7) | 7.2 | 12 | 19.1 | 26.2 | 19.1 | 30.6 | 29.2 | 27.5 | 26.1 | 13.3 | 9 (9) |
| **AS22□1FG-01-04(S)A** | 4 | | | 8.2 | | | | | | | | | | |
| **AS22□1FG-01-06(S)A** | 6 | | | 10.4 | | | | | | | | | | 10 (9) |
| **AS22□1FG-01-08(S)A** | 8 | | | 13.2 | | 22.4 | 29.5 | | | | | | 14.2 | 11 (10) |
| **AS22□1FG-01-10(S)A** | 10 | | | 15.9 | | 25.3 | 32.4 | | | | | | 15.6 | 12 (11) |
| **AS22□1FG-02-23(S)A** | 3.2 | 1/4 | 17 (17.5) | 7.2 | 13 | 20.9 | 30.2 (30.3) | 22.6 | 36.6 | 35 | 31.1 | 29.5 | 13.3 | 17 (18) |
| **AS22□1FG-02-04(S)A** | 4 | | | 8.2 | | | | | | | | | | |
| **AS22□1FG-02-06(S)A** | 6 | | | 10.4 | | 23.4 | 32.7 (32.8) | | | | | | | |
| **AS22□1FG-02-08(S)A** | 8 | | | 13.2 | | 23.9 | 33.2 (33.3) | | | | | | 14.2 | 18 (19) |
| **AS22□1FG-02-10(S)A** | 10 | | | 15.9 | | 26.9 | 36.2 (36.3) | | | | | | 15.6 | 19 (20) |
| **AS32□1FG-02-06(S)A** | 6 | 1/4 | 19 | 10.4 | 16.6 | 21.8 | 32.1 | 36.4 | 50 | 48.4 | 44.5 | 42.9 | 13.3 | 40 (40) |
| **AS32□1FG-02-08(S)A** | 8 | | | 13.2 | | 22.7 | 33 | | | | | | 14.2 | 41 (41) |
| **AS32□1FG-02-10(S)A** | 10 | | | 15.9 | | 26.7 | 37 | 35.7 | | | | | 15.6 | 42 (42) |
| **AS32□1FG-02-12(S)A** | 12 | | | 18.5 | | 29.7 | 40 | 34.5 | | | | | 17 | 43 (43) |
| **AS32□1FG-03-06(S)A** | 6 | 3/8 | 19 | 10.4 | 16.6 | 21.8 | 32.1 | 28.7 | 42.3 | 40.7 | 37.1 | 35.5 | 13.3 | 29 (30) |
| **AS32□1FG-03-08(S)A** | 8 | | | 13.2 | | 22.7 | 33 | | | | | | 14.2 | |
| **AS32□1FG-03-10(S)A** | 10 | | | 15.9 | | 26.7 | 37 | 28 | | | | | 15.6 | 30 (31) |
| **AS32□1FG-03-12(S)A** | 12 | | | 18.5 | | 29.7 | 40 | 26.8 | | | | | 17 | 32 (33) |
| **AS42□1FG-04-10(S)A** | 10 | 1/2 | 24 (23.8) | 15.9 | 18.8 | 27.4 | 40.3 (40.2) | 36.2 | 50.8 | 49.2 | 43.7 | 42.1 | 15.6 | 52 (51) |
| **AS42□1FG-04-12(S)A** | 12 | | | 18.5 | | 30.8 | 43.7 (43.6) | 35.1 | | | | | 17 | 54 (53) |
| **AS42□1FG-04-16(S)A** | 16 | | | 23.8 | | 34.8 | 47.7 (47.6) | 32.7 | | | | | 20.6 | 58 (57) |

Note 1) Reference dimensions Note 2) Reference dimensions of threads after installation Note 3) The values in ( ) are for NPT thread.

### Inch Size

[mm]

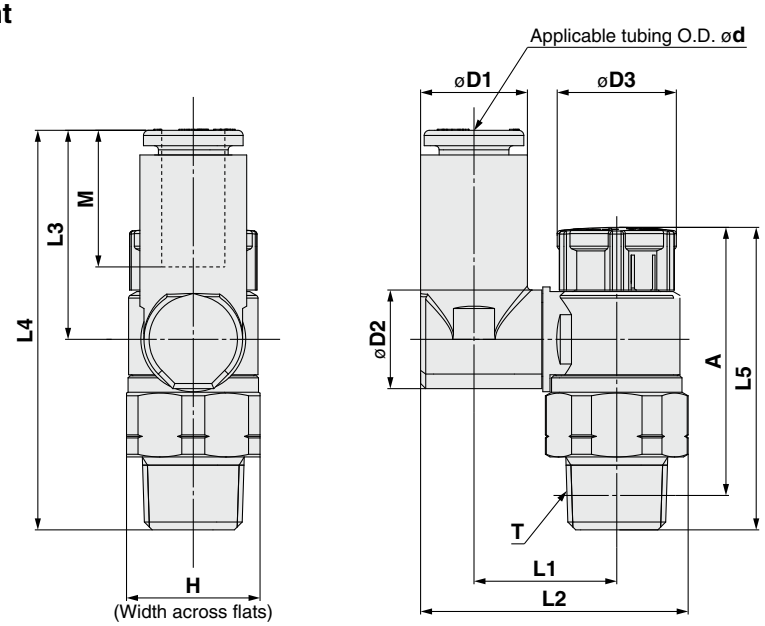
| Model | d | T | H | D1 | D3 | L1 | L2 | L3 | L4 Note 1) | | A Note 2) | | M | Weight [g] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Unlocked | Locked | Unlocked | Locked | | |
| **AS22□1FG-01-01(S)A** | 1/8" | 1/8 | 13 (12.7) | 7.2 | 12 | 19.1 | 26.2 | 19.1 | 30.6 | 29.2 | 27.5 | 26.1 | 13.3 | 9 (9) |
| **AS22□1FG-01-03(S)A** | 5/32" | | | 8.2 | | | | | | | | | | |
| **AS22□1FG-01-07(S)A** | 1/4" | | | 11.2 | | 20.8 | 27.9 | | | | | | | 10 (9) |
| **AS22□1FG-01-09(S)A** | 5/16" | | | 13.2 | | 22.4 | 29.5 | | | | | | 14.2 | 11 (10) |
| **AS22□1FG-02-01(S)A** | 1/8" | 1/4 | 17 (17.5) | 7.2 | 13 | 20.9 | 30.2 (30.3) | 22.6 | 36.6 | 35 | 31.1 | 29.5 | 13.3 | 17 (18) |
| **AS22□1FG-02-03(S)A** | 5/32" | | | 8.2 | | | | | | | | | | |
| **AS22□1FG-02-07(S)A** | 1/4" | | | 11.2 | | 23.4 | 32.7 (32.8) | | | | | | | 18 (18) |
| **AS22□1FG-02-09(S)A** | 5/16" | | | 13.2 | | 23.9 | 33.2 (33.3) | | | | | | 14.2 | 18 (19) |
| **AS22□1FG-02-11(S)A** | 3/8" | | | 15.5 | | 26.4 | 35.7 (35.8) | | | | | | 15.6 | 19 (20) |
| **AS32□1FG-02-07(S)A** | 1/4" | 1/4 | 19 | 11.2 | 16.6 | 21.8 | 32.1 | 36.4 | 50 | 48.4 | 44.5 | 42.9 | 13.3 | 40 (40) |
| **AS32□1FG-02-09(S)A** | 5/16" | | | 13.2 | | 22.7 | 33 | | | | | | 14.2 | 41 (41) |
| **AS32□1FG-02-11(S)A** | 3/8" | | | 15.5 | | 26.7 | 37 | 35.9 | | | | | 15.6 | |
| **AS32□1FG-03-07(S)A** | 1/4" | 3/8 | 19 | 11.2 | 16.6 | 21.8 | 32.1 | 28.7 | 42.3 | 40.7 | 37.1 | 35.5 | 13.3 | 29 (30) |
| **AS32□1FG-03-09(S)A** | 5/16" | | | 13.2 | | 22.7 | 33 | | | | | | 14.2 | |
| **AS32□1FG-03-11(S)A** | 3/8" | | | 15.5 | | 26.7 | 37 | 28.2 | | | | | 15.6 | 30 (31) |
| **AS42□1FG-04-11(S)A** | 3/8" | 1/2 | 24 (23.8) | 15.5 | 18.8 | 27.4 | 40.3 (40.2) | 36.2 | 50.8 | 49.2 | 43.7 | 42.1 | 15.6 | 52 (51) |
| **AS42□1FG-04-13(S)A** | 1/2" | | | 19.3 | | 30.9 | 43.8 (43.7) | 34.7 | | | | | 17 | 54 (53) |

Note 1) Reference dimensions Note 2) Reference dimensions of threads after installation Note 3) The values in ( ) are for NPT thread.



## Dimensions/ Universal type

**Seal method: Sealant**
**For R, NPT thread**




### Metric Size

[mm]

| Model | d | T | H | D1 | D2 | D3 | L1 | L2 | L3 | L4 | L5 Note 1) Unlocked | L5 Note 1) Locked | A Note 2) Unlocked | A Note 2) Locked | M | Weight [g] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AS23□1FG-01-23(S)A** | 3.2 | 1/8 | 13 (12.7) | 7.2 | 9.6 | 12 | 13.3 | 24 | 17.5 | 36 | 30.6 | 29.2 | 27.5 | 26.1 | 13.3 | 10 (9) |
| **AS23□1FG-01-04(S)A** | 4 | | | 8.2 | | | 13.9 | 25.1 | | | | | | | | 10 (10) |
| **AS23□1FG-01-06(S)A** | 6 | | | 10.4 | | | | 26.2 | 20.4 | 38.8 | | | | | | |
| **AS23□1FG-01-08(S)A** | 8 | | | 13.2 | 10.2 | | 16.4 | 30.1 | 21.5 | 40 | | | | | 14.2 | 12 (11) |
| **AS23□1FG-02-04(S)A** | 4 | 1/4 | 17 (17.5) | 8.2 | 12.9 | 13 | 16.5 | 29.9 (30) | 17.5 | 40.1 | 36.6 | 35 | 31.1 | 29.5 | 13.3 | 18 (19) |
| **AS23□1FG-02-06(S)A** | 6 | | | 11.2 | | | 19 | 33.8 (33.9) | 21.4 | 43.9 | | | | | | 20 (21) |
| **AS23□1FG-02-08(S)A** | 8 | | | 13.2 | | | | 34.9 (35) | 23.5 | 46 | | | | | 14.2 | 21 (22) |
| **AS23□1FG-02-10(S)A** | 10 | | | 15.9 | | | 20.9 | 38.1 (38.2) | 24.7 | 47.3 | | | | | 15.6 | 23 (23) |
| **AS33□1FG-02-06(S)A** | 6 | 1/4 | 19 | 11.2 | 12.9 | 16.6 | 20.2 | 36 | 21.4 | 57.8 | 50 | 48.4 | 44.5 | 42.9 | 13.3 | 42 (42) |
| **AS33□1FG-02-08(S)A** | 8 | | | 13.2 | | | | 37.1 | 23.5 | 59.9 | | | | | 14.2 | 43 (43) |
| **AS33□1FG-02-10(S)A** | 10 | | | 15.9 | 17.4 | | 23 | 41.2 | 26.1 | 62.5 | | | | | 15.6 | 46 (46) |
| **AS33□1FG-02-12(S)A** | 12 | | | 18.5 | | | | 42.5 | 28.3 | 64.7 | | | | | 17 | 48 (48) |
| **AS33□1FG-03-06(S)A** | 6 | 3/8 | 19 | 11.2 | 12.9 | 16.6 | 20.2 | 36 | 21.4 | 50.1 | 42.3 | 40.7 | 37.1 | 35.5 | 13.3 | 32 (33) |
| **AS33□1FG-03-08(S)A** | 8 | | | 13.2 | | | | 37.1 | 23.5 | 52.2 | | | | | 14.2 | 33 (34) |
| **AS33□1FG-03-10(S)A** | 10 | | | 15.9 | 17.4 | | 23 | 41.2 | 26.1 | 54.8 | | | | | 15.6 | 37 (38) |
| **AS33□1FG-03-12(S)A** | 12 | | | 18.5 | | | | 42.5 | 28.3 | 57 | | | | | 17 | 38 (39) |
| **AS43□1FG-04-10(S)A** | 10 | 1/2 | 24 (23.8) | 15.9 | 17.4 | 18.8 | 25.6 | 46.4 (46.3) | 26.1 | 61.2 | 50.8 | 49.2 | 43.7 | 42.1 | 15.6 | 58 (57) |
| **AS43□1FG-04-12(S)A** | 12 | | | 18.5 | 21 | | 26.2 | 48.3 (48.2) | 28.3 | 63.4 | | | | | 17 | 62 (61) |

Note 1) Reference dimensions Note 2) Reference dimensions of threads after installation Note 3) The values in ( ) are for NPT thread.

### Inch Size

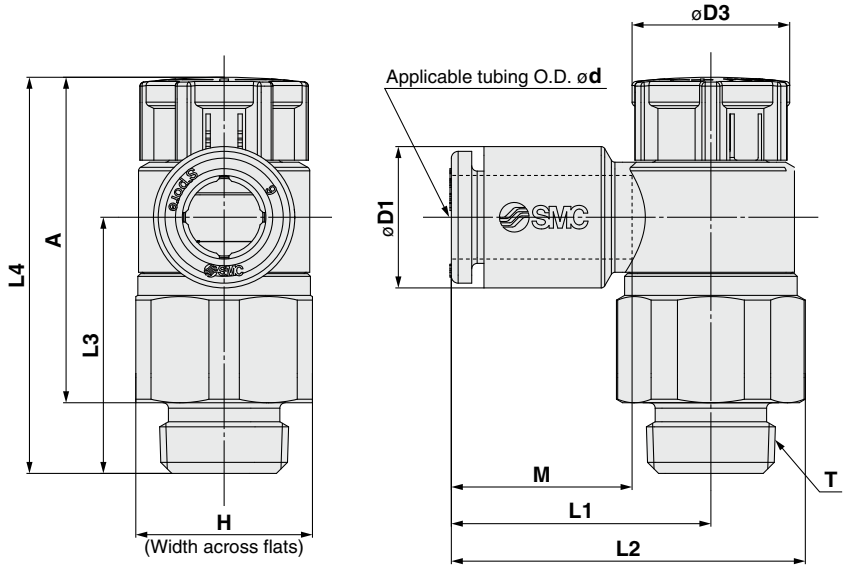
[mm]

| Model | d | T | H | D1 | D2 | D3 | L1 | L2 | L3 | L4 | L5 Note 1) Unlocked | L5 Note 1) Locked | A Note 2) Unlocked | A Note 2) Locked | M | Weight [g] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AS23□1FG-01-01(S)A** | 1/8" | 1/8 | 13 (12.7) | 7.2 | 9.6 | 12 | 13.3 | 24 | 17.5 | 36 | 30.6 | 29.2 | 27.5 | 26.1 | 13.3 | 10 (9) |
| **AS23□1FG-01-03(S)A** | 5/32" | | | 8.2 | | | 13.9 | 25.1 | | | | | | | | 10 (10) |
| **AS23□1FG-01-07(S)A** | 1/4" | | | 11.2 | 10.2 | | 16.4 | 29.1 | 20.2 | 38.7 | | | | | | 11 (10) |
| **AS23□1FG-01-09(S)A** | 5/16" | | | 13.2 | | | | 30.1 | 21.5 | 40 | | | | | 14.2 | 12 (11) |
| **AS23□1FG-02-03(S)A** | 5/32" | 1/4 | 17 (17.5) | 8.2 | 12.9 | 13 | 16.5 | 29.9 (30) | 17.5 | 40.1 | 36.6 | 35 | 31.1 | 29.5 | 13.3 | 18 (19) |
| **AS23□1FG-02-07(S)A** | 1/4" | | | 11.2 | | | 19 | 33.8 (33.9) | 21.4 | 43.9 | | | | | | 20 (21) |
| **AS23□1FG-02-09(S)A** | 5/16" | | | 13.2 | | | | 34.9 (35) | 23.5 | 46 | | | | | 14.2 | 21 (22) |
| **AS23□1FG-02-11(S)A** | 3/8" | | | 15.9 | | | 20.9 | 38.1 (38.2) | 24.7 | 47.3 | | | | | 15.6 | 23 (23) |
| **AS33□1FG-02-07(S)A** | 1/4" | 3/8 | 19 | 11.2 | 12.9 | 16.6 | 20.2 | 36 | 21.4 | 57.8 | 50 | 48.4 | 44.5 | 42.9 | 13.3 | 42 (42) |
| **AS33□1FG-02-09(S)A** | 5/16" | | | 13.2 | | | | 37.1 | 23.5 | 59.9 | | | | | 14.2 | 43 (43) |
| **AS33□1FG-02-11(S)A** | 3/8" | | | 15.9 | 17.4 | | 23 | 41.2 | 26.1 | 62.5 | | | | | 15.6 | 46 (46) |
| **AS33□1FG-03-07(S)A** | 1/4" | 3/8 | 19 | 11.2 | 12.9 | 16.6 | 20.2 | 36 | 21.4 | 50.1 | 42.3 | 40.7 | 37.1 | 35.5 | 13.3 | 32 (33) |
| **AS33□1FG-03-09(S)A** | 5/16" | | | 13.2 | | | | 37.1 | 23.5 | 52.2 | | | | | 14.2 | 33 (34) |
| **AS33□1FG-03-11(S)A** | 3/8" | | | 15.9 | 17.4 | | 23 | 41.2 | 26.1 | 54.8 | | | | | 15.6 | 37 (38) |
| **AS43□1FG-04-11(S)A** | 3/8" | 1/2 | 24 (23.8) | 15.9 | 17.4 | 18.8 | 25.6 | 46.4 (46.3) | 26.1 | 61.2 | 50.8 | 49.2 | 43.7 | 42.1 | 15.6 | 58 (57) |
| **AS43□1FG-04-13(S)A** | 1/2" | | | 18.5 | 21 | | 26.2 | 48.3 (48.2) | 28.3 | 63.4 | | | | | 17 | 61 (60) |

Note 1) Reference dimensions Note 2) Reference dimensions of threads after installation Note 3) The values in ( ) are for NPT thread.

## Dimensions/ Elbow type

**Seal method: Face seal**
**For G thread**



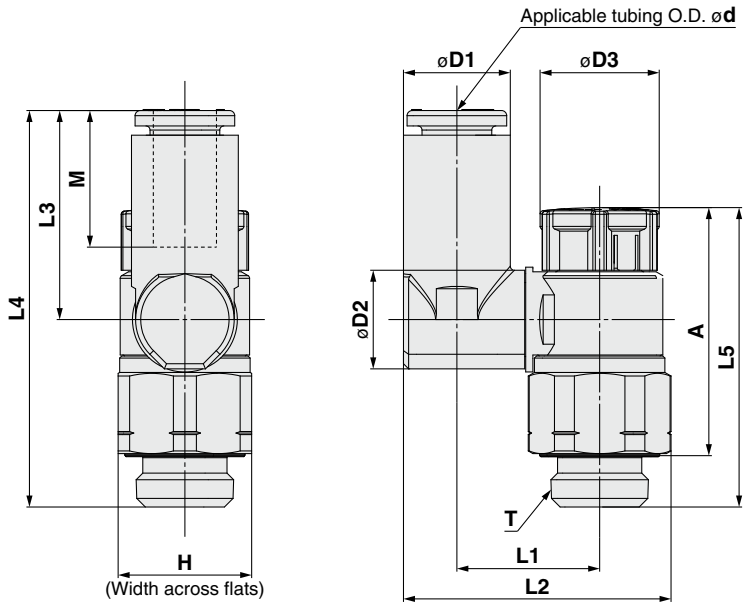

**Metric Size** [mm]

| Model | d | T | H | D1 | D3 | L1 | L2 | L3 | L4 | | A | | M | Weight [g] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Unlocked | Locked | Unlocked | Locked | | |
| **AS22□1FG-G01-23A** | 3.2 | 1/8 | 13 | 7.2 | 12 | 19.1 | 26.2 | 18.8 | 30.3 | 28.9 | 24.8 | 23.4 | 13.3 | 10 |
| **AS22□1FG-G01-04A** | 4 | | | 8.2 | | | | | | | | | | |
| **AS22□1FG-G01-06A** | 6 | | | 10.4 | | | | | | | | | | |
| **AS22□1FG-G01-08A** | 8 | | | 13.2 | | 22.4 | 29.5 | | | | | | 14.2 | 11 |
| **AS22□1FG-G01-10A** | 10 | | | 15.9 | | 25.3 | 32.4 | | | | | | 15.6 | 12 |
| **AS22□1FG-G02-23A** | 3.2 | 1/4 | 17 | 7.2 | 13 | 20.9 | 30.2 | 22.6 | 36.6 | 35 | 30.1 | 28.5 | 13.3 | 20 |
| **AS22□1FG-G02-04A** | 4 | | | 8.2 | | | | | | | | | | |
| **AS22□1FG-G02-06A** | 6 | | | 10.4 | | 23.4 | 32.7 | | | | | | | |
| **AS22□1FG-G02-08A** | 8 | | | 13.2 | | 23.9 | 33.2 | | | | | | 14.2 | 21 |
| **AS22□1FG-G02-10A** | 10 | | | 15.9 | | 26.9 | 36.2 | | | | | | 15.6 | 22 |
| **AS32□1FG-G02-06A** | 6 | 1/4 | 21 | 10.4 | 16.6 | 21.8 | 33 | 36.4 | 50 | 48.4 | 43.5 | 41.9 | 13.3 | 50 |
| **AS32□1FG-G02-08A** | 8 | | | 13.2 | | 22.7 | 33.9 | | | | | | 14.2 | |
| **AS32□1FG-G02-10A** | 10 | | | 15.9 | | 26.7 | 37.9 | 35.7 | | | | | 15.6 | 52 |
| **AS32□1FG-G02-12A** | 12 | | | 18.5 | | 29.7 | 40.9 | 34.5 | | | | | 17 | 53 |
| **AS32□1FG-G03-06A** | 6 | 3/8 | 21 | 10.4 | 16.6 | 21.8 | 33 | 28.7 | 42.3 | 40.7 | 34.8 | 33.2 | 13.3 | 37 |
| **AS32□1FG-G03-08A** | 8 | | | 13.2 | | 22.7 | 33.9 | | | | | | 14.2 | 38 |
| **AS32□1FG-G03-10A** | 10 | | | 15.9 | | 26.7 | 37.9 | 28 | | | | | 15.6 | 39 |
| **AS32□1FG-G03-12A** | 12 | | | 18.5 | | 29.7 | 40.9 | 26.8 | | | | | 17 | 41 |
| **AS42□1FG-G04-10A** | 10 | 1/2 | 27 | 15.9 | 18.8 | 27.4 | 41.8 | 36.2 | 50.8 | 49.2 | 41.8 | 40.2 | 15.6 | 69 |
| **AS42□1FG-G04-12A** | 12 | | | 18.5 | | 30.8 | 45.2 | 35.1 | | | | | 17 | 71 |
| **AS42□1FG-G04-16A** | 16 | | | 23.8 | | 34.8 | 49.2 | 32.7 | | | | | 20.6 | 75 |



## Dimensions/ Universal type

**Seal method: Face seal**
**For G thread**



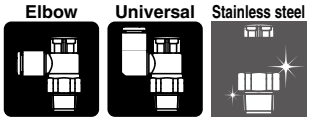

**Metric Size**

[mm]

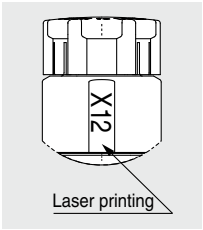
| Model | d | T | H | D1 | D2 | D3 | L1 | L2 | L3 | L4 | L5 | | A | | M | Weight [g] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Unlocked | Locked | Unlocked | Locked | | |
| **AS23□1FG-G01-23A** | 3.2 | 1/8 | 13 | 7.2 | 9.6 | 12 | 13.3 | 24.0 | 17.5 | 35.7 | 30.3 | 28.9 | 24.8 | 23.4 | 13.3 | 10 |
| **AS23□1FG-G01-04A** | 4 | | | 8.2 | | | 13.9 | 25.1 | | | | | | | | 10 |
| **AS23□1FG-G01-06A** | 6 | | | 10.4 | | | | 26.2 | 20.4 | 38.5 | | | | | | 11 |
| **AS23□1FG-G01-08A** | 8 | | | 13.2 | 10.2 | | 16.4 | 30.1 | 21.5 | 39.7 | | | | | 14.2 | 12 |
| **AS23□1FG-G02-04A** | 4 | 1/4 | 17 | 8.2 | 12.9 | 13 | 16.5 | 29.9 | 17.5 | 40.1 | 36.6 | 35 | 30.1 | 28.5 | 13.3 | 21 |
| **AS23□1FG-G02-06A** | 6 | | | 10.4 | | | 19 | 33.8 | 21.4 | 43.9 | | | | | | 23 |
| **AS23□1FG-G02-08A** | 8 | | | 13.2 | | | | 34.9 | 23.5 | 46.0 | | | | | 14.2 | 24 |
| **AS23□1FG-G02-10A** | 10 | | | 15.9 | | | 20.9 | 38.1 | 24.7 | 47.3 | | | | | 15.6 | 25 |
| **AS33□1FG-G02-06A** | 6 | 1/4 | 21 | 10.4 | 12.9 | 16.6 | 20.2 | 36.6 | 21.4 | 57.8 | 50 | 48.4 | 43.5 | 41.9 | 13.3 | 51 |
| **AS33□1FG-G02-08A** | 8 | | | 13.2 | | | | 38.0 | 23.5 | 59.9 | | | | | 14.2 | 52 |
| **AS33□1FG-G02-10A** | 10 | | | 15.9 | 17.4 | | 23 | 42.2 | 26.1 | 58.0 | | | | | 15.6 | 55 |
| **AS33□1FG-G02-12A** | 12 | | | 18.5 | | | | 43.5 | 28.3 | 59.9 | | | | | 17 | 57 |
| **AS33□1FG-G03-06A** | 6 | 3/8 | 21 | 10.4 | 12.9 | 16.6 | 20.2 | 36.6 | 21.4 | 50.1 | 42.3 | 40.7 | 34.8 | 33.2 | 13.3 | 40 |
| **AS33□1FG-G03-08A** | 8 | | | 13.2 | | | | 38.0 | 23.5 | 52.2 | | | | | 14.2 | 41 |
| **AS33□1FG-G03-10A** | 10 | | | 15.9 | 17.4 | | 23 | 42.2 | 26.1 | 50.3 | | | | | 15.6 | 44 |
| **AS33□1FG-G03-12A** | 12 | | | 18.5 | | | | 43.5 | 28.3 | 52.2 | | | | | 17 | 46 |
| **AS43□1FG-G04-10A** | 10 | 1/2 | 27 | 15.9 | 17.4 | 18.8 | 25.6 | 47.9 | 26.1 | 61.2 | 50.8 | 49.2 | 41.8 | 40.2 | 15.6 | 75 |
| **AS43□1FG-G04-12A** | 12 | | | 18.5 | 21 | | 26.2 | 49.8 | 28.3 | 63.4 | | | | | 17 | 79 |

# Made to Order

Please contact SMC for detailed dimensions, specifications and delivery.

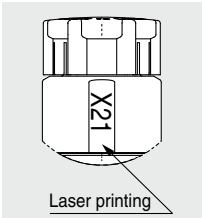



## 1 Lubricant: Vaseline -X12




**Example) AS2201FG-01-04SA-X12**

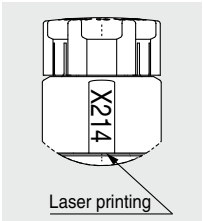
## 2 Grease-free (Seal: Fluorine-coated) + Restrictor (Without check valve) -X21




**Example) AS2201FG-01-04SA-X21**

Note 1) Not particle-free
Note 2) The restrictor is only compatible with the part number of the meter-out type.

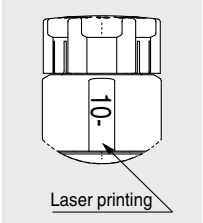
## 3 Restrictor (Without check valve) -X214




**Example) AS2201FG-01-04SA-X214**

Note) The restrictor is only compatible with the part number of the meter-out type.

## 4 Clean Series 10-




**Example) 10-AS2201FG-01-04SA**

Note 1) Fluorine grease is used.
Note 2) The particulate generation grade is 3.
Note 3) Excluding G thread type.

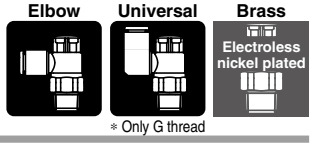
# Speed Controller with One-touch Fitting

**Face Seal**

## Elbow Type/Universal Type

# *Series AS*

RoHS




∗ Only G thread

## Model

| Model | | Port size | | Seal method | Applicable tubing O.D. | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Metric size | | | | | | | Inch size | | | | | | |
| Elbow type | Universal type | | | | 3.2 | 4 | 6 | 8 | 10 | 12 | 16 | 1/8" | 5/32" | 1/4" | 5/16" | 3/8" | 1/2" |
| **AS22□1F-G01** | **AS23□1F-G01** | G | 1/8 | Face seal | ● | ● | ● | ● | ● Note) | | | | | | | | |
| **AS22□1F-G02** | **AS23□1F-G02** | | 1/4 | | ● Note) | ● | ● | ● | ● | | | | | | | | |
| **AS32□1F-G02** | **AS33□1F-G02** | | 1/4 | | | | ● | ● | ● | ● | | | | | | | |
| **AS32□1F-G03** | **AS33□1F-G03** | | 3/8 | | | | ● | ● | ● | ● | | | | | | | |
| **AS42□1F-G04** | **AS43□1F-G04** | | 1/2 | | | | | | ● | ● | ● Note) | | | | | | |
| **AS22□1F-01-□PA** | — | R NPT | 1/8 | Face seal | ● | ● | ● | ● | ● | | | ● | ● | ● | ● | | |
| **AS22□1F-02-□PA** | — | | 1/4 | | ● | ● | ● | ● | ● | | | ● | ● | ● | ● | ● | |
| **AS32□1F-03-□PA** | — | | 3/8 | | | | ● | ● | ● | ● | | | | ● | ● | ● | |
| **AS42□1F-04-□PA** | — | | 1/2 | | | | | | ● | ● | | | | | | ● | ● |

Note) Universal type is not available.

### Flow Direction Symbols on Body

| | Meter-out | Meter-in |
|---|---|---|
| Symbol |  |  |

## Specifications

| | |
|---|---|
| **Fluid** | Air |
| **Proof pressure** | 1.5 MPa |
| **Max. operating pressure** | 1 MPa |
| **Min. operating pressure** | 0.1 MPa |
| **Ambient and fluid temperature** | –5 to 60°C (No freezing) |
| **Applicable tubing material** | Nylon, Soft nylon, Polyurethane Note), FEP, PFA |

Note) Use caution at the max. operating pressure when using soft nylon or polyurethane tubing.
(Refer to the **WEB catalog** or the Best Pneumatics No. 6 for details.)

## ⚠ Caution

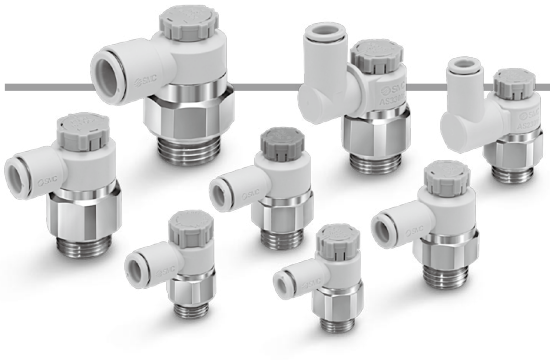
**Be sure to read this before handling. Refer to the back cover for Safety Instructions. For Flow Control Equipment Precautions, refer to "Handling Precautions for SMC Products" and the Operation Manual on SMC website, http://www.smcworld.com**

## Flow Rate and Sonic Conductance

| Model | | AS2□□1F-G01<br>AS22□1F-01-□PA | | | AS2□□1F-G02<br>AS22□1F-02-□PA | | | | AS3□□1F-G02/03<br>AS32□1F-03-□PA | | | AS4□□1F-G04<br>AS42□1F-04-□PA | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tubing O.D. | Metric size | ø3.2 | ø4 | ø6<br>ø8<br>ø10 | ø3.2 | ø4 | ø6 | ø8<br>ø10 | ø6 | ø8 | ø10<br>ø12 | ø10 | ø12<br>ø16 |
| | Note 2) Inch size | ø1/8" | ø5/32" | ø1/4"<br>ø5/16" | ø1/8" | ø5/32" | — | ø1/4"<br>ø5/16"<br>ø3/8" | ø1/4" | ø5/16" | ø3/8" | ø3/8" | ø1/2" |
| C values: Sonic conductance dm³/(s·bar) | Free flow | 0.4 | 0.6 | 0.6 | 0.7 | 1.0 | 1.3 | 1.5 | 1.6 | 1.7 | 2.5 | 4.4 | 4.8 |
| | Controlled flow | 0.4 | 0.7 | 0.8 | 0.6 | 0.9 | 1.3 | | 2.1 | 2.4 | 3.3 | 4.4 | 4.9 |
| b values: Critical pressure ratio | Free flow | 0.2 | | 0.3 | 0.3 | | 0.4 | | 0.4 | | 0.3 | 0.3 | |
| | Controlled flow | 0.2 | | 0.3 | 0.3 | | | | 0.3 | | | 0.3 | |

Note 1) C and b values are for controlled flow with the needle fully open and free flow with the needle fully closed.
Note 2) G thread is not available.

Elbow | Universal | Brass
Electroless nickel plated
∗ Only G thread



## How to Order

**G thread** AS 2 2 0 1 F − G 01 − 06 A

**R, NPT thread** AS 2 2 0 1 F − □ 01 − 06 P A

**Type**

| | |
|---|---|
| 2 | Elbow |
| 3 | Universal |

**Thread type**

| | |
|---|---|
| G | G |

**Body size**

| | |
|---|---|
| 2 | 1/8, 1/4 |
| 3 | 3/8 |
| 4 | 1/2 |

**Type**

| | |
|---|---|
| 2 | Elbow |

**Control type**

| | |
|---|---|
| 0 | Meter-out |
| 1 | Meter-in |

**Thread type**

| | |
|---|---|
| Nil | R |
| N | NPT |

**Port size**

| | |
|---|---|
| 01 | 1/8 |
| 02 | 1/4 |
| 03 | 3/8 |
| 04 | 1/2 |

**Push-lock type**

**Seal method**

| | |
|---|---|
| P | Face seal |

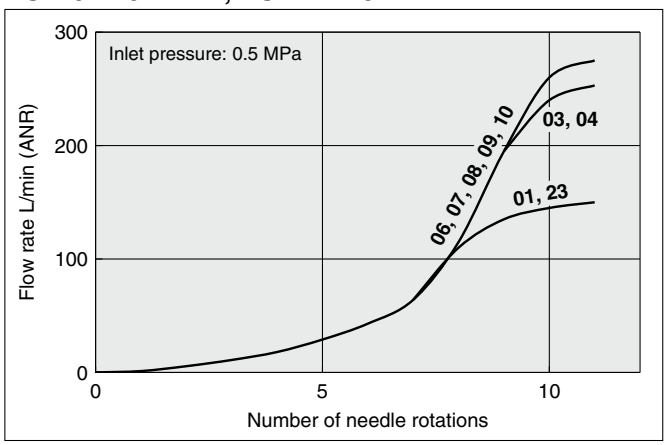
**Applicable tubing O.D.** Note 1)

| Metric size | | Inch size Note 3) | |
|---|---|---|---|
| 23 | ø3.2 Note 2) | 01 | ø1/8" |
| 04 | ø4 | 03 | ø5/32" |
| 06 | ø6 | 07 | ø1/4" |
| 08 | ø8 | 09 | ø5/16" |
| 10 | ø10 | 11 | ø3/8" |
| 12 | ø12 | 13 | ø1/2" |
| 16 | ø16 Note 4) | | |

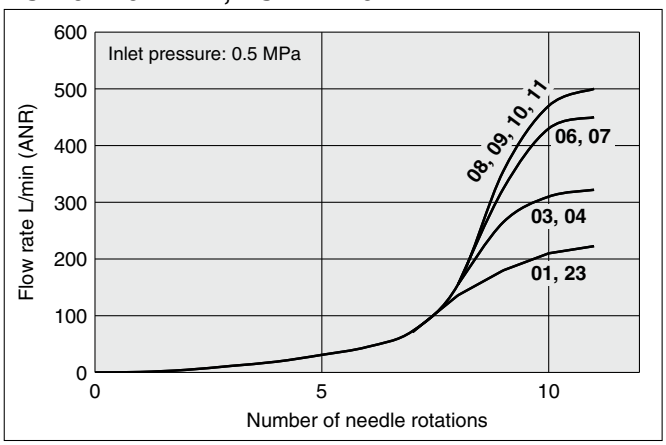
Note 1) For selecting applicable tubing O.D., refer to the “Model” on page 27.
Note 2) Use ø1/8" tube.
Note 3) Only the metric size is available for the G thread type.
Note 4) Only G thread

## Needle Valve/Flow-rate Characteristics

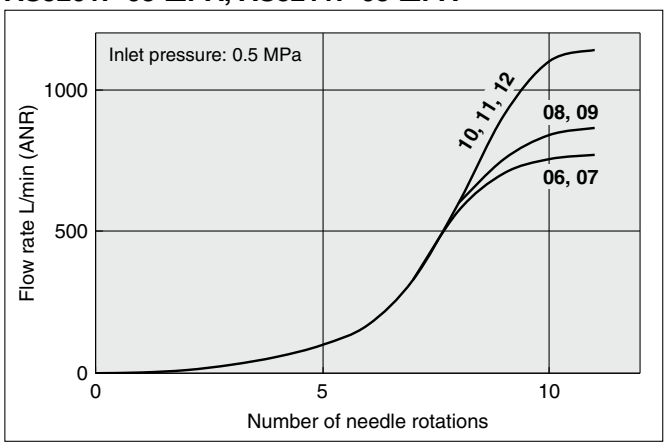
**AS2201F-G01-□, AS2211F-G01-□**
**AS2301F-G01-□, AS2311F-G01-□**
**AS2201F-01-□PA, AS2211F-01-□PA**



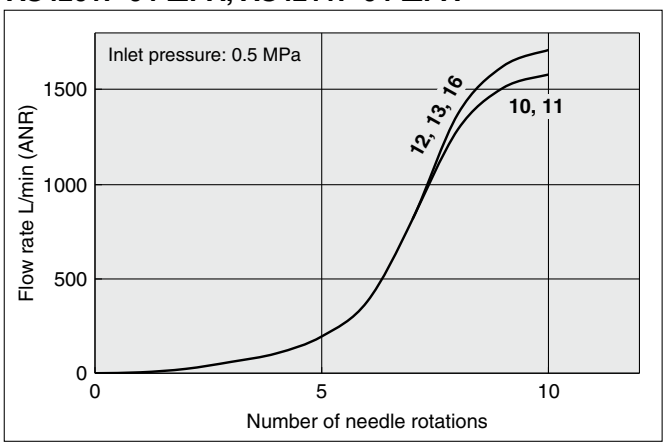

**AS2201F-G02-□, AS2211F-G02-□**
**AS2301F-G02-□, AS2311F-G02-□**
**AS2201F-02-□PA, AS2211F-02-□PA**




**AS3201F-G02/03-□, AS3211F-G02/03-□**
**AS3301F-G02/03-□, AS3311F-G02/03-□**
**AS3201F-03-□PA, AS3211F-03-□PA**




**AS4201F-G04-□, AS4211F-G04-□**
**AS4301F-G04-□, AS4311F-G04-□**
**AS4201F-04-□PA, AS4211F-04-□PA**

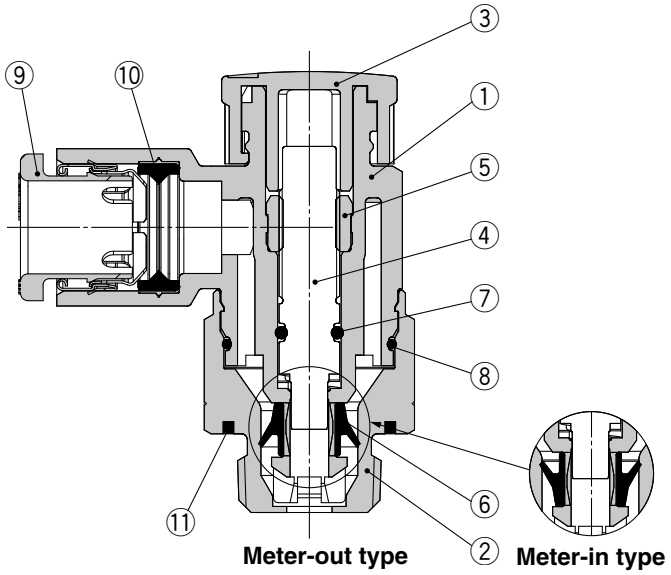



Note) The numbers above the flow-rate characteristic curves in the charts show the applicable tubing outside diameter as defined by the product number.

## Construction

### Elbow type

**Seal method: Face seal**
**For G, R, NPT thread**

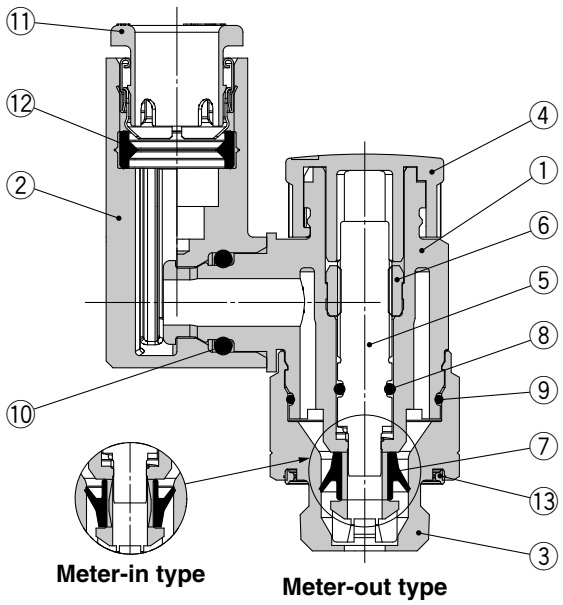



**Component Parts**

| No. | Description | Material | Note |
|---|---|---|---|
| 1 | **Body A** | PBT | |
| 2 | **Body B** | Brass | Electroless nickel plating |
| 3 | **Knob** | POM | |
| 4 | **Needle** | PBT | |
| 5 | **Needle guide** | Brass | Electroless nickel plating |
| 6 | **U-seal** | HNBR | |
| 7 | **O-ring** | NBR | |
| 8 | **O-ring** | NBR | |
| 9 | **Cassette** | — | |
| 10 | **Seal** | NBR | |
| 11 | **Seal** | NBR | |

### Universal type

**Seal method: Face seal**
**For G thread**

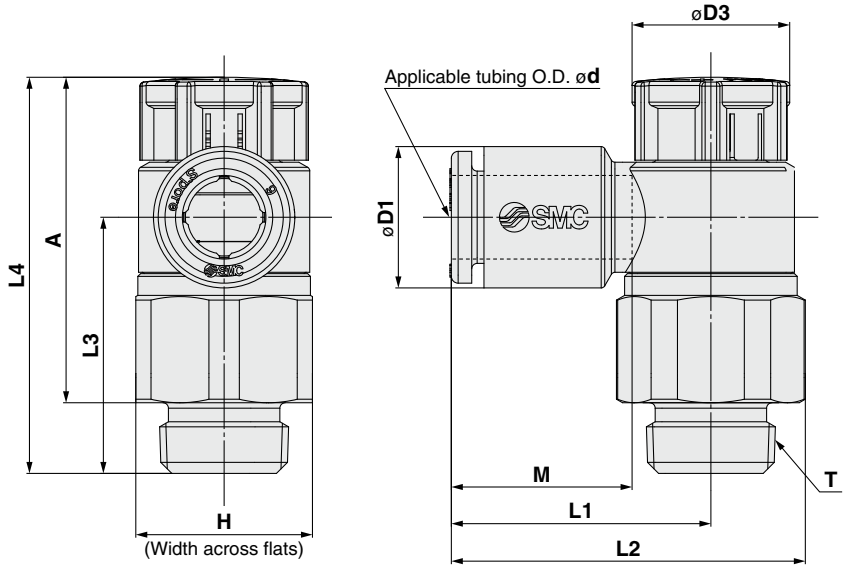



**Component Parts**

| No. | Description | Material | Note |
|---|---|---|---|
| 1 | **Body A** | PBT | |
| 2 | **Elbow body** | PBT | |
| 3 | **Body B** | Stainless steel | |
| 4 | **Knob** | POM | |
| 5 | **Needle** | PBT | |
| 6 | **Needle guide** | Stainless steel | |
| 7 | **U-seal** | HNBR | |
| 8 | **O-ring** | NBR | |
| 9 | **O-ring** | NBR | |
| 10 | **O-ring** | NBR | |
| 11 | **Cassette** | — | |
| 12 | **Seal** | NBR | |
| 13 | **Seal** | NBR | |

## Dimensions/ Elbow type

**Seal method: Face seal**
**For G thread**



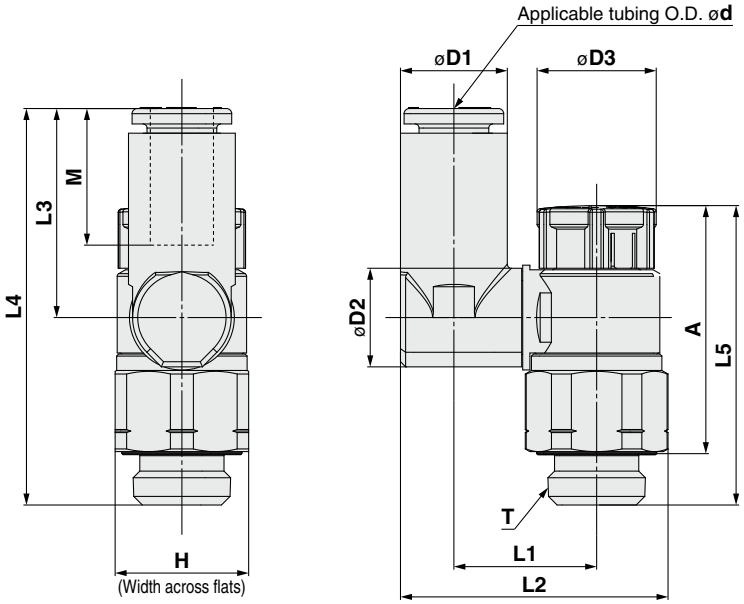

**Metric Size** [mm]

| Model | d | T | H | D1 | D3 | L1 | L2 | L3 | L4 | | A | | M | Weight [g] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Unlocked | Locked | Unlocked | Locked | | |
| **AS22□1F-G01-23A** | 3.2 | 1/8 | 13 | 7.2 | 12 | 19.1 | 26.2 | 18.8 | 30.3 | 28.9 | 24.8 | 23.4 | 13.3 | 10 |
| **AS22□1F-G01-04A** | 4 | | | 8.2 | | | | | | | | | | |
| **AS22□1F-G01-06A** | 6 | | | 10.4 | | | | | | | | | | |
| **AS22□1F-G01-08A** | 8 | | | 13.2 | | 22.4 | 29.5 | | | | | | 14.2 | 11 |
| **AS22□1F-G01-10A** | 10 | | | 15.9 | | 25.3 | 32.4 | | | | | | 15.6 | 12 |
| **AS22□1F-G02-23A** | 3.2 | 1/4 | 17 | 7.2 | 13 | 20.9 | 30.2 | 22.6 | 36.6 | 35 | 30.1 | 28.5 | 13.3 | 21 |
| **AS22□1F-G02-04A** | 4 | | | 8.2 | | | | | | | | | | |
| **AS22□1F-G02-06A** | 6 | | | 10.4 | | 23.4 | 32.7 | | | | | | | |
| **AS22□1F-G02-08A** | 8 | | | 13.2 | | 23.9 | 33.2 | | | | | | 14.2 | 22 |
| **AS22□1F-G02-10A** | 10 | | | 15.9 | | 26.9 | 36.2 | | | | | | 15.6 | 23 |
| **AS32□1F-G02-06A** | 6 | 1/4 | 21 | 10.4 | 16.6 | 21.8 | 33 | 36.4 | 50 | 48.4 | 43.5 | 41.9 | 13.3 | 50 |
| **AS32□1F-G02-08A** | 8 | | | 13.2 | | 22.7 | 33.9 | | | | | | 14.2 | |
| **AS32□1F-G02-10A** | 10 | | | 15.9 | | 26.7 | 37.9 | 35.7 | | | | | 15.6 | 52 |
| **AS32□1F-G02-12A** | 12 | | | 18.5 | | 29.7 | 40.9 | 34.5 | | | | | 17 | 53 |
| **AS32□1F-G03-06A** | 6 | 3/8 | 21 | 10.4 | 16.6 | 21.8 | 33 | 28.7 | 42.3 | 40.7 | 34.8 | 33.2 | 13.3 | 38 |
| **AS32□1F-G03-08A** | 8 | | | 13.2 | | 22.7 | 33.9 | | | | | | 14.2 | 39 |
| **AS32□1F-G03-10A** | 10 | | | 15.9 | | 26.7 | 37.9 | 28 | | | | | 15.6 | 40 |
| **AS32□1F-G03-12A** | 12 | | | 18.5 | | 29.7 | 40.9 | 26.8 | | | | | 17 | 42 |
| **AS42□1F-G04-10A** | 10 | 1/2 | 27 | 15.9 | 18.8 | 27.4 | 41.8 | 36.2 | 50.8 | 49.2 | 41.8 | 40.2 | 15.6 | 72 |
| **AS42□1F-G04-12A** | 12 | | | 18.5 | | 30.8 | 45.2 | 35.1 | | | | | 17 | 74 |
| **AS42□1F-G04-16A** | 16 | | | 23.8 | | 34.8 | 49.2 | 32.7 | | | | | 20.6 | 78 |



## Dimensions/ Universal type

**Seal method: Face seal**
**For G thread**



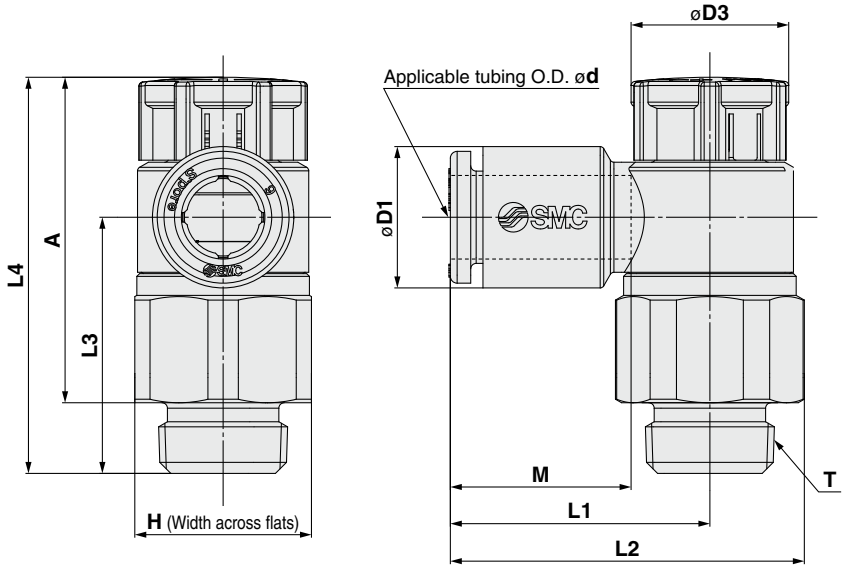

**Metric Size**

[mm]

| Model | d | T | H | D1 | D2 | D3 | L1 | L2 | L3 | L4 | L5 | | A | | M | Weight [g] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Unlocked | Locked | Unlocked | Locked | | |
| **AS23□1F-G01-23A** | 3.2 | 1/8 | 13 | 7.2 | 9.6 | 12 | 13.3 | 24.0 | 17.5 | 35.7 | 30.3 | 28.9 | 24.8 | 23.4 | 13.3 | 10 |
| **AS23□1F-G01-04A** | 4 | | | 8.2 | | | 13.9 | 25.1 | | | | | | | | 11 |
| **AS23□1F-G01-06A** | 6 | | | 10.4 | | | | 26.2 | 20.4 | 38.5 | | | | | | 11 |
| **AS23□1F-G01-08A** | 8 | | | 13.2 | 10.2 | | 16.4 | 30.1 | 21.5 | 39.7 | | | | | 14.2 | 12 |
| **AS23□1F-G02-04A** | 4 | 1/4 | 17 | 8.2 | 12.9 | 13 | 16.5 | 29.9 | 17.5 | 40.1 | 36.6 | 35 | 30.1 | 28.5 | 13.3 | 22 |
| **AS23□1F-G02-06A** | 6 | | | 10.4 | | | 19 | 33.8 | 21.4 | 43.9 | | | | | | 24 |
| **AS23□1F-G02-08A** | 8 | | | 13.2 | | | | 34.9 | 23.5 | 46.0 | | | | | 14.2 | 25 |
| **AS23□1F-G02-10A** | 10 | | | 15.9 | | | 20.9 | 38.1 | 24.7 | 47.3 | | | | | 15.6 | 26 |
| **AS33□1F-G02-06A** | 6 | 1/4 | 21 | 10.4 | 12.9 | 16.6 | 20.2 | 36.6 | 21.4 | 57.8 | 50 | 48.4 | 43.5 | 41.9 | 13.3 | 51 |
| **AS33□1F-G02-08A** | 8 | | | 13.2 | | | | 38.0 | 23.5 | 59.9 | | | | | 14.2 | 52 |
| **AS33□1F-G02-10A** | 10 | | | 15.9 | 17.4 | | 23 | 42.2 | 26.1 | 58.0 | | | | | 15.6 | 55 |
| **AS33□1F-G02-12A** | 12 | | | 18.5 | | | | 43.5 | 28.3 | 59.9 | | | | | 17 | 57 |
| **AS33□1F-G03-06A** | 6 | 3/8 | 21 | 10.4 | 12.9 | 16.6 | 20.2 | 36.6 | 21.4 | 50.1 | 42.3 | 40.7 | 34.8 | 33.2 | 13.3 | 41 |
| **AS33□1F-G03-08A** | 8 | | | 13.2 | | | | 38.0 | 23.5 | 52.2 | | | | | 14.2 | 42 |
| **AS33□1F-G03-10A** | 10 | | | 15.9 | 17.4 | | 23 | 42.2 | 26.1 | 50.3 | | | | | 15.6 | 46 |
| **AS33□1F-G03-12A** | 12 | | | 18.5 | | | | 43.5 | 28.3 | 52.2 | | | | | 17 | 47 |
| **AS43□1F-G04-10A** | 10 | 1/2 | 27 | 15.9 | 17.4 | 18.8 | 25.6 | 47.9 | 26.1 | 61.2 | 50.8 | 49.2 | 41.8 | 40.2 | 15.6 | 78 |
| **AS43□1F-G04-12A** | 12 | | | 18.5 | 21 | | 26.2 | 49.8 | 28.3 | 63.4 | | | | | 17 | 82 |

## Dimensions/ Elbow type

**Seal method: Face seal**
**For R, NPT thread**




### Metric Size

[mm]

| Model | d | T | H | D1 | D3 | L1 | L2 | L3 | L4 | | A | | M | Weight [g] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Unlocked | Locked | Unlocked | Locked | | |
| **AS22□1F-01-23PA** | 3.2 | 1/8 | 13 (12.7) | 7.2 | 12 | 19.1 | 26.2 | 18.8 | 30.3 | 28.9 | 25.1 (24.9) | 23.7 (23.5) | 13.3 | 10 (9) |
| **AS22□1F-01-04PA** | 4 | | | 8.2 | | | | | | | | | | |
| **AS22□1F-01-06PA** | 6 | | | 10.4 | | | | | | | | | | |
| **AS22□1F-01-08PA** | 8 | | | 13.2 | | 22.4 | 29.5 | | | | | | 14.2 | 11 (10) |
| **AS22□1F-01-10PA** | 10 | | | 15.9 | | 25.3 | 32.4 | | | | | | 15.6 | 12 (11) |
| **AS22□1F-02-23PA** | 3.2 | 1/4 | 17 (17.5) | 7.2 | 13 | 20.9 | 30.2 (30.3) | 22.6 | 36.6 | 35 | 29 (28.5) | 27.4 (26.9) | 13.3 | 19 (19) |
| **AS22□1F-02-04PA** | 4 | | | 8.2 | | | | | | | | | | 19 (20) |
| **AS22□1F-02-06PA** | 6 | | | 10.4 | | 23.4 | 32.7 (32.8) | | | | | | | 20 (20) |
| **AS22□1F-02-08PA** | 8 | | | 13.2 | | 23.9 | 33.2 (33.3) | | | | | | 14.2 | 20 (21) |
| **AS22□1F-02-10PA** | 10 | | | 15.9 | | 26.9 | 36.2 (36.3) | | | | | | 15.6 | 21 (22) |
| **AS32□1F-03-06PA** | 6 | 3/8 | 21 (21.7) | 10.4 | 16.6 | 21.8 | 33 (33.4) | 28.7 | 42.3 | 40.7 | 34.7 (34.2) | 33.1 (32.6) | 13.3 | 37 (39) |
| **AS32□1F-03-08PA** | 8 | | | 13.2 | | 22.7 | 33.9 (34.3) | | | | | | 14.2 | 38 (40) |
| **AS32□1F-03-10PA** | 10 | | | 15.9 | | 26.7 | 37.9 (38.3) | 28 | | | | | 15.6 | 39 (41) |
| **AS32□1F-03-12PA** | 12 | | | 18.5 | | 29.7 | 40.9 (41.3) | 26.8 | | | | | 17 | 41 (42) |
| **AS42□1F-04-10PA** | 10 | 1/2 | 27 (28.6) | 15.9 | 18.8 | 27.4 | 41.8 (42.6) | 36.2 | 50.8 | 49.2 | 40.4 | 38.8 | 15.6 | 66 (72) |
| **AS42□1F-04-12PA** | 12 | | | 18.5 | | 30.8 | 45.2 (46) | 35.1 | | | | | 17 | 68 (74) |

Note) The values in ( ) are for NPT thread.

### Inch Size

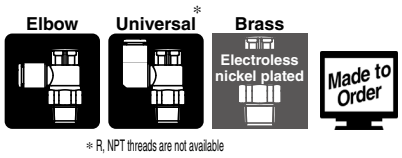
[mm]

| Model | d | T | H | D1 | D3 | L1 | L2 | L3 | L4 | | A | | M | Weight [g] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Unlocked | Locked | Unlocked | Locked | | |
| **AS22□1F-01-01PA** | 1/8" | 1/8 | 13 (12.7) | 7.2 | 12 | 19.1 | 26.2 | 18.8 | 30.3 | 28.9 | 25.1 (24.9) | 23.7 (23.5) | 13.3 | 10 (9) |
| **AS22□1F-01-03PA** | 5/32" | | | 8.2 | | | | | | | | | | |
| **AS22□1F-01-07PA** | 1/4" | | | 11.2 | | 20.8 | 27.9 | | | | | | | 10 (10) |
| **AS22□1F-01-09PA** | 5/16" | | | 13.2 | | 22.4 | 29.5 | | | | | | 14.2 | 11 (10) |
| **AS22□1F-02-01PA** | 1/8" | 1/4 | 17 (17.5) | 7.2 | 13 | 20.9 | 30.2 (30.3) | 22.6 | 36.6 | 35 | 29 (28.5) | 27.4 (26.9) | 13.3 | 19 (19) |
| **AS22□1F-02-03PA** | 5/32" | | | 8.2 | | | | | | | | | | 19 (20) |
| **AS22□1F-02-07PA** | 1/4" | | | 11.2 | | 23.4 | 32.7 (32.8) | | | | | | | 20 (20) |
| **AS22□1F-02-09PA** | 5/16" | | | 13.2 | | 23.9 | 33.2 (33.3) | | | | | | 14.2 | 20 (21) |
| **AS22□1F-02-11PA** | 3/8" | | | 15.5 | | 26.4 | 35.7 (35.8) | | | | | | 15.6 | 21 (22) |
| **AS32□1F-03-07PA** | 1/4" | 3/8 | 21 (21.7) | 11.2 | 16.6 | 21.8 | 33 (33.4) | 28.7 | 42.3 | 40.7 | 34.7 (34.2) | 33.1 (32.6) | 13.3 | 38 (39) |
| **AS32□1F-03-09PA** | 5/16" | | | 13.2 | | 22.7 | 33.9 (34.3) | | | | | | 14.2 | 38 (40) |
| **AS32□1F-03-11PA** | 3/8" | | | 15.5 | | 26.7 | 37.9 (38.3) | 28.2 | | | | | 15.6 | 39 (40) |
| **AS42□1F-04-11PA** | 3/8" | 1/2 | 27 (28.6) | 15.5 | 18.8 | 27.4 | 41.8 (42.6) | 36.2 | 50.8 | 49.2 | 40.4 | 38.8 | 15.6 | 66 (72) |
| **AS42□1F-04-13PA** | 1/2" | | | 19.3 | | 30.9 | 45.3 (46.1) | 34.7 | | | | | 17 | 68 (74) |

Note) The values in ( ) are for NPT thread.

# Made to Order

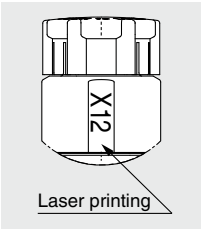
Please contact SMC for detailed dimensions, specifications and delivery.




* R, NPT threads are not available

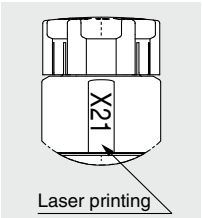


## 1 Lubricant: Vaseline -X12




**Example) AS2201F-G01-04A-X12**

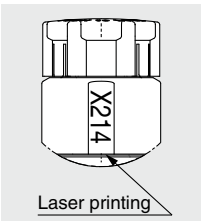
## 2 Grease-free (Seal: Fluorine-coated) + Restrictor (Without check valve) -X21




**Example) AS2201F-G01-04A-X21**

Note 1) Not particle-free
Note 2) The restrictor is only compatible with the part number of the meter-out type.
Note 3) Only the needle and O-ring are fluorine-coated.

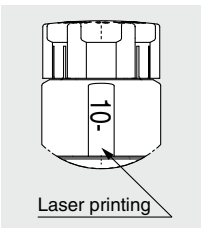
## 3 Restrictor (Without check valve) -X214




**Example) AS2201F-G01-04A-X214**

Note) The restrictor is only compatible with the part number of the meter-out type.

## 4 Clean Series 10-




**Example) 10-AS2201F-G01-04A**

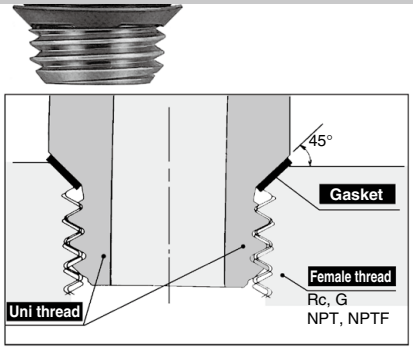
Note 1) Fluorine grease is used.
Note 2) The particulate generation grade is 3.
Note 3) Excluding G thread type.

# Speed Controller with Uni One-touch Fitting

# *Series AS*

Elbow | Universal | Brass — Electroless nickel plated

## New-stand male threads for piping that reduces the screw-in time by 1/3.



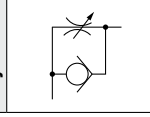
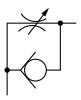

### Shape of Uni thread ridge

Use of the chamfered surface of the female thread as the seat surface and adoption of gaskets made by laminating NBR on both surfaces of stainless steel plates achieve secure sealing regardless of the difference of diameters due to the female thread type, deviations due to the tolerance, or the size of the chamfered corner. (Any standard chamfered female thread can be used.)

**A ridge shape has been created as a Uni thread for common applications for Rc, G, NPT and NPTF.**

**The gasket seal method drastically cuts piping work-hours.**

**Flow Direction Symbols on Body**

| | Meter-out | Meter-in |
|---|---|---|
| Symbol |  |  |

### ⚠ Caution

**Be sure to read this before handling. Refer to the back cover for Safety Instructions. For Flow Control Equipment Precautions, refer to "Handling Precautions for SMC Products" and the Operation Manual on SMC website, http://www.smcworld.com**

## Model

| Model | | Uni thread size | Applicable tubing O.D. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Metric size | | | | | | | Inch size | | | | |
| Elbow type | Universal type | | 3.2 | 4 | 6 | 8 | 10 | 12 | 16 | 1/8" | 5/32" | 1/4" | 5/16" | 3/8" | 1/2" |
| **AS22□1F-U01** | **AS23□1F-U01** | 1/8 | ● | ● | ● | ● | ●Note) | | | ● | ● | ● | ● | | |
| **AS22□1F-U02** | **AS23□1F-U02** | 1/4 | ●Note) | ● | ● | ● | ● | | | ●Note) | ● | ● | ● | ● | |
| **AS32□1F-U02** | **AS33□1F-U02** | 1/4 | | | ● | ● | ● | ● | | | | ● | ● | ● | |
| **AS32□1F-U03** | **AS33□1F-U03** | 3/8 | | | ● | ● | ● | ● | | | | ● | ● | ● | |
| **AS42□1F-U04** | **AS43□1F-U04** | 1/2 | | | | | ● | ● | ●Note) | | | | | ● | ● |

Note) Universal type is not available.

## Specifications

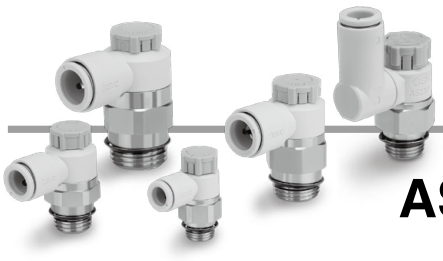
| | |
|---|---|
| **Fluid** | Air |
| **Proof pressure** | 1.5 MPa |
| **Max. operating pressure** | 1 MPa |
| **Min. operating pressure** | 0.1 MPa |
| **Ambient and fluid temperature** | –5 to 60°C (No freezing) |
| **Applicable tubing material** | Nylon, Soft nylon, Polyurethane Note) |

Note) Use caution at the max. operating pressure when using soft nylon or polyurethane tubing. (Refer to the **WEB catalog** or the Best Pneumatics No. 6 for details.)

## Flow Rate and Sonic Conductance

| Model | | **AS22□1F-U01 AS23□1F-U01** | | | **AS22□1F-U02 AS23□1F-U02** | | | | **AS32□1F AS33□1F** | | | **AS42□1F AS43□1F** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tubing O.D. | Metric size | ø3.2 | ø4 | ø6 ø8 ø10 | ø3.2 | ø4 | ø6 | ø8 ø10 | ø6 | ø8 | ø10 ø12 | ø10 | ø12 ø16 |
| | Inch size | ø1/8" | ø5/32" | ø1/4" ø5/16" | ø1/8" | ø5/32" | — | ø1/4" ø5/16" ø3/8" | ø1/4" | ø5/16" | ø3/8" | ø3/8" | ø1/2" |
| C values: Sonic conductance dm³/(s·bar) | Free flow | 0.4 | 0.6 | 0.6 | 0.7 | 1.0 | 1.3 | 1.5 | 1.6 | 1.7 | 2.5 | 4.4 | 4.8 |
| | Controlled flow | 0.4 | 0.7 | 0.8 | 0.6 | 0.9 | 1.3 | | 2.1 | 2.4 | 3.3 | 4.4 | 4.9 |
| b values: Critical pressure ratio | Free flow | 0.2 | | 0.3 | 0.3 | | 0.4 | | 0.4 | | 0.3 | 0.3 | |
| | Controlled flow | 0.2 | | 0.3 | 0.3 | | | | 0.3 | | | 0.3 | |

Note) C and b values are for controlled flow with the needle fully open and free flow with the needle fully closed.



Elbow | Universal | Brass — Electroless nickel plated

## How to Order

**AS 2 2 0 1 F – U01 – 06 A**

**Body size**

| | |
|---|---|
| **2** | 1/8, 1/4 |
| **3** | 3/8 |
| **4** | 1/2 |

**Type**

| | |
|---|---|
| **2** | Elbow |
| **3** | Universal |

**Control type**

| | |
|---|---|
| **0** | Meter-out |
| **1** | Meter-in |

∗ Meter-out and meter-in types can be visually identified by color of the knob.
Meter-out: Gray
Meter-in: Light blue

**With One-touch fitting**

**Port size**

| | |
|---|---|
| **U01** | Uni 1/8 |
| **U02** | Uni 1/4 |
| **U03** | Uni 3/8 |
| **U04** | Uni 1/2 |

**Push-lock type**

**Applicable tubing O.D.** Note 1)

**Metric size**

| Tubing O.D. | |
|---|---|
| **23** | ø3.2 Note 2) |
| **04** | ø4 |
| **06** | ø6 |
| **08** | ø8 |
| **10** | ø10 |
| **12** | ø12 |
| **16** | ø16 |

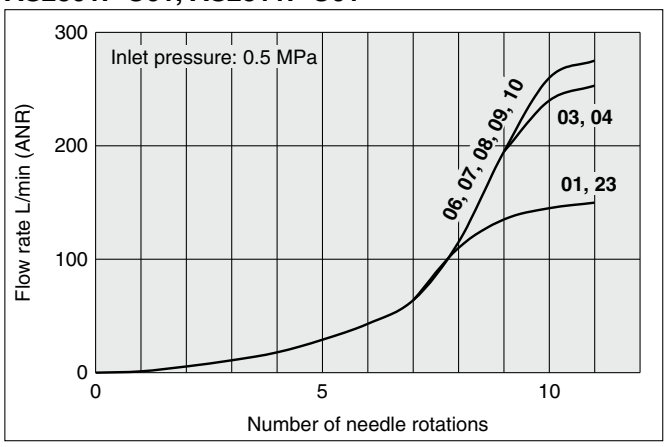
**Inch size**

| Tubing O.D. | |
|---|---|
| **01** | ø1/8" |
| **03** | ø5/32" |
| **07** | ø1/4" |
| **09** | ø5/16" |
| **11** | ø3/8" |
| **13** | ø1/2" |

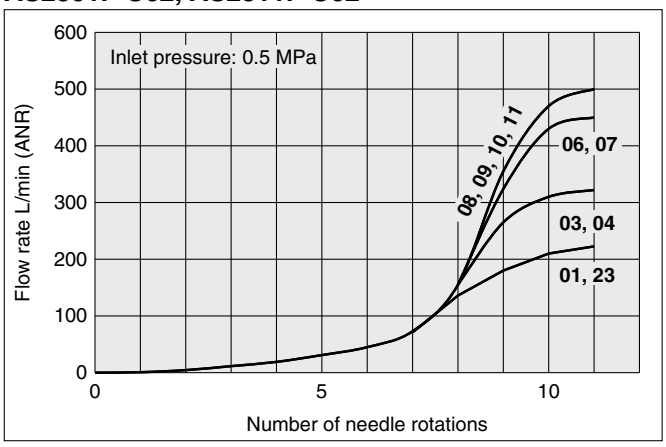
Note 1) For selecting applicable tubing O.D., refer to the "Model" on page 35. Metric size and inch size types can be visually identified by color of the release button.
Metric size: Light gray
Inch size: Orange
Note 2) Use ø1/8" tube.

## Needle Valve/Flow-rate Characteristics

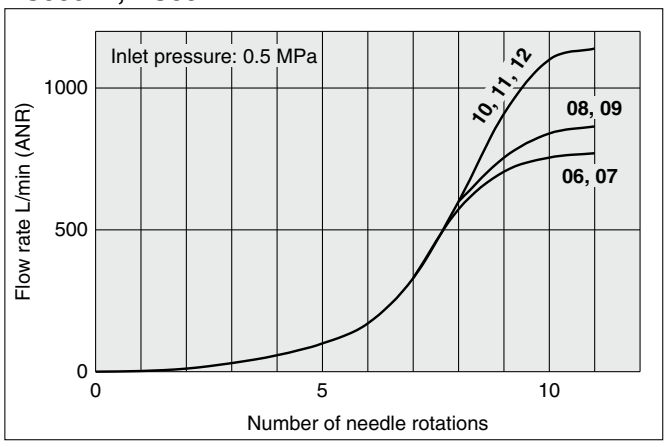
**AS2201F-U01, AS2211F-U01**
**AS2301F-U01, AS2311F-U01**



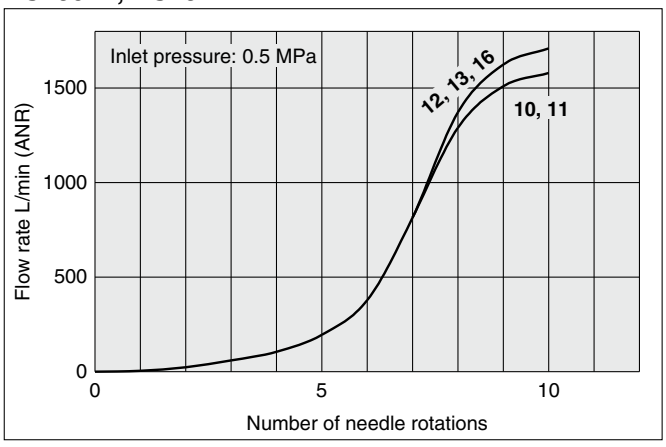

**AS2201F-U02, AS2211F-U02**
**AS2301F-U02, AS2311F-U02**




**AS3201F, AS3211F**
**AS3301F, AS3311F**




**AS4201F, AS4211F**
**AS4301F, AS4311F**

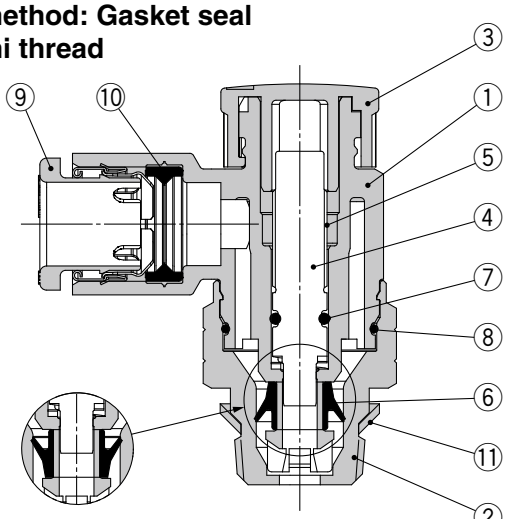



Note) The numbers above the flow-rate characteristic curves in the charts show the applicable tubing outside diameter as defined by the product number.

## Construction

### Elbow type

**Seal method: Gasket seal**
**For Uni thread**



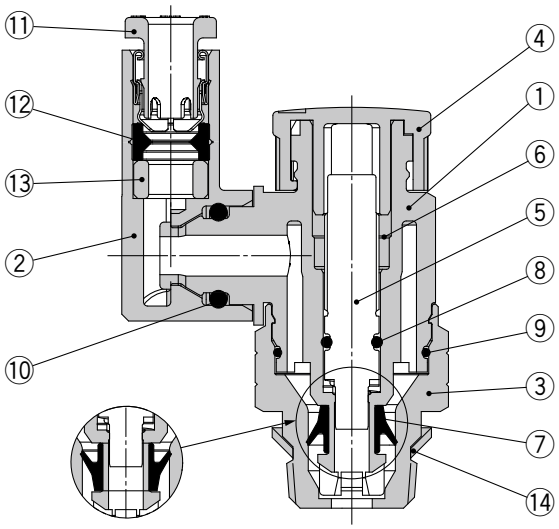

**Meter-in type** **Meter-out type**

**Component Parts**

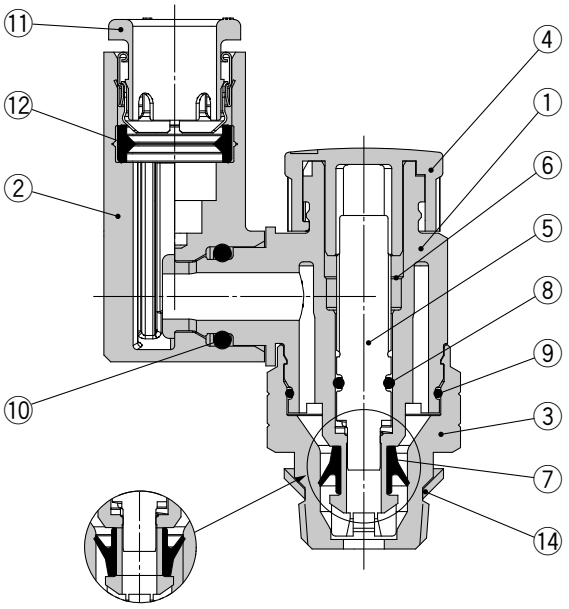
| No. | Description | Material | Note |
|---|---|---|---|
| 1 | **Body A** | PBT | |
| 2 | **Body B** | Brass | Electroless nickel plating |
| 3 | **Knob** | POM | |
| 4 | **Needle** | PBT | |
| 5 | **Needle guide** | Brass | Electroless nickel plating |
| 6 | **U-seal** | HNBR | |
| 7 | **O-ring** | NBR | |
| 8 | **O-ring** | NBR | |
| 9 | **Cassette** | — | |
| 10 | **Seal** | NBR | |
| 11 | **Gasket** | NBR/Stainless steel | |

### Universal type

**Seal method: Gasket seal**
**For Uni thread**




**Meter-in type** **Meter-out type**



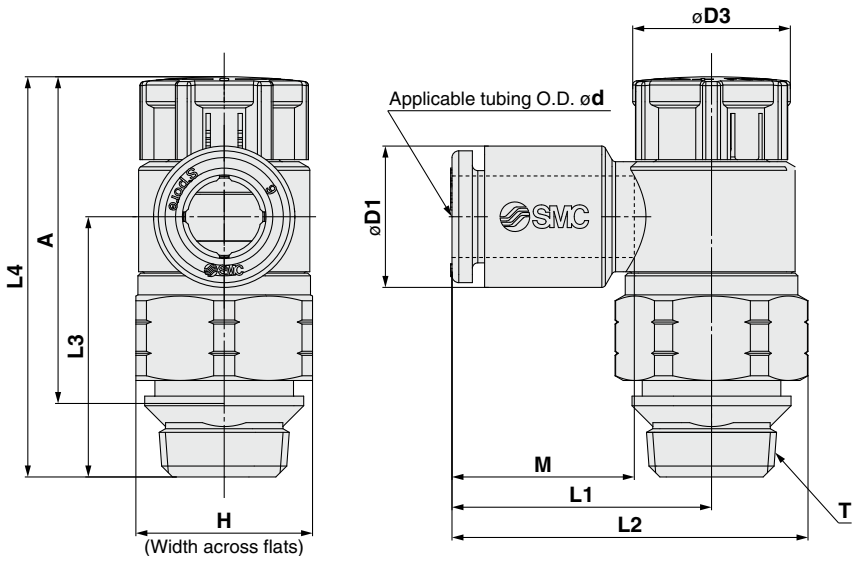

**Meter-in type** **Meter-out type**

**Component Parts**

| No. | Description | Material | Note |
|---|---|---|---|
| 1 | **Body A** | PBT | |
| 2 | **Elbow body** | PBT | |
| 3 | **Body B** | Brass | Electroless nickel plating |
| 4 | **Knob** | POM | |
| 5 | **Needle** | PBT | |
| 6 | **Needle guide** | Brass | Electroless nickel plating |
| 7 | **U-seal** | HNBR | |
| 8 | **O-ring** | NBR | |
| 9 | **O-ring** | NBR | |
| 10 | **O-ring** | NBR | |
| 11 | **Cassette** | — | |
| 12 | **Seal** | NBR | |
| 13 | **Spacer** Note) | — | |
| 14 | **Gasket** | NBR/Stainless steel | |

Note) Used only for the AS22□1F-U01-23A.

## Dimensions/ Elbow type




### Metric Size

[mm]

| Model | d | T Uni thread | H | D1 | D3 | L1 | L2 | L3 | L4 Note1) | | A Note 2) | | M | Weight [g] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Unlocked | Locked | Unlocked | Locked | | |
| **AS22□1F-U01-23A** | 3.2 | 1/8 | 13 | 7.2 | 12 | 19.1 | 26.2 | 19.1 | 30.6 | 29.2 | 25.8 | 24.4 | 13.3 | 9 |
| **AS22□1F-U01-04A** | 4 | | | 8.2 | | | | | | | | | | |
| **AS22□1F-U01-06A** | 6 | | | 10.4 | | | | | | | | | | 10 |
| **AS22□1F-U01-08A** | 8 | | | 13.2 | | 22.4 | 29.5 | | | | | | 14.2 | 11 |
| **AS22□1F-U01-10A** | 10 | | | 15.9 | | 25.3 | 32.4 | | | | | | 15.6 | 12 |
| **AS22□1F-U02-23A** | 3.2 | 1/4 | 17 | 7.2 | 13 | 20.9 | 30.2 | 22.6 | 36.6 | 35 | 30.2 | 28.6 | 13.3 | 17 |
| **AS22□1F-U02-04A** | 4 | | | 8.2 | | | | | | | | | | |
| **AS22□1F-U02-06A** | 6 | | | 10.4 | | 23.4 | 32.7 | | | | | | | |
| **AS22□1F-U02-08A** | 8 | | | 13.2 | | 23.9 | 33.2 | | | | | | 14.2 | 18 |
| **AS22□1F-U02-10A** | 10 | | | 15.9 | | 26.9 | 36.2 | | | | | | 15.6 | 19 |
| **AS32□1F-U02-06A** | 6 | 1/4 | 19 | 10.4 | 16.6 | 21.8 | 32.1 | 36.4 | 50 | 48.4 | 43.6 | 42 | 13.3 | 39 |
| **AS32□1F-U02-08A** | 8 | | | 13.2 | | 22.7 | 33 | | | | | | 14.2 | |
| **AS32□1F-U02-10A** | 10 | | | 15.9 | | 26.7 | 37 | 35.7 | | | | | 15.6 | 40 |
| **AS32□1F-U02-12A** | 12 | | | 18.5 | | 29.7 | 40 | 34.5 | | | | | 17 | 42 |
| **AS32□1F-U03-06A** | 6 | 3/8 | 19 | 10.4 | 16.6 | 21.8 | 32.1 | 28.7 | 42.3 | 40.7 | 35.9 | 34.3 | 13.3 | 39 |
| **AS32□1F-U03-08A** | 8 | | | 13.2 | | 22.7 | 33 | | | | | | 14.2 | |
| **AS32□1F-U03-10A** | 10 | | | 15.9 | | 26.7 | 37 | 28 | | | | | 15.6 | 40 |
| **AS32□1F-U03-12A** | 12 | | | 18.5 | | 29.7 | 40 | 26.8 | | | | | 17 | 42 |
| **AS42□1F-U04-10A** | 10 | 1/2 | 24 | 15.9 | 18.8 | 27.4 | 40.3 | 36.2 | 50.8 | 49.2 | 42.2 | 40.6 | 15.6 | 52 |
| **AS42□1F-U04-12A** | 12 | | | 18.5 | | 30.8 | 43.7 | 35.1 | | | | | 17 | 54 |
| **AS42□1F-U04-16A** | 16 | | | 23.8 | | 34.8 | 47.7 | 32.7 | | | | | 20.6 | 58 |

Note 1) Reference dimensions Note 2) Reference dimensions of threads after installation

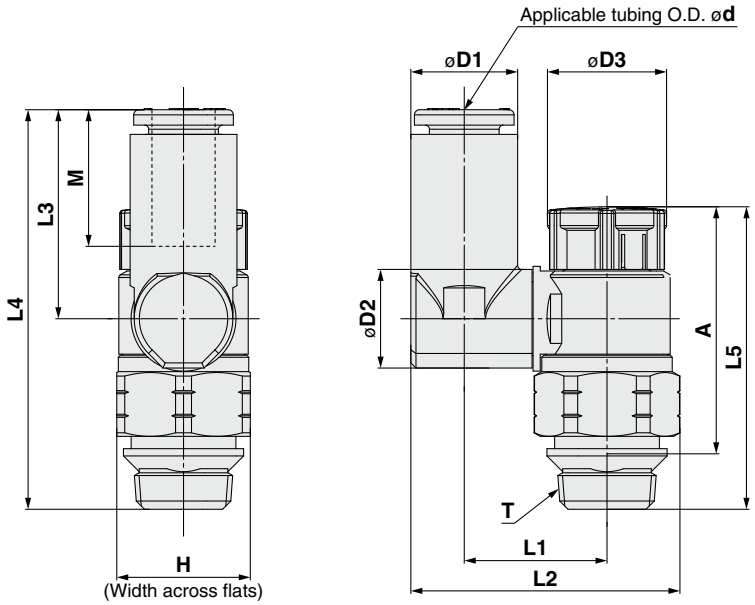
### Inch Size

[mm]

| Model | d | T Uni thread | H | D1 | D3 | L1 | L2 | L3 | L4 Note1) | | A Note 2) | | M | Weight [g] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Unlocked | Locked | Unlocked | Locked | | |
| **AS22□1F-U01-01A** | 1/8" | 1/8 | 13 | 7.2 | 12 | 19.1 | 26.2 | 19.1 | 30.6 | 29.2 | 25.8 | 24.4 | 13.3 | 9 |
| **AS22□1F-U01-03A** | 5/32" | | | 8.2 | | | | | | | | | | |
| **AS22□1F-U01-07A** | 1/4" | | | 11.2 | | 20.8 | 27.9 | | | | | | | 10 |
| **AS22□1F-U01-09A** | 5/16" | | | 13.2 | | 22.4 | 29.5 | | | | | | 14.2 | 11 |
| **AS22□1F-U02-01A** | 1/8" | 1/4 | 17 | 7.2 | 13 | 20.9 | 30.2 | 22.6 | 36.6 | 35 | 30.2 | 28.6 | 13.3 | 17 |
| **AS22□1F-U02-03A** | 5/32" | | | 8.2 | | | | | | | | | | |
| **AS22□1F-U02-07A** | 1/4" | | | 11.2 | | 23.4 | 32.7 | | | | | | | 18 |
| **AS22□1F-U02-09A** | 5/16" | | | 13.2 | | 23.9 | 33.2 | | | | | | 14.2 | |
| **AS22□1F-U02-11A** | 3/8" | | | 15.5 | | 26.4 | 35.7 | | | | | | 15.6 | 19 |
| **AS32□1F-U02-07A** | 1/4" | 1/4 | 19 | 11.2 | 16.6 | 21.8 | 32.1 | 36.4 | 50 | 48.4 | 43.6 | 42 | 13.3 | 39 |
| **AS32□1F-U02-09A** | 5/16" | | | 13.2 | | 22.7 | 33 | | | | | | 14.2 | |
| **AS32□1F-U02-11A** | 3/8" | | | 15.5 | | 26.7 | 37 | 35.9 | | | | | 15.6 | 40 |
| **AS32□1F-U03-07A** | 1/4" | 3/8 | 19 | 11.2 | 16.6 | 21.8 | 32.1 | 28.7 | 42.3 | 40.7 | 35.9 | 34.3 | 13.3 | 39 |
| **AS32□1F-U03-09A** | 5/16" | | | 13.2 | | 22.7 | 33 | | | | | | 14.2 | |
| **AS32□1F-U03-11A** | 3/8" | | | 15.5 | | 26.7 | 37 | 28.2 | | | | | 15.6 | 40 |
| **AS42□1F-U04-11A** | 3/8" | 1/2 | 24 | 15.5 | 18.8 | 27.4 | 40.3 | 36.2 | 50.8 | 49.2 | 42.2 | 40.6 | 15.6 | 52 |
| **AS42□1F-U04-13A** | 1/2" | | | 19.3 | | 30.9 | 43.8 | 34.7 | | | | | 17 | 54 |

Note 1) Reference dimensions Note 2) Reference dimensions of threads after installation

## Dimensions/ Universal type




### Metric Size

[mm]

| Model | d | T Uni thread | H | D1 | D2 | D3 | L1 | L2 | L3 | L4 | L5 Note 1) Unlocked | L5 Note 1) Locked | A Note 2) Unlocked | A Note 2) Locked | M | Weight [g] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AS23□1F-U01-23A** | 3.2 | 1/8 | 13 | 7.2 | 9.6 | 12 | 13.3 | 24 | 17.5 | 36 | 30.6 | 29.2 | 25.8 | 24.4 | 13.3 | 9 |
| **AS23□1F-U01-04A** | 4 | | | 8.2 | | | 13.9 | 25.1 | | | | | | | | |
| **AS23□1F-U01-06A** | 6 | | | 10.4 | | | | 26.2 | 20.4 | 38.8 | | | | | | 10 |
| **AS23□1F-U01-08A** | 8 | | | 13.2 | 10.2 | | 16.4 | 30.1 | 21.5 | 40 | | | | | 14.2 | 11 |
| **AS23□1F-U02-04A** | 4 | 1/4 | 17 | 8.2 | 12.9 | 13 | 16.5 | 29.9 | 17.5 | 40.1 | 36.6 | 35 | 30.2 | 28.6 | 13.3 | 18 |
| **AS23□1F-U02-06A** | 6 | | | 11.2 | | | 19 | 33.8 | 21.4 | 43.9 | | | | | | |
| **AS23□1F-U02-08A** | 8 | | | 13.2 | | | | 34.9 | 23.5 | 46 | | | | | 14.2 | 19 |
| **AS23□1F-U02-10A** | 10 | | | 15.9 | | | 20.9 | 38.1 | 24.7 | 47.3 | | | | | 15.6 | 20 |
| **AS33□1F-U02-06A** | 6 | 1/4 | 19 | 11.2 | 12.9 | 16.6 | 20.2 | 36 | 21.4 | 57.8 | 50 | 48.4 | 43.6 | 42 | 13.3 | 31 |
| **AS33□1F-U02-08A** | 8 | | | 13.2 | | | | 37.1 | 23.5 | 59.9 | | | | | 14.2 | |
| **AS33□1F-U02-10A** | 10 | | | 15.9 | 17.4 | | 23 | 41.2 | 26.1 | 62.5 | | | | | 15.6 | 32 |
| **AS33□1F-U02-12A** | 12 | | | 18.5 | | | | 42.5 | 28.3 | 64.7 | | | | | 17 | 34 |
| **AS33□1F-U03-06A** | 6 | 3/8 | 19 | 11.2 | 12.9 | 16.6 | 20.2 | 36 | 21.4 | 50.1 | 42.3 | 40.7 | 35.9 | 34.3 | 13.3 | 31 |
| **AS33□1F-U03-08A** | 8 | | | 13.2 | | | | 37.1 | 23.5 | 52.2 | | | | | 14.2 | |
| **AS33□1F-U03-10A** | 10 | | | 15.9 | 17.4 | | 23 | 41.2 | 26.1 | 54.8 | | | | | 15.6 | 32 |
| **AS33□1F-U03-12A** | 12 | | | 18.5 | | | | 42.5 | 28.3 | 57 | | | | | 17 | 34 |
| **AS43□1F-U04-10A** | 10 | 1/2 | 24 | 15.9 | 17.4 | 18.8 | 25.6 | 46.4 | 26.1 | 61.2 | 50.8 | 49.2 | 42.2 | 40.6 | 15.6 | 54 |
| **AS43□1F-U04-12A** | 12 | | | 18.5 | 21 | | 26.2 | 48.3 | 28.3 | 63.4 | | | | | 17 | 56 |

Note 1) Reference dimensions Note 2) Reference dimensions of threads after installation

### Inch Size

[mm]

| Model | d | T Uni thread | H | D1 | D2 | D3 | L1 | L2 | L3 | L4 | L5 Note 1) Unlocked | L5 Note 1) Locked | A Note 2) Unlocked | A Note 2) Locked | M | Weight [g] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AS23□1F-U01-01A** | 1/8" | 1/8 | 13 | 7.2 | 9.6 | 12 | 13.3 | 24 | 17.5 | 36 | 30.6 | 29.2 | 25.8 | 24.4 | 13.3 | 9 |
| **AS23□1F-U01-03A** | 5/32" | | | 8.2 | | | 13.9 | 25.1 | | | | | | | | |
| **AS23□1F-U01-07A** | 1/4" | | | 11.2 | 10.2 | | 16.4 | 29.1 | 20.2 | 38.7 | | | | | | 10 |
| **AS23□1F-U01-09A** | 5/16" | | | 13.2 | | | | 30.1 | 21.5 | 40 | | | | | 14.2 | 11 |
| **AS23□1F-U02-03A** | 5/32" | 1/4 | 17 | 8.2 | 12.9 | 13 | 16.5 | 29.9 | 17.5 | 40.1 | 36.6 | 35 | 30.2 | 28.6 | 13.3 | 17 |
| **AS23□1F-U02-07A** | 1/4" | | | 11.2 | | | 19 | 33.8 | 21.4 | 43.9 | | | | | 13.3 | 19 |
| **AS23□1F-U02-09A** | 5/16" | | | 13.2 | | | | 34.9 | 23.5 | 46 | | | | | 14.2 | |
| **AS23□1F-U02-11A** | 3/8" | | | 15.9 | | | 20.9 | 38.1 | 24.7 | 47.3 | | | | | 15.6 | 20 |
| **AS33□1F-U02-07A** | 1/4" | 3/8 | 19 | 11.2 | 12.9 | 16.6 | 20.2 | 36 | 21.4 | 57.8 | 50 | 48.4 | 43.6 | 42 | 13.3 | 31 |
| **AS33□1F-U02-09A** | 5/16" | | | 13.2 | | | | 37.1 | 23.5 | 59.9 | | | | | 14.2 | |
| **AS33□1F-U02-11A** | 3/8" | | | 15.9 | 17.4 | | 23 | 41.2 | 26.1 | 62.5 | | | | | 15.6 | 32 |
| **AS33□1F-U03-07A** | 1/4" | 3/8 | 19 | 11.2 | 12.9 | 16.6 | 20.2 | 36 | 21.4 | 50.1 | 42.3 | 40.7 | 35.9 | 34.3 | 13.3 | 31 |
| **AS33□1F-U03-09A** | 5/16" | | | 13.2 | | | | 37.1 | 23.5 | 52.2 | | | | | 14.2 | |
| **AS33□1F-U03-11A** | 3/8" | | | 15.9 | 17.4 | | 23 | 41.2 | 26.1 | 54.8 | | | | | 15.6 | 32 |
| **AS43□1F-U04-11A** | 3/8" | 1/2 | 24 | 15.9 | 17.4 | 18.8 | 25.6 | 46.4 | 26.1 | 61.2 | 50.8 | 49.2 | 42.2 | 40.6 | 15.6 | 54 |
| **AS43□1F-U04-13A** | 1/2" | | | 18.5 | 21 | | 26.2 | 48.3 | 28.3 | 63.4 | | | | | 17 | 56 |

Note 1) Reference dimensions Note 2) Reference dimensions of threads after installation

# Prior to Use

## Female Thread Conditions Applicable to Face Seal

1. Surface roughness of bearing surface: Rz 25 or less
2. Chamfer dimension: ø**D1**, Seal bearing surface diameter: ø**D2** (Refer to the table below.)
3. Female thread inclination angle: 1° or less
4. Counterbore diameter when the female thread is counterbored.: ø**D3**
   · Models with width across flats: Body width across flats x 1.1 or more
   · Models other than hexagon (Hexagon socket head male connector etc.): Body dimensions + 0.2 mm or more
   ∗ The width across flats and the body dimensions differ depending on the model even when the same thread size is used. Refer to the dimensions in the catalog.
5. If oil content or sealant is sticking to the female thread, this may cause damage of the product. Remove it before piping.

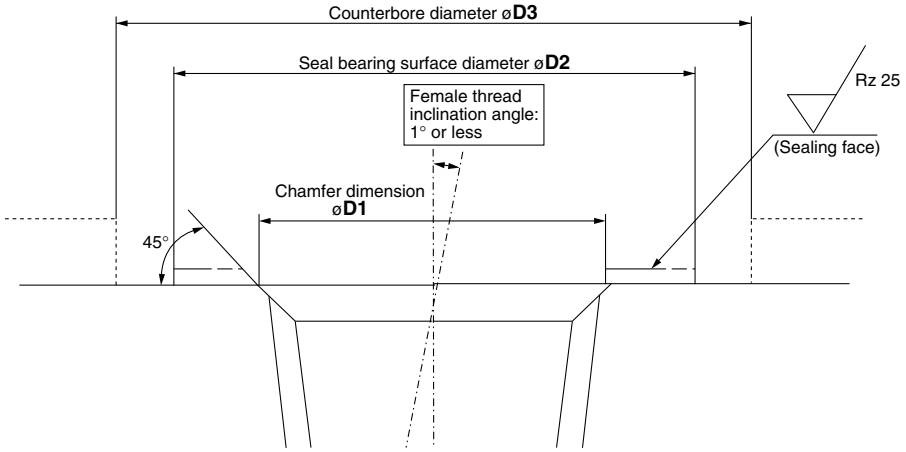



**Table 1**

| Connection thread size | Chamfer dimension ø**D1** mm | Seal bearing surface diameter ø**D2** mm |
|---|---|---|
| R1/8 | 10.2 to 10.4 | 12 or more |
| R1/4 | 13.6 to 13.8 | 17 or more |
| R3/8 | 17.1 to 17.3 | 21 or more |
| R1/2 | 21.4 to 21.6 | 27 or more |
| NPT1/16 | 8.2 to 8.4 | 11.11 or more |
| NPT1/8 | 10.5 to 10.7 | 12.7 or more |
| NPT1/4 | 14.1 to 14.3 | 17.46 or more |
| NPT3/8 | 17.4 to 17.6 | 22 or more |
| NPT1/2 | 21.7 to 21.9 | 28.7 or more |
| G1/8 | 10.2 to 10.6 | 12 or more |
| G1/4 | 13.6 to 14.0 | 17 or more |
| G3/8 | 17.1 to 17.5 | 21 or more |
| G1/2 | 21.4 to 21.8 | 27 or more |

⚠ **Precautions**

For products that do not satisfy the female thread conditions shown above and the piping with a piping pitch narrower than the product dimension, use the conventional sealant type.

∗ The rubber parts of the face seal cannot be replaced.

∗ The rubber parts of the face seal may fall off by the air blow and they cannot be mounted again. Be careful not to perform the air blow.

# *Series* AS
# Specific Product Precautions 1

**Be sure to read this before handling. Refer to the back cover for Safety Instructions. For Flow Control Equipment Precautions, refer to "Handling Precautions for SMC Products" and the Operation Manual on SMC website, http://www.smcworld.com**

## Design and Selection

### ⚠ Warning

**1. Check the specifications.**

The products in this catalog are designed to be used in compressed air systems (including vacuum) only.
If the products are used in an environment where pressure or temperature is out of the specified range, damage and/or malfunction may result. Do not use under such conditions. (Refer to the specifications.)
Please contact SMC when using a fluid other than compressed air (including vacuum).
We do not guarantee against any damage if the product is used outside of the specification range.

**2. The products in this catalog are not designed for the use as stop valve with zero air leakage.**

A certain amount of leakage is allowed in the product's specifications.
Tightening the needle to reduce leakage to zero may result in equipment damage.

**3. Do not disassemble the product or make any modifications, including additional machining.**

It may cause human injury and/or an accident.

**4. The flow-rate characteristics for each product are representative values.**

The flow-rate characteristics are characteristics of each individual product. Actual values may differ depending on the piping, circuitry, pressure conditions, etc.

**5. Sonic conductance (C) and critical pressure ratio (b) values for products are representative values.**
**The speed controller's controlled flow values are with the needle fully open and free flow with the needle fully closed.**

**6. Check if PTFE can be used in application.**

PTFE powder (Polytetrafluoroethylene resin) is included in the seal material for piping taper thread of male thread type. Confirm that the use of it will not cause any adverse effect on the system.
Please contact SMC if the Material Safety Data Sheet (MSDS) is required.

## Mounting

### ⚠ Warning

**1. Operation Manual**

Install the products and operate them only after reading the Operation Manual carefully and understanding its contents. Also, keep the manual where it can be referred to as necessary.

**2. Ensure sufficient space for maintenance activities.**

When installing the products, allow access for maintenance.

**3. Tighten threads with the proper tightening torque.**

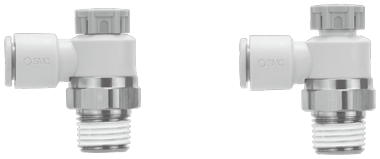
When installing the products, follow the listed proper torque.

## Mounting

### ⚠ Warning

**4. After pushing the knob down to lock, confirm that it is locked.**

It should not be possible to rotate the knob to the right or to the left. If the knob is pulled with force, it may break. Do not pull the knob with excessive force.



**Locked** **Unlocked**

**5. Check the degree of rotation of the needle valve.**

The products in this catalog are retainer type so that the needle is not removed completely. Over rotation will cause damage.

**6. Do not use tools such as pliers to rotate the knob.**

It can cause idle rotation of the knob or damage.

**7. Verify the air flow direction.**

Mounting backward is dangerous, because the speed adjustment needle will not work and the actuator may lurch suddenly.

**8. Adjust the speed by opening the needle slowly from the fully closed state.**

Loose needle valves may cause unexpected sudden actuator lurching.
When a needle valve is turned clockwise, it is closed and actuator speed decreases. When a needle valve is turned counterclockwise, it is open and actuator speed increases.

**9. Do not apply excessive force or shock to the body or fittings with an impact tool.**

It can cause damage or air leakage.

**10. Refer to the Fittings & Tubing Precautions in the Best Pneumatics No. 6 catalog for handling One-touch fittings.**

**11. Tubing O.D. ø2**

Tubing other than that from SMC cannot be used, because it may result in inability to connect the tube, air leakage after connecting the tube or disconnection of the tube.

**12. To install/remove the product, use an appropriate wrench to tighten/loosen at the supplied nut on body B.**

Do not apply torque at other points as the product may be damaged. Rotate body A manually for positioning after installation.

# Specific Product Precautions 2

**Be sure to read this before handling. Refer to the back cover for Safety Instructions. For Flow Control Equipment Precautions, refer to "Handling Precautions for SMC Products" and the Operation Manual on SMC website, http://www.smcworld.com**

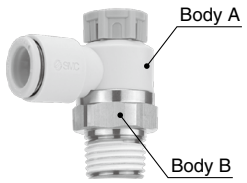
## Mounting

## ⚠ Warning

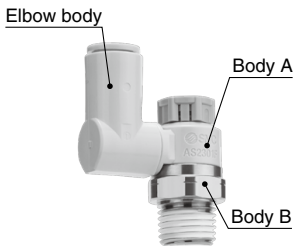
**13. Do not use body A and/or elbow body for applications involving continuous rotation.**

Body A and the fitting section may be damaged.

**Elbow**




**Universal**




## ⚠ Caution

### For M5, 10-32UNF

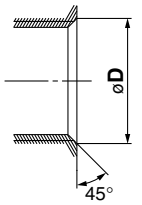
#### Tightening method

First, tighten it by hand, then give it an additional 1/6 turn to 1/4 turn with a wrench. A reference value for the tightening torque is 1 to 1.5 N·m.

Note) Excessive tightening may damage the thread portion or deform the gasket and cause air leakage.
If the screw is too shallowly screwed in, it may come loose or air may leak.

#### Chamfered area for female thread

1. Conforming to ISO 16030 (air pressure fluid dynamics – connection – ports and stud ends), the chamfered dimensions shown in the table below are recommended.

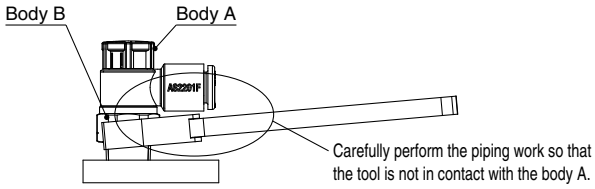



| Female thread size | Chamfered dimension ø**D** (Recommended value) |
|---|---|
| M5 | 5.1 to 5.4 |
| 10-32UNF | 5.0 to 5.3 |

2. This product has a stopper for fully close in rotating direction. Excess torque may break the stopper. Table below shows the maximum allowable torque of the knob.

| Body size | Maximum allowable torque [N·m] |
|---|---|
| M5 | 0.05 |
| 1/8 | 0.07 |
| 1/4 | 0.16 |
| 3/8 | 0.2 |
| 1/2 | 0.4 |

3. When performing the piping work, turn the tightening tool in the horizontal direction to the hexagon across flats of the body B so that any moment is not applied to the body A. If the tool is in contact with the body A, this may cause the body B to come off.




## ⚠ Caution

### For R, NPT Thread (With sealant)

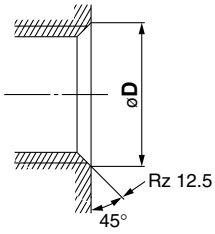
#### Tightening method

1. The proper tightening torques of the fittings are as shown in the table below. As a guide, tighten by hand, then turn it two or three turns with a wrench. Check the dimensions of each product for the hexagon width across flats.

| Connection thread size | Proper tightening torque [N·m] |
|---|---|
| NPT, R1/8 | 3 to 5 |
| NPT, R1/4 | 8 to 12 |
| NPT, R3/8 | 15 to 20 |
| NPT, R1/2 | 20 to 25 |

#### Chamfered area for female thread

By chamfering as shown in the table below, machining of threads is easier and effective for burr prevention.




| Connection thread size | Chamfered dimension ø**D** (Recommended value) | |
|---|---|---|
| | Rc | NPT, NPTF |
| 1/8 | 10.2 to 10.4 | 10.5 to 10.7 |
| 1/4 | 13.6 to 13.8 | 14.1 to 14.3 |
| 3/8 | 17.1 to 17.3 | 17.4 to 17.6 |
| 1/2 | 21.4 to 21.6 | 21.7 to 21.9 |

∗ For Uni thread, Rz 12.5 is necessary for sealing at the chamfered part.

### For R, NPT, G Thread (Face seal type)

#### Tightening method

First, tighten the threaded portion by hand, then use a proper wrench, which could be suitable for the width across flats of the hexagon body, to tighten it further at a wrench tightening angle shown in the table below. For a tightening torque guide, refer to the table below. Check the dimensions of each product for the hexagon width across flats.

1. Tighten fittings with face seal using the proper tightening torques in the table below.

| Connection thread size (R, NPT, G) | Proper tightening torque [N·m] |
|---|---|
| 1/16, 1/8 | 3 to 5 |
| 1/4 | 8 to 12 |
| 3/8 | 15 to 20 |
| 1/2 | 20 to 25 |

2. Insufficient tightening may cause seal failure, or loosen the threads.
3. Reuse
   1) Normally, fittings with face seal can be reused 6 to 10 times.
   2) The seal ring cannot be replaced.

# Specific Product Precautions 3

**Be sure to read this before handling. Refer to the back cover for Safety Instructions. For Flow Control Equipment Precautions, refer to "Handling Precautions for SMC Products" and the Operation Manual on SMC website, http://www.smcworld.com**

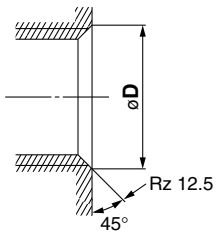
## Mounting

### ⚠Caution

### For R, NPT, G Thread (Face seal type)

**Chamfered area for female thread (Recommended value)**

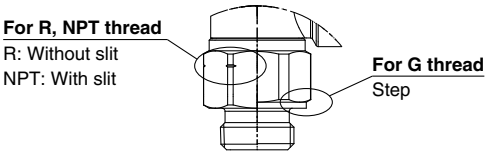
1. Conforming to ISO 16030-2001, the chamfered dimensions shown in the table below are recommended. By chamfering as shown in the table below, machining of threads is easier and effective for burr prevention.




| Nominal thread size | Chamfered dimension ø**D** | |
|---|---|---|
| | Min. | Max. |
| 1/8 | 9.8 | 10.2 |
| 1/4 | 13.3 | 13.7 |
| 3/8 | 16.8 | 17.2 |
| 1/2 | 21.0 | 21.4 |

2. Use G external threads with G internal threads.

**How to distinguish between G, R and NPT threads**




### For Uni Thread

**Tightening method**

1. First, tighten the threaded portion by hand, then use a proper wrench, which could be suitable for the width across flats of the hexagon body, to tighten it further at a wrench tightening angle shown in the table below. For a tightening torque guide, refer to the table below.

**Connection Female Thread: Rc, NPT, NPTF**

| Uni thread size | Wrench tightening angle after hand-tightening [deg] | Tightening torque [N·m] |
|---|---|---|
| 1/8 | 30 to 60 | 3 to 5 |
| 1/4 | 30 to 60 | 8 to 12 |
| 3/8 | 15 to 45 | 14 to 16 |
| 1/2 | 15 to 30 | 20 to 22 |

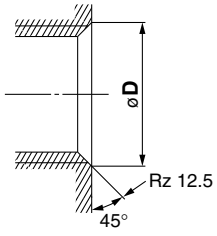
**Connection Female Thread: G**

| Uni thread size | Wrench tightening angle after hand-tightening [deg] | Tightening torque [N·m] |
|---|---|---|
| 1/8 | 30 to 45 | 3 to 4 |
| 1/4 | 15 to 30 | 4 to 5 |
| 3/8 | 15 to 30 | 8 to 9 |
| 1/2 | 15 to 30 | 14 to 15 |

2. The gasket can be reused up to 6 to 10 times.

**Chamfered area for female thread**

By chamfering as shown in the table below, machining of threads is easier and effective for burr prevention.




| Connection thread size | Chamfered dimension ø**D** (Recommended value) | | |
|---|---|---|---|
| | G | Rc | NPT, NPTF |
| 1/8 | 10.2 to 10.6 | 10.2 to 10.4 | 10.5 to 10.7 |
| 1/4 | 13.6 to 14.0 | 13.6 to 13.8 | 14.1 to 14.3 |
| 3/8 | 17.1 to 17.5 | 17.1 to 17.3 | 17.4 to 17.6 |
| 1/2 | 21.4 to 21.8 | 21.4 to 21.6 | 21.7 to 21.9 |

∗ For Uni thread, Rz 12.5 is necessary for sealing at the chamfered part.

## Piping Threads with Sealant

### ⚠Caution

**1. If the fitting is tightened with excessive torque, a large amount of sealant will seep out. Remove the excess sealant.**

**2. Insufficient tightening may loosen the threads, or cause air leakage.**

**3. Reuse**

1) Normally, fittings with sealant can be reused 2 to 3 times.
2) To prevent air leakage through the sealant, remove any loose sealant stuck to the fitting by blowing air over the threaded portion.
3) If the sealant no longer provides effective sealing, wrap sealing tape over the sealant before reusing. Do not use the sealant in any form other than a tape type.

**4. Once the fitting has been tightened, backing it out to its original position often causes the sealant to become defective. Air leakage will occur.**

**5. Use R external threads with Rc internal threads and NPT external threads with NPT internal threads.**

## Piping

### ⚠Caution

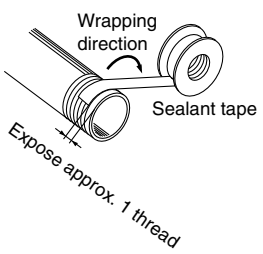
**1. Refer to the Fittings & Tubing Precautions in the Best Pneumatics No. 6 catalog for handling One-touch fittings.**

**2. Preparation before piping**

Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and other debris from inside the pipe.

**3. Wrapping of sealant tape**

When screwing together pipes and fittings, etc., be certain that chips from the pipe threads and sealing material do not get inside the pipe. Also, when the sealant tape is used, leave approx. 1 thread ridges exposed at the end of the threads.



# ⚠ Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of **"Caution," "Warning"** or **"Danger."** They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)*1), and other safety regulations.

**⚠ Caution:** **Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

**⚠ Warning:** **Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

**⚠ Danger :** **Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

*1) ISO 4414: Pneumatic fluid power – General rules relating to systems.
ISO 4413: Hydraulic fluid power – General rules relating to systems.
IEC 60204-1: Safety of machinery – Electrical equipment of machines.
(Part 1: General requirements)
ISO 10218-1: Manipulating industrial robots – Safety.
etc.

## ⚠ Warning

**1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.**

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

**2. Only personnel with appropriate training should operate machinery and equipment.**

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

**3. Do not service or attempt to remove product and machinery/ equipment until safety is confirmed.**

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

**4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.**

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

## ⚠ Caution

**1. The product is provided for use in manufacturing industries.**

The product herein described is basically provided for peaceful use in manufacturing industries.
If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.
If anything is unclear, contact your nearest sales branch.

## Limited warranty and Disclaimer/ Compliance Requirements

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements".
Read and accept them before using the product.

### Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.*2)
   Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.
   This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

*2) **Vacuum pads are excluded from this 1 year warranty.**
A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.
Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

### Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

## ⚠ Caution

**SMC products are not intended for use as instruments for legal metrology.**

Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country. Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.

**Revision history**

Edition B ∗ Not available

Edition C ∗ Universal type added.
∗ Needle guide material changed.
∗ Width across flats (8 mm) added to the AS12□1F-M5, U10/32.
∗ Knob size changed.
∗ Number of pages increased from 20 to 36 SU

Edition D ∗ Face seal (R, NPT thread) added.
∗ Number of pages increased from 36 to 48 TS