Flow Control Equipment Precautions 1

Be sure to read this before handling.

Design / Selection

⚠Warning

1. Confirm the specifications.

Products represented in this catalog are designed only for use in compressed air systems (including vacuum).
Do not operate at pressures or temperatures, etc., beyond the range of specifications, as this can cause damage or malfunction. (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. Products mentioned 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 characteristics for each product are representative values.

The flow characteristics are characteristics of each individual product. Actual values may differ depending on the piping, circuitry, pressure conditions, etc. Also, there are variations in the zero needle rotations position of the flow characteristics, depending on product specifications.

5. 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 product and operate it 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 torque specifications.

4. Confirm that the lock nut is tightened.

A loose lock nut may cause speed changes in the actuator.

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

Products mentioned 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.

Mounting

⚠Warning

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

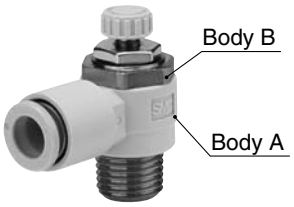
10. Refer to the Fittings and Tubing Precautions (pages 13 to 16) for handling one-touch fittings.

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 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 and universal type fittings for applications involving continuous rotation.

Body A and the fitting section may be damaged.

Flow Control Equipment Precautions 2

Be sure to read this before handling.

Mounting

⚠Caution

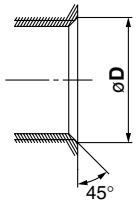
1. Tightening the threaded portion of the connection thread M3, M5, 10-32 UNF

1) M3
First, tighten it by hand, then give it an additional 1/4 turn with a wrench. A reference value for the tightening torque is 0.4 to 0.5 N·m.
Note) AS12□1F-M3-02 should be given an approx. 1/6 turn after tightening by hand (reference value: 0.4 to 0.5 N·m).

2) M5 and 10-32UNF
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. Chamfered female thread size of the connection thread M3, M5, 10-32UNF

Confirming to ISO16030 (air pressure fluid dynamics – connection – boards and stud ends), the chamfered thread sizes shown below are recommended.



Female thread size	Chamfered port size ø**D** (Recommended value)
M3	3.1 to 3.4
M5	5.1 to 5.4
10-32UNF	5.0 to 5.3

3. Proper tightening torque for a hexagon lock nut is shown in the table below. For standard installation, turn 15 to 30° using tool, after fastening by hand. Pay attention not to over torque the product. Check the dimensions for each product for the hexagonal width across flats.

Body size	Proper tightening torque (N·m)	Lock nut width across flats
M3	0.07	5 Note 1)
M5	0.3 Note 2)	7 Note 1)
1/8	1 Note 3)	10 Note 4)
1/4	1.2 Note 3)	12 Note 5)
3/8	2	14
1/2	6	17

Note 1) 4.5 for AS12□1F-M3-02, AS12□1F-M5-02 and AS1200-M3.
Note 2) 0.07 N·m for AS12□1F-M5-02, AS1□□1FM, AS12□0M and ASD230FM.
Note 3) 2 N·m for AS22□1FE-01 and AS22□1FE-02.
Note 4) 9 for AS2001F-□-3 and 12 for AS22□1FE-01.
Note 5) 14 for AS22□1FE-02.

UNI Thread Type

Mounting

⚠Caution

1. First tighten by hand, then use a proper wrench, which could be suitable for the hexagon across flats on the body to tighten with the proper tightening torque given below.

Connection Female Thread: Rc, NPT, NPTF

Nominal size of UNI thread	Proper tightening torque (N·m)	Approx. wrench tightening angle after tightened by hand deg
1/8	5 to 7	30 to 60
1/4	11 to 13	30 to 60
3/8	14 to 16	15 to 45
1/2	20 to 22	15 to 30

Connection Female Thread: G

Nominal size of UNI thread	Proper tightening torque (N·m)	Approx. wrench tightening angle after tightened by hand deg
1/8	3 to 4	30 to 45
1/4	4 to 5	15 to 30
3/8	8 to 9	15 to 30
1/2	14 to 15	15 to 30

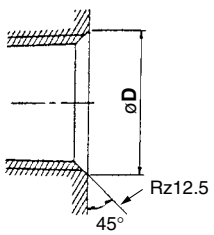
2. The gasket can be recycled up to 6 to 10 times. It can be replaced easily when it has sustained damage. A broken gasket can be removed by holding it and then turning it in the same direction as loosening the thread. If gasket is difficult to remove, cut it with nippers, etc. In such a case, use caution not to scratch the seat face because the seat face of 45° gasket of fitting is the sealing face.

3. Please consult with SMC if using for other fluids than air.

4. Other precautions on handling, etc. are the same as those for one-touch fittings.

Chamfered area for female thread (Recommended value)

By chamfering as shown in the following table, machining of threads is easier and effective for burr prevention.



Female thread size	Chamfered port size ø**D** (Recommended value)		
	G	Rc	NPT, NPTF
1/8	10.2 to 11.5	10.2 to 11.8	10.5 to 11.8
1/4	13.6 to 14.5	13.6 to 15.8	14.1 to 15.8
3/8	17.1 to 18.5	17.1 to 19.4	17.4 to 19.4
1/2	21.4 to 22.5	21.4 to 25.1	21.7 to 25.1

Flow Control Equipment Precautions 2-1

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With Sealant Type

Piping

⚠Caution

1. The standard torque for the fittings are shown in the table below. In short, 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

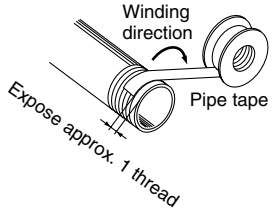
1. Refer to the Fittings and Tubing Precautions (pages 13 to 16) for handling one-touch fittings.

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 pipe tape

When screwing piping or fittings into ports, ensure that chips from the pipe threads or sealing material do not enter the piping. Also, if pipe tape is used, leave 1 thread ridge exposed at the end of the threads.



Air Supply

⚠Warning

1. Type of fluids

Please consult with SMC when using the product in applications other than compressed air.

2. When there is a large amount of drainage.

Compressed air containing a large amount of drainage can cause malfunction of pneumatic equipment. An air dryer or water separator should be installed upstream from filters.

3. Drain flushing

If condensation in the drain bowl is not emptied on a regular basis, the bowl will overflow and allow the condensation to enter the compressed air lines. It causes malfunction of pneumatic equipment.

If the drain bowl is difficult to check and remove, installation of a drain bowl with an auto drain option is recommended.

For compressed air quality, refer to SMC's Best Pneumatics catalog.

4. Use clean air.

Do not use compressed air that contains chemicals, synthetic oils including organic solvents, salt or corrosive gases, etc., as it can cause damage or malfunction.

⚠Caution

1. Install an air filter.

Install an air filter upstream near the valve. Select an air filter with a filtration size of 5 μm or smaller.

2. Take measures to ensure air quality, such as by installing an aftercooler, air dryer, or water separator.

Compressed air that contains a large amount of drainage can cause malfunction of pneumatic equipment such as flow control equipment. Therefore, take appropriate measures to ensure air quality, such as by providing an aftercooler, air dryer, or water separator.

3. Ensure that the fluid and ambient temperature are within the specified range.

If the fluid temperature is 5°C or less, the moisture in the circuit could freeze, causing damage to the seals and leading to equipment malfunction. Therefore, take appropriate measures to prevent freezing.

For compressed air quality, refer to SMC's Best Pneumatics catalog.

Flow Control Equipment Precautions 3

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Operating Environment

⚠Warning

1. Do not use in an atmosphere having corrosive gases, chemicals, sea water, water, water steam, or where there is direct contact with any of these.

Refer to each construction drawing on the flow control equipment material.

2. Do not expose the product to direct sunlight for an extended period of time.

3. Do not use in a place subject to heavy vibration and/or shock.

4. Do not mount the product in locations where it is exposed to radiant heat.

5. Using a flat blade screwdriver adjustable type tamper proof speed controller in locations where vibrations or impacts occur could lead to loosening of the needle. So please use a hexagon lock nut adjustable type speed controller.

For reference, SMC has conducted vibration tests in 25G for 200 operations, and we have confirmed no loosening of the needle. Since the tests were conducted under limited conditions, use caution.

Maintenance

⚠Warning

1. Perform maintenance inspection according to the procedures indicated in the operation manual.

If handled improperly, malfunction and damage of machinery or equipment may occur.

2. Maintenance work

If handled improperly, compressed air can be dangerous. Assembly, handling, repair and element replacement of pneumatic systems should be performed by a knowledgeable and experienced person.

3. Drain flushing

Remove drainage from air filters regularly.

4. Removal of equipment, and supply/exhaust of compressed air

When components are removed, first confirm that measures are in place to prevent workpieces from dropping, run-away equipment, etc. Then, cut off the supply pressure and electric power, and exhaust all compressed air from the system using the residual pressure release function.

When machinery is restarted, proceed with caution after confirming that appropriate measures are in place to prevent cylinders from sudden movement.