



# Operation Manual

PRODUCT NAME

METERING VALVE WITH SILENCER

MODEL / Series / Product Number

*ASN2 Series*

**SMC Corporation**

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# Metering Valve with Silencer 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" and "Danger". They are all important notes for safety and must be followed in addition to International Standards (ISO/ IEC)\*1) and other safety regulations.

- \*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: Manipulating industrial robots – Safety.  
etc.



## 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.

## 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 location 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.



# Metering Valve with Silencer Safety Instructions

## Caution

**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.  
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 SMC 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

### 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 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.

## 2. Specific Product Precautions

### Design/ Selection

#### Warning

##### (1) Confirm the specifications.

Products represented in this catalog are designed only for use in compressed air systems.

Do not operate at pressures, 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.

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 use as stop valves with zero air leakage.

A certain amount of leakage is allowed in the products' 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.

Doing so may cause human injury and/or injury 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. Also, depending on product specifications, there may be variations in the zero needle rotations position of the flow rate characteristics.

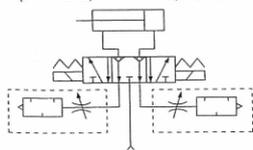
##### (5) Check if PTFE can be used in the application.

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

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

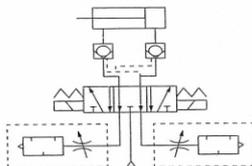
##### (6) Example of inapplicable circuits

(a) Perfect Valve (VF66□□, VS7-6-FPG, VS7-8-FPG)



Residual pressure behind the exhaust needle may cause check valve malfunction in the Perfect Valve.

(b) Pilot check valve between Actuator and Valve



Residual pressure behind the exhaust needle may cause pilot check valve malfunction.

## 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 and inspection.

##### (3) Confirm that the lock nut is tightened.

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

##### (4) Check the number of opening and closing rotations of the needle valve.

It is not possible to remove the needle valve completely, over rotation will cause damage to the product.

##### (5) Do not use tools, such as pliers, to rotate the knob.

This can cause the idle rotation of the knob or damage.

##### (6) Tighten threads with the proper tightening torque.

When installing the products, follow the listed torque specifications.

##### (7) 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.

##### (8) Do not apply excessive force or shock to the body with an impact tool.

This can cause damage or air leakage.

##### (9) To install/remove the flow control equipment, use an appropriate wrench to tighten/loosen the supplied nut on body B as close to the thread as possible.

Do not apply torque at other points, as the product may be damaged.

##### (10)

1. If installing flow controls to valve ports, interference may occur with the fittings. Please consult the catalog before installing.

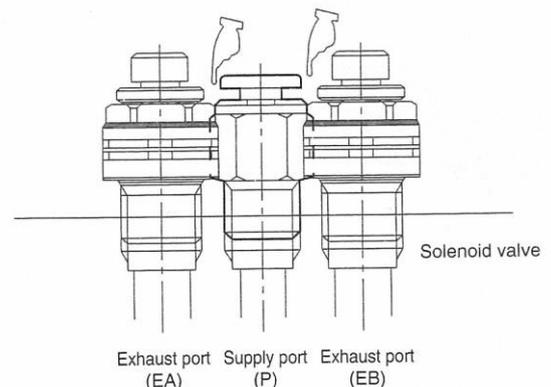


Fig. Example of the interference with fittings

## Mounting

### **Caution**

(1) First, tighten the fitting by hand, then use a suitable wrench to tighten the hexagonal portion of the body a further two or three turns. For the reference value for the tightening torque, refer to the table below. Check the dimensions of each product for the width across flats.

Connection thread size (R, NPT)	[Reference value] Tightening torque N·m
1/8	3 to 5
1/4	8 to 12
3/8	15 to 20
1/2	20 to 25

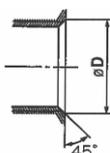
#### (2) M5 and 10-32 UNF

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

※ 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.

#### (3) Chamfered female thread size of the connection thread M5, 10-32UNF

In compliance with ISO16030 Standards (air pressure fluid dynamics – connection – ports and stud ends), the chamfered thread sizes shown below are recommended.



Female thread size	Chamfered port size ΦD (Recommended value)
M5	3.1 to 3.4
10-32UNF	5.1 to 5.3

(4) The proper tightening torques for hexagon lock nuts are shown in the table below. For standard installation, turn 15 to 30° using a tool, after fastening by hand.

Pay attention not to over tighten the product for the width across flats.

Body size	Proper tightening torque (N·m)	Lock nut width across flats
M5 10-32UNF	0.3	7
1/8	1	10
1/4	1.2	12
3/8	2	14
1/2	6	17

## Piping

### **Caution**

#### (1) 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.

## Piping

### **Caution**

#### (2) Winding of sealant 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 sealant 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. This causes malfunction of pneumatic equipment.

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

For compressed air quality, refer to the Best Pneumatics No.6 catalog.

#### (4) Use clean air.

Do not use compressed air that contains chemicals, synthetic oils that include organic solvents, salts 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 5µm 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 the 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 temperatures air 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 or leading to equipment malfunction. Therefore, take appropriate measures to prevent freezing. For compressed air quality, refer to the Best Pneumatics No.6 catalog.

## Operating environment



### Warning

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

Refer to each construction drawing for information on the materials of flow control equipment.

- (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.**

## Maintenance



### Warning

- (1) Perform maintenance and inspection according to the procedures indicated in the operation manual.**

If handled improperly, malfunction or damage of machinery and 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**

Before 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 sudden movement.

### 3. Application

This product is designed to control the speed of a pneumatic actuator.

### 4. Specifications

WORKING FLUID	AIR
WORKING PRESS.RANGE	0~1MPa
PROOF PRESS	1.5MPa
AMBIENI TEMP. AND WORKING FLUID TEMP.	-5~60°C(NO FREEZING)

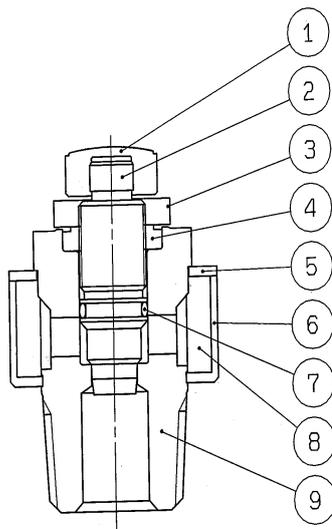
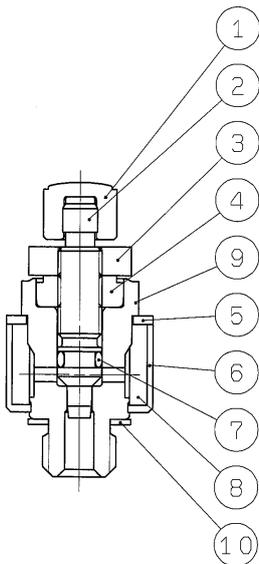
### 5. Troubleshooting

Trouble	Possible cause	Countermeasures
The speed (flow rate) cannot be controlled.	Dust inside	Fully open the needle and apply air blow from the screw. If the problem is not solved even after air blow, install an air filter to the piping, and replace the product with a new one.

### 6. Construction

ASN2-M5,U10/32

ASN2-01~04  
ASN2-N01~N04



No.	Description	Material	Remarks
1	Handle	PBT	
2	Needle	Brass	Electroless nickel plating
3	Lock nut	Steel wire	
4	Needle guide	Brass	Electroless nickel plating
5	Washer	Steel	
6	Cover	PE	
7	O ring	NBR	
8	Sponge	PVA Sponge	
9	Body B	Brass	Electroless nickel plating
10	Gasket	NBR/Stainless	M5,U10/32

Revision history
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Note: Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.

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