In-line Air Filter

New

RoHS

Operating pressure range **–100 kPa to 1.0 MPa**

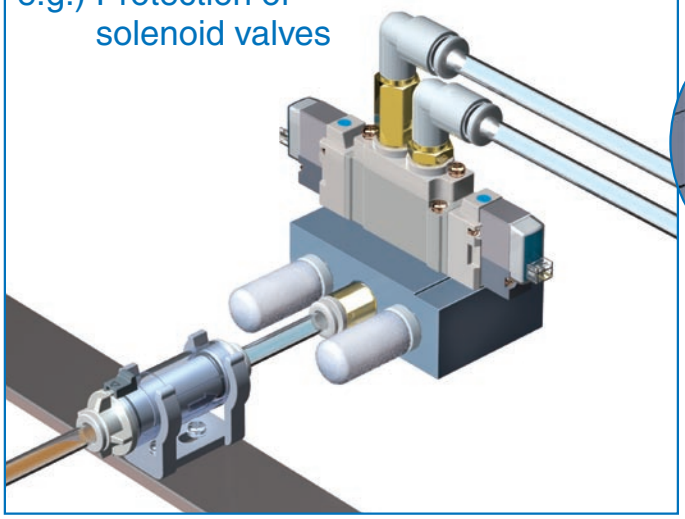
Both positive pressure and vacuum pressure can be used with one unit! Filtration 5 μm

Positive pressure 1.0 MPa

Positive pressure 0 to 1 MPa

IN OUT

e.g.) Protection of solenoid valves



Vacuum pressure –100 kPa

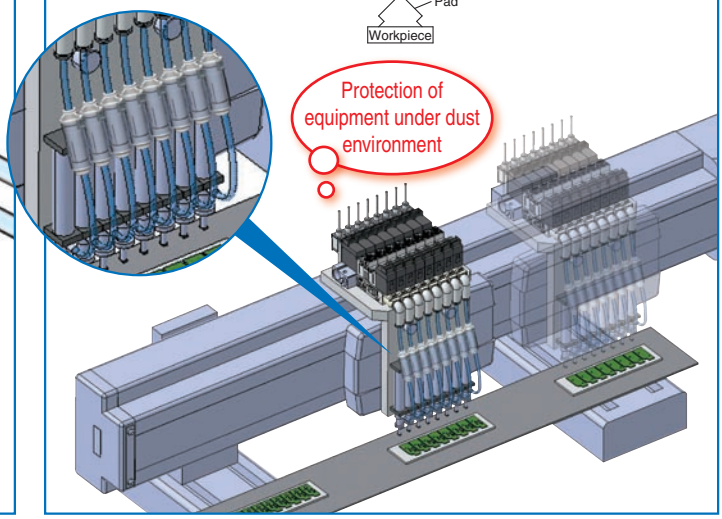
Vacuum pressure –100 to 0 kPa

IN OUT

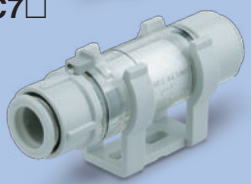
Pad

Workpiece

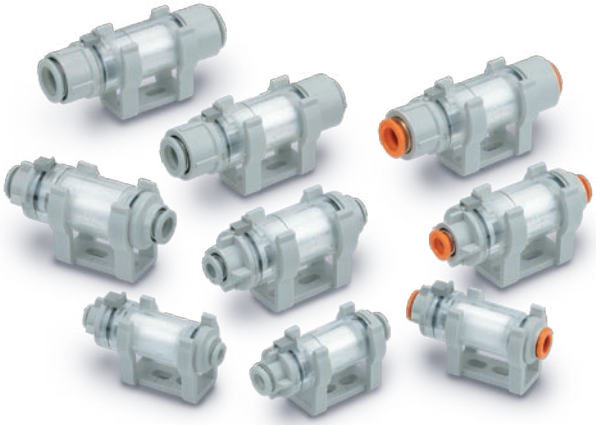
Protection of equipment under dust environment



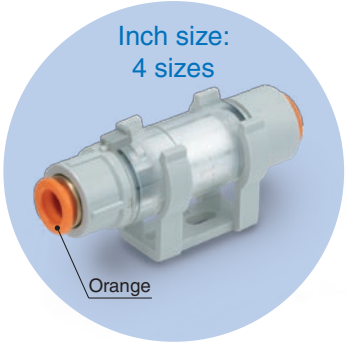
Series Variations

Series	Applicable tubing O.D.		Maximum flow rate under positive pressure [L/min (ANR)] 100 200 300
	Metric size	Inch size	
ZFC5□ 	ø4	ø5/32"	45
	ø6	ø1/4"	100
ZFC7□ 	ø6	ø1/4"	120
	ø8	ø5/16"	250
	ø10	ø3/8"	300
	ø12	—	350

Flow rate (positive pressure) conditions: Supply pressure 0.1 MPa, Differential pressure 30 kPa







Series ZFC

SMC

CAT.ES100-103A



With lock mechanism

During positive pressure, prevents components from being scattered when they are loosened.

2 types of transparent case materials are available.

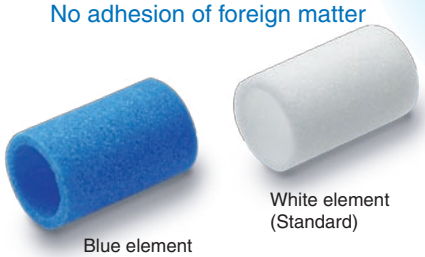
- Polycarbonate (Standard)
  Possible to degrease with alcohol.



- Nylon (Made to Order)
  Resistant to coolant oil

2 element colors are available.

No adhesion of foreign matter



Blue element (Made to Order)

White element (Standard)

Adhesion of foreign matter



Easy to visually check white foreign matter

With One-touch fitting

Metric size: ø4 to ø12
Inch size: ø5/32" to ø3/8"

Available with different bores on IN and OUT sides — Made to Order

IN side < OUT side

Applicable tubing O.D.	
IN port size	OUT port size
ø4	ø6



IN side > OUT side

Applicable tubing O.D.	
IN port size	OUT port size
ø8	ø6
ø10	ø8
ø12	ø10

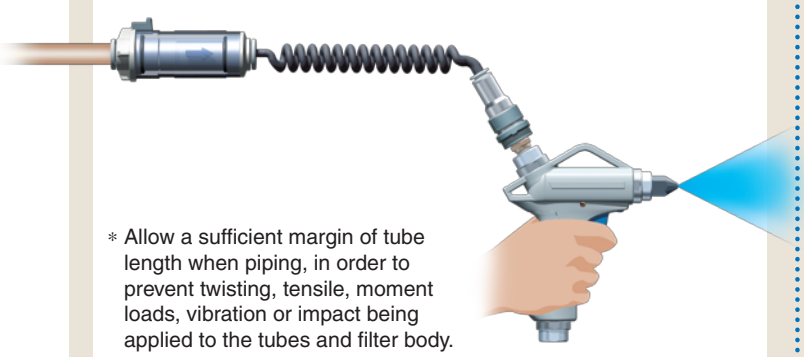


2 levels of filtration rating are available.

·5 µm
·10 µm/Made to Order

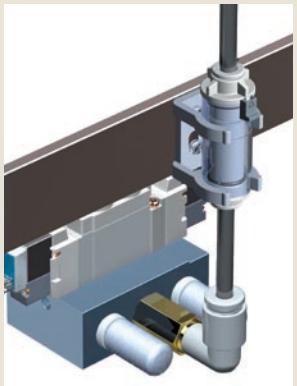
Application examples

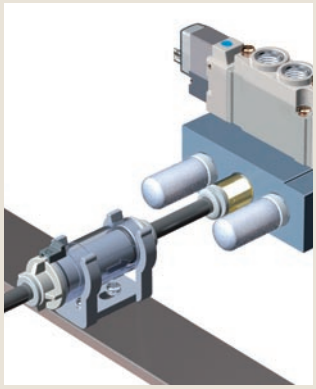
Improvement of air quality for air blow



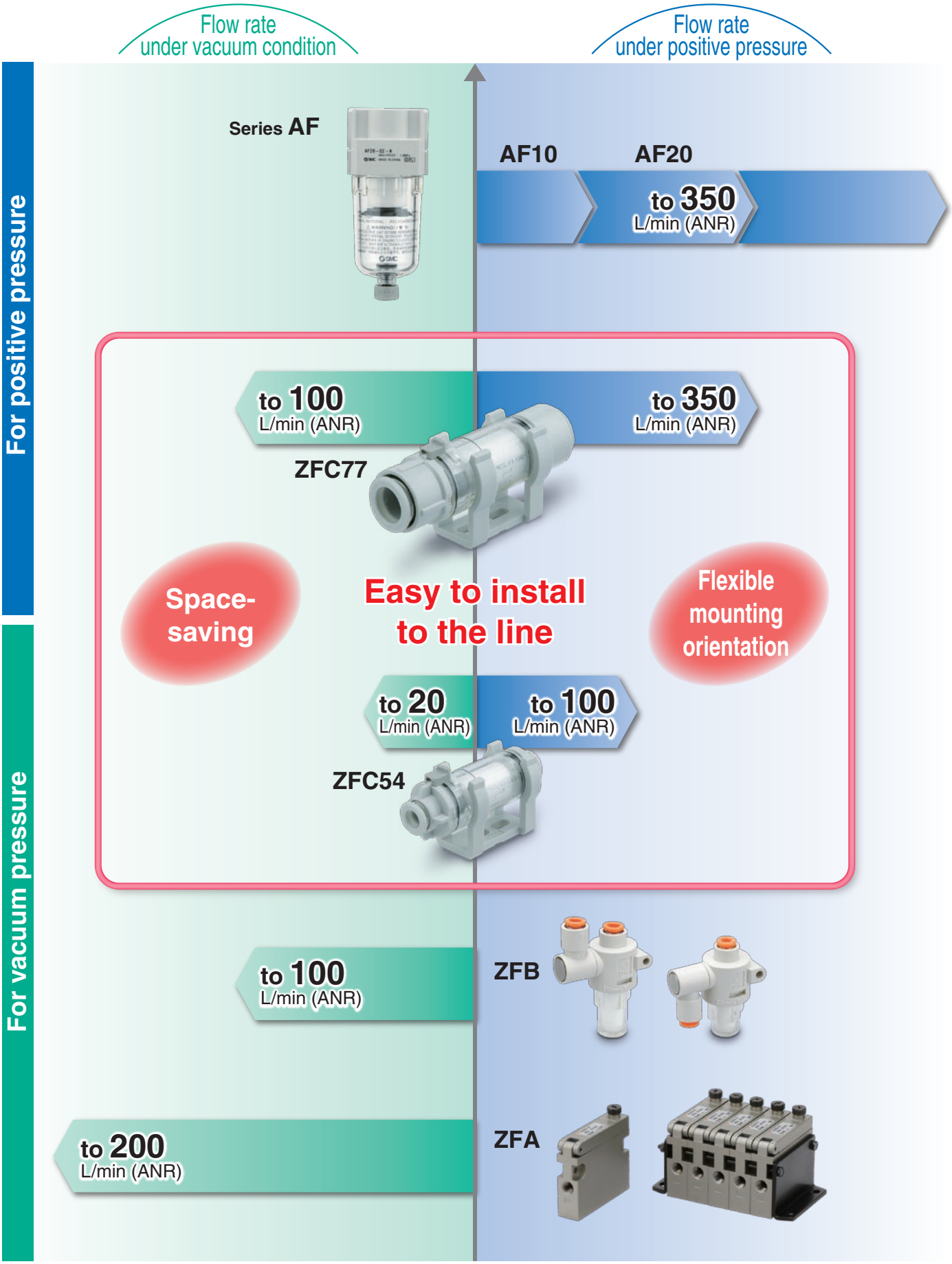
* Allow a sufficient margin of tube length when piping, in order to prevent twisting, tensile, moment loads, vibration or impact being applied to the tubes and filter body.

Flexible mounting orientation





Filter Variations

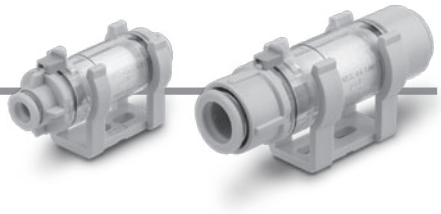


Flow rate (positive pressure) conditions: Supply pressure 0.1 MPa, Differential pressure 30 kPa

In-line Air Filter

Series ZFC

RoHS



How to Order

ZFC 5 4 – B –

Body size

Symbol	Body size	Filtration area
5	20 L/min	750 mm²
7	100 L/min	1260 mm²

Applicable tubing O.D.

Metric size

Symbol	Applicable tubing O.D.	ZFC5	ZFC7
3	ø4	●	—
4	ø6	●	●
5	ø8	—	●
6	ø10	—	●
7	ø12	—	●

Inch size

B	ø5/32"	●	—
D	ø1/4"	●	●
E	ø5/16"	—	●
F	ø3/8"	—	●

Option

Nil	None
B	With bracket

Made to Order

Refer to page 5 for details.

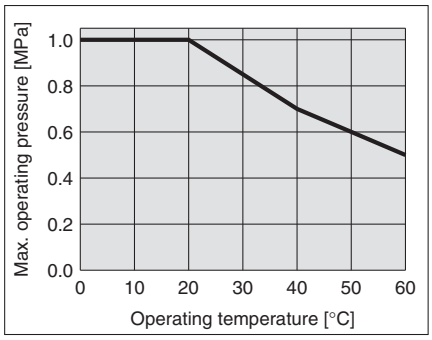
Symbol	Specifications
X01	Different diameters (IN side < OUT side)
X02	Different diameters (IN side > OUT side)
X03	Blue element
X04	Filtration: 10 μm
X05	FKM/Oil free (Seal)
X06	Nylon

Specifications

Model		ZFC5□		ZFC7□			
Port size (Applicable tubing O.D.)	**Metric size**	ø4	ø6	ø6	ø8	ø10	ø12
	Inch size	ø5/32"	ø1/4"	ø1/4"	ø5/16"	ø3/8"	—
Fluid		Air, Nitrogen					
Operating pressure		–100 kPa to 1.0 MPa					
Flow rate (Positive pressure) L/min Note)		45	100	120	250	300	350
Flow rate (Vacuum pressure) L/min		10	20	30	70	80	100
Proof pressure MPa		1.5					
Operating and ambient temperature range °C		0 to 60					
Filtration μm		5 (Filtration efficiency 95%)					
Element replacement differential pressure MPa		0.1 (Vacuum pressure 20 kPa)					
Filtration area mm²		750		1260			
Applicable tubing material		Nylon, Soft nylon, Polyurethane					
Weight g		10.5		20.0		25.0	
Internal capacity cm³		4.5		6.0		7.0	
Total length mm		53.9		68.4		79.7	
Total width mm		19.0		23.6			
Bracket total length mm		23.0		27.3			
Case material		Polycarbonate					

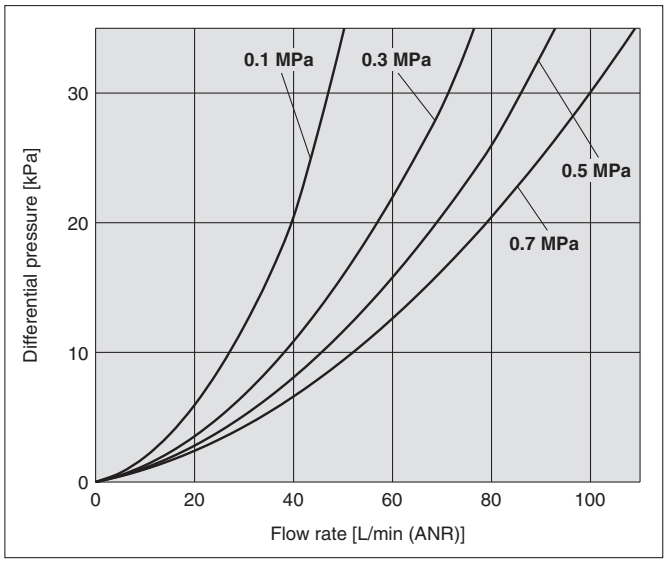
Note) Flow rate (positive pressure) conditions: Supply pressure 0.1 MPa, Differential pressure 30 kPa

Max. Operating Pressure and Operating Temperature

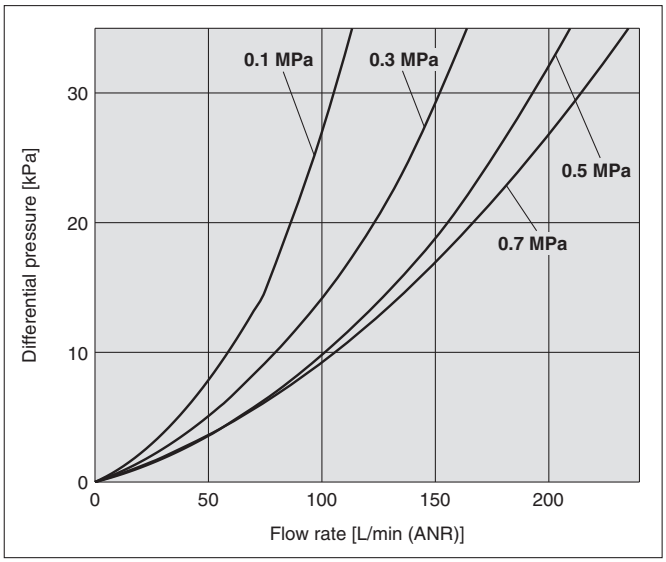


Flow Characteristics

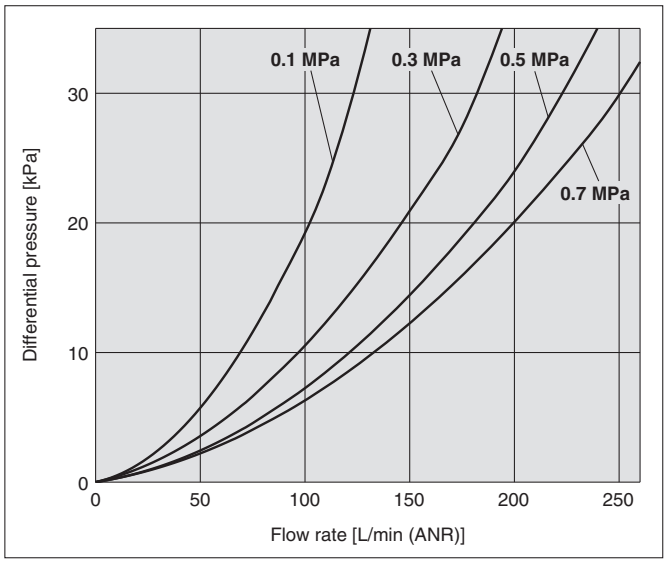
ZFC53 ø4



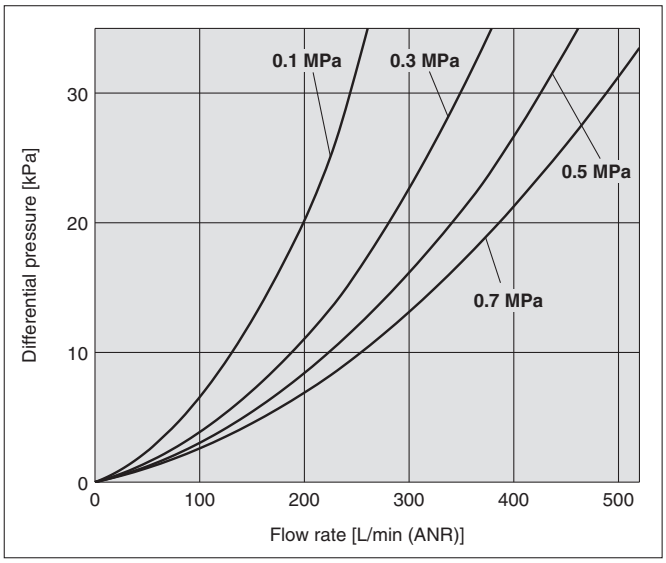
ZFC54 ø6



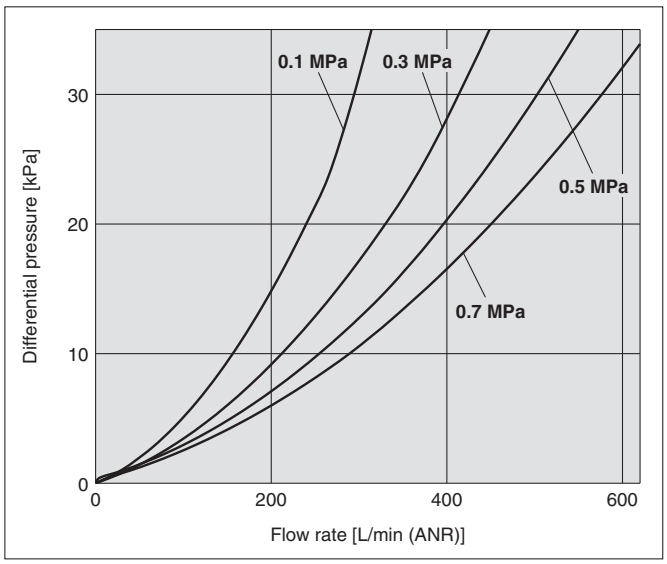
ZFC74 ø6



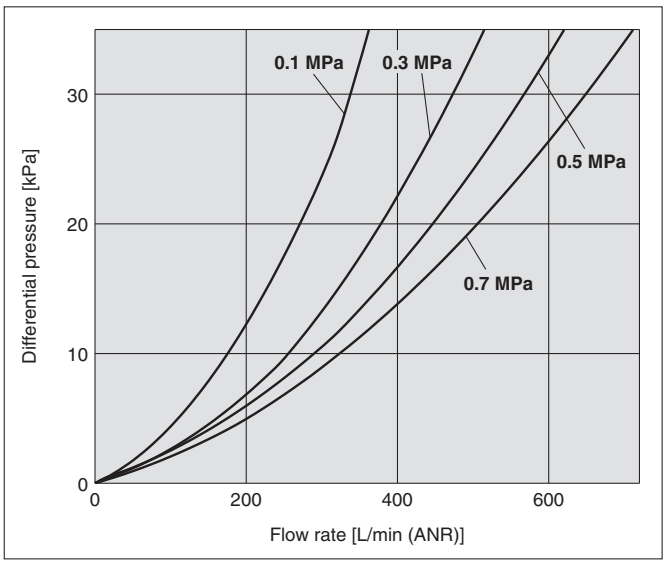
ZFC75 ø8



ZFC76 ø10



ZFC77 ø12



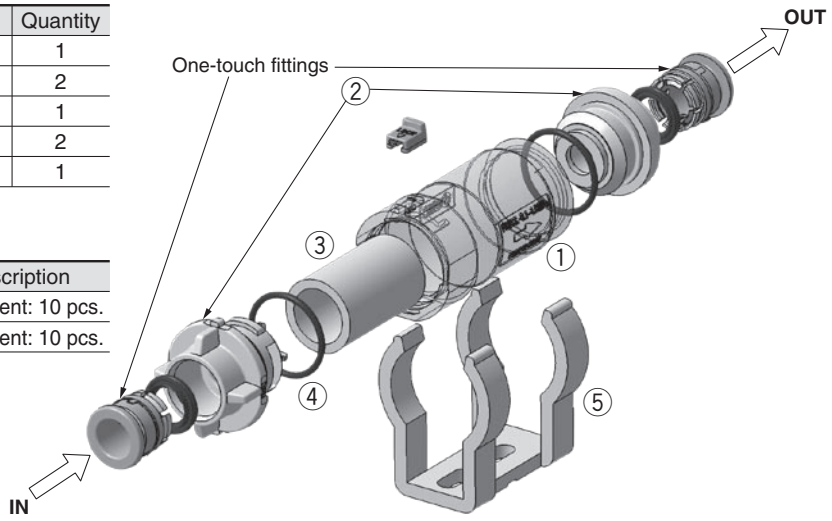
Construction

Component Parts

No.	Description	Material	Quantity
1	**Case**	PC	1
2	**Cover**	Resin PBT	2
3	**Element**	Sintered resin	1
4	**Seal**	HNBR	2
5	**Bracket**	Resin PBT	1

Replacement Element Part No.

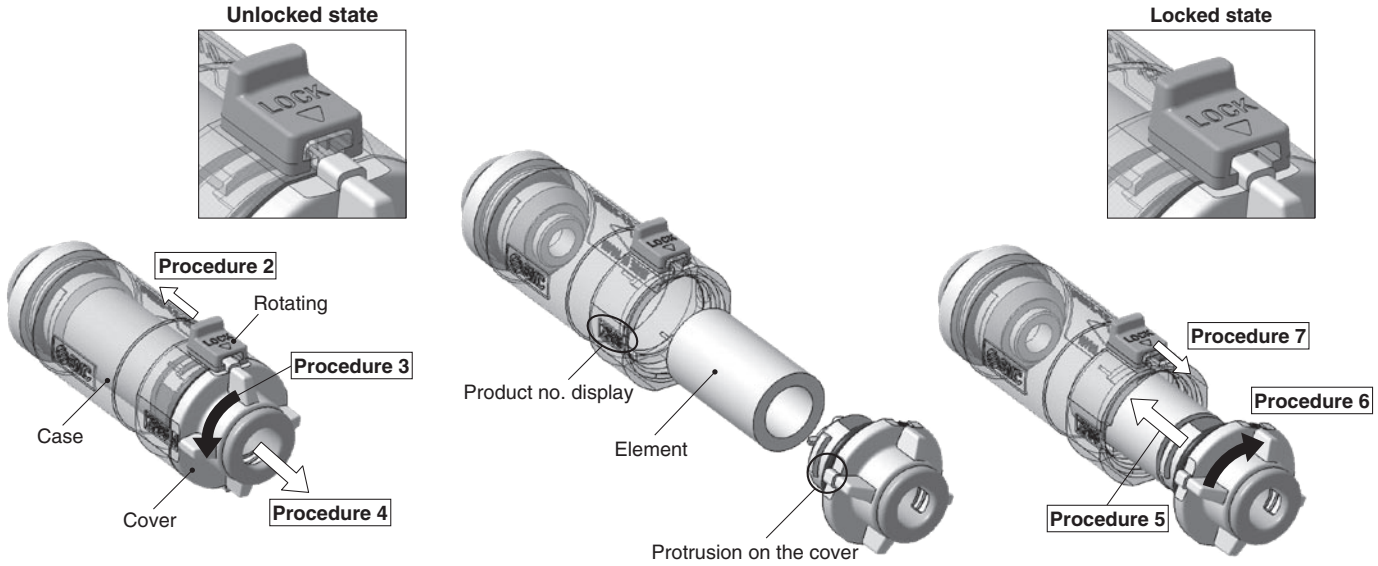
Part no.	Applicable filter model	Element size	Set description
ZFC-EL-3	ZFC5	ø12 x ø8 x L20	Spare element: 10 pcs.
ZFC-EL-4	ZFC7	ø16 x ø12 x L25	Spare element: 10 pcs.



Element Replacement

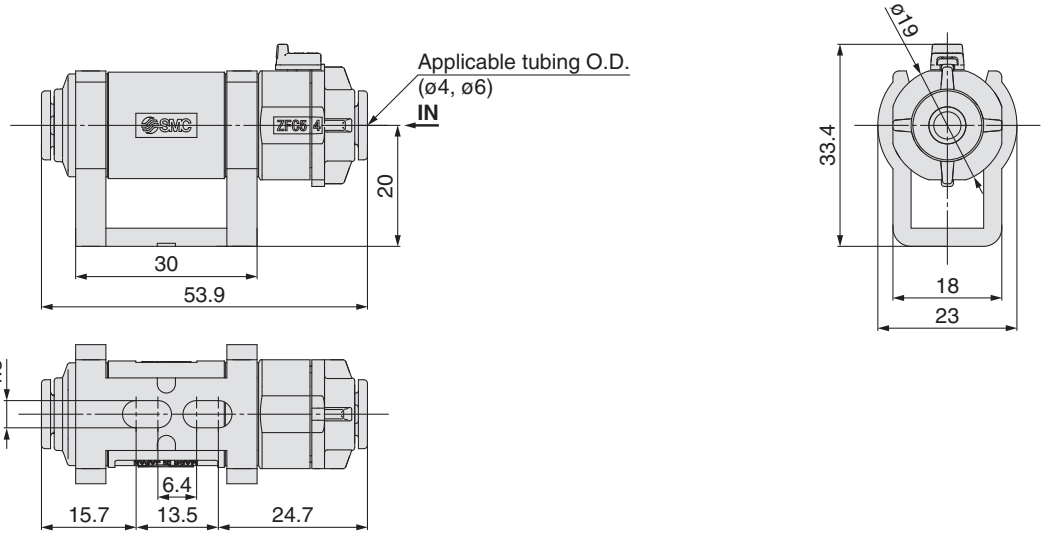
Procedure

1. Stop operation and reduce the filter's internal pressure to atmosphere.
2. Slide the lock mechanism in the direction of the arrow to release the lock.
3. Rotate the cover counterclockwise at least 90 degrees.
4. Pull the cover out of the case to remove the element. Remove dust and other debris remaining inside the case by blowing it out with air, etc. (Also, confirm that the O-ring is not damaged.)
5. Install a new element on cover and insert it into the case.
6. Align the raised part of the cover with the model no. display of the body, and push the cover to the end of the body and rotate it clockwise until it stops.
7. Set the lock mechanism and check that the cover is locked completely.

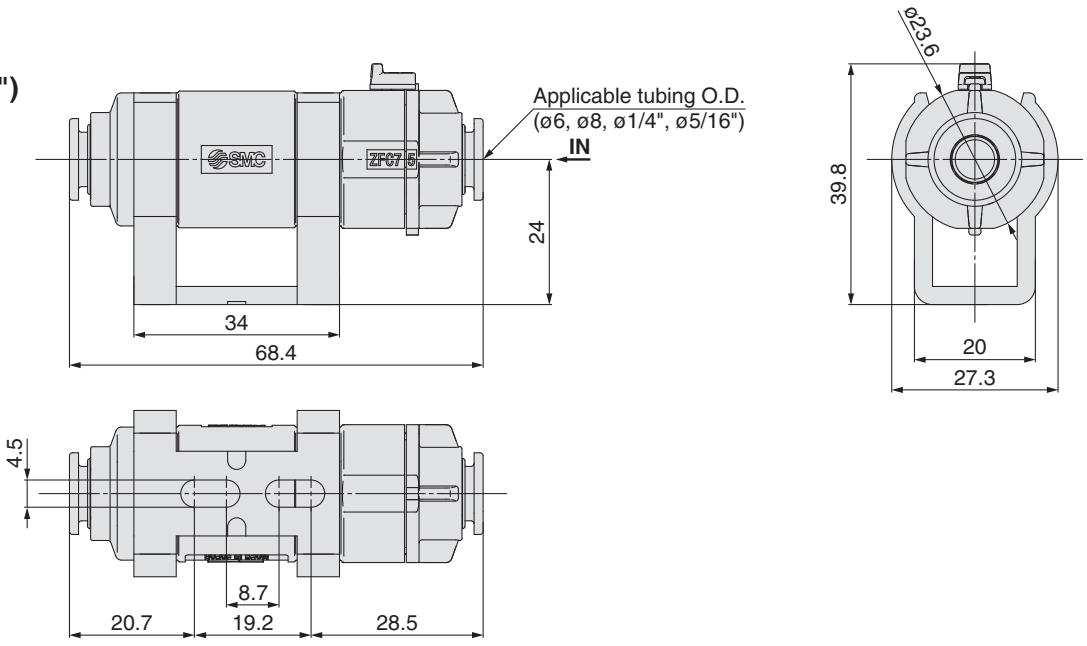


Dimensions

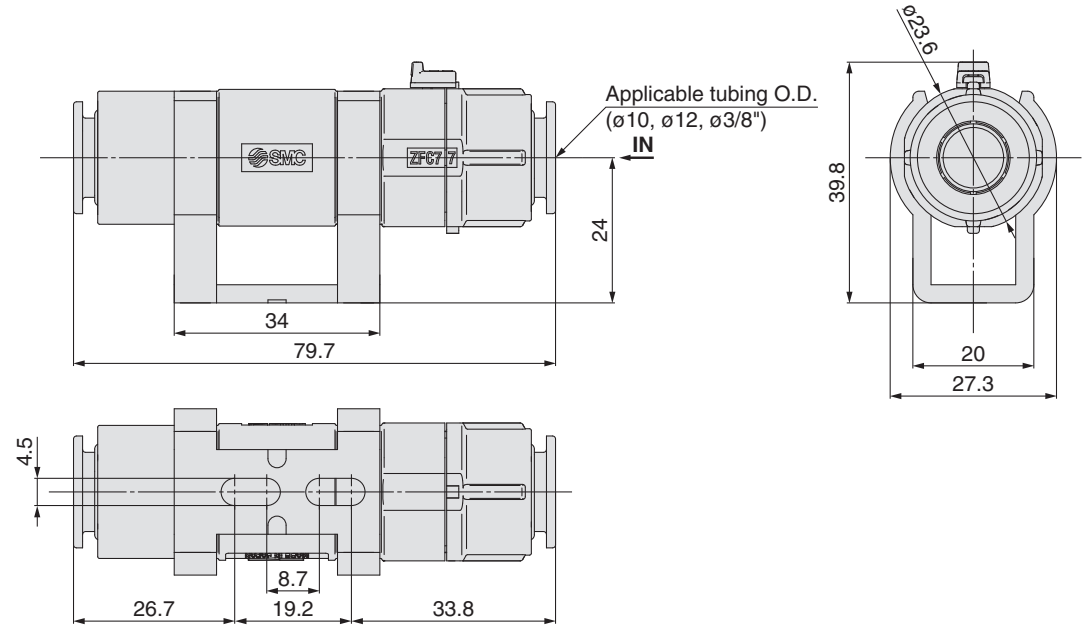
ZFC5
(ø4, ø6)



ZFC7
(ø6, ø8, ø1/4", ø5/16")



ZFC7
(ø10, ø12, ø3/8")



Series ZFC
Made to Order

Please contact SMC for detailed specifications, dimensions and delivery.

Made to Order

1 Different diameters (IN side < OUT side)

Symbol: **-X01**

IN side applicable tubing O.D. (Metric size): ø4
OUT side applicable tubing O.D. (Metric size): ø6

ZFC5 3 – □ – X01

- X01: IN side < OUT side
- 3: Applicable tubing O.D.
- □: Option

Symbol	IN port	OUT port
3	ø4	ø6

Nil	None
B	With bracket



2 Different diameters (IN side > OUT side)

Symbol: **-X02**

IN side applicable tubing O.D. (Metric size): ø8 to ø12
OUT side applicable tubing O.D. (Metric size): ø6 to ø10

ZFC7 5 – □ – X02

- X02: IN side > OUT side
- 5: Applicable tubing O.D.
- □: Option

Symbol	IN side	OUT side
5	ø8	ø6
6	ø10	ø8
7	ø12	ø10

Nil	None
B	With bracket



3 Blue element

Symbol: **-X03**

Easy to recognize white foreign matter on the element by coloring the element.

Standard product – X03

- X03: Blue element

4 Filtration: 10 μm

Symbol: **-X04**

Standard product – X04

- X04: Filtration: 10 μm

5 Seal material: FKM Oil free: Seal

Symbol: **-X05**

Standard product – X05

6 Case material: Nylon

Symbol: **-X06**

Standard product – X06

- X06: Case material: Nylon

SMC

Specific Product Precautions 1

Be sure to read before handling. Refer to back cover for Safety Instructions, "Handling Precautions for SMC Products" (M-E03-3) and Operation Manual for Vacuum Equipment Precautions. Please download it via our website, http://www.smcworld.com

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. Maintenance space

Allow sufficient space for maintenance and inspection.

3. Observe the tightening torque for screws.

Tighten the screws to the recommended torque for mounting the product.

4. Connect tubing to the IN and OUT One-touch fittings in accordance with the precautions for One-touch fittings.

⚠Caution

1. Connect the piping after checking the arrow indication showing the flow direction on the body. If the piping is connected the other way around, it is not possible to seal the element.

2. Positive and negative pressures cannot be used together in the same circuit.

3. Allow a sufficient margin of tube length when piping, in order to prevent twisting, tensile, moment loads, vibration or impact being applied to the tubes and filter body.

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 regularly from the air filters, etc.

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.

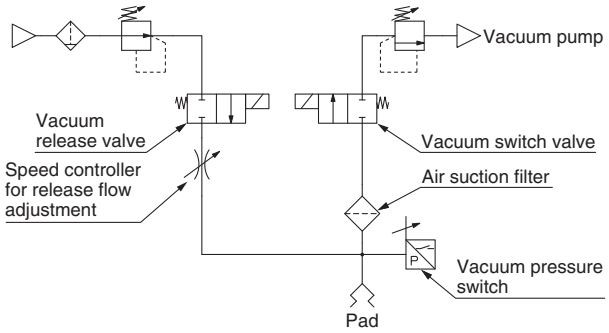
When machinery is restarted after remounting or replacement, confirm that the equipment is operating normally.

Maintenance

⚠Warning

5. The performance of an ejector will deteriorate due to clogged suction filters and silencers.

High flow filters should be used, especially in dusty locations.



If a filter is required on the release pressure side, a different filter should be prepared.

∗ Not possible to use vacuum pressure and positive pressure together in the same line.

6. When the element becomes clogged, stop operation and adjust the internal pressure of the filter to atmospheric pressure before replacing the element.

⚠Caution

1. Element should be replaced in either of the two cases below.

1) When pressure drop reaches 0.1 MPa in a positive pressure or 20 kPa in a vacuum pressure.

2) When the set values (flow rate, vacuum reaching time) change.

2. During disassembly and assembly, confirm that there are no scratches or damage, etc, on the O-ring.

3. Before using, confirm there is no leakage after replacing elements.

Specific Product Precautions 2

Be sure to read before handling. Refer to back cover for Safety Instructions, "Handling Precautions for SMC Products" (M-E03-3) and Operation Manual for Vacuum Equipment Precautions. Please download it via our website, http://www.smcworld.com

Recommended Piping Conditions

1. When connecting piping to the One-touch fitting, use pipe length with sufficient margin, in accordance with the piping conditions shown in Figure 1.

Also, when using a tying band, etc., to bind the piping together, make sure that external force does not come to bear on the fitting. (see Figure 2)

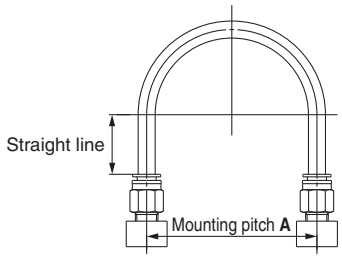


Figure 1 Recommended piping

Unit: mm

Tubing size	Mounting pitch **A**			Straight-line pipe length
	Nylon tube	Soft nylon tube	Polyurethane tube	
ø4, 5/32"	56 or more	30 or more	26 or more	20 or more
ø6	84 or more	39 or more	39 or more	30 or more
ø1/4"	89 or more	56 or more	57 or more	32 or more
ø8, 5/16"	112 or more	58 or more	52 or more	40 or more
ø10	140 or more	70 or more	69 or more	50 or more
ø3/8"	134 or more	76 or more	69 or more	48 or more
ø12	168 or more	82 or more	88 or more	60 or more

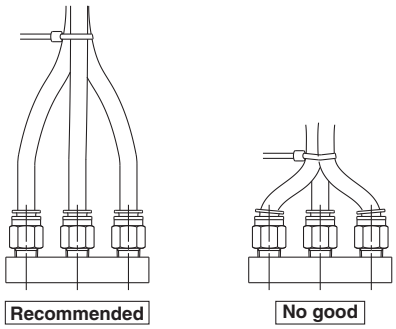


Figure 2 When using a tying band to bind the piping together

Handling of One-touch Fittings

⚠Caution

1. Tubing attachment/detachment for One-touch fittings

1) Installing of tubing

(1) Use tubing with no flaws on its periphery and cut it off at a right angle. When cutting the tubing, use a tube cutter, TK-1, 2 or 3. Do not use pinchers, nippers or scissors, etc. If cutting is done with tools other than tube cutters, the tubing may be cut diagonally or become flattened, etc. This can make a secure installation impossible, and cause problems such as the tubing pulling out after installation or air leakage. Allow some extra length in the tubing.

(2) The outside diameter of the polyurethane tubing swells when internal pressure is applied to it. Therefore, it may not be possible that the tubing can be re-inserted into the One-touch fitting. Confirm the tubing outside diameter, and when the accuracy of the outside diameter is +0.15 or larger, re-insert the tubing into the One-touch fitting without cutting it. When the tubing is re-inserted into the One-touch fitting, confirm that the tubing goes through the release button smoothly.

(3) Grasp the tubing and push it in slowly, inserting it securely all the way into the fitting.

(4) After inserting the tubing, pull on it lightly to confirm that it will not come out. If it is not installed securely all the way into the fitting, this can cause problems such as air leakage or the tubing pulling out.

2) Removal of tubing

(1) Push in the release button sufficiently. When doing this, push the collar evenly.

(2) Pull out the tubing while holding down the release button so that it does not come out. If the release button is not pressed down sufficiently, there will be increased bite on the tubing and it will become more difficult to pull it out.

(3) When the removed tubing is to be used again, cut off the portion which has been chewed before reusing it. If the chewed portion of the tubing is used as it is, this can cause trouble such as air leakage or difficulty in removing the tubing.

2. Do not install the SMC's KQ One-touch fitting series with a metal rod into the ZFC5 series fittings. The metal rod will not be held and the fitting will shoot out.

Specific Product Precautions 3

Be sure to read before handling. Refer to back cover for Safety Instructions, "Handling Precautions for SMC Products" (M-E03-3) and Operation Manual for Vacuum Equipment Precautions. Please download it via our website, http://www.smcworld.com

Other Tube Brands

⚠Caution

1. When tubing of brands other than SMC's are used, verify that the tubing O.D. satisfies the following accuracy;

1) Nylon tubing : Within ±0.1 mm
2) Soft nylon tubing : Within ±0.1 mm
3) Polyurethane tubing : Within +0.15 mm, Within –0.2 mm

Do not use tubing which does not meet these outside diameter tolerances. It may not be possible to connect them, or they may cause other trouble, such as air leakage or the tube pulling out after connection.

2. Connecting products with metal rods

After connecting the products with metal rods (Series KC, etc.) to the One-touch fittings, do not use tubes, resin plugs or reducers, etc. These may come off the fittings.

Design

⚠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. Modification prohibited

Do not make any modifications, including additional machining. It may cause human injury and/or an accident and will void the warranty.

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 droplet separator should be installed upstream from filters.

3. Drain flushing

If condensate in the drain bowl is not emptied on a regular basis, the condensate will overflow and allow it to enter the compressed air lines. This will cause a 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.

Refer to "SMC Air Preparation System" for further details on compressed air quality.

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.

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.

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

3. Do not use in an environment where flammable gas or explosive gas exists. Usage may cause a fire or explosion. The products do not have an explosion proof construction.

4. The valve should not be exposed to prolonged sunlight. Use a protective cover.

5. Remove any sources of excessive heat.

6. In locations where there is contact with spatter from water, oil, solder, etc., take suitable protective measures.

⚠ 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.

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

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