

Clean Air Filter

Hollow Fibre Element

RoHS

- Nominal filtration rating: **0.01** μm (filtration efficiency 99.99 %)
- Initial pressure drop: **0.03** MPa (at inlet pressure 0.7 MPa, maximum flow)
- Maximum operating pressure: **1.0** MPa (at 20 °C)

SFD100 / **New** 110

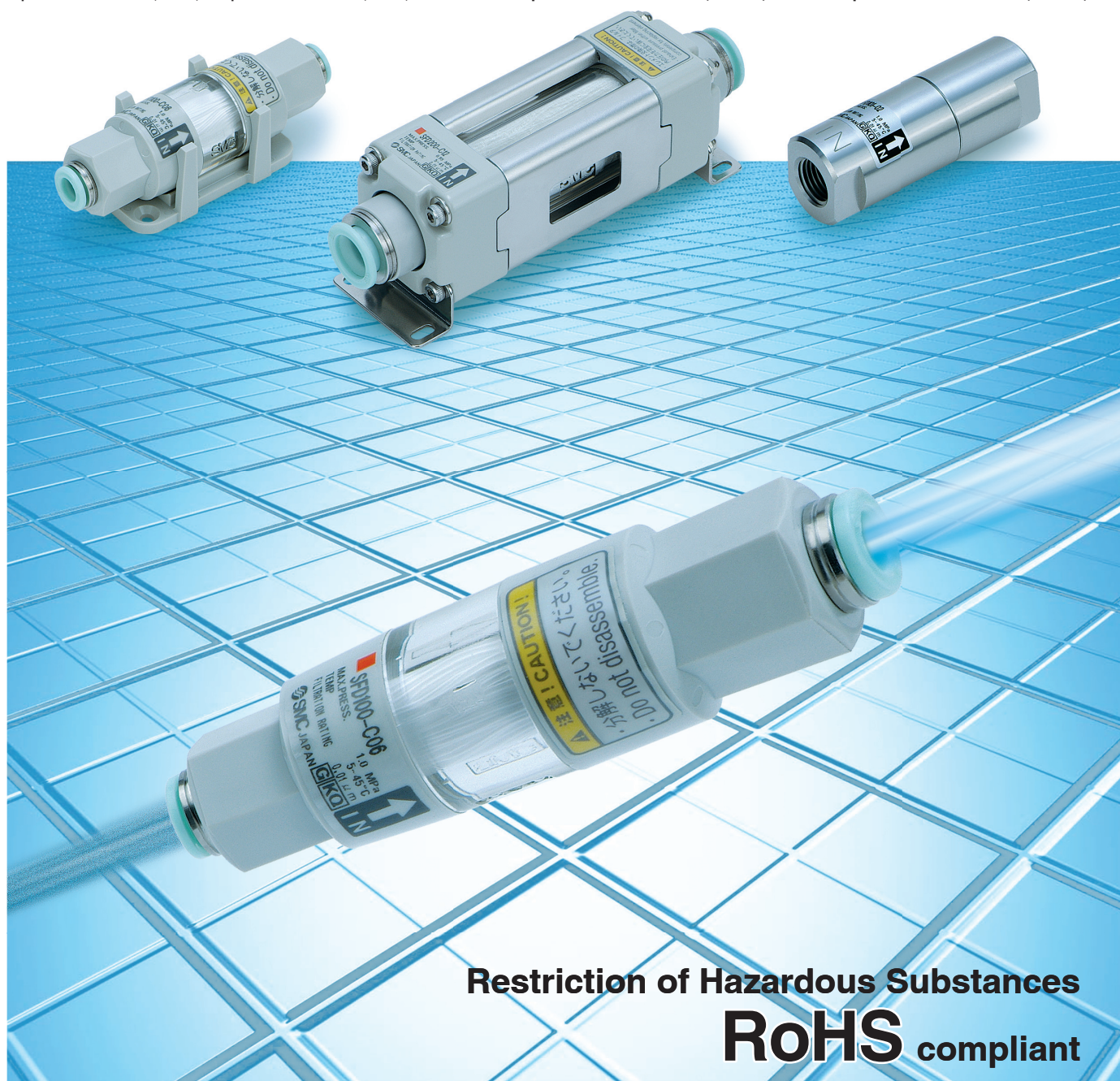
SFD200

SFD101/102 **Made to Order**

Up to **100** l/min(ANR) / Up to **120** l/min(ANR)

Up to **500** l/min(ANR)

Up to **100** l/min(ANR)

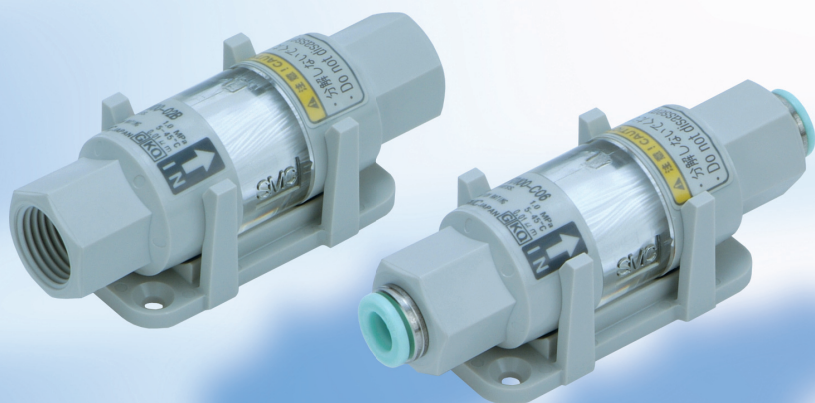


Restriction of Hazardous Substances

RoHS compliant

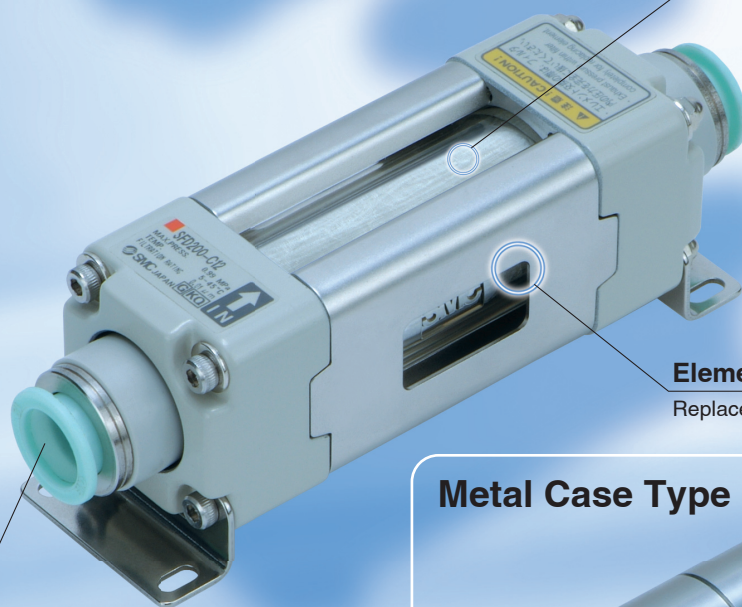
SFD Series

SMC
CAT.EUS120-5A-UK



Clear resin case

- Easy to confirm a dirty element.
- Polycarbonated material is resistant to alcohol-based cleaning solutions.



Element replaceable (Cartridge type)

Replaceable hollow fibre elements

Piping variation

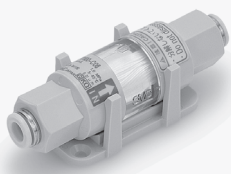
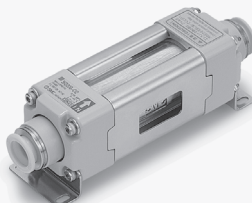
- Clean One-touch fittings
- Female thread

Metal Case Type



Stainless steel or aluminium cases are available.

Metal case suitable for an atmosphere exposed to organic solvents and chemicals (Fluids: Air and (Nitrogen))

SFD100, 110							SFD200			SFD101	SFD102
											
										Made to Order	
										Pages 9 and 10	
Type		Disposable type (non-replaceable element)					Cartridge type (replaceable element)				
Flow rate l/min (ANR) (at inlet pressure 0.7 MPa)		SFD100	SFD110	SFD100	SFD110	SFD100	SFD110	Up to 300	Up to 400	Up to 500	Up to 100
		Up to 60	Up to 70	Up to 80	Up to 100	Up to 100	Up to 120				
Port size	One-touch fitting	Ø 4		Ø 6		Ø 8		Ø 8	Ø 10	Ø 12	—
	Female thread	—		—		Rc 1/4, G 1/4 NPT 1/4		—	—	Rc 1/4, G 1/4 NPT 1/4	Rc 1/4, G 1/4, NPT 1/4
Case material		Resin					Resin			Aluminium	Stainless steel
Fluid		Air (Nitrogen)									
Nominal filtration rating		0.01 µm (filtration efficiency: 99.99 %) Note)									
Initial pressure drop		0.03 MPa (at inlet pressure 0.7 MPa, maximum flow)									
Maximum operating pressure (at 20 °C)		1.0 MPa (in case of nitrogen: 0.99 MPa)									
Operating temperature		5 to 45 °C									

Note) The clean air filter is designed for the filtration of solid objects. It is not suitable for the separation of water and oil.

Integrated production in a clean environment

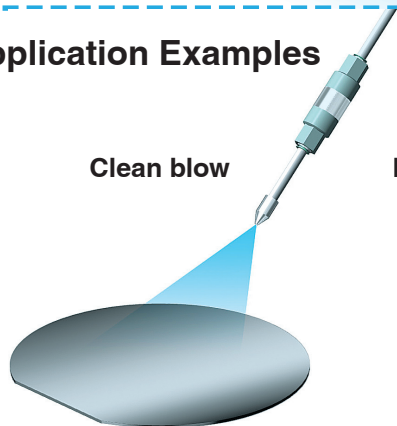
Under a clean environment, all components have undergone ultrasonic cleaning.
Assembly, inspection and antistatic double packaging processes are conducted in an integrated production system.

Assembly environment

- Clean room : Class **M5.5** (ISO class **7**)*
- Clean bench : Class **M3.5** (ISO class **5**)*

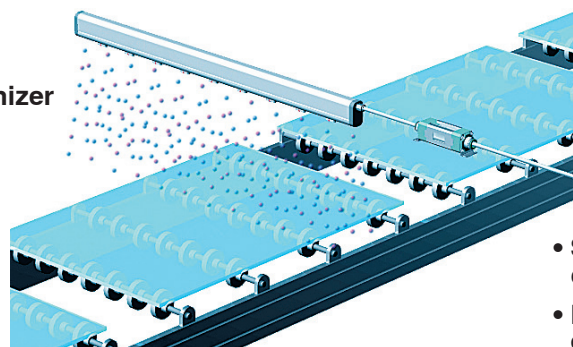
* Fed. Std. 209E (): based on ISO14644-1.

Application Examples



Clean blow

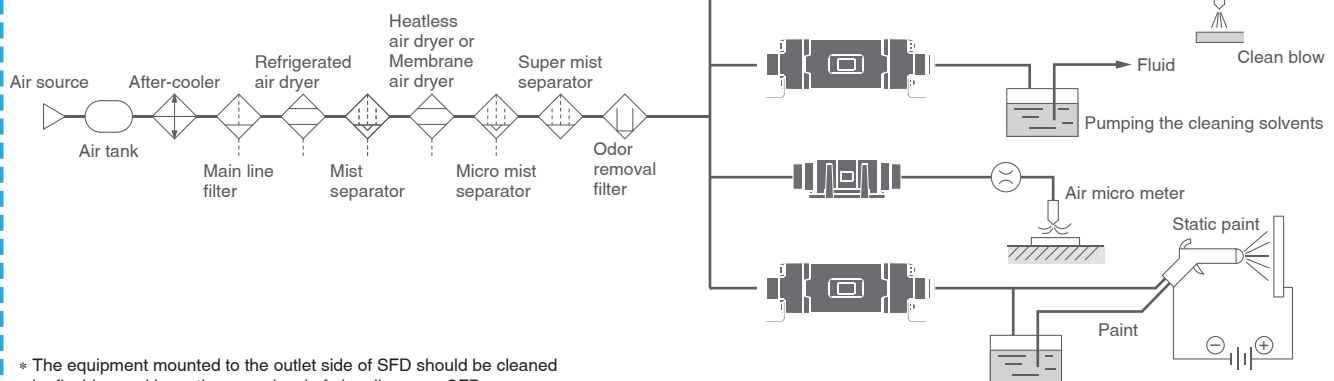
Blow of ionizer



- Substitution of chamber
- Fluid pumping, etc.

* When blowing, take care not to entrain ambient air which could contaminate the workpieces.

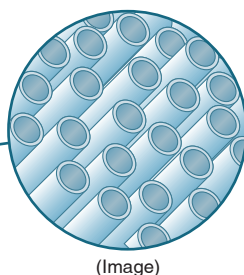
Circuit Examples



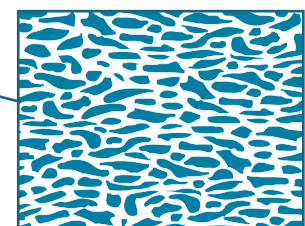
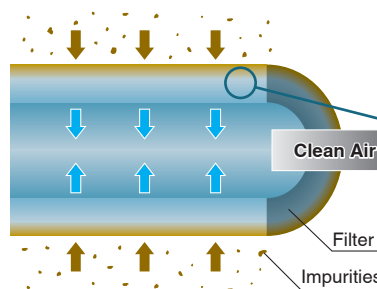
* The equipment mounted to the outlet side of SFD should be cleaned by flushing and have the same level of cleanliness as SFD.

Hollow fibre membrane

The hollow fibre membrane has a porous construction with numerous fine holes on a straw type fibre membrane wall. The hollow fibre membrane filter traps and filtrates the impurities from the compressed air through the overlapping layered fine holes.



(Image)



(Image)

SFD Series

Model Selection

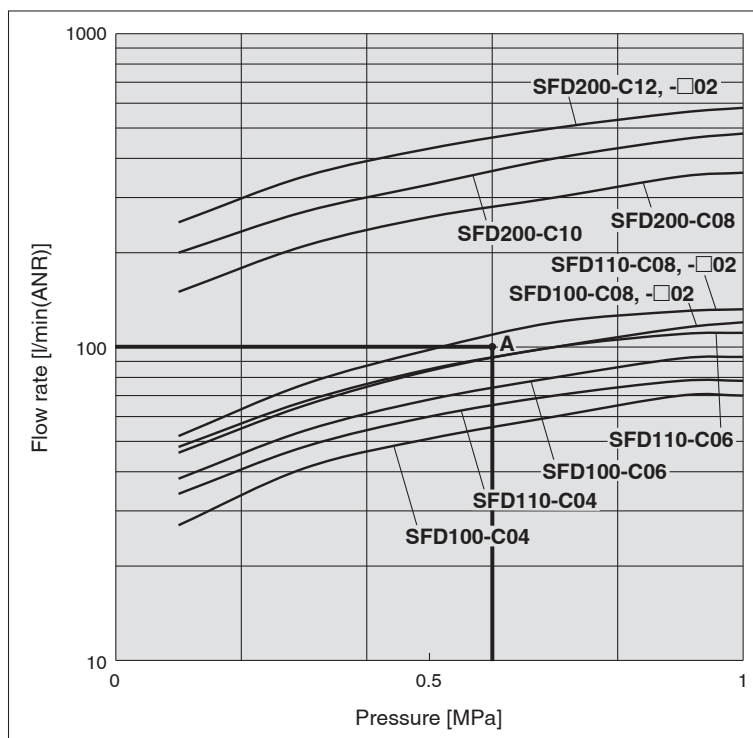
Select the model by using the following procedures involving the inlet pressure and the maximum flow rate.

[Example] Inlet pressure: 0.6 MPa

Maximum flow rate: 100 l/min (ANR)

1. Obtain the intersection A for the inlet pressure and the maximum flow rate by using the maximum flow rate chart.
2. If the obtained intersection A is above the maximum flow rate line, the SFD110-C08, -□02, SFD200-C12, -□02, -C10, or -C08 are selected.

Maximum Flow Rate



Clean Air Filter *SFD Series*

RoHS

How to Order

SFD 10 0 0 - C08

• Clean air filter

• Size

Symbol	Max. flow rate
10	100 l/min (ANR)
11	120 l/min (ANR)
20	500 l/min (ANR)

• Case material

Symbol	Material
0	Resin
1	Aluminium
2	Stainless steel

Symbol 1 and 2 are made to order.
For details, refer to page 9.

• Option

Symbol	Option
—	None
B	Bracket (SFD100 only)

* The brackets are provided with the SFD200 series as a standard product. (—)

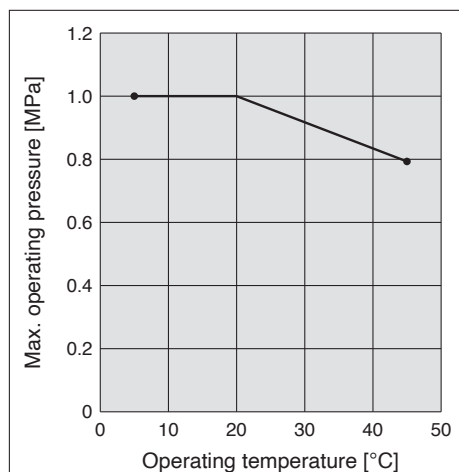
• Port size

Symbol	Connection size	Applicable size	
		SFD100, 110	SFD200
C04	Ø 4	●	—
C06	Ø 6	●	—
C08	Ø 8	●	●
C10	Ø 10	—	●
C12	Ø 12	—	●
02	Rc 1/4	●	●
N02	NPT 1/4	●	●
F02	G 1/4	●	●



Different diameters for IN and OUT ports are Made to Order.
For details, refer to page 10.

Relationship between Operating Temperature and Max. Operating Pressure



Specifications

Model	SFD10□	SFD11□	SFD20□
Port size	One-touch fittings Ø 4, Ø 6, Ø 8 Rc, NPT, G 1/4		One-touch fittings Ø 8, Ø 10, Ø 12 Rc, NPT, G 1/4
Fluid	Air (Nitrogen)		Air (Nitrogen)
Air flow capacity (at inlet pressure 0.7)	Up to 100 l/min (ANR)	Up to 120 l/min (ANR)	Up to 500 l/min (ANR)
Nominal filtration rating ^{Note 1)}	0.01 µm (99.99%)		
Operating pressure range ^{Note 2)}	— 100 kPa to 1.0 MPa (in case of nitrogen: 0.99 MPa)		
Operating temperature	5 to 45 °C		
Initial pressure drop	0.03 MPa (at inlet pressure 0.7 MPa, maximum flow)		
Element proof differential pressure ^{Note 3)}	0.5 MPa		
Proof pressure	1.5 MPa		
Element service life	1 year, or when the pressure drop reaches 0.1 MPa.		

Note 1) Measured under SMC's specified conditions.

Note 2) The maximum operating pressure varies depending on temperature. Refer to the graph that shows the relationship between operating temperature and maximum operating pressure on the left.

Note 3) This means that the element does not break at 0.5 MPa. See "Specific Product Precautions".

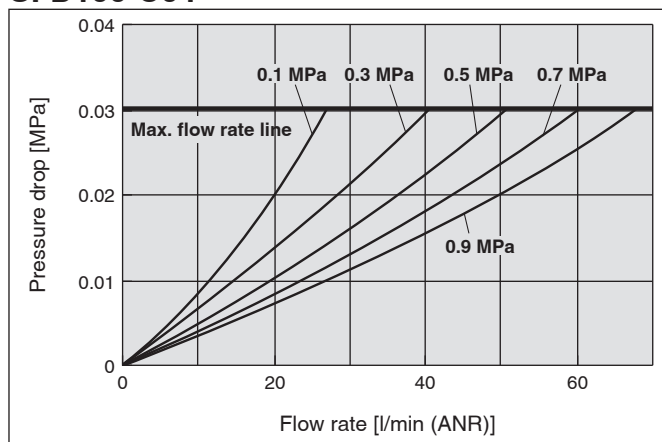
Model	Port size	Rated flow (l/min (ANR)) ^{Note 1)}	Weight
SFD100	Ø 4 (One-touch fittings)	60	35 g
	Ø 6 (One-touch fittings)	80	35 g
	Ø 8 (One-touch fittings)	100	35 g
	Rc, NPT, G 1/4	100	35 g
SFD101 ^{Note 2)}	Rc, NPT, G 1/4	100	60 g
SFD102 ^{Note 2)}	Rc, NPT, G 1/4	100	150 g
SFD110	Ø 4 (One-touch fittings)	70	35 g
	Ø 6 (One-touch fittings)	100	35 g
	Ø 8 (One-touch fittings)	120	35 g
	Rc, NPT, G 1/4	120	35 g
SFD200	Ø 8 (One-touch fittings)	300	190 g
	Ø 10 (One-touch fittings)	400	190 g
	Ø 12 (One-touch fittings)	500	190 g
	Rc, NPT, G 1/4	500	260 g

Note 1) The maximum flow rate when the inlet pressure is 0.7 MPa.

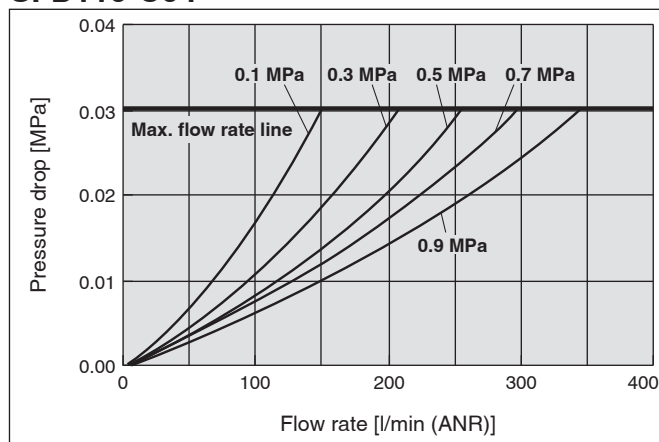
Note 2) SFD101 and SFD102 are produced upon receipt of order.

Flow Rate Characteristics

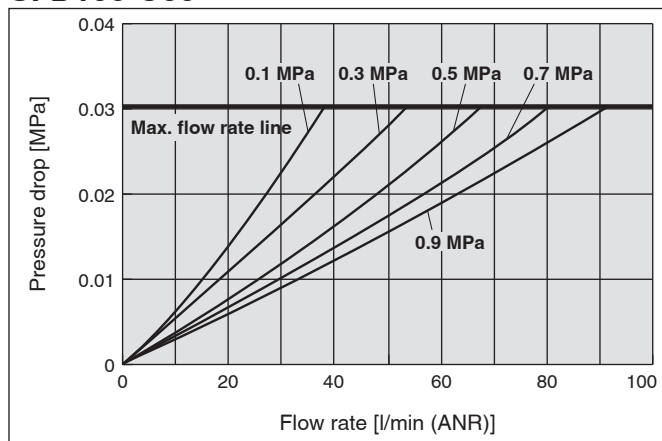
SFD100-C04



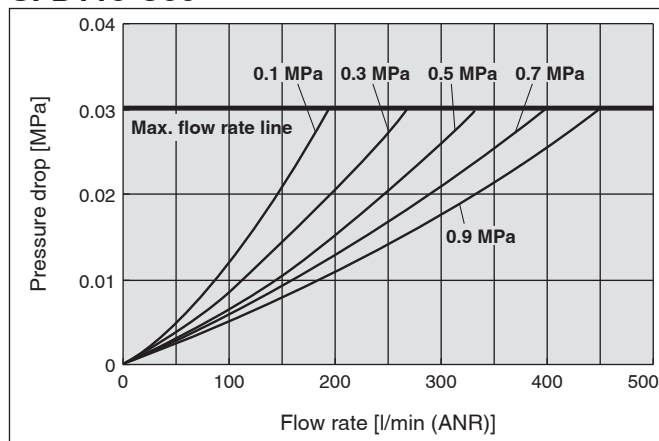
SFD110-C04



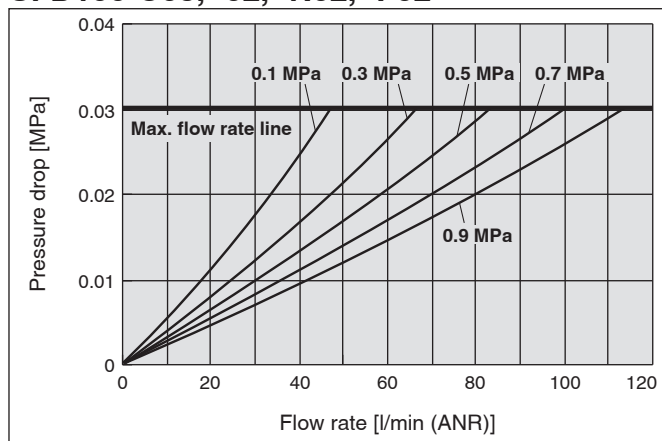
SFD100-C06



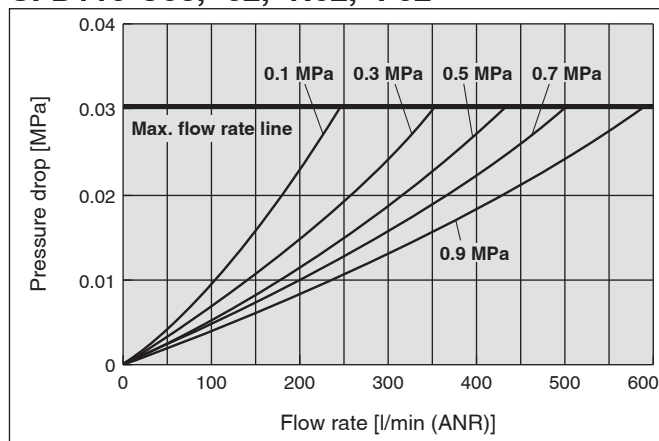
SFD110-C06



SFD100-C08, -02, -N02, -F02

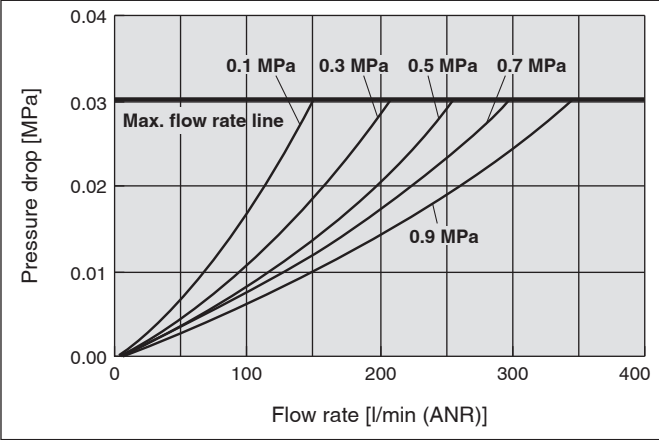


SFD110-C08, -02, -N02, -F02

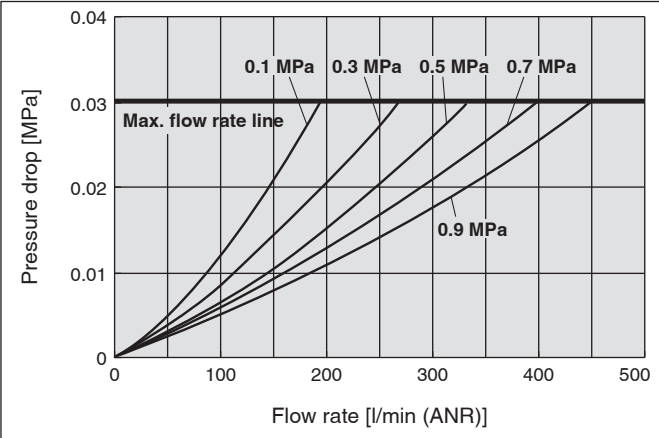


Flow Rate Characteristics

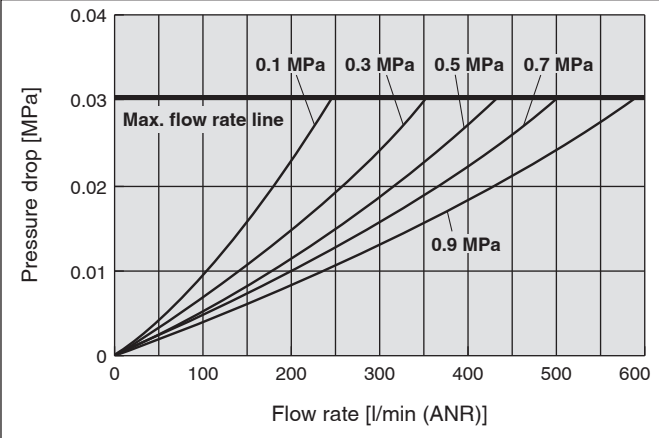
SFD200-C08



SFD200-C10



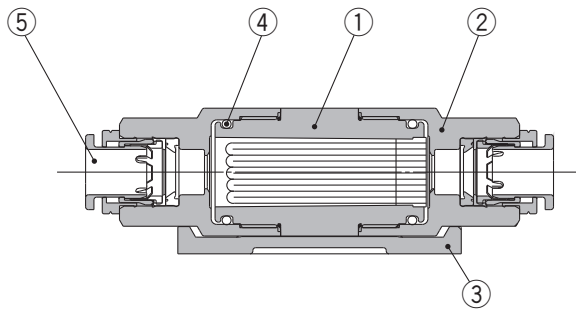
SFD200-C12, -02, -N02, -F02



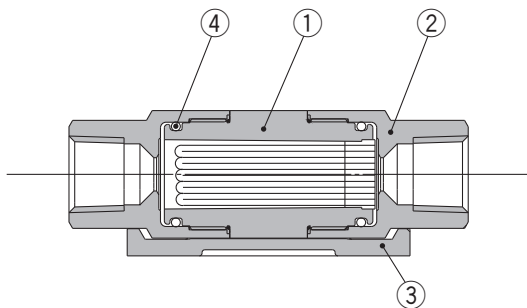
Serie SFD

Construction

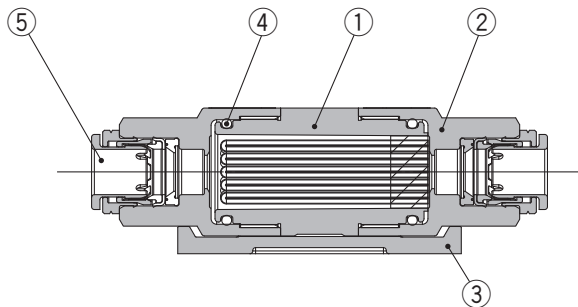
SFD100-C□



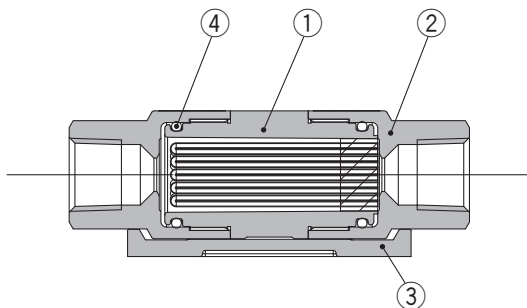
SFD100-□02



SFD110-C□



SFD110-□02



Component Parts

No.	Description	Material	Note
1	Element	PC, Polyolefin, PU, PET, ABS	
2	Cover	PBT	
3	Bracket	PBT	
4	O-ring	H-NBR	
5	Cassette	PP, EPDM, Stainless steel	

Replacement Parts

No.	Description	Material	Note
1	Bracket set	SFD-BR100	With 2 countersunk head screws (M3)

Component Parts

No.	Description	Material	Note
1	Element	PC, Polyolefin, PU, PET, ABS	
2	Cover	PBT	
3	Bracket	PBT	
4	O-ring	H-NBR	

Replacement Parts

No.	Description	Material	Note
1	Bracket set	SFD-BR100	With 2 countersunk head screws (M3)

Component Parts

No.	Description	Material	Note
1	Element	PC, Polyolefin, PU	
2	Cover	PBT	
3	Bracket	PBT	
4	O-ring	H-NBR	
5	Cassette	PP, EPDM, Stainless steel	

Replacement Parts

No.	Description	Material	Note
1	Bracket set	SFD-BR100	With 2 countersunk head screws (M3)

Component Parts

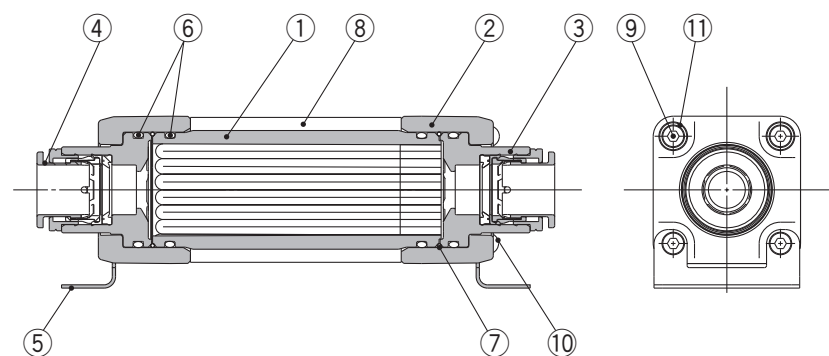
No.	Description	Material	Note
1	Element	PC, Polyolefin, PU	
2	Cover	PBT	
3	Bracket	PBT	
4	O-ring	H-NBR	

Replacement Parts

No.	Description	Material	Note
1	Bracket set	SFD-BR100	With 2 countersunk head screws (M3)

Construction

SFD200-C□



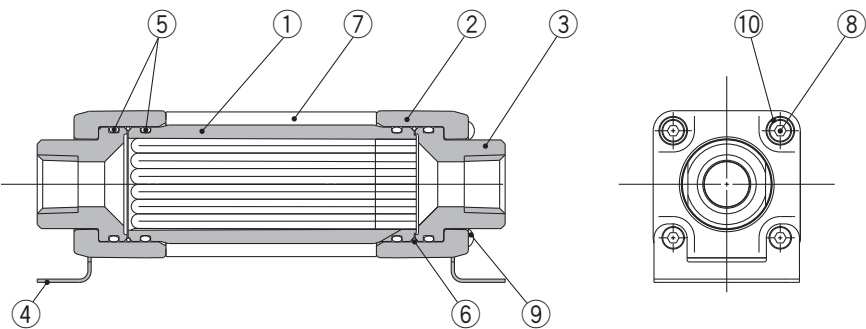
Component Parts

No.	Description	Material	Note
1	Element	PC, Polyolefin, PU	
2	Cover	Aluminium alloy	
3	Fitting body	PBT	
4	Cassette	PP, EPDM, Stainless steel	
5	Bracket	Stainless steel alloy	
6	O-ring A	H-NBR	
7	O-ring B	H-NBR	
8	Rod cover	Stainless steel alloy	
9	Tie-rod	Stainless steel alloy	
10	Cap nut	Stainless steel alloy	
11	Plain washer	Stainless steel alloy	

Replacement Parts

No.	Description	Material	Note
1	Element set	SFD-EL200	With 3 O-rings

SFD200-□02



Component Parts

No.	Description	Material	Note
1	Element	PC, Polyolefin, PU	
2	Cover	Aluminium alloy	
3	Fitting body	Stainless steel alloy	
4	Bracket	Stainless steel alloy	
5	O-ring A	H-NBR	
6	O-ring B	H-NBR	
7	Rod cover	Stainless steel alloy	
8	Tie-rod	Stainless steel alloy	
9	Cap nut	Stainless steel alloy	
10	Plain washer	Stainless steel alloy	

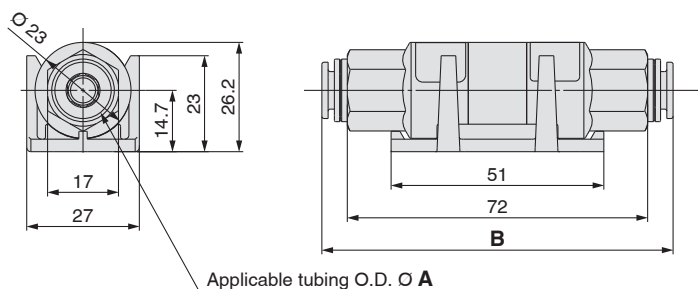
Replacement Parts

No.	Description	Material	Note
1	Element set	SFD-EL200	With 3 O-rings

SFD Series

Dimensions

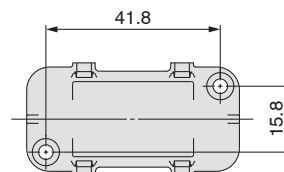
SFD100-C□/SFD110-C□



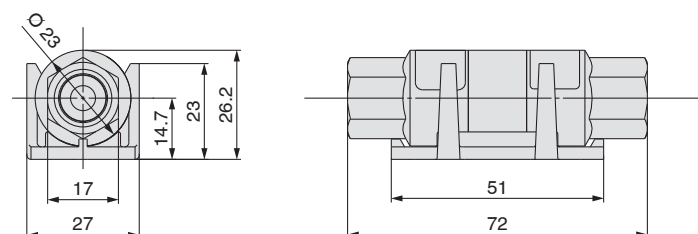
SFD100-C□ Dimensions

Model	A	B
SFD100-	C04	4
	C06	6
	C08	8

Bracket mounting dimensions

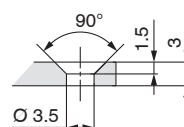


SFD100-□02/SFD110-□02

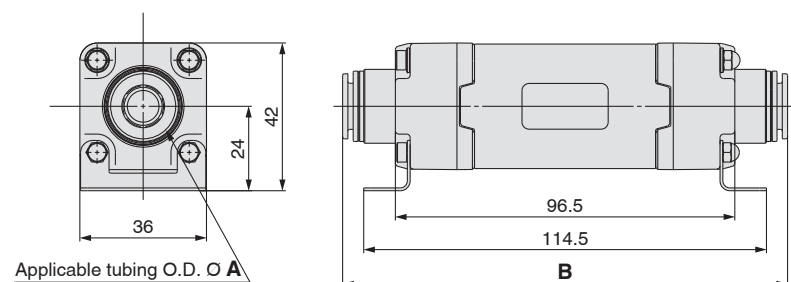


* Including the bracket mounting dimensions, the SFD100 and SFD110 have the same dimensions.

Hole shape for bracket mounting



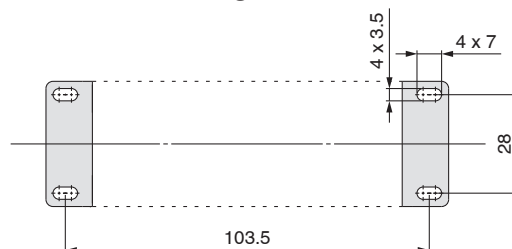
SFD200-C□



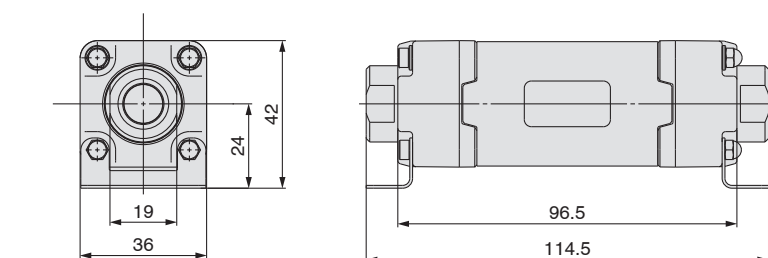
SFD200-C□ Dimensions

Model	A	B
SFD200-	C08	8
	C10	10
	C12	12

Bracket mounting dimensions



SFD200-□02



SFD Series

Made to Order Specifications 1

Please contact SMC for detailed specifications, delivery and prices.



1 Metal Case

SFD 1 0 1 - 02

Clean air filter

Size

Symbol	Max. flow rate
1	100 l/min (ANR)

* The SFD2 is not applicable.

Case material

Symbol	Material
1	Aluminium
2	Stainless steel

Port size

Symbol	Connection size
02	Rc 1/4
N02	NPT 1/4
F02	G 1/4

* The metal case is not available with a clean One-touch fitting.
* The bracket is provided as a standard product.

Metal case suitable for an atmosphere exposed to organic solvents and chemicals



Specifications

The specifications are the same as the standard product. Refer to "Specifications" on page 5.

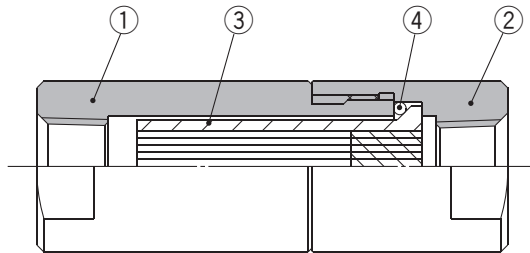
Flow Rate Characteristics

The flow rate characteristics are the same as the SFD100-02.

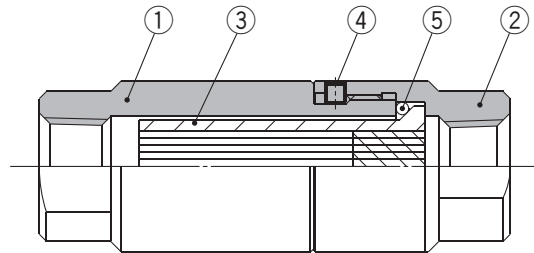
Refer to "Flow Rate Characteristics" on page 6.

Construction

SFD101-02



SFD102-02



Component Parts

No.	Description	Material	Note
1	Case	Aluminium alloy	
2	Cover	Aluminium alloy	
3	Element	PC, Polyolefin, PU, PET, ABS	
4	O-ring	FKM	

Replacement Parts

No.	Description	Part no.	Note
1	Element set	SFD-EL101	With O-ring
2	Bracket	SFD-BR101	Material: Stainless steel 304

Component Parts

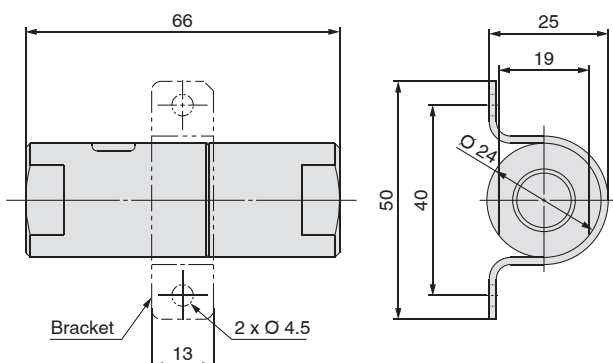
No.	Description	Material	Note
1	Case	Stainless steel alloy	
2	Cover	Stainless steel alloy	
3	Element	PC, Polyolefin, PU, PET, ABS	
4	Hex. socket head set screw	Stainless steel alloy	
5	O-ring	FKM	

Replacement Parts

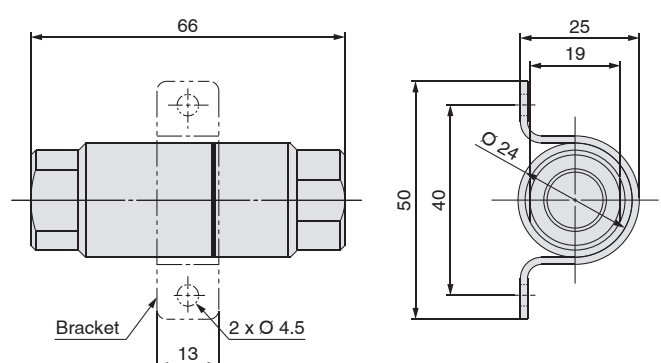
No.	Description	Part no.	Note
1	Element set	SFD-EL101	With O-ring
2	Bracket	SFD-BR101	Material: Stainless steel 304

Dimensions

SFD101-02



SFD102-02



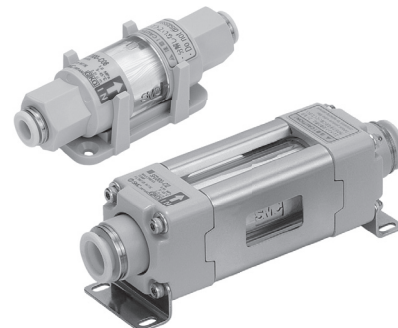
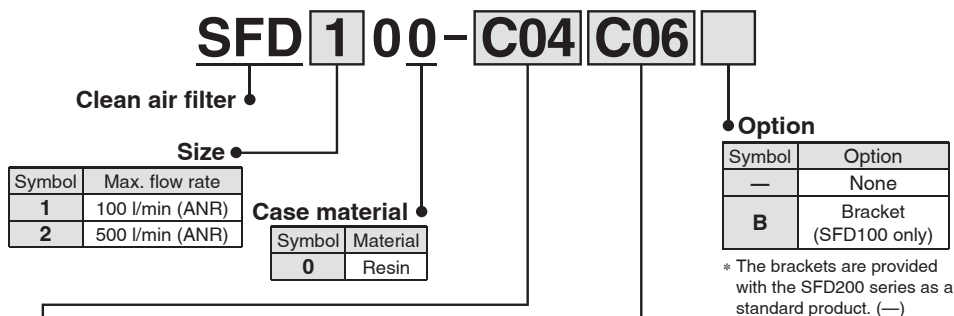
SFD Series

Made to Order Specifications 2

Please contact SMC for detailed specifications, delivery and prices.



2 Different Diameters for IN and OUT Ports



IN side connection symbol

IN side connection symbol	Connection size
C04	Ø 4
C06	Ø 6
C08	Ø 8
C10	Ø 10
C12	Ø 12
02	Rc 1/4
N02	NPT 1/4
F02	G 1/4

OUT side connection symbol

OUT side connection symbol	Connection size
C04	Ø 4
C06	Ø 6
C08	Ø 8
C10	Ø 10
C12	Ø 12
02	Rc 1/4
N02	NPT 1/4
F02	G 1/4

* IN/OUT combination is the below table.

SFD100 Different Diameter Combinations

IN port size	OUT port size					
	C04	C06	C08	02	N02	F02
C04	●	—	—	—	—	—
C06	●	●	—	—	—	—
C08	—	●	●	—	—	—
02	●	●	●	●	—	—
N02	●	●	●	—	●	—
F02	●	●	●	—	—	●

* The symbol "—" stands for unavailable combination.

SFD200 Different Diameter Combinations

IN port size	OUT port size					
	C08	C10	C12	02	N02	F02
C08	●	—	—	—	—	—
C10	●	●	—	—	—	—
C12	—	●	●	—	—	—
02	●	●	●	●	—	—
N02	●	●	●	—	●	—
F02	●	●	●	—	—	●

* The symbol "—" stands for unavailable combination.

Specifications

The specifications are the same as the standard models.
Refer to "Specifications" on page 5.

Flow Rate Characteristics

When the IN and OUT ports have different diameters, the flow rate characteristics will be those of the port with the smaller diameter.
Refer to "Flow Rate Characteristics" for the smaller diameter from the chart of standard product on page 6.

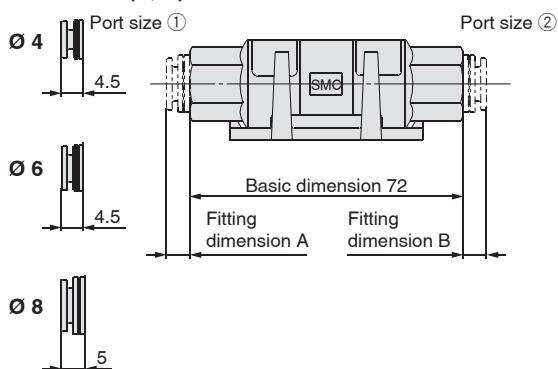
Construction

The construction and materials are the same as the standard product.
Refer to "Construction" on page 7.

Dimensions

SFD100 different diameters

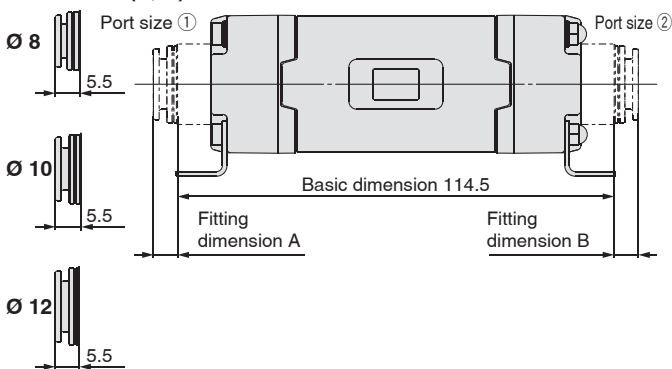
One-touch fitting dimensions (A, B)



Model	Port size ①	Port size ②	Total length
SFD100-	C04 (C06)	C06 (C04)	81 (A + 72 + B)
	C04 (□02)	□02 (C04)	76.5 (72 + A)
	C06 (C08)	C08 (C06)	81.5 (A + 72 + B)
	C06 (□02)	□02 (C06)	76.5 (72 + A)
	C08 (□02)	□02 (C08)	77 (72 + A)

SFD200 different diameters

One-touch fitting dimensions (A, B)



Model	Port size ①	Port size ②	Total length
SFD200-	C08 (C10)	C10 (C08)	125.5 (A + 114.5 + B)
	C08 (□02)	□02 (C08)	120 (114.5 + A)
	C10 (C12)	C12 (C10)	125.5 (A + 114.5 + B)
	C10 (□02)	□02 (C10)	120 (114.5 + A)
	C12 (□02)	□02 (C12)	120 (114.5 + A)

Related Products

<Pre-filters for SFD Series>

Mist Separator **AM Series**



AM Series

Model	AM150C	AM250C
Rated flow (l/min (ANR))	300	750
Port size (Nominal size B)	1/8, 1/4	1/4, 3/8

Specifications

Fluid	Compressed air
Max. operating pressure	1.0 MPa
Min. operating pressure ^{Note)}	0.05 MPa
Proof pressure	1.5 MPa
Ambient temperature	5 to 60 °C
Nominal filtration rating	0.3 μm (Filtering efficiency 99.9 %)

Note) With auto drain: 0.1 MPa (N.O. type), 0.15 MPa (N.C. type)

Micro Mist Separator **AMD Series**



AMD Series

Model	AMD150C	AMD250C
Rated flow (l/min (ANR))	200	500
Port size (Nominal size B)	1/8, 1/4	1/4, 3/8

Specifications

Fluid	Compressed air
Max. operating pressure	1.0 MPa
Min. operating pressure ^{Note)}	0.05 MPa
Proof pressure	1.5 MPa
Ambient temperature	5 to 60 °C
Nominal filtration rating	0.01 μm (Filtering efficiency 99.9 %)

Note) With auto drain: 0.1 MPa (N.O. type), 0.15 MPa (N.C. type)

Super Mist Separator **AME Series**



AME Series

Model	AME150C	AME250C
Rated flow (l/min (ANR))	200	500
Port size (Nominal size B)	1/8, 1/4	1/4, 3/8

Specifications

Fluid	Compressed air
Max. operating pressure	1.0 MPa
Min. operating pressure	0.05 MPa
Proof pressure	1.5 MPa
Ambient temperature	5 to 60 °C
Nominal filtration rating	0.01 μm (Filtering efficiency 99.9 %)

Odor Removal Filter **AMF Series**



AMF Series

Model	AMF150C	AMF250C
Rated flow (l/min (ANR))	200	500
Port size (Nominal size B)	1/8, 1/4	1/4, 3/8

Specifications

Fluid	Compressed air
Max. operating pressure	1.0 MPa
Min. operating pressure	0.05 MPa
Proof pressure	1.5 MPa
Ambient temperature	5 to 60 °C
Nominal filtration rating	0.01 μm (Filtering efficiency 99.9 %)



SFD Series

Specific Product Precautions 1

Be sure to read this before handling the products. Refer to back cover for safety instructions.

Selection

Warning

1. Thoroughly and carefully confirm the purpose of use, required specifications and operating conditions (fluid, pressure, flow rate, nominal filtration rating and environment) then select a model within the specifications.
2. The product is not certified under the High Pressure Gas Safety law, so for nitrogen, its maximum operating pressure will be 0.99 MPa (gauge pressure).
3. Contact us beforehand if the product will be used in an application such as a caisson shield, breathing, food and/or medical treatment that affects the human body directly or indirectly.
4. If the compressed air includes ozone, do not use it since it may damage the product or cause malfunction. When it includes ozone, use a clean gas filter (SFA/B/C).

Mounting

Warning

1. Operation manual

Mount the product after reading and understanding the operation manual. Keep it in a location where it can easily be found.

2. Flushing

Flush the piping line when the filter is used for the first time or has been replaced. In the event of connecting such as piping, flush (air blow) when using this product for the first time or replacing its elements in order to reduce the affect of the dust generated from the connection, etc. Flushing the line is also required to eliminate contamination resulting from the piping line installation. Therefore, be sure to flush the line before actually running the system. Fix all mounting parts for use.

3. Use fittings with resin threads for the connection of fittings to the IN and OUT ports.

Using fittings with metal threads could damage the IN and OUT ports (SFD100 only).

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 in accordance with the flow direction marked on the case.

If connected in reverse, the element could break.

2. The mounting orientation does not affect the performance, but if excessive force is applied to the SFD100 series, the body may become disconnected from the bracket.

Therefore, take particular care about the mounting orientation.

Caution on Installation

Warning

1. The material of the element is polycarbonate.

The material is resistant to wiping with alcohol, but is not suitable for atmospheres or places with organic solvents, chemicals, cutting oils, synthetic oils, ester base compressor oils, alkalis or thread locking agents.

Caution

1. If the pressure difference (pressure drop) between the inlet and the outlet exceeds 0.1 MPa, it can cause damage to the product.

2. Do not install the product in a place where it can be affected by a pulsation (including surge pressure) of over 0.1 MPa.

3. Use caution regarding the particles that may be emitted from the outlet side of a pneumatic equipment.

Installation of a pneumatic equipment on the outlet side can deteriorate the cleanliness because a particle will be generated from the equipment. The mounting position of the pneumatic equipment needs to be considered.

4. Set the air flow capacity with an initial pressure drop of 0.03 MPa or less. If the initial pressure drop is set to be high, its service life will be shorten due to clogging.

5. Determine the product by the maximum consumption flow rate.

When using compressed air for an air blow application, calculate the maximum volume of air that will be consumed before selecting the SFD series product size.

6. Generally, the following pollutant particles are contained in compressed air.

[Pollutant particle substances contained in the compressed air]

- Moisture (drainage)
- Dusts and particles which are in the surrounding air
- Deteriorated oil which is discharged from the compressor
- Solid foreign matter such as rust and/or oil in the piping

1) The SFD series is not compatible with compressed air which contains fluids such as water and/or oil.

2) Install a dryer (IDF, IDG, ID series), mist separator (AM series), micro mist separator (AMD series), super mist separator (AME series), or odor removal filter (AMF series), etc., for the source of the air for the SFD series.

7. Using with a flow-rate much higher than its specification could lead to exceeding the differential pressure the product can resist.

Use the product within its specifications. Also, take care about the replacement period of the product, taking into consideration that the differential pressure of the filter will increase over time.



SFD Series

Specific Product Precautions 2

Be sure to read this before handling the products. Refer to back cover for safety instructions.

Piping

Caution

1. Unpacking the sealed package

Since the filter is sealed in an antistatic double bag, the inner package should be unpacked in a clean atmosphere (such as a clean room).

2. Apply a wrench to 2 chamfered flats or hexagon portion on the IN side or the OUT side to prevent the housing from rotating.

3. Always tighten threads with the proper tightening torque.

When attaching fittings to the product, tighten with the proper tightening torque shown below.

Material	Tightening torque (N·m)
Resin	2 to 3
Metal	12 to 14

4. Check the arrow mark on the case which shows the flow direction to connect the IN and OUT ports correctly.

If connected in reverse, the element could break.

Maintenance

Warning

1. Follow the maintenance procedures in the operation manual. If handled incorrectly equipment or device can be damaged or cause a malfunction.

2. When removing the product, exhaust the air and ensure the air is released to atmosphere before removing it.

3. When the element comes to the end of its life, immediately replace it with a new filter or replacement element.

Service life of element

The service life of the element ends when either of the following two conditions occurs.

- 1) After 1 year of usage has elapsed.
- 2) When the pressure drop reaches 0.1 MPa even though the operating period has been less than 1 year.

Operating Environment

Warning

1. Do not operate under the conditions listed below due to a risk of malfunction.

In locations having corrosive gases, organic solvents, and chemical solutions, or in locations in which these elements are likely to adhere to the equipment.

In locations in which salt water, water, or water vapour could come in contact with the equipment.

In locations that are exposed to direct sunlight. (Shield the equipment from sunlight to prevent its resin material from ultraviolet ray degradation or overheating.)

In locations that have a heat source and poor ventilation. (Shield the equipment from heat sources to protect it from softening degradation due to radiated heat.)

In locations that are exposed to shocks and vibrations. In locations with high humidity or a large amounts of dust.

2. When the product is used for blowing, use caution to prevent the work from being damaged by entrained air from the surrounding area.

When the compressed air is used for air blow, the exhausted air from the blow nozzle may have taken in airborne foreign matter (such as solid particle, fluid particle) from the surround air. The foreign matter will be sprayed on the work, and the airborne foreign matter may adhere to it. Therefore, use caution for the surrounding environment.

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) Polyolefin tube: Within ± 0.1 mm
- 2) Polyurethane tubing: Within $+0.15$ mm, within -0.2 mm
- 3) Nylon tubing: Within ± 0.1 mm
- 4) Soft nylon tubing: Within ± 0.1 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.

The recommended tube for the clean fitting is polyolefin tube. Other tubes can satisfy the performance in terms of leakage, tensile strength, etc., but impair the cleanliness. Note this point for use.

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 catalogue 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 catalogue.
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 catalogue 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.

Safety Instructions

Be sure to read “Handling Precautions for SMC Products” (M-E03-3) before using.

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