

# Low Maintenance Filter Series FN1

## How to Order

**FN1 1 0 1 N — 10 — S 020**

**Housing material**

1	Stainless steel SUS304
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**Element type**

0	Cylindrical type
1 <sup>Note)</sup>	Step type

Note) Only 5μm of filtration is available.

**Element length**

1	250mm
2	500mm

**Seal material**

N	NBR
V	FPM

**Pressure gauge**

Nil	Without pressure gauge (with plug)
G <sup>Note)</sup>	G46-15-02 (Wetted part: Brass)

Note) Contact SMC for the pressure gauge specification for stainless steel wetted parts.

**Filtration**

005	5μm (Cylindrical type, Step type)
020	20μm (Cylindrical type)

**Element material**

S	Stainless steel SUS304
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**Port size**

10	Rc 1
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## Specifications

### Filter

Model	FN1111	FN1101	FN1102	FN1112	
Element dimension	ø65 x 250/		ø65 x 500/		
Fluid	Cleaning solvent, Coolant <sup>Note1)</sup>				
Operating pressure	MAX. 1.0MPa				
Operating fluid temperature	MAX. 80°C				
Flow rate <sup>Note2)</sup>	40/min		80/min		
Bore size	Rc 1 (IN, OUT, DRAIN)				
Material	Case and cover: Stainless steel SUS304, O-ring: NBR/FPM				
Element	Material	Stainless steel SUS304			
	Construction	Cylindrical type	Step type	Cylindrical type	Step type
	Filtration	5μm, 20μm	5μm	5μm, 20μm	5μm
	Differential pressure proof	0.6 MPa			
Weight	13kg	12.5kg	15kg	14.5kg	

Note 1) Refer to the fluid compatibility table on page 2 for details.

Note 2) Values under the following conditions:

Fluid: Water; Filtration: 20μm; Pressure drop: 0.02MPa or less.

### Operating part

Model	CDLQB63-□D-F	
Auto switch	Without auto switch (built-in magnet) <sup>Note 1)</sup>	
Fluid	Air	
Operating pressure	0.2 to 1.0MPa <sup>Note 2)</sup>	
Ambient and fluid temperature	-10 to 70°C (with no freezing) <sup>Note 3)</sup>	
Lock	Unlocking pressure	0.2MPa or more
	Locking pressure	0.05MPa or more
	Locking direction	Extension locking

Note 1) Auto switch must be ordered separately. Refer to Series CLQ (Compact Cylinder with Lock) catalog (CAT.ES20-155) for details.

Note 2) The minimum operating pressure for the cylinder is 0.1MPa when the cylinder port and the lock port are separately piped.

Note 3) The temperature will be 0°C to 60°C when the auto switch is mounted on the cylinder.



**Option**



**Reservoir**

Model	FNR100N-10	FNR100V-10	FNR101N-10	FNR101V-10
Tank capacity	1.1 /		1.8 /	
Port size	Rc 1			
Material	Bowl & Cover: Stainless steel SUS304			
	O-ring: NBR		FPM	
Weight	1.5kg		1.9kg	
Applicable filter	FN11□1□ (Element 250mm)		FN11□2□ (Element 500mm)	

**Dust recovery filter**

Model	FND100N-10-M149X0	FND100V-10-M149X0
Port size	R1	
Material	Bowl & Cover: Stainless steel SUS304	
	O-ring: NBR	
	Element: Stainless steel SUS304	
Element filtration	149μm	
Weight	7.5kg	

Note) Produced upon receipt of order.

**Fluid Compatibility (Guide)**

Fluid / Seal material		Water			Coolant		Petroleum		Alkali	
		Potable water	Industrial water	Distilled water	Water soluble	Oil-based	Gas oil Kerosene	Xylene	Ammonium hydroxide	Sodium hydroxide
Nitrile rubber	NBR	⊙	⊙	⊙	⊙	⊙	⊙	×	⊙	⊙
Fluoro rubber	FPM	○	○	○	○	○	○	⊙	×	×

⊙... Most compatible    ○... Compatible    ×... Not compatible

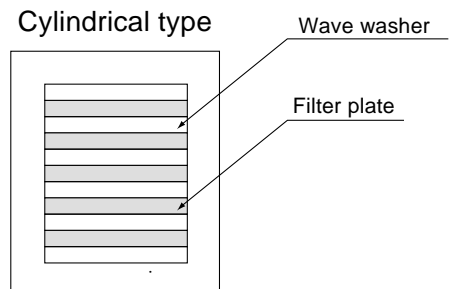
Note 1) Contact SMC when PTFE is required for seal material.  
 Note 2) Contact SMC regarding the compatibility of the seal and pressure gauge.

**Cylindrical Type and Step Type Elements**

**1. Cylinder type element (5μm, 20μm)**

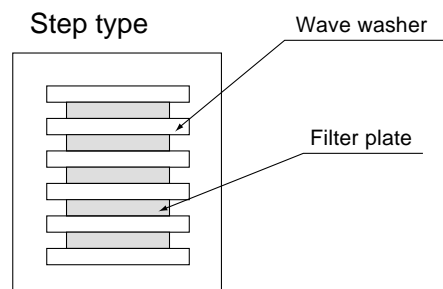
•The cylindrical type construction has a smooth peripheral surface since the dimension of the filter plate and wave washer is the same. The use of the entire peripheral surface of the element to collect dust allows larger filtration area and easy dust separation. For this reason, this type of element is ideal for filtering the fluids that contain dust with the same particle size.  
 If the cylindrical type element is used for fluids containing dust particles with a great variance in sizes, large-size dust particles can cover the element's peripheral surface. This can clog the element prematurely and thus you may no longer use it. (Especially for soft and sticky foreign matter)

(Example: the cylindrical type is recommended to filter polishing chips and the step type for cutting chips)



**2. Step type element (5μm)**

•The step type construction has an uneven (stepped) surface since the dimension of the filter plate is smaller than that of the wave washer. When filtering uneven dust particles, larger particles are caught on the peripheral surface of the wave washers, and smaller particles are filtered out with filter plates. This construction can extend the element life and make the effective filtering possible when filtering fluids containing dust particles with a great variance in sizes.  
 Select the appropriate element type (cylindrical or step type) depending on the dust size variance in the fluid.

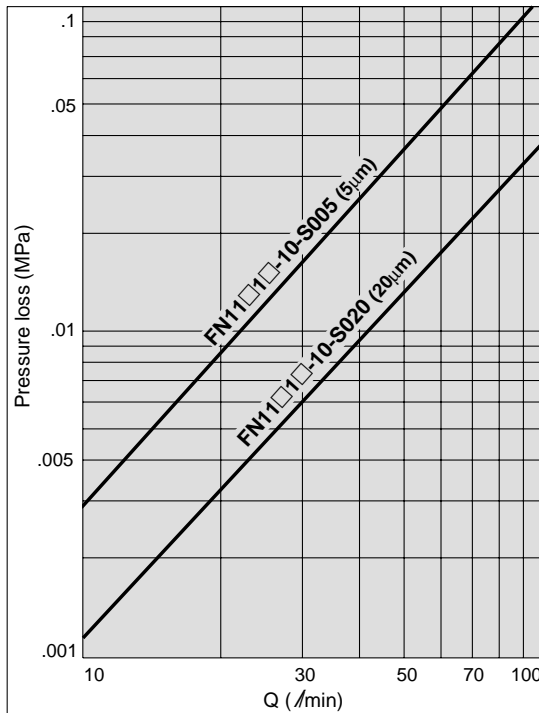


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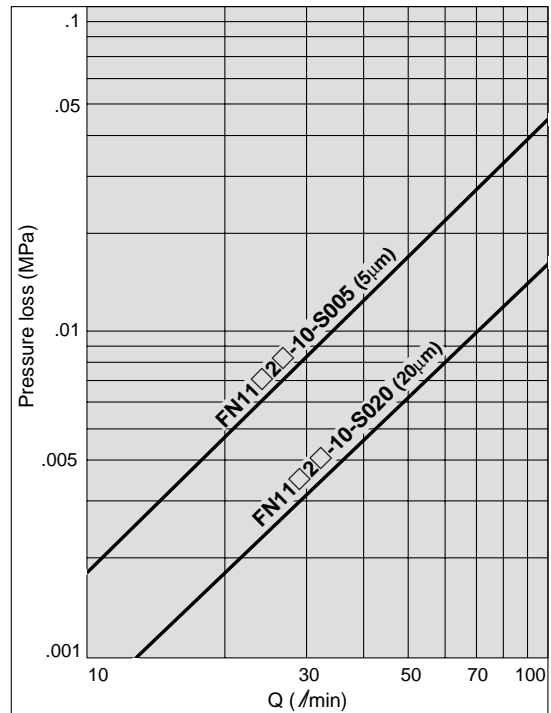
## Flow Characteristics (Initial Value)

- Test fluid: Potable water ● Liquid temperature: 17 to 20°C (room temperature)
- Test method: Per SMC test method (sanitary test stand)

Element length 250mm: FN1□1□□-10-S□□

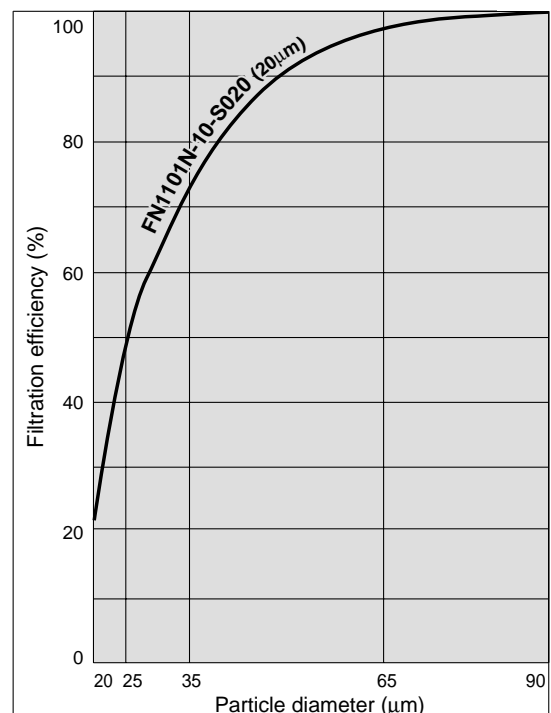
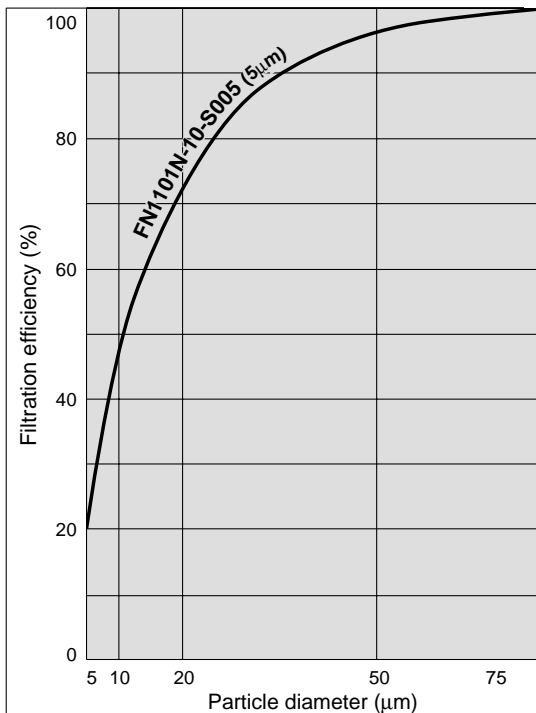


Element length 500mm: FN1□2□□-10-S□□



## Filtration Efficiency (Initial Value)

- Fluid: Potable water ● Flow rate: 20 l/min ● Liquid temperature: Room temperature ● Test dust: AC course ● Amount of dust: 0.2mg/min
- Test method: Per SMC test method (sanitary test stand, HIAC particle counter)



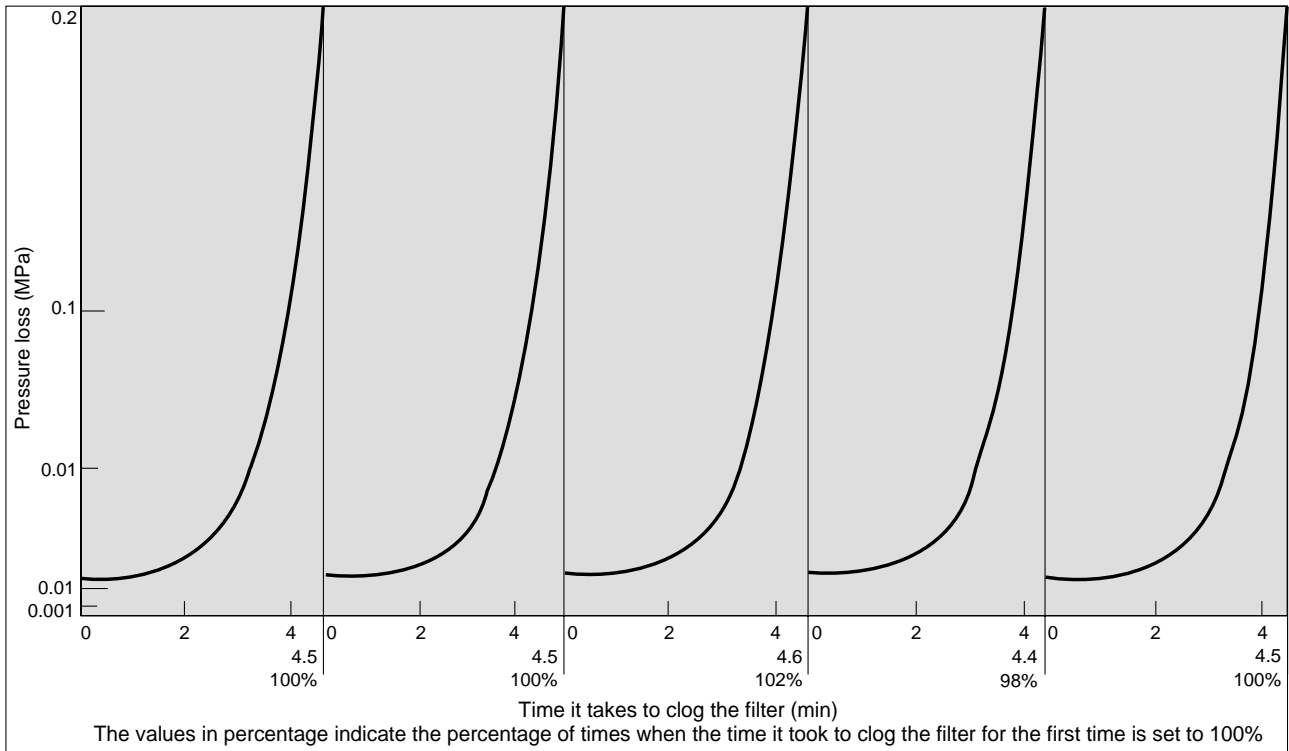
## Blocking Characteristics (Repeatability Characteristics)

●Fluid: Potable water ●Supply pressure: 0.2MPa ●Flow rate: 20 /min ●Test dust: AC course test dust

●Test method: Per SMC test method

Filter part no.: FN1101N-10-020

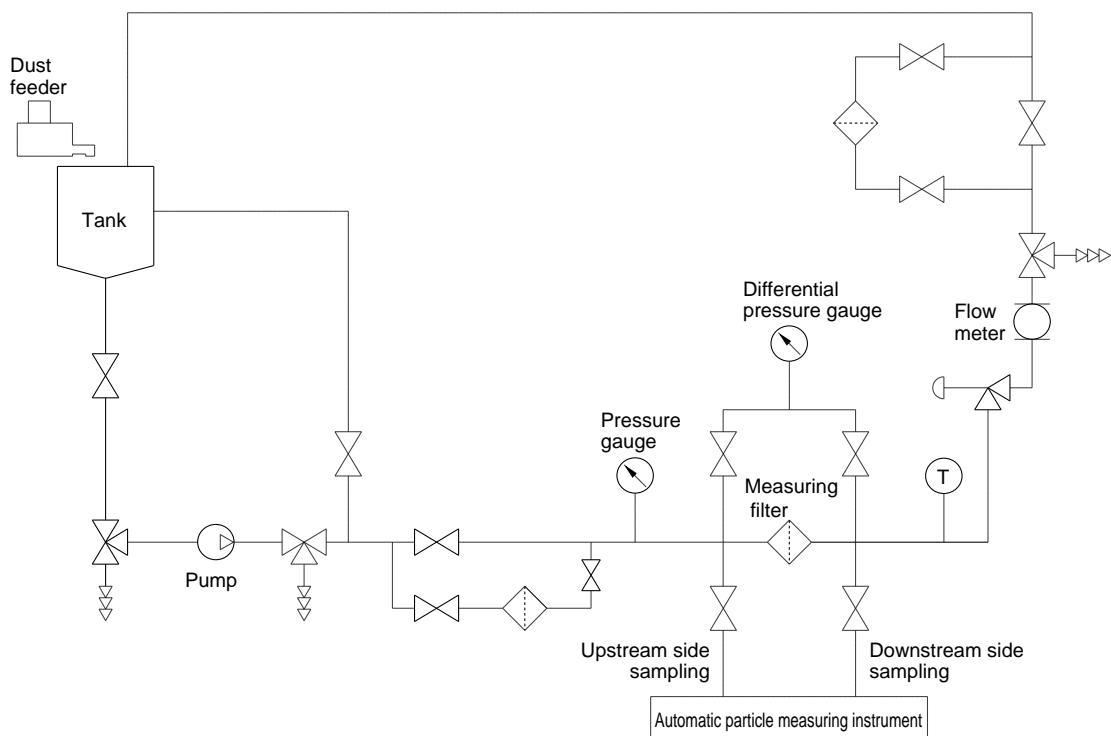
Element: END100-020 (cylindrical type with 20 $\mu$ m filtration)



Introduce a certain concentration of dust and back-flush the filter when the pressure loss reaches 0.2 MPa. Repeat filtering and back flushing process (up to five times shown in the graphs).

The graphs above show that the initial pressure loss ( $\Delta P=0.015\text{MPa}$ ) and time it takes to reach the pressure loss of  $\Delta P=0.2\text{MPa}$  return to the rough initial value even after repeated back-flushing.

## Measurement Circuit

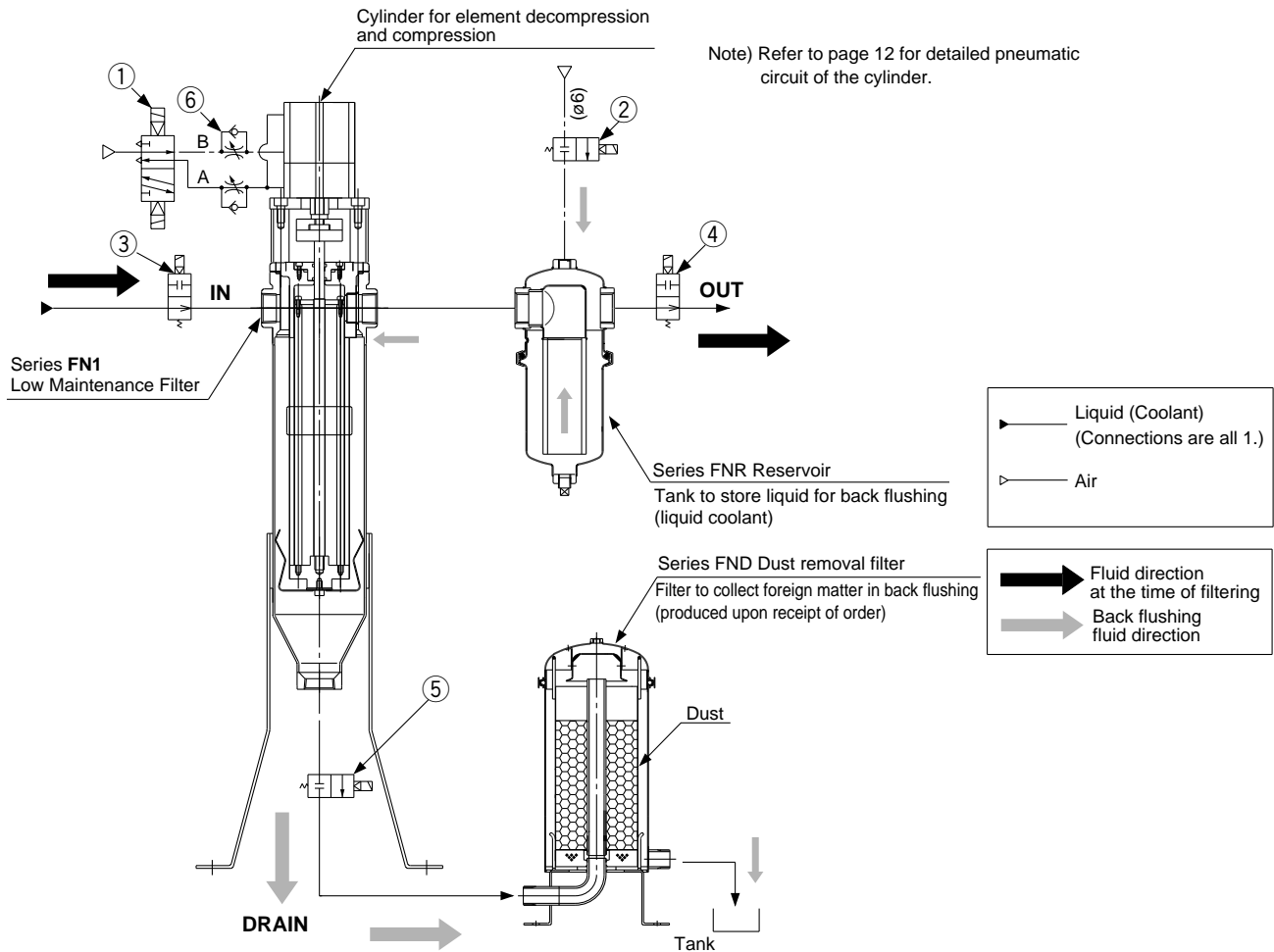


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## Piping Example

Series FN1 Low Maintenance Filter cannot be used alone.

Please follow the component configuration and operation steps illustrated below.

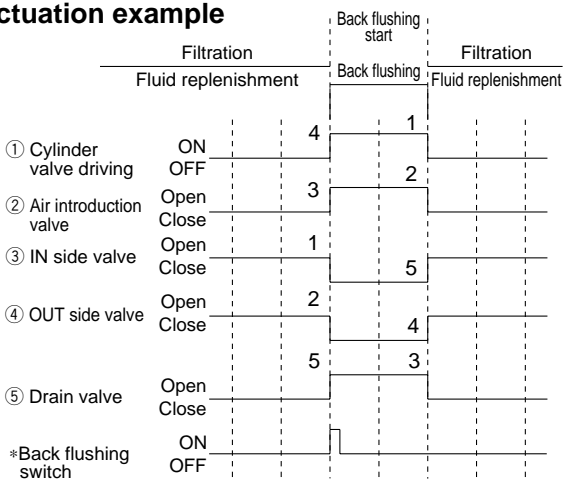


### Example of connection device

No.	Description	Device	No.	Description	Device
①	<b>Cylinder driving valve</b>	5-port solenoid valve (Series SY)	④	<b>OUT side valve</b>	Coolant valve (Series VNC)
②	<b>Air supply valve</b>	Process valve (Series VNB)	⑤	<b>Drain valve</b>	Coolant valve (Ball type)
③	<b>IN side valve</b>	Coolant valve (Ball type)	⑥	<b>Speed controller</b>	Speed controller (Series AS)

Series inside ( ) indicate SMC products. Contact SMC regarding the valves 3 to 5.

### Actuation example



\*The M/C stop signal and a signal for element clogging (differential signal switch) are used to start back flushing. Numbers in the chart indicate the operation order for each operation.

	Step	Operation description
Back flushing	1	③ IN side valve: Close Stops fluid supply to the filter.
	2	④ OUT side valve: Close Seals the filter and reservoir containing fluid.
	3	② Air supply valve: Open Supply the fluid in the reservoir to the filter.
	4	① Cylinder driving valve: ON Lowers the cylinder to decompress the element.
	5	⑤ Drain valve: Open The fluid in the reservoir passes through the decompressed element and forces out to the tank.
At the time of filtering operation	1	① Cylinder driving valve: OFF Raises the cylinder to compress the element.
	2	② Air supply valve: Close Stops pressure feed.
	3	⑤ Drain valve: Open
	4	④ OUT side valve: Open
	5	③ IN side valve: Open

## Caution

### 1. Cylinder for element decompression and compression

- Do not overthrottle the speed controller when adjusting the cylinder retraction speed (element decompression). If the element is decompressed too slowly, the back flushing may become ineffective.
- Refer to page 12 for "Cylinder for element decompression and compression" regarding the detailed pneumatic circuit of the cylinder and lock.

### 2. Reservoir installation

- Installation of a reservoir (optional) is recommended to store fluid for back flushing. If a reservoir is not going to be installed, make sure to allow piping capacity equivalent to a size of reservoir between the low maintenance filter and air supply valve.

### 3. Air pressure

- Set the pressure of the air supply valve to 0.25 to 0.3 MPa. Increasing the pressure will not improve the back flushing effect.
- Use the same set pressure for the supply pressure of the lock cylinder. Exceeding this pressure range may increase the load applied to the filtering plate when the element is compressed, causing malfunction.

### 4. Air pressure

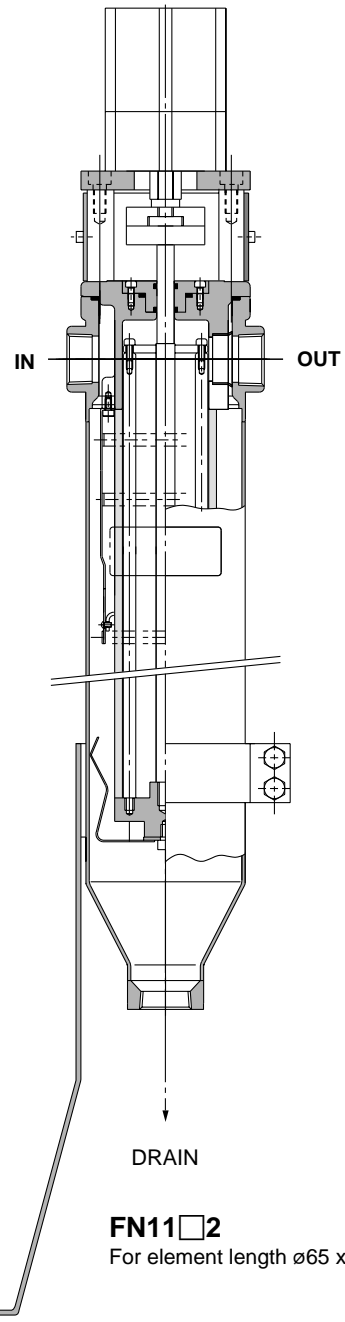
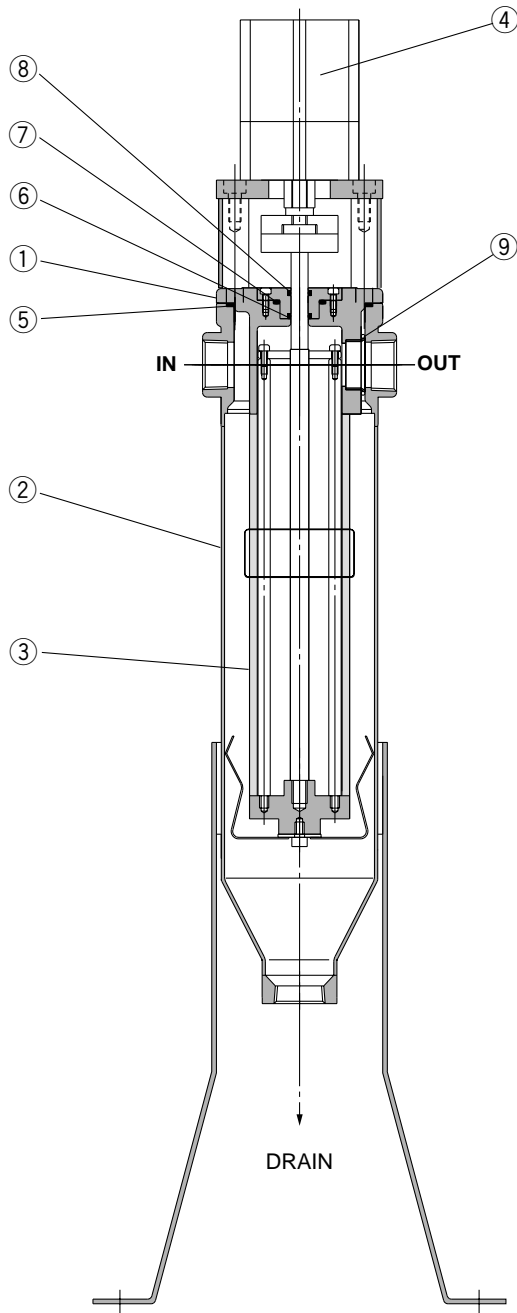
- Devise the by-pass circuit on the upstream side of IN side valve to prevent the line pressure during back flushing from rising and to protect the pump.

### 5. Maintenance

- The filter should be back flushed until the differential pressure reaches 0.1 MPa to avoid a drop in the flow rate due to the element clogging and to maintain back flushing efficiency.
- Time it takes to clog the element varies depending on the dust condition. Monitor the clogging condition of the element using a detection switch for differential pressure. The detection switch for differential pressure is sold separately. Contact SMC for more information.
- Since the element of this low maintenance filter provides rough filtration efficiency (with conventional notch wire level), it can be used as a pre-filter to extend the life of the check filter depending on the fluid condition in use. Installing these low maintenance filters side by side to use them alternately enables continuous operation during back flushing. Use an element with 500 mm in length for highly contaminated fluid. A sufficient flow rate can be ensured by installing two to three low maintenance filters in a row in case of the insufficient flow capacity.

# Series FN1

## Construction



### Parts list

No.	Description	Material	Note
1	Cover	SCS13	
2	Bowl	SCS13	
3	Element	SUS304	ø65 x 250mm ø65 x 500mm
4	Compact cylinder with lock	<b>FN1□1</b> <b>FN1□2</b>	CDLQB63-30D-F CDLQB63-50D-F

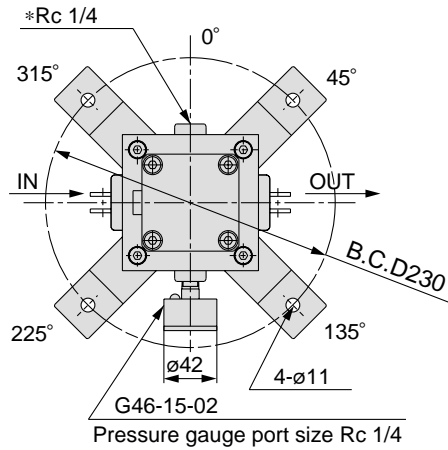
### Replacement parts

No.	Description	Material
5	O-ring	NBR
6	Seal	
7	O-ring	
8	Scraper	
9	O-ring	FPM

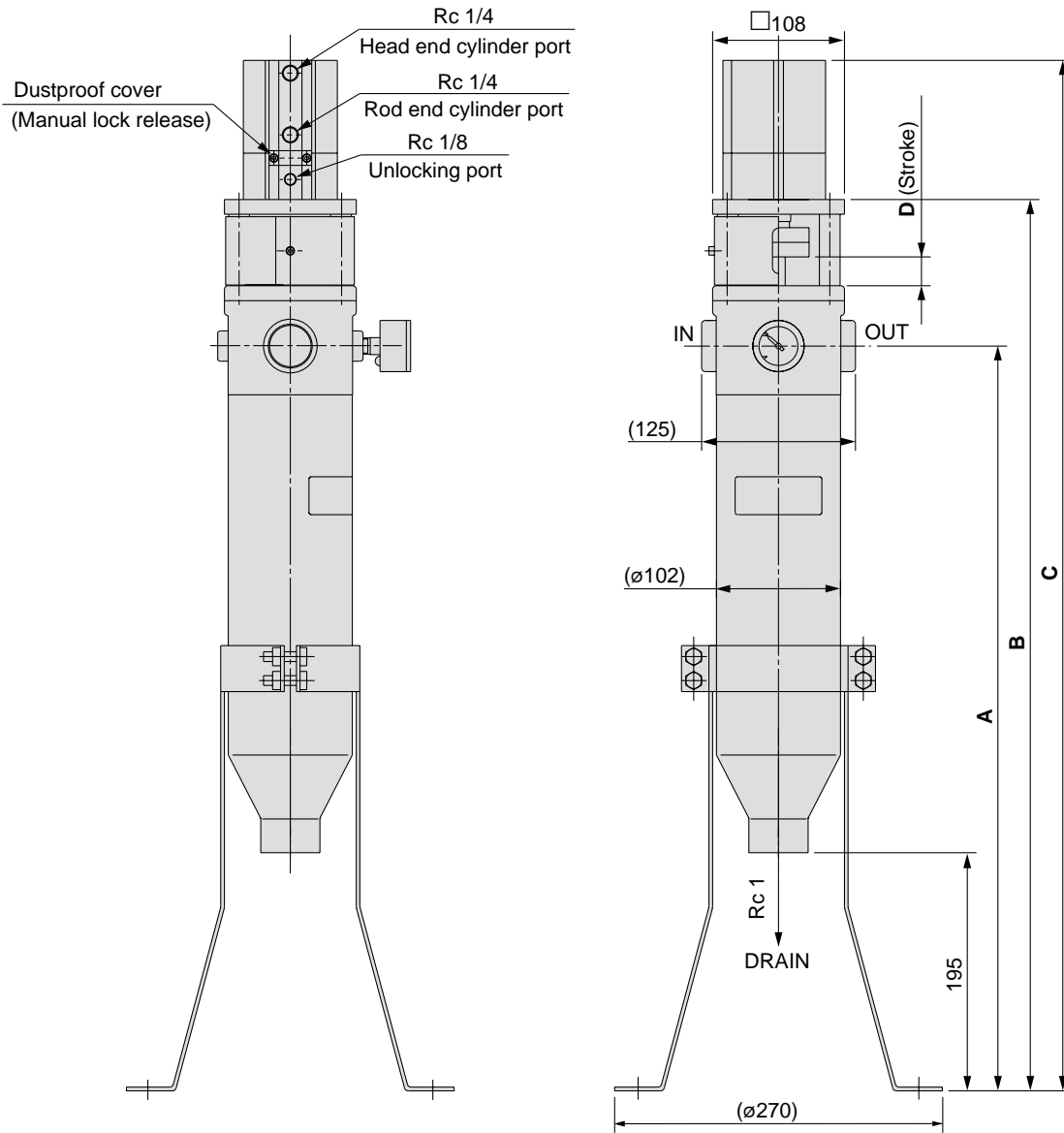
### Replacement parts: Seal kit

Model	Order no.	Material	Note
<b>FN1□□N</b>	<b>KT-FN11N</b>	NBR	Items 5 through 9 from the above chart.
<b>FN1□□V</b>	<b>KT-FN11V</b>	FPM	

**Dimensions**



Note) Use the Pc 1/4 port marked with an asterisk when designing an air release circuit.



**Dimensions**

(mm)

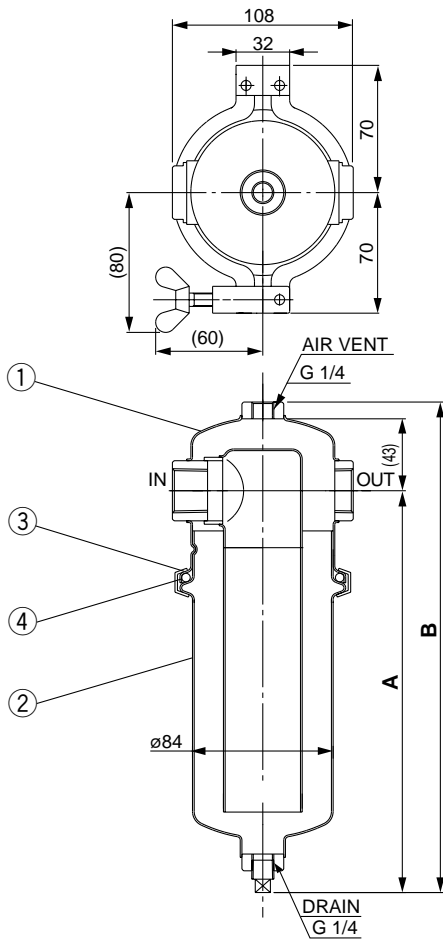
Model	Bore size (Nominal size B)	A	B	C	D
FN11□1	Rc 1	610	(730)	(844)	20
FN11□2		860	(1000)	(1134)	40



# Series FN1

## Options

### Reservoir



### Dimensions

Model	Bore size (Nominal size B)	(mm)	
		A	B
<b>FNR100<sup>N</sup>-10</b>	Rc 1	194	(257)
<b>FNR101<sup>N</sup>-10</b>		332	(385)

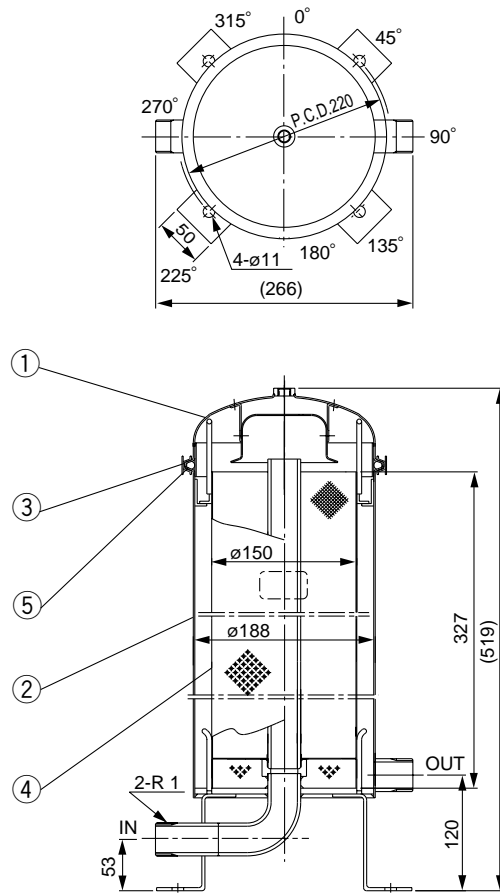
### Parts list

No.	Description	Material	Note
1	<b>Cover</b>	Stainless steel SUS304	
2	<b>Bowl</b>	Stainless steel SUS304	
3	<b>V-band</b>	Stainless steel SUS304	

### Replacement parts

No.	Description	Material	Note
4	<b>O-ring</b>	NBR	JIS B 2401-1A-P85
		FPM	JIS B 2401-4D-P85

### Dust removal filter



### Parts list

No.	Description	Material	Note
1	<b>Cover</b>	Stainless steel SUS304	
2	<b>Bowl</b>	Stainless steel SUS304	
3	<b>V-band</b>	Stainless steel SUS304	

### Replacement parts

No.	Description	Material	Note
4	<b>Element</b>	Stainless steel SUS304	EZH710AS-149
5	<b>O-ring</b>	NBR	JIS B 2401-1A-P185
		FPM	JIS B 2401-4D-P185