

# Return Filter

# Series *FH100*

## Selection of elements for different applications

Depending on the application, the user can choose among several standard element types, paper elements (5, 10 and 20 μm) and micro-mesh elements (74 and 105 μm).

## Easy maintenance

The element slides into place and is sealed with an O-ring, making it easy to install and remove.

## Large drain exhaust outlet

The large M16 drain exhaust outlet assures rapid drainage.

## Clogging sensor

The filter can be fitted with a differential pressure indicator (two-stage indicator, reset type) or differential pressure indication switch (visual combined, non-reset type).



## Specifications

<b>Fluid</b>		Hydraulic fluid	
<b>Operating pressure</b>		Max. 1 MPa	
<b>Operating temperature</b>		Max. 80°C	
<b>Main material</b>	<b>Cover</b>	Cast iron	
	<b>Case</b>	Aluminum-cast	
	<b>O-ring</b>	NBR or FKM <sup>Note)</sup>	
<b>Element</b>	<b>Seal</b>	Stainless steel & NBR or Stainless steel & FKM <sup>Note)</sup>	
	<b>Material</b>	Paper	Micromesh
	<b>Nominal filtration</b>	5, 10, 20 μm	74, 105 μm (200, 150 mesh)
	<b>Differential pressure resistance</b>	0.6 MPa	
<b>Differential pressure indicator operating pressure</b>		0.13 MPa	
<b>Relief valve open pressure</b>		0.15 MPa	

Note) The material of the O-rings differs depending on the hydraulic fluid used.  
Petroleum, Water-glycol, Emulsion: NBR; Phosphoric ester: FKM

## Model/Rated Flow Rate

Model	Port size (Rc)	Rated flow rate (ℓ/min)	
		Paper	Micromesh
<b>FH100-06</b>	3/4	50	60
<b>FH100-08</b>	1	80	100
<b>FH100-10</b>	1 1/4	120	150
<b>FH100-12</b>	1 1/2	160	200
<b>FH100-16</b>	2	260	300
<b>FH100-20</b>	2 1/2	450	550
<b>FH100-24</b>	3	600	700

## Accessory/Option

Description	Part no.	Note
Differential pressure indicator	CB-50H	Petroleum, Water-glycol, Emulsion
	CB-50H-V	Phosphoric ester
Differential pressure indication switch (N.C. and N.O. common)	CB-51H	Petroleum, Water-glycol, Emulsion
	CB-51H-V	Phosphoric ester
Blanking cap (for differential pressure indication part)	AG-12H	Petroleum
	AG-12H-W	Water-glycol, Emulsion
	AG-12H-V	Phosphoric ester

# Series FH100

## How to Order

**FH 1 00 - 06 - 0 0 0 - P 005**

**Hydraulic filter**

**Operating pressure**  

<b>B</b>	Max. 1 MPa
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**Construction/Connection**  

<b>00</b>	Element downward removal, threaded
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**Port size (Rc)**

<b>06</b>	3/4
<b>08</b>	1
<b>10</b>	1 1/4
<b>12</b>	1 1/2
<b>16</b>	2
<b>20</b>	2 1/2
<b>24</b>	3

**Differential pressure indication**

<b>0</b>	None
<b>4</b>	Differential pressure indicator
<b>5</b>	Differential pressure indication switch <small>Note)</small>

Note) N.C. and N.O. common

**Relief valve**

<b>0</b>	With relief valve
<b>1</b>	None

**Element**

<b>P</b>	Paper
<b>M</b>	Micromesh

**Hydraulic fluid**

<b>0</b>	Petroleum
<b>1</b>	Water-glycol, Emulsion
<b>2</b>	Phosphoric ester

**Made to Order**

<b>Nil</b>	None
<b>X0</b>	Non-standard filtration

Note) The non-standard filtration is for micromesh elements only. Refer to page 32 for details.

**Nominal filtration**

<b>005</b>	5 μm
<b>010</b>	10 μm
<b>020</b>	20 μm
<b>074</b>	74 μm
<b>105</b>	105 μm

Note) The paper elements for water-glycol or emulsion is 10 μm only.

### Replacement Element Part No. (including O-ring for element)

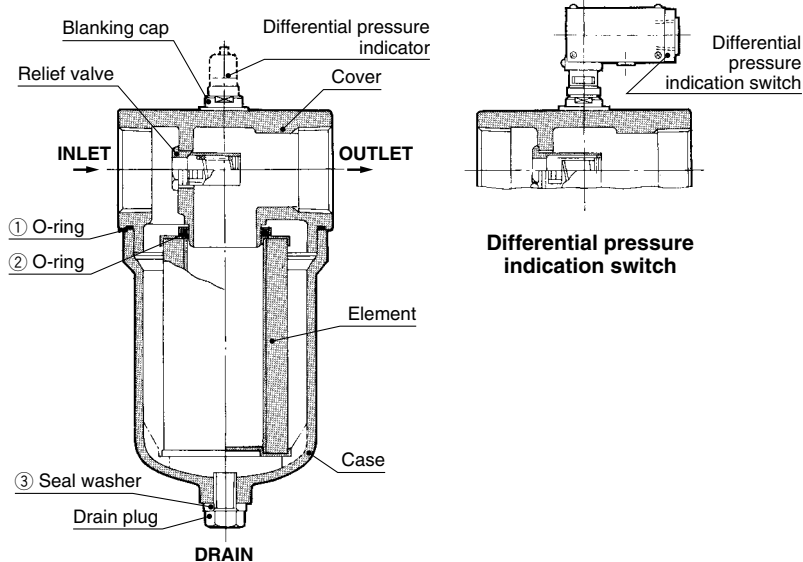
Model	Paper			Micromesh		Element size
	5 μm	10 μm	20 μm	74 μm (200 mesh)	105 μm (150 mesh)	
<b>FH100-06</b>	EP420-005N	EP420-010N	EP420-020N	EM810-074N	EM810-105N	ø64 x 95
<b>FH100-08</b>	EP420-005N	EP420-010N	EP420-020N	EM810-074N	EM810-105N	
<b>FH100-10</b>	EP020-005N	EP020-010N	EP020-020N	EM910-074N	EM910-105N	
<b>FH100-12</b>	EP020-005N	EP020-010N	EP020-020N	EM910-074N	EM910-105N	ø74 x 117
<b>FH100-16</b>	EP520-005N	EP520-010N	EP520-020N	EM020-074N	EM020-105N	
<b>FH100-20</b>	EP620-005N	EP620-010N	EP620-020N	EM120-074N	EM120-105N	ø119 x 208
<b>FH100-24</b>	EP620-005N	EP620-010N	EP620-020N	EM120-074N	EM120-105N	

Note 1) The symbol at the end of the element part no. indicates the hydraulic fluid type.  
 N: Petroleum, V: Phosphoric ester, W: Water-glycol, Emulsion (10 μm only for paper)

Note 2) Refer to page 32 for non-standard filtration.

Note 3) Above elements require one element per filter.

### Construction/Seal List

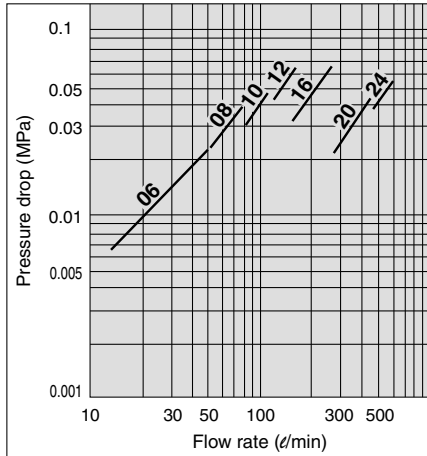


### Replacement Seal List (One each of the seal and O-ring types listed below are required per filter.)

Model	No.	Description	Hydraulic fluid type	①	②	③
				O-ring for cover case	O-ring for element	Seal washer
FH100-	06	Petroleum, Emulsion, Water-glycol	Standard	Standard	JIS B2401 -1A-P35	SM-16
	08			JIS B2401 -1A-G90		
	10			JIS B2401 -1A-P44		
	12			JIS B2401 -1A-P50		
	16			JIS B2401 -1A-G130		
	20			JIS B2401 -1A-P85		
FH100-	06	Phosphoric ester	Standard	Standard	JIS B2401 -4D-P35	SM-16-V
	08			JIS B2401 -4D-G90		
	10			JIS B2401 -4D-P44		
	12			JIS B2401 -4D-P50		
	16			JIS B2401 -4D-G130		
	20			JIS B2401 -4D-P85		

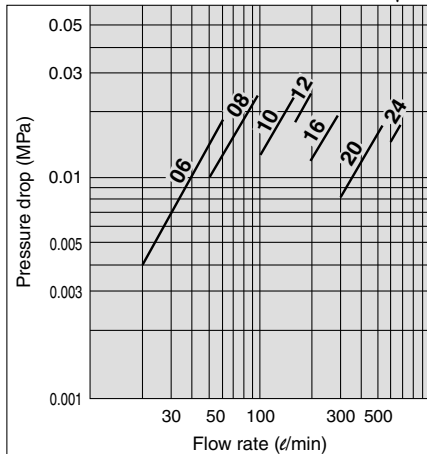
## Flow Characteristics

### FH100-06 to 24: Nominal filtration 10 μm



Conditions Fluid: Turbine oil Class 2 VG56  
 Measured pressure: 1 MPa  
 Viscosity: 45 mm<sup>2</sup>/s  
 Filter material: Paper  
 Nominal filtration: 10 μm

### FH100-06 to 24: Nominal filtration 74 μm



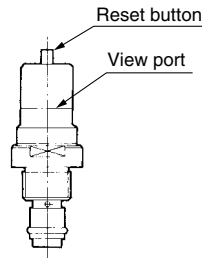
Conditions Fluid: Turbine oil Class 2 VG56  
 Measured pressure: 1 MPa  
 Viscosity: 45 mm<sup>2</sup>/s  
 Filter material: Micromesh  
 Nominal filtration: 74 μm

## Differential Pressure Indication

Two indication methods are available: differential pressure indicator and differential pressure indication switch. These can be mounted on all filter models.

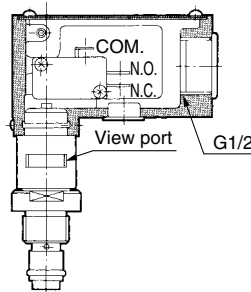
### ■ Differential pressure indicator

- Operating pressure—0.13 MPa
- Once a value is displayed, it will continue to be displayed until reset, even if the pump is stopped. (2-stage display reset type)
- Perform element replacement when the red ring floats up and covers the entire view port.



### ■ Differential pressure indication switch

- Operating pressure—0.13 MPa
- When a value has been displayed, it will be automatically reset when the pump is stopped. (Non-reset type)
- This is a visual dual-purpose 2-stage display. Perform element replacement when the switch has actuated (when the red ring floats up and covers the entire view point).
- N.C. and N.O. common



## Microswitch Rating

Rated voltage (V)	Non-inductive load (A)				Inductive load (A)		
	Resistance load		Light load		Inductive load		Motor load
	Normally closed	Normally open	Normally closed	Normally open	Normally closed	Normally open	
AC125	5		1.5	0.7	4	2.5	1.3
AC250	5		1	0.5	4	1.5	0.8
DC8	5		3		5	4	3
DC14	5		3		4		3
DC30	5		3		4		3
DC125	0.4		0.1		0.4		0.1
DC250	0.3		0.05		0.3		0.05

### Precautions

1. The figures in the above table indicate stationary current.
2. An inductive load has a power factor (AC) of 0.75 or more, and a time constant (DC) of 7 msec or less.
3. A light load has an inrush current 10 times greater.
4. Lead wires are connected using a screw tightening terminal.
5. The electrical entry is equipped with a conduit (G1/2) and grommet.
6. Please wire freely to the microswitch indication symbol 1(COM.), 2(N.C.) and 3(N.O.).
7. If a holding mechanism is necessary for the non-reset type, provide it using electric circuits.

## Handling Precautions

### ① Mounting

- Confirm INLET and OUTLET before mounting. Then connect so that the drain is oriented downward. For maintenance, make sure to provide sufficient space above the filter for removing the element.

### ② Operation

- Operation of the differential pressure indicator in cold weather, such as during winter, mostly occurs due to high viscosity, so check whether it is from clogging or not after normal operation starts.
- Once the differential pressure indicator is actuated, the indication continues to be displayed until the indicator is reset (by depressing the reset button), even if the pump stops operating.

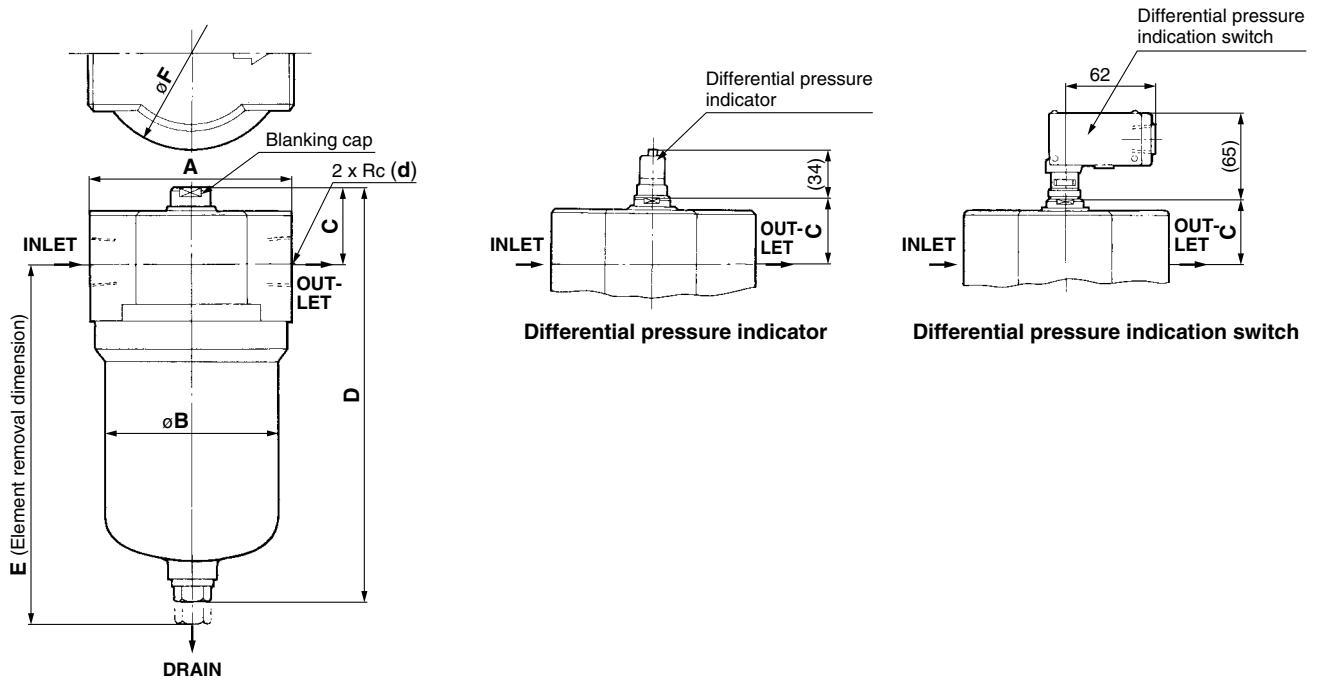
- Reset after replacing the element and restarting operation, or after normal operation starts in cold weather such as during winter.
- When using a differential pressure indication switch and if a filter clogged signal is incorporated into the sequence circuit of the machine, make sure to design the system so the filter clogged signal does not operate until normal operation starts.

### ③ Element replacement

- When the pressure difference reaches 0.13 MPa during filter operation (actuating the differential pressure indicator), stop operation, drain the oil from the case, and replace the paper element or wash the micromesh element. If the micromesh element has reached the end of its service life, replace it.
- When replacing the element, check the O-rings and replace them if they are damaged.
- When washing the micromesh element, do not wipe it using a stiff brush or rag.

# Series FH100

## Dimensions



(mm)

Model	d	A	B	C	D	E	F	Weight (kg)
FH100-06	3/4	102	90	35	200	290	104	2.5
FH100-08	1							
FH100-10	1 1/4	110	100	45	265	380	144	4.3
FH100-12	1 1/2							
FH100-16	2	150	128	52	299	430	175	6.8
FH100-20	2 1/2	200	157	70	387	540	175	17.5
FH100-24	3							

# Series FH

# Made to Order (Non-Standard Filtration)

Please contact SMC for detailed specifications, lead times and prices.

## How to Order

**Filter symbol (Refer to “How to Order” for each series)**

**X0**

Note) Made-to-order specifications (non-standard filtration rating) are available only for micromesh elements (element symbol: M).

↓  
**Made to Order  
(Non-standard filtration)**

## Hydraulic Filter Non-Standard Filtration Replacement Element Part No.

Description	Model	Port size	Replacement element part no.		Element size
			Micromesh element	Micromesh element (With relief valve)	
Vertical suction filter	<b>FHIA</b> (Refer to P. 3.)	1/2	EM001H-*1*2	—	ø65 x ℓ90
		3/4, 1	EM101H-*1*2	—	ø85 x ℓ110
		1 1/4, 1 1/2	EM201H-*1*2	—	ø100 x ℓ160
		2	EM301H-*1*2	—	ø120 x ℓ180
		2 1/2, 3	EM401H-*1*2	—	ø140 x ℓ200
		3 1/2, 4	EM501H-*1*2	—	ø180 x ℓ260
Suction filter with case	<b>FH99</b> (Refer to P. 7.)	1/2, 3/4	EM230-*1*2	EM520-*1*2	ø65 x ℓ90
		1, 1 1/4	EM330-*1*2	EM620-*1*2	ø82 x ℓ133
		1 1/2	EM430-*1*2	EM720-*1*2	ø104 x ℓ177
		2	EM530-*1*2	EM820-*1*2	ø104 x ℓ177
		2 1/2	EM630-*1*2	EM920-*1*2	ø132 x ℓ212
		3	EM730-*1*2	EM030-*1*2	ø132 x ℓ212
Suction guard	<b>FHG</b> (Refer to P. 11.)	1/2, 3/4, 1	EM220-*1*2	—	ø69 x ℓ88
		1 1/4, 1 1/2, 2	EM320-*1*2	—	ø89 x ℓ123
		2 1/2, 3	EM420-*1*2	—	ø109 x ℓ188
Line filter	<b>FH34 FH44 FH54 FH64</b> (Refer to P. 15.)	3/8, 1/2	EM040-*1*2	—	ø53.1 x ℓ90
		3/4, 1	EM910-*1*2	—	ø73.5 x ℓ117
		1 1/4, 1 1/2	EM140-*1*2	—	ø73.5 x ℓ195
		2	EM930-*1*2	—	ø87.6 x ℓ282
		2 1/2, 3	EM240-*1*2	—	ø118.7 x ℓ280
Vertical return filter	<b>FHBA</b> (Refer to P. 19.)	3/4	EM601H-*1*2	—	ø56 x ℓ180
		1 1/4	EM701H-*1*2	—	ø76 x ℓ190
		1 1/2	EM801H-*1*2	—	ø76 x ℓ290
Return filter	<b>FH100</b> (Refer to P. 22.)	3/4, 1	EM810-*1*2	—	ø65 x ℓ95
		1 1/4, 1 1/2	EM910-*1*2	—	ø73.5 x ℓ117
		2	EM020-*1*2	—	ø87.6 x ℓ157
		2 1/2, 3	EM120-*1*2	—	ø118.7 x ℓ207
Oil filter	<b>FH150</b> (Refer to P. 26.)	1/4, 3/8, 1/2	EM040-*1*2	—	ø53 x ℓ90

Note) In the table above \*1 indicates nominal filtration and \*2 indicates hydraulic fluid type.

### Nominal Filtration

Symbol (*1)	µm
003	3
005	5
010	10
020	20
040	40
074	74
105	105
149	149
270	270

### Hydraulic Fluid

Symbol (*2)	Type
N	Petroleum
W	Water-glycol, Emulsion
V	Phosphoric ester