

Suction Filter with Case

Series *FH99*

Compact and lightweight

The compact and lightweight design employs an aluminum casted housing.

Prevents pump cavitation

The inlet size is larger than the outlet size to prevent pump cavitation.

Easy element maintenance

Simply open the cover to detach the element without touching the pipes.

Easy-mounting pipes

There is no mounting orientation, and two types are available: threaded and flange.

Accessories available for a variety of applications

Available accessories include differential pressure indicators (differential pressure indicator or differential pressure indication switch), relief valves, and companion flanges.

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

Fluid		Hydraulic fluid
Operating pressure		Negative pressure
Operating temperature		Max. 80°C
Main material	Cover/Case	Aluminum cast
	O-ring	NBR or FKM ^{Note)}
	Seal	NBR or EPDM ^{Note)}
Element	Material	Micromesh
	Nominal filtration	74, 105, 149 μm (200, 150, 100 mesh)
	Differential pressure resistance	0.2 MPa
Differential pressure indicator operating pressure		24.0 kPa
Relief valve open pressure		33.3 kPa

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

Model/Rated Flow Rate

Model	Port size ^{Note)}		Rated flow rate (l/min)
	INLET	OUTLET	
FH990-04	1 ^B	1/2 ^B	20
FH990-06	1 ^B	3/4 ^B	50
FH990-08	1 1/2 ^B	1 ^B	100
FH990-10	1 1/2 ^B	1 1/4 ^B	150
FH990-12	2 ^B	1 1/2 ^B	200
FH990-16	2 ^B	2 ^B	300
FH991-20	2 1/2 ^B	2 1/2 ^B	450
FH991-24	3 ^B	3 ^B	600
FH991-28	3 1/2 ^B	3 1/2 ^B	750
FH991-32	4 ^B	4 ^B	900

Note) Both flange and threaded connections are supported. However, only flange types for FH991-20 to FH991-32 are compatible. The flange configuration is exclusive to SMC. Tapered threaded types (female) conforming to JIS B 0203.

Accessory/Option

Description	Part no.	Note
Differential pressure indicator	CB-54H	Petroleum, Water-glycol, Emulsion
	CB-54H-V	Phosphoric ester
Differential pressure indication switch (N.C. and N.O. common)	CB-55H	Petroleum, Water-glycol, Emulsion
	CB-55H-V	Phosphoric ester
Blanking cap (for differential pressure indication part)	AG-12H	Petroleum
	AG-12H-W	Water-glycol, Emulsion
	AG-12H-V	Phosphoric ester

How to Order

FH 9 90 - 04 - 0 0 0 - M 074

Hydraulic filter

Rated pressure

9	Negative pressure
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Construction/Connection

90	Common with L-type threaded and flange
91	L-type flange

Port size (Outlet side)

04	1/2 ^B
06	3/4 ^B
08	1 ^B
10	1 1/4 ^B
12	1 1/2 ^B
16	2 ^B
20	2 1/2 ^B
24	3 ^B
28	3 1/2 ^B
32	4 ^B

Differential pressure indication

0	None
4	Differential pressure indicator
5	Differential pressure indication switch (Note)

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

Relief valve

0	With relief valve
1	None

Made to Order

Nil	None
X0	Non-standard filtration

Note) Refer to page 32 for details.

Companion flange

Nil	None
F	With companion flange

Nominal filtration

074	74 μm
105	105 μm
149	149 μm

Element

M	Micromesh
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Hydraulic fluid

0	Petroleum
1	Water-glycol, Emulsion
2	Phosphoric ester

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

Model	With relief valve			Without relief valve			Element size
	74 μm (200 mesh)	105 μm (150 mesh)	149 μm (100 mesh)	74 μm (200 mesh)	105 μm (150 mesh)	149 μm (100 mesh)	
FH990-04/06	EM520-074N	EM520-105N	EM520-149N	EM230-074N	EM230-105N	EM230-149N	ø65 x 90
FH990-08/10	EM620-074N	EM620-105N	EM620-149N	EM330-074N	EM330-105N	EM330-149N	ø82 x 133
FH990-12	EM720-074N	EM720-105N	EM720-149N	EM430-074N	EM430-105N	EM430-149N	ø104 x 177
FH990-16	EM820-074N	EM820-105N	EM820-149N	EM530-074N	EM530-105N	EM530-149N	ø104 x 177
FH991-20	EM920-074N	EM920-105N	EM920-149N	EM630-074N	EM630-105N	EM630-149N	ø132 x 212
FH991-24	EM030-074N	EM030-105N	EM030-149N	EM730-074N	EM730-105N	EM730-149N	ø132 x 212
FH991-28/32	EM130-074N	EM130-105N	EM130-149N	EM830-074N	EM830-105N	EM830-149N	ø155 x 193

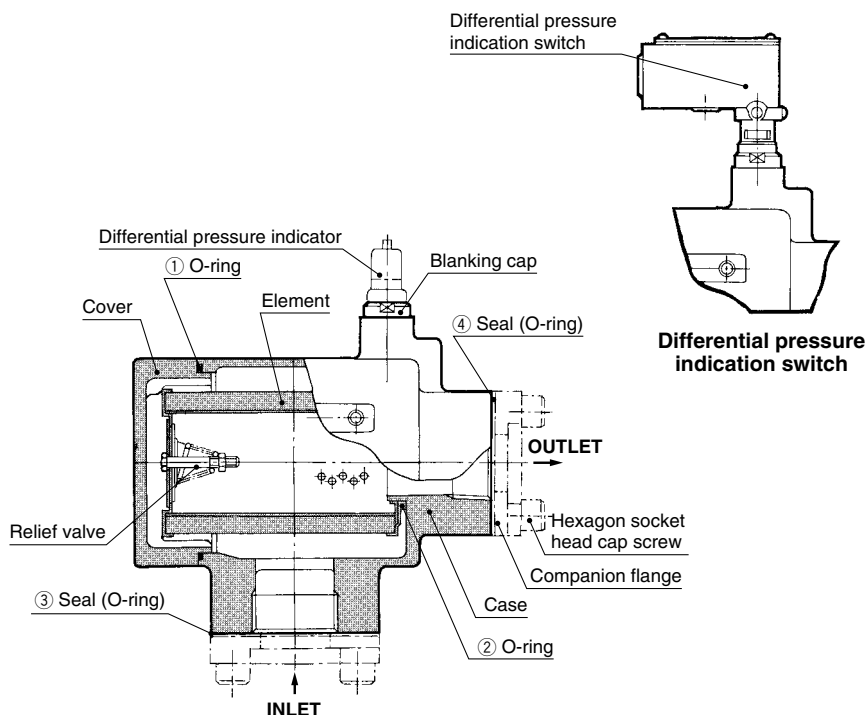
Note 1) The symbol at the end of the element part no. indicates the hydraulic fluid type.

N: Petroleum, W: Water-glycol, Emulsion, V: Phosphoric ester

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

Note 3) Above elements require one element per filter.

Construction/Seal List



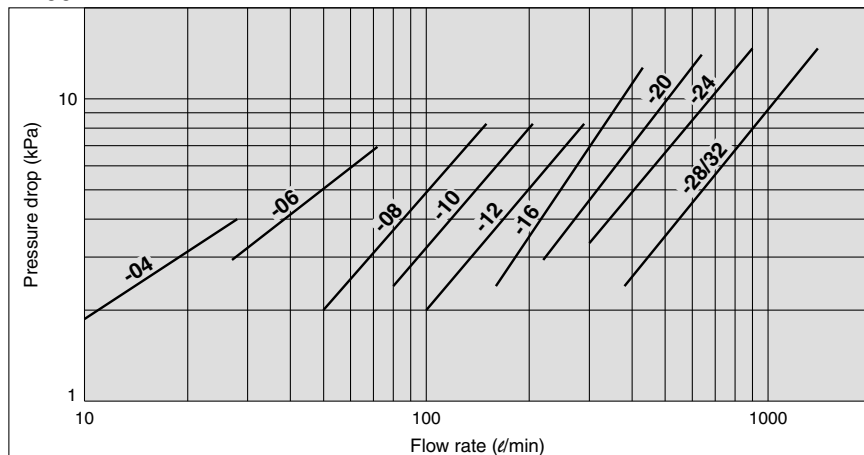
Replacement Seal List (One each of the seal and O-ring types listed below are required per filter.)

No.	Description	Hydraulic fluid type	①	②	③	④
			O-ring for cover case	O-ring for element	Seal for companion flange (O-ring) IN side	OUT side
Model			Standard	Standard	Part no.	Part no.
FH990-	04	Petroleum, Emulsion, Water-glycol	JIS B2401	JIS B2401	AL-130H	AL-128H
	06		-1A-V85	-1A-P28		AL-129H
	08		JIS B2401	JIS B2401	AL-133H	AL-131H
	10		-1A-V100	-1A-P42		AL-132H
	12		JIS B2401	JIS B2401	AL-135H	AL-134H
16	-1A-V120		-1A-P60	AL-135H		
FH991-	20		JIS B2401	JIS B2401	AL-136H	AL-136H
	24		-1A-V150	-1A-P90		AL-137H
	28		JIS B2401	JIS B2401	AL-137H	AL-137H
	32		-1A-V175	-1A-P120		AL-137H
FH990-	04	Phosphoric ester	JIS B2401	JIS B2401	AL-130H-V	AL-128H-V
	06		-4D-V85	-4D-P28		AL-129H-V
	08		JIS B2401	JIS B2401	AL-133H-V	AL-131H-V
	10		-4D-V100	-4D-P42		AL-132H-V
	12		JIS B2401	JIS B2401	AL-135H-V	AL-134H-V
16	-4D-V120		-4D-P60	AL-135H-V		
FH991-	20		JIS B2401	JIS B2401	AL-136H-V	AL-136H-V
	24		-4D-V150	-4D-P90		AL-137H-V
	28		JIS B2401	JIS B2401	AL-137H-V	AL-137H-V
	32		-4D-V175	-4D-P120		AL-137H-V

Series FH99

Flow Characteristics

FH99□



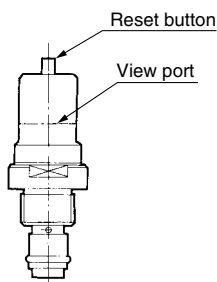
Conditions Fluid: Turbine oil Class 2 VG56
 Viscosity: 45 mm²/s
 Filter material: Micromesh
 Nominal filtration: 74 μm

Differential Pressure Indication

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

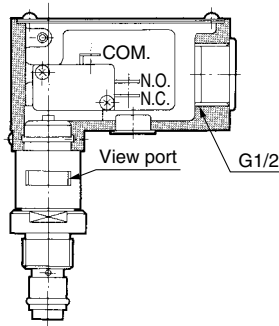
■ Differential pressure indicator

- Operating pressure—24 kPa
- 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—24 kPa
- 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 port).
- 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	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 connecting.
- For maintenance, make sure to provide sufficient space above the filter for removing the element.

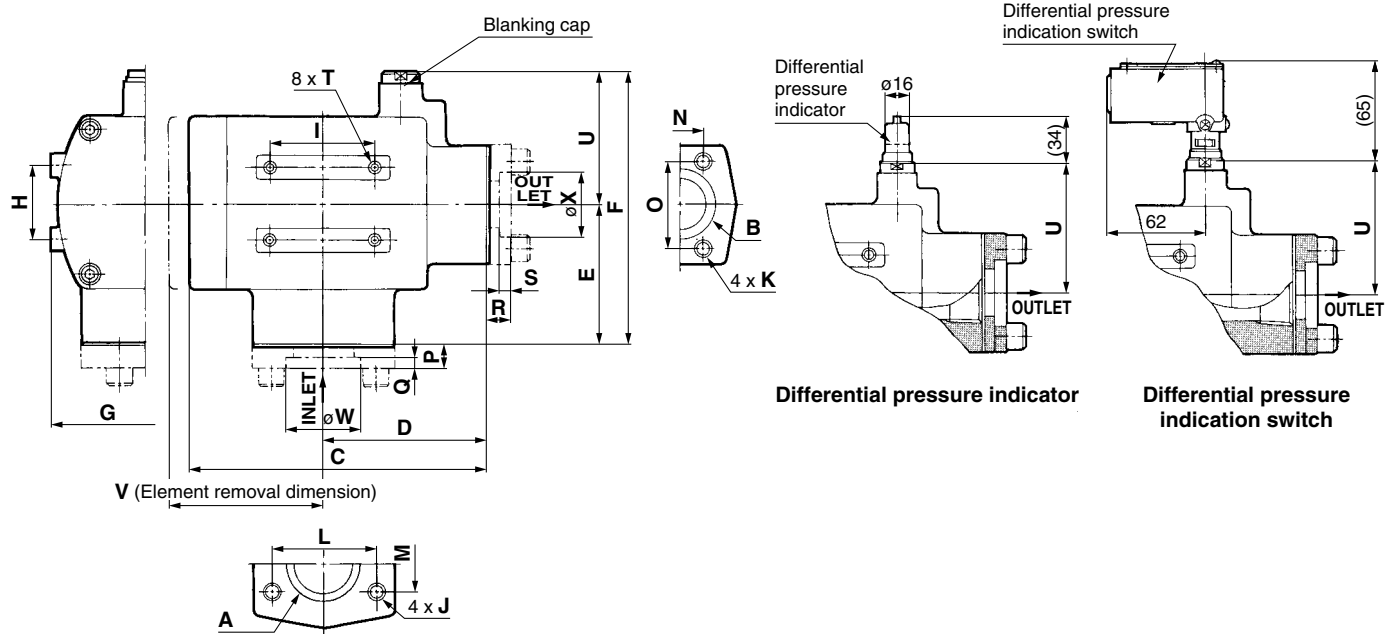
② Operation

- 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.
- If the differential pressure indicator is the reset type, make sure to reset it after replacing the element 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 24 kPa during filter operation (actuating the differential pressure indicator), stop operation and either wash or replace the element.
- During disassembly and assembly, check that there is no cracking of or damage to the O-rings.
- When installing and removing an element, do not scratch or damage it by touching the corners of the case, etc.
- When washing the element, do not wipe it using a stiff brush or rag.

Dimensions



(mm)

Model	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
FH990-04	1 ^B	1/2 ^B	150	75	80	164	112	40	40	M10 x 1.5 Thread depth 22	M10 x 1.5 Thread depth 22	52.4	26.2	22.2	47.6	16.5	6	16.5
FH990-06		3/4 ^B																
FH990-08	1 1/2 ^B	1 ^B	200	110	95	186	126	50	70	M12 x 1.75 Thread depth 23	M12 x 1.75 Thread depth 23	69.9	35.7	30.2	58.7	16.5	8	16.5
FH990-10		1 1/4 ^B																
FH990-12		1 1/2 ^B																
FH990-16	2 ^B	2 ^B	250	140	115	218	150	60	90	M12 x 1.75 Thread depth 23	M12 x 1.75 Thread depth 23	77.8	42.9	42.9	77.8	21.5	10	21.5
FH991-20		2 1/2 ^B																
FH991-24		3 ^B																
FH991-28		3 1/2 ^B																
FH991-32		4 ^B																

Model	S	T	U	V	W	X	Weight (kg)	
							Threaded without flange	With flange
FH990-04	6	M8 x 1.25 Thread depth 8	84	180	35	23	2.4	3.4
28								
FH990-08	8	M8 x 1.25 Thread depth 8	91	240	50	35	3.6	5.0
44								
FH990-12	10	M8 x 1.25 Thread depth 9	103	300	62	50	5.4	7.8
62								
FH991-20	10	M10 x 1.5 Thread depth 12	118	360		77	9.7	13.5
90								
FH991-28	5	M10 x 1.5 Thread depth 12	133	340		102	10.6	14.4
115								

Note) Both flange and thread connections are supported. However, only flange types for FH991-20 to FH991-32 are compatible. The flange configuration is exclusive to SMC. Tapered thread types (female) conforming to JIS B 0203.

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	FHIA (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	FH99 (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	FHG (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	FH34 FH44 FH54 FH64 (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	FHBA (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	FH100 (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	FH150 (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