

Suction Guard

Series FHG

Designed to prevent collected dust from falling into the tank

All collected dust can be disposed completely when the element is replaced. There is no danger of collected matter dropping back into the tank.

No need to replace flushing oil

Since all dust is eliminated during trial operation, it is not necessary to replace flushing oil. This reduces both labor and wasted oil.

Easy maintenance and no air mixing

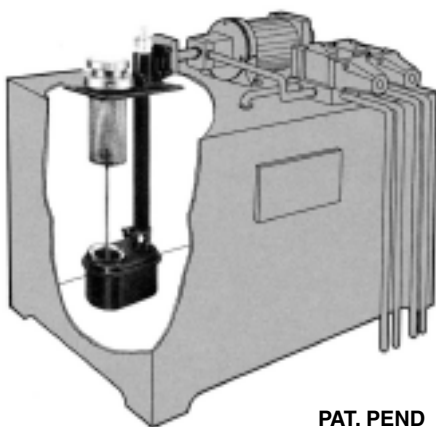
No special tools are required for maintenance, and insertion-type element replacement is quick and easy. This helps prevent air mixture into the suction line and pump damage.

Compact tank equipment

The lubrication port strainer, suction filter, and air breeder are all integrated into a single unit, reducing the volume of equipment around the tank.

Selection of connection methods and accessories for a variety of applications

Six methods are available as standard. Differential pressure indicators (visual and switch) are available and can be selected to match the application.



PAT. PEND

Specifications

Fluid		Hydraulic fluid
Operating pressure		Negative pressure
Operating temperature		Max. 80°C
Main material	Top flange	Steel plate
	Case	Steel plate
	Inlet pipe	Steel plate
	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
Air breeder nominal filtration		40 μm
Lubrication port strainer nominal filtration		10 mesh or equivalent

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

Connection

Companion flange,
Female threaded companion flange,
L-block companion flange,
L-block female threaded companion flange,
S-block companion flange,
S-block female threaded companion flange

Note 1) Female threaded connection ports are 1/2^B to 2^B only.

Note 2) Flange configuration is exclusive to SMC.

Model/Rated Flow Rate

Model	Port size	Rated flow rate (ℓ/min)
FHG9□A□-M□-04	1/2 ^B	18
FHG9□A□-M□-06	3/4 ^B	32
FHG9□A□-M□-08	1 ^B	53
FHG9□B□-M□-10	1 1/4 ^B	90
FHG9□B□-M□-12	1 1/2 ^B	120
FHG9□B□-M□-16	2 ^B	200
FHG9□C□-M□-20	2 1/2 ^B	315
FHG9□C□-M□-24	3 ^B	450

Accessory/Option

Description	Part no.	Note	
Differential pressure indicator	CB-21H	Petroleum, Water-glycol, Emulsion	
	CB-21H-V	Phosphoric ester	
Differential pressure indication switch (N.C. and N.O. common)	CB-67H	Petroleum, Water-glycol, Emulsion	
	CB-67H-V	Phosphoric ester	
Air breeder	CW-4H	Petroleum	
	CW-4H-W	For 1/2 ^B to 1 ^B	Water-glycol, Emulsion
	CW-4H-V		Phosphoric ester
	CW-5H	Petroleum	
	CW-5H-W	For 1 1/4 ^B to 2 ^B	Water-glycol, Emulsion
	CW-5H-V		Phosphoric ester
	CW-6H	Petroleum	
	CW-6H-W	For 2 1/2 ^B , 3 ^B	Water-glycol, Emulsion
	CW-6H-V		Phosphoric ester
Cap	D-73H	Petroleum	
	D-73H-W	For 1/2 ^B to 1 ^B	Water-glycol, Emulsion
	D-73H-V		Phosphoric ester
	D-74H	Petroleum	
	D-74H-W	For 1 1/4 ^B to 2 ^B	Water-glycol, Emulsion
	D-74H-V		Phosphoric ester
	D-75H	Petroleum	
	D-75H-W	For 2 1/2 ^B , 3 ^B	Water-glycol, Emulsion
	D-75H-V		Phosphoric ester

How to Order

FH G 9 0 A [] - M 074 - 04 - 0 0 [] []

Hydraulic filter

Suction guard

Rated pressure

9	Negative pressure
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Hydraulic fluid

0	Petroleum
1	Water-glycol, Emulsion
2	Phosphoric ester

Port size category

A	1/2 ^B , 3/4 ^B , 1 ^B
B	1 1/4 ^B , 1 1/2 ^B , 2 ^B
C	2 1/2 ^B , 3 ^B

Length below flange neck (T dimension)

Port size (Nominal size)	Standard T dimension			T dimension when shipped (Max. T dimension)
	Symbol	Length (mm)	Adjustment range (mm)	
04 (1/2 ^B) 06 (3/4 ^B) 08 (1 ^B)	1	310	±30	340
	2	380		410
	3	450		480
	4	520		550
	5	590		620
10 (1 1/4 ^B) 12 (1 1/2 ^B) 16 (2 ^B)	1	385	±45	430
	2	485		530
	3	585		630
	4	685		730
	5	785		830
20 (2 1/2 ^B) 24 (3 ^B)	1	560	Fixed	560
	2	650		650
	3	750		750
	4	850		850

Port size

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

Nominal filtration

074	74 μm
105	105 μm
149	149 μm

Element

M	Micromesh
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Made to Order

Nil	None
X0	Non-standard filtration

Note) Refer to page 32 for details.

Air breezer

Nil	Air breezer
C	Cap

Connection

0	Companion flange
1	Female threaded companion flange
2	L-block companion flange
3	L-block female threaded companion flange
4	S-block companion flange
5	S-block female threaded companion flange

Differential pressure indication

0	None
1	Differential pressure indicator
5	Differential pressure indication switch ^{Note)}

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

Note) The symbol Z indicates lengths other than the standard T length and adjustment range. Specify the T length in this case.

Port size (Nominal size)	T dimension allowable range for symbol Z (mm)
04 (1/2 ^B), 06 (3/4 ^B), 08 (1 ^B)	630 to 1,040
10 (1 1/4 ^B), 12 (1 1/2 ^B), 16 (2 ^B)	740 to 1,130
20 (2 1/2 ^B), 24 (3 ^B)	570 to 1,200

* Standard T dimensions are excluded for 20 (2 1/2^B), 24 (3^B).

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

Port size (Nominal size)	74 μm (200 mesh)	105 μm (150 mesh)	149 μm (100 mesh)	Element size
04 (1/2 ^B), 06 (3/4 ^B), 08 (1 ^B)	EM220-074N	EM220-105N	EM220-149N	ø70 x 90
10 (1 1/4 ^B), 12 (1 1/2 ^B), 16 (2 ^B)	EM320-074N	EM320-105N	EM320-149N	ø90 x 125
20 (2 1/2 ^B), 24 (3 ^B)	EM420-074N	EM420-105N	EM420-149N	ø110 x 190

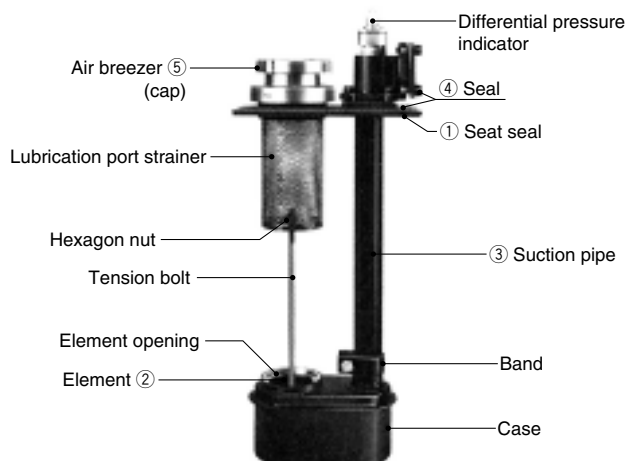
Note 1) The symbol at the end of the element part no. indicates the hydraulic fluid type.

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

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

Note 3) Above elements require one element per filter.

Construction/Seal List

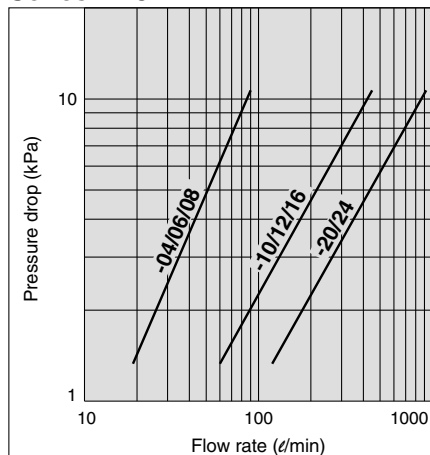


Replacement Seal List (One each of the seal and O-ring types listed below are required per filter.)

Description	No.	①	②	③	④	⑤
		Hydraulic fluid type	Top flange seal	O-ring for element	Bottom case O-ring for suction pipe	OUT connection packing
Port size		Part no.	Standard	Standard	Part no.	Part no.
04 to 08	Petroleum, Emulsion, Water-glycol	AL-180H	JIS B2401 -1A-G65	JIS B2401 -1A-P34	AL-183H	AL-162H
		AL-181H	JIS B2401 -1A-G85	JIS B2401 -1A-P60	AL-184H	AL-163H
		AL-182H	JIS B2401 -1A-G95	—	AL-185H	AL-164H
10 to 16	Phosphoric ester	AL-180H-V	JIS B2401 -4D-G65	JIS B2401 -4D-P34	AL-183H-V	AL-162H-V
		AL-181H-V	JIS B2401 -4D-G85	JIS B2401 -4D-P60	AL-184H-V	AL-163H-V
		AL-182H-V	JIS B2401 -4D-G95	—	AL-185H-V	AL-164H-V

Flow Characteristics

Series FHG



Conditions Fluid: Turbine oil Class 2 VG32
 Viscosity: 45 mm²/s
 Filter material: Micromesh
 Nominal filtration: 74 μm

Differential Pressure Indication

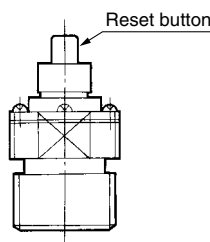
Two indication methods are available: differential pressure indicator and differential pressure indication switch. These can be mounted on all filter models.

Direct mounting is possible if the connection method is L-block or S-block. Otherwise, an Rc1 female thread fitting is required.

In addition, if no differential pressure indication is required, use a commercially available plug (R1).

■ Differential pressure indicator

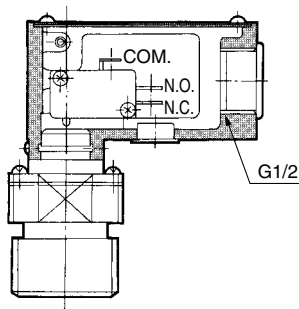
- Operating pressure—24 kPa
- Once a value is displayed, it will continue to be displayed until reset, even if the pump is stopped. (Reset type)
- The element should be replaced when the red indication is visible.



Differential Pressure Indication

■ 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)
- The element should be replaced when the switch is actuated.
- 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

- The portion of the suction guard below the oil tank mounting flange is installed inside the oil tank, so check to make sure it is clean when mounting it. For maintenance, make sure to provide sufficient space above the filter for removing the element.
- Use caution to ensure airtightness when connecting an outlet and installing a differential pressure indicator (especially for the thread type).
- Ensure that the oil tank fluid volume (minimum fluid level MIN(r) dimension) is 30 mm for 1/2^B to 1^B, 60 mm for 1 1/4^B to 1 1/2^B, 80 mm for 2^B, and 120 mm or more for 2 1/2^B to 3^B, measured when there is no turbulence in the flow from the element opening or fluctuation in the fluid level. Also, select a T dimension (length below flange neck) that will ensure that the fluid level does not reach the lubrication port strainer.

Handling Precautions

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 triggered, 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 24 kPa during filter operation (triggering the differential pressure indicator), stop operation and either wash or replace the element.
- When replacing the element, check the O-rings and replace them if they are damaged.
- 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.

④ Removing the element

- Rotate the air brezer (cap) one-third of a turn counterclockwise and remove it. Grasp the handle of the lubrication port strainer inside and, while rotating it clockwise, pull it up vertically. The suction element is screwed onto one end of the tension bolt and along with the lubrication port strainer, can be removed and installed freely. Do not remove the suction element while the pump is operating.

⑤ T dimension (length below flange neck) adjustment

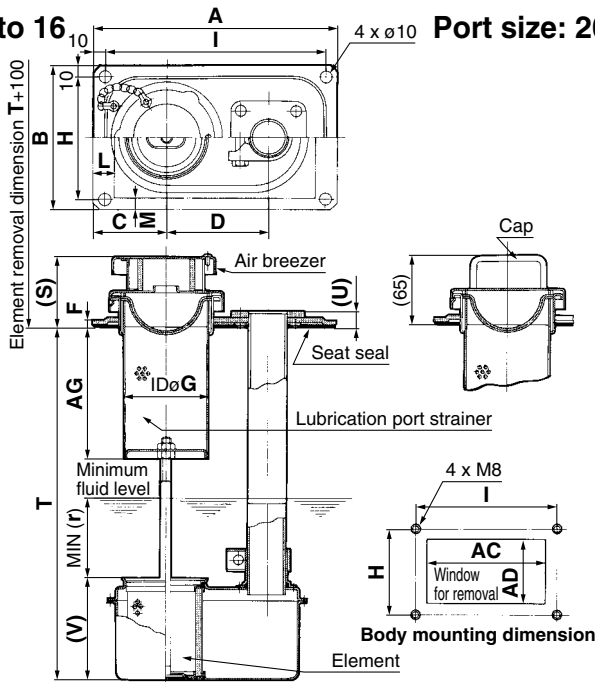
- The product is shipped from the factory with the maximum T dimension, so the user must adjust it to the required T dimension.
- The T dimension adjustment range, relative to the standard T dimension, is ±30 mm for 1/2^B to 1^B and ±45 mm for 1 1/4^B to 2^B. The dimension for ±30 mm for 2 1/2^B to 3^B is fixed, so no adjustment is possible.
- Refer to the operating manual for details of the adjustment method.

⑥ Lubrication

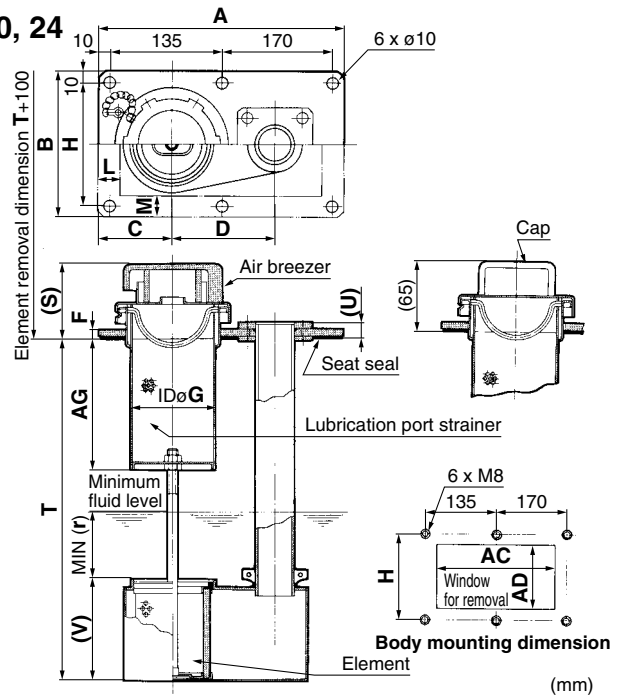
- Remove the air brezer (cap) and lubricate through the lubrication port strainer. Be careful not to let oil, etc., get onto the cap while it is being removed.

Dimensions

Port size: 04 to 16

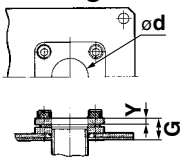


Port size: 20, 24



Port size (Nominal size)	A	B	C	D	F	G	H	I	L	M	S	U	V	r	AC	AD	AG	Standard T dimension					T dimension adjustment range
																		1	2	3	4	5	
1/2 ^B (04)	215	130	65	90	6	72	110	195	19	10	63	14	90	30	177	110	120	310	380	450	520	590	±30
3/4 ^B (06)	215	130	65	90	6	72	110	195	19	10	63	14	90	30	177	110	120	310	380	450	520	590	±30
1 ^B (08)	215	130	65	90	6	72	110	195	19	10	63	14	90	30	177	110	120	310	380	450	520	590	±30
1 1/4 ^B (10)	265	150	75	115	6	86	130	245	19	10	63	17	126	60	227	130	140	385	485	585	685	—	±45
1 1/2 ^B (12)	265	150	75	115	6	86	130	245	19	10	63	17	126	60	227	130	140	385	485	585	685	—	±45
2 ^B (16)	265	150	75	115	6	86	130	245	19	10	63	17	126	80	227	130	140	385	485	585	685	—	±45
2 1/2 ^B (20)	325	190	85	145	8	106	170	—	20	20	76	17	197	120	285	150	170	560	650	750	850	—	Fixed
3 ^B (24)	325	190	85	145	8	106	170	—	20	20	76	17	197	120	285	150	170	560	650	750	850	—	Fixed

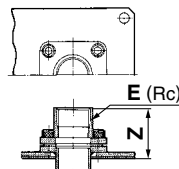
Connection part dimensions/ Companion flange



Port size	d	G	Y	Weight (kg)*
1/2 ^B (04)	22.2	25	9	2.7
3/4 ^B (06)	27.7	25	9	2.7
1 ^B (08)	34.5	25	9	2.7
1 1/4 ^B (10)	43.9	28	9	5.1
1 1/2 ^B (12)	49.1	28	9	5.1
2 ^B (16)	61.1	28	9	5.0
2 1/2 ^B (20)	77.1	28	9	10.3
3 ^B (24)	90.0	28	9	10.3

* Weight values are for the minimum T dimension (symbol 1) in each standard T dimension.

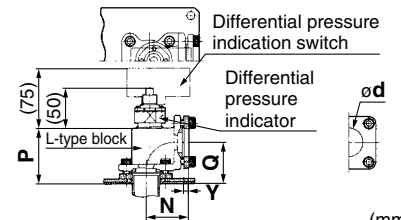
Female threaded companion flange



Port size	E	Z	Weight (kg)*
1/2 ^B (04)	1/2	47	2.8
3/4 ^B (06)	3/4	47	2.8
1 ^B (08)	1	52	2.8
1 1/4 ^B (10)	1 1/4	58	5.3
1 1/2 ^B (12)	1 1/2	58	5.3
2 ^B (16)	2	63	5.4

* Weight values are for the minimum T dimension (symbol 1) in each standard T dimension.

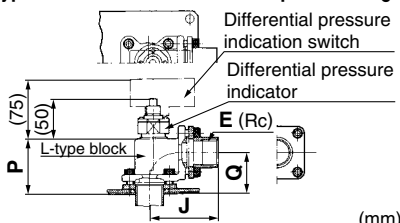
L-type block companion flange



Port size	d	N	P	Q	Y	Weight (kg)*
1/2 ^B (04)	22.2	56	71	53	9	3.6
3/4 ^B (06)	27.7	56	71	53	9	3.6
1 ^B (08)	34.5	56	71	53	9	3.6
1 1/4 ^B (10)	43.9	76	104	74	9	7.3
1 1/2 ^B (12)	49.1	76	104	74	9	7.3
2 ^B (16)	61.1	76	104	74	9	7.1
2 1/2 ^B (20)	77.1	101	129	94	9	14.5
3 ^B (24)	90.0	101	129	94	9	14.5

* Weight values are for the minimum T dimension (symbol 1) in each standard T dimension.
* The "OUT" direction can be mounted up to 90° to the left or right.

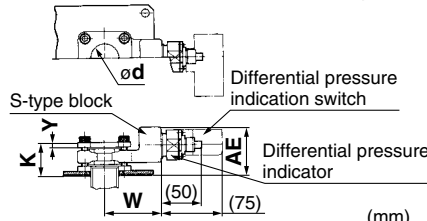
L-type block female threaded companion flange



Port size	E	J	P	Q	Weight (kg)*
1/2 ^B (04)	1/2	78	71	53	3.7
3/4 ^B (06)	3/4	78	71	53	3.7
1 ^B (08)	1	83	71	53	3.7
1 1/4 ^B (10)	1 1/4	106	104	74	7.4
1 1/2 ^B (12)	1 1/2	106	104	74	7.4
2 ^B (16)	2	111	104	74	7.5

* Weight values are for the minimum T dimension (symbol 1) in each standard T dimension.
* The "OUT" direction can be mounted up to 90° to the left or right.

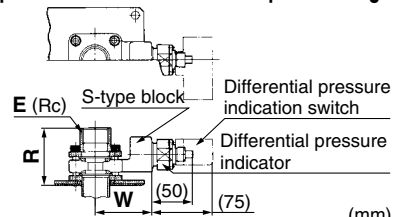
S-type block companion flange



Port size	d	K	W	Y	AE	Weight (kg)*
1/2 ^B (04)	22.2	47	70	9	62	3.5
3/4 ^B (06)	27.7	47	70	9	62	3.5
1 ^B (08)	34.5	47	70	9	62	3.5
1 1/4 ^B (10)	43.9	50	85	9	65	6.2
1 1/2 ^B (12)	49.1	50	85	9	65	6.2
2 ^B (16)	61.1	50	85	9	65	6.1
2 1/2 ^B (20)	77.1	50	105	9	65	11.9
3 ^B (24)	90.0	50	105	9	65	11.9

* Weight values are for the minimum T dimension (symbol 1) in each standard T dimension.
* The differential pressure indication entry can be mounted up to 90° to the left or right.

S-type block female threaded companion flange



Port size	E	R	W	Weight (kg)*
1/2 ^B (04)	1/2	69	70	3.6
3/4 ^B (06)	3/4	69	70	3.6
1 ^B (08)	1	74	70	3.6
1 1/4 ^B (10)	1 1/4	80	85	6.4
1 1/2 ^B (12)	1 1/2	80	85	6.4
2 ^B (16)	2	85	85	6.5

* Weight values are for the minimum T dimension (symbol 1) in each standard T dimension.
* The differential pressure indication entry can be mounted up to 90° to the left or right.

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
		3 1/2, 4	EM830-*1*2	EM130-*1*2	ø155 x ℓ193
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