

Magnetic Separator *FHM Series*

RoHS

These magnetic separators protect machinery from malfunctions, reduced precision, and burnout by adsorbing and eliminating contaminants in the fluid by means of magnetism. This helps extend the service life of hydraulic equipment.

Zero running cost

Since there are no consumable parts, the running cost is basically zero and the magnetic separator can be used semi-permanently.

Extends service life of hydraulic fluid

By adsorbing and eliminating contaminants, the magnetic separator retards deterioration of the hydraulic fluid and makes it possible to extend the fluid replacement time.

Reduced maintenance costs

The magnetic separator prevents mechanical problems caused by contaminants such as abrasive particles and greatly reduces maintenance costs.



Specifications

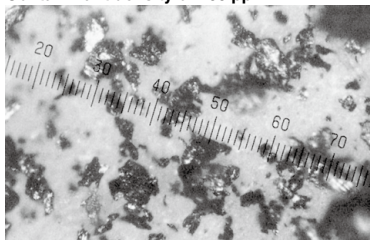
	FHMN	FHM
Fluid	Petroleum, Water-glycol, Cutting oil, Emulsion	Petroleum, Water-glycol, Cutting oil, Emulsion, Phosphoric ester
Operating temperature	Max. 80°C	Max. 150°C
Fluid speed	3 m/min or less	

Model

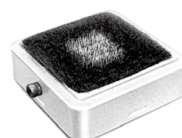
Model	Applicable fluid storage volume (L/unit) <small>Note)</small>	Dimension (mm)	Weight (kg)
FHMN-055	20	□55 x t20	0.2
FHM-100	100	□100 x t30	0.9
FHM-200	200	200 x 140 x t40	2.5

Note) For example, three FHM100 magnetic separator units would be sufficient for a 300-liter fluid storage tank.

Contaminant density of 200 ppm



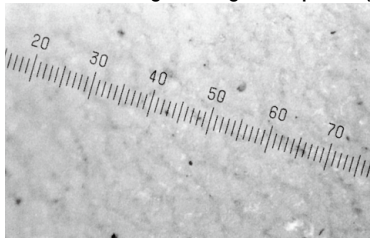
Separator after contaminant adsorption



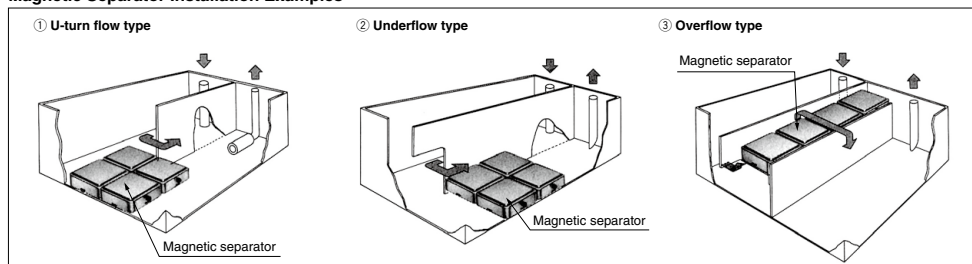
FH□

HOW□

Fluid after cleaning with magnetic separator (5 ppm)



Magnetic Separator Installation Examples



How to Order

FHMN-055

• Magnetic separator

• Main unit representative dimensions

055 □55 x 120

FHM-100

• Magnetic separator

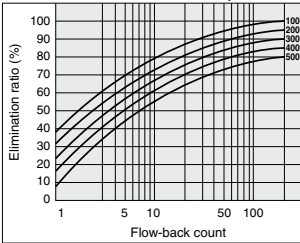
• Main unit representative dimensions

100 □100 x 130
200 200 x 140 x 140

Fluid Iron Content Elimination Performance by Iron Particle Concentration

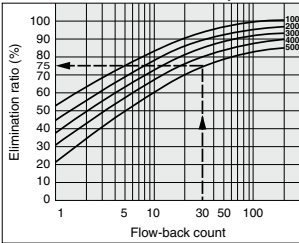
FHMN-055

Fluid: Hydraulic fluid



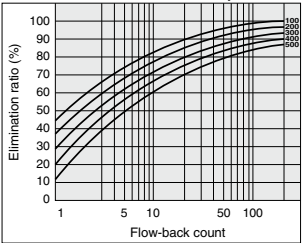
FHM-100

Fluid: Hydraulic fluid



FHM-200

Fluid: Hydraulic fluid



Explanation of graph

Example: Elimination ratio and concentration after using the FHM-100 for one hour under the following conditions.

- Conditions
1. Volume of fluid in tank: 200 L
 2. Pump-out volume: 100 L/min
 3. Contaminant concentration of used fluid: 500 ppm (initial concentration, percentage by volume)
 4. Number of separators: 2 pcs. (applicable fluid storage volume of 100 L/unit)

Explanation of graph

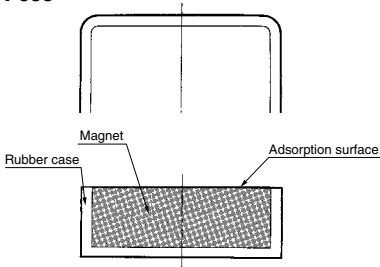
① Calculate the flow-back count (N).

$$N = \frac{\text{Pump-out volume} \times \text{Operation time}}{\text{Volume of fluid in tank}} = \frac{100 \times 60}{200} = 30$$

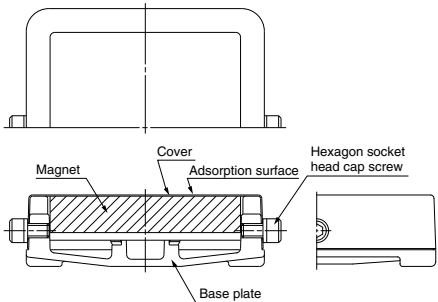
② Based on the elimination ratio data for the FHM-100 and the point where the 500 ppm line and flow-back count 30 line intersect (one hour after starting operation), the result is 75%.

Construction

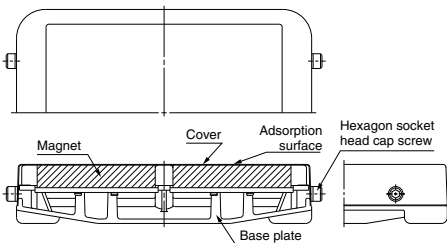
FHMN-055



FHM-100

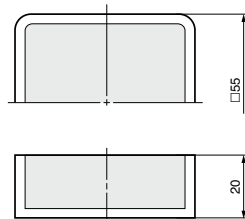


FHM-200

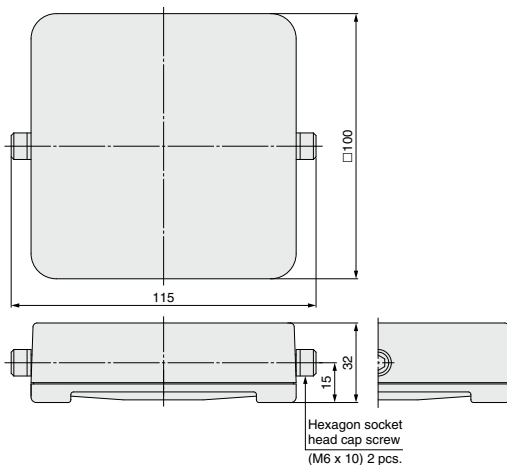


Dimensions

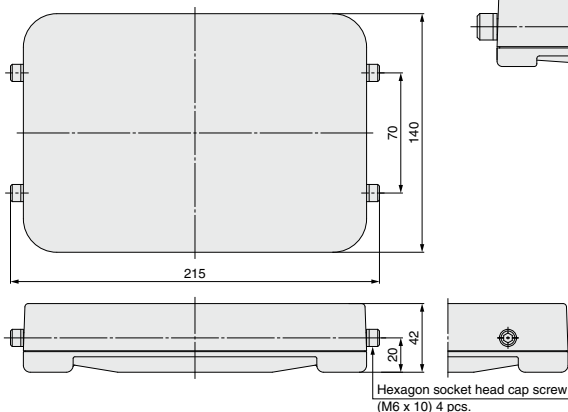
FHMN-055



FHM-100



FHM-200



Handling Precautions

Mounting

- ① The flat portion of the stainless steel cover functions as the contaminant adsorption surface. However, for FHM□-055, the flat portion of the magnetic material functions as the contaminant adsorption surface.
- ② Mount the magnetic separator in a location where fluid is constantly flowing in laminar flow.
- ③ Avoid locations such as near the suction pipe or return pipe, places where there is turbulence, and locations where the flow speed is 3 m/min or greater.

Example of handle equipped type

Example of cover/handle equipped type

Example of tank fixed type

- ④ If necessary, fix the separator in place. If frequent cleaning will be necessary, it can be suspended from the top panel of the tank.
- ⑤ If a fluid switch (built-in lead switch) or the like is used, it should be installed in a location where it will not be affected by magnetism from the separator. (Refer to the technical data sheet (FGX-TD-T011) for information on magnetic fields.)

Maintenance

- ① Clean the separator regularly. Make sure to clean it once the accumulation of contaminants reaches a thickness of 20 mm or so.
- ② Clean the adsorption surface of the separator by wiping away the accumulated contaminants using a soft rag or the like.

Handling

- ① Do not bring the top surface of the separator near magnetically attractive objects such as iron plates.
- ② Handle the separators individually and do not bring them into close proximity with each other.
- ③ Be careful not to get your fingers caught between the product and iron plate, etc., when installing the separator.
- ④ Do not bring objects that are affected by magnetism (electronic equipment, magnetic cards, watches, etc.) close to the separator.
- ⑤ When transporting this product by air freight, the product must be packaged so that the magnetic flux density becomes below the predetermined specified value. Confirm with the International Air Transport Association (IATA) or the Aviation Laws of each country.



Please consult with SMC for detailed specifications, delivery and prices.

1 Non-Standard Filtration

Symbol

X0

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 or
Micromesh element equipped)

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)	
Line filter	FH34 FH44 FH54 FH64 (Refer to P. 511.)	3/8, 1/2	EM040- \rightarrow 1 \rightarrow 2	—	ϕ 55 x L90
		3/4, 1	EM910- \rightarrow 1 \rightarrow 2	—	ϕ 74 x L117
		1 1/4, 1 1/2	EM140- \rightarrow 1 \rightarrow 2	—	ϕ 74 x L195
		2	EM930- \rightarrow 1 \rightarrow 2	—	ϕ 88 x L282
		2 1/2, 3	EM240- \rightarrow 1 \rightarrow 2	—	ϕ 119 x L280
Return filter	FH100 (Refer to P. 518.)	3/4, 1	EM810- \rightarrow 1 \rightarrow 2	—	ϕ 65 x L95
		1 1/4, 1 1/2	EM910- \rightarrow 1 \rightarrow 2	—	ϕ 74 x L117
		2	EM020- \rightarrow 1 \rightarrow 2	—	ϕ 88 x L157
		2 1/2, 3	EM120- \rightarrow 1 \rightarrow 2	—	ϕ 119 x L207
Oil filter	FH150 (Refer to P. 522.)	1/4, 3/8, 1/2	EM040- \rightarrow 1 \rightarrow 2	—	ϕ 55 x L90

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

Nominal Filtration

Symbol ⁽⁺¹⁾	μ m
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

(1) Contact specifications

Table 1 Contact specifications

Item	Specifications
Inrush current	Max. 15 A
Minimum applicable load	5 VDC 160 mA

(2) Rating

Table 2 Rating

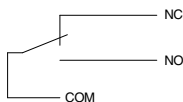
Rated voltage	Resistance load
250 VAC	5 A

(3) Other performance

Table 3 Other specifications

Item	Specifications
Insulation resistance	100 MΩ or more (Measured by 500 VDC, insulation resistance tester.)
Contact resistance	30 mΩ or less
Withstand voltage	Between terminals with the same pole.
	1,000 VAC 50/60 Hz 1 min
	Between charged metal part and ground
	1,500 VAC 50/60 Hz 1 min
	Between each terminal and non-charged metal part
	1,500 VAC 50/60 Hz 1 min

(4) Electric circuit



(N.C. and N.O. common)

Precautions

1. Connect desired wiring to the micro switch indication symbols 1 (COM.), 2 (N.C.), and 3 (N.O.).
2. When a protection mechanism is required, take appropriate considerations on the electric circuit since the micro switch is a type of non-reset.

(5) Terminal type

Soldering terminal



Hydraulic Filters/Precautions 1

Be sure to read this before handling products.

Model Selection/Range of Operating Conditions

Do not select a model exceeding specification ranges and carefully consider the purpose of use, required specifications and operating conditions such as fluid, pressure, flow rate, temperature and environment. Mishandling may lead to an unexpected accident.

⚠ Warning

1. Operating pressure

Do not use the product beyond the operating pressure range.
Do not use in locations where peak pressure exceeds the operating pressure range due to water hammer, surge pressure, etc.

2. Operating temperature

Do not use the product beyond the operating temperature range. Do not use at temperatures at or above the boiling point of the fluid.

3. Fluid

- Do not use fluids other than those indicated in the drawings and catalog.
- Do not use fluids which cause corrosion or swelling of the material used for each part of the filter.
- Never use the product with gases.
- Do not use any fluid which will cause the seal, O-ring or element to swell or deteriorate. The fluid may deteriorate these causing leakage.

4. Operating environment

- Do not use in operating conditions or environments where changes in color or deterioration of material due to corrosion occur.
- Do not use this product in a place where shock or vibrations occur.
- Do not use the hydraulic filter outdoors.

⚠ Caution

1. Rated flow rate

- Do not use flow rates beyond the rated flow rate indicated in the drawings and catalog.

Design and Installation

⚠ Caution

[Design]

1. Design the system with operating conditions, including operating pressure, operating temperature, operating fluid, and operating environment appropriate for safe operation.
2. Use the product with a circuit having lesser fluctuation to the filter caused by pressure or flow. If the occurrence of water hammering and surge pressure, etc. can be considered, take the necessary measures, such as installing an accumulator.
3. Prevent back pressure and backflow from occurring.
The element may be damaged by back pressure and backflow.
4. Prevent the propagation of an excess moment load and vibration from the piping side.
5. If a relief function of the hydraulic filter which controls the pressure is not used in the hydraulic circuit, design a circuit safe for the customer's system.
6. Provide sufficient space for maintenance.

[Piping]

1. Connect it with IN and OUT ports in proper location.
It does not work with the connection reversed.
2. Connect the valves or fittings suited to the operating conditions by checking the size of each connection port.
During connection work, make sure that powder from the piping screws or seal material does not get into the interior of the piping. Prior to operating, flush the piping line and check for abnormalities, such as fluid leakage.
3. Firmly fix the piping to the mounting frame using a saddle, etc., to avoid vibration or force caused by the weight.
4. During element replacement, it is necessary to release fluid from the vessel.
Be sure to connect the pipe so that fluid releasing work can be absolutely performed.
5. Make sure that air releasing work can be absolutely performed.
If the pump is in a high position, idling sometimes occurs during re-start. Take measures such as releasing the air in a high position, etc.

[Low temperature operation]

The hydraulic fluid used becomes high viscosity when the temperature is low during the winter, etc., and the differential pressure indicator or the switch may activate. If this occurs, wait until the oil temperature rises by a warm-up operation, and confirm if the differential pressure indicator and switch can be reset, then start the operation. (20 °C or more is the guide.) In the case of the differential pressure indication switch, design the system in combination with the temperature sensor, so that the output signal is not accepted until the oil temperature reaches the set value or more.



Hydraulic Filters/Precautions 2

Be sure to read this before handling products.

Operation

Warning

1. Never loosen the tightened parts (Bolt, Clamp ring.) under pressurized conditions.

Caution

1. When operating

When applying pressure for starting a pump, confirm that each connecting parts are completely sealed. If any abnormality is found, such as fluid leakage, stop the product immediately and locate the possible cause of the failure.

Resume operation after taking appropriate measures to stop the fluid leakage by replacing the O-rings or seals, or additionally tightening the fittings.

Maintenance

Warning

1. Failure to observe the procedure will likely cause fluid leakage or removal of a cover, which may lead to an unexpected accident. Follow the procedure in the operation manual.
2. Make sure that the line is stopped and the pressure is atmospheric pressure (gauge pressure: zero) before starting maintenance and inspection.
3. Depending on the fluid, it may affect the human body. Check the MSDS of the fluid, and take the necessary measures.

Caution

1. Timing of element replacement

- When the time has come to replace the element, replace it with a new element immediately.

Confirm the element replacement period by the differential pressure indicator or the differential pressure indication switch.

2. Element replacement work

- Carry out element replacement work based on the procedure in the operation manual. Mishandling could lead to malfunction or damage the machinery and equipment.
- Before replacing the elements, be sure to wear protective gloves, safety glasses.

There is a possibility of being injured by the captured foreign matter. There is also a possibility of being injured by slippage of your hands caused by the adhesion of fluid.

- After the elements are replaced, correctly perform the attachment and assembly of each part of the filter in the predetermined positions according to the Operation Manual.

3. Cleaning each component

During element replacement, in order for firm sealing to take place, clean the sealing surface of the O-ring and seal, and/or remove the paint which is left on the tightened parts or the thread parts.

4. Replacing O-rings and seals

Replace the deteriorated or expanded O-ring or seal.

Also, replace the seal after it has been used for one year or when fluid leakage occurs.

5. Temperature

When operating at high temperatures (40°C to 80°C), there is danger of burns.

Confirm that the surface temperature of the filter or the parts for operation are 40°C or less, to prevent a burn from occurring.

FH□

HOW□