SMC

Operation Manual

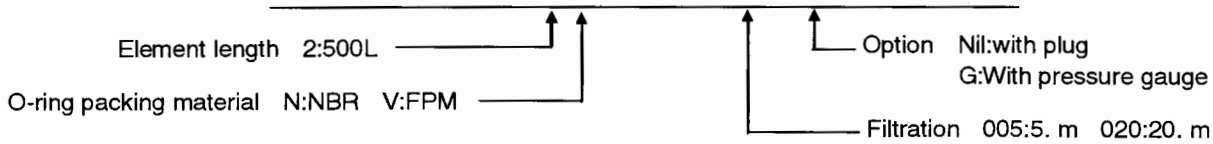
Low maintenance filter

FN4102N-20-S005G

FN4102N-20-S020G

FN4102V-20-S005G

FN4102V-20-S020G



(a) This operation manual is for above model numbers. Confirm the model number of used bag filter.
(b) Read the operation manual carefully before installation.
Read thoroughly the description concerning safety.
(c) Keep this operation manual accessible whenever you need for future reference.
(d) This operation manual will be revised without prior notice.

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SMC Corporation

Low maintenance filter

Safety Instruction

These safety instructions are intended for the safe operation of the low maintenance filter, and to protect you and your people from damage and injuries.

⚠ **Caution** : Operator error could result in injury or equipment damage.
⚠ **Warning** : Operator error could result in serious injury or loss of life.

⚠ **Warning** : Wrong operation causes fluid leakage or falling of the cover which could lead to cause an unexpected accident. Decision of suitability of equipment shall be made by the system designer with experience and knowledge.

Operating condition range

1. Operating pressure
   Keep pressure in specified range.
2. Fluid temperature
   Keep temperature in specified range.
3. Operating fluid
   (a)Don't use for gases.
   (b)Don't use for corrosive fluid.
   (c)Don't use for fluid which cause
   Swelling and deterioration to packing and "O" ring.
4. Operating environment
   (a)Don't use in corrosive environment.
   (b)Don't used where exposed to vibration and impact.

Caution on operation

1. 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.
2. 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 of the lock cylinder. Exceeding this pressure range may increase the load applied to the filtering plate when the element is compressed, causing malfunction.

⚠ **Caution** : Keep the following cautions to protect the element and ensure performance and feasibility of maintenance.

Precautions on design and installation

1. Pressure drop(. P)
   Initial pressure drop of the flow shall be 0.02Mpa or less.
2. Installation space
   Ensure enough space for maintenance for installation and piping.
3. Flushing
   Flush piping line before initial operation.
4. Connect piping ensuring IN / OUT direction.
5. Preventive measure for burnt is necessary for high temp.

Precautions on operation

1. IN side circuit
   Device 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 pomp.
2. Back flushing
   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.
3. Low maintenance filter surface temp
   To avoid burnt, confirm the filter surface temperature is 40 °C or less before replacing the element. Be careful for burnt when use for high temperature.

1. Parts description and functions

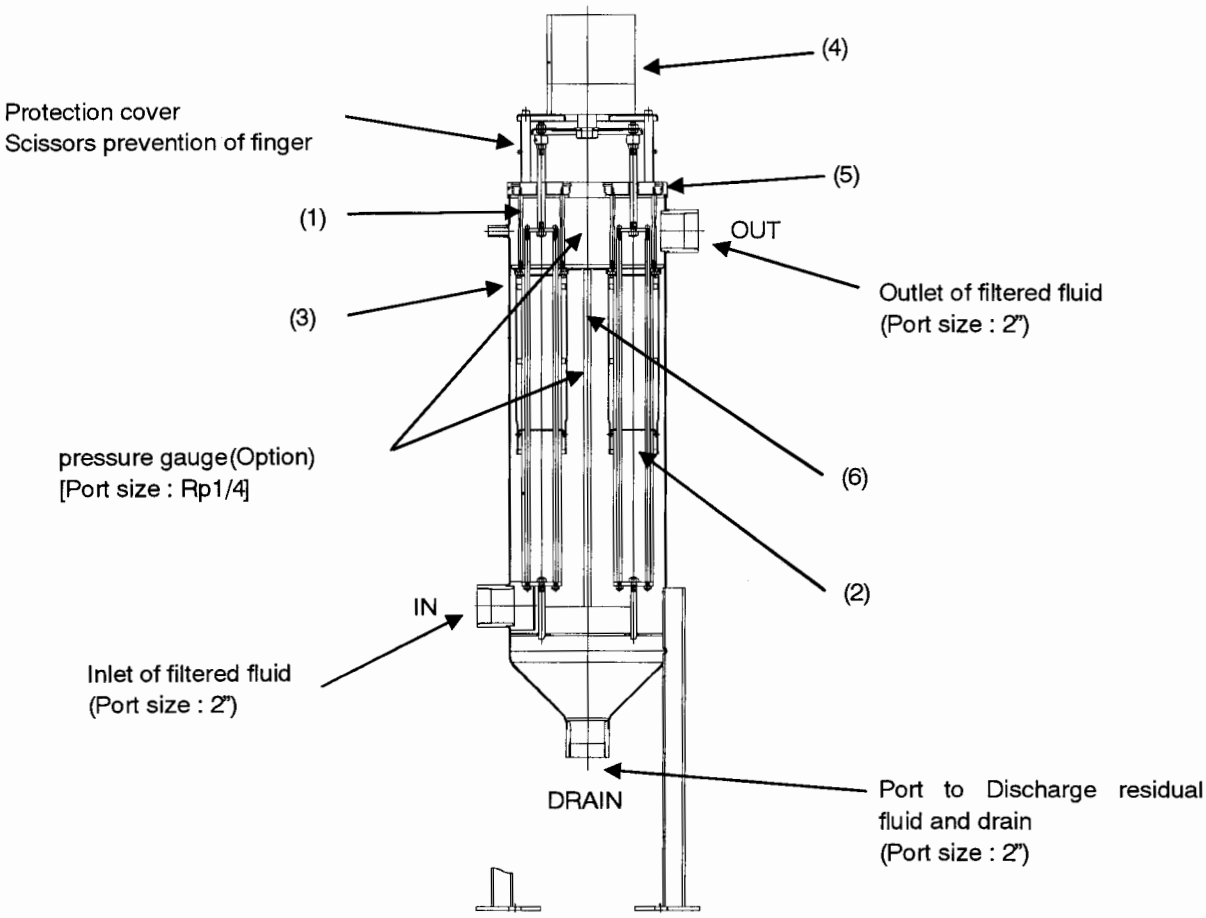


Fig 1. Parts description and functions

Table1. Parts description and functions

No.	Description	Part no.	Material	Function
1	Cover	-	SUS303	-
2	Element	END400-005(5. m,L500) END400-020(20. m,L500)	SUS304	Our unique element construction with back flushing capability
3	Case	AB-24S	SUS304	-
4	Cylinder	CDLQA100-50D-F	-	For element decompression and compression
5	O-ring	KT-FN41N(NBR) KT-FN41V(FPM)	NBR FPM	O-ring to seal at the cover and the case seat Part No. is packing-set
7	Model label	BH-59S	Synthetic paper	⚠**Caution** Replace when it became hard to see

2. System Designing, Installation, and Piping

⚠ **Warning** (1) Use the pump with a system designed in the way that the operating conditions such as operating pressure, operating temperature, operating fluid, and operating environment meet the product specifications on Table 2 enough to secure safety.

(2) Use the pump with a circuit which has less pressure to the filter and less fluctuation load of flow rate.

(3) The feet of the pump shall be fixed firmly to the ground witha basic bolt (M10).

(4) Confirming the size of each connection port, piping shall be done with a valve and a fitting complying with the operating conditions. Before operation, the piping shall be flushed and checked for failures such as leakage.

(5) Piping at IN and OUT shall be fixed firmly to a base with saddle support so as not to apply load vibration or weight.

[The following setup shall be done to use the pump as automatic back flushing system.]

(1) Mount an automatic operation valve at IN and OUT of the filter and DRAIN port.

(2) For detecting the clogging of an element automatically, connect upstream and downstream pressure which are at before and after the filter, to a differential pressure switch.

(3) Lay pneumatic piping to an air vent of the filter and a cylinder (top of the filter).

(4) Setup each valve and cylinder so that they can be operated along with the purpose of the operation with a controller. (Refer to time chart on Fig.3)

* As the valve at IN side is closed during back flushing, consider to provide a by-pass circuit to disperse the operating pressure if necessary. (Protection of machinery set at upstream side of filter 1)

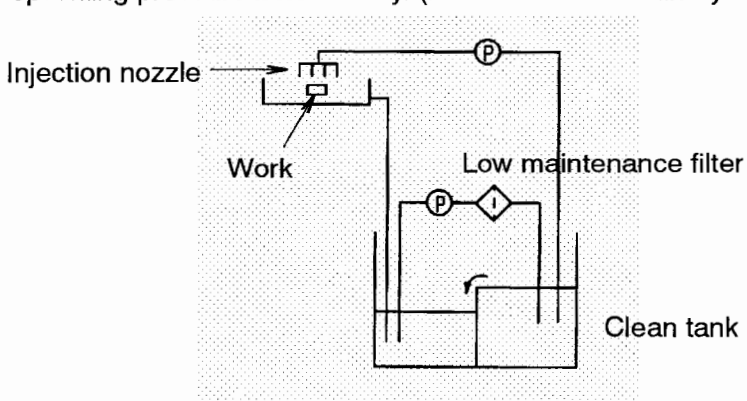


Fig2. Circuit example

3. Operation

(1) When pressure is applied on occasions such as starting the pump, check the valve at piping for opening and closing and each connection for being sealed completely. If any failure such as leakage occurs, stop it immediately. Restart the operation after an investigation into a cause is made and a proper measure such as replacement to a new O-ring and tightening of a fitting is taken.

(2) Residual air in a housing is exhausted to OUT side together with fluid.

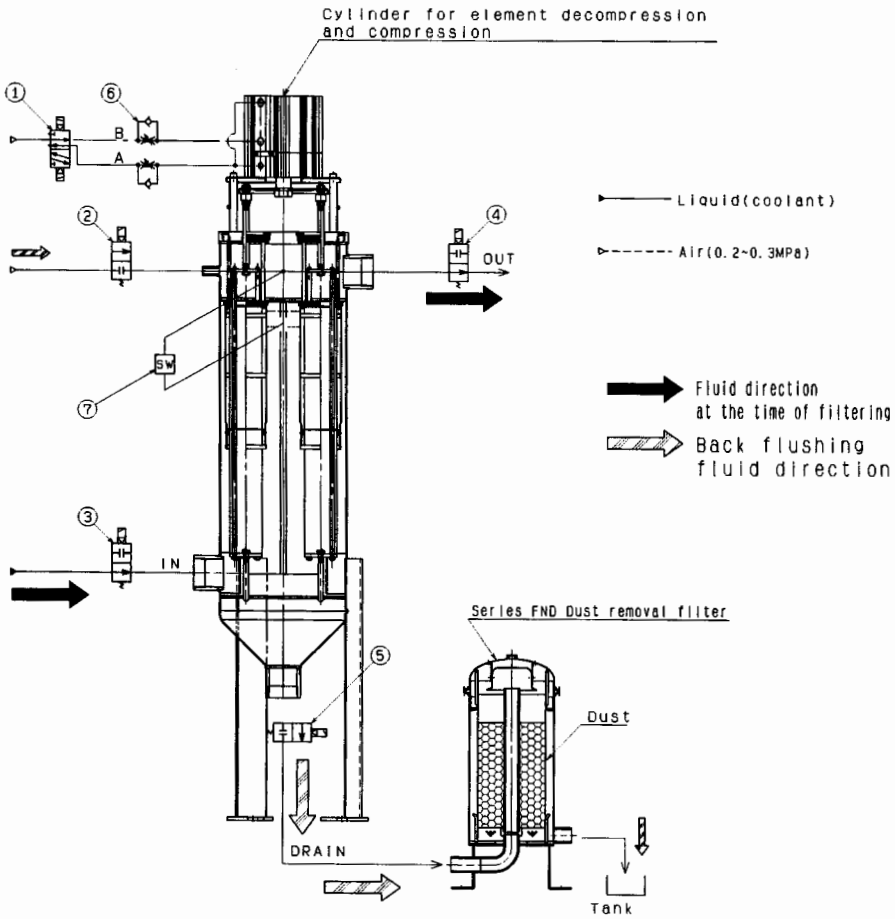
(3) Back flushing shall be done before differential pressure reaches to 0.1 to 0.12.(Be careful not to exceed this range when back flushing will be done in accordance with the operation cycle of a machinery.)

(4) When the operation is closed, back flushing shall be surely done, and the fluid must not be inside the filter. (Prevention of dust adhesion)

Piping Example

Series FN4 Low Maintenance Filter cannot be used alone.

Please follow the component configuration and operation steps illustrated below.

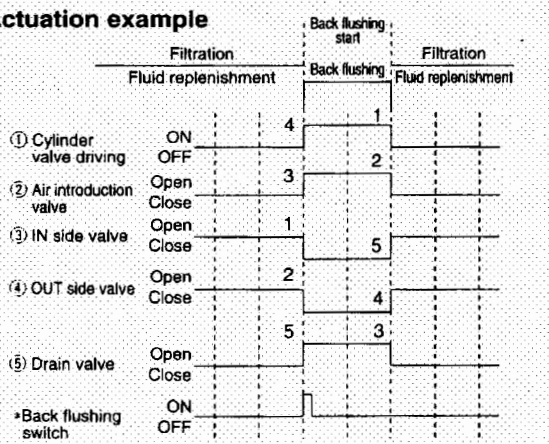


Example of connection device

No.	Description	Device	No.	Description	Device
①	Cylinder driving valve	5-port solenoid valve (Series SY)	④	OUT side valve	Boll valve (Series FNVB)
②	Air supply valve	Process valve (Series VNB)	⑤	DRAIN valve	Boll valve (Series FNVB)
③	In side valve	Boll valve (Series FNVB)	⑥	Speed controller	Speed controller (Series AS)

Series inside ( ) indicate SMC product. 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	

Fig3. Circuit example

4. Product specification

Table2. Product specification

	Item	Content	Note
Filter	Max. operating pressure	1.0 MPa	
	Max. operating temp.	80 °C	
	Flow rate	250 L/min	Water ; Pressure drop 0.02MPa or less
	Filtration	5,20 . m	
	Port size	Rc2	IN,OUT,DRAIN
		Rp1/4	Pressure port, Air port
	Capacity	38 L	
	Weight	65 Kg	
Cylinder	Auto switch	Without	Built-in magnet
	Operation fluid	Air	
	Operating pressure	0.2 to 1.0 MPa	
	Ambient and fluid temperature	-10 to 70 °C	No freezing

5. Maintenance

Basically, this filter does not need any maintenance, but if an element needs cleaning (differential pressure cannot be returned as dust adheres) or an element or a packing needs replacement, clean or replace the element by following the dismantling procedure below.

5-1 Dismantling procedure

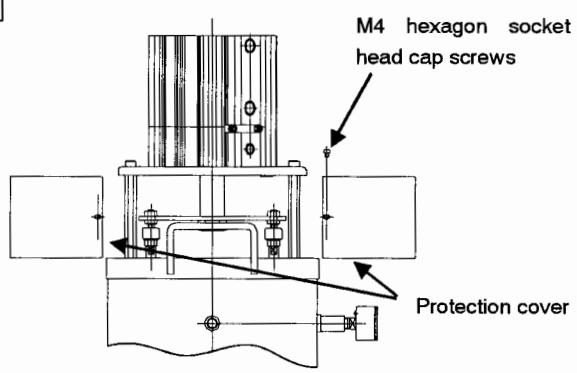
1	Stopping operation

- Stop the operation of filter.
- Close the valves at IN and OUT.
- Open the DRAIN valve to make the internal pressure zero and to exhaust all the fluid inside.

2	Removing protection cover

- Remove the set screws of a protection cover, and slide the cover to the side.

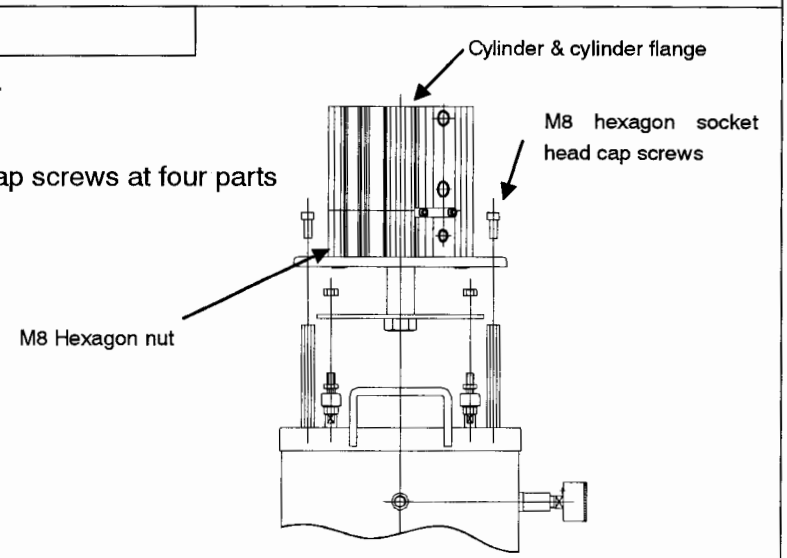
  Set screw: M4 hexagon socket head cap screws at two parts



3	Removing cylinder

- Remove the M8 hexagon nut at four parts.
- Remove the cylinder flange holding bolts.

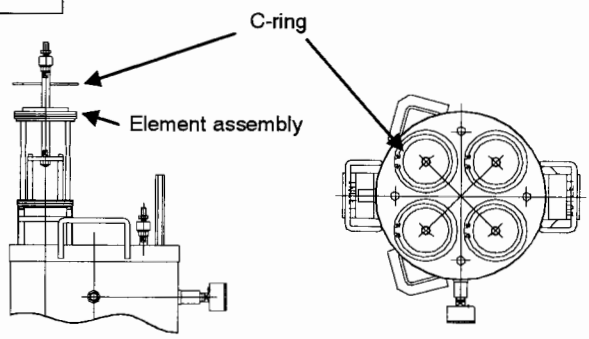
  Holding bolt: M8 hexagon socket head cap screws at four parts
- Up to the cylinder, and remove it.



4	Taking out cover assembly

- Remove the C-ring at four parts.
- Withdraw the element assembly upward from the case.

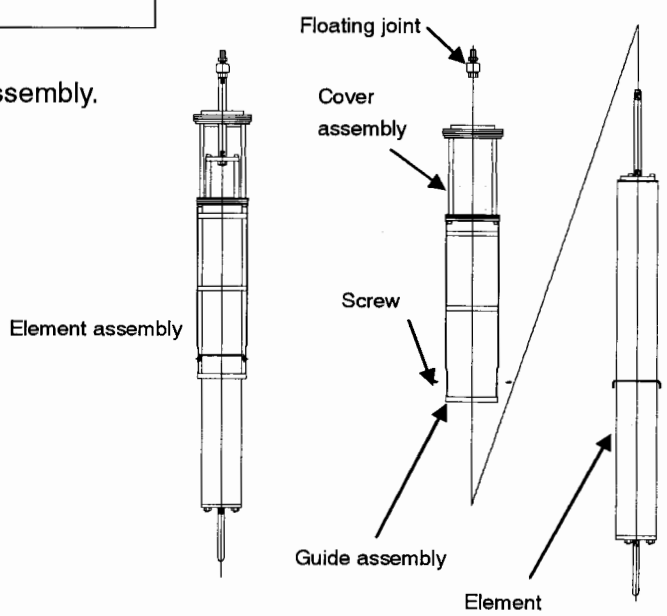
- Remove the O-ring to the new one if it has any problems such as swelling.
  [O-ring for replacement]
  JIS B2401-1A-G90 and G80 (Material: NBR)
  JIS B2401-4D-G90 and G80(Material: FPM)



5	Removing element

- Remove the floating joint.
- Remove the intermediate screws of the guide assembly.
- Withdraw the element from the cover assembly.

*** Do not dismantle the element further more.**



6	Cleaning element

- Clean the element taken out.
  [Cleaning method] Ultrasonic cleaning, solvent cleaning, blowing cleaning, etc
  *** Do not clean it with acid or a hard brush.**

7	Assembling and restarting

- Assemble it by following the dismantling procedure backward.
- For restarting, follow Section 3 “Operation”.

Please contact our sales person when you have any questions.