

## THE IMPORTANCE OF AN EFFICIENT FILTRATION

The main cause of anomalies in hydraulic systems has to be attributed to the presence of contaminants in the fluid. The nature of the contaminant may be: gaseous, namely air mixed with the fluid; fluid, in most cases it is water that has penetrated the fluid; solid, therefore particles of various origins and dimensions.

The customers who operate equipment are always focused on obtaining the best possible performance, lower energy consumptions and greater respect for the environment.

These characteristics can be attained by using top quality components in the hydraulic system for generating and regulating the fluid power, which are however rather sensitive to the presence of contaminants in the fluid. Starting from these requirements, we understand how important and fundamental it is to prevent the presence of air and water from mixing in the fluid tank by using dedicated solutions.

It is also crucial to limit the presence of solid particles in the hydraulic circuit through a suitable filtering system, which is indispensable to maintain the project requirements of the system over time and to keep running costs low.

The correct choice of a filter and its optimum position in the hydraulic system requires the same care and experience needed to choose all the other components.

The use of filters with larger filtering surfaces reduces, at equal flow rates, the superficial contaminant load and therefore the filter's life is extended proportionally.

To maintain the maximum efficiency of the system, the filters must have a clogging indicator showing the differential pressure on the filtering cartridge and to immediately point out when the cartridge needs replacing in order to prevent the by-pass valve from opening.

### **The following factors should be analysed when choosing the ideal filter:**

- The filtration degree required to protect the most sensitive component from contamination
- The points of the circuit in which the filters have to be installed
- The working pressure of the system
- The maximum flow rate and the type of fluid to be filtered
- The duty cycle
- The retention efficiency of the filtering cartridge
- The contaminant accumulation capacity of the filtering cartridge
- The working ambient temperature

Each filter used generates a pressure drop that increases continuously as time goes by. This pressure drop represents an efficiency index of the filter itself.

When the hydraulic system is about to be assembled, all the components must be perfectly clean and the fluid has to be added through a device complete with a filter.

During the test phase, it is advisable to run some work cycles at low pressure in order to create the best possible conditions for all the components.

## TECHNICAL CHARACTERISTICS

The HF705 filters serie represent the last crash barrier for the hydraulic components of a circuit's pressure line that need a steady and absolute control as regards fluid's contamination level.

Characterized by the small space occupied, the high working pressure and the sintered bronze element, the HF705 is particularly suggested for mountings on pilotage devices and for quick-release couplings.

- Flow up to 30.4 US gpm (115 l/min)
- Maximum working pressure 5076 psi (350 bar)
- Sintered bronze filter element
- Bidirectional flow
- Compact design

### MATERIALS

Housing	High strength aluminium
Seals	Buna - Viton
Filter media	Sintered bronze

### FLUID COMPATIBILITY

Conforming to ISO 2943 (Norm ISO 6743/4)

Oil mineral (1)	HH - HL - HM - HR - HV - HG
Water emulsion (1)	HFAE - HFAS
Water glycol (1)	HFC
Syntetic fluid (2)	HS - HFDR - HFDU - HFDS

(1) With Buna seals

(2) With Viton seals

### FLOW

Flow max.	30.4 US gpm (115 l/min)
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### PRESSURE

Working pressure	5075 psi (350 bar)
Testing pressure	6019 psi (415 bar)
Burst pressure	7542 psi (520 bar)
Element collapse pressure rating (conforming to ISO 2941)	1160 psi (80 bar)

### OPERATING TEMPERATURE

With Buna seals	-22 ÷ 195 °F (-30 ÷ 90 °C)
With Viton seals	-4 ÷ 230 °F (-20 ÷ 110 °C)

### ENDURANCE STRENGTH

1.000.000 cycle  
0 ÷ 5075 psi (0 ÷ 350 bar)

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## SIZING – PRESSURE DROP

In the filters of series HF 705 in normal working conditions, the total  $\Delta p$  must not be more than 29 psi (2 bar). To establish the values of pressure drop involved, the following page provide some diagrams with curves referred to the use of mineral oils SAE 10 with kinematic viscosity of 120 SSU (30 cSt) and density of 7.29 lb/gal (0,856 kg/dm<sup>3</sup>).

### Example calculation

Filter HF705-10.040-SB060-GD-B  
 Flow rate = 11.9 US gpm (45 l/min)  
 Kinematic viscosity: 120 SSU (30 cSt)  
 Oil density : 7.29 lb/gal (0,856 kg/dm<sup>3</sup>)  
 Filtering degree: 60  $\mu$ m

Data obtained from the diagrams:

Total  $\Delta p$  = 15.9 psi (1,1 bar) (pag.3 -  $\Delta p$  is lower than maximum value admitted – therefore sizing is correct).

If oil with different kinematic viscosity and different density is used, the values obtained from the diagrams shall be re-calculated considering the following indications:

$$\text{Total } \Delta p = \Delta p \text{ of diagram (psi)} \cdot \frac{\text{Oil density (lb/gal)}}{7.29 \text{ (lb/gal)}} \cdot \frac{\text{Oil viscosity (SSU)}}{120 \text{ (SSU)}} \quad [\text{psi}]$$

Or

$$\text{Total } \Delta p = \Delta p \text{ of diagram (bar)} \cdot \frac{\text{Oil density (kg/dm}^3\text{)}}{0,856 \text{ (kg/dm}^3\text{)}} \cdot \frac{\text{Oil viscosity (cSt)}}{30 \text{ (cSt)}} \quad [\text{bar}]$$

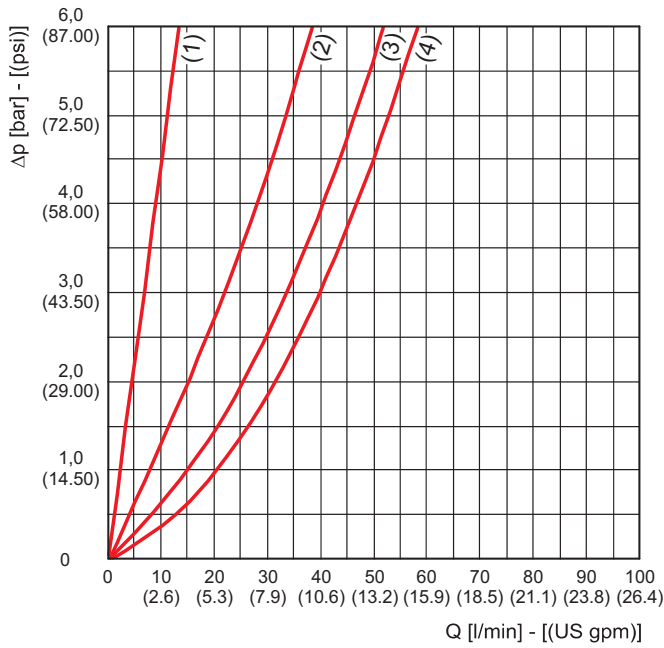
Make sure that the total recalculated  $\Delta p$  does not exceed the pressure limit of 29 psi (2 bar).

### HF705-10 PRESSURE DROP CURVE

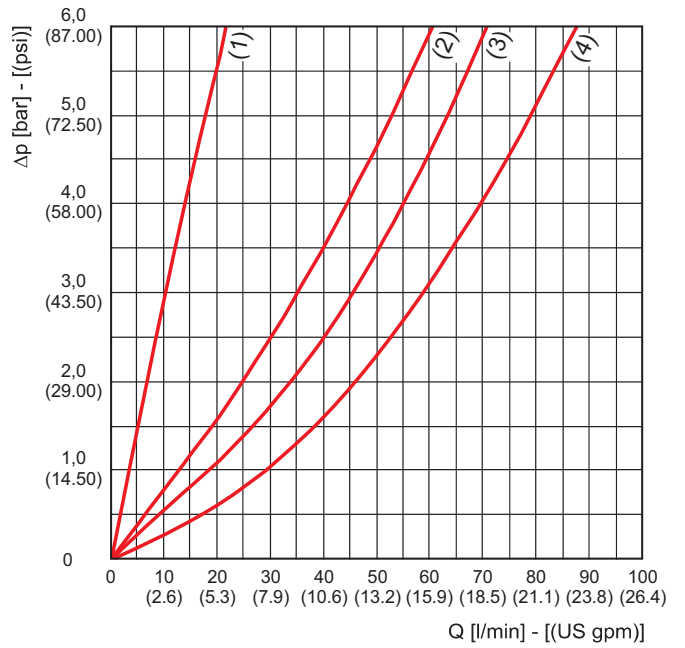
The curves are obtained in the following conditions:  
 Mineral oil type SAE 10  
 Kinematic viscosity 120 SSU (30 cSt)  
 Density 7.29 lb/gal (0,856 kg/dm<sup>3</sup>).

- (1) SB010
- (2) SB025
- (3) SB040
- (4) SB060

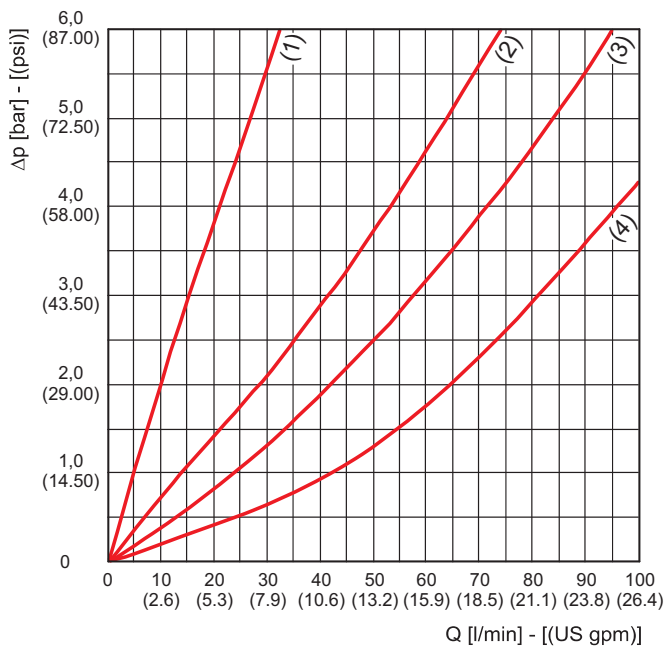
**HF 705-10.040 Ports G 1/4**



**HF 705-10.040 Ports G 3/8**



**HF 705-10.040 Ports G 1/2**



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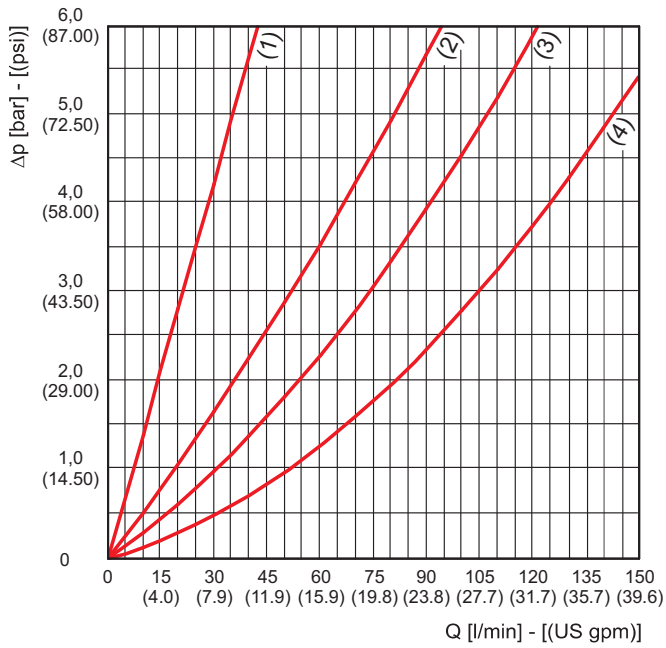
### HF705-20 PRESSURE DROP CURVE

The curves are obtained in the following conditions:

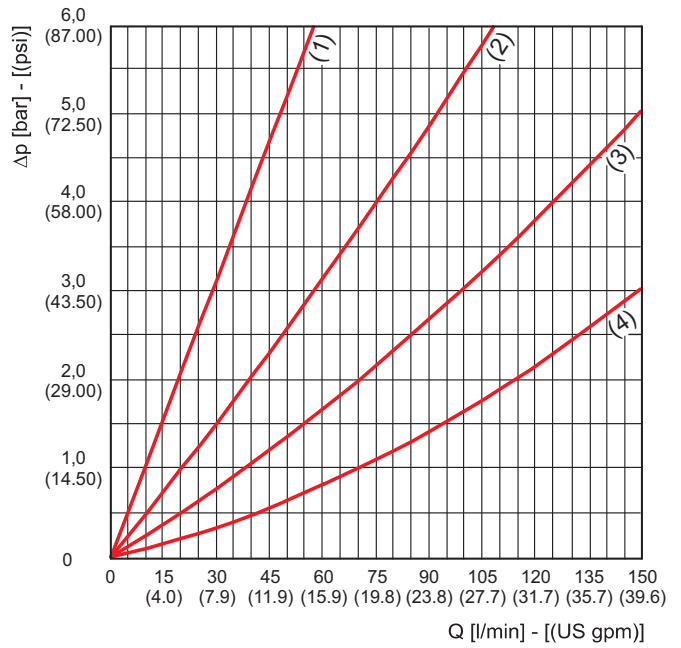
- (1) SB010
- (2) SB025
- (3) SB040
- (4) SB060

Mineral oil type SAE 10  
Kinematic viscosity 120 SSU (30 cSt)  
Density 7.29 lb/gal (0,856 kg/dm<sup>3</sup>).

**HF 705-20.070 Ports G 1/2**



**HF 705-20.070 Ports G 3/4**



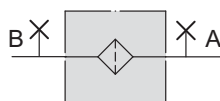
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**FLOW**

Filter type	Ports IN/OUT GAS (BSPP)	Degree of filtration			
		SB010	SB025	SB040	SB060
		Flow $\Delta p = 29 \text{ psi (2 bar)}$ US gpm l/min			
<b>HF 705-10.040</b>	G 1/4	1.3 (5)	4.0 (15)	6.6 (25)	7.9 (30)
	G 3/8	1.8 (7)	6.6 (25)	9.2 (35)	11.9 (45)
	G 1/2	2.6 (10)	7.9 (30)	10.6 (40)	17.2 (65)
<b>HF 705-20.070</b>	G 1/2	4.0 (15)	9.2 (35)	14.5 (55)	21.1 (80)
	G 3/4	5.3 (20)	10.6 (40)	18.5 (70)	30.4 (115)

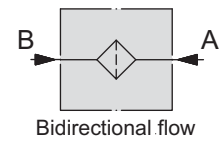
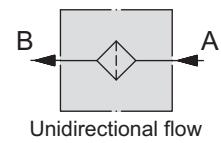
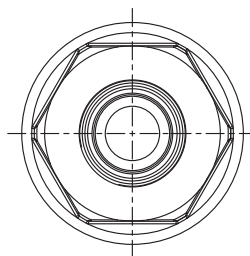
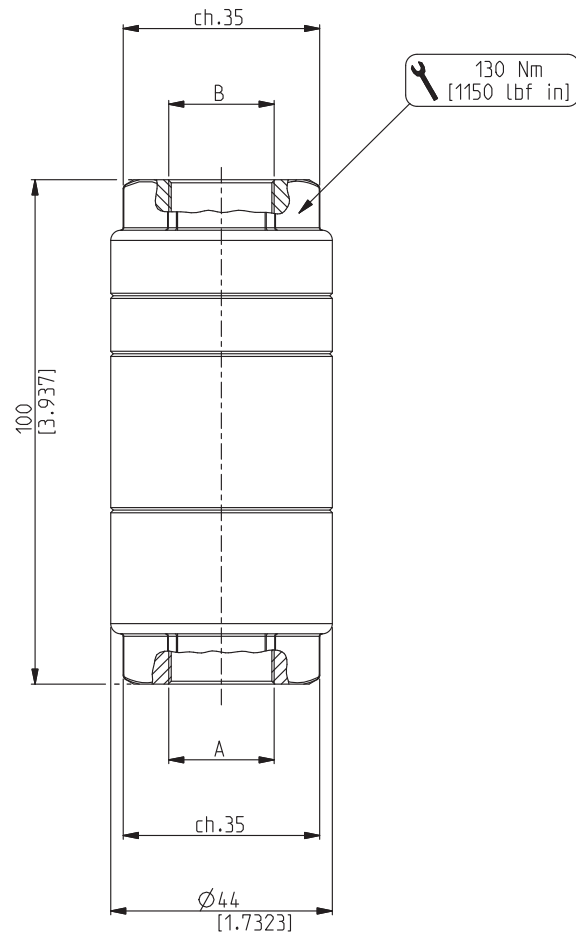
HF705 serie filters are devoid of by-pass valves and are not arranged to adopt clogging indicators.

To highlight the element's clogging level, we advise to mount three-ways connections on the inlet and outlet threads, so that they can receive suitable pressure gauges with end-scale conformed to the maximum working pressure.



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**HF705-20 DIMENSIONS**



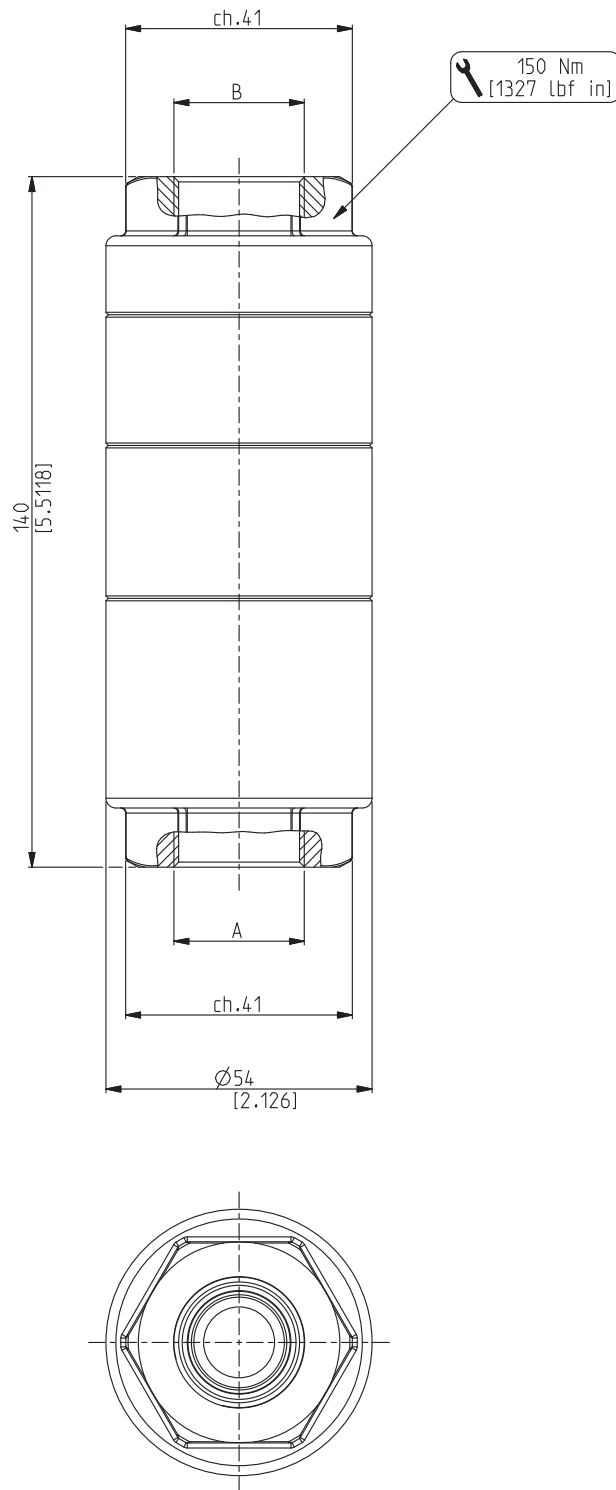
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Filter type	Weight kg (lbs)	A/B (ports)	
		GAS (BSPP)	
<b>HF 705-10.040</b>	0,3 (0.66)	G 1/4	
		G 3/8	
		G 1/2	

IN/OUT ports with metric or SAE J514b threads are available.

**HF705-20 DIMENSIONS**



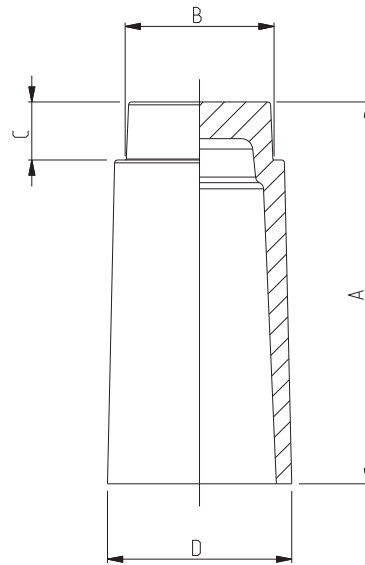
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Filter type	Weight kg (lbs)	A/B (ports)
		GAS (BSPP)
<b>HF 705-20.070</b>	0,6 (1.32)	G 1/2
		G 3/4

IN/OUT ports with metric or SAE J514b threads are available.



## ELEMENT'S DIMENSIONS FOR HF 705



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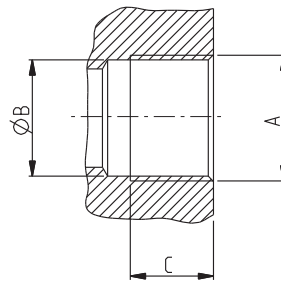
Element type	A	Ø B	C	Ø D
	mm (in)	mm (in)	mm (in)	mm (in)
<b>HE K80-10.040</b>	39 (1.5354)	21 (0.8268)	10 (0.3937)	25,5 (1.0039)
<b>HE K80-20.070</b>	68 (2.6772)	25,5 (1.0039)		32 (1.2598)

## PORTS IN/OUT

## GAS STRAIGHT THREAD PORTS

BSPP

British standard pipe parallel (55°) conforms to UNI - ISO 228



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CODE	Nominal size	A	Ø B	C	Nm (lbf in)
			mm (in)	mm (in)	
<b>GB</b>	1/4"	G 1/4	12,5 (0.4921)	14,0 (0.5512)	15 <sup>+1</sup> (133 ÷ 142)
<b>GC</b>	3/8"	G 3/8	16,0 (0.6299)	14,0 (0.5512)	25 <sup>+1</sup> (221 ÷ 230)
<b>GD</b>	1/2"	G 1/2	20,0 (0.7874)	16,0 (0.6299)	50 <sup>+2,5</sup> (443 ÷ 465)
<b>GE</b>	3/4"	G 3/4	25,5 (1.0324)	18,0 (0.7087)	90 <sup>+2,5</sup> (797 ÷ 841)

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## ASSEMBLY AND REPLACING ELEMENT INSTRUCTIONS

### ASSEMBLY

Once you have checked the integrity of the filter inside its package, proceed as follows:

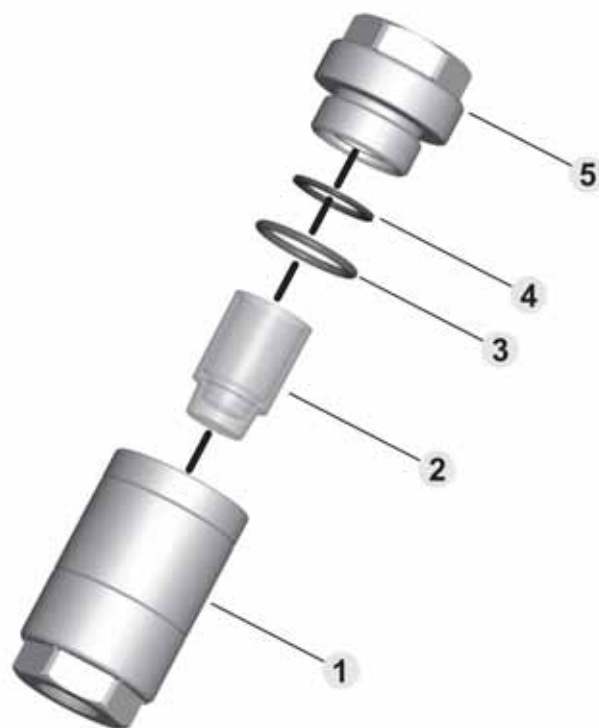
- A Take the protection caps off the oil inlet and outlet.
- B Link the circuit's pipes to the filter and secure the connections with tightening torques as indicated on page 8.  
In case of unidirectional use, make the circuit's connection in accordance with the symbology of pages 6, 7 .
- C Start the circuit for a few minutes.
- D Make sure there are no leaks.

### REPLACING ELEMENT

Once the working hours limit indicated in the maintenance instructions of the system is reached, or when there is a considerable circuit's pressure drop, the cartridge must be replaced, remembering that this procedure involves the drainage of hydraulic oil and therefore you need to prepare suitable containers to collect the oil.

Proceed as follows:

- A Stop the system in "Machine stopped" status.
- B Secure any shut-off valves on the hydraulic circuit.
- C Disconnect the circuit's pipes from the filter.
- D Unscrew the closure cap with the maximum care (pos.5).
- E Remove the clogged filtering cartridge (pos.2).
- F Make sure the O-ring (pos.3) and the gasket (pos.4) are not damaged, otherwise replace them and consequently position the new ones correctly.
- G In case of substitution, insert the new element or the one partially restored after having immersed it in cleaning fluids and then treated with compressed air.
- H Screw the closure cap, then tighten to a tightening torque as indicated on pages 6, 7.
- I Reconnect the pipes and secure the connections with tightening torques as indicated on pages 8.
- L Start the circuit for a few minutes.
- M Make sure there are no leaks.



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#### Pos. Description

- |   |                   |
|---|-------------------|
| 1 | Filter body       |
| 2 | Filtering element |
| 3 | O-Ring            |
| 4 | Gasket            |
| 5 | Closure cap       |

When ordering spare parts, always specify the reference number, the filter code and quantity.

Example: Spare part pos. 3 - HHQ00010 - Qty 2

## HOW TO ORDER A COMPLETE FILTER

1

2

3

4

**HF705-10.040** - **SB010** - **GB** - **B**

1	Filter type	CODE
	See dimensions from pag. 6 to pag. 7	<b>HF705-</b>
2	Degree of filtration	CODE
	10 [µm] Sintered bronze	<b>SB010</b>
	25 [µm] Sintered bronze	<b>SB025</b>
	40 [µm] Sintered bronze	<b>SB040</b>
	60 [µm] Sintered bronze	<b>SB060</b>

3	Ports IN/OUT	CODE
	<b>Threads GAS (BSPP)</b>	
	G 1/4	<b>GB</b>
	G 3/8	<b>GC</b>
	G 1/2	<b>GD</b>
	G 3/4	<b>GE</b>

4	Seals	CODE
	Buna	<b>B</b>
	Viton	<b>V</b>

## HOW TO ORDER A REPLACEMENT ELEMENT

1

2

**HE K80-10.040** - **SB010**

1	Element type	CODE
	See dimensions from pag. 8	<b>HE K80-</b>
2	Degree of filtration	CODE
	10 [µm] Sintered bronze	<b>SB010</b>
	25 [µm] Sintered bronze	<b>SB025</b>
	40 [µm] Sintered bronze	<b>SB040</b>
	60 [µm] Sintered bronze	<b>SB060</b>

Standard  
 On request

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