

FHP series

Maximum pressure up to 420 bar - Flow rate up to 750 l/min



The correct filter sizing have to be based on the variable pressure drop depending by the application. For example, for the return filter the pressure drop have to be in the range 0.4 - 0.6 bar.

The pressure drop calculation is performed by adding together the value of the housing with the value of the filter element. The pressure drop in the housing is proportional to the fluid density (kg/dm³); all the graphs in the catalogue are referred to mineral oil with density of 0.86 kg/dm³.

The filter element pressure drop is proportional to its viscosity (mm²/s), the corrective factor Y is related to an oil viscosity different than 30 mm²/s.

Sizing data for single cartridge, head at top

Δp_c = Filter housing pressure drop [bar]

Δp_e = Filter element pressure drop [bar]

Y = Multiplication factor Y (see correspondent table), depending on the filter element size, on the filter element lenght and on the filter media

Q = flow rate (l/min)

V1 reference viscosity = 30 mm²/s (cSt)

V2 = operating viscosity in mm²/s (cSt)

$\Delta p_e = Y : 1000 \times Q \times (V2/V1)$

$\Delta p_{Tot.} = \Delta p_c + \Delta p_e$

Calculation examples with HLP Mineral oil Variation in viscosity

Application data:

Top tank return filter

Filter with in-line connections

Pressure Pmax = 10 bar

Flow rate Q = 120 l/min

Viscosity V2 = 46 mm²/s (cSt)

Oil viscosity = 0.86 kg/dm³

Required filtration efficiency = 25 µm with absolute filtration

With bypass valve and 1 1/4" inlet connection

From the working pressure and the flow rate we understand it should be possible using the following top tank return filter series: MPT, MPH and FRI. Let's proceed with MPT series.

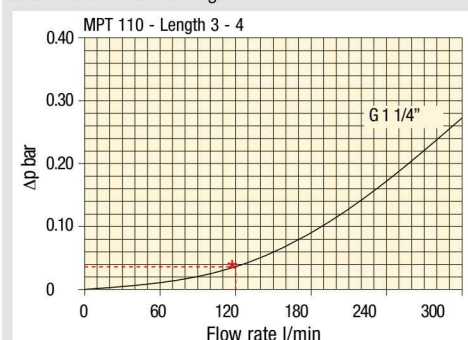
The size 20 doesn't achieve the required flow rate, therefore we have to consider the size 100. The final version of size 100 (101, 104, 110, 120 and 114) will be then defined in function of the mounting characteristics.

$\Delta p_c = 0.03 \text{ bar}$ (★ see graphic below, considering size 100 with the max available lenght to get the lowest pressure drop)

$\Delta p_e = (2.0 : 1000) \times 120 \times (46/30) = 0.37 \text{ bar}$

$\Delta p_{Tot.} = 0.03 + 0.37 = 0.4 \text{ bar}$

The selection is correct because the total pressure drop value is inside the admissible range for top tank return filters. It is of course possible trying to find a different solution, according to the mounting position or to other commercial need, repeating the previous steps while using a different series or lenght.



Filter housings Δp pressure drop.

The curves are plotted using mineral oil with density of 0.86 kg/dm³ in compliance with ISO 3968. Δp varies proportionally with density.

Corrective factor Y, to be used for the filter element pressure drop calculation. The values depend to the filter size and lenght and to the filter media.

Reference viscosity 30 mm²/s

Return filters

Filter element Type	Absolute filtration H Series					Nominal filtration N Series		
	A03	A06	A10	A16	A25	P10	P25	M25 M60 M90
MF 020	1	74.00	50.08	20.00	16.00	9.00	6.43	5.51
	2	29.20	24.12	8.00	7.22	5.00	3.33	2.85
	3	22.00	19.00	6.56	5.33	4.33	1.68	1.44
MF 030 MFX 030	1	74.00	50.08	20.00	16.00	9.00	6.43	5.51
MF 100 MFX 100	1	28.20	24.40	8.67	8.17	6.88	4.62	3.96
	2	17.33	12.50	6.86	5.70	4.00	3.05	2.47
	3	10.25	9.00	3.65	3.33	2.50	1.63	1.32
	4	6.10	5.40	2.30	2.20	2.00	1.19	0.96
MF 180 MFX 180	1	3.67	3.05	1.64	1.56	1.24	1.18	1.06
	2	1.69	1.37	0.68	0.54	0.51	0.43	0.39
MF 190 MFX 190	2	1.69	1.37	0.60	0.49	0.44	0.35	0.31
MF 400 MFX 400	1	3.20	2.75	1.39	1.33	1.06	0.96	0.87
	2	2.00	1.87	0.88	0.85	0.55	0.49	0.45
	3	1.90	1.60	0.63	0.51	0.49	0.39	0.35
MF 750 MFX 750	1	1.08	0.84	0.49	0.36	0.26	0.21	0.19
CU 025		78.00	48.00	28.00	24.00	9.33	9.33	8.51
CU 040		25.88	20.88	10.44	10.00	3.78	3.78	3.30
CU 100		15.20	14.53	5.14	4.95	2.00	2.00	0.17
CU 250		3.25	2.55	1.55	1.35	0.71	0.71	0.59
CU 630		1.96	1.68	0.85	0.72	0.42	0.42	0.36
CU 850		1.06	0.84	0.42	0.33	0.17	0.17	0.13
MR 100	1	19.00	17.00	6.90	6.30	4.60	2.94	2.52
	2	11.70	10.80	4.40	4.30	3.00	2.94	2.52
	3	7.80	6.87	3.70	3.10	2.70	2.14	1.84
	4	5.50	4.97	2.60	2.40	2.18	1.72	1.47
	5	4.20	3.84	2.36	2.15	1.90	1.60	1.37
MR 250	1	5.35	4.85	2.32	1.92	1.50	1.38	1.20
	2	4.00	3.28	1.44	1.10	1.07	0.96	0.83
	3	2.60	2.20	1.08	1.00	0.86	0.77	0.64
	4	1.84	1.56	0.68	0.56	0.44	0.37	0.23
MR 630	1	3.10	2.48	1.32	1.14	0.92	0.83	0.73
	2	2.06	1.92	0.82	0.76	0.38	0.33	0.27
	3	1.48	1.30	0.60	0.56	0.26	0.22	0.17
	4	1.30	1.20	0.48	0.40	0.25	0.21	0.16
	5	0.74	0.65	0.30	0.28	0.13	0.10	0.08
MR 850	1	0.60	0.43	0.34	0.25	0.13	0.12	0.09
	2	0.37	0.26	0.23	0.21	0.11	0.08	0.07
	3	0.27	0.18	0.17	0.17	0.05	0.04	0.04
	4	0.23	0.16	0.13	0.12	0.04	0.03	0.03

Technical data

High Pressure filters Maximum pressure up to 420 bar - Flow rate up to 750 l/min

Filter housing materials

- Head: Phosphatized cast iron
- Housing: Phosphatized steel
- Bypass valve:
 - AISI 316L (FHP 010 - 011)
 - Brass (FHP 065 - 135 - 320)
 - Steel (FHP 500)
- Reverse Flow: Steel (FHP 320 - FHP 500)
- Check valve: Steel

Pressure

- Working pressure: 42 MPa (420 bar)
- Test pressure: 63 MPa (630 bar)
- Burst pressure: 126 MPa (1260 bar)
- Pulse pressure fatigue test: 1 000 000 cycles with pressure from 0 to 42 MPa (420 bar)

Bypass valve

- Opening pressure 600 kPa (6 bar)
- Other opening pressures on request.

Δp element type

- Microfibre filter elements - series N: 20 bar
- Microfibre filter elements - series R: 20 bar (not available for FHP 010-011 and FHP 500)
- Microfibre filter elements - series H: 210 bar
- Microfibre filter elements - series S: 210 bar (only for FHP 500)
- Wire mesh filter elements - series N: 20 bar
- Fluid flow through the filter element from OUT to IN.

Seals

- Standard NBR series A
- Optional FPM series V

Temperature

From -25 °C to +110 °C

Connections

FHP 010 - 065 - 135 - 500:
In-line Inlet/Outlet
FHP 011 - 320:
90° Inlet/Outlet

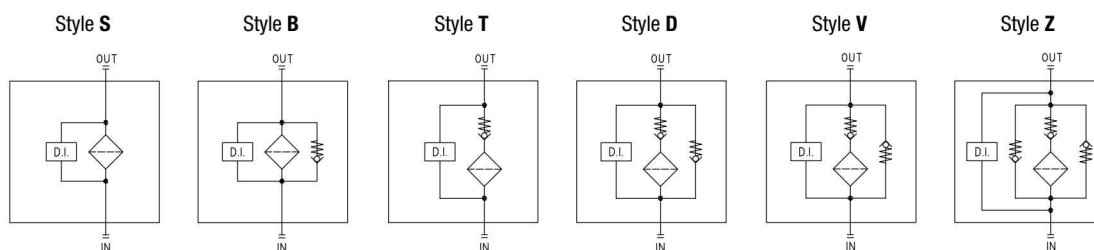
Note

FHP filters are provided for vertical mounting

Weights [kg] and volumes [dm³]

	Weights [kg]					Volumes [dm³]						
	Lenght	1	2	3	4	5	Lenght	1	2	3	4	5
FHP 010		2.05	2.18	2.64	3.13	-		0.10	0.12	0.15	0.20	-
FHP 065		4.26	4.62	5.83	-	-		0.25	0.30	0.50	-	-
FHP 135		7.11	8.71	9.76	-	-		0.43	0.76	0.97	-	-
FHP 320		13.95	16.08	18.37	20.85	-		1.00	1.72	2.49	3.32	-
FHP 500		27.00	31.17	34.69	46.70	52.5		1.71	2.43	3.04	5.18	6.51

Hydraulic symbols



FHP FHP065 - FHP135 - FHP320

Designation & Ordering code

COMPLETE FILTER

Series and size Configuration example: **FHP320** **4** **V** **A** **G1** **A06** **S** **P01**

FHP065 | **FHP135** | **FHP320**

Length	FHP065	FHP135	FHP320
1	•	•	•
2	•	•	•
3	•	•	•
4			•

Valves	FHP065	FHP135	FHP320
S Without bypass	•	•	•
B With bypass 6 bar	•	•	•
T With check valve, without bypass	•	•	•
D With check valve, with bypass 6 bar			•
V With reverse flow, without bypass			•
Z With reverse flow, with bypass 6 bar			•

Seals	FHP065	FHP135	FHP320
A NBR			
V FPM			

Connections	FHP065	FHP135	FHP320
G1	G1/2"	G3/4"	G1 1/4"
G2	G3/4"	G1"	G1 1/2"
G3	1/2" NPT	3/4" NPT	1 1/4" NPT
G4	3/4" NPT	1" NPT	1 1/2" NPT
G5	SAE 8 - 3/4" - 16 UNF	SAE 12 - 1 1/16" - 12 UN	SAE 20 - 1 5/8" - 12 UN
G6	SAE 12 - 1 1/16" - 12 UN	SAE 16 - 1 5/16" - 12 UN	SAE 24 - 1 7/8" - 12 UN
F1	-	3/4" SAE 3000 psi/M	1 1/4" SAE 3000 psi/M
F2	-	1" SAE 3000 psi/M	1 1/2" SAE 3000 psi/M
F3	-	3/4" SAE 3000 psi/UNC	1 1/4" SAE 3000 psi/UNC
F4	-	1" SAE 3000 psi/UNC	1 1/2" SAE 3000 psi/UNC
F5	-	3/4" SAE 6000 psi/M	1 1/4" SAE 6000 psi/M
F6	-	3/4" SAE 6000 psi/UNC	1 1/4" SAE 6000 psi/UNC

Filtration rating (filter media)	
A03 Inorganic microfiber	3 µm
A06 Inorganic microfiber	6 µm
A10 Inorganic microfiber	10 µm
A16 Inorganic microfiber	16 µm
A25 Inorganic microfiber	25 µm
M25 Wire mesh	25 µm

Element Δp	S	B	T	D	V	Z
N 20 bar		•				
R 20 bar				•		•
H 210 bar	•					
S 210 bar		•			•	

Execution	1	2	3	4
P01 MP Filtri standard	•	•	•	•
P02 Maintenance from the bottom of the housing				•
Pxx Customized				

FILTER ELEMENT

Element series and size Configuration example: **HP320** **4** **A06** **A** **S** **P01**

HP065 | **HP135** | **HP320**

Element length	HP065	HP135	HP320
1	•	•	•
2	•	•	•
3	•	•	•
4			•

Filtration rating (filter media)	
A03 Inorganic microfiber	3 µm
A06 Inorganic microfiber	6 µm
A10 Inorganic microfiber	10 µm
A16 Inorganic microfiber	16 µm
A25 Inorganic microfiber	25 µm
M25 Wire mesh	25 µm

Seals	Element Δp	Execution
A NBR	N 20 bar	P01 MP Filtri standard
V FPM	R 20 bar	Pxx Customized
	H 210 bar	
	S 210 bar	

ACCESSORIES

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DEM Electrical differential indicator	517-518	DVA Visual differential indicator	520
DLA Electrical / visual differential indicator	518-519	DVM Visual differential indicator	520
DLE Electrical / visual differential indicator	519		

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