

NEW

High Pressure filters

FHP 350 series

Maximum working pressure up to 42 MPa (420 bar) - Flow rate up to 500 l/min



PASSION TO PERFORM



FILTER SIZING

THE CORRECT FILTER SIZING HAVE TO BE BASED ON THE TOTAL PRESSURE DROP DEPENDING BY THE APPLICATION.
THE MAXIMUM TOTAL PRESSURE DROP ALLOWED BY A NEW AND CLEAN HIGH PRESSURE PRESSURE FILTER HAVE TO BE IN THE RANGE 0.8 ÷ 1.5 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 Δpc of 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 Δpe is proportional to its viscosity (mm²/s), the corrective factor Y have to be used in case of an oil viscosity different than 30 mm²/s (cSt).

Sizing data for single filter element, head at top

Δpc = Filter housing pressure drop [bar]
Δpe = Filter element pressure drop [bar]
Y = Corrective factor Y (see correspondent table), depending on the filter type, on the filter element size, on the filter element length and on the filter media
Q = flow rate (l/min)
V1 reference oil viscosity = 30 mm²/s (cSt)
V2 = operating oil viscosity in mm²/s (cSt)

Filter element pressure drop calculation with an oil viscosity different than 30 mm²/s (cSt)

Δpe = Y : 1000 x Q x (V2:V1)
Δp Tot. = Δpc + Δpe

Verification formula

Δp Tot. ≤ Δp max allowed

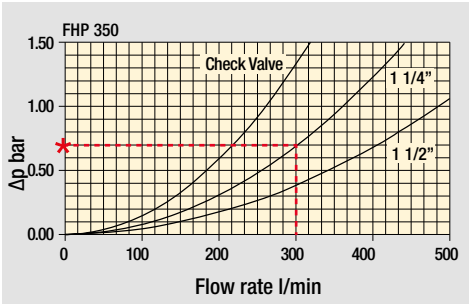
Maximum total pressure drop (Δp max) allowed by a new and clean filter

Application	Range (bar)
Suction filters	0.08 ÷ 0.10
Return filters	0.4 ÷ 0.6
Low & Medium Pressure filters	0.4 ÷ 0.6 return lines
	0.3 ÷ 0.5 lubrication lines
	0.3 ÷ 0.4 off-line in power systems
	0.1 ÷ 0.3 off-line in test benches
High Pressure filters	0.4 ÷ 0.6 over-boost
	0.8 ÷ 1.5
Stainless Steel filters	0.8 ÷ 1.5

FHP350 calculation example

Application data:
High pressure filter
Pressure Pmax = 300 bar
Flow rate Q = 300 l/min
Viscosity V2 = 46 mm²/s (cSt)
Oil density = 0.86 kg/dm³
Required filtration efficiency = 25 µm with absolute filtration
With bypass valve and 1 1/4" inlet connection

Calculation:
Δpc = 0.7 bar (see graphic below)



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.

Δpe = (0.88 : 1000) x 300 x (46 : 30) = 0.41

FHP350 corrective factor

Corrective factor Y to be used for the filter element pressure drop calculation.
The values depend to the filter size and length and to the filter media.
Reference oil viscosity 30 mm²/s

Filter element Type	Absolute filtration N - R Series					Nominal filtration N Series
	A03	A06	A10	A16	A25	M25
HP 320	1 10.88	9.73	5.02	3.73	2.54	1.04
	2 4.40	3.83	1.75	1.48	0.88	0.71
	3 2.75	2.11	1.05	0.87	0.77	0.61
	4 2.12	1.77	0.98	0.78	0.55	0.47

Δp Tot. = 0.7 + 0.41 = 1.11 bar

The selection is correct because the total pressure drop value is inside the admissible range for high pressure filters.
In case the allowed max total pressure drop is not verified, it is necessary to repeat the calculation changing the filter length.

Flow rates [l/min]

		Filter element design - H Series					Filter element design - N Series					
Filter series	Length	A03	A06	A10	A16	A25	A03	A06	A10	A16	A25	M25
FHP 350	1	108	115	188	197	301	127	140	234	282	343	451
	2	196	225	317	323	396	256	278	394	415	465	480
	3	266	310	384	392	440	331	370	450	466	475	490
	4	308	333	391	398	445	369	393	456	474	495	503

Maximum flow rate for a complete pressure filter with a pressure drop Δp = 1.5 bar.

The reference fluid has a kinematic viscosity of 30 mm²/s (cSt) and a density of 0.86 kg/dm³.
For different pressure drop or fluid viscosity we recommend to use our selection software available
Please, contact our Sales Department for further additional information.



Corrective factor Y
to be used for the filter element pressure drop calculation.
The values depend to the filter size and length and to the filter media.
Reference oil viscosity 30 mm²/s

High pressure filters

Filter element		Absolute filtration					Nominal filtration
		N - R Series					N Series
Type		A03	A06	A10	A16	A25	M25
HP 011	1	332.71	250.07	184.32	152.36	128.36	-
	2	220.28	165.56	74.08	59.13	37.05	-
	3	123.24	92.68	41.48	33.08	20.72	-
	4	77.76	58.52	28.37	22.67	16.17	-
HP 039	1	70.66	53.20	25.77	20.57	14.67	4.90
	2	36.57	32.28	18.00	13.38	8.00	2.90
	3	26.57	23.27	12.46	8.80	5.58	2.20
HP 050	1	31.75	30.30	13.16	12.3	7.29	1.60
	2	24.25	21.26	11.70	9.09	4.90	1.40
	3	17.37	16.25	8.90	7.18	3.63	1.25
	4	12.12	10.75	6.10	5.75	3.08	1.07
	5	7.00	6.56	3.60	3.10	2.25	0.80
HP 065	1	58.50	43.46	23.16	19.66	10.71	1.28
	2	42.60	25.64	16.22	13.88	7.32	1.11
	3	20.50	15.88	8.18	6.81	3.91	0.58
HP 135	1	20.33	18.80	9.71	8.66	4.78	2.78
	2	11.14	10.16	6.60	6.38	2.22	1.11
	3	6.48	6.33	3.38	3.16	2.14	1.01
HP 150	1	17.53	15.91	7.48	6.96	5.94	1.07
	2	8.60	8.37	3.54	3.38	3.15	0.58
	3	6.53	5.90	2.93	2.79	2.12	0.49
HP 320	1	10.88	9.73	5.02	3.73	2.54	1.04
	2	4.40	3.83	1.75	1.48	0.88	0.71
	3	2.75	2.11	1.05	0.87	0.77	0.61
	4	2.12	1.77	0.98	0.78	0.55	0.47
HP 500	1	4.44	3.67	2.30	2.10	1.65	0.15
	2	3.37	2.77	1.78	1.68	1.24	0.10
	3	2.22	1.98	1.11	1.09	0.75	0.08
	4	1.81	1.33	0.93	0.86	0.68	0.05
	5	1.33	1.15	0.77	0.68	0.48	0.04

Filter element		Absolute filtration					Nominal filtration
		N Series					N Series
Type		A03	A06	A10	A16	A25	M25
HF 320	1	3.65	2.95	2.80	1.80	0.90	0.38
	2	2.03	1.73	1.61	1.35	0.85	0.36
	3	1.84	1.42	1.32	1.22	0.80	0.35

FHP350 GENERAL INFORMATION

Technical data

High Pressure filters

In-line

Maximum working pressure up to 42 MPa (420 bar)

Flow rate up to 500 l/min

FHP is a range of versatile high pressure filter for protection of sensitive components in high pressure hydraulic systems in the industrial equipment.

They are directly connected to the lines of the system through the hydraulic fittings.

Available features:

- Female threaded connections up to 1 1/2", for a maximum return flow rate of 500 l/min
- Fine filtration rating, to get a good cleanliness level into the system
- Bypass valve, to relieve excessive pressure drop across the filter media
- Check valve, to protect the system against reverse flow
- Reverse flow valve, to allow bidirectional flow through the filter housing. The back flow is not filtered. The filter requires the use of internal check valves to direct the flow through the element in one direction and around the element in the other
- Low collapse filter element "N", for use with filters provided with bypass valve
- High collapse filter element "H", for use with filters not provided with bypass valve
- Low collapse filter element with external support "R", for filter element protection against the back pressure caused by the check valve or the reverse flow in filters provided with the bypass valve
- High collapse filter element with external support "S", for filter element protection against the back pressure caused by the check valve or the reverse flow in filters not provided with the bypass valve
- Visual, electrical and electronic differential clogging indicators

Common applications:

Delivery lines, in any high pressure industrial equipment or mobile machines

Filter housing materials

- Head: Phosphatized cast iron
- Housing: Phosphatized steel
- Bypass valve: Brass / AISI 304
- Reverse Flow: Steel
- Check valve: Steel

Pressure

- 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) $\pm 10\%$
- Other opening pressures on request.

Δp element type

- Microfibre filter elements - series N-R: 20 bar
- Microfibre filter elements - series H-S: 210 bar
- 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

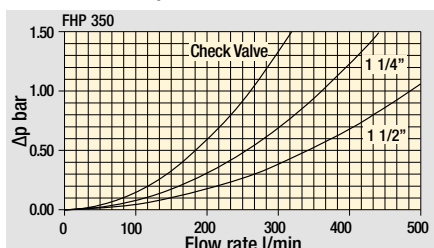
In-line Inlet/Outlet

Note

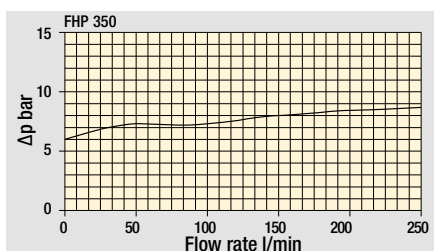
FHP350 filters are provided for vertical mounting



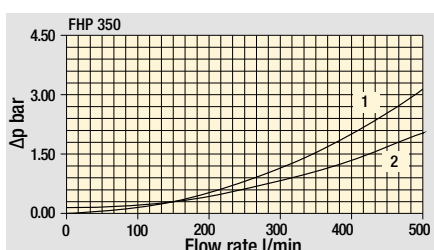
Pressure drop



Filter housings
 Δp pressure drop



Bypass valve
pressure drop

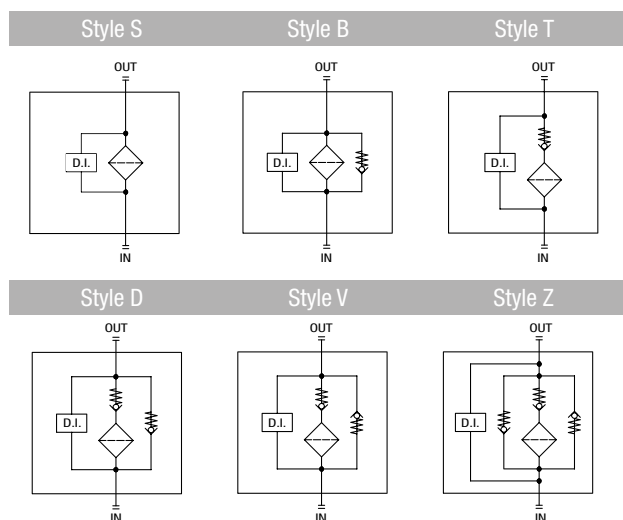


Valves
Pressure drop with
reverse flow valves in
1 - Filtering direction
2 - Opposite direction

Weights [kg] and volumes [dm³]

	Length	1	2	3	4
FHP 350 - Weights		13.95	16.08	18.37	20.85
FHP 350 - Volumes		1.00	1.72	2.49	3.32

Hydraulic symbols



FHP350

Designation & Ordering code

COMPLETE FILTER

Series and size	Configuration example: FHP350										4	B	A	D	2	A06	N	P01	
FHP350																			
Length																			
1	2	3	4																
Valves																			
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																			
A	NBR																		
V	FPM																		
Connections																			
A	G 1 1/2"																		
B	1 1/2" NPT																		
C	SAE 24 - 1 7/8" - 12 UN																		
D	1 1/2" SAE 3000 psi/M + G 1 1/4"																		
E	1 1/2" SAE 3000 psi/UNC + 1 1/4" NPT																		
F	1 1/2" SAE 3000 psi/UNC + SAE 20 - 1 5/8" - 12 UN																		
G	1 1/4" SAE 3000 psi/M																		
H	1 1/4" SAE 3000 psi/UNC																		
I	1 1/4" SAE 6000 psi/M																		
L	1 1/4" SAE 6000 psi/UNC																		
Connection for differential indicator																			
2	With connection																		
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																		
Valves																			
Element Δp	S	B	T	D	V	Z													
N 20 bar		•																	
R 20 bar				•		•													
H 210 bar	•																		
S 210 bar			•		•														
Execution																			
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	N	P01
HP320															
Element length															
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															
A	NBR														
V	FPM														
Element Δp															
N	20 bar														
R	20 bar														
H	210 bar														
S	210 bar														
Execution															
P01	MP Filtri standard														
Pxx	Customized														

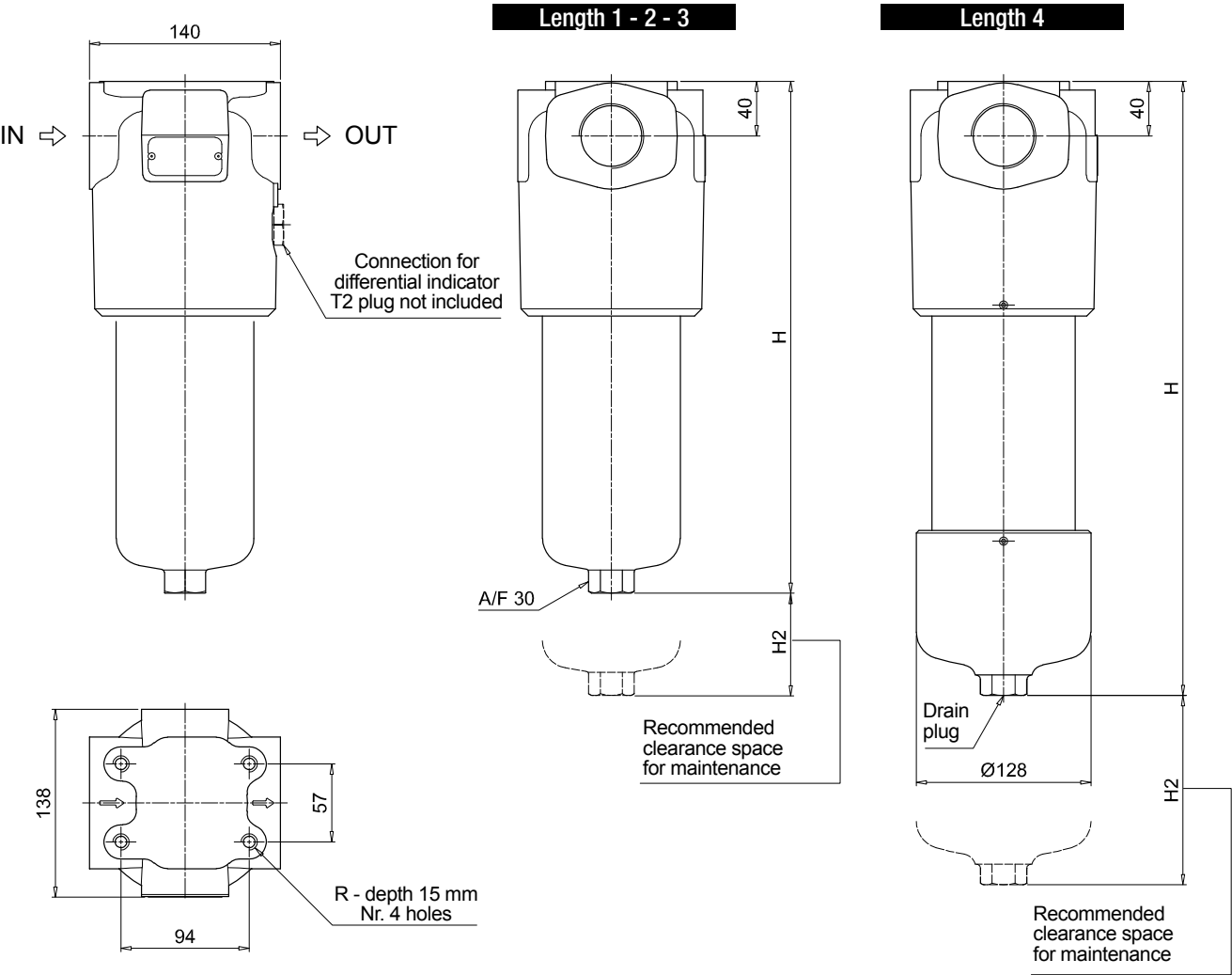
ACCESSORIES

Differential indicators										
DEA	Electrical differential indicator									
DEH	Hazardous area electronic differential indicator									
DEM	Electrical differential indicator									
DLE	Electrical / visual differential indicator									
DLA	Electrical / visual differential indicator									
DTA	Electronic differential indicator									
DVA	Visual differential indicator									
DVM	Visual differential indicator									
Additional features										
T2	Plug									

FHP350

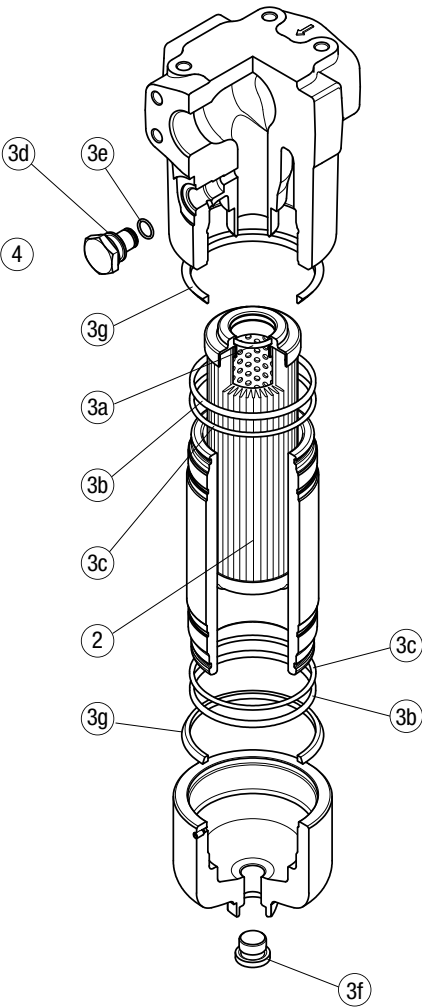
Dimensions

Filter length	H [mm]	H2 [mm]		Connections	R
		Execution P01	Execution P02		
1	295	150	-	A	M12
2	418	150	-	B - C	1/2" UNC
3	550	150	-	D	M12
4	703	150	550	E - F	1/2" UNC
				G	M12
				H	1/2" UNC
				I	M12
				L	1/2" UNC



FHP350 SPARE PARTS

Order number for spare parts



Item:		Q.ty: 1 pc.		Q.ty: 1 pc.	
		2		3 (3a ÷ 3g)	
		4			
Filter series	Filter element	Seal Kit code number		Indicator connection plug	
		NBR	FPM	NBR	FPM
FHP 350	See order table	02050272	02050283	T2H	T2V

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