

FHM SERIES

IN-LINE FILTER



LEHENGOTAK, S.A.



MPFILTRI
filtri per oleodinamica



Maximum working pressure 320 bar

Flow rate from 10 l/min to 350 l/min

Description

FHM

FHM series filters are designed for pressure line applications where manifold mounting is a specific requirement. The manifold type filters are designed to integrate onto manifold valve systems to provide a compact low pressure loss and leak free installation. The filters incorporate the standard FHP high efficiency filtration filter elements. A complete line of pressure differential visual and electrical indicators are available with this series of filters.

The **FHM 006 e 010** series are designed for CETOP 03 e 05.

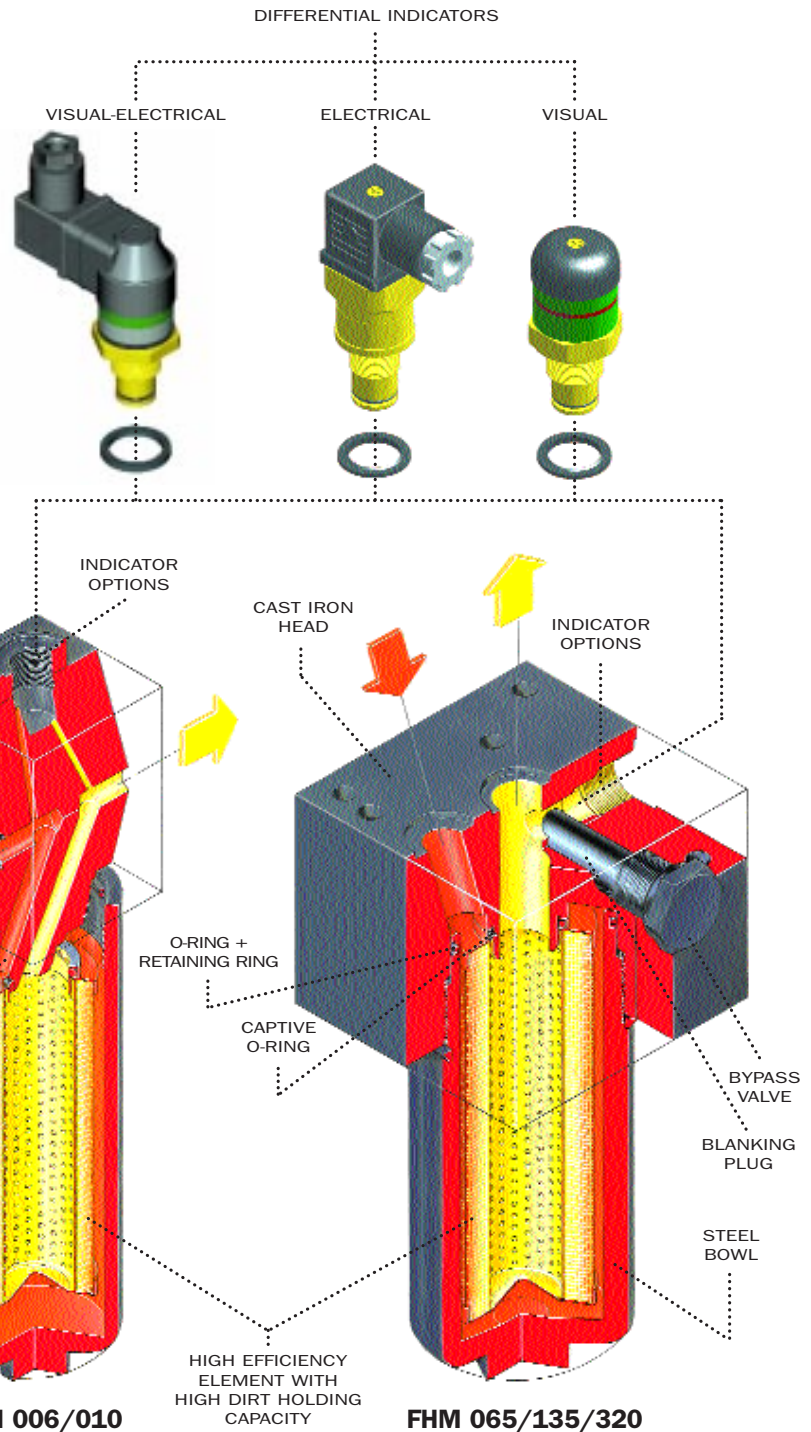
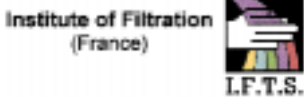
The **FHM 065, 135** and **320** are top mounted manifold design filters. **FHM** series filters within this range are suitable for flow rates to 300 l/min.

FHM 135 - 320 series are available with Reverse Flow Valve. See page 14.

FHM series filters are suitable for industrial machinery steel and process application.

New

absolute filter elements
independently tested
in the following Institutes:



Filter element:

Filter element material

End caps:

Steel (Thermal treatment)

Support tube:

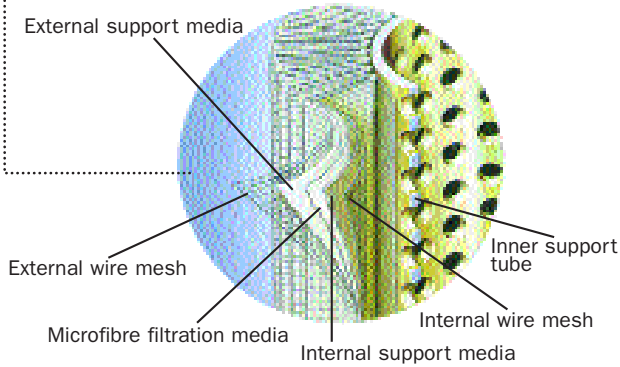
Steel (Thermal treatment)

Support frames:

Coated wire cloth

A Series

Inorganic microfibre



MP Filter elements - Conform to the following ISO standards

- ISO 2941 - Verification of collapse/burst resistance.
- ISO 2942 - Verification of fabrication integrity and determination of the first bubble point.
- ISO 2943 - Verification of material compatibility with fluids.
- ISO 3723 - Method for end load test.
- ISO 3724 - Verification of flow fatigue characteristics.
- ISO 3968 - Evaluation of pressure drop versus flow characteristics.
- ISO 4572 - Multi-pass method for evaluating filtration performance.

Element material Absolute filtration

New material:

New improved $\beta \geq 200$ filter elements with greater efficiency and increased dirt holding capacity

A Series

Inorganic microfibre with acrylic support

Contamination retention
as per ISO 4572: Multi-pass test

Filter element	Dimension for β (μm) values				Filtration ratios			ΔP (bar)
	$\beta \geq 2$ (50%)	$\beta \geq 20$ (95%)	$\beta \geq 75$ (98,7%)	$\beta \geq 200$ (99,5%)	β_2	β_{10}	β_{20}	
A03	-	2	2,4	3	20	>10.000	>10.000	7
A06	-	3	4,6	6	8	> 2.000	>10.000	7
A10	3	6	7,8	10	1,5	≥ 200	>10.000	7
A25	13	19	22	25	-	> 1,5	> 35	7

N.B. Other materials giving different degrees of filtration are available on request.

Filtering area Filter elements N - ΔP 20 bar

Type HP	020-1	065-1	065-2	065-3	135-1	135-2	320-1	320-2	320-3	320-4
A03/A06	—	386	546	1098	895	1879	1512	3326	5428	7544
A10/A25	—	386	546	1098	895	1879	1512	3326	5428	7544

Values in cm^2

Filtering area Filter elements H - ΔP 210 bar

Type HP	020-1	065-1	065-2	065-3	135-1	135-2	320-1	320-2	320-3	320-4
A03/A06	278	386	544	1094	777	1655	1475	3258	5341	7425
A10/A25	278	386	544	1094	777	1655	1475	3258	5341	7425

Values in cm^2

Element material Nominal filtration

M Series

Square wire mesh (filtration degree is defined in microns by the maximum diameter of a sphere corresponding to the mesh size)

T Series

Triangular stainless steel wire mesh

Filtering area Filter elements N - ΔP 20 bar

Type HP	020-1	065-1	065-2	065-3	135-1	135-2	320-1	320-2	320-3	320-4
M10	—	374	530	1064	950	2020	1650	3645	5970	8280
M25	—	374	530	1064	950	2020	1650	3645	5970	8280
M60	—	374	530	1064	950	2020	1650	3645	5970	8280

Values in cm^2

Filtering area Filter elements T - ΔP 80 bar

Type HP	020-1	065-1	065-2	065-3	135-1	135-2	320-1	320-2	320-3	320-4
T10/T25	278	385	545	1090	710	1500	1670	3690	6040	8380

Values in cm^2

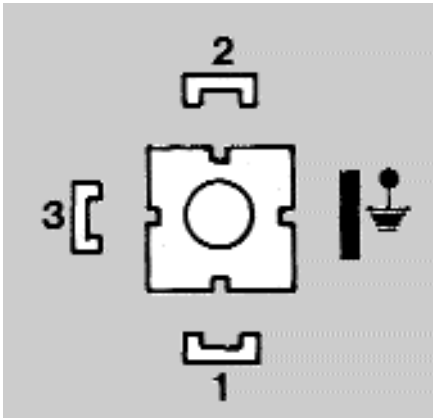
Filter body:

Materials	Head Cast iron (Thermal treatment)	Seals A Series: Nitrile (Buna-N) V Series: Viton							
	Bowl Steel (Thermal treatment)	Bypass valve Brass							
	Reverse flow (Only for 135/320 series) Steel	Indicator Brass (with viton seals)							
Working temperature	From -25 to +110°C For temperatures outside this range, please consult our Sales Network Organization								
Pressure filter body	Maximum working pressure up to 320 bar Test pressure: 420 bar Minimum burst pressure: 840 bar	Fatigue test: a filter body subjected to pressure impulses from 0 to 320 bar will withstand 1.000.000 cycles							
Collapse pressure filter elements	N Series 20 bar T Series 80 bar H Series 210 bar								
Bypass valve Calibration pressure	Bypass valve, differential opening pressure:	B: 6 bar ± 10%							
Compatibility with fluids	Filter head and bowls compatible for use with: <ul style="list-style-type: none"> • mineral oils (types HH-HL-HM-HR-HV-HG as per ISO 6743/4) • water-based emulsions (types HFAE-HFAS as per ISO 6743/4) • synthetic fluids (types HS-HFDR-HFDS-HFDU as per ISO 6743/4) • water-glycol (types HFC as per ISO 6743/4) 	Filter elements As per ISO 2943; suitable for mineral oils (types HH-HL-HM-HR-HV-HG as per ISO 6743/4) and synthetic fluids (A and M series only) (types HS-HFDR-HFDS-HFDU as per ISO 6743/4) For water-based emulsions (types HFAE-HFAS as per ISO 6743/4) and fluids other than those mentioned, please consult our Sales Network Organization.							
	Seals A Series Nitrile (Buna-N) compatible with mineral oils (types HH-HL-HM-HR-HV-HG as per ISO 6743/4) water - based emulsions (types HFAE-HFAS as per ISO 6743/4)	water - glycol (types HFC as per ISO 6743/4)							
		V Series Viton compatible with synthetic fluids (types HS-HFDR-HFDS-HFDU as per ISO 6743/4)							
Types of indicators	(Complete with Viton seals)								
	Description: FHM series filters are fitted with indicators switching at a pressure of:	5 bar ± 10% 7 bar ± 10% 10 bar ± 10% "J series - Thermal lockout Electrical Indicators available - contact MP Filtri"							
Visual indicator	With bypass 5 bar setting: V7 Series	Without bypass 7 bar setting: V8 Series	Without bypass 10 bar setting: V9 Series						
Electrical indicator	With bypass 5 bar setting: N7 Series	Without bypass 7 bar setting: N8 Series	Without bypass 10 bar setting: N9 Series						
Visual-electrical indicator	With bypass 5 bar setting: E7-K7* Series	Without bypass 7 bar setting: E8-K8* Series	Without bypass 10 bar setting: E9-K9* Series						
For K visual-electrical indicator, specify the voltage (f.i. K71 = LED: 24 volt) <div style="float: right;"> <table border="0"> <tr> <td></td> <td>1 - 24 Volt</td> </tr> <tr> <td></td> <td>2 - 115 Volt</td> </tr> <tr> <td></td> <td>3 - 230 Volt</td> </tr> </table> </div>				*	1 - 24 Volt		2 - 115 Volt		3 - 230 Volt
*	1 - 24 Volt								
	2 - 115 Volt								
	3 - 230 Volt								

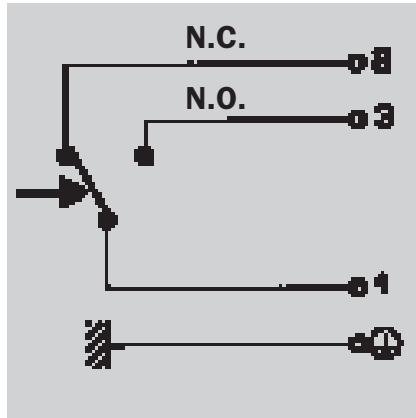
K - E - N Series

Supply voltage (50/60 Hz)	Resistive load	Inductive load
(V)	(A)	(A)
Vca 125	5	2
Vca 250	5	2
Vcc 30	5	3
Vcc 125	0,5	0,03
Vcc 250	0,25	0,03

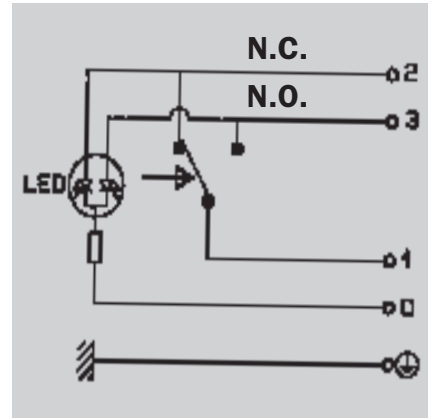
CONNECTOR DIN 43650



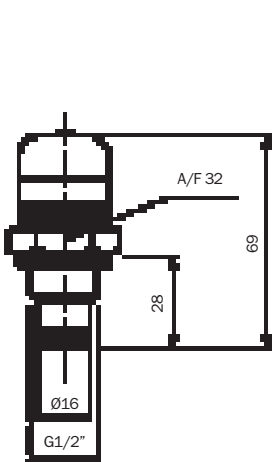
ELECTRICAL CONNECTION E - N SERIES



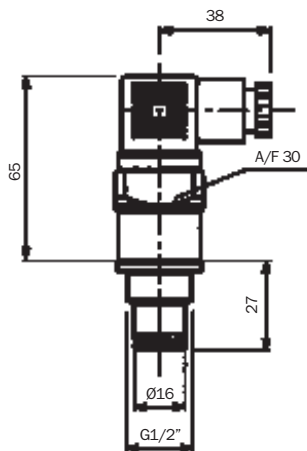
ELECTRICAL CONNECTION K SERIES



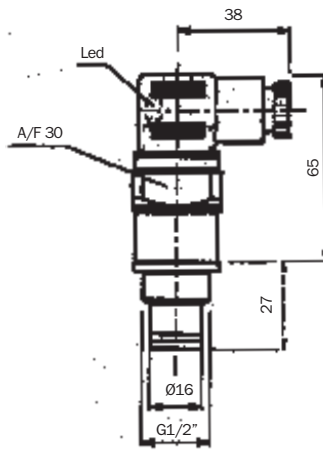
Visual V series



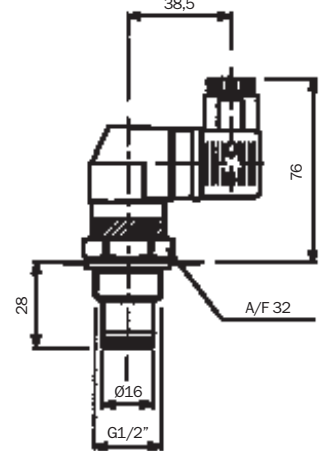
Electrical N series



Visual - Electrical K series



Visual - Electrical E series



Selection & installation information

Filter elements types

A Series

Absolute inorganic microfibre filtration media, available in 3, 6, 10 and 25 micron
Example - **A03, A06, A10** or **A25**

M Series

Metal mesh media, available in 10, 25, and 60 micron.
Example - **M10, M25** or **M60**.

T Series

Nominal cellulose impregnated paper media, available in 10 and 25 micron.
Example - **T10** or **T25**

Please refer to individual pressure drop curves to obtain filter assembly pressure drop information

The following filter sizing recommendations are based using a mineral oil fluid at 30 mm²/s (cSt), with a maximum filter assembly (housing and filter element) pressure drop of 25% of the filter condition indicator (1.5 bar)

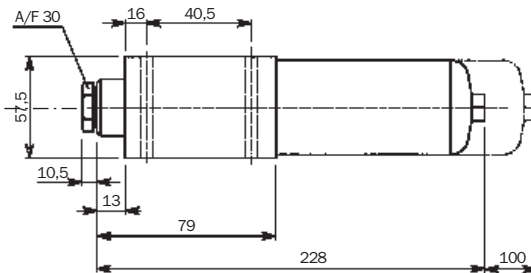
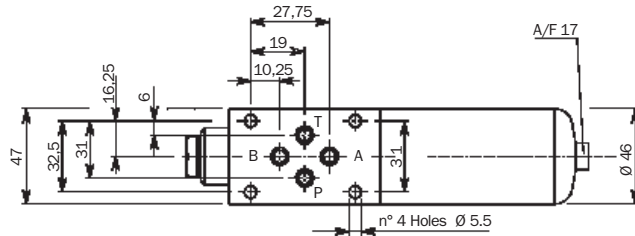
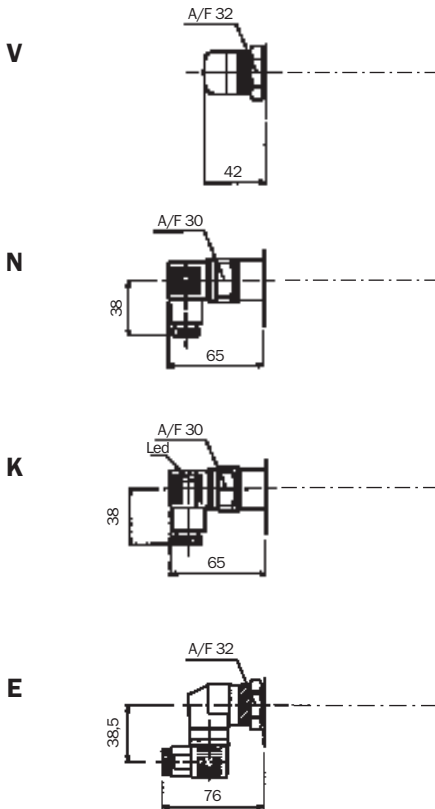
FHM 006 SERIES

FHM 006

Filter assembly	Flow Rate l/min H - T Series *	Bowl length	Port size BSP/NPT/SAE	Weight kg **
A03	8	1	-	2,4
A06	10			
A10	12			
A25	15			
T10	20			

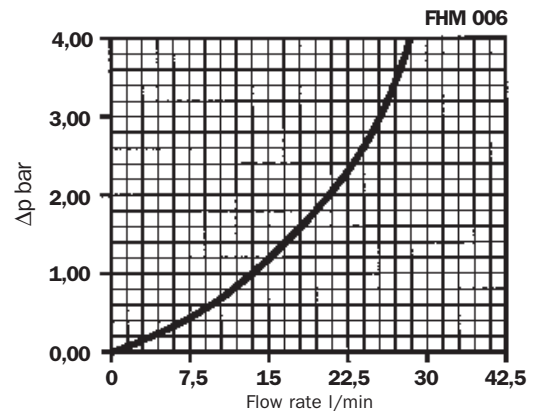
* Flow rates with 30 mm²/s fluid viscosity
** Weight including filter element

**Bowl adjacent to Port A = G1
Bowl adjacent to Port B = G2**



BOWL SIDE A

Housing pressure drop curve



Selection & installation information

Please refer to individual pressure drop curves to obtain filter assembly pressure drop information

The following filter sizing recommendations are based using a mineral oil fluid at 30 mm²/s (cSt), with a maximum filter assembly (housing and filter element) pressure drop of 25% of the filter condition indicator (1.5 bar)

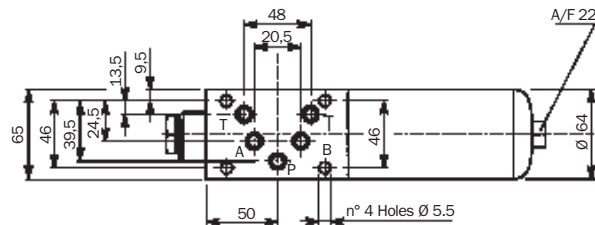
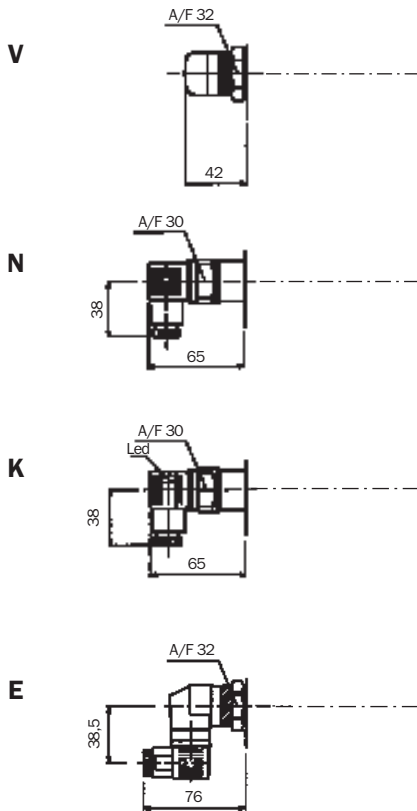
FHM 010 SERIES

FHM 010

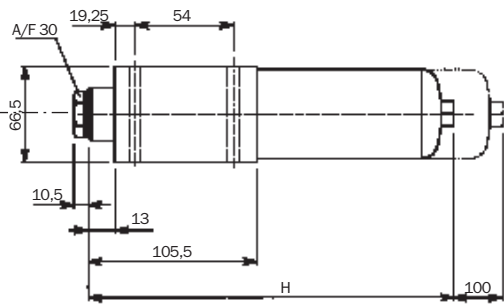
Filter assembly	Flow rate l/min serie N*	Flow rate l/min serie H-T*	Bowl length	Port size BSP/NPT/SAE	Weight kg **
A03	18	14	2	—	4,9
A06	22	20			
A10	25	24			
A25	30	28			
T10	==	40			
A03	22	20	3	—	6,2
A06	27	25			
A10	32	27			
A25	35	30			
T10	==	45			

* Flow rates with 30 mm²/s fluid viscosity
** Weight including filter element

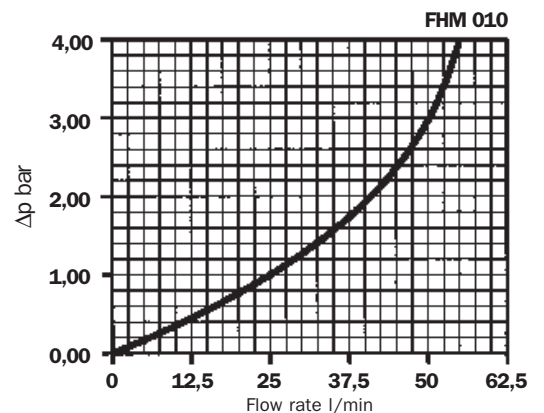
**Bowl adjacent to Port A = G1
Bowl adjacent to Port B = G2**



BOWL SIDE B



Housing pressure drop curve



Lengths

Type	H
1	279
2	380

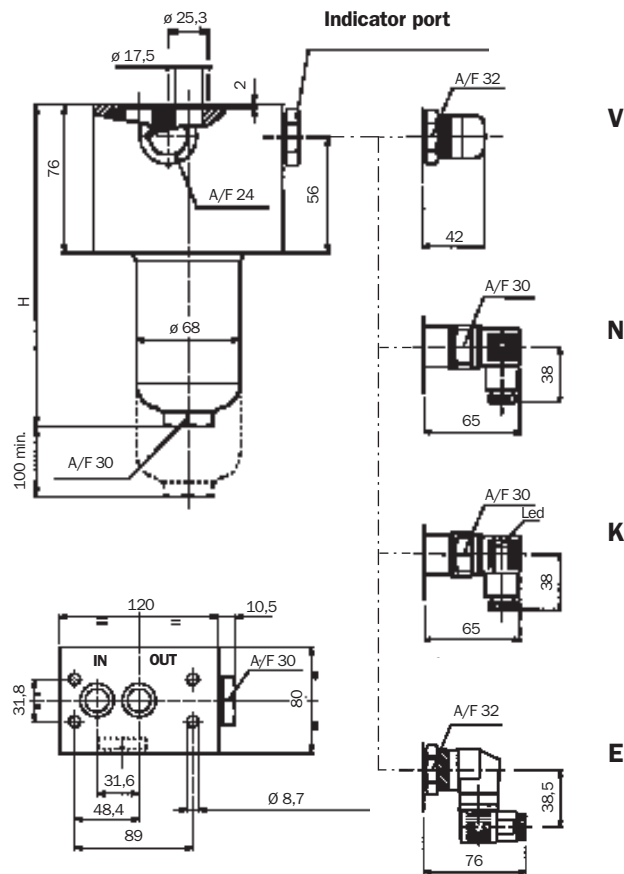
Selection & installation information

Please refer to individual pressure drop curves to obtain filter assembly pressure drop information

The following filter sizing recommendations are based using a mineral oil fluid at 30 mm²/s (cSt), with a maximum filter assembly (housing and filter element) pressure drop of 25% of the filter condition indicator (1.5 bar)

FHM 065

FHM 065 SERIES



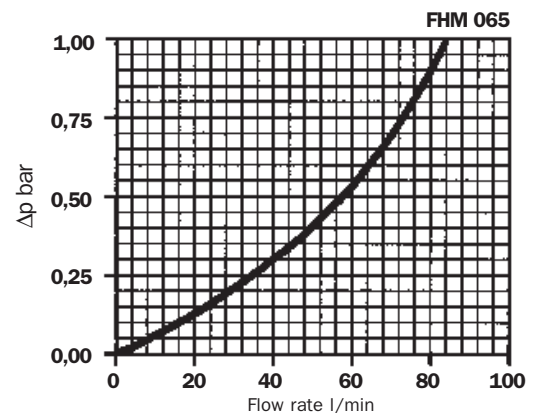
Filter assembly	Flow rate l/min N series *	Flow rate l/min H-T series *	Bowl length	Port size BSP/NPT/SAE	Weight kg **
A03	12	10	1	-	5,2
A06	14	12			
A10	25	20			
A25	40	32			
T10	-	60	2	-	5,9
A03	22	14			
A06	24	20			
A10	40	32			
A25	60	45	3	-	6,5
T10	-	80			
A03	30	25			
A06	45	35			
A10	80	60			
A25	90	75			
T10	-	90			

* Flow rates with 30 mm²/s fluid viscosity
 ** Weight including filter element

Lengths

Type	H
1	166
2	196
3	296

Housing pressure drop curve



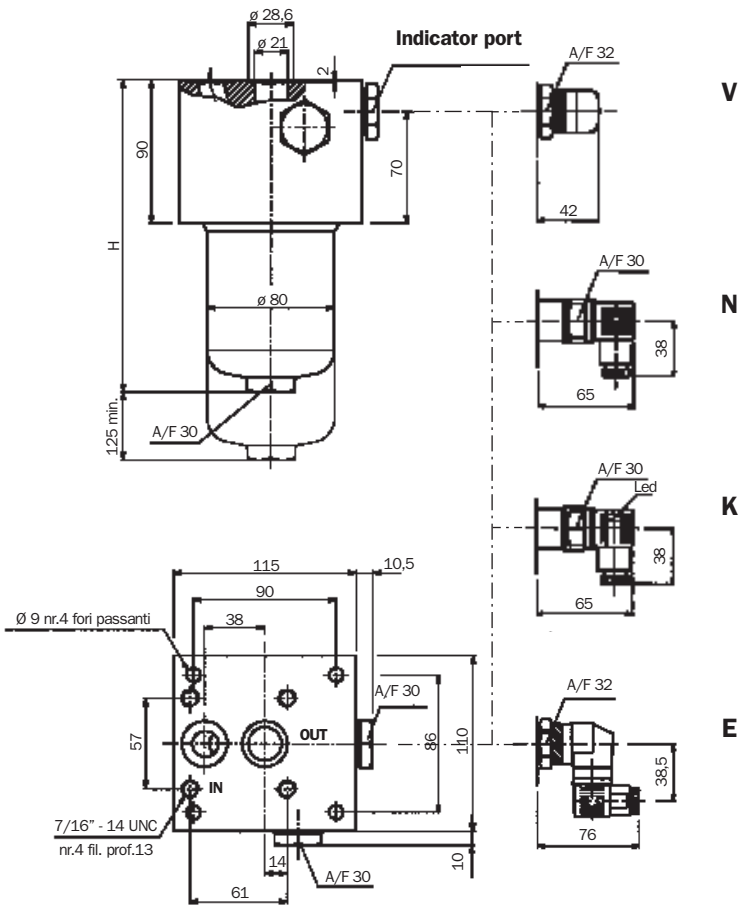
Selection & installation information

Please refer to individual pressure drop curves to obtain filter assembly pressure drop information

The following filter sizing recommendations are based using a mineral oil fluid at 30 mm²/s (cSt), with a maximum filter assembly (housing and filter element) pressure drop of 25% of the filter condition indicator (1.5 bar)

FHM 135

FHM 135 SERIES



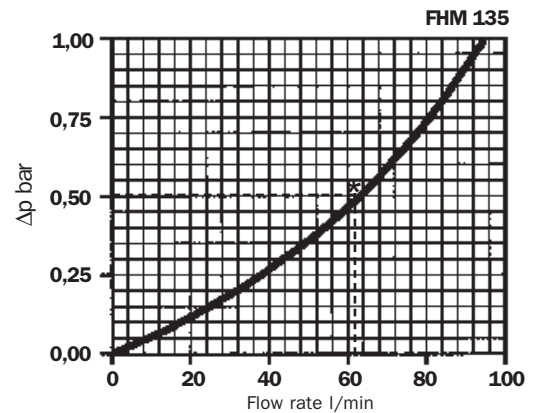
Filter assembly	Flow rate l/min N series *	Flow rate l/min H-T series *	Bowl length	Port size BSP/NPT/SAE	Weight kg **
A03	25	20	1	-	8,6
A06	40	26			
A10	60	30			
A25	75	40			
T10	-	95	2	-	10,0
A03	75	42			
A06	80	45			
A10	95	75			
A25	110	85			
T10	-	100			

* Flow rates with 30 mm²/s fluid viscosity
 ** Weight including filter element

Lengths

Type	H
1	205
2	315

Housing pressure drop curve



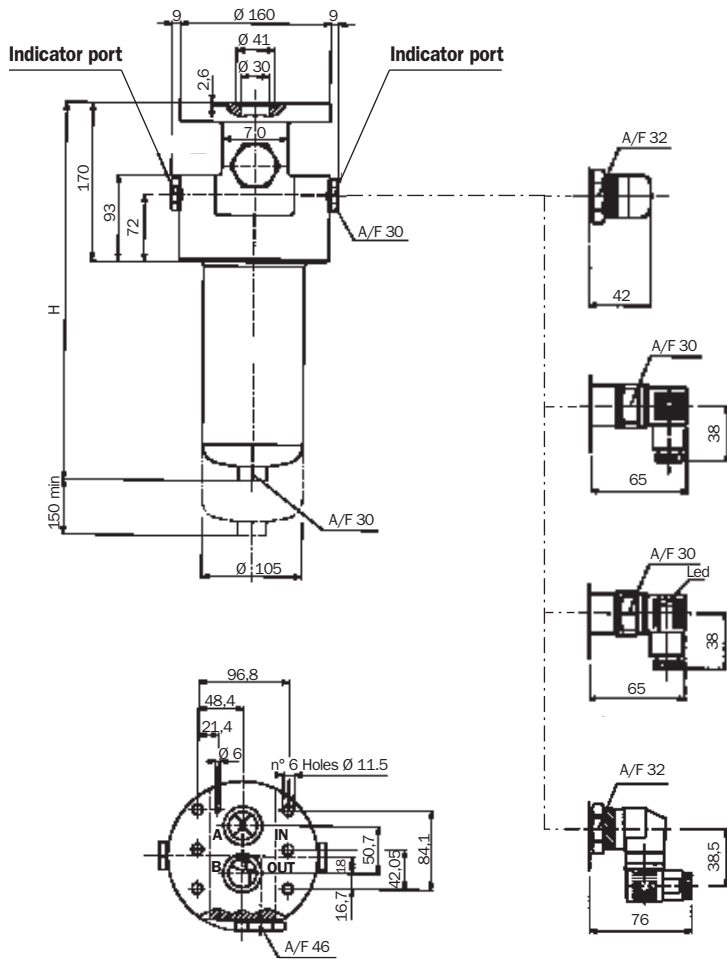
Selection & installation information

Please refer to individual pressure drop curves to obtain filter assembly pressure drop information

The following filter sizing recommendations are based using a mineral oil fluid at 30 mm²/s (cSt), with a maximum filter assembly (housing and filter element) pressure drop of 25% of the filter condition indicator (1.5 bar)

FHM 320

FHM 320 SERIES



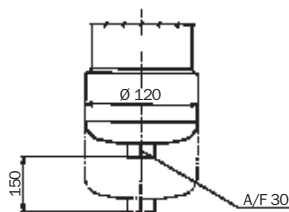
Filter Assembly	Flow Rate l/min N series *	Flow Rate l/min H-T series *	Bowl Length	Port Size BSP/NPT/SAE	Weight kg **
A03	75	40	1	-	21,1
A06	80	45			
A10	100	70			
A25	150	90			
T10	-	150	2	-	24,8
A03	175	80			
A06	180	100			
A10	240	130			
A25	260	200	3	-	28,7
T10	-	220			
A03	230	150			
A06	240	180			
A10	255	225	4	-	33,3
A25	270	255			
T10	-	300			
A03	240	200			
A06	255	235	4	-	33,3
A10	270	255			
A25	280	270			
T10	-	300			

* Flow rates with 30 mm²/s fluid viscosity
 ** Weight including filter element

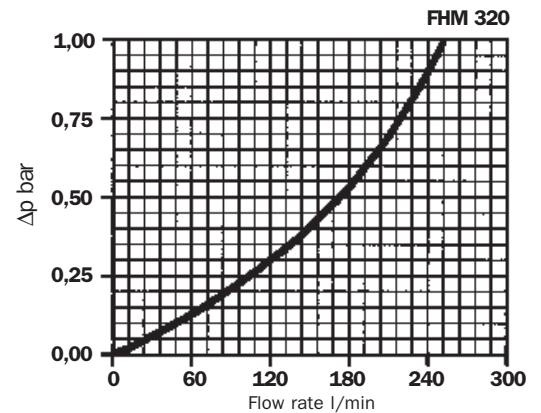
Lengths

Type	H
1	294
2	414
3	555
4	685

ONLY FOR FHM 320-4



Housing pressure drop curve



General

Pressure drop versus flow rate curve information for both housing and filter elements is in accordance with ISO 3968

Filter assembly pressure drop - $\Delta p_{\text{Total}} = \Delta p_{\text{Housing}} + \Delta p_{\text{Filter element}}$

Housing pressure drop - The housing pressure drop is proportional to the fluid density

Filter element pressure drop - Filter element pressure drop is proportional to kinematic viscosity therefore always check the fluid operating temperature and fluid type to obtain the working viscosity according to the following formula:

$\Delta p_1 \text{ Filter element} = (\text{working viscosity} / \text{brochure viscosity}) \times \Delta p \text{ filter element}$

Brochure viscosity 30 mm²/s (cSt)

Filter assembly sizing example

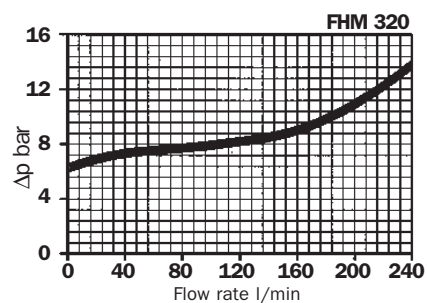
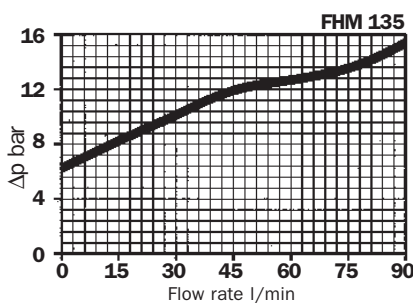
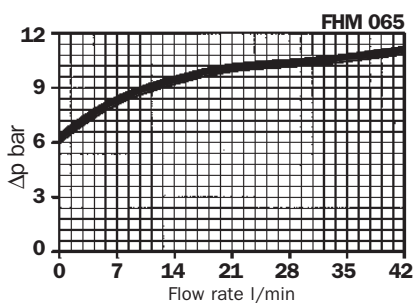
- Customer requires a 70 l/min filter assembly
- Mineral oil fluid: ISO VG 46 (46 mm²/s (cSt) at 40°C)
- A10 - 10 micron absolute filtration

Selection :

- **Housing pressure drop** - FHM 135-2 with 70 l/min $\Delta p = 0.5$ bar (see curve on page 9)
- **Filter element pressure drop** (brochure viscosity) - HP135-2A10AH with 70 l/min $\Delta p = 0.64$ bar (see curve on page 13)
- **Filter element pressure drop** (working viscosity) - With 46 mm²/s (cSt) $\Delta p_1 = 0.64 \times (46/30) = 0.98$ bar
- **Filter assembly pressure drop** $\Delta p_{\text{Total}} = \Delta p_{\text{Housing}} + \Delta p_1 \text{ Filter element} = 0.5 + 0.98 = \mathbf{1.48 \text{ bar}^*}$ } Acceptable pressure drop value, as per our recommendations

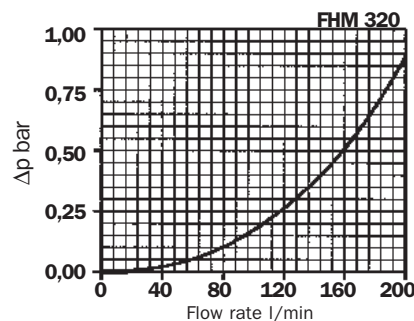
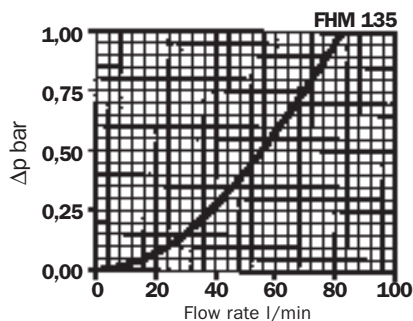
Bypass valves pressure drop

The curves were obtained using a mineral oil with a density of 0,86 kg/dm³.
The Δp varies proportionally to the density.



Reverse flow valves pressure drop

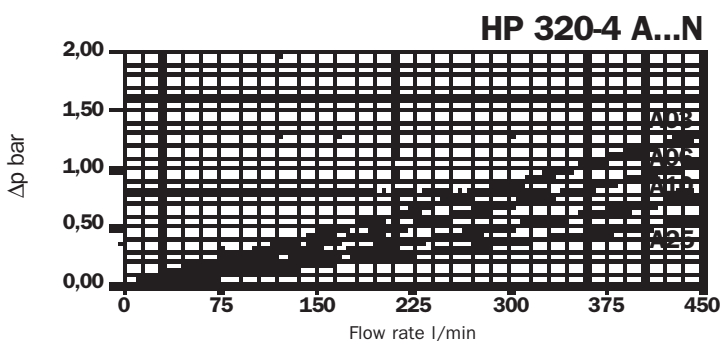
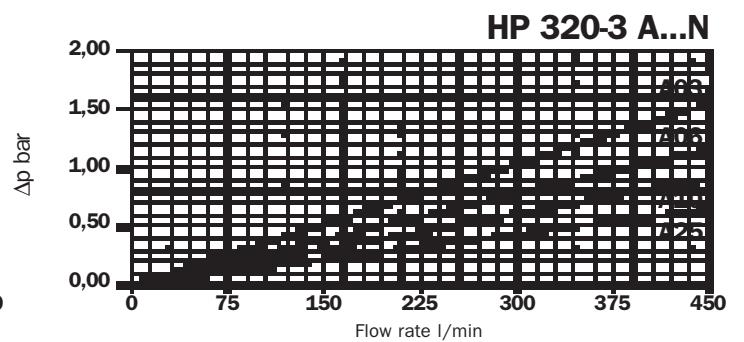
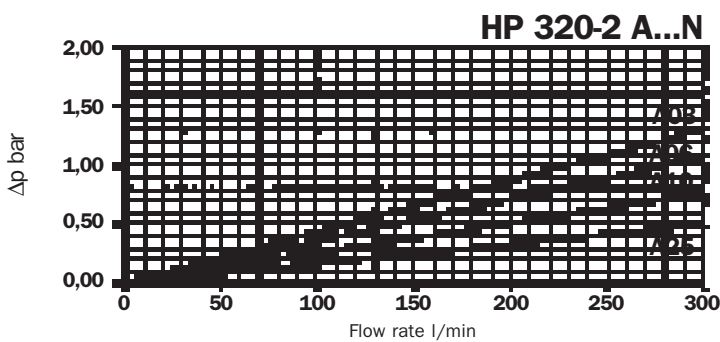
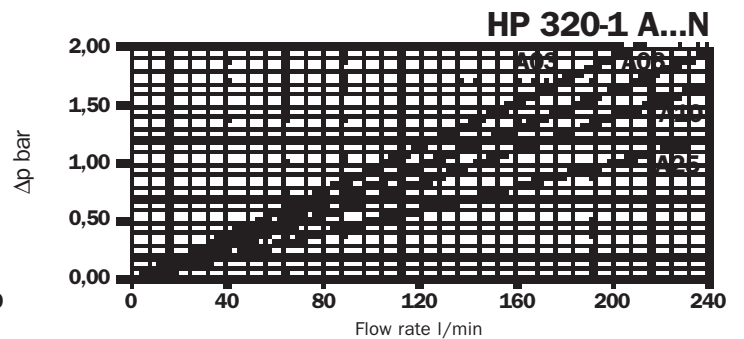
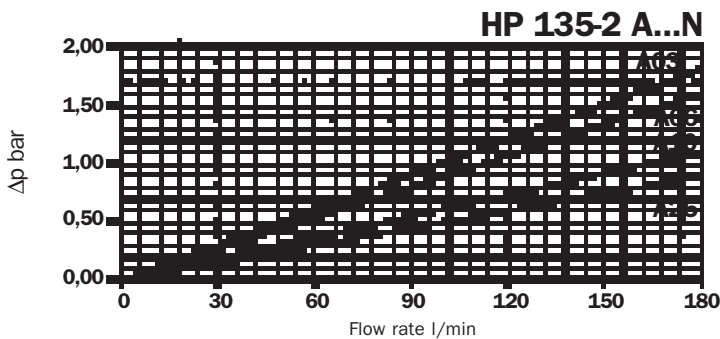
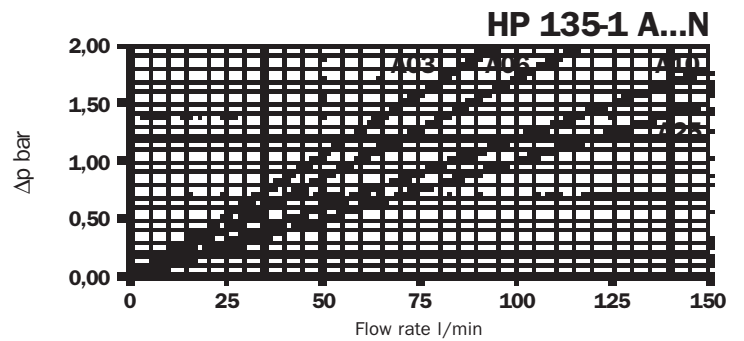
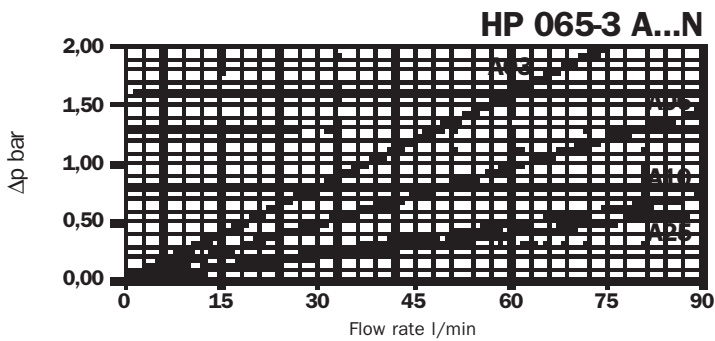
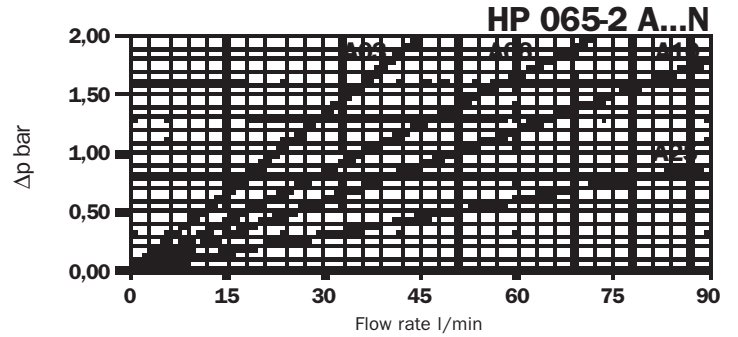
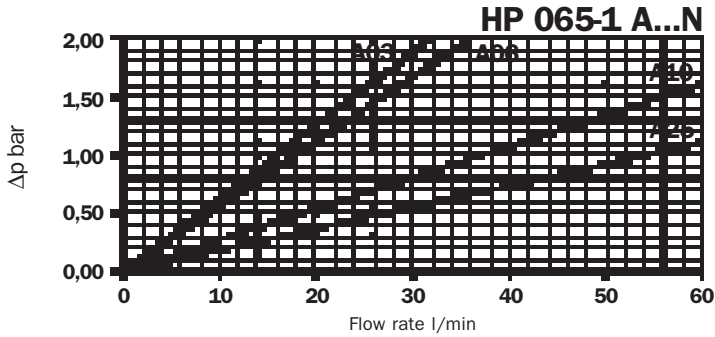
The curves were obtained using a mineral oil with a density of 0,86 kg/dm³.
The Δp varies proportionally to the density.



Filter elements - N - ΔP 20bar

The curves were obtained using a mineral oil with a kinematic viscosity of 30 mm²/s (cSt).
The Δp varies proportionally to the fluid kinematic viscosity.

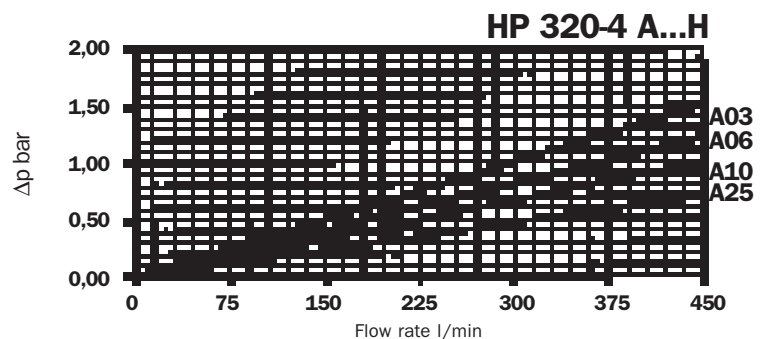
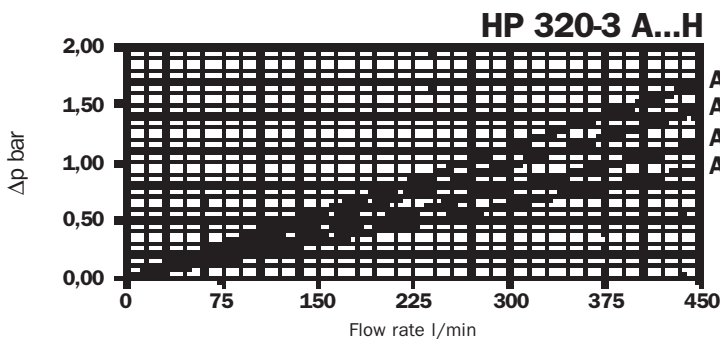
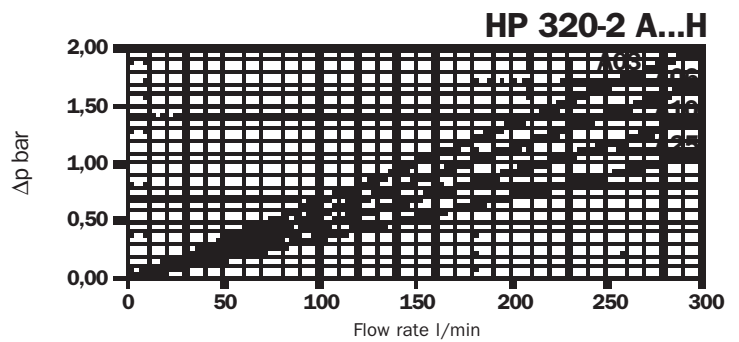
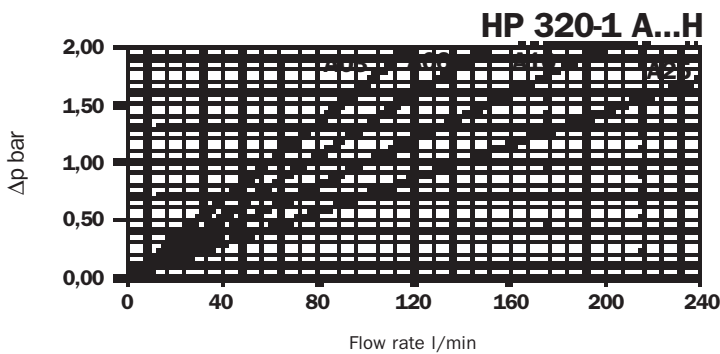
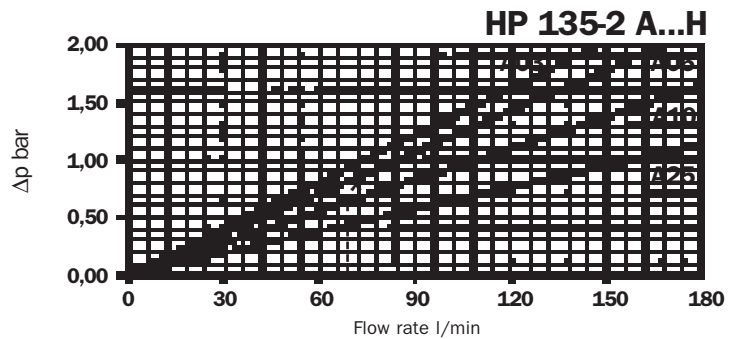
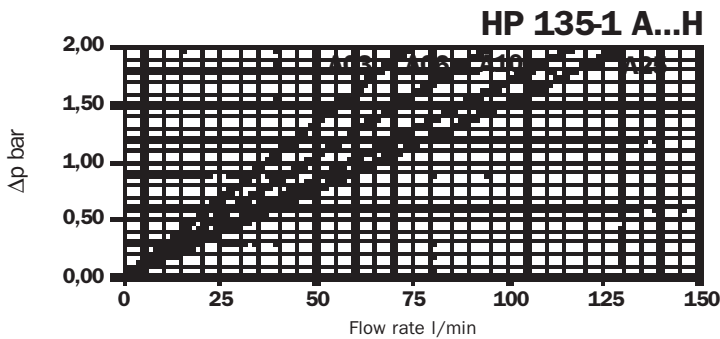
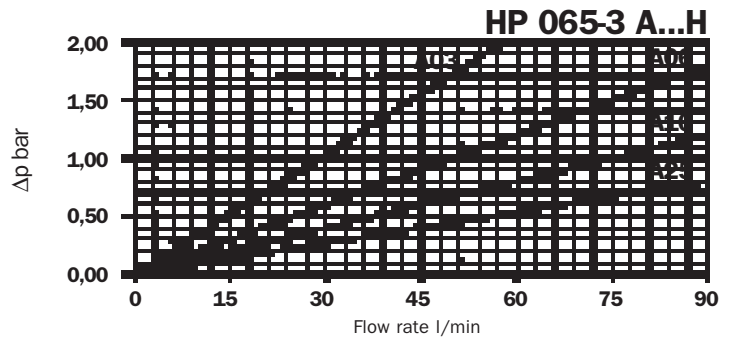
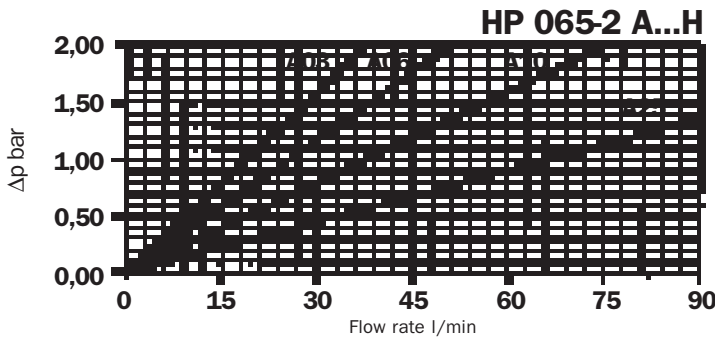
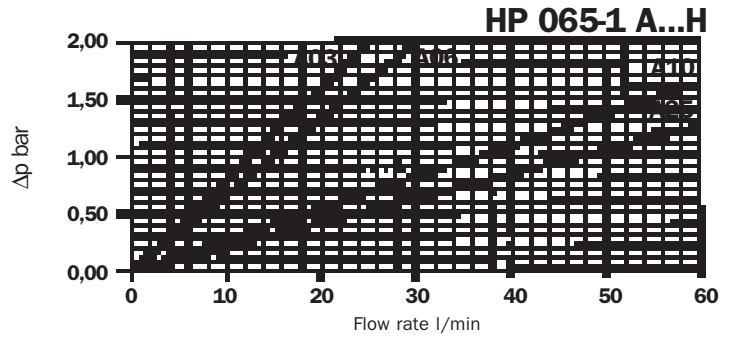
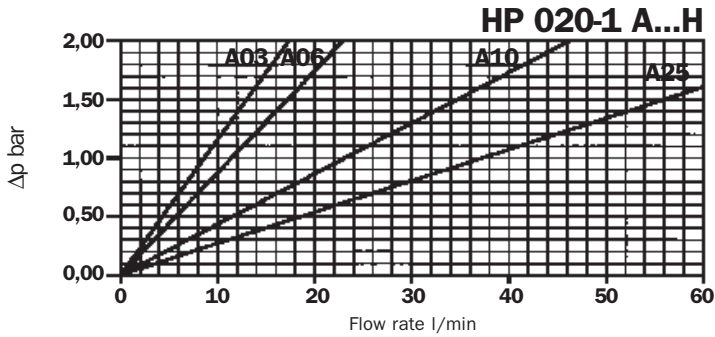
For the metal filter elements curves (M series), please consult our Sales and Network Organization



Filter elements - H - ΔP 210bar

The curves were obtained using a mineral oil with a kinematic viscosity of 30 mm²/s (cSt).
The Δp varies proportionally to the fluid kinematic viscosity.

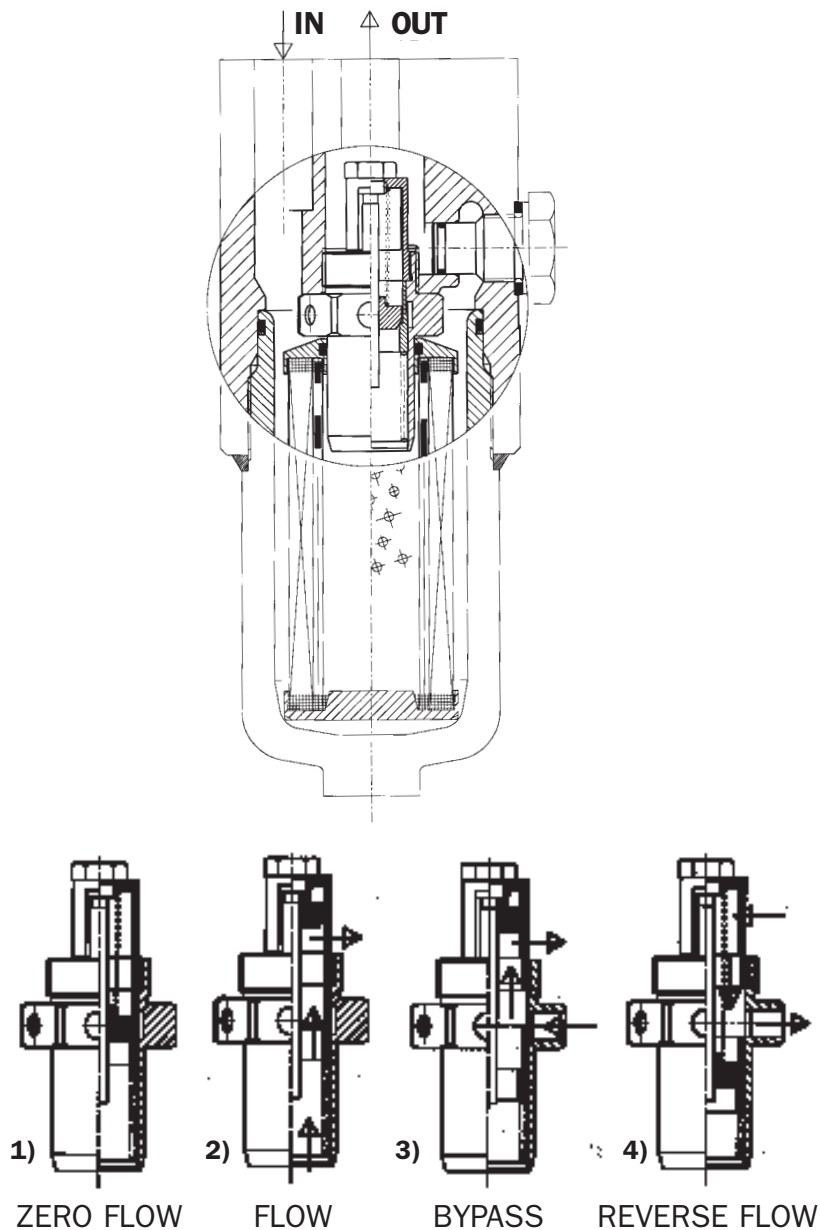
For the stainless steel mesh filter elements curves (T series), please consult our Sales and Network Organization



CONTAMINATION CODES ISO 4406		CORRESPONDENT CODES NAS 1638	RECOMMENDED FILTRATION DEGREE	TYPICAL APPLICATIONS
5 μm	15 μm			
12	9	3	$\beta_x \geq 200$ 3	High precision and laboratory servo-systems
15	11	6	3-6	Robotic and servo-systems
16	13	7	10-12	Very sensitive systems where a high degree of reliability is required
18	14	9	12-15	General equipment of limited reliability
19	16	10	15-25	General equipment of limited reliability
21	18	12	25-40	Low - pressure equipment not in continuous service

Reverse flow valve - Drawing

FHM 135 - FHM 320 SERIES



FHM

Nominal sizes

006
010
065
135
320

Bowl length

FHM 006 = 1
FHM 010 = 2,3
FHM 065 = 1,2,3
FHM 135 = 1,2
FHM 320 = 1,2,3,4

Integral bypass valve

S	Without bypass
B	With bypass (Only 065-135-320)
W	With reverse flow
R	With reverse flow + bypass (Not available for FHM 065)

Seals

A	Nitrile (Buna-N)
V	Viton

Ports option

G1	Bowl side A (size 006 & 010 only)
G2	Bowl side B (size 006 & 010 only)
F1	Size 065 - 135 - 320 only

Nominal sizes - Filter elements

020 FHM 006
065 FHM 010 & 065
135 FHM 135
320 FHM 320

Filter condition indicator

S	With threaded hole only	
T2	With plug	
V7	Visual 5 bar	
V8	Visual 7 bar	
V9	Visual 10 bar	
N7	Electrical 5 bar	
N8	Electrical 7 bar	
N9	Electrical 10 bar	
E7	Visual - electrical 5 bar	
E8	Visual - electrical 7 bar	
E9	Visual - electrical 10 bar	
K7*	Visual - electrical 5 bar	1 - 24 Volt 2 - 115 Volt 3 - 230 Volt
K8*	Visual - electrical 7 bar	
K9*	Visual - electrical 10 bar	

*For K visual-electrical indicator, specify the voltage (f.i. K71 = LED 24 volt)

Collapse pressure series

N	20 bar
T	80 bar
H	210 bar

Filter elements

A03	Inorganic microfibre Bx ≥ 200
A06	
A10	
A25	
M25	Square wire mesh
M60	
M90	
T10	Stainless steel wire mesh
T25	

HP

Replacement element

MP Filtri - Filtration products will only be guaranteed if original MP Filtri replacement elements and spares are used

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