FMP SERIES

IN-LINE FILTER

LEHENGOAK, S.A.

MP FILTRI
filtri per oleodinamica

Maximum working pressure 250 bar

Flow rates to 180 l/min

LEHENGOAK, S.A.

FMP

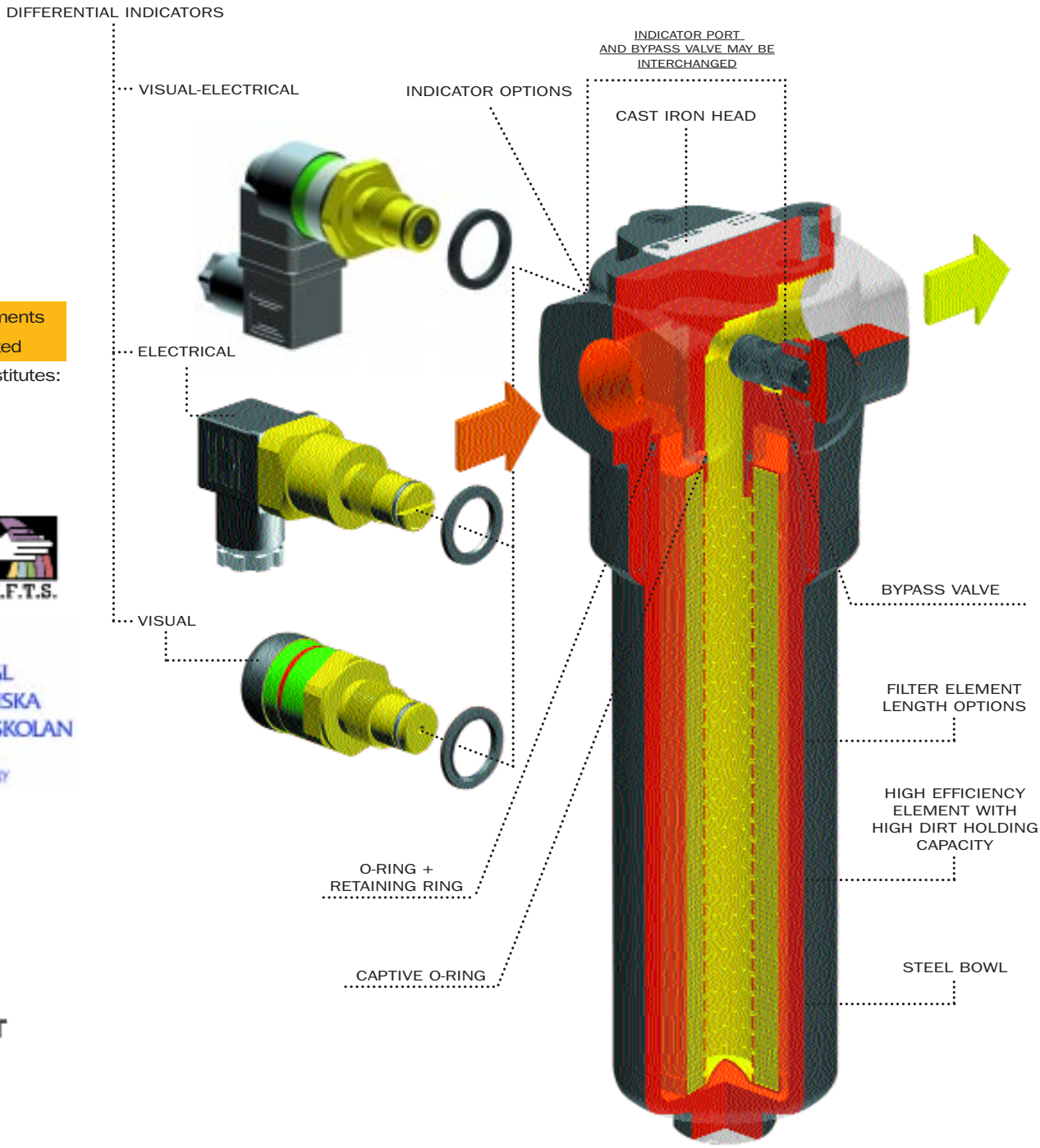
FMP series filters are designed for pressure line applications and are suitable for in-line installation. This completely new series of filters has been developed to satisfy the medium working pressure sector of the pressure filter market. Continued research and development on both the filter bodies and the filter elements has resulted in a product line featuring a compact light weight housing combined with a high filtration efficiency.

A complete line of pressure differential visual and electrical indicators are available with this series of filters.

FMP series filters within this range are suitable for flow rates to 180 l/min.

FMP 135 series are available with reverse flow valve. See page 10

FMP series are specifically designed for mobile, agricultural and industrial applications.



New

absolute filter elements independently tested in the following Institutes:

Institute of Filtration (France) — L.F.T.S.

Kungl Tekniska Högskolan — Royal Institute of Technology

UNI EN ISO 9001 N° 037/98 — ITALCERT

Filter element:

Filter element material

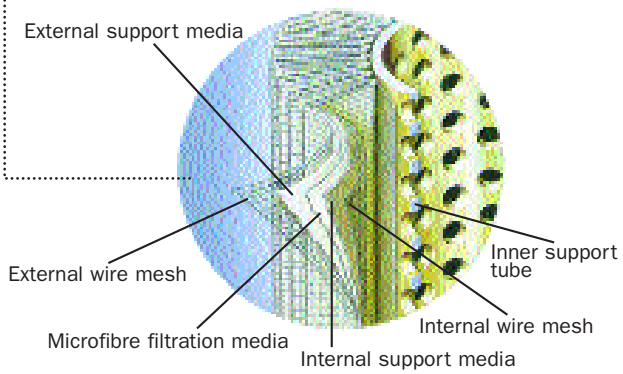
End caps:
Steel (Thermal treatment)

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

A Series

Inorganic microfibre with acrilic support

New material:

New improved ß ≥ 200 filter elements with greater efficiency and increased dirt holding capacity

Contamination retention

as per ISO 4572: Multi-pass test.

Filter elements	Dimensions for ß(µm) values				Filtration ratios			Δ P (bar)
	ß ≥ 2 (50%)	ß ≥ 20 (95%)	ß ≥ 75 (98,7%)	ß ≥ 200 (99,5%)	$ß_2$	$ß_{10}$	$ß_{20}$	
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	065-1	065-2	065-3	135-1	135-2
A03/A06	386	546	1098	895	1879
A10/A25	386	546	1098	895	1879

Values in cm^2

Filtering area Filter elements H - ΔP 210 bar

Type HP	065-1	065-2	065-3	135-1	135-2
A03/A06	386	544	1094	777	1655
A10/A25	386	544	1094	777	1655

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	065-1	065-2	065-3	135-1	135-2
M10	374	530	1064	950	2020
M25	374	530	1064	950	2020
M60	374	530	1064	950	2020

Values in cm^2

Filtering area Filter elements T - ΔP 80 bar

Type HP	065-1	065-2	065-3	135-1	135-2
T10/T25	385	545	1090	710	1500

Values in cm^2

Filter body:

Materials

Head
Cast iron (Thermal treatment)

Bowl
Steel (Thermal treatment)

Seals
A Series: Nitrile (Buna-N)
V Series: Viton

Bypass valve
Brass

Reverse flow (Only for 135 series)
Steel

Indicator
Brass (with viton seal)

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 250 bar
Test pressure: 350 bar
Minimum burst pressure: 750 bar

Fatigue test: a filter body subjected to pressure impulses from 0 to 250 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:
- 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/a) 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: **FMP** series filters are fitted with indicators switching at a pressure of
5 bar ± 10%
(for N elements series)
7 bar ± 10%
(for H and T elements series)
10 bar ± 10%
(for H and T elements series)

"J series - Thermal lockout Electrical Indicators available - contact MP Filtri"

Visual indicator

With bypass 5 bar setting:	Without bypass 7 bar setting:	Without bypass 10 bar setting:
V7-Z7 Series	**V8-Z8 Series**	**V9-Z9 Series**

Electrical indicator

With bypass 5 bar setting:	Without bypass 7 bar setting:	Without bypass 10 bar setting:
N7 Series	**N8 Series**	**N9 Series**

Visual-electrical indicator

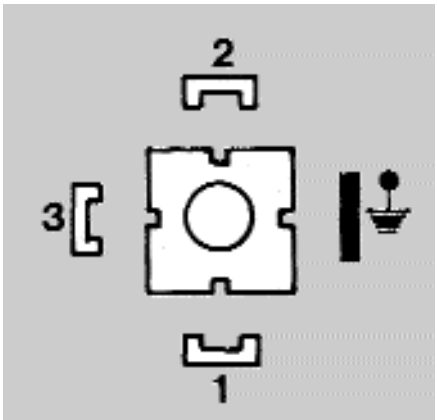
With bypass 5 bar setting:	Without bypass 7 bar setting:	Without bypass 10 bar setting:
E7-K7* Series	**E8-K8* Series**	**E9-K9* Series**

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

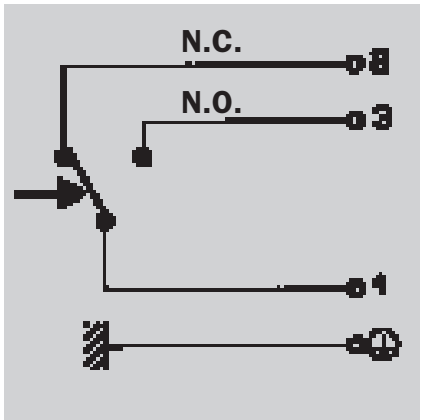
*{ 1 - 24 Volt
2 - 115 Volt
3 - 230 Volt

	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

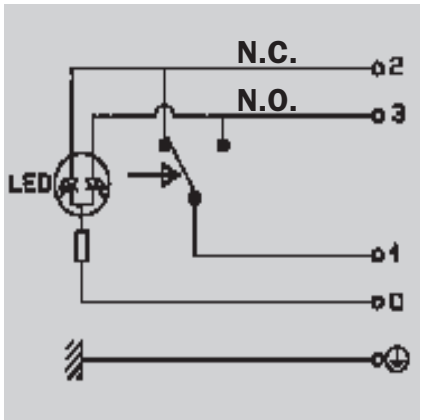
CONNECTOR DIN 43650



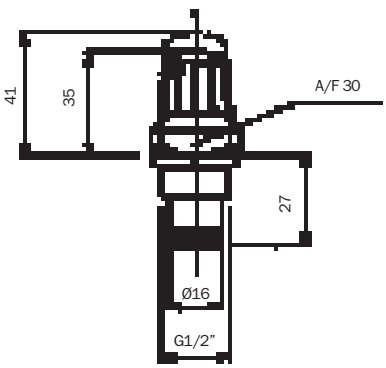
ELECTRICAL CONNECTION E - N SERIES



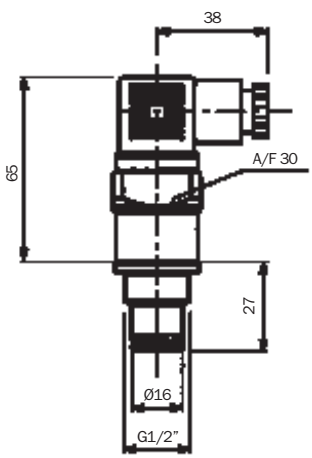
ELECTRICAL CONNECTION K SERIES



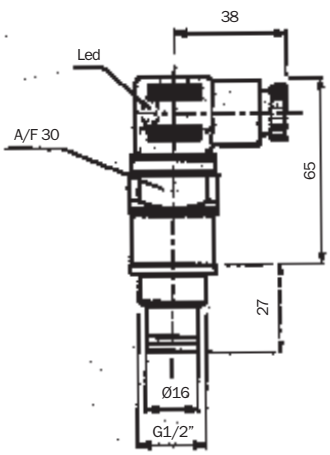
Visual Z series



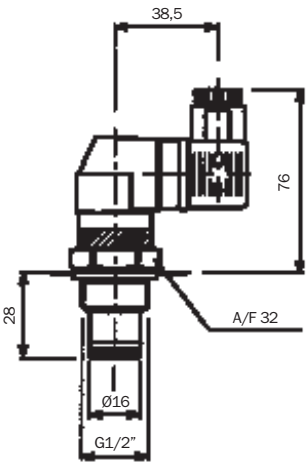
Electrical N series



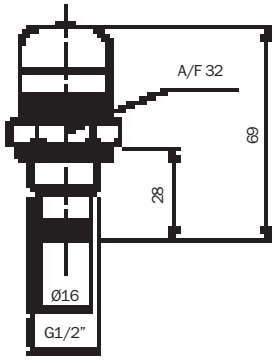
Visual - Electrical K series



Visual - Electrical E series



Visual V series



Filter Elements types

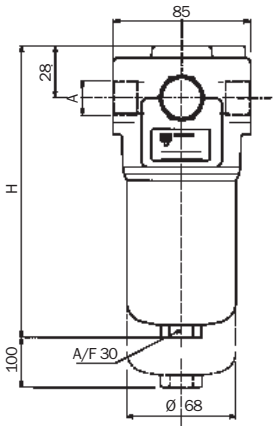
A Series
Absolute inorganic microfibre filtration media, available in 3, 6, 10 and 25 micron
Example - **A03, A06, A10** or **A25**

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

T Series
Triangular stainless steel mesh media, available in 10, 25 micron
Example - **T10, 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 (1.25 bar)

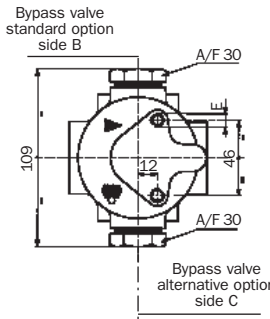


FMP 065

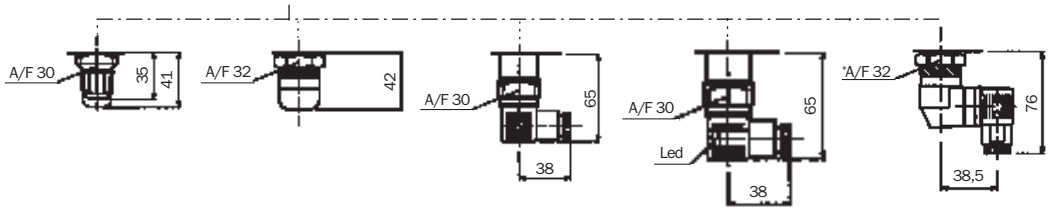
FMP 065 SERIES

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	18	15	1	1/2"	3,6
A06	20	18			
A10	35	32			
A25	50	48			
T10	–	75			
A03	22	18	2	1/2"	3,9
A06	35	25			
A10	50	45			
A25	75	65			
T10	–	90		3/4"	
A03	35	30	3	3/4"	5,4
A06	60	50			
A10	75	65			
A25	90	80			
T10	–	110			

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



Indicator port and bypass valve may be interchanged

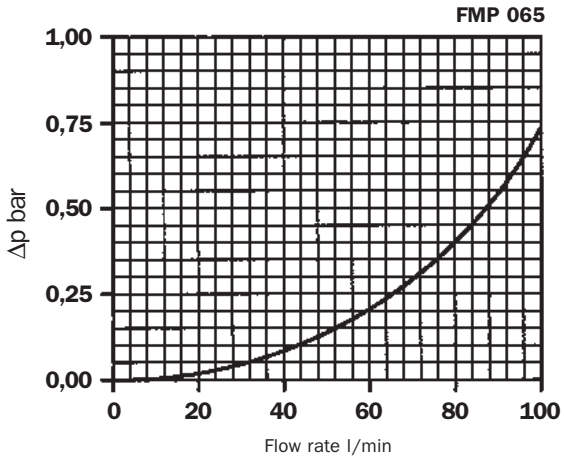


Z V N K E

Lengths

Type	H
1	175
2	200
3	302

Housing pressure drop curve



Thread connections

Type	A	E (15 mm)
G1	1/2" BSP	M8
G2	3/4" BSP	M8
G3	1/2" NPT	5/16" UNC
G4	3/4" NPT	5/16" UNC
G5	SAE 8 - 3/4" - 16 UNF	5/16" UNC
G6	SAE 12 - 1 1/16" - 12 UN	5/16" UNC

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

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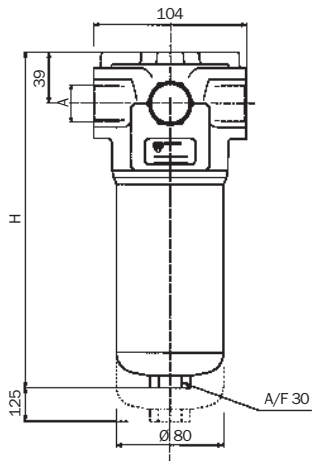
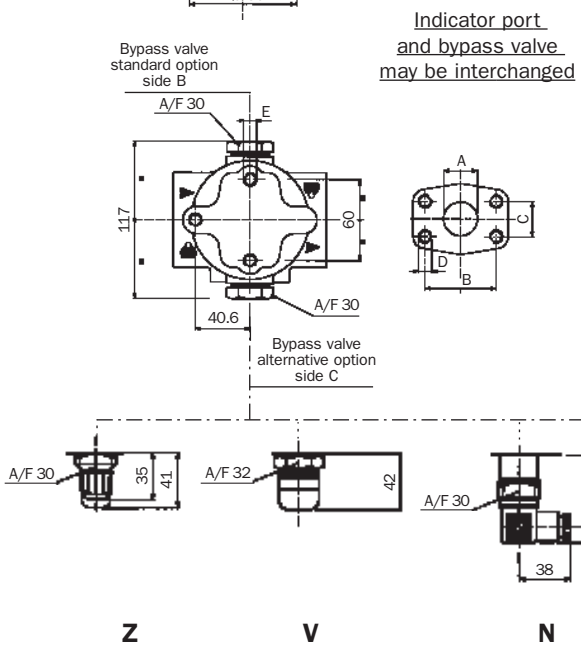


FMP 135

FMP 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	50	35			
A06	60	50			
A10	80	60	1	3/4"	6,3
A25	100	75			
T10	–	150			
A03	100	80			
A06	110	90			
A10	140	120	2	1"	7,8
A25	180	150			
T10	–	180			

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



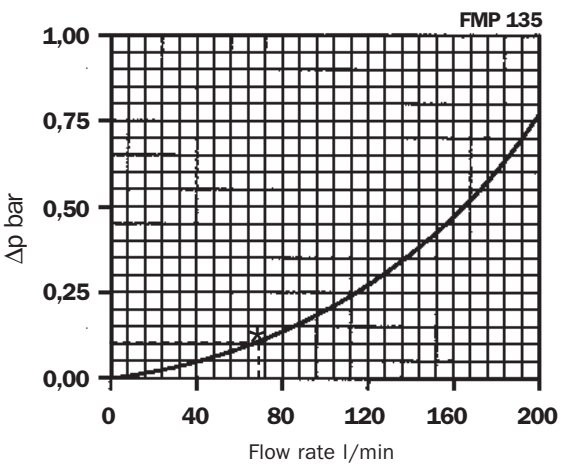
Lengths

Type	H
1	225
2	334

Thread connections

Type	A	E (15 mm)
G1	3/4" BSP	M10
G2	1" BSP	M10
G3	3/4" NPT	3/8" UNC
G4	1" NPT	3/8" UNC
G5	SAE 12 - 1 1/16" - 12 UN	3/8" UNC
G6	SAE 16 - 1 5/16" - 12 UN	3/8" UNC

Housing pressure drop curve



Flange connections

Type	Port A	B	C	D	E (15 mm)
F1	3/4" SAE - 3000 PSI/M	47,63	22,23	M10	M10
F2	1" SAE - 3000 PSI/M	52,37	26,19	M10	M10
F3	3/4" SAE - 3000 PSI/UNC	47,63	22,23	3/8" UNC	3/8" UNC
F4	1" SAE - 3000 PSI/UNC	52,37	26,19	3/8" UNC	3/8" UNC

Pressure drop information

General

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

Filter assembly pressure drop - Δp Total = Δp Housing + Δp 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:

Δp_1 Filter element = (working viscosity/brochure viscosity) x Δp filter element **Brochure viscosity 30 mm²/s (cSt)**

Filter assembly sizing example

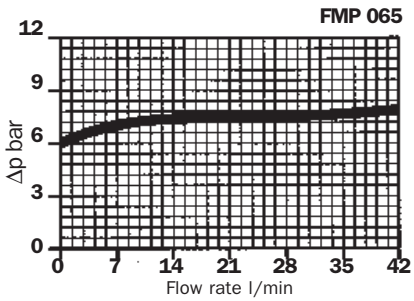
- Customer requires a 70 l/min filter assembly
- Mineral oil fluid: ISO VG 46 (46 mm²/s (cSt) at 40°C)
- A10 - 10 micron absolute filtration

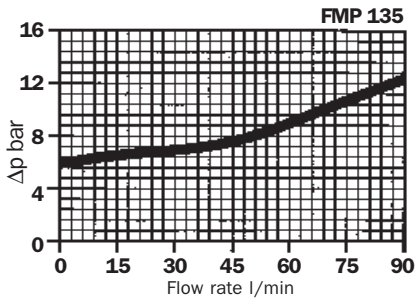
Selection :

- **Housing pressure drop** - FMP 135-2 with 70 l/min Δp = 0.12 bar (see curve on page 7)
- **Filter element pressure drop** (brochure viscosity) - HP 135-2A10AH with 70 l/min Δp = 0.64 bar (see curve on page 9)
- **Filter element pressure drop** (working viscosity) - With 46 mm²/s (cSt) Δp_1 = 0.64 x (46/30) = 0.98 bar
- **Filter assembly pressure drop** Δp Total = Δp Housing + Δp_1 Filter element = 0.12 + 0.98 = **1.10 bar*** { *Acceptable pressure drop value as per our recommendations

Bypass valves pressure drop

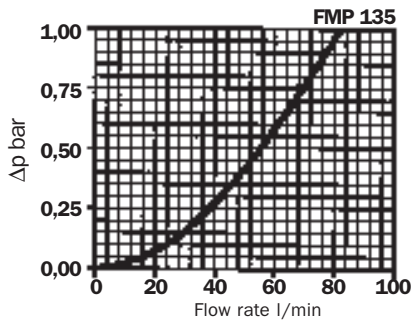
The curves were obtained using a mineral oil with a density of 0,86 kg/dm³. The Δp varies proportionally to the density.





Reverse flow valve 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.

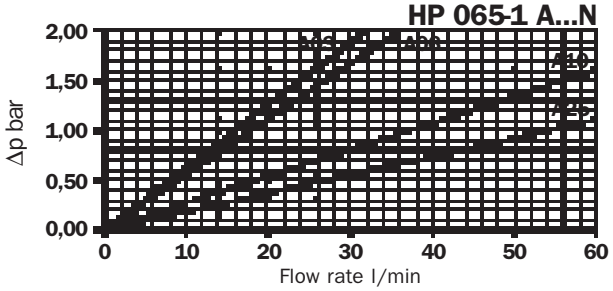


Filter elements - N - ΔP 20bar

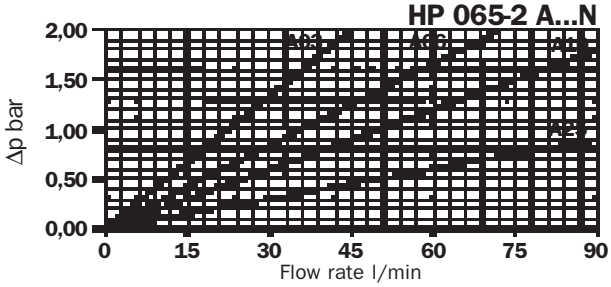
The curves were obtained using a mineral oil with a kinematic viscosity of 30 mm^2/s (cSt).
The Δp varies proportionally to the fluid kinematic viscosity.

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

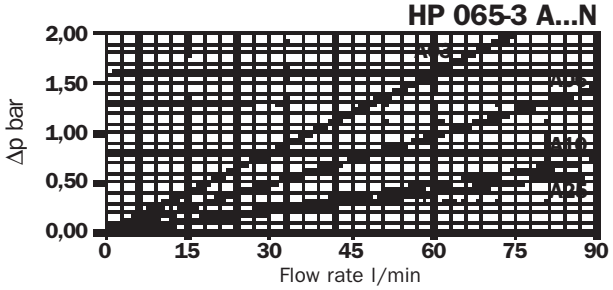
HP 065-1 A...N



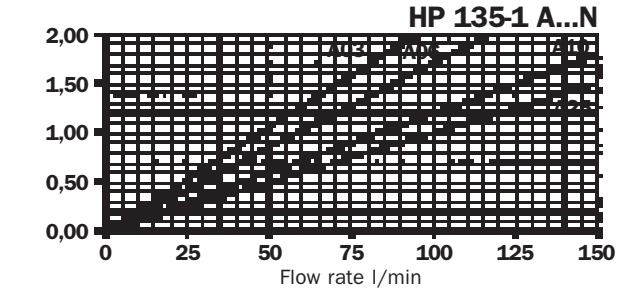
HP 065-2 A...N



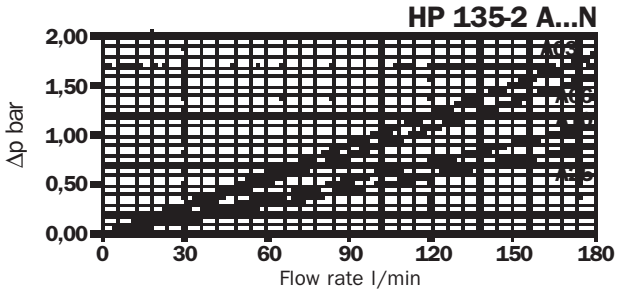
HP 065-3 A...N



HP 135-1 A...N



HP 135-2 A...N

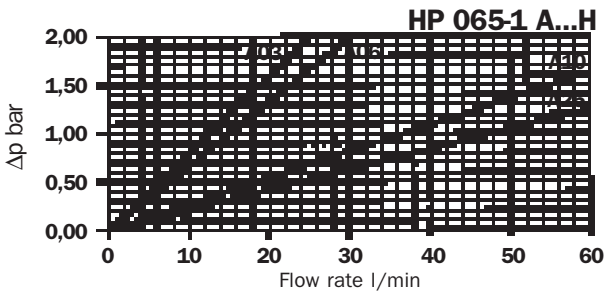


Filter elements - H - ΔP 210bar

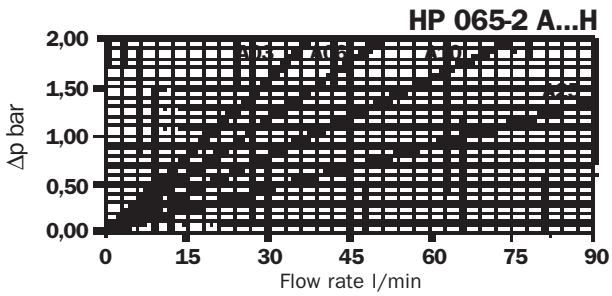
The curves were obtained using a mineral oil with a kinematic viscosity of 30 mm^2/s (cSt).
The Δp varies proportionally to the fluid kinematic viscosity.

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

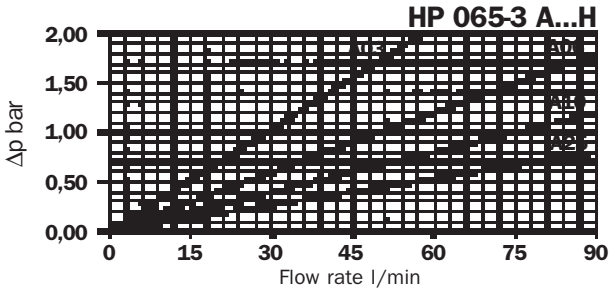
HP 065-1 A...H



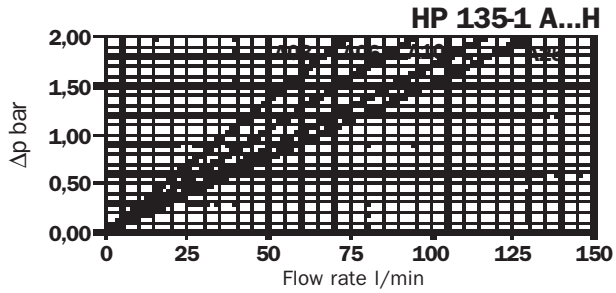
HP 065-2 A...H



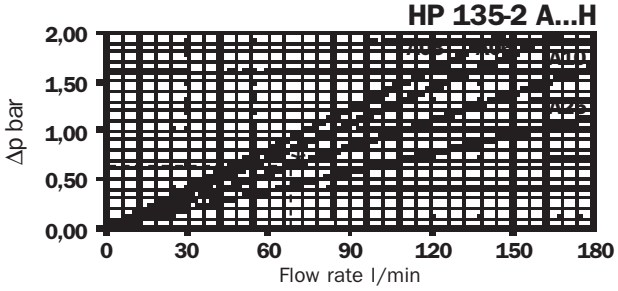
HP 065-3 A...H



HP 135-1 A...H



HP 135-2 A...H

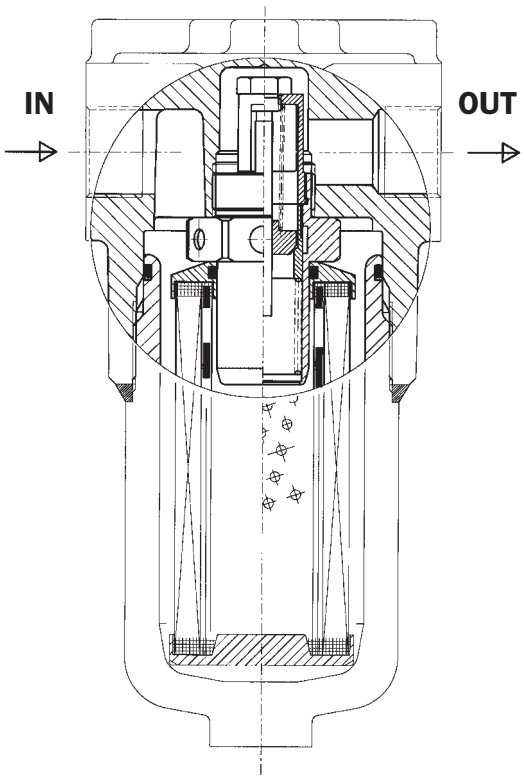


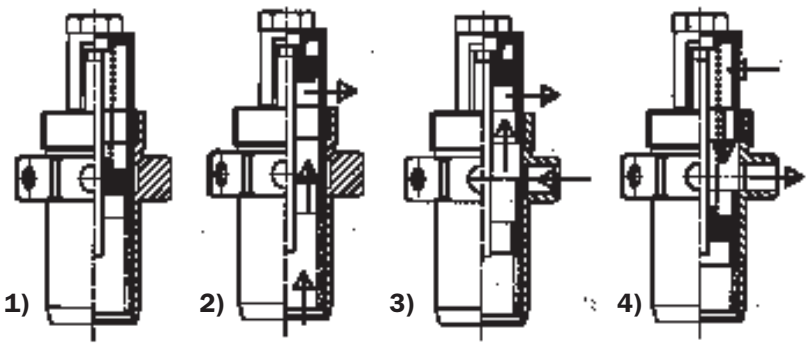
International standards for contamination fluid control

CONTAMINATION CODES ISO 4406		CORRESPONDENT CODES NAS 1638	RECOMMENDED FILTRATION DEGREE	TYPICAL APPLICATIONS
5 µm	15 µm		ßx ≥200	
12	9	3	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
18	14	9	12-15	reliability is required
19	16	10	15-25	General equipment of limited reliability
21	18	12	25-40	Low - pressure equipment not in continuos service

Reverse flow valve - Drawing

FMP 135 SERIES





Ordering information

FMP ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Nominal sizes

065
135

Bowl lengths

FMP 065 = 1,2,3
FMP 135 = 1,2

Integral bypass valve

S	Without bypass
B	With bypass (standard option)
C	With bypass (alternative option)
W	With reverse flow
R	With reverse flow + bypass (Not available for FMP 065)

Seals

A	Nitrile (Buna-N)
V	Viton

Filter condition indicator

S	With threaded hole only
T2	With plug
V7	Visual 5 bar
V8	Visual 7 bar
V9	Visual 10 bar
Z7	Visual 5 bar
Z8	Visual 7 bar
Z9	Visual 10 bar
N7	Electrical 5 bar
N8	Electrical 7 bar
N9	Electrical 10 bar
E7	Visual - electrical 5 bar
E8	Visual - electrical 7 ba
E9	Visual - electrical 10 bar
K7*	Visual - electrical 5 bar * { 1 - 24 Volt
K8*	Visual - electrical 7 bar { 2 - 115 Volt
K9*	Visual - electrical 10 bar { 3 - 230 Volt

*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 A06 A10 A25	Inorganic microfibre Bx ≥200
M10 M25 M60	Square wire mesh
T10 T25	Stainless steel wire mesh

Ports option

Type	065	135
G1	1/2" BSP	3/4" BSP
G2	3/4" BSP	1" BSP
G3	1/2" NPT	3/4" NPT
G4	3/4" NPT	1" NPT
G5	SAE 8	SAE 12
G6	SAE 12	SAE 16
F1	–	3/4" SAE 3000 PSI/M
F2	–	1" SAE 3000 PSI/M
F3	–	3/4" SAE 3000 PSI/UNC
F4	–	1" SAE 3000 PSI/UNC

HP ☐ ☐ ☐ ☐ ☐

Replacement element

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