NEW

High Pressure filters

FMM 150 series

Maximum working pressure up to 42 MPa (420 bar) - Flow rate up to 300 l/min

PASSION TO PERFORM

MP FILTRI®

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 mm^2/s

High pressure filters

Filter element		Absolute filtration N - R Series					Nominal filtration 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 N Series					Nominal filtration 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

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

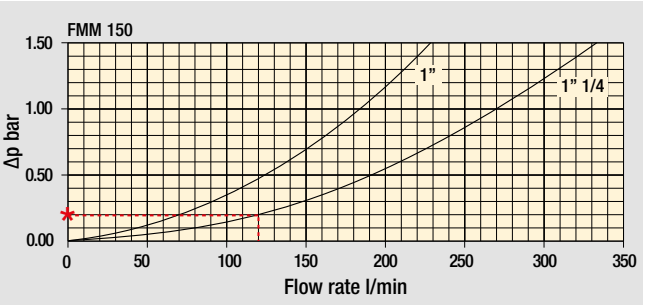
Maximum total pressure drop (Δp max) allowed by a new and clean filter

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
	0.4 ÷ 0.6 over-boost
High Pressure filters	0.8 ÷ 1.5
Stainless Steel filters	0.8 ÷ 1.5

FMM150 calculation example

Application data:
High pressure filter
Pressure Pmax = 300 bar
Flow rate Q = 120 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 = 0.2 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 = (5.94 : 1000) x 120 x (46 : 30) = 1.09 bar

FMM150 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		Absolute filtration N - R Series					Nominal filtration N Series
Type		A03	A06	A10	A16	A25	M25
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

Δp Tot. = 0.2 + 1.09 = 1.29 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 - N Series					
Filter series	Length	A03	A06	A10	A16	A25	M25
FMM 150	1	81	88	156	163	179	295
	2	142	145	227	230	236	312
	3	170	180	242	245	263	315

Maximum flow rate for a complete pressure filter with a pressure drop Δp = 1.5 bar.
Connections of filter under test G 1 1/4".
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 on www.mpfiltri.com.
Please, contact our Sales Department for further additional information.

FMM150 GENERAL INFORMATION

Technical data

High Pressure filters

In-line
Maximum working pressure up to 42 MPa (420 bar)
Flow rate up to 300 l/min

FMM is a range of versatile high pressure filter for protection of sensitive components in high pressure hydraulic systems in the mobile machines.
They are directly connected to the lines of the system through the hydraulic fittings.

Available features:
- Female threaded connections up to 1 1/4", for a maximum flow rate of 250 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
- Low collapse filter element "N", for use with filters 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 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 in filters not provided with the bypass valve
- Visual, electrical and electronic differential clogging indicators

Common applications:
- Agricultural machines
- Mobile machines

Filter housing materials
- Head: Painted cast iron
- Housing: Phosphatized steel
- Bypass 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) ±10%
- Other opening pressures on request.

Δp element type
- Microfibre filter elements - series N-R: 20 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

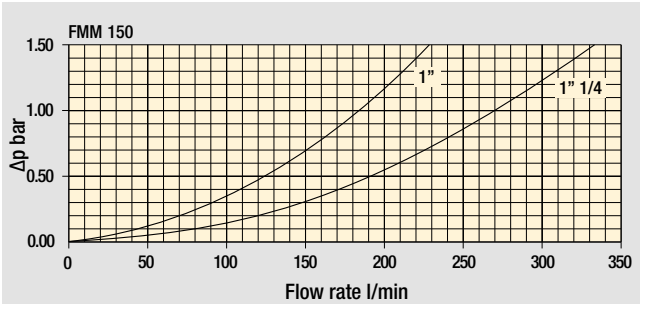
Connections
In-line Inlet/Outlet

Note
FMM150 filters are provided for vertical mounting

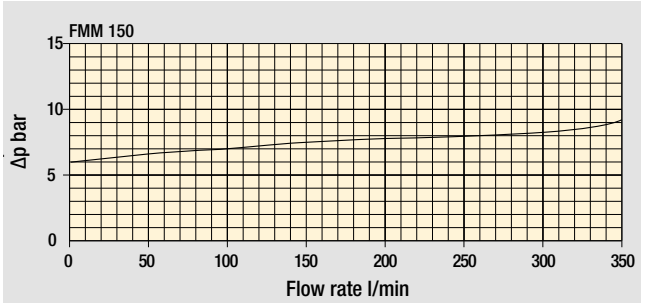
Weights [kg] and volumes [dm³]

	Weights [kg]						Volumes [dm³]					
	Length	1	2	3	4	5	Length	1	2	3	4	5
FMM 150		7.50	9.50	10.90	-	-		0.60	1.00	1.25	-	-

Pressure drop



Filter housings
Δp pressure drop

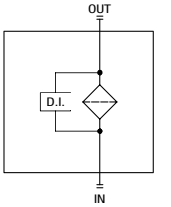


Bypass valve
pressure drop

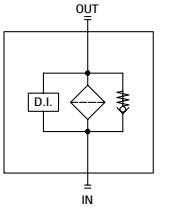
The curves are plotted using mineral oil with density of 0.86 kg/dm³ in compliance with ISO 3968. Δp varies proportionally with density.

Hydraulic symbols

Style S



Style B



FMM150

Designation & Ordering code

COMPLETE FILTER

Configuration example: FMM150 | 2 | B | A | D | 2 | M25 | N | P01

Series and size
FMM150

Length
1 | **2** | **3**

Valves
S Without bypass
B With bypass 6 bar

Seals
A NBR
V FPM

Connections
C G 1”
D G 1 1/4”
E 1” NPT
F 1 1/4” NPT
G SAE 16 - 1 5/16” - 12 UN
H SAE 20 - 1 5/8” - 12 UN

Connection for differential indicator
1 Without connection
2 Upper connection
3 Frontal connection

Filtration rating (filter media)

A03	Inorganic microfiber 3 µm	**A16**	Inorganic microfiber 16 µm
A06	Inorganic microfiber 6 µm	**A25**	Inorganic microfiber 25 µm
A10	Inorganic microfiber 10 µm	**M25**	Wire mesh 25 µm

Element Δp
N 20 bar

Execution
P01 MP Filtri standard
Pxx Customized

FILTER ELEMENT

Configuration example: HP150 | 2 | M25 | A | N | P01

Element series and size
HP150

Element length
1 | **2** | **3**

Filtration rating (filter media)

A03	Inorganic microfiber 3 µm	**A16**	Inorganic microfiber 16 µm
A06	Inorganic microfiber 6 µm	**A25**	Inorganic microfiber 25 µm
A10	Inorganic microfiber 10 µm	**M25**	Wire mesh 25 µm

Seals
A NBR
V FPM

Element Δp
N 20 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
DLA Electrical / visual differential indicator
DLE Electrical / visual differential indicator
DTA Electronic differential indicator
DVA Visual differential indicator
DVM Visual differential indicator

Additional features

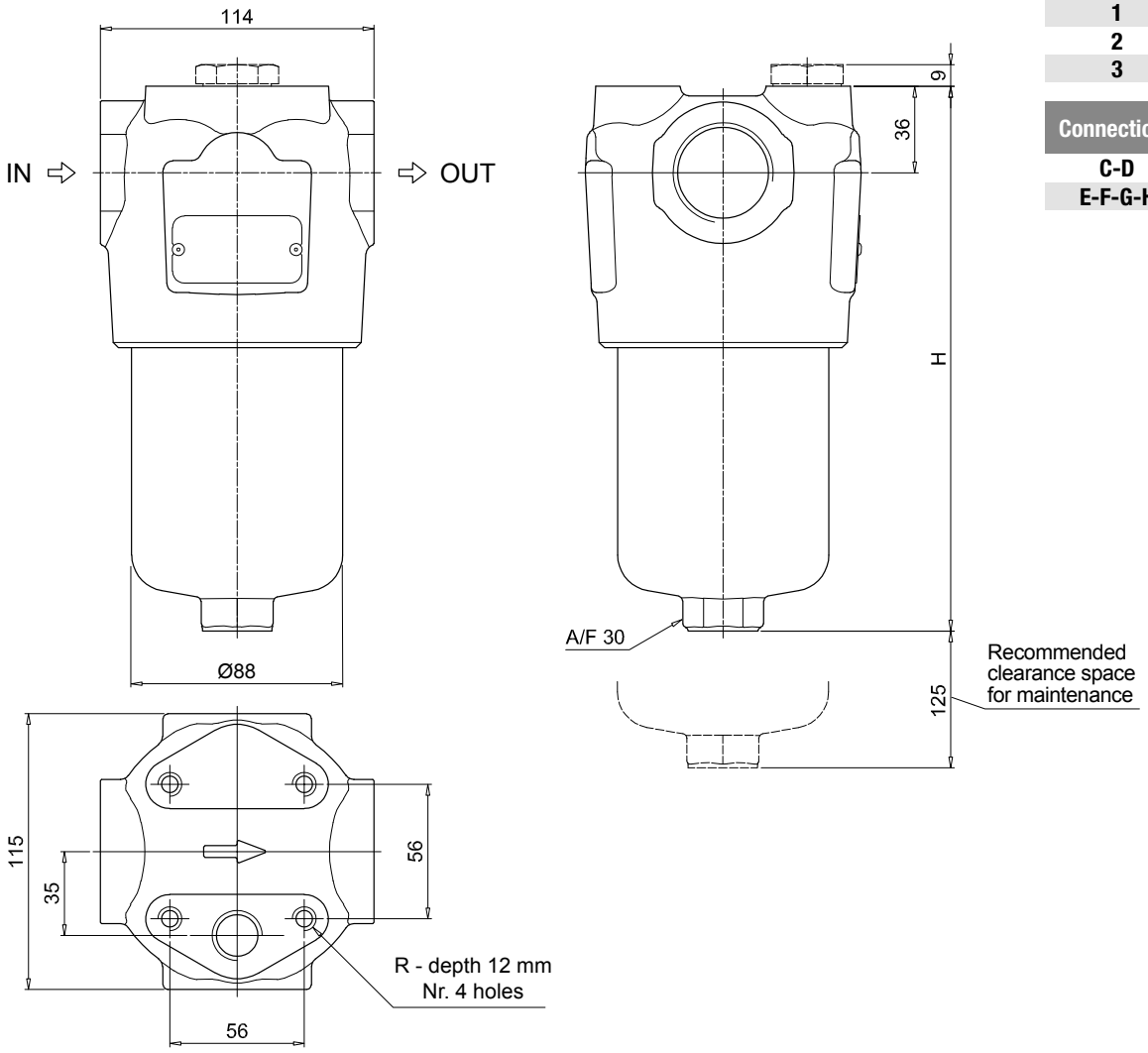
T2 Plug

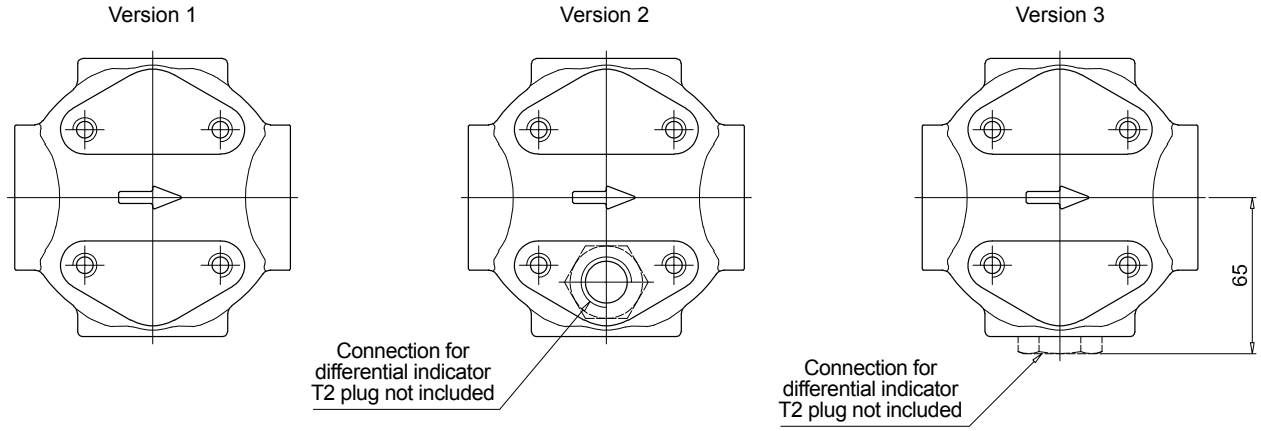
FMM150

Dimensions

FMM150	
Filter length	**H [mm]**
1	230
2	340
3	415

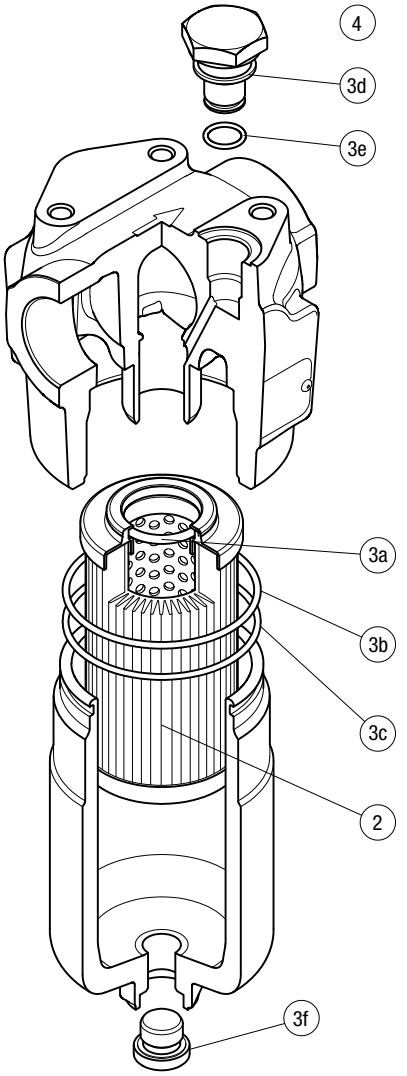
Connections	**R**
C-D	M10
E-F-G-H	3/8" UNC





FMM150 SPARE PARTS

Order number for spare parts



Item:	Q.ty: 1 pc. 2	Q.ty: 1 pc. 3 (3a ÷ 3f)		Q.ty: 1 pc. 4	
Filter series	Filter element	Seal Kit code number NBR	FPM	Indicator connection plug NBR	FPM
FMM 150	See order table	02050731	02050732	T2H	T2V

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