

FMM 050 series | FHA 051 series

Maximum pressure up to 420 bar - Flow rate up to 152 l/min

Maximum pressure up to 560 bar - Flow rate up to 140 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.

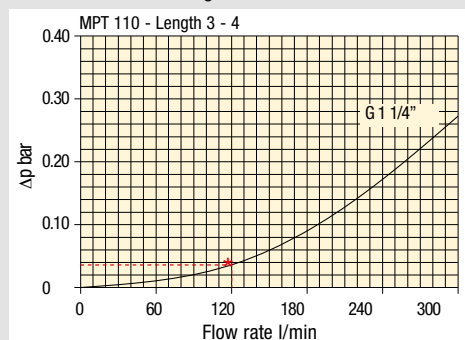
The size 20 doesn't achieve the required flow rate, therefore we have to consider the size 100. The final version of size 100 (101, 104, 110, 120 and 114) will be then defined in function of the mounting characteristics.

$\Delta p_c = 0.03 \text{ bar}$ (★ 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	Absolute filtration H Series					Nominal filtration N Series			
	Type	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	4.40
	2	29.20	24.12	8.00	7.22	5.00	3.33	2.85	2.00
	3	22.00	19.00	6.56	5.33	4.33	1.68	1.44	1.30
MF 030 MFX 030	1	74.00	50.08	20.00	16.00	9.00	6.43	5.51	3.40
MF 100 MFX 100	1	28.20	24.40	8.67	8.17	6.88	4.62	3.96	1.25
	2	17.33	12.50	6.86	5.70	4.00	3.05	2.47	1.10
	3	10.25	9.00	3.65	3.33	2.50	1.63	1.32	0.96
	4	6.10	5.40	2.30	2.20	2.00	1.19	0.96	0.82
MF 180 MFX 180	1	3.67	3.05	1.64	1.56	1.24	1.18	1.06	0.26
	2	1.69	1.37	0.68	0.54	0.51	0.43	0.39	0.12
MF 190 MFX 190	2	1.69	1.37	0.60	0.49	0.44	0.35	0.31	0.11
MF 400 MFX 400	1	3.20	2.75	1.39	1.33	1.06	0.96	0.87	0.22
	2	2.00	1.87	0.88	0.85	0.55	0.49	0.45	0.13
	3	1.90	1.60	0.63	0.51	0.49	0.39	0.35	0.11
MF 750 MFX 750	1	1.08	0.84	0.49	0.36	0.26	0.21	0.19	0.06
CU 025		78.00	48.00	28.00	24.00	9.33	9.33	8.51	1.25
CU 040		25.88	20.88	10.44	10.00	3.78	3.78	3.30	1.25
CU 100		15.20	14.53	5.14	4.95	2.00	2.00	0.17	1.10
CU 250		3.25	2.55	1.55	1.35	0.71	0.71	0.59	0.25
CU 630		1.96	1.68	0.85	0.72	0.42	0.42	0.36	0.09
CU 850		1.06	0.84	0.42	0.33	0.17	0.17	0.13	0.04
MR 100	1	19.00	17.00	6.90	6.30	4.60	2.94	2.52	1.60
	2	11.70	10.80	4.40	4.30	3.00	2.94	2.52	1.37
	3	7.80	6.87	3.70	3.10	2.70	2.14	1.84	1.34
	4	5.50	4.97	2.60	2.40	2.18	1.72	1.47	1.34
	5	4.20	3.84	2.36	2.15	1.90	1.60	1.37	1.34
MR 250	1	5.35	4.85	2.32	1.92	1.50	1.38	1.20	0.15
	2	4.00	3.28	1.44	1.10	1.07	0.96	0.83	0.13
	3	2.60	2.20	1.08	1.00	0.86	0.77	0.64	0.12
	4	1.84	1.56	0.68	0.56	0.44	0.37	0.23	0.11
MR 630	1	3.10	2.48	1.32	1.14	0.92	0.83	0.73	0.09
	2	2.06	1.92	0.82	0.76	0.38	0.33	0.27	0.08
	3	1.48	1.30	0.60	0.56	0.26	0.22	0.17	0.08
	4	1.30	1.20	0.48	0.40	0.25	0.21	0.16	0.08
	5	0.74	0.65	0.30	0.28	0.13	0.10	0.08	0.04
MR 850	1	0.60	0.43	0.34	0.25	0.13	0.12	0.09	0.03
	2	0.37	0.26	0.23	0.21	0.11	0.08	0.07	0.03
	3	0.27	0.18	0.17	0.17	0.05	0.04	0.04	0.02
	4	0.23	0.16	0.13	0.12	0.04	0.03	0.03	0.02

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

Suction filters

Filter element	Nominal filtration N Series	
	P10	P25
SF 250	65	21

Return / Suction filters

Filter element	Absolute filtration			
	A10	A16	A25	
RSX 116	1	5.12	4.33	3.85
	2	2.22	1.87	1.22
RSX 165	1	2.06	1.75	1.46
	2	1.24	1.05	0.96
	3	0.94	0.86	0.61

Low & Medium pressure filters

Filter element	Type	Absolute filtration N-W Series					Nominal filtration N Series		
		A03	A06	A10	A16	A25	P10	P25	M25
CU 110	1	16.25	15.16	8.75	8.14	5.87	2.86	2.65	0.14
	2	12.62	10.44	6.11	6.02	4.15	1.60	1.49	0.12
	3	8.57	7.95	5.07	4.07	2.40	1.24	1.15	0.11
	4	5.76	4.05	2.80	2.36	1.14	0.91	0.85	0.05
CU 210	1	5.30	4.80	2.00	1.66	1.32	0.56	0.43	0.12
	2	3.44	2.95	1.24	1.09	0.70	0.42	0.35	0.09
	3	2.40	1.70	0.94	0.84	0.54	0.33	0.23	0.05
DN	016	7.95	7.20	3.00	2.49	1.98	0.84	0.65	0.18
	025	5.00	4.53	1.89	1.57	1.25	0.53	0.41	0.11
	040	3.13	2.66	1.12	0.98	0.63	0.38	0.32	0.08
CU 400	2	3.13	2.55	1.46	1.22	0.78	0.75	0.64	0.19
	3	2.15	1.70	0.94	0.78	0.50	0.40	0.34	0.10
	4	1.60	1.28	0.71	0.61	0.40	0.34	0.27	0.08
	5	1.00	0.83	0.47	0.34	0.20	0.24	0.19	0.06
	6	0.82	0.58	0.30	0.27	0.17	0.22	0.18	0.05
	CU 900	1	0.86	0.63	0.32	0.30	0.21	-	-
CU 950	2	1.03	0.80	0.59	0.40	0.26	-	-	0.05
	3	0.44	0.40	0.27	0.18	0.15	-	-	0.02
MR 630	7	0.88	0.78	0.36	0.34	0.16	0.12	0.96	0.47

FILTER SIZING Corrective factor

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

High pressure filters

Filter element	Absolute filtration N - R Series					Nominal filtration N Series	
	Type	A03	A06	A10	A16		A25
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 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
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

Stainless steel high pressure filters

Filter element	Absolute filtration N Series					
	Type	A03	A06	A10	A16	A25
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	2	70.66	53.20	25.77	20.57	14.67
	3	36.57	32.28	18.00	13.38	8.00
	4	26.57	23.27	12.46	8.80	5.58
	1	31.75	30.30	13.16	12.3	7.29
HP 050	2	24.25	21.26	11.70	9.09	4.90
	3	17.37	16.25	8.90	7.18	3.63
	4	12.12	10.75	6.10	5.75	3.08
	5	7.00	6.56	3.60	3.10	2.25
	1	20.33	18.80	9.71	8.66	4.78
HP 135	2	11.14	10.16	6.60	6.38	2.22
	3	6.48	6.33	3.38	3.16	2.14

Filter element	Absolute filtration H - U Series					
	Type	A03	A06	A10	A16	A25
HP 011	1	424.58	319.74	235.17	194.44	163.78
	2	281.06	211.25	94.53	75.45	47.26
	3	130.14	97.50	43.63	34.82	21.81
	4	109.39	82.25	36.79	29.37	18.40
HP 039	2	70.66	53.20	25.77	20.57	14.67
	3	36.57	32.28	18.00	13.38	8.00
	4	26.57	23.27	12.46	8.80	5.58
	1	47.33	34.25	21.50	20.50	14.71
HP 050	2	29.10	25.95	14.04	10.90	5.88
	3	20.85	19.50	10.68	8.61	4.36
	4	14.55	12.90	7.32	6.90	3.69
	5	9.86	9.34	6.40	4.80	2.50
	1	29.16	25.33	13.00	12.47	5.92
HP 135	2	14.28	11.04	7.86	7.60	4.44
	3	8.96	7.46	4.89	4.16	3.07

Step 1 Select "FILTERS"



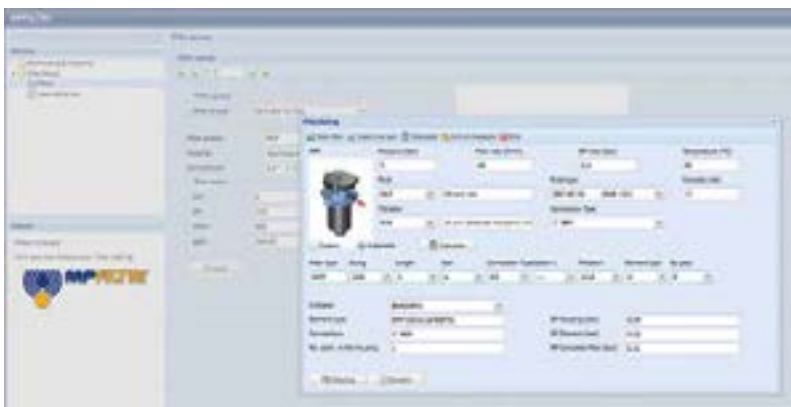
Step 2 Choose filter group (Return Filter, Pressure Filter, etc.)



Step 3 Choose filter type (MPF, MPT, etc.) in function of the max working pressure and the max flow rate



Step 4 Push "PROCEED"



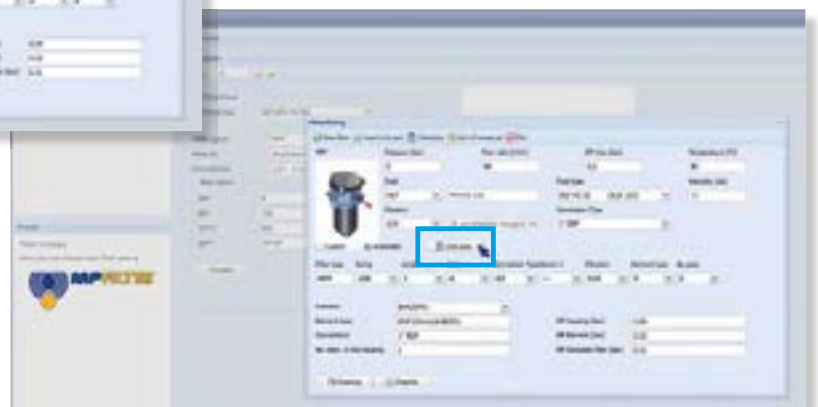
Step 5

Insert all application data to calculate the filter size following the sequence:

- working pressure
- working flow rate
- working pressure drop
- working temperature
- fluid material and fluid type
- filtration media
- connection type

Step 6

Push "CALCULATE" to have result; in case of any mistake, the system will advice which parameter is out of range to allow to modify/adjust the selection



Step 7

Download PDF Datasheet "Report.aspx" pushing the button "Drawing"

FMM 050 series | FHA 051 series

Maximum pressure up to 420 bar - Flow rate up to 152 l/min

Maximum pressure up to 560 bar - Flow rate up to 140 l/min



FMM - FHA GENERAL INFORMATION

Technical data

High Pressure filters

FMM 050

Maximum pressure up to 420 bar
Flow rate up to 152 l/min

Filter housing materials

- Head: Phosphatized cast iron
- Housing: Phosphatized steel
- Bypass 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)

FHA 051

Maximum pressure up to 560 bar
Flow rate up to 140 l/min

Filter housing materials

- Head: Steel (chemical heat treatment)
- Housing: Steel (chemical heat treatment)
- Bypass valve: Steel

Pressure

- Working pressure: 56 MPa (560 bar)
- Test pressure: 84 MPa (840 bar)
- Burst pressure: 168 MPa (1680 bar)
- Pulse pressure fatigue test: 1 000 000 cycles with pressure from 0 to 56 MPa (560 bar)

FMM 050 & FHA 051

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 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

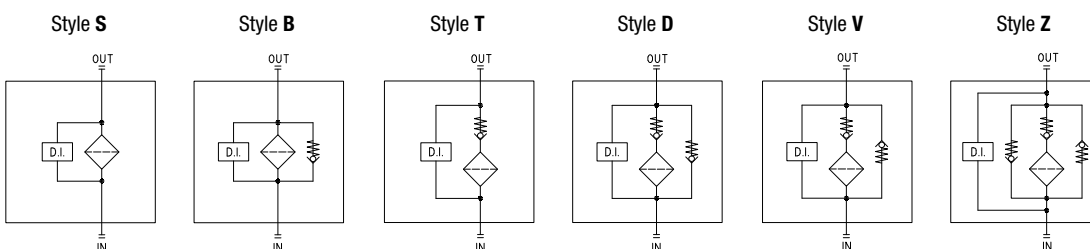
Note

Both FMM and FHA filters are provided for vertical mounting

Weights [kg] and volumes [dm³]

	Weights [kg]					Volumes [dm ³]						
	Lenght	1	2	3	4	5	Lenght	1	2	3	4	5
FMM 050		3.11	3.48	3.90	4.36	5.54		0.34	0.48	0.63	0.81	1.23
FHA 051		3.28	3.65	4.06	4.54	5.74		0.33	0.47	0.62	0.79	1.23

Hydraulic symbols

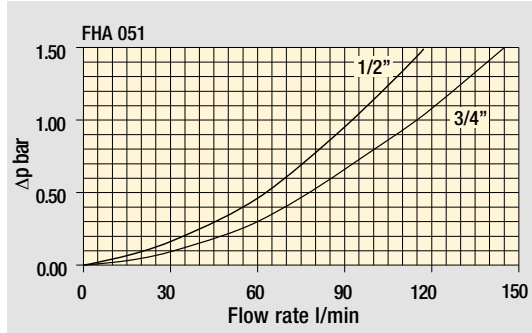
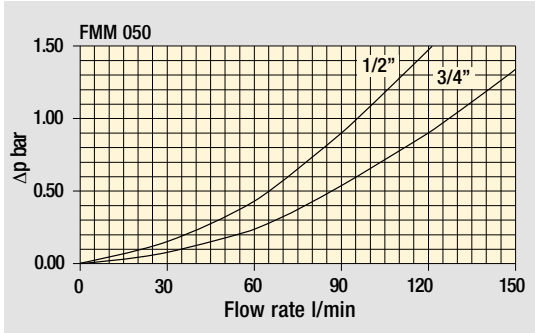


The curves are plotted using mineral oil with density of 0.86 kg/dm³ in compliance with ISO 3968.

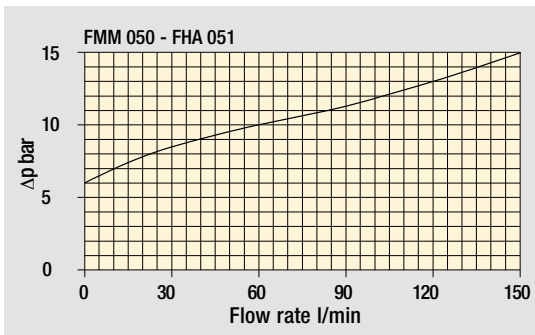
Δp varies proportionally with density.

Pressure drop

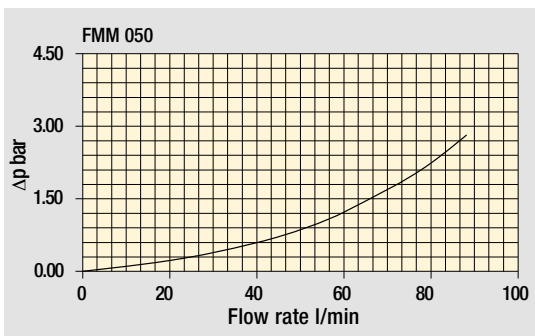
Filter housings Δp pressure drop



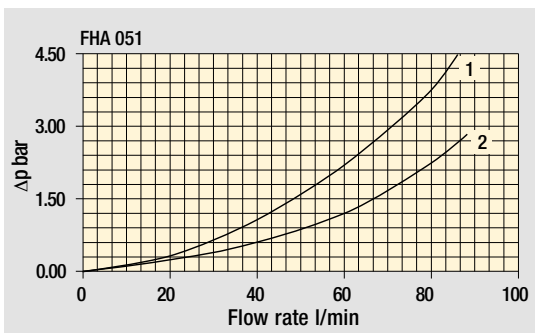
Bypass valve pressure drop



Valves



Filter housing with check valve



Pressure drop in reverse flow valves

- 1 - Reverse flow
- 2 - In filter direction

FMM - FHA

Designation & Ordering code

COMPLETE FILTER

Series and size **FMM050 | FHA051** Configuration example: **FMM050** **3** **B** **A** **G** **A10** **N** **P01**

Length
1 | **2** | **3** | **4** | **5**

Valves	FMM050	FHA051
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 M18x1.5 - ISO 6149	E 1/2" NPT
B M22x1.5 - ISO 6149	F 3/4" NPT
C G1/2"	G SAE 8 - 3/4" - 16 UNF
D G3/4"	H SAE 12 - 1 1/16" - 12 UN

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	Valves						
	S	B	T	D	V	Z	
N 20 bar		•					
R 20 bar				•		•	
S 210 bar	•		•		•		

Execution
P01 Upper connection for clogging indicator
P02 Without connection for clogging indicator
P03 Frontal connection for clogging indicator
Pxx Customized

FILTER ELEMENT

Element series and size **HP050** Configuration example: **HP050** **3** **A10** **A** **N** **P01**

Element length
1 | **2** | **3** | **4** | **5**

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

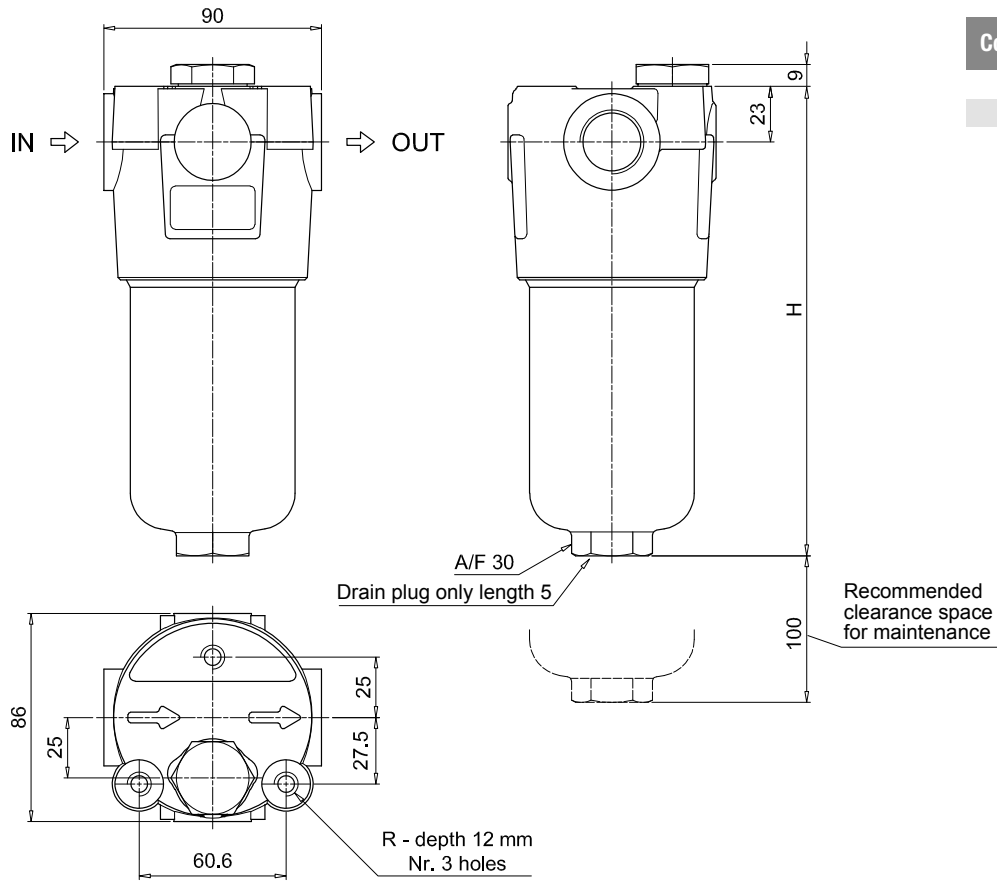
Element Δp
N 20 bar
R 20 bar
S 210 bar

Execution
P01 MP Filtri standard
Pxx Customized

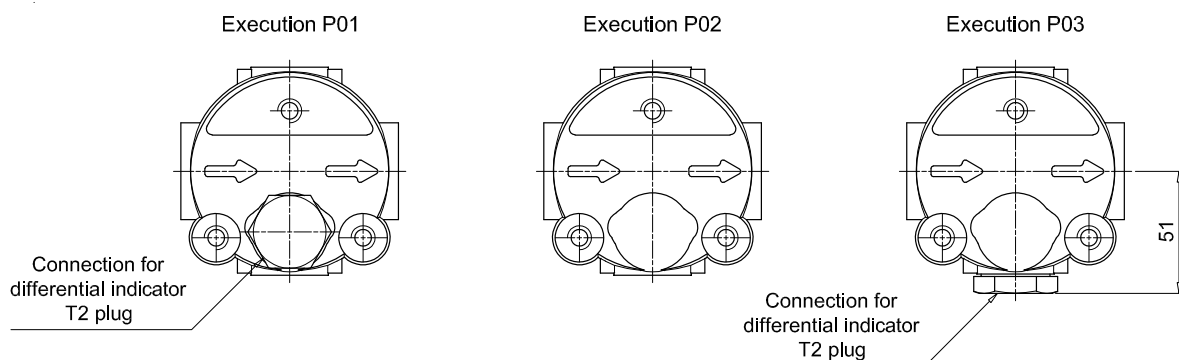
ACCESSORIES

Differential indicators	page	Differential indicators	page
DEA Electrical differential indicator	517	DTA Electronic differential indicator	520
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		

Additional features	page
T2 Plug	521

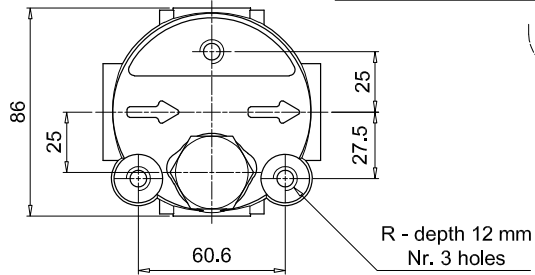
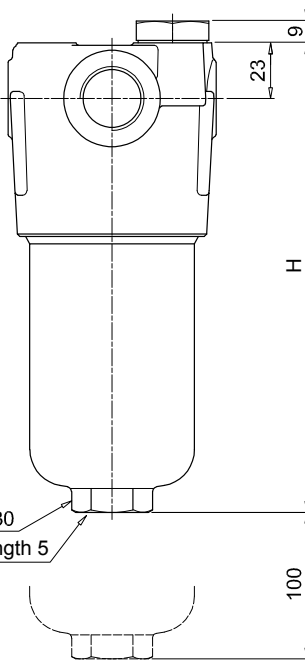
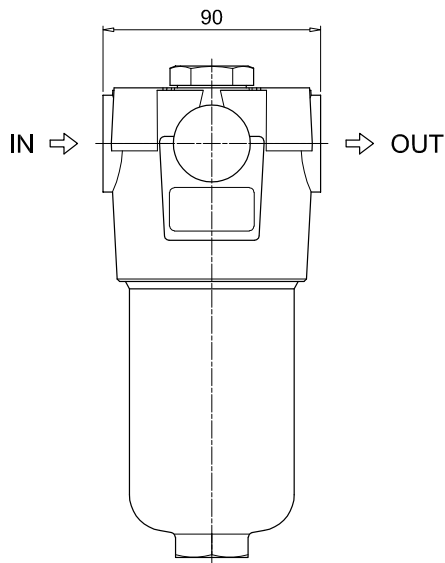


FMM050	
Filter length	H [mm]
1	158
2	195
3	237
4	285
5	407
Connections	R
A-B-C-D	M10
E-F-G-H	3/8" UNC



FMM - FHA

Dimensions



FHA051

Filter length	H [mm]
1	158
2	195
3	237
4	285
5	407

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

Recommended clearance space for maintenance

Valves S - B - T - D

Execution P01

Execution P02

Execution P03

Connection for differential indicator T2 plug

Connection for differential indicator T2 plug

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Valves V - Z

Execution P01

Execution P02

Execution P03

Connection for differential indicator T2 plug

Connection for differential indicator T2 plug

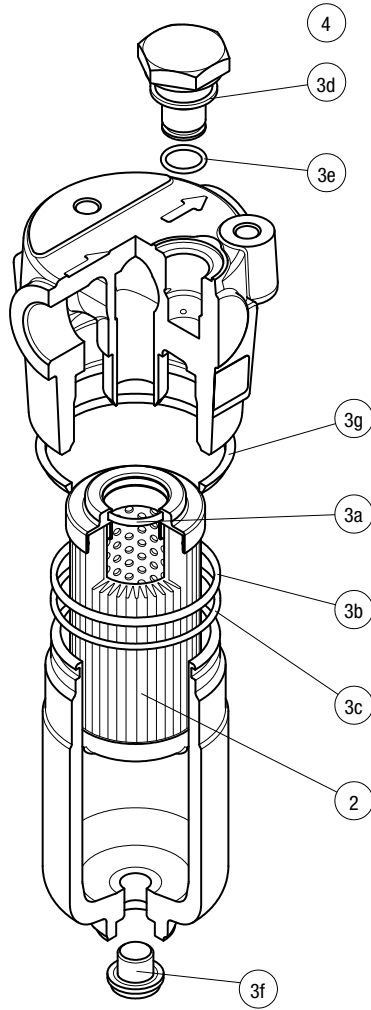
51

51

SPARE PARTS FMM - FHA

Order number for spare parts

FMM 050 - FHA 051



Item:	Q.ty: 1 pc.	Q.ty: 1 pc.		Q.ty: 1 pc.	
Filter series	Filter element	Seal Kit code number		Indicator connection plug	
		NBR	FPM	NBR	FPM
FMM 050	See order table	02050314	02050315	T2H	T2V
FHA 051		02050288	02050305		