

Return filters

# MPT 116

Maximum working pressure up to 800 kPa (8 bar) - Flow rate up to 300 l/min



**PASSION TO PERFORM**



# MPT 116 GENERAL INFORMATION

## Technical data

### Return filter

**Maximum working pressure up to 800 kPa (8 bar)**

**Flow rate up to 300 l/min**

MPT is a range of return filters with integrated breather filter, for protection of the reservoir against the system contamination.

They are directly fixed to the reservoir, in immersed or semi-immersed position.

The filter output must be always immersed into the fluid to avoid aeration or foam generation into the reservoir.

#### Available features:

- Female threaded connections up to 1 1/4", for a maximum flow rate of 300 l/min
- Multiple connections, to connect several return lines or drains
- Fine filtration rating, to get a good cleanliness level into the reservoir
- Bypass valve integrated into the filter element, to relieve excessive pressure drop across the filter media
- 2, 4 or 6 fixing holes for installation, to meet any reservoir surface flatness and roughness
- O-ring or Flat seal, to meet any reservoir surface flatness and roughness
- Screw-in cover with a special shape, to allow the filter element replacement without the use of specific tools
- Oil dipstick, to easily check the level of the fluid into the reservoir (sold as separate item)
- Extension tube, to be used in deep reservoirs (sold as separate item)
- Diffuser, to reduce the risk of aeration, foaming and noise (sold as separate item)
- Integrated breather filter, to clean the air that moves into the reservoir as result of the oil level fluctuation
- Integrated breather filter with pressurization valve, to clean the air that moves into the reservoir as result of the oil level fluctuation and to guarantee the pressurization into the reservoir
- Visual, electrical and electronic clogging indicators

#### Common applications:

- Light industrial equipment
- Mobile application

### Filter housing materials

- Head: Aluminium
- Cover: Polyamide
- Bowl: Polyamide

### Bypass valve

- Opening pressure 175 kPa (1.75 bar)  $\pm 10\%$
- Opening pressure 300 kPa (3 bar)  $\pm 10\%$

### $\Delta p$ element type

- Microfibre filter elements - series H: 10 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

### Note

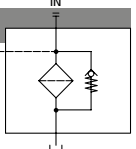
MPT filters are provided for vertical mounting



## Weights [kg] and volumes [dm<sup>3</sup>]

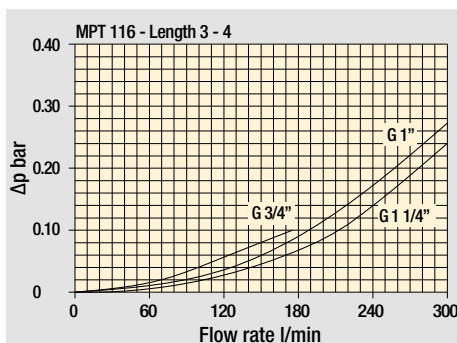
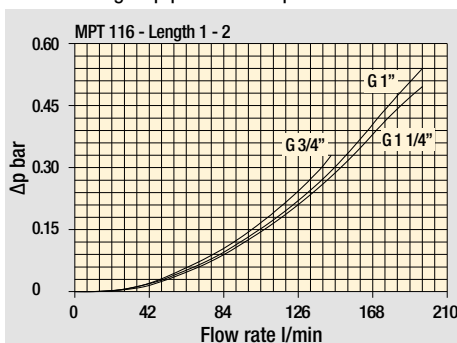
	Weights [kg]				Volumes [dm <sup>3</sup> ]					
	Length	1	2	3	4	Length	1	2	3	4
<b>MPT 116</b>		1.10	1.15	1.25	1.50		0.72	0.93	1.28	1.74

## Hydraulic symbols

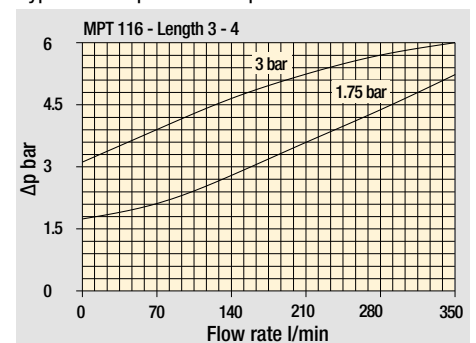
Filter series	Style 1 connection	
<b>MPT 116</b>	•	

## Pressure drop

### Filter housings $\Delta p$ pressure drop



### Bypass valve pressure drop



The curves are plotted using mineral oil with density of 0.86 kg/dm<sup>3</sup> in compliance with ISO 3968.  $\Delta p$  varies proportionally with density.

# 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 RETURN FILTER 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  $\Delta p_c$  of the housing is proportional to the fluid density ( $\text{kg}/\text{dm}^3$ ); all the graphs in the catalogue are referred to mineral oil with density of  $0.86 \text{ kg}/\text{dm}^3$ .

The filter element pressure drop  $\Delta p_e$  is proportional to its viscosity ( $\text{mm}^2/\text{s}$ ), the corrective factor Y have to be used in case of an oil viscosity different than  $30 \text{ mm}^2/\text{s}$  (cSt).

### Sizing data for single filter element, head at top

$\Delta p_c$  = Filter housing pressure drop [bar]

$\Delta p_e$  = 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 =  $30 \text{ mm}^2/\text{s}$  (cSt)

V2 = operating oil viscosity in  $\text{mm}^2/\text{s}$  (cSt)

### Filter element pressure drop calculation with an oil viscosity different than $30 \text{ mm}^2/\text{s}$ (cSt)

$$\Delta p_e = Y : 1000 \times Q \times (V2:V1)$$

$$\Delta p_{\text{Tot.}} = \Delta p_c + \Delta p_e$$

### Verification formula

$$\Delta p_{\text{Tot.}} \leq \Delta p_{\text{max allowed}}$$

### Maximum total pressure drop ( $\Delta p_{\text{max}}$ ) allowed by a new and clean filter

Application	Range (bar)
Suction filters	0.08 ÷ 0.10
Return filters	0.4 ÷ 0.6
	0.4 ÷ 0.6 return lines
	0.3 ÷ 0.5 lubrication lines
Low & Medium Pressure filters	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

### MPT calculation example

Application data:

Tank top return filter

Pressure Pmax = 8 bar

Flow rate Q = 120 l/min

Viscosity V2 =  $46 \text{ mm}^2/\text{s}$  (cSt)

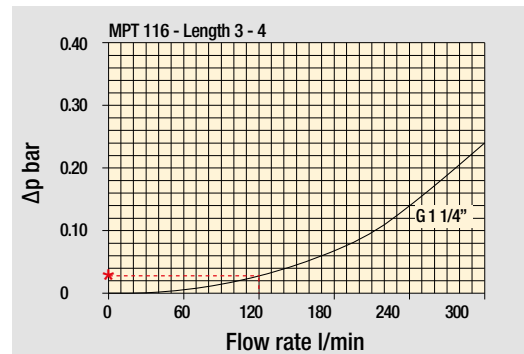
Oil density =  $0.86 \text{ kg}/\text{dm}^3$

Required filtration efficiency =  $25 \mu\text{m}$  with absolute filtration

With bypass valve and G1 1/4" inlet connection

Calculation:

$\Delta p_c = 0.03 \text{ bar}$  (see graphic below)



Filter housings  $\Delta p$  pressure drop.

The curves are plotted using mineral oil with density of  $0.86 \text{ kg}/\text{dm}^3$  in compliance with ISO 3968.  $\Delta p$  varies proportionally with density.

$$\Delta p_e = (2.50 : 1000) \times 120 \times (46 : 30) = 0.46 \text{ bar}$$

### MPT 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  $30 \text{ mm}^2/\text{s}$

Filter element	Absolute filtration H Series					Nominal filtration N Series			
	A03	A06	A10	A16	A25	P10	P25	M25 M60 M90	
Type									
MF 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

$$\Delta p_{\text{Tot.}} = 0.03 + 0.46 = 0.49 \text{ bar}$$

The selection is correct because the total pressure drop value is inside the admissible range for tank top return filters.

In case the allowed max total pressure drop is not verified, it is necessary to repeat the calculation changing the filter size.

Flow rates [l/min]

Filter series	Length	Filter element design - H series					Filter element design - N series		
		A03	A06	A10	A16	A25	M25 M60 M90	P10	P25
MPT 116	1	18	20	53	56	65	153	87	96
	2	28	38	65	75	95	158	111	123
	3	48	55	125	135	169	289	224	251
	4	79	89	180	185	198	306	264	289

### Maximum flow rate for a complete return filter with a pressure drop $\Delta p = 0.5 \text{ bar}$ .

Connections of filter under test: G 1 1/4"

The reference fluid has a kinematic viscosity of  $30 \text{ mm}^2/\text{s}$  (cSt) and a density of  $0.86 \text{ kg}/\text{dm}^3$ .

For different pressure drop or fluid viscosity we recommend to use our selection software available on [www.mpfiltri.com](http://www.mpfiltri.com).

Please, contact our Sales Department for further additional information.



# MPT 116

## Designation & Ordering code

### COMPLETE FILTER

<b>Series and size</b>		Configuration example 1:		MPT116	1	S	A	G1	M90	E	P01
<b>MPT116</b> Filter element with standard spigot		Configuration example 2:		MPT116	2	S	Z	G9	A03	B	P01
<b>Length</b>											
1   2   3   4											
<b>Air breather</b>											
S Without air breather											
<b>Seals and treatments</b>		Filtration rating									
		Axx	Mxx	Pxx							
A NBR		•	•	•							
V FPM		•	•	•							
W NBR head anodized		•	•		filter element compatible with fluids HFA-HFB-HFC						
Z FPM head anodized		•	•								
Flat seal on the head on request											
<b>Connections</b>											
G1 G 3/4"	G6 1 1/4" NPT										
G2 G 1"	G7 SAE 12 - 1 1/16" - 12 UN										
G3 G 1 1/4"	G8 SAE 16 - 1 5/16" - 12 UN										
G4 3/4" NPT	G9 SAE 20 - 1 5/8" - 12 UN										
G5 1" NPT											
<b>Filtration rating (filter media)</b>											
A03 Inorganic microfiber 3 µm	M25 Wire mesh 25 µm										
A06 Inorganic microfiber 6 µm	M60 Wire mesh 60 µm										
A10 Inorganic microfiber 10 µm	M90 Wire mesh 90 µm										
A16 Inorganic microfiber 16 µm	P10 Resin impregnated paper 10 µm										
A25 Inorganic microfiber 25 µm	P25 Resin impregnated paper 25 µm										
		<b>Bypass valve</b>		<b>Execution</b>							
		E 3 bar		P01 MP Filtri standard							
		B 1.75 bar		Pxx Customized							

### FILTER ELEMENT

<b>Element series and size</b>		Configuration example 2:		MF100	1	M90	N	B	E	P01	
<b>MF100</b> Filter element with standard spigot		Configuration example 1:		MF100	2	A03	W	V		P01	
<b>Element length</b>											
1   2   3   4											
<b>Filtration rating (filter media)</b>											
A03 Inorganic microfiber 3 µm	M25 Wire mesh 25 µm										
A06 Inorganic microfiber 6 µm	M60 Wire mesh 60 µm										
A10 Inorganic microfiber 10 µm	M90 Wire mesh 90 µm										
A16 Inorganic microfiber 16 µm	P10 Resin impregnated paper 10 µm										
A25 Inorganic microfiber 25 µm	P25 Resin impregnated paper 25 µm										
<b>Element Δp</b>		Filter media									
		Axx	Mxx	Pxx							
N 10 bar			•	•							
H 10 bar		•									
W 10 bar, compatible with fluids HFA, HFB and HFC		•	•								
		<b>Seals</b>		<b>Bypass valve</b>		<b>Execution</b>					
		B NBR		E 3 bar		P01 MP Filtri standard					
		V FPM		1.75 bar		Pxx Customized					

### ACCESSORIES

<b>Indicators</b>			
BVA Axial pressure gauge	BEA Electrical pressure indicator		
BVR Radial pressure gauge	BEM Electrical pressure indicator		
BVP Visual pressure indicator with automatic reset	BLA Electrical / visual pressure indicator		
BVQ Visual pressure indicator with manual reset			
<b>Additional features</b>			
TE Extension tube	DPT Dipstick		
DFS Diffuser with fast lock connection			

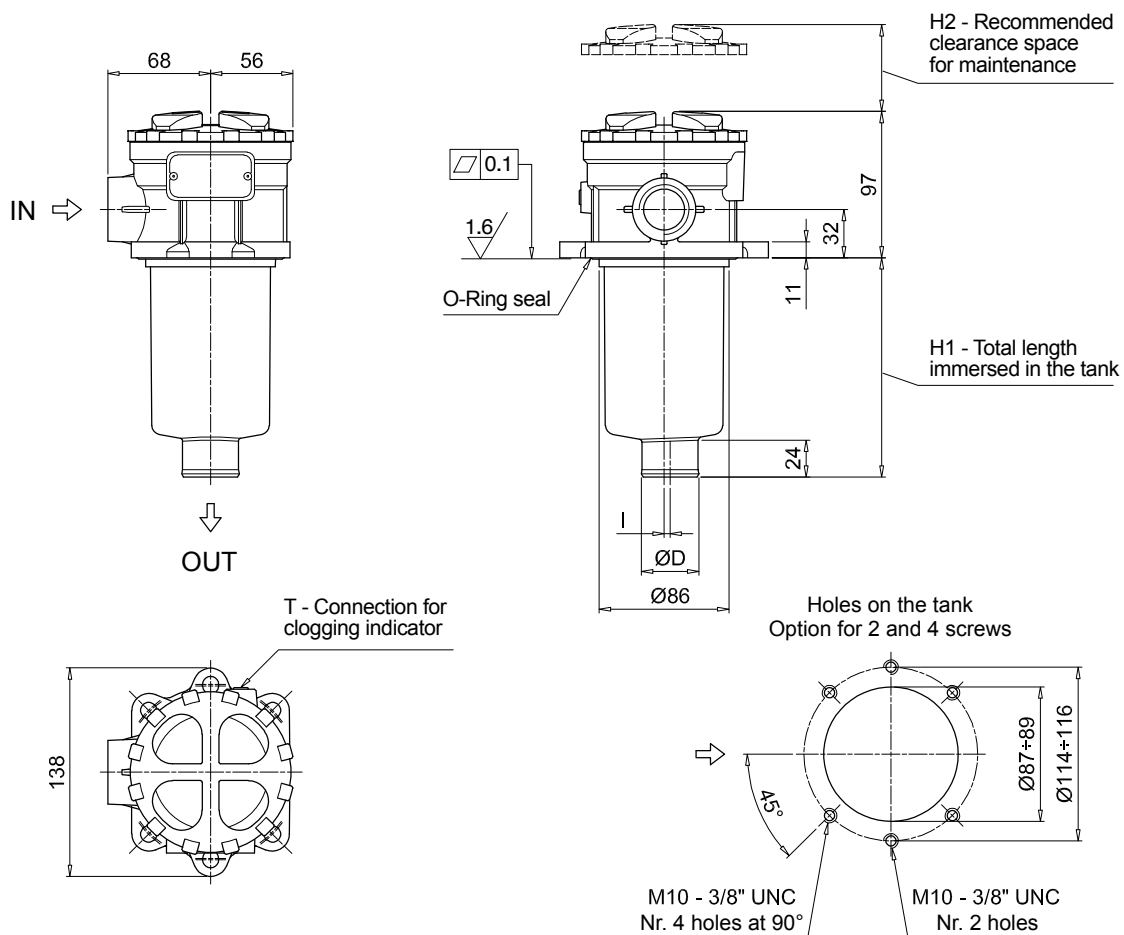
# MPT 116

## Dimensions

### MPT116

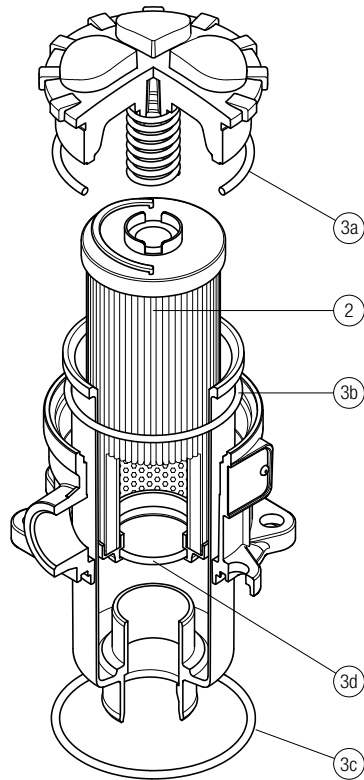
Filter length	H1 [mm]	H2 [mm]	D [mm]	I [mm]
<b>1</b>	99	120	38	4
<b>2</b>	146	170	38	4
<b>3</b>	224	250	47	-
<b>4</b>	326	350	47	2.5

Connections	T
<b>G1-G2-G3</b>	G 1/8"
<b>G4-G5-G6-G7-G8-G9</b>	1/8" NPT



# MPT 116 SPARE PARTS

Order number for spare parts



Item:	Q.ty: 1 pc.	Q.ty: 1 pc.	
Filter series	Filter element	Seal Kit code number	
		NBR	FPM
<b>MPT 116</b>	See order table	02050466	02050467

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