

## Tank top return-line filter

Pi 5000

Nominal size 40 up to 100  
according to DIN 24550

### 1. Features

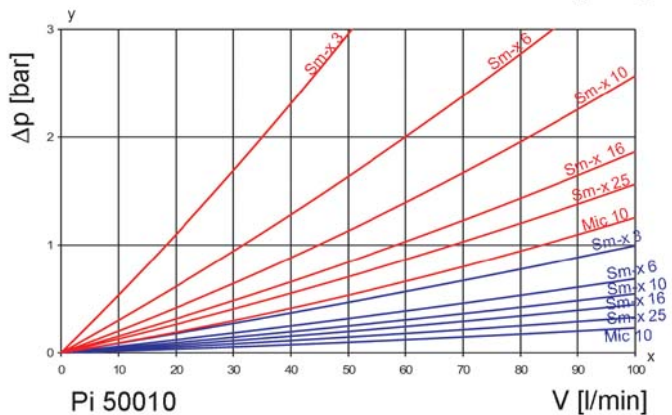
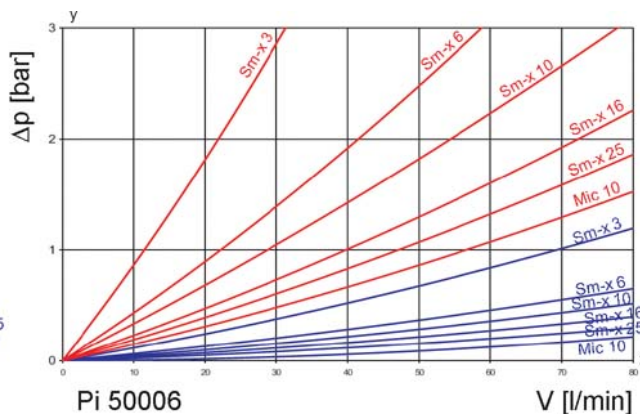
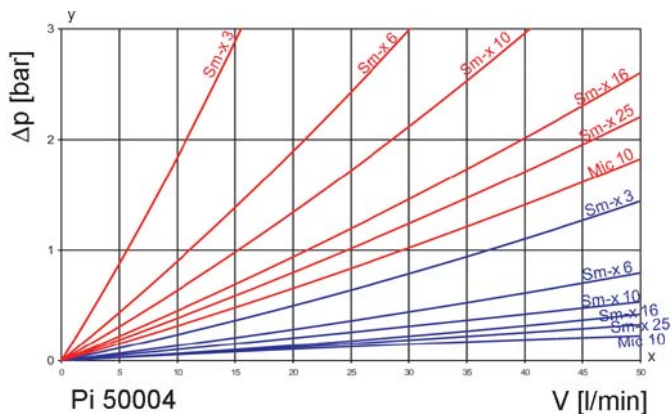
#### High performance filters for modern hydraulic system

- Provided for tank top installation
- Modular system
- Compact design
- Minimal pressure drop through optimal flow design
- Visual/electrical/electronic maintenance indicator
- Threaded connections
- Quality filters, easy to service
- Equipped with highly efficient glass fibre Sm-x filter elements
- Beta rated elements according to ISO 16889 multipass test
- Elements with high differential pressure stability and dirt holding capacity
- NPT- and SAE-connections on request
- Worldwide distribution



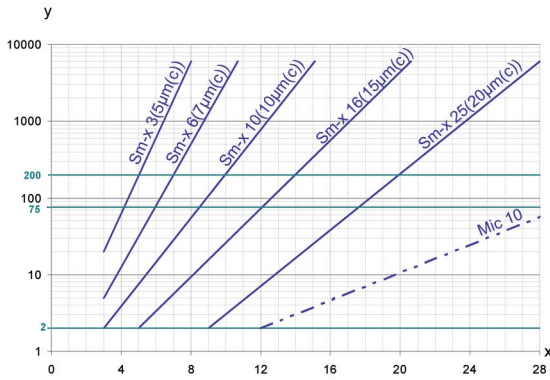
## 2. Flow rate/pressure drop curve complete filter

190 mm<sup>2</sup>/s (25° E)  
 33 mm<sup>2</sup>/s (4,5° E)



y = differential pressure  $\Delta p$  [bar]  
 x = flow rate  $V$  [l/min]

### 3. Separation grade characteristics



y = beta-value  
x = particle size [µm]

determined by multipass tests (ISO 16889)  
calibration according to ISO 11171 (NIST)

### 4. Filter performance data

tested according to ISO 16889 (multipass test)

Sm-x-elements with  
max.  $\Delta p$  10 bar

Sm-x	3	$\beta_3$	$\geq 75$
Sm-x	6	$\beta_6$	$\geq 75$
Sm-x	10	$\beta_{10}$	$\geq 75$
Sm-x	16	$\beta_{16}$	$\geq 75$
Sm-x	25	$\beta_{25}$	$\geq 75$

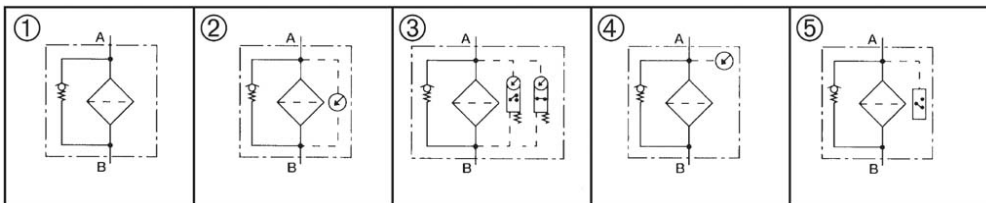
values guaranteed up to  
10 bar differential pressure

### 5. Quality assurance

MAHLE filters and filter elements are produced according to the following international standards:

Norm	Designation
DIN ISO 2 941	Hydraulic fluid power filter elements; verification of collapse/burst resistance
DIN ISO 2 942	Hydraulic fluid power filter elements; verification of fabrication integrity
DIN ISO 2 943	Hydraulic fluid power filter elements; verification of material compatibility with fluids
DIN ISO 3 723	Hydraulic fluid power filter elements; method for end load test
DIN ISO 3 724	Hydraulic fluid power filter elements; verification of flow fatigue characteristics
ISO 3 968	Hydraulic fluid power-filters-evaluation of pressure drop versus flow characteristics
ISO 10 771.1	Fatigue pressure testing of metal containing envelopes in hydraulic fluid applications
ISO 16 889	Hydraulic fluid power filters-multi-passmethod for evaluation filtration performance of a filter element

### 6. Symbols



## 7. Order numbers

Example for ordering filters:

1. Filter housing	2. Filter element
Housing design = Bypass valve 3.5 bar Pressure switch normally closed (DSS) Type: Pi 50006-050 = NG 63	Type: Pi 25006 RN = Sm-x 25

### 7.1 Housing design\* Pi 50004- Pi 50006- Pi 50010-

Nominal size NG [l/min]	Housing code	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
		with bypass valve 3.5 bar	with visual indicator 2.2 bar	with electr. indicator 2.2 bar	with pressure gauge (DM)	with pressure switch normally closed (DSS)	with pressure switch normally open (DSO)	with breather MIC-element (BE-MIC)	with breather Sm-L-element (BE-SML)	with filling connection (BA)	with anti spillage sleeve
50004 50006 50010	- 056	■									
	- 057	■	■								
	- 058	■	■	■							
	- 059	■			■						
	- 050	■				■					
	- 052	■					■				
	- 076	■	■					■			■
	- 077	■	■						■		■
	- 078	■	■	■				■			■
	- 079	■	■	■					■		■
	- 080	■			■			■			■
	- 081	■			■				■		■
	- 082	■				■		■			■
	- 083	■					■		■		■
	- 084	■					■	■			■
	- 085	■						■	■		■
	- 086	■			■			■		■	■
	- 087	■			■				■	■	■
	- 088	■				■		■		■	■
	- 089	■					■		■	■	■
- 090	■						■	■		■	
- 091	■						■		■	■	

\* a wider range of executions is available on request.

## 7.2 Filter elements\*

Nominal size NG [l/min]	Order number	Type	Filter material	max. $\Delta p$ [bar]	Filter surface [cm <sup>2</sup> ]
<b>40</b>	77925001	Pi 13004 RN Mic 10 NBR	Mic 10	<b>10</b>	820
	77962210	Pi 15004 RN Mic 25 NBR	Mic 25		820
	77923998	Pi 21004 RN Sm-x 3 NBR	Sm-x 3		820
	77964033	Pi 22004 RN Sm-x 6 NBR	Sm-x 6		820
	77924004	Pi 23004 RN Sm-x 10 NBR	Sm-x 10		820
	77962244	Pi 24004 RN Sm-x 16 NBR	Sm-x 16		820
	77960206	Pi 25004 RN Sm-x 25 NBR	Sm-x 25		820
<b>63</b>	77925019	Pi 13006 RN Mic 10 NBR	Mic 10	<b>10</b>	1 445
	77962228	Pi 15006 RN Mic 25 NBR	Mic 25		1 445
	77924012	Pi 21006 RN Sm-x 3 NBR	Sm-x 3		1 445
	77964042	Pi 22006 RN Sm-x 6 NBR	Sm-x 6		1 445
	77924020	Pi 23006 RN Sm-x 10 NBR	Sm-x 10		1 445
	77962251	Pi 24006 RN Sm-x 16 NBR	Sm-x 16		1 445
	77960214	Pi 25006 RN Sm-x 25 NBR	Sm-x 25		1 445
<b>100</b>	77925027	Pi 13010 RN Mic 10 NBR	Mic 10	<b>10</b>	2 380
	77962236	Pi 15010 RN Mic 10 NBR	Mic 25		2 380
	77924038	Pi 21010 RN Sm-x 3 NBR	Sm-x 3		2 380
	77940844	Pi 22010 RN Sm-x 6 NBR	Sm-x 6		2 380
	77924046	Pi 23010 RN Sm-x 10 NBR	Sm-x 10		2 380
	77962269	Pi 24010 RN Sm-x 16 NBR	Sm-x 16		2 380
	77960222	Pi 25010 RN Sm-x 25 NBR	Sm-x 25		2 380

\* a wider range of element types is available on request

## 8. Technical specifications

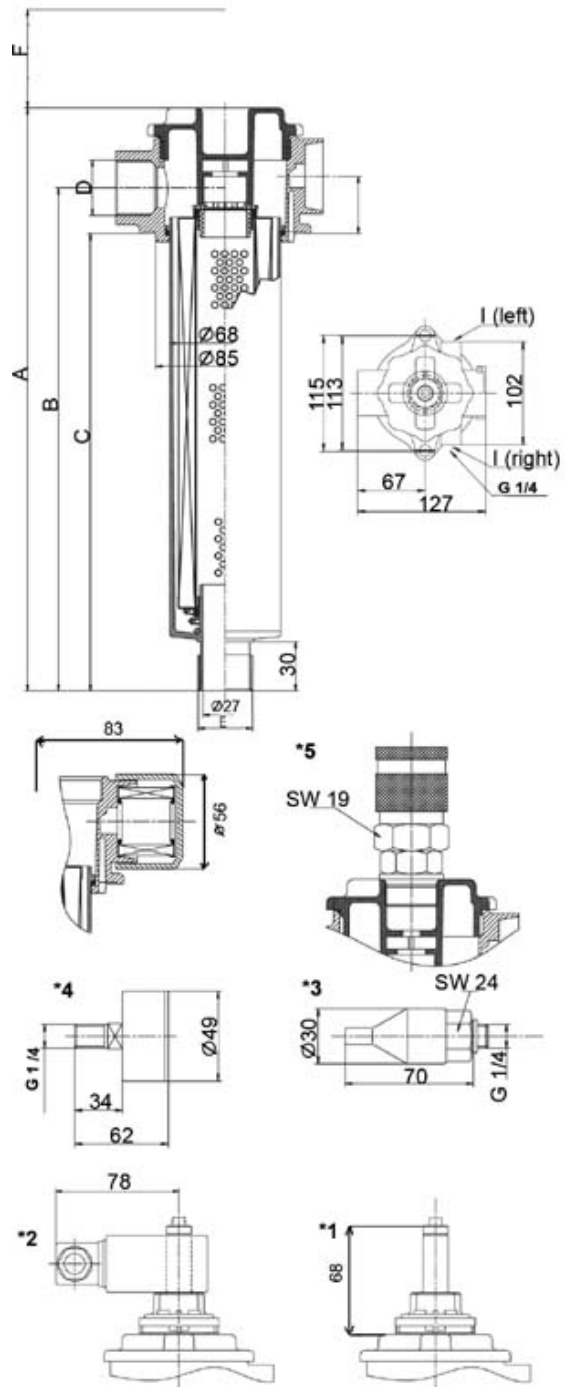
Design:	tank top mounting filter
Nominal pressure:	10 bar (140 psi)
Test pressure:	13 bar (180 psi)
Temperature range:	-10 °C to +80 °C (other temperature ranges on request)
Bypass setting:	3.5 bar ± 10%
Filter head material:	GD Al
Filter housing material:	plastic
Sealing material:	plastic
Maintenance indicator setting	2.2 bar ± 10 %
PiS 3084/85:	
Electrical data of maintenance indicator:	
Max. voltage:	250 V AC/200 V DC
Max. current:	1 A
Contact load:	70 W
Type of protection:	IP 65 in inserted and secured status
Contact:	normally open/closed
Cable sleeve:	M20x1.5

The switching function can be changed by turning the electric upper part by 180° (normally closed contact or normally open contact). The state on delivery is a normally closed contact. By inductivity in the direct current circuit the use of suitable protection circuit should be considered. Further maintenance indicator details and designs are available in the maintenance indicator data sheet.

We draw attention to the fact that all values indicated are average values which do not always occur in specific cases of application. Our products are continually being further developed. Values, dimensions and weights can change as a result of this. Our specialized department will be pleased to offer you advice.

With the inrush current of 70 VA the indicator can trigger small contactors or contactor relays. Inductivity in the direct current may require the use of a signal suppressor.

Recommended max. flow rate of the filling unit at viscosity of 500 mm<sup>2</sup>/s and a degree of filtration 3 µm: NG 40 = 8 l/min, NG 63 = 15 l/min, NG 100 = 25 l/min.



## 9. Dimensions

All dimensions except "D" in mm.

Type	A	B	C	D*	E DIN 2999	F	Weight [kg]
Pi 50004	208	159	131	G1	G1	100	0.65
Pi 50006	268	219	191	G1	G1	130	0.68
Pi 50010	358	309	281	G1	G1	200	0.74

\*NPT- and SAE- connections on request

- 1 = Standard maintenance indicator visual PiS 3084
- 1 + 2 = Standard maintenance indicator electrical PiS 3085
- 3 = Pressure switch
- 4 = Pressure gauge 0 to 6 bar
- 5 = Quick release coupling for filling

## 10. Installation, operating and maintenance instructions

### 10.1 Filter installation

When installing the filter make sure that:

- a) that sufficient space is available to remove filter element and filter housing,
- b) the mounting hole in the tank top is not excessively large, to ensure proper sealing,
- c) the filter is free of tension after installation

Preferably the filter should be installed with the filter housing pointing downwards. In this position the visual pressure indicator is accessible and visible.

### 10.2 Connecting the electrical pressure indicator

The electrical pressure indicator is connected via a 2-pole appliance plug according to DIN EN 17 5301-803 with poles marked 1 and 2. The electrical section can be inverted to change from normally open position to normally closed position or vice versa.

### 10.3 When must the filter element be replaced?

- 1 . Filters equipped with visual and/or electrical pressure indicator:  
During cold starts, the indicator may give a warning signal. Press the button of the visual indicator once again only after operating temperature has been reached. If the red button immediately pops up again and/or the electrical signal has not switched off after reaching operating temperature, the filter element must be replaced after the end of the shift.
- 2 . Filters without pressure indicator:  
The filter element should be replaced after trial run or flushing of the system. Afterward follow instructions of the manufacturer.
- 3 . Please always ensure that you have original MAHLE spare elements in stock: Disposable elements (Sm-x) cannot be cleaned.

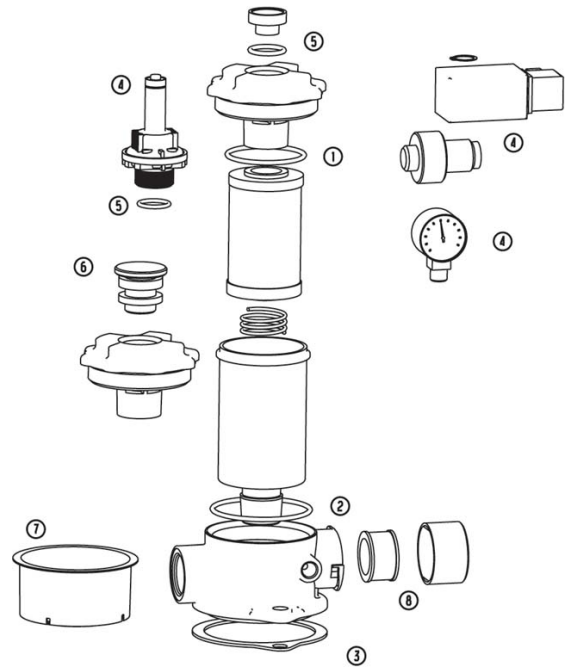
### 10.4 Element replacement

- 1 . Stop system and relieve filter from pressure.
- 2 . Unscrew cover, turning counter-clockwise.
- 3 . Remove filter housing and filter element by pulling upwards.
- 4 . Remove filter element with a side-to-side motion.
- 5 . Clean the housing using a suitable cleaning solvent.
- 6 . Check O-ring on filter cover and filter housing for damage. Replace, if necessary.
- 7 . Make sure that the order number on the spare element corresponds to the order number of the filter name-plate.
- 8 . Remove filter element from the plastic bag and reassemble filter in reverse order (items 1 to 6).

Subject to technical alteration without prior notice.

## 11. Spare parts list

Order number for spare parts		
Pos.	Type	Order number
<b>Pi 50004-50010</b>		
Seal kit for housing		
Without air breather		
	NBR	77999709
①	FPM	77999725
-	EPDM	77999741
③	With air breather	
	NBR	77999717
	FPM	77999733
	EPDM	77999758
Maintenance indicator		
	Visual PiS 3084/ 2.2 bar	77737802
	Electrical PiS 3085/ 2.2 bar	77738032
④	Electrical upper section only	77536550
	Pressure Gauge	78381998
	Pressure switch normally closed	77845845
	Pressure switch normally open	77870595
Seal kit for maintenance indicator		
⑤	NBR	77760218
	FPM	77760226
	EPDM	77760234
⑥	Thread connection for filling	77969017
	Quick release coupling	77965130
⑦	Anti spillage sleeve	77927643
Air breather element		
⑧	Paper 852 514 Mic	77687692
	Glas fibre 852 514 Sm-L	77643562



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