

# Tank top return-line filter Pi 5000

Nominal size 160 up to 1000 according to DIN 24550

#### 1. Features

#### High performance filters for modern hydraulic systems

- Provided for tank top installation
- Modular system
- Compact design
- Minimal pressure drop through optimal flow design
- Visual/electrical/electronic maintenance indicator
- Threaded or flanged connections
- Quality filters, easy to service
- Equipped with highly efficient glass fibre PS 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





900 1000 V [l/min]

800

700

y = differential pressure  $\Delta p$  [bar]

300

x = flow rate V [l/min]

Pi 50100

\*1 - 6

1. PS 3 2. PS 6

3. PS 10

4. PS 16

- 5. PS 25
- 6. Mic 10

190 mm²/s

## 3. Separation grade characteristics



y = beta-value x = particle size [µm]

determined by multipass tests (ISO 16889) calibration according to ISO 1171 (NIST)

## 5. Quality assurance

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

Norm	Designation
DIN ISO 2941	Hydraulic fluid power filter elements; verification of collapse/burst resistance
DIN ISO 2942	Hydraulic fluid power filter elements; verification of fabrication integrity
DIN ISO 2943	Hydraulic fluid power filter elements; verification material compatibility with fluids
DIN ISO 3723	Fluidtechnik-Hydraulik Filterelemente; method for end load test
DIN ISO 3724	Hydraulic fluid power filter elements; verification of flow fatigue characteristics
ISO 3968	Hydraulic fluid power filters; evaluation of pressure drop versus flow characteristics
ISO 10771.1	Fatigue pressure testing of metal containing envelopes in hydraulic fluid applications
ISO 16889	Hydraulic fluid power filters; multipass method for evaluation filtration performance of a filter element

## 6. Symbols



## 4. Filter performance data

tested according to ISO 16889 (multipass test)

# PS elements with max. $\Delta$ p 10 bar

PS	3	$\beta_{5(C)}$	≥200
PS	6	$\beta_{7(C)}$	≥200
PS	10	β <sub>10(C)</sub>	≥200
PS	16	β <sub>15(C)</sub>	≥200
PS	25	β <sub>20(C)</sub>	≥200

values guaranteed up to 10 bar differential pressure

# 7. Order numbers

## Example for ordering filters:

1. Housing design	2. Filter element
Bypass valve 3.5 bar, Connection execution 2 = DN 38	PS 25 NBR
Type: Pi 50016-056/NG 160	Type: Pi 2516 RN

7.1 Housing	7.1 Housing design* Pi 50016- Pi 50025 - Pi 50040 - Pi 50063 - Pi 50100-									
Nominal size NG [l/min]	Hous- ing code	() with bypass valve 3.5 bar	① with indicator cavity	③withvisualmain-tenanceindicator2.2 bar	③withelectricalmain-tenanceindicator2.2 bar	ھ with pressure gauge (DM)	⑤   with   pressure   switch   normally   open   (DSS)	⑤      with      pressure      switch      normally      closed      (DSO)	with filling connection (BA)	
	- 047									
	- 056									
	- 057									
	- 058									
160	- 059									
250	- 050									
400	- 052									
630	- 092									
1000	- 093									
	- 094									
	- 095									
	- 096									
	- 097									

\* a wider range of executions is available on request

.2 Connection executions									
Nominal size NG [l/min]	Туре	Standard connection according DIN 24550 part 1	/1	/2	/3	/4	/5	/6	
160	Pi 50016	G1¼	G1½	DN 38					
250	Pi 50025	G1½		DN 38	G1¼				
400	Pi 50040	DN 51	G1½			G2	DN 64		
630	Pi 50063	DN 64	G1½			G2		DN 51	
1000	Pi 50100	DN 76							

DN 38 = SAE 1½ "

DN 51 = SAE 2"

DN 64 = SAE 2½"

2½" DN 76 = SAE 3"

3000 psi

7.3 Filter elements	*				
Nominal size	Order			max. $\Delta$ p	Filter surface
NG [l/min]	number	Туре	Filter material	[bar]	[cm <sup>2</sup> ]
	77925035	Pi 13016 RN Mic 10 NBR	Mic 10	_	3750
	77924137	Pi 21016 RN PS 3 NBR		3750	
160	77964067	Pi 22016 RN PS 6 NBR	PS 6	10	3750
160	77924145	Pi 23016 RN PS 10 NBR	PS 10	10	3750
	77963648	Pi 24016 RN PS 16 NBR	PS 16		3750
	77960230	Pi 25016 RN PS 25 NBR	PS 25		3750
	77925043	Pi 13025 RN Mic 10 NBR	Mic 10		6050
	77924152	Pi 21025 RN PS 3 NBR	PS 3		6050
050	77964075	Pi 22025 RN PS 6 NBR	PS 6	10	6050
250	77924160	Pi 23025 RN PS 10 NBR	PS 10		6050
	77963655	Pi 24025 RN PS 16 NBR	PS 16		6050
	77960248	Pi 25025 RN PS 25 NBR	PS 25		6050
	77925050	Pi 13040 RN Mic 10 NBR	Mic 10		9450
	77924178	Pi 21040 RN PS 3 NBR	PS 3		8250
400	77964083	Pi 22040 RN PS 6 NBR	PS 6	10	8250
400	77924186	Pi 23040 RN PS 10 NBR	PS 10	10	8250
	77963663	Pi 24040 RN PS 16 NBR	PS 16		8250
	77960255	Pi 25040 RN PS 25 NBR	PS 25		8250
	77925068	Pi 13063 RN Mic 10 NBR	Mic 10		15500
	77924194	Pi 21063 RN PS 3 NBR	PS 3		13515
620	77964091	Pi 22063 RN PS 6 NBR	PS 6	10	13515
030	77924202	Pi 23063 RN PS 10 NBR	PS 10		13515
	77963671	Pi 24063 RN PS 16 NBR	PS 16		13515
	77960263	Pi 25063 RN PS 25 NBR	PS 25		13515
	77925076	Pi 13100 RN Mic 10 NBR	Mic 10		18335
	77924210	Pi 21100 RN PS 3 NBR	PS 3		18335
1000	77964109	Pi 22100 RN PS 6 NBR	PS 6	10	18335
1000	77924228	Pi 23100 RN PS 10 NBR	PS 10	] 10	18335
	77963689	Pi 24100 RN PS 16 NBR	PS 16		18335
-	77960271	Pi 25100 RN PS 25 NBR	PS 25		18335

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

#### 8. Technical specifications

Design:	tank top installation
Nominal pressure:	10 bar (140 psi)
Test pressure:	13 bar (180 psi)
Temperature range:	- 10 °C to +80 °C
(other temp	perature ranges on request)
Bypass setting:	$\Delta$ p 3.5 bar $\pm$ 10 %
Filter head material:	GD AI
Filter housing material:	St.
Filter cover material:	gd Al/g Al
Maintenance indicator setting:	$\Delta$ p 2.2 bar $\pm$ 10 %
Electrical data of maintenance indicator:	
Maximum voltage:	250 V AC/200 V DC
Maximum current:	1 A
Contact load:	70 W
Type of protection:	IP 65 in inserted and
	secured status
Contact:	normally open/closed
Cable sleave:	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 and 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.

We recommend you to contact us concerning applications of our filters in areas governed by the EU Directive 94/9 EC (ATEX 95). The standard version can be used for liquids based on mineral oil (corresponding to the fluids in Group 2 of Directive 97/23 EC Article 9). If you consider to use other fluids please contact us for additional support.

Subject to technical alteration without prior notice.

- 1 = Standard maintenance indicator visual PiS 3084
- 1 + 2 = Standard maintenance indicator electrical PiS 3085
- 3 = Further executions see data sheet maintenance indicator
- 4 = Pressure switch
- 4 + 5 = Can be mounted at I or II alternatively
- 5 = Pressure gauge
- 6 = Coupling for filling





All Dimensions except "L" in mm.

																					Weight
Туре	Α	в	С	D	Е	F	G	н	I	κ	L	м	Ν	ο	Р	R	S	т	U	v	[kg]
Pi 50016	78	42		298	361	180	135.0	130	96	52	G1½	185	47	171	11	183	93.5	70	35.7	M12	3.2
Pi 50025	78	42		391	454	270	135.0	130	96	52	G1½	185	47	171	11	183	93.5	70	35.7	M12	3.4
Pi 50040	78	57	see	427	489	270	175.5	163	120	70	G2	220	56	216	11	218	110	77.8	42.9	M12	6.4
Pi 50063	78	57	1.2	577	639	420	175.5	163	120	70	G2	220	56	216	11	218	110	89	50.8	M12	6.9
Pi 50100	78	72		579	639	420	200.0	190	151	-	G3	250	70	257	11	256	135	106	62.0	M16	11.1

#### 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 maintenance indicator is accessible and visible.

#### 10.2 Connecting the electricalmaintenance indicator

The electrical maintenance 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 maintenance 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.

- Filters without maintenance indicator: The filter element should be replaced after trial run or flushing of the system. Afterward folow instructions of the manufacturer.
- 3. Please always ensure that you have original MAHLE spare elements in stock: Disposable elements (PS and Mic) 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.
- 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 numbers for spare parts									
Position	Туре	Order number							
	Seal kit for housing								
	NG 160/250								
	NBR	78227902							
	FPM	78227910							
	EPDM	78227928							
-	NG 400/630								
(1)	NBR	78227936							
(4)	FPM	78227944							
	EPDM	78227951							
	NG 1000								
	NBR	78227969							
	FPM	78227977							
	EPDM	78227985							
	Maintenance indicator								
	Visual PiS 3084/2.2	77737802							
	Electrical PiS 3085/2.2	77738032							
(5)	Electrical upper section only	77536550							
0	Pressure gauge	70521417							
	Pressure switch								
	Normally open	77845845							
	Normally closed	77870595							
	Seal kit for maintenance indicato	or							
6	NBR	78383382							
	FPM	78383390							
	EPDM	78383408							
7	Quick-release coupling	77965130							



MAHLE Industriefiltration GmbH Schleifbachweg 45 74613 Öhringen Phone +49 7941 67-0 Fax +49 7941 67-23429 industrialfiltration@mahle.com www.mahle-industrialfiltration.com 70363178.03/2012



# 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 Mic or PS 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





Mic 10

V [l/min]

Pi 50010

x = flow rate V [l/min]

y = differential pressure  $\Delta$  p [bar]

## 3. Separation grade characteristics



y = beta-value x = particle size [µm]

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

## 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



## 4. Filter performance data

tested according to ISO 16889 (multipass test)

PS elements with
max. $\Delta$ p 10 bar

PS	3	$\beta_3$	≥75
PS	6	$\beta_6$	≥75
PS	10	$\beta_{10}$	≥75
PS	16	$\beta_{16}$	≥75
PS	25	β <sub>25</sub>	≥75

values guaranteed up to 10 bar differential pressure

# 7. Order numbers

# Example for ordering filters:

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

7.1 Hou	using desig	ın*									
Nom- inal size NG [I/ min]	Housing	্য with bypass valve 3.5 bar	② with visual indicator 2.2 bar	ा with electr. indicator 2.2 bar	ا with pressure gauge (DM)	S 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 con- nection (BA)	with anti spillage sleeve
	- 056										
	- 057										
	- 058										
	- 059										
	- 050										
	- 052										
	- 076										
	- 077										
	- 078										
50004	- 079										
50004	- 080										
50010	- 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	Туре	Filter material	max. ∆ p [bar]	Filter surface [cm²]	
	77925001	Pi 13004 RN Mic 10 NBR	Mic 10		900	
	77962210	Pi 15004 RN Mic 25 NBR	Mic 25		900	
	77923998	Pi 21004 RN PS 3 NBR	PS 3		820	
40	77964034	Pi 22004 RN PS 6 NBR	PS 6	10	820	
	77924004	Pi 23004 RN PS 10 NBR	PS 10		820	
	77962244	Pi 24004 RN PS 16 NBR	PS 16		820	
	77960206	Pi 25004 RN PS 25 NBR	PS 25		820	
	77925019	Pi 13006 RN Mic 10 NBR	Mic 10		1585	
	77962228	Pi 15006 RN Mic 25 NBR	Mic 25		1585	
	77924012	Pi 21006 RN PS 3 NBR	PS 3	10	1445	
63	77964042	Pi 22006 RN PS 6 NBR	PS 6		1445	
	77924020	Pi 23006 RN PS 10 NBR	PS 10		1445	
	77962251	Pi 24006 RN PS 16 NBR	PS 16		1445	
	77960214	Pi 25006 RN PS 25 NBR	PS 25		1445	
	77925027	Pi 13010 RN Mic 10 NBR	Mic 10		2610	
	77962236	Pi 15010 RN Mic 10 NBR	Mic 25		2610	
	77924038	Pi 21010 RN PS 3 NBR	PS 3		2380	
100	77940844	Pi 22010 RN PS 6 NBR	PS 6	10	2380	
	77924046	Pi 23010 RN PS 10 NBR	PS 10		2380	
	77962269	Pi 24010 RN PS 16 NBR	PS 16		2380	
	77960222	Pi 25010 RN PS 25 NBR	PS 25		2380	

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

#### 8. Technical specifications

Design:	tank top installatior
Nominal pressure:	10 bar (140 psi
Test pressure:	13 bar (180 psi
Temperature range:	-10 °C to +80 °C
(other tem	perature ranges on request
Bypass setting:	3.5 bar ± 10%
Filter head material:	GD A
Filter housing material:	plastic
Sealing material:	plastic
Maintenance indicator setting	2.2 bar ± 10 %
PiS 3084/85:	
Electrical data of maintenance indicato	r:
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 sleave:	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  $\mu$ m: NG 40 = 8 I /min, NG 63 = 15 I /min, NG 100 = 25 I /min.

#### 9. Dimensions

All dimensions except "D" in mm.

					E		Weight
Туре	Α	В	С	D*	DIN 2999	F	[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 filing

#### **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?

- 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.
- Filters without pressure indicator: The filter element should be replaced after trial run or flushing of the system. Afterward follow instructions of the manufacturer.
- Please always ensure that you have original MAHLE spare elements in stock: Disposable elements (PS and Mic) 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.
- 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 numbers for spare parts					
Pos.	Туре	Order number				
	Pi 50004-50010					
	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	70521417				
	Pressure switch normally closed	77845845				
	Pressure switch normally open	77870595				
	Seal kit for maintenance indicator					
6	NBR	77760218				
	FPM	77760226				
	EPDM	77760234				
0	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				



MAHLE Industriefiltration GmbH Schleifbachweg 45 74613 Öhringen Phone +49 7941 67-0 Fax +49 7941 67-23429 industrialfiltration@mahle.com www.mahle-industrialfiltration.com 70363176.03/2012



# Duplex-tank top return line filter Pi 5100

Nominal size 40 up to 1000 according DIN 24550

#### 1. Features

#### High performance filters for modern hydraulic systems

- Provided for tank top installation
- Modular system
- Compact design
- Minimal pressure drop through optimal flow design
- Visual/electrical/electronic maintenance indicator
- Threaded and flanged connections

- Quality filters, easy to service
- Equipped with highly efficient glass fibre PS filter elements
- Beta rated elements according to ISO 16889 multipass test
- Elements with high differential pressure stability and dirt holding capacity
- Worldwide distribution



see data sheet Pi 5000

## 3. Separation grade characteristics



## 4. Filter performance data

tested according to ISO 16889 (multipass test) PS elements with max.  $\Delta$  p 10 bar

PS	3	$\beta_{5(C)}$	≥200
PS	6	β <sub>7(C)</sub>	≥200
PS	10	β <sub>10(C)</sub>	≥200
PS	16	β <sub>15(C)</sub>	≥200
PS	25	β <sub>20(C)</sub>	≥200

values guaranteed up to 5 bar differential pressure

y = beta-value

x = particle size [µm]

determined by multipass tests (ISO 16889) calibration according to ISO 1171 (NIST)

## 5. Quality assurance

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

Norm	Designation
DIN ISO 2941	Hydraulic fluid power filter elements; verification of collapse/burst resistance
DIN ISO 2942	Hydraulic fluid power filter elements; verification of fabrication integrity
DIN ISO 2943	Hydraulic fluid power filter elements; verification material compatibility with fluids
DIN ISO 3723	Fluidtechnik-Hydraulik Filterelemente; method for end load test
DIN ISO 3724	Hydraulic fluid power filter elements; verification of flow fatigue characteristics
ISO 3968	Hydraulic fluid power filters; evaluation of pressure drop versus flow characteristics
ISO 10771.1	Fatigue pressure testing of metal containing envelopes in hydraulic fluid applications
ISO 16889	Hydraulic fluid power filters; multipass method for evaluation filtration performance of a filter element

## 6. Symbols

see data sheet Pi 5000

# 7. Order numbers

7.1 Housing design						
Nominal size NG [l/min]	Order number	Туре	Image: The systemwithbypass3.5 barandindicatorcavity	②withbypass3.5 barandvisualindicator2.2 bar	③withbypass3.5 barandelectricalindicator2.2 bar	with electrical indicator (2 setting points, 3 LED)
	78337438	Pi 51004-047				
40	78275729	Pi 51004-057				
40	78275737	Pi 51004-058				
	78278202	Pi 51004-058/PiS 3103				
	78337446	Pi 51006-047				
60	78275513	Pi 51006-057				
63	78275307	Pi 51006-058				
	78337453	Pi 51006-058/PiS 3103				
	77994320	Pi 51010-047				
100	78274110	Pi 51010-057				
100	77993306	Pi 51010-058				
	78337461	Pi 51010-058/PiS 3103				
	78276453	Pi 51016-047				
160	78337479	Pi 51016-057				
160	78276644	Pi 51016-058				
	78267775	Pi 51016-058/PiS 3103				
	78276479	Pi 51025-047				
050	78336323	Pi 51025-057				
250	78316044	Pi 51025-058				
	78276420	Pi 51025-058/PiS 3103				
	78276487	Pi 51040-047				
400	78337495	Pi 51040-057				
400	78337503	Pi 51040-058				
	78337511	Pi 51040-058/PiS 3103				
	78276495	Pi 51063-047/6				
620	78336844	Pi 51063-057/6				
030	78336547	Pi 51063-058/6				
	78337529	Pi 51063-058/6/PiS 3103				
	78337537	Pi 51100-047				
1000	78337545	Pi 51100-057				
1000	78337420	Pi 51100-058				
	78337552	Pi 51100-0/PiS 3103				

When filter with non bypass configuration is selected, the collapse pressure of the element must not be exceeded.

## 7.2 Filter elements

see data sheet Pi 5000

# 8. Technical specifications

see data sheet Pi 5000











Pi 51016 - Pi 51025



Pi 51040 - Pi 51063



Pi 51100

\*B= Minimum clearance for filter element removal

#### \* 90°= Pivoting range

Туре	Α	В
Pi 51004	130	150
Pi 51006	190	210
Pi 51010	280	300
Pi 51016	207	220
Pi 51025	297	310
Pi 51040	309	480
Pi 51063	459	480
Pi 51100	427	450

# 10. Installation, operating and maintenance instructions

see data sheet Pi 5000

# 11. Spare parts list

see data sheet Pi 5000

MAHLE Industriefiltration GmbH Schleifbachweg 45 74613 Öhringen Phone +49 79 41 67-0 Fax +49 79 41 67-2 34 29 industrialfiltration@mahle.com www.mahle-industrialfiltration.com 70364395.03/2012



# Tank Top Return-Line Filter Pi 530

Nominal size 35 and 50

#### **1.Features**

#### High performance filters for modern hydraulic systems

- Provided for tank top installation
- Modular system
- Compact design
- Minimal pressure drop through optimal flow design
- Visual/electrical/electronic maintenance control
- Threaded alt. hose connections

- Quality filters, easy to service
- Equipped with highly efficient glass fibre Sm-x filter
- Beta rated elements according to ISO 16889 multipass test
- Elements with high differential pressure stability and dirt holding capacity
- Worldwide distribution



2. Flow rate/pressure drop curve complete filter



y = differential pressure p [bar

x = flow rate V [l/min]

190 mm²/s

# 3. Separation grade characteristics



y = beta-value

x = particle size [µm]

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

## 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



# 4. Filter performance data

tested according to ISO 16889 (multipass test)

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

Sm-x	3	β <sub>5(C)</sub>	≥200
Sm-x	10	β <sub>10(C)</sub>	≥200
Sm-x	25	β <sub>20(C)</sub>	≥200

values guaranteed up to 5 bar differential pressure

# 7. Order numbers

# Example for ordering filters:

1. Housing design	2. Filter element
Housing NG 35 with hose connection, bypass valve,	
breather and pressure gauge	Mic 10
Type: Pi 53003/1-141	Type: 852 939 Mic 10

7.1 Housing	design						
			0		2	3 with	③ with
Neminal					with	pressure	pressure
Nominai		Varaian	with	with	bypass	switch	switch
Size	Type	filter bead	1 5 bar	breather	anu	closed	open
			1.0 bai	breather	gauge	ciosed	open
	PI 53003/1-009						
	Pi 53003/1-020						
	Pi 53003/1-144	Filter head					
	Pi 53003/1-145	PA 6 with					
	Pi 53003/1-146	connection					
35	Pi 53003/1-141	DN20					
	Pi 53003/1-142						
	Pi 53003/1-143						
	Pi 53003/2-009						
	Pi 53003/2-020	Al-liller field G/2					
	Pi 53005/1-009						
	Pi 53005/1-020						
	Pi 53005/1-144 Filter head	Filter head					
	Pi 53005/1-145	PA 6 with hose- connection DN20					
50	Pi 53005/1-146						
50	Pi 53005/1-141						
	Pi 53005/1-142						
	Pi 53005/1-143						
	Pi 53005/2-009	Al-filter head G1/6					
	Pi 53005/2-020	AI-TIITER NEAD G1/2					

7.2 Filter elements	s*				
Nominal size NG [l/min]	Order number	Туре	Filter material	max. ∆ p [bar]	Filter surface [cm <sup>2</sup> ]
	78309387	852 939 Mic 10	Mic 10	E	970
	78206781	852 939 Mic 25	Mic 25	5	870
35	79312117	852 588 Sm-x 3	Sm-x 3	10	650
	79312125	852 588 Sm-x 10	Sm-x 10		
	79312133	852 588 Sm-x 25	Sm-x 25		
	78309395	852 940 Mic 10	Mic 10	5	1100
	79312315	852 940 Mic 25	Mic 25	5	
50	79312158	852 945 Sm-x 3	Sm-x 3		
-	79312166	852 945 Sm-x 10	Sm-x 10	10	810
	79312174	852 945 Sm-x 25	Sm-x 25		

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

7.3 Breather element (only for filter head PA 6, batch size 3 pcs.)					
Nominal size NG [l/min]	Order number	Туре	Filter material	Filter surface [cm <sup>2</sup> ]	
35	70000001	950.007	Mie	40	
50	10200831	852 937	IVIIC	40	

## 8. Technical Specifications

Design:	tank mounting filter
Nominal pressure:	6 bar (90 psi)
Test pressure:	9 bar (130 psi)
Temperature range:	-10 °C to +80 °C
	(other temperature ranges on request)
Bypass setting:	∆ p 1.5 bar
Filter head material:	plastic-PA 6/Al
Filter housing material:	plastic PA 6
Filter cover material:	plastic PA 6
Indication range of	
pressure gauge:	0 to 4 bar
Activating pressure	
of pressure switch:	1.2 bar
Electrical data of pressure s	witch:
Max. voltage:	42 V
Max. current	2 A
Contact load:	100 VA
Type of protection:	IP 65 - with protection cap
Contact:	normally open/closed
Electrical connection:	AMP 6,3 DIN 46248
	connector according to
	DIN 46247,
	connection method 2-pole

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.

We recommend to contact us concerning applications of our filters in areas governed by the EU Directive 94/9 EC (ATEX 95). The standard version can be used for liquids based on mineral oil (corresponding to the fluids in Group 2 of Directive 97/23 EC Article 9). If you consider to use other fluids please contact us for additional support.

Subject to technical alteration without prior notice.



Version with filter head PA 6

\*E= Minimum clearance for filter element removal

\* Ø 60= Mounting hole Ø 60

\*G1/4= Option



Version with filter head Al



All dimensions except "D" in mm.

Туре	Α	В	С	D	E
Pi 53003/1	203	133,5	DN20	-	130
Pi 53003/2	203	135,5	-	G½	130
Pi 53005/1	241	171,5	DN20	-	180
Pi 53005/2	241	173,0	-	G1⁄2	180

#### 10. Installation, operating and maintenance instructions

#### **10.1 Filter installation**

ing downwards.

When installing the filter make sure that :

a) 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, max. torque 7 Nm. Preferably the filter should be installed with the filter housing point-

#### 10.2 Connecting the electrical pressure switch

The electrical pressure switch is connected via connectors according to DIN 46247.

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

- Filters equipped with pressure gauge: When the dynamic pressure reaches 1.2 bar (red/green indication), the filter element must be replaced.
- 2. Filters equipped with pressure switch:

During cold starts, the pressure switch may give a signal. If the electrical signal has not switched off after reaching operating temperature, the filter element must be replaced after the end of the shift.

3. Filters without indicator:

The filter element should be replaced after trial run or flushing of the system.

Afterwards follow instructions of manufacturer.

4. Please, always ensure that you have original MAHLE spare elements in stock: Disposable elements (MIc, 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 filter housing with a suitable medium.
- 6. Check O-rings 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.
- Remove filter element from plastic bag and reassemble in reverse order (items 1 to 4).
- 9. Contaminated Mic elements can be reduced to ashes. Sm-x filter elements must be disposed in another way.

# 10.5 Replacement of air breather filter element (plastic filter head only)

- 1. Push slightly on the lid and air breather element downwards (lid A).
- 2. Remove lid and element from the lower hook.
- 3. Pull out element from the lid.
- 4. Install new element in the lid.
- 5. Installation in reverse order.
- 6. Check correct position of the lid.

Note: Filter element and air breather element should be always replaced at the same time.

Subject to technical alteration without prior notice.



# 11. Spare parts list

Order numbers for spare parts				
Туре	Order number			
Seal kit NBR				
Pi 530/1	78309072			
Pi 530/2 78206062				
Pressure gauge	79358326			
Pressure switch				
normally closed	77870587			
normally open	77863814			
Breather element for Pi 530/1 (batch size 3 pcs.) 78206831				

MAHLE Industriefiltration GmbH Schleifbachweg 45 74613 Öhringen Phone +49 7941 67-0 Fax +49 7941 67-23429 industrialfiltration@mahle.com www.mahle-industrialfiltration.com 70329496.02/2012