

## Tank top return-line filter

### Pi 5000

Nominal size 40 up to 100  
according to DIN 24550

#### 1. Features

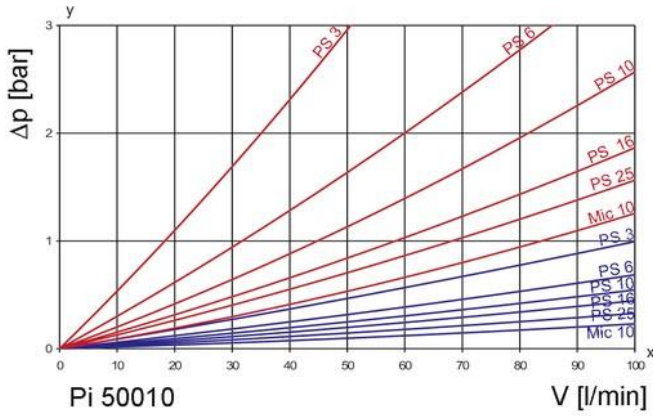
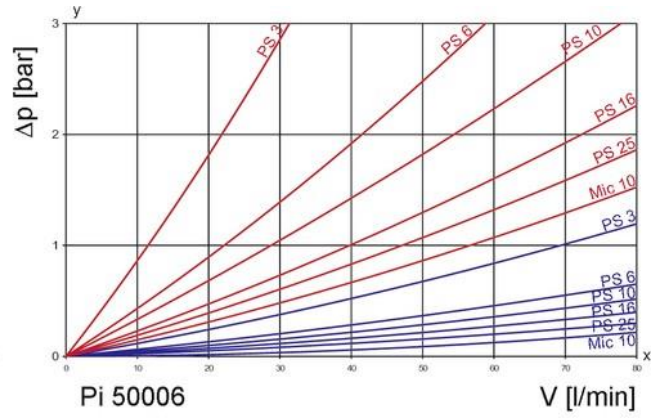
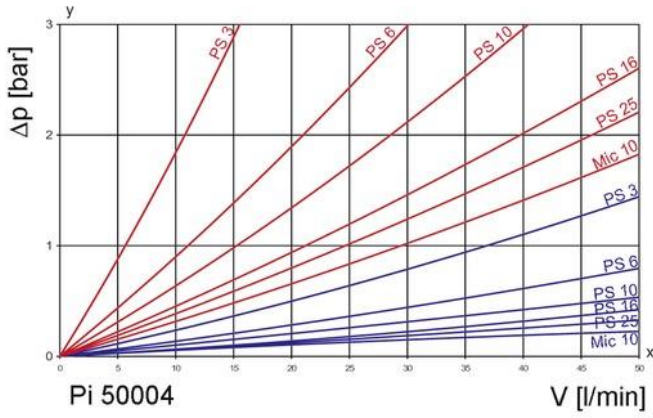
##### High performance filters for modern hydraulic system

- 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



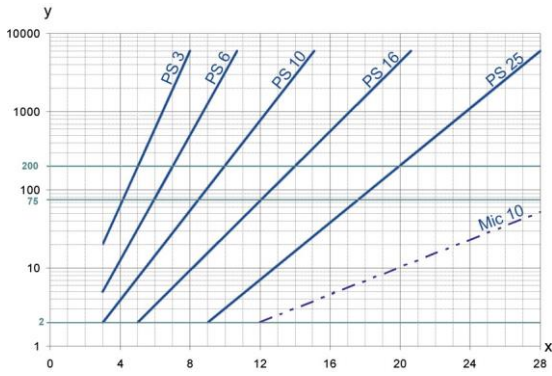
## 2. Flow rate/pressure drop curve complete filter

190 mm<sup>2</sup>/s  
33 mm<sup>2</sup>/s



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

### 3. Separation grade characteristics



y = beta-value  
x = particle size [ $\mu\text{m}$ ]

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

### 4. Filter performance data

tested according to ISO 16889 (multipass test)

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

PS	3	$\beta_3$	$\geq 200$
PS	6	$\beta_6$	$\geq 200$
PS	10	$\beta_{10}$	$\geq 200$
PS	16	$\beta_{16}$	$\geq 200$
PS	25	$\beta_{25}$	$\geq 200$

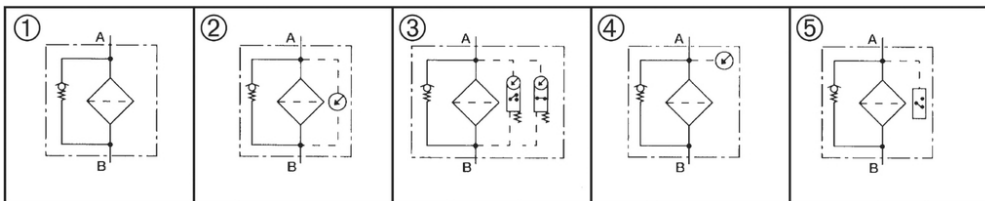
values guaranteed up to  
10 bar differential pressure

### 5. Quality assurance

Filtration Group 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 = PS 25

7.1 Housing design*											
Nom- inal size NG [l/ min]	Housing code	① with bypass valve 3.5 bar	② with visual indicator 2.2 bar	③ with electr. indicator 2.2 bar	④ with pressure gauge (DM)	⑤ with pressure switch normally closed (DSS)	⑥ 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
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>	900
	77962210	Pi 15004 RN Mic 25 NBR	Mic 25		900
	77923998	Pi 21004 RN PS 3 NBR	PS 3		820
	77964034	Pi 22004 RN PS 6 NBR	PS 6		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
<b>63</b>	77925019	Pi 13006 RN Mic 10 NBR	Mic 10	<b>10</b>	1585
	77962228	Pi 15006 RN Mic 25 NBR	Mic 25		1585
	77924012	Pi 21006 RN PS 3 NBR	PS 3		1445
	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
<b>100</b>	77925027	Pi 13010 RN Mic 10 NBR	Mic 10	<b>10</b>	2610
	77962236	Pi 15010 RN Mic 10 NBR	Mic 25		2610
	77924038	Pi 21010 RN PS 3 NBR	PS 3		2380
	77940844	Pi 22010 RN PS 6 NBR	PS 6		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

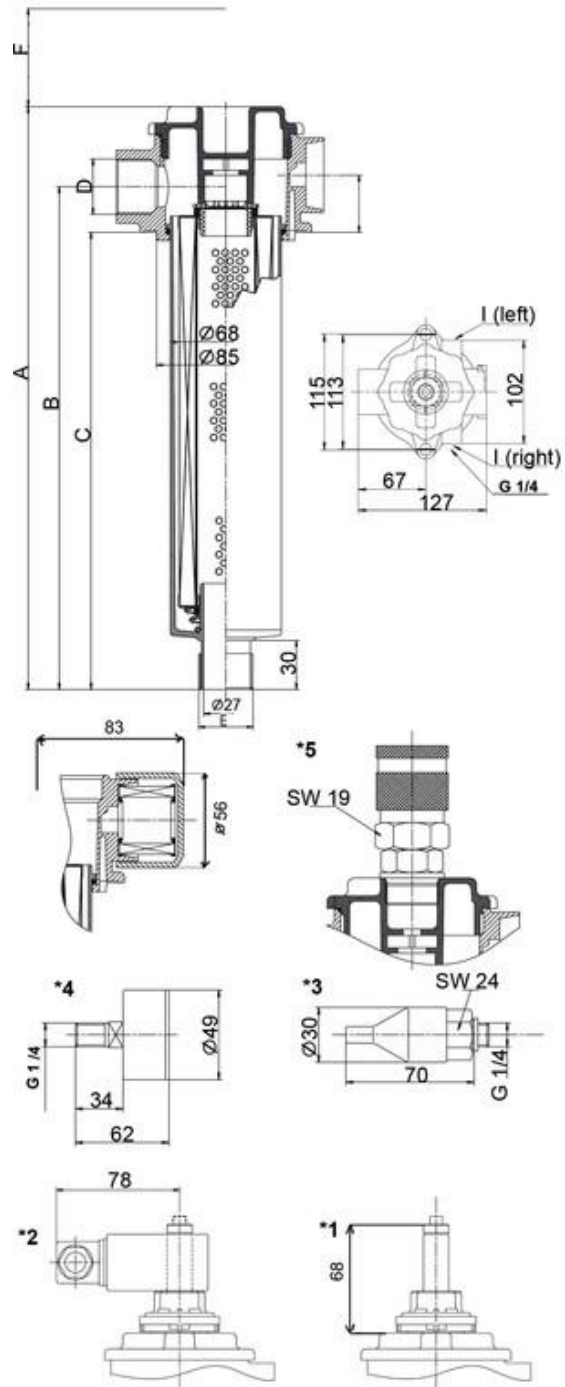
Design:	tank top installation
Nominal pressure:	10 bar (140 psi)
Test pressure:	13 bar (180 psi)
Temperature range:	-10 °C to +80 °C (other temperature ranges on request)
Bypass setting:	3.5 bar ± 10%
Filter head material:	GD Al
Filter housing material:	plastic
Sealing material:	plastic
Maintenance indicator 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 spare elements in stock: Disposable elements (PS and Mic) cannot be cleaned.

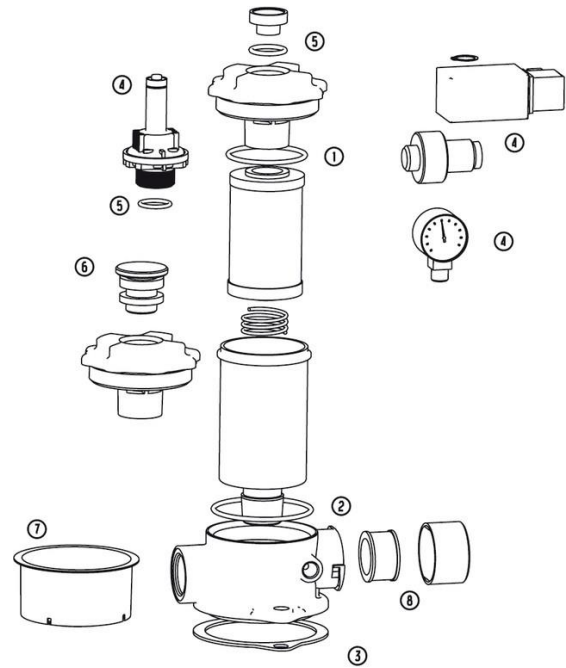
### 10.4 Element replacement

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.
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 numbers 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	70521417
	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





## Tank top return-line filter

### Pi 5000

Nominal size 160 up to 1000  
according to DIN 24550

#### 1. Features

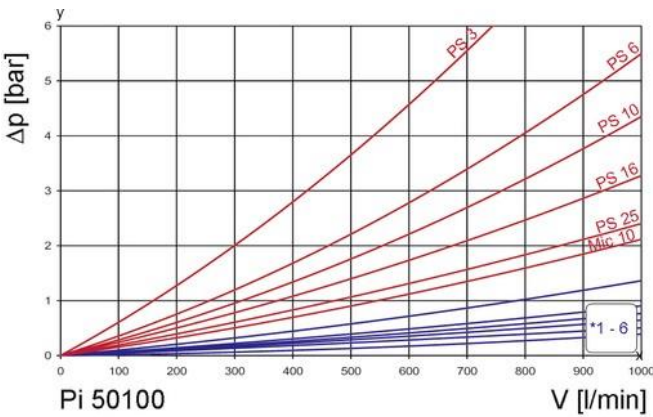
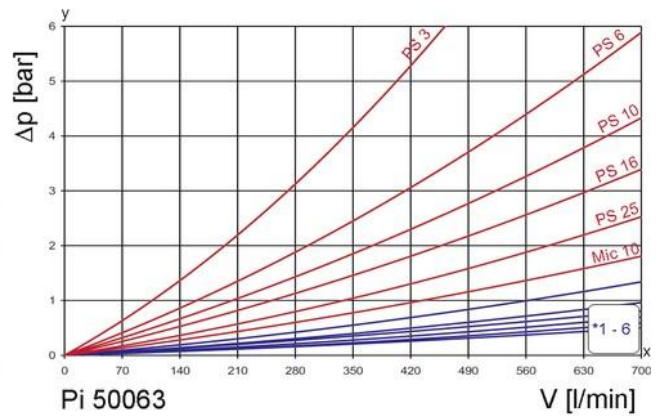
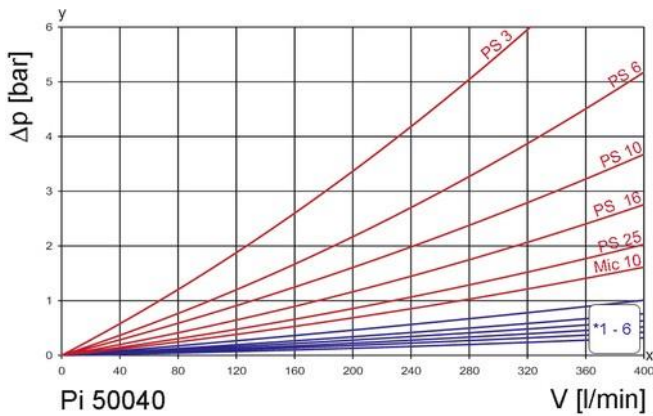
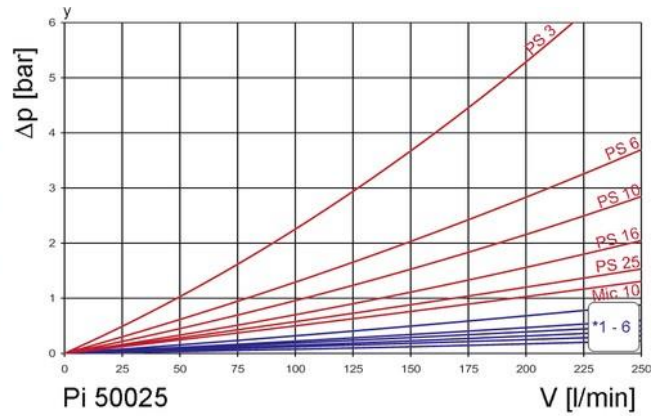
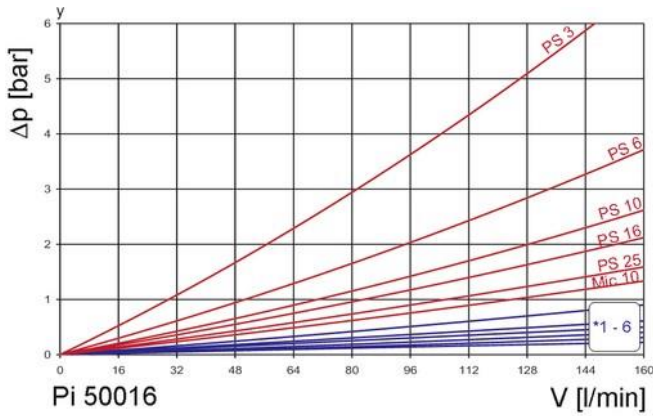
##### High performance filters for modern hydraulic systems

- 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



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

190 mm<sup>2</sup>/s  
33 mm<sup>2</sup>/s



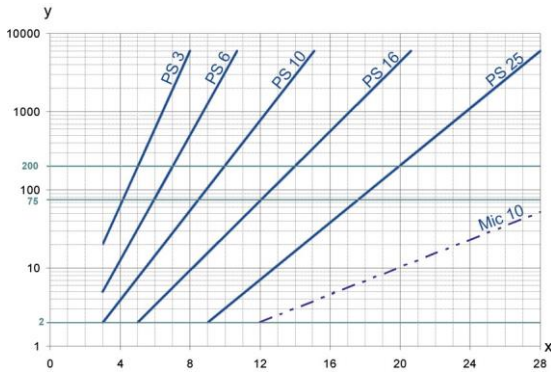
y = differential pressure  $\Delta p$  [bar]

x = flow rate V [l/min]

\*1 - 6

1. PS 3
2. PS 6
3. PS 10
4. PS 16
5. PS 25
6. Mic 10

### 3. Separation grade characteristics



y = beta-value  
x = particle size [ $\mu\text{m}$ ]

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

### 4. Filter performance data

tested according to ISO 16889 (multipass test)

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

PS	3	$\beta_{5(C)}$	$\geq 200$
PS	6	$\beta_{7(C)}$	$\geq 200$
PS	10	$\beta_{10(C)}$	$\geq 200$
PS	16	$\beta_{15(C)}$	$\geq 200$
PS	25	$\beta_{20(C)}$	$\geq 200$

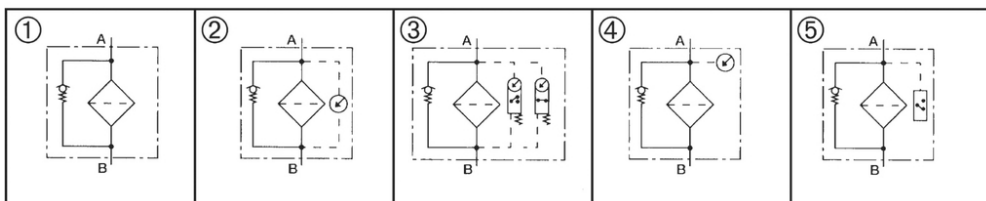
values guaranteed up to  
10 bar differential pressure

### 5. Quality assurance

Filtration Group 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	Hydraulic fluid power filter elements; 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



## 7. Order numbers

Example for ordering filters:

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

7.1 Housing design* Pi 50016- Pi 50025 - Pi 50040 - Pi 50063 - Pi 50100-									
Nominal size NG [l/min]	Housing code	① with bypass valve 3.5 bar	① with indicator cavity	② with visual main- tenance indicator 2.2 bar	③ with electrical main- tenance indicator 2.2 bar	④ with pressure gauge (DM)	⑤ with pressure switch normally open (DSS)	⑤ with pressure switch normally closed (DSO)	with filling connection (BA)
160 250 400 630 1000	- 047								
	- 056								
	- 057								
	- 058								
	- 059								
	- 050								
	- 052								
	- 092								
	- 093								
	- 094								
	- 095								
	- 096								
	- 097								

\* a wider range of executions is available on request

7.2 Connection executions								
Nominal size NG [l/min]	Type	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"

DN 76 = SAE 3"

3000 psi

7.3 Filter elements*					
Nominal size NG [l/min]	Order number	Type	Filter material	max. $\Delta p$ [bar]	Filter surface [cm <sup>2</sup> ]
160	77925035	Pi 13016 RN Mic 10 NBR	Mic 10	10	3750
	77924137	Pi 21016 RN PS 3 NBR	PS 3		3750
	77964067	Pi 22016 RN PS 6 NBR	PS 6		3750
	77924145	Pi 23016 RN PS 10 NBR	PS 10		3750
	77963648	Pi 24016 RN PS 16 NBR	PS 16		3750
	77960230	Pi 25016 RN PS 25 NBR	PS 25		3750
250	77925043	Pi 13025 RN Mic 10 NBR	Mic 10	10	6050
	77924152	Pi 21025 RN PS 3 NBR	PS 3		6050
	77964075	Pi 22025 RN PS 6 NBR	PS 6		6050
	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
400	77925050	Pi 13040 RN Mic 10 NBR	Mic 10	10	9450
	77924178	Pi 21040 RN PS 3 NBR	PS 3		8250
	77964083	Pi 22040 RN PS 6 NBR	PS 6		8250
	77924186	Pi 23040 RN PS 10 NBR	PS 10		8250
	77963663	Pi 24040 RN PS 16 NBR	PS 16		8250
	77960255	Pi 25040 RN PS 25 NBR	PS 25		8250
630	77925068	Pi 13063 RN Mic 10 NBR	Mic 10	10	15500
	77924194	Pi 21063 RN PS 3 NBR	PS 3		13515
	77964091	Pi 22063 RN PS 6 NBR	PS 6		13515
	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
1000	77925076	Pi 13100 RN Mic 10 NBR	Mic 10	10	18335
	77924210	Pi 21100 RN PS 3 NBR	PS 3		18335
	77964109	Pi 22100 RN PS 6 NBR	PS 6		18335
	77924228	Pi 23100 RN PS 10 NBR	PS 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 temperature ranges on request)
Bypass setting:	$\Delta p$ 3.5 bar $\pm$ 10 %
Filter head material:	GD Al
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 sleeve:	M20x1.5

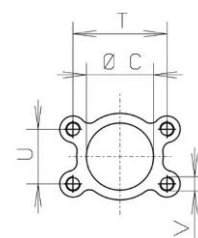
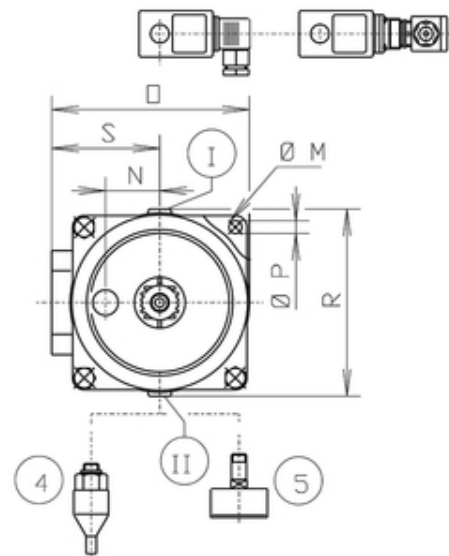
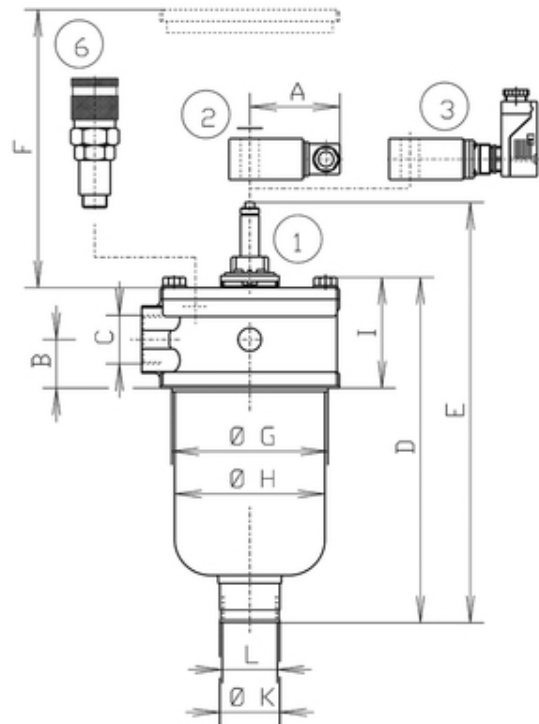
The switching function can be changed by turning the electric upper part by 180° (normally closed contact or normally open contact). The state on delivery is a normally closed contact. By inductivity in the direct current circuit the use of suitable protection circuit should be considered. Further maintenance 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 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 main-  
tenance indicator
- 4 = Pressure switch
- 4 + 5 = Can be mounted at I or II alternatively
- 5 = Pressure gauge
- 6 = Quick-release coupling



## 9. Dimensions

All Dimensions except "L" in mm.

Type	A	B	C	D	E	F	G	H	I	K	L	M	N	O	P	R	S	T	U	V	Weight [kg]
Pi 50016 - ...	78	42	see 7.2	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		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		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:

- sufficient space is available to remove filter element and filter housing,
- the mounting hole in the tank top is not excessively large, to ensure proper sealing,
- 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 electrical maintenance 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?

- 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 follow instructions of the manufacturer. Please always ensure that you have original Filtration Group spare elements in stock: Disposable elements (PS and Mic) cannot be cleaned.
- 

### 10.4 Element replacement

- Stop system and relieve filter from pressure.
- Unscrew cover, turning counter-clockwise.
- Remove filter housing and filter element by pulling upwards.
- Remove filter element with a side-to-side motion.
- Clean the housing using a suitable cleaning solvent.
- Check O-ring on filter cover and filter housing for damage. Replace, if necessary.
- Make sure that the order number on the spare element corresponds to the order number of the filter name-plate.
- 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	Type	Order number
① to ③	Seal kit for housing	
	<b>NG 160/250</b>	
	NBR	78227902
	FKM	78227910
	EPDM	78227928
	<b>NG 400/630</b>	
	NBR	72460035
	FKM	72460036
	EPDM	72460037
	<b>NG 1000</b>	
	NBR	78227969
	FKM	78227977
EPDM	78227985	
④	Pressure gauge	78381998
	Pressure switch normally open	77845845
	Pressure switch normally closed	77870595
⑤	Maintenance indicator	
	Visual PiS 3084/2.2	77737802
	Electrical PiS 3085/2.2	77738032
	Electrical upper section only	77536550
⑥	Seal kit for maintenance indicator + blind plug	
	NBR	78383382
	FPM	78383390
	EPDM	78383408
⑦	Quick-release coupling	77965130

