

Low Pressure Filter

Pi 150

Nominal pressure 10/25 bar (140/360 psi), nominal size up to 630

1. Features

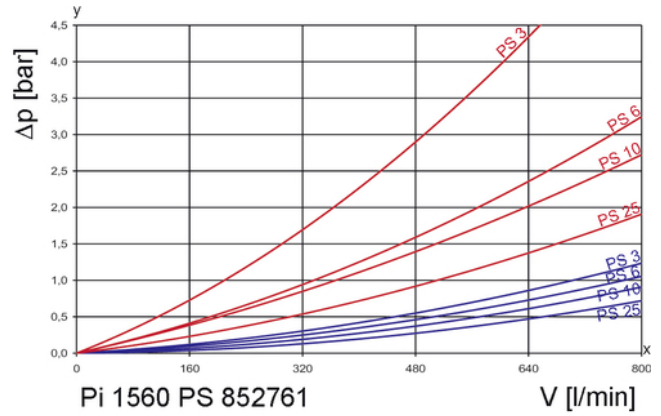
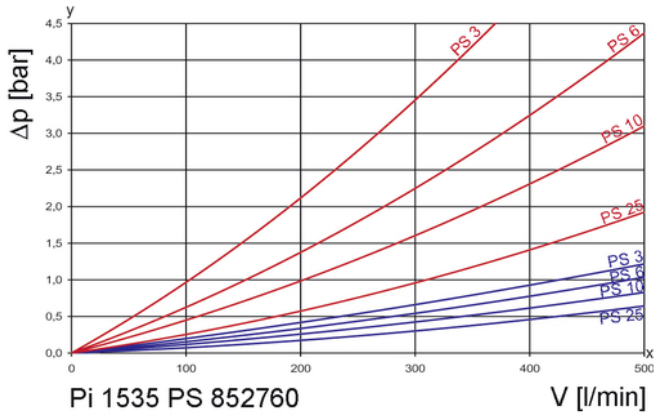
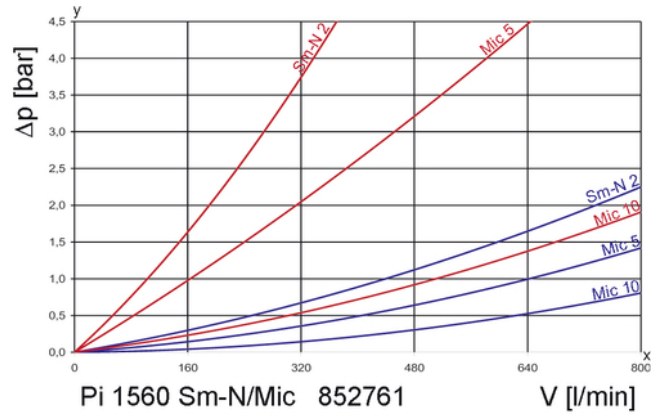
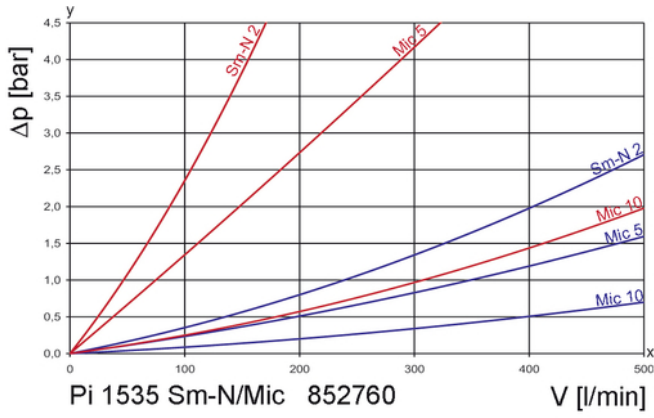
High performance filters for modern hydraulic systems

- Provided for pipe 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 PS filter elements
- Beta rated elements according to ISO 16889 multipass test
- Elements with high differential pressure stability and dirt holding capacity
- Worldwide distribution



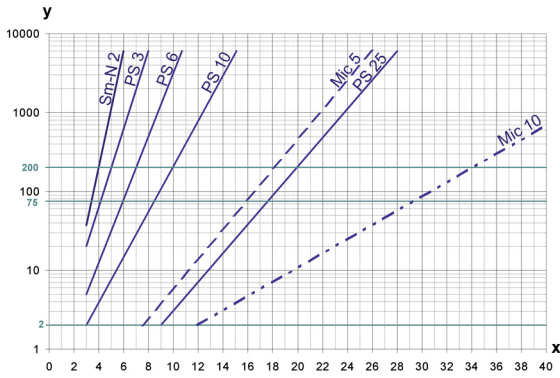
2. Flow rate/pressure drop curve complete filter

190 mm²/s
33 mm²/s



y = differential pressure Δp [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

measured according to ISO 16889 (multipass test)

PS elements with max. Δp 10 bar

Sm-N 2 elements with max. Δp 5 bar

Sm-N	2	$\beta_{4(C)}$	≥ 200
PS	3	$\beta_{5(C)}$	≥ 200
PS	6	$\beta_{7(C)}$	≥ 200
PS	10	$\beta_{10(C)}$	≥ 200
PS	25	$\beta_{20(C)}$	≥ 200

values guaranteed up to 10 bar differential pressure, Sm-N 2 elements up to 5 bar differential pressure

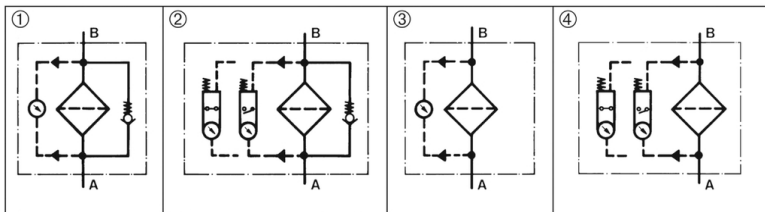
The filter element Sm-N 2 is an element with a very large dirt holding capacity, especially for bypass filtration.

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 of 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
V = 400 l/min, bypass, electrical indication, nominal pressure 10 bar Type: Pi 1535 / 10-058 Order number: 77774631	PS 10 Type: 852 760 PS 10 Order number: 77774425

7.1 Housing design							
Nominal size NG [l/min]	Order number	Type	Nominal pressure [bar]	① with bypass valve and visual indicator	② with bypass valve and electrical indicator	③ with visual indicator	④ with electrical indicator
400	77774649	Pi 1535/10-057	10				
	77774631	Pi 1535/10-058					
	77804909	Pi 1535/10-068					
	77804917	Pi 1535/10-069					
	77955982	Pi 1535/25-057	25				
	77907892	Pi 1535/25-058					
630	77774623	Pi 1560/10-057	10				
	77774615	Pi 1560/10-058					
	77804941	Pi 1560/10-068					
	77804958	Pi 1560/10-069					
	77955990	Pi 1560/25-057	25				
	77970718	Pi 1560/25-058					

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

7.2 Filter elements*					
Nominal size NG [l/min]	Order number	Type	Filter material	max. Δp [bar]	Filter surface [cm ²]
400	77774458	852 760 Mic 5	Mic 5	5	23800
	77774441	852 760 Mic 10	Mic 10		23800
	77955859	852 760 Sm-N 2	Sm-N 2		16000
	77774433	852 760 PS 3	PS 3	10	14500
	78299042	852 760 PS 6	PS 6		14500
	77774425	852 760 PS 10	PS 10		14500
	77806565	852 760 PS 25	PS 25		14500
630	77774417	852 761 Mic 5	Mic 5	5	47600
	77774409	852 761 Mic 10	Mic 10		47600
	78375867	852 761 Sm-N 2	Sm-N 2		32000
	77774391	852 761 PS 3	PS 3	10	29000
	78225898	852 761 PS 6	PS 6		29000
	77774383	852 761 PS 10	PS 10		29000
	77806573	852 761 PS 25	PS 25		29000

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

8. Technical specifications

Nominal pressure:	10/25 bar (140/360 psi)
Temperature range:	-10 °C to +120 °C (other temperature ranges on request)
Bypass setting:	Δp 3.5 bar \pm 10 %
Material filter head/cover:	GAL
Material filter housing:	St
Sealing material:	NBR
Maintenance indicator setting:	Δp 2.2 bar \pm 10 %
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 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.

Housings with nominal pressure 10 bar (140 psi) are fitted standard with air bleeder valve, housings with nominal pressure 25 bar (360 psi) with a venting screw.

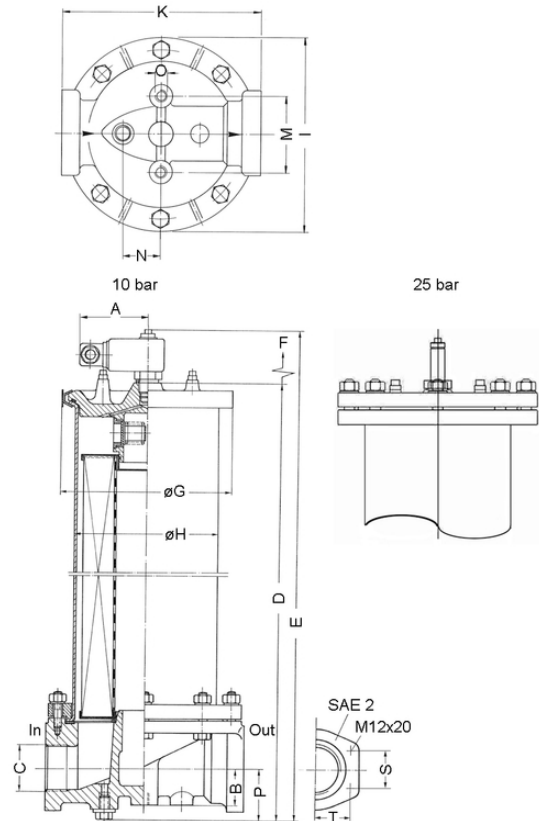
9. Dimensions

All dimensions except "C" in mm.

Type	A	B	C	D	E	F	G 10 bar	G 25 bar	H	I	K	M	N	O	P	S	T	Weight [kg]
Pi 1535	78	42	G1½	643	680	425	190	225	165	225	230	90	44	M12x20	59	-	-	17.1
Pi 1560	78	42	SAE 2	1005	1045	850	190	225	165	225	230	90	44	M12x20	59	42.9	77.8	27.1

NPT- and SAE connections on request.

* Standard pressure series hole pattern 3000 PSI



Subject to technical alteration without prior notice.

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.

10.2 Connecting the electrical maintenance indicator

The electrical indicator is connected via a 2-pole appliance plug according to DIN EN 175301–803 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.

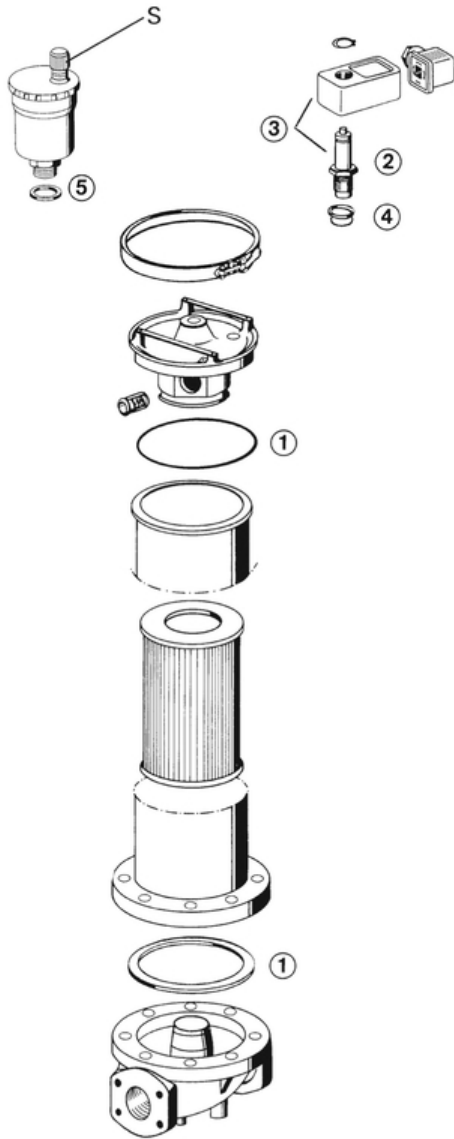
10.3 When should the filter element be replaced?

1. Filters equipped with visual and electrical maintenance indicator:
During cold starts, the indicator may give a warning signal. Press the red 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 maintenance indicator:
The filter element should be replaced after the trial run or flushing of the system. Afterwards follow instructions of the manufacturer.
3. Please always ensure that you have original Filtration Group spare elements in stock: Disposable elements (PS, Sm-N, Mic) cannot be cleaned.

10.4 Element replacement

1. Stop system and relieve filter from pressure.
2. Loosen quick-action clamp (10 bar version) or screws of flanged cover, remove cover, and open drain valve. Housing completely vented.
3. Remove filter element from the filter housing.
4. Check seal for damages, replace if necessary.
5. Make sure that the order number on the spare element corresponds to the order number of the filter name-plate. Remove the plastic bag and push element over the spigot in the filter head.
6. 10 bar version: Close drain valve, relocate cover, and close the quick-action clamp. Filters are automatically vented via the air bleeder valve, the protection cap S has to be turned 2 times for being open.
7. 25 bar version: Close drain valve, and put the cover plate on so that the stud bolts go into the holes of the cover plate. Make sure not to squeeze the O-ring on the bottom side of the cover plate. Hand-tighten the 8 mounting nuts with spring rings. Then draw up the nuts tight crosswise with a turn-screw SW19 without canting the cover plate. Tightening torque for mountings nuts is 50 Nm. After bringing the hydraulic unit to service de-aerate the filter via vent-screw.

11. Spare parts list



Order numbers for spare parts		
Position	Type	Order number
①	Seal kit	
	NBR	77831407
	FPM	77831415
	EPDM	77831423
② + ③	Maintenance indicator	
	Visual PiS 3098/2.2	77669971
	Electrical PiS 3097/2.2	77669948
	Electrical upper part only	77536550
④	Seal kit for maintenance indicator PiS 3098/2.2 + PiS 3097/2.2	
	NBR	77760309
	FPM	77760317
	EPDM	77760325
⑤	Air bleeder valve	70323353

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Suction Filter

Pi 160

1. Features

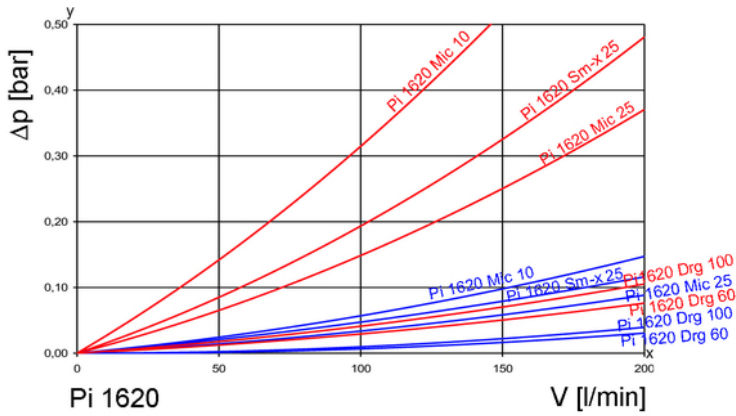
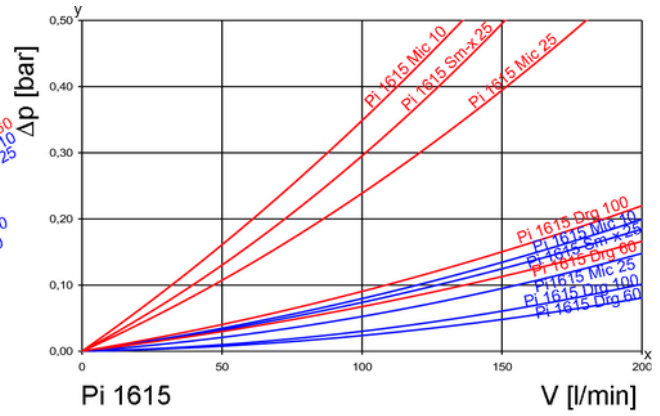
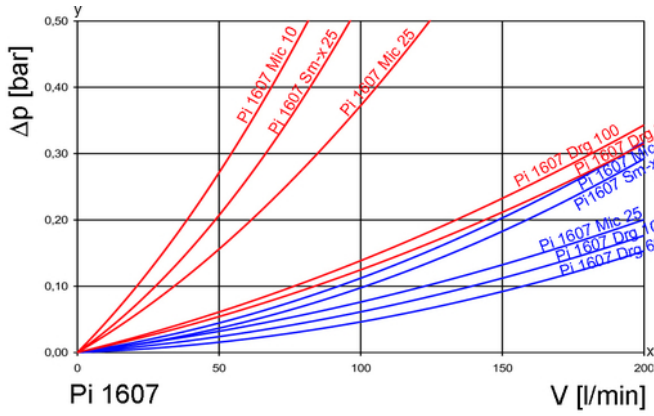
High performance filters for modern hydraulic systems

- Provided for tank mounting
- Compact design
- Minimal pressure drop through optimal flow design
- Visual/electrical/electronic maintenance indicator
- Threaded or flanged connections
- Vacuum gauge serial production
- Quality filters, easy to service
- Quick-lock design and shut off valve
- Equipped with highly efficient Mic, Sm-x or Drg filter elements
- Beta rated elements according to ISO 16889 multipass test
- Elements with high differential pressure stability and dirt holding capacity
- Worldwide distribution



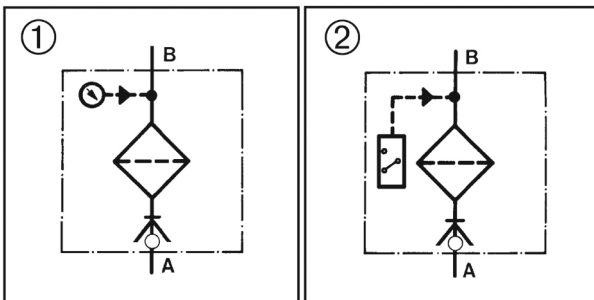
2. Flow rate/pressure drop curve complete filter

190 mm²/s
33 mm²/s



y = differential pressure Δp [bar]
x = flow rate V [l/min]

3. Symbols



4. Order numbers

Example for ordering filters:

1. Housing design	2. Filter element
V=100 l/min, gauge Type: Pi 1615-366 Order number: 77774813	Sm-x 25 Type: 852 754 Sm-x 25 Order number: 77730195

4.1 Housing design

Nominal size* NG [l/min] Sm-x + Mic/Drg	Order number	Type	① with vacuum gauge	② with vacuum switch 230V	② with vacuum switch 42V
80/100	77774854	Pi 1607-166			
	77774847	Pi 1607-165			
	77774714	Pi 1607-170			
100/160	77774839	Pi 1615-166			
	77774821	Pi 1615-165			
	77774706	Pi 1615-170			
	77774813	Pi 1615-366			
	77774805	Pi 1615-365			
	77774730	Pi 1615-370			
	77774797	Pi 1615-466			
	77774789	Pi 1615-465			
	77774722	Pi 1615-470			
160/315	77874480	Pi 1620-366			
	77874498	Pi 1620-365			
	77874506	Pi 1620-370			

* at operational viscosity (33 mm²/s); Sm-x 25 ($\beta_{20(C)} \geq 200$) and $\Delta p \leq 0,1$ bar

4.2 Filter elements

Nominal size NG [l/min]	Order number	Type	Filter material	Filter surface [cm ²]
80	77729338	852 753 Mic 10	Mic 10	5700
	77729429	852 753 Mic 25	Mic 25	5700
	77729577	852 753 Sm-x 25	Sm-x 25	3750
100	77729387	852 754 Mic 10	Mic 10	15850
	77729445	852 754 Mic 25	Mic 25	15850
	77730195	852 754 Sm-x 25	Sm-x 25	10400
160	77874514	852 821 Mic 10	Mic 10	16750
	77874522	852 821 Mic 25	Mic 25	16750
	77874530	852 821 Sm-x 25	Sm-x 25	11000

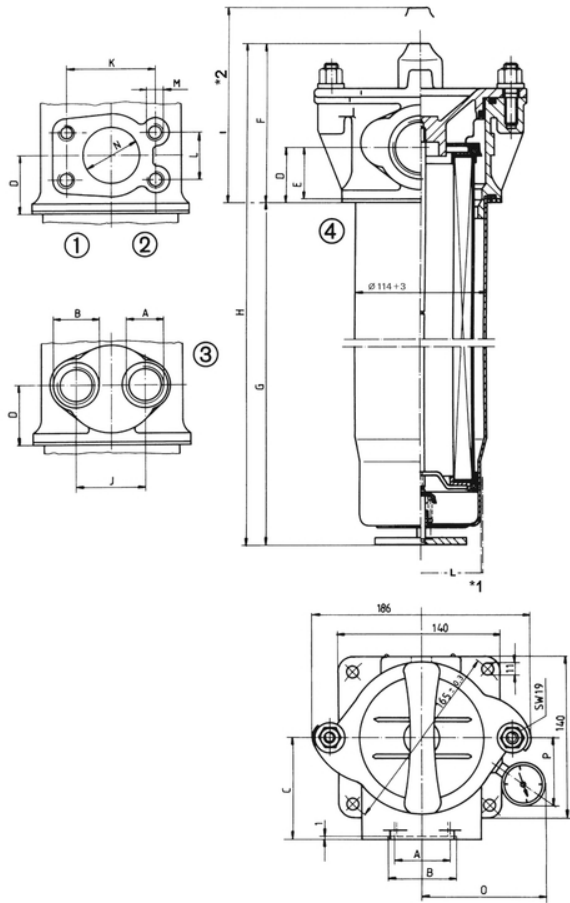
4.3 Filter elements wire mesh

Nominal size* NG [l/min]	Order number	Type	Filter material	Filter surface [cm ²]
100	77862345	852 753 Drg 60	Drg 60	2300
	77729486	852 753 Drg 100	Drg 100	2300
160	77862352	852 754 Drg 60	Drg 60	6250
	77729528	852 754 Drg 100	Drg 100	6250
315	77874548	852 821 Drg 60	Drg 60	6650
	77874555	852 821 Drg 100	Drg 100	6650

* at operational viscosity (33 mm²/s) and Drg 100

5. Technical specifications

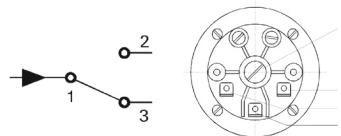
Design:	suction filter for tank mounting with shut off valve
Installation:	horizontally under oil level or vertically above oil level with optional extension pipe
Temperature range:	-10 °C to +120 °C (other temperature ranges on request)
Filter head material:	GDAL
Filter housing material:	St
Sealing material:	NBR/AL
Indicating range vacuum gauge:	-1 bar to 1.5 bar
Pressure setting vacuum switch:	-200 mbar
Electrical data of vacuum switch (PiS 3070):	
Maximum voltage:	230 V~/=
Maximum current on contact:	6 A
Contact:	change-over switch
Electrical connections:	AMP 6.3 DIN 46248 for bushings according to DIN 46247
Fitting position:	any fitting positions possible (fitting position has to be defined when ordering indicators with defined switch point)
Type of protection:	IP 00 - without protecting cap IP 54 - with protecting cap
Vacuum switch 42 V (HES 2200 BP)	
Contact:	normally open
Breaking capacity:	42 V/6 W as ohmic resistor
Type of protection:	IP 54 – with protecting cap
Electrical connections:	AMP 6.3 DIN 46248 for receptacle for tabs according to connection method, 2 pole



*1 Extension pipe available upon request
*2 Extension height min.

Connecting plan

- 1 supply line
- 2 operating contact
- 3 normally closed contact
- 4 adjusting screw



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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.

6. Dimensions

Dimension	Pi 1607-...		Pi 1615-...		Pi 1615-...		Pi 1615-...		Pi 1620-...	
O/P	110/64	166	110/64	166	110/64	366	110/64	466	110/64	366
O/P	135/71	165	135/71	165	135/71	365	135/71	465	135/71	365
O/P	130/55	170	130/55	170	130/55	370	130/55	470	130/55	370
Fig.	4		4		2		3		1	
A	G1½		G2		SAE 2"		2 x G1		SAE 3"	
B	56		68				41			
C	87		87		87		87		95	
D	49		49		53		53		73	
E	46		46		50		50		70	
F	144		144		144		144		182	
G	178		471		471		471		433	
H	322		615		615		615		615	
I	375		680		680		680		710	
J							60			
K					77,8				106,4	
L					42,9				61,9	
M					M12				M16	
N					50				76	
Weight [kg]	2.7		3.5		3.5		3.5		5.0	

7. Installation, operating and maintenance instructions

7.1 Filter installation

When installing the filter make sure that sufficient space is available to remove the filter element and the filter housing. Preferably the filter should be installed with the housing pointing downwards.

The maintenance indicator must be visible.

7.2 When should the filter element be replaced or cleaned?

Filters equipped with visual and electrical maintenance indicator: During cold starts, the indicator may give a warning signal. If vacuummeter shows > 0,2 bar or the electrical signal has not switched off after reaching operating temperature, the filter element must be replaced or cleaned after the end of the shift. Please always ensure that you have original Filtration Group spare elements in stock: Disposable elements (Mic or Sm-x) cannot be cleaned.

7.3 Element replacement

1. Stop system and relieve filter from pressure.
2. Unscrew nuts, turn cover counter-clockwise and pull. Unscrew element from support.
3. Check O-ring on the filter for damage. Replace, if necessary.
4. Make sure that the order number on the spare element corresponds to the order number of the filter name-plate.
5. Complete installation.

7.4 Cleaning methods for cleanable elements

a) Ultrasonic cleaning

Insert the contaminated suction filter element into an ultrasonic bath for approx. 3 minutes; then rinse in clean liquid. Afterwards, blow air into the filter from the clean side inward.

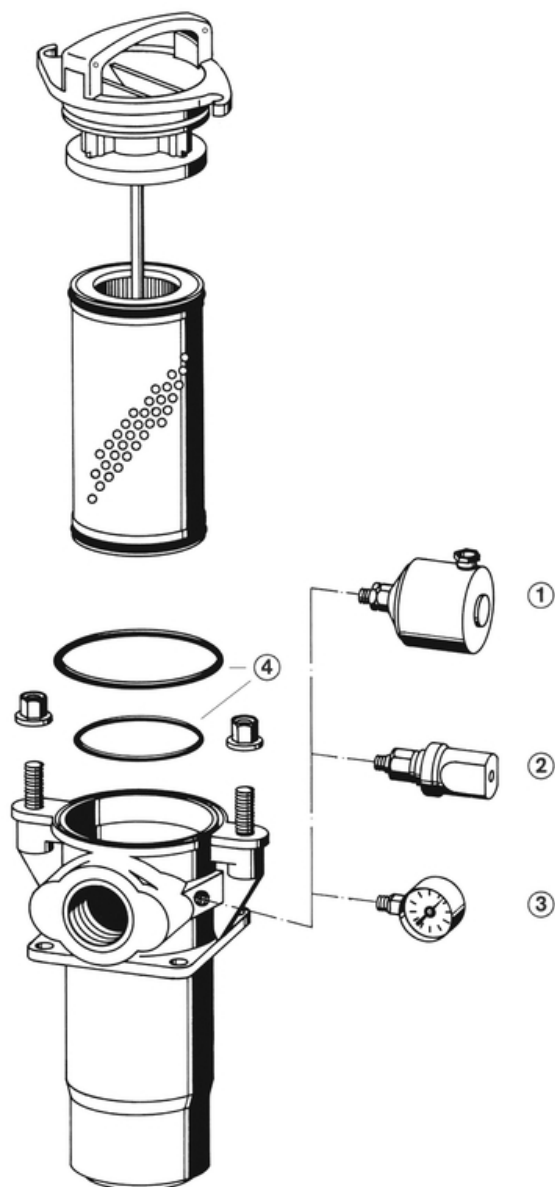
b) Manual cleaning

1. Remove coarse external contamination in a separate cleaning tank using a brush and cleaning agent.
2. Place filter in unused cleaning liquid (approx. 20 min)
3. Wash filter with cleaning liquid from the outside to the inside.
4. Dry element with pressured-air from the clean side to the dirt side; the cleaning efficiency is about 60–70%

Using either method, be sure that no dirt is entering to the clean side of filter.

8. Spare parts list

Order numbers for spare parts		
Position	Type	Order number
①	Vacuum switch 230 V (PiS 3070/200 mbar)	77669724
②	Vacuum switch 42 V (HES 2200 BP)	78308892
③	Pressure gauge (-1 to 1.5 bar)	76345763
④	Seal kit for filter housing + filter element	
	NBR	77874563
	FPM	77904840
	EPDM	77904857



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Suction Filters

Pi 1710

Nominal size up to 480

1. Features

Pumps incorporated in hydraulic systems must be protected from coarse contaminants which when not removed by any other filtering devices may gain access to tank.

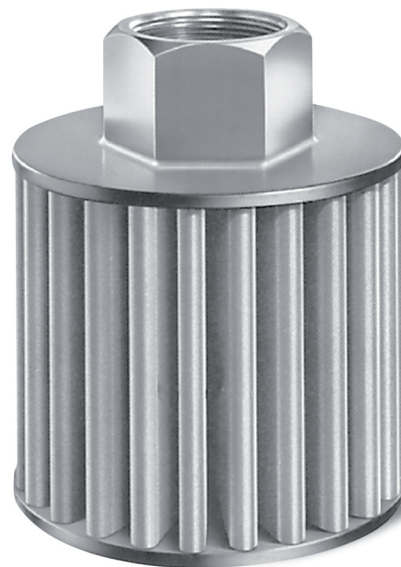
Filtration Group suction filters, series Pi 1710, stand out for their rugged construction and large filter surface area.

The filter surface is dimensioned to ensure long life at the proper corresponding flow rate.

The installation should be ahead of the pump in the tank for optimal protection.

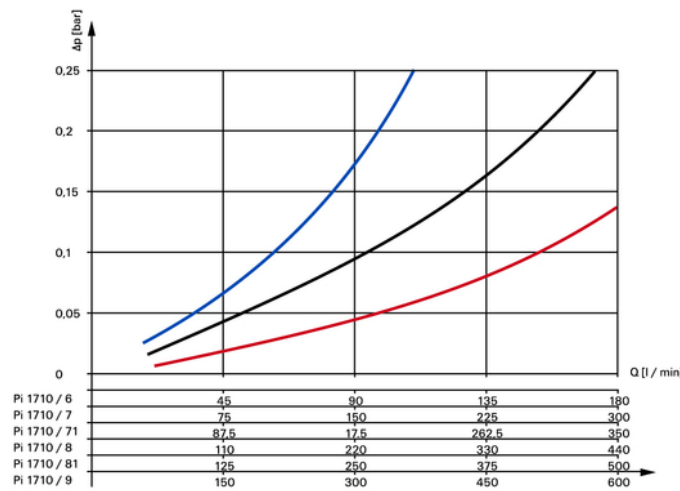
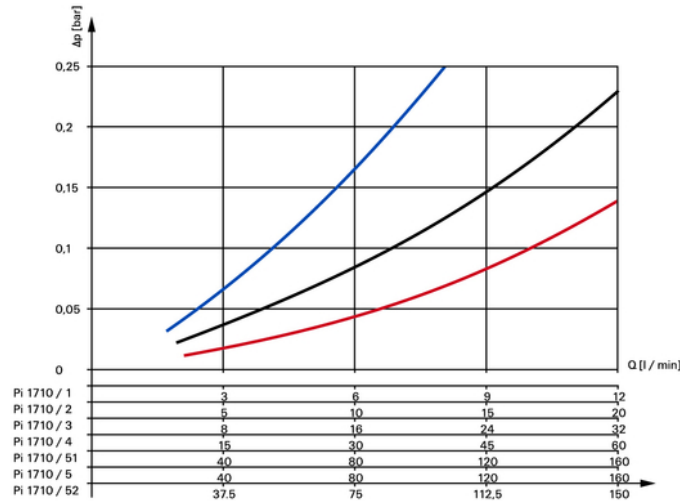
The standard filter material is a 100 µm stainless steel wire mesh.

- Rugged construction
- Large filtering surface area
- Worldwide distribution



2. Flow rates/pressure drop curve

— 500 mm²/s
— 190 mm²/s
— 33 mm²/s



3. Order numbers

3.1 Housing design			
Nominal size NG [l/min]	Order number	Type	Filter surface [cm ²]
10	77661598	Pi 1710/1	104
15	77661606	Pi 1710/2	104
30	77661614	Pi 1710/3	170
50	77661622	Pi 1710/4	394
60	77661697	Pi 1710/51	510
80	77661630	Pi 1710/5	642
120	77661705	Pi 1710/52	940
150	77661648	Pi 1710/6	1104
240	77661655	Pi 1710/7	1484
290	77661689	Pi 1710/71	1858
360	77661663	Pi 1710/8	2738
410	77661713	Pi 1710/81	3434
480	77661671	Pi 1710/9	3422

4. Technical specifications

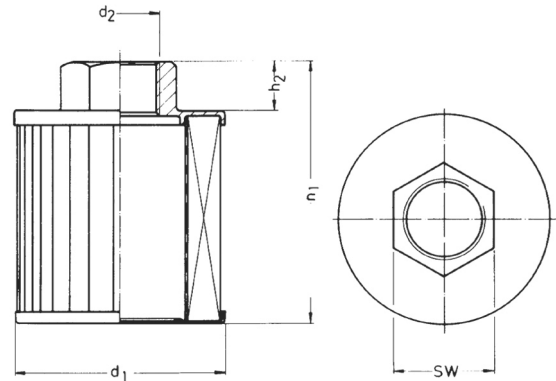
Flow capacity:	10 to 480 l/min at 33 mm ² /s viscosity and 0.1 bar Δ p
Temperature range:	-10 °C to +120 °C
Degree of filtration:	100 μ m
Other ratings:	on request
Material of connecting port + end cap:	PA 6 GF 30
Material of end cap:	galvanized steel
Material of inner tube:	galvanized steel
Material of wire mesh:	stainless steel 1.4301

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We recommend you to contact us concerning applications of our filters in areas governed by the EU Directive 94/9 EG (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 are planning to use other fluids please contact us for additional support.

Subject to technical alteration.



5. Dimensions

All dimensions except "d₂" in mm.

Type	d ₁	d ₂	h ₁	h ₂	SW	Weight [kg]
Pi 1710/1	46	G¼	59.5	18	22	0.10
Pi 1710/2	46	G3/8	59.5	18	22	0.10
Pi 1710/3	61	G½	53.5	13	27	0.14
Pi 1710/4	61	G¾	86.5	13	32	0.20
Pi 1710/51	87	G1	86.5	21	41	0.32
Pi 1710/5	87	G1	107.5	21	41	0.35
Pi 1710/52	87	G1	152.5	21	41	0.40
Pi 1710/6	99	G1¼	122	21.5	46	1.00
Pi 1710/7	99	G1½	159	28	50	1.00
Pi 1710/71	99	G1½	189	28	50	1.05
Pi 1710/8	131	G2	161	30	65	1.20
Pi 1710/81	131	G2	191	30	65	1.40
Pi 1710/9	131	G2½	198	37.5	80	1.50

6. Cleaning methods

a) Ultrasonic cleaning

Insert the contaminated suction filter element into an ultrasonic bath for approximately 3 minutes, then rinse in clean liquid. Afterwards, blow air into the filter from the clean side outward.

The cleaning effect is approximately 80-90 %.

b) Manual cleaning

1. Remove coarse external contamination in a separate cleaning tank using a brush and cleaning agent.
2. Place filter in unused cleaning liquid (approximately 20 minutes).
3. Wash filter with cleaning liquid from the inside to the outside. The cleaning effect is approximately 60-70 %.

Using either method be sure that no dirt is washed on the inside of the element.

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78357287.12/2016
Suction Filter Pi 1710 up to NG 480

Low Pressure Filter/Suction Filter Pi 1941

Nominal pressure 10/25 bar (140/360 psi), up to nominal size 63

1. Features

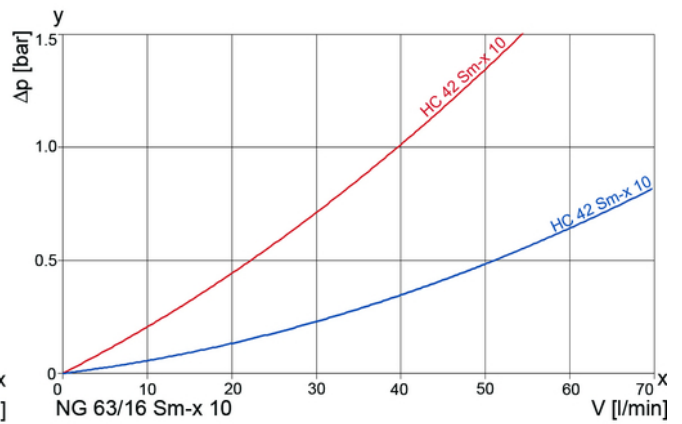
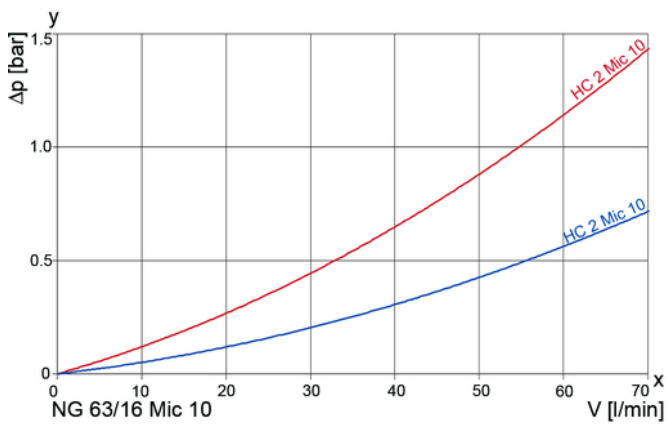
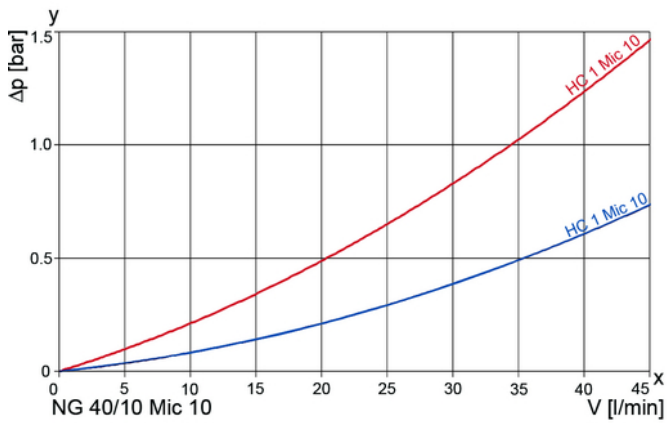
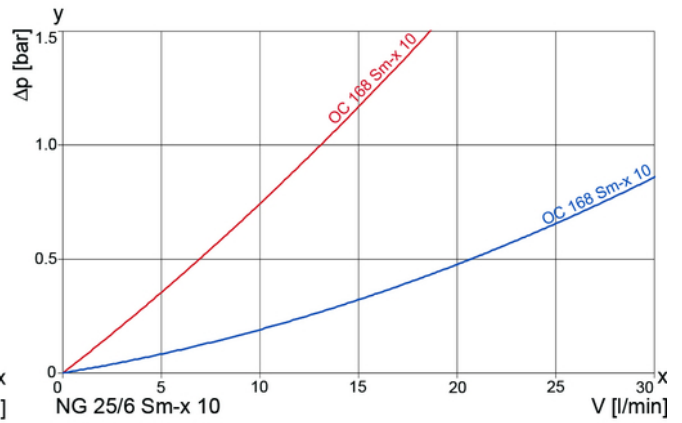
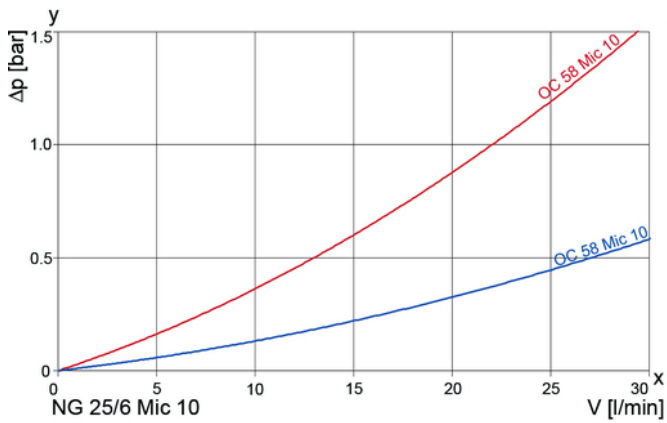
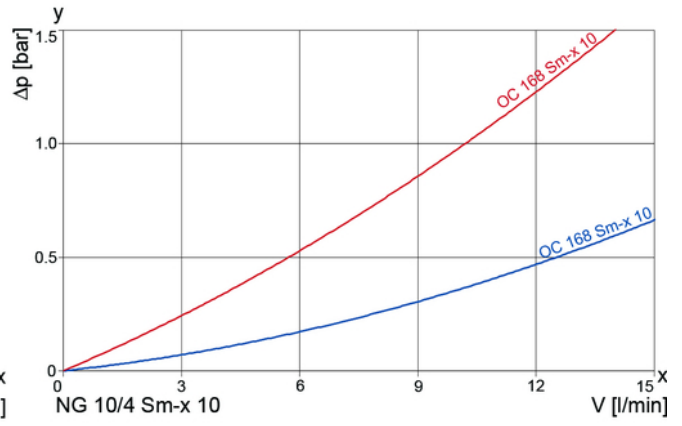
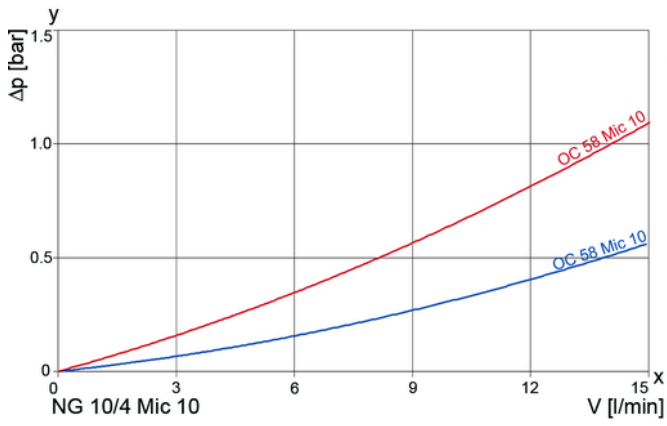
High performance filters for modern hydraulic systems

- Provided for pipe installation
- Modular system
- Compact design
- Minimal pressure drop through optimal flow design
- Visual maintenance indicator
- Threaded connections
- Quality filters, easy to service
- Equipped with highly efficient glass fibre Sm-x and Mic filter elements
- 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

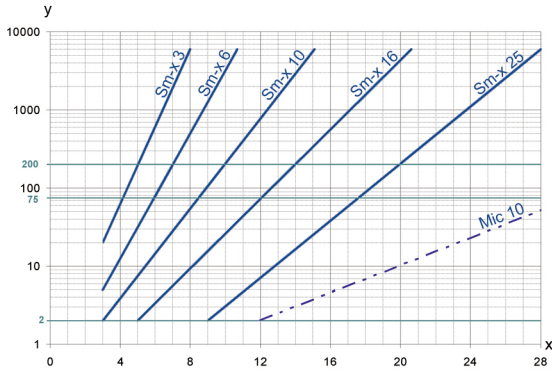
190 mm²/s
33 mm²/s



y = differential pressure Δp [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. Δp 5 bar

Sm-x 10 $\beta_{10(C)} \geq 75$

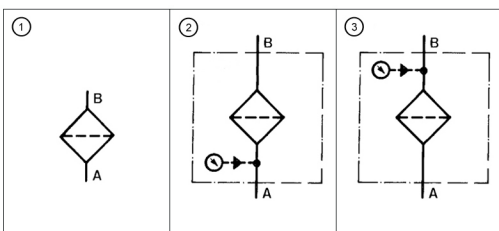
values guaranteed up to
5 bar differential pressure

5. Quality assurance

Filtration Group and filter elements are produced according to the following international standards:

Norm	Designation
DIN ISO 2941	Hydraulic filter elements: Verification of burst resistance
DIN ISO 2942	Hydraulic filter elements: Determination of fabrication integrity
DIN ISO 2943	Hydraulic filter elements: Verification of material compatibility with hydraulic fluids
DIN ISO 3723	Hydraulic filter elements: Method for testing end-cap load
DIN ISO 3724	Hydraulic filter elements: Verification of flow fatigue characteristics
ISO 3 968.2	Hydraulic filter elements: Evaluation of pressure drop versus flow
ISO 16889	Hydraulic filter elements: Testing of filter performance

6. Symbols



7. Order numbers

Example for ordering filters:

1. Housing design

V= 63 l/min, pressure gauge + spin-on cartridge Mic 10

Type Pi 1941/10/G¾/DM + HC 2

Order number 77807811 + 72013241

7.1 Housing design/order number for pressure-side installation

Nominal flow rate NG [l/min]	Order number	Type	①	②
			no options	with pressure gauge
10	77664360	Pi 1941/10/G¾		
	77812225	Pi 1941/10/G¾/DM		
25	77664386	Pi 1941/10/G3/8		
	77815509	Pi 1941/10/G3/8/DM		
40	77664394	Pi 1941/10/G½		
	77664402	Pi 1941/10/G½/DM		
63	77664378	Pi 1941/10/G¾		
	77807811	Pi 1941/10/G¾/DM		

7.2 Spin-on cartridges

Nominal flow rate NG [l/min] press-/suct. side	Order number	Type	Filter material	max. Δ p [bar]	Filter surface [cm²]
10/4	77785983	OC 58	Mic 10	5	1775
	77500184	OC 168	Sm-x 10		1309
25/6	77785983	OC 58	Mic 10	5	1775
	77500184	OC 168	Sm-x 10		1309
40/10	77640899	HC 1	Mic 10	5	3000
63/16	72013241	HC 2	Mic 10	5	5440
	77501372	HC 42	Sm-x 10		3360

7.3 Housing design/order numbers for suction-side installation

Nominal flow rate NG [l/min]	Order number	Type	①	③
			no options	with vacuum gauge
4	77664360	Pi 1941/10/G¾		
	77894033	Pi 1941/10/G¾/UM		
6	77664386	Pi 1941/10/G3/8		
	77894041	Pi 1941/10/G3/8/UM		
10	77664394	Pi 1941/10/G½		
	77894058	Pi 1941/10/G½/UM		
16	77664378	Pi 1941/10/G¾		
	77658966	Pi 1941/10/G¾/UM		

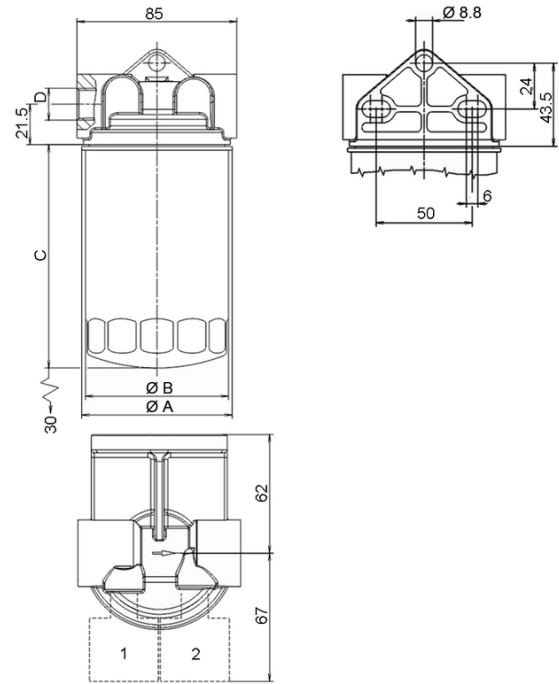
8. Technical specifications

Design:	line mounting filter
Nominal pressure*:	10 bar (140 psi)
Test pressure:	13 bar (180 psi)
Temperature range:	-10 °C to +120 °C (other temperature ranges on request)
Filter head material:	GDAL
Spin-on cartridge material:	St
Sealing material:	NBR
Installation position:	preferably vertical
Indicating range pressure manometer:	0 to 10 bar
Indicating range vacuum gauge:	-1 to 0 bar

*For the combination of the housing designs as per 7.1 with medium-pressure spin-on cartridges at 25 bar pressure refer to data sheet "spin-on cartridges" for dimensions and specifications.

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.



1 = pressure gauge

2 = vacuum gauge

Subject to technical alteration without prior notice.

9. Dimensions

All dimensions except "D" in mm.

Type	Ø A	Ø B	C	D	Weight [kg] Execution Mic*	Weight [kg] Execution Sm-x*
Pi 1941/10/G 1/4	80	76	120	G 1/4	0.67	0.82
Pi 1941/10/G 3/8	80	76	120	G 3/8	0.67	0.82
Pi 1941/10/G 1/2	95	93	141	G 1/2	0.82	1.02
Pi 1941/10/G 3/4	95	93	210	G 3/4	1.02	1.02

*Design with gauge + 0.1 kg

10. Installation, operating and maintenance instructions

10.1 Filter installation

When installing the filter make sure that sufficient space is available to remove the spin-on cartridge.

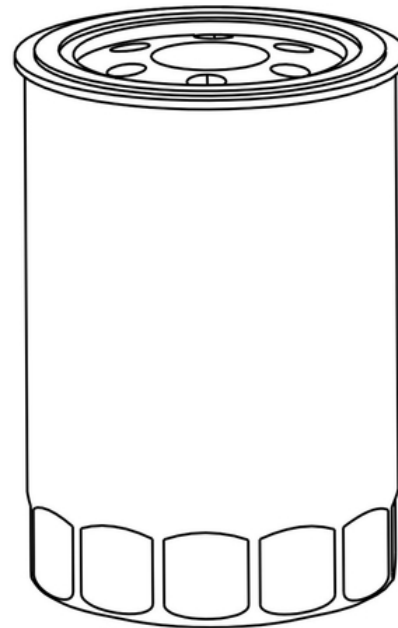
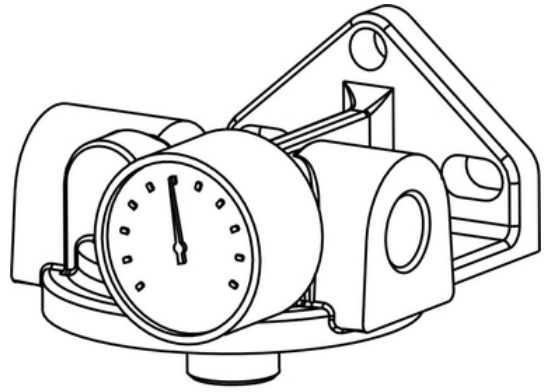
Preferably the filter should be installed with the spin-on cartridge pointing downwards.

10.2 When should the spin-on cartridge be replaced?

1. Filter equipped with the vacuum gauge for suction-side installation: During cold start the vacuum gauge may for a short period indicate > 0.2 bar. With increasing operating temperature the indicator needle must drop clearly below the 0.2 bar mark. Should this not be the case, the spin-on cartridge must be replaced after the end of the shift.
2. Filters without maintenance indicator: The spin-on cartridge should be replaced after the trial run or flushing of the system. Afterwards follow instructions of the manufacturer.
3. Please always ensure that you have original Filtration Group spare cartridges in stock.

10.3 Change of spin-on cartridge

1. Stop system and relieve filter from pressure.
2. Unscrew the spin-on cartridge with the aid of a belt spanner by turning same to the left.
3. Make sure that the order number on the new spin-on cartridge corresponds to the order number of the name-plate.
4. The seal of the spin-on cartridge should be lightly oiled.
5. Screw cartridge on in accordance with the printed-on instructions.



11. Spare parts list

Position	Type	Order number
①	Pressure gauge (not shown)	77870611
②	Vacuum gauge	77617558

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 www.filtrationgroup.com
 78357337.12/2016

Nízkotlakfiltr Pi 200

Jmenovitý tlak 32/63 bar, do jmenovité velikosti 600 l/min

1. Stručný popis

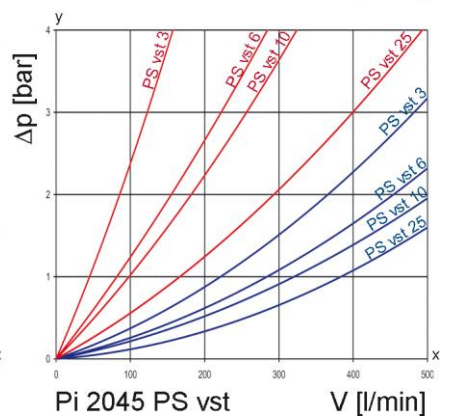
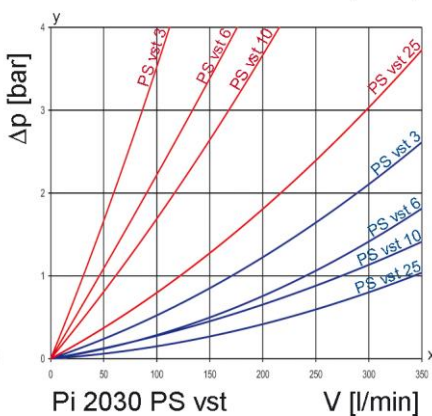
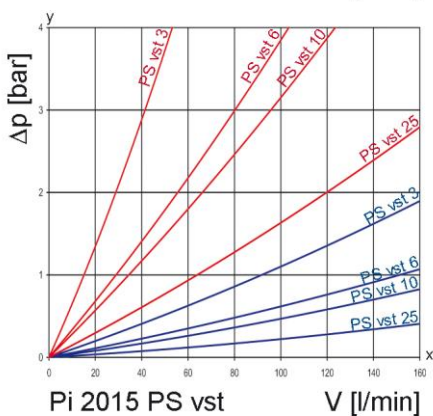
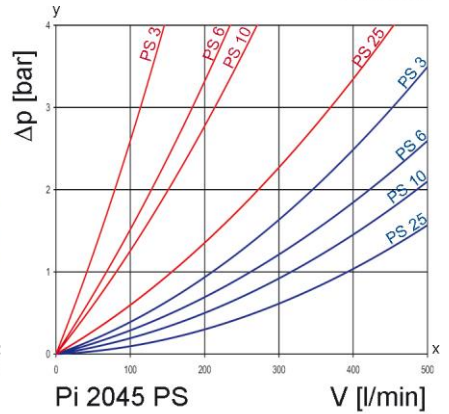
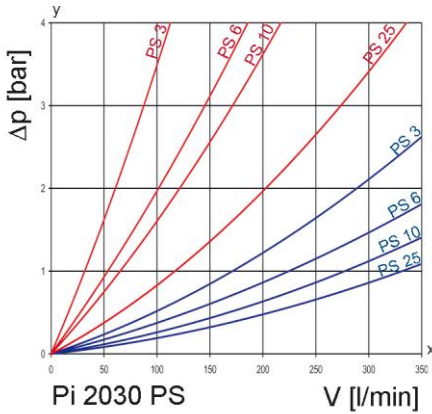
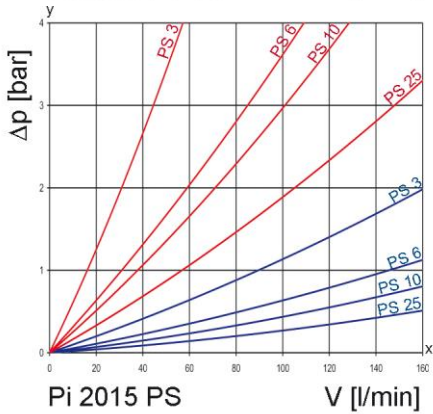
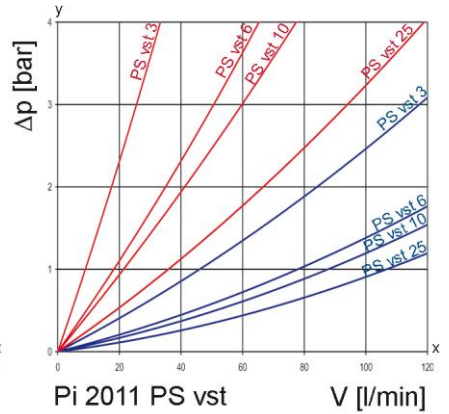
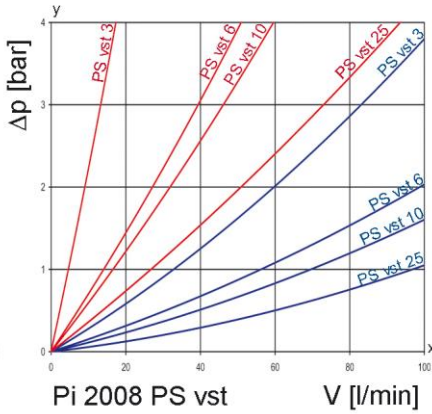
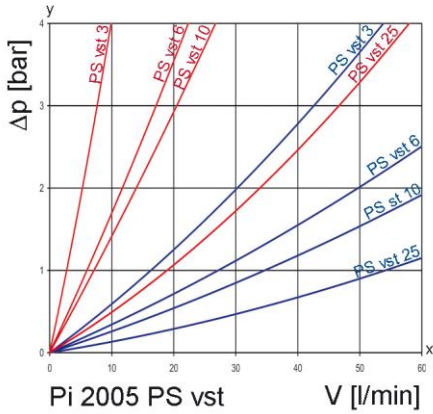
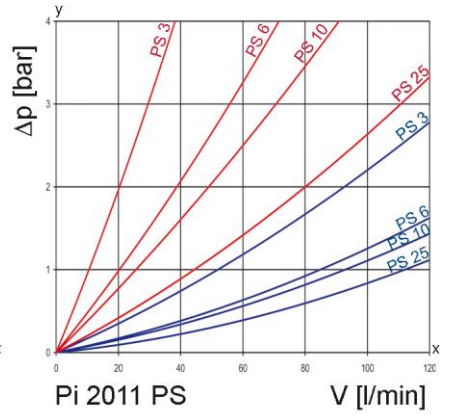
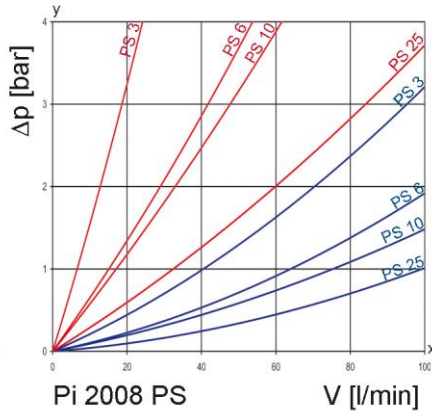
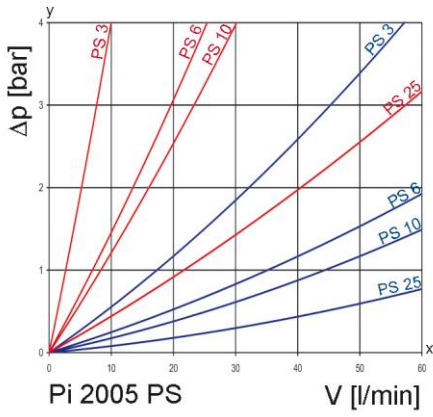
Výkonné filtry pro moderní hydraulická zařízení

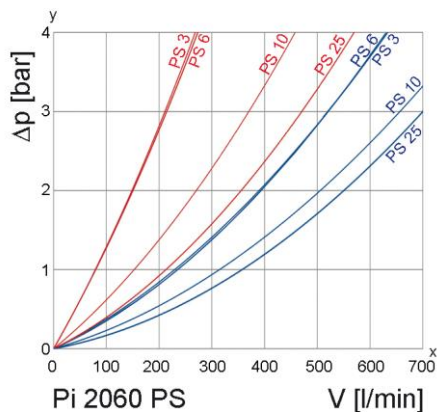
- Filtr pro montáž do vedení
- Modulový systém pro optimální volbu filtru
- Malá potřeba místa díky kompaktní konstrukci
- Minimální ztráta tlaku díky uspořádání dílů příznivého z hlediska proudění
- Optická/elektrická/elektronická indikace údržby
- Připojení přírubové
- Snadná manipulace a údržba
- Vybaven filtračními vložkami PS s vysokou účinností
- Garantovaná účinnost odlučování na základě víceprůchodového testu podle ISO16889
- Vysoká stabilita tlakového rozdílu a kapacita zachycení nečistot vložek
- Jine závitové přípojky na požádání
- Prodej po celém světě



2. Křivky výkonnosti kompletních filtrů

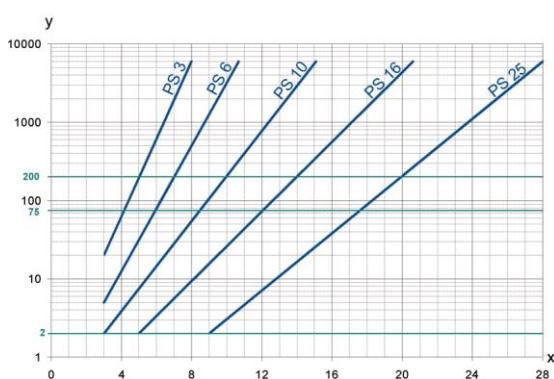
190 mm²/s
33 mm²/s





y = tlakový rozdíl Δp [bar]
 x = objemový proud V [l/min]

3. Charakteristiky stupně odlučování



y = hodnota Beta
 x = velikost částic [μm]

zjištěno víceprůchodovými měřeními (ISO 16889)
 kalibrace podle ISO 11171 (NIST)

5. Zajištění kvality

Filtry a filtrační vložky Filtration Group se vyrábějí, resp. testují podle následujících mezinárodních norem:

Norma	Název
DIN ISO 2941	Hydraulické tlakové filtrační vložky; Tlaková zkouška porušení, protržení
DIN ISO 2942	Hydraulické tlakové filtrační vložky; Doklad o bezchybné kvalitě výroby
DIN ISO 2943	Hydraulické filtrační vložky; Doklad o snášenlivost s tlakovou kapalinou
DIN ISO 3723	Hydraulické tlakové filtrační vložky; Metoda zkoušení zatížení koncových desek
DIN ISO 3724	Hydraulické filtrační vložky; Doklad o vlastnostech průtoků vlivem únavy
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

4. Výkonové údaje filtru

změřeno podle ISO 16889 (Multipass-Test)

Vložky PS s
 max. Δp 20 bar

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

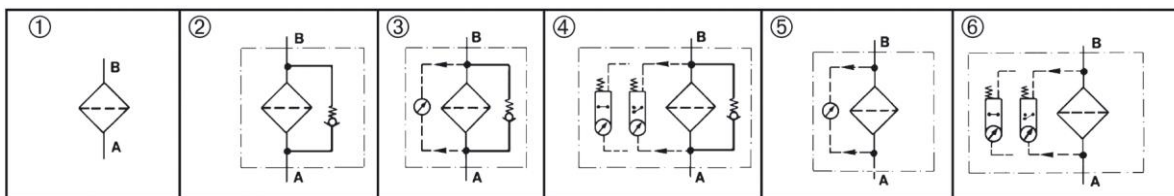
do tlakového rozdílu 10 bar

Vložky PS vst s
 max. Δp 210 bar

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

do tlakového rozdílu 20 bar

6. Schématická zobrazení



7. Objednací čísla

Příklad objednávky filtru:

1. Těleso filtru	2. Filtrační vložka
V=80 l/min a optická/elektrická indikace údržby Typové označení: Pi 2008-069 Objednací číslo: 77665284	PS vst 3 Typové označení: Pi 2208 PS vst 3 Objednací číslo: 77680200

7.1 Provedení tělesa filtru									
Jmenovitá velikost NG [l/min]	Objednací číslo	Typové označení	① vrtání pro signaliz.	② s obtokem vrtání pro signaliz.	③ s obtokem a optickou indikací	④ s obtokem a elektrickou indikací	⑤ s optickou indikací	⑥ s elektrickou indikací	
50	77665144	Pi 2005-060							
	77665110	Pi 2005-056							
	77665128	Pi 2005-057							
	77665136	Pi 2005-058							
	77665169	Pi 2005-068							
	77665177	Pi 2005-069							
80	77665235	Pi 2008-060							
	77665201	Pi 2008-056							
	77665219	Pi 2008-057							
	77665227	Pi 2008-058							
	77665276	Pi 2008-068							
	77665284	Pi 2008-069							
110	78205114	Pi 2011-060							
	78205122	Pi 2011-056							
	78205130	Pi 2011-057							
	78205148	Pi 2011-058							
	78205155	Pi 2011-068							
	78205163	Pi 2011-069							
150	77840580	Pi 2015-060							
	76165203	Pi 2015-056							
	76165211	Pi 2015-057							
	79320748	Pi 2015-058							
	76165229	Pi 2015-068							
	78396616	Pi 2015-069							
300	77665474	Pi 2030-060							
	77665441	Pi 2030-056							
	77665458	Pi 2030-057							
	77665466	Pi 2030-058							
	77665516	Pi 2030-068							
	77665532	Pi 2030-069							

7.1 Provedení tělesa filtru								
Jmenovitá velikost NG [l/min]	Objednací číslo	Typové označení	① vrtání pro signaliz.	② s obtokem vrtání pro signaliz.	③ s obtokem a optickou indikací	④ s obtokem a elektrickou indikací	⑤ s optickou indikací	⑥ s elektrickou indikací
450	77664881	Pi 2045-060						
	77664873	Pi 2045-056						
	77664865	Pi 2045-057						
	77664857	Pi 2045-058						
	77664923	Pi 2045-068						
	77664931	Pi 2045-069						
600	70576045	Pi 2045-060						
	70534876	Pi 2045-056						
	79714171	Pi 2045-057						
	70576046	Pi 2045-058						
	78205254	Pi 2045-068						
	70576047	Pi 2045-069						

V případě použití filtru bez obtoku musí být zajištěno, aby nebyl překročen max. Δp filtrační vložky.

7.2 Filtrační vložky (jiné provedení vložky na požádání)					
Jmenovitá velikost NG [l/min]	Objednací číslo	Typové označení	Filtrační materiál	max. Δp [bar]	Filtrační plocha [cm ²]
50	77680135	Pi 2105 PS 3	PS 3	20	590
	77943509	Pi 5105 PS 6	PS 6		590
	77680325	Pi 3105 PS 10	PS 10		590
	77680440	Pi 4105 PS 25	PS 25		590
	77680192	Pi 2205 PS vst 3	PS vst 3	210	425
	77943533	Pi 5205 PS vst 6	PS vst 6		425
	77680382	Pi 3205 PS vst 10	PS vst 10		425
	77680507	Pi 4205 PS vst 25	PS vst 25		425
80	77680143	Pi 2108 PS 3	PS 3	20	1150
	77943517	Pi 5108 PS 6	PS 6		1150
	77680341	Pi 3108 PS 10	PS 10		1150
	77680457	Pi 4108 PS 25	PS 25		1150
	77680200	Pi 2208 PS vst 3	PS vst 3	210	850
	77943541	Pi 5208 PS vst 6	PS vst 6		850
	77681190	Pi 3208 PS vst 10	PS vst 10		850
	77680515	Pi 4208 PS vst 25	PS vst 25		850
110	77680150	Pi 2111 PS 3	PS 3	20	1700
	77943525	Pi 5111 PS 6	PS 6		1700
	77680333	Pi 3111 PS 10	PS 10		1700
	77680465	Pi 4111 PS 25	PS 25		1700
	77680218	Pi 2211 PS vst 3	PS vst 3	210	1275
	77943558	Pi 5211 PS vst 6	PS vst 6		1275
	77680390	Pi 3211 PS vst 10	PS vst 10		1275
	77680523	Pi 4211 PS vst 25	PS vst 25		1275
150	77680168	Pi 2115 PS 3	PS 3	20	2425
	77955099	Pi 5115 PS 6	PS 6		2425
	77680358	Pi 3115 PS 10	PS 10		2425
	77680473	Pi 4115 PS 25	PS 25		2425

7.2 Filtrační vložky (jiné provedení vložky na požádání)					
Jmenovitá velikost NG [l/min]	Objednací číslo	Typové označení	Filtrační materiál	max. Δp [bar]	Filtrační plocha [cm ²]
150	77680226	Pi 2215 PS vst 3	PS vst 3	210	2010
	77955123	Pi 5215 PS vst 6	PS vst 6		2010
	77680408	Pi 3215 PS vst 10	PS vst 10		2010
	77680531	Pi 4215 PS vst 25	PS vst 25		2010
300	77680176	Pi 2130 PS 3	PS 3	20	4620
	77955107	Pi 5130 PS 6	PS 6		4620
	77680366	Pi 3130 PS 10	PS 10		4620
	77680481	Pi 4130 PS 25	PS 25		4620
	77680234	Pi 2230 PS vst 3	PS vst 3	210	3800
	77955131	Pi 5230 PS vst 6	PS vst 6		3800
	77680416	Pi 3230 PS vst 10	PS vst 10		3800
	77680549	Pi 4230 PS vst 25	PS vst 25		3800
450	77680184	Pi 2145 PS 3	PS 3	20	6865
	77955115	Pi 5145 PS 6	PS 6		6865
	77680374	Pi 3145 PS 10	PS 10		6865
	77680499	Pi 4145 PS 25	PS 25		6865
	77680242	Pi 2245 PS vst 3	PS vst 3	210	5600
	77955149	Pi 5245 PS vst 6	PS vst 6		5600
	77680424	Pi 3245 PS vst 10	PS vst 10		5600
	77680556	Pi 4245 PS vst 25	PS vst 25		5600
600	70346506	Pi 2160 PS 3	PS 3	20	9398
	76114318	Pi 5160 PS 6	PS 6		9398
	79393380	Pi 3160 PS 10	PS 10		9398
	79748047	Pi 4160 PS 25	PS 25		9398

8. Technické údaje

Konstrukce: Filtr pro montáž do vedení

Jmenovitý tlak:

Pi 2005 - 2011 10⁷ Změny zatížení 63 bar
 Pi 2015 - 2060 10⁷ Změny zatížení 25 bar
 2x 10⁶ Změny zatížení 32 bar

Zkušební tlak:

Pi 2005 - 2011 95 bar
 Pi 2015 - 2060 48 bar

Rozsah teplot:

-30 °C až +120 °C
 Teplota pro přežití -40 °C
 (jiné rozsahy teplot na požádání)

Otvírací tlak obtoku: Δp 3,5 bar \pm 10 %

Materiál hlavy filtru: GDAL

Materiál tělesa filtru: AL/ocel

Materiál těsnění: NBR/AL

Spínání opt./elektr. indikátoru údržby: Δp 2,2 bar \pm 10 %

Elektrické údaje indikátoru údržby:

Napětí max.: 250 V AC/200 V DC

Spínací proud max.: 1 A

Spínací výkon: 70 W

Druh ochrany: IP 65 v zasunutém a zajištěném stavu

Druh kontaktů: Zapínací kontakt/rozpojovací kontakt

Kabelová průchodka: M20x1,5

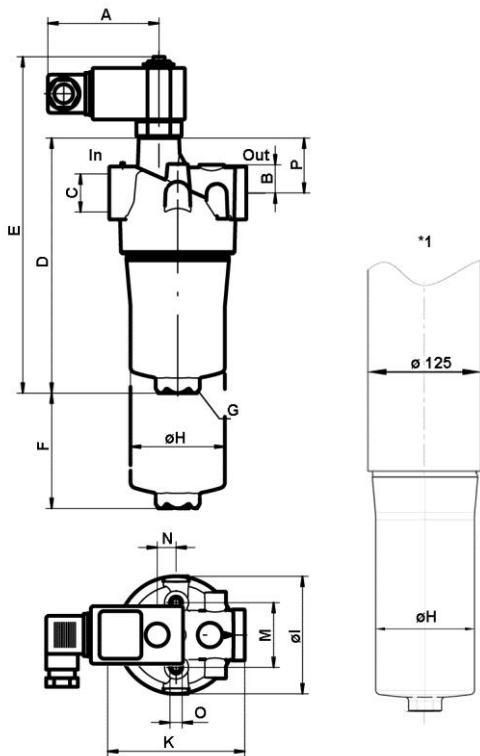
Přestavením elektrického spínacího dílu o 180° lze změnit spínací funkci (zapínací nebo rozpojovací kontakt). Stav při dodání je rozpojovací kontakt. V případě indukčnosti ve stejnosměrném obvodu je třeba zkontrolovat použití zhášecích členů. Další údaje a další provedení indikátoru údržby obsahuje specifikace indikátoru údržby.

Upozorňujeme na to, že se u uvedených hodnot jedná o průměrné hodnoty. Naše výrobky jsou neustále zlepšovány. Proto se mohou hodnoty, rozměry a hmotnosti změnit. Pracovníci našeho odborného oddělení Vám rádi poskytnou potřebné informace.

V případě použití našich filtrů v oblastech, které je třeba klasifikovat podle směrnice EU 94/9 EU (ATEX 95), Vám doporučujeme se s námi za účelem konzultace spojit. Standardní provedení je určeno pro kapaliny skupiny na bázi minerálního oleje (podle kapalin skupiny 2 směrnice 97/23/EU, článek 9). V případě použití jiných médií Vás prosíme, abyste se s námi spojili.

Technické změny vyhrazeny!

9. Rozměry



In Vstup
 Out Výstup
 *1 Provedení tělesa filtru pro NG 600

Všechny rozměry s výjimkou "C" jsou v mm.

Typ	A	B	C*	D	E	F	G SW	H	I	K	M	N	O	P	Hmotnost [kg]
Pi 2005	78	19	G½	177	235	80	27	66	80	95	45	13,0	M8x10	37,5	0.9
Pi 2008	78	19	G¾	253	311	80	27	66	80	95	45	13,0	M8x10	37,5	1.0
Pi 2011	78	19	G¾	335	393	80	27	66	80	95	45	13,0	M8x10	37,5	1.2
Pi 2015	78	30	G1¼	244	302	110	32	109	128	150	60	24,5	M12x15	43,5	2.1
Pi 2030	78	30	G1¼	360	418	110	32	109	128	150	60	24,5	M12x15	43,5	2.4
Pi 2045	78	30	G1¼	475	533	110	24	109	128	150	60	24,5	M12x15	43,5	6.5
Pi 2060	78	30	G1¼	615	643	110	32	109	128	150	60	24,5	M12x15	43,5	5.5

* Závitové přípojky NPT a SAE na požádání

10. Návod na montáž, obsluhu a údržbu

10.1 Montáž filtru

Při montáži filtru dbejte na to, aby byla k dispozici potřebná demontážní výška pro vyjmutí filtrační vložky a tělesa filtru. Filtr by měl být přednostně zabudován tělesem filtru směrem dolů. Indikátor údržby musí být viditelný.

10.2 Připojení elektrického indikátoru údržby

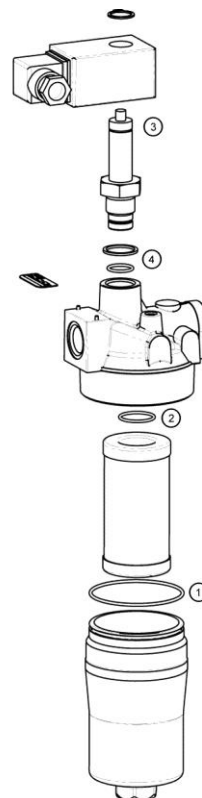
Připojení elektrické indikace se provádí pomocí 2-pólové přístrojové zástrčky podle normy DIN EN 17 5301-803, u které jsou póly označeny číslicemi 1 a 2. Spínací díl nasuňte podle požadavku jako zapínací kontakt nebo rozpojovací kontakt. Spínací díl nasuňte podle požadavku jako zapínací kontakt nebo rozpojovací kontakt.

10.3 Kdy je nutné vyměnit filtrační vložku?

1. U filtrů s optickou a elektrickou indikací údržby: Při rozběhu ve studeném stavu může v důsledku vysoké viskozity vyskočit červený indikátor a aktivovat se elektrický signál. Vyskočí –lisignalizační kolík,nebenezruší-li se při pracovní teplotě elektrický signál musí se po skončení směny vyměnit filtrační element.
2. U filtrů bez signalizátorů znečištění: Filtrační prvek by měl být vyměněn po zkušebním provozu nebo po proplachování zařízení. Dále se řiďte návodem od výrobce zařízení.
3. Vždy dbejte na to, abyste měli na skladě originální náhradní vložky firmy Filtration Group. Jednorázové vložky nelze čistit.

10.4 Výměna vložky

1. Odstavte zařízení, filtr musí být tlakově odlehčen.
2. Odšroubujte těleso filtru otáčením doleva. Vyčistěte těleso filtru vhodným prostředkem.
3. Vyjměte filtrační vložku směrem dolů mírným posuvně vratným pohybem.
4. Zkontrolujte těsnicí O kroužek v tělese filtru a upevnění vložky z hlediska poškození. V případě potřeby je třeba tyto díly vyměnit.
5. Zkontrolujte, zda objednací číslo na náhradní vložce souhlasí s objednací číslem na štítku. Otevřete umělohmotný obal a zasuňte vložku přes upevňovací díl do hlavy filtru. Stáhněte umělohmotný obal.
6. Na závit tělesa filtru naneste tenkou vrstvu oleje a zašroubujte jej do hlavy filtru. Maximální utahovací moment při NG 50 až 110 = 30 Nm, při NG 150 až 600 = 50 Nm.



11. Seznam náhradních dílů

Objednací čísla pro náhradní díly		
Pozice	Označení	Objednací číslo
① bis ②	Sada těsnění pro těleso	
	Pi 2005 - Pi 2011	
	NBR	77550213
	FPM	77845795
	EPDM	77845803
	Pi 2015 - Pi 2060	
	NBR	77550221
	FPM	77845811
EPDM	77845829	
③	Indikátor údržby	
	Optický PiS 3098/2,2	77669971
	Elektrický PiS 3097/2,2	77669948
	Pouze elektrická horní část	77536550
④	Sada těsnění pro indikátor údržby	
	NBR	77760309
	FPM	77760317
	EPDM	77760325

Low Pressure Filter

Pi 200

Nominal pressure 32/63 bar (460/910 psi), nominal size up to 600

1. Features

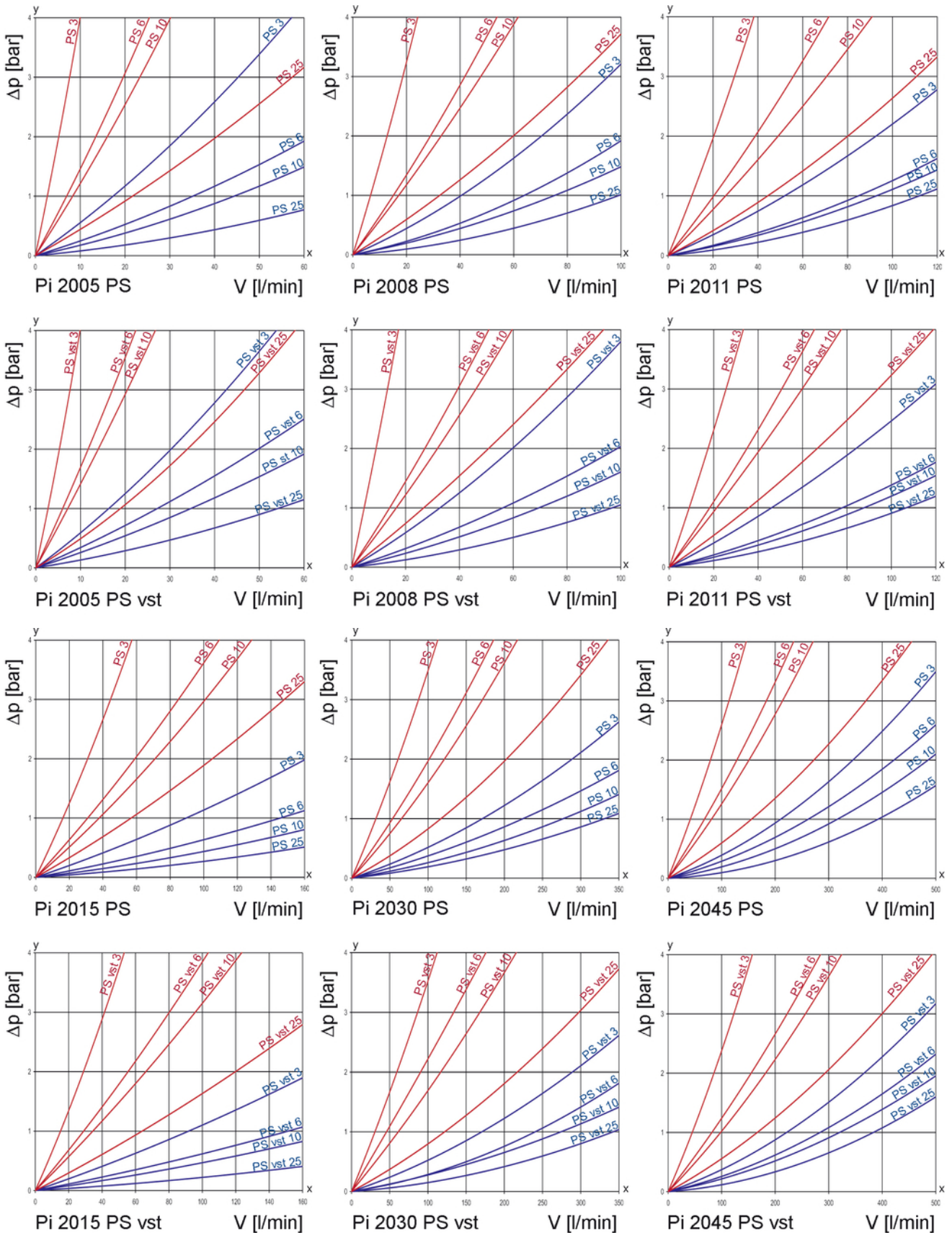
High performance filters for modern hydraulic systems

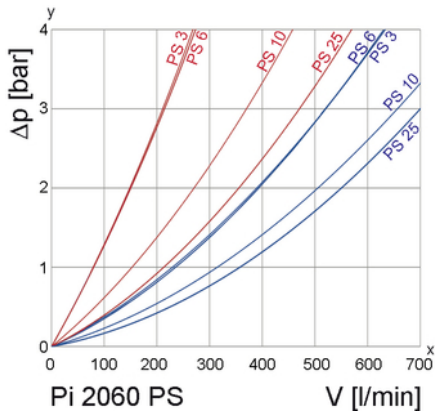
- Provided for pipe installation
- Modular system
- Compact design
- Minimal pressure drop through optimal flow design
- Visual/electrical/electronic maintenance indicator
- Threaded connections
- Quality filters, easy to service
- Equipped with highly efficient glass fibre PS filter elements
- Beta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



2. Flow rate/pressure drop curve (filter housing incl. element)

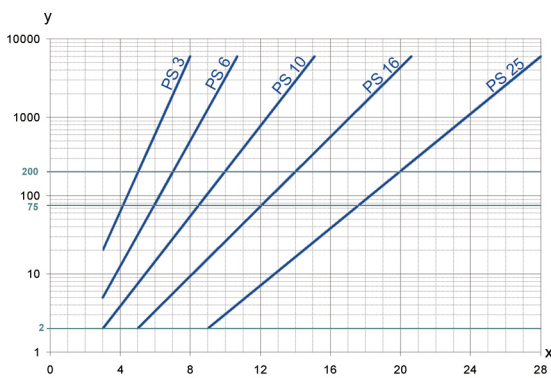
■ 190 mm²/s
■ 33 mm²/s





y = differential pressure Δp [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 (NIST)

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 of 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

4. Filter performance data

tested according to ISO 16889 (multipass test)

PS elements with
max. Δp 20 bar

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

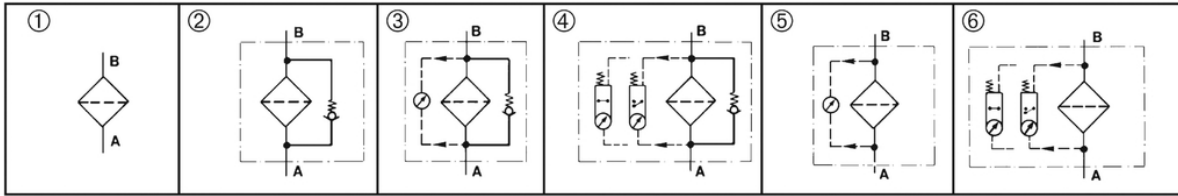
values guaranteed up to
10 bar differential pressure

PS vst elements with
max. Δp 210 bar

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

values guaranteed up to
20 bar differential pressure

6. Symbols



7. Order numbers

Example for ordering filters:

1. Filter housing	2. Filter element
V = 80 l/min and visual/electrical maintenance indicator	PS vst 3
Type: Pi 2008-069	Type: Pi 2208 PS vst 3
Order number: 77665284	Order number: 77680200

7.1 Housing design

Nominal size NG [l/min]	Order number	Type	①	②	③	④	⑤	⑥
			no options	with bypass valve	with bypass valve and visual indicator	with bypass valve and electrical indicator	with visual indicator	with electrical indicator
50	77665144	Pi 2005-060	■					
	77665110	Pi 2005-056		■				
	77665128	Pi 2005-057			■			
	77665136	Pi 2005-058				■		
	77665169	Pi 2005-068					■	
	77665177	Pi 2005-069						■
80	77665235	Pi 2008-060	■					
	77665201	Pi 2008-056		■				
	77665219	Pi 2008-057			■			
	77665227	Pi 2008-058				■		
	77665276	Pi 2008-068					■	
	77665284	Pi 2008-069						■
110	78205114	Pi 2011-060	■					
	78205122	Pi 2011-056		■				
	78205130	Pi 2011-057			■			
	78205148	Pi 2011-058				■		
	78205155	Pi 2011-068					■	
	78205163	Pi 2011-069						■
150	77840580	Pi 2015-060	■					
	76165203	Pi 2015-056		■				
	76165211	Pi 2015-057			■			
	79320748	Pi 2015-058				■		
	76165229	Pi 2015-068					■	
	78396616	Pi 2015-069						■
300	77665474	Pi 2030-060	■					
	77665441	Pi 2030-056		■				
	77665458	Pi 2030-057			■			
	77665466	Pi 2030-058				■		
	77665516	Pi 2030-068					■	
	77665532	Pi 2030-069						■

7.1 Housing design

Nominal size NG [l/min]	Order number	Type						
			① no options	② with bypass valve	③ with bypass valve and visual indicator	④ with bypass valve and electrical indicator	⑤ with visual indicator	⑥ with electrical indicator
450	77664881	Pi 2045-060						
	77664873	Pi 2045-056						
	77664865	Pi 2045-057						
	77664857	Pi 2045-058						
	77664923	Pi 2045-068						
	77664931	Pi 2045-069						
600	70576046	Pi 2060-060						
	70576045	Pi 2060-056						
	70534876	Pi 2060-057						
	79714171	Pi 2060-058						
	78205254	Pi 2060-068						
	70576047	Pi 2060-069						

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

7.2 Filter elements (a wider range of element types is available on request)

Nominal size NG [l/min]	Order number	Type	Filter material	max. Δp [bar]	Filter surface [cm ²]
50	77680135	Pi 2105 PS 3	PS 3	20	590
	77943509	Pi 5105 PS 6	PS 6		590
	77680325	Pi 3105 PS 10	PS 10		590
	77680440	Pi 4105 PS 25	PS 25		590
	77680192	Pi 2205 PS vst 3	PS vst 3	210	425
	77943533	Pi 5205 PS vst 6	PS vst 6		425
	77680382	Pi 3205 PS vst 10	PS vst 10		425
	77680507	Pi 4205 PS vst 25	PS vst 25		425
80	77680143	Pi 2108 PS 3	PS 3	20	1150
	77943517	Pi 5108 PS 6	PS 6		1150
	77680341	Pi 3108 PS 10	PS 10		1150
	77680457	Pi 4108 PS 25	PS 25		1150
	77680200	Pi 2208 PS vst 3	PS vst 3	210	850
	77943541	Pi 5208 PS vst 6	PS vst 6		850
	77681190	Pi 3208 PS vst 10	PS vst 10		850
	77680515	Pi 4208 PS vst 25	PS vst 25		850
110	77680150	Pi 2111 PS 3	PS 3	20	1700
	77943525	Pi 5111 PS 6	PS 6		1700
	77680333	Pi 3111 PS 10	PS 10		1700
	77680465	Pi 4111 PS 25	PS 25		1700
	77680218	Pi 2211 PS vst 3	PS vst 3	210	1275
	77943558	Pi 5211 PS vst 6	PS vst 6		1275
	77680390	Pi 3211 PS vst 10	PS vst 10		1275
	77680523	Pi 4211 PS vst 25	PS vst 25		1275
150	77680168	Pi 2115 PS 3	PS 3	20	2425
	77955099	Pi 5115 PS 6	PS 6		2425
	77680358	Pi 3115 PS 10	PS 10		2425
	77680473	Pi 4115 PS 25	PS 25		2425

7.2 Filter elements (a wider range of element types is available on request)

Nominal size NG [l/min]	Order number	Type	Filter material	max. Δp [bar]	Filter surface [cm ²]
150	77680226	Pi 2215 PS vst 3	PS vst 3	210	2010
	77955123	Pi 5215 PS vst 6	PS vst 6		2010
	77680408	Pi 3215 PS vst 10	PS vst 10		2010
	77680531	Pi 4215 PS vst 25	PS vst 25		2010
300	77680176	Pi 2130 PS 3	PS 3	20	4620
	77955107	Pi 5130 PS 6	PS 6		4620
	77680366	Pi 3130 PS 10	PS 10		4620
	77680481	Pi 4130 PS 25	PS 25		4620
	77680234	Pi 2230 PS vst 3	PS vst 3	210	3800
	77955131	Pi 5230 PS vst 6	PS vst 6		3800
	77680416	Pi 3230 PS vst 10	PS vst 10		3800
	77680549	Pi 4230 PS vst 25	PS vst 25		3800
450	77680184	Pi 2145 PS 3	PS 3	20	6865
	77955115	Pi 5145 PS 6	PS 6		6865
	77680374	Pi 3145 PS 10	PS 10		6865
	77680499	Pi 4145 PS 25	PS 25		6865
	77680242	Pi 2245 PS vst 3	PS vst 3	210	5600
	77955149	Pi 5245 PS vst 6	PS vst 6		5600
	77680424	Pi 3245 PS vst 10	PS vst 10		5600
	77680556	Pi 4245 PS vst 25	PS vst 25		5600
600	70346506	Pi 2160 PS 3	PS 3	20	9398
	76114318	Pi 5160 PS 6	PS 6		9398
	79393380	Pi 3160 PS 10	PS 10		9398
	79748047	Pi 4160 PS 25	PS 25		9398

8. Technical specifications

Design:	in-line filter
Nominal pressure:	
Pi 2005 - 2011	10 ⁷ load changes 63 bar (900 psi)
Pi 2015 - 2060	10 ⁷ load changes 25 bar (360 psi)
	2x 10 ⁶ load changes 32 bar (460 psi)
Test pressure:	
Pi 2005 - 2011	95 bar (1370 psi)
Pi 2015 - 2060	48 bar (690 psi)
Temperature range:	-30 °C to +120 °C
	survival temperature -40 °C (other temperature ranges on request)
Bypass setting:	Δp 3.5 bar \pm 10 %
Filter head material:	GDAL
Filter housing material:	AL/St
Sealing material:	NBR/AL
Maintenance indicator setting:	Δp 2.2 bar \pm 10 %
Electrical data of maintenance indicator:	
Max. voltage:	250 V AC/200 V DC
Max. current:	1 A
Max. power:	70 W
Type of protection:	IP 65 in inserted and secured status
Contact:	normally open/closed
Cable sleeve:	M20x1.5

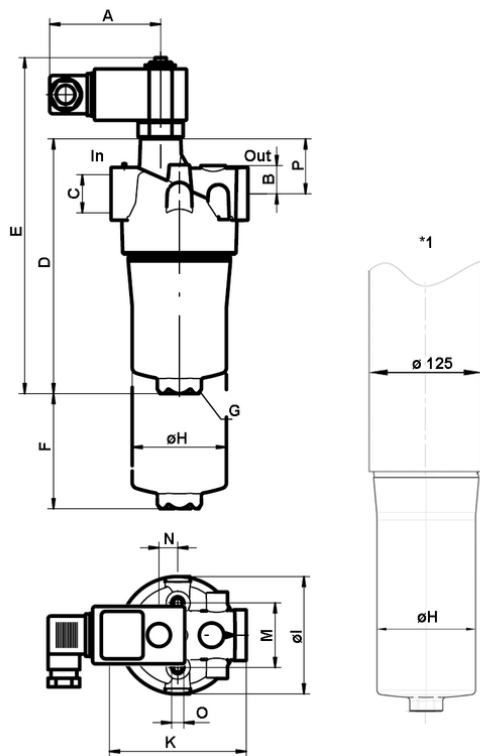
The switching function can be changed by turning the electric upper part by 180° (normally closed contact or normally open contact). The state on delivery is a normally closed contact. By inductivity in the direct current circuit the use of suitable protection circuit should be considered. Further maintenance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

9. Dimensions



In Inlet

Out Outlet

*1 Housing design for NG 600

All dimensions except "C" in mm.

Type	A	B	C*	D	E	F	G SW	H	I	K	M	N	O	P	Weight [kg]
Pi 2005	78	19	G½	177	235	80	27	66	80	95	45	13.0	M8x10	37,5	0.9
Pi 2008	78	19	G¾	253	311	80	27	66	80	95	45	13.0	M8x10	37,5	1.0
Pi 2011	78	19	G¾	335	393	80	27	66	80	95	45	13.0	M8x10	37,5	1.2
Pi 2015	78	30	G1¼	244	302	110	32	109	128	150	60	24.5	M12x15	43,5	2.1
Pi 2030	78	30	G1¼	360	418	110	32	109	128	150	60	24.5	M12x15	43,5	2.4
Pi 2045	78	30	G1¼	475	533	110	24	109	128	150	60	24.5	M12x15	43,5	6.5
Pi 2060	78	30	G1¼	615	643	110	32	109	128	150	60	24.5	M12x15	43,5	5.5

* NPT and SAE connections on request

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.

Preferably the filter should be installed with the filter housing pointing downwards.

The maintenance indicator must be visible.

10.2 Connecting the electrical maintenance indicator

The electrical indicator is connected via a 2-pole appliance plug according to DIN EN 175301-803 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.

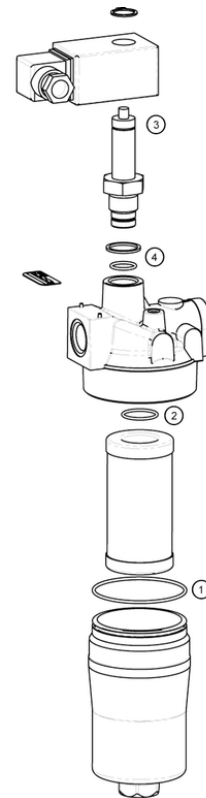
The state on delivery is a normally closed contact

10.3 When should the filter element be replaced?

1. Filters equipped with visual and electrical maintenance indicator:
During cold starts, the indicator may give a warning signal. Press the red 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 maintenance indicator:
The filter element should be replaced after the trial run or flushing of the system. Afterwards follow instructions of the manufacturer.
3. Please always ensure that you have original Filtration Group spare elements in stock: Disposable elements cannot be cleaned.

10.4 Element replacement

1. Stop system and relieve filter from pressure.
2. Unscrew the filter housing by turning counter-clockwise. Clean the housing using a suitable cleaning solvent.
3. Remove element by pulling down carefully.
4. Check O-ring on the filter housing for damage. Replace, if necessary.
5. Make sure that the order number on the spare element corresponds to the order number of the filter name-plate.
To ensure no contamination occurs during the exchange of the element first open the plastic bag and push the element over the spigot in the filter head. Now remove plastic bag.
6. Lightly lubricate the threads of the filter housing a little bit and screw into the filter head. Maximum tightening torque for NG 50 to 110 = 30 Nm, for NG 150 to 600 = 50 Nm.



11. Spare parts list

Order numbers of spare parts		
Position	Type	Order number
① - ②	Seal kit for filter	
	Pi 2005 - Pi 2011	
	NBR	77550213
	FPM	77845795
	EPDM	77845803
	Pi 2015 - Pi 2060	
	NBR	77550221
	FPM	77845811
	EPDM	77845829
③	Maintenance indicator	
	Visual PiS 3098/2,2	77669971
	Electrical PiS 3097/2,2	77669948
	Electrical upper section only	77536550
④	Seal kit for maintenance indicator	
	NBR	77760309
	FPM	77760317
	EPDM	77760325

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Fax +49 7941 6466-429
fm.de.sales@filtrationgroup.com
www.filtrationgroup.com
78356446.03/2017

Suction Filter

Pi 200

Nominal size up to 90

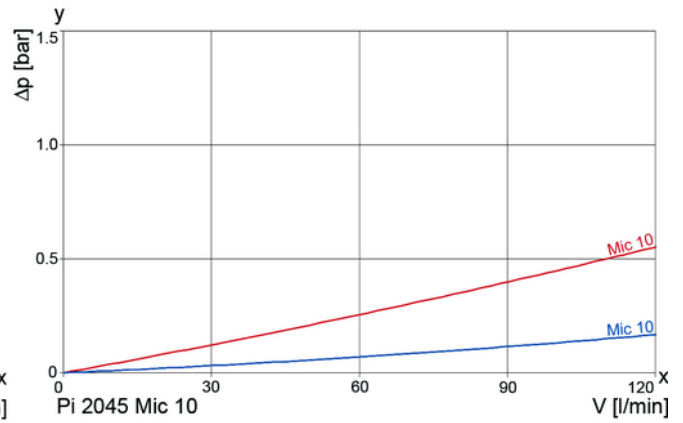
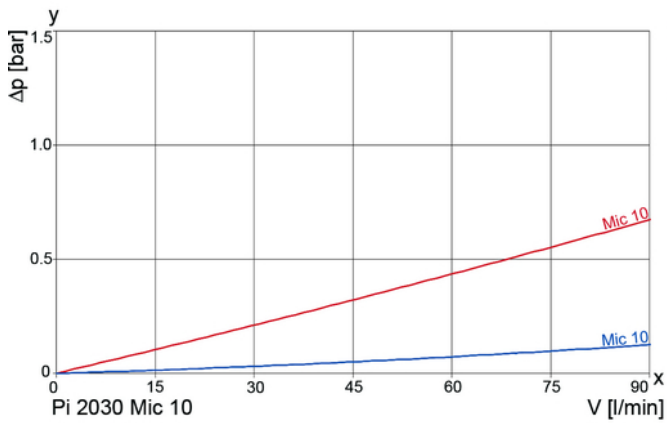
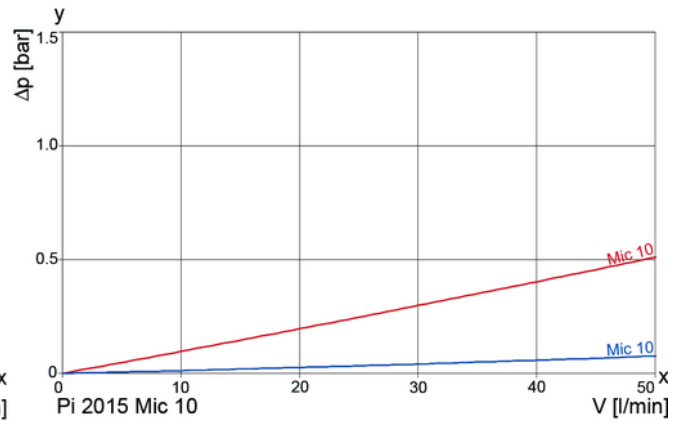
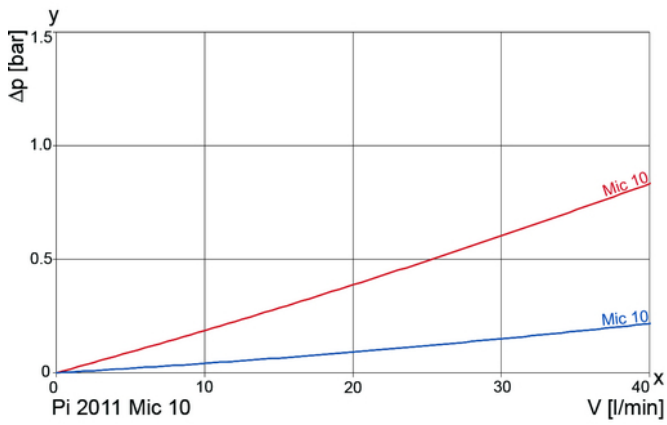
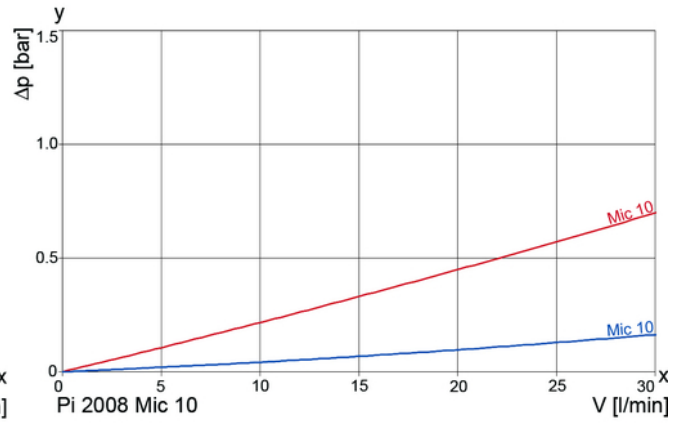
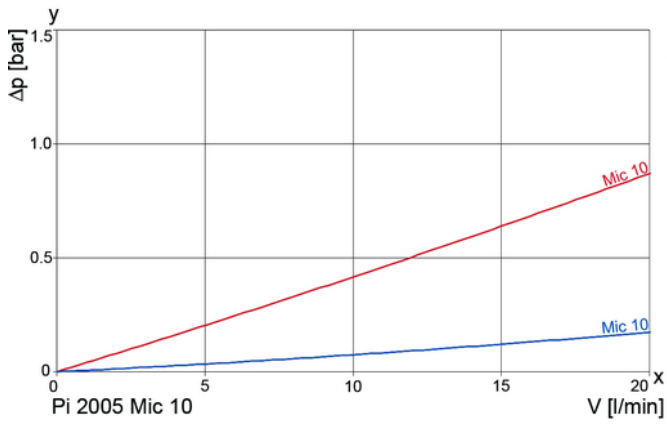
1. Features

High performance filters for modern hydraulic systems

- Provided for pipe 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 dirt holding capacity
- NPT and SAE connections on request
- Worldwide distribution

2. Flow rate/pressure drop curve (filter housing incl. element)

■ 190 mm²/s
■ 33 mm²/s

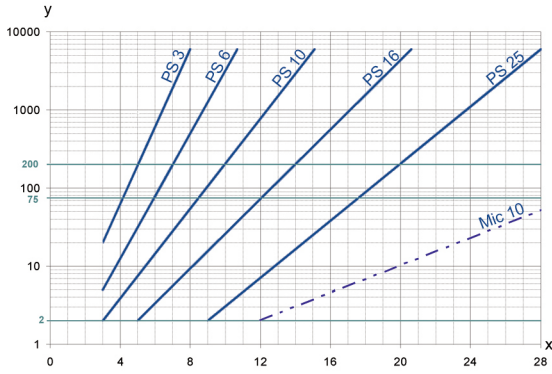


y = differential pressure Δp [bar]

x = flow rate V [l/min]

PS elements on request.

3. Separation grade characteristics



y = beta-value
x = particle size [μm]

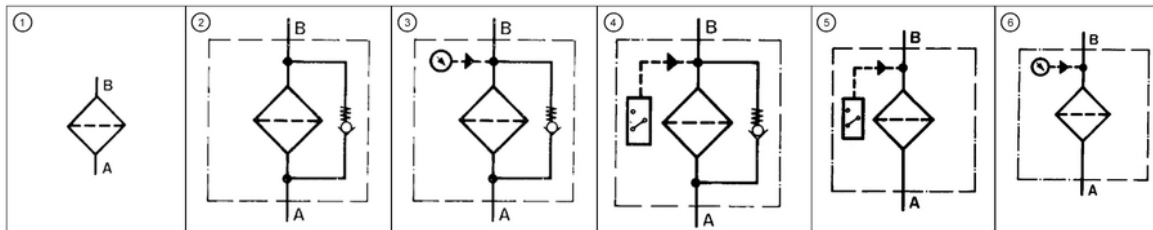
determined by multipass tests (ISO 16889)
calibration according to ISO 11171 (NIST)

5. Quality assurance

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 of 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



4. Filter performance data

tested according to ISO 16889 (multipass test)

PS elements with
max. Δp 20 bar

PS 10 $\beta_{10(C)} \geq 200$

PS 25 $\beta_{20(C)} \geq 200$

values guaranteed up to 10
bar differential pressure

7. Order numbers

Example for ordering filters:

1. Filter housing	2. Filter element
V=16 l/min and vacuum switch Type: Pi 2008-065 Order number: 77736937	PS 25 Type: Pi 4108 PS 25 Order number: 77680457

7.1 Housing design								
Nominal size NG [l/min]	Order number	Type	① no options	② with bypass valve	③ with bypass valve and vacuum gauge	④ with bypass valve and vacuum switch	⑤ with vacuum switch	⑥ with vacuum gauge
10	77665144	Pi 2005-060						
	77665151	Pi 2005-067						
	77736903	Pi 2005-062						
	77736911	Pi 2005-061						
	77736895	Pi 2005-065						
	77736887	Pi 2005-066						
16	77665235	Pi 2008-060						
	77665268	Pi 2008-067						
	77665243	Pi 2008-062						
	77736945	Pi 2008-061						
	77736937	Pi 2008-065						
	77665250	Pi 2008-066						
22	78205114	Pi 2011-060						
	70361602	Pi 2011-067						
	70361595	Pi 2011-062						
	79767013	Pi 2011-061						
	79373077	Pi 2011-065						
	76374318	Pi 2011-066						
30	77840580	Pi 2015-060						
	N.N.	Pi 2015-067						
	N.N.	Pi 2015-062						
	N.N.	Pi 2015-061						
	76387880	Pi 2015-065						
	N.N.	Pi 2015-066						
60	77665474	Pi 2030-060						
	77735921	Pi 2030-067						
	77665482	Pi 2030-062						
	77665490	Pi 2030-061						
	77665508	Pi 2030-065						
	77735939	Pi 2030-066						
90	77664881	Pi 2045-060						
	77736986	Pi 2045-067						
	77664907	Pi 2045-062						
	77664899	Pi 2045-061						
	77664915	Pi 2045-065						
	77736978	Pi 2045-066						

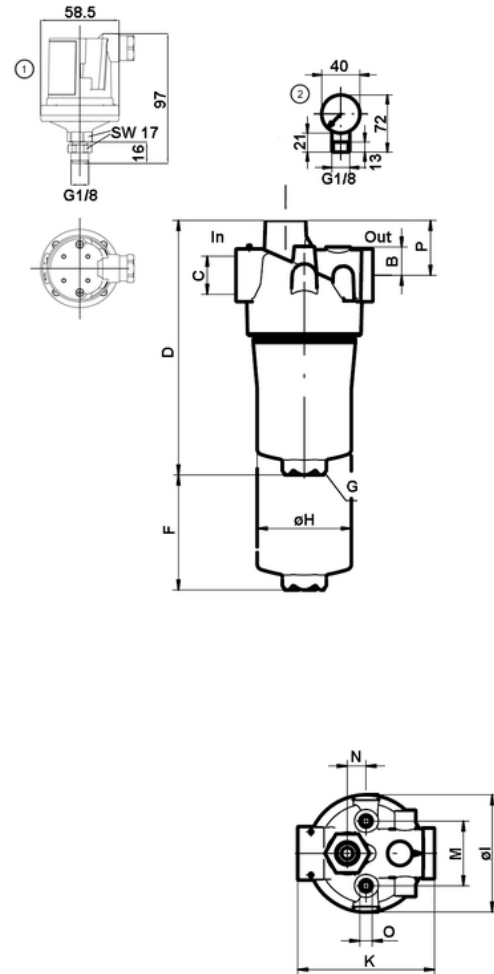
When filter with non bypass configuration is selected, the collapse pressure of the element must not be exceeded.

7.2 Filter elements (a wider range of element types is available on request)

Nominal size NG [l/min]	Order number	Type	Filter material	max. Δp [bar]	Filter surface [cm ²]
10	77680325	Pi 3105 PS 10	PS 10	20	590
	77680440	Pi 4105 PS 25	PS 25		590
	77576630	Pi 1105 Mic 10	Mic 10		640
16	77680341	Pi 3108 PS 10	PS 10	20	1150
	77680457	Pi 4108 PS 25	PS 25		1150
	77680085	Pi 1108 Mic 10	Mic 10		1250
22	77680333	Pi 3111 PS 10	PS 10	20	1700
	77680465	Pi 4111 PS 25	PS 25		1700
	77680093	Pi 1111 Mic 10	Mic 10		1800
30	77680358	Pi 3115 PS 10	PS 10	20	2425
	77680473	Pi 4115 PS 25	PS 25		2425
	77680101	Pi 1115 Mic 10	Mic 10		2565
60	77680366	Pi 3130 PS 10	PS 10	20	4620
	77680481	Pi 4130 PS 25	PS 25		4620
	77680119	Pi 1130 Mic 10	Mic 10		4885
90	77680374	Pi 3145 PS 10	PS 10	20	6865
	77680499	Pi 4145 PS 25	PS 25		6865
	77680127	Pi 1145 Mic 10	Mic 10		7265

8. Technical specifications

Design:	in-line suction filter
Nominal pressure: Pi 2005 - 2011	63 bar (910 psi)
Pi 2015 - 2045	25 bar (360 psi)
Test pressure: Pi 2005 - 2011	82 bar (1190 psi)
Pi 2015 - 2045	33 bar (480 psi)
Temperature range:	-10 °C to +120 °C (other temperature ranges on request)
Bypass setting:	Δp 0.25 bar \pm 10 %
Filter head material:	GDAL
Filter housing material:	AL/St
Sealing material:	NBR/AL
Indicating range	
vacuum gauge:	-1 bar to -1.5 bar
Pressure setting vacuum switch:	-200 mbar
Electrical data of vacuum switch PiS 3070:	
Max. voltage:	230 V AC/DC
Max. current:	6 A
Contact:	change-over switch
Electrical connections:	AMP 6.3 DIN 46248 for bushings according to DIN 46247
Fitting position:	any fitting positions possible (fitting position has to be defined when ordering indicators with defined switch point)
Type of protection:	IP 00 without protecting cap IP 54 with protecting cap



In = Inlet
Out = Outlet

1 = Vacuum switch
2 = Vacuum gauge

Subject to technical alteration without prior notice.

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.

9. Dimensions

All dimensions except "C" in mm.

Type	B	C*	D	F	G SW	H	I	K	M	N	O	P	Weight [kg]
Pi 2005	19	G $\frac{1}{2}$	177	80	27	66	80	95	45	13.0	M8x10	37.5	0.9
Pi 2008	19	G $\frac{3}{4}$	253	80	27	66	80	95	45	13.0	M8x10	37.5	1.0
Pi 2011	19	G $\frac{3}{4}$	335	80	27	66	80	95	45	13.0	M8x10	37.5	1.1
Pi 2015	30	G1 $\frac{1}{4}$	244	110	32	109	128	150	60	24.5	M12x15	43.5	2.1
Pi 2030	30	G1 $\frac{1}{4}$	360	110	32	109	128	150	60	24.5	M12x15	43.5	2.4
Pi 2045	30	G1 $\frac{1}{4}$	475	110	24	109	128	150	60	24.5	M12x15	43.5	6.5

* NPT and SAE connections on request

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. Preferably the filter should be installed with the filter housing pointing downwards.

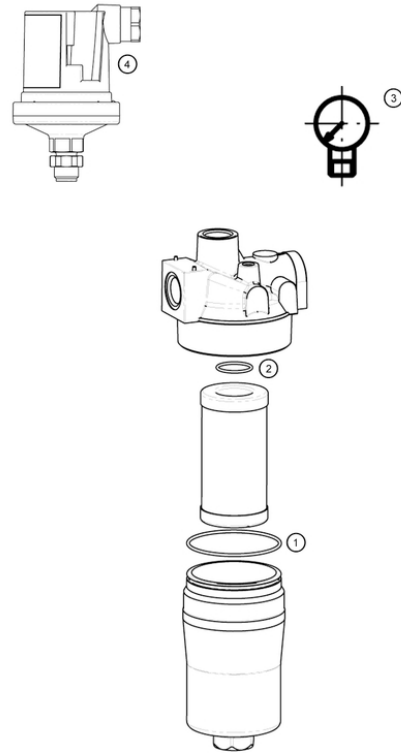
The maintenance indicator must be visible.

10.2 When should the filter element be replaced?

Filters equipped with visual and electrical maintenance indicator: During cold starts, the indicator may give a warning signal. If vacuummeter shows > 0,2 bar or the electrical signal has not switched off after reaching operating temperature, the filter element must be replaced or cleaned after the end of the shift. Please always ensure that you have original Filtration Group spare elements in stock: Disposable elements (Mic or PS) cannot be cleaned.

10.3 Element replacement

1. Stop system and relieve filter from pressure.
2. Unscrew the filter housing by turning counter-clockwise. Clean the housing using a suitable cleaning solvent.
3. Remove element by pulling down carefully.
4. Check O-ring on the filter housing for damage. Replace, if necessary.
5. Make sure that the order number on the spare element corresponds to the order number of the filter name-plate.
To ensure no contamination occurs during the exchange of the element first open the plastic bag and push the element over the spigot in the filter head. Now remove plastic bag.
6. Lightly lubricate the threads of the filter housing a little bit and screw into the filter head. Maximum tightening torque for NG 50 to 110 = 60 Nm.



11. Spare parts list

Order numbers of spare parts		
Position	Type	Order number
① to ②	Seal kit for housing	
	Pi 2005 - Pi 2011	
	NBR	77550213
	FPM	77845795
	EPDM	77845803
	Pi 2015 - Pi 2045	
	NBR	77550221
	FPM	77845811
③	Vacuum gauge	
	NG 40 G 1/8	76345763
④	Vacuum switch	
	PiS 3070	77669724

Filtration Group GmbH
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D-74613 Öhringen
Phone +49 7941 6466-0
Fax +49 7941 6466-429
sales@filtrationgroup.com
www.filtrationgroup.com
70364038.11/2016

Low Pressure Filter/Suction Filter Pi 220

Nominal pressure 10 bar (140 psi), up to nominal size 160

1. Features

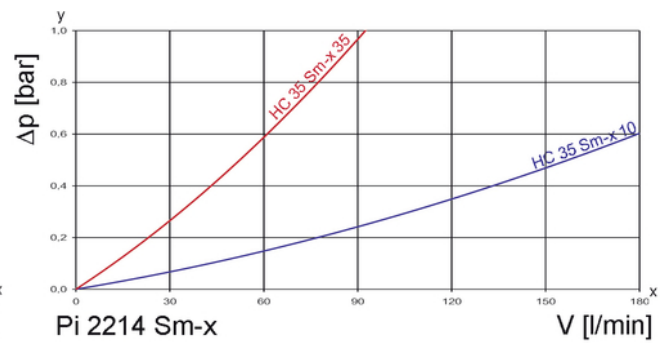
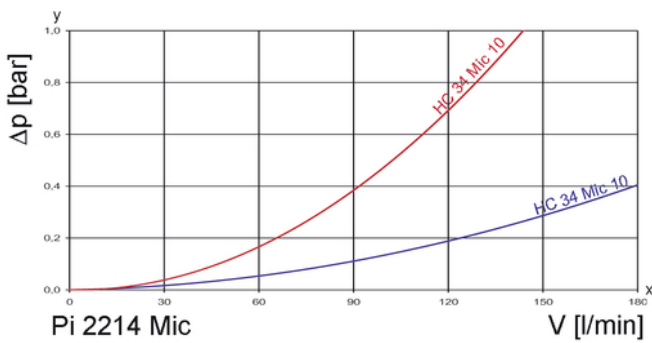
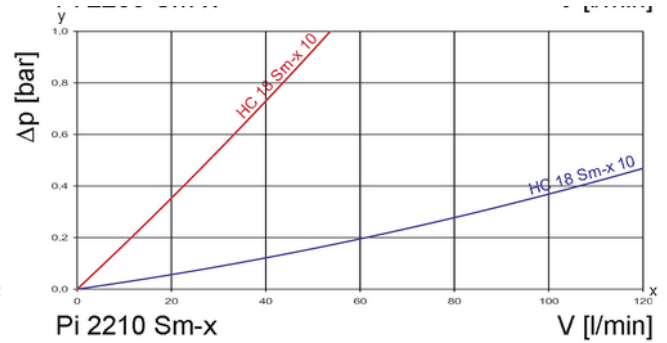
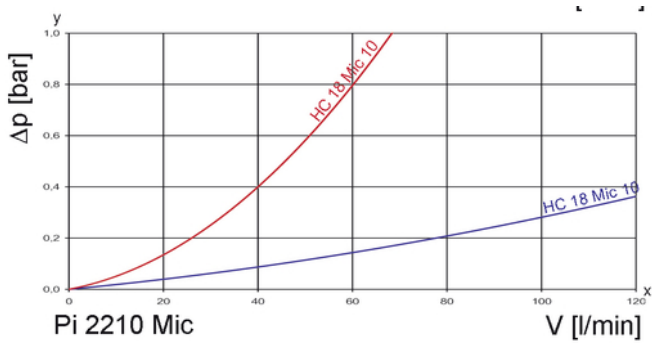
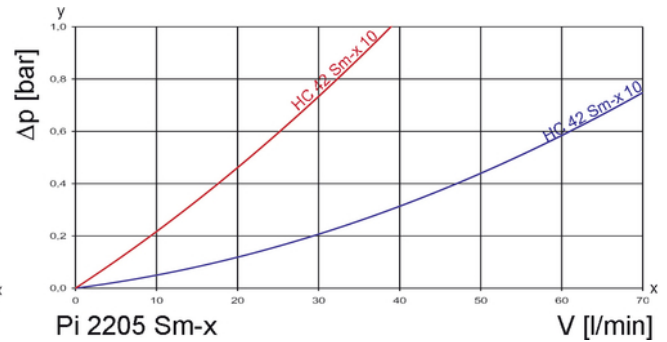
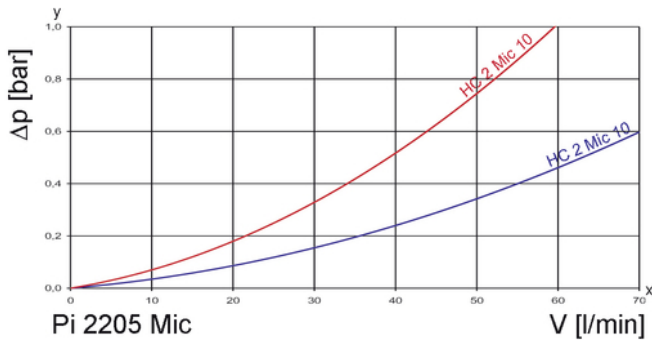
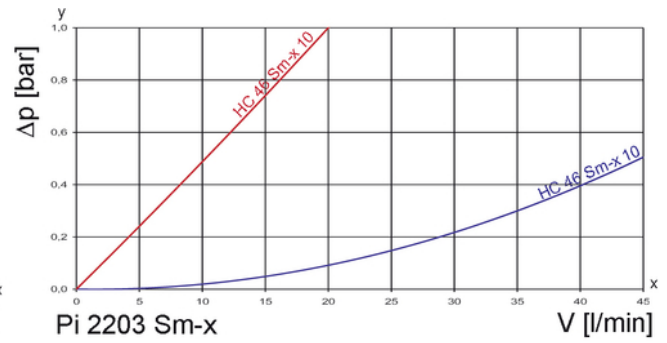
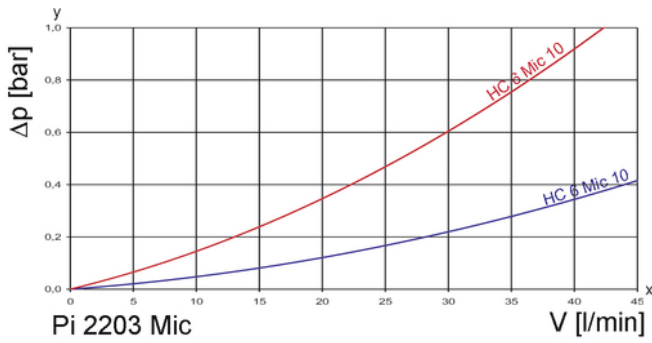
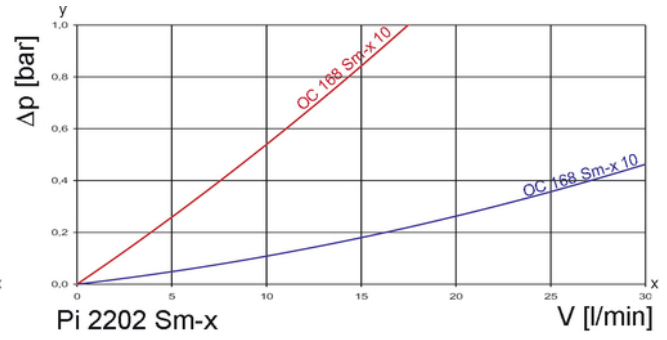
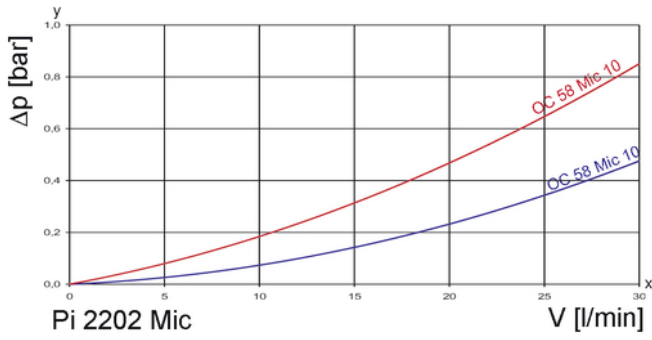
High performance filters for modern hydraulic systems

- Provided for pipe installation
- Modular system
- Compact design
- Minimal pressure drop through optimal flow design
- Visual/electronic/electrical maintenance indicator
- Threaded connections
- Quality filters, easy to service
- Equipped with highly efficient Mic or Sm-x filter elements
- Beta rated elements according to ISO 16889
- Elements with high differential pressure stability and dirt holding capacity
- Worldwide distribution



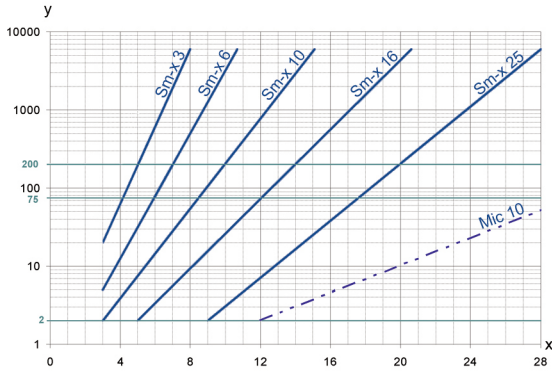
2. Flow rate/pressure drop curve complete filter

190 mm²/s
33 mm²/s



y = differential pressure Δp [bar]
x = flow rate V [l/min]

3. Separation grade characteristics



y = beta-value
x = particle size [μm]

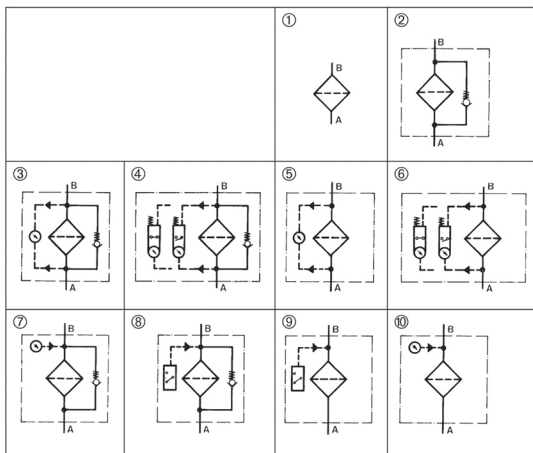
determined by multipass tests (ISO 16889)
calibration according to ISO 11171 (NIST)

5. Quality assurance

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

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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 of material compatibility
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



4. Filter performance data

tested according to ISO 16889 (multipass test)

Sm-x-elements with
max. Δp 5 bar

Sm-x 10 $\beta_{10(C)} \geq 200$

values guaranteed up to
5 bar differential pressure

7. Order numbers

Example for ordering filters:

1. Housing design	2. Spin-on cartridge
V = 25 l/min, bypass, electrical maintenance indicator Type: Pi 2202-058 Order number: 77665649	Mic 10 Type: OC 58 Order number: 77785983

7.1 Housing design/order number for pressure-side installation								
Nominal size NG [l/min]	Order number	Type	① no options	② with by- pass valve	③ with bypass valve and visual indicator	④ with bypass valve and electrical indicator	⑤ with visual indicator	⑥ with electrical indicator
25	77665656	Pi 2202-060						
	77665623	Pi 2202-056						
	77665631	Pi 2202-057						
	77665649	Pi 2202-058						
	77665664	Pi 2202-068						
	77665672	Pi 2202-069						
40	77665714	Pi 2203-060						
	77665680	Pi 2203-056						
	77665698	Pi 2203-057						
	77665706	Pi 2203-058						
	77665748	Pi 2203-068						
	77665755	Pi 2203-069						
63	77665813	Pi 2205-060						
	77665789	Pi 2205-056						
	77665797	Pi 2205-057						
	77665805	Pi 2205-058						
	77665847	Pi 2205-068						
	77665854	Pi 2205-069						
100	77666001	Pi 2210-060						
	77665979	Pi 2210-056						
	77665987	Pi 2210-057						
	77665995	Pi 2210-058						
	77666050	Pi 2210-068						
	77666068	Pi 2210-069						
160	77666126	Pi 2214-060						
	77666092	Pi 2214-056						
	77666100	Pi 2214-057						
	77666118	Pi 2214-058						
	77666183	Pi 2214-068						
	77666191	Pi 2214-069						

When filter with non bypass configuration is selected, the collapse pressure of the spin-on cartridge must not be exceeded.

7.2 Spin-on cartridges

Nominal size NG [l/min] Press./Suct. side	Order number	Type	Filter material	max. Δp [bar]	Filter surface [cm ²]
25/10	77785983	OC 58	Mic 10	5	1775
	77500184	OC 168	Sm-x 10		1309
40/16	77501273	HC 6	Mic 10	5	3000
	77501232	HC 46	Sm-x 10		2075
63/25	72013241	HC 2	Mic 10	5	5440
	77501372	HC 42	Sm-x 10		3360
100/40	77643331	HC 18	Mic 10	5	7000
	77643398	HC 28	Sm-x 10		3400
160/63	77504194	HC 34	Mic 10	5	14025
	77643844	HC 35	Sm-x 10		7638

7.3 Housing design/order numbers for suction-side installation

Nominal size NG [l/min]	Order number	Type	① no options	② with bypass 0.25 bar	⑦ with bypass 0.25 bar and vacuum gauge	⑧ with bypass 0.25 bar and vacuum switch	⑨ with vacuum switch	⑩ with vacuum gauge
10	77665656	Pi 2202-060						
	77736614	Pi 2202-067						
	77736622	Pi 2202-062						
	77736630	Pi 2202-061						
	77736606	Pi 2202-065						
	77736598	Pi 2202-066						
16	77665714	Pi 2203-060						
	77665730	Pi 2203-067						
	77736689	Pi 2203-062						
	77736697	Pi 2203-061						
	77736671	Pi 2203-065						
	77665722	Pi 2203-066						
25	77665813	Pi 2205-060						
	77736747	Pi 2205-067						
	77665821	Pi 2205-062						
	77736754	Pi 2205-061						
	77665839	Pi 2205-065						
	77736739	Pi 2205-066						
40	77666001	Pi 2210-060						
	77735947	Pi 2210-067						
	77666027	Pi 2210-062						
	77666019	Pi 2210-061						
	77666035	Pi 2210-065						
	77666043	Pi 2210-066						
63	77666126	Pi 2214-060						
	77666175	Pi 2214-067						
	77666142	Pi 2214-062						
	77666134	Pi 2214-061						
	77666159	Pi 2214-065						
	77666167	Pi 2214-066						

When filter with non bypass configuration is selected, the collapse pressure of the spin-on cartridge must not be exceeded.

8. Technical specifications

Design: line mounting filter
 Nominal pressure: 10 bar (140 psi)*
 Test pressure: 13 bar (180 psi)
 Temperature range: -10 °C to +120 °C
 (other temperature ranges on request)

Bypass setting:
 Pressure side: Δp 3.5 bar \pm 10%
 Suction side: Δp 0.25 bar \pm 10%
 Filter head material: GDAL
 Filter housing material: St
 Sealing material: NBR/AL
 Maintenance indicator setting: Δp 2.2 bar \pm 0.3 bar
 Indicating range vacuum meter: -1 bar to +1.5 bar
 Pressure setting vacuum switch: 200 mbar
 Type of protection (suction side): IP 54
 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

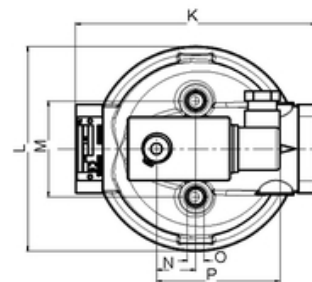
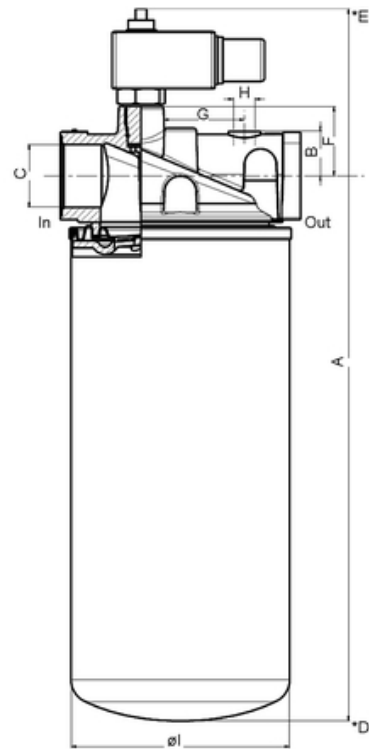
Contact: normally open/closed
 Cable sleeve: M20x1.5

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.

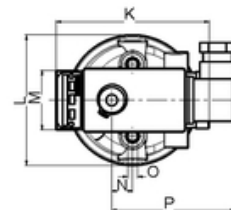
We draw attention to the fact that all values indicated are average values which do not always occur in specific cases of application. Our products are continually being further developed. Values, dimensions and weights can change as a result of this. Our specialized department will be pleased to offer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

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.

* For the contamination of the housing designs as per 7.1 with medium-pressure spin-on cartridges refer to leaflet "spin-on cartridges" for dimensions and specifications. Operating pressure on request.



Pi 2210 - Pi 2214



Pi 2202 - Pi 2205

In = Inlet

Out = Outlet

*D = Height required for spin-on cartridge removal

*E = Height required for maintenance indicator removal

Subject to technical alteration without prior notice.

9. Dimensions

All dimensions except "C" and "H" in mm.

Type	A	B	C	D	E	F	G*	H*	I	K	L	M	N	O	P	Weight [kg]
Pi 2202	241	19	G½	30	45	37.5	23.5	G1/8	76	95	80	45	13.0	M8x10	78	0.90
Pi 2203	261	19	G½	30	45	37.5	23.5	G1/8	93	95	80	45	13.0	M8x10	78	1.00
Pi 2205	328	19	G¾	30	45	37.5	23.5	G1/8	93	95	80	45	13.0	M8x10	78	1.25
Pi 2210	302	30	G1¼	40	45	43.5	40.0	G1/8	136	150	128	60	24.5	M12x15	78	2.30
Pi 2214	442	30	G1¼	40	45	43.5	40.0	G1/8	136	150	128	60	24.5	M12x15	78	2.70

*with suction-side installation only.

10. Installation, operating and maintenance instructions

10.1 Filter installation

When installing the filter make sure that sufficient space is available to remove spin-on cartridge. Filter should be installed with the spin-on cartridge pointing downwards.

The maintenance indicator must be visible.

10.2 Connecting the electrical maintenance indicator

The electrical indicator is connected via a 2-pole appliance plug according to DIN EN 175301-803 with poles marked 1 and 2.

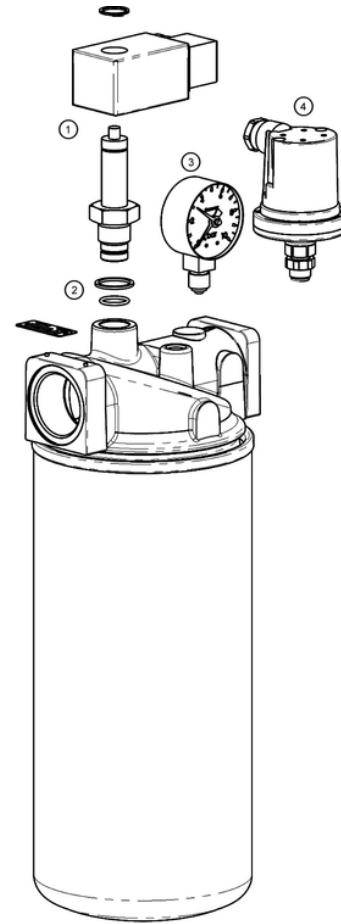
The electrical section can be inverted to change from normally open position to normally closed position or vice versa.

10.3 When should the filter element be replaced?

- Filters equipped with visual and electrical maintenance indicator:
During cold starts, the indicator may give a warning signal. Press the red 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 the trial run or flushing of the system. Afterwards follow instructions of the manufacturer.
- Please always ensure that you have original Filtration Group spare elements in stock: disposable elements (Sm-x) cannot be cleaned.

10.4 Spin-on cartridge exchange

- Stop system and relieve filter from pressure.
- Unscrew the spin-on cartridge with the aid of a belt spanner by turning same to the left
- Make sure that the order number on the spin-on cartridge corresponds to the order number of the plate.
- The seal of the screw-on cartridge should be lightly oiled.
- Screw cartridge on in accordance with the printed-on instructions.



11. Spare parts list

Order numbers for spare parts		
Position	Type	Order number
①	Maintenance indicator	
	Visual PiS 3098	77669971
	Electrical PiS 3097	77669948
	Electrical upper part only	77536550
②	Seal kit for maintenance indicator	
	NBR	77760309
③	Vacuum gauge	76345763
④	Vacuum switch PiS 3070	77669724

Filtration Group GmbH
Schleifbachweg 45
D-74613 Öhringen
Phone +49 7941 6466-0
Fax +49 7941 6466-429
sales@filtrationgroup.com
www.filtrationgroup.com
78356610.11/2016

Duplex Filter

Pi 232

Nominal pressure 25 bar (360 psi), nominal size 800 and 1400

1. Features

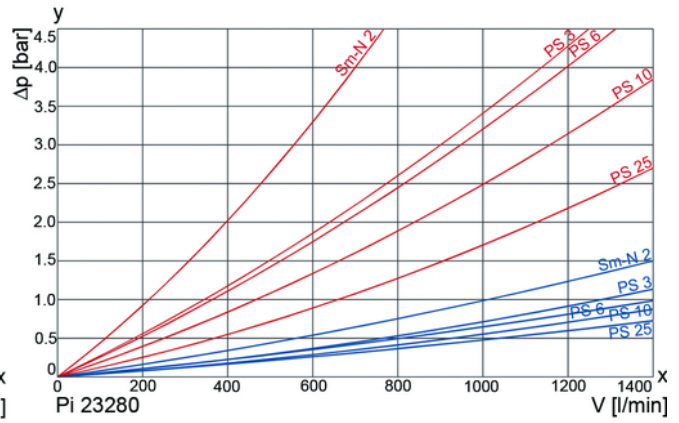
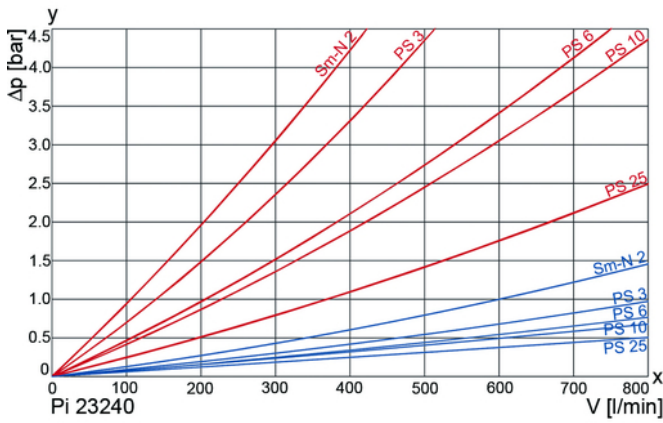
Duplex filter for gear boxes, lubrication and hydraulic systems

- Modular system
- Compact design
- Weight optimized design
- Minimal pressure drop through optimal flow design
- Flange connections, DIN DN 80, SAE 3"
- Visual/electrical maintenance indicator
- Drain on dirt and clean side
- Beta rated elements according to ISO 16889 multipass test
- Defined cleanliness classes according to ISO 4406/1999
- Elements with high differential pressure stability and dirt holding capacity
- Version according to DIN 24550 also deliverable
- Quality filters, easy to service
- Worldwide sales and service



2. Flow rate/pressure drop curve complete filter

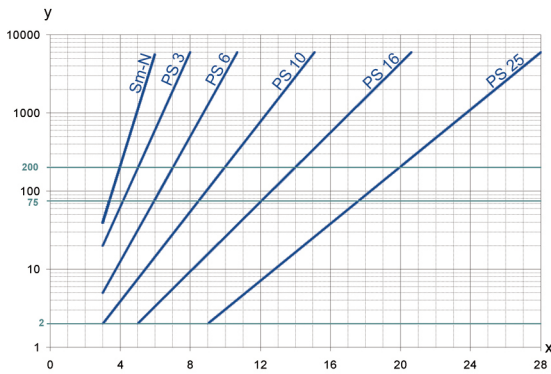
■ 190 mm²/s
■ 33 mm²/s



y = differential pressure Δp [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)

PS elements with

max. Δp 20 bar

PS 3 $\beta_{5(C)} \geq 200$

PS 6 $\beta_{7(C)} \geq 200$

PS 10 $\beta_{10(C)} \geq 200$

PS 25 $\beta_{20(C)} \geq 200$

values guaranteed up to

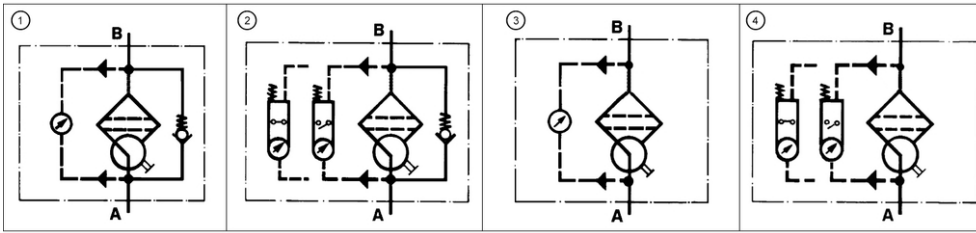
10 bar differential pressure

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 of material compatibility with fluids
DIN ISO 3723	Hydraulic fluid power filter elements, methods 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. 2x Filter element
V = 800 l/min and visual/electrical maintenance indicator Type: Pi 23240-069 Order number: 70554948	PS 25 Type: 852014 PS 25 Order number: 76321663

7.1 Housing design

Nominal size NG [l/min]	Order number	Type	①	②	③	④
			with bypass valve and visual indicator	with bypass valve and electrical indicator	with visual indicator	with electrical indicator
800	70554951	Pi 23240-057				
	70554950	Pi 23240-058				
	70554949	Pi 23240-068				
	70554948	Pi 23240-069				
1400	70554947	Pi 23280-057				
	70554942	Pi 23280-058				
	70554945	Pi 23280-068				
	70554946	Pi 23280-069				

When filter with non bypass configuration is selected the collapse pressure must not be exceeded!

7.2 Filter elements for standard housing design*

Nominal size NG [l/min]	Order number	Type	Filter material	max. Δp [bar]	Filter surface [cm ²]
800	76136220	852014 Sm-N 2	Sm-N 2	20	18533
	76321830	852014 PS 3	PS 3		24830
	76321822	852014 PS 6	PS 6		24830
	76321814	852014 PS 10	PS 10		24830
	76321806	852014 PS 25	PS 25		24830
1400	76136212	852015 Sm-N 2	Sm-N 2	20	42275
	76321897	852015 PS 3	PS 3		57200
	76321889	852015 PS 6	PS 6		57200
	76321871	852015 PS 10	PS 10		57200
	76321863	852015 PS 25	PS 25		57200

*other element types are available on request

8. Technical specifications

Design:	line mounting filter
Nominal pressure:	10 ⁷ load changes 25 bar (360 psi)
Test pressure:	33 bar (470 psi)
Temperature range:	-10 °C to +120 °C
survival temperature	-40 °C (other temperature ranges on request)
	minimum viscosity of the fluid: 10 mm ² /s
Bypass setting:	Δp 3.5 bar \pm 10
Filter head material:	GAL
Filter housing material:	AL
Filter cover material:	GAL
Sealing material:	NBR
Maintenance indicator setting	Δp 2.2 bar \pm 10 %
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

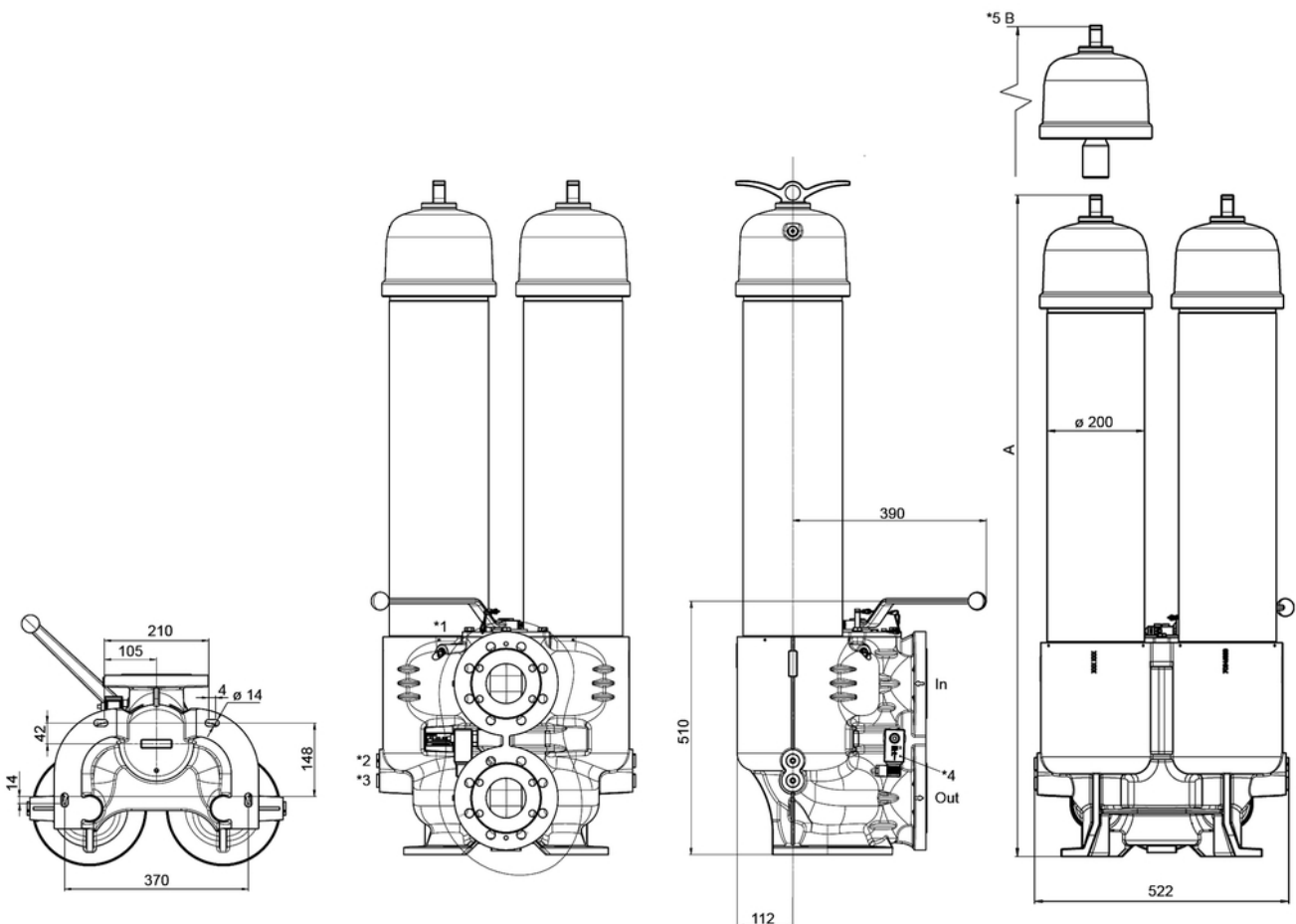
The switching function can be changed by turning the electric upper part by 180° (normally closed contact or normally open contact). The state on delivery is a normally closed contact. By inductivity in the direct current circuit the use of suitable protection circuit should be considered. Further maintenance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

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.

9. Dimensions



In	Inlet
Out	Outlet
*1	Pressure equalization screw
*2	Drain dirt side G $\frac{1}{2}$

*3	Drain clean side G $\frac{1}{2}$
*4	Maintenance indicator
*5	Clearance B

All dimensions in mm.

Type	Connection	A	B	Weight [kg]
Pi 23240	DN 80	805	500	80
Pi 23280	DN 80	1355	1000	90

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 maintenance indicator must be visible.

10.2 Connecting the electrical maintenance indicator

The electrical indicator is connected via a 2-pole appliance plug according to DIN EN 175301-803 with poles marked 1 and 2. The electrical section can be inverted to change from normally open to normally closed position or vice versa. The state on delivery is a normally closed contact.

10.3 When should the filter element be replaced?

- Filters equipped with visual and electrical maintenance indicator:
During cold starts, the indicator may give a warning signal. Press the red 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 the trial run or flushing of the system. Afterwards follow instructions of the manufacturer.
- Please always ensure that you have original Filtration Group spare elements in stock: disposable elements (PS, Sm-N) cannot be cleaned.

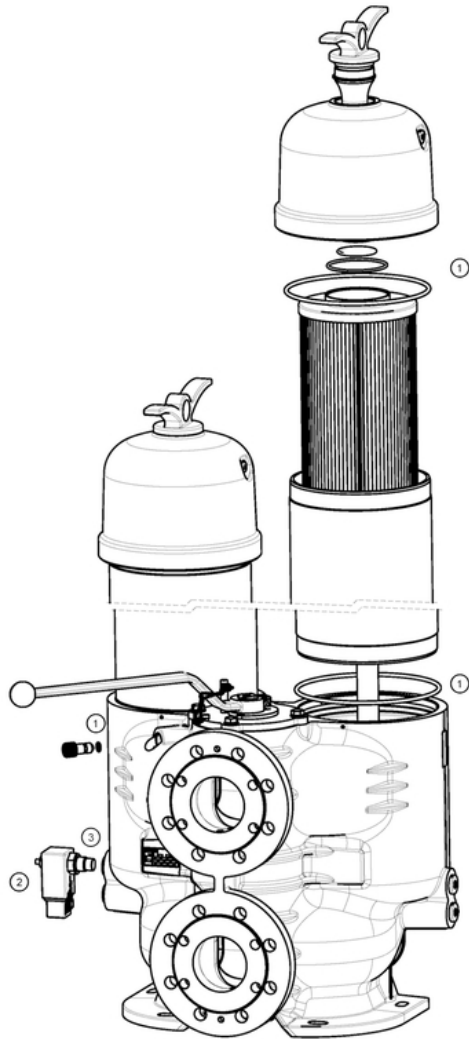
10.4 Element replacement

Note: Elements may only be replaced by people who are familiar with the function of the filter. When replacing elements, appropriate safety clothing (protective goggles, gloves, safety shoes) must be worn.

Note: The maintenance indicator monitors the filter side in operation, which is identified by the position of the switching lever catch. The change-over transfer valve must be switched prior filter servicing. Now the signal of the maintenance indicators cancelled and the red button can be repressed again.

- Operate pressure equalizing screw. Swivel switching lever. Place through or drip pan underneath to collect leaving oil. Close pressure equalization screw.
- Loosen vent screw of the filter side not in use by 2-3 turns.
- Remove drain plug in housing bottom and drain oil.
- Unscrew filter cover counter-clockwise.
Warning: The shift lever may not, from now until the screwing back in of the filter housing (7.), be activated under any circumstances!
- Lift out filter element.
- Check seal on filter cover. We recommend replacement in any case.
- Make sure that the order number on the spare element corresponds to the order number of the filter name-plate. Remove the element packaging and put the element with the o-Ring side down into the housing.
- Push the element carefully over the spigot and tight cover with the hand-tight.
- Tighten drain plug housing bottom.
- To refill the filter chamber, operate only the pressure equalizing screw. Tighten the screw when fluid emerges bubble-free from the drain.
- Tight vent screw. Check for leakage by actuating the equalizing screw again.

11. Spare parts list



Order numbers for spare parts		
Position	Type	Order number
①	Seal kit for housing	
	NBR	70566903
	FPM	70566904
	EPDM	70566905
②	Maintenance indicator	
	Visual PiS 3098/2,2	77669971
	Visual/electrical PiS 3097/2,2	77669948
	Electrical upper section only	77536550
③	Seal kit for maintenance indicator	
	NBR	77760309
	FPM	77760317
	EPDM	77760325

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Low Pressure Filter/Suction Filter Pi 270

Nominal pressure 10 bar (140 psi), up to nominal size 315

1. Features

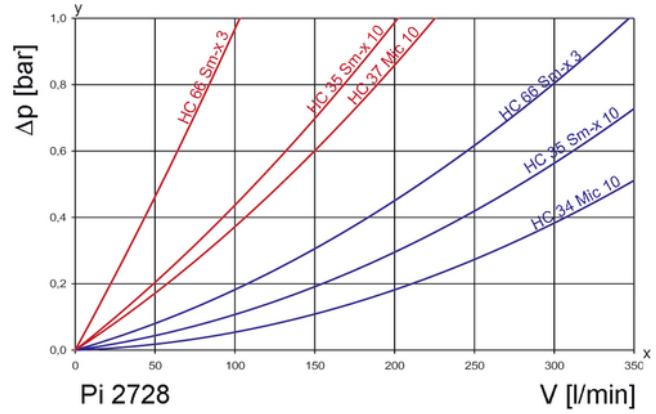
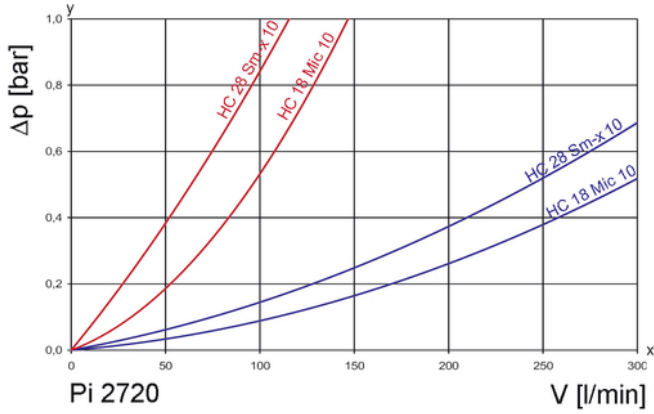
High performance filters for modern hydraulic systems

- Provided for pipe 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 Sm-x filter elements
- 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

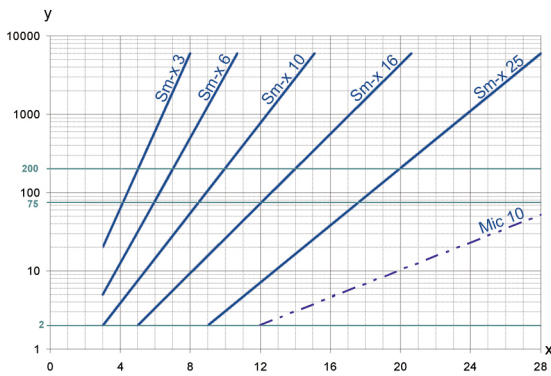
190 mm²/s
33 mm²/s



y = differential pressure Δp [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. Δp 5 bar

Sm-x 3 $\beta_{5(C)} \geq 200$

Sm-x 10 $\beta_{10(C)} \geq 200$

values guaranteed up to 5 bar differential pressure

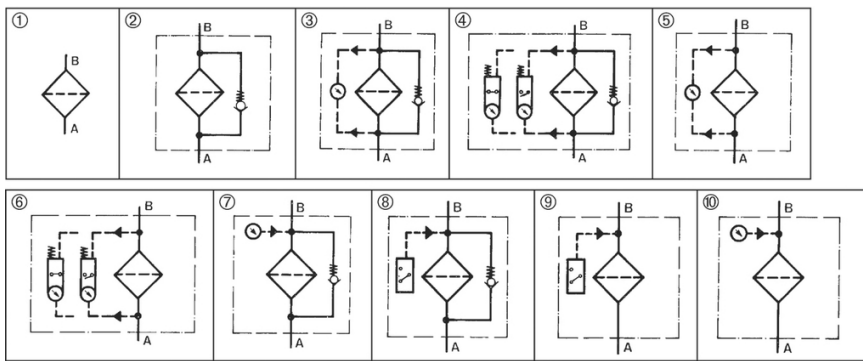
Subject to technical alteration without prior notice.

5. Quality assurance

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Norm	Designation
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DIN ISO 2942	Hydraulic fluid power filter elements; verification of fabrication integrity
DIN ISO 2943	Hydraulic fluid power filter elements; verification of 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. Filter design	2. 2x Filter elements
V = 250 l/min, bypass, electrical maintenance indicator Type: Pi 27020-058 Order number: 77694060	Mic 10 Type: HC 18 Order number: 77643331

7.1 Housing design/order numbers for pressure side installation

Nominal size NG [l/min]	Order number	Type	Options					
			① no options	② with bypass 3,5 bar	③ with bypass 3,5 bar and visual indicator	④ with bypass 3.5 bar and electrical indicator	⑤ with visual indicator	⑥ with electrical indicator
250	77694011	Pi 2720-060	■					
	77694029	Pi 2720-056		■				
	77694078	Pi 2720-057			■			
	77694060	Pi 2720-058				■		
	77694045	Pi 2720-068					■	
	77694037	Pi 2720-069						■
315	77694128	Pi 2728-060	■					
	77694136	Pi 2728-056		■				
	77694185	Pi 2728-057			■			
	77694177	Pi 2728-058				■		
	77694151	Pi 2728-068					■	
	77694144	Pi 2728-069						■

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

7.2 Spin-on cartridge/order numbers for pressure side installation

Nominal size NG [l/min]	Order number	Type	Filter material	max. Δp [bar]	Filter surface [cm ²]
250	77643331	HC 18	Mic 10	5	7000
	77643398	HC 28	Sm-x 10		3400
315	77504194	HC 34	Mic 10	5	14025
	78714750	HC 66	Sm-x 3		7638
	77643844	HC 35	Sm-x 10		7638

7.3 Housing design/order numbers for suction side installation

Nominal size NG [l/min]	Order number	Type	① no options	② with bypass 0.25 bar	⑦ with bypass 0.25 bar + vacuum gauge	⑧ with bypass 0.25 bar + vacuum switch	⑨ with vacuum switch	⑩ with vacuum gauge
80	77694011	Pi 2720-060						
	77694094	Pi 2720-067						
	77694102	Pi 2720-062						
	77694110	Pi 2720-061						
	77694086	Pi 2720-065						
	77694052	Pi 2720-066						
125	77694128	Pi 2728-060						
	77694201	Pi 2728-067						
	77694219	Pi 2728-062						
	77694227	Pi 2728-061						
	77694193	Pi 2728-065						
	77694169	Pi 2728-066						

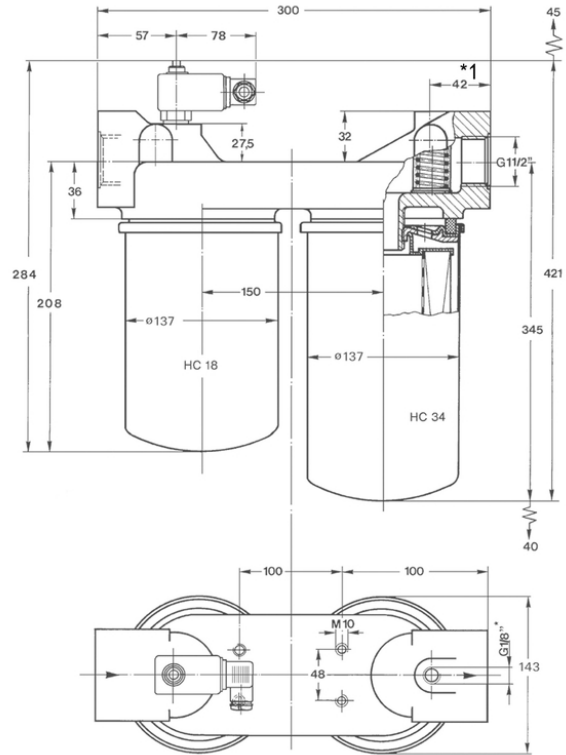
When filter with non bypass configuration is selected Δp of 5 bar may not be exceeded.

7.4 Spin-on cartridge/order numbers for suction side installation

Nominal size NG [l/min]	Order number	Type	Filter material	max. Δp [bar]	Filter surface [cm ²]
80	77643331	HC 18	Mic 10	5	7000
125	77504194	HC 34	Mic 10		14025

8. Technical specifications

Design:	in-line filter
Nominal pressure:	10 bar (140 psi)
Test pressure:	13 bar (180 psi)
Temperature range:	-10 °C to +120 °C (other temperature ranges on request)
Bypass setting:	
Pressure side:	Δp 3.5 bar \pm 10 %
Suction side:	Δp 0.25 bar \pm 10 %
Filter head material:	GAL
Spin-on cartridge material:	St
Sealing material:	NBR/AL
Maintenance indicator setting:	Δp 2.2 bar \pm 10 %
Indicating range vacuum gauge:	-1 bar to +1.5 bar
Pressure setting vacuum switch:	200 mbar
Type of protection (suction side):	IP 54
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 connection:	M20x1.5



*1 only existing at suction side design

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.

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.

9. Installation, operating and maintenance instructions

9.1 Filter installation

When installing the filter make sure that sufficient space is available to remove spin-on cartridge. Filter should be installed with the spin-on cartridge pointing downwards. The maintenance indicator must be visible.

9.2 Connecting the electrical maintenance indicator

The electrical indicator is connected via a 2-pole appliance plug according to DIN EN 175301-803 with poles marked 1 and 2.

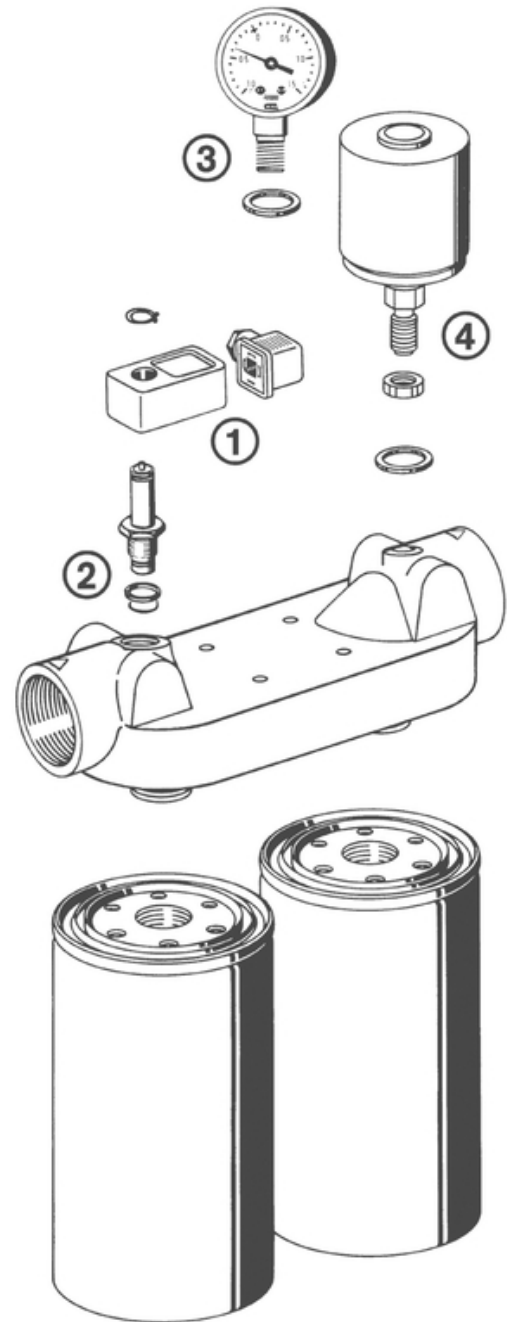
The electrical section can be inverted to change from normally open position to normally closed position or vice versa.

9.3 When should the filter element be replaced?

- Filters equipped with visual and electrical maintenance indicator:
During cold starts, the indicator may give a warning signal. Press the red 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 the trial run or flushing of the system. Afterwards follow instructions of the manufacturer.
- Please always ensure that you have original Filtration Group spare spin-on cartridges in stock.

9.4 Spin-on cartridge replacement

- Stop system and relieve filter from pressure.
- Unscrew the spin-on cartridge by using a filter wrench by turning counter-clockwise.
- Make sure that the order number on the spin-on cartridge corresponds to the order number of the filter plate.
- Oil the seal of the spin-on cartridge.
- Spin-on cartridge must be installed according to the printed instructions.



10. Spare parts list

Order numbers for spare parts		
Position	Type	Order number
①	Maintenance indicator	
	Visual PiS 3098/2.2	77669971
	Electrical PiS 3097/2.2	77669948
	Electrical upper section only	77536550
②	Seal kit for maintenance indicator	
	NBR	77760309
③	Vacuum gauge	76345763
④	Vacuum switch PiS 3070/200 mbar	77669724

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