

Low Pressure Filter

Pi 230

Operating pressure 25 (63) bar, Nominal size up to 800

1. Features

Efficient filters for modern hydraulic systems

- Modular design
 - Compact design
 - Minimal pressure loss
 - Visual / electrical / electronic differential pressure indication
 - SAE 3 bolt flange ports
 - Inlet sideways or at the bottom, outlet sideways
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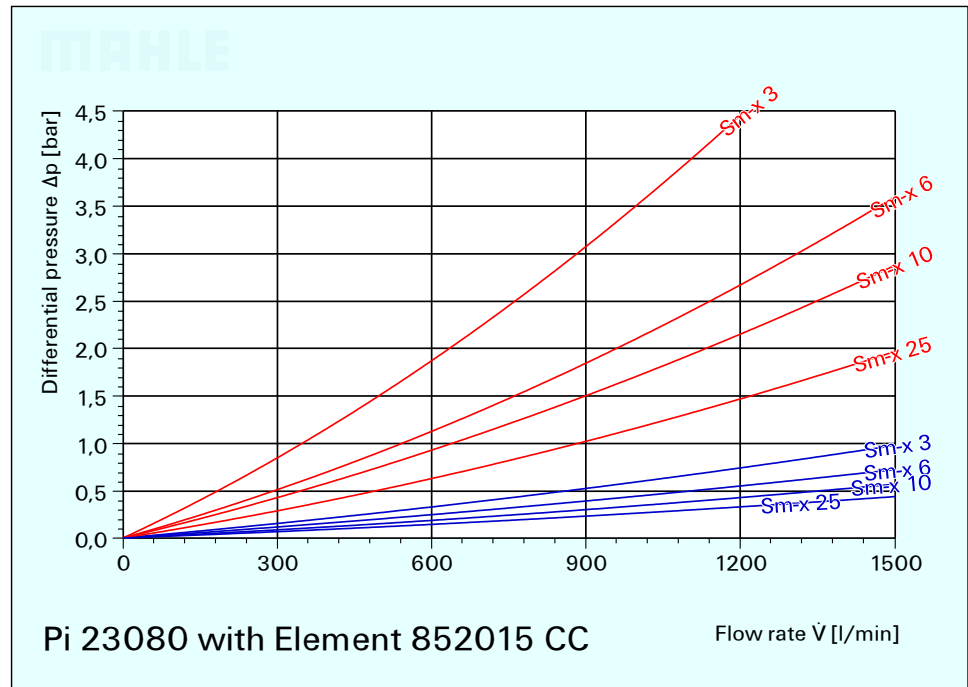
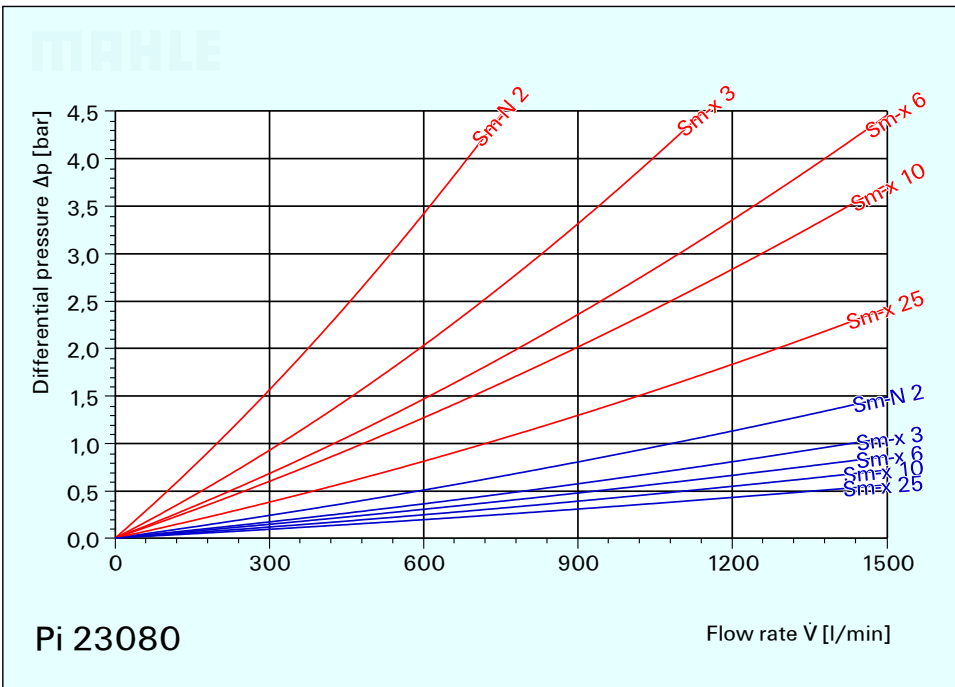
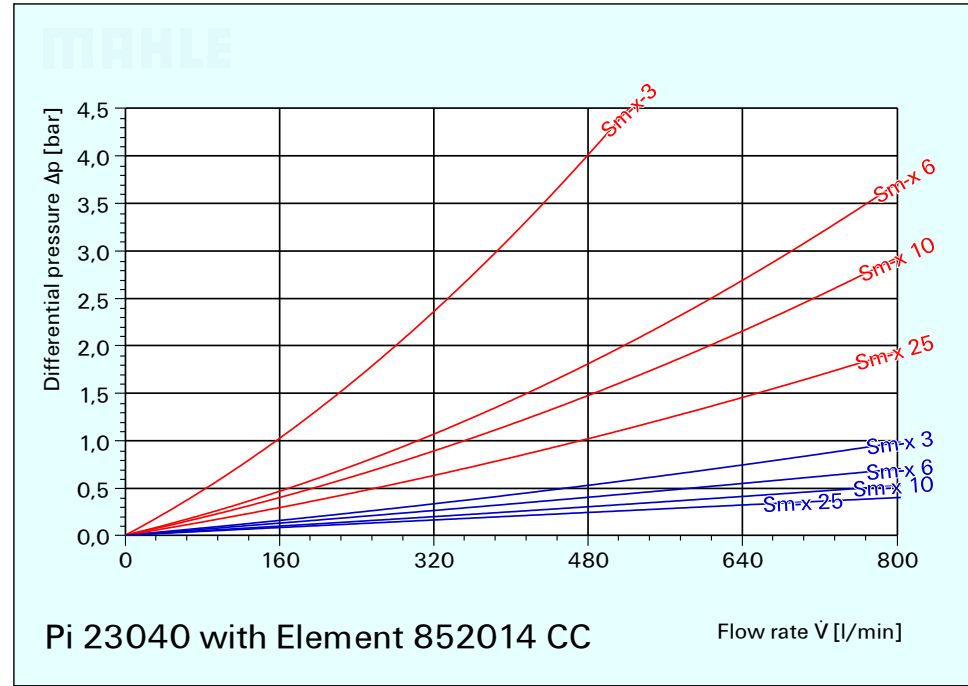
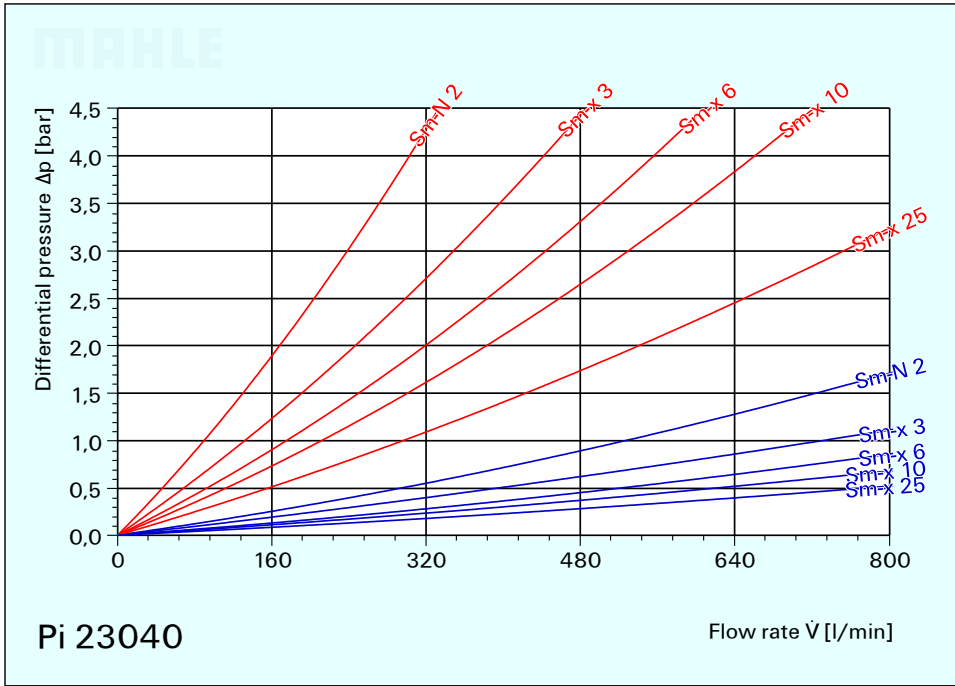
Quality filters, easy to service

- Highly efficient Sm-x or Sm-N2 filter elements
 - Optional with metallic support parts or a high differential pressure stability or with fully ashable and disposal-friendly MAHLE-CC elements
 - β -rated elements per ISO 4572
 - Large dirt holding capacity and high differential pressure stability providing optimal element service life
 - Maintainable with toggle-lock for easy element change
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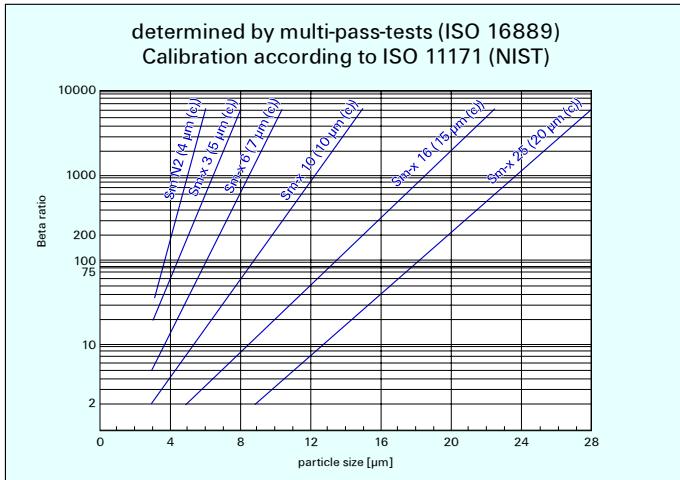


2. Flow rate / pressure drop curve compl. filter

190 mm²/s (25 °E)
33 mm²/s (4,5 °E)



3. Separation characteristics



4. Filter performance data

tested according to ISO 16 889 (multi-pass-test)

Sm-x elements
with Δp 20 bar

Sm-N 2	$\beta_{4(c)} \geq 200$
Sm-x 3	$\beta_{5(c)} \geq 200$
Sm-x 6	$\beta_{7(c)} \geq 200$
Sm-x 10	$\beta_{10(c)} \geq 200$
Sm-x 25	$\beta_{20(c)} \geq 200$

Sm-x CC-elements
with Δp 5 bar

Sm-x 3	$\beta_{5(c)} \geq 200$
Sm-x 6	$\beta_{7(c)} \geq 200$
Sm-x 10	$\beta_{10(c)} \geq 200$
Sm-x 25	$\beta_{20(c)} \geq 200$

at 20 bar differential
pressure

at 5 bar differential
pressure

The filter element Sm-N2 is an element with very large
dirt holding capacity, especially for bypass filtration.

Example for ordering filters:

1. Housing design
V= 400 l/min, bypass, electrical indication,
inlet at the sight, for standard filter elements
Type-no. **Pi 23040/22-058**

Order-no. **632.097.2**

2. Filter element
Sm-x 10
Type-no. **852 014 Sm-x 10**

Order no. **632.181.4**

7. Part Numbers

7.1 Housing design

Order-no.	Type number	Order-no.	Type number	Nominal size NG [k/min]	①	②	③	④
Inlet at the bottom	Inlet at the bottom	Inlet at the sight	Inlet at the sight		with bypass with visual indicator	with bypass with electrical indicator	with visual indicator	with electrical indicator
633.466.8	Pi 23040/12-057	632.093.1	Pi 23040/22-057	400				
632.096.4	Pi 23040/12-058	632.097.2	Pi 23040/22-058					
632.100.4	Pi 23040/12-068	632.101.2	Pi 23040/22-068					
632.104.6	Pi 23040/12-069	632.105.3	Pi 23040/22-069					
632.094.9	Pi 23080/12-057	632.095.6	Pi 23080/22-057	800				
632.098.0	Pi 23080/12-058	632.099.8	Pi 23080/22-058					
632.102.0	Pi 23080/12-068	632.103.8	Pi 23080/22-068					
632.106.1	Pi 23080/12-069	632.107.9	Pi 23080/22-069					

7.3 Housing design

977.007.4	Pi 23040/1C-057	977.011.6	Pi 23040/2C-057	400				
632.064.2	Pi 23040/1C-058	632.065.9	Pi 23040/2C-058					
632.068.3	Pi 23040/1C-068	632.069.1	Pi 23040/2C-068					
632.072.5	Pi 23040/1C-069	632.073.3	Pi 23040/2C-069					
976.885.4	Pi 23080/1C-057	976.886.2	Pi 23080/2C-057	800				
632.066.7	Pi 23080/1C-058	632.067.5	Pi 23080/2C-058					
632.070.9	Pi 23080/1C-068	632.071.7	Pi 23080/2C-068					
632.074.1	Pi 23080/1C-069	632.075.8	Pi 23080/2C-069					

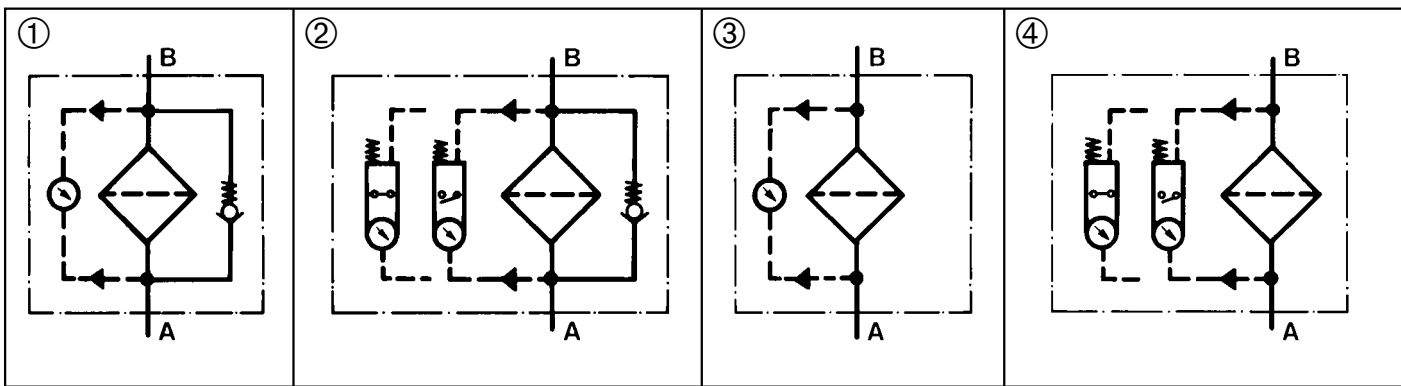
Bei Verwendung von Filter ohne Bypass muß sichergestellt sein, daß der Kollapsdruck des Filterelementes nicht überschritten wird.

5. Test regulations

MAHLE filter elements are manufactured respectively, tested in accordance with the following international standards:

Norm	Designation
ISO 2941	Hydraulic-fluid power-Filter elements-Verification of collapse / burst resistance
ISO 2942	Hydraulic-fluid power-Filter elements-Verification of fabrication integrity and determination of the first bubble point
ISO 2943	Hydraulic-fluid power-Filter elements-Verification of material compatibility with fluids
ISO 3723	Hydraulic fluid power-Filter elements-Method for end load test
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 10 771.1	Fatigue pressure testing of metal containig envelopes in hydraulic fluid applications.
ISO 16 889	Hydraulic Fluidpower filters-Multi-pass method for evaluation filtration performance of a filterelement

6. Symbols



7.2 Filter elements standard*

collapse pressure / filter surface / order number / type number

Sm-N 2	Sm-x 3	Sm-x 6	Sm-x 10	Sm-x 25
Δp 20 bar	Δp 20 bar	Δp 20 bar	Δp 20 bar (26440 cm ²)	Δp 20 bar (26440 cm ²)
613.622.0 [852 014 Sm-N 2]	632.183.0 [852 014 Sm-x 3]	632.182.2 [852 014 Sm-x 6]	632.181.4 [852 014 Sm-x 10]	632.180.6 [852 014 Sm-x 25]
Δp 20 bar (42275 cm ²)	Δp 20 bar (60900 cm ²)	Δp 20 bar (60900 cm ²)	Δp 20 bar (60900 cm ²)	Δp 20 bar (60900 cm ²)
613.621.2 [852 015 Sm-N 2]	632.189.7 [852 015 Sm-x 3]	632.188.9 [852 015 Sm-x 6]	632.187.1 [852 015 Sm-x 10]	632.186.3 [852 015 Sm-x 25]

7.4 Filter elements CC*

collapse pressure / filter surface / order number / type number

	Δp 5 bar (23000 cm ²)	Δp 5 bar (23000 cm ²)	Δp 5 bar (23000 cm ²)	Δp 5 bar (23000 cm ²)
N.N.	613.585.9 [852 014 CC Sm-x 3]	613.586.7 [852 014 CC Sm-x 6]	613.587.5 [852 014 CC Sm-x 10]	613.588.3 [852 014 CC Sm-x 25]
	Δp 5 bar (57500 cm ²)	Δp 5 bar (57500 cm ²)	Δp 5 bar (57500 cm ²)	Δp 5 bar (57500 cm ²)
N.N.	632.202.8 [852 015 CC Sm-x 3]	632.201.0 [852 015 CC Sm-x 6]	632.200.2 [852 015 CC Sm-x 10]	632.199.6 [852 015 CC Sm-x 25]

*andere Elementausführungen auf Anfrage.

8. Specifications

Nominal pressure (10 ⁷ LW):	25 bar*
Nominal pressure (statical):	40 bar
Temperature range:	-10 °C to +120 °C (other temperature ranges on request)
Bypass valve opening pressure:	Δp 3,5 bar ±10 %
Filter head material:	GAl
Filter bowl material:	AL
Sealing material:	NBR
Activating pressure of visual/electrical differential pressure indicator:	Δp 2,2 bar ±0,3 bar
Electrical data of differential pressure indicator:	
Maximum voltage:	230 V ~/=
Maximum current on contact:	2,5 A
Maximum contact load:	60 VA / 40 W
Inrush current:	70 VA
Type of protection:	IP 65 when inserted and secured
Contact:	bistable
Cable connection:	M 10

The electrical indicator function can be changed from the Normally Open position to the Normally Closed position or visa versa by inverting the electrical section.

With the inrush current of 70 VA the indicator can trigger small contactors or contactor relays.

Inductivity in the direct current may require the use of a signal eraser.

For further information and executions please see our leaflet "contamination indicators".

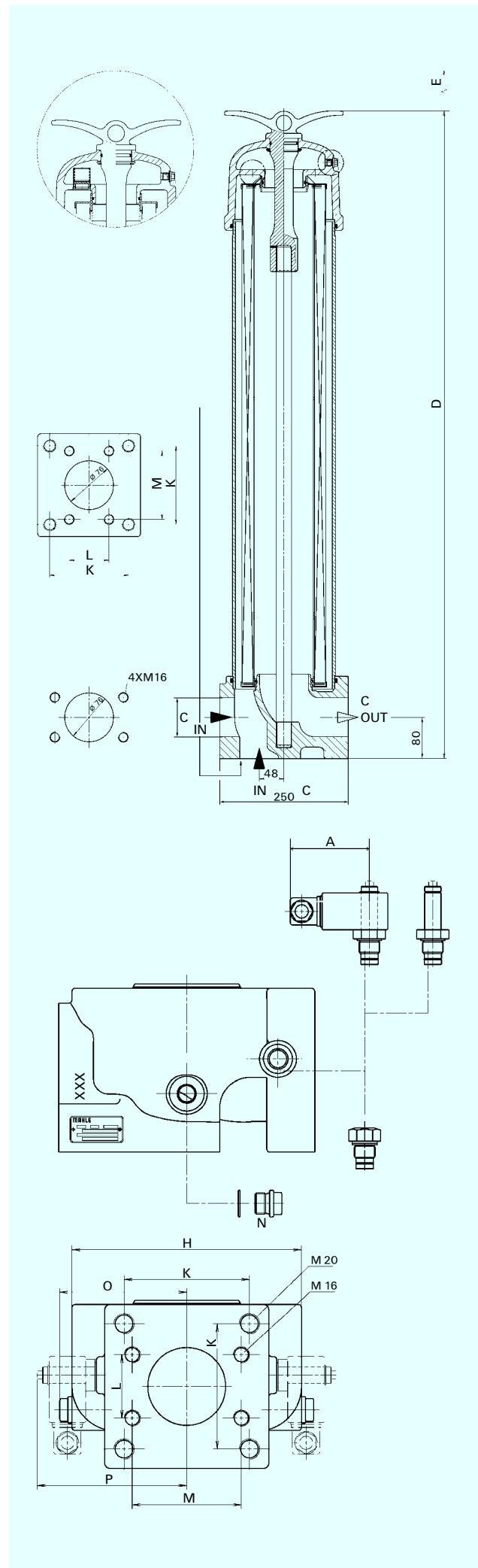
Filters compatible with standard mineral oils. (according to fluids of group 2 of guideline 97/23 EG, art. 9)

Please contact us in case of using other media.

9. Dimensions

All dimensions (except "C" and "O") in mm

Dimension \ Type	Pi 23040	Pi 23080
A	78	78
B	80	80
C	SAE 3", 3000 psi	SAE 3", 3000 psi
D	710	1260
E	770	770
F	230	230
G	200	200
H	224	224
I	250	250
K	122,3	122,3
L	61,9	61,9
M	104,4	104,4
N	G ½	G ½
O	124	124
P	146	146
Weight (kg)	29	38



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.
The contamination indicator must be visible.

10.2 Connecting the electrical contamination indicator

The electrical indicator is connected via a 2-pole appliance plug according to DIN 43650 with poles marked 1 and 2.
The electrical section can be inverted to change from Normally Open position to Normally Closed position or visa versa.

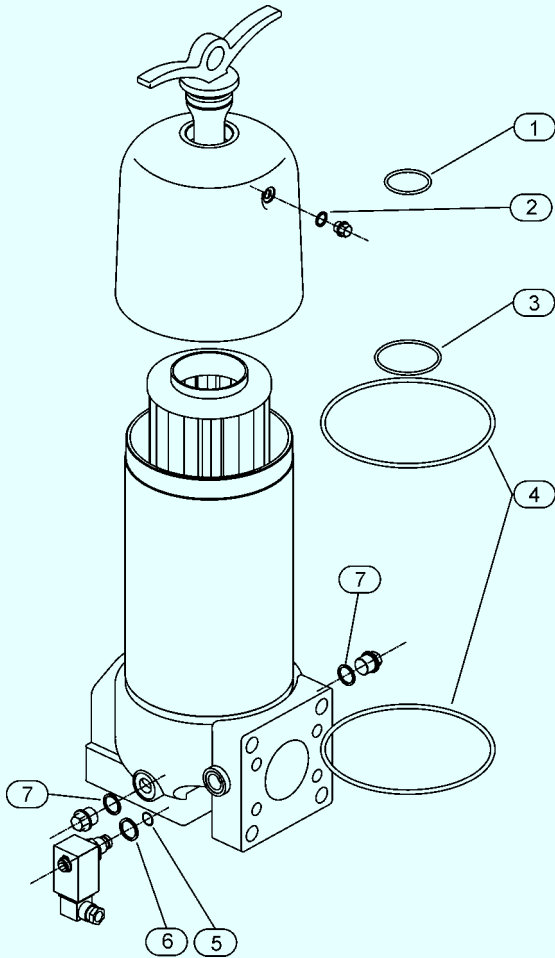
10.3 When must the filter element be replaced?

- Filters equipped with visual and electrical contamination indicator:
During cold starts, the indicator may give a warning signal. Depress the red button of the visual indicator once again only after operating temperature has been reached. If the red button immediately pops out 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 contamination 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 MAHLE-replacement elements in stock: disposable elements, Sm-x, Sm-N2 cannot be cleaned.

10.4 Element replacement

- Stop system and relieve filter from pressure.
- Loosen quick-action clamp, remove cover, and open drain valve. Housing completely vented.
- Remove filter element from the filter bowl.
- Check seal for damages, replace if necessary.
- Make sure that the part number on the spare element corresponds with the part number on the filter label. Remove the plastic bag and push element over the spigot in the filter head.
- Close drain valve. Put the thumb screw together with the cover on the centre rod and tighten strong. Filter must be bled!

Subject to technical alteration without prior notice.



11. Spare Parts List

Pos.	Housing design	
①	Seal kit NBR 632.124.4 FPM 632.125.1 EPDM 632.126.9	
②	Differential pressure indicator	
③	visual 766.997.1 Pis 3098 / 2,2	visual/electrical 766.994.8 Pis 3097 / 2,2
④	Seal kit for differential pressure indicator Pis 3098 / 2,2 + Pis 3097/2,2 NBR 776.030.9 FPM 776.031.7 EPDM 776.032.5	

MAHLE

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