

Low Pressure Filter

Pi 200

Operating pressure 25 (63) bar, Nominal size up to 450

1. Features

Efficient filters for modern hydraulic systems

- Modular design
- Minimal pressure loss
- Compact design
- Visual / electrical / electronical differential pressure indication
- Threaded ports

Quality filters, easy to service

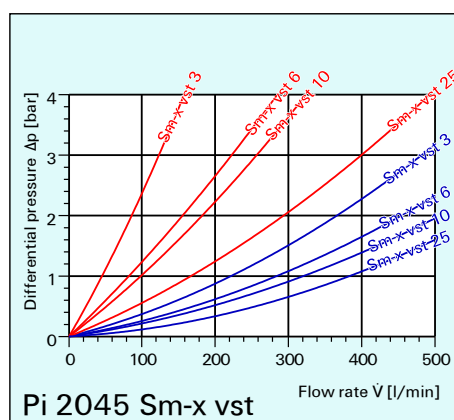
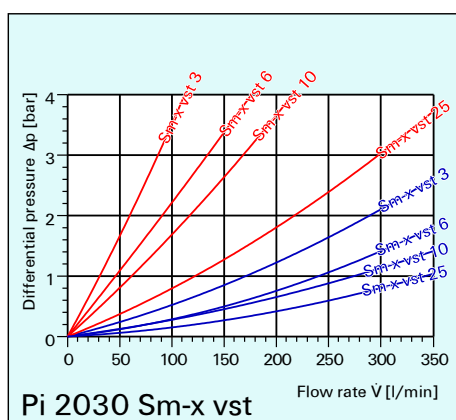
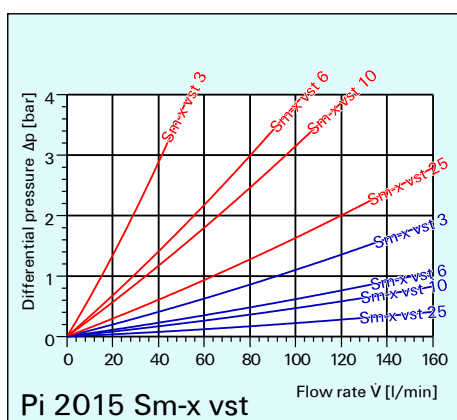
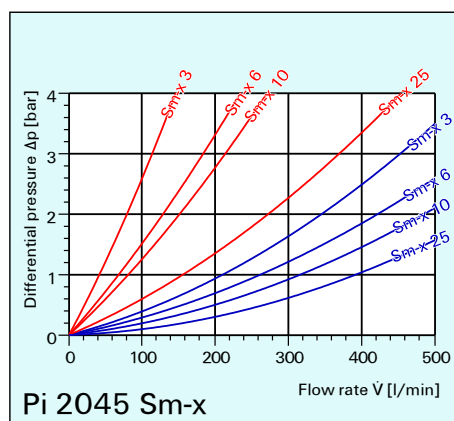
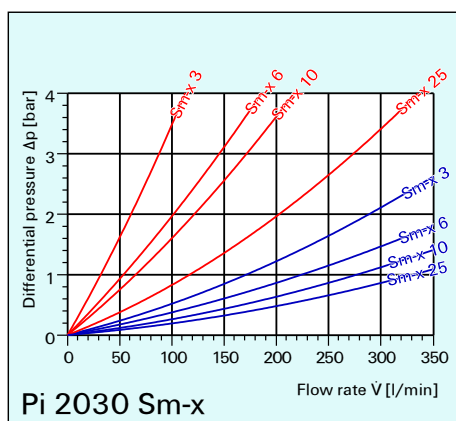
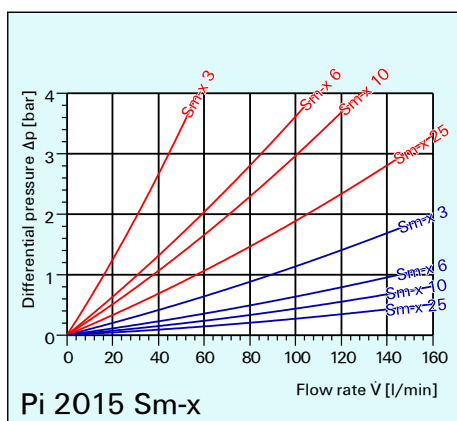
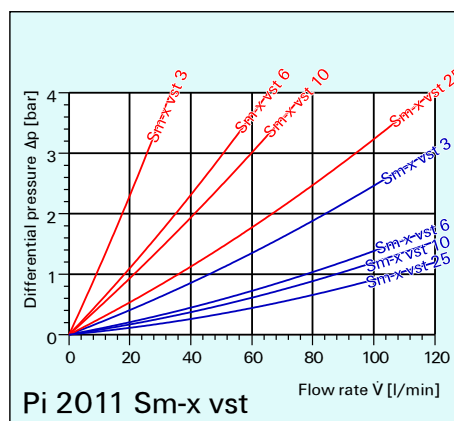
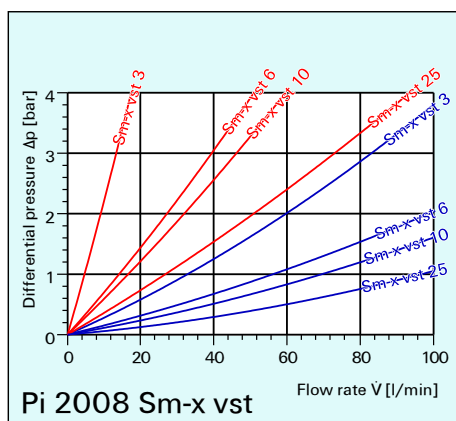
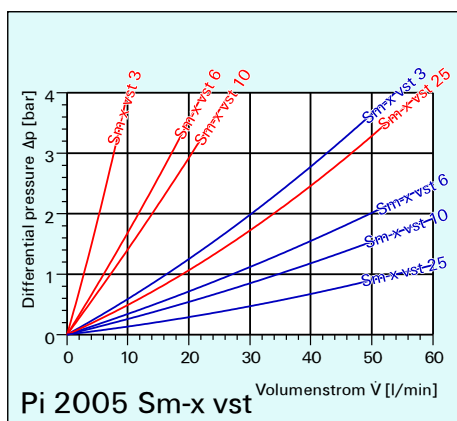
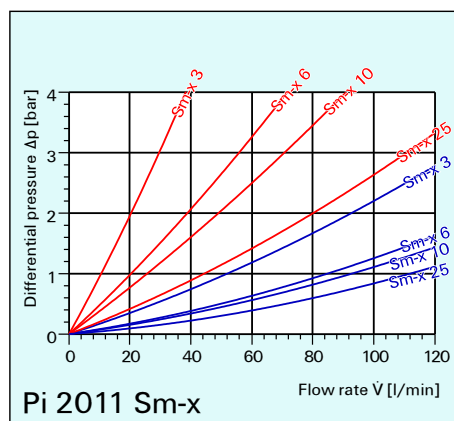
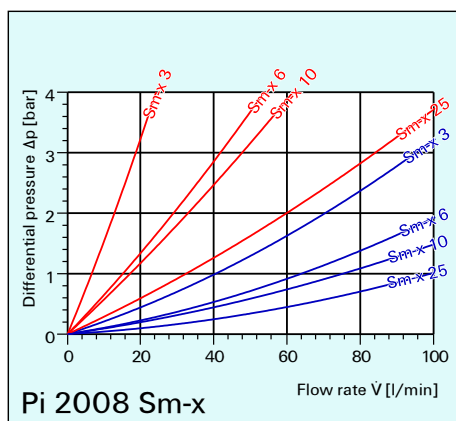
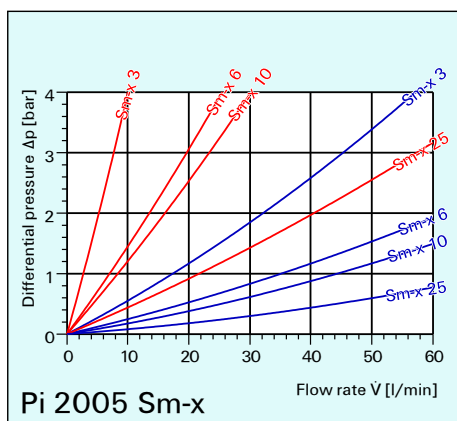
- Highly efficient Sm-x filter elements
- β -rated elements per ISO 4572
- Large dirt holding capacity and high differential pressure stability providing optimal element service life
- 100% bubble-point tested elements

World-wide sales

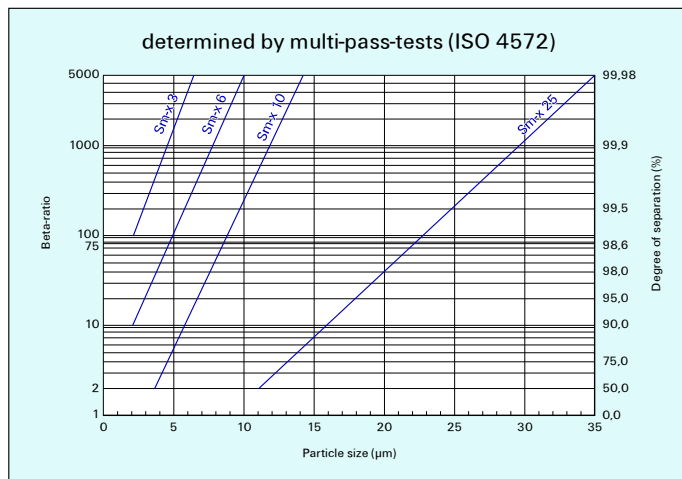


2. Flow rate / pressure drop curve compl. filter

190 mm²/s (25 ° E)
33 mm²/s (4,5 ° E)



3. Separation characteristics



4. Filter performance data

tested according to ISO 4572 (multi-pass-test)

Sm-x elements
with Δp 20 bar

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

at 7 bar differential pressure

Sm-x vst elements
with Δp 210 bar

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

at 16 bar differential pressure

Example for ordering filters:

1. Housing design $\dot{V} = 80$ l/min,
electrical indication

Type-no. Pi 2208-69

Order-no. **766.528.4**

+ 2. Filter element Sm-x vst 3

Type-no. Pi 2208

Order-no. **768.020.0**

7. Order numbers

7.1 Housing design

Part number	Type number	Nominal size (NG)	① With indicator cavity	② With bypass valve and indicator cavity	③ With bypass valve and visual indicator	④ With bypass valve and electrical indicator	⑤ With visual indicator	⑥ With electrical indicator
766.514.4	Pi 2005-60	50						
766.511.0	Pi 2005-56							
766.512.8	Pi 2005-57							
766.513.6	Pi 2005-58							
766.516.9	Pi 2005-68							
766.517.7	Pi 2005-69							
766.523.5	Pi 2008-60	80						
766.520.1	Pi 2008-56							
766.521.9	Pi 2008-57							
766.522.7	Pi 2008-58							
766.527.6	Pi 2008-68							
766.528.4	Pi 2008-69							
820.511.4	Pi 2011-60	110						
820.512.2	Pi 2011-56							
820.513.0	Pi 2011-57							
820.514.8	Pi 2011-58							
820.515.5	Pi 2011-68							
820.516.3	Pi 2011-69							
766.533.4	Pi 2015-60	150						
766.530.0	Pi 2015-56							
766.531.8	Pi 2015-57							
766.532.6	Pi 2015-58							
766.539.1	Pi 2015-68							
766.540.9	Pi 2015-69							
766.547.4	Pi 2030-60	300						
766.544.1	Pi 2030-56							
766.545.8	Pi 2030-57							
766.546.6	Pi 2030-58							
766.551.6	Pi 2030-68							
766.553.2	Pi 2030-69							
766.488.1	Pi 2045-60	450						
766.487.3	Pi 2045-56							
766.486.5	Pi 2045-57							
766.485.7	Pi 2045-58							
766.492.3	Pi 2045-68							
766.493.1	Pi 2045-69							

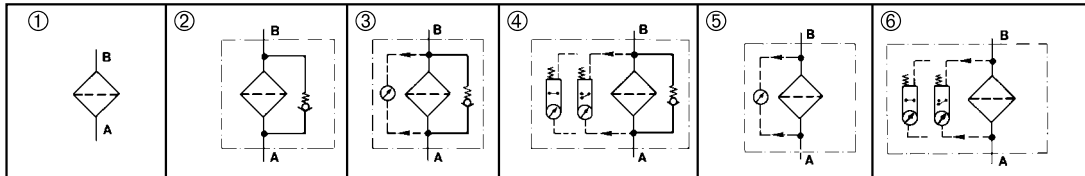
When filter with non bypass configuration is selected the collapse pressure of the element may not be exceeded.

5. Test regulations

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

No.	Designation
ISO 2941	Hydraulic-filter elements: Verification of burst resistance
ISO 2942	Hydraulic-filter elements: Determination of fabrication integrity
ISO 2943	Hydraulic-filter elements: Verification of material compatibility with hydraulic fluids
ISO 3723	Hydraulic-filter elements: Method for testing end-cap load
ISO 3724	Hydraulic-filter elements: Verification of flow fatigue characteristics
ISO 3968.2	Hydraulic-filters: Evaluation of pressure drop versus flow
ISO 4572	Hydraulic-filter elements: Testing of filter performance (multi-pass-test)

6. Symbols



7.2 Filter elements* () = Filter surface area [] = Type number

	Sm-x 3 Δp 20 bar (590 cm ²)	Sm-x 6 Δp 20 bar (590 cm ²)	Sm-x 10 Δp 20 bar (590 cm ²)	Sm-x 25 Δp 20 bar (590 cm ²)	Sm-x vst 3 Δp 210 bar (470 cm ²)	Sm-x vst 6 Δp 210 bar (470 cm ²)	Sm-x vst 10 Δp 210 bar (470 cm ²)	Sm-x vst 25 Δp 210 bar (470 cm ²)
					768.019.2	794.353.3	768.038.2	768.050.7
	768.013.5	794.350.9	768.032.5	768.044.0				
	768.013.5	794.350.9	768.032.5	768.044.0	[Pi 2205]	[Pi 5205]	[Pi 3205]	[Pi 4205]
	768.013.5	794.350.9	768.032.5	768.044.0				
	[Pi 2105]	[Pi 5105]	[Pi 3105]	[Pi 4105]	768.019.2	794.353.3	768.038.2	768.050.7
					768.019.2	794.353.3	768.038.2	768.050.7
	(1150 cm ²)	(1150 cm ²)	(1150 cm ²)	(1150 cm ²)	(900 cm ²)	(900 cm ²)	(900 cm ²)	(900 cm ²)
					768.020.0	794.354.1	768.119.0	768.051.5
	768.014.3	794.351.7	768.034.1	768.045.7				
	768.014.3	794.351.7	768.034.1	768.045.7	[Pi 2208]	[Pi 5208]	[Pi 3208]	[Pi 4208]
	768.014.3	794.351.7	768.034.1	768.045.7				
	[Pi 2108]	[Pi 5108]	[Pi 3108]	[Pi 4108]	768.020.0	794.354.1	768.119.0	768.051.5
					768.020.0	794.354.1	768.119.0	768.051.5
	(1700 cm ²)	(1700 cm ²)	(1700 cm ²)	(1700 cm ²)	(1315 cm ²)	(1315 cm ²)	(1315 cm ²)	(1315 cm ²)
					768.021.8	794.355.8	768.039.0	768.052.3
	768.015.0	794.352.5	768.033.3	768.046.5				
	768.015.0	794.352.5	768.033.3	768.046.5	[Pi 2211]	[Pi 5211]	[Pi 3211]	[Pi 4211]
	768.015.0	794.352.5	768.033.3	768.046.5				
	[Pi 2111]	[Pi 5111]	[Pi 3111]	[Pi 4111]	768.021.8	794.355.8	768.039.0	768.052.3
					768.021.8	794.355.8	768.039.0	768.052.3
	(2350 cm ²)	(2350 cm ²)	(2350 cm ²)	(2350 cm ²)	(2010 cm ²)	(2010 cm ²)	(2010 cm ²)	(2010 cm ²)
					768.022.6	795.512.3	768.040.8	768.053.1
	768.016.8	795.509.9	768.035.8	768.047.3				
	768.016.8	795.509.9	768.035.8	768.047.3	[Pi 2215]	[Pi 5215]	[Pi 3215]	[Pi 4215]
	768.016.8	795.509.9	768.035.8	768.047.3				
	[Pi 2115]	[Pi 5115]	[Pi 3115]	[Pi 4115]	768.022.6	795.512.3	768.040.8	768.053.1
					768.022.6	795.512.3	768.040.8	768.053.1
	(4420 cm ²)	(4420 cm ²)	(4420 cm ²)	(4420 cm ²)	(3800 cm ²)	(3800 cm ²)	(3800 cm ²)	(3800 cm ²)
					768.023.4	795.513.1	768.041.6	768.054.9
	768.017.6	795.510.7	768.036.6	768.048.1				
	768.017.6	795.510.7	768.036.6	768.048.1	[Pi 2230]	[Pi 5230]	[Pi 3230]	[Pi 4230]
	768.017.6	795.510.7	768.036.6	768.048.1				
	[Pi 2130]	[Pi 5130]	[Pi 3130]	[Pi 4130]	768.023.4	795.513.1	768.041.6	768.054.9
					768.023.4	795.513.1	768.041.6	768.054.9
	(6540 cm ²)	(6540 cm ²)	(6540 cm ²)	(6540 cm ²)	(5600 cm ²)	(5600 cm ²)	(5600 cm ²)	(5600 cm ²)
					768.024.2	795.514.9	768.042.4	768.055.6
	768.018.4	795.511.5	768.037.4	768.049.9				
	768.018.4	795.511.5	768.037.4	768.049.9	[Pi 2245]	[Pi 5245]	[Pi 3245]	[Pi 4245]
	768.018.4	795.511.5	768.037.4	768.049.9				
	[Pi 2145]	[Pi 5145]	[Pi 3145]	[Pi 4145]	768.024.2	795.514.9	768.042.4	768.055.6
					768.024.2	795.514.9	768.042.4	768.055.6

*Further elements available upon request.

8. Specifications

Design:	line mounting filter
Operating pressure:	25 bar*
Test pressure:	33 bar
Temperature range:	-10 °C to +120 °C (other temperature ranges on request)
Bypass opening pressure:	Δp 3,5 bar $\pm$ 10 %
Filter head material:	GDAL
Filter bowl material:	AL / St
Material of seals:	NBR / AL
Activating pressure of visual / electrical differential pressure indicator:	Δp 2,2 bar $\pm$ 0,3 bar
Electrical data of contamination indicator:	
Maximum voltage:	230 V $\sim$ / =
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:	PG 11 $\varnothing$ 6–10

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.

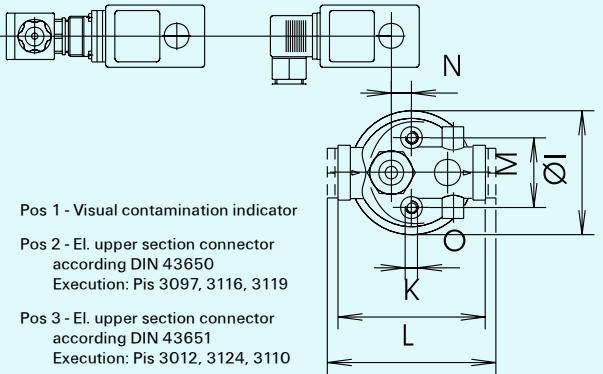
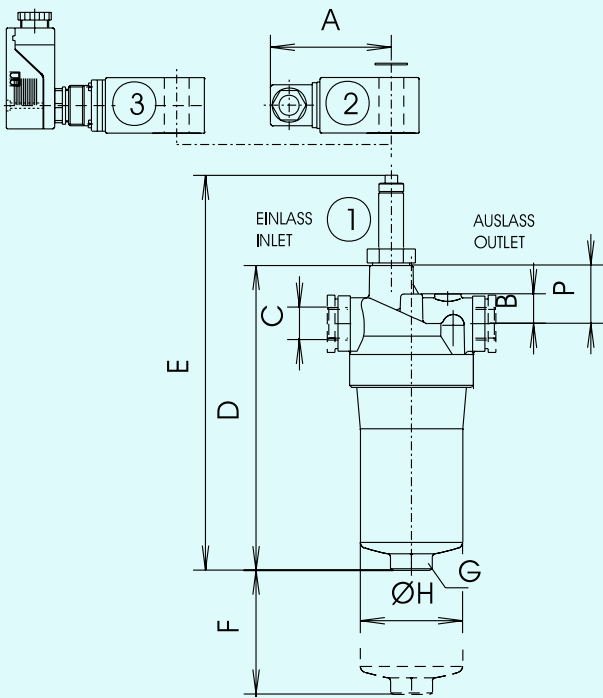
Inductivity in the direct current may require the use of a signal eraser.

For further information and executions please see our leaflet Contamination indicators.

Filters compatible with standard mineral oils.

Please contact us in case of using other media.

***Types Pi 2005.. – Pi 2011.. have an operating pressure of 63 bar, test pressure 82 bar.**

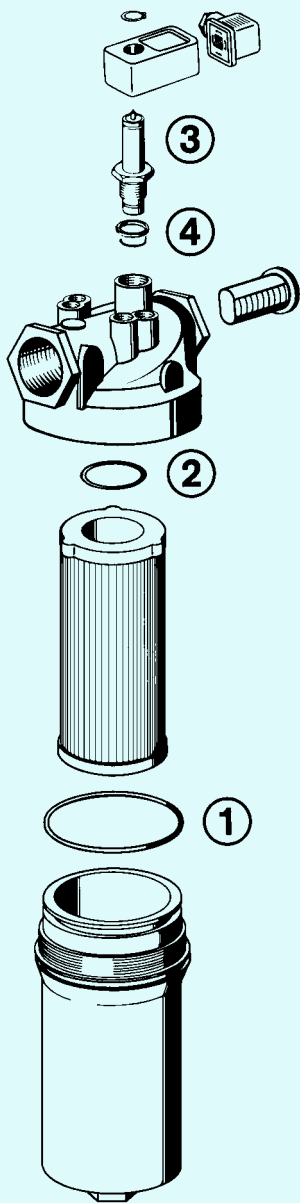


Pos 1 - Visual contamination indicator
Pos 2 - El. upper section connector
according DIN 43650
Execution: Pis 3097, 3116, 3119
Pos 3 - El. upper section connector
according DIN 43651
Execution: Pis 3012, 3124, 3110

9. Dimensions

All dimensions (except "C") in mm

Dimen- sion Type	A	B	C	D	E	F	G SW	H	I	K	L	M	N	O	P	Weight
Pi 2005	78	19	G ½	177	235	80	27	66	80	–	109	45	13	M 8 x 10	37,5	0,9 kg
Pi 2008	78	19	G ¾	253	311	80	27	66	80	95	–	45	13	M 8 x 10	37,5	1 kg
Pi 2011	78	19	G ¾	335	393	80	27	66	80	95	–	45	13	M 8 x 10	37,5	1,1 kg
Pi 2015	78	30	G 1 ¼	246	304	110	32	109	128	150	–	60	24,5	M 12 x 15	43,5	2,1 kg
Pi 2030	78	30	G 1 ¼	363	421	110	32	109	128	150	–	60	24,5	M 12 x 15	43,5	2,4 kg
Pi 2045	78	30	G 1 ¼	478	536	110	24	109	128	150	–	60	24,5	M 12 x 15	43,5	6,5 kg



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 bowl. Preferable the filter should be installed with the filter bowl pointing downwards. 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 43 650 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) cannot be cleaned.

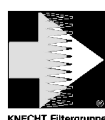
10.4 Element replacement

- Stop system and relieve filter from pressure.
- Unscrew the filter bowl by turning counter-clockwise. Clean the bowl using a suitable cleaning solvent.
- Remove filter element with a side-to-side motion.
- Check O-ring on the filter bowl and spigot for damage. Replace, if necessary.
- Make sure that the part number an the spare element corresponds with the part number of the filter label. Open the plastic bag and push element over the spigot in the filter head.
Now remove plastic bag.
- Complete installation by screwing on the bowl, turning clockwise until it comes to a full stop. Back off the bowl $\frac{1}{8}$ to $\frac{1}{2}$ turn.

Subject to technical alteration without prior notice.

11. Spare parts list

Pos.	Type number / housing		
	Pi 2005-Pi 2011	Pi 2015-Pi 2045	
① to ②	Seal kit for filter housing NBR 755.021.3 FPM 784.579.5 EPDM 784.580.3	Seal kit for filter housing NBR 755.022.1 FPM 784.581.1 EPDM 784.582.9	
③	Contamination indicator visual 766.997.1 Pis 3098/2,2 bar	electrical 766.994.8 Pis 3097/2,2 bar	electrical upper section only 753.655.0
④	Seal kit for contamination indicator NBR 776.030.9 FPM 776.031.7 EPDM 776.032.5		



MAHLE
Industriefilter

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