

Duplex Filter **Pi 2100**

Operating pressure 25 (63) bar, Nominal size up to 40, 100, 250
according DIN 24550

1. Features

Efficient filters for modern hydraulic systems

- Modular design
- Minimal pressure loss
- Compact design
- Visual / electrical / electronical differential pressure indication
- Threaded or SAE 4 bolt flange ports
- Switching valve on upstream side
- Ergonomic switch-over handle with safety lock and pressure compensation
- User-optimized one-hand-operation

Quality filters, easy to service

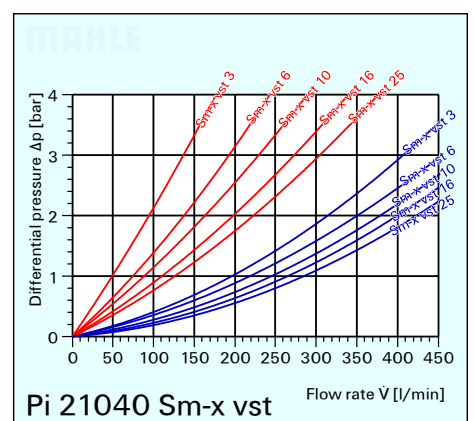
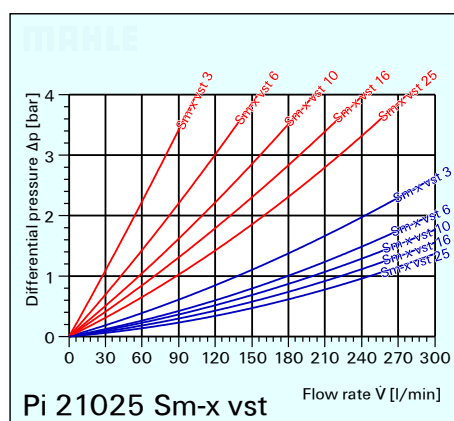
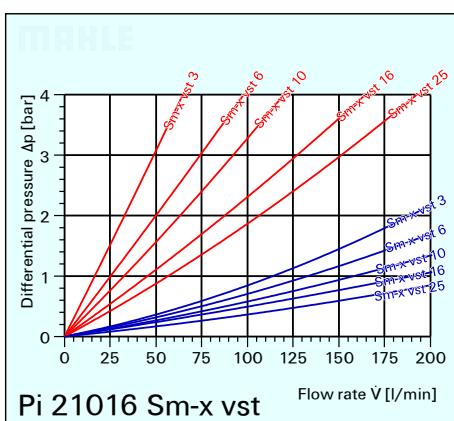
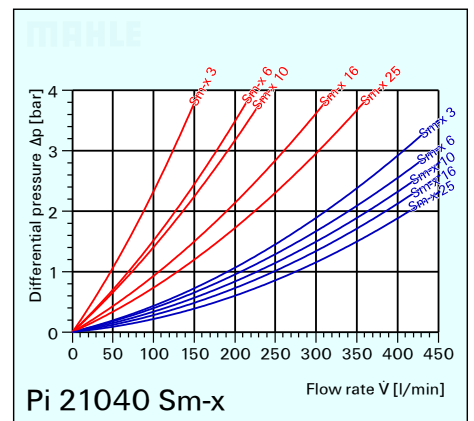
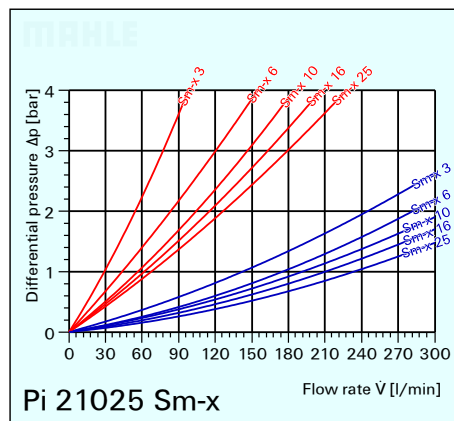
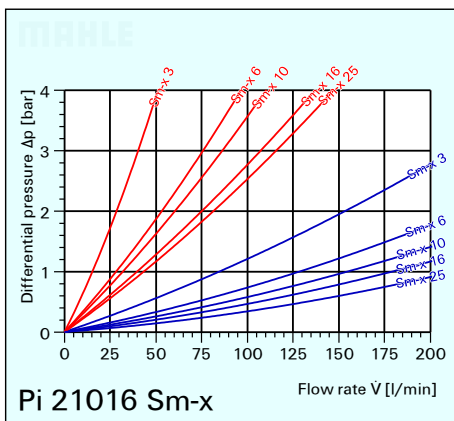
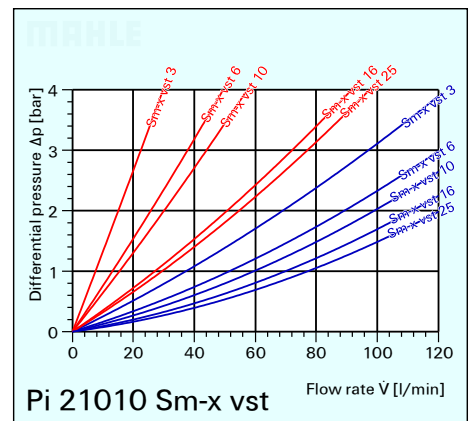
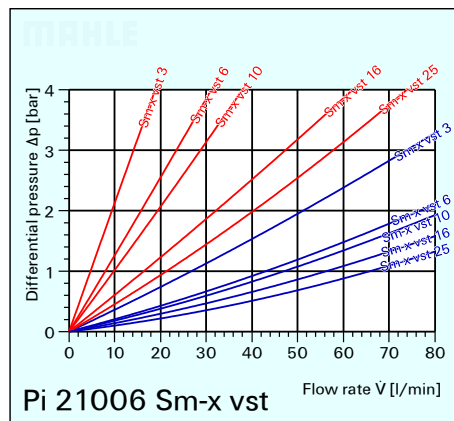
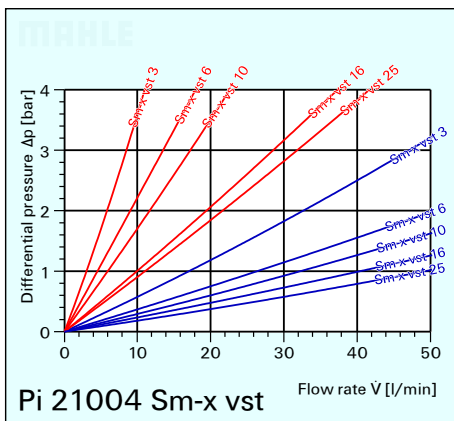
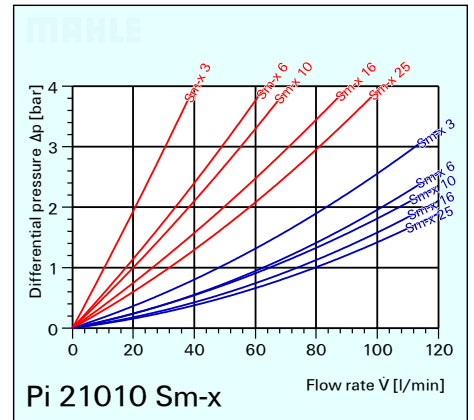
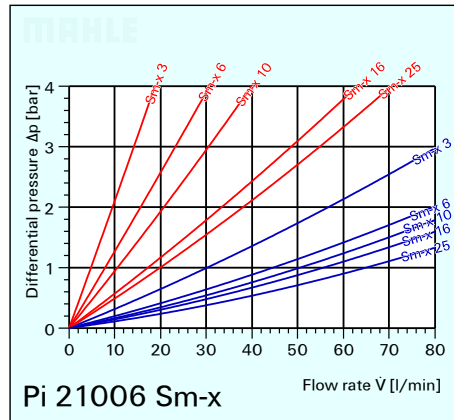
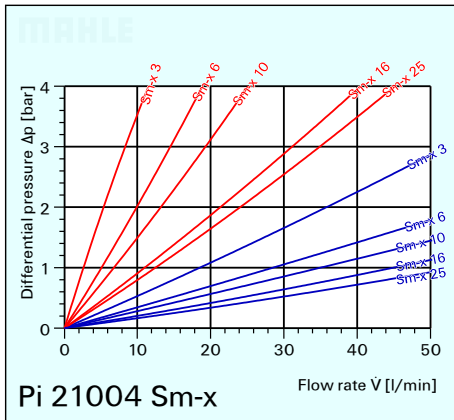
- Highly efficient Sm-x filter elements
- β -rated elements per ISO 4572
- Large dirt holding capacity and high differential pressure stability providing optimum element service life
- 100% bubble-point tested elements

World-wide sales

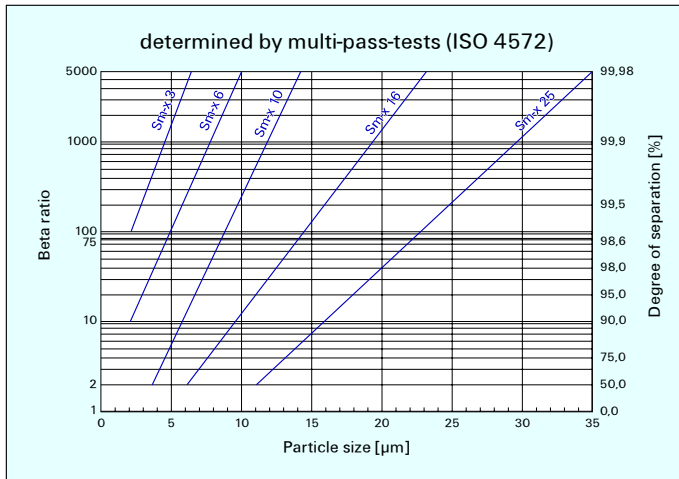


2. Flow rate / pressure drop curve compl. filter

█ 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 16 $\beta_{16} \geq 75$
 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 16 $\beta_{16} \geq 75$
 Sm-x vst 25 $\beta_{25} \geq 75$

at 16 bar differential pressure

Example for ordering filters:

1. Housing design with $\dot{V} = 100$ l/min, electrical indicator
type no. **Pi 21010-069**

order-no. **820.415.8**

+ 2. Filter element Sm-x vst 3
type no. **Pi 71010 DN**

order-no. **822.748.0**

7. Order numbers for pressure side installation

7.1 Housing Design

Order number	Type number	Nominal size NG	① with bypass valve and visual indicator	② with bypass valve and visual/ electrical indicator	③ with visual indicator	④ with visual/electrical indicator
932.826.1	Pi 21004-057	40				
830.426.3	Pi 21004-058					
932.827.9	Pi 21004-068					
932.828.7	Pi 21004-069					
971.590.5	Pi 21006-057	63				
830.427.1	Pi 21006-058					
971.591.3	Pi 21006-068					
971.592.1	Pi 21006-069					
820.412.5	Pi 21010-057	100				
820.413.3	Pi 21010-058					
820.414.1	Pi 21010-068					
820.415.8	Pi 21010-069					
971.593.9	Pi 21016-057	160				
971.594.7	Pi 21016-058					
971.595.4	Pi 21016-068					
971.596.2	Pi 21016-069					
932.829.5	Pi 21025-057	250				
932.830.3	Pi 21025-058					
932.831.1	Pi 21025-068					
932.832.9	Pi 21025-069					
971.597.0	Pi 21040-057	400				
971.598.8	Pi 21040-058					
971.599.6	Pi 21040-068					
971.600.2	Pi 21040-069					

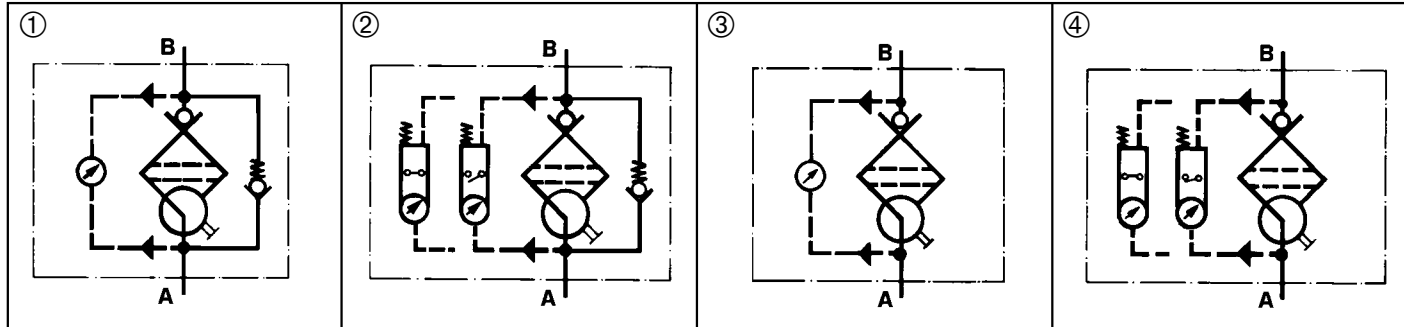
When filter with non bypass configuration is selected, the collapse pressure of the element may not be exceeded

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	Sm-x 6 Δp 20 bar	Sm-x 10 Δp 20 bar	Sm-x 16 Δp 20 bar	Sm-x 25 Δp 20 bar	Sm-x vst 3 Δp 210 bar	Sm-x vst 6 Δp 210 bar	Sm-x vst 10 Δp 210 bar	Sm-x vst 16 Δp 210 bar	Sm-x vst 25 Δp 210 bar
(540 cm ²)	(540 cm ²)	(540 cm ²)	(540 cm ²)	(540 cm ²)	(440 cm ²)	(440 cm ²)	(440 cm ²)	(440 cm ²)	(440 cm ²)
					[Pi 71004 DN]	[Pi 72004 DN]	[Pi 73004 DN]	[Pi 74004 DN]	[Pi 75004 DN]
					821.607.9	796.015.6	792.565.4	821.608.7	821.609.5
[Pi 21004 DN]	[Pi 22004 DN]	[Pi 23004 DN]	[Pi 24004 DN]	[Pi 25004 DN]					
826.092.9	796.085.9	792.557.1	826.093.7	826.094.5					
(910 cm ²)	(910 cm ²)	(910 cm ²)	(910 cm ²)	(910 cm ²)	(780 cm ²)	(780 cm ²)	(780 cm ²)	(780 cm ²)	(780 cm ²)
					[Pi 71006 DN]	[Pi 72006 DN]	[Pi 73006 DN]	[Pi 74006 DN]	[Pi 75006 DN]
					821.613.7	796.014.9	792.566.2	821.614.5	821.615.2
[Pi 21006 DN]	[Pi 22006 DN]	[Pi 23006 DN]	[Pi 24006 DN]	[Pi 25006 DN]					
826.096.0	796.086.7	792.558.9	826.097.8	826.098.6					
(1490 cm ²)	(1490 cm ²)	(1490 cm ²)	(1490 cm ²)	(1490 cm ²)	(1270 cm ²)	(1270 cm ²)	(1270 cm ²)	(1270 cm ²)	(1270 cm ²)
					[Pi 71010 DN]	[Pi 72010 DN]	[Pi 73010 DN]	[Pi 74010 DN]	[Pi 75010 DN]
					822.748.0	796.013.1	792.567.0	826.128.1	821.616.0
[Pi 21010 DN]	[Pi 22010 DN]	[Pi 23010 DN]	[Pi 24010 DN]	[Pi 25010 DN]					
822.747.2	796.087.5	792.559.7	826.100.0	826.101.8					
(2420 cm ²)	(2420 cm ²)	(2420 cm ²)	(2420 cm ²)	(2420 cm ²)	(2030 cm ²)	(2030 cm ²)	(2030 cm ²)	(2030 cm ²)	(2030 cm ²)
					[Pi 71016 DN]	[Pi 72016 DN]	[Pi 73016 DN]	[Pi 74016 DN]	[Pi 75016 DN]
					794.063.8	796.012.3	792.568.8	826.979.7	821.617.8
[Pi 21016 DN]	[Pi 22016 DN]	[Pi 23016 DN]	[Pi 24016 DN]	[Pi 25016 DN]					
826.103.4	796.082.6	792.560.5	826.104.2	826.105.9					
(4020 cm ²)	(4020 cm ²)	(4020 cm ²)	(4020 cm ²)	(4020 cm ²)	(3370 cm ²)	(3370 cm ²)	(3370 cm ²)	(3370 cm ²)	(3370 cm ²)
					[Pi 71025 DN]	[Pi 72025 DN]	[Pi 73025 DN]	[Pi 74025 DN]	[Pi 75025 DN]
					794.064.6	796.011.5	792.569.6	826.981.3	821.618.6
[Pi 21025 DN]	[Pi 22025 DN]	[Pi 23025 DN]	[Pi 24025 DN]	[Pi 25025 DN]					
822.751.4	796.083.4	792.561.3	826.107.5	826.108.3					
(6700 cm ²)	(6700 cm ²)	(6700 cm ²)	(6700 cm ²)	(6700 cm ²)	(5600 cm ²)	(5600 cm ²)	(5600 cm ²)	(5600 cm ²)	(5600 cm ²)
					[Pi 71040 DN]	[Pi 72040 DN]	[Pi 73040 DN]	[Pi 74040 DN]	[Pi 75040 DN]
					794.065.3	796.010.7	793.082.9	826.982.1	826.090.3
[Pi 21040 DN]	[Pi 22040 DN]	[Pi 23040 DN]	[Pi 24040 DN]	[Pi 25040 DN]					
822.752.2	796.084.2	792.562.1	826.110.9	826.111.7					

*further elements upon request

8. Specifications

Design:	line mounting filter
Nominal 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
Filter head material:	GAl
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

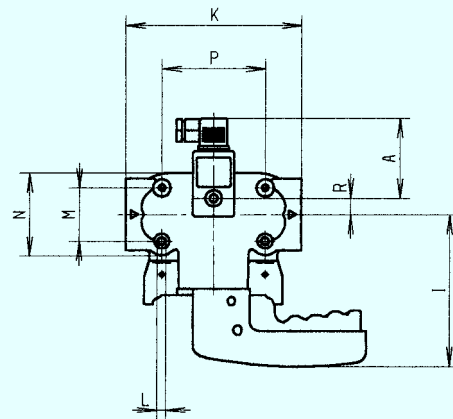
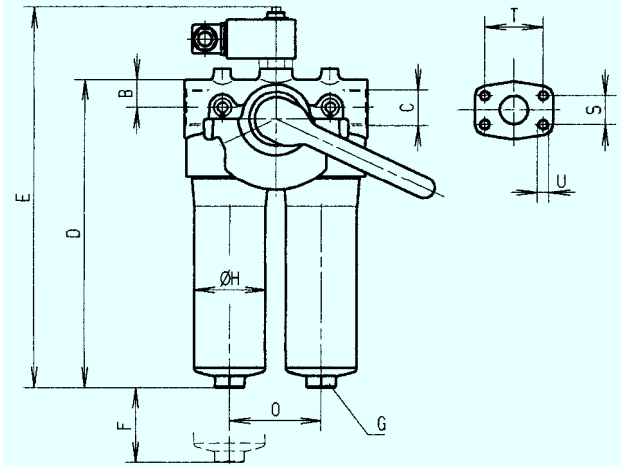
The electrical indicator function can be changed from the Normally Open position to the Normally Closed position or vice versa by inverting the electrical section.

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 suppressor.

For further information also see our leaflet: "Contamination indicators".

* The housings Pi 21004, Pi 21006 and Pi 21010 are approved for 63 bar operating pressure (test pressure 82 bar).



9. Dimensions

All dimensions (except "C") in mm

Dimension Type	Dimension																			Weight [kg]
	A	B	C	D	E	F	G	H	I	K	L	M	N	O	P	R	S	T	U	
Pi 21004	78	38	G 1*	205	263	80	SW 27	66	139	168	M 8 x 16	52	81	85	100	16	26,2	52,4	M 10 x 20	2,6
Pi 21006	78	38	G 1*	265	323	80	SW 27	66	139	168	M 8 x 16	52	81	85	100	16	26,2	52,4	M 10 x 20	2,9
Pi 21010	78	38	G 1*	358	416	80	SW 27	66	139	168	M 8 x 16	52	81	85	100	16	16,2	52,4	M 10 x 20	3,3
Pi 21016	78	40	G 1½*	291	349	110	SW 32	109	165	280	M 10 x 20	62	140	140	210	19	35,7	69,9	M 12 x 20	7,1
Pi 21025	78	40	G 1½*	386	444	110	SW 32	109	165	280	M 10 x 20	62	140	140	210	19	35,7	69,9	M 12 x 20	8,0
Pi 21040	78	40	G 1½*	530	588	110	SW 24	109	165	280	M 10 x 20	62	140	140	210	19	35,7	69,9	M 12 x 20	16,3

*SAE flange connections (3000 PSI) on request

10. Installation, Operating and maintenance Instructions

10.1 Filter installation

Install filter in accordance with the identified flow direction. The filter head is provided with threaded holes for mounting the filter. Ascertain that the required underclearance is provided so that the filter element and the filter bowl can be removed. Preferably the filter should be installed with the filter bowl pointing downwards. The contamination indicator must be well 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 vice versa.

10.3 When must the filter element be replaced?

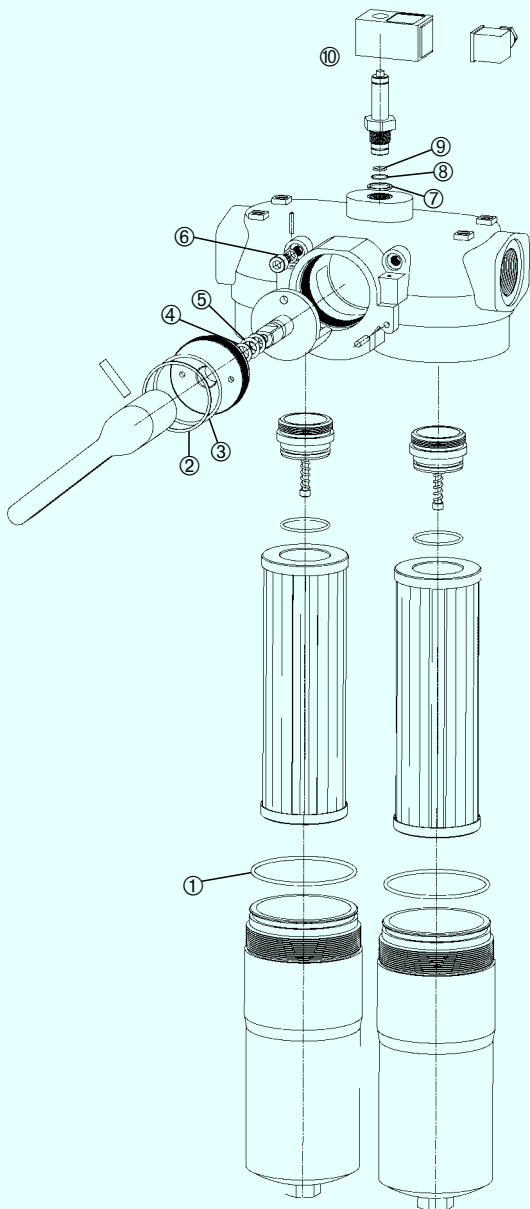
- During cold starts, the indicator may give a warning signal. Depress the red button of the visual indicator once again only after operating temperature has been reached. If the red button immediately pops out again and/or the electrical signal has not switched off after reaching operating temperature, the filter element must be replaced after the end of the shift.
- Please always ensure that you have original MAHLE replacement elements in stock: disposable elements (Sm-x) cannot be cleaned.

10.4 Element replacement

Note: The contamination 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 to filter servicing. Now the signal of the contamination indicator is cancelled and the red button can be depressed again.

- Operate and hold pressure equalizing lever located behind the switching lever. Pull catch knob and swivel switching lever. Engage the catch on the clear filter side. Place trough or drip pan underneath to collect leaking oil.
- Loosen vent screw of the filter side not in use by 2–3 turns; max. until contact is made with the safety stop.
- Unscrew filter bowl by rotating same counterclockwise and clean with a suitable medium.
- Remove filter element with a side-to-side motion.
- Check O-ring on the filter bowl for damage. Replace, if necessary.
- Make sure that the part number on the spare element corresponds with the part number on 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.
- To refill the filter chamber, operate only the pressure equalizing lever (leave the switching lever arrested in its catch) long enough for the medium to emerge bubble-free from the vent bore.
- Tighten vent screw. Check filter for leaks by operating the pressure equalizing lever once again.

Subject to technical alteration.



11. Spare parts list

Pos.	Type number / housing		
	Pi 21004 - Pi 21010		Pi 21016 - Pi 21040
①	Seal kit		Seal kit
to	NBR 977.425.8	NBR 977.428.2	
⑥	FPM 977.426.6	FPM 977.429.0	
	EPDM 977.427.4	EPDM 977.430.8	
⑦	Seal kit for contamination indicator		
to	NBR 776.030.9		
⑨	FPM 776.031.7		
	EPDM 776.032.5		
⑩	Contamination indicator		
	visual 766.997.1	electrical 766.994.8	electrical upper part only 753.655.0
	Pis 3098/2,2	Pis 3097/2,2	

Please return filter for sealing replacement of switch-over unit!

MAHLE

MAHLE Filtersysteme GmbH

Bereich Industriefilter · Schleifbachweg 45 · D-74613 Öhringen · Postfach 13 09 · D-74603 Öhringen
 Telefon (0 79 41) 67-0 · Telefax (0 79 41) 67-429 · Internet: <http://www.mahle.com> · E-mail: ub2.industrie@mahle.com