MAHLE

Duplex Filter
Pi 370

Operating pressure 200 (250) bar, Nominal size up to 450

1. Features

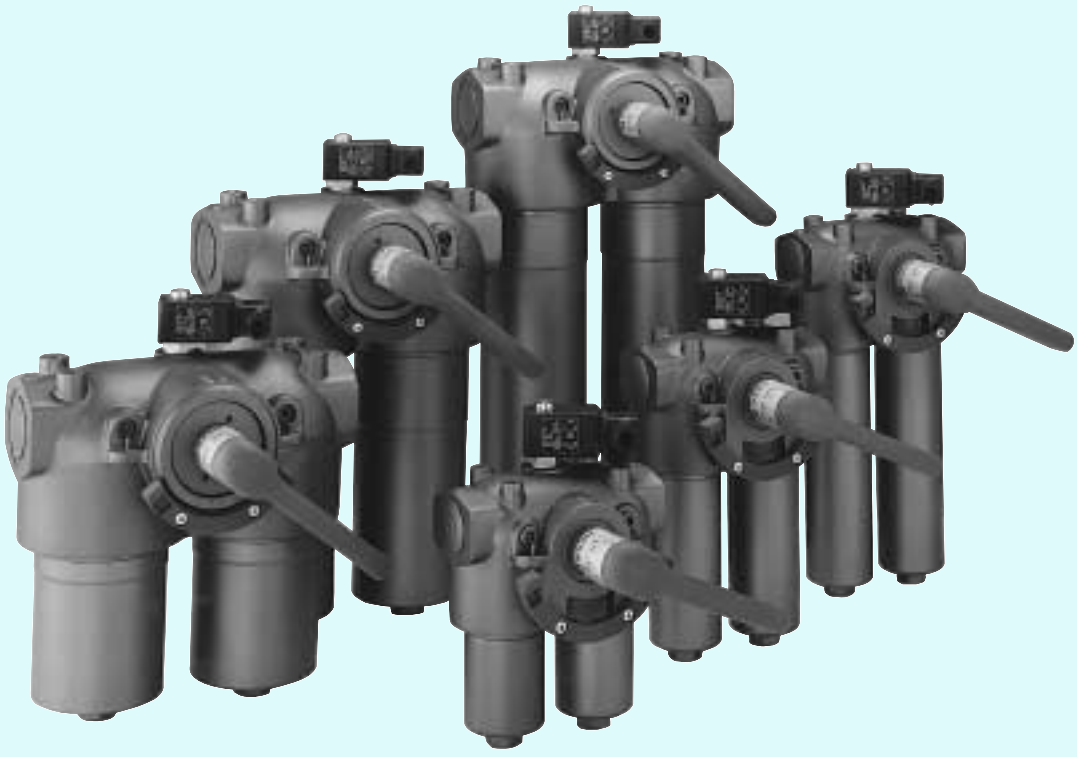
Efficient filters for modern hydraulic systems

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

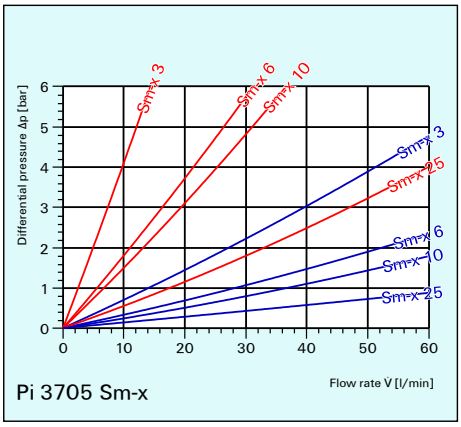
- Highly efficient Sm-x filter elements
- ß-rated elements per ISO 4572
- Large dirt holding capacity and high differential pressure stability providing optimal element service life

World-wide sales

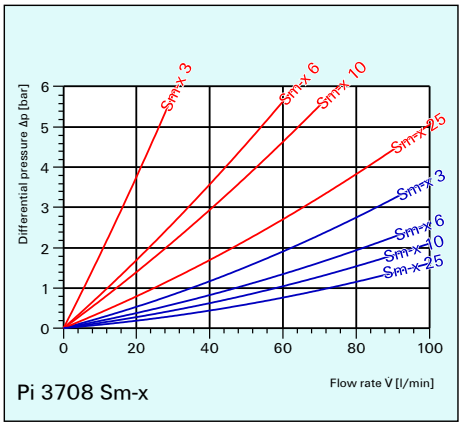


2. Flow rate / pressure drop curve compl. filter

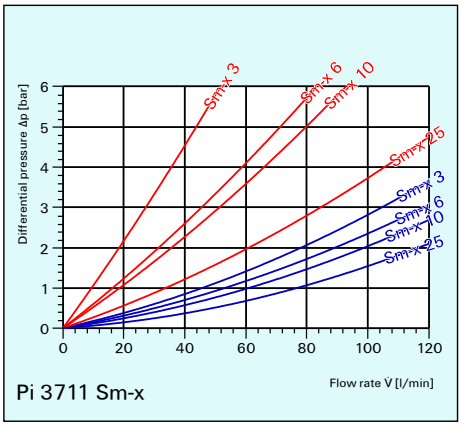
190 mm²/s (25 ° E)
33 mm²/s (4,5 ° E)



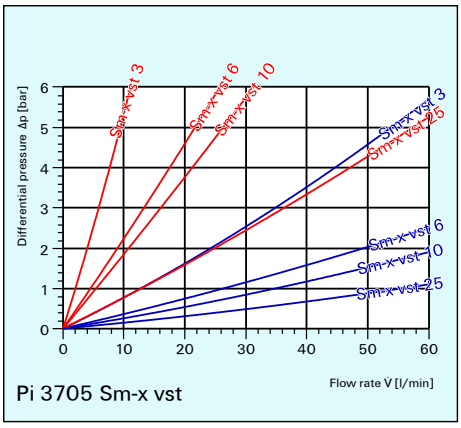
Pi 3705 Sm-x



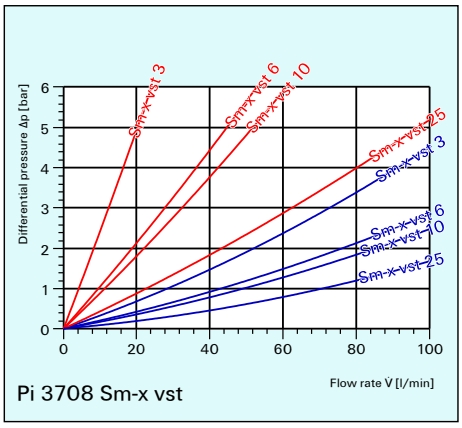
Pi 3708 Sm-x



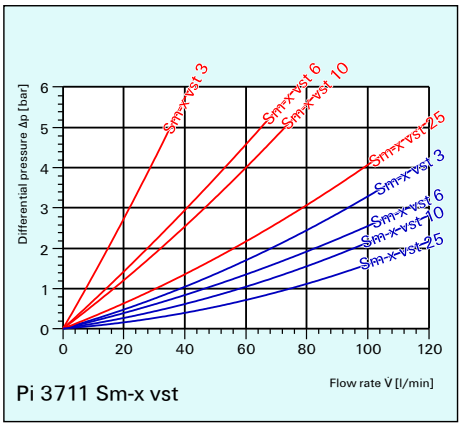
Pi 3711 Sm-x



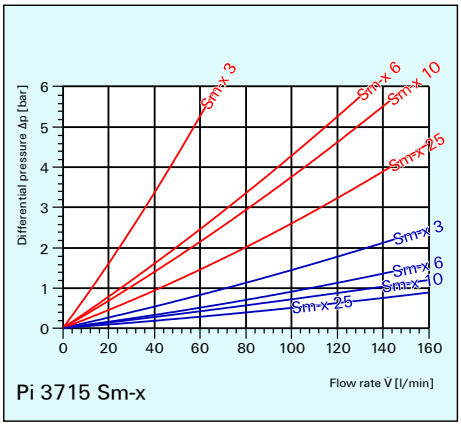
Pi 3705 Sm-x vst



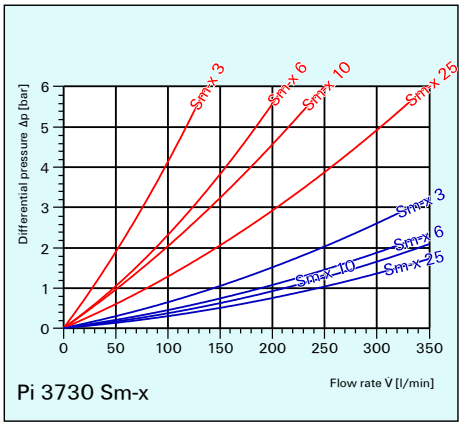
Pi 3708 Sm-x vst



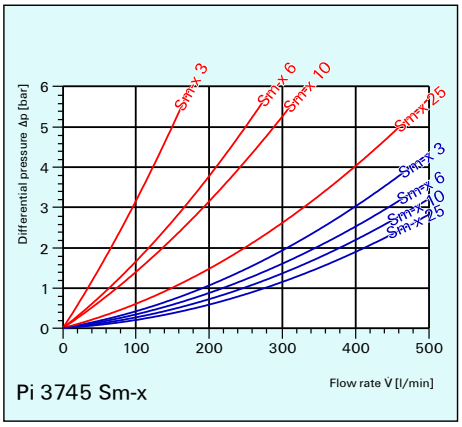
Pi 3711 Sm-x vst



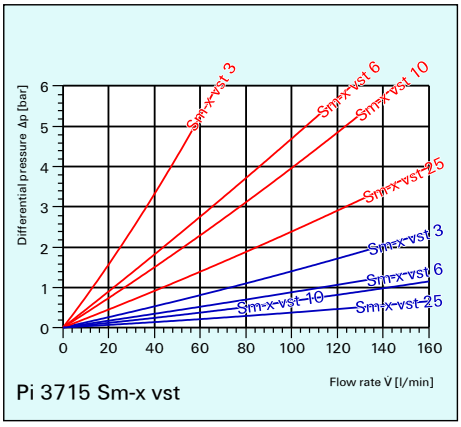
Pi 3715 Sm-x



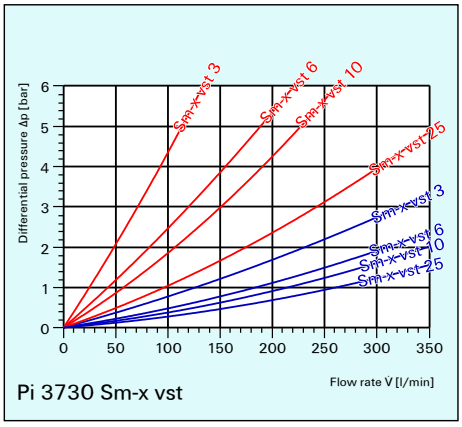
Pi 3730 Sm-x



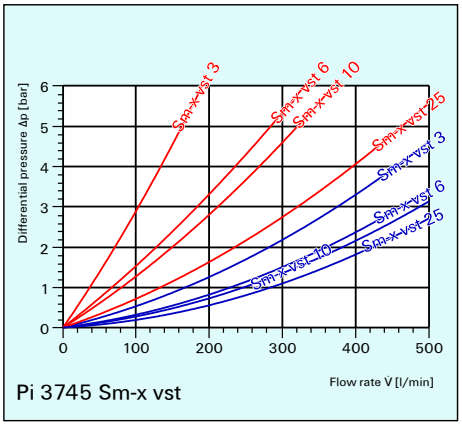
Pi 3745 Sm-x



Pi 3715 Sm-x vst

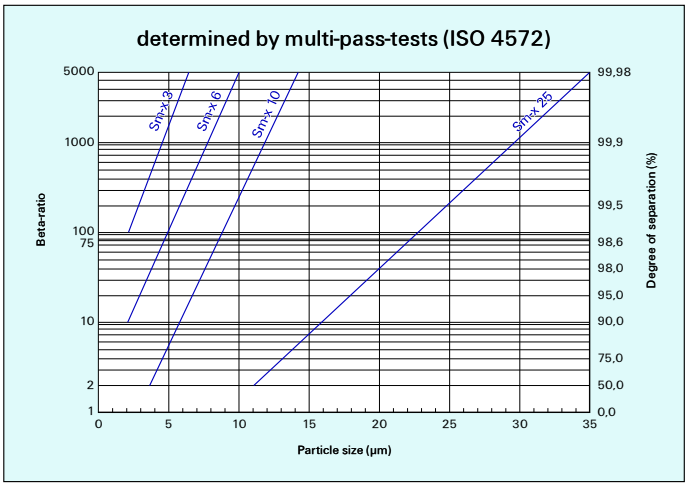


Pi 3730 Sm-x vst



Pi 3745 Sm-x vst

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

at 7 bar differential pressure

Sm-x vst elements
with Δp 210 bar

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

at 16 bar differential pressure

Example for ordering filters:

1. Housing design with $\dot{V}$ = 80 l/min, electrical indicator type-no. **Pi 3708-015** — Order-no. **781.036.9**

+ 2. filter element Sm-x vst 3 type-no. **Pi 2208** — Order-no. **768.020.0**

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 electrical indicator	③ with visual indicator	④ with electrical indicator
781.029.4	Pi 3705-012	50	■			
781.030.2	Pi 3705-013			■		
781.031.0	Pi 3705-014				■	
781.032.8	Pi 3705-015					■
781.033.6	Pi 3708-012	80	■			
781.034.4	Pi 3708-013			■		
781.035.1	Pi 3708-014				■	
781.036.9	Pi 3708-015					■
781.037.7	Pi 3711-012	110	■			
781.038.5	Pi 3711-013			■		
781.039.3	Pi 3711-014				■	
781.040.1	Pi 3711-015					■
781.041.9	Pi 3715-012	150	■			
781.042.7	Pi 3715-013			■		
781.043.5	Pi 3715-014				■	
781.044.3	Pi 3715-015					■
781.045.0	Pi 3730-012	300	■			
781.046.8	Pi 3730-013			■		
781.047.6	Pi 3730-014				■	
781.048.4	Pi 3730-015					■
781.049.2	Pi 3745-012	450	■			
781.440.3	Pi 3745-013			■		
781.441.1	Pi 3745-014				■	
781.442.9	Pi 3745-015					■

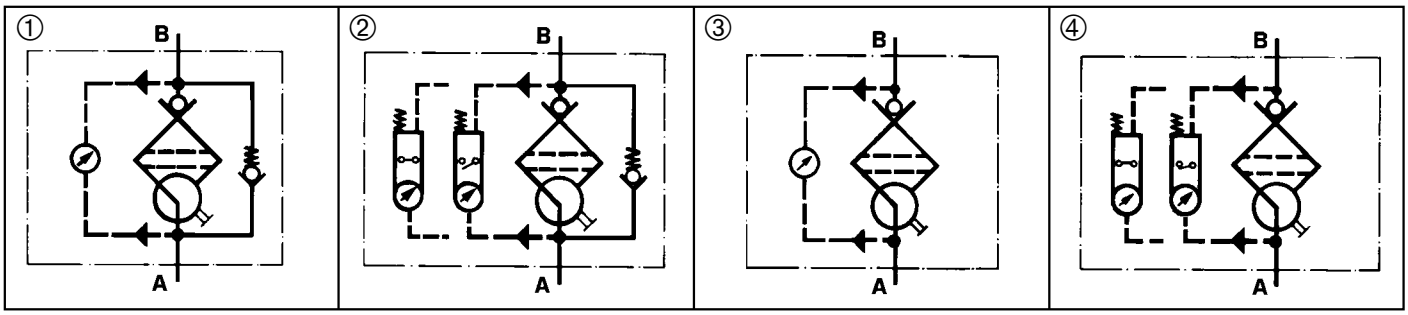
When filter with non bypass configuration is selected, collapse pressure of element may not be exceeded.

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*

( ) = 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 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 25 Δp 210 bar
(590 cm²)	(590 cm²)	(590 cm²)	(590 cm²)	(470 cm²)	(470 cm²)	(470 cm²)	(470 cm²)
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]
[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 cm²)	(1150 cm²)	(1150 cm²)	(1150 cm²)	(900 cm²)	(900 cm²)	(900 cm²)	(900 cm²)
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]
[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 cm²)	(1700 cm²)	(1700 cm²)	(1700 cm²)	(1315 cm²)	(1315 cm²)	(1315 cm²)	(1315 cm²)
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]
[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 cm²)	(2350 cm²)	(2350 cm²)	(2350 cm²)	(2010 cm²)	(2010 cm²)	(2010 cm²)	(2010 cm²)
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]
[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 cm²)	(4420 cm²)	(4420 cm²)	(4420 cm²)	(3800 cm²)	(3800 cm²)	(3800 cm²)	(3800 cm²)
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]
[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 cm²)	(6540 cm²)	(6540 cm²)	(6540 cm²)	(5600 cm²)	(5600 cm²)	(5600 cm²)	(5600 cm²)
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]
[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 upon request.

8. Specifications

Design:	line mounting filter
Operating pressure:	200 bar*
Test pressure:	260 bar*
Temperature range: (other temperature ranges on request)	-10 °C to +120 °C
Bypass opening pressure:	Δp 7 bar ±10 %
Filter head material:	GGG
Filter bowl material:	St
Material of seals:	NBR / PTFE / CU
Activating pressure of visual / electrical differential pressure indicator:	Δp 5 bar ±10 %
Electrical data of contamination 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:	PG 11 ⌀ 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.

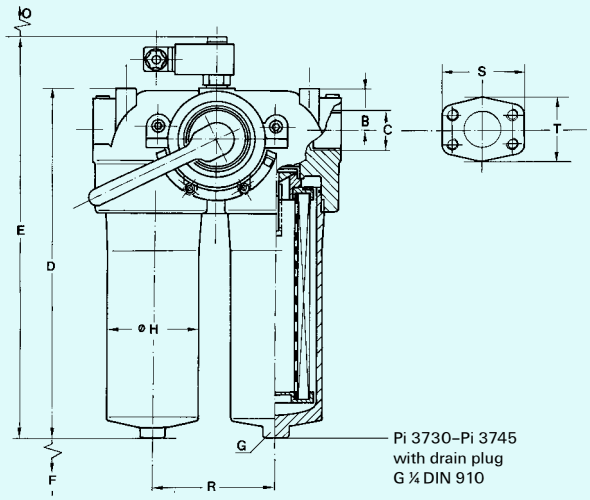
Inductivity in the direct current may require the use of a signal eraser.

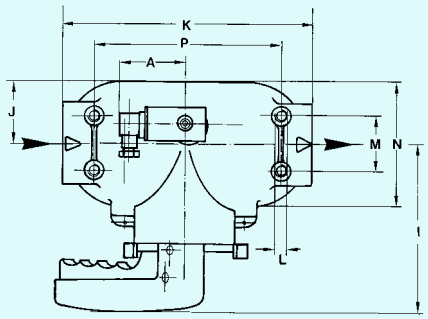
For further information and executions please see our leaflet: "Contamination indicators".

Filters compatible with standard mineral oils.

Please contact us in case of using other media.

* The housings Pi 3705, Pi 3708 and Pi 3711 are approved for 250 bar operating pressure (test pressure 325 bar).



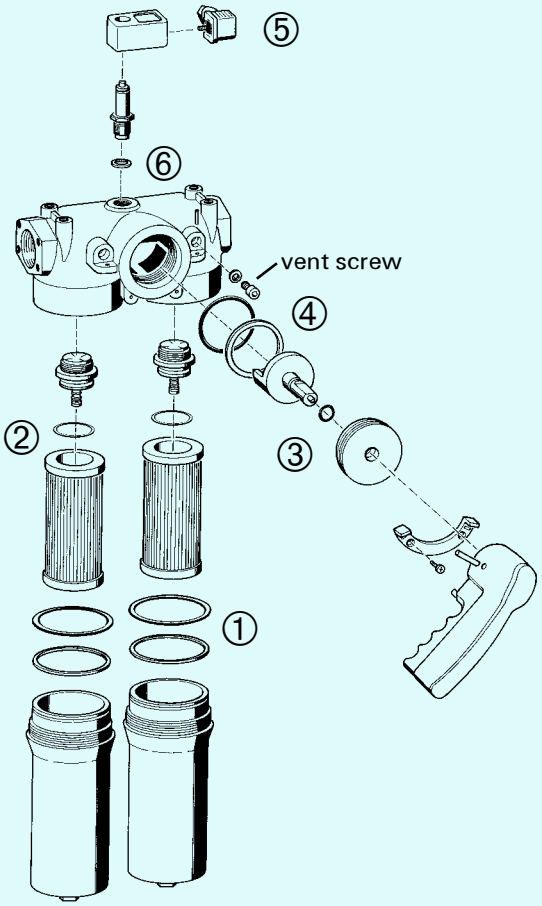


9. Dimensions

All dimensions (except "C") in mm.

Dimension / Type	A	B	C	D	E	F	G SW	H	I	J	K	L	M	N	O	P	R	S	T	Weight [kg]
Pi 3705	78	38	G 1*	219	271	80	27	65	144	45	182	M 8 x 15	55	90	45	100	86	70	58	11,0
Pi 3708	78	38	G 1*	294	346	80	27	65	144	45	182	M 8 x 15	55	90	45	100	86	70	58	13,0
Pi 3711	78	38	G 1*	370	422	80	27	65	144	45	182	M 8 x 15	55	90	45	100	86	70	58	15,0
Pi 3715	78	50	G 1½*	302	354	110	30	110	175	70	280	M 12 x 18	62	140	45	210	136	94	82	31,5
Pi 3730	78	50	G 1½*	427	479	110	30	110	175	70	280	M 12 x 18	62	140	45	210	136	94	82	37,0
Pi 3745	78	50	G 1½*	543	595	110	30	110	175	70	280	M 12 x 18	62	140	45	210	136	94	82	41,5

*SAE flange connections (3000 PSI) on request.



11. Spare parts list

Pos.	Type-Number / Housing	
	Pi 3705–Pi 3711	**Pi 3715–Pi 3745**
① – ④	Seal kit NBR 830.506.2 FPM 830.505.4 EPDM 830.504.7	Seal kit NBR 937.505.6 FPM 937.506.4 EPDM 937.507.2
⑤	Contamination indicator visual: 766.991.4, Pis 3093/5 bar electrical: 766.986.4, Pis 3092/5 bar electrical upper section only: 753.655.0	
⑥	Seal kit for contamination indicator NBR 776.027.5 FPM 776.028.3 EPDM 776.029.1	

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 visa versa.

10.3 When must the filter element be replaced?

1. 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.
2. 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 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.

1. 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.
2. Loosen vent screw of the filter side not in use by 2–3 turns; max. until contact is made with the safety stop.
3. Unscrew filter bowl by rotating same counterclockwise and clean with a suitable medium.
4. Remove filter element with a side-to-side motion.
5. Check O-ring and back-up ring on the filter bowl and spigot for damage. Replace, if necessary.
6. Make sure that the part number on 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.
7. Complete installation by screwing on the bowl, turning clockwise until it comes to a full stop.
   Back off the bowl ⅛ to ½ turn.
8. 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.
9. Tighten vent screw. Check filter for leaks by operating the pressure equalizing lever once again.

Subject to technical alteration.

Printed in Germany/Imprimé en Allemagne 07/03 Ba 2000 835.690.8