MAHLE

Duplex Filter
Pi 2100

Operating pressure 25 bar, Nominal size up to 630 und 1000
according DIN 24550

1. Features

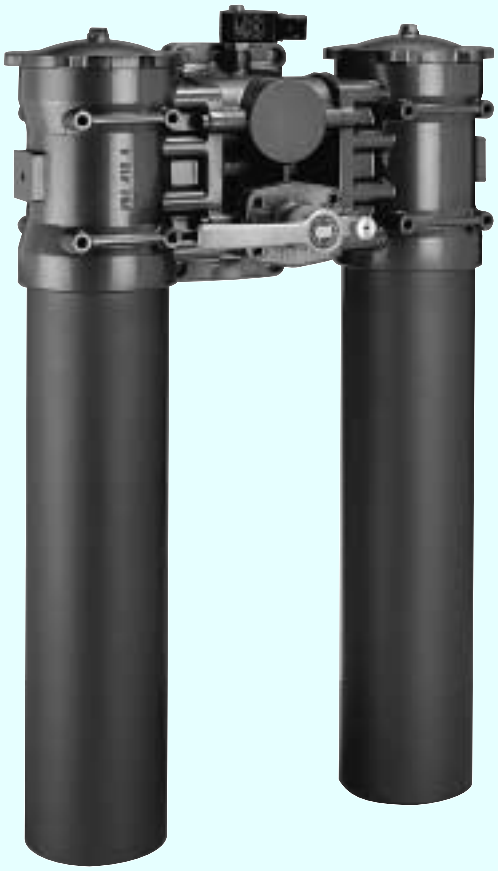
Efficient filters for modern hydraulic systems

- Modular design
- Minimal pressure loss
- Compact design
- Visual / electrical / electronical differential pressure indication
- Flange ports
- Module design offers possibilities for extension

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 optimum element service life

World-wide sale



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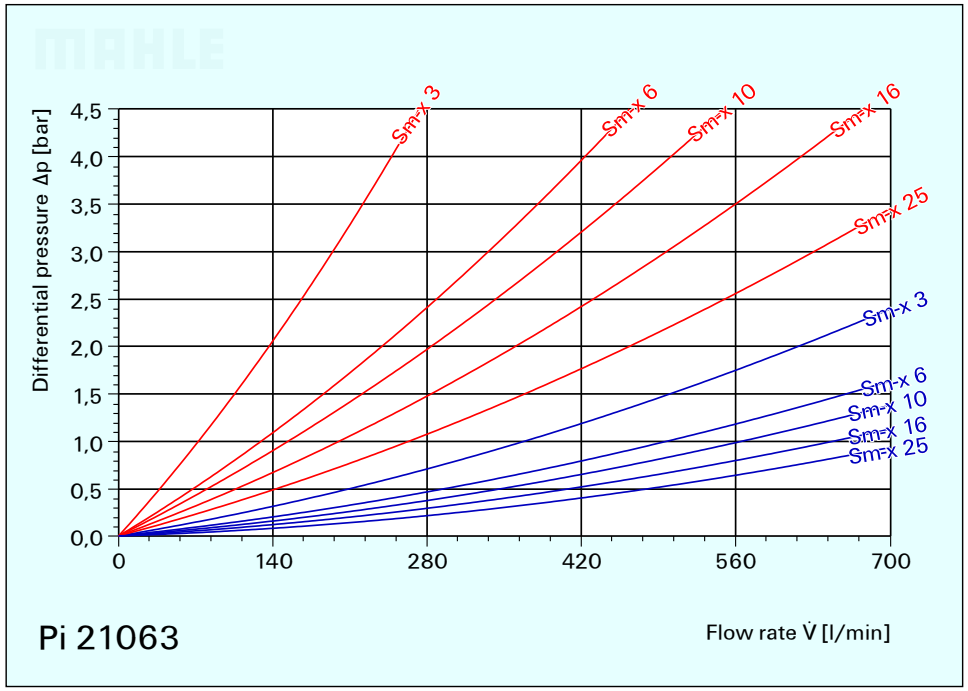
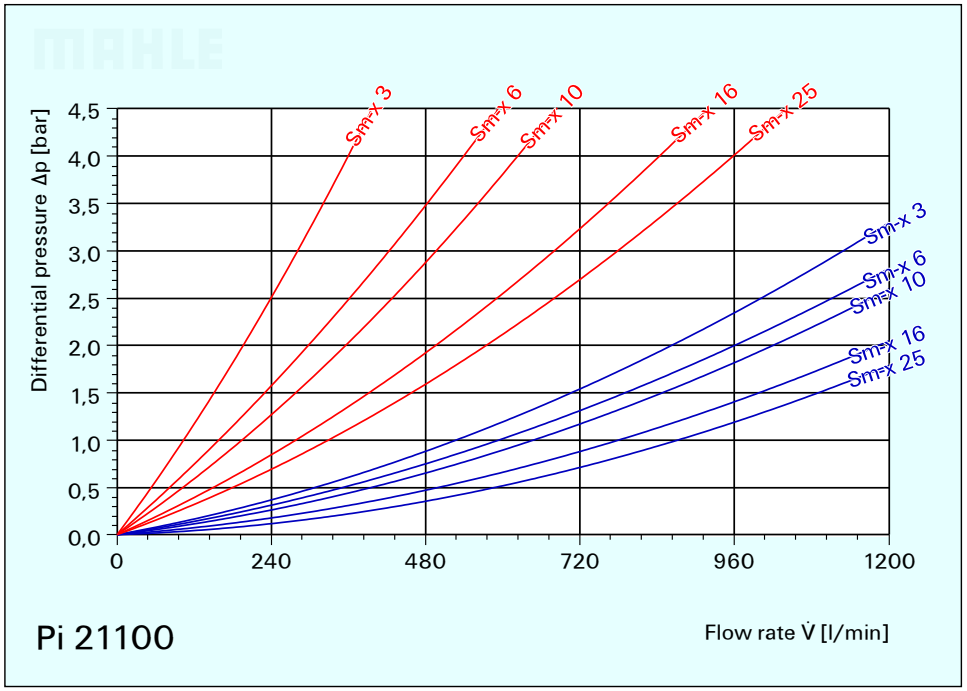
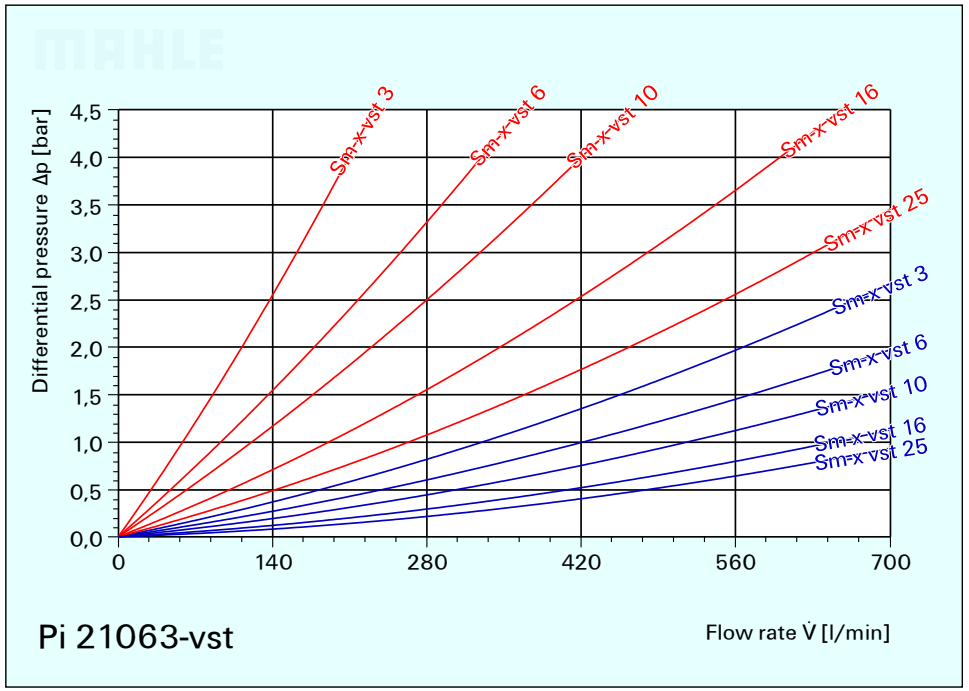
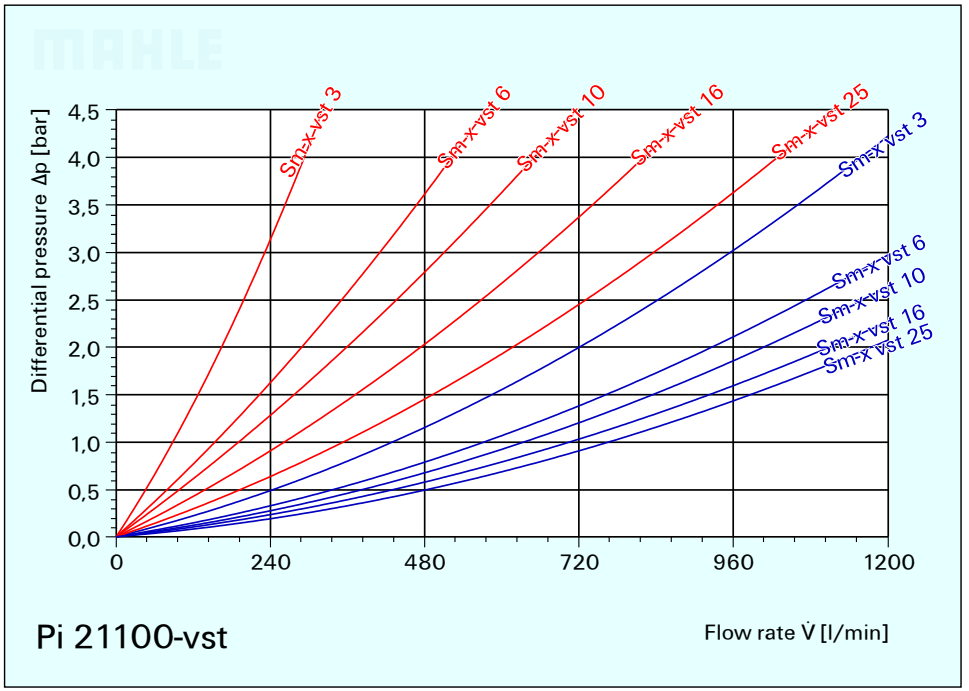


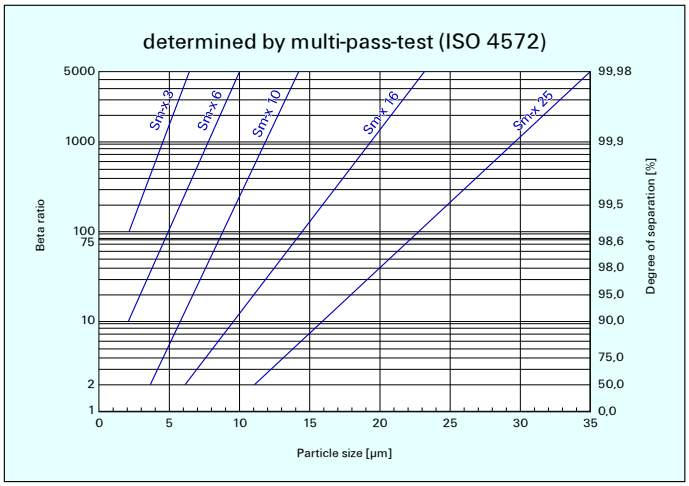






190 mm²/s (25 °E)
33 mm²/s (4,5 °E)

3. Separation characteristics



4. Filter performance data

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

Sm-x-elements with Δp 20 bar			Sm-x-vst-elements with Δp 210 bar		
Sm-x	3	$\beta_{5(c)} \geq 200$	Sm-x vst	3	$\beta_{5(c)} \geq 200$
Sm-x	6	$\beta_{7(c)} \geq 200$	Sm-x vst	6	$\beta_{7(c)} \geq 200$
Sm-x	10	$\beta_{10(c)} \geq 200$	Sm-x vst	10	$\beta_{10(c)} \geq 200$
Sm-x	16	$\beta_{15(c)} \geq 200$	Sm-x vst	16	$\beta_{15(c)} \geq 200$
Sm-x	25	$\beta_{20(c)} \geq 200$	Sm-x vst	25	$\beta_{20(c)} \geq 200$
up to 10 bar differential pressure			up to 20 bar differential pressure		

Example for ordering filters:

1. Housing designe with $\dot{V}$ = 630 l/min electrical indicator
type no.**Pi 21063-069** order-no. **796.912.4**

+ 2. Filter element Sm-x vst 25
type no. **Pi 75063 DN** order-no. **796.156.8**

7. Order numbers

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
796.541.1	Pi 21063–57	**630**	■			
797.481.9	Pi 21063–58			■		
796.542.9	Pi 21063–68				■	
796.912.4	Pi 21063–69					■
796.544.5	Pi 21100–57	**1000**	■			
797.480.1	Pi 21100–58			■		
796.545.2	Pi 21100–68				■	
796.546.0	Pi 21100–69					■

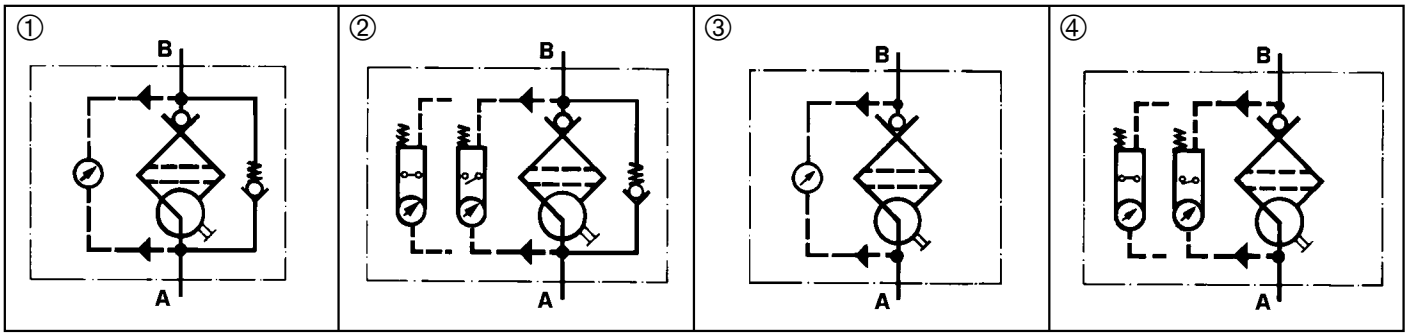
When filter with non bypass configuration is selected, the collapse pressure of the element may not be exceeded

5. Test regulations

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

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 filter element

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
(9200 cm²)	(9200 cm²)	(9200 cm²)	(9200 cm²)	(9200 cm²)	(7250 cm²)	(7250 cm²)	(7250 cm²)	(7250 cm²)	(7250 cm²)
796.151.9	794.369.9	792.563.9	796.152.7	796.153.5					
796.151.9	794.369.9	792.563.9	796.152.7	796.153.5	[Pi 71063 DN]	[Pi 72063 DN]	[Pi 73063 DN]	[Pi 74063 DN]	[Pi 75063 DN]
[Pi 21063 DN]	[Pi 22063 DN]	[Pi 23063 DN]	[Pi 24063 DN]	[Pi 25063 DN]	796.154.3	796.009.9	792.571.2	796.155.0	796.156.8
					796.154.3	796.009.9	792.571.2	796.155.0	796.156.8
(14500 cm²)	(14500 cm²)	(14500 cm²)	(14500 cm²)	(14500 cm²)	(11450 cm²)	(11450 cm²)	(11450 cm²)	(11450 cm²)	(11450 cm²)
796.161.8	794.372.3	792.564.7	796.162.6	796.163.4					
796.161.8	794.372.3	792.564.7	796.162.6	796.163.4	[Pi 71100 DN]	[Pi 72100 DN]	[Pi 73100 DN]	[Pi 74100 DN]	[Pi 75100 DN]
[Pi 21100 DN]	[Pi 22100 DN]	[Pi 23100 DN]	[Pi 24100 DN]	[Pi 25100 DN]	796.164.2	796.008.1	792.572.0	796.165.9	796.166.7
					796.164.2	796.008.1	792.572.0	796.165.9	796.166.7

*further elements upon request

8. Specifications

Design:	line mounting filter
Nominal pressure:	25 bar
Test pressure:	32 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
Material of seals:	NBR / CU
Activating pressure of visual / electrical differential pressure indicator:	Δp 2,2 bar ± 0,3 bar
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 Ø 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.

The module design permits later extension from single to twin or parallel filter.

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

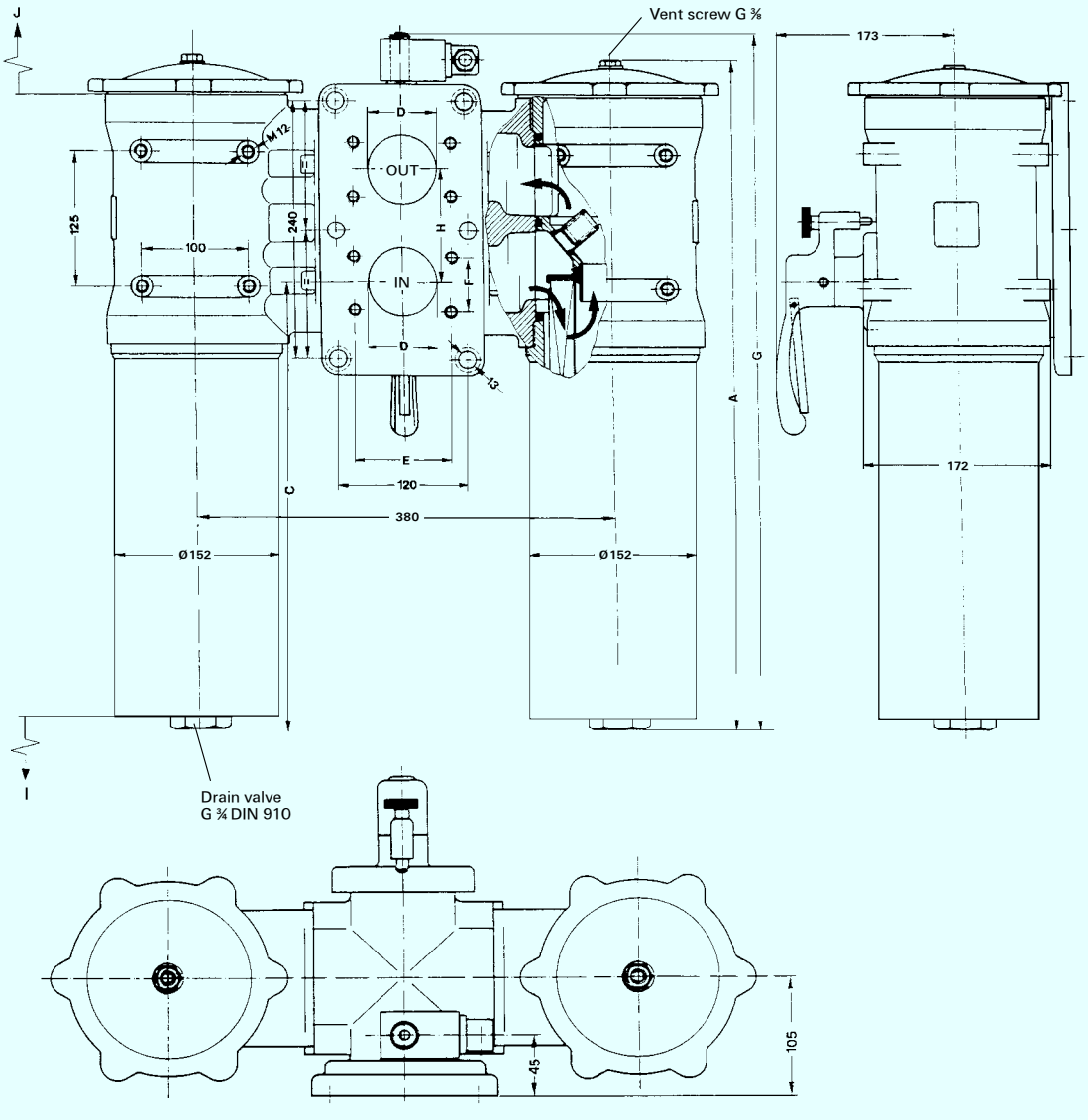
Filters compatible with standard mineral oils. (according to fluids of group 2 of guideline 97/23 EG, art. 9)

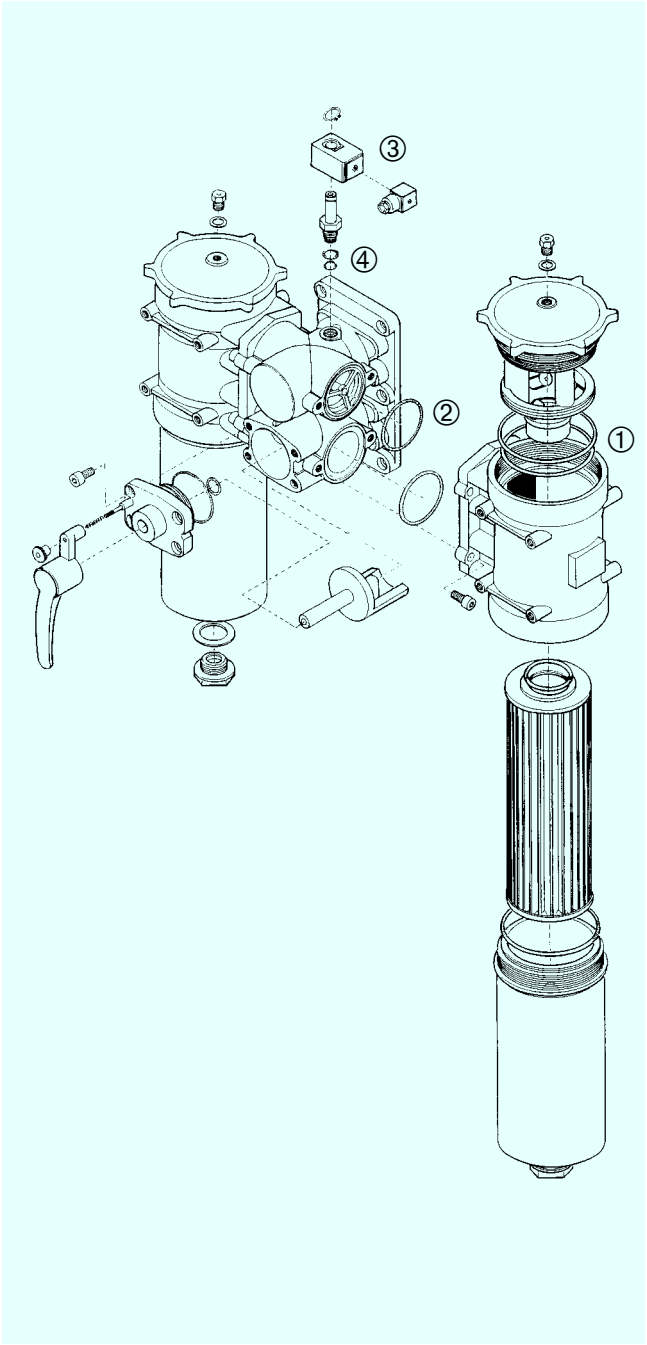
9. Dimensions

All dimensions in mm

Dimension / Type	A	C	D	E	F	G	H	I*	J*	Weight [kg]
Pi 21063	644	434	DN 64	88,9	50,8	673	110	60	450	31
Pi 21100	874	664	DN 64	88,9	50,8	903	110	60	686	36

* Element removal upwards





11. Spare parts list

Pos.	Pi 20063 – Pi 22100			
①	Seal kit for single filter 796.743.3 NBR	796.744.1 FPM	796.745.8 EPDM	(if duplex or parallel filter 2 sets)
②	Seal kit for parallel unit 796.843.1 NBR	796.844.9 FPM	796.845.6 EPDM	
③	Contamination indicator visual 766.997.1 Pis 3098/2,2 bar	electrical 766.994.8 Pis 3097/2,2 bar	electrical upper part only 753.655.0	
④	Seal kit for contamination indicator 776.030.9 NBR	776.031.7 FPM	776.032.5 EPDM	

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?

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. 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.
3. 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.

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. Remove drain plug in housing bottom and drain oil.
4. Unscrew filter cover (CCW).
5. Lift out filter element.
6. Check seal on filter cover. We recommend replacement in any case.
7. 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.
8. Complete installation by screwing on the bowl, turning clockwise until it comes to a full stop.
   Back off the bowl ⅛ to ½ turn.
9. Tighten drain plug in housing bottom.
10. 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.
11. Tighten vent screw. Check filter for leaks by operating the pressure equalizing lever once again.

Subject to technical alteration.

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