

Low Pressure Filter

Pi 2000/Pi 2200

Nominal pressure 25 bar (360 psi), nominal size 630 up to 2000
according to DIN 24550

1. Features

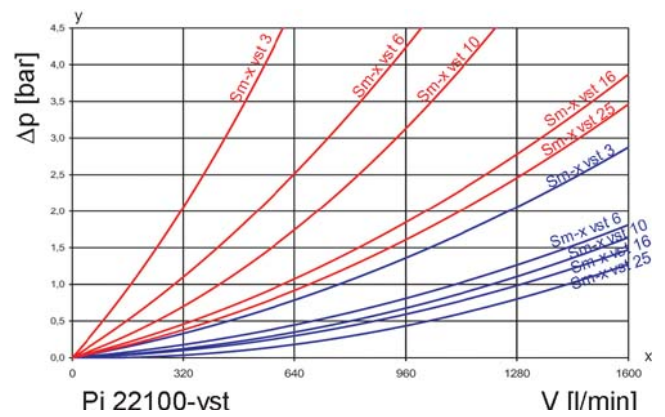
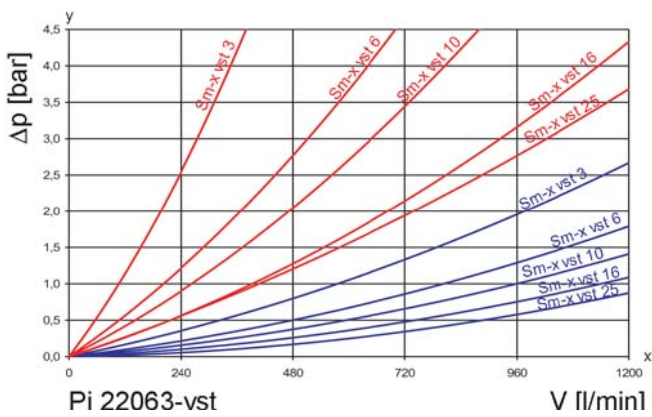
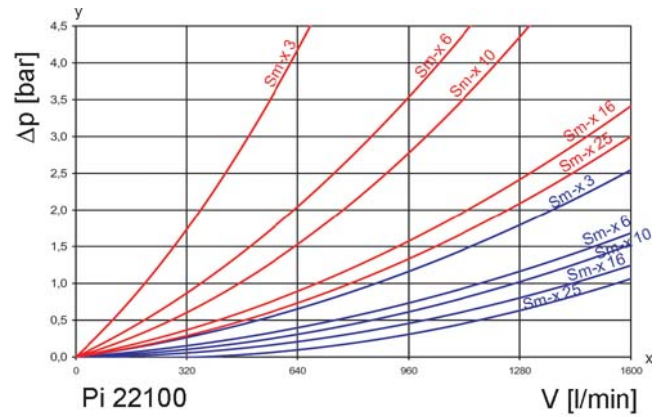
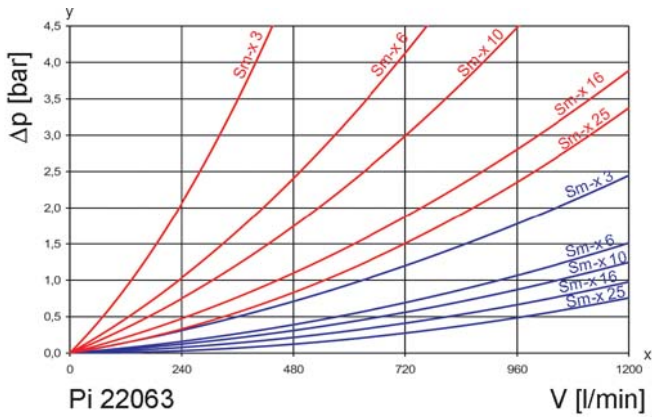
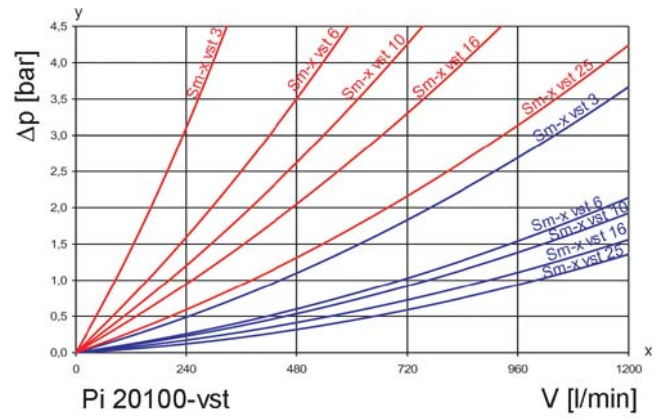
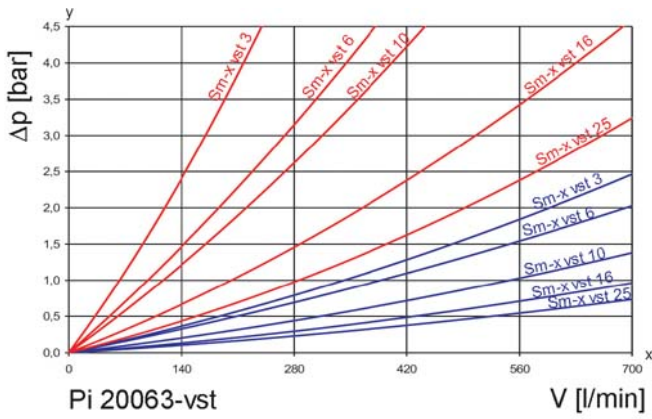
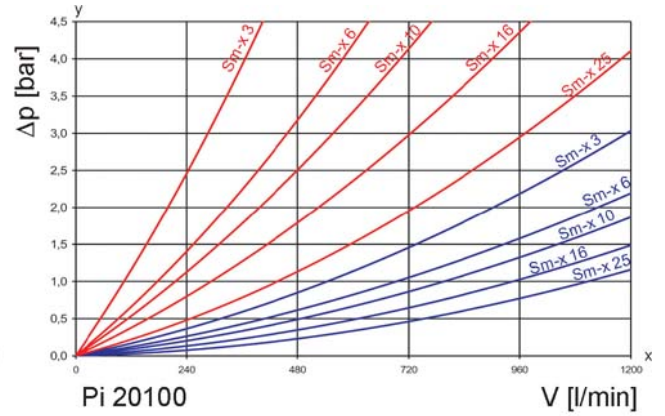
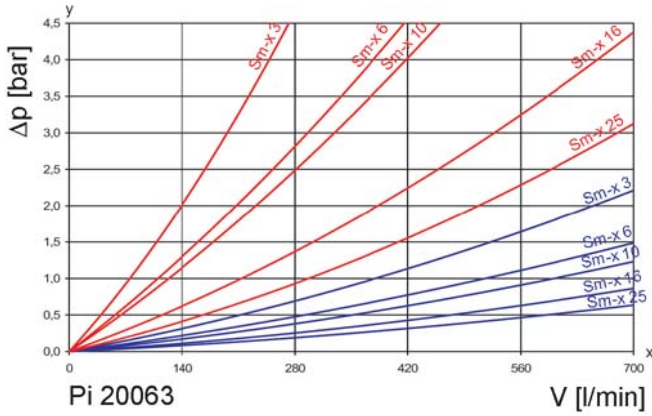
High performance filters for modern hydraulic systems

- Modular system
- Compact design
- Minimal pressure drop through optimal flow design
- Visual/electrical maintenance indicator
- Quality filters, easy to service
- Equipped with highly efficient glass fibre Sm-x filter elements
- Beta rated elements according to ISO 16889 multipass test
- Elements with high differential pressure stability and dirt holding capacity
- Worldwide distribution



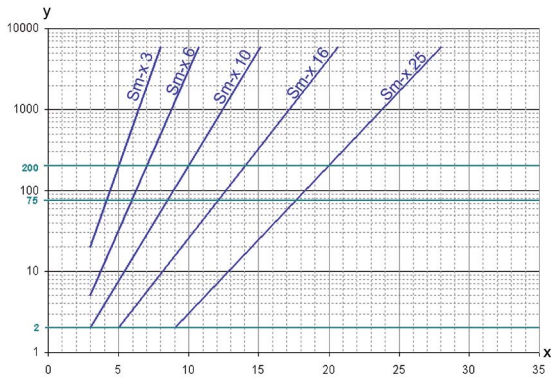
2. Flow rate/pressure drop curve complete filter

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



y = differential pressure Δp [bar]
 x = flow rate V [l/min]

3. Separation grade characteristics



y = beta-value
x = particle size [μm]

determined by multipass tests (ISO 16889)
calibration according to ISO 11171 (NIST)

4. Filter performance data

tested according to ISO 16889 (multipass test)

Sm-x elements with
max. Δp 20 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	16	$\beta_{15(C)} \geq 200$
Sm-x	25	$\beta_{20(C)} \geq 200$

values guaranteed at
10 bar differential pressure

Sm-x vst elements with
max. Δp 210 bar

Sm-x vst	3	$\beta_{5(C)} \geq 200$
Sm-x vst	6	$\beta_{7(C)} \geq 200$
Sm-x vst	10	$\beta_{10(C)} \geq 200$
Sm-x vst	16	$\beta_{15(C)} \geq 200$
Sm-x vst	25	$\beta_{20(C)} \geq 200$

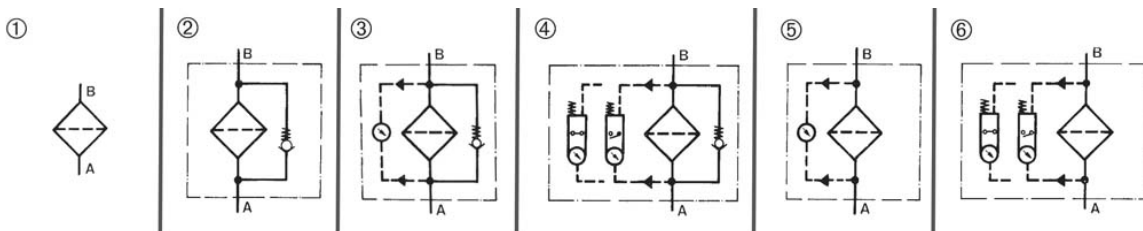
values guaranteed at
20 bar differential pressure

5. Quality assurance

MAHLE filter and filter elements are produced according to the following international standards:

Norm	Designation
DIN ISO 2941	Hydraulic fluid power filter elements; verification of collapse/burst resistance
DIN ISO 2 942	Hydraulic fluid power filter elements; verification of fabrication integrity
DIN ISO 2 943	Hydraulic fluid power filter elements; verification of material compatibility
DIN ISO 3 723	Hydraulic fluid power filter elements; method for end load test
DIN ISO 3 724	Hydraulic fluid power filter elements; verification of flow fatigue characteristics
ISO 3 968	Hydraulic fluid power-filters-evaluation of pressure drop versus flow characteristics
ISO 10 771.1	Fatigue pressure testing of metal containing envelopes in hydraulic fluid applications
ISO 16 889	Hydraulic fluid power filters-multi-passmethod for evaluation filtration performance of a filter element

6. Symbols



7. Order numbers

Example for ordering filters:

1. Housing design	2. Filter element
V =630 l/min and electrical maintenance indicator Type: Pi 20063-69 Order number: 77965510	Sm-x vst 25 Type: Pi 75063 DN Order number: 77961568 2 elements required for parallel arrangement

7.1 Housing design									
Design	Nominal size NG [l/min]	Order number	Type	① no options	② with bypass valve	③ with bypass valve and visual indicator	④ with bypass valve and electrical indicator	⑤ with visual indicator	⑥ with electrical indicator
Line filter single	630	77965478	Pi 20063-060						
		77965486	Pi 20063-056						
		77965496	Pi 20063-057						
		77964497	Pi 20063-058						
		77965502	Pi 20063-068						
		77965510	Pi 20063-069						
	1000	77965577	Pi 20100-060						
		77965585	Pi 20100-056						
		77965593	Pi 20100-057						
		77974769	Pi 20100-058						
		77965601	Pi 20100-068						
		77965619	Pi 20100-069						
Line filter parallel	1260	77965387	Pi 22063-060						
		77965676	Pi 22063-056						
		77965684	Pi 22063-057						
		77965692	Pi 22063-058						
		77965700	Pi 22063-068						
		77965718	Pi 22063-069						
	2000	77965775	Pi 22100-060						
		77965783	Pi 22100-056						
		77965791	Pi 22100-057						
		77965809	Pi 22100-058						
		77965817	Pi 22100-068						
		77965825	Pi 22100-069						

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

7.2 Filter elements*

Order number	Type	Filter material	max. Δp [bar]	Filter surface [cm ²]
77961519	Pi 21063 DN	Sm-x 3	20	9900
77943699	Pi 22063 DN	Sm-x 6		9900
77925639	Pi 23063 DN	Sm-x 10		9900
77961527	Pi 24063 DN	Sm-x 16		9900
77961535	Pi 25063 DN	Sm-x 25		9900
77961543	Pi 71073 DN	Sm-x vst 3	210	7900
77960099	Pi 72063 DN	Sm-x vst 6		7900
77925712	Pi 73063 DN	Sm-x vst 10		7900
77961550	Pi 74063 DN	Sm-x vst 16		7900
77961568	Pi 75073 DN	Sm-x vst 25		7900
77961618	Pi 2100 DN	Sm-x 3	20	15500
77943723	Pi 22100 DN	Sm-x 6		15500
77925647	Pi 23100 DN	Sm-x 10		15500
77961626	Pi 24100 DN	Sm-x 16		15500
77961634	Pi 25100 DN	Sm-x 25		15500
77961642	Pi 71100 DN	Sm-x vst 3	210	12420
77960081	Pi 72100 DN	Sm-x vst 6		12420
77925720	Pi 73100 DN	Sm-x vst 10		12420
77961659	Pi 74100 DN	Sm-x vst 16		12420
77961667	Pi 75100 DN	Sm-x vst 25		12420
77961519	Pi 21063 DN	Sm-x 3	20	2x9900
77943699	Pi 22063 DN	Sm-x 6		2x9900
77925639	Pi 23063 DN	Sm-x 10		2x9900
77961527	Pi 24063 DN	Sm-x 16		2x9900
77961535	Pi 25063 DN	Sm-x 25		2x9900
77961543	Pi 71063 DN	Sm-x vst 3	210	2x7900
77960099	Pi 71063 DN	Sm-x vst 6		2x7900
77925712	Pi 72063 DN	Sm-x vst 10		2x7900
77961550	Pi 73063 DN	Sm-x vst 16		2x7900
77961568	Pi 74063 DN	Sm-x vst 25		2x7900
77961618	Pi 21100 DN	Sm-x 3	20	2x15500
77943723	Pi 22100 DN	Sm-x 6		2x15500
77925647	Pi 23100 DN	Sm-x 10		2x15500
77961626	Pi 24100 DN	Sm-x 16		2x15500
77961634	Pi 25100 DN	Sm-x 25		2x15500
77961642	Pi 71100 DN	Sm-x vst 3	210	2x12420
77960081	Pi 72100 DN	Sm-x vst 6		2x12420
77925720	Pi 73100 DN	Sm-x vst 10		2x12420
77961659	Pi 74100 DN	Sm-x vst 16		2x12420
77961667	Pi 75100 DN	Sm-x vst 25		2x12420

* a wider range of element types is available on request.

8. Technical specifications

Design:	Flange filter
Nominal pressure:	25 bar (360 psi)
Test pressure:	32 bar (460 psi)
Temperature range:	- 10 °C to + 120 °C (other temperature ranges on request)
Bypass setting:	Δp 3.5 bar \pm 10 %
Filter head material:	GAL
Filter housing material:	AL
Sealing material:	NBR/AL
Maintenance indicator setting:	Δp 2.2 bar \pm 0.3 bar
Electrical data of maintenance indicator:	
Maximum voltage:	230 V ~/=
Maximum current:	2.5 A
Contact load:	60 VA / 40 W
Inrush current:	70 VA
Type of protection:	IP 65 in inserted and secured status
Contact:	normally open/closed
Cable sleeve:	PG 11 \varnothing 6-10

If desired, electrical indicator may be supplied with lamp plug connector or with pin-and-socket connector as per DIN 43651 part 2, 6-pole sleeve terminals and earthing, voltage 24 V=, wiring box with 3 luminous diodes and transparent housing.

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.

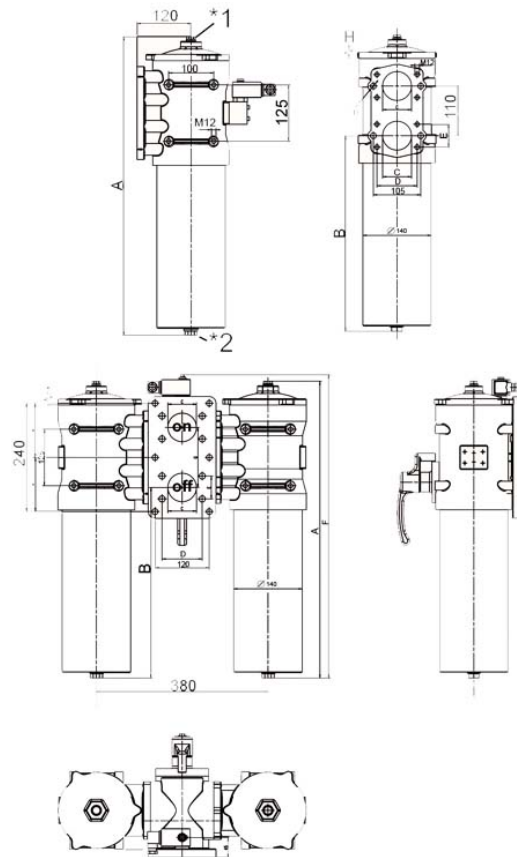
With the inrush current of 70 VA the indicator can trigger small contactors or contact relays.

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

Further maintenance indicator details and designs are available in the maintenance indicator data sheet.

When the acoustic vent is used the permissible operating pressure is 10 bar. The module design permits later extension from single to twin or parallel filter.

Subject to technical alteration without prior notice.



*1 vent screw G 3/8

*2 drain plug G 3/4 DIN 910

9. Dimensions

All dimensions in mm.

Type	A	B	C	D	E	F	G	H	Weight [kg]
Pi 20063	665	439	DN64	89	50.8	-	110	400	12.5
Pi 20100	885	669	DN64	89	50.8	-	110	630	15.0
Pi 22063	665	427.5	DN76	106	61.9	695	133	400	30.0
Pi 22100	885	657.5	DN76	106	61.9	915	133	630	35.0

NPT- and SAE- connections on request.

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 housing.

Preferably the filter should be installed with the filter housing pointing downwards.

The maintenance indicator must be visible.

10.2 Connecting the electrical maintenance indicator

The electrical indicator is connected via a 2-pole appliance plug according to DIN 43650 with poles marked 1 and 2.

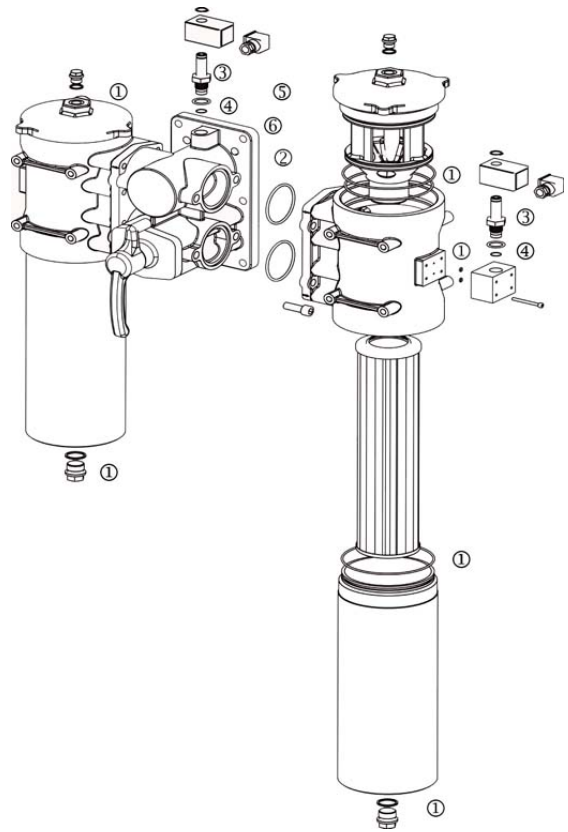
The electrical section can be inverted to change from normally open position to normally closed position or vice versa.

10.3 When should the filter element be replaced?

1. Filters equipped with visual and electrical maintenance indicator:
During cold starts, the indicator may give a warning signal. Press the red button of the visual indicator once again only after operating temperature has been reached. If the red button immediately pops up 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 maintenance indicator:
The filter element should be replaced after trial run or flushing of the system. Afterwards follow instructions of the manufacturer.
3. Please always ensure that you have original MAHLE spare elements in stock: Disposable elements (SM-x) cannot be cleaned.

10.4 Element replacement

1. Switch off system and relieve filter on pressure side.
2. Open venting screw in filter cover (ascertain switching lever position with duplex filter and carefully check which filter housing is under pressure).
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 order number on the spare element corresponds to the order number of the filter name-plate. Remove packaging and place element closed end downward into filter housing.
8. Carefully insert element holding fixture of the filter cover into the open end of the element and tighten cover against stop.
9. Close drain plug on housing bottom.
10. Carefully vent filter prior operation. Then tighten venting screw.



11. Spare parts list

Order numbers for spare parts		
Position	Type	Order number
①	Seal kit for filter housing (if duplex or parallel filter 2 sets)	
	NBR	77967433
	FPM	77967441
	EPDM	77967458
②	Seal kit for parallel unit	
	NBR	79350984
	FPM	79350992
	EPDM	79351008
③	Maintenance indicator	
	Visual PiS 3098/2,2 bar	77669971
	Electrical PiS 3097/2,2 bar	77669948
	Electrical upper part only	77536550
④	Seal kit for maintenance indicator	
	NBR	77760300
	FPM	77760317
	EPDM	77760325
⑤	Parallel unit (for parallel filter modification)	77974876
⑥	Shift unit (for duplex filter modification Pi 2100)	77974868

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