

# MAHLE

Industrial Filtration

## Oil Solutions

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Low Pressure Filter

Pi 150

Operating pressure 10/25 bar, Nominal size up to 630

### 1. Features

#### Efficient filters for modern hydraulic systems

- Modular design principle
- Compact design
- Minimal pressure drop
- Optical/electrical/electronic differential contamination control
- Threaded or SAE 4 bolt flange connection

#### Quality filters, easy to service

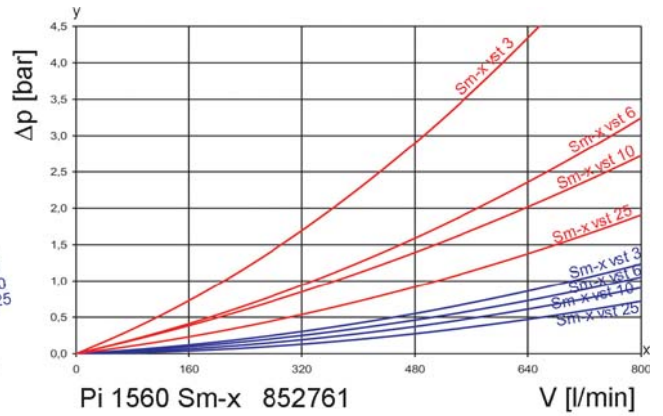
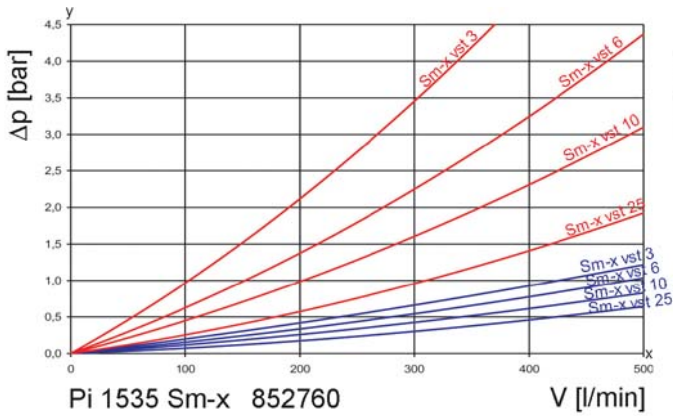
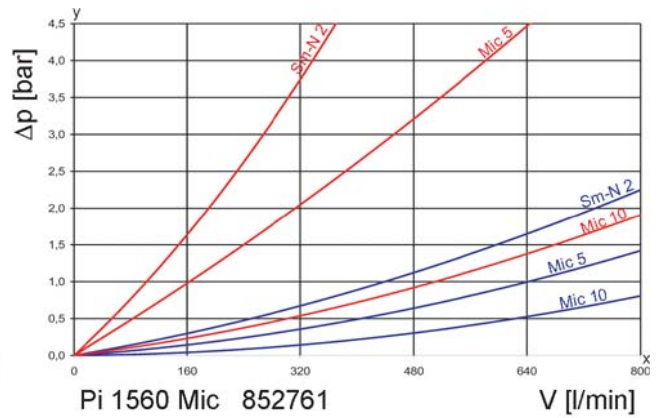
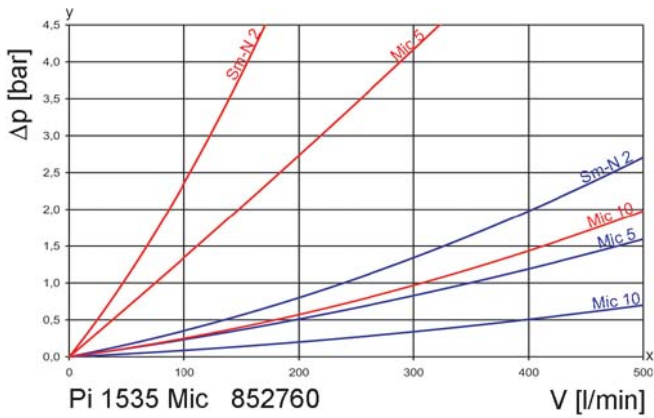
- Equipped with highly efficient Mic- or SM-X filter elements
- ©-valued elements per ISO 16889
- High dirt holding capacity and differential pressure stability providing optimal element service life

#### Worldwide distribution



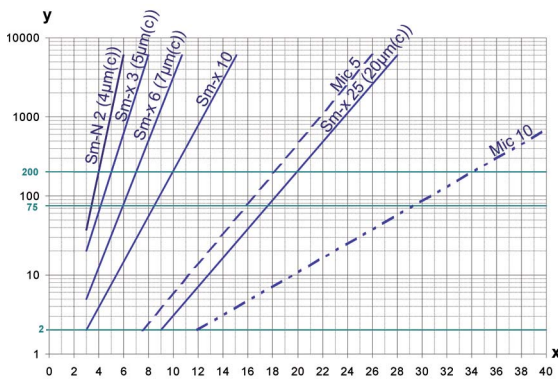
## 2. Flow rate/pressure drop curve complete filter

■ 190 mm<sup>2</sup>/s (25° E)  
■ 33 mm<sup>2</sup>/s (4,5° E)



y = differential pressure  $\Delta p$  [bar]  
 x = flow rate V [l/min]

### 3. Separation characteristics



y = beta-ratio  
x = particle size [µm]

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

### 4. Filter performance data

measured according to ISO 16889 (multipass test)

Sm-x-/ Sm-N 2 elements  
with  $\Delta p$  10 bar

Sm-N	2	$\beta_{4(C)}$	$\geq 200$
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	$\beta_{20(C)}$	$\geq 200$

up to 10 bar differential pressure

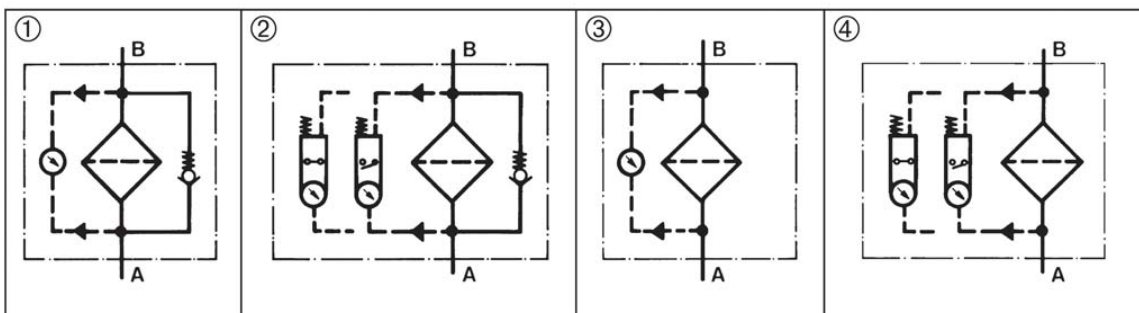
The filter element 852 76 Sm-N 2 is an element with a very large dirt holding capacity, especially for bypass filtration.

### 5. Quality assurance

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

Norm	Designation
DIN ISO 2941	Hydraulic fluid power filter elements; verification of collapse/burst resistance
DIN ISO 2942	Hydraulic fluid power filter elements; verification of fabrication integrity
DIN ISO 2943	Hydraulic fluid power filter elements; verification of material compatibility with fluids
DIN ISO 3723	Hydraulic fluid power filter elements; method for end load test
DIN 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 10771.1	Fatigue pressure testing of metal containing envelopes in hydraulic fluid applications
ISO 16889	Hydraulic fluid power filters; multipass method for evaluation filtration performance of a filter element

### 6. Symbols



## 7. Order numbers

Example for ordering filters:

1. Housing design	2. Filter element
V=400 l/min, Bypass, electrical indication, nominal pressure 10 bar Type: Pi 1535 / 10-058 Order number: 77774631	Sm-x 10 Type: 852 760 Sm-x 10 Order number: 77774425

7.1 Housing design							
Nominal size NG [l/min]	Order number	Type	Nominal pressure [bar]	① with bypass valve and optical indicator	② with bypass valve and electrical indicator	③ with optical indicator	④ with electrical indicator
400	77774649	Pi 1535/10-057	10				
	77774631	Pi 1535/10-058					
	77804909	Pi 1535/10-068					
	77804917	Pi 1535/10-069					
	77955982	Pi 1535/25-057	25				
	77907892	Pi 1535/25-058					
630	77774623	Pi 1560/10-057	10				
	77774615	Pi 1560/10-058					
	77804941	Pi 1560/10-068					
	77804958	Pi 1560/10-069					
	77955990	Pi 1560/25-057	25				
	77970718	Pi 1560/25-058					

7.2 Filter elements*					
Nominal size NG [l/min]	Order number	Type	Filter material	Collapse pressure [bar]	Filter surface [cm <sup>2</sup> ]
400	77774458	852 760Mic 5	Mic 5	5	23 800
	77774441	852 760 Mic 10	Mic 10		23 800
	77955859	852 760 Sm-N 2	Sm-N 2		15 900
	77774433	852 760 Sm-x 3	Sm-x 3	10	14 500
	78239042	852 760 Sm-x 6	Sm-x 6		14 500
	77774425	852 760 Sm-x 10	Sm-x 10		14 500
	77806565	852 760 Sm-x 25	Sm-x 25		14 500
630	77774417	852 761 Mic 5	Mic 5	5	47 600
	77774409	852 761 Mic 10	Mic 10		47 600
	78375867	852 761 Sm-N 2	Sm-N 2		31 800
	77774391	852 761 Sm-x 3	Sm-x 3	10	29 000
	78225898	852 761 Sm-x 6	Sm-x 6		29 000
	77774383	852 761 Sm-x 10	Sm-x 10		29 000
	77806573	852 761 Sm-x 25	Sm-x 25		29 000

\* further elements available upon request.

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

## 8. Specifications

Operating pressure:	10/25 bar*
Temperature range:	- 10 °C to + 120 °C (other temperature ranges on request)
Bypass opening pressure:	$\Delta p$ 3.5 bar $\pm$ 10 %
Filter head material:	GAL
Filter bowl material:	St
Sealing material:	NBR
Activating pressure of optical/ electrical differential pressure indicator:	$\Delta p$ 2.2 bar $\pm$ 10 %
Electrical data of contamination indicator:	
Maximum voltage:	250 V AC/200 V DC
Maximum current on contact:	1 A
Inrush current:	70 W
Type of protection:	IP 65 when inserted and secured

Contact: bistable  
Cable connection: M 20 x 1.5  
The switching function can be changed by turning the electric upper part by 180° (normally closed contact or normally open contact). The state on delivery is a normally closed contact.  
The use of quenching circuits must be checked in the case of inductivity in the DC current circuit. The contamination indicator datasheet contains further information and additional contamination indicator versions.

## 9. Dimensions

All dimensions except "C" and "O" in mm.

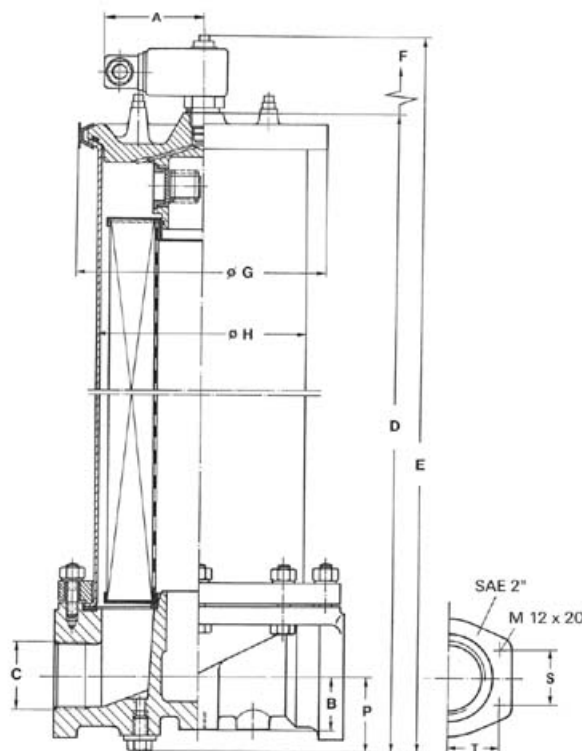
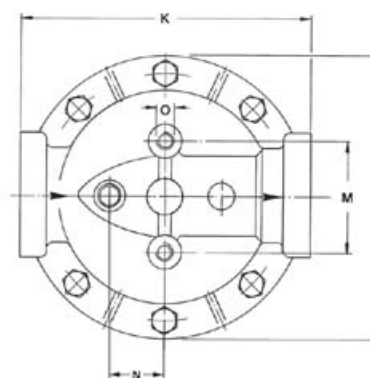
Maß	Pi 1535	Pi 1560
A	78	78
B	42	42
C	G 1 ½	SAE 2"*
D	607	1035
E	643	1068
F	425	850
G	190	190
H	164	164
I	225	225
K	230	230
M	90	90
N	44	44
O	M 12 x 20	M 12 x 20
P	59	59
R	45	45
S	-	42.9
T	-	77.8
weight (kg)	17.1	27.1

\* Standard pressure series hole pattern 3000 PSI

We draw attention to the fact that all values indicated are average values which do not always occur in specific cases of application. Our products are continually being further developed. Values, dimensions and weights can change as a result of this. Our specialized department will be pleased to offer you advice.

When using our filters in areas which are to be classified according to EU Directive 94/9 EC (ATEX 95), we recommend prior discussion with us. The standard version can be used for liquids based on mineral oil (corresponding to the fluids in Group 2 of Directive 97/23 EC Article 9). Please consult with us if using other media. Housings with nominal pressure 10 bar are fitted standard with an air bleeder valve, housings with nominal pressure 25 bar with a venting screw.

Subject to technical alteration without prior notice.



## 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.

### 10.2 Connecting the electrical contamination indicator

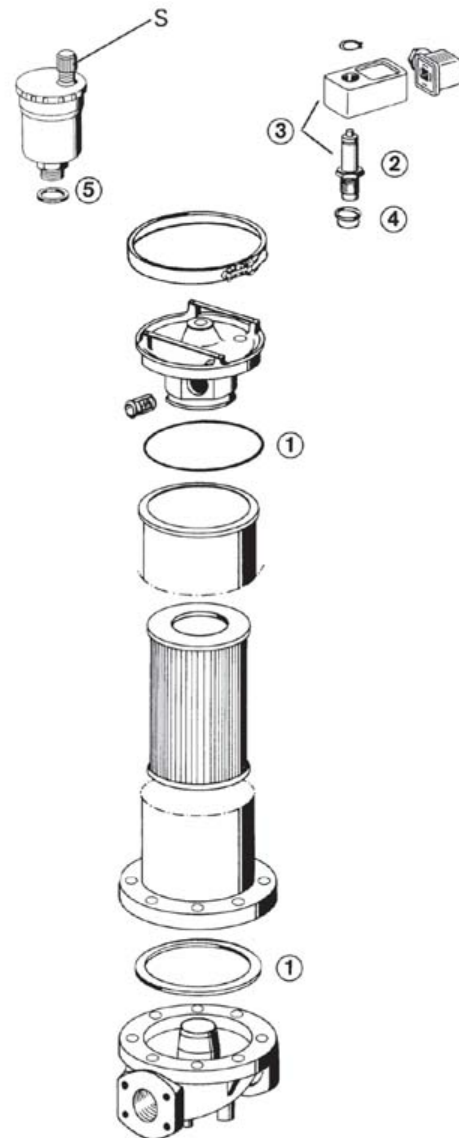
The electrical indicator is connected via a 2-pole appliance plug according to DIN EN 175301–803 with poles marked 1 and 2. The electrical section can be inverted to change from normally open position to normally closed position or vice versa.

### 10.3 When must the filter element be replaced?

- Filters equipped with optical 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 Mic or Sm-x cannot be cleaned.

### 10.4 Element replacement

- Stop system and relieve filter from pressure.
- Loosen quick-action clamp, remove cover, and open drain valve. Housing completely vented.
- Remove filter element from the filter bowl.
- Check seal for damages, replace if necessary.
- Make sure that the part number on the spare element corresponds with the part number on the filter label. Remove the plastic bag and push element over the spigot in the filter head.
- Close drain valve, relocate cover, and close the quick-action clamp. Filters are automatically vented via the air bleeder valve (10 bar version), the protection cap S has to be turned 2 times for being open.



## 11. Spare parts list

Order numbers for spare parts		
Position	Type	Order number
①	Seal kit	
	NBR	77831407
	FPM	77831415
	EPDM	77831423
②	Contamination indicator	
	Optical PiS 3098/2.2	77669971
	Electrical PiS 3097/2.2	77669948
③	Electrical upper part only	77536550
④	Seal kit for differential pressure indicator PiS 3098/2.2 + PiS 3097/2.2	
	NBR	77760309
	FPM	77760317
	EPDM	77760325
⑤	Air bleeder valve	77888035

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