

# MAHLE

Industry

## Duplex Filter

### Pi 241

Nominal pressure 40 bar (570 psi), nominal size 50 up to 80

#### 1. Features

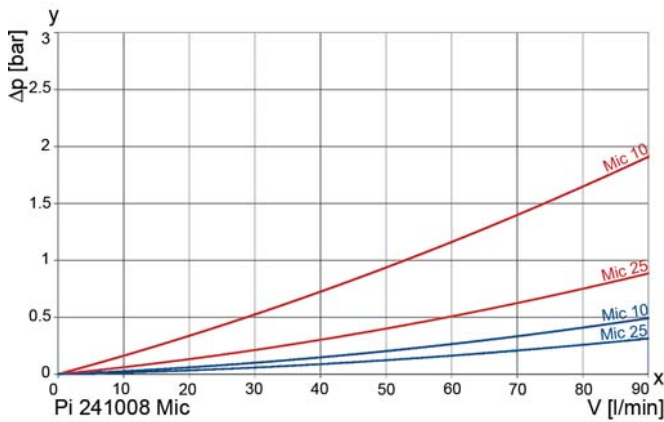
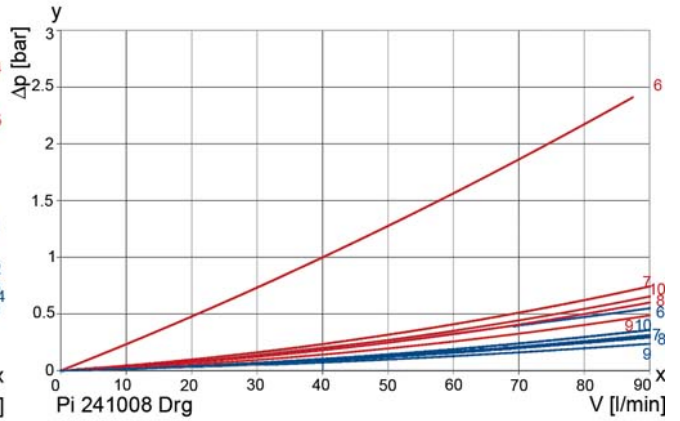
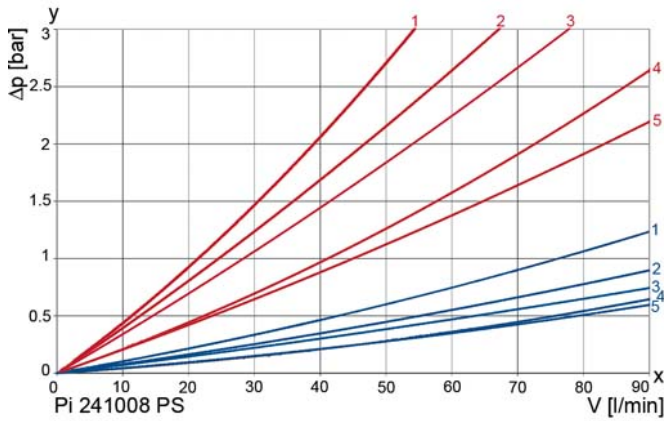
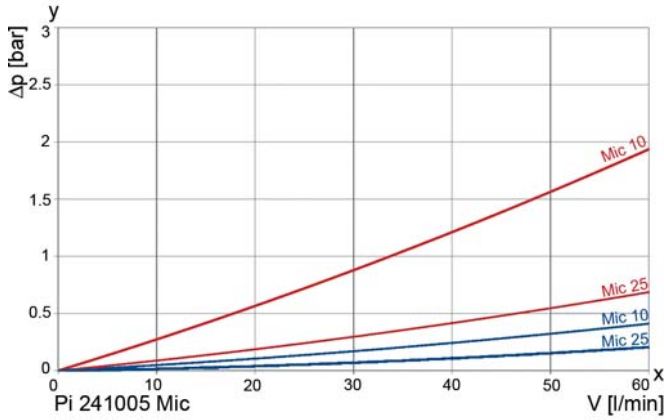
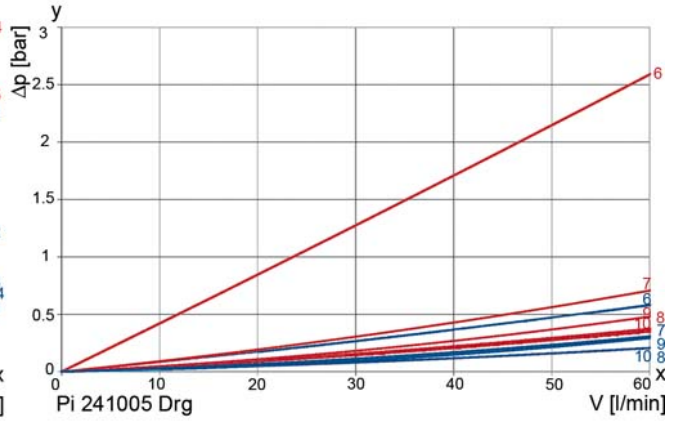
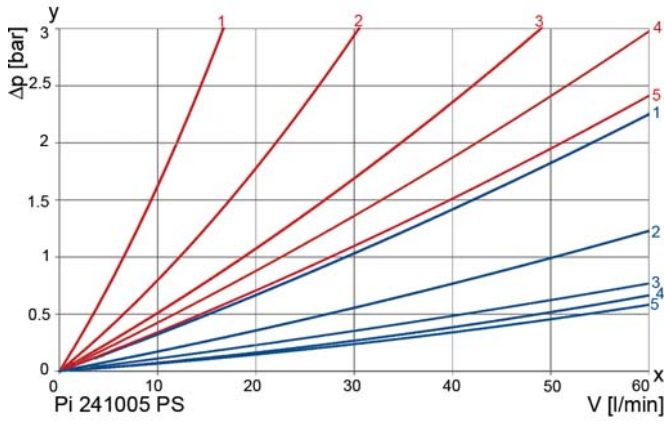
##### High performance filters for modern hydraulic, lubrication and fuel systems

- Modular system
- Compact design
- Minimal pressure drop through optimal flow design
- Ball switching unit
- Visual/electrical/electronic maintenance indicator
- Flanged and threaded connections
- Variable operating and mounting possibilities
- Extensive range of accessories
- Quality filters, easy to service
- Equipped with highly efficient glass fibre PS 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 mm<sup>2</sup>/s  
33 mm<sup>2</sup>/s



y = differential pressure  $\Delta p$  [bar]

x = flow rate V [l/min]

1 = PS 3

3 = PS 10

5 = PS 25

7 = Drg 25

9 = Drg 60

2 = PS 6

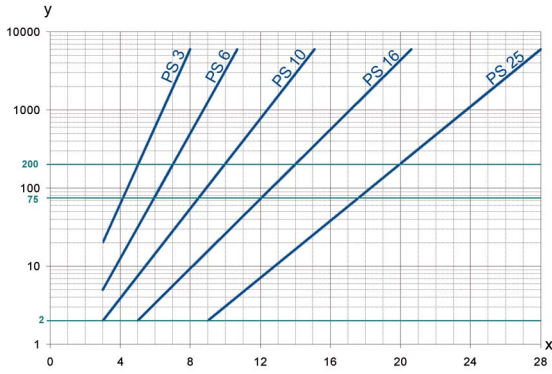
4 = PS 16

6 = Drg 10

8 = Drg 40

10 = Drg 100

### 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)

PS elements with max.  $\Delta p$  20 bar

PS	3	$\beta_{5(C)} \geq 200$
PS	6	$\beta_{7(C)} \geq 200$
PS	10	$\beta_{10(C)} \geq 200$
PS	16	$\beta_{16(C)} \geq 200$
PS	25	$\beta_{20(C)} \geq 200$

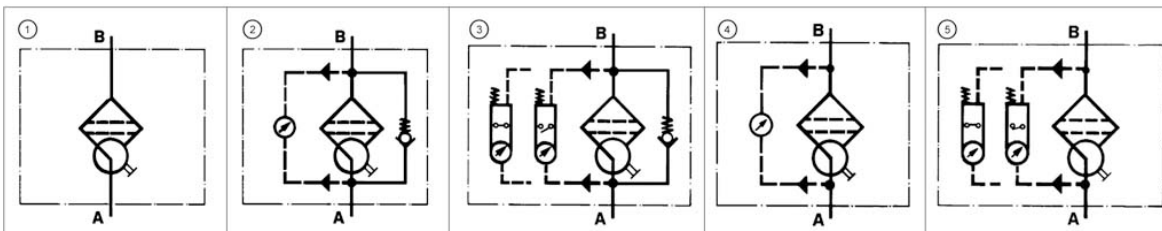
values guaranteed up to  
10 bar differential pressure

### 5. Quality assurance

MAHLE filters 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 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. Type number key and order numbers

### 7.1 Type number key housings

<b>Type</b>							
<b>241</b>	Duplex filter						
<b>Nominal size [l/min]</b>							
<b>005</b>	NG 50						
<b>008</b>	NG 80						
<b>Connection</b>							
<b>1</b>	SAE flange						
<b>4</b>	Thread connection						
<b>Clearance opening</b>							
<b>C</b>	1" DN 25						
<b>Seal material</b>							
<b>N</b>	NBR						
<b>F</b>	FPM						
<b>E</b>	EPDM						
<b>Housing code*</b>							
<b>-046</b>	with screw plug						
<b>-057</b>	with bypass and visual indicator						
<b>-058</b>	with bypass and electrical indicator						
<b>-068</b>	with visual indicator						
<b>-069</b>	with electrical indicator						
<b>Special equipment</b>							
<b>M</b>	Magnet						
<b>Pi 241</b>	<b>008/</b>	<b>1</b>	<b>C/</b>	<b>N</b>	<b>-069/</b>	<b>M</b>	Example for ordering

\*Other types on request

Example for ordering filters:

1. Filter housing	2. Filter element
V = 80 l/min, connection 1" SAE, seal NBR und visual/electrical maintenance indicator Type: Pi 241008/1C/N-069 Order number: 70535442	PS 10 Type: Pi 23008 AN PS 10 Order number: 70518877

### 7.2 Order numbers housings

Nominal size NG [l/min]	Order number	Type	①	②	③	④	⑤
			with blank plug for indicator	with bypass valve and visual indicator	with bypass valve and electrical indicator	with visual indicator	with electrical indicator
50	70525737	Pi 241005/1C/N-046					
	70535419	Pi 241005/1C/N-057					
	70535420	Pi 241005/1C/N-058					
	70535421	Pi 241005/1C/N-068					
	70535422	Pi 241005/1C/N-069					
80	70535438	Pi 241008/1C/N-046					
	70535439	Pi 241008/1C/N-057					
	70535440	Pi 241008/1C/N-058					
	70535441	Pi 241008/1C/N-068					
	70535442	Pi 241008/1C/N-069					

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

### 7.3 Filter elements (a wider range of element types is available on request)

Nominal size NG [l/min]	Order number	Type	Filter material	max. $\Delta p$ [bar]	Filter surface [cm <sup>2</sup> ]
50	70526314	Pi 21005 AN PS 3	PS 3	20	820
	70526312	Pi 22005 AN PS 6	PS 6		820
	70526310	Pi 23005 AN PS 10	PS 10		820
	70526308	Pi 24005 AN PS 16	PS 16		820
	70526302	Pi 25005 AN PS 25	PS 25		820
	70526259	Pi 11005 AN Mic 10	Mic 10		855
	70526261	Pi 12005 AN Mic 25	Mic 25		855
	70526219	Pi 31005 AN Drg 10	Drg 10		495
	70526234	Pi 32005 AN Drg 25	Drg 25		495
	70526237	Pi 33005 AN Drg 40	Drg 40		495
	70526241	Pi 34005 AN Drg 60	Drg 60		495
	70526243	Pi 35005 AN Drg 100	Drg 100		495
80	70518885	Pi 21008 AN PS 3	PS 3	20	1445
	70518881	Pi 22008 AN PS 6	PS 6		1445
	70518877	Pi 23008 AN PS 10	PS 10		1445
	70518873	Pi 24008 AN PS 16	PS 16		1445
	70518863	Pi 25008 AN PS 25	PS 25		1445
	70526267	Pi 11008 AN Mic 10	Mic 10		1539
	70526269	Pi 12008 AN Mic 25	Mic 25		1539
	70518989	Pi 31008 AN Drg 10	Drg 10		915
	70518983	Pi 32008 AN Drg 25	Drg 25		915
	70518981	Pi 33008 AN Drg 40	Drg 40		915
	70518978	Pi 34008 AN Drg 60	Drg 60		915
	70518975	Pi 35008 AN Drg 100	Drg 100		915

## 8. Technical specifications

Design:	Duplex filter
Nominal pressure:	40 bar (570 psi)
Test pressure:	60 bar (860 psi)
Temperature range:	-10 °C to +120 °C (other temperature ranges on request)
Bypass setting:	$\Delta p$ 3.5 bar $\pm$ 10 %
Filter housing material:	EN-GJS-400
Switch parts material:	Stainless steel
Sealing material:	NBR/AL
Maintenance indicator setting:	$\Delta p$ 2.2 bar $\pm$ 10 %
Electrical data of maintenance indicator:	
Maximum voltage:	250 V AC/200 V DC
Maximum current:	1 A
Contact load:	70 W
Type of protection:	IP 65 in inserted and secured status
Contact:	normally open/closed
Cable sleeve:	M20x1.5

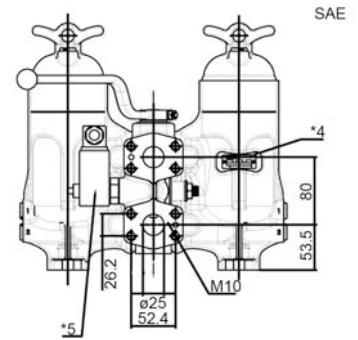
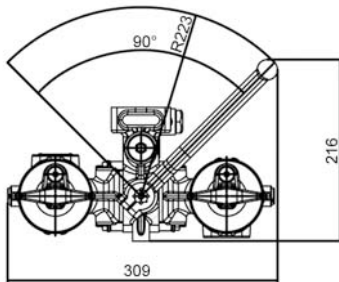
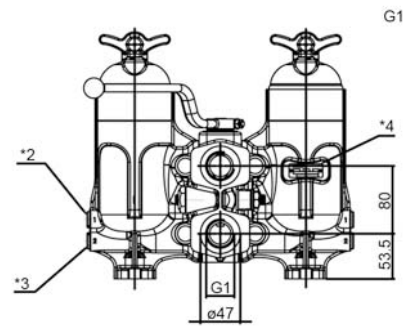
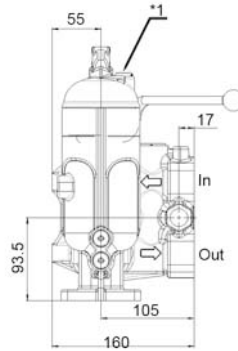
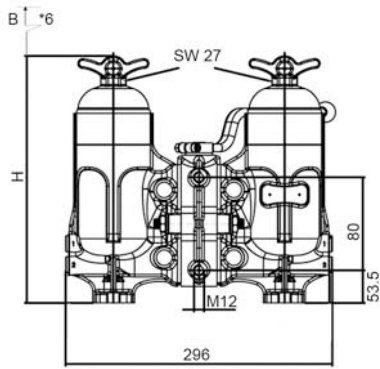
The switching function can be changed by turning the electric upper part by 180° (normally closed contact or normally open contact). The state on delivery is a normally closed contact. By inductivity in the direct current circuit the use of suitable protection circuit should be considered. Further maintenance indicator details and designs are available in the maintenance indicator data sheet.

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.

We recommend you to contact us concerning applications of our filters in areas governed by the EU Directive 94/9 EC (ATEX 95). 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). If you consider to use other fluids please contact us for additional support.

Subject to technical alteration without prior notice.

## 9. Dimensions



All dimensions in mm.

Type	Connections*	H	B	Weight in [kg]
241005	SAE DN 25/G1"	248	110	16
241008	SAE DN 25/G1"	286	160	18

\* Other connections on request

- In Inlet
- Out Outlet
- \*1 Venting G $\frac{1}{4}$
- \*2 Drain outlet dirt side G $\frac{1}{4}$
- \*3 Drain outlet clean side G $\frac{1}{4}$
- \*4 Type plate
- \*5 Maintenance indicator optional
- \*6 Clearance B

## 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. 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 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. The state on delivery is a normally closed contact.

### 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.
2. Filters without maintenance 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 spare elements in stock: Disposable elements (PS/Mic) cannot be cleaned.

### 10.4 Element replacement

**Note:** Elements may only be replaced by people who are familiar with the function of the filter. When replacing elements, appropriate safety clothing (protective goggles, gloves, safety shoes) must be worn.

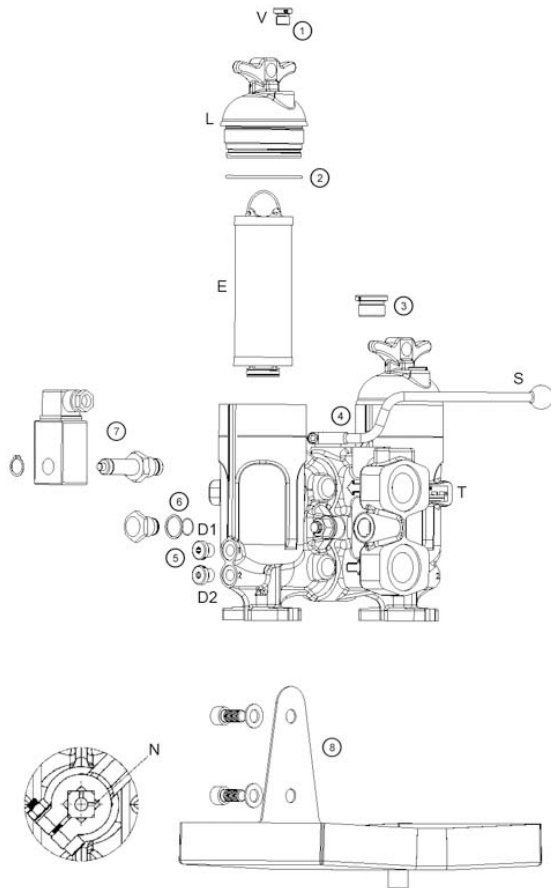
**Note:** The maintenance indicator monitors the filter side in operation. This is indicated by notches (N) on the switching shaft. Before carrying out filter maintenance, switch off the housing to be serviced.

1. Move switching lever (S) completely to the stop.
2. Loosen vent plug (V) on the filter side now shut down by 2-3 turns.
3. Remove drain plug "1" (D1) and allow the medium to drain.
4. Remove drain plug "2" (D2) and allow the medium to drain.
5. Unscrew filter cover (L) by turning in anti-clockwise direction.

**Warning: The shift lever may not, from now until the screwing back in of the filter housing, be activated under any circumstances!**

6. Lift out filter element (E) from above.
7. Check seal (2) on filter cover. We recommend replacement in any case.
8. Make sure that the order number on the spare element corresponds to the order number of the filter name plate (T). Remove the element packaging and insert the element into the housing with the closed side facing upwards.
9. Push the element carefully into the holding fixture and tighten cover against stop.
10. Screw in drain plugs "1" and "2" and tighten (30-35 Nm).
11. When filling the filter chamber, move the switching lever to the middle position until the medium flows out of the vent bore bubble-free. Tighten vent plug (30-35 Nm).
12. Check the serviced filter chamber for leaks.
13. Move the switching lever back to stop position and put the serviced filter chamber out of operation again.

## 11. Spare parts list



Order number for spare parts		
Position	Type	Order number
① - ②	Seal kit for housing Pi 241 005 - Pi 241 008	
	NBR	70535673
	FPM	70535674
	EPDM	70535675
③	Seal kit for maintenance indicator	
	NBR	77760309
	FPM	77760317
④	Maintenance indicator	
	Visual PiS 3098/2.2	77669971
	Electrical PiS 3097/2.2	77669948
⑤	Oil drip pan	
	Pi 241 005 - Pi 241 008	70535711
⑥	SAE welding counter-flange 3000 psi incl. O-Ring and mounting screws	
	SAE 1" NBR	70535783
⑦	Drain plugs with permanent magnet	
	G1/4"	70535672

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