

Dvojitý spínací filtr Pi 210

Jmenovitý tlak 32/63 bar, do jmenovité velikosti 600

1. Stručný popis

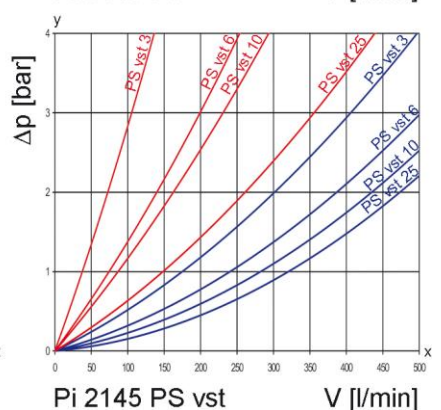
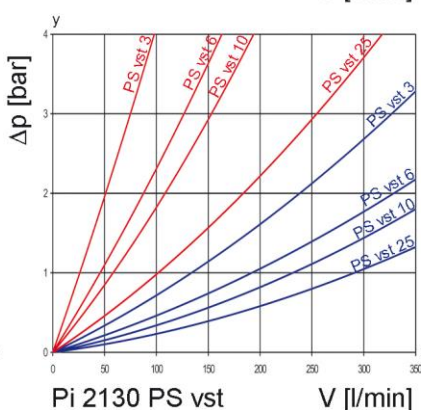
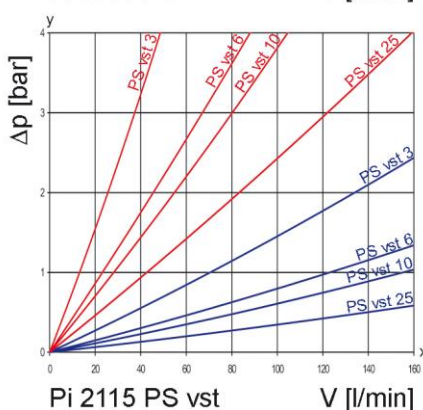
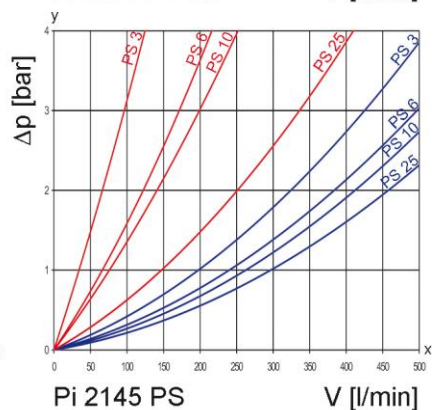
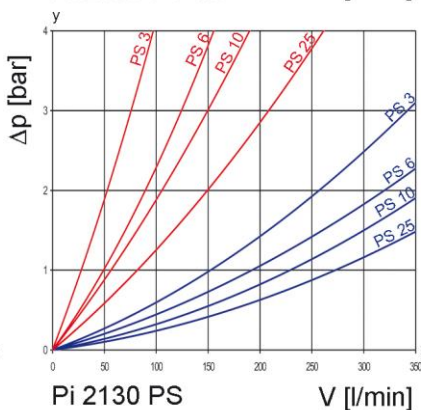
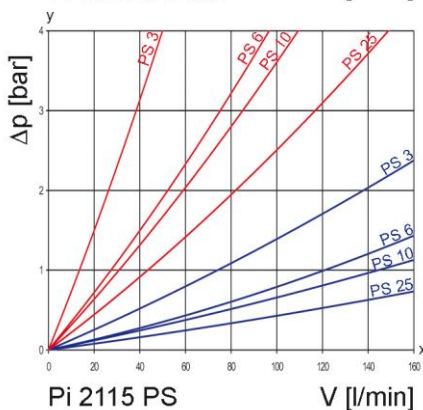
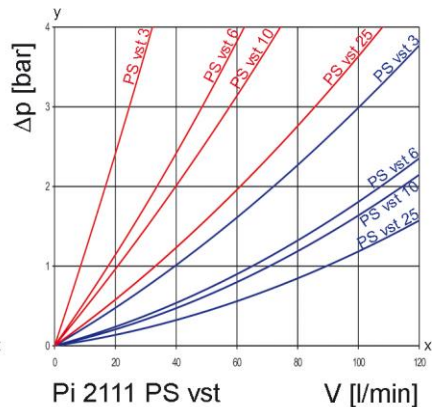
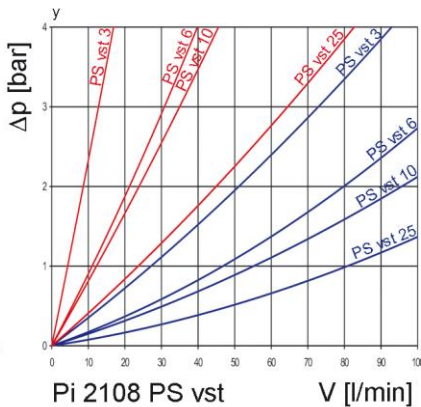
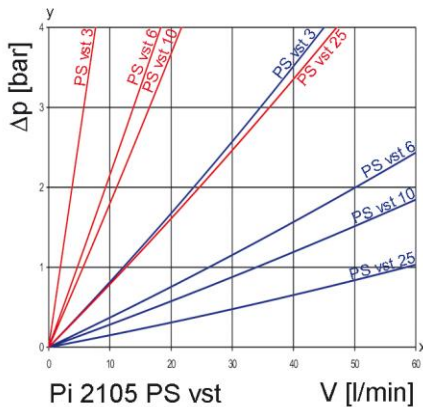
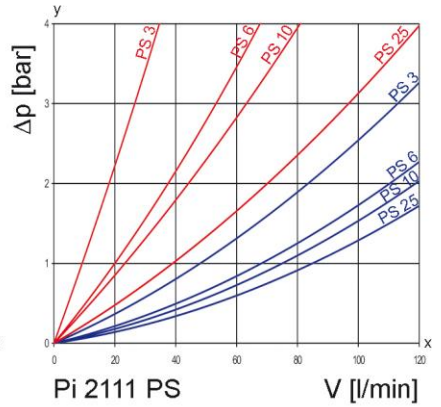
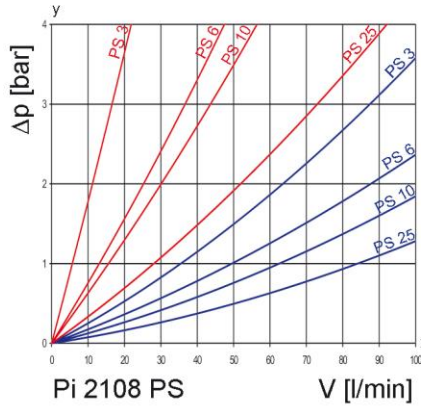
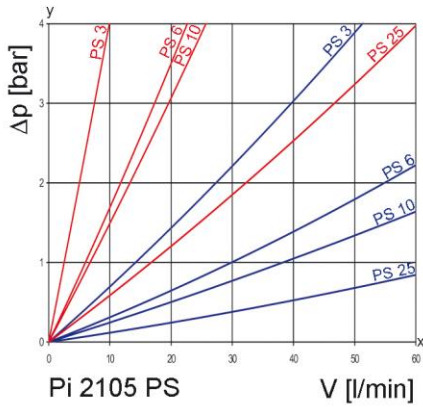
Výkonné filtry pro moderní hydraulická zařízení

- Modulový systém pro optimální volbu filtru
- Malá potřeba místa díky kompaktní konstrukci
- Minimální ztráta tlaku díky uspořádání dílů příznivého z hlediska proudění
- Optická/elektrická/elektronická indikace údržby
- Provedení se závitovými přípojkami
- Přepínání pouze na znečištěné straně
- Ergonomická přepínací páka s pákovou pojistkou s vyrovnáváním tlaku
- Uživatelsky příjemné jednoruční ovládání
- Vybaven filtračními vložkami PS s vysokou účinností
- Garantovaná účinnost odlučování na základě víceprůchodového testu podle ISO 16889
- Vysoká stabilita tlakového rozdílu a kapacita zachycení nečistot vložek
- Jiné přípojky na požádání
- Prodej po celém světě

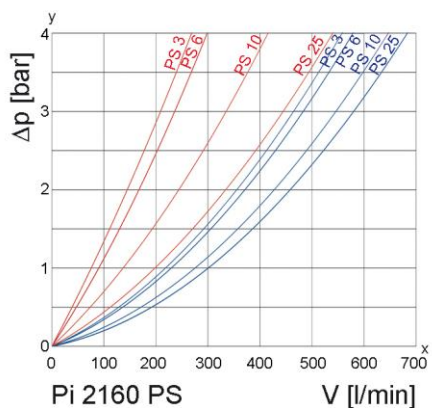


2. Křivky výkonosti kompletních filtrů

■ 190 mm²/s
■ 33 mm²/s

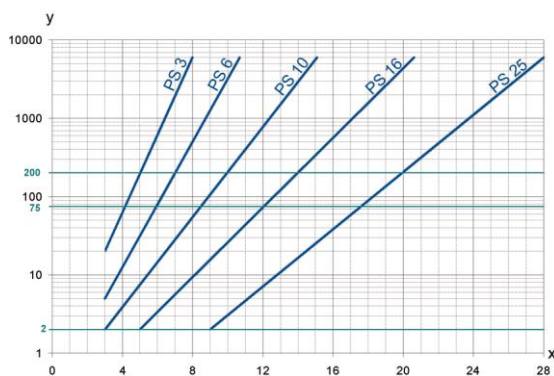


y = tlakový rozdíl Δp [bar]
 x = objemový proud V [l/min]



y = tlakový rozdíl Δp [bar]
 x = objemový proud V [l/min]

3. Charakteristiky stupně odlučování



y = hodnota Beta
 x = velikost částic [μm]

zjištěno víceprůchodovými měřeními (ISO 16889)
 kalibrace podle ISO 11171 (NIST)

5. Zajištění kvality

Filtry a filtrační vložky FGC se vyrábějí, resp. testují podle následujících mezinárodních norem:

| Norma | Název |
|--------------|---|
| DIN ISO 2941 | Hydraulické tlakové filtrační vložky; Tlaková zkouška porušení, protřžení |
| DIN ISO 2942 | Hydraulické tlakové filtrační vložky; Doklad o bezchybné kvalitě výroby |
| DIN ISO 2943 | Hydraulické filtrační vložky; Doklad o snášenlivost s tlakovou kapalinou |
| DIN ISO 3723 | Hydraulické tlakové filtrační vložky; Metoda zkoušení zatížení koncových desek |
| DIN ISO 3724 | Hydraulické filtrační vložky; Doklad o vlastnostech průtoků vlivem únavy |
| ISO 3968 | Hodnocení poklesu tlaku hydraulických tlakových filtrů ve vztahu k charakteristice průtoku |
| ISO 10771.1 | Únavová tlaková zkouška pláštů obsahujících kov v hydraulických aplikacích |
| ISO 16889 | Metoda zkoušení hydraulických tlakových filtrů vícenásobným průchodem pro hodnocení účinnosti filtrace filtrační vložky |

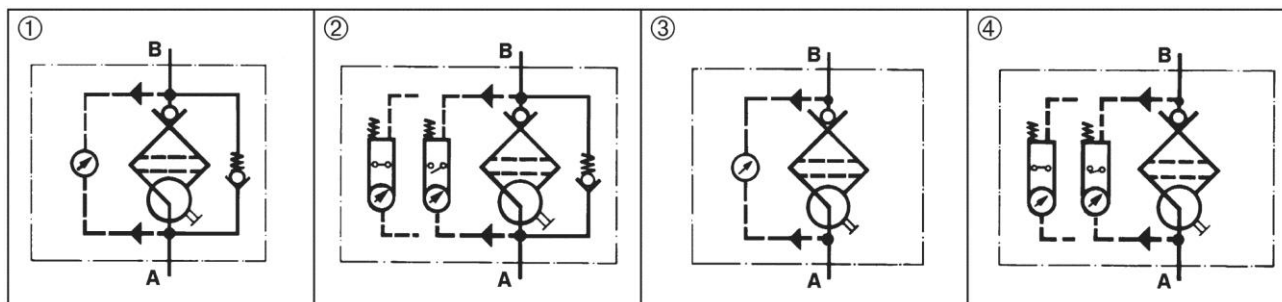
4. Výkonové údaje filtru

změřeno podle ISO 16889 (víceprůchodový test)

| Vložky PS max. Δp 20 bar | | Vložky PS vst max. Δp 210 bar | |
|-------------------------------------|-------------------------------|--|-------------------------------|
| PS | 3 $\beta_{5(C)}$ ≥ 200 | PS vst | 3 $\beta_{5(C)}$ ≥ 200 |
| PS | 6 $\beta_{7(C)}$ ≥ 200 | PS vst | 6 $\beta_{7(C)}$ ≥ 200 |
| PS | 10 $\beta_{10(C)}$ ≥ 200 | PS vst | 10 $\beta_{10(C)}$ ≥ 200 |
| PS | 25 $\beta_{20(C)}$ ≥ 200 | PS vst | 25 $\beta_{20(C)}$ ≥ 200 |

do tlakového rozdílu 10 bar do tlakového rozdílu 20 bar

6. Schématická zobrazení



7. Objednáací čísla

Příklad objednávky filtru:

| 1. Těleso filtru | 2. Filtrační vložka |
|---|---|
| V = 80 l/min a optická/elektrická indikace údržby Typové označení: Pi 2108-069 Objednáací číslo: 77810286 | PS vst 3 Typové označení: Pi 2208 PS vst 3 Order number: 77680200 Objednáací číslo: 77680200 |

| 7.1 Provedení tělesa filtru | | | | | | |
|-------------------------------|------------------|-----------------|---------------------------------|------------------------------------|-----------------------|--------------------------|
| Jmenovitá velikost NG [l/min] | Objednáací číslo | Typové označení | ① s obtokem a optickou indikací | ② s obtokem a elektrickou indikací | ③ s optickou indikací | ④ s elektrickou indikací |
| 50 | 77810211 | Pi 2105-057 | | | | |
| | 77810229 | Pi 2105-058 | | | | |
| | 77810237 | Pi 2105-068 | | | | |
| | 77810245 | Pi 2105-069 | | | | |
| 80 | 77810252 | Pi 2108-057 | | | | |
| | 77810260 | Pi 2108-058 | | | | |
| | 77810278 | Pi 2108-068 | | | | |
| | 77810286 | Pi 2108-069 | | | | |
| 110 | 78204083 | Pi 2111-057 | | | | |
| | 78204091 | Pi 2111-058 | | | | |
| | 78204109 | Pi 2111-068 | | | | |
| | 78204117 | Pi 2111-069 | | | | |
| 150 | 77774573 | Pi 2115-057 | | | | |
| | 77774565 | Pi 2115-058 | | | | |
| | 77774557 | Pi 2115-068 | | | | |
| | 77774540 | Pi 2115-069 | | | | |
| 300 | 77774532 | Pi 2130-057 | | | | |
| | 77774524 | Pi 2130-058 | | | | |
| | 77774516 | Pi 2130-068 | | | | |
| | 77774508 | Pi 2130-069 | | | | |
| 450 | 77774490 | Pi 2145-057 | | | | |
| | 77774482 | Pi 2145-058 | | | | |
| | 77774474 | Pi 2145-068 | | | | |
| | 77774466 | Pi 2145-069 | | | | |
| 600 | 70574769 | Pi 2160-057 | | | | |
| | 70574768 | Pi 2160-058 | | | | |
| | 70574767 | Pi 2160-068 | | | | |
| | 70574766 | Pi 2160-069 | | | | |

V případě použití filtru bez obtoku musí být zajištěno, aby nebyl překročen max Δp filtrační vložky.

7.2 Filtrační vložky *

| Jmenovitá velikost NG [l/min] | Objednací číslo | Typové označení | Filtrační materiál | max. Δp [bar] | Filtrační plocha [cm ²] |
|----------------------------------|-----------------|-------------------|--------------------|--------------------------|--|
| 50 | 77680135 | Pi 2105 PS 3 | PS 3 | 20 | 590 |
| | 77943509 | Pi 5105 PS 6 | PS 6 | | 590 |
| | 77680325 | Pi 3105 PS 10 | PS 10 | | 590 |
| | 77680440 | Pi 4105 PS 25 | PS 25 | | 590 |
| | 77680192 | Pi 2205 PS vst 3 | PS vst 3 | 210 | 425 |
| | 77943533 | Pi 5205 PS vst 6 | PS vst 6 | | 425 |
| | 77680382 | Pi 3205 PS vst 10 | PS vst 10 | | 425 |
| | 77680507 | Pi 4205 PS vst 25 | PS vst 25 | | 425 |
| 80 | 77680143 | Pi 2108 PS 3 | PS 3 | 20 | 1150 |
| | 77943517 | Pi 5108 PS 6 | PS 6 | | 1150 |
| | 77680341 | Pi 3108 PS 10 | PS 10 | | 1150 |
| | 77680457 | Pi 4108 PS 25 | PS 25 | | 1150 |
| | 77680200 | Pi 2208 PS vst 3 | PS vst 3 | 210 | 850 |
| | 77943541 | Pi 5208 PS vst 6 | PS vst 6 | | 850 |
| | 77681190 | Pi 3208 PS vst 10 | PS vst 10 | | 850 |
| | 77680515 | Pi 4208 PS vst 25 | PS vst 25 | | 850 |
| 110 | 77680150 | Pi 2111 PS 3 | PS 3 | 20 | 1700 |
| | 77943525 | Pi 5111 PS 6 | PS 6 | | 1700 |
| | 77680333 | Pi 3111 PS 10 | PS 10 | | 1700 |
| | 77680465 | Pi 4111 PS 25 | PS 25 | | 1700 |
| | 77680218 | Pi 2211 PS vst 3 | PS vst 3 | 210 | 1275 |
| | 77943558 | Pi 5211 PS vst 6 | PS vst 6 | | 1275 |
| | 77680390 | Pi 3211 PS vst 10 | PS vst 10 | | 1275 |
| | 77680523 | Pi 4211 PS vst 25 | PS vst 25 | | 1275 |
| 150 | 77680168 | Pi 2115 PS 3 | PS 3 | 20 | 2425 |
| | 77955099 | Pi 5115 PS 6 | PS 6 | | 2425 |
| | 77680358 | Pi 3115 PS 10 | PS 10 | | 2425 |
| | 77680473 | Pi 4115 PS 25 | PS 25 | | 2425 |
| | 77680226 | Pi 2215 PS vst 3 | PS vst 3 | 210 | 2010 |
| | 77955123 | Pi 5215 PS vst 6 | PS vst 6 | | 2010 |
| | 77680408 | Pi 3215 PS vst 10 | PS vst 10 | | 2010 |
| | 77680531 | Pi 4215 PS vst 25 | PS vst 25 | | 2010 |
| 300 | 77680176 | Pi 2130 PS 3 | PS 3 | 20 | 4620 |
| | 77955107 | Pi 5130 PS 6 | PS 6 | | 4620 |
| | 77680366 | Pi 3130 PS 10 | PS 10 | | 4620 |
| | 77680481 | Pi 4130 PS 25 | PS 25 | | 4620 |
| | 77680234 | Pi 2230 PS vst 3 | PS vst 3 | 210 | 3800 |
| | 77955131 | Pi 5230 PS vst 6 | PS vst 6 | | 3800 |
| | 77680416 | Pi 3230 PS vst 10 | PS vst 10 | | 3800 |
| | 77680549 | Pi 4230 PS vst 25 | PS vst 25 | | 3800 |
| 450 | 77680184 | Pi 2145 PS 3 | PS 3 | 20 | 6865 |
| | 77955115 | Pi 5145 PS 6 | PS 6 | | 6865 |
| | 77680374 | Pi 3145 PS 10 | PS 10 | | 6865 |
| | 77680499 | Pi 4145 PS 25 | PS 25 | | 6865 |
| | 77680242 | Pi 2245 PS vst 3 | PS vst 3 | 210 | 5600 |
| | 77955149 | Pi 5245 PS vst 6 | PS vst 6 | | 5600 |
| | 77680424 | Pi 3245 PS vst 10 | PS vst 10 | | 5600 |
| | 77680556 | Pi 4245 PS vst 25 | PS vst 25 | | 5600 |

*jiné provedení vložky na požádání

| 7.2 Filtrační vložky * | | | | | |
|-------------------------------|-----------------|-----------------|--------------------|-----------------------|-------------------------------------|
| Jmenovitá velikost NG [l/min] | Objednací číslo | Typové označení | Filtrační materiál | max. Δp [bar] | Filtrační plocha [cm ²] |
| 600 | 70346506 | Pi 2160 PS 3 | PS 3 | 20 | 9398 |
| | 76114318 | Pi 5160 PS 6 | PS 6 | | 9398 |
| | 79393380 | Pi 3160 PS 10 | PS 10 | | 9398 |
| | 79748047 | Pi 4160 PS 25 | PS 25 | | 9398 |

*jiné provedení vložky na požádání

8. Technické údaje

| | |
|---|--|
| Konstrukce: | Filtr pro montáž do vedení |
| Jmenovitý tlak: | |
| Pi 2105 - Pi 2111 | 10 ⁷ Změny zatížení 63 bar |
| Pi 2115 - Pi 2160 | 10 ⁷ Změny zatížení 25 bar |
| Zkušební tlak: | 2x10 ⁶ Změny zatížení 32 bar |
| Pi 2105 - Pi 2111 | 95 bar |
| Pi 2115 - Pi 2160 | 486 bar |
| Rozsah teplot: | -10 °C to +120 °C Teplota pro přežití -40 °C (jiné rozsahy teplot na požádání) |
| Otvírací tlak obtoku: | Δp 3,5 bar \pm 10 % |
| Materiál hlavy filtru: | GAL |
| Materiál tělesa filtru: | AL/St |
| Materiál těsnění: | NBR/AL |
| Spínání opt./elektr. indikátoru údržby: | Δp 2,2 bar \pm 10 % |
| Elektrické údaje indikátoru údržby: | |
| Napětí max.: | 250 V AC/200 V DC |
| Spínací proud max.: | 1 A |
| Contact load: Spínací výkon: | 70 W |
| Druh ochrany: | IP 65 v zasunutém a zajištěném stavu |
| Druh kontaktů: | Zapínací kontakt/rozpojovací kontakt |
| Kabelová průchodka: | M20x1,5 |

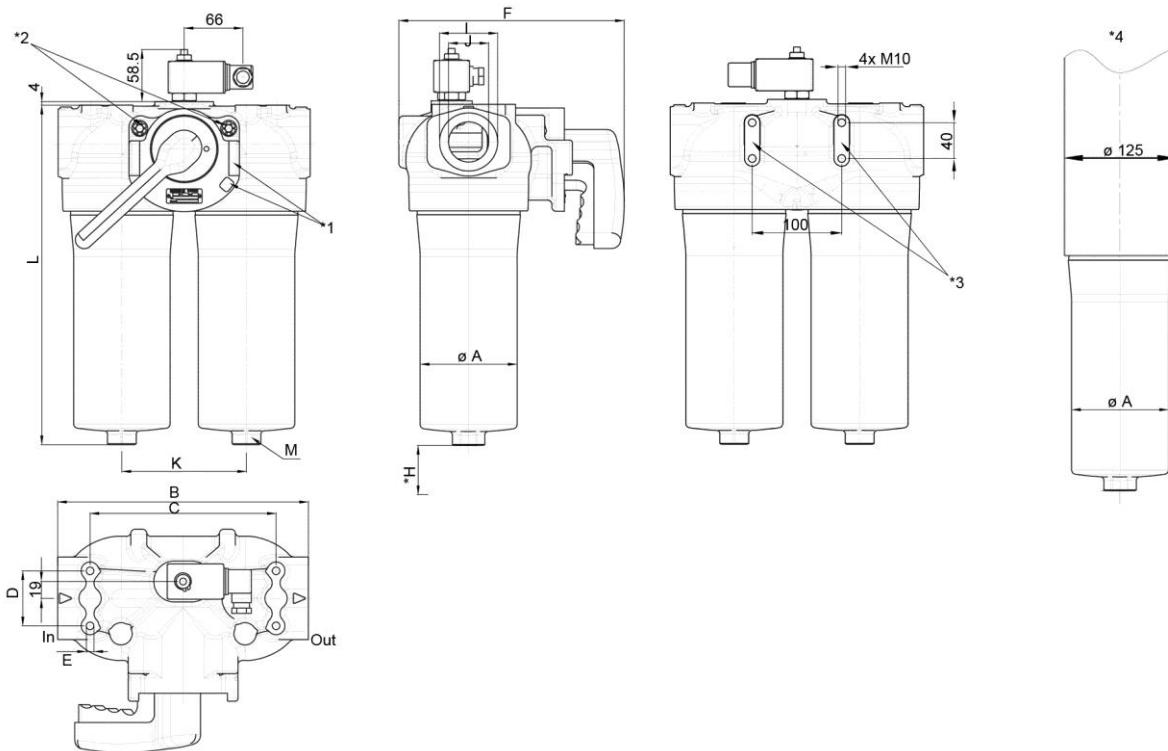
Přestavením elektrického spínacího dílu o 180° lze změnit spínací funkci (zapínací nebo rozpojovací kontakt). Stav při dodání je rozpojovací kontakt. V případě indukčnosti ve stejnosměrném obvodu je třeba zkontrolovat použití zhašecích členů. Další údaje a další provedení indikátorů údržby obsahuje specifikace indikátoru údržby.

Upozorňujeme na to, že se u uvedených hodnot jedná o průměrné hodnoty. Naše výrobky jsou neustále zlepšovány. Proto se mohou hodnoty, rozměry a hmotnosti změnit. Pracovníci našeho odborného oddělení Vám rádi poskytnou potřebné informace.

V případě použití našich filtrů v oblastech, které je třeba klasifikovat podle směrnice EU 94/9 EU (ATEX 95), Vám doporučujeme se s námi za účelem konzultace spojit. Standardní provedení je určeno pro kapaliny skupiny na bázi minerálního oleje (podle kapalin skupiny 2 směrnice 97/23/EU, článek 9). V případě použití jiných médií Vás prosíme, abyste se s námi spojili.

Technické změny vyhrazeny.

9. Rozměry



In Vstup
 Out Výstup
 *H Minimální demontážní výška pro výměnu vložky

*1 Páková pojistka a aretace páky
 *2 Odvzdušňovací šrouby
 *3 Volitelné upevnění na stěnu pro NG 150 až 600
 *4 Provedení tělesa filtru pro NG 600

Všechny rozměry s výjimkou "J" jsou v mm

| Type | A | B | C* | D | E | F | G | H | I | J* | K | L | MSW | Hmotnost [kg] |
|---------|-----|-----|-----|----|--------|-----|-----|-----|----|-------------------|-----|-----|-----|---------------|
| Pi 2105 | 66 | 172 | 100 | 52 | M8x16 | 189 | 130 | 80 | 47 | G1 | 85 | 203 | 27 | 2,60 |
| Pi 2108 | 66 | 172 | 100 | 52 | M8x16 | 189 | 130 | 80 | 47 | G1 | 85 | 261 | 27 | 2,90 |
| Pi 2111 | 66 | 172 | 100 | 52 | M8x16 | 189 | 130 | 80 | 47 | G1 | 85 | 351 | 27 | 3,30 |
| Pi 2115 | 109 | 283 | 210 | 62 | M10x20 | 252 | 194 | 110 | 65 | G1 ^{1/2} | 140 | 264 | 32 | 8,50 |
| Pi 2130 | 109 | 283 | 210 | 62 | M10x20 | 252 | 194 | 110 | 65 | G1 ^{1/2} | 140 | 385 | 32 | 9,50 |
| Pi 2145 | 109 | 283 | 210 | 62 | M10x20 | 252 | 194 | 110 | 65 | G1 ^{1/2} | 140 | 497 | 32 | 17,25 |
| Pi 2160 | 109 | 283 | 210 | 62 | M10x20 | 252 | 194 | 110 | 65 | G1 ^{1/2} | 140 | 636 | 32 | 15,50 |

*Přírubové přípojky SAE (3000 PSI) na požádání, závitové přípojky NPT a SAE na požádání

10. Návod na montáž, obsluhu a údržbu

10.1 Montáž filtru

Namontujte filtr podle vyznačeného směru průtoku. Pro upevnění filtru jsou určeny závitové otvory na hlavě filtru. Při montáži filtru dbejte na to, aby byla k dispozici potřebná demontážní výška pro vyjmutí filtrační vložky a tělesa filtru. Filtr by měl být přednostně zabudován tělesem filtru směrem dolů. Indikátor údržby musí být viditelný.

10.2 Připojení elektrického indikátoru údržby

Připojení elektrické indikace se provádí pomocí 2-pólové přístrojové zástrčky podle normy DIN EN 17 5301-803, u které jsou póly označeny číslicemi 1 a 2. Spínací díl nasuňte podle požadavku jako zapínací kontakt nebo rozpojovací kontakt. Stav při dodání je rozpojovací kontakt.

10.3 Kdy je nutné vyměnit filtrační vložku?

1. U filtrů s optickou a elektrickou indikací údržby: Při rozběhu ve studeném stavu může v důsledku vysoké viskozity vyskočit červený indikátor a aktivovat se elektrický signál. Teprve po dosažení provozní teploty indikátor opět stiskněte. Pokud indikátor okamžitě opět vyskočí, resp. elektrický signál při provozní teplotě se nedeaktivuje, musí se po konci směny vyměnit filtrační vložka.
2. Vždy dbejte na to, abyste měli na skladě originální náhradní vložky firmy Filtration Group. Jednorázové vložky nelze čistit

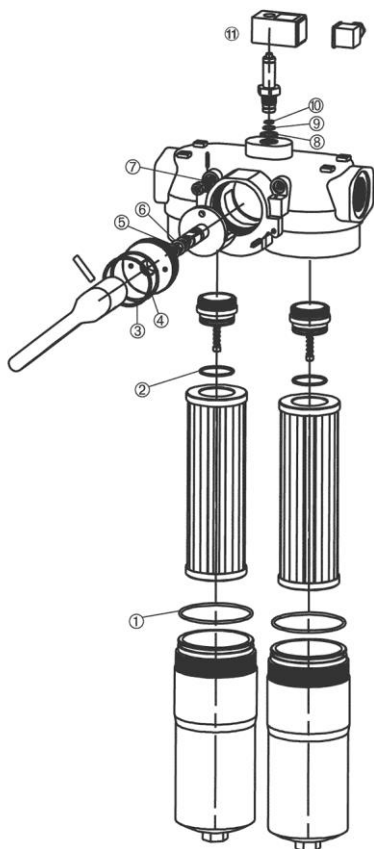
10.4 Výměna vložky

Upozornění: Výměna vložky se smí provádět pouze ve dvou, přičemž obě osoby musejí být obeznámeny s funkcí filtru. Při výměně vložky noste odpovídající ochranný oděv (ochranné brýle, rukavice, bezpečnostní obuv).

Pozor: Indikace údržby kontroluje stranu filtru, která je právě v provozu. Přepínací páka směřuje na stranu filtru vyřazenou z provozu. Před údržbou filtru je třeba proto filtr přepnout, čímž se deaktivuje signál indikátoru údržby a červený indikátor lze opět zatlačit.

1. Stiskněte a přidržte tlakový vyrovnávací ventil v přepínací páce. Otočte přepínací páku. Zajistěte aretaci. Postavte pod filtr vanu nebo odkapávací plech, aby se zachytil unikající olej.
2. Uvolněte o 2-3 otáčky odvzdušňovací šroub na straně filtru vyřazené nyní z provozu. Maximálně po dorazový pojistný kolík.
3. Odšroubujte těleso filtru otáčením doleva. Vyčistěte těleso filtru vhodným prostředkem.
Pozor: Od této chvíle až do opětovného zašroubování tělesa filtru (7.) se v žádném případě nesmí aktivovat přepínací páka!
4. Vyjměte filtrační vložku směrem dolů mírným posuvně vratným pohybem.
5. Zkontrolujte těsnicí O kroužek v tělese filtru a upevnění vložky z hlediska poškození. V případě potřeby je třeba tyto díly vyměnit.
6. Zkontrolujte, zda objednávací číslo na náhradní vložce souhlasí s objednávacím číslem na štítku. Otevřete umělohmotný obal a zasuňte vložku přes upevňovací díl do hlavy filtru. Stáhněte umělohmotný obal.
7. Na závit tělesa filtru naneste tenkou vrstvu oleje a zašroubujte jej do hlavy filtru. Maximální utahovací moment při NG 50 až 110 = 30 Nm, při NG 150 až 600 = 50 Nm.
8. Pro naplnění komor filtru použijte páčku vyrovnání tlaku pouze tak dlouho, až médium vytéká z odvzdušňovacího otvoru bez bublin. Odvzdušňovací šroub dotáhněte. Opětovným použitím páky vyrovnání tlaku zkontrolujte filtr z hlediska těsnosti.
9. Odvzdušňovací šroub dotáhněte. Opětovným použitím páky vyrovnání tlaku zkontrolujte filtr z hlediska těsnosti.

11. Seznam náhradních dílů



| Objednací čísla pro náhradní díly | | |
|-----------------------------------|-----------------------------------|-----------------|
| Pozice | Označení | Objednací číslo |
| ① - ⑦ | Sada těsnění pro těleso | |
| | Pi 2105 - Pi 2111 | |
| | NBR | 79761271 |
| | FPM | 79761289 |
| | EPDM | 79761297 |
| | Pi 2115 - Pi 2160 | |
| | NBR | 79761230 |
| FPM | 79761248 | |
| EPDM | 79761255 | |
| ⑧ - ⑩ | Sada těsnění pro indikátor údržby | |
| | NBR | 77760309 |
| | FPM | 77760317 |
| | EPDM | 77760325 |
| ⑪ | Indikátor údržby | |
| | Optický PiS 3098/2,2 | 77669971 |
| | Elektrický PiS 3097/2,2 | 77669948 |
| | Pouze elektrická horní část | 77536550 |

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70523766.03/2017

Dvojitý spínací filtr Pi 210 do NG 600

Duplex Filter Pi 210

Nominal pressure 32/63 bar (460/900 psi), nominal size up to 600

1. Features

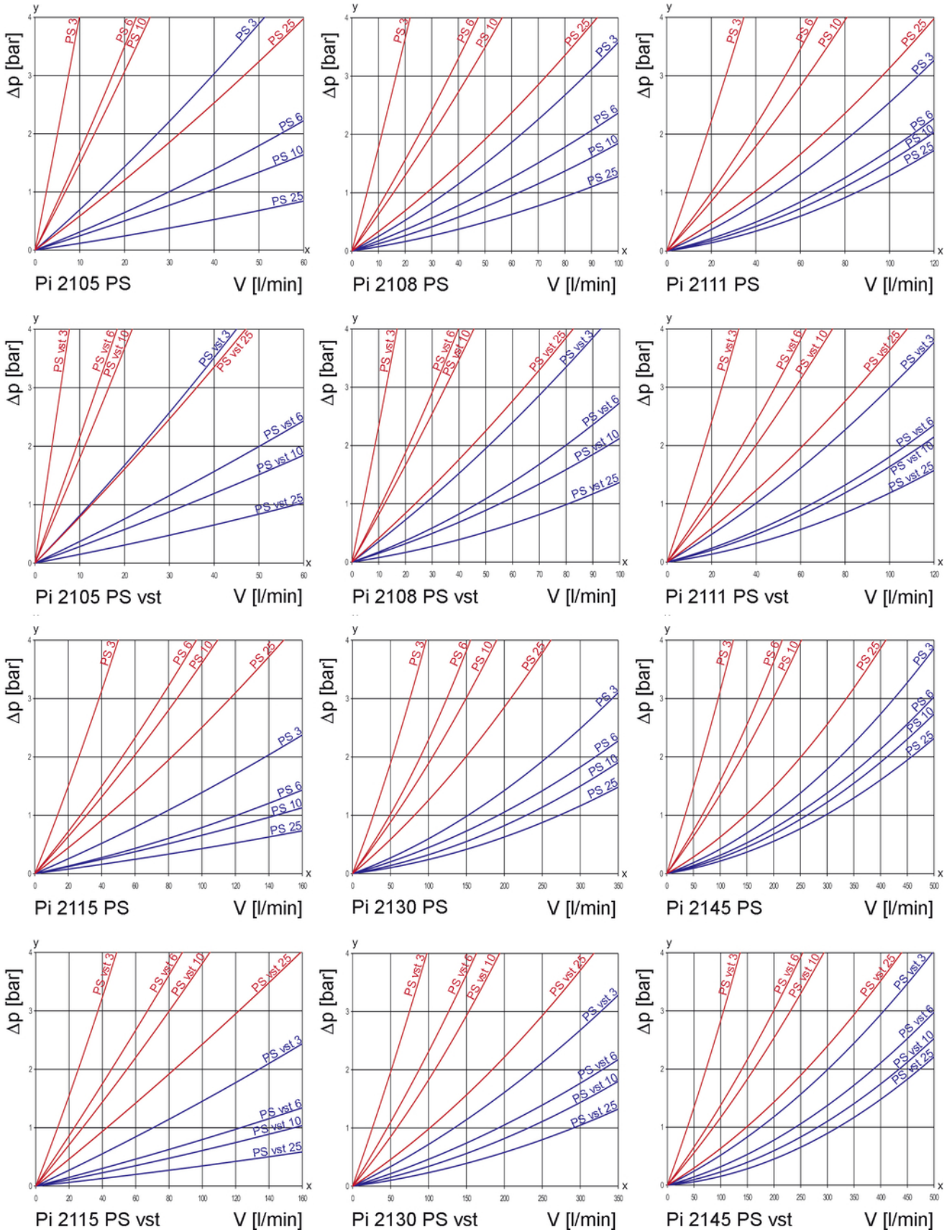
High performance filters for modern hydraulic systems

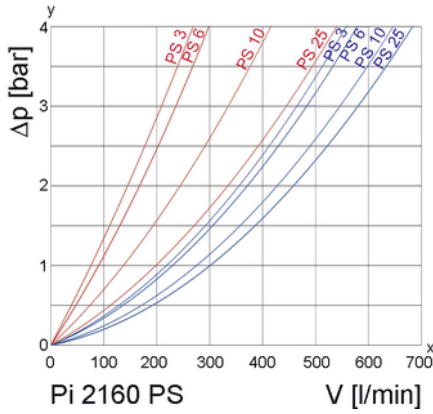
- Modular system
- Compact design
- Minimal pressure drop through optimal flow design
- Visual/electrical/electronic maintenance indicator
- Threaded connections
- Change over valve on upstream side
- Ergonomic switch-over handle with safety lock and pressure compensation
- User-optimized one-hand-operation
- 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
- Other connections on request
- Worldwide distribution



2. Flow rate/pressure drop curve complete filter

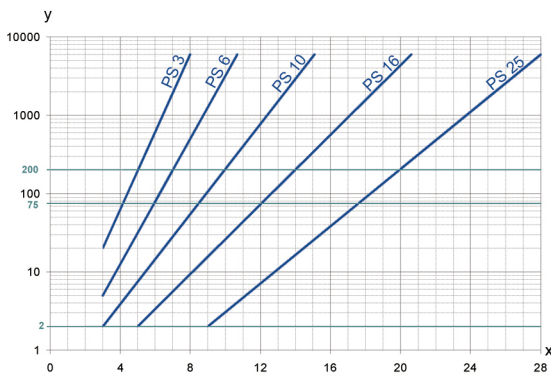
■ 190 mm²/s
■ 33 mm²/s





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 (NIST)

5. Quality assurance

Filtration Group 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 |

4. Filter performance data

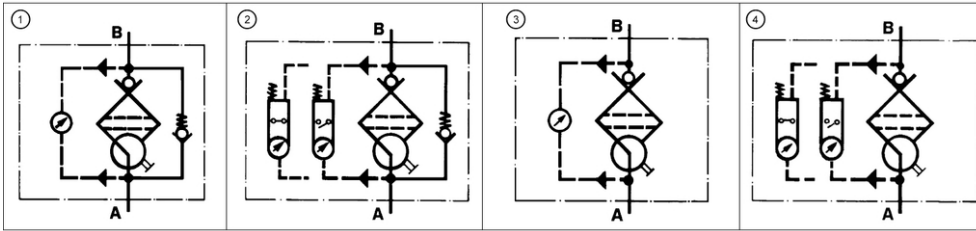
tested according to ISO 16889 (multipass test)

| PS elements with max. Δp 20 bar | | | PS vst elements with max. Δp 210 bar | | |
|--|----|--------------------------|---|----|--------------------------|
| PS | 3 | $\beta_{5(C)} \geq 200$ | PS vst | 3 | $\beta_{5(C)} \geq 200$ |
| PS | 6 | $\beta_{7(C)} \geq 200$ | PS vst | 6 | $\beta_{7(C)} \geq 200$ |
| PS | 10 | $\beta_{10(C)} \geq 200$ | PS vst | 10 | $\beta_{10(C)} \geq 200$ |
| PS | 25 | $\beta_{20(C)} \geq 200$ | PS vst | 25 | $\beta_{20(C)} \geq 200$ |

values guaranteed up to
 10 bar differential pressure

values guaranteed up to
 20 bar differential pressure

6. Symbols



7. Order numbers

Example for ordering filters:

| 1. Housing design | 2. Filter element |
|---|--|
| V = 80 l/min and visual/electrical indicator Type: Pi 2108-069 Order number: 77810286 | PS vst 3 Type: Pi 2208 PS vst 3 Order number: 77680200 |

7.1 Housing design

| Nominal size NG [l/min] | Order number | Type | ① with bypass valve and visual indicator | ② with bypass valve and electrical indicator | ③ with visual indicator | ④ with electrical indicator |
|----------------------------|-----------------|-------------|---|--|----------------------------------|--------------------------------------|
| 50 | 77810211 | Pi 2105-057 | | | | |
| | 77810229 | Pi 2105-058 | | | | |
| | 77810237 | Pi 2105-068 | | | | |
| | 77810245 | Pi 2105-069 | | | | |
| 80 | 77810252 | Pi 2108-057 | | | | |
| | 77810260 | Pi 2108-058 | | | | |
| | 77810278 | Pi 2108-068 | | | | |
| | 77810286 | Pi 2108-069 | | | | |
| 110 | 78204083 | Pi 2111-057 | | | | |
| | 78204091 | Pi 2111-058 | | | | |
| | 78204109 | Pi 2111-068 | | | | |
| | 78204117 | Pi 2111-069 | | | | |
| 150 | 77774573 | Pi 2115-057 | | | | |
| | 77774565 | Pi 2115-058 | | | | |
| | 77774557 | Pi 2115-068 | | | | |
| | 77774540 | Pi 2115-069 | | | | |
| 300 | 77774532 | Pi 2130-057 | | | | |
| | 77774524 | Pi 2130-058 | | | | |
| | 77774516 | Pi 2130-068 | | | | |
| | 77774508 | Pi 2130-069 | | | | |
| 450 | 77774490 | Pi 2145-057 | | | | |
| | 77774482 | Pi 2145-058 | | | | |
| | 77774474 | Pi 2145-068 | | | | |
| | 77774466 | Pi 2145-069 | | | | |
| 600 | 70574769 | Pi 2160-057 | | | | |
| | 70574768 | Pi 2160-058 | | | | |
| | 70574767 | Pi 2160-068 | | | | |
| | 70574766 | Pi 2160-069 | | | | |

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

7.2 Filter elements*

| Nominal size NG [l/min] | Order number | Type | Filter material | max. Δp [bar] | Filter surface [cm ²] |
|----------------------------|-----------------|-------------------|-----------------|------------------|--------------------------------------|
| 50 | 77680135 | Pi 2105 PS 3 | PS 3 | 20 | 590 |
| | 77943509 | Pi 5105 PS 6 | PS 6 | | 590 |
| | 77680325 | Pi 3105 PS 10 | PS 10 | | 590 |
| | 77680440 | Pi 4105 PS 25 | PS 25 | | 590 |
| | 77680192 | Pi 2205 PS vst 3 | PS vst 3 | 210 | 425 |
| | 77943533 | Pi 5205 PS vst 6 | PS vst 6 | | 425 |
| | 77680382 | Pi 3205 PS vst 10 | PS vst 10 | | 425 |
| | 77680507 | Pi 4205 PS vst 25 | PS vst 25 | | 425 |
| 80 | 77680143 | Pi 2108 PS 3 | PS 3 | 20 | 1150 |
| | 77943517 | Pi 5108 PS 6 | PS 6 | | 1150 |
| | 77680341 | Pi 3108 PS 10 | PS 10 | | 1150 |
| | 77680457 | Pi 4108 PS 25 | PS 25 | | 1150 |
| | 77680200 | Pi 2208 PS vst 3 | PS vst 3 | 210 | 850 |
| | 77943541 | Pi 5208 PS vst 6 | PS vst 6 | | 850 |
| | 77681190 | Pi 3208 PS vst 10 | PS vst 10 | | 850 |
| | 77680515 | Pi 4208 PS vst 25 | PS vst 25 | | 850 |
| 110 | 77680150 | Pi 2111 PS 3 | PS 3 | 20 | 1700 |
| | 77943525 | Pi 5111 PS 6 | PS 6 | | 1700 |
| | 77680333 | Pi 3111 PS 10 | PS 10 | | 1700 |
| | 77680465 | Pi 4111 PS 25 | PS 25 | | 1700 |
| | 77680218 | Pi 2211 PS vst 3 | PS vst 3 | 210 | 1275 |
| | 77943558 | Pi 5211 PS vst 6 | PS vst 6 | | 1275 |
| | 77680390 | Pi 3211 PS vst 10 | PS vst 10 | | 1275 |
| | 77680523 | Pi 4211 PS vst 25 | PS vst 25 | | 1275 |
| 150 | 77680168 | Pi 2115 PS 3 | PS 3 | 20 | 2425 |
| | 77955099 | Pi 5115 PS 6 | PS 6 | | 2425 |
| | 77680358 | Pi 3115 PS 10 | PS 10 | | 2425 |
| | 77680473 | Pi 4115 PS 25 | PS 25 | | 2425 |
| | 77680226 | Pi 2215 PS vst 3 | PS vst 3 | 210 | 2010 |
| | 77955123 | Pi 5215 PS vst 6 | PS vst 6 | | 2010 |
| | 77680408 | Pi 3215 PS vst 10 | PS vst 10 | | 2010 |
| | 77680531 | Pi 4215 PS vst 25 | PS vst 25 | | 2010 |
| 300 | 77680176 | Pi 2130 PS 3 | PS 3 | 20 | 4620 |
| | 77955107 | Pi 5130 PS 6 | PS 6 | | 4620 |
| | 77680366 | Pi 3130 PS 10 | PS 10 | | 4620 |
| | 77680481 | Pi 4130 PS 25 | PS 25 | | 4620 |
| | 77680234 | Pi 2230 PS vst 3 | PS vst 3 | 210 | 3800 |
| | 77955131 | Pi 5230 PS vst 6 | PS vst 6 | | 3800 |
| | 77680416 | Pi 3230 PS vst 10 | PS vst 10 | | 3800 |
| | 77680549 | Pi 4230 PS vst 25 | PS vst 25 | | 3800 |
| 450 | 77680184 | Pi 2145 PS 3 | PS 3 | 20 | 6865 |
| | 77955115 | Pi 5145 PS 6 | PS 6 | | 6865 |
| | 77680374 | Pi 3145 PS 10 | PS 10 | | 6865 |
| | 77680499 | Pi 4145 PS 25 | PS 25 | | 6865 |
| | 77680242 | Pi 2245 PS vst 3 | PS vst 3 | 210 | 5600 |
| | 77955149 | Pi 5245 PS vst 6 | PS vst 6 | | 5600 |
| | 77680424 | Pi 3245 PS vst 10 | PS vst 10 | | 5600 |
| | 77680556 | Pi 4245 PS vst 25 | PS vst 25 | | 5600 |

*a wider range of element types is available on request

7.2 Filter elements*

| Nominal size NG [l/min] | Order number | Type | Filter material | max. Δp [bar] | Filter surface [cm ²] |
|----------------------------|-----------------|---------------|-----------------|--------------------------|--------------------------------------|
| 600 | 70346506 | Pi 2160 PS 3 | PS 3 | 20 | 9398 |
| | 76114318 | Pi 5160 PS 6 | PS 6 | | 9398 |
| | 79393380 | Pi 3160 PS 10 | PS 10 | | 9398 |
| | 79748047 | Pi 4160 PS 25 | PS 25 | | 9398 |

*a wider range of element types is available on request

8. Technical specifications

| | |
|---|---|
| Design: | line mounting filter |
| Nominal pressure: Pi 2105 - Pi 2111 | 10 ⁷ load changes 63 bar (900 psi) |
| Pi 2115 - Pi 2160 | 10 ⁷ load changes 25 bar (360 psi) 2x 10 ⁶ load changes 32 bar (460 psi) |
| Test pressure: Pi 2105 - Pi 2111 | 95 bar (1370 psi) |
| Pi 2115 - Pi 2160 | 48 bar (690 psi) |
| Temperature range: | -10 °C to +120 °C survival temperature -40 C (other temperature ranges on request) |
| Bypass setting: | Δp 3.5 bar \pm 10 |
| Filter head material: | GAL |
| Filter housing material: | AL/St |
| Sealing material: | NBR/AL |
| Maintenance indicator setting: | Δp 2.2 bar \pm 10 % |
| Electrical data of maintenance indicator: | |
| Max. voltage: | 250 V AC/200 V DC |
| Max. current: | 1 A |
| Contact load: | 70 W |
| Type of protection: | IP 65 in inserted and secured status |
| Contact: | normally open/closed |
| Cable connection: | M20x1.5 |

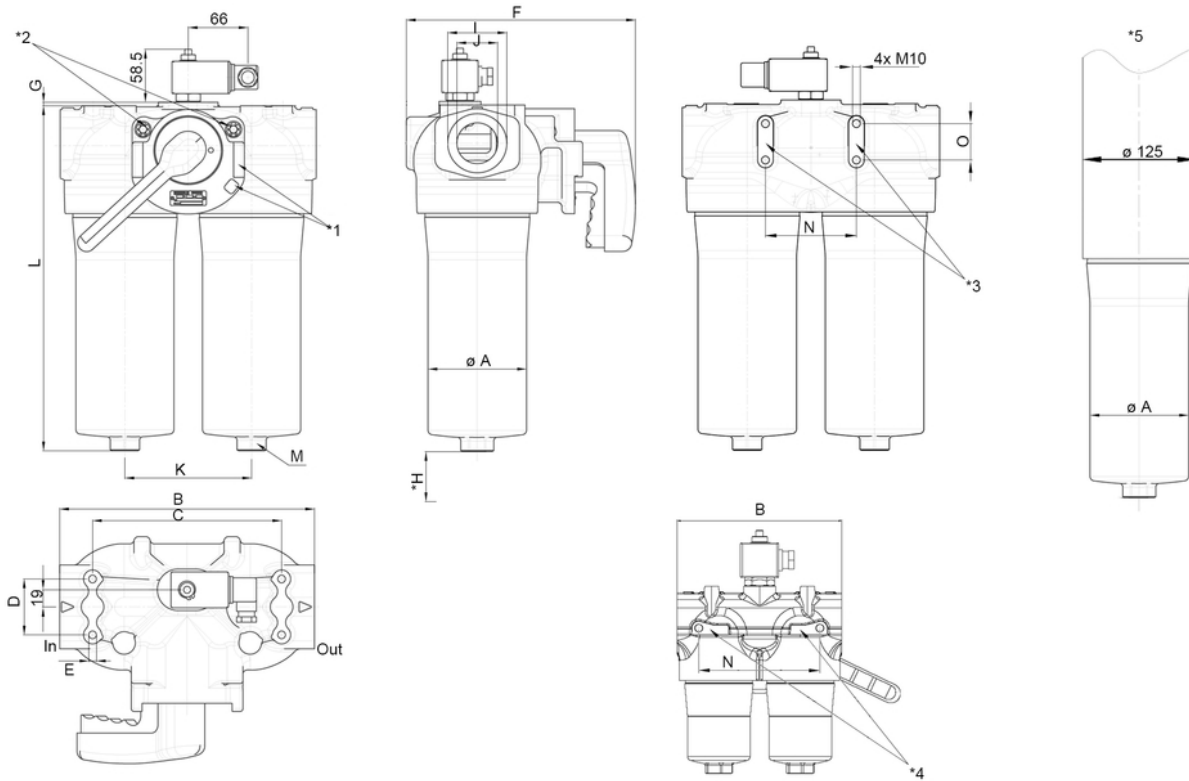
The switching function can be changed by turning the electric upper part by 180° (normally closed contact or normally open contact). The state on delivery is a normally closed contact. By inductivity in the direct current circuit the use of suitable protection circuit should be considered. Further maintenance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



In Inlet

Out Outlet

*H Minimum clearance required for element change

*1 Lever locking and arresting

*2 Venting screws

*3 Optional fixing for NG 150 to 600 (WB version)

*4 Optional fixing for NG 50 to 110 (WB version)

*5 Housing version NG 600

All dimensions except "J" in mm

| Type | øA | B | C | D | E | F | G | H |
|---------|-----|-----|-----|----|--------|-----|---|-----|
| Pi 2105 | 66 | 172 | 100 | 52 | M8x16 | 189 | - | 80 |
| Pi 2108 | 66 | 172 | 100 | 52 | M8x16 | 189 | - | 80 |
| Pi 2111 | 66 | 172 | 100 | 52 | M8x16 | 189 | - | 80 |
| Pi 2115 | 109 | 283 | 210 | 62 | M10x20 | 252 | 4 | 110 |
| Pi 2130 | 109 | 283 | 210 | 62 | M10x20 | 252 | 4 | 110 |
| Pi 2145 | 109 | 283 | 210 | 62 | M10x20 | 252 | 4 | 110 |
| Pi 2160 | 109 | 283 | 210 | 62 | M10x20 | 252 | 4 | 110 |

| Type | øI | J* | K | L** | M SW | N | O | Wt. [kg] |
|---------|----|-----|-----|-------|------|-----|----|----------|
| Pi 2105 | 47 | G1 | 85 | 195.5 | 27 | 128 | - | 2.60 |
| Pi 2108 | 47 | G1 | 85 | 272.5 | 27 | 128 | - | 2.90 |
| Pi 2111 | 47 | G1 | 85 | 352.0 | 27 | 128 | - | 3.30 |
| Pi 2115 | 65 | G1½ | 140 | 264.0 | 32 | 100 | 40 | 8.50 |
| Pi 2130 | 65 | G1½ | 140 | 381.0 | 32 | 100 | 40 | 9.50 |
| Pi 2145 | 65 | G1½ | 140 | 501.0 | 32 | 100 | 40 | 17.25 |
| Pi 2160 | 65 | G1½ | 140 | 637.0 | 32 | 100 | 40 | 15.50 |

* SAE flange connections (3000 psi), NPT and SAE connections on request

** Not shown drain screw at NG 450 and NG 600 is part of dimension "L"

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 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 after the end of the shift.
2. Please always ensure that you have original Filtration Group spare elements in stock: Disposable elements cannot be cleaned.

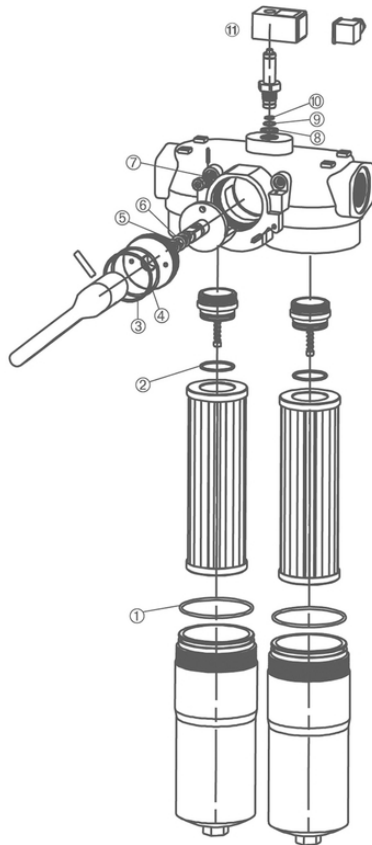
10.4 Element replacement

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, which is identified by the position of the switching lever catch. The change-over transfer valve must be switched prior filter servicing. Now the signal of the maintenance indicators cancelled and the red button can be repressed again.

1. Operate and hold pressure equalizing lever located behind switching lever. Pull catch knob and swivel switching lever. Engage the catch on the clear filter side. Place through or drip pan underneath to collect leaving 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 housing by rotating same counter-clockwise and clean with a suitable medium.
Warning: The shift lever may not, from now until the screwing back in of the filter housing (7.), be activated under any circumstances!
4. Remove filter element with a side-to-side motion.
5. Check O-ring on the filter house for damage. Replace, if necessary.
6. Make sure that the order number on the spare element corresponds to the order number of the filter name-plate.
7. Lightly lubricate the threads of the filter housing and screw into the filter head. Maximum tightening torque for NG 50 to 110 = 30 Nm, for NG 150 to 600 = 50 Nm.
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.

11. Spare parts list



| Order number for spare parts | | |
|------------------------------|------------------------------------|--------------|
| Position | Type | Order number |
| ① - ⑦ | Seal kit for housing | |
| | Pi 2105 - Pi 2111 | |
| | NBR | 79761271 |
| | FPM | 79761289 |
| | EPDM | 79761297 |
| | Pi 2115 - Pi 2160 | |
| | NBR | 79761230 |
| | FPM | 79761248 |
| | EPDM | 79761255 |
| ⑧ - ⑩ | Seal kit for maintenance indicator | |
| | NBR | 77760309 |
| | FPM | 77760317 |
| | EPDM | 77760325 |
| ⑪ | Maintenance indicator | |
| | Visual PiS 3098/2.2 | 77669971 |
| | Electrical PiS 3097/2.2 | 77669948 |
| | Electrical upper section only | 77536550 |

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www.filtrationgroup.com
78356552.03/2017

Duplex Filter Pi 2100

Nominal pressure 32/63 bar (460/900 psi), nominal size up to 400
according to DIN 24550

1. Features

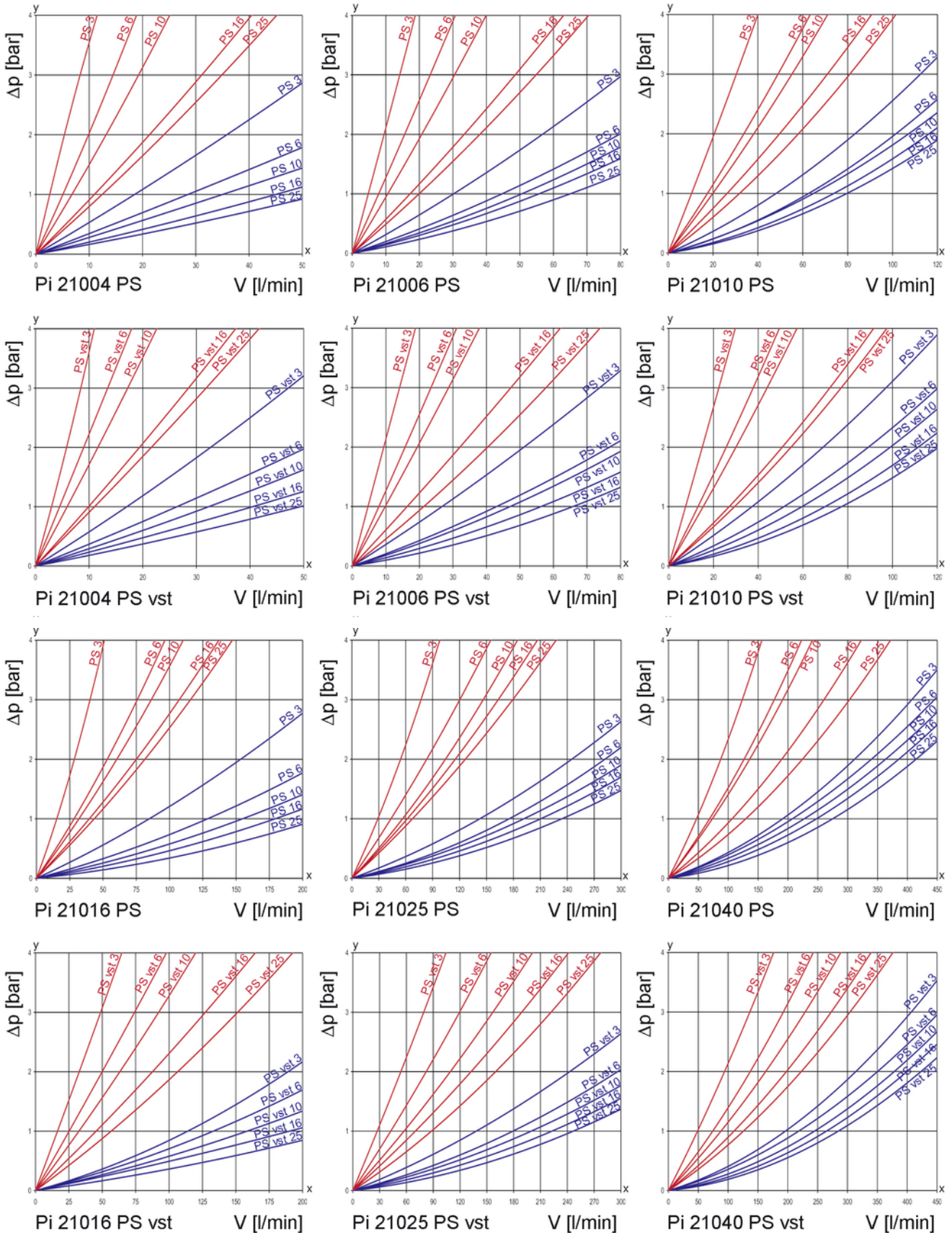
High performance filters for modern hydraulic systems

- Modular system
- Compact design
- Minimal pressure drop through optimal flow design
- Visual/electrical/electronic maintenance indicator
- Threaded connections
- Change over valve on upstream side
- Ergonomic switch-over handle with safety lock and pressure compensation
- User-optimized one-hand-operation
- 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
- Other connections on request
- Worldwide distribution



2. Flow rate/pressure drop curve complete filter

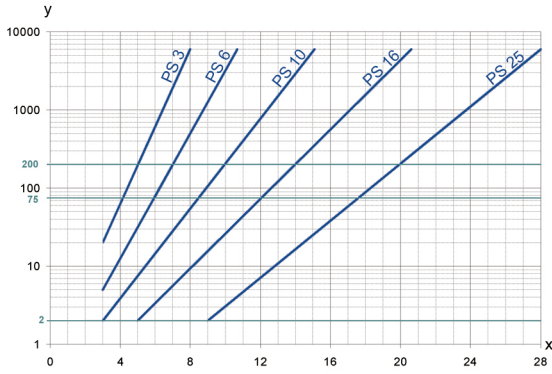
■ 190 mm²/s
■ 33 mm²/s



y = differential pressure Δp [bar]

x = flow rate V [l/min]

3. Separation grade characteristics



y = beta-value
x = particle size [µm]

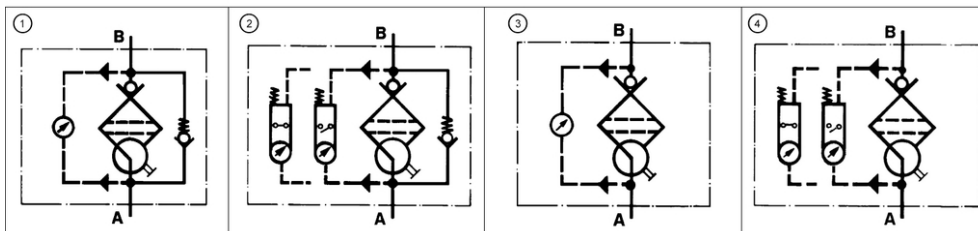
determined by multipass tests (ISO 16889)
calibration according to ISO 11171 (NIST)

5. Quality assurance

Filtration Group 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



4. Filter performance data

tested according to ISO 16889 (multipass test)

PS elements with
max. Δ 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 | $\beta_{15(C)} \geq 200$ |
| PS | 25 | $\beta_{20(C)} \geq 200$ |

values guaranteed up to
10 bar differential pressure

PS vst elements with
max. Δ p 210 bar

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

values guaranteed up to
20 bar differential pressure

7. Order numbers

Example for ordering filter:

| 1. Housing design | 2. 2x Filter elements |
|--|--|
| V = 100 l/min and electrical maintenance indicator Type: Pi 21010-069 Order number: 78204158 | PS vst 3 NBR Type: Pi 71010 DN PS vst 3 Order number: 78227480 |

| 7.1 Housing design | | | | | | |
|----------------------------|-----------------|--------------|--|--|----------------------------------|--------------------------------------|
| Nominal size NG [l/min] | Order number | Type | ① with bypass valve and visual indicator | ② with bypass valve and electrical indicator | ③ with visual indicator | ④ with electrical indicator |
| 40 | 79328261 | Pi 21004-057 | | | | |
| | 78304263 | Pi 21004-058 | | | | |
| | 79328279 | Pi 21004-068 | | | | |
| | 79328287 | Pi 21004-069 | | | | |
| 63 | 79715905 | Pi 21006-057 | | | | |
| | 78304271 | Pi 21006-058 | | | | |
| | 79715913 | Pi 21006-068 | | | | |
| | 79715921 | Pi 21006-069 | | | | |
| 100 | 78204125 | Pi 21010-057 | | | | |
| | 78204133 | Pi 21010-058 | | | | |
| | 78204141 | Pi 21010-068 | | | | |
| | 78204158 | Pi 21010-069 | | | | |
| 160 | 79715939 | Pi 21016-057 | | | | |
| | 79715947 | Pi 21016-058 | | | | |
| | 79715954 | Pi 21016-068 | | | | |
| | 79715962 | Pi 21016-069 | | | | |
| 250 | 79328295 | Pi 21025-057 | | | | |
| | 79328303 | Pi 21025-058 | | | | |
| | 79328311 | Pi 21025-068 | | | | |
| | 79328329 | Pi 21025-069 | | | | |
| 400 | 79715970 | Pi 21040-057 | | | | |
| | 79715988 | Pi 21040-058 | | | | |
| | 79715996 | Pi 21040-068 | | | | |
| | 79716002 | Pi 21040-069 | | | | |

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

7.2 Filter elements*

| Nominal size NG [l/min] | Order number | Type | Filter material | max. Δp [bar] | Filter surface [cm ²] |
|----------------------------|--------------|-----------------------|-----------------|--------------------------|---|
| 40 | 78260929 | Pi 21004 DN PS 3 | PS 3 | 20 | 475 |
| | 77960859 | Pi 22004 DN PS 6 | PS 6 | | 475 |
| | 77925571 | Pi 23004 DN PS 10 | PS 10 | | 475 |
| | 78260937 | Pi 24004 DN PS 16 | PS 16 | | 475 |
| | 78260945 | Pi 25004 DN PS 25 | PS 25 | | 475 |
| | 78216079 | Pi 71004 DN PS vst 3 | PS vst 3 | 210 | 445 |
| | 77960156 | Pi 72004 DN PS vst 6 | PS vst 6 | | 445 |
| | 77925654 | Pi 73004 DN PS vst 10 | PS vst 10 | | 445 |
| | 78216087 | Pi 74004 DN PS vst 16 | PS vst 16 | | 445 |
| | 78216095 | Pi 75004 DN PS vst 25 | PS vst 25 | | 445 |
| 63 | 78260960 | Pi 21006 DN PS 3 | PS 3 | 20 | 835 |
| | 77960867 | Pi 22006 DN PS 6 | PS 6 | | 835 |
| | 77925589 | Pi 23006 DN PS 10 | PS 10 | | 835 |
| | 78260978 | Pi 24006 DN PS 16 | PS 16 | | 835 |
| | 78260986 | Pi 25006 DN PS 25 | PS 25 | | 835 |
| | 78216137 | Pi 71006 DN PS vst 3 | PS vst 3 | 210 | 780 |
| | 77960149 | Pi 72006 DN PS vst 6 | PS vst 6 | | 780 |
| | 77925662 | Pi 73006 DN PS vst 10 | PS vst 10 | | 780 |
| | 78216145 | Pi 74006 DN PS vst 16 | PS vst 16 | | 780 |
| | 78216152 | Pi 75006 DN PS vst 25 | PS vst 25 | | 780 |
| 100 | 78227472 | Pi 21010 DN PS 3 | PS 3 | 20 | 1375 |
| | 77960875 | Pi 22010 DN PS 6 | PS 6 | | 1375 |
| | 77925597 | Pi 23010 DN PS 10 | PS 10 | | 1375 |
| | 78261000 | Pi 24010 DN PS 16 | PS 16 | | 1375 |
| | 78261018 | Pi 25010 DN PS 25 | PS 25 | | 1375 |
| | 78227480 | Pi 71010 DN PS vst 3 | PS vst 3 | 210 | 1275 |
| | 77960131 | Pi 72010 DN PS vst 6 | PS vst 6 | | 1275 |
| | 77925670 | Pi 73010 DN PS vst 10 | PS vst 10 | | 1275 |
| | 78261281 | Pi 74010 DN PS vst 16 | PS vst 16 | | 1275 |
| | 78216160 | Pi 75010 DN PS vst 25 | PS vst 25 | | 1275 |
| 160 | 78261034 | Pi 21016 DN PS 3 | PS 3 | 20 | 2530 |
| | 77960826 | Pi 22016 DN PS 6 | PS 6 | | 2530 |
| | 77925605 | Pi 23016 DN PS 10 | PS 10 | | 2530 |
| | 78261042 | Pi 24016 DN PS 16 | PS 16 | | 2530 |
| | 78261059 | Pi 25016 DN PS 25 | PS 25 | | 2530 |
| | 77940638 | Pi 71016 DN PS vst 3 | PS vst 3 | 210 | 1885 |
| | 77960123 | Pi 72016 DN PS vst 6 | PS vst 6 | | 1885 |
| | 77925688 | Pi 73016 DN PS vst 10 | PS vst 10 | | 1885 |
| | 78269797 | Pi 74016 DN PS vst 16 | PS vst 16 | | 1885 |
| | 78216178 | Pi 75016 DN PS vst 25 | PS vst 25 | | 1885 |

*a wider range of elements is available on request

7.2 Filter elements*

| Nominal size NG [l/min] | Order number | Type | Filter material | max. Δp [bar] | Filter surface [cm ²] |
|----------------------------|--------------|------------------------|-----------------|--------------------------|---|
| 250 | 78227514 | Pi 21025 DN PS 3 | PS 3 | 20 | 4020 |
| | 77960834 | Pi 22025 DN PS 6 | PS 6 | | 4020 |
| | 77925613 | Pi 23025 DN PS 10 | PS 10 | | 4020 |
| | 78261075 | Pi 24025 DN PS 16 | PS 16 | | 4020 |
| | 78261083 | Pi 25025 DN PS 25 | PS 25 | | 4020 |
| | 77940646 | Pi 71025 DN PS vst 3 | PS vst 3 | 210 | 3090 |
| | 77960115 | Pi 72025 DN PS vst 6 | PS vst 6 | | 3090 |
| | 77925696 | Pi 73025 DN PS vst 10 | PS vst 10 | | 3090 |
| | 78269813 | Pi 74025 DN PS vst 16 | PS vst 16 | | 3090 |
| | 78216186 | Pi 75025 DN PS vst 25 | PS vst 25 | | 3090 |
| 400 | 78227522 | Pi 21 040 DN PS 3 | PS 3 | 20 | 6770 |
| | 77960842 | Pi 22 040 DN PS 6 | PS 6 | | 6770 |
| | 77925621 | Pi 23 040 DN PS 10 | PS 10 | | 6770 |
| | 78261109 | Pi 24 040 DN PS 16 | PS 16 | | 6770 |
| | 78261117 | Pi 25 040 DN PS 25 | PS 25 | | 6770 |
| | 77940653 | Pi 71 040 DN PS vst 3 | PS vst 3 | 210 | 5240 |
| | 77960107 | Pi 72 040 DN PS vst 6 | PS vst 6 | | 5240 |
| | 77930829 | Pi 73 040 DN PS vst 10 | PS vst 10 | | 5240 |
| | 78269821 | Pi 74 040 DN PS vst 16 | PS vst 16 | | 5240 |
| | 78260903 | Pi 75 040 DN PS vst 25 | PS vst 25 | | 5240 |

*a wider range of elements is available on request

8. Technical specifications

| | |
|---|---|
| Design: | line mounting filter |
| Nominal pressure: | |
| Pi 21004-21010 | 10 ⁷ load changes 63 bar (900 psi) |
| Pi 21016-21040 | 10 ⁷ load changes 25 bar (360 psi) 2x 10 ⁶ load changes 32 bar (460 psi) |
| Test pressure: | |
| Pi 21004-21010 | 95 bar (1370 psi) |
| Pi 21016-21040 | 48 bar (690 psi) |
| Temperature range: | -10 °C to +120 °C survival temperature - 40 °C (other temperature ranges on request) |
| Bypass setting: | Δp 3.5 bar \pm 10 % |
| Filter head material: | GAL |
| Filter housing material: | AL/St. |
| Sealing material: | NBR/AL |
| Maintenance indicator setting: | Δp 2.2 bar \pm 10 % |
| Electrical data of maintenance indicator: | |
| Max. voltage: | 250 V AC/200 V DC |
| Max. current: | 1 A |
| Contact load: | 70 W |
| Type of protection: | IP 65 in inserted and secured status |
| Contact: | normally open/closed |
| Cable connection: | M20x1.5 |

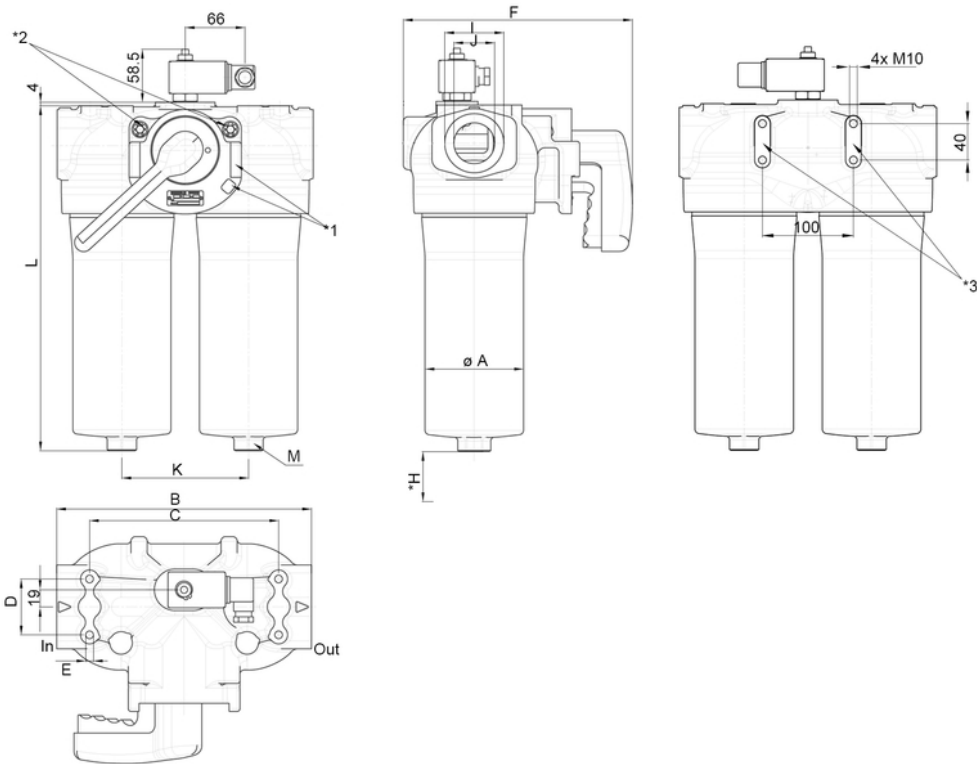
The switching function can be changed by turning the electric upper part by 180° (normally closed contact or normally open contact). The state on delivery is a normally closed contact. By inductivity in the direct current circuit the use of suitable protection circuit should be considered. Further maintenance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



In Inlet

Out Outlet

*H Minimum clearance required for element change

*1 Lever locking and arresting

*2 Venting screws

*3 Optional wall mounting for NG 160 up to 400

All dimensions except "J" in mm.

| Type | øA | B | C | D | E | F | G | H | øI | J* | K | L | M SW | Wt. [kg] |
|----------|-----|-----|-----|----|--------|-----|-----|-----|----|-----|-----|-----|------|----------|
| Pi 21004 | 66 | 172 | 100 | 52 | M8x16 | 189 | 130 | 80 | 47 | G1 | 85 | 203 | 27 | 2.6 |
| Pi 21006 | 66 | 172 | 100 | 52 | M8x16 | 189 | 130 | 80 | 47 | G1 | 85 | 261 | 27 | 2.9 |
| Pi 21010 | 66 | 172 | 100 | 52 | M8x16 | 189 | 130 | 80 | 47 | G1 | 85 | 351 | 27 | 3.3 |
| Pi 21016 | 109 | 283 | 210 | 62 | M10x20 | 252 | 194 | 110 | 65 | G1½ | 140 | 288 | 32 | 8.6 |
| Pi 21025 | 109 | 283 | 210 | 62 | M10x20 | 252 | 194 | 110 | 65 | G1½ | 140 | 389 | 32 | 9.5 |
| Pi 21040 | 109 | 283 | 210 | 62 | M10x20 | 252 | 194 | 110 | 65 | G1½ | 140 | 531 | 32 | 19.0 |

* SAE flange connections (3000 psi), NPT and SAE connections on request

10. Installation, operating and maintenance instructions

10.1 Filter installation

When installing 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 EN 175301-803 with poles marked 1 and 2. The electrical section can be inverted to change from normally open 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 after the end of the shift.
2. Please always ensure that you have original Filtration Group spare elements in stock: Disposable elements cannot be cleaned.

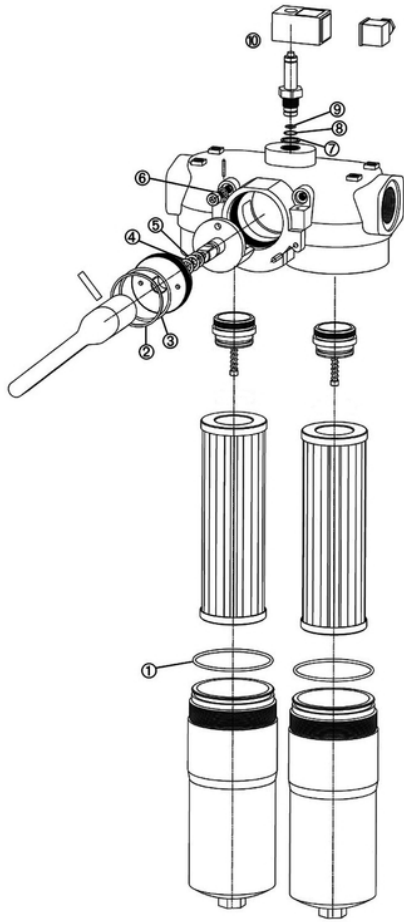
10.4 Element replacement

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, which is identified by the position of the switching lever catch. The change-over transfer valve must be switched prior filter servicing. Now the signal of the maintenance indicators cancelled and the red button can be repressed again:

1. Operate and hold pressure equalizing lever located behind switching lever. Pull catch knob and swivel switching lever. Engage the catch on the clear filter side. Place through or drip pan underneath to collect leaving 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 housing by rotating same counter-clockwise and clean with a suitable medium.
Warning: The shift lever may not, from now until the screwing back in of the filter housing (7.), be activated under any circumstances!
4. Remove filter element with a side-to-side motion.
5. Check O-ring on the filter house for damage. Replace, if necessary.
6. Make sure that the order number on the spare element corresponds to the order number of the filter name-plate.
7. Lightly lubricate the threads of the filter housing and screw into the filter head. Maximum tightening torque for NG 40 to 100 = 30 Nm, for NG 160 to 400 = 50 Nm.
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.

11. Spare parts list



| Order number for spare parts | | |
|------------------------------|------------------------------------|--------------|
| Position | Type | Order number |
| ① bis ⑥ | Seal kit for housing | |
| | Pi 21004 - Pi 21010 | |
| | NBR | 79774258 |
| | FPM | 79774266 |
| | EPDM | 79774274 |
| | Pi 21016 - Pi 21040 | |
| | NBR | 79774282 |
| | FPM | 79774290 |
| | EPDM | 79774308 |
| ⑦ bis ⑨ | Seal kit for maintenance indicator | |
| | NBR | 77760309 |
| | FPM | 77760317 |
| | EPDM | 77760325 |
| ⑩ | Maintenance indicator | |
| | Visual PiS 3098/2.2 | 77669971 |
| | Electrical PiS 3097/2.2 | 77669948 |
| | Electrical upper section only | 77536550 |

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79336280.03/2017

Duplex Filter

Pi 211

Nominal pressure 40 bar (570 psi), nominal size 800 and 1100

1. Features

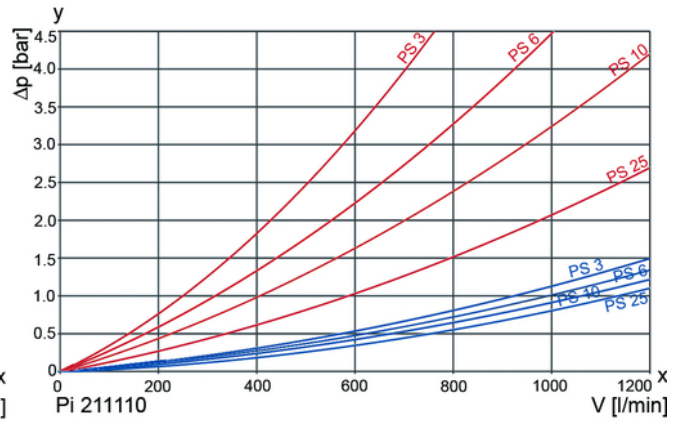
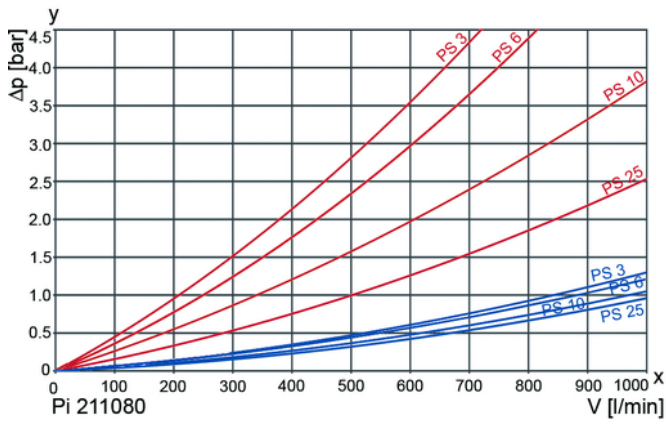
High performance filters for modern hydraulic systems

- Modular system
- Compact design
- Minimal pressure drop through optimal flow design
- Visual/electrical/electronic maintenance indicator
- Flanged connections
- 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

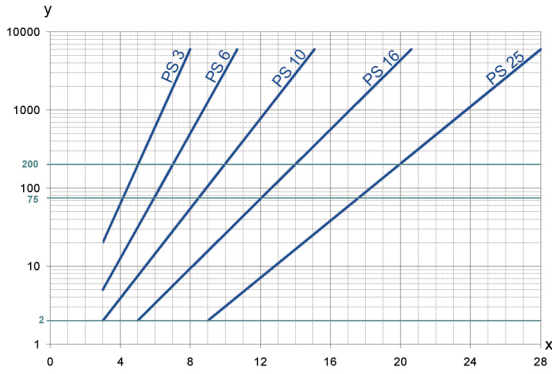
190 mm²/s
33 mm²/s



y = differential pressure Δp [bar]

x = flow rate V [l/min]

3. Separation grade characteristics



y = beta-value
x = particle size [μm]

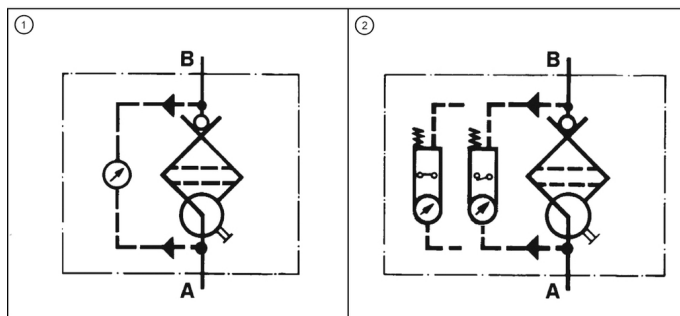
determined by multipass tests (ISO 16889)
calibration according to ISO 11171 (NIST)

5. Quality assurance

Filtration Group 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, methods 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



4. Filter performance data

tested according to ISO 16889 (multipass test)

PS elements with
max. Δp 20 bar

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

values guaranteed up to
10 bar differential pressure

7. Order numbers

Example for ordering filters:

| 1. Housing design | 2. 2x Filter element with bypass |
|--|---|
| V = 800 l/min and visual/electrical maintenance indicator Type: Pi 211080-069 Order number: 70514415 | PS 25 Type: 852 094 PS 25/V3.5 Order number: 70514489 |

| 7.1 Housing design | | | | |
|--------------------|--------------|---------------|----------------------------|--------------------------------|
| Nominal size NG | Order number | Type | ③ with visual indicator | ④ with electrical indicator |
| 800 | 70514414 | Pi 211080-068 | | |
| | 70514415 | Pi 211080-069 | | |
| 1100 | 70514410 | Pi 211110-068 | | |
| | 70514411 | Pi 211110-069 | | |

If bypass is requested, it can be realized with appropriate filter element.

| 7.2 Filter elements* | | | | | |
|---------------------------|--------------|--------------------|-----------------|---------------|--------------------|
| Nominal size NG [l/min] | Order number | Type | Filter material | max. Δp [bar] | Filterfläche [cm²] |
| 800 without bypass | 70527011 | 852 094 PS 3 | PS 3 | 20 | 31200 |
| | 70527014 | 852 094 PS 6 | PS 6 | | |
| | 70527016 | 852 094 PS 10 | PS 10 | | |
| | 70527019 | 852 094 PS 25 | PS 25 | | |
| 800 with bypass | 70514474 | 852 094 PS 3/V3.5 | PS 3 | | |
| | 70514480 | 852 094 PS 6/V3.5 | PS 6 | | |
| | 70514484 | 852 094 PS 10/V3.5 | PS 10 | | |
| | 70514489 | 852 094 PS 25/V3.5 | PS 25 | | |
| 1100 without bypass | 70527061 | 852 095 PS 3 | PS 3 | 20 | 39690 |
| | 70527064 | 852 095 PS 6 | PS 6 | | |
| | 70527082 | 852 095 PS 10 | PS 10 | | |
| | 70527085 | 852 095 PS 25 | PS 25 | | |
| 1100 with bypass | 70514577 | 852 095 PS 3/V3.5 | PS 3 | | |
| | 70514580 | 852 095 PS 6/V3.5 | PS 6 | | |
| | 70514582 | 852 095 PS 10/V3.5 | PS 10 | | |
| | 70514586 | 852 095 PS 25/V3.5 | PS 25 | | |

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

8. Technical specifications

| | |
|---|---|
| Design: | line mounting filter |
| Nominal pressure: | 10 ⁷ load changes 40 bar (570 psi) |
| Test pressure: | 60 bar (850 psi) |
| Temperature range: | -10 °C to +120 °C (other temperature ranges on request) |
| | Minimum viscosity of the fluid: 10 mm ² /s (if viscosity of the fluid < 10 mm ² /s on request) |
| Bypass Setting (in the element): | Δ p 3.5 bar ± 10 % |
| Filter head material: | GGG |
| Filter housing material: | St |
| Filter cover material: | GGG |
| Sealing material: | NBR |
| Maintenance indicator setting: | Δ p 2.2 bar ± 0.3 bar |
| Electrical data of maintenance indicator: | |
| Max. voltage: | 250 V AC/200 V DC |
| Max. 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.

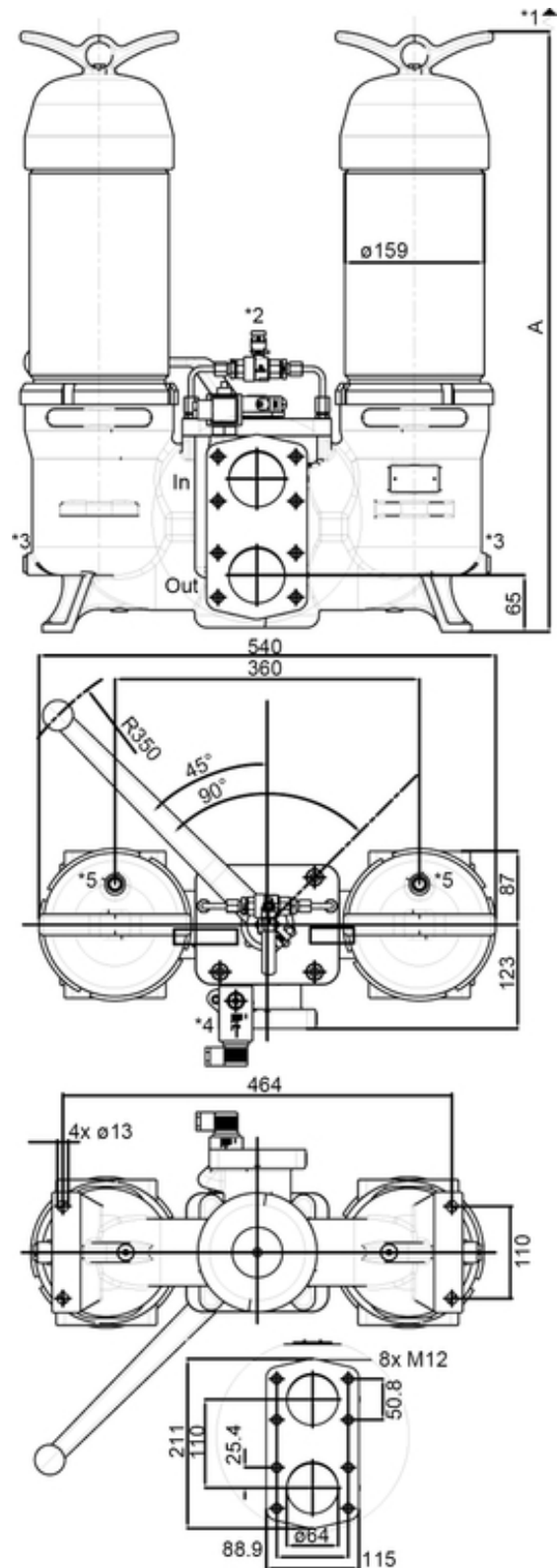
We draw attention to the fact that all values indicated are average values which do not always occur in specific cases of application. Our products are continually being further developed. Values, dimensions and weights can change as a result of this. Our specialized department will be pleased to offer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

| | |
|----------------|--|
| In = Inlet | *2 Pressure equalization valve |
| Out = Outlet | *3 Drain screw G ¹ / ₄ |
| *1 Clearance B | *4 Maintenance indicator |
| | *5 Vent screw |

DN64 according to SAE2¹/₂" 3000 psi



9. Dimensions

All dimensions in mm.

| Type | Connection | A | B | Weight [kg] |
|-----------|------------|------|------|-------------|
| Pi 211080 | DN 64 | 1200 | 785 | 150 |
| Pi 211110 | DN 64 | 1465 | 1085 | 180 |

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.

The maintenance indicator (*4) 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 to normally closed position or vice versa.

10.3 When should the filter element be replaced?

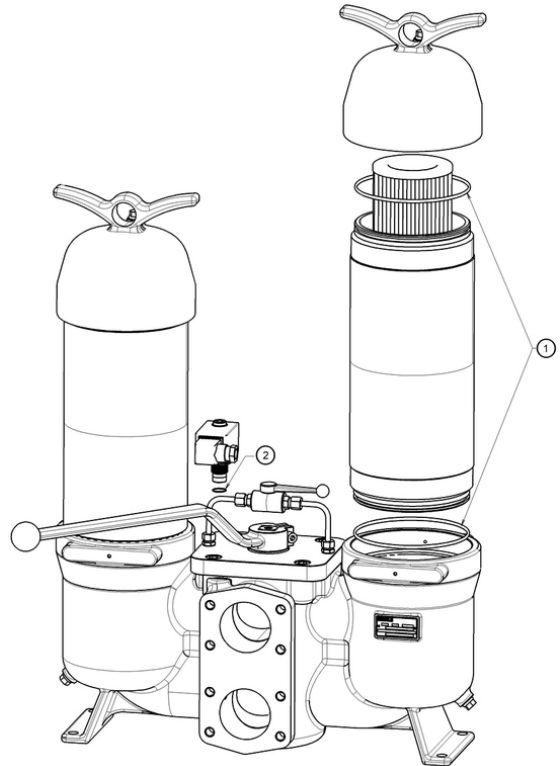
- Filters equipped with visual and electrical maintenance indicator (*4) :
During cold starts, the indicator may give a warning signal. Press the red button of the visual indicator once again only after operating temperature has been reached. If the red button immediately pops up again and/or the electrical signal has not switched off after reaching operating temperature the filter element must be replaced after the end of the shift.
- 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.
- Please always ensure that you have original Filtration Group spare elements in stock: disposable elements (PS) cannot be cleaned.

10.4 Element replacement

Note: The maintenance indicator (*4) 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 filter servicing. Now the signal of the maintenance indicators cancelled and the red button can be repressed again.

- Operate and hold pressure equalizing lever (*2) located behind switching lever. Pull catch knob and swivel switching lever. Place through or drip pan underneath to collect leaving oil. Close pressure equalization valve.
- Loosen vent screw (*5) of the filter side not in use by 2-3 turns; max. until contact is made with the safety stop.
- Remove drain plug (*3) in housing bottom and drain oil.
- Unscrew filter cover counter-clockwise.
- Lift out filter element.
- Check seal on filter cover. We recommend replacement in any case.
- Make sure that the order number on the spare element corresponds to the order number of the filter name-plate. To ensure no contamination occurs during the exchange of the element first open the plastic bag and push the element over the spigot in the filter head. Now remove plastic bag.

- Push the element carefully over the spigot and tight cover until full stop. Back off the cover 1/8 turn.
- Tighten drain plug (*3) housing bottom.
- To refill the filter chamber, operate only the pressure equalizing Lever (*2), until fluid emerges bubble-free from the drain cavity.
- Tight vent screw (*5). Check vent screw (*5) for leakage by actuating the equalizing Lever (*2) again.



11. Spare parts list

| Order numbers for spare parts | | |
|-------------------------------|------------------------------------|--------------|
| Position | Type | Order number |
| ① | Seal kit for housing | |
| | NBR | 70318468 |
| | FPM | 70318469 |
| | EPDM | 70318471 |
| | Maintenance indicator | |
| | Visual PiS 3098/2,2 | 77669971 |
| | Visual/electrical PiS 3097/2,2 | 77669948 |
| | Electrical upper section only | 77536550 |
| ② | Seal kit for maintenance indicator | |
| | NBR | 77760309 |
| | FPM | 77760317 |
| | EPDM | 77760325 |

Duplex Filter Pi 2110

Nominal pressure 40 bar (570 psi), nominal size 630 and 1000
according DIN 24550

1. Features

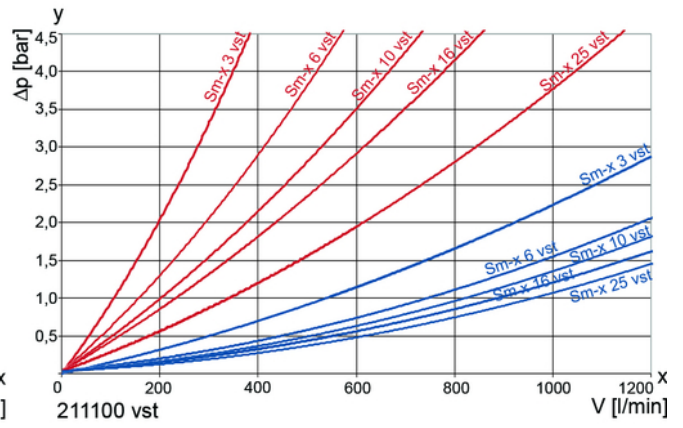
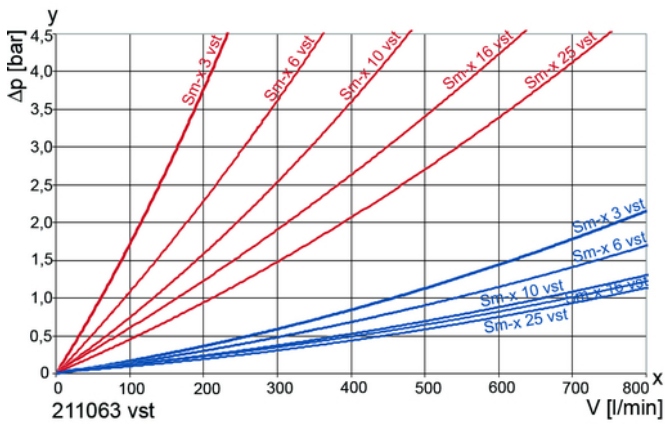
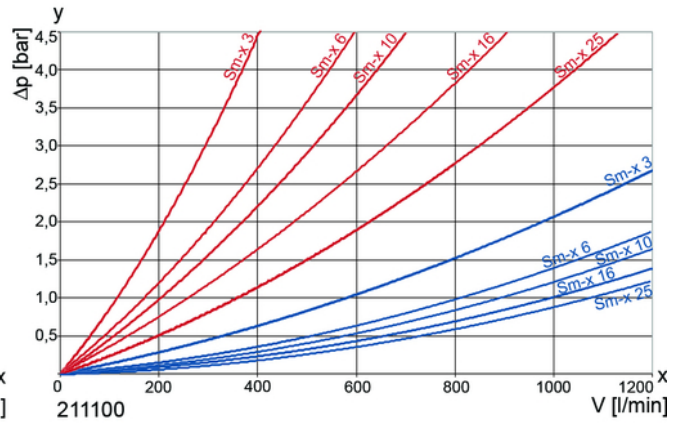
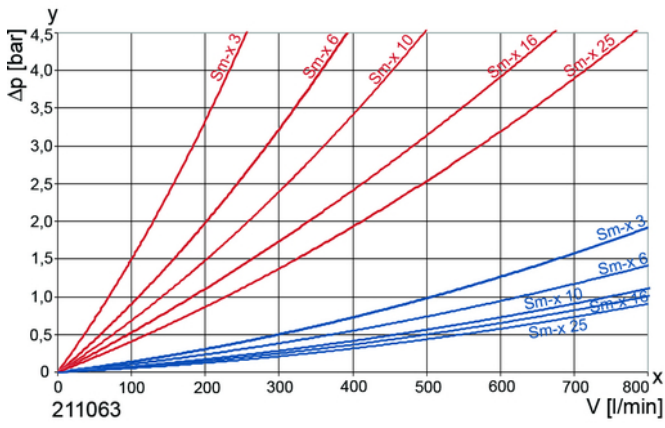
High performance filters for modern hydraulic systems

- Modular system
- Compact design
- Minimal pressure drop through optimal flow design
- Visual/electrical/electronic maintenance indicator
- Flanged connections
- 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

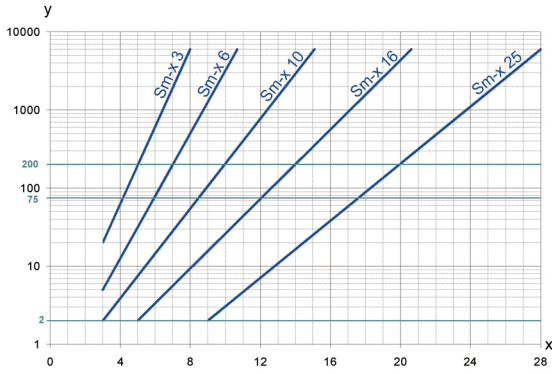
190 mm²/s
33 mm²/s



y = differential pressure Δp [bar]

x = flow rate V [l/min]

3. Separation grade characteristics



y = beta-value
x = particle size [μm]

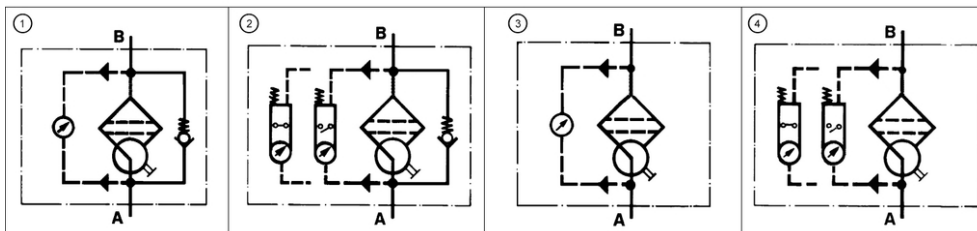
determined by multipass tests (ISO 16889)
calibration according to ISO 11171 (NIST)

5. Quality assurance

Filtration Group 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, methods 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



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 up to
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 up to
20 bar differential pressure

7. Order numbers

Example for ordering filters:

| 1. Housing design | 2. 2 x Filter element |
|--|--|
| V = 630 l/min and visual/electrical maintenance indicator Type: Pi 211063-069 Order number: 70316223 | Sm-x vst 25 Type: Pi 75063 DN Sm-x vst 25 Order number: 77961568 |

| 7.1 Housing design | | | | | | |
|----------------------------|-----------------|---------------|--|--|----------------------------------|--------------------------------------|
| Nominal size NG [l/min] | Order number | Type | ① with bypass valve and visual indicator | ② with bypass valve and electrical indicator | ③ with visual indicator | ④ with electrical indicator |
| 630 | 70316221 | Pi 211063-057 | | | | |
| | 70316207 | Pi 211063-058 | | | | |
| | 70316222 | Pi 211063-068 | | | | |
| | 70316223 | Pi 211063-069 | | | | |
| 1000 | 70316224 | Pi 211100-057 | | | | |
| | 70316226 | Pi 211100-058 | | | | |
| | 70316227 | Pi 211100-068 | | | | |
| | 70316228 | Pi 211100-069 | | | | |

When filter with non bypass configuration is selected the collapse pressure must not be exceeded!

| 7.2 Filter elements* | | | | | |
|----------------------------|-----------------|-------------------------|-----------------|--------------------------|--------------------------------------|
| Nominal size NG [l/min] | Order number | Type | Filter material | max. Δp [bar] | Filter surface [cm ²] |
| 630 | 77961519 | Pi 21063 DN Sm-x 3 | Sm-x 3 | 20 | 9300 |
| | 77943699 | Pi 22063 DN Sm-x 6 | Sm-x 6 | | 9300 |
| | 77925639 | Pi 23063 DN Sm-x 10 | Sm-x 10 | | 9300 |
| | 77961527 | Pi 24063 DN Sm-x 16 | Sm-x 16 | | 9300 |
| | 77961535 | Pi 25063 DN Sm-x 25 | Sm-x 25 | | 9300 |
| | 77961543 | Pi 71063 DN Sm-x vst 3 | Sm-x vst 3 | 210 | 7230 |
| | 77960099 | Pi 72063 DN Sm-x vst 6 | Sm-x vst 6 | | 7230 |
| | 77925712 | Pi 73063 DN Sm-x vst 10 | Sm-x vst 10 | | 7230 |
| | 77961550 | Pi 74063 DN Sm-x vst 16 | Sm-x vst 16 | | 7230 |
| | 77961568 | Pi 75063 DN Sm-x vst 25 | Sm-x vst 25 | | 7230 |
| 1000 | 77961618 | Pi 21100 DN Sm-x 3 | Sm-x 3 | 20 | 14500 |
| | 77943723 | Pi 22100 DN Sm-x 6 | Sm-x 6 | | 14500 |
| | 77925647 | Pi 23100 DN Sm-x 10 | Sm-x 10 | | 14500 |
| | 77961626 | Pi 24100 DN Sm-x 16 | Sm-x 16 | | 14500 |
| | 77961634 | Pi 25100 DN Sm-x 25 | Sm-x 25 | | 14500 |
| | 77961642 | Pi 71100 DN Sm-x vst 3 | Sm-x vst 3 | 210 | 11450 |
| | 77960081 | Pi 72100 DN Sm-x vst 6 | Sm-x vst 6 | | 11450 |
| | 77925720 | Pi 73100 DN Sm-x vst 10 | Sm-x vst 10 | | 11450 |
| | 77961659 | Pi 74100 DN Sm-x vst 16 | Sm-x vst 16 | | 11450 |
| | 77961667 | Pi 75100 DN Sm-x vst 25 | Sm-x vst 25 | | 11450 |

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

8. Technical specifications

| | |
|---|---|
| Design: | line mounting filter |
| Nominal pressure: | 40 bar (570 psi) |
| Test pressure: | 60 bar (850 psi) |
| Temperature range: | -10 °C to +120 °C (other temperature ranges on request) |
| | Minimum viscosity of the fluid: 10 mm ² /s (if viscosity of the fluid < 10 mm ² /s on request) |
| Bypass setting: | Δp 3.5 bar \pm 10 % |
| Filter head material: | GGG |
| Filter housing material: | St |
| Filter cover material: | GGG |
| Sealing material: | NBR |
| Maintenance indicator setting: | Δp 2.2 bar \pm 0.3 bar |
| Electrical data of maintenance indicator: | |
| Max. voltage: | 250 V AC/200 V DC |
| Max. 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 |

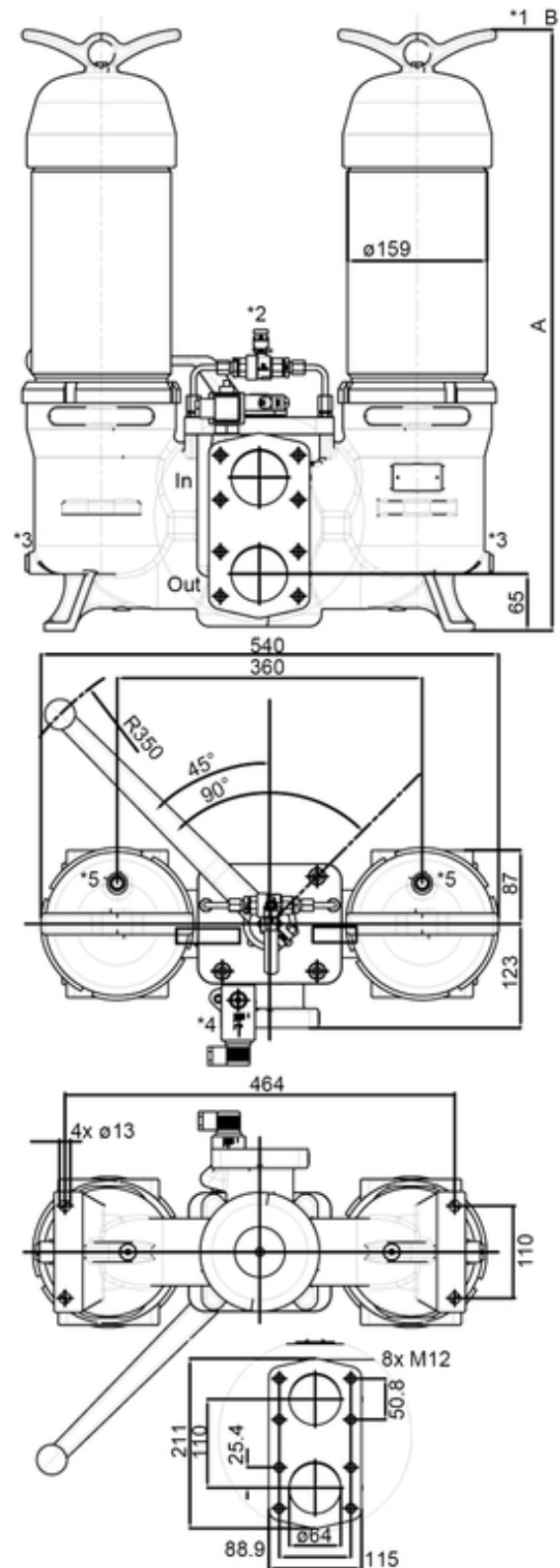
The switching function can be changed by turning the electric upper part by 180° (normally closed contact or normally open contact). The state on delivery is a normally closed contact. By inductivity in the direct current circuit the use of suitable protection circuit should be considered. Further maintenance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

| | |
|--------------|--------------------------------|
| In = Inlet | *1 Clearance B |
| Out = Outlet | *2 Pressure equalization valve |
| | *3 Drain screw G $\frac{1}{4}$ |
| | *4 Maintenance indicator |
| | *5 Vent screw |



9. Dimensions

All dimensions in mm.

| Type | Connection | A | B | Weight [kg] |
|-----------|------------|-----|-----|-------------|
| Pi 211063 | DN 64 | 690 | 300 | 80 |
| Pi 211100 | DN 64 | 920 | 530 | 100 |

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 to normally closed position or vice versa.

10.3 When should the filter element be replaced?

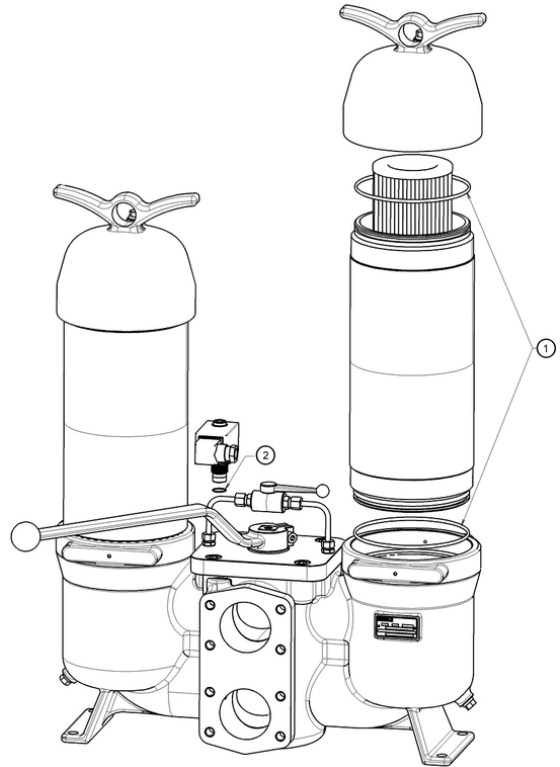
- Filters equipped with visual and electrical maintenance indicator:
During cold starts, the indicator may give a warning signal. Press the red button of the visual indicator once again only after operating temperature has been reached. If the red button immediately pops up again and/or the electrical signal has not switched off after reaching operating temperature the filter element must be replaced after the end of the shift.
- 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.
- Please always ensure that you have original Filtration Group spare elements in stock: disposable elements (Sm-x) cannot be cleaned.

10.4 Element replacement

Note: The maintenance 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 filter servicing. Now the signal of the maintenance indicators cancelled and the red button can be repressed again.

- Operate and hold pressure equalizing lever located behind switching lever. Pull catch knob and swivel switching lever. Place through or drip pan underneath to collect leaving oil. Close pressure equalization valve.
- Loosen vent screw of the filter side not in use by 2-3 turns; max. until contact is made with the safety stop.
- Remove drain plug in housing bottom and drain oil.
- Unscrew filter cover counter-clockwise.
- Lift out filter element.
- Check seal on filter cover. We recommend replacement in any case.
- Make sure that the order number on the spare element corresponds to the order number of the filter name-plate. To ensure no contamination occurs during the exchange of the element first open the plastic bag and push the element over the spigot in the filter head. Now remove plastic bag.

- Push the element carefully over the spigot and tight cover until full stop. Back off the cover 1/8 turn.
- Tighten drain plug housing bottom.
- To refill the filter chamber, operate only the pressure equalizing lever, until fluid emerges bubble-free from the drain cavity.
- Tight vent screw. Check for leakage by actuating the equalizing lever again.



11. Spare parts list

| Order numbers for spare parts | | |
|-------------------------------|------------------------------------|--------------|
| Position | Type | Order number |
| ① | Seal kit for housing | |
| | NBR | 70318468 |
| | FPM | 70318469 |
| | EPDM | 70318471 |
| | Maintenance indicator | |
| | Visual PiS 3098/2,2 | 77669971 |
| | Visual/electrical PiS 3097/2,2 | 77669948 |
| | Electrical upper section only | 77536550 |
| ② | Seal kit for maintenance indicator | |
| | NBR | 77760309 |
| | FPM | 77760317 |
| | EPDM | 77760325 |

Filtration Group GmbH, Schleifbachweg 45, D-74613 Öhringen, Phone +49 7941 6466-0,
Fax +49 7941 6466-429, sales@filtrationgroup.com, www.filtrationgroup.com
70352585.12/2016

Duplex Filter

Pi 241

Nominal pressure 40 bar (580 psi), nominal size up to 300

1. Features

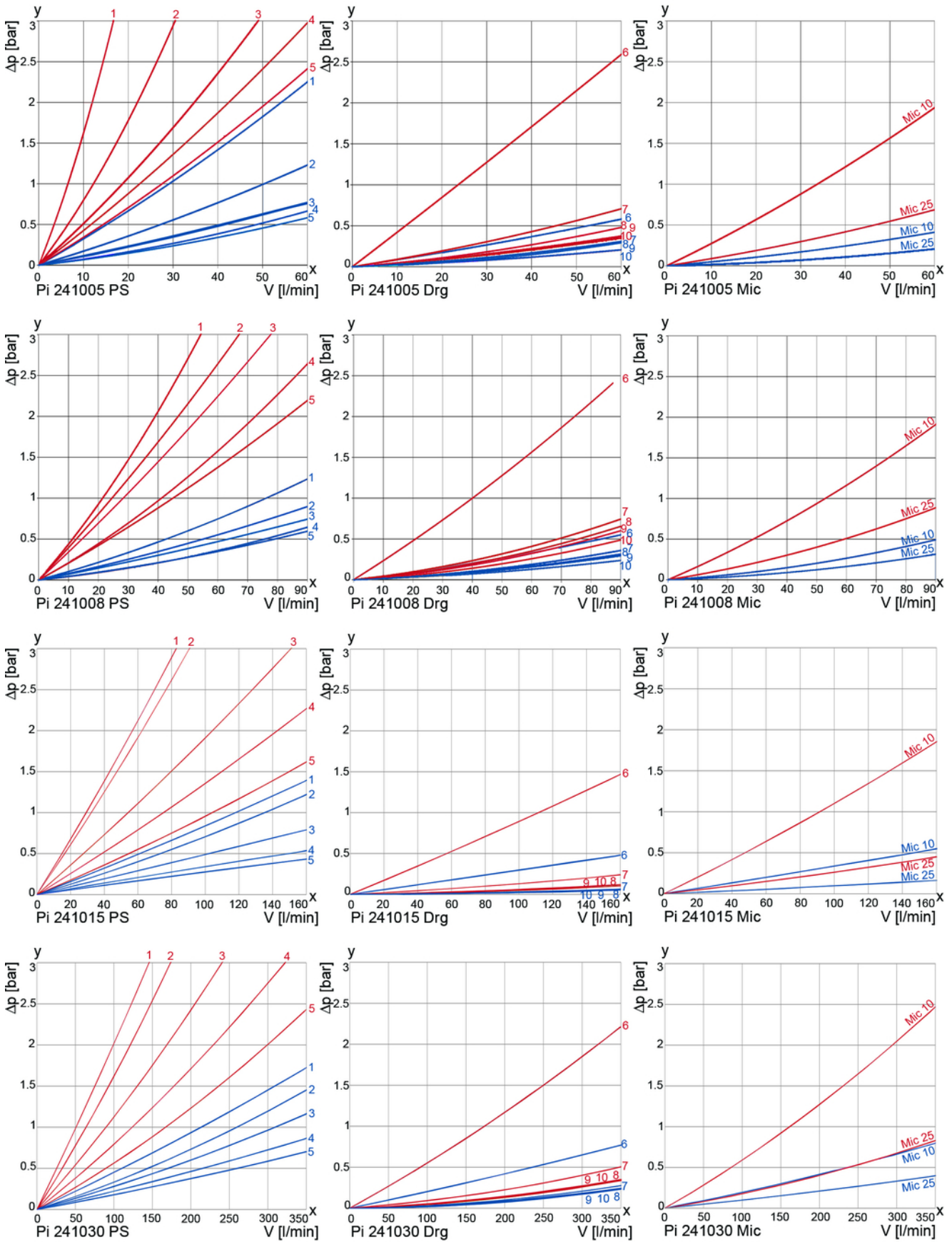
High performance filters for modern hydraulic, lubrication and fuel systems

- Modular system
- Compact design
- Minimal pressure drop through optimal flow design
- Constantly flow clearance opening
- Ball switching unit
- Visual/electrical/electronic maintenance indicator
- Flanged and threaded connections
- Variable operating and mounting possibilities
- International certificates of examinations
- Extensive range of accessories
- Quality filters, easy to service
- Equipped with highly efficient Filtration Group 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
33 mm²/s



y = differential pressure Δp [bar]

x = flow rate V [l/min]

1 = PS 3
2 = PS 6

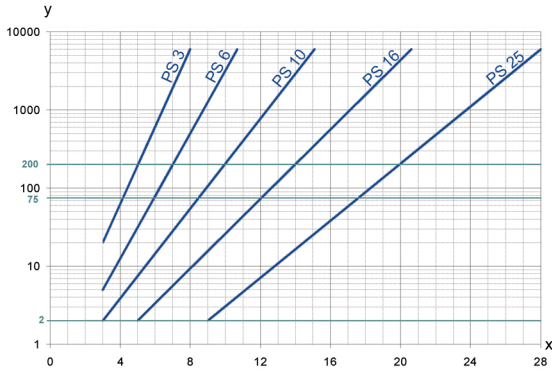
3 = PS 10
4 = PS 16

5 = PS 25
6 = Drg 10

7 = Drg 25
8 = Drg 40

9 = Drg 60
10 = Drg 100

3. Separation grade characteristics



y = beta-value
x = particle size [μm]

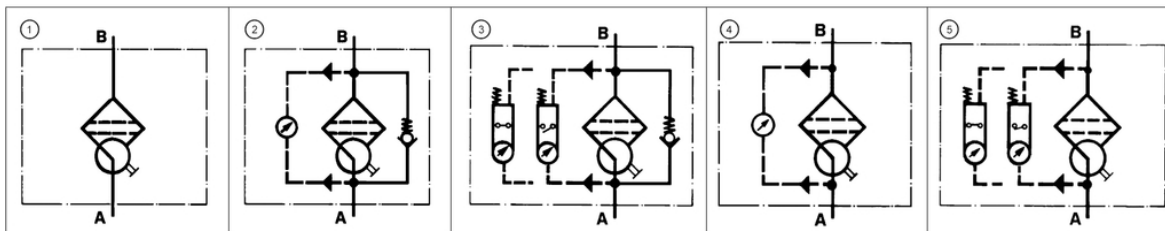
determined by multipass tests (ISO 16889)
calibration according to ISO 11171 (NIST)

5. Quality assurance

Filtration Group 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



4. Filter performance data

tested according to ISO 16889 (multipass test)

PS elements with max. Δp 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

7. Type number key and order numbers

7.1 Type number key housings

| Type | | | | | | | |
|----------------------|--------------------------------------|-------------------|----|---|-------|---|----------------------|
| 241 | Duplex filter | | | | | | |
| Nominal size [l/min] | | | | | | | |
| 005 | NG 50 | | | | | | |
| 008 | NG 80 | | | | | | |
| 015 | NG 150 | | | | | | |
| 030 | NG 300 | | | | | | |
| Connection | | | | | | | |
| 1 | SAE flange | | | | | | |
| 4 | Thread connection | | | | | | |
| Clearance opening | | | | | | | |
| C | 1" DN 25 | (NG 50 - NG 80) | | | | | |
| F | 2" DN 50 | (NG 150 - NG 300) | | | | | |
| Seal material* | | | | | | | |
| N | NBR | | | | | | |
| F | FPM | | | | | | |
| C | CR | | | | | | |
| Housing code* | | | | | | | |
| -046 | with screw plug | | | | | | |
| -057 | with bypass and visual indicator | | | | | | |
| -058 | with bypass and electrical indicator | | | | | | |
| -068 | with visual indicator | | | | | | |
| -069 | with electrical indicator | | | | | | |
| Special equipment* | | | | | | | |
| M | Magnet | | | | | | |
| M | Example for ordering | | | | | | |
| Pi 241 | 008/ | 1 | C/ | N | -069/ | M | 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 and 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 and visual indicator | with bypass 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.

7.2 Order numbers housings

| Nominal size NG [l/min] | Order number | Type | ① | ② | ③ | ④ | ⑤ |
|-------------------------------|--------------|--------------------|-------------------------------------|--|--|-----------------------------|---------------------------------|
| | | | with blank plug for indicator | with bypass and visual indicator | with bypass and electrical indicator | with visual indicator | with electrical indicator |
| 150 | 70543016 | Pi 241015/1F/N-046 | | | | | |
| | 70543017 | Pi 241015/1F/N-057 | | | | | |
| | 70543018 | Pi 241015/1F/N-058 | | | | | |
| | 70543019 | Pi 241015/1F/N-068 | | | | | |
| | 70543020 | Pi 241015/1F/N-069 | | | | | |
| 300 | 70543021 | Pi 241030/1F/N-046 | | | | | |
| | 70543022 | Pi 241030/1F/N-057 | | | | | |
| | 70543023 | Pi 241030/1F/N-058 | | | | | |
| | 70543024 | Pi 241030/1F/N-068 | | | | | |
| | 70543025 | Pi 241030/1F/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. Δp [bar] | Filter surface [cm ²] |
|----------------------------|--------------|-------------------|-----------------|--------------------------|--------------------------------------|
| 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 |
| 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 |
| 150 | 70519044 | Pi 21015 AN PS 3 | PS 3 | 20 | 4240 |
| | 70519042 | Pi 22015 AN PS 6 | PS 6 | | 4240 |
| | 70519040 | Pi 23015 AN PS 10 | PS 10 | | 4240 |
| | 70519038 | Pi 24015 AN PS 16 | PS 16 | | 4240 |
| | 70519036 | Pi 25015 AN PS 25 | PS 25 | | 4240 |
| 300 | 70519106 | Pi 21030 AN PS 3 | PS 3 | 20 | 6890 |
| | 70519104 | Pi 22030 AN PS 6 | PS 6 | | 6890 |
| | 70519102 | Pi 23030 AN PS 10 | PS 10 | | 6890 |
| | 70519198 | Pi 24030 AN PS 16 | PS 16 | | 6890 |
| | 70519196 | Pi 25030 AN PS 25 | PS 25 | | 6890 |

8. Technical specifications

| | |
|---|---|
| Design: | Duplex filter |
| Nominal pressure: | 10 ⁷ load changes 40 bar (580 psi) |
| Pi 241005-241008 | |
| Pi 241015-241030 | 2x 10 ⁶ load changes 40 bar (580 psi) |
| Test pressure: | 60 bar (870 psi) |
| Temperature range: | -10 °C to +120 °C |
| | Survival temperature -40 °C (other temperature ranges on request) |
| Bypass setting: | Δ p 35 bar ± 10 % |
| Filter housing material: | EN-GJS-400 |
| Switch parts material: | EN-GJS-400/Stainless steel |
| Sealing material: | NBR/AL |
| Maintenance indicator setting: | Δ p 2.2 bar ± 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 |

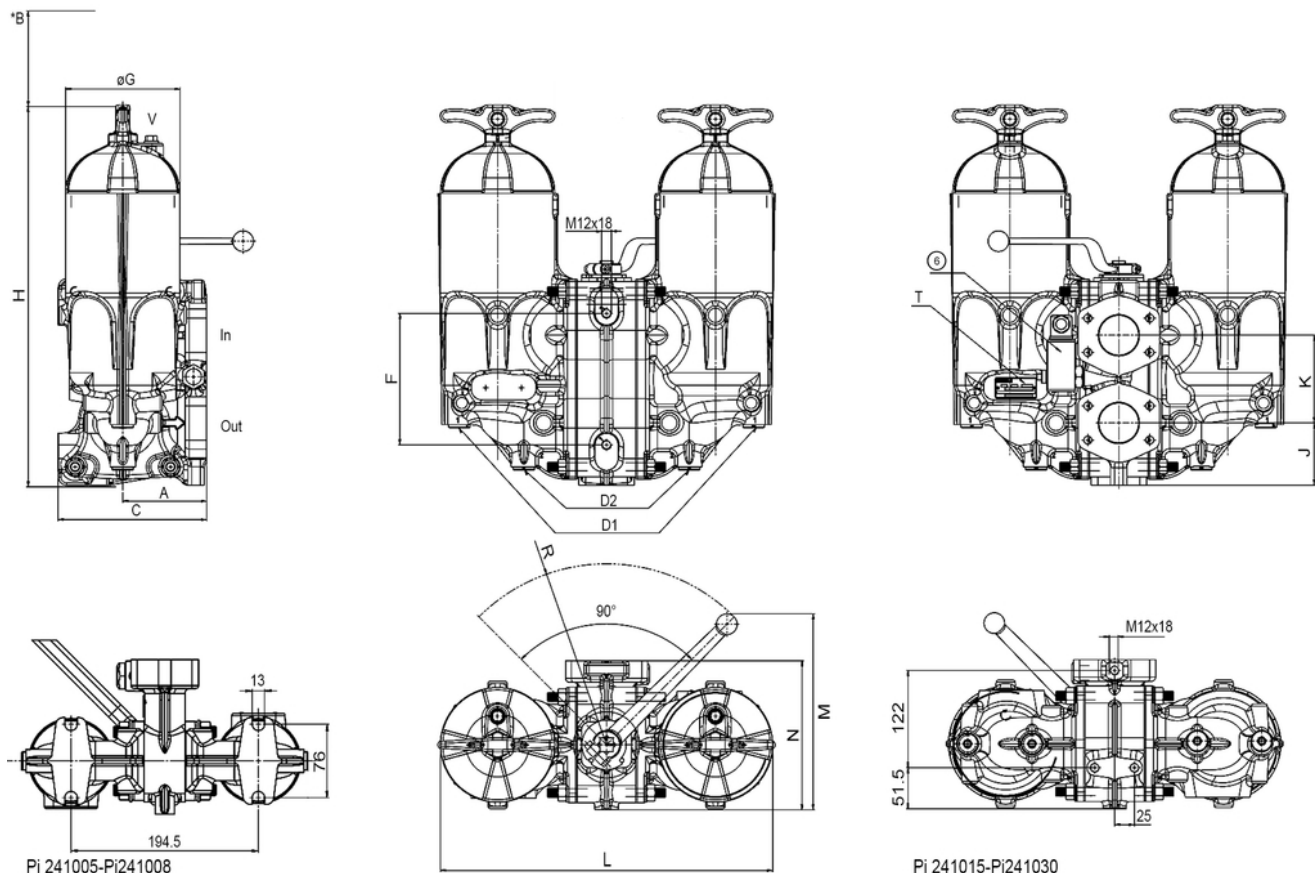
The switching function can be changed by turning the electric upper part by 180° (normally closed contact or normally open contact). The state on delivery is a normally closed contact. By inductivity in the direct current circuit the use of suitable protection circuit should be considered. Further maintenance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



Pi 241005-Pi241008

Pi 241015-Pi241030

| | |
|-----|--|
| In | Inlet |
| Out | Outlet |
| V | Venting G ¹ / ₄ |
| D1 | Drain outlet dirt side G ¹ / ₄ |

| | |
|----|---|
| D2 | Drain outlet clean side G ¹ / ₄ |
| T | Type plate |
| ⊕ | Maintenance indicator optional |
| *B | Clearance |

9. Dimensions

All dimensions in mm.

| Type | Connections* | A | B | C | E SW | F | øG | H | J | K | L | M | N | R | Weight [kg] |
|--------|--------------|-------|-----|-----|---------|-----|-----|-----|------|-----|-----|-----|-----|-----|----------------|
| 241005 | SAE DN25/G1 | 105.0 | 110 | 160 | 27 | 80 | 88 | 248 | 53.5 | 80 | 296 | 216 | 160 | 223 | 16 |
| 241008 | SAE DN25/G1 | 105.0 | 160 | 160 | 27 | 80 | 88 | 286 | 53.5 | 80 | 296 | 216 | 160 | 223 | 18 |
| 241015 | SAE DN50/G2 | 105.5 | 150 | 187 | 32 | 165 | 144 | 387 | 78.0 | 110 | 418 | 246 | 167 | 227 | 41 |
| 241030 | SAE DN50/G2 | 105.5 | 240 | 187 | 32 | 165 | 144 | 477 | 78.0 | 110 | 418 | 246 | 167 | 227 | 47 |

* Other 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. 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?

- 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.
- 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.
- Please always ensure that you have original Filtration Group spare elements in stock: Disposable elements 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.

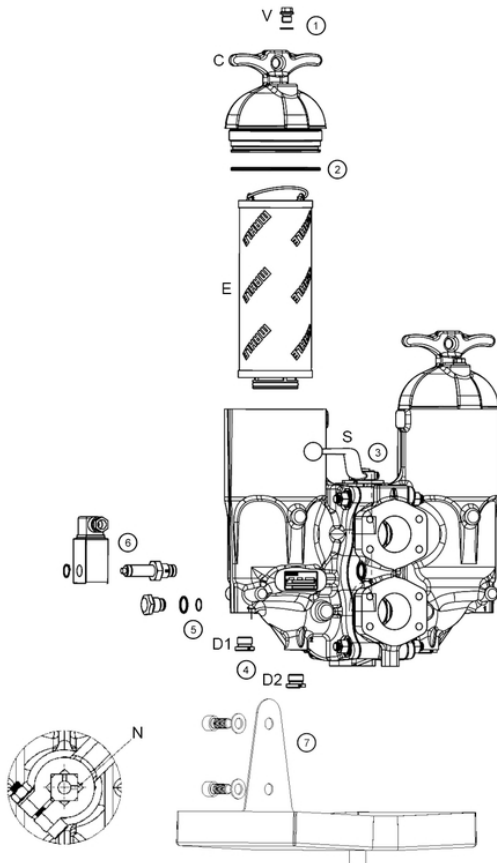
Note: The maintenance indicator monitors the filter side in operation. This is indicated by notches (N) on the switching shaft. Before carrying out filter maintenance, switch off the housing to be serviced.

- Move switching lever (S) completely to the stop.
- Loosen vent plug (V) on the filter side now shut down by 2-3 turns.

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

- Remove drain plug (D1) and allow the medium to drain.
- Remove drain plug (D2) and allow the medium to drain.
- Unscrew filter cover (C) by turning in anti-clockwise direction.
- Lift out filter element (E) from above.
- Check seal ☺ on filter cover. We recommend replacement in any case.
- 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.
- Push the element carefully into the holding fixture and tighten cover against stop.
- Screw in drain plugs and tighten (30-35 Nm).
- 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)
- Check the serviced filter chamber for leaks.
- Move the switching lever back to stop position and put the serviced filter chamber out of operation again.

11. Spare parts and accessories lists



| Order numbers for spare parts | | |
|-------------------------------|------------------------------------|--------------|
| Position | Type | Order number |
| ① - ④ | Seal kit for housing | |
| | Pi 241 005 - Pi 241 008 | |
| | NBR | 70535673 |
| | FPM | 70535674 |
| | CR | 70535676 |
| | Pi 241 015 - Pi 241 030 | |
| | NBR | 70575730 |
| | FPM | 70575731 |
| ⑤ | Seal kit for maintenance indicator | |
| | NBR | 77760309 |
| | FPM | 77760317 |
| | CR | 70535788 |

| Order numbers for accessories | | |
|-------------------------------|--|--------------|
| Position | Type | Order number |
| ⑥ | Maintenance indicator | |
| | Visual PiS 3098/2.2 | 77669971 |
| | Visual/electrical PiS 3097/2.2 | 77669948 |
| | Electrical upper section only | 77536550 |
| ⑦ | Oil drip pan | |
| | Pi 241 005 - Pi 241 008 | 70550102 |
| | Pi 241 015 - Pi 241 030 | 70576337 |
| | SAE welding counter-flange 3000 psi incl. O-Ring and mounting screws | |
| | SAE 1" NBR | 70535781 |
| | SAE 2" NBR | 70527145 |
| | Drain plugs with permanent magnet | |
| | G¼" | 70535672 |

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 sales@filtrationgroup.com
 www.filtrationgroup.com
 70543420.11/2016

Duplex Filter Pi 251

Nominal pressure 10/16 bar (140/230 psi), nominal size 2000

1. Features

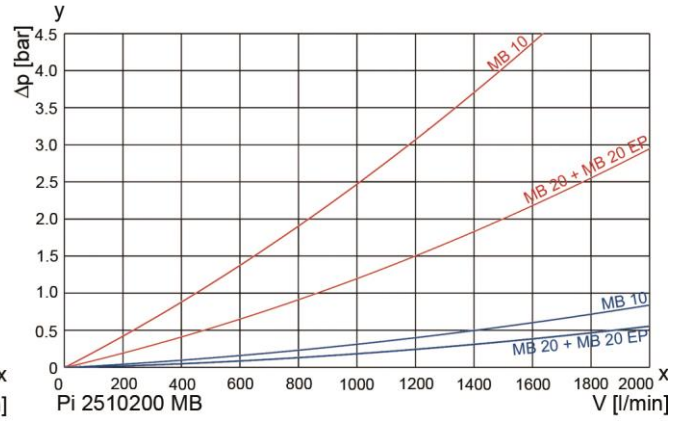
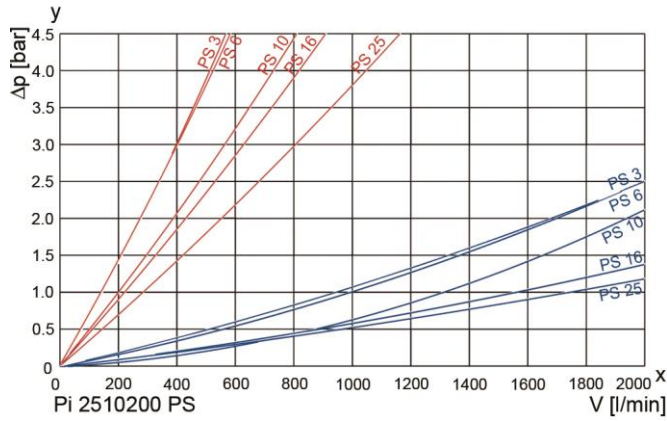
High performance filters for modern hydraulic, lubrication and fuel systems

- Compact design
- Minimal pressure drop through optimal flow design
- Visual/electrical/electronic maintenance indicator
- Extensive range of accessories
- Quality filters, easy to service
- Equipped with highly efficient PS and MB filter elements
- Beta rated elements according to ISO 16889 multipass test
- Elements with high differential pressure stability and dirt holding capacity
- Worldwide distribution



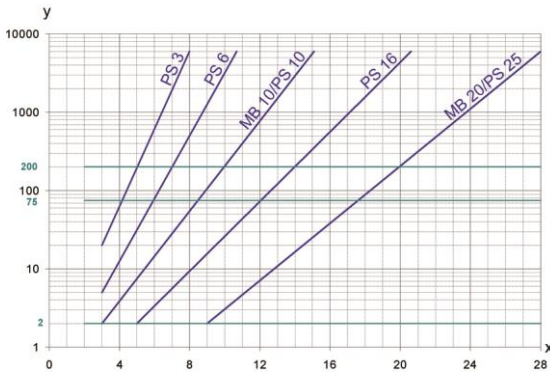
2. Flow rate/pressure drop curve (for Pi 251 0200/2K version)

190 mm²/s
33 mm²/s



y = differential pressure Δp [bar]
x = flow rate V [l/min]
EP = e-protect version

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. Δp 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 $\beta_{15(C)} \geq 200$
PS 25 $\beta_{20(C)} \geq 200$

MB elements with
max. Δp 20 bar

MB 10 $\beta_{10(C)} \geq 200$
MB 20 $\beta_{20(C)} \geq 200$

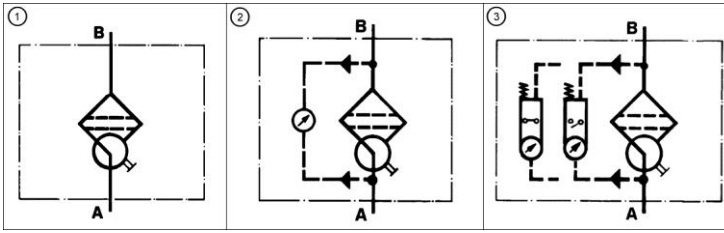
values guaranteed up to
10 bar differential pressure

5. Quality assurance

FGC 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 | | | | | | | | | |
|------------------------------|-------------------|---|----|---|----|---|------|------|----------------------|
| Type | Duplex filter | | | | | | | | |
| 251 | Nominal size | | | | | | | | |
| | 0200 | NG 2000 | | | | | | | |
| | Connection | | | | | | | | |
| | 2 | DIN flange | | | | | | | |
| | 3 | ANSI flange | | | | | | | |
| | Nominal width | | | | | | | | |
| | H | DN 80/3* | | | | | | | |
| | I | DN 100/4* | | | | | | | |
| | J | DN 125/5* | | | | | | | |
| | K | DN 150/6* | | | | | | | |
| | Nominal pressure | | | | | | | | |
| | 1 | 10 bar/140 psi | | | | | | | |
| | 2 | 16 bar/230 psi | | | | | | | |
| | Switch | | | | | | | | |
| | C | Double disc valve | | | | | | | |
| | Seal material | | | | | | | | |
| | N | NBR | | | | | | | |
| | F | FPM | | | | | | | |
| | Housing code | | | | | | | | |
| | 060 | no options ① | | | | | | | |
| | 118 | with visual indicator ② | | | | | | | |
| | 119 | with visual /electrical indicator ③ | | | | | | | |
| | Special equipment | | | | | | | | |
| | 3.1 | Inspection certificate 3.1 acc. to DIN EN 10204 | | | | | | | |
| | A | Cover lifting tool | | | | | | | |
| | M | Magnet | | | | | | | |
| Pi 251 | 0200/ | 2 | K/ | 2 | C/ | N | -119 | /3.1 | Example for ordering |

* other types on request

Example for ordering filter:

| 1. Filter housing | 2. 2x Filter elements |
|--|--|
| V = 2000 l/min, connection DIN DN 150, nominal pressure 16 bar, double disc valve switch, seal NBR and visual/electrical maintenance indicator, with inspection certificate 3.1 Type: Pi 251 0200/2K/2C/N-119/3.1 | PS 10 Type: Pi 23200 AN PS 10 Order number: 70561158 |

| 7.2 Housing design | | |
|-------------------------|---------------------|-------------------------------------|
| Nominal size NG [l/min] | Type | Number of elements each filter side |
| 2000 | see type number key | 1 |

| 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. Δp [bar] | Filter surface [cm ²] |
| 2000 | 70561113 | Pi 21200 AN PS 3 | PS 3 | 20 | 40140 |
| | 70561152 | Pi 22200 AN PS 6 | PS 6 | | 40140 |
| | 70561158 | Pi 23200 AN PS 10 | PS 10 | | 40140 |
| | 70561161 | Pi 24200 AN PS 16 | PS 16 | | 40140 |
| | 70561163 | Pi 25200 AN PS 25 | PS 25 | | 40140 |
| 2000 | 72413295 | Pi 41200 AN MB 10 | MB 10 | 20 | 43708 |
| | 72351312 | Pi 44200 AN MB 20 | MB 20 | | 43708 |
| | 70597037 | Pi 44200 AN MB 20 EP* | MB 20 EP | | 43708 |

* e-protect version

8. Technical specifications

| | |
|---|---|
| Design: | Duplex filter |
| Nominal pressure: | 10 bar or 16 bar |
| Test pressure: | 14.4 or 23.4 bar |
| Temperature range: | -10 °C up to +100 °C (other temperature ranges on request) |
| Filter housing material: | welded steel |
| Double disc valve material: | EN-GJS-400 |
| Sealing material: | NBR/C4400 |
| Maintenance indicator setting: | Δ p 1.25 bar +/-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 |

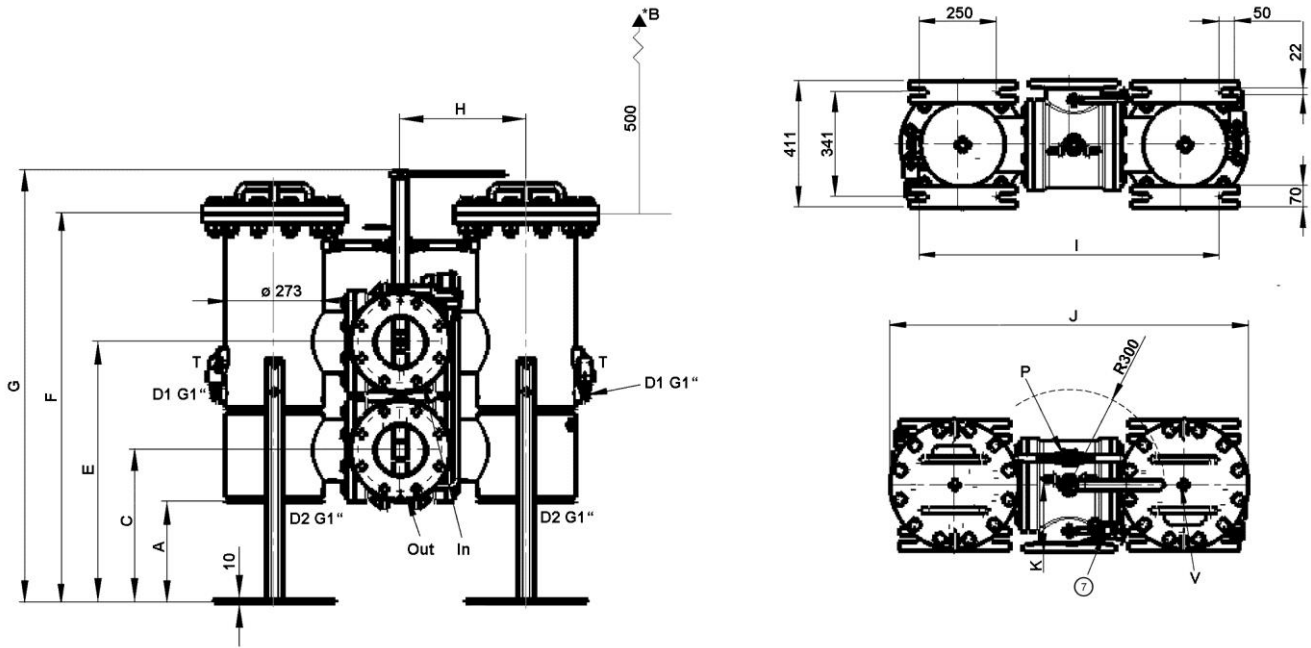
The switching function can be changed by turning the electric upper part by 180° (normally closed contact or normally open contact). The state on delivery is a normally closed contact. By inductivity in the direct current circuit the use of suitable protection circuit should be considered. Further maintenance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



In = Inlet
 Out = Outlet
 D1 Drain clean side G1
 D2 Drain outlet dirt side G1
 P Pressure balance valve
 T Type plate
 V Venting G½
 Ⓢ Maintenance indicator
 *B Clearance

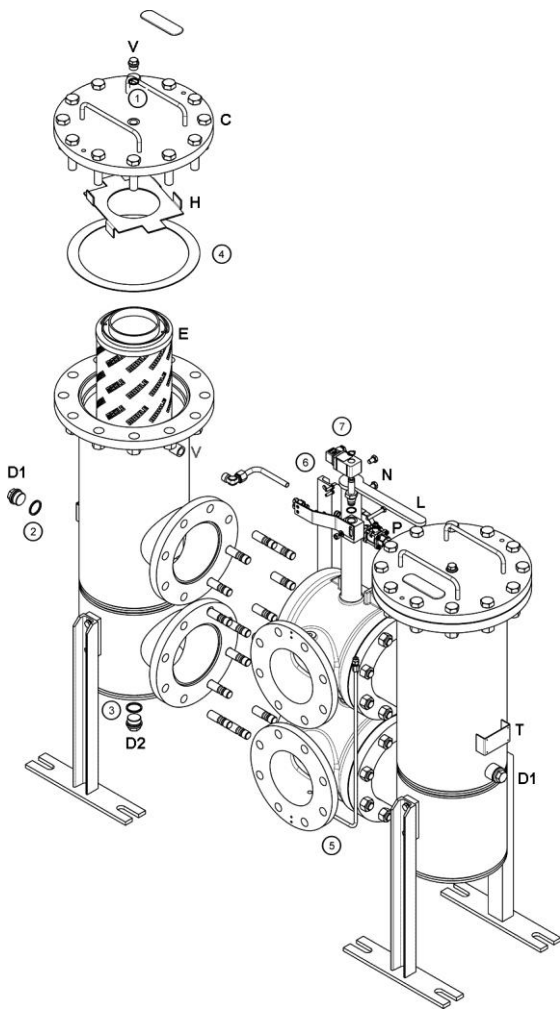
All dimensions in mm.

| Type | Connection | A | C | E | F | G | H | I | J | K |
|----------------|------------|-----|-----|-----|------|------|-----|-----|------|-----|
| Pi2510200/2H/2 | DN 80 | 299 | 408 | 638 | 1046 | 1211 | 324 | 898 | 1053 | 170 |
| Pi2510200/2I/2 | DN 100 | 286 | 408 | 658 | 1059 | 1199 | 332 | 914 | 1069 | 180 |
| Pi2510200/2J/2 | DN 125 | 303 | 438 | 708 | 1102 | 1234 | 362 | 974 | 1129 | 200 |
| Pi2510200/2K/2 | DN 150 | 289 | 438 | 748 | 1116 | 1240 | 362 | 974 | 1129 | 210 |

10. Installation, operating and maintenance instructions

see instruction manual

11. Spare parts and accessories lists



| Order numbers for spare parts and accessories | | |
|---|---|--------------|
| Position | Type | Order number |
| ① - ④ | Seal kit for element change (per chamber) | |
| | D-Satz Pi 251 0200 E NBR | 70602830 |
| | D-Satz Pi 251 0200 E FPM | 70604080 |
| ① - ⑤ | Seal kit for housing NG 2000 | |
| | DN 80 | |
| | NBR | 70604082 |
| | FPM | 70604083 |
| | DN 100 | |
| | NBR | 70604100 |
| | FPM | 70604101 |
| | DN 125 | |
| | NBR | 70601686 |
| | FPM | 70604078 |
| | DN 150 | |
| | NBR | 70601687 |
| FPM | 70604079 | |
| ⑥ | Seal kit for maintenance indicator | |
| | NBR | 77760309 |
| | FPM | 77760317 |
| ⑦ | Maintenance indicator | |
| | Visual PiS 3098/1.25 | 77809080 |
| | Electrical PiS 3097/1.25 | 70328693 |
| | Electrical upper section only | 77536550 |

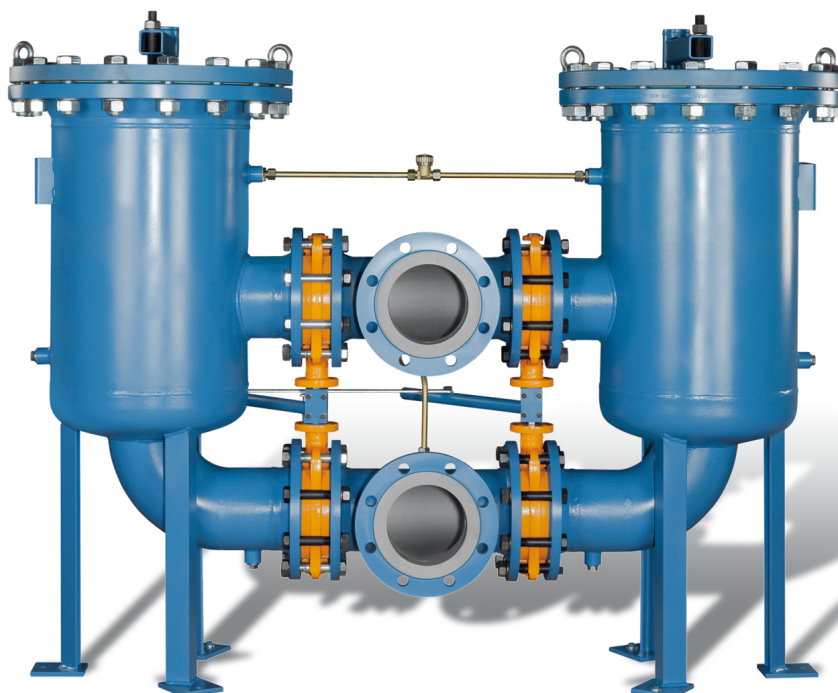
Duplex Filter Pi 281

Nominal pressure 10/16 bar (140/230 psi), nominal size 1250 up to 8000

1. Features

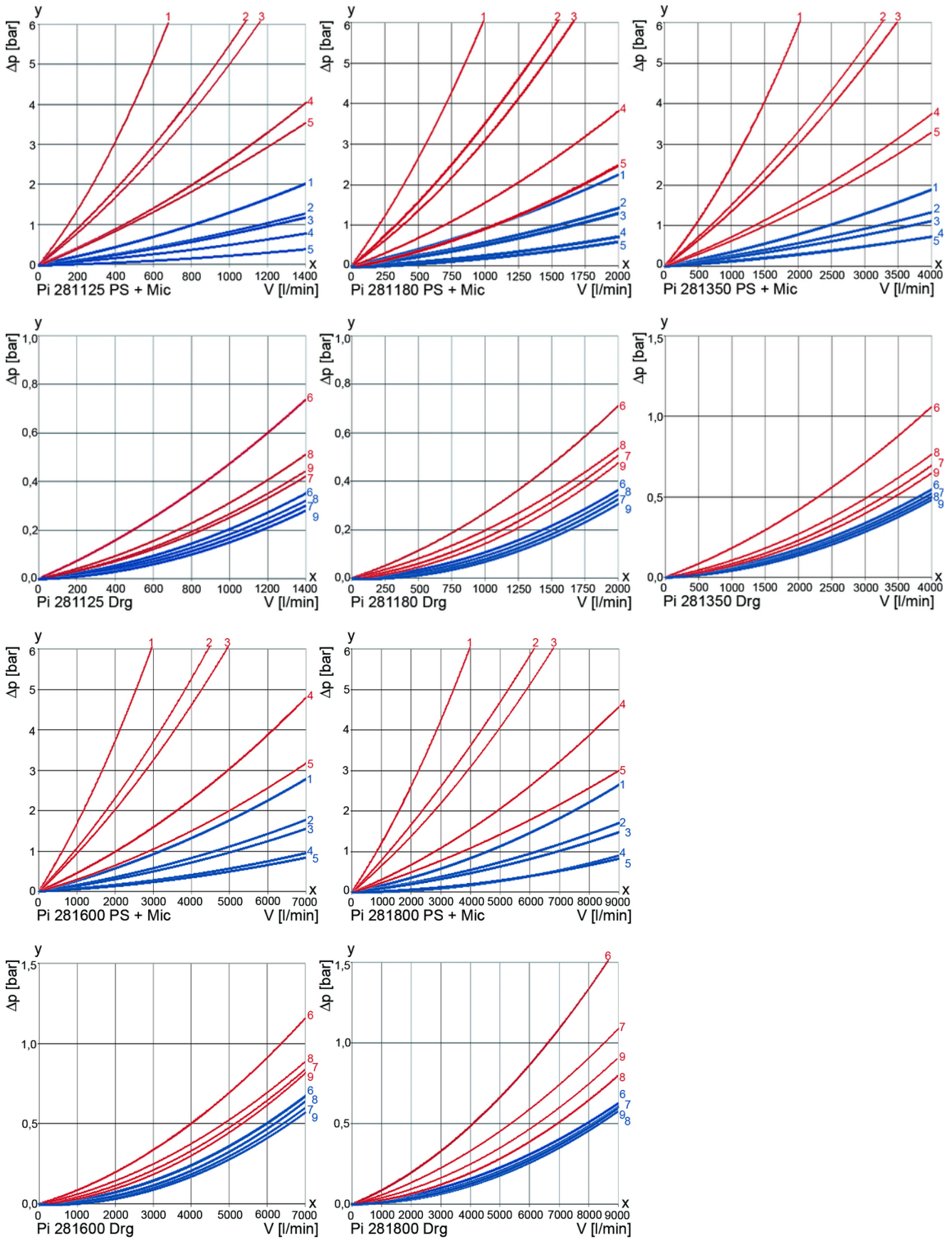
High performance filters for modern hydraulic systems

- Modular system
- Compact design
- Minimal pressure drop through optimal flow design
- Visual/electrical/electronic maintenance indicator
- Flanged connections
- 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 mm²/s
33 mm²/s



y = differential pressure Δp [bar]

x = flow rate V [l/min]

1 = PS 3
2 = PS 6

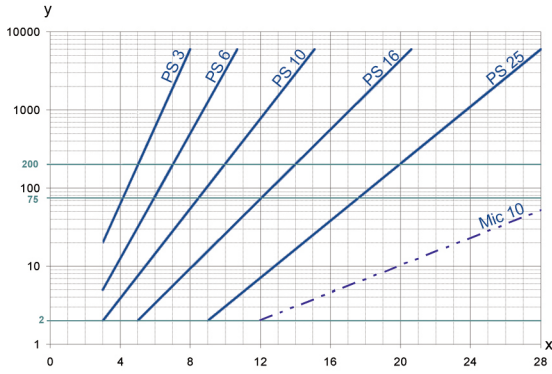
3 = PS 10
4 = PS 25

5 = Mic 10
6 = Drg 25

7 = Drg 40
8 = Drg 60

9 = 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. Δp 10 bar

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

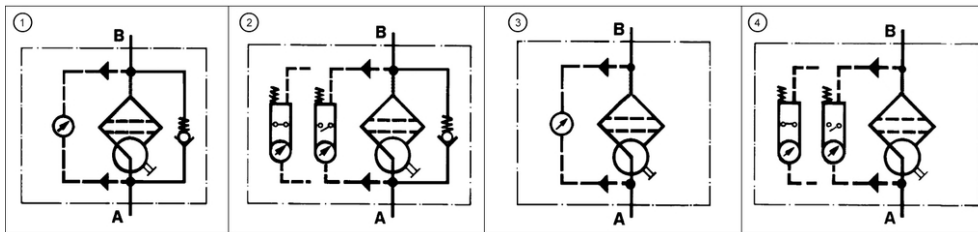
values guaranteed at
5 bar differential pressure

5. Quality assurance

Filtration Group 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-multi-passmethod for evaluation filtration performance of a filter element |

6. Symbols



7. Type code and order numbers

Pi 281125/21-058/852 888 PS 10

| | | | | | |
|---------------|------------|-----------|----------|-------------|-----------------------|
| Pi 281 | 125 | /2 | 1 | -058 | /825 888 PS 10 |
| 1 | 2 | 3 | 4 | 5 | 6 |

1 Filter type

2 Size/Connections 125 = 1250 l/min - DN 100

Connection flange 180 = 1800 l/min - DN 125

(In, Out): DIN EN 1092-1 350 = 3500 l/min - DN 150

600 = 6000 l/min - DN 200

800 = 8000 l/min - DN 250

3 Nominal pressure 1 = 10 bar

2 = 16 bar

4 Number of elements 1 per filter side from NG 1250 up to NG 1800,

3 per filter side from NG 3500 up to NG 6000,

4 per filter side at NG 8000

5 Housing design 058 = with bypass valve and electrical maintenance indicator

069 = electrical maintenance indicator

6 Filter element Filter element type and filter rating

Filters DN 100 and DN 125 optional, DN 150 up to DN 250 standard with cover lifting device.

7.1 Housing design

| Nominal size NG [l/min] | Type | Number of elements per filter side and element type | Pressure [bar] | ② with bypass valve and electrical indicator | ④ with electrical indicator |
|-------------------------------|---------------|--|-------------------|--|--------------------------------------|
| 1250 | 281125/11-058 | 1x 852 888 | 10 | | |
| | 281125/11-069 | | | | |
| | 281125/21-058 | | 16 | | |
| | 281125/21-069 | | | | |
| 1800 | 281180/11-058 | 1x 852 884 | 10 | | |
| | 281180/11-069 | | | | |
| | 281180/21-058 | | 16 | | |
| | 281180/21-069 | | | | |
| 3500 | 281350/13-058 | 3x 852 888 | 10 | | |
| | 281350/13-069 | | | | |
| | 281350/23-058 | | 16 | | |
| | 281350/23-069 | | | | |
| 6000 | 281600/13-058 | 3x 852 884 | 10 | | |
| | 281600/13-069 | | | | |
| | 281600/23-058 | | 16 | | |
| | 281600/23-069 | | | | |
| 8000 | 281800/14-058 | 4x 852 884 | 10 | | |
| | 281800/14-069 | | | | |
| | 281800/24-058 | | 16 | | |
| | 281800/24-069 | | | | |

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

| Order number | Type | Filter material | max. Δp [bar] | Filter surface [cm ²] |
|--------------|-----------------|-----------------|-----------------------|-----------------------------------|
| 78263295 | 852 888 PS 3 | PS 3 | 10 | 21850 |
| 78354029 | 852 888 PS 6 | PS 6 | | 21850 |
| 78226813 | 852 888 PS 10 | PS 10 | | 21850 |
| 78226821 | 852 888 PS 25 | PS 25 | | 21850 |
| 78207664 | 852 888 Mic 10 | Mic 10 | | 21850 |
| 78228017 | 852 888 Drg 25 | Drg 25 | | 16500 |
| 78228025 | 852 888 Drg 40 | Drg 40 | | 16500 |
| 78303026 | 852 888 Drg 60 | Drg 60 | | 16500 |
| 78228470 | 852 888 Drg 100 | Drg 100 | | 16500 |
| 78227431 | 852 884 PS 3 | PS 3 | | 10 |
| 79337916 | 852 884 PS 6 | PS 6 | 28500 | |
| 78226797 | 852 884 PS 10 | PS 10 | 28500 | |
| 78226805 | 852 884 PS 25 | PS 25 | 28500 | |
| 70366315 | 852 884 Mic 10 | Mic 10 | 28500 | |
| 79337460 | 852 884 Drg 25 | Drg 25 | 23450 | |
| 78261653 | 852 884 Drg 40 | Drg 40 | 23450 | |
| 79700402 | 852 884 Drg 60 | Drg 60 | 23450 | |
| 79327750 | 852 884 Drg 100 | Drg 100 | 23450 | |

8. Technical specifications

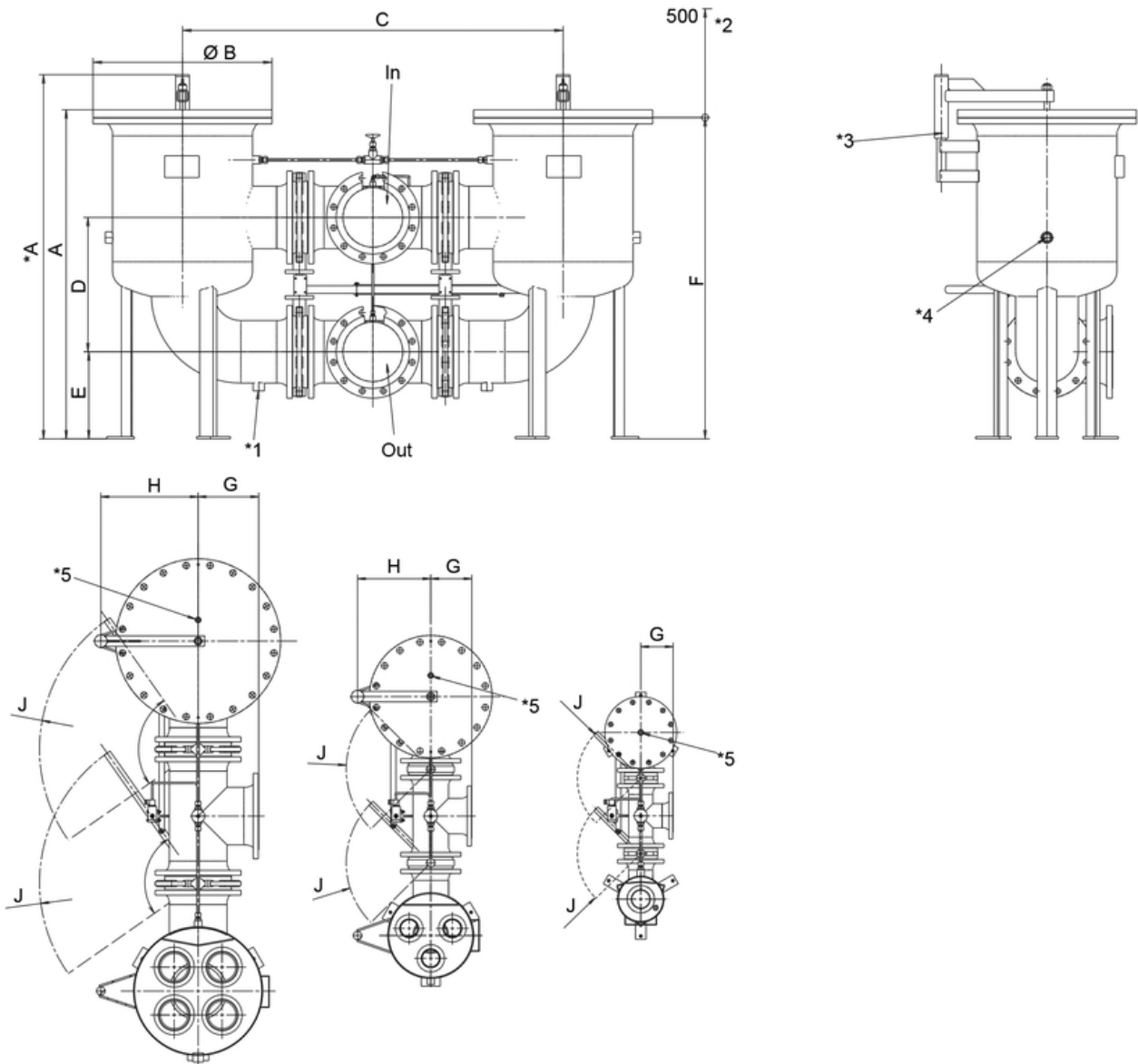
| | |
|--|---|
| Design: | line mounting filter, mounting via through holes at supporting stands |
| Fitting position: | upright |
| Butterfly valve switch over device | |
| Temperature range: | - 10 °C to + 100 °C (other temperature ranges on request) |
| Filter housing material: | steel welded construction |
| Material of seals: | NBR (other materials on request) |
| Bypass opening pressure: | Δp 3.5 bar +/- 10 % |
| Activating pressure of optical/electrical contamination indicator: | Δp 2.2 bar +/-10 % |
| Electrical data of contamination indicator: | |
| Maximum voltage: | 230 V AC/200 V DC |
| Maximum current on contact: | 1 A |
| Maximum contact load: | 70 W |
| Type of protection: | IP 65 when inserted and secured |
| Contact: | bistable |
| Cable connection: | M20x1.5 |
| Please contact us in case of using other media. | |

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 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



A for Pi 281125 up to 281180
 *A for Pi 281350 up to 281800

*1 drain connection G $\frac{1}{2}$
 *2 minimum clearance

*3 cover lifting device
 *4 drain connection G $\frac{1}{2}$

*5 vent screw G $\frac{1}{2}$ In = Inlet
 Out = Outlet

All dimensions in mm.

| Nominal size NG [l/min] | Connection DN | Nominal pressure PN [bar] | A ± 10 | B | C ± 10 | D ± 1 | E ± 1 | F | G | H | J |
|-------------------------|---------------|---------------------------|------------|-----|------------|-----------|-----------|------|-----|-----|-----|
| 1250 | 100 | 10 + 16 | 984 | 340 | 790 | 365 | 250 | 960 | 153 | - | 378 |
| 1800 | 125 | | 1091 | 405 | 922 | 391 | 250 | 975 | 175 | 250 | 378 |
| 3500 | 150 | 16 | 1346 | 580 | 1132 | 435 | 332 | 1200 | 194 | 340 | 396 |
| 6000 | 200 | | 1466 | 715 | 1332 | 483 | 350 | 1300 | 236 | 400 | 421 |
| 8000 | 250 | | 1610 | 840 | 1654 | 587 | 380 | 1403 | 279 | 490 | 726 |
| 3500 | 150 | 10 | 1346 | 565 | 1132 | 435 | 332 | 1200 | 194 | 340 | 396 |
| 6000 | 200 | | 1450 | 670 | 1332 | 483 | 350 | 1300 | 236 | 380 | 421 |
| 8000 | 250 | | 1590 | 780 | 1654 | 587 | 380 | 1403 | 279 | 460 | 726 |

Filtration Group GmbH, Schleifbachweg 45, D-74613 Öhringen, Phone +49 7941 6466-0,
 Fax +49 7941 6466-429, sales@filtrationgroup.com, www.filtrationgroup.com, 70366830.04/2015

Duplex Filter

Pi 370

Nominal pressure 200/210/250/315 bar (2900/3040/3620/4570 psi), nominal size up to 450

1. Features

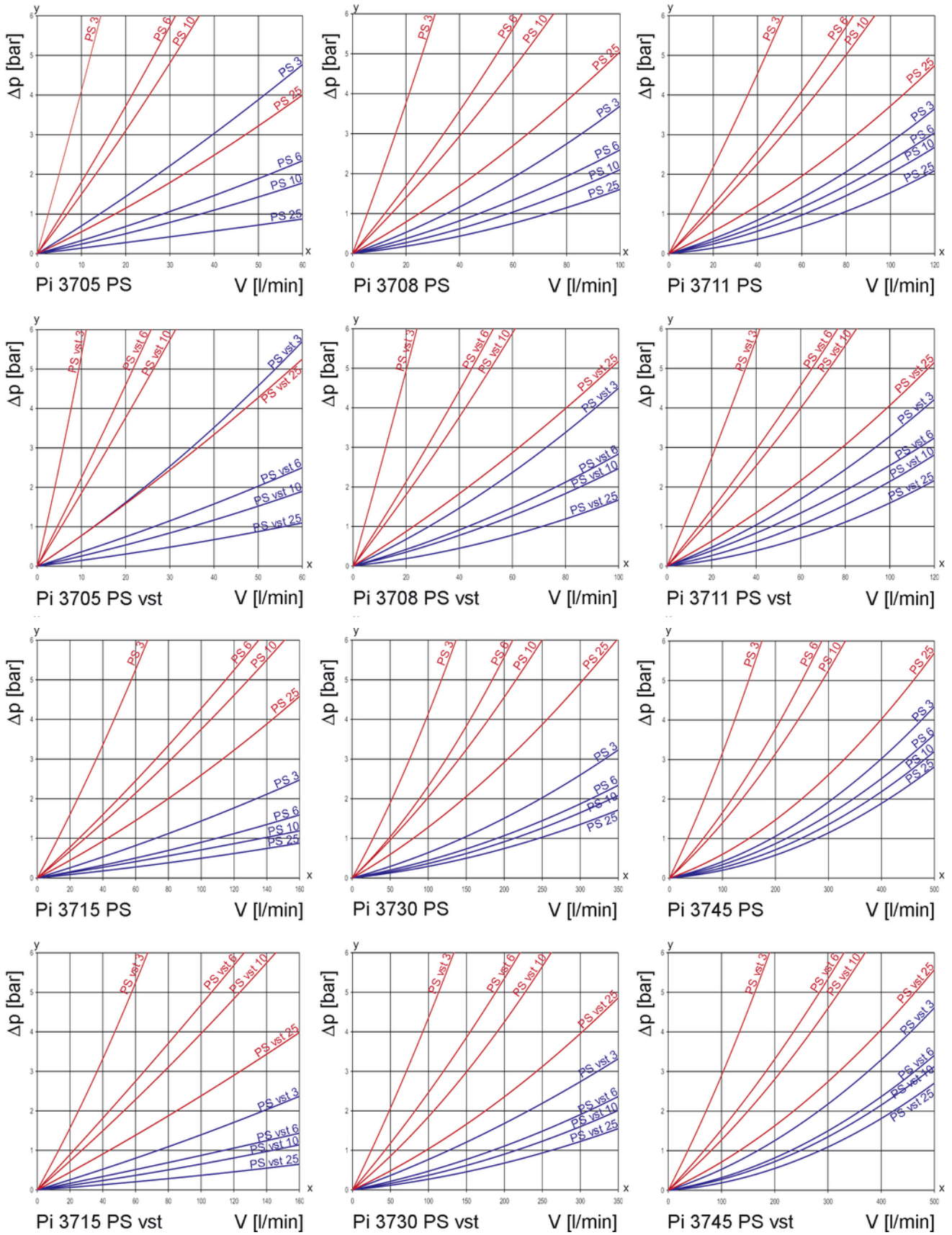
High performance filters for modern hydraulic systems

- Modular system
- Compact design
- Minimal pressure drop through optimal flow design
- Visual/electrical/electronic maintenance indicator
- Threaded connections
- Change over valve on upstream side
- Ergonomic switch-over handle with safety lock and pressure compensation
- User-optimized one-hand-operation
- 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
- NPT- and SAE-connections on request
- Worldwide distribution



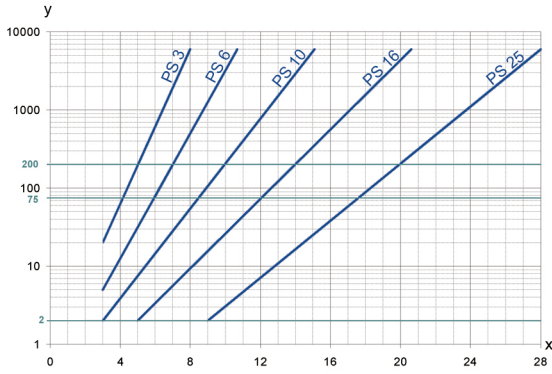
2. Flow rate/pressure drop curve complete filter

190 mm²/s
33 mm²/s



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

3. Separation grade characteristics



y = beta-value
x = particle size [μm]

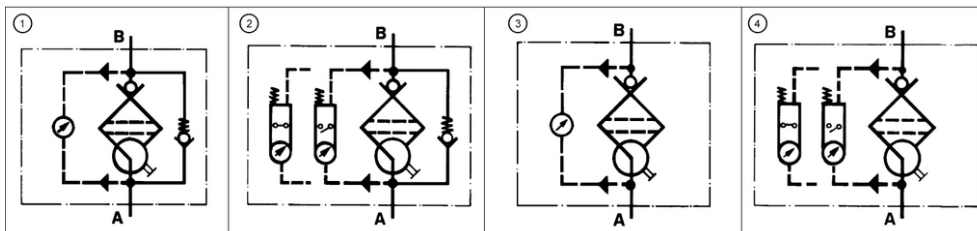
determined by multipass tests (ISO 16889)
calibration according to ISO 11171 (NIST)

5. Quality assurance

Filtration Group 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 pressure |
| 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 filter; 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



4. Filter performance data

tested according to ISO 16889 (multipass test)

PS elements with
max. Δp 20 bar

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

values guaranteed up to
10 bar differential pressure

PS vst elements with
max. Δp 210 bar

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

values guaranteed up to
20 bar differential pressure

7. Order numbers

Example for ordering filters:

| 1. Filter housing | 2. 2x Filter element |
|--|--|
| V = 80 l/min and electrical maintenance indicator Type: Pi 3708-015 Order number: 77810369 | PS vst 3 Type: Pi 2208 PS vst 3 Order number: 77680200 |

| 7.1 Housing design | | | | | | |
|----------------------------|-----------------|-------------|--|--|----------------------------------|--------------------------------------|
| Nominal size NG [l/min] | Order number | Type | ① with bypass valve and visual indicator | ② with bypass valve and electrical indicator | ③ with visual indicator | ④ with electrical indicator |
| 50 | 77810294 | Pi 3705-012 | | | | |
| | 77810302 | Pi 3705-013 | | | | |
| | 77810310 | Pi 3705-014 | | | | |
| | 77810328 | Pi 3705-015 | | | | |
| 80 | 77810336 | Pi 3708-012 | | | | |
| | 77810344 | Pi 3708-013 | | | | |
| | 77810351 | Pi 3708-014 | | | | |
| | 77810369 | Pi 3708-015 | | | | |
| 110 | 77810377 | Pi 3711-012 | | | | |
| | 77810385 | Pi 3711-013 | | | | |
| | 77810393 | Pi 3711-014 | | | | |
| | 77810401 | Pi 3711-015 | | | | |
| 150 | 77810419 | Pi 3715-012 | | | | |
| | 77810427 | Pi 3715-013 | | | | |
| | 77810435 | Pi 3715-014 | | | | |
| | 77810443 | Pi 3715-015 | | | | |
| 300 | 77810450 | Pi 3730-012 | | | | |
| | 77810468 | Pi 3730-013 | | | | |
| | 77810476 | Pi 3730-014 | | | | |
| | 77810484 | Pi 3730-015 | | | | |
| 450 | 77810492 | Pi 3745-012 | | | | |
| | 77814403 | Pi 3745-013 | | | | |
| | 77814411 | Pi 3745-014 | | | | |
| | 77814429 | Pi 3745-015 | | | | |

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

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

| Nominal size NG [l/min] | Order number | Type | Filter material | max. Δp [bar] | Filter surface [cm ²] |
|----------------------------|-----------------|-------------------|-----------------|------------------|--------------------------------------|
| 50 | 77680135 | Pi 2105 PS 3 | PS 3 | 20 | 590 |
| | 77943509 | Pi 5105 PS 6 | PS 6 | | 590 |
| | 77680325 | Pi 3105 PS 10 | PS 10 | | 590 |
| | 77680440 | Pi 4105 PS 25 | PS 25 | | 590 |
| | 77680192 | Pi 2205 PS vst 3 | PS vst 3 | 210 | 425 |
| | 77943533 | Pi 5205 PS vst 6 | PS vst 6 | | 425 |
| | 77680382 | Pi 3205 PS vst 10 | PS vst 10 | | 425 |
| | 77680507 | Pi 4205 PS vst 25 | PS vst 25 | | 425 |
| 80 | 77680143 | Pi 2108 PS 3 | PS 3 | 20 | 1150 |
| | 77943517 | Pi 5108 PS 6 | PS 6 | | 1150 |
| | 77680341 | Pi 3108 PS 10 | PS 10 | | 1150 |
| | 77680457 | Pi 4108 PS 25 | PS 25 | | 1150 |
| | 77680200 | Pi 2208 PS vst 3 | PS vst 3 | 210 | 850 |
| | 77943541 | Pi 5208 PS vst 6 | PS vst 6 | | 850 |
| | 77681190 | Pi 3208 PS vst 10 | PS vst 10 | | 850 |
| | 77680515 | Pi 4208 PS vst 25 | PS vst 25 | | 850 |
| 110 | 77680150 | Pi 2111 PS 3 | PS 3 | 20 | 1700 |
| | 77943525 | Pi 5111 PS 6 | PS 6 | | 1700 |
| | 77680333 | Pi 3111 PS 10 | PS 10 | | 1700 |
| | 77680465 | Pi 4111 PS 25 | PS 25 | | 1700 |
| | 77680218 | Pi 2211 PS vst 3 | PS vst 3 | 210 | 1275 |
| | 77943558 | Pi 5211 PS vst 6 | PS vst 6 | | 1275 |
| | 77680390 | Pi 3211 PS vst 10 | PS vst 10 | | 1275 |
| | 77680523 | Pi 4211 PS vst 25 | PS vst 25 | | 1275 |
| 150 | 77680168 | Pi 2115 PS 3 | PS 3 | 20 | 2425 |
| | 77955099 | Pi 5115 PS 6 | PS 6 | | 2425 |
| | 77680358 | Pi 3115 PS 10 | PS 10 | | 2425 |
| | 77680473 | Pi 4115 PS 25 | PS 25 | | 2425 |
| | 77680226 | Pi 2215 PS vst 3 | PS vst 3 | 210 | 2010 |
| | 77955123 | Pi 5215 PS vst 6 | PS vst 6 | | 2010 |
| | 77680408 | Pi 3215 PS vst 10 | PS vst 10 | | 2010 |
| | 77680531 | Pi 4215 PS vst 25 | PS vst 25 | | 2010 |
| 300 | 77680176 | Pi 2130 PS 3 | PS 3 | 20 | 4620 |
| | 77955107 | Pi 5130 PS 6 | PS 6 | | 4620 |
| | 77680366 | Pi 3130 PS 10 | PS 10 | | 4620 |
| | 77680481 | Pi 4130 PS 25 | PS 25 | | 4620 |
| | 77680234 | Pi 2230 PS vst 3 | PS vst 3 | 210 | 3800 |
| | 77955131 | Pi 5230 PS vst 6 | PS vst 6 | | 3800 |
| | 77680416 | Pi 3230 PS vst 10 | PS vst 10 | | 3800 |
| | 77680549 | Pi 4230 PS vst 25 | PS vst 25 | | 3800 |
| 450 | 77680184 | Pi 2145 PS 3 | PS 3 | 20 | 6865 |
| | 77955115 | Pi 5145 PS 6 | PS 6 | | 6865 |
| | 77680374 | Pi 3145 PS 10 | PS 10 | | 6865 |
| | 77680499 | Pi 4145 PS 25 | PS 25 | | 6865 |
| | 77680242 | Pi 2245 PS vst 3 | PS vst 3 | 210 | 5600 |
| | 77955149 | Pi 5245 PS vst 6 | PS vst 6 | | 5600 |
| | 77680424 | Pi 3245 PS vst 10 | PS vst 10 | | 5600 |
| | 77680556 | Pi 4245 PS vst 25 | PS vst 25 | | 5600 |

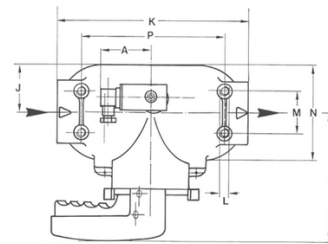
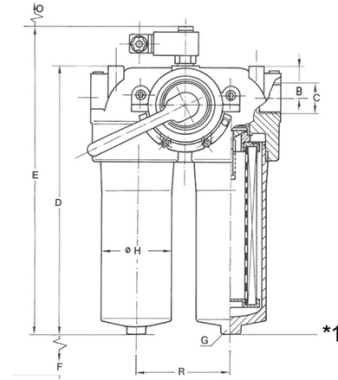
8. Technical specifications

| | |
|---|--|
| Design: | line mounting filter |
| Operating pressure: | |
| Pi 3705 - Pi 3711 | 10 [^] 7 load changes 250 bar (3620 psi) |
| | 10 [^] 6 load changes 315 bar (4570 psi) |
| Pi 3715 - Pi 3745 | 2x 10 [^] 6 load changes 210 bar (3040 psi) |
| Test pressure: | |
| Pi 3705 - Pi 3711 | 450 bar (6520 psi) |
| Pi 3715 - Pi 3745 | 300 bar (4350 psi) |
| Pi 3705 - Pi 3745 when use on ships operating/test pressure | 200/260 bar (2900/3770 psi) |
| Temperature range: | -10 °C to +120 °C (other temperature ranges on request) |
| Bypass opening pressure: | Δp 7 bar \pm 10 % |
| Filter head material: | GGG |
| Filter bowl material: | St |
| Sealing material: | NBR/PTFE |
| Activating pressure of optical/electrical differential pressure indicator | Δp 5 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: | M20x1.5 |

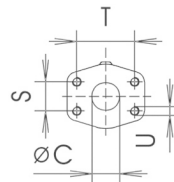
The switching function can be changed by turning the electric upper part by 180° (normally closed contact or normally open contact). The state on delivery is a normally closed contact. The use of quenching circuits must be checked in the case of inductivity in the DC current circuit. The contamination indicator data sheet contains further information and additional contamination indicator versions.

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.



*1 Pi 3730-Pi 3745 with drain screw G $\frac{1}{4}$ DIN 910



9. Dimensions

All dimensions except "C" in mm.

| Type | A | B | C* | D | E | F | Weight [kg] |
|---------|----|----|-----|-----|-----|-----|-------------|
| Pi 3705 | 78 | 38 | G1 | 219 | 271 | 80 | 11.0 |
| Pi 3708 | 78 | 38 | G1 | 294 | 346 | 80 | 12.0 |
| Pi 3711 | 78 | 38 | G1 | 370 | 422 | 80 | 15.0 |
| Pi 3715 | 78 | 50 | G1½ | 302 | 354 | 110 | 31.5 |
| Pi 3730 | 78 | 50 | G1½ | 427 | 479 | 110 | 37.0 |
| Pi 3745 | 78 | 50 | G1½ | 543 | 595 | 110 | 41.5 |

* SAE flange connection on request.

Subject to technical alteration without prior notice.

| Type | G SW | H | I | J | K | L | M | N | O | P | R | S | T | U | Weight [kg] |
|---------|------|-----|-----|----|-----|--------|----|-----|----|-----|-----|------|-------|--------|-------------|
| Pi 3705 | 27 | 65 | 144 | 45 | 182 | M8x15 | 55 | 90 | 45 | 100 | 86 | - | - | - | 11.0 |
| Pi 3708 | 27 | 65 | 144 | 45 | 182 | M8x15 | 55 | 90 | 45 | 100 | 86 | - | - | - | 12.0 |
| Pi 3711 | 27 | 65 | 144 | 45 | 182 | M8x15 | 55 | 90 | 45 | 100 | 86 | - | - | - | 15.0 |
| Pi 3715 | 30 | 110 | 175 | 70 | 280 | M12x18 | 62 | 140 | 45 | 210 | 136 | - | - | - | 31.5 |
| Pi 3730 | 30 | 110 | 175 | 70 | 280 | M12x18 | 62 | 140 | 45 | 210 | 136 | - | - | - | 37.0 |
| Pi 3745 | 30 | 110 | 175 | 70 | 280 | M12x18 | 62 | 140 | 45 | 210 | 136 | 35.7 | 69.85 | M12x20 | 41.5 |

10. Installation, operating and maintenance instructions

10.1 Filter installation

When installing 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 EN 175301-803 with poles marked 1 and 2. The electrical section can be inverted to change from normally open 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. Please always ensure that you have original Filtration Group spare elements in stock: Disposable elements (PS) cannot be cleaned.

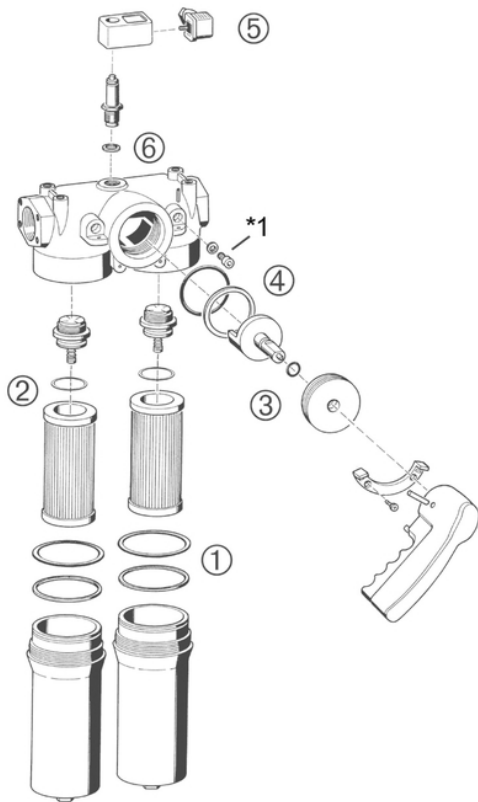
10.4 Element replacement

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, which is identified by the position of the switching lever catch. The change-over transfer valve must be switched prior filter servicing. Now the signal of the maintenance indicators cancelled and the red button can be repressed again.

1. Operate and hold pressure equalizing lever located behind switching lever. Pull catch knob and swivel switching lever. Engage the catch on the clear filter side. Place through or drip pan underneath to collect leaving 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 housing by rotating same counter-clockwise and clean with a suitable medium.
Warning: The shift lever may not, from now until the screwing back in of the filter housing (7.), be activated under any circumstances!
4. Remove filter element with a side-to-side motion.
5. Check O-ring on the filter house for damage. Replace, if necessary.
6. Make sure that the order number on the spare element corresponds to the order number of the filter name-plate.
7. Lightly lubricate the threads of the filter housing and screw into the filter head. Maximum tightening torque for NG 50 to 110 = 60 Nm, for NG 150 to 450 = 100 Nm.
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.

11. Spare parts list



*1 vent screw

| Order numbers for spare parts | | |
|-------------------------------|------------------------------------|---------------|
| Position | Type | Order numbers |
| ① bis ④ | Seal kit | |
| | Pi 3705 - Pi 3711 | |
| | NBR | 78305062 |
| | FPM | 78305054 |
| | EPDM | 78305047 |
| | Pi 3715 - Pi 3745 | |
| | NBR | 79375056 |
| | FPM | 79375064 |
| | EPDM | 79375072 |
| ⑤ | Maintenance indicator | |
| | Visual PiS 3093/5 | 77669914 |
| | Electrical PiS 3092/5 | 77669864 |
| | Electrical upper section only | 77536550 |
| ⑥ | Seal kit for maintenance indicator | |
| | NBR | 77760275 |
| | FPM | 77760283 |
| | EPDM | 77760291 |

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 www.filtrationgroup.com
 78356909.11/2016

Duplex Filter

Pi 3700

Nominal pressure 200/250/315 bar (2900/3620/4570 psi), nominal size up to 400 according DIN 24550

1. Features

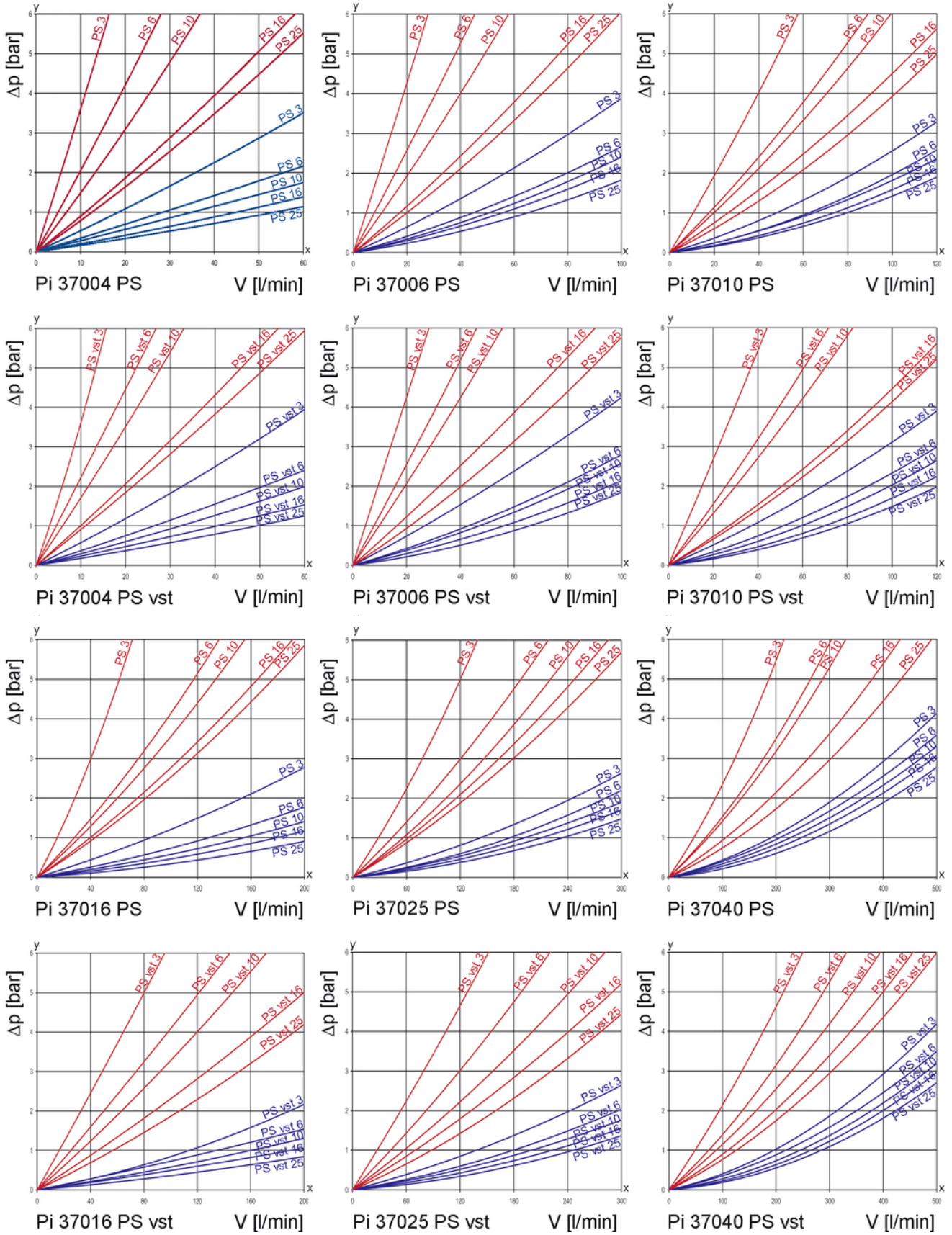
High performance filters for modern hydraulic systems

- Modular system
- Compact design
- Minimal pressure drop through optimal flow design
- Visual/electrical/electronic maintenance indicator
- Threaded connections
- Change over valve on upstream side
- Ergonomic switch-over handle with safety lock and pressure compensation
- User-optimized one-hand-operation
- 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
- NPT- and SAE-connections on request
- Worldwide distribution



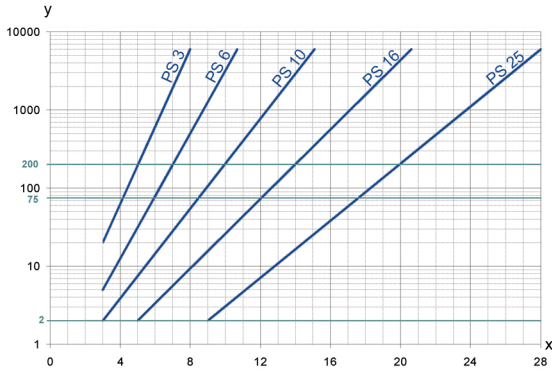
2.. Flow rate/pressure drop curve complete filter

190 mm²/s
33 mm²/s



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)

PS elements with
max. Δp 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 | $\beta_{15(C)} \geq 200$ |
| PS | 25 | $\beta_{20(C)} \geq 200$ |

values guaranteed up to
10 bar differential pressure

PS vst elements with
max. Δp 210 bar

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

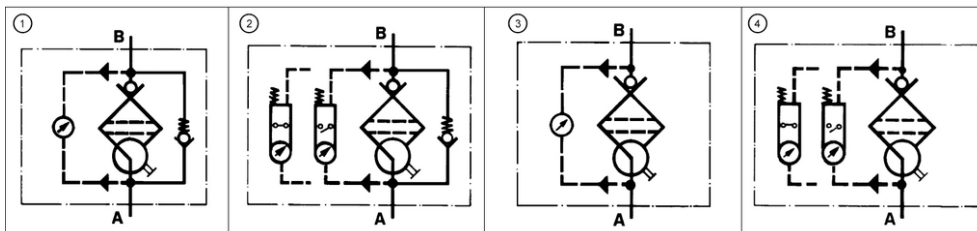
values guaranteed up to
20 bar differential pressure

5. Quality assurance

Filtration Group 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. Order numbers

Example for ordering filters:

| 1. Filter housing | 2. 2x Filter element |
|--|--|
| V = 100 l/min and electrical maintenance indicator Type: Pi 37010-015 Order number: 78208423 | PS vst 3 Type: Pi 71010 DN PS vst 3 Order number: 78227480 |

| 7.1 Housing design | | | | | | |
|----------------------------|-----------------|-----------------|--|--|----------------------------------|--------------------------------------|
| Nominal size NG [l/min] | Order number | Type | ① with bypass valve and visual indicator | ② with bypass valve and electrical indicator | ③ with visual indicator | ④ with electrical indicator |
| 40 | 78208290 | Pi 37004-012 | | | | |
| | 78259889 | Pi 37004-013 | | | | |
| | 78208316 | Pi 37004-014 | | | | |
| | 78208324 | Pi 37004-015 | | | | |
| 63 | 78208340 | Pi 37006-012 | | | | |
| | 78259897 | Pi 37006-013 | | | | |
| | 78208365 | Pi 37006-014 | | | | |
| | 78208373 | Pi 37006-015 | | | | |
| 100 | 78208399 | Pi 37010-012 | | | | |
| | 78259905 | Pi 37010-013 | | | | |
| | 78208415 | Pi 37010-014 | | | | |
| | 78208423 | Pi 37010-015 | | | | |
| 160 | 78208449 | Pi 37016-012 | | | | |
| | 78259913 | Pi 37016-013 | | | | |
| | 78208464 | Pi 37016-014 | | | | |
| | 78208472 | Pi 37016-015 | | | | |
| 250 | 78208498 | Pi 37025-012 | | | | |
| | 78259921 | Pi 37025-013 | | | | |
| | 78208514 | Pi 37025-014 | | | | |
| | 78259863 | Pi 37025-015 | | | | |
| 400 | 78208530 | Pi 37040-012 FL | | | | |
| | 78259939 | Pi 37040-013 FL | | | | |
| | 78208555 | Pi 37040-014 FL | | | | |
| | 78208563 | Pi 37040-015 FL | | | | |

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

7.2 Filter elements*

| Nominal size NG [l/min] | Order number | Type | Filter material | max. Δp [bar] | Filter surface [cm ²] |
|----------------------------|--------------|---------------------------|-----------------|--------------------------|---|
| 40 | 78260929 | Pi 21004 DN PS 3 NBR | PS 3 | 20 | 475 |
| | 77960859 | Pi 22004 DN PS 6 NBR | PS 6 | | 475 |
| | 77925571 | Pi 23004 DN PS 10 NBR | PS 10 | | 475 |
| | 78260937 | Pi 24004 DN PS 16 NBR | PS 16 | | 475 |
| | 78260945 | Pi 25004 DN PS 25 NBR | PS 25 | | 475 |
| | 78216079 | Pi 71004 DN PS vst 3 NBR | PS vst 3 | 210 | 445 |
| | 77960156 | Pi 72004 DN PS vst 6 NBR | PS vst 6 | | 445 |
| | 77925654 | Pi 73004 DN PS vst 10 NBR | PS vst 10 | | 445 |
| | 78216087 | Pi 74004 DN PS vst 16 NBR | PS vst 16 | | 445 |
| | 78216095 | Pi 75004 DN PS vst 25 NBR | PS vst 25 | | 445 |
| 63 | 78260960 | Pi 21006 DN PS 3 NBR | PS 3 | 20 | 835 |
| | 77960867 | Pi 22006 DN PS 6 NBR | PS 6 | | 835 |
| | 77925589 | Pi 23006 DN PS 10 NBR | PS 10 | | 835 |
| | 78260978 | Pi 24006 DN PS 16 NBR | PS 16 | | 835 |
| | 78260986 | Pi 25006 DN PS 25 NBR | PS 25 | | 835 |
| | 78216137 | Pi 71006 DN PS vst 3 NBR | PS vst 3 | 210 | 780 |
| | 77960149 | Pi 72006 DN PS vst 6 NBR | PS vst 6 | | 780 |
| | 77925662 | Pi 73006 DN PS vst 10 NBR | PS vst 10 | | 780 |
| | 78216145 | Pi 74006 DN PS vst 16 NBR | PS vst 16 | | 780 |
| | 78216152 | Pi 75006 DN PS vst 25 NBR | PS vst 25 | | 780 |
| 100 | 78227472 | Pi 21010 DN PS 3 NBR | PS 3 | 20 | 1375 |
| | 77960875 | Pi 22010 DN PS 6 NBR | PS 6 | | 1375 |
| | 77925597 | Pi 23010 DN PS 10 NBR | PS 10 | | 1375 |
| | 78261000 | Pi 24010 DN PS 16 NBR | PS 16 | | 1375 |
| | 78261018 | Pi 25010 DN PS 25 NBR | PS 25 | | 1375 |
| | 78227480 | Pi 71010 DN PS vst 3 NBR | PS vst 3 | 210 | 1275 |
| | 77960131 | Pi 72010 DN PS vst 6 NBR | PS vst 6 | | 1275 |
| | 77925670 | Pi 73010 DN PS vst 10 NBR | PS vst 10 | | 1275 |
| | 78261281 | Pi 74010 DN PS vst 16 NBR | PS vst 16 | | 1275 |
| | 78216160 | Pi 75010 DN PS vst 25 NBR | PS vst 25 | | 1275 |

*a wider range of element types is available on request

7.2 Filter elements*

| Nominal size NG [l/min] | Order number | Type | Filter material | max. Δp [bar] | Filter surface [cm ²] |
|----------------------------|--------------|----------------------------|-----------------|--------------------------|---|
| 160 | 78261034 | Pi 21016 DN PS 3 NBR | PS 3 | 20 | 2530 |
| | 77960826 | Pi 22016 DN PS 6 NBR | PS 6 | | 2530 |
| | 77925605 | Pi 23016 DN PS 10 NBR | PS 10 | | 2530 |
| | 78261042 | Pi 24016 DN PS 16 NBR | PS 16 | | 2530 |
| | 78261059 | Pi 25016 DN PS 25 NBR | PS 25 | | 2530 |
| | 77940638 | Pi 71016 DN PS vst 3 NBR | PS vst 3 | 210 | 1885 |
| | 77960123 | Pi 72016 DN PS vst 6 NBR | PS vst 6 | | 1885 |
| | 77925688 | Pi 73016 DN PS vst 10 NBR | PS vst 10 | | 1885 |
| | 78269797 | Pi 74016 DN PS vst 16 NBR | PS vst 16 | | 1885 |
| | 78216178 | Pi 75016 DN PS vst 25 NBR | PS vst 25 | | 1885 |
| 250 | 78227514 | Pi 21025 DN PS 3 NBR | PS 3 | 20 | 4020 |
| | 77960834 | Pi 22025 DN PS 6 NBR | PS 6 | | 4020 |
| | 77925613 | Pi 23025 DN PS 10 NBR | PS 10 | | 4020 |
| | 78261075 | Pi 24025 DN PS 16 NBR | PS 16 | | 4020 |
| | 78261083 | Pi 25025 DN PS 25 NBR | PS 25 | | 4020 |
| | 77940646 | Pi 71025 DN PS vst 3 NBR | PS vst 3 | 210 | 3090 |
| | 77960115 | Pi 72025 DN PS vst 6 NBR | PS vst 6 | | 3090 |
| | 77925696 | Pi 73025 DN PS vst 10 NBR | PS vst 10 | | 3090 |
| | 78269813 | Pi 74025 DN PS vst 16 NBR | PS vst 16 | | 3090 |
| | 78216186 | Pi 75025 DN PS vst 25 NBR | PS vst 25 | | 3090 |
| 400 | 78227522 | Pi 21 040 DN PS 3 NBR | PS 3 | 20 | 6770 |
| | 77960842 | Pi 22 040 DN PS 6 NBR | PS 6 | | 6770 |
| | 77925621 | Pi 23 040 DN PS 10 NBR | PS 10 | | 6770 |
| | 78261109 | Pi 24 040 DN PS 16 NBR | PS 16 | | 6770 |
| | 78261117 | Pi 25 040 DN PS 25 NBR | PS 25 | | 6770 |
| | 77940653 | Pi 71 040 DN PS vst 3 NBR | PS vst 3 | 210 | 5240 |
| | 77960107 | Pi 72 040 DN PS vst 6 NBR | PS vst 6 | | 5240 |
| | 77930829 | Pi 73 040 DN PS vst 10 NBR | PS vst 10 | | 5240 |
| | 78269821 | Pi 74 040 DN PS vst 16 NBR | PS vst 16 | | 5240 |
| | 78260903 | Pi 75 040 DN PS vst 25 NBR | PS vst 25 | | 5240 |

* a wider range of element types is available on request

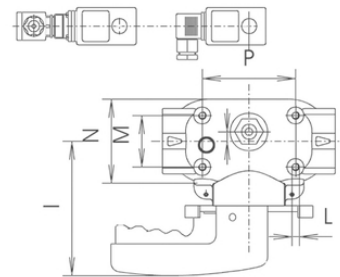
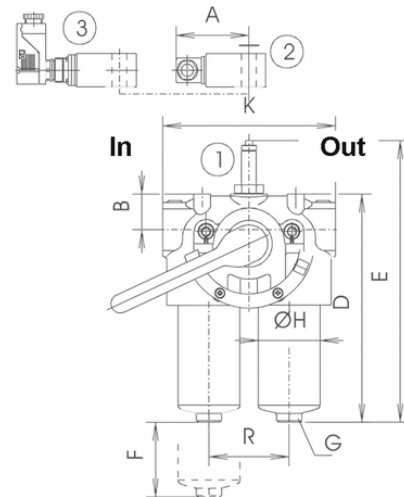
8. Technical specifications

| | |
|---|--|
| Design: | line mounting filter |
| Nominal: Pi 37004-37010 | 10 [^] 7 load changes 250 bar (3620 psi) |
| | 10 [^] 6 load changes 315 bar (4570 psi) |
| Pi 37016-37040 | 2x 10 [^] 6 load changes 200 bar (2900 psi) |
| Test pressure: Pi 37004-37010 | 450 bar (6520 psi) |
| Pi 37016-37040 | 260 bar (3770 psi) |
| Pi 37004 - Pi 37040 when use on ships operating/test pressure | 200/260 bar (2900/3770 psi) |
| Temperature range: | -10 °C to +120 °C (other temperature ranges on request) |
| Bypass setting: | Δ p 7 bar ± 10 % |
| Filter head material: | GGG |
| Filter housing material: | St |
| Sealing material: | NBR/PTFE |
| Maintenance indicator setting: | Δ p 5 bar ± 10 % |
| Electrical data of maintenance indicator: | |
| Max. voltage: | 250 V AC/200 V DC |
| Max. 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 |

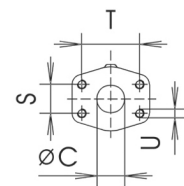
The switching function can be changed by turning the electric upper part by 180° (normally closed contact or normally open contact). The state on delivery is a normally closed contact. By inductivity in the direct current circuit the use of suitable protection circuit should be considered. Further maintenance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



- In = inlet
- Out = outlet
- Pos. 1 Visual maintenance indicator
- Pos. 2 Electrical upper section
Connector acc. DIN EN 175301-803
Version: PiS 3092, 3105, 3115
- Pos. 3 Electrical upper section
Connector acc. DIN EN 175301-804
Version: PiS 3102, 3122, 3110
- Pos. 4 NG 250, 400 with drain plug G ¼ DIN 910



DN 38 ≥ SAE 11/2" 6000 psi flange,
Bolts and O-rings not included in delivery

Subject to technical alteration without prior notice.

9. Dimensions

All dimensions except "C" in mm.

| Type | A | B | C* | D | E | F | G SW | H | I | K | L | M | N | O | P | R | S | T | U | Weight [kg] |
|----------|----|----|-------|-----|-----|-----|------|-----|-----|-----|--------|----|-----|----|-----|-----|------|-------|--------|-------------|
| Pi 37004 | 78 | 38 | G1 | 228 | 285 | 80 | 27 | 66 | 144 | 182 | M8x15 | 55 | 90 | 10 | 100 | 86 | - | - | - | 10.5 |
| Pi 37006 | 78 | 38 | G1 | 288 | 345 | 80 | 27 | 66 | 144 | 182 | M8x15 | 55 | 90 | 10 | 100 | 86 | - | - | - | 12.0 |
| Pi 37010 | 78 | 38 | G1 | 370 | 427 | 80 | 27 | 66 | 144 | 182 | M8x15 | 55 | 90 | 10 | 100 | 86 | - | - | - | 14.0 |
| Pi 37016 | 78 | 50 | G1½ | 311 | 363 | 110 | 30 | 110 | 160 | 280 | M12x18 | 62 | 140 | 28 | 210 | 136 | - | - | - | 30.0 |
| Pi 37025 | 78 | 50 | G1½ | 412 | 463 | 110 | 30 | 110 | 160 | 280 | M12x18 | 62 | 140 | 28 | 210 | 136 | - | - | - | 35.0 |
| Pi 37040 | 78 | 50 | DN 38 | 562 | 614 | 110 | 20 | 110 | 160 | 280 | M12x18 | 62 | 140 | 28 | 210 | 136 | 35.7 | 69.85 | M12x20 | 41.0 |

* 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 EN 175301-803 with poles marked 1 and 2. The electrical section can be inverted to change from normally open 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. Please always ensure that you have original Filtration Group spare elements in stock: Disposable elements (PS) cannot be cleaned.

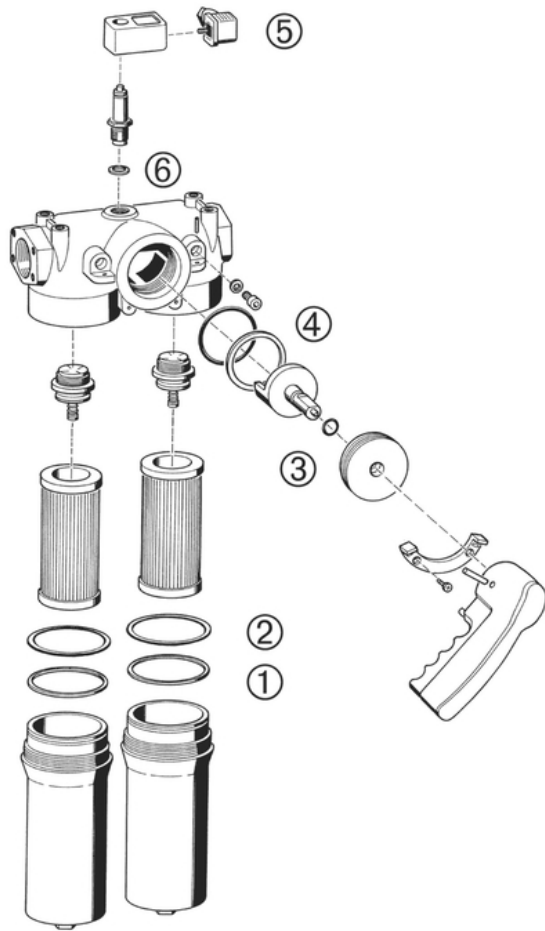
10.4 Element replacement

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, which is identified by the position of the switching lever catch. The change-over transfer valve must be switched prior filter servicing. Now the signal of the maintenance indicators cancelled and the red button can be repressed again.

1. Operate and hold pressure equalizing lever located behind switching lever. Pull catch knob and swivel switching lever. Engage the catch on the clear filter side. Place through or drip pan underneath to collect leaving 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 housing by turning counter-clockwise. Clean the housing using a suitable cleaning solvent.
Warning: The shift lever may not, from now until the screwing back in of the filter housing (7.), be activated under any circumstances!
4. Remove filter element by pulling down carefully.
5. Check o-ring on the filter housing for damage. Replace, if necessary.
6. Make sure that the order number on the spare element corresponds to the order number of the filter name-plate.
To ensure no contamination occurs during the exchange of the element first open the plastic bag and push the element over the spigot in the filter head. Now remove plastic bag.
7. Lightly lubricate the threads of the filter housing and screw into the filter head. Maximum tightening torque for NG 40 to 100 = 60 Nm, for NG 160 to 400 = 100 Nm.
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.

11. Spare parts list



| Order numbers for spare parts | | |
|-------------------------------|------------------------------------|---------------|
| Position | Type | Order numbers |
| ① bis ④ | Seal kit | |
| | Pi 37004 - Pi 37010 | |
| | NBR | 79322009 |
| | FPM | 79322017 |
| | EPDM | 79322025 |
| | Pi 37016 - Pi 37040 | |
| | NBR | 79375213 |
| ⑤ | Maintenance indicator | |
| | Visual PiS 3093/5 | 77669914 |
| | Electrical PiS 3092/5 | 77669864 |
| | Electrical upper section only | 77536550 |
| ⑥ | Seal kit for maintenance indicator | |
| | NBR | 77760275 |
| | FPM | 77760283 |
| | EPDM | 77760291 |

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78368631.12/2016

Duplex Filter

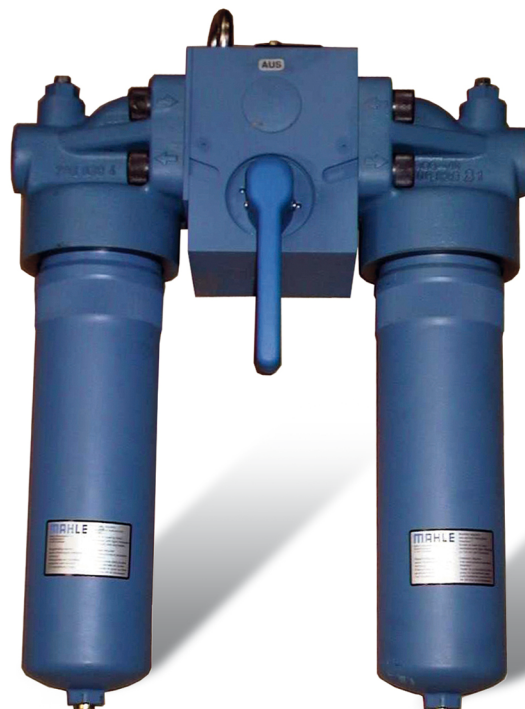
Pi 4700

Nominal pressure up to 315/350 bar (4570/4980 psi), nominal size 40 up to 400
according to DIN 24550

1. Features

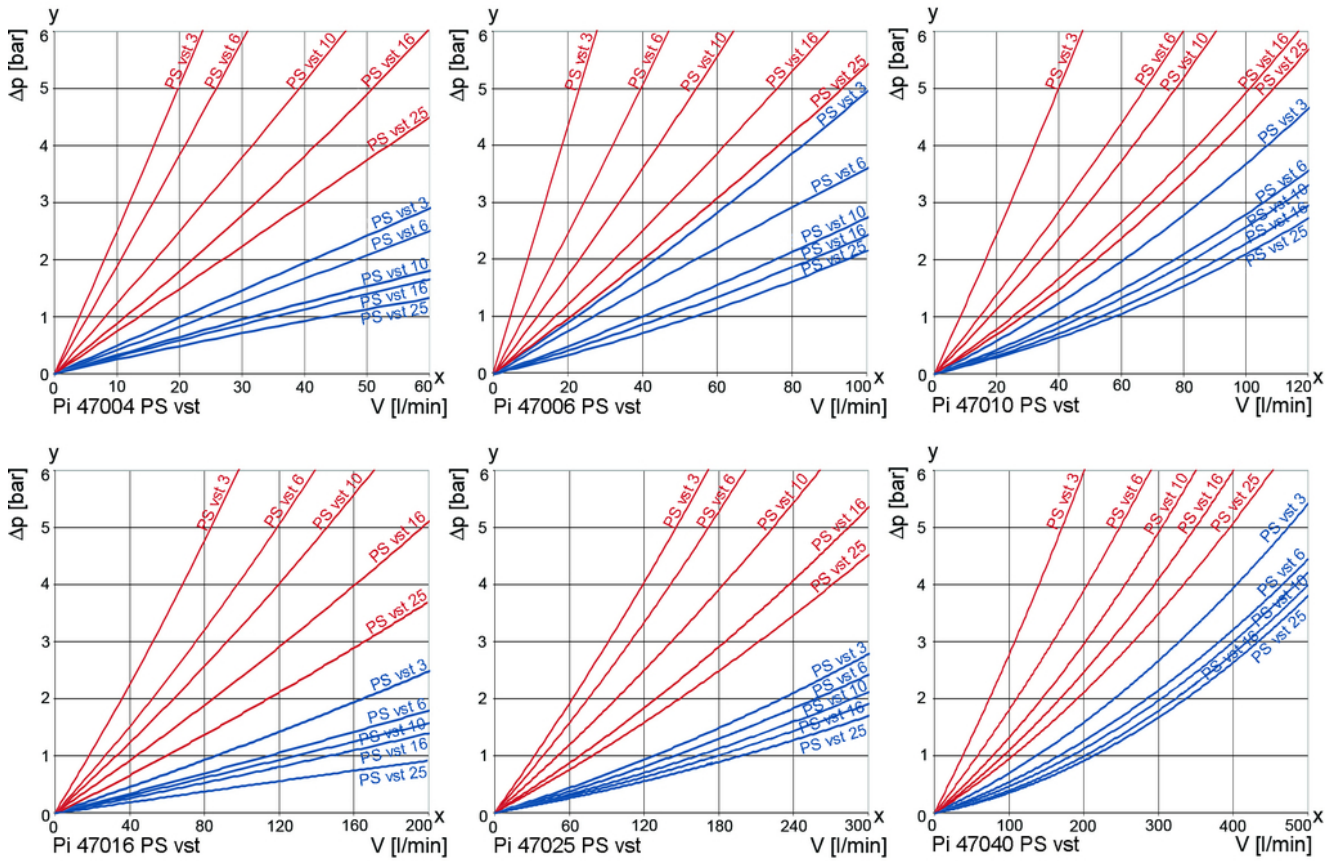
High performance filters for modern hydraulic systems

- Provided for pipe installation
- Modular system
- Compact design
- Minimal pressure drop through optimal flow design
- Visual/electrical/electronic maintenance indicator
- Threaded connections
- Ergonomic switch-over handle with safety lock user-optimized one-hand-operation
- 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
- NPT- and SAE-connections on request
- Worldwide distribution



2. Flow rate/pressure drop curve complete filter

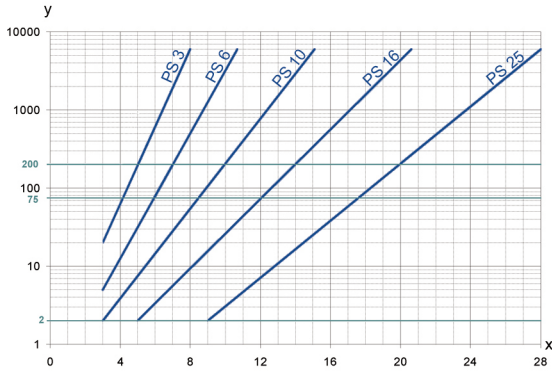
190 mm²/s
33 mm²/s



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)

PS vst elements with
max. Δp 210 bar

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

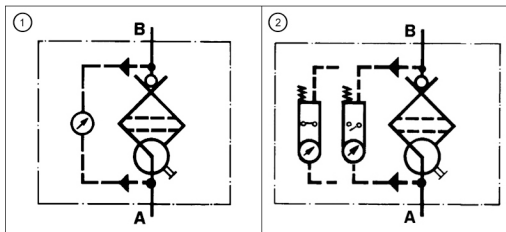
values guaranteed up to
20 bar differential pressure

5. Quality assurance

Filtration Group 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 | Fluidtechnik-Hydraulik Filterelemente, 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. 2x Filter element |
|--|--|
| V = 100 l/min and visual/electrical maintenance indication Type: Pi 47010-015 Order number: 70304308 | PS vst 10 Type: Pi 73010 DN PS vst 10 Order number: 77925670 |

| 7.1 Housing design | | | | | |
|-------------------------------|-----------------|--------------|--------------------------|-----------------------------------|---------------------------------------|
| Nominal size NG [l/min] | Order number | Type | with indicator cavity | ① with visual indication | ② with electrical indication |
| 40 | 70304318 | Pi 47004-010 | | | |
| | 70304300 | Pi 47004-014 | | | |
| | 70304306 | Pi 47004-015 | | | |
| 63 | 70304319 | Pi 47006-010 | | | |
| | 70304301 | Pi 47006-014 | | | |
| | 70304307 | Pi 47006-015 | | | |
| 100 | 70304320 | Pi 47010-010 | | | |
| | 70304302 | Pi 47010-014 | | | |
| | 70304308 | Pi 47010-015 | | | |
| 160 | 70304338 | Pi 47016-010 | | | |
| | 70304340 | Pi 47016-014 | | | |
| | 70304341 | Pi 47016-015 | | | |
| 250 | 70304332 | Pi 47025-010 | | | |
| | 70304335 | Pi 47025-014 | | | |
| | 70304331 | Pi 47025-015 | | | |
| 400 | 70304333 | Pi 47040-010 | | | |
| | 70304336 | Pi 47040-014 | | | |
| | 70304337 | Pi 47040-015 | | | |

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

| 7.2 Filter elements* | | | | | |
|----------------------------|-----------------|-----------------------|--------------------|--------------------------|--------------------------------------|
| Nominal size NG [l/min] | Order number | Type | Filter material | max. Δp [bar] | Filter surface [cm ²] |
| 40 | 78216079 | Pi 71004 DN PS vst 3 | PS vst 3 | 210 | 445 |
| | 77960156 | Pi 72004 DN PS vst 6 | PS vst 6 | | |
| | 77925654 | Pi 73004 DN PS vst 10 | PS vst 10 | | |
| | 78216087 | Pi 74004 DN PS vst 16 | PS vst 16 | | |
| | 78216095 | Pi 75004 DN PS vst 25 | PS vst 25 | | |
| 63 | 78216137 | Pi 71006 DN PS vst 3 | PS vst 3 | | |
| | 77960149 | Pi 72006 DN PS vst 6 | PS vst 6 | | |
| | 77925662 | Pi 73006 DN PS vst 10 | PS vst 10 | | |
| | 78216145 | Pi 74006 DN PS vst 16 | PS vst 16 | | |
| | 78216152 | Pi 75006 DN PS vst 25 | PS vst 25 | | |
| 100 | 78227480 | Pi 71010 DN PS vst 3 | PS vst 3 | | |
| | 77960131 | Pi 72010 DN PS vst 6 | PS vst 6 | | |
| | 77925670 | Pi 73010 DN PS vst 10 | PS vst 10 | | |
| | 78261281 | Pi 74010 DN PS vst 16 | PS vst 16 | | |
| | 78216160 | Pi 75010 DN PS vst 25 | PS vst 25 | | |

*a wider range of element types is available on request

| 7.2 Filter elements* | | | | | |
|----------------------------|-----------------|-----------------------|--------------------|--------------------------|--------------------------------------|
| Nominal size NG [l/min] | Order number | Type | Filter material | max. Δp [bar] | Filter surface [cm ²] |
| 160 | 77940638 | Pi 71016 DN PS vst 3 | PS vst 3 | 210 | 1885 |
| | 77960123 | Pi 72016 DN PS vst 6 | PS vst 6 | | |
| | 77925688 | Pi 73016 DN PS vst 10 | PS vst 10 | | |
| | 78269797 | Pi 74016 DN PS vst 16 | PS vst 16 | | |
| | 78216178 | Pi 75016 DN PS vst 25 | PS vst 25 | | |
| 250 | 77940646 | Pi 71025 DN PS vst 3 | PS vst 3 | 210 | 3090 |
| | 77960115 | Pi 72025 DN PS vst 6 | PS vst 6 | | |
| | 77925696 | Pi 73025 DN PS vst 10 | PS vst 10 | | |
| | 78269813 | Pi 74025 DN PS vst 16 | PS vst 16 | | |
| | 78216186 | Pi 75025 DN PS vst 25 | PS vst 25 | | |
| 400 | 77940653 | Pi 71040 DN PS vst 3 | PS vst 3 | 210 | 5240 |
| | 77960107 | Pi 72040 DN PS vst 6 | PS vst 6 | | |
| | 77930829 | Pi 73040 DN PS vst 10 | PS vst 10 | | |
| | 78269821 | Pi 74040 DN PS vst 16 | PS vst 16 | | |
| | 78260903 | Pi 75040 DN PS vst 25 | PS vst 25 | | |

* a wider range of element types is available on request

8. Technical specifications

| | |
|---|--|
| Design: | line mounting filter |
| Nominal pressure: Pi 47016-47040 | 315 bar (4480 psi) |
| Pi 47004-Pi 47010 | 350 bar (4980 psi) |
| Test pressure: Pi 47016-47040 | 410 bar (5830 psi) |
| Pi 47004-Pi 47010 | 455 bar (6470 psi) |
| Temperature range: | -10 °C to +120 °C (other temperature ranges on request) |
| Filter head material: | St |
| Filter housing material: | St |
| Sealing material: | NBR/PTFE |
| Maintenance indicator setting: | Δp 5 bar \pm 10 % |
| Electrical data of maintenance indicator: | |
| Max. voltage: | 250 V AC/200 V DC |
| Max. 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 |

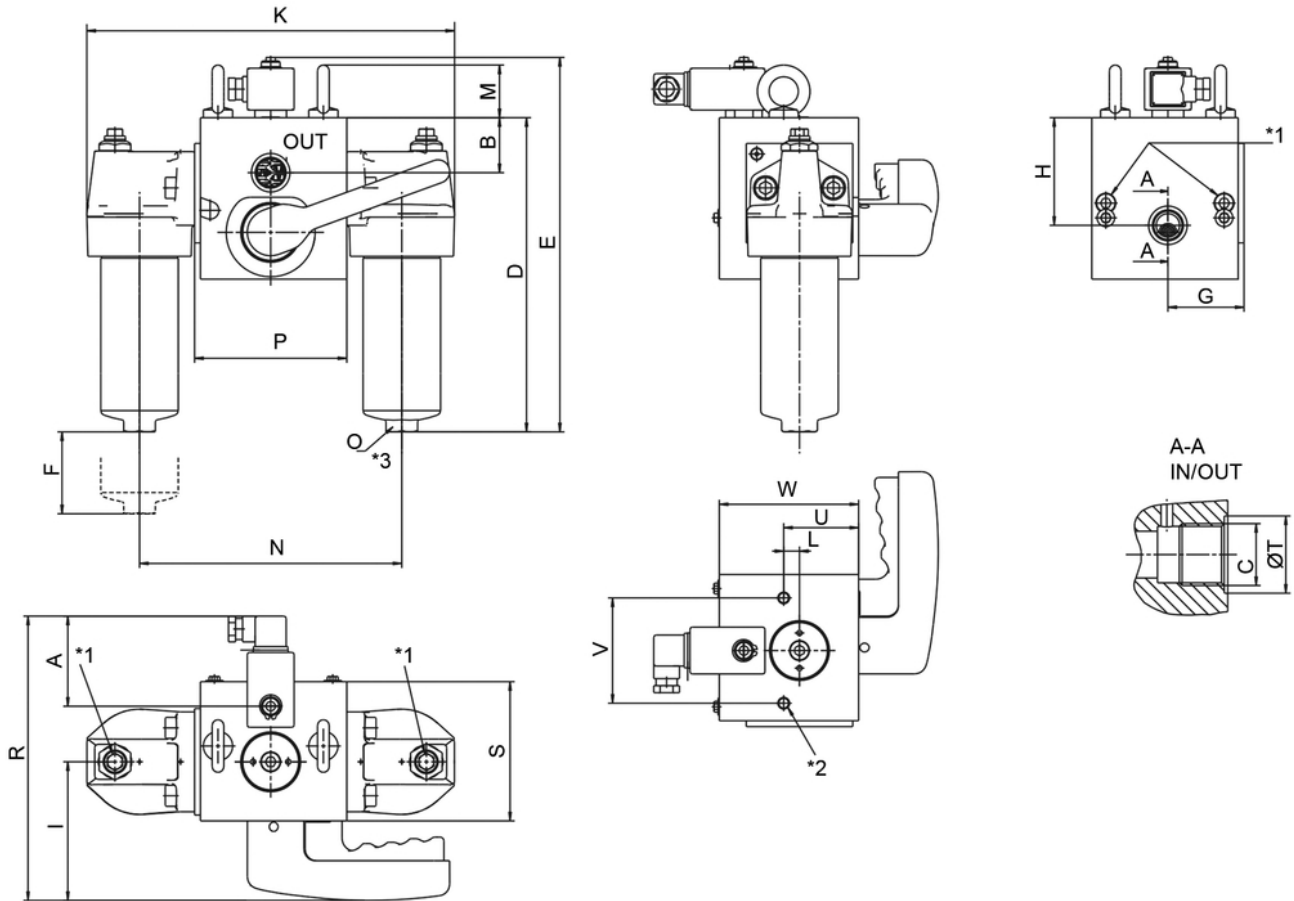
The switching function can be changed by turning the electric upper part by 180° (normally closed contact or normally open contact). The state on delivery is a normally closed contact. By inductivity in the direct current circuit the use of suitable protection circuit should be considered. Further maintenance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



*1 Vent screw

*2 Mounting cavity

*3 Drain screw Pi 47016 up to Pi 47040

M10x20 for Pi 47004 up to Pi 47010
M16x20 for Pi 47016 up to Pi 47040

All dimensions except "C" in mm.

| Type | A | B | C | D | E | F | G | H | I | K | L |
|----------|----|----|-----|-----|-----|-----|----|-----|-----|-----|----|
| Pi 47004 | 78 | 47 | G¾ | 269 | 320 | 110 | 65 | 92 | 119 | 314 | 14 |
| Pi 47006 | 78 | 47 | G¾ | 347 | 398 | 110 | 65 | 92 | 119 | 314 | 14 |
| Pi 47010 | 78 | 47 | G¾ | 423 | 474 | 110 | 65 | 92 | 119 | 314 | 14 |
| Pi 47016 | 78 | 53 | G1½ | 334 | 396 | 110 | 75 | 125 | 135 | 450 | 23 |
| Pi 47025 | 78 | 53 | G1½ | 424 | 486 | 110 | 75 | 125 | 135 | 450 | 23 |
| Pi 47040 | 78 | 53 | G1½ | 574 | 636 | 110 | 75 | 125 | 135 | 450 | 23 |

| Type | M | N | O | P | R | S | T | U | V | W | Weight [kg] |
|----------|----|-----|------|-----|-----|-----|----|----|-----|-----|-------------|
| Pi 47004 | 45 | 224 | SW27 | 130 | 243 | 119 | 33 | 64 | 90 | 119 | 22 |
| Pi 47006 | 45 | 224 | SW27 | 130 | 243 | 119 | 33 | 64 | 90 | 119 | 23 |
| Pi 47010 | 45 | 224 | SW27 | 130 | 243 | 119 | 33 | 64 | 90 | 119 | 25 |
| Pi 47016 | 62 | 300 | SW30 | 150 | 271 | 150 | 65 | 90 | 100 | 150 | 56 |
| Pi 47025 | 62 | 300 | SW30 | 150 | 271 | 150 | 65 | 90 | 100 | 150 | 61 |
| Pi 47040 | 62 | 300 | SW30 | 150 | 271 | 150 | 65 | 90 | 100 | 150 | 66 |

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 filters. Ascertain that the required clearance is provided so that the filter element and the filter housing can be removed. 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 EN 175301-803 with poles marked 1 and 2. The electrical section can be inverted to change from normally open 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 the trial run or flushing of the system. Afterwards follow instructions of the manufacturer.
3. Please always ensure that you have original Filtration Group spare elements in stock: Disposable elements (PS) 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

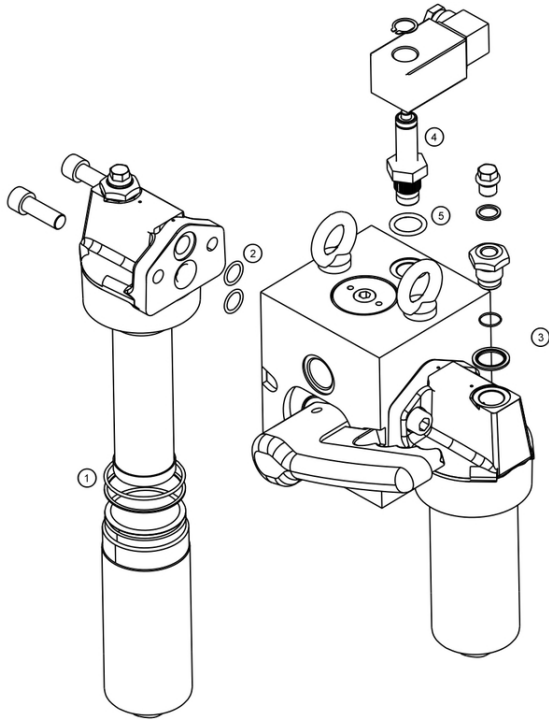
Note: The maintenance indicator monitors the filter side in operation, which is identified by the position of the switching lever catch. The change-over transfer valve must be switched prior filter servicing. Now the signal of the contamination indicator is cancelled and the red button can be repressed again:

1. Operate and hold pressure equalizing lever located behind switching lever. Pull catch knob and swivel switching lever. Engage the catch on the clear filter side. Place through or drip pan underneath to collect leaving oil.
2. Loosen vent screw of the filter side not in use by 2 to 3 turns.
3. Unscrew filter housing by turning counter-clockwise. Clean the housing using a suitable cleaning solvent.

Warning: The shift lever may not, from now until the screwing back in of the filter housing (7.), be activated under any circumstances!

4. Remove filter element by pulling down carefully.
5. Check O-ring on the filter housing for damage. Replace, if necessary.
6. Make sure that the order number on the spare element corresponds to the order number of the filter name-plate. Open the plastic bag and push element over the spigot in the filter head. Now remove plastic bag.
7. Lightly lubricate the threads of the filter housing and screw into the filter head. Maximum tightening torque for NG 40 to 100 = 60 Nm, for NG 160 to 400 = 100 Nm.
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.

11. Spare parts



| Order number for spare parts | | |
|------------------------------|------------------------------------|--------------|
| Position | Type | Order number |
| ① - ③ | Seal kit for housing | |
| | Pi 47004-47010 | |
| | NBR | 70304944 |
| | FPM | 70304945 |
| | EPDM | 70304946 |
| | Pi 47016-47040 | |
| | NBR | 70304922 |
| | FPM | 70304924 |
| ④ | Maintenance indicator | |
| | Visual PiS 3093/5 | 77669914 |
| | Electrical PiS 3092/5 | 77669864 |
| | Electrical upper part only | 77536550 |
| ⑤ | Seal kit for maintenance indicator | |
| | NBR | 77760275 |
| | FPM | 77760283 |
| | EPDM | 77760291 |

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