

## Low Pressure Filter

### Pi 230

Nominal pressure 25/40 bar, (360/570 psi), nominal size up to 1400

#### 1. Features

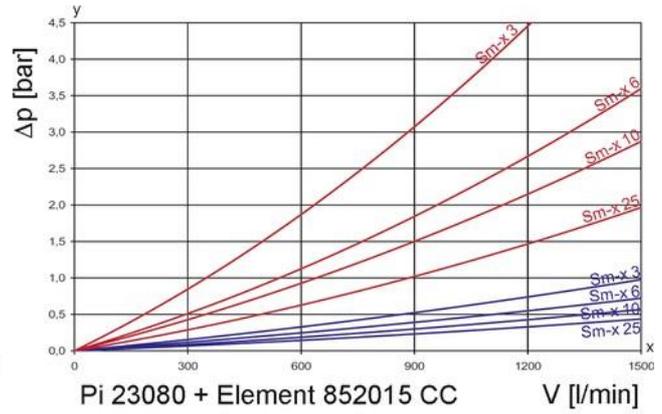
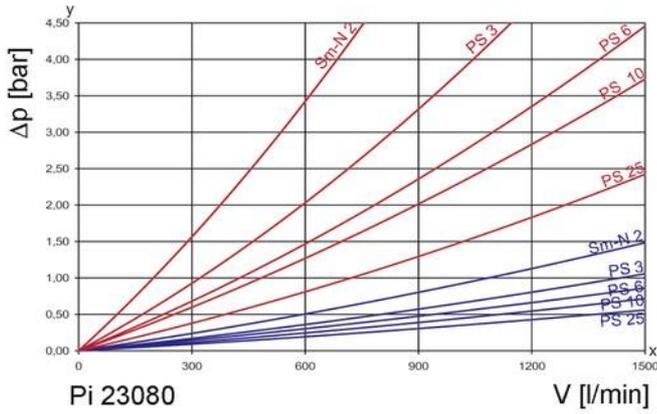
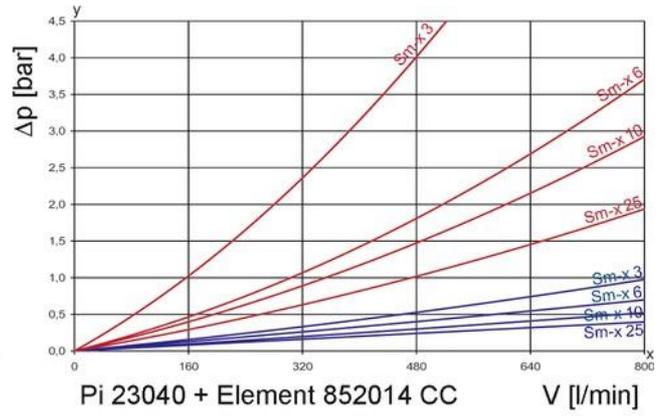
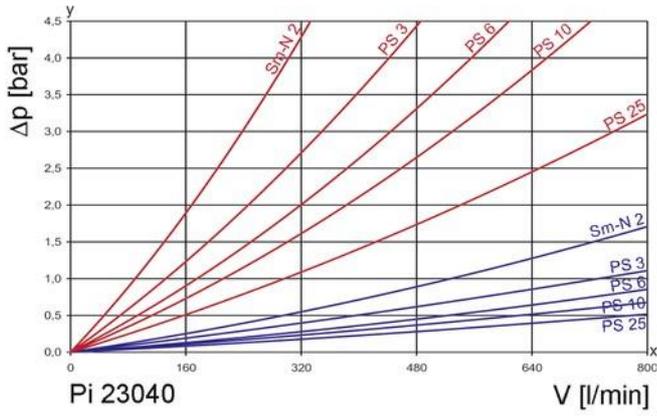
##### High performance filters for modern hydraulic systems

- Provided for pipe installation
- Modular system
- Compact design
- Minimal pressure drop through optimal flow design
- Visual/electrical/electronic maintenance indicator
- Quality filters, easy to service
- Equipped with highly efficient glass fibre PS and 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



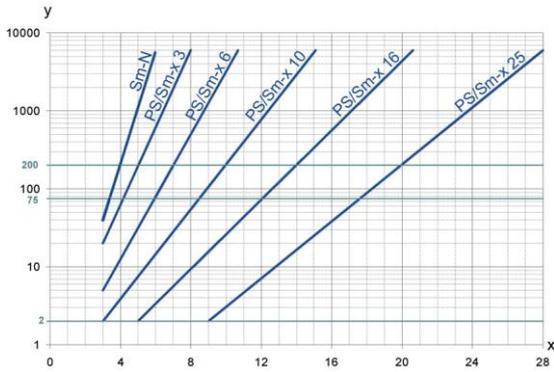
## 2. Flow rates/pressure drop curve (filter housing incl. element)

■ 190 mm<sup>2</sup>/s  
■ 33 mm<sup>2</sup>/s



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

### 3. Separation grade characteristics



y = beta-value  
x = particel size [ $\mu\text{m}$ ]

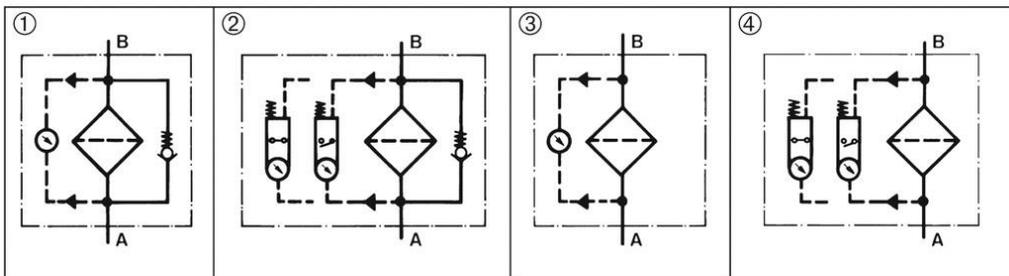
determined by multipass tests (ISO 16889)  
calibration according to ISO 11171 (NIST)

### 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 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.  $\Delta p$  20 bar

|         |    |                          |
|---------|----|--------------------------|
| Sm-N    | 2  | $\beta_{4(C)} \geq 200$  |
| PS/Sm-x | 3  | $\beta_{5(C)} \geq 200$  |
| PS/Sm-x | 6  | $\beta_{7(C)} \geq 200$  |
| PS/Sm-x | 10 | $\beta_{10(C)} \geq 200$ |
| PS/Sm-x | 25 | $\beta_{20(C)} \geq 200$ |

values guaranteed up to 10 bar differential pressure

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

## 7. Order numbers

Example for ordering filters:

| 1. Filter housing   | 2. Filter element  |
|---|--|
| Nominal size: 800, with bypass, electrical maintenance indicator, inlet at the side for standard filter elements<br>Type: Pi 23040/22-058<br>Order number: 76320972 | PS 10<br>Type: Pi 852014 PS 10<br>Order number: 76321814 |

### 7.1 Housing design standard

| Nominal size<br>NG [l/min] | Order number<br>inlet at<br>the bottom | Type<br>inlet at<br>the bottom | Order number<br>inlet at<br>the side | Type<br>inlet at<br>the side | ①  | ②  | ③                           | ④                               |
|----------------------------|--|--------------------------------|--------------------------------------|------------------------------|--|--|-----------------------------|---------------------------------|
|                            |  |                                |                                      |                              | with<br>bypass<br>valve and<br>visual<br>indicator | with<br>bypass<br>valve and<br>electrical<br>indicator | with<br>visual<br>indicator | with<br>electrical<br>indicator |
| 800                        | 76334668                               | Pi 23040/12-057                | 76320931                             | Pi 23040/22-057              |  |  |                             |                                 |
|                            | 76320964                               | Pi 23040/12-058                | 76320972                             | Pi 23040/22-058              |  |  |                             |                                 |
|                            | 76321004                               | Pi 23040/12-068                | 76321012                             | Pi 23040/22-068              |  |  |                             |                                 |
|                            | 76321046                               | Pi 23040/12-069                | 76321053                             | Pi 23040/22-069              |  |  |                             |                                 |
| 1400                       | 76320949                               | Pi 23080/12-057                | 76320956                             | Pi 23080/22-057              |  |  |                             |                                 |
|                            | 76320980                               | Pi 23080/12-058                | 76320998                             | Pi 23080/22-058              |  |  |                             |                                 |
|                            | 76321020                               | Pi 23080/12-068                | 76321038                             | Pi 23080/22-068              |  |  |                             |                                 |
|                            | 76321061                               | Pi 23080/12-069                | 76321079                             | Pi 23080/22-069              |  |  |                             |                                 |

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

### 7.2 Filter elements standard\*

| Nominal size<br>NG [l/min] | Order number | Type          | Filter material | max. $\Delta p$<br>[bar] | Filter surface<br>[cm <sup>2</sup> ] |
|----------------------------|--------------|---------------|-----------------|--------------------------|--------------------------------------|
| 800                        | 76136220     | 852014 Sm-N 2 | Sm-N 2          | 20                       | 18533                                |
|                            | 76321830     | 852014 PS 3   | PS 3            |                          | 24830                                |
|                            | 76321822     | 852014 PS 6   | PS 6            |                          | 24830                                |
|                            | 76321814     | 852014 PS 10  | PS 10           |                          | 24830                                |
|                            | 76321806     | 852014 PS 25  | PS 25           |                          | 24830                                |
| 1400                       | 76136212     | 852015 Sm-N 2 | Sm-N 2          | 20                       | 42275                                |
|                            | 76321897     | 852015 PS 3   | PS 3            |                          | 57200                                |
|                            | 76321889     | 852015 PS 6   | PS 6            |                          | 57200                                |
|                            | 76321871     | 852015 PS 10  | PS 10           |                          | 57200                                |
|                            | 76321863     | 852015 PS 25  | PS 25           |                          | 57200                                |

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

### 7.3 Housing design CC

| Nominal size<br>NG [l/min] | Order number<br>inlet at<br>the bottom | Type<br>inlet at<br>the bottom | Order number<br>inlet at<br>the side | Type<br>inlet at<br>the side | ①  | ②  | ③                           | ④                               |
|----------------------------|--|--------------------------------|--------------------------------------|------------------------------|--|--|-----------------------------|---------------------------------|
|                            |  |                                |                                      |                              | with<br>bypass<br>valve and<br>visual<br>indicator | with<br>bypass<br>valve and<br>electrical<br>indicator | with<br>visual<br>indicator | with<br>electrical<br>indicator |
| 800                        | 79770074                               | Pi 23040/1C-057                | 79770116                             | Pi 23040/2C-057              |  |  |                             |                                 |
|                            | 76320642                               | Pi 23040/1C-058                | 76320659                             | Pi 23040/2C-058              |  |  |                             |                                 |
|                            | 76320683                               | Pi 23040/1C-068                | 76320691                             | Pi 23040/2C-068              |  |  |                             |                                 |
|                            | 76320725                               | Pi 23040/1C-069                | 76320733                             | Pi 23040/2C-069              |  |  |                             |                                 |
| 1400                       | 79768854                               | Pi 23080/1C-057                | 79768862                             | Pi 23080/2C-057              |  |  |                             |                                 |
|                            | 76320667                               | Pi 23080/1C-058                | 76320675                             | Pi 23080/2C-058              |  |  |                             |                                 |
|                            | 76320709                               | Pi 23080/1C-068                | 76320717                             | Pi 23080/2C-068              |  |  |                             |                                 |
|                            | 76320741                               | Pi 23080/1C-069                | 76320758                             | Pi 23080/2C-069              |  |  |                             |                                 |

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

### 7.4 Filter elements CC\*

| Nominal size<br>NG [l/min] | Order number | Type              | Filter material | max. $\Delta p$<br>[bar] | Filter surface<br>[cm <sup>2</sup> ] |
|----------------------------|--------------|-------------------|-----------------|--------------------------|--------------------------------------|
| 800                        | 76135859     | 852014 CC Sm-x 3  | Sm-x 3          | 5                        | 23000                                |
|                            | 76135867     | 852014 CC Sm-x 6  | Sm-x 6          |                          | 23000                                |
|                            | 76135875     | 852014 CC Sm-x 10 | Sm-x 10         |                          | 23000                                |
|                            | 76135883     | 852014 CC Sm-x 25 | Sm-x 25         |                          | 23000                                |
| 1400                       | 76322028     | 852015 CC Sm-x 3  | Sm-x 3          | 5                        | 60159                                |
|                            | 76322010     | 852015 CC Sm-x 6  | Sm-x 6          |                          | 60159                                |
|                            | 76322002     | 852015 CC Sm-x 10 | Sm-x 10         |                          | 60159                                |
|                            | 76321996     | 852015 CC Sm-x 25 | Sm-x 25         |                          | 60159                                |

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

## 8. Technical specifications

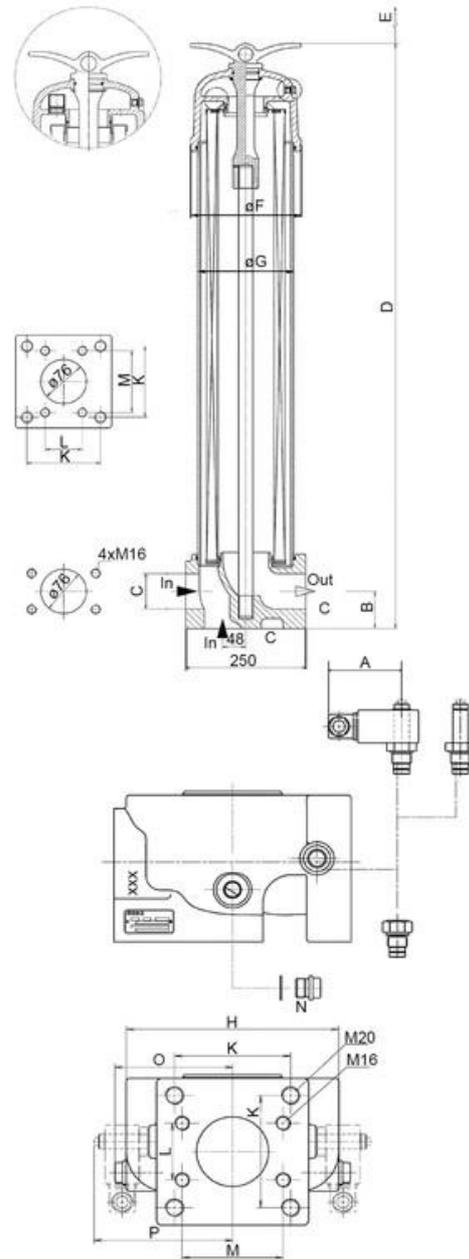
|   |  |
|---|--|
| Nominal pressure (10 <sup>7</sup> LW):    | 25 bar (360 psi)   |
| Nominal pressure (static):                | 40 bar (570 psi)   |
| Temperature range:                        | -10 °C to +120 °C<br>(other temperature ranges on request) |
| Bypass setting:                           | Δ 3.5 bar ± 10 %   |
| Filter head and cap material:             | GAL  |
| Filter housing material:                  | AL   |
| Sealing material:                         | NBR  |
| Maintenance indicator setting:            | Δ p 2.2 bar ± 0.3 bar                                      |
| 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 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 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 94/4 EC (ATEX 95). The standard version can be used for liquids based on mineral oil (corresponding to fluids in Group2 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  
Out = Outlet

## 9. Dimensions

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

| Type     | A  | B  | C               | D    | E   | F   | G   | H   | K     | L    | M     | N  | O   | P   | Weight [kg] |
|----------|----|----|-----------------|------|-----|-----|-----|-----|-------|------|-------|----|-----|-----|-------------|
| Pi 23040 | 78 | 80 | SAE 3, 3000 psi | 710  | 220 | 230 | 200 | 224 | 122,3 | 61,9 | 106,6 | G½ | 124 | 146 | 29          |
| Pi 23080 | 78 | 80 | SAE 3, 3000 psi | 1260 | 770 | 230 | 200 | 224 | 122,3 | 61,9 | 106,6 | G½ | 124 | 146 | 30          |

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 upwards.

The maintenance indicator must be visible.

### 10.2 Connecting the electrical maintenance indicator

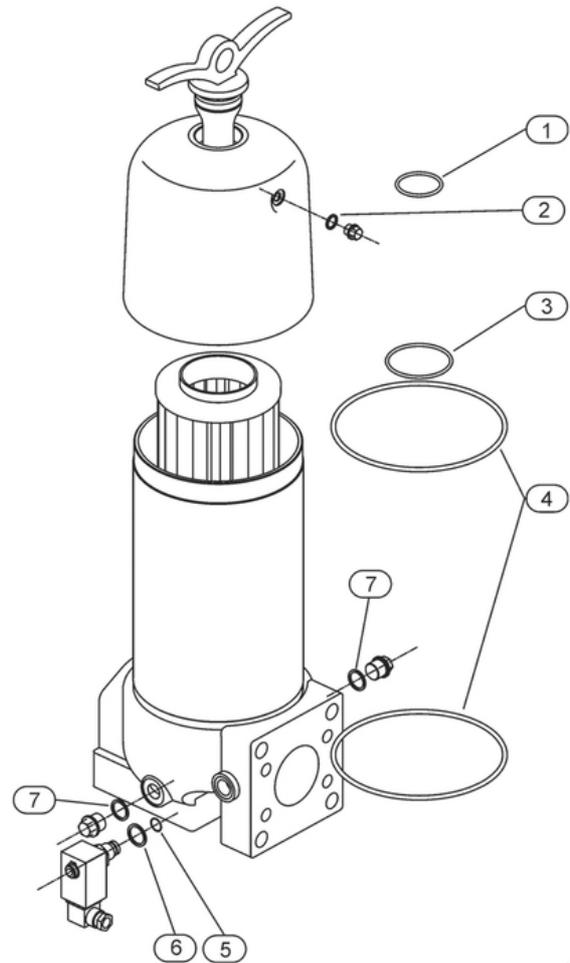
The electrical indicator is connected via a 2-pole appliance plug according to DIN EN 175301-803 with poles marked 1 and 2. The electrical section can be inverted to change from normally open to normally closed position or vice versa.

### 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 and 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 the instructions of the manufacturer.
- Please always ensure that you have original Filtration Group spare elements in stock: Disposable elements (PS, Sm-x, Sm-N2) cannot be cleaned.

### 10.4. Element replacement

- Stop system and relieve filter from pressure.
- Loosen quick-action clamp, remove cover and open drain valve. Housing completely vented.
- Remove filter element from filter housing.
- Check seals for damages. Replace, if necessary.
- 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.
- Close drain valve. Put the thumb screw together with the cover on the centre rod and tighten strong. Filter must be bled.



## 11. Spare parts list

| Order numbers for spare parts |                                    |              |
|-------------------------------|------------------------------------|--------------|
| Position                      | Type                               | Order number |
| ①②③<br>④⑦                     | Seal kit                           |              |
|                               | NBR                                | 76321244     |
|                               | FPM                                | 76321251     |
|                               | EPDM                               | 76321269     |
|                               | Maintenance indicator              |              |
|                               | Visual PiS 3098/2.2                | 77669971     |
|                               | Visual/electrical PiS 3097/2.2     | 77669948     |
|                               | Electrical upper section only      | 77536550     |
| ⑤⑥                            | Seal kit for maintenance indicator |              |
|                               | NBR                                | 77760309     |
|                               | FPM                                | 77760317     |
|                               | EPDM                               | 77760325     |

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[Low Pressure Filter Pi 230 up to NG 1400](#)