# Duplex filter with filter element according to DIN 24550

## Type 40 FLDN 0400 to 1001; 40 FLD 0120 to 0274

**RE 51408**
Edition: 2021-04
Replaces: -

- Size **according to DIN 24550**: 0400 to 1001
- Additional sizes: 0120 to 0274
- Nominal pressure: 40 bar *[580 psi]*
- Connection up to SAE 4" 3000 psi
- Operating temperature -10 °C ... +100 °C *[14 °F ... 212 °F]*

## Features

Duplex filters are used in hydraulic systems for separating solid materials from fluids and lubricating oils.
They are intended for installation into pipelines and allow for the exchange of the filter element without operational interruption.

They distinguish themselves by the following:

- Filters for inline installation, switchable
- Special highly efficient filter materials
- Filtration of very fine particles and high dirt holding capacity across a broad pressure differential range
- Optionally equipped with mechanical optical maintenance indicator with memory function
- Available as an option with various optional electronic switching elements, modular design
- Optional bypass valve integrated in the filter housing
- Switch-over via bank segment change-over
- Inlet above, outlet below

## Contents

## Ordering code filter

| 01 | 02 | 03 | 04 | | 05 | | 06 | 07 | 08 | | 09 | 10 | 11 | 12 | 12 | 12 | | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **40 FLD** | | | | **–** | **A00** | **–** | **0** | | | **–** | **S0** | | **0** | **A** | | | **–** | |

**Series**

| | | |
|---|---|---|
| 01 | Duplex filter 40 bar *[580 psi]* | **40 FLD** |

**Filter element**

| | | |
|---|---|---|
| 02 | **With** filter element according to **DIN 24550** | **N** |

**Size**

| | | |
|---|---|---|
| 03 | FLDN... | **0400**<br>**0630**<br>**1001** |
| | FLD... | **0120**<br>**0201**<br>**0271**<br>**0272**<br>**0273**<br>**0274** |

**Filter rating in µm**

| | | | |
|---|---|---|---|
| 04 | **Absolute**<br>**(ISO 16889; $\beta_x(c) \geq 200$)** | Glass fiber material, not cleanable | **PWR3**<br>**PWR6**<br>**PWR10**<br>**PWR20** |
| | **Nominal** | Stainless steel wire mesh, cleanable | **G10**<br>**G25**<br>**G40**<br>**G60**<br>**G100** |
| | | Paper, not cleanable | **P10**<br>**P25** |

**Pressure differential**

| | | |
|---|---|---|
| 05 | Max. admissible pressure differential of the filter element 30 bar *[435 psi]*, filter **with** bypass valve recommended | **A00** |

**Solenoid**

| | | |
|---|---|---|
| 06 | **Without** magnet | **0** |

**Bypass valve**

| | | |
|---|---|---|
| 07 | **Without** bypass valve[1)] | **0** |
| | **With** bypass valve – release pressure 2.5 bar *[36.3 psi]* – **configurable with** maintenance indicator V0.8 | **5** |
| | **With** bypass valve– release pressure 3.5 bar *[51 psi]* – **configurable with** maintenance indicator V1.5 or V2.2 | **7** |

**Maintenance indicator**

| | | |
|---|---|---|
| 08 | Maintenance indicator, mech./optical, switching pressure 0.8 bar *[11.6 psi]* | **V0.8** |
| | Maintenance indicator, mech./optical, switching pressure 1.5 bar *[21.8 psi]* | **V1.5** |
| | Maintenance indicator, mech./optical, switching pressure 2.2 bar *[32 psi]* | **V2.2** |

**Port**

| 09 | **Frame size** | **0400-0630; 0120** | **1001; 0201-0274** | | |
|---|---|---|---|---|---|
| | **Port** | | | | |
| | SAE 3" | ● | | SAE flange 3000 psi | **S0** |
| | SAE 4" | | ● | | **S0** |
| | | ● Standard connection | | | |

**Seal**

| | | |
|---|---|---|
| 10 | NBR seal | **M** |
| | FKM seal | **V** |

## Ordering code filter

| 01 | 02 | 03 | 04 | | 05 | | 06 | 07 | 08 | | 09 | 10 | 11 | 12 | 12 | 12 | | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **40 FLD** | | | | **–** | **A00** | **–** | **0** | | | **–** | **S0** | | **0** | **A** | | | **–** | |

**Material**

| | | |
|---|---|---|
| 11 | Standard | **0** |

**Supplementary information** (Multiple specifications possible)

| | | |
|---|---|---|
| 12 | Pressure equalization line (standard) | **A** |
| | Bleed valve | **E** |
| | Manufacturer's inspection certificate M according to DIN 55350 T18 | **Z1** |

**Additional supplementary information**

| | | | |
|---|---|---|---|
| 13 | Design for hydraulic special fluids<br>(see table "Compatibility with approved hydraulic fluids", page 9) | NG0400-0630; 0120 | **(omit)** |
| | | NG1001; 0201-0274 | **0066** |

1) **Attention**: If this option is selected and the switching signal of the maintenance indicator is not observed during operation, the filter element may collapse in case of pressure differentials of more than 30 bar *[435 psi]*.

**Order example:**
**40 FLDN 0400 PWR10-A00-07V2,2-S0M0A**

**Further versions (filter materials, etc.) are available on request.**

## Preferred types

**40 FLD(N) preferred types, NBR seal, flow specifications for 30 mm²/s** *[143 SUS]*
**Duplex filter, filter rating 3 µm**

| Type | Flow in l/min *[US gpm]* with Δ*p* = 0.8 bar *[11.6 psi]* 1) | Material no. filter | Material no. replacement element |
|---|---|---|---|
| 40 FLDN 0400 PWR3-A00-07V2,2-S0M0A | 355 *[93]* | **R928000387** | **R928005961** |
| 40 FLDN 0630 PWR3-A00-07V2,2-S0M0A | 515 *[136]* | **R928000388** | **R928005997** |
| 40 FLD 0120 PWR3-A00-07V2,2-S0M0A | 735 *[194]* | **R928000392** | **R928006033** |
| 40 FLDN 1001 PWR3-A00-07V2,2-S0M0A | 550 *[145]* | **R928000389** | **R928005745** |
| 40 FLD 0201 PWR3-A00-07V2,2-S0M0A | 1040 *[274]* | **R928000393** | **R928005799** |
| 40 FLD 0271 PWR3-A00-07V2,2-S0M0A | 1190 *[314]* | **R928000394** | **R928005817** |

**40 FLD(N) preferred types, NBR seal, flow specifications for 30 mm²/s** *[143 SUS]*
**Duplex filter, filter rating 10 µm**

| Type | Flow in l/min *[US gpm]* with Δ*p* = 0.8 bar *[11.6 psi]* 1) | Material no. filter | Material no. replacement element |
|---|---|---|---|
| 40 FLDN 0400 PWR10-A00-07V2,2-S0M0A | 710 *[187]* | **R928000397** | **R928005963** |
| 40 FLDN 0630 PWR10-A00-07V2,2-S0M0A | 830 *[219]* | **R928000398** | **R928005999** |
| 40 FLD 0120 PWR10-A00-07V2,2-S0M0A | 950 *[250]* | **R928000402** | **R928006035** |
| 40 FLDN 1001 PWR10-A00-07V2,2-S0M0A | 850 *[224]* | **R928000399** | **R928005747** |
| 40 FLD 0201 PWR10-A00-07V2,2-S0M0A | 1500 *[396]* | **R928000403** | **R928005801** |
| 40 FLD 0271 PWR10-A00-07V2,2-S0M0A | 1570 *[414]* | **R928000404** | **R928005819** |

1) An appropriate differential pressure via the filter and measuring device according to ISO 3968. The differential pressure measured on the maintenance indicator is lower.

## **Ordering code accessories**(dimensions in mm *[inch]*)

## Electronic switching element for maintenance indicators

| 01 | | 02 | | 03 |
|---|---|---|---|---|
| **WE** | **–** | | **–** | |

**Maintenance indicator**

| | | |
|---|---|---|
| 01 | electronic switching element | **WE** |

**Type of signal**

| | | |
|---|---|---|
| 02 | 1 switching point | **1SP** |
| | 2 switching points, 3 LED | **2SP** |
| | 2 switching points, 3 LED and signal suppression up to 30 °C *[86 °F]* | **2SPSU** |

**Connector**

| | | |
|---|---|---|
| 03 | Round plug-in connection M12x1, 4-pole | **M12x1** |
| | Rectangular plug-in connector, 2-pole, design A according to EN-175301-803 | **EN175301-803** |

**Material numbers of the electronic switching elements**

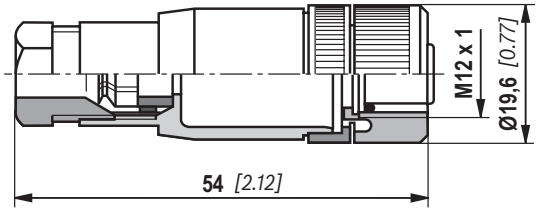
| Material no. | Type | Signal | Switching points | Connector | LED |
|---|---|---|---|---|---|
| **R928028409** | WE-1SP-M12x1 | Changeover | 1 | M12x1 | without |
| **R928028410** | WE-2SP-M12x1 | Normally open (at 75 %) / normally closed contact (at 100 %) | 2 | | 3 pieces |
| **R928028411** | WE-2SPSU-M12x1 | | | | |
| **R928036318** | WE-1SP-EN175301-803 | Normally closed contact | 1 | EN 175301-803 | without |

## Mating connectors

for electronic switching element with round plug-in connection M12x1

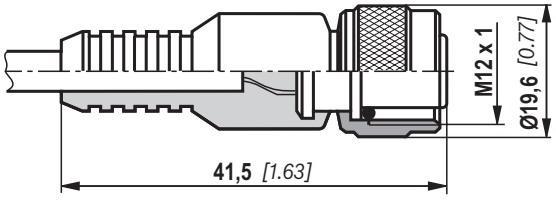
Mating connector suitable for K24 4-pole, M12x1
with screw connection, cable gland Pg9.

**Material no. R900031155**




Mating connector suitable for K24-3m 4-pole, M12x1
with potted-in PVC cable, 3 m long.
Line cross-section: 4 x 0.34 mm²
Core marking: **1** brown **2** white
**3** blue **4** black

**Material no. R900064381**




For more round plug-in connections and technical data refer to data sheet 08006.

**Order example:**
Duplex filter with mechanical optical maintenance indicator for $p_{nominal}$ = 40 bar *[580 psi]* with bypass valve, size 0400, with filter element 3 µm and electronic switching element M12x1 with one switching point.

| | | |
|---|---|---|
| **Filter with mech. optical maintenance indicator:** | 40 FLDN 0400 PWR3-A00-07V2,2-S0M0A | **Material no. R928000387** |
| **Switching element:** | WE-1SP-M12x1 | **Material no. R928028409** |
| **Mating connector:** | Mating connector suitable for K24 4-pole, M12x1 | **Material no. R900031155** |

## Filter design

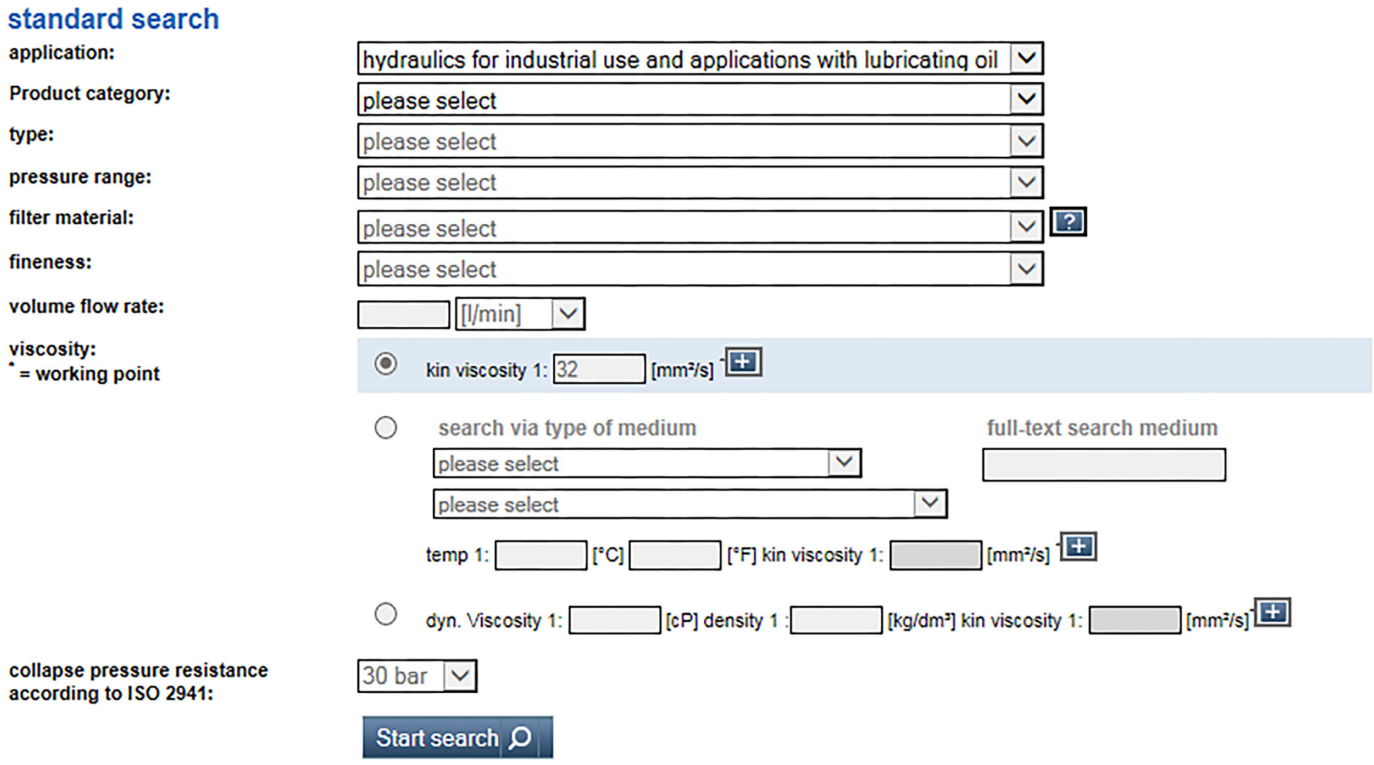
Easy selection of the filter size is made possible by the FilterSelect online tool. The filter can be designed using the operating pressure, flow and fluid system parameters. The required filter rating is based on the application, the sensitivity to contamination of the components and the environmental conditions.

The program leads you through the menu on a step-by-step basis.

A documentation of the filter selection can finally be created in the form of a PDF file. This file contains the entered parameters, the designed filter with material number including spare parts, and the pressure loss curves.

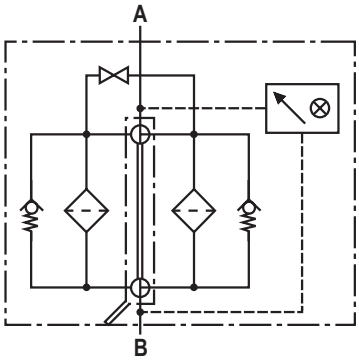
Link FilterSelect:
http://www.filterselect.de/

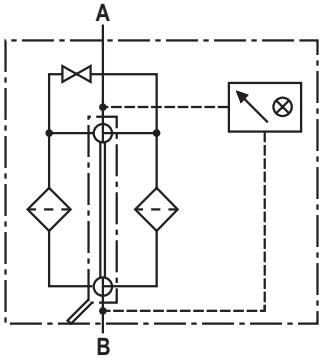
Other languages can be selected using the page navigation.



## Symbols

**Duplex filter**
with bypass and with mechanical indicator



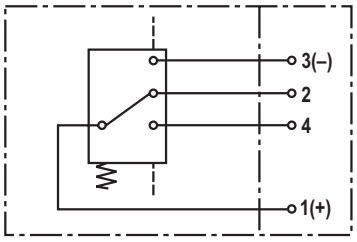




**Duplex filter**
without bypass and with mechanical indicator

**electronic switching element**

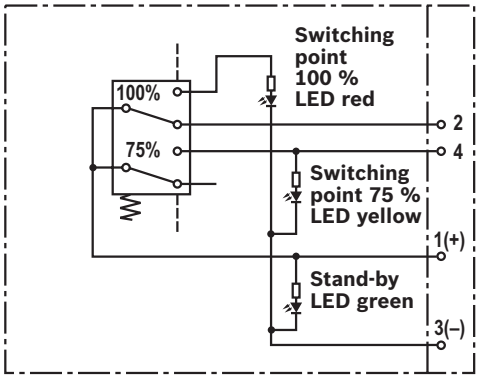
**for maintenance indicator**

**Switching element** **Connector**




**WE-1SP-M12x1**

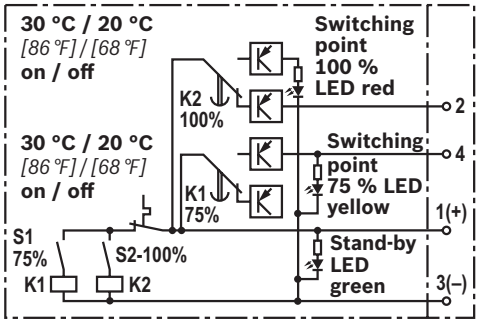
**Switching element** **Connector**




**WE-2SP-M12x1**

Circuit diagram drawn in plugged condition (operating state)

**Switching element** **Connector**




**WE-2SPSU-M12x1**

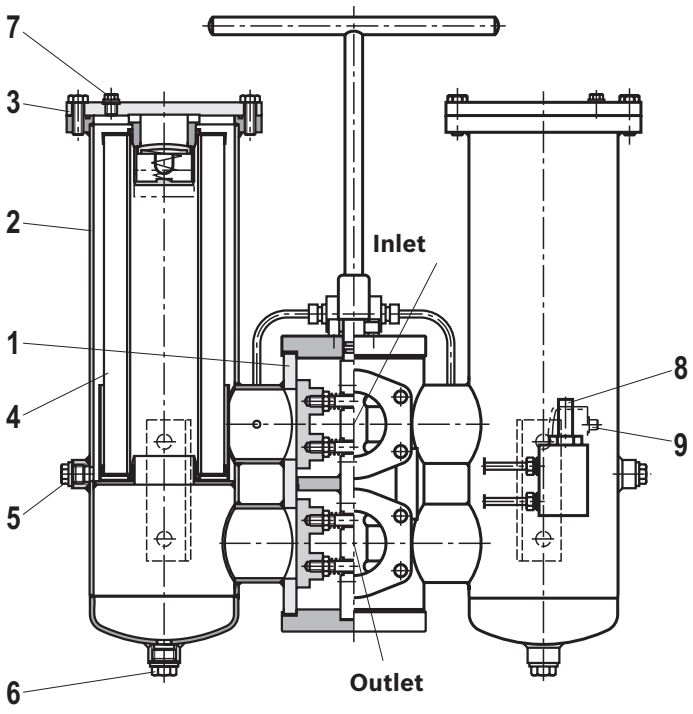
Circuit diagram drawn in plugged condition at temperature > 30 °C *[86 °F]* (operating condition)

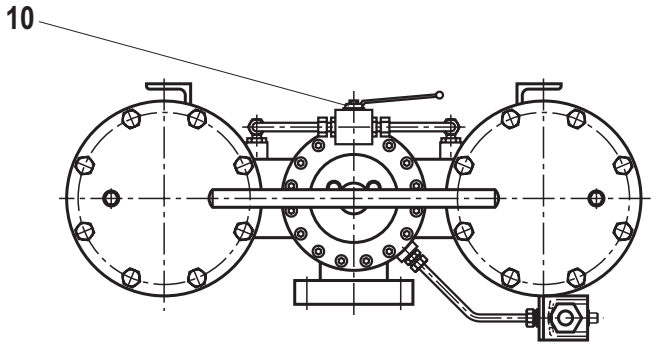
## Function, section: NG0400 ... 0630 / 0120

The 40FLDK(N) duplex filter is suitable for inline installation. It basically consists of two filter housings (2) with one switch-over fitting (1), two filter covers (3), two filter elements (4) as well as mechanical optical maintenance indicator (8).
Via the inlet, the hydraulic fluid reaches the filter element (4) where it is cleaned. The dirt particles filtered out collect in the filter element (4). Via the outlet, the filtered fluid enters the hydraulic circuit.
Switching between the two filter housings is carried out by means of the switching lever.

The filter housing and all connection elements are designed so that pressure peaks – as they may occur e.g. in case of abrupt opening of large control valves due to the accelerated fluid quantity – can be securely absorbed.

Via the bleed screws (standard) and/or bleed valves – amending ordering code E – (7) the filter side to be maintained can be bled.
The sizes 0400-0630 / 0120 are equipped with mounting brackets. The standard pressure equalization line (10) serves to simplify the filling and bleeding in a filter element exchange.
By default, the filter is equipped with mechanical optical maintenance indicator (8). The electronic switching element (9) which has to be ordered separately is attached to the mechanical optical maintenance indicator (8) and held by means of a locking ring.
The electronic switching elements with 1 or 2 switching points are connected via a mating connector according to IEC-60947-5-2 or via a cable connection according to EN17301-803.




**Type 40 FLDN 0630**

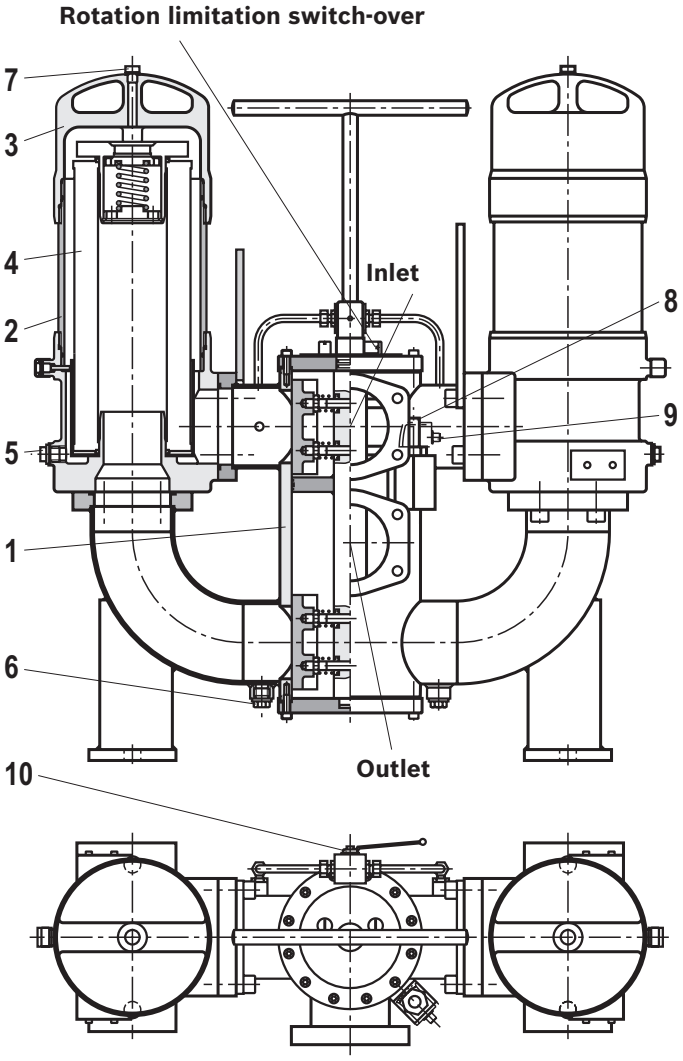
**5** Draining dirt side
**6** Draining clean side

## Function, section: NG1001 / 0201 ... 0271

The 40 FLD(N) duplex filter is suitable for inline installation. It basically consists of two filter housings (2) with one switch-over fitting (1), two threaded filter heads (3), two filter elements (4) as well as mechanical optical maintenance indicator (8).
Via the inlet, the hydraulic fluid reaches the filter element (4) where it is cleaned. The filtered dirt particles collect in the filter element (4) and the filtered fluid enters the hydraulic circuit via the outlet.
Switching between the two filter housings is carried out by means of the switching lever. The rotation limitation must be placed at the stop position.

The filter housing and all connection elements are designed so that pressure peaks – as they may occur e.g. in case of abrupt opening of large control valves due to the accelerated fluid quantity – can be securely absorbed.

Via the bleed screws (standard) and/or bleed valves – amending ordering code E – (7) the filter side to be maintained can be bled.
The sizes 1001 / 0201-0271 are equipped with a floor mount. The standard pressure equalization line (10) serves to simplify the filling and bleeding in a filter element exchange.
By default, the filter is equipped with mechanical optical maintenance indicator (8). The electronic switching element (9) which has to be ordered separately is attached to the mechanical optical maintenance indicator (8) and held by means of a locking ring.
The electronic switching elements with 1 or 2 switching points are connected via a mating connector according to IEC-60947-5-2 or via a cable connection according to EN17301-803.




**Type 40 FLDN 1001**

**5** Draining dirt side
**6** Draining clean side

## **Technical data** (For applications outside these parameters, please consult us!)

| **General** | | | | | | | |
|---|---|---|---|---|---|---|---|
| Installation position | | | | vertical | | | |
| Ambient temperature range | | | °C *[°F]* | –10 ... +65 *[14 ... 149]*; (briefly up to -30 *[-22]*) | | | |
| Storage conditions | – NBR seal | | | –40 ... +65 *[+14 ... +149]*; max. relative air humidity 65 % | | | |
| | – FKM seal | | | –20 ... +65 *[+14 ... +149]*; max. relative air humidity 65 % | | | |
| Weight | | | NS | **0400** | **0630** | **0120** | **1001** |
| | | | kg *[lbs]* | 84 *[185]* | 86 *[189]* | 99 *[218]* | 198 *[436]* |
| | | | NS | **0201** | **0271** | **0272** | **0273** | **0274** |
| | | | kg *[lbs]* | 128 *[282]* | 176 *[388]* | 326 *[719]* | 476 *[1049]* | 626 *[1380]* |
| Volume | | | NS | **0400** | **0630** | **0120** | **1001** |
| | | | l *[US gal]* | 2x 8 2x *[2.1]* | 2x 11 2x *[2.9]* | 2x 18 2x *[4.7]* | 2x 12 2x *[3.1]* |
| | | | NS | **0201** | **0271** | **0272** | **0273** | **0274** |
| | | | l *[US gal]* | 2x 22 2x *[5.8]* | 2x 28 2x *[7.3]* | 2x 67 *2x [18]* | 2x 99 *2x [26]* | 2x 131 *2x [35]* |
| Material | – Filter cover | NG0400-0630 | | Steel | | | |
| | | NG1001-0274 | | Aluminum | | | |
| | – Filter housing | NG0400-0630 | | Steel | | | |
| | | NG1001-0274 | | Steel / aluminum | | | |
| | – Bypass valve | | | PA6 / steel / POM | | | |
| | – Seals | | | NBR or FKM | | | |
| | – Optical maintenance indicator | | | Aluminum | | | |
| | – Electronic switching element | | | Plastic PA6 | | | |

| **Hydraulic** | | | |
|---|---|---|---|
| Maximum operating pressure | bar *[psi]* | 40 *[580]* | |
| Hydraulic fluid temperature range | °C *[°F]* | –10 ... +100 *[+14 ... +212]* | |
| Minimum conductivity of the medium | pS/m | 300 | |
| Fatigue strength according to ISO 10771 | Load cycles | > $10^6$ with max. operating pressure | |
| Type of pressure measurement of the maintenance indicator | | Pressure differential | |
| Assignment: Response pressure of the maintenance indicator / cracking pressure of the bypass valve | | Response pressure of the maintenance indicator | Cracking pressure of the bypass valve |
| | bar *[psi]* | 0.8 ± 0.15 *[11.6 ± 2.2]* | 2.5 ± 0.25 *[36.25 ± 3.63]* |
| | | 1.5 ± 0.2 *[21.8 ±2.9]* | 3.5 ± 0.35 *[50.8 ± 5.1]* |
| | | 2.2 ± 0.3 *[31.9 ± 4.4]* | 3.5 ± 0.35 *[50.8 ± 5.1]* |

## **Technical data** (For applications outside these parameters, please consult us!)

| **Electric** (electronic switching element) | | | | | | |
|---|---|---|---|---|---|---|
| Electrical connection | | | Round plug-in connection M12x1, 4-pole | | | Standard connection EN 175301-803 |
| | | Version | WE-1SP-M12x1 | WE-2SP-M12x1 | WE-2SPSU-M12x1 | WE-1SP-EN175301-803 |
| Contact load, direct voltage | | $A_{max.}$ | 1 | | | |
| Voltage range | | $V_{max.}$ | 150 (AC/DC) | 10 ... 30 (DC) | | 250 (AC)/200 (DC) |
| max. switching power with resistive load | | W | 20 | | | 70 |
| Switching type | – 75 % signal | | – | Normally open contact | | – |
| | – 100 % signal | | Changeover | Normally closed contact | | Normally closed contact |
| | – 2SPSU | | | | Signal interconnection at 30 °C *[86 °F]*, return switching at 20 °C *[68°F]* | |
| Display via LEDs in the electronic switching element 2SP... | | | | Stand-by (LED green); 75 % switching point (LED yellow) 100 % switching point (LED red) | | |
| Protection class according to EN 60529 | | | IP 67 | | | IP 65 |
| Ambient temperature range | | °C *[°F]* | –25 ... +85 *[–13 ... +185]* | | | |
| For direct voltage above 24 V, spark extinguishing is to be provided for protecting the switching contacts. | | | | | | |
| Weight | – electronic switching element | kg *[lbs]* | 0,1 *[0.22]* | | | |

| **Filter element** | | | | |
|---|---|---|---|---|
| Glass fiber material PWR... | | | Single-use element on the basis of inorganic fiber | |
| | | | Filtration ratio according to ISO 16889 up to $\Delta p$ = 5 bar *[72.5 psi]* | Achievable oil cleanliness according to ISO 4406 *[SAE-AS 4059]* |
| Particle separation | | PWR20 | $\beta_{20(c)} \geq 200$ | 19/16/12 ... 22/17/14 |
| | | PWR10 | $\beta_{10(c)} \geq 200$ | 17/14/10 ... 21/16/13 |
| | | PWR6 | $\beta_{6(c)} \geq 200$ | 15/12/10 ... 19/14/11 |
| | | PWR3 | $\beta_{5(c)} \geq 200$ | 13/10/8 ... 17/13/10 |
| admissible pressure differential | – A00 | bar *[psi]* | 30 *[435]* | |

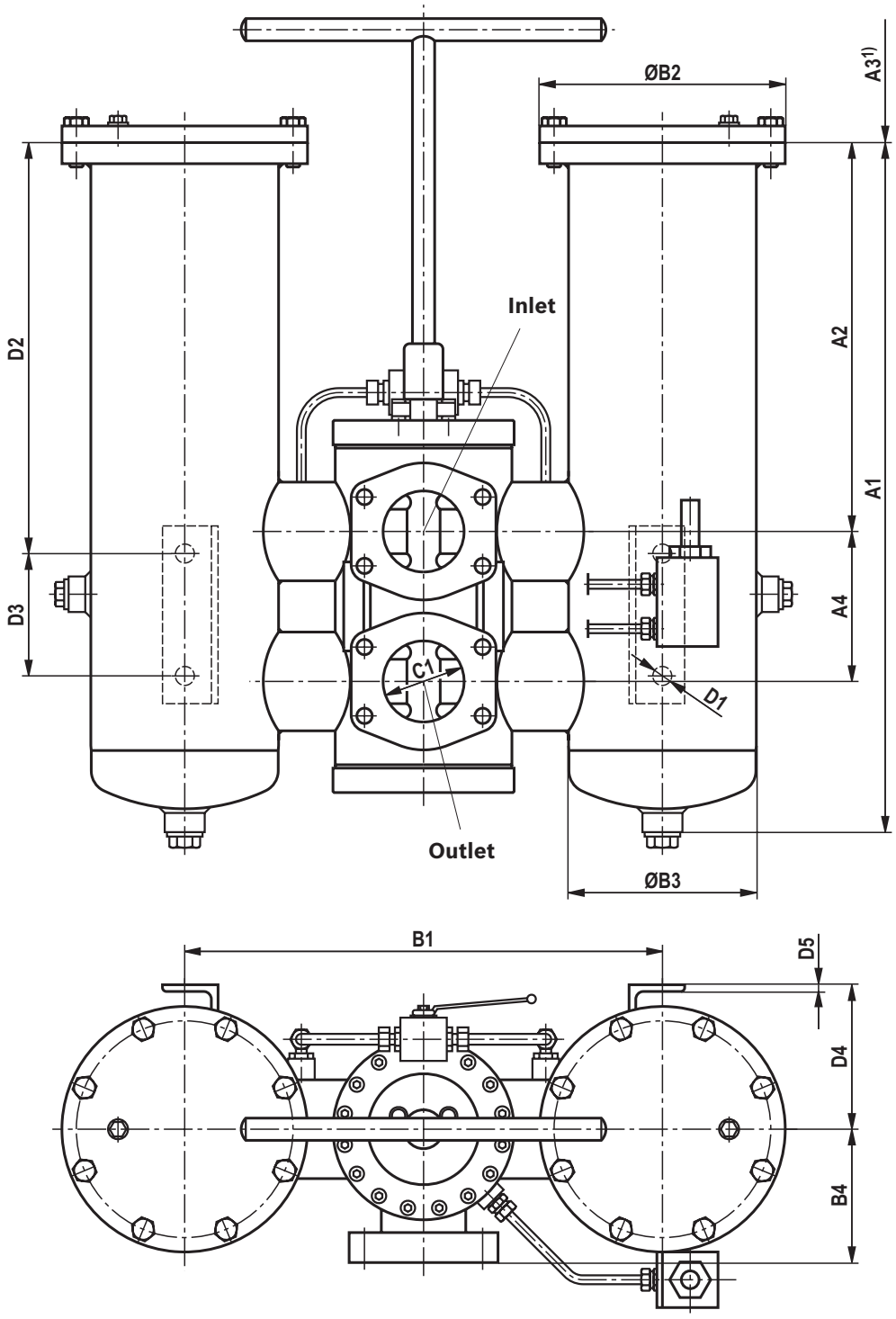
## Compatibility with permitted hydraulic fluids

| **Hydraulic fluid** | | **Classification** | | **Suitable sealing materials** | **Standards** |
|---|---|---|---|---|---|
| Mineral oil | | HLP | | NBR | DIN 51524 |
| Bio-degradable | – insoluble in water | HETG | ☞ **Notice:** with NG1001 ... 0274 ordering code “Supplementary information = -0066” mandatory | NBR | VDMA 24568 |
| | | HEES | | FKM | |
| | – soluble in water | HEPG | | FKM | VDMA 24568 |
| Flame-resistant | – water-free | HFDU, HFDR | | FKM | VDMA 24317 |
| | – containing water | HFAS | | NBR | DIN 24320 |
| | | HFAE | | NBR | |
| | | HFC | | NBR | VDMA 24317 |

☞ **Important information on hydraulic fluids!**

- For more information and data on the use of other hydraulic fluids, please refer to data sheet 90220 or contact us!
- **Flame-resistant – containing water**: Due to possible chemical reactions with materials or surface coatings of machine and system components, the service life with these hydraulic fluids may be less than expected. Filter materials made of filter paper (cellulose) may not be used, filter elements with glass fiber filter material or wire mesh have to be used instead.
- **Bio-degradable:** If filter materials made of filter paper are used, the filter life may be shorter than expected due to material incompatibility and swelling.

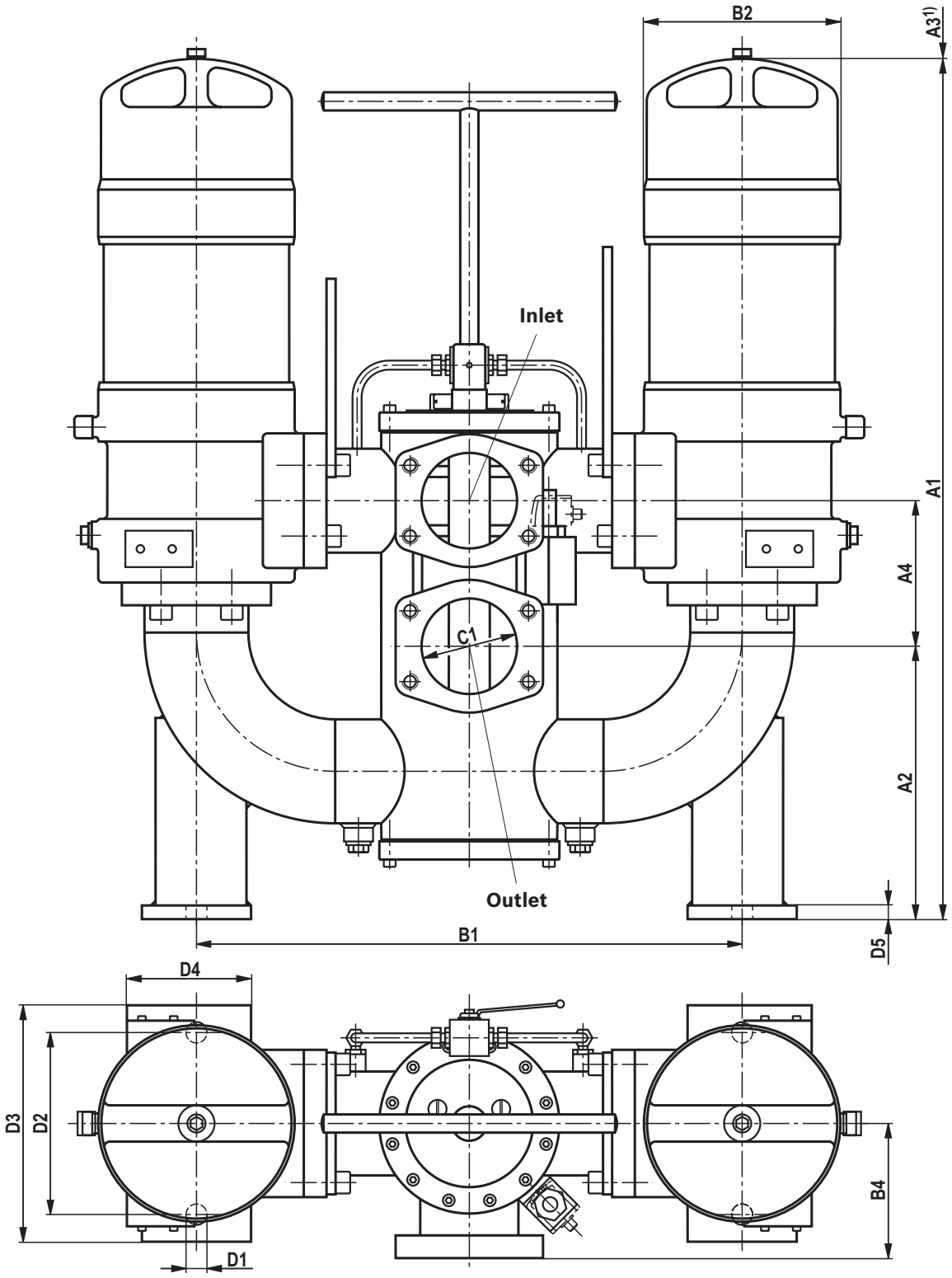
## **Dimensions: NG0400** ... **NG0630, NG0120** (Dimensions in mm *[inch]*)




1) Servicing height for filter element exchange

| Type 40FLD(N)... | Height | | | | Widths | | | | Ports | Mounting | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 | A2 | A3 1) | A4 | B1 | ØB2 | ØB3 | B4 | C1 | ØD1 | D2 | D3 | D4 | D5 |
| **0400** | 471 *[18.54]* | 200 *[7.87]* | 250 *[9.84]* | 135 *[5.31]* | 430 *[16.93]* | 220 *[8.66]* | 168,3 *[6.63]* | 120 *[4.72]* | SAE 3" 3000 psi | 17 *[0.67]* | 220 *[8.66]* | 110 *[4.33]* | 130 *[5.12]* | 6 *[0.24]* |
| **0630** | 621 *[24.45]* | 350 *[13.78]* | 400 *[15.75]* | | | | | | | | 370 *[14.57]* | | | |
| **0120** | 978 *[38.50]* | 707 *[27.83]* | 760 *[29.92]* | | | | | | | | 587 *[23.11]* | 250 *[9.84]* | | |

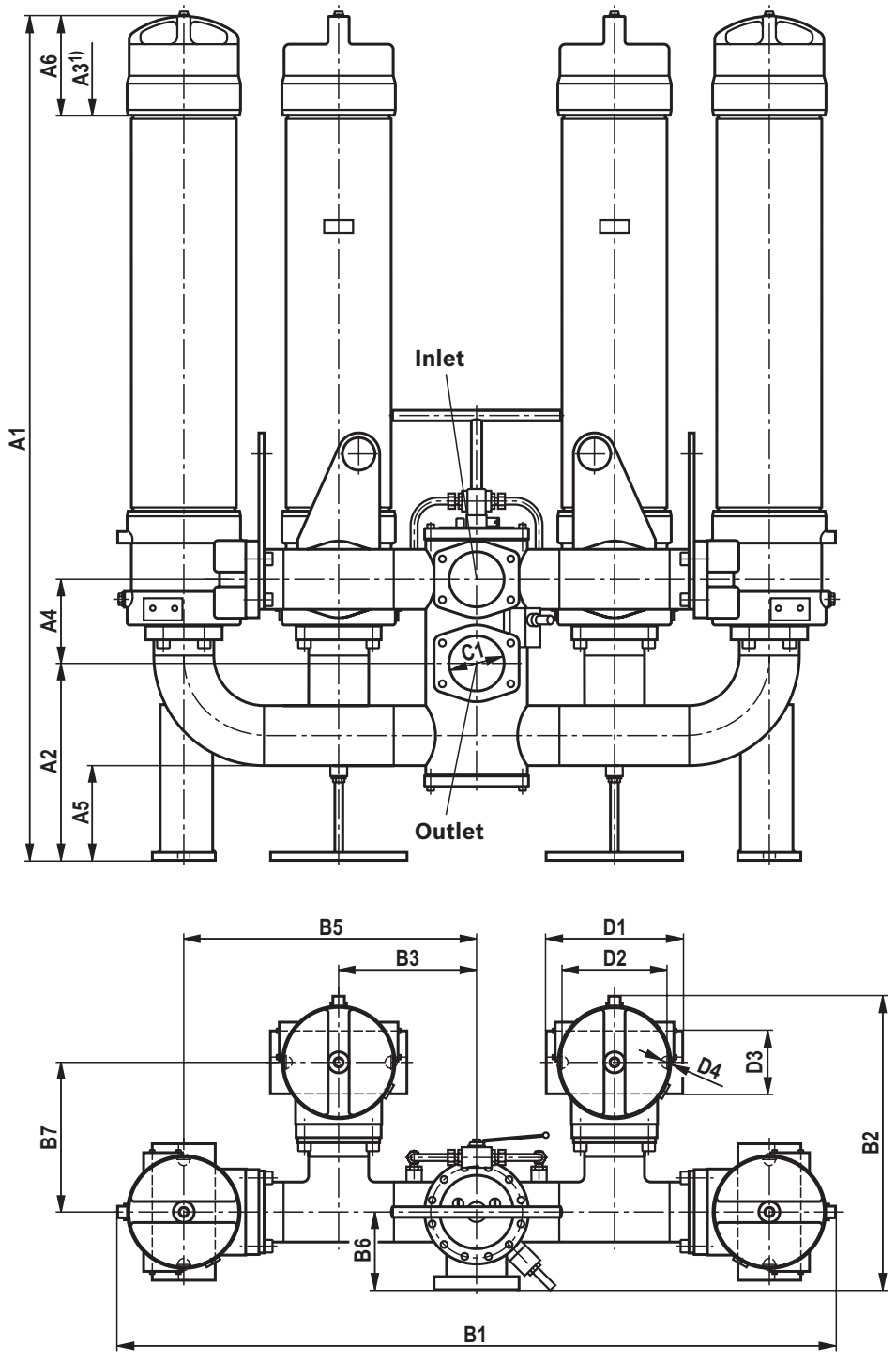
## **Dimensions: NG0201** ... **NG0271, NG1001** (Dimensions in mm *[inch]*)




1) Servicing height for filter element exchange

| Type 40FLD(N)... | Height | | | | Widths | | | Ports | Mounting | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 | A2 | A3 1) | A4 | B1 | ØB2 | B4 | C1 | ØD1 | D2 | D3 | D4 | D5 |
| **0201** | 1280 *[50.39]* | 300 *[11.81]* | 760 *[29.92]* | 160 *[6.30]* | 600 *[23.62]* | 216 *[8.50]* | 148 *[5.83]* | SAE4" 3000 psi | 23 *[0.91]* | 200 *[7.87]* | 260 *[10.24]* | 120 *[4.72]* | 15 *[0.59]* |
| **0271** | 1522 *[59.92]* | | 990 *[38.98]* | | | | | | | | | | |
| **1001** | 930 *[36.61]* | | 400 *[15.75]* | | | | | | | | | | |

## **Dimensions: NG0272** (dimensions in mm *[in]*)

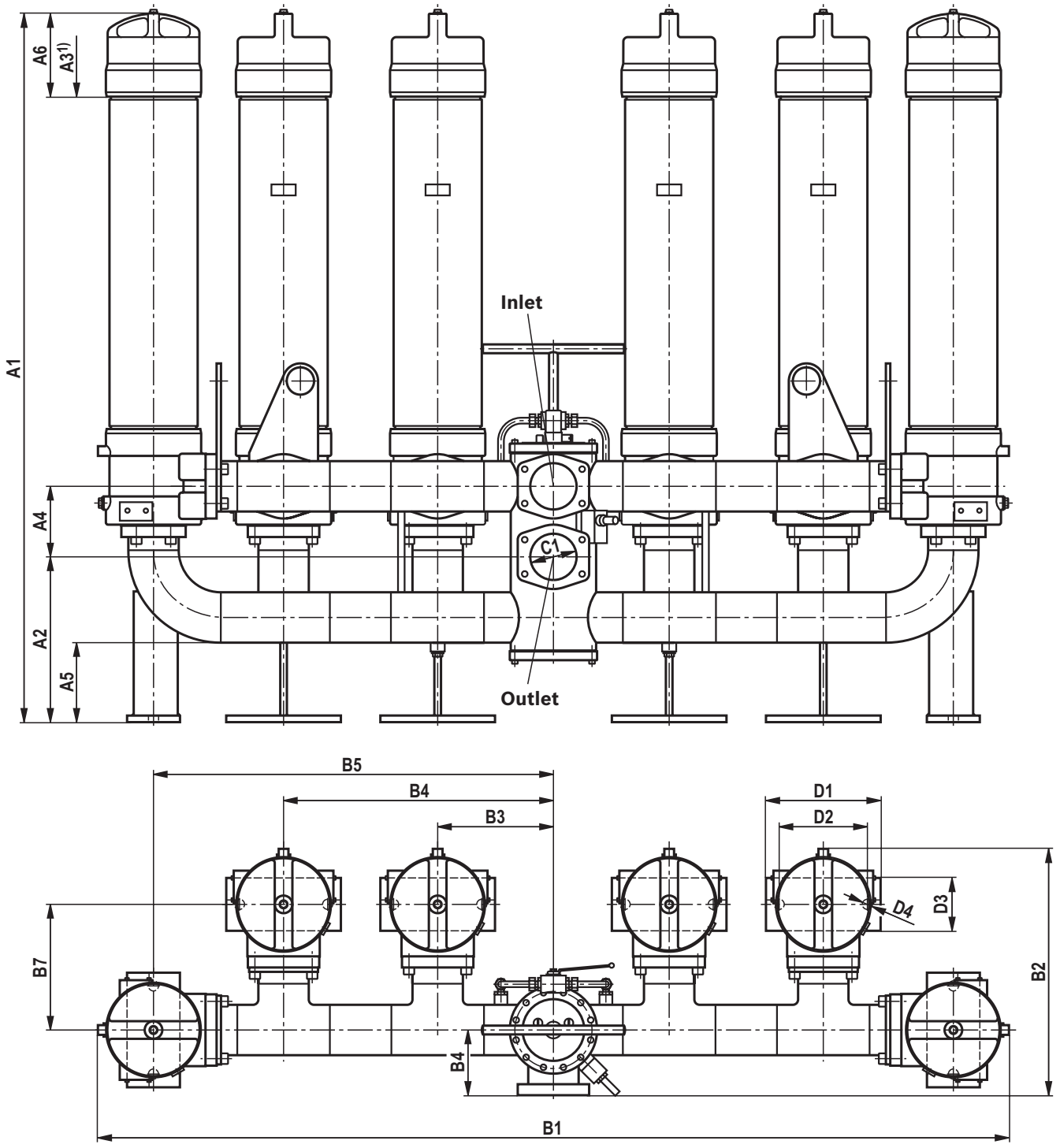



1) Servicing height for filter element exchange

| Type 40FLD... | Height | | | | | | Widths | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 | A2 | A3 1) | A4 | A5 | A6 | B1 | B2 | B3 | B5 | B6 | B7 |
| 0272 | 1590 *[62.60]* | 375 *[14.76]* | 1100 *[43.31]* | 160 *[6.30]* | 180 *[7.09]* | 188 *[7.40]* | 1347 *[53.03]* | 559 *[22.01]* | 262,5 *[10.33]* | 547,5 *[21.55]* | 148 *[5.83]* | 285 *[11.22]* |

| Type 40FLD... | Ports | Mounting | | | | |
|---|---|---|---|---|---|---|
| | C1 | D1 | D2 | D3 | ØD4 | G |
| 0272 | SAE4", 3000 psi | 260 *[10.24]* | 200 *[7.87]* | 120 *[4.72]* | 23 *[0.91]* | G1/2 |

## **Dimensions: NG0273** (dimensions in mm *[in]*)

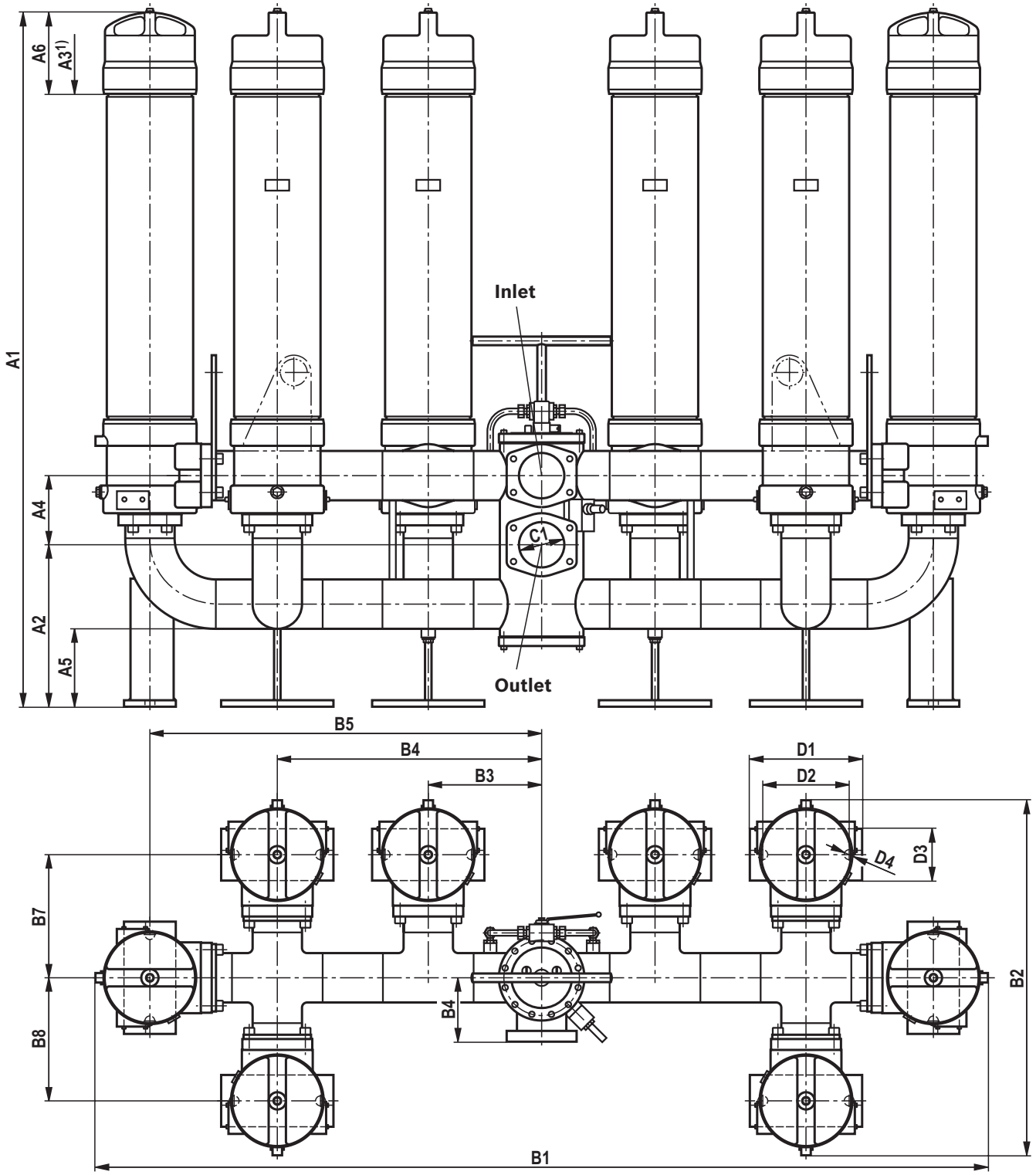



1) Servicing height for filter element exchange

| Type 40FLD... | Height | | | | | | Widths | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 | A2 | A3 1) | A4 | A5 | A6 | B1 | B2 | B3 | B4 | B5 | B6 | B7 |
| 0273 | 1590 *[62.60]* | 375 *[14.76]* | 1100 *[43.31]* | 160 *[6.30]* | 180 *[7.09]* | 188 *[7.40]* | 2066 *[81.34]* | 559 *[22.01]* | 262,5 *[10.33]* | 612 *[24.09]* | 897 *[35.31]* | 148 *[5.83]* | 285 *[11.22]* |

| Type 40FLD... | Ports | Mounting | | | | |
|---|---|---|---|---|---|---|
| | C1 | D1 | D2 | D3 | ØD4 | G |
| 0273 | SAE4", 3000 psi | 260 *[10.24]* | 200 *[7.87]* | 120 *[4.72]* | 23 *[0.91]* | G1/2 |

## **Dimensions: NG0274** (dimensions in mm *[in]*)



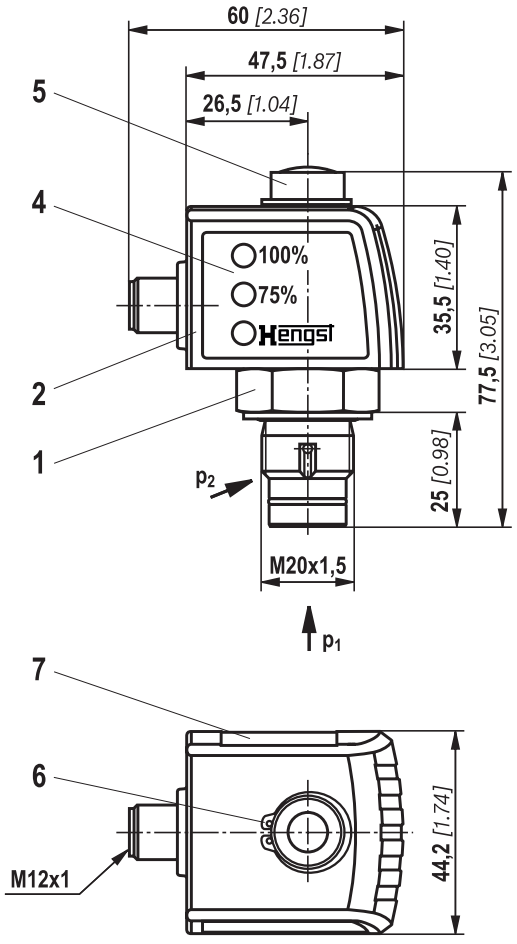

1) Servicing height for filter element exchange

| Type 40FLD... | Height | | | | | | Widths | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 | A2 | A3 1) | A4 | A5 | A6 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | B8 |
| 0274 | 1590 *[62.60]* | 375 *[14.76]* | 1100 *[43.31]* | 160 *[6.30]* | 180 *[7.09]* | 188 *[7.40]* | 2066 *[81.34]* | 822 *[32.36]* | 262,5 *[10.33]* | 612 *[24.09]* | 897 *[35.31]* | 148 *[5.83]* | 285 *[11.22]* | 285 *[11.22]* |

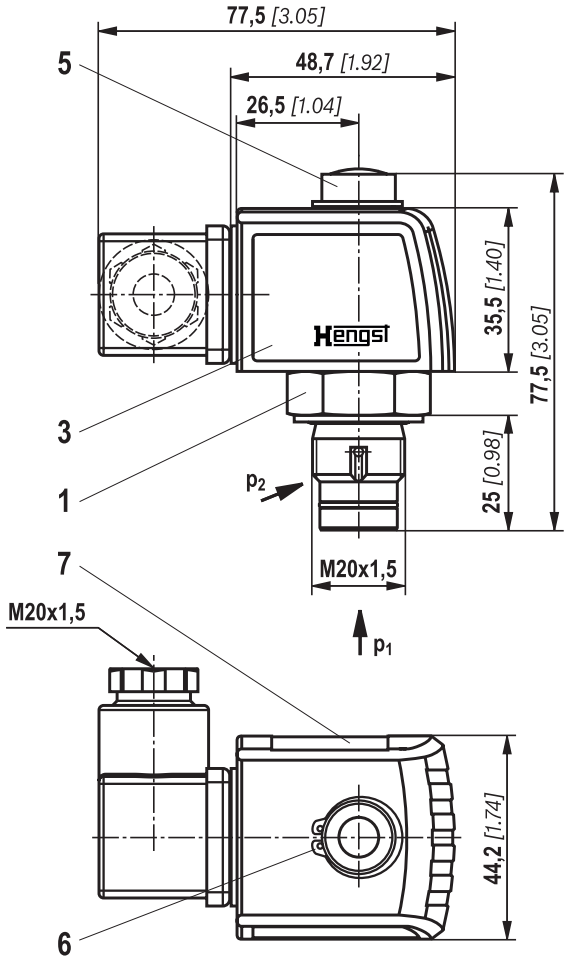
| Type 40FLD... | Ports | Mounting | | | | |
|---|---|---|---|---|---|---|
| | C1 | D1 | D2 | D3 | ØD4 | G |
| 0274 | SAE4", 3000 psi | 260 *[10.24]* | 200 *[7.87]* | 120 *[4.72]* | 23 *[0.91]* | G1/2 |

## **Maintenance indicator** (dimensions in mm *[inch]*)

**Pressure differential indicator with mounted switching element M12x1**




**Pressure differential indicator with mounted switching element EN-175301-803**




**1** Mechanical optical maintenance indicator;
max. tightening torque $M_{A\,max}$ = 50 Nm *[36.88 lb-ft]*

**2** Switching element with locking ring for electrical maintenance indicator (rotatable by 360°);round plug-in connection M12x1, 4-pole

**3** Switching element with locking ring for electrical maintenance indicator (rotatable by 360°);rectangular plug-in connection EN175301-803

**4** Housing with three LEDs: 24 V =
Green: stand-by
Yellow: switching point 75 %
red: switching point 100 %

**5** Visual indicator with memory function

**6** Locking ring DIN 471-16x1, **material no. R900003923**

**7** Name plate

☞ **Notices:** Representation contains mechanical optical maintenance indicator (1) and electronic switching element (2) (3).

## Ordering code spare parts

### Filter element

| 01 | 02 | 03 | | 04 | | 05 | | 06 |
|---|---|---|---|---|---|---|---|---|
| **1.** | | | **–** | **A00** | **–** | **0** | **–** | |

**Filter element**

| | | |
|---|---|---|
| 01 | Design | **1.** |

**Size**

| | | | | |
|---|---|---|---|---|
| 02 | | Filter size | Number of filter elements (per complete filter) | |
| | FLDN... | 0400 | 2 | **0400** |
| | | 0630 | 2 | **0630** |
| | | 1001 | 2 | **1000** |
| | FLD... | 0120 | 2 | **0120** |
| | | 0201 | 2 | **0200** |
| | | 0271 | 2 | **0270** |
| | | 0272 | 4 | **0270** |
| | | 0273 | 6 | **0270** |
| | | 0274 | 8 | **0270** |

**Filter rating in µm**

| | | | |
|---|---|---|---|
| 03 | **Absolute (ISO 16889; $\beta_x(c) \geq 200$)** | Glass fiber material, not cleanable | **PWR3<br>PWR6<br>PWR10<br>PWR20** |
| | **Nominal** | Stainless steel wire mesh, cleanable | **G10<br>G25<br>G40<br>G60<br>G100** |
| | | Paper, not cleanable | **P10<br>P25** |

**Pressure differential**

| | | |
|---|---|---|
| 04 | Maximum admissible pressure differential of the filter element: 30 bar *[435 psi]* | **A00** |

**Bypass valve**

| | | |
|---|---|---|
| 05 | **Without** bypass valve | **0** |

**Seal**

| | | |
|---|---|---|
| 06 | NBR seal | **M** |
| | FKM seal | **V** |

**Order example:**
**1.0270 PWR3-A00-0-M**

**For detailed information on Hengst filter elements please refer to data sheet 51420.**

### Preferred program replacement elements

| | Filter material/material no. | | |
|---|---|---|---|
| **Filter element type** | **PWR3** | **PWR6** | **PWR10** |
| 1.0400 ...A00-0-M | **R928005961** | **R928005962** | **R928005963** |
| 1.0630 ...A00-0-M | **R928005997** | **R928005998** | **R928005999** |
| 1.1000 ...A00-0-M | **R928006033** | **R928006034** | **R928006035** |
| 1.0120 ...A00-0-M | **R928005745** | **R928005746** | **R928005747** |
| 1.0200 ...A00-0-M | **R928005799** | **R928005800** | **R928005801** |
| 1.0270 ...A00-0-M | **R928005817** | **R928005818** | **R928005819** |

## Ordering code spare parts

### Mechanical optical maintenance indicator

| 01 | 02 | | 03 | | 04 | | 05 | | 06 |
|---|---|---|---|---|---|---|---|---|---|
| **W** | **O** | **–** | **D01** | **–** | | **–** | | **–** | **160** |

| | | |
|---|---|---|
| 01 | **Maintenance indicator** | **W** |
| 02 | **Mechanical optical indicator** | **O** |
| **Version** | | |
| 03 | Pressure differential, modular design | **D01** |
| **Switching pressure** | | |
| 04 | 0.8 bar *[11.6 psi]* | **0.8** |
| | 1.5 bar *[21.8 psi]* | **1.5** |
| | 2.2 bar *[31.9 psi]* | **2.2** |
| **Seal** | | |
| 05 | NBR seal | **M** |
| | FKM seal | **V** |
| **max. nominal pressure** | | |
| 06 | Switching pressure 0.8 bar *[11.6 psi]*, 160 bar *[2321 psi]* | **160** |
| | Switching pressure 1.5 bar *[21.8 psi]*, 160 bar *[2321 psi]* | **160** |
| | Switching pressure 2.2 bar *[31.9 psi]*, 160 bar *[2321 psi]* | **160** |

| Mechanical optical maintenance indicator | Material no. |
|---|---|
| WO-D01-0.8-M-160 | **R928038779** |
| WO-D01-0.8-V-160 | **R928038778** |
| WO-D01-1.5-M-160 | **R928038781** |
| WO-D01-1.5-V-160 | **R928038780** |
| WO-D01-2.2-M-160 | **R901025312** |
| WO-D01-2.2-V-160 | **R901066233** |

## Ordering code spare parts

### Seal kit

| 01 | 02 | 03 | | 04 |
|---|---|---|---|---|
| **D** | **40 FLD** | | **–** | |

| | | |
|---|---|---|
| 01 | **Seal kit** | **D** |

| | | |
|---|---|---|
| 02 | **Series** | **40 FLD** |

**Size**

| | | |
|---|---|---|
| 03 | 0060-0120/N0400-0630 | **0060-0120/ N0400-0630** |
| | 0146-0271/N1001 | **0146-0271/ N1001** |
| | 0272 | **0272** |
| | 0273 | **0273** |
| | 0274 | **0274** |

**Seal**

| | | |
|---|---|---|
| 04 | NBR seal | **M** |
| | FKM seal | **V** |

| Seal kit | Material no. |
|---|---|
| D40FLD0060-0120/N0400-0630-M | **R928037177** |
| D40FLD0060-0120/N0400-0630-V | **R928044758** |
| D40FLD0146-0271/N1001-M | **R928039036** |
| D40FLD0146-0271/N1001-V | **R928039959** |
| D40FLD0272-M | **R928054103** |
| D40FLD0272- V | **R928054104** |
| D40FLD0273-M | **R928054105** |
| D40FLD0273-V | **R928054106** |
| D40FLD0274-M | **R928054107** |
| D40FLD0274-V | **R928054108** |

## Assembly, commissioning, maintenance

**Assembly**

- The max. operating pressure of the system must not exceed the max. admissible operating pressure of the filter (see type plate).
- In the assembly, depending upon the dimensions, you have to distinguish between floor mounting and wall mounting.
- During assembly of the filter the flow direction (direction arrows) and the required servicing height of the filter element (see chapter "Dimensions") are to be considered.
- The filter covers may not be used as lifting points.
- Perfect filter function is only guaranteed when mounted with th filter cover vertically upward.
- The maintenance indicator must be arranged so it is easily viewed in operation.
- Filters with foot mount or wall mount should be securely using proper fasteners.
- Ensure that the system is assembled without tension stress.
- Remove the plastic plugs from the filter inlet and outlet.
- The optional electronic maintenance indicator is connected via the electronic switching element with one or two switching points, which is attached to the mechanical optical maintenance indicator and held by means of the locking ring.

**Commissioning**

- Bring the switching lever into central position in order to fill both filter sides.
- Commission the system.
- Bleed filter by opening the bleed screws or bleed valves, close when operating liquid escapes.
- Switch the filter into the operating position; to do so, switch the switching lever to one of the two end positions. (See information on the indicator disc on the switch housing) The switch-over lever is on the filter side that is in operation.
- Close pressure equalization line.

**Maintenance**

- If at operating temperature, the red indicator pin reaches out of the mechanical optical maintenance indicator and/or if the electronic switching element opens/closes the circuit, the filter element is contaminated and needs to be replaced or cleaned respectively.
- The material number of the corresponding replacement filter element is indicated on the name plate of the complete filter. It must correspond to the material number on the filter element.
- The switch-over lever is over the filter side that is in operation. (See notice on the indicator disc of the switch housing.)
- Open the pressure compensation at the ball valve.
- Switch the filter using the switch-over lever.
- Close the pressure compensation at the ball valve.
- Open the bleed screw or bleed valve at the decommissioned filter side in order to reduce the pressure.
- Via the drain screw, the oil on the dirt side can be drained.
- Remove the filter cover of the filter side that is not in operation.
- Remove the filter element from the spigot by rotating it slightly.
- Clean the filter components, if necessary.
- Check the seals for damage and replace them, if necessary. For suitable seal kits refer to chapter “Spare parts”.
- Filter elements made of wire mesh can be cleaned. For detailed cleaning instructions refer to data sheet 51420.
- Install the new or cleaned filter element on the spigot again by slightly rotating it.
- The filter is to be assembled in reverse order.
- To fill the maintained filter side, open the pressure equalization line.
- The filter is bled via the bleed screw or the bleed valve which is still open.
- After fluid escapes, close the bleed screw or the bleed valve again
- Ensure correct position of the switch-over lever end position.
- Close pressure equalization line.

## Assembly, commissioning, maintenance

**⚠ WARNING!**

- Assemble and disassemble only with depressurized system!
- Filter is under pressure!
- Remove the filter cover only if it is depressurized!
- Do not exchange the maintenance indicator while the filter is under pressure!
- Do not operate the switching lever and the pressure equalization valve during the filter element exchange.
- When disassembling the filter, it has to be ensured that the system is depressurized.
- If the flow direction is not considered during assembly, the filter element will be destroyed. Particles will enter the system and damage the downstream components.

☞ **Notices:**

- All maintenance of the filter should be performed by trained specialists.
- Proper function and safety are only guaranteed if original Hengst filter elements and spare parts are used.
- Warranty becomes void if the delivered item is changed by the ordering party or third parties or improperly mounted, installed, maintained, repaired, used or exposed to environmental condition that do not comply with the installation conditions.

## Directives and standardization

### Product validation

Hengst filters, the filter elements built into them and filter accessories are tested and quality-monitored according to different ISO test standards:

| | |
|---|---|
| Pressure pulse test | ISO 10771:2015-08 |
| Filtration performance test (multipass test) | ISO 16889:2008-06 |
| Δ*p* (pressure loss) characteristic curves | ISO 3968:2001-12 |
| Compatibility with hydraulic fluid | ISO 2943:1998-11 |
| Collapse pressure test | ISO 2941:2009-04 |

The development, manufacture and assembly of Hengst industrial filters and Hengst filter elements is carried out within the framework of a certified quality management system in accordance with ISO 9001:2015.

### Classification according to the Pressure Equipment Directive

The duplex filters for hydraulic applications according to 51408 are pressure holding equipment according to article 1, section 2.1.4 of the Pressure Equipment Directive 97/23/EC (PED). However, based on the exception in article 1, section 3.6 of the PED, hydraulic filters are exempt from the PED if they are not classified higher than category I (guideline 1/19).
The fluids from the chapter “Compatibility with approved pressure fluids” were considered for the classification. They do not receive a CE mark.

### Use in potentially explosive areas according to directive 94/9/EC (ATEX)

The duplex filters according to 51408 are not equipment or components in the sense of directive 94/9/EC and are not provided with a CE mark. It has been proven with the ignition risk analysis that these inline filters do not have own ignition sources acc. to DIN EN 13463-1:2009.

According to DIN EN 60079-11:2012, electronic maintenance indicators with a switching point:
WE-1SP-M12x1 **R928028409**
WE-1SP-EN175301-803 **R928036318**
are simple, electronic operating equipment that do not have an own voltage source. This simple, electronic operating equipment may – according to DIN EN 60079-14:2012 – in intrinsically safe electric circuits (Ex ib) be used in systems without marking and certification.
The duplex filters and the electronic maintenance indicators described here can be used for the following explosive areas:

| | Zone suitability | |
|---|---|---|
| Gas | 1 | 2 |
| Dust | 21 | 22 |

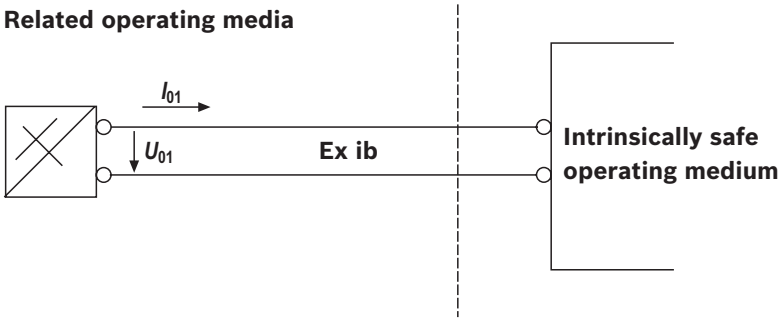
| **Complete filter with mech./opt. Maintenance indicator** | | | | |
|---|---|---|---|---|
| **Use/assignment** | | | **Gas 2G** | **Dust 2D** |
| Assignment | | | Ex II 2G c IIC TX | Ex II 2D c IIC TX |
| Conductivity of the medium | pS/m | min | 300 | |
| Dust accumulation | | max | – | 0.5 mm |

| **Electronic switching element in the intrinsically safe electric circuit** | | | | |
|---|---|---|---|---|
| **Use/assignment** | | | **Gas 2G** | **Dust 2D** |
| Assignment | | | Ex II 2G Ex ib IIB T4 Gb | Ex II 2D Ex ib IIIC T100 °C Db |
| Perm. intrinsically safe electric circuits | | | Ex ib IIC, Ex ic IIC | Ex ib IIIC |
| **Technical data** | | | **Values only for intrinsically safe electric circuit** | |
| Switching voltage | Ui | max | 150 V AC/DC | |
| Switching current | Ii | max | 1.0 A | |
| Switching power | Pi | max | 1.3 W T4 $T_{max}$ 40 °C | 750 mW $T_{max}$ 40 °C |
| | | max | 1.0 W T4 $T_{max}$ 80 °C | 550 mW $T_{max}$ 100 °C |
| Surface temperature [1] | | max | – | 100 °C |
| Inner capacity | Ci | | negligible | |
| Inner inductivity | Li | | negligible | |
| Dust accumulation | | max | – | 0.5 mm |

[1] The temperature depends on the temperature of the medium in the filter and must not exceed the value specified here.

## Directives and standardization

Possible circuit according to DIN EN 60079-14




**⚠ WARNING!**

- Explosion hazard due to high temperature! The temperature depends on the temperature of the medium in the hydraulic circuit and must not exceed the value specified here. Measures are to be taken so that in the potentially explosive area, the max. admissible ignition temperature is not exceeded.
- When using the duplex filters according to 51408 in explosive areas, sufficient potential equalization has to be ensured. The filter is preferably to be grounded via the mounting screws. It has to be noted in this connection that painted and oxidized protective layers are not electrically conductive.
- During filter element exchanges, the packaging material is to be removed from the replacement element outside the explosive area

☞ **Notices:**

- All maintenance of the filter should be performed by trained specialists, instruction by the machine end-user acc. to DIRECTIVE 1999/92/EC appendix II, section 1.1
- Functional and safety warranty only applicable when using genuine Hengst spare parts

## Notes

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