HARLEX

# Duplex tank-mounted return line filter, with filter element in accordance with DIN 24550

## Type 10TDN0040 … 1000; 10TD2000; 2500

- Size according to **DIN 24550**: 0040 to 1000
- Additional sizes: 2000, 2500
- Component series 1X
- Nominal pressure 10 bar *[145 psi]*
- Connection up to 3”
- Operating temperature –10 °C to +100 °C *[14 °F to 212 °F]*

### Features

The tank mounted return line filters are designed for instal-lation on fluid tanks. Their function is to separate solid materials from fluids.

They distinguish themselves by the following:

- Filter for tank mounting, switchable
- Special highly efficient filter materials
- Filtration of very fine particles and high dirt holding capacity across a broad pressure differential range
- High collapse resistance of the filter elements
- Optionally equipped with mechanical optical mainte-nance indicator with memory function
- Various, optional electronic switching elements, modular design
- Filters are equipped as standard with a bypass valve integrated in the filter housing
- Optional measuring port

# Ordering code filter

| 01 | 02 | 03 | | 04 | | 05 | 06 | | 07 | | 08 | | 09 | | 10 | | 10 | | 10 | | 10 | | 10 | | 10 | | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **10TD** | | | **–** | **1X** | **/** | | **A00** | **–** | | **–** | | **–** | | **–** | | **–** | | **–** | | **–** | | **–** | | **–** | | **–** | |

**Series**

| | | |
|---|---|---|
| 01 | Duplex tank mounted return line filter 10 bar *[145 psi]* | **10TD** |

**Filter element**

| | | |
|---|---|---|
| 02 | with filter element according to **DIN 24550** (only with frame size 0040-1000) | **N** |

**Size**

| | | |
|---|---|---|
| 03 | TDN...<br>(Filter element according to **DIN 24550**) | **0040**<br>**0063**<br>**0100**<br>**0160**<br>**0250**<br>**0400**<br>**0630**<br>**1000** |
| | TD...<br>(Filter elements according to **standard**) | **2000**<br>**2500** |

| | | |
|---|---|---|
| 04 | **Component series** 10 ... 19 (10 ... 19: unchanged installation and connection dimensions) | **1X** |

**Filter rating in µm**

| | | | |
|---|---|---|---|
| 05 | **Nominal** | Paper, not cleanable | **P10**<br>**P25** |
| | **Nominal** | Stainless steel wire mesh, cleanable | **G10**<br>**G25**<br>**G40**<br>**G60**<br>**G100** |
| | **Absolute**<br>**(ISO 16889; $\beta_{x(c)} \geq 200$)** | Glass fiber material, not cleanable | **H3XL**<br>**H6XL**<br>**H10XL**<br>**H20XL** |
| | **Absolute**<br>**(ISO 16889; $\beta_{x(c)} \geq 200$)** | Water-absorbing, not cleanable | **AS6**<br>**AS10**<br>**AS20** |

**Pressure differential**

| | | |
|---|---|---|
| 06 | Max. admissible filter element pressure differential: 30 bar *[435 psi]*, filter **with** bypass valve | **A00** |

**Maintenance indicator (1 unit per filter side)**

| | | |
|---|---|---|
| 07 | **Without** maintenance indicator - bypass release pressure 3.5 bar*[51 psi]* | **0** |
| | Manometer [1] 0...6 bar *[0...87 psi]* opposite of connection - bypass release pressure 3.5 bar *[51 psi]* | **MB** |
| | Maintenance indicator, cover mounted, aluminum, mech./optical, switching pressure 2.2 bar *[32 psi]*<br>**with** additional manometer [1] 0...0.6 bar *[0...0.87 psi]* opposite of connection - bypass release pressure 3.5 bar *[51 psi]* | **MBV2.2** |
| | Maintenance indicator, polyamide, mech./optical, switching pressure 2.2 bar *[32 psi]* – bypass release pressure 3.5 bar *[51 psi]* | **P2.2** |
| | Maintenance indicator, aluminum, mech./optical, switching pressure 0.8 bar *[11.6 psi]* – bypass release pressure 3.5 bar *[51 psi]* | **V0.8** |
| | Maintenance indicator, aluminum, mech./optical, switching pressure 1.5 bar *[21.8 psi]* – bypass release pressure 3.5 bar *[51 psi]* | **V1.5** |
| | Maintenance indicator, aluminum, mech./optical, switching pressure 2.2 bar *[32 psi]* – bypass release pressure 3.5 bar *[51 psi]* | **V2.2** |

1) When using a manometer, the maximum permissible operating pressure is reduced to 6 bar *[87 psi]*.

HARLEX
HRL MACHINERY

## Ordering code filter

| 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **10TD** | | | – **1X** | / | **A00** | – | – | – | – | – | – | – | – | – | – |

**Seal**

| | | |
|---|---|---|
| 08 | NBR seal | **M** |
| | FKM seal | **V** |

**Connection**

| 09 | **Frame size** / **Connection** | **0040-0100** | **0160-0250** | **0400-0630** | **1000-2500** | |
|---|---|---|---|---|---|---|
| | G1 | ● | | | | **R4** |
| | G1 1/4 | | X | | | **R5** |
| | G1 1/2 | | ● | | | **R6** |
| | SAE 2 1/2” - 3000 psi | | | ● | | **S9** |
| | SAE 3” - 3000 psi | | | | ● | **S10** |
| | SAE 16” | X | | | | **U9** |
| | SAE 20” | | X | | | **U5** |
| | ● Standard connection<br>X optional connection | | | | | |

**Supplementary information** (Multiple specifications possible)

| | | |
|---|---|---|
| 10 | Breathing filter **with** oil mist separator (only size 0040-0100) | **FN** |
| | Additional screw coupling, G1/4, opposite the intake (not in conjunction with a manometer) | **M** |
| | Installation plate (only NG0400-2500) | **MP** |
| | **without** bypass valve | **NB** |
| | Outlet pipe L110 mm *[4.33 inch]* (only NG0040-0100, from NG0160 see chapter “Accessories”) | **R110** |
| | Outlet pipe L150 mm *[5.91 inch]* (only NG0040-0100, from NG0160 see chapter “Accessories”) | **R150** |
| | Outlet pipe L250 mm *[9.84 inch]* (only NG0040-0100, from NG0160 see chapter “Accessories”) | **R250** |

**Order example:**
**10TDN0040-1X/H10XLA00-P2,2-M-R4**

**Further models on request.**

## Preferred types

### Filter rating 3 µm, 6 µm, 10 µm and 20 µm

| Filter type | Flow in l/min *[gpm]* with $\nu$ = 30 mm²/s *[142 SUS]* and $\Delta p$ = 0.5 bar *[7.25 psi]* [1] | Connection | Connection |
|---|---|---|---|
| 10TDN0040-1X/H3XLA00-P2,2-M-... | 23 *[6.1]* | ..R4 | ..U9 |
| 10TDN0063-1X/H3XLA00-P2,2-M-... | 35 *[9.2]* | ..R4 | ..U9 |
| 10TDN0100-1X/H3XLA00-P2,2-M-... | 52 *[13.7]* | ..R4 | ..U9 |
| 10TDN0160-1X/H3XLA00-P2,2-M-... | 105 *[27.7]* | ..R6 | ..U5 |
| 10TDN0250-1X/H3XLA00-P2,2-M-... | 160 *[42.3]* | ..R6 | ..U5 |
| 10TDN0400-1X/H3XLA00-P2,2-M-...-MP | 290 *[76.6]* | ..S9 | |
| 10TDN0630-1X/H3XLA00-P2,2-M-...-MP | 410 *[108.3]* | ..S9 | |
| 10TDN1000-1X/H3XLA00-P2,2-M-...-MP | 560 *[147.9]* | ..S10 | |
| 10TD2000-1X/H3XLA00-P2,2-M-...-MP | *900 [237.7]* | ..S10 | |
| 10TD2500-1X/H3XLA00-P2,2-M-...-MP | 1100 *[290.6]* | ..S10 | |
| | | | |
| 10TDN0040-1X/H6XLA00-P2,2-M-... | 37 *[9.8]* | ..R4 | ..U9 |
| 10TDN0063-1X/H6XLA00-P2,2-M-... | 49 *[12.9]* | ..R4 | ..U9 |
| 10TDN0100-1X/H6XLA00-P2,2-M-... | 70 *[18.5]* | ..R4 | ..U9 |
| 10TDN0160-1X/H6XLA00-P2,2-M-... | 150 *[39.6]* | ..R6 | ..U5 |
| 10TDN0250-1X/H6XLA00-P2,2-M-... | 200 *[52.8]* | ..R6 | ..U5 |
| 10TDN0400-1X/H6XLA00-P2,2-M-...-MP | 410 *[108.3]* | ..S9 | |
| 10TDN0630-1X/H6XLA00-P2,2-M-...-MP | 510 *[134.7]* | ..S9 | |
| 10TDN1000-1X/H6XLA00-P2,2-M-...-MP | 870 *[229.8]* | ..S10 | |
| 10TD2000-1X/H6XLA00-P2,2-M-...-MP | 1250 *[330.1]* | ..S10 | |
| 10TD2500-1X/H6XLA00-P2,2-M-...-MP | 1350 *[356.5]* | ..S10 | |
| | | | |
| 10TDN0040-1X/H10XLA00-P2,2-M-... | 43 *[11.3]* | ..R4 | ..U9 |
| 10TDN0063-1X/H10XLA00-P2,2-M-... | 62 *[16.4]* | ..R4 | ..U9 |
| 10TDN0100-1X/H10XLA00-P2,2-M-... | 80 *[21.1]* | ..R4 | ..U9 |
| 10TDN0160-1X/H10XLA00-P2,2-M-... | 190 *[50.2]* | ..R6 | ..U5 |
| 10TDN0250-1X/H10XLA00-P2,2-M-... | 260 *[68.7]* | ..R6 | ..U5 |
| 10TDN0400-1X/H10XLA00-P2,2-M-...-MP | 460 *[121.5]* | ..S9 | |
| 10TDN0630-1X/H10XLA00-P2,2-M-...-MP | 560 *[147.9]* | ..S9 | |
| 10TDN1000-1X/H10XLA00-P2,2-M-...-MP | 970 *[256.2]* | ..S10 | |
| 10TD2000-1X/H10XLA00-P2,2-M-...-MP | 1350 *[356.6]* | ..S10 | |
| 10TD2500-1X/H10XLA00-P2,2-M-...-MP | 1450 *[383.0]* | ..S10 | |
| | | | |
| 10TDN0040-1X/H20XLA00-P2,2-M-... | 62 *[16.4]* | ..R4 | ..U9 |
| 10TDN0063-1X/H20XLA00-P2,2-M-... | 80 *[21.1]* | ..R4 | ..U9 |
| 10TDN0100-1X/H20XLA00-P2,2-M-... | 95 *[25.1]* | ..R4 | ..U9 |
| 10TDN0160-1X/H20XLA00-P2,2-M-... | 260 *[68.7]* | ..R6 | ..U5 |
| 10TDN0250-1X/H20XLA00-P2,2-M-... | 320 *[84.5]* | ..R6 | ..U5 |
| 10TDN0400-1X/H20XLA00-P2,2-M-...-MP | *560 [147.9]* | ..S9 | |
| 10TDN0630-1X/H20XLA00-P2,2-M-...-MP | 630 *[166.4]* | ..S9 | |
| 10TDN1000-1X/H20XLA00-P2,2-M-...-MP | 1270 *[335.5]* | ..S10 | |
| 10TD2000-1X/H20XLA00-P2,2-M-...-MP | 1600 *[422.7]* | ..S10 | |
| 10TD2500-1X/H20XLA00-P2,2-M-...-MP | 1680 *[443.8]* | ..S10 | |

[1] Measured pressure differential across filter and measuring equipment in accordance with ISO 3968. The measured pressure differential at the maintenance indicator is lower.

## Ordering code accessories

### Electronic switching element for maintenance indicators

If an electronic switching element with signal suppression up to 30 °C *[86 °F]* is used (WE-2SPSU-M12X1), it has to be ensured that the aluminum version of the mechanical-optical maintenance indicator **must** be used. These maintenance indicators are referred to in the filter type key as “V0.8”, “V1.5” or “V2.2”.

In this connection, also refer to the chapter “Maintenance indicator”.
The temperature-controlled signal processing does not work with mechanical-optical maintenance indicators made of polyamide, “P2.2”.

| 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** |

**Plug**

| | | |
|---|---|---|
| 03 | Round plug-in connection M12x1, 4-pole | **M12x1** |
| | Rectangular connector, 2-pole, design A according to EN-175301-803, only possible with “1SP” type of signal. | **EN175301-803** |

**Material numbers of the electronic switching elements**

With the “mechanical-optical maintenance indicator” option (V..., P...), two mechanical optical maintenance indicators are installed at the factory. So you must always order two electric switching elements as optional accessories.

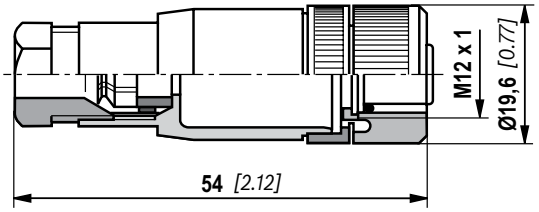
| Type | Signal | Switching points | Plug | LED |
|---|---|---|---|---|
| WE-1SP-M12x1 | Changeover | 1 | M12x1 | without |
| WE-2SP-M12x1 | Normally open (at 75%) / normally closed contact (at 100%) | 2 | | 3 pieces |
| WE-2SPSU-M12x1 | | | | |
| WE-1SP-EN175301-803 | Normally closed contact | 1 | EN 175301-803 | without |

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

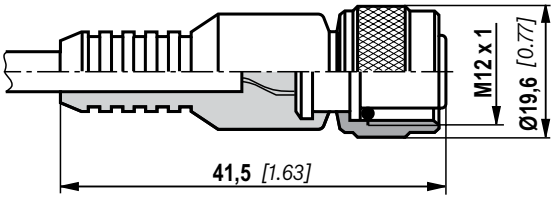
### **Mating connectors** (max. admissible voltage: 50 V)

for electronic switching element with round plug-in connection M12x1

Mating connector suitable for K24 4-pole, M12x1with screw connection, cable gland Pg9.




Mating connector suitable for K24-3m 4-pole, M12x1with 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




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

**Order example:**
Tank-mounted return line filter with mechanical optical maintenance indicator for $p_{nominal}$ = 10 bar *[145 psi]* size 0040, with filter element 10 µm and electronic switching element M12x1 with one switching point.

| | |
|---|---|
| **Filter with mech. optical maintenance indicator:** | 10TDN0040-1X/H10XLA00-P2,2-M-R4 |
| **Electr. switching element:** | WE-1SP-M12x1 |
| **Mating connector:** | Mating connector suitable for K24 4-pole, M12x1with screw connection, cable gland Pg9 |

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

## Outlet pipe

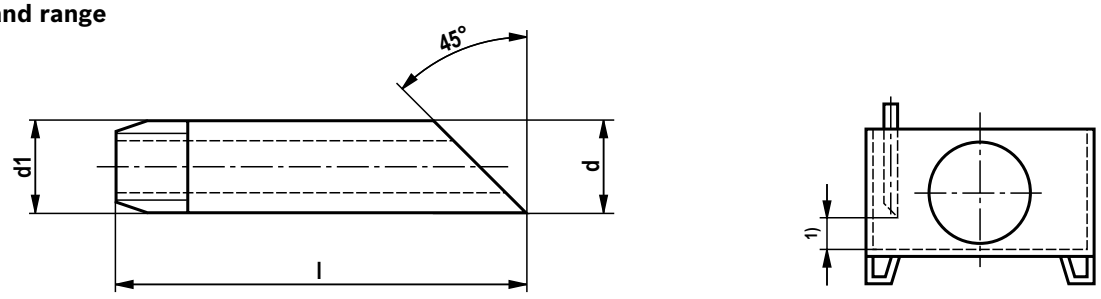
The outlet pipe is push connected onto the filter bowl outlet piece. Correct seat is confirmed by an audible click. After the connection is made, the outlet pipe can no longer be removed.

**Outlet pipe with push connection size 0040-0100**

| Description |
|---|
| ACC-R-10TEN0040-0100-R110 |
| ACC-R-10TEN0040-0100-R150 |
| ACC-R-10TEN0040-0100-R250 |

**Outlet pipe with threaded connection from size 0160**

**Dimensions and range**




1) Recommended distance to tank bottom (unless otherwise specified): 60...160 mm *[2.4...6.3 inch]*
From a pipe length of 400 mm *[15.75 inch]*, we strongly recommend fixing the outlet pipe by means of a tank-internal pipe bracket.

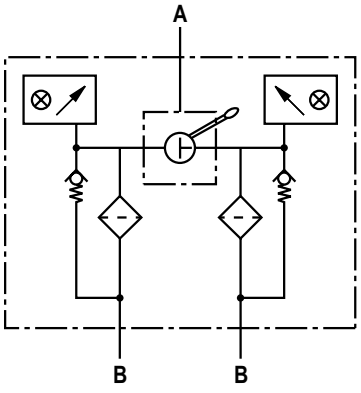
| DN | Dimensions | | | galvanized | ES (stainless) |
|---|---|---|---|---|---|
| | d | d1 | l | Description: **PIPE AB23-03/R...** | Description: **PIPE AB23-03/R... -ES** |
| 40 *[1.57]* | 48.3 *[1.90]* | R 1 1/2 | 250 *[9.84]* | 1 1/2 L = 250 | |
| | | | 400 *[15.75]* | 1 1/2 L = 400 | |
| | | | 800 *[31.50]* | 1 1/2 L = 800 | |
| | | | 1300 *[51.18]* | 1 1/2 L = 1300 | |
| | | | 2000 *[78.74]* | 1 1/2 L = 2000 | |
| 50 *[1.97]* | 60.3 *[2.37]* | R 2 | 400 *[15.75]* | 2 L = 400 | |
| | | | 800 *[31.50]* | 2 L = 800 | |
| 80 *[3.15]* | 88.9 *[3.50]* | R 3 | 160 *[6.30]* | 3 L = 160 | |
| | | | 200 *[7.87]* | 3 L = 200 | |
| | | | 350 *[13.78]* | 3 L = 350 | |
| | | | 650 *[25.59]* | 3 L = 650 | |
| | | | 800 *[31.50]* | 3 L = 800 | |

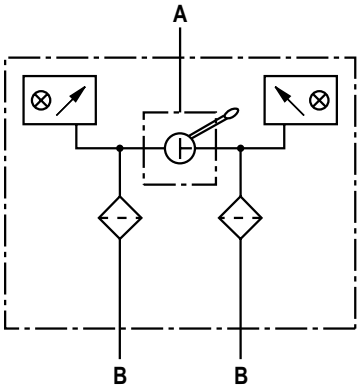
Thread: Whitworth pipe thread according to DIN 2999 part 1, poppet 1:16
Material/surface treatment: St 33-1 according to DIN 17100/galvanized (B) according to DIN 2444
1.4541

**Order example/search term**
Pipe according to DIN 2440 (ISO 65) with thread R 1 1/2 and L = 250 mm *[9.84 inch]*, galvanized:
**PIPE AB23-03/R 1 1/2 L = 250**

## Symbols

**Tank-mounted return line filter**
with bypass and
mechanical indicator and / or manometer



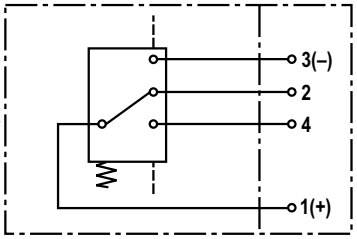




**Tank-mounted return line filter**
without bypass and
mechanical indicator and / or manometer

**electronic switching element**

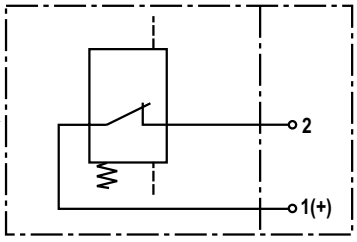
**for maintenance indicator**

**Switching element** **Plug**



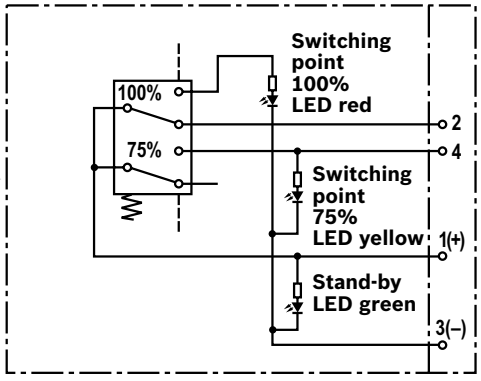

**WE-1SP-M12x1**

**Switching element** **Plug**




**WE-1SP-EN175301-803**

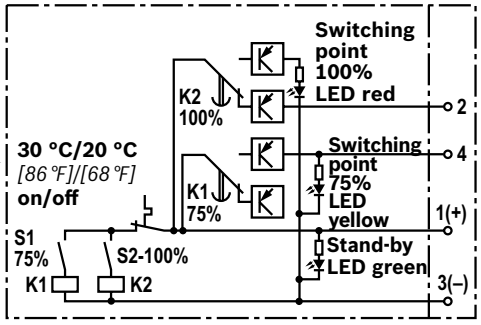
**Switching element** **Plug**




**WE-2SP-M12x1**

Circuit diagram drawn in plugged condition (operating state)

**Switching element** **Plug**




**WE-2SPSU-M12x1**

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

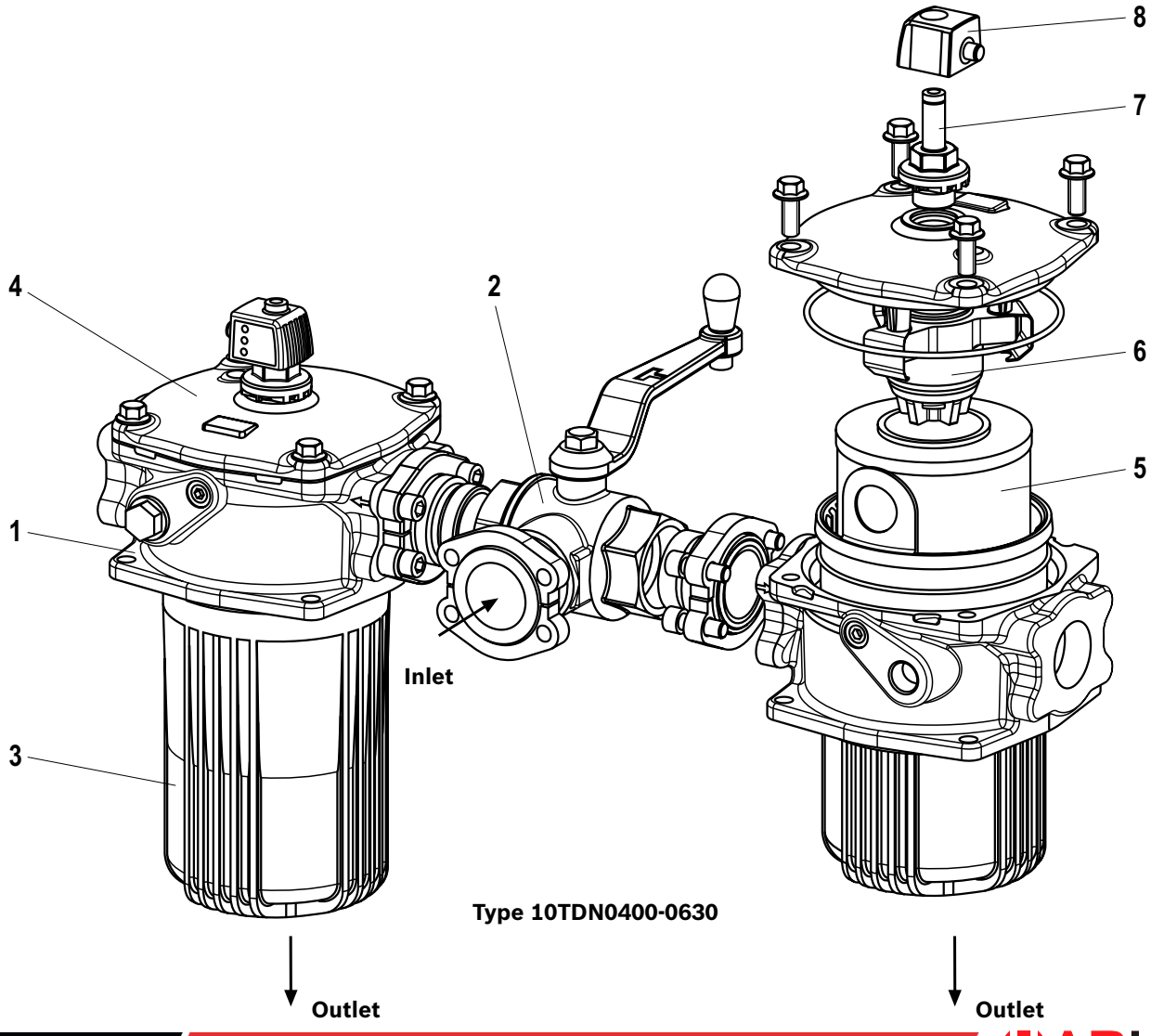
## Function, section

The switchable tank mounted return line filter is located in the return line for direct attachment onto the tank of a hydraulic or lubrication system. It can also be used as filling or bypass filter. The filter basically consists of filter head (1) and switch-over fitting (2), filter bowl (3), cover (4), filter element (5) as well as a bypass valve (6), by default.

Optionally, the filter is equipped with mechanical optical maintenance indicator including memory function (7). An electronic switching element can be added to the mechanical/optical maintenance indicator in order to integrate the maintenance indicator.
The electronic switching element (8) must be attached to the mechanical/optical maintenance indicator (7) and held by means of a locking ring. The electronic switching elements are connected via a plug-in connector or a cable. The electronic switching element must be ordered separately. For every filter housing, a switching element is required.

Depending on the filter size, more additional functions are available - e.g. a breathing filter, surge protection (only for size 0040 - 0100) or outlet pipes in different lengths – in this connection, also refer to the chapter “Accessories”.

During operation, the hydraulic fluid reaches the filter housing via the inlet; here, it flows through the filter element from the outside to the inside and is cleaned according to the filter rating. Any dirt particles filtered out settle in the filter element. Via the outlet, the filtered hydraulic fluid enters the tank. In case of contamination, the necessary filter element exchange is displayed by the relevant maintenance indicator. Within the course of this exchange, you should also exchange the breathing filter element if equipped (only with size 0040-0100). The system is manually switched to the clean filter element by means of the switch-over fitting. Continuous flow is guaranteed during the switching process.



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

| General | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Installation position | | | | vertical | | | | |
| Ambient temperature range | | | °C *[°F]* | –10...+65 *[14...+149]* | | | | |
| Storage conditions | ▶ NBR seal | | °C *[°F]* | –40 ... +65 *[–40 ... +149]*; max. relative air humidity: 65% | | | | |
| | ▶ FKM seal | | °C *[°F]* | –20 ... +65 *[–4 ... +149]*; max. relative air humidity: 65% | | | | |
| Weight | | | **Size** | **0040** | **0063** | **0100** | **0160** | **0250** |
| | | | kg *[lbs]* | 4.46 *[9.81]* | 4.86 *[10.7]* | 5.26 *[11.6]* | 14 *[30.8]* | 15 *[33]* |
| | | | **Size** | **0400** | **0630** | **1000** | **2000** | **2500** |
| | | | kg *[lbs]* | 23 *[50.6]* | 27 *[59.4]* | 61 *[134.2]* | 68 *[149.9]* | 79 *[174.1]* |
| Material | ▶ Filter cover | | | Carbon fiber reinforced plastic (sizes 0040...0100)<br>Aluminum (sizes 0160...2500) | | | | |
| | ▶ Filter head | | | Aluminum | | | | |
| | ▶ Filter bowl | | | Carbon fiber reinforced plastic (sizes 0040...0630)<br>Aluminized steel (sizes 1000...2500) | | | | |
| | ▶ Visual maintenance indicator | (P2.2) | | Plastic PA6 | | | | |
| | | (V...) | | Aluminum | | | | |
| | ▶ Bypass valve | | | Plastic | | | | |
| | ▶ electronic switching element | | | Plastic PA6 | | | | |
| | ▶ Manometer | | | Plastic | | | | |
| | ▶ Seals | | | NBR / FKM | | | | |
| Surface requirement Tank opening | ▶ roughness depth | $R_{z\ max.}$ | µm | 25 (10TDN0040-0100) and 6.3 ... 16 (from 10TDN0160) | | | | |
| | ▶ Flatness | $t_{E\ max.}$ | µm | 0.3 ... 0.5 (10TDN0040-0100) and 0.2 (from 10TDN0160) | | | | |

| Hydraulic | | | |
|---|---|---|---|
| Maximum operating pressure | bar *[psi]* | 10 *[145]*<br>When using a manometer, the maximum permissible operating pressure is reduced to 6 bar *[87 psi]*. | |
| 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 | > $10^5$ at max. operating pressure | |
| Type of pressure measurement of the maintenance indicator | | Back pressure | |
| Assignment: Response pressure of the maintenance indicator / release pressure of the bypass valve | | Response pressure of the maintenance indicator | Release pressure of the bypass valve |
| | bar *[psi]* | Without maintenance indicator | 3.5 ± 0.35 *[50.8 ±5.1]* |
| | | with manometer | |
| | | V0.8 ± 0.15 *[11.6 ± 2.2]* | |
| | | V1.5 ± 0.2 *[21.8 ± 2.9]* | |
| | | V2.2 ± 0.3 *[31.9 ± 4.4]* | |
| | | P2.2 +0.45/-0.25 *[31.9 (+6.4/-3.6)]* | |
| Filtration direction | | From the outside to the inside | |

## 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 | | WE1SP-M12x1 | WE2SP-M12x1 | WE2SPSU-M12x1 | WE1SP-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 65 | | 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 | kg *[lbs]* | 0.1 *[0.22]* | | | |

| **Filter element** | | | | |
|---|---|---|---|---|
| Fiberglass paper H..XL | | Single-use element on the basis of inorganic fiber | | |
| | | Filtration ratio as per ISO 16889 up to $\Delta p$ = 5 bar *[72.5 psi]* | | Achievable oil cleanliness according to ISO 4406 (SAE-AS 4059) |
| Particle separation | H20XL | $\beta_{20(c)} \geq 200$ | | 19/16/12 ... 22/17/14 |
| | H10XL | $\beta_{10(c)} \geq 200$ | | 17/14/10 ... 21/16/13 |
| | H6XL | $\beta_{6(c)} \geq 200$ | | 15/12/10 ... 19/14/11 |
| | H3XL | $\beta_{5(c)} \geq 200$ | | 13/10/8 ... 17/13/10 |
| Permissible pressure differential ▶ A00 | bar *[psi]* | 30 *[435]* | | |

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

## Compatibility with permitted hydraulic fluids

| **Hydraulic fluid** | | **Classification** | **Suitable sealing materials** | **Standards** |
|---|---|---|---|---|
| Mineral oil | | HLP | NBR | DIN 51524 |
| Biodegradable | ▶ Water insoluble | HETG | NBR | VDMA 24568 |
| | | HEES | FKM | |
| | ▶ Water soluble | HEPG | FKM | VDMA 24568 |
| Flame-resistant | ▶ Water-free | HFDU, HFDR | FKM | VDMA 24317 |
| | ▶ Contains 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 or contact us!
- **Flame-resistant, aqueous**: Due to possible chemical reactions with materials or machine and system component surface coating, the service life with these hydraulic fluids may be less than expected.

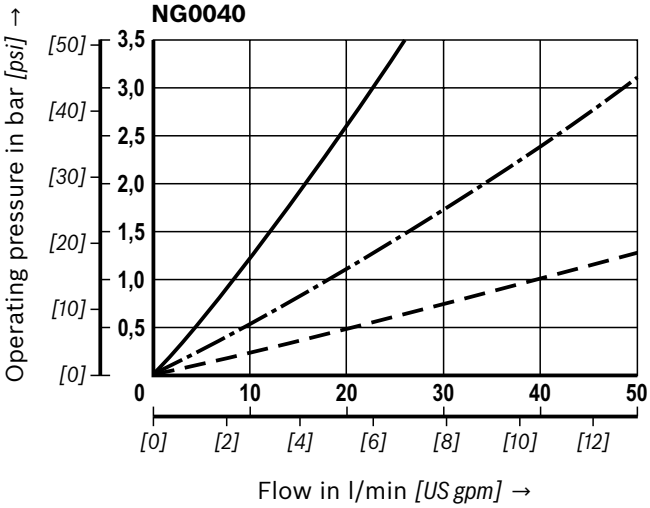
Filter materials made of filter paper (cellulose) may not be used, filter elements with glass fiber material have to be used instead.
- **Biodegradable:** If filter materials made of filter paper are used, the filter life may be shorter than expected due to material incompatibility and swelling.

## Characteristic curves: H3XL
(measured with mineral oil HLP46 according to DIN 51524)

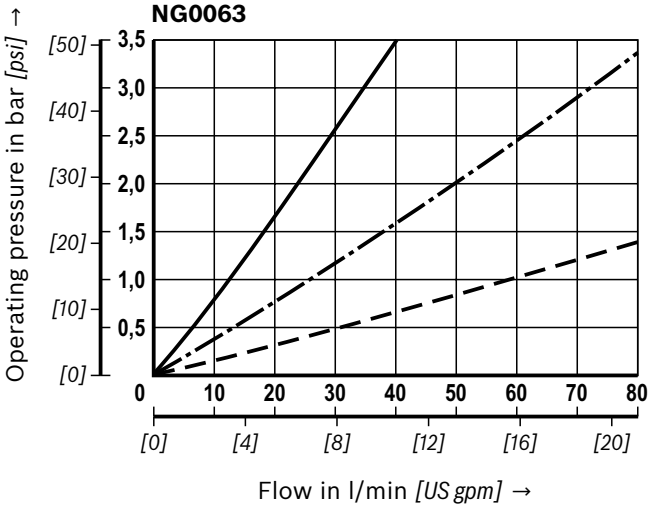
Spec. Weight: < 0.9 kg/dm³
Δ*p*-Q characteristic curves for complete filter
recommended initial Δ*p* for design = 0.5 bar *[7.25 psi]*

Oil viscosity:
- **140 mm²/s** *[649 SUS]*
- **68 mm²/s** *[315 SUS]*
- **30 mm²/s** *[142 SUS]*

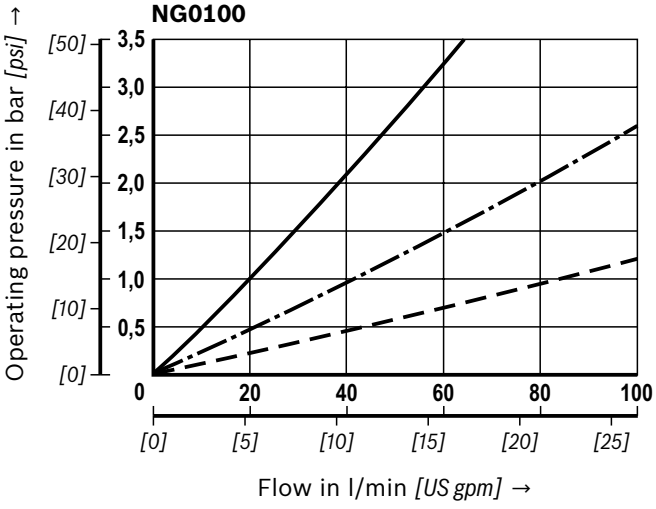
**NG0040**




**NG0063**




**NG0100**

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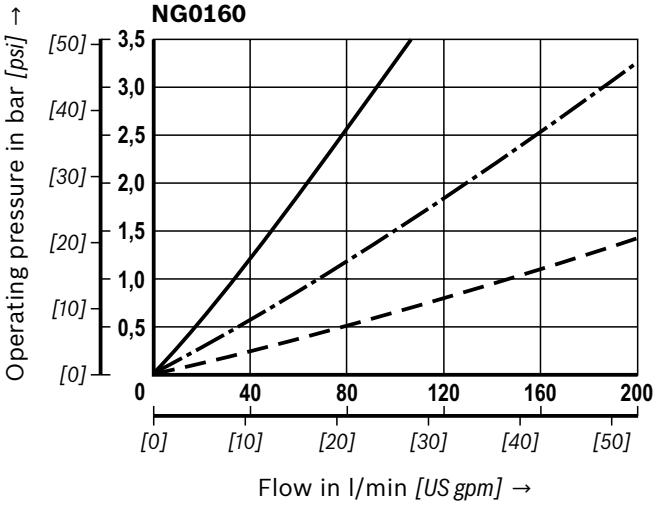
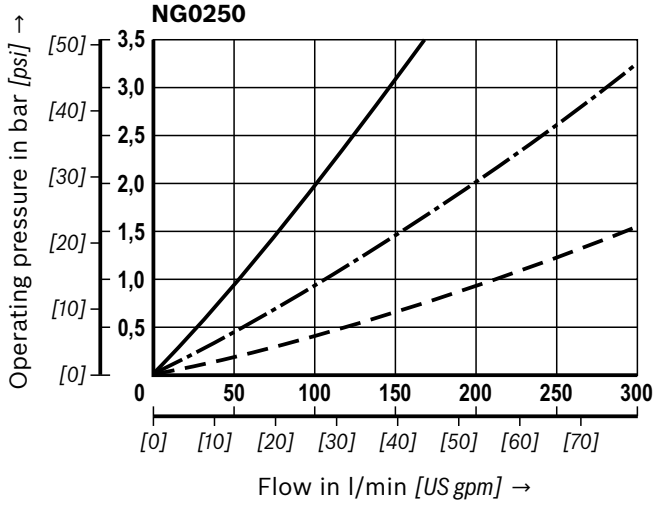
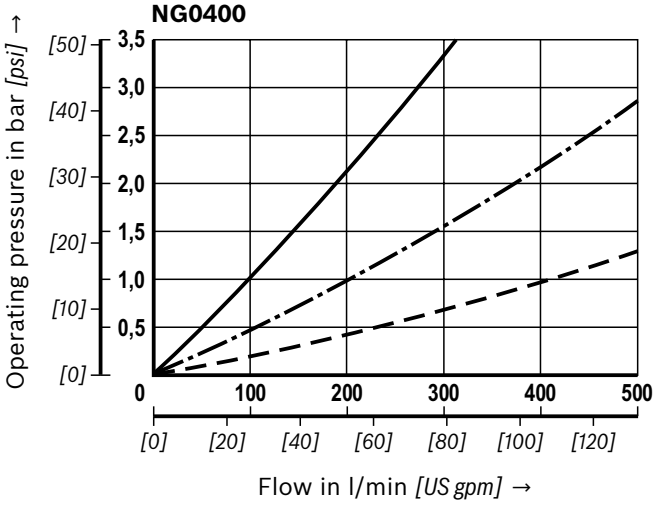



**NG0250**




**NG0400**

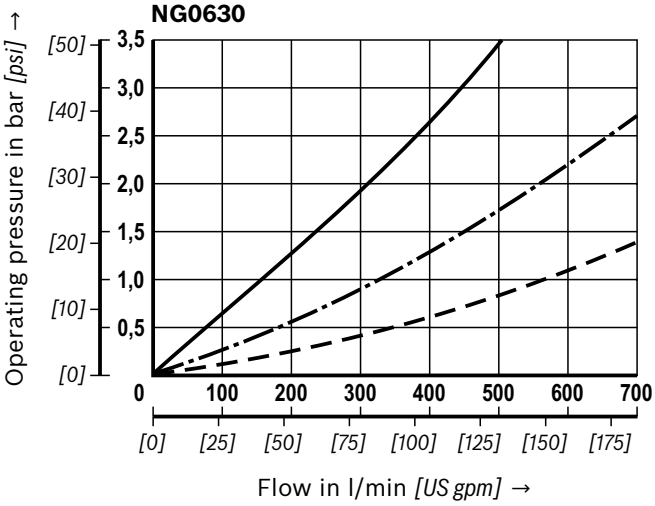


## Characteristic curves: H3XL
(measured with mineral oil HLP46 according to DIN 51524)

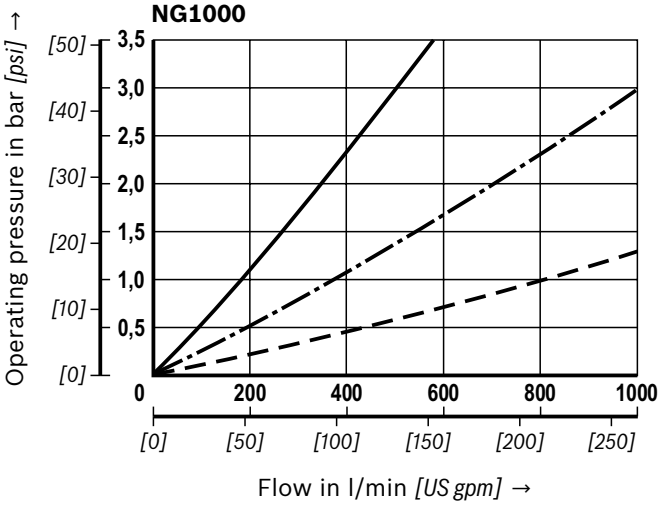
Spec. Weight: < 0.9 kg/dm³
Δ*p*-Q characteristic curves for complete filter
recommended initial Δ*p* for design = 0.5 bar *[7.25 psi]*

Oil viscosity:
— **140 mm²/s** *[649 SUS]*
–·– **68 mm²/s** *[315 SUS]*
– – **30 mm²/s** *[142 SUS]*

**NG0630**




**NG1000**

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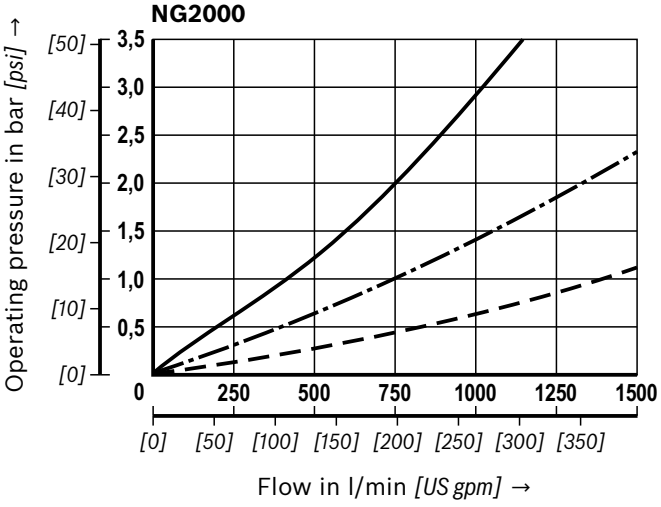
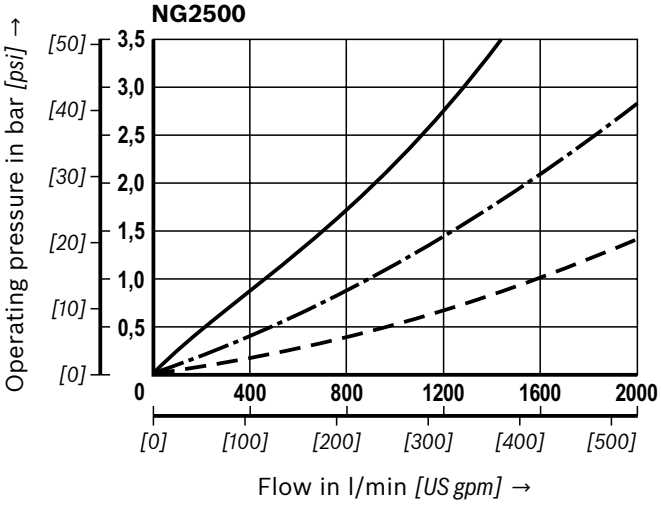



**NG2500**

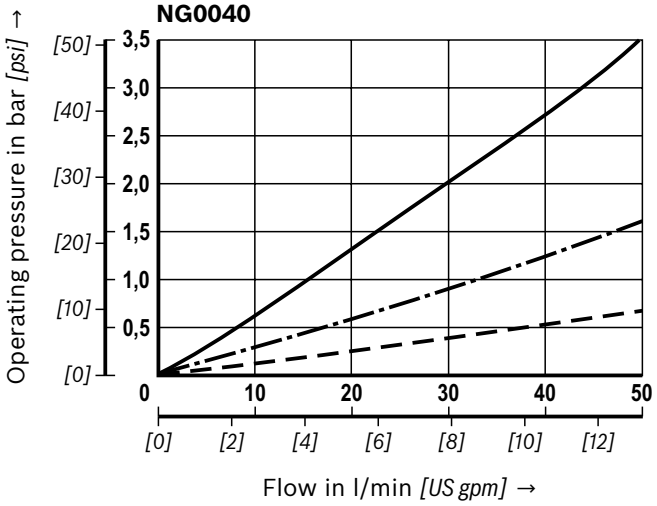


## Characteristic curves: H6XL
(measured with mineral oil HLP46 according to DIN 51524)

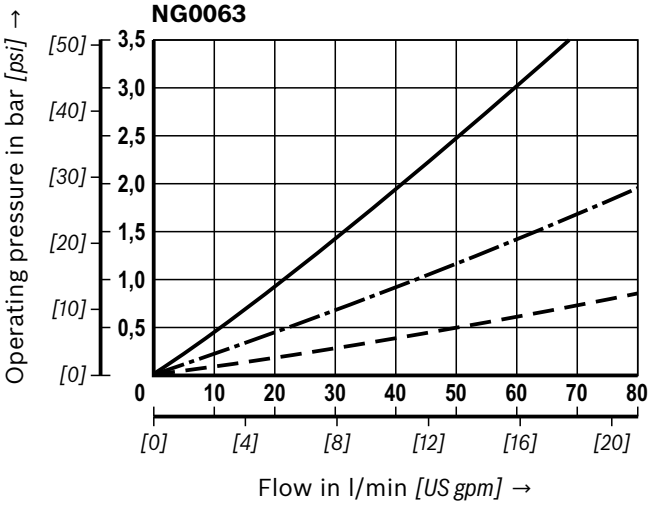
Spec. Weight: < 0.9 kg/dm³
Δ*p*-Q characteristic curves for complete filter
recommended initial Δ*p* for design = 0.5 bar *[7.25 psi]*

Oil viscosity:
- **140 mm²/s** *[649 SUS]*
- **68 mm²/s** *[315 SUS]*
- **30 mm²/s** *[142 SUS]*

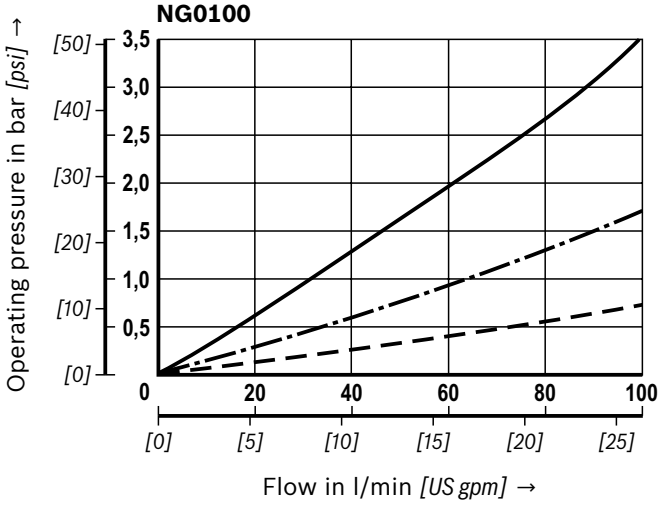
**NG0040**




**NG0063**




**NG0100**

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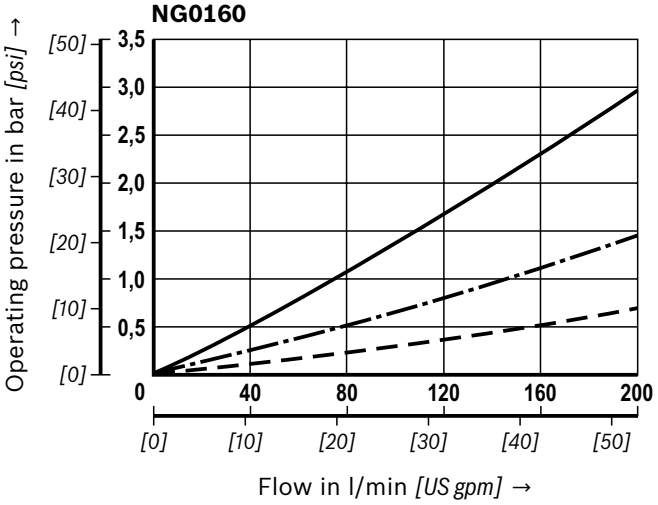


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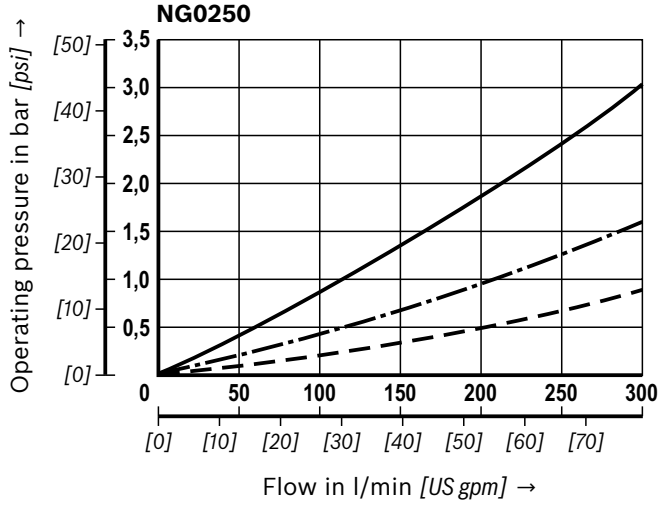
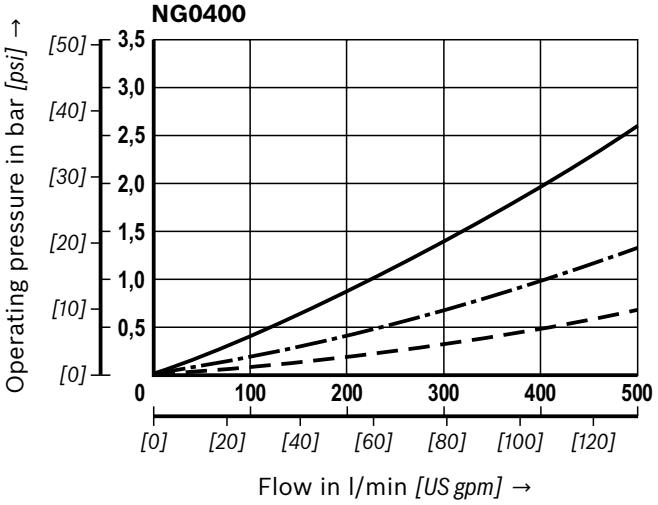



**NG0400**

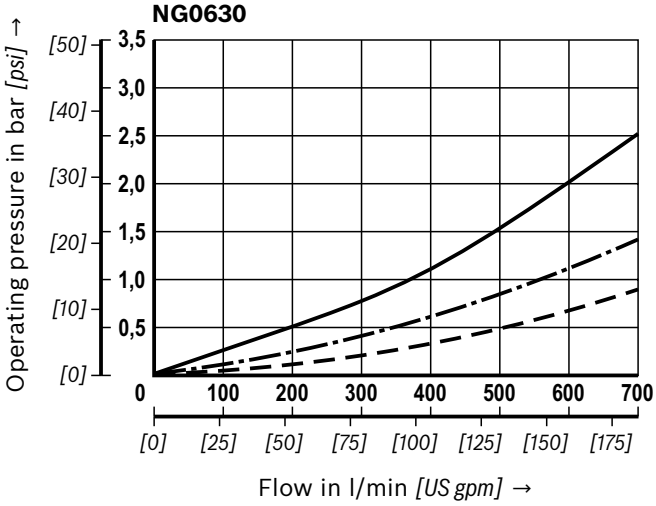


## Characteristic curves: H6XL
(measured with mineral oil HLP46 according to DIN 51524)

Spec. Weight: < 0.9 kg/dm³
Δ*p*-Q characteristic curves for complete filter
recommended initial Δ*p* for design = 0.5 bar *[7.25 psi]*

Oil viscosity:
- **140 mm²/s** *[649 SUS]*
- **68 mm²/s** *[315 SUS]*
- **30 mm²/s** *[142 SUS]*

**NG0630**

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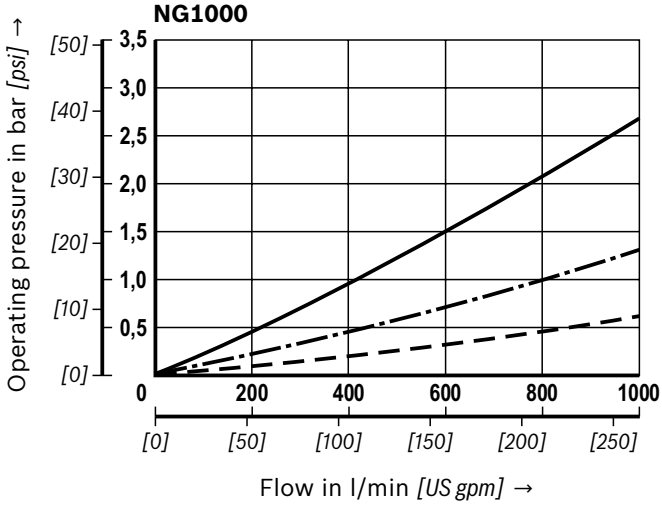


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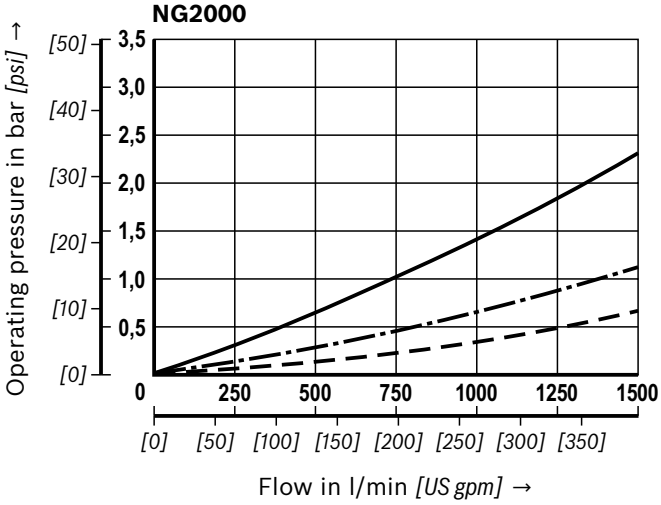
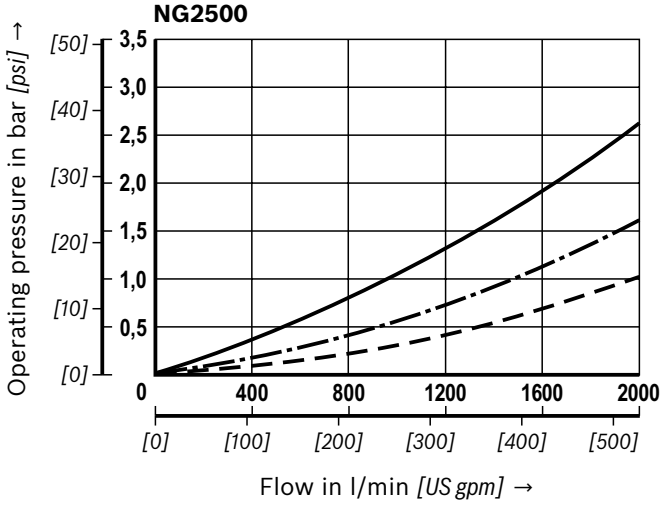



**NG2500**

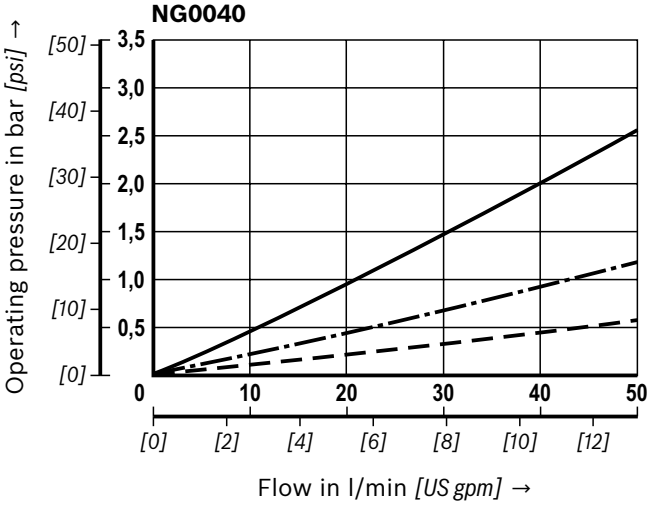


## Characteristic curves: H10XL
(measured with mineral oil HLP46 according to DIN 51524)

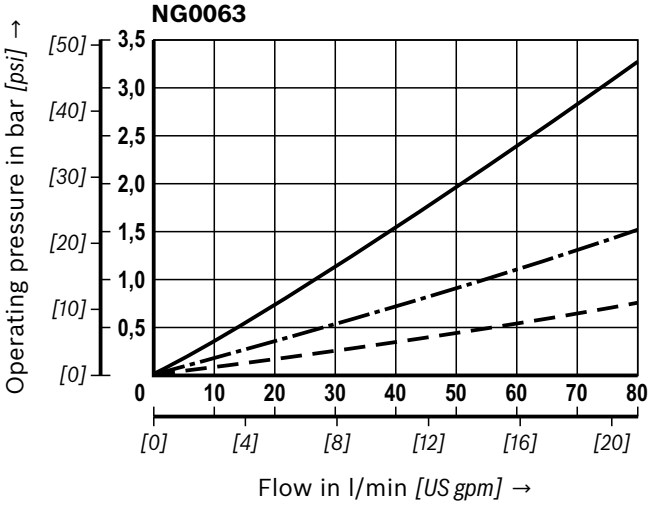
Spec. Weight: < 0.9 kg/dm³
Δ*p*-Q characteristic curves for complete filter
recommended initial Δ*p* for design = 0.5 bar *[7.25 psi]*

Oil viscosity:
— **140 mm²/s** *[649 SUS]*
–·– **68 mm²/s** *[315 SUS]*
– – **30 mm²/s** *[142 SUS]*

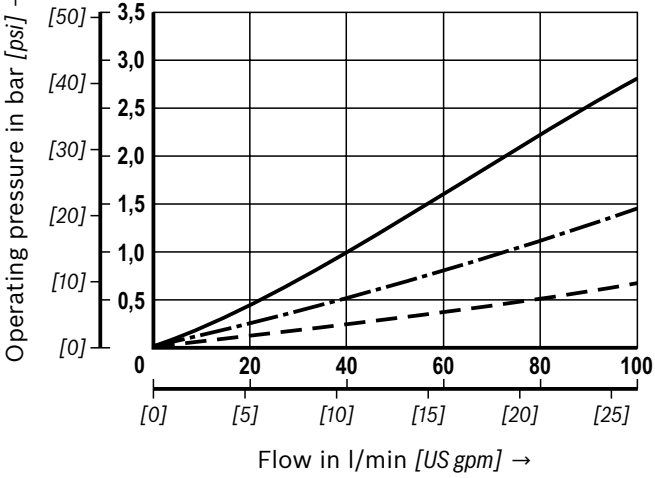
**NG0040**



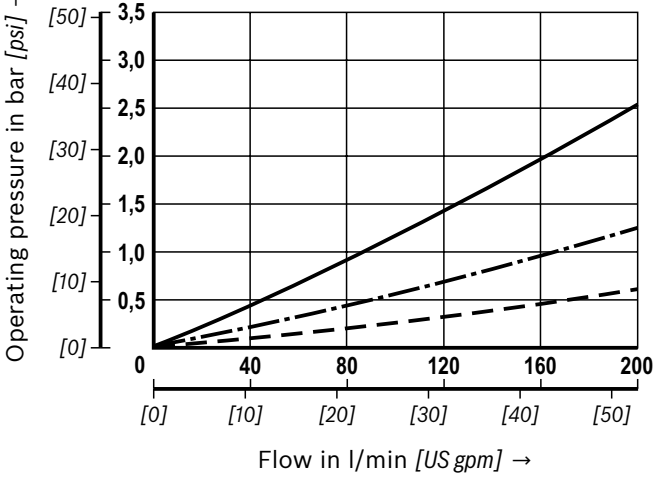

**NG0063**



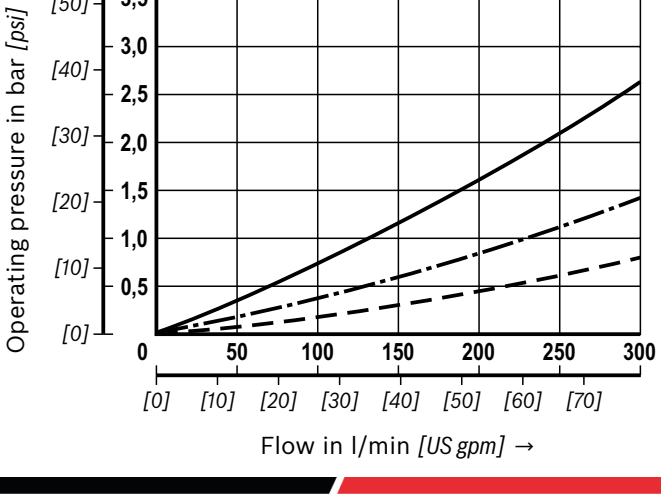

**NG0100**



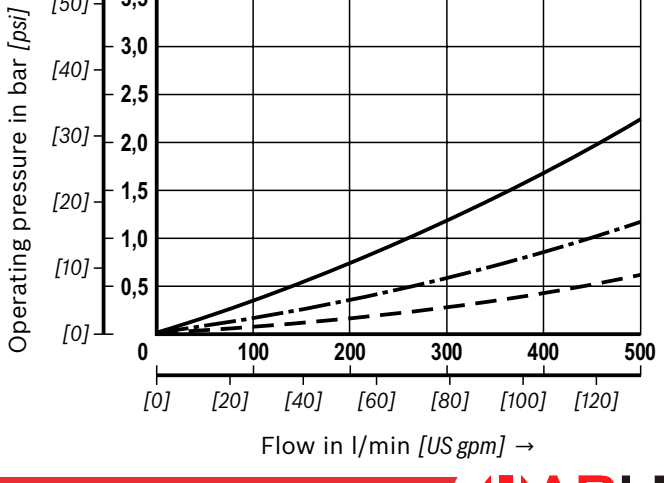

**NG0160**




**NG0250**




**NG0400**

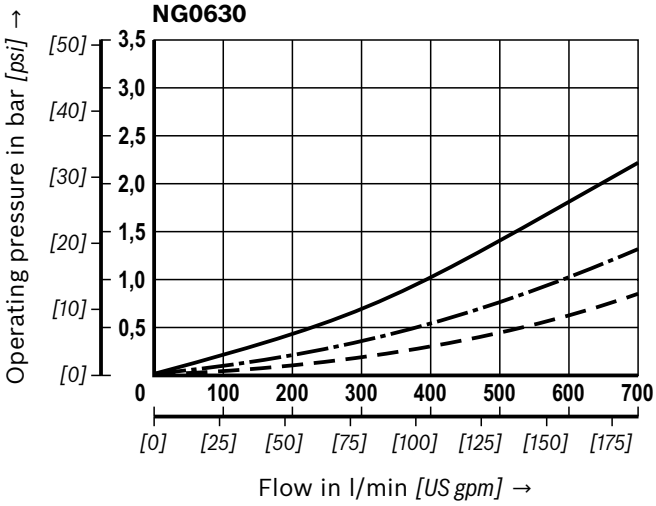


## Characteristic curves: H10XL
(measured with mineral oil HLP46 according to DIN 51524)

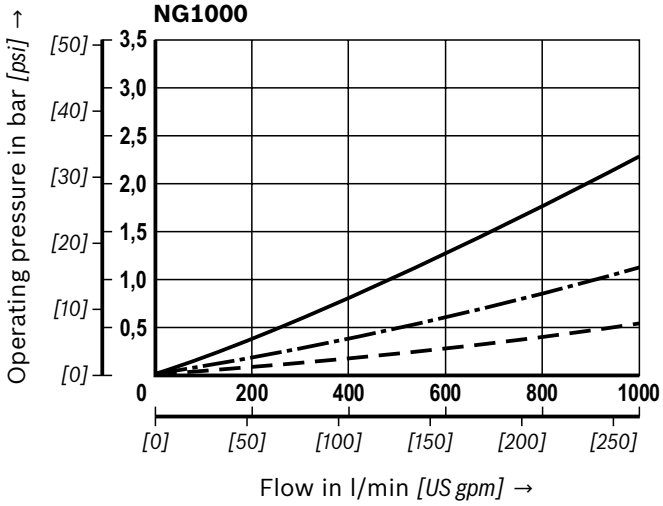
Spec. Weight: < 0.9 kg/dm³
Δ*p*-Q characteristic curves for complete filter
recommended initial Δ*p* for design = 0.5 bar *[7.25 psi]*

Oil viscosity:
— 140 mm²/s *[649 SUS]*
-·- 68 mm²/s *[315 SUS]*
– – – 30 mm²/s *[142 SUS]*

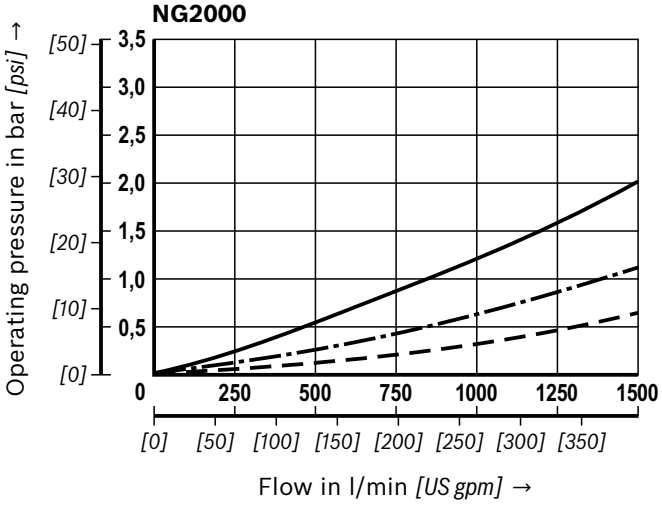
**NG0630**



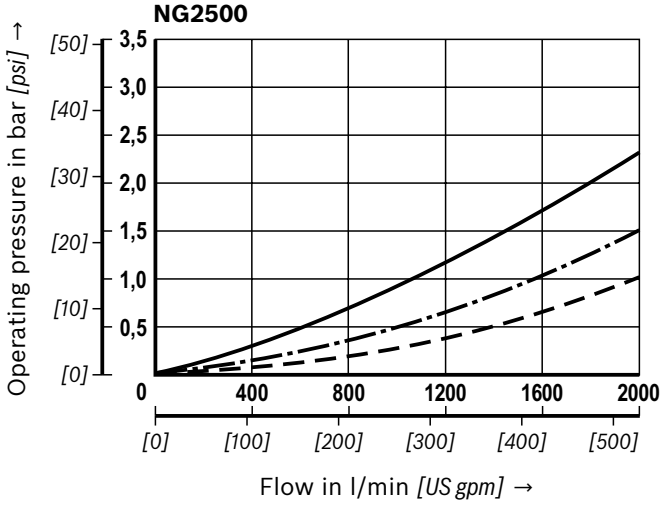

**NG1000**




**NG2000**




**NG2500**

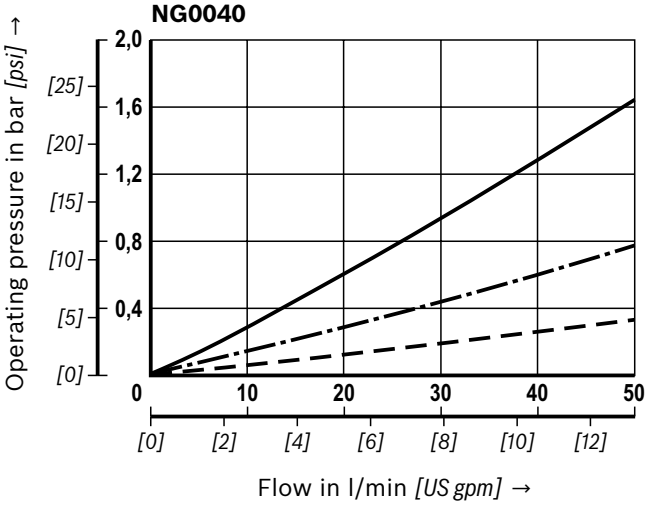


## Characteristic curves: H20XL
(measured with mineral oil HLP46 according to DIN 51524)

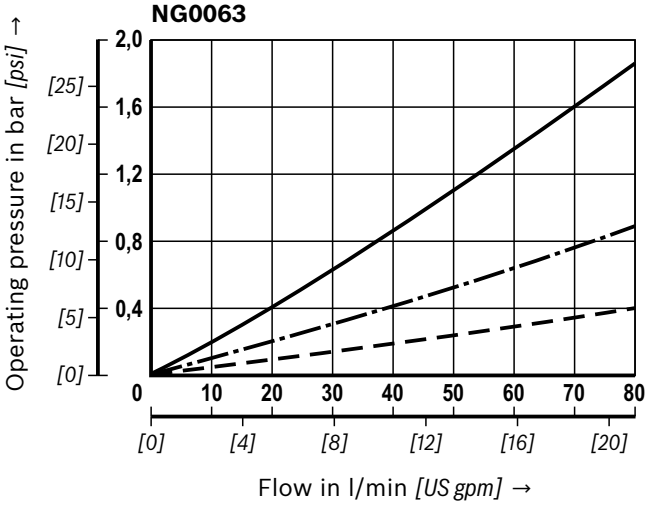
Spec. Weight: < 0.9 kg/dm³
Δ*p*-Q characteristic curves for complete filter
recommended initial Δ*p* for design = 0.5 bar *[7.25 psi]*

Oil viscosity:
- **140 mm²/s** *[649 SUS]*
- **68 mm²/s** *[315 SUS]*
- **30 mm²/s** *[142 SUS]*

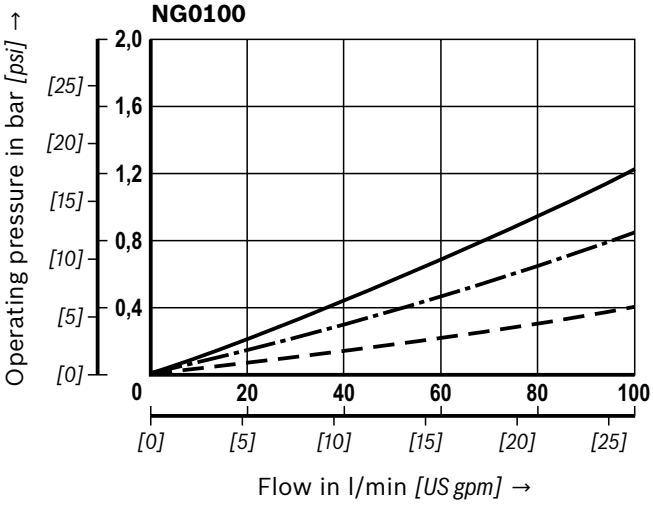
**NG0040**



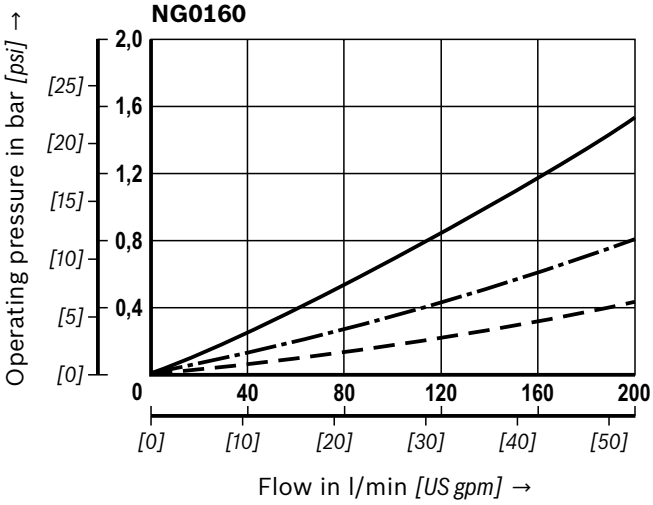

**NG0063**



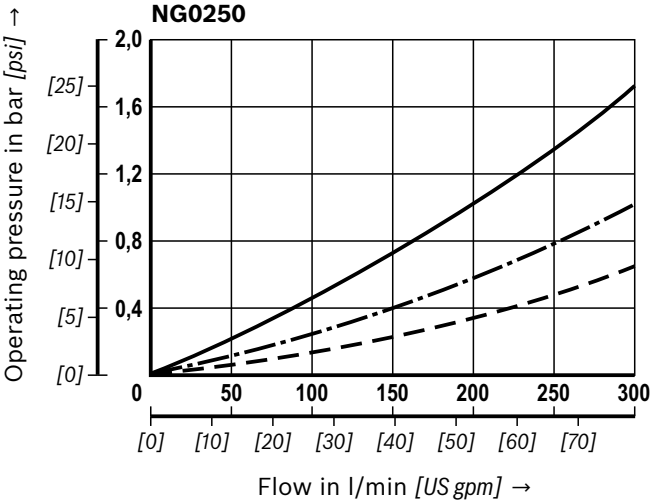

**NG0100**



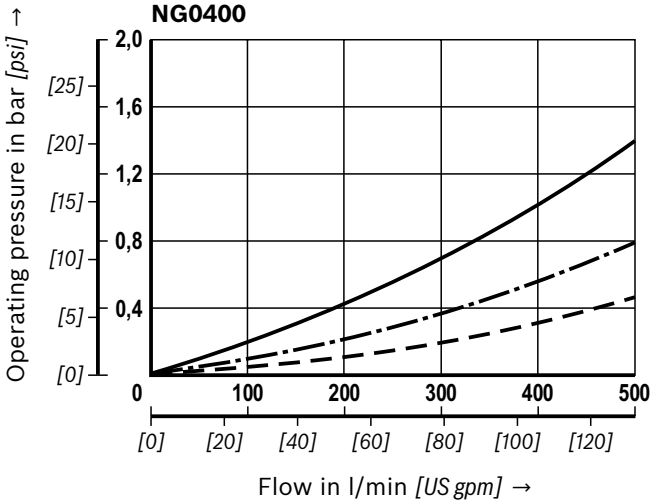

**NG0160**




**NG0250**




**NG0400**

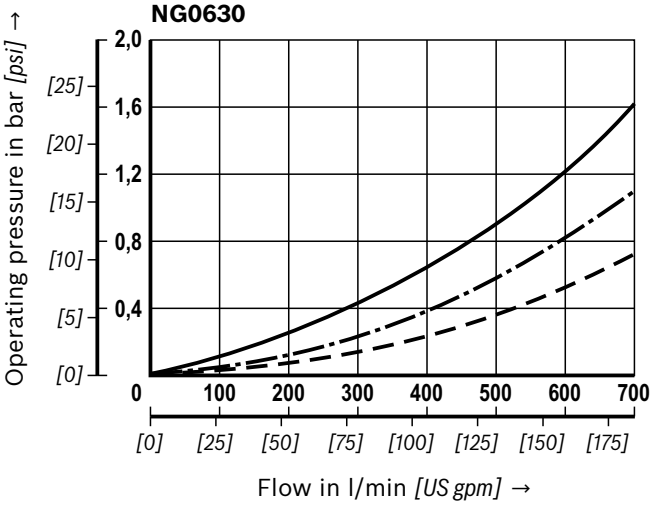


## Characteristic curves: H20XL
(measured with mineral oil HLP46 according to DIN 51524)

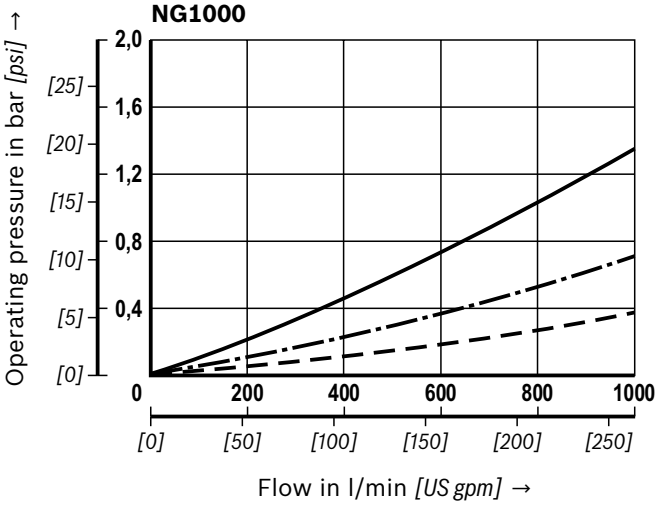
Spec. Weight: < 0.9 kg/dm³
Δ*p*-Q characteristic curves for complete filter
recommended initial Δ*p* for design = 0.5 bar *[7.25 psi]*

Oil viscosity:
— **140 mm²/s** *[649 SUS]*
–·– **68 mm²/s** *[315 SUS]*
– – – **30 mm²/s** *[142 SUS]*

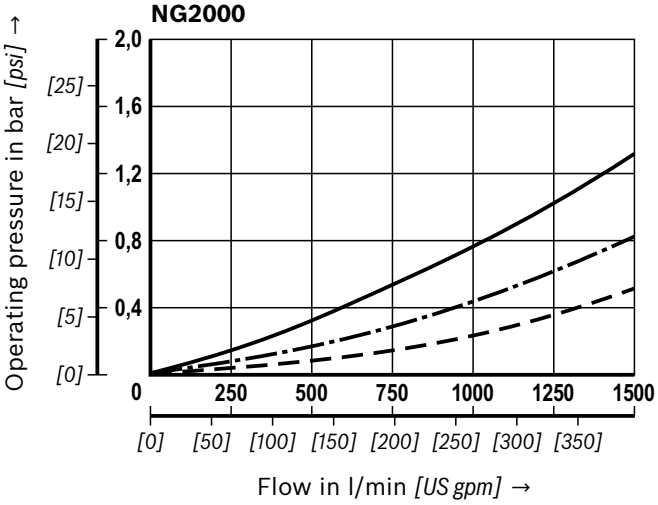
**NG0630**



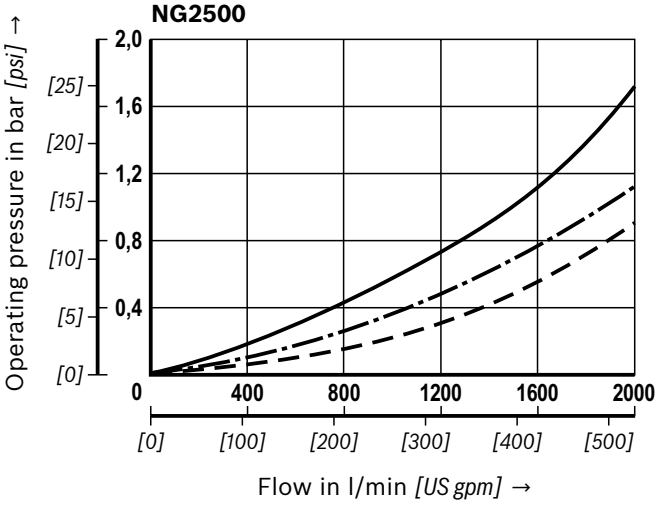

**NG1000**




**NG2000**

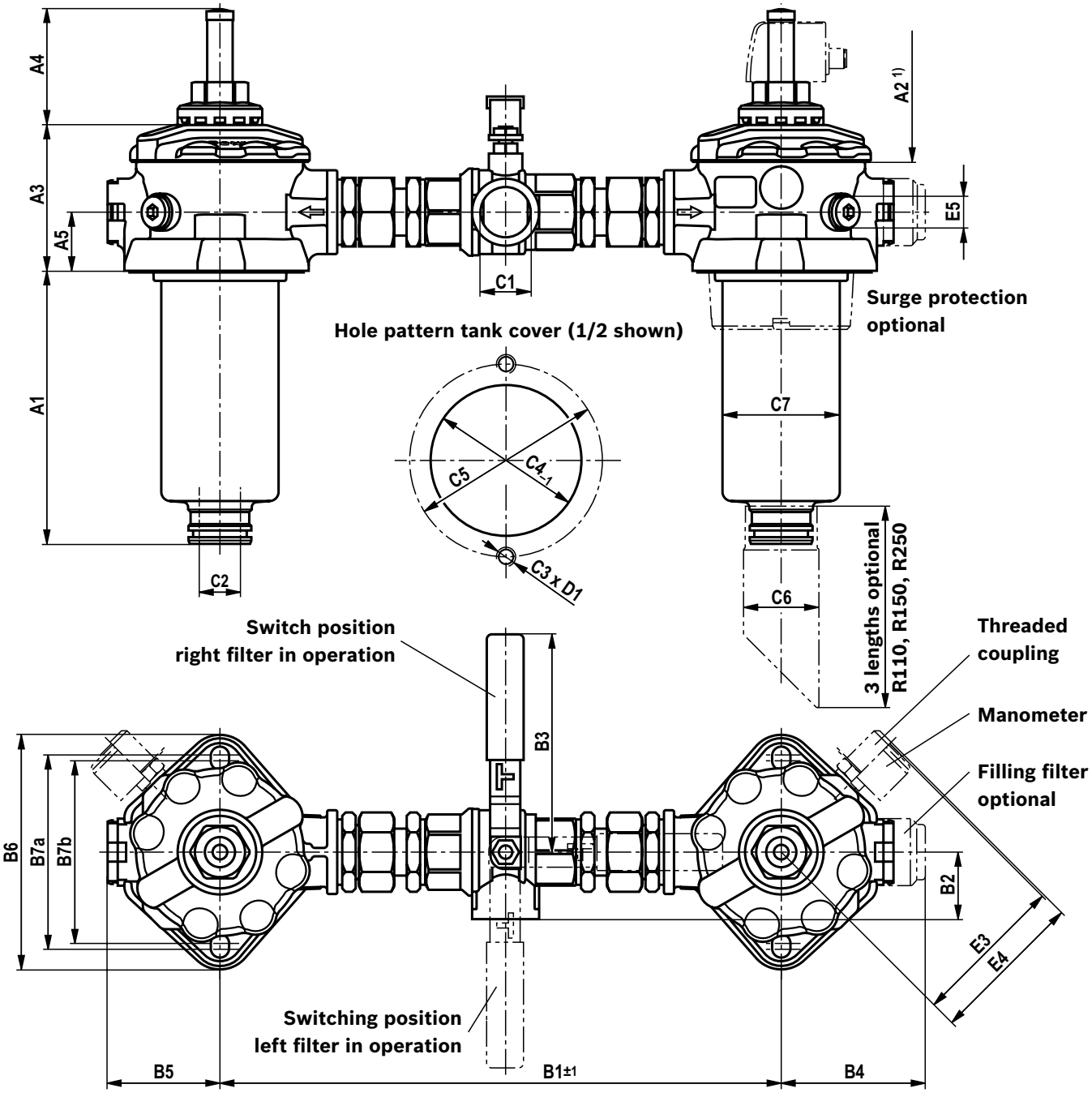



**NG2500**



## Dimensions: 10TDN0040, 0063, 0100

(dimensions in mm *[inch]*)



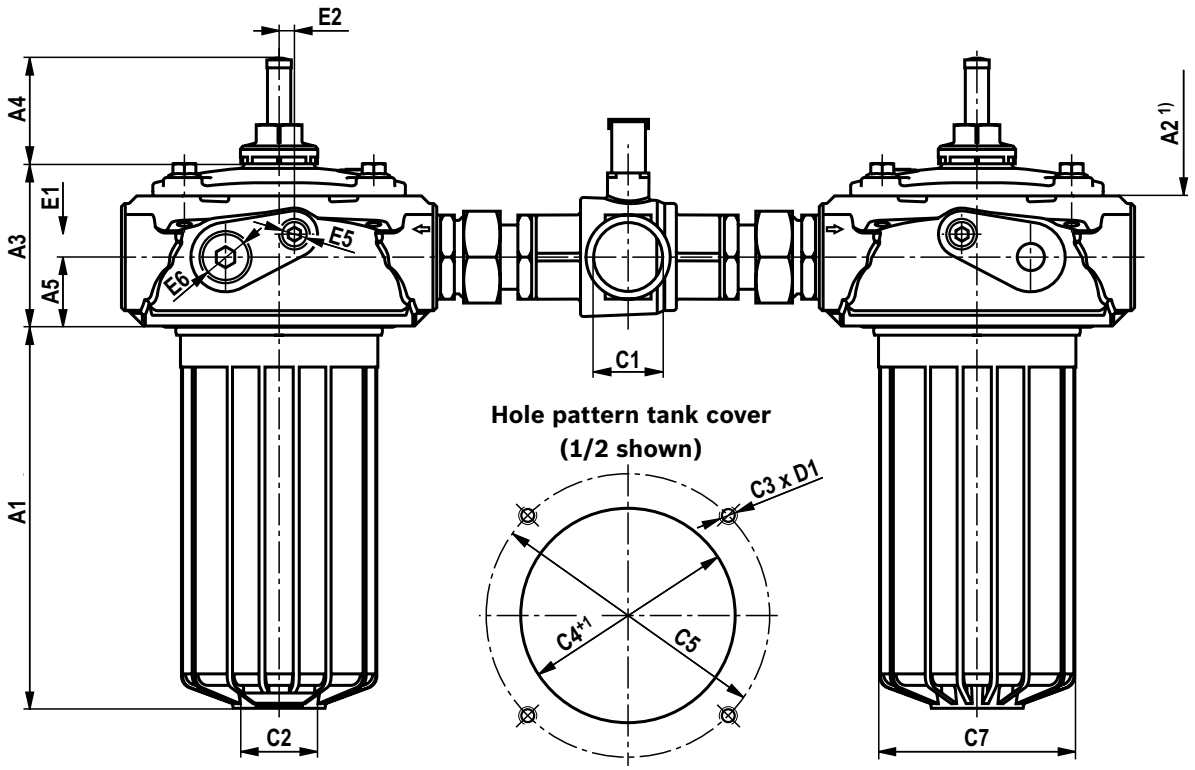

1) Observe the servicing height plus the length of the outlet pipe, if applicable

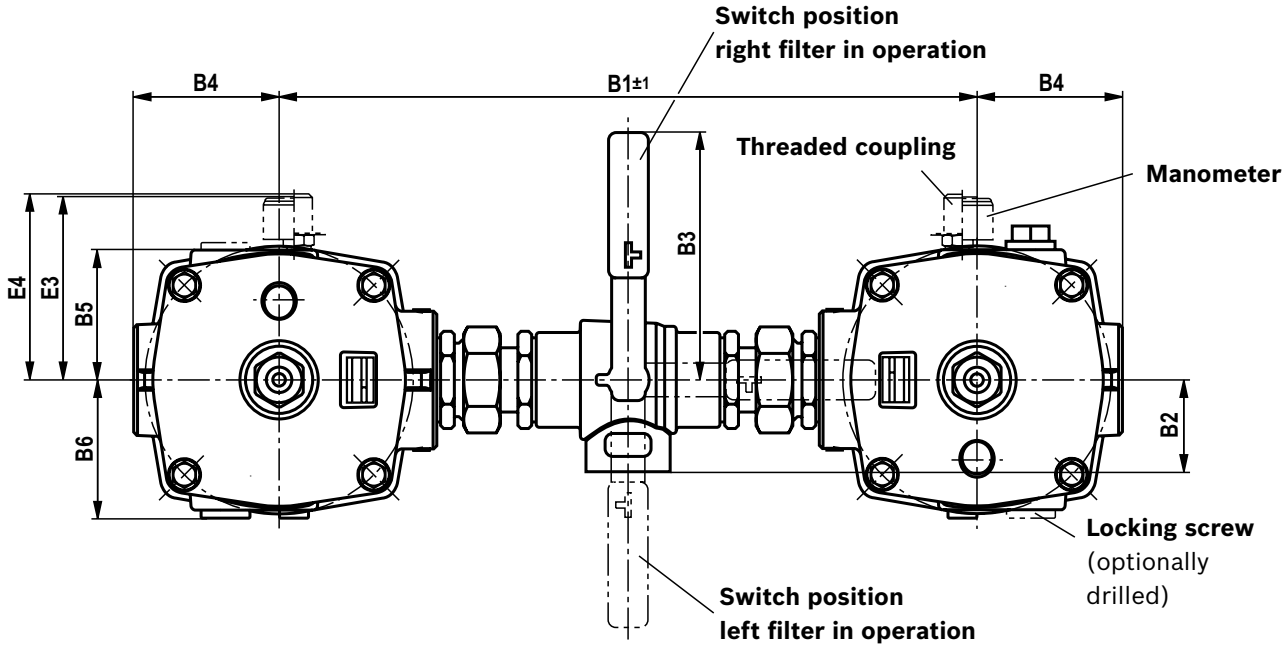
| Type | Height | | | | | Depths | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 | A2 1) | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7a | B7b |
| **10TDN0040** | 103 *[4.06]* | 100 *[3.94]* | 87 *[3.43]* | 69 *[2.72]* | 35 *[1.38]* | 335 *[13.19]* | 45 *[1.77]* | 130 *[5.12]* | 86 *[3.39]* | 67 *[2.64]* | 140 *[5.51]* | 116 *[4.57]* | 109 *[4.29]* |
| **10TDN0063** | 163 *[6.42]* | 160 *[6.30]* | | | | | | | | | | | |
| **10TDN0100** | 253 *[9.96]* | 250 *[9.84]* | | | | | | | | | | | |

| Type | Connections | | | | | | | | Depths | Measuring port | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | C1 connection | | ØC2 | C3 | ØC4 | ØC5 | C6 | ØC7 | D1 | E3 | E4 | E5 |
| | Standard | U... (SAE J1926) | | | | | | | | | | |
| **10TDN0040** | G1 | SAE 16<br>1 5/16–12 UN–2B | 25 *[0.98]* | M10 | 90 *[3.54]* | 115 *[4.53]* | 45 *[1.77]* | 71 *[2.80]* | $12^{+2}$ *[0.47 $^{+0.08}$]* | 86 *[3.39]* | 90 *[3.54]* | G1/4 |
| **10TDN0063** | | | | | | | | | | | | |
| **10TDN0100** | | | | | | | | | | | | |

## Dimensions: 10TDN0160, 0250

(dimensions in mm *[inch]*)



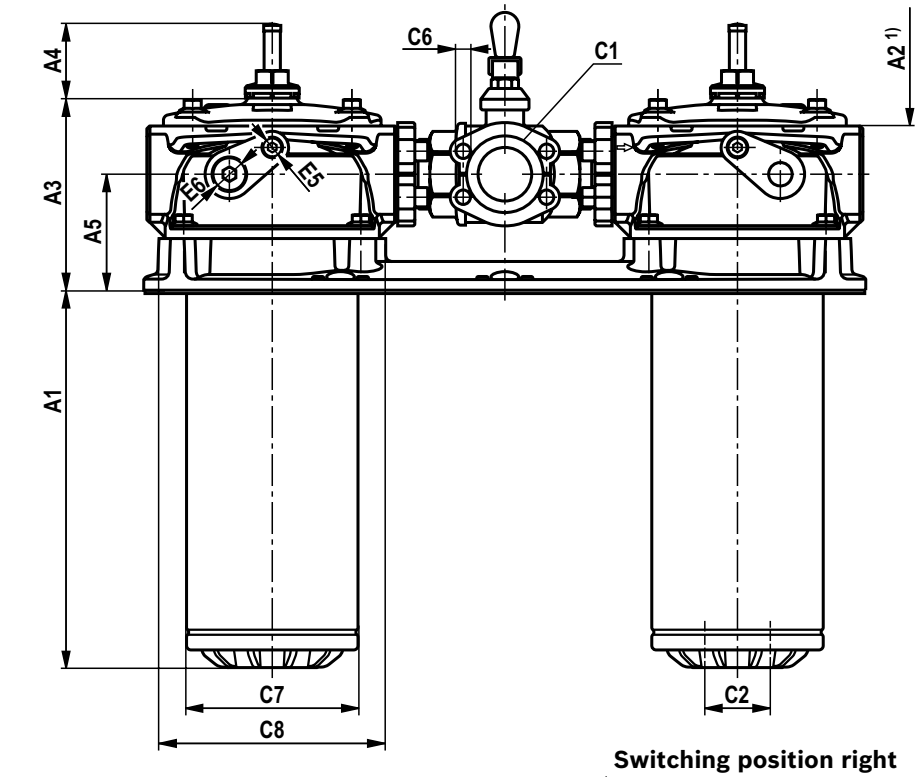

1) Observe the servicing height plus the length of the outlet pipe, if applicable

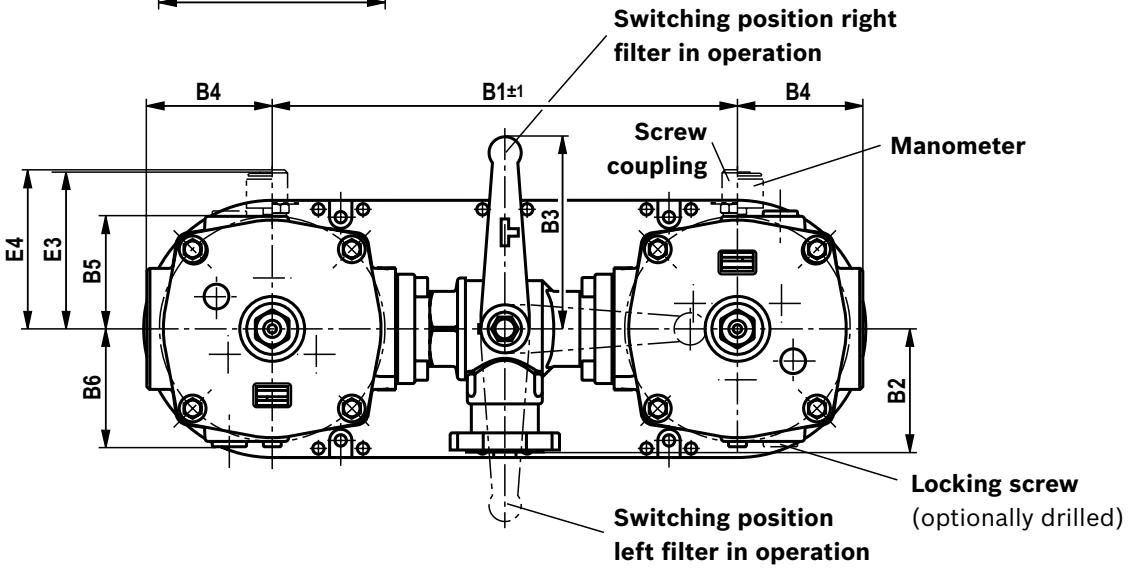
| Type | Height | | | | | Depths | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 | A2 1) | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 |
| 10TDN0160 | 160 *[6.30]* | 160 *[6.30]* | 106 *[4.17]* | 69 *[2.72]* | 45 *[1.77]* | 456 *[17.95]* | 60 *[2.36]* | 159 *[6.26]* | 95 *[3.74]* | 85 *[3.35]* | 90 *[3.54]* |
| 10TDN0250 | 250 *[9.84]* | 250 *[9.84]* | | | | | | | | | |

| Type | Connections | | | | | | | Depths | Measuring port | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | C1 connection | | ØC2 | C3 | ØC4 | ØC5 | ØC7 | D1 | E1 | E2 | E3 | E4 | E5 | E6 |
| | Standard | U... (SAE J1926) | | | | | | | | | | | | |
| 10TDN0160 | G1 1/2 | SAE 20 1 5/8–12 UN–2B | 25 *[0.98]* | M10 | 140 *[5.51]* | 185 *[7.28]* | 129 *[5.08]* | $12^{+2}$ *[0.47 +0.08]* | 15 *[0.59]* | 10 *[0.39]* | 116 *[4.57]* | 120 *[4.72]* | G1/4 | G3/4 |
| 10TDN0250 | | | | | | | | | | | | | | |

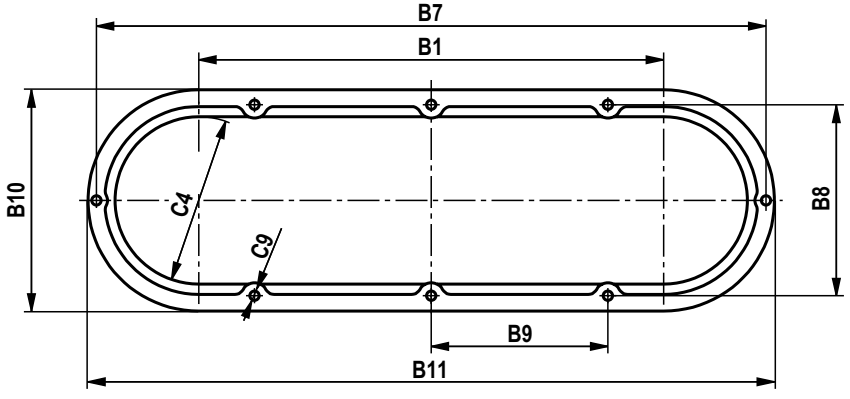
## Dimensions: 10TDN0400, 0630

(dimensions in mm *[inch]*)

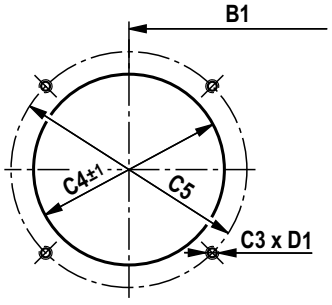



**Hole pattern tank cover with installation plate**




**Hole pattern tank cover (1/2 shown) without installation plate**



## Dimensions: 10TDN0400, 0630
(dimensions in mm *[inch]*)

| Type | Height | | | | |
|---|---|---|---|---|---|
| | A1 | A2 [1] | A3 | A4 | A5 |
| 10TDN0400 | 255 *[10.04]* | 335 *[13.19]* | 176 *[6.93]* | 69 *[2.72]* | 105 *[4.13]* |
| 10TDN0630 | 352 *[13.86]* | 485 *[19.09]* | | | |

| Type | Depths | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | B1 | B2 | B3 | B4 | B5 | B6 | B7 | B8 | B9 | B10 | B11 |
| 10TDN0400 | 500 *[19.69]* | 143 *[5.63]* | 220 *[8.66]* | 117 *[4.61]* | 105 *[4.13]* | 110 *[4.33]* | 720 *[28.35]* | 205 *[8.07]* | 190 *[7.48]* | 238 *[9.37]* | 738 *[29.06]* |
| 10TDN0630 | | | | | | | | | | | |

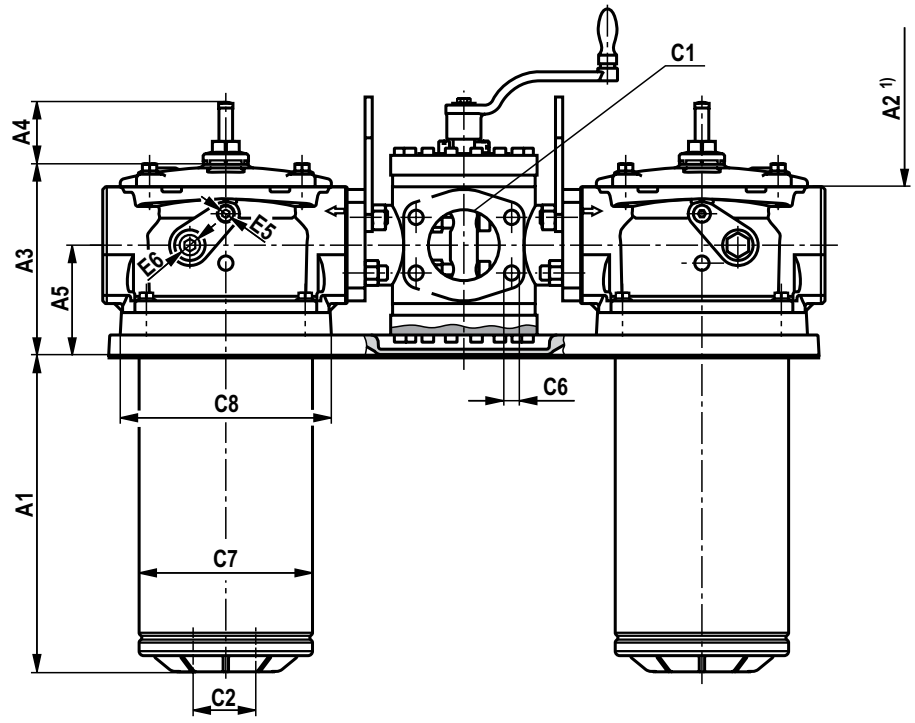
| Type | Connections | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | C1 connection | | C2 | C3 | ØC4 | ØC5 | C6 | ØC7 | ØC8 | C9 |
| | Standard | U... (SAE J1926) | | | | | | | | |
| 10TDN0400 | SAE 2 1/2” 3000 psi | – | G2 | M10 | 178 *[70.1]* | 220 *[8.66]* | M12 | 160 *[6.30]* | 202 *[7.95]* | M10 |
| 10TDN0630 | | | | | | | | | | |

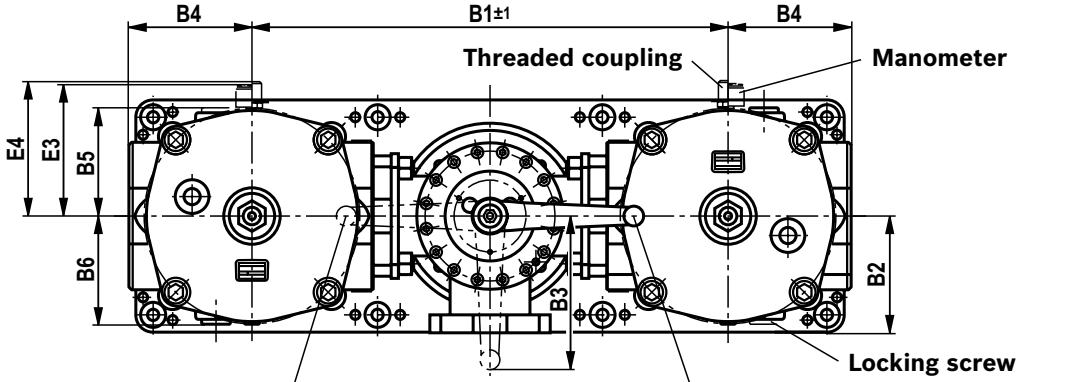
| Type | Depths | Measuring port | | | | |
|---|---|---|---|---|---|---|
| | D1 | E1 | E3 | E4 | E5 | E6 |
| 10TDN0400 | $12^{+2}$ *[0.47 $^{+0.08}$]* | 25 *[0.98]* | 134 *[5.28]* | 138 *[5.43]* | G1/4 | G3/4 |
| 10TDN0630 | | | | | | |

[1] Observe the servicing height plus the length of the outlet pipe, if applicable

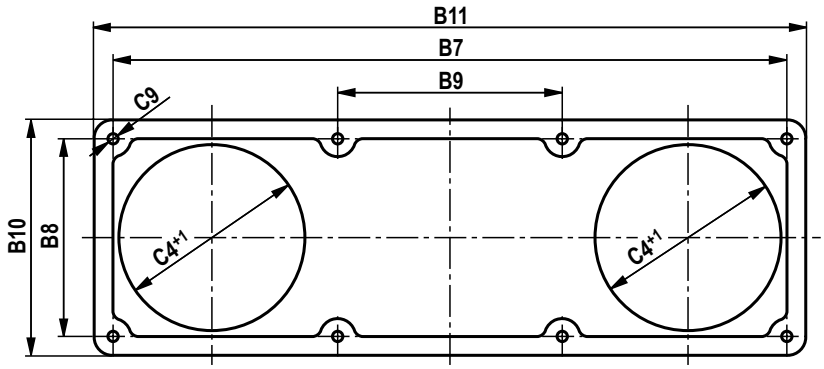
## Dimensions: 10TDN1000, 10TD2000, 10TD2500

(dimensions in mm *[inch]*)

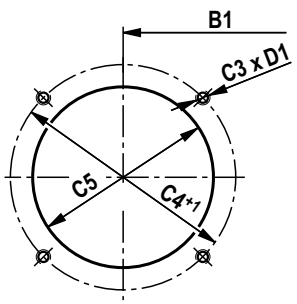



**Hole pattern tank cover with installation plate**




**Hole pattern tank cover (1/2 shown) without installation plate**



## Dimensions: 10TDN1000, 10TD2000, 10TD2500

(dimensions in mm *[inch]*)

| Type | Height | | | | |
|---|---|---|---|---|---|
| | A1 | A2 [1] | A3 | A4 | A5 |
| 10TDN1000 | 353 *[13.90]* | 530 *[20.87]* | 213 *[8.39]* | 69 *[2.72]* | 123 *[4.84]* |
| 10TD2000 | 710 *[27.95]* | 880 *[34.65]* | | | |
| 10TD2500 | 945 *[37.20]* | 1130 *[44.49]* | | | |

| Type | Depths | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | B1 | B2 | B3 | B4 | B5 | B6 | B7 | B8 | B9 | B10 | B11 |
| 10TDN1000 | 530 *[20.87]* | 130 *[5.12]* | 160 *[6.30]* | 137 *[5.39]* | 115 *[4.53]* | 120 *[4.72]* | 750 *[29.53]* | 220 *[8.66]* | 250 *[9.84]* | 262 *[10.31]* | 792 *[31.18]* |
| 10TD2000 | | | | | | | | | | | |
| 10TD2500 | | | | | | | | | | | |

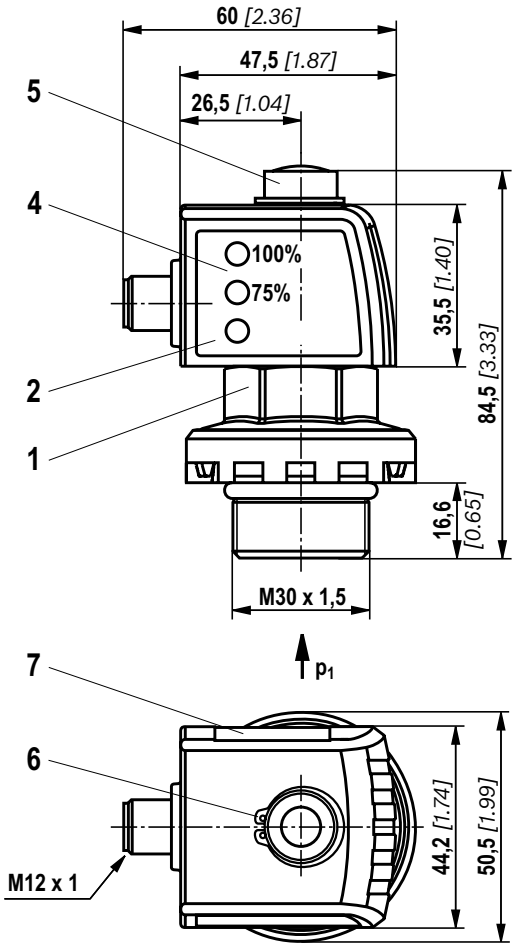
| Type | Connections | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | C1 connection | | C2 | C3 | ØC4 | ØC5 | C6 | ØC7 | ØC8 | C9 |
| | Standard | U... (SAE J1926) | | | | | | | | |
| 10TDN1000 | SAE 3” 3000 psi | – | G3 | M10 | 202 *[7.95]* | 250 *[9.84]* | M16 | 193 *[7.60]* | 235 *[9.25]* | M10 |
| 10TD2000 | | | | | | | | | | |
| 10TD2500 | | | | | | | | | | |

| Type | Depths | Measuring port | | | | |
|---|---|---|---|---|---|---|
| | D1 | E1 | E3 | E4 | E5 | E6 |
| 10TDN1000 | $12^{+2}$ *[0.47 $^{+0.08}$]* | 35 *[1.38]* | 145 *[5.71]* | 149 *[5.87]* | G1/4 | G3/4 |
| 10TD2000 | | | | | | |
| 10TD2500 | | | | | | |

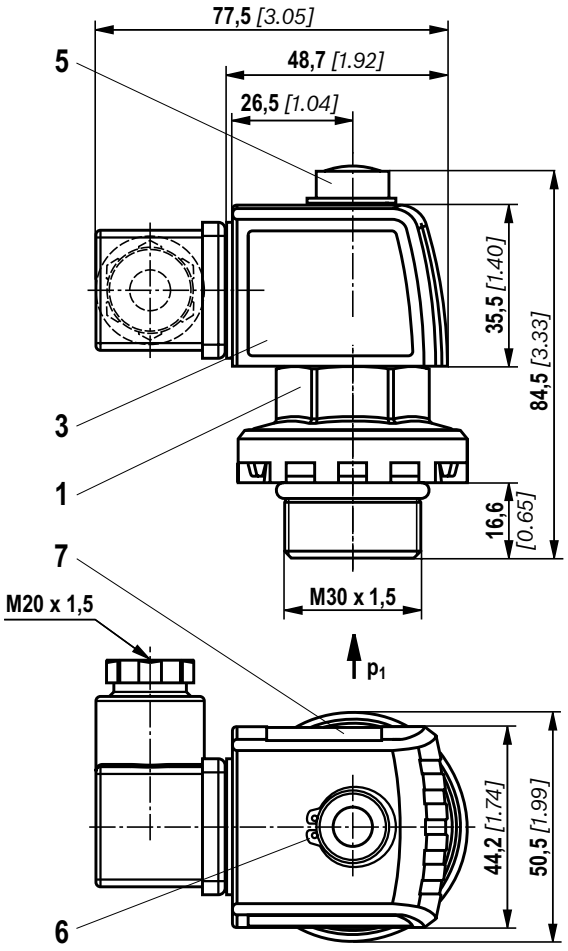
[1] Observe the servicing height plus the length of the outlet pipe, if applicable

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

**electronic switching element with round plug-in connection M12x1, 4-pole**




**electronic switching element with rectangular plug-in connection EN 175301-803**




**1** Mechanical optical maintenance indicator;
max. tightening torque $M_{A\,max}$ = 50 Nm *[36.88 lb-ft]*
Tightening torque for back pressure indicator in PA6.6
$M_{A\,max}$ = 35 Nm *[25.82 lb-ft]*

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

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

**4** Housing with three LEDs: 24 V =
green: Stand-by
yellow: Switching point 75%
red: Switching point 100%

**5** Optical display with memory function

**6** Locking ring DIN 471-16x1

**7** Name plate

☞ **Important:**
If an electronic switching element with signal suppression up to 30 °C *[86 °F]* is used (WE-2SPSU-M12X1), it has to be ensured that the aluminum version of the mechanical-optical maintenance indicator **must** be used. These maintenance indicators are referred to in the filter type key as “V2.2”, “V1.5” or “V0.8”. Also refer to the chapter “Spare parts and accessories”.
The temperature-controlled signal processing does not work with mechanical-optical maintenance indicators made of polyamide.

# Ordering code spare parts

## Filter element

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

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

**Size**

| | | |
|---|---|---|
| 02 | TDN...<br>(Filter element according to **DIN 24550)** | **0040**<br>**0063**<br>**0100**<br>**0160**<br>**0250**<br>**0400**<br>**0630**<br>**1000** |
| | TD...<br>(Filter elements according to **standard)** | **2000**<br>**2500** |

**Filter rating in µm**

| | | | |
|---|---|---|---|
| 03 | **Nominal** | Paper, not cleanable | **P10**<br>**P25** |
| | **Nominal** | Stainless steel wire mesh, cleanable | **G10**<br>**G25**<br>**G40**<br>**G60**<br>**G100** |
| | **Absolute**<br>**(ISO 16889; βx(c) ≥ 200)** | Glass fiber material, not cleanable | **H3XL**<br>**H6XL**<br>**H10XL**<br>**H20XL** |
| | **Absolute**<br>**(ISO 16889; βx(c) ≥ 200)** | Water-absorbing, not cleanable | **AS6**<br>**AS10**<br>**AS20** |

**Pressure differential**

| | | |
|---|---|---|
| 04 | Max. admissible filter element pressure differential: 30 bar *[435 psi]*, filter **with** bypass valve | **A00** |

**Bypass valve**

| | | |
|---|---|---|
| 05 | **without** bypass valve | **0** |

**Seal**

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

**Order example:**
**1.0040 H10XL-A00-0-M**

**Further models on request.**
**For detailed information filter elements please refer to data sheet**

# Ordering code spare parts

## Mechanical optical maintenance indicator

| 01 | 02 | | 03 | | 04 | | 05 | | 06 | 07 |
|---|---|---|---|---|---|---|---|---|---|---|
| **W** | **O** | **-** | **S01** | **-** | | **-** | | **-** | **10** | |

| | | |
|---|---|---|
| 01 | **Maintenance indicator** | **W** |
| 02 | **mechanical visual indicator** | **O** |

**Version**

| | | |
|---|---|---|
| 03 | Back pressure M30x1.5 | **S01** |

**Switching pressure**

| | | |
|---|---|---|
| 04 | 0.8 bar *[12 psi]* (not possible with plastic version) | **0.8** |
| | 1.5 bar *[22 psi]* (not possible with plastic version) | **1.5** |
| | 2.2 bar *[32 psi]* | **2.2** |

**Seal**

| | | |
|---|---|---|
| 05 | NBR seal | **M** |
| | FKM seal | **V** |

**Max. operating pressure**

| | | |
|---|---|---|
| 06 | 10 bar *[145 psi]* | **10** |

**Housing material**

| | | |
|---|---|---|
| 07 | Plastic only 2.2 bar *[32 psi]* possible | **PA** |
| | Aluminum | **No code** |

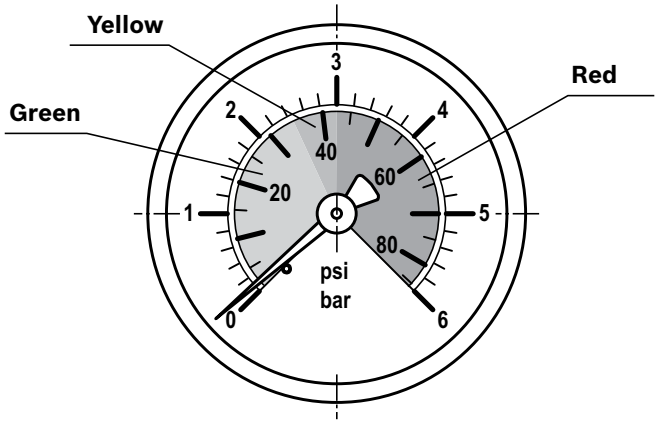
## Mechanical optical maintenance indicator

| Description |
|---|
| WO-S01-0.8-M-10 |
| WO-S01-0.8-V-10 |
| WO-S01-1.5-M-10 |
| WO-S01-1.5-V-10 |
| WO-S01-2.2-M-10 |
| WO-S01-2.2-V-10 |
| WO-S01-2.2-M-10-PA |
| WO-S01-2.2-V-10-PA |

## Manometer [1)]

| Description |
|---|
| M010 0-6 bar *[0-87 psi]*, Fluid connection R 1/4, Ø 50 mm |

1) When using a manometer, the maximum permissible operating pressure is reduced to 6 bar *[87 psi]*.




## Breathing filter element

(only for 10TDN0040-0100) incl. plastic cap

| Description |
|---|
| 71.001 P5-S00-0-0 |

# Ordering code spare parts

## Seal kit

| 01 | 02 | 03 | | 04 | | 05 | | 06 |
|---|---|---|---|---|---|---|---|---|
| **D** | **10TD** | | **-** | **1X** | **/** | **-** | | **-** | |

| | | |
|---|---|---|
| 01 | **Seal kit** | **D** |
| 02 | **Series** | **10TD** |

**Size**

| | | |
|---|---|---|
| 03 | 0040-0100 | **N0040-0100** |
| | 0160-0250 | **N0160-0250** |
| | 0400-0630 | **N0400-0630** |
| | 1000 | **N1000** |
| | 2000-2500 | **2000-2500** |
| 04 | **Component series** 10 ... 19 (10 ... 19: unchanged installation and connection dimensions) | **1X** |

**Seal**

| | | |
|---|---|---|
| 05 | NBR seal | **M** |
| | FKM seal | **V** |

**Amending information**

| | | |
|---|---|---|
| 06 | Breathing filter with oil mist separator (only size 0040-0100) | **FN** |

## Seal kit

| Description |
|---|
| D10TDN0040-0100-1X/-M |
| D10TDN0160-0250-1X/-M |
| D10TDN0400-0630-1X/-M |
| D10TDN1000-1X/-M |
| D10TD2000-2500-1X/-M |
| D10TDN0040-0100-1X/-V |
| D10TDN0160-0250-1X/-V |
| D10TDN0400-0630-1X/-V |
| D10TDN1000-1X/-V |
| D10TD2000-2500-1X/-V |
| D10TDN0040-0100-1X/-M-FN |
| D10TDN0040-0100-1X/-V-FN |

## Assembly, commissioning, maintenance

**Installation**

The max. operating pressure of the system must not exceed the max. admissible operating pressure of the filter (see nameplate).

☞ **Notice:**
When using a manometer, the maximum permissible operating pressure is reduced to 6 bar *[87 psi]*.

Before the assembly, the hole pattern of the tank must be compared to the dimensions from the “Dimensions” chapter.

It is strongly recommended to secure drain pipes longer than 400 mm with an inside tank mount bracket in order to avoid vibrations due to fluid flow in the tank. Additionally, it is necessary for maintenance work to ensure the filter bowl and the outlet pipe are pulled out of the filter head together.
During assembly of the filter (see also chapter “Tightening torque”), the flow direction (direction arrows) and the required servicing height of the filter element (see chapter “Dimensions”) are to be considered. With frame sizes 1000 - 2500, the lifting eyes can be used as assembly aid. Perfect functioning is only guaranteed in the installation position filter bowl vertically downwards and ON the tank. The maintenance indicator must be arranged so it is easily viewed in operation.

Remove the plastic plugs in the filter inlet and outlet. Ensure that the system is assembled without tension stress. The optional electronic maintenance indicator is connected via the electronic switching element with 1 or 2 switching points, which is attached to the mechanical optical maintenance indicator and held by means of the locking ring.

**Commissioning**

Commission the system.
Switch the filter into the operating position; to do so, switch the switching lever to one of the two end positions. The filter in use is identified by the flow symbol on the changeover handle.

☞ **Notice:**
There is no bleed function provided at the filter.

**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 nameplate of the complete filter. It must comply with the material number on the filter element.
- Move the switching lever to the opposite end position in order to switch to the clean filter side. Observe the switching symbol on the switching lever and/or the switch-over.
- Unscrew the filter cover and/or loosen the screws and remove the filter over upwards.

☞ **Notice:**
Note that elements with lower filtration ratings may take slightly longer to discharge the residual oil. If there is still residual oil in the filter bowl, the fluid has to be collected in a separate tank.

- Remove the filter element together with the filter bowl. From frame size 0160, the filter bowls are equipped with removal brackets.
- Remove the filter element from the spigot in the filter bowl by rotating it slightly.
- Clean the filter components, if necessary.
- Check the seals at filter cover and filter bowl 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. The efficiency of the cleaning process depends on the type of dirt and the amount of the pressure differential before the filter element exchange.
  If the pressure differential after the filter element exchange exceeds 150% of the value of a brand-new filter element, the filter element made of wire mesh (G...) also needs to be replaced.
  For detailed cleaning instructions, see data sheet.
- Install the new or cleaned filter element on the spigot again by slightly rotating it.
- The filter is to be assembled in reverse order.
- The torque specifications (“Tightening torques” chapter) are to be observed.
- During the filter element exchange, the breathing filter element should be exchanged manually if equipped. (only with NG 0040-0100)

## Assembly, commissioning, maintenance

**⚠ WARNING!**

- Assemble and disassemble only with depressurized system! For the filter element exchange refer to “Maintenance”.
- Filter is pressurized.
- Do not operate the switching lever during the filter element exchange.
- Do not exchange the optical/mechanical maintenance indicator while the filter is under pressure!
- If the flow direction is not considered during assembly, the filter element will be destroyed. Particle contaminates could enter the system and damage the downstream components.

☞ **Important:**

- All maintenance of the filter should be performed by trained specialists.
- Proper function and safety are only guaranteed if original 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.

# Tightening torques

## Tank mounting without installation plate

| Series 10TD... | | N0040 | N0063 | N0100 | N0160 | N0250 | N0400 | N0630 | N1000 | 2000 | 2500 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Tank mounting screw | | M10 x 30 | | | M10 x 25 | | | | M12 x 25 | | |
| Quantity | | 4 | | | 8 | | | | | | |
| Recommended property class of screw | | 8.8 | | | | | | | | | |
| Tightening torque with $\mu_{total}$ = 0.14 | Nm *[lb-ft]* | 21 ± 10% *[16 ± 10%]* | | | | | | | 37 ± 10% *[27 ± 10%]* | | |

## Tank mounting with installation plate

| Series 10TD... | | N0040 | N0063 | N0100 | N0160 | N0250 | N0400 | N0630 | N1000 | 2000 | 2500 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Installation plate screw (hexagon socket head cap screw) | | – | | | | | M10 x 20 | | M10 x 25 | | |
| Quantity | | – | | | | | 8 | | | | |
| Recommended property class of screw | | – | | | | | 8.8 | | | | |
| Tightening torque with $\mu_{total}$ = 0.14 | Nm *[lb-ft]* | – | | | | | 21 ± 10% *[16 ± 10%]* | | | | |

## Filter cover

| Series 10TD... | | N0040 | N0063 | N0100 | N0160 | N0250 | N0400 | N0630 | N1000 | 2000 | 2500 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Filter cover screw | | – | | | M10 | | M12 | | | | |
| Quantity | | – | | | 4 | | | | | | |
| Recommended property class of screw | | – | | | 8.8 | | | | | | |
| Tightening torque with $\mu_{total}$ = 0.14 | Nm *[lb-ft]* | manually to the stop 20 ± 10% [1] *[15 ± 10%]* | | | 21 ± 10% *[16 ± 10%]* | | 37 ± 10% *[27 ± 10%]* | | | | |

## Maintenance indicator

| Series 10TD... | | N0040 | N0063 | N0100 | N0160 | N0250 | N0400 | N0630 | N1000 | 2000 | 2500 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Maintenance indicator, mechanical optical, aluminum, V... | Nm *[lb-ft]* | Max. 50 *[37]* | | | | | | | | | |
| Maintenance indicator, mechanical optical, PA, P2.2 | Nm *[lb-ft]* | 35 ± 3 *[26 ± 3%]* | | | | | | | | | |
| Cubic connector screw switching element EN–175301–803 | Nm *[lb-ft]* | M3/0.5 *[0.4]* | | | | | | | | | |

[1] Re-tighten using an open-end wrench (SW19), if necessary

## Directives and standardization

### Classification according to the Pressure Equipment Directive

The return line filters for hydraulic applications according to 51454 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 PEG, 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. The intended use is only permitted with fluids in group 2 and within the specified operating limits (see “Specifications”). These filters do not receive a CE mark.

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

The tank mounted return line filters according to 51454 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 return line 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
WE-1SP-EN175301-803
are simple, electronic operating equipment that do not have an own voltage source.

**Notice:**
Maintenance Indicators with EC type examination certificate on request.

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 tank mounted return line filters and the electronic maintenance indicators described here can be used for the following explosive areas:

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

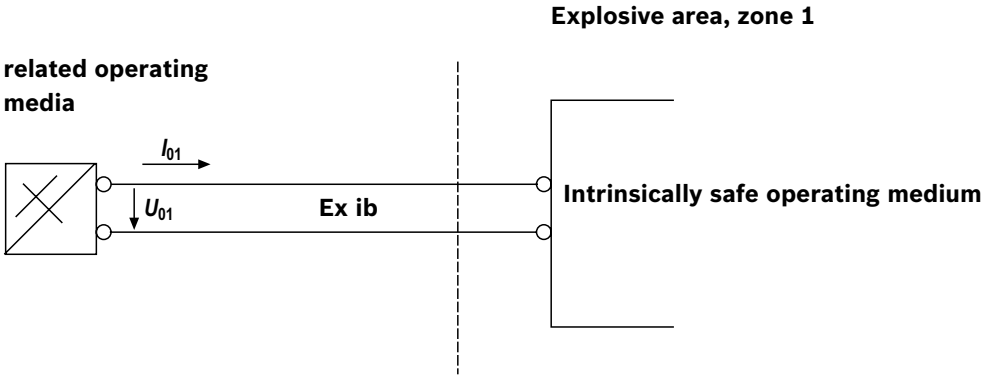
| **Complete filter with mech./opt. Maintenance indicator** | | | | |
|---|---|---|---|---|
| **Use /assignment** | | | **Gas 2G** | **Dust 2D** |
| Assignment [1] | | | Ex II 2G c IIC T6 | Ex II 2D c IIC T6 |
| Conductivity of the medium | pS/m | min | 300 | |
| Dust accumulation | | max | – | 0.5 mm |

| **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 [2] | | 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.
[2] TX = max. temperature range: see chapter “Technical data”

## Directives and standardization

Possible circuit according to DIN EN 60079-14




**⚠ WARNING!**

- Explosion hazard due to high temperature!
  The surface temperature of the filter 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 explosive area, the max. admissible ignition temperature is not exceeded.
- When using the tank mounted return line filters according to in explosive areas, appropriate 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 paintings and oxidic 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

☞ **Important:**

- Maintenance only by trained specialists, instruction by the machine end-user acc. to DIRECTIVE 1999/92/EC appendix II, section 1.1
- Functional and safety warranty is only applicable when using genuine spare parts

## Environmental safety and recycling

- The used filter element should be disposed of in accordance with the respective country-specific legal regulations of environmental protection.
- After completion of the filter life, the components of the filter, in accordance with the respective country-specific legal regulations of environmental protection, are recycled.