

# Inline filter with filter element according to DIN 24550

## Type 445LEN0040 to 1000

**RE 51423**

Issue: 2023-06

Replaces: 2021-04



HAD7826\_d

### Features

Inline filters are used in hydraulic systems for separating solid materials from fluids and lubricating oils. They are intended for attachment in pipelines.

They distinguish themselves by the following:

- ▶ Filters for inline installation
- ▶ Size 1000 with divided filter bowl
- ▶ 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
- ▶ By default equipped with mechanical optical maintenance indicator with memory function
- ▶ Available as an option with different electronic switching elements, modular design
- ▶ Optional bypass valve integrated in the filter housing
- ▶ Optional measuring port
- ▶ High filtration performance due to the tangential cyclone-effect flow path

- ▶ Sizes according to **DIN 24550**: 0040 to 1000
- ▶ Nominal pressure 450 bar [*6527 psi*]
- ▶ Connection up to 2", SAE 2 1/2", SAE 24
- ▶ Operating temperature:  $-10^{\circ}\text{C} \dots +100^{\circ}\text{C}$  [ $+14^{\circ}\text{F} \dots +212^{\circ}\text{F}$ ]

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## Ordering codes

### Filter

01	02	03	04	05	06	07	08	09	09	09
445LE	N		-		-	-	-	-	-	-

**Series**

01	Inline filter 450 bar [6527 psi]	445LE
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**Filter element**

02	With filter element according to <b>DIN 24550</b>	N
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**Nominal size**

03	LEN... (with filter element according to <b>DIN 24550</b> )	0040 0063 0100 0160 0250 0400 0630 1000
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**Filter rating in µm**

04	<b>Absolute (ISO 16889 ;</b> Glass fiber material, not cleanable $\beta_x(c) \geq 200$ )	PWR3 PWR6 PWR10 PWR20
	<b>Nominal</b> Stainless steel wire mesh, cleanable	G10 G25 G40 G60 G100

**Pressure differential**

05	Max. permissible pressure differential of the filter element 30 bar [435 psi] ( <b>with</b> bypass valve)	A00
	Max. permissible pressure differential of the filter element 330 bar [4786 psi] ( <b>without</b> bypass valve)	B00

**Maintenance indicator**

06	Maintenance indicator, mech./optical, switching pressure 5.0 bar [72.5 psi] – bypass cracking pressure 7 bar [101.53 psi]	V5,0
	Maintenance indicator, mech./optical, switching pressure 8.0 bar [116 psi] – <b>without</b> bypass valve	V8,0

**Seal**

07	NBR seal	M
	FKM seal	V

**Connection**

08	Frame size	0040	0063-0100	0160-0400	0630-1000	
	Connection					
	G1/2	●	X			R2
	G3/4	X	X			R3
	G1	X	●			R4
	G1 1/2			●		R6
	G2				●	R8
	SAE 1 1/2"			X		S6
	SAE 2"			X	X	S8
	SAE 2 1/2"				X	S9
	7/8-14 UNF-2B	X				U3
	1 1/16-12 UN-2B [SAE 12]		X			U4
	1 7/8-12 UN-2B			X		U6
	<span style="border: 1px solid black; padding: 2px;">●</span> Standard connection <span style="border: 1px solid black; padding: 2px;">X</span> Alternative connection					

## Ordering codes

### Filter

01	02	03	04	05	06	07	08	09	09	09
445LE	N		-		-	-	-	-	-	-

**Supplementary information** (for configuration options, see chapter “**Version options**”)

09	Outlet top, outlet opposite, inlet closed (only with size 0160 - 1000) <sup>1)</sup> Filter rotated 180°, filter bowl can be unscrewed to the top (only with size 0160 - 1000) Bleed function in the filter bowl, drain in the filter head	7 9
	Additional threaded couplings G 1/4, on the side (only with size 0160 - 1000), not possible with 7 or 9	M
	Maintenance indicator on the right (only with size 0160 - 1000), not possible with M	V3
	Maintenance indicator on the left (only with size 0160 - 1000), not possible with M	V9
	Manufacturer's inspection certificate M according to DIN 55350 T18 Z1	Z1

<sup>1)</sup> The option can only be configured with SAE flange connection

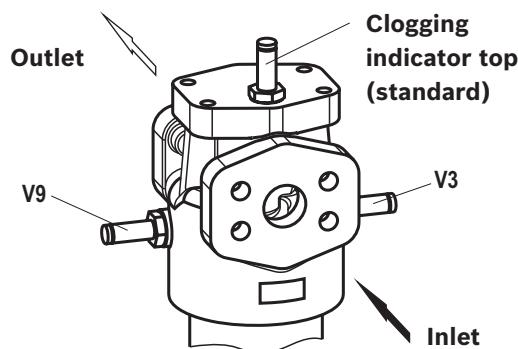
**Order example:**

445LEN0100-PWR3A00-V5,0-M-R4

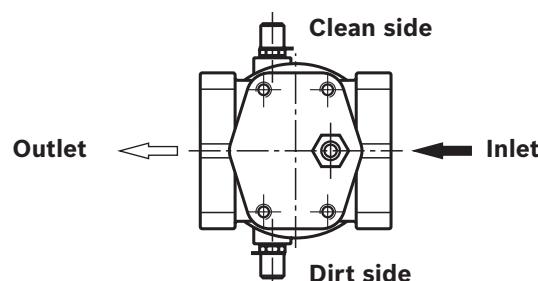
**Further versions (filter materials, connections) are available on request.**

## Version options

### Possible positions of the mechanical optical maintenance indicator



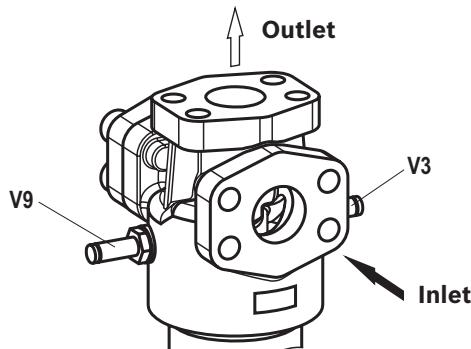
### 2 additional Minimess connections on the clean and dirt side



Cannot be combined with “7”, “9”, “V3” and “V9”

### Outlet top – order option “7”

Outlet opposite inlet closed



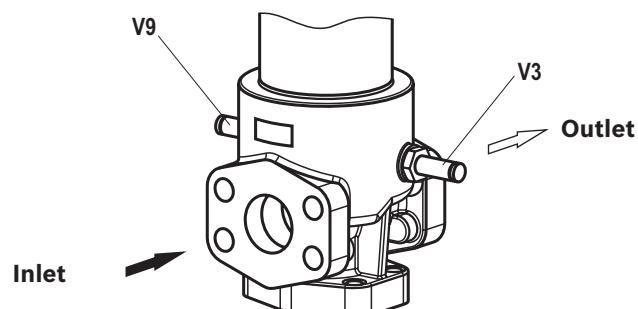
Cannot be combined with “M”!

Always specify the position of the clogging indicator (“V3” or “V9”)

In this version, the filter has no mounting possibility. The pipe mounting elements must be positioned close to the filter so that the filter weight can be held.

### Filter rotated 180° – order option “9”

Filter bowl can be unscrewed from the top



Cannot be combined with “M”!

Always specify the position of the clogging indicator (“V3” or “V9”)

## Preferred types

445LEN preferred types, NBR seal, flow specification for 30 mm<sup>2</sup>/s [142 SUS]

### Inline filter with bypass, filter rating 3 µm

Type	Flow in l/min [gpm] at $\Delta p = 1.5$ bar [21.8 psi] <sup>1)</sup>	Material no. Filter				Material no. replacement element
445LEN0040-PWR3A00-V5,0-M-..	26 [6.87]	..R2	R928043216	..U3	R928043456	R928006645
445LEN0063-PWR3A00-V5,0-M-..	36 [9.51]	..R4	R928043217	..U4	R928043457	R928006699
445LEN0100-PWR3A00-V5,0-M-..	46 [12.15]	..R4	R928043218	..U4	R928043458	R928006753
445LEN0160-PWR3A00-V5,0-M-..	126 [33.29]	..R6	R928043221	..U6	R928043461	R928006807
445LEN0250-PWR3A00-V5,0-M-..	212 [56.01]	..R6	R928043222	..U6	R928043462	R928006861
445LEN0400-PWR3A00-V5,0-M-..	258 [68.16]	..R6	R928043223	..U6	R928043463	R928006915
445LEN0630-PWR3A00-V5,0-M-..	325 [85.86]	..R8	R928043224	..S8	R928043304	R928006969
445LEN1000-PWR3A00-V5,0-M-..	486 [128.40]	..R8	R928043225	..S8	R928043305	R928007023

### Inline filter with bypass, filter rating 6 µm

Type	Flow in l/min [gpm] at $\Delta p = 1.5$ bar [21.8 psi] <sup>1)</sup>	Material no. Filter				Material no. replacement element
445LEN0040-PWR6A00-V5,0-M-..	33 [8.72]	..R2	R928043520	..U3	R928043760	R928006646
445LEN0063-PWR6A00-V5,0-M-..	55 [14.53]	..R4	R928043521	..U4	R928043761	R928006700
445LEN0100-PWR6A00-V5,0-M-..	69 [18.23]	..R4	R928043522	..U4	R928043762	R928006754
445LEN0160-PWR6A00-V5,0-M-..	175 [46.23]	..R6	R928043525	..U6	R928043765	R928006808
445LEN0250-PWR6A00-V5,0-M-..	253 [66.84]	..R6	R928043526	..U6	R928043766	R928006862
445LEN0400-PWR6A00-V5,0-M-..	298 [78.73]	..R6	R928043527	..U6	R928043767	R928006916
445LEN0630-PWR6A00-V5,0-M-..	406 [107.26]	..R8	R928043528	..S8	R928043608	R928006970
445LEN1000-PWR6A00-V5,0-M-..	505 [133.42]	..R8	R928043529	..S8	R928043609	R928007024

### Inline filter with bypass, filter rating 10 µm

Type	Flow in l/min [gpm] at $\Delta p = 1.5$ bar [21.8 psi] <sup>1)</sup>	Material no. Filter				Material no. replacement element
445LEN0040-PWR10A00-V5,0-M-..	37 [9.77]	..R3	R928043904	..U3	R928044064	R928006647
445LEN0063-PWR10A00-V5,0-M-..	70 [18.49]	..R4	R928043825	..U4	R928044065	R928006701
445LEN0100-PWR10A00-V5,0-M-..	78 [20.60]	..R4	R928043826	..U4	R928044066	R928006755
445LEN0160-PWR10A00-V5,0-M-..	211 [55.75]	..R6	R928043829	..U6	R928044069	R928006809
445LEN0250-PWR10A00-V5,0-M-..	280 [73.98]	..R6	R928043830	..U6	R928044070	R928006863
445LEN0400-PWR10A00-V5,0-M-..	325 [85.86]	..R6	R928043831	..U6	R928044071	R928006917
445LEN0630-PWR10A00-V5,0-M-..	460 [121.53]	..R8	R928043832	..S8	R928043912	R928006971
445LEN1000-PWR10A00-V5,0-M-..	515 [136.06]	..R8	R928043833	..S8	R928043913	R928007025

<sup>1)</sup> 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 M12 x 1, 4-pole	M12 x 1
	Rectangular plug-in connection, 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-M12 x 1	Changeover	1		without
R928028410	WE-2SP-M12 x 1	Normally open (at 75%) / normally closed contact (at 100%)	2	M12 x 1	3 pieces
R928028411	WE-2SPSU-M12 x 1	Normally closed contact	1	EN 175301-803	without
R928036318	WE-1SP-EN175301-803				

### Connection sockets

for electronic switching element with round plug-in connection M12 x 1

Connection socket suitable for K24 4-pole, M12 x 1 with screw connection, cable gland Pg9.

#### Material no. R900031155

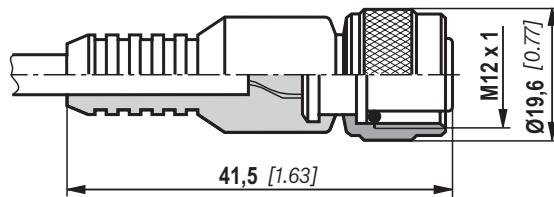
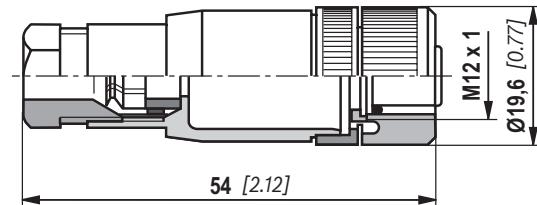
Connection socket suitable for K24-3m 4-pole, M12 x 1 with integrated PVC cable, 3 m long.

Wire cross-section: 4 x 0.34 mm<sup>2</sup>

Wire identification: 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:

Inline filter with mechanical optical maintenance indicator for  $p_{Nominal} = 450$  [6527 psi] with bypass valve, Size 0160, with filter element 10 µm and electronic switching element M12 x 1 with 1 switching point.

**Filter with mech. optical maintenance indicator:** 445LEN0160-PWR10A00-V5,0-M-R6

**Material no. R928043829**

**Switching element:** WE-1SP-M12 x 1

**Material no. R928028409**

**Connection socket:**

Connection socket suitable for K24 4-pole, **Material no. R900031155**

M12 x 1 with screw connection,  
Cable gland Pg9.

## Filter design

Filter size selection is made easy by using our online FilterSelect tool. The filter can be selected using basic parameters like, flow rates, system pressure, viscosities, etc.. The filter fineness is dependant on the required cleanliness level, application, type of contamination and environmental conditions.

The online tool is very user friendly with step-by-step guidelines.

A PDF file can be created of the selected filter, which contains all the stipulated parameters, including relevant part numbers of the selected filter and its spare parts.

Link FilterSelect:

<http://www.filterselect.de>

Other languages can be selected using the page navigation.

### standard search

application:

hydraulics for industrial use and applications with lubricating oil

Product category:

please select

type:

please select

pressure range:

please select

filter material:

please select



fineness:

please select

volume flow rate:

  [l/min] ▾

viscosity:

\* = working point

kin viscosity 1: 32 [mm²/s] +

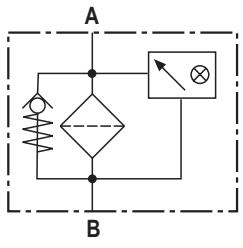
collapse pressure resistance  
according to ISO 2941:

30 bar ▾

Start search

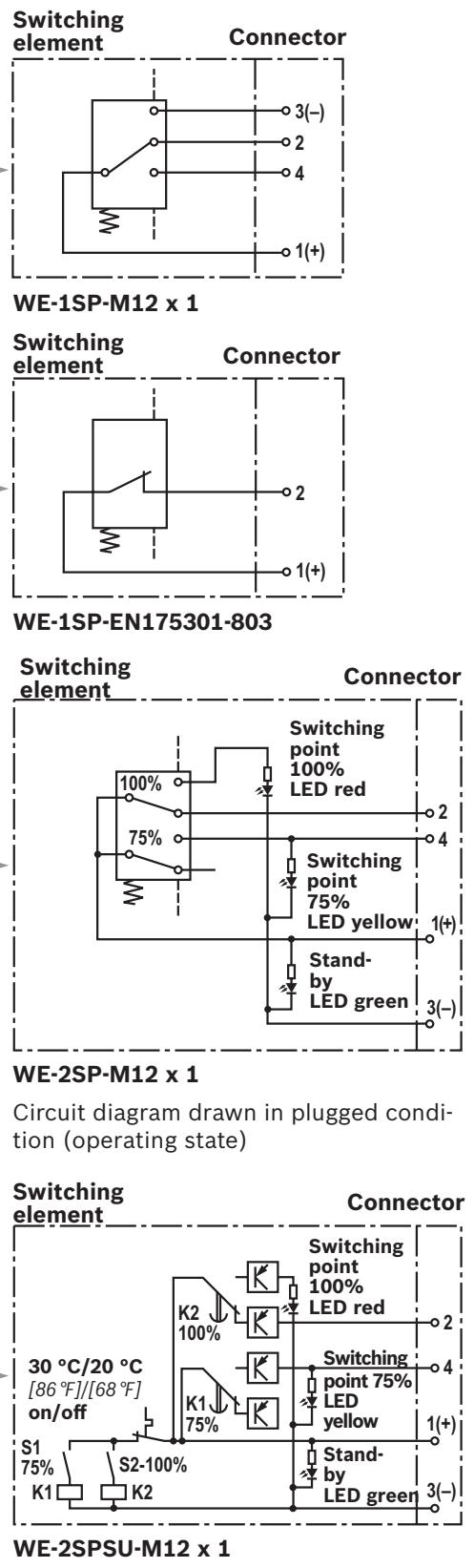
## Symbols

**Inline filter** with bypass and mechanical indicator



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

electronic switching element  
for maintenance indicator



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

## Function, section

The inline filter 445LEN is suitable for installation in pressure lines.

The inline filter consists of filter head (1), a removable filter bowl (2) (size 1000 filter pipe with filter cover), filter element (3) as well as a mechanical optical maintenance indicator (4). In case of filters with low-pressure-differential-stable filter elements (= code letter pressure differential A), a by-pass valve (5) is fitted as a standard.

The fluid reaches the filter element (3) through the inlet port where it is cleaned. The filtered particulate settle either in the filter bowl (2) or in the filter element (3). The fluid then exits the filter through the outlet port and enters the hydraulic circuit.

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

As of size 0160, the standard equipment comprises a drain screw (6). With the size 1000, the filter bowl has a two-part design. The filter pipe is secured against twisting in the filter head.

As a standard, the filter is equipped with a mechanical optical maintenance indicator (4). The electronic switching element (7) which has to be ordered separately is attached over the mechanical optical maintenance indicator (4) and is secured in place by a circlip ring.

The electronic switching elements with 1 or 2 switching points are connected via a connection socket according to IEC-60947-5-2 or via a cable connection according to EN17301-803.

### Variants

#### ► Order option supplementary information -7

The standard outlet is closed with a SAE blind flange. The outlet is mounted upwards, which means that the direction of flow is angled upwards by 90°.

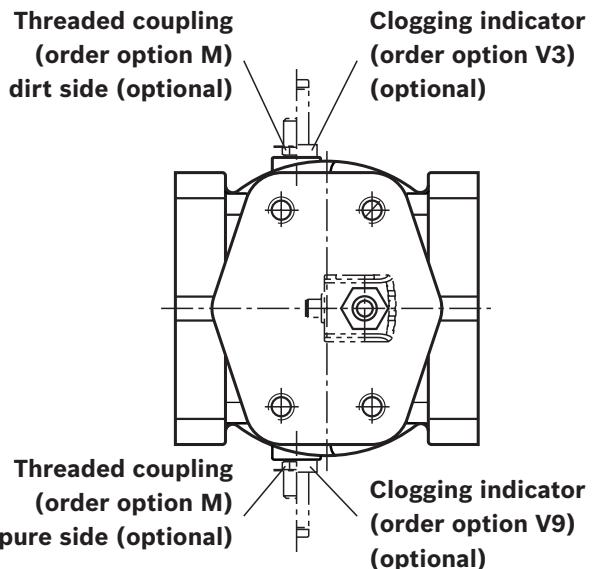
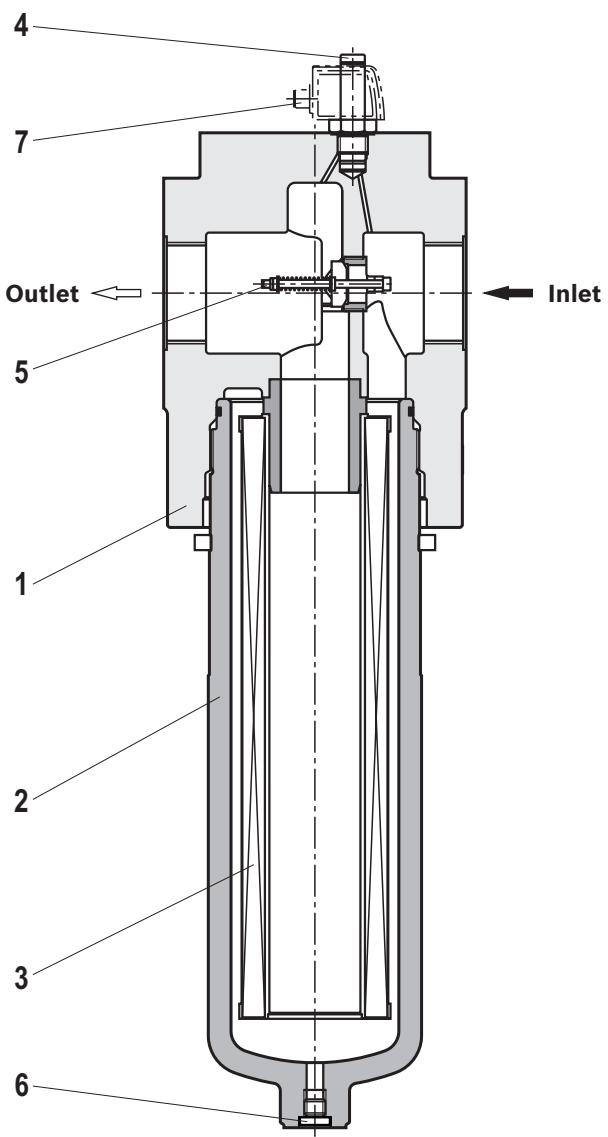
#### ► Order option supplementary information -9

The bleeding is on the hexagon of the filter bowl. The drain function is located on the side of the filter head opposite the clogging indicator.

Type	Assembly position		
445LEN...	Mainten- ance indicator	Bleeding	Draining
0160-1000...9-V3	V3	On the filter bowl, top, G1/4	Opposite mainten- ance indicator
0160-1000...9-V9	V9		

#### ⚠ Notice:

Configuration options see version options on page 3



## Technical data

(For applications outside these parameters, please consult us!)

General					
Installation position	vertical				
Ambient temperature range	°C [°F] -10 ... +65 [+14 ... +149]; (briefly to -30 [-22])				
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	- Filters	NS	<b>0040</b>	<b>0063</b>	<b>0100</b>
		kg [lbs]	4.4 [9.7]	5 [11.1]	5.9 [13.1]
		NS	<b>0250</b>	<b>0400</b>	<b>0630</b>
		kg [lbs]	26 [57.7]	30 [66.5]	60 [133.1]
	- Filter bowl	NS	<b>0040</b>	<b>0063</b>	<b>0100</b>
		kg [lbs]	1.33 [2.93]	1.33 [2.93]	2.1 [4.63]
		NS	<b>0250</b>	<b>0400</b>	<b>0630</b>
		kg [lbs]	8.02 [17.68]	12.21 [26.91]	21.36 [47.08]
Volume		NS	<b>0040</b>	<b>0063</b>	<b>0100</b>
		l [US gal]	0.25 [0.06]	0.35 [0.09]	0.52 [0.13]
		NS	<b>0250</b>	<b>0400</b>	<b>0630</b>
		l [US gal]	1.95 [0.51]	3.1 [0.81]	5.0 [1.32]
Material	- Filter head	GGG			
	- Filter bowl	Steel			
	- Optical maintenance indicator	Brass			
	- Electronic switching element	Plastic PA6			
	- Bypass valve	PA6 / Steel / POM			
	- Seals	NBR or FKM			

Hydraulic					
Maximum operating pressure	bar [psi] 450 [6527]				
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 <sup>6</sup> at rated 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]		5.0 ± 0.5 [72.5 ± 7.3]	7.0 ± 0.5 [101.5 ± 7.3]	
			8.0 ± 0.8 [116 ± 11.6]	without bypass valve	
Filtration direction	From the outside to the inside				

## Technical data

(For applications outside these parameters, please consult us!)

Electric (electronic switching element)						
Electrical connection		Version	Round plug-in connection M12 x 1, 4-pole			
			WE-1SP-M12 x 1	WE-2SP-M12 x 1		
Contact load, direct voltage	A <sub>max.</sub>	WE-2SPSU-M12 x 1				
Voltage range	V <sub>max.</sub>	WE-1SP-EN175301-803				
Max. switching power with resistive load	W	150 (AC/DC) 10 ... 30 (DC) 250 (AC)/200 (DC)				
Switching type	- 75% signal		20			
	- 100% signal		70			
	- 2SPSU		Normally open contact	Normally closed contact		
			Changeover	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				
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 Δp = 5 bar [72.5 psi]		Achievable oil cleanliness according to ISO 4406 [SAE-AS 4059]		
Particle separation		PWR20	β <sub>20(c)</sub> ≥ 200	19/16/12 ... 22/17/14		
		PWR10	β <sub>10(c)</sub> ≥ 200	17/14/10 ... 21/16/13		
		PWR6	β <sub>6(c)</sub> ≥ 200	15/12/10 ... 19/14/11		
		PWR3	β <sub>5(c)</sub> ≥ 200	13/10/8 ... 17/13/10		
Permissible pressure differential		- A00	bar [psi]	30 [435]		
		- B00	bar [psi]	330 [4785]		

## Compatibility with permitted hydraulic fluids

Hydraulic fluid	Classification	Suitable sealing materials	Standards
Mineral oil	HLP	NBR	DIN 51524
Biodegradable	- insoluble in water	HETG	VDMA 24568
		HEES	
Flame-resistant	- soluble in water	HEPG	VDMA 24568
	- water-free	HFDU, HFDR	VDMA 24317
	- containing water	HFAS	DIN 24320
		HFAE	
		HFC	VDMA 24317

### Important information on hydraulic fluids:

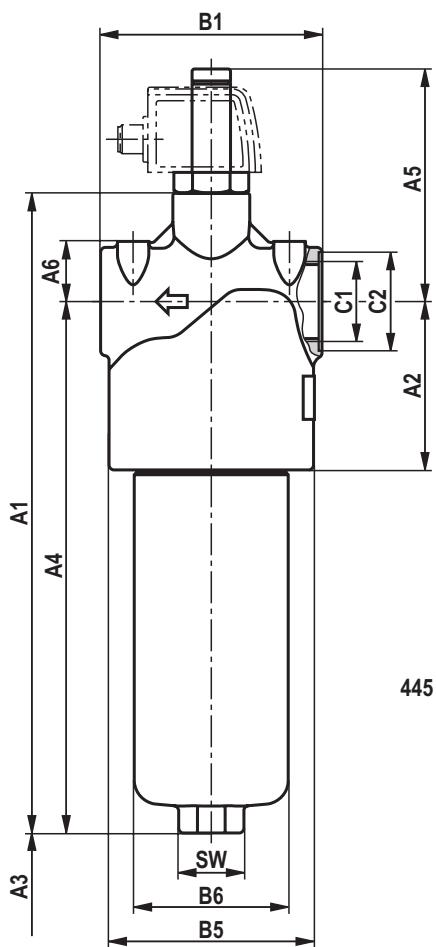
- For more information and data on the use of other hydraulic fluids, please refer to data sheet 90220 or contact us!
- **Flame-resistant - containing water:** due to possible chemical reactions with materials or surface coatings of machine and system components, the service life with these hydraulic fluids may be less than expected.

Filter materials made of filter paper P may not be used, filter elements with glass fiber material have to be used instead.

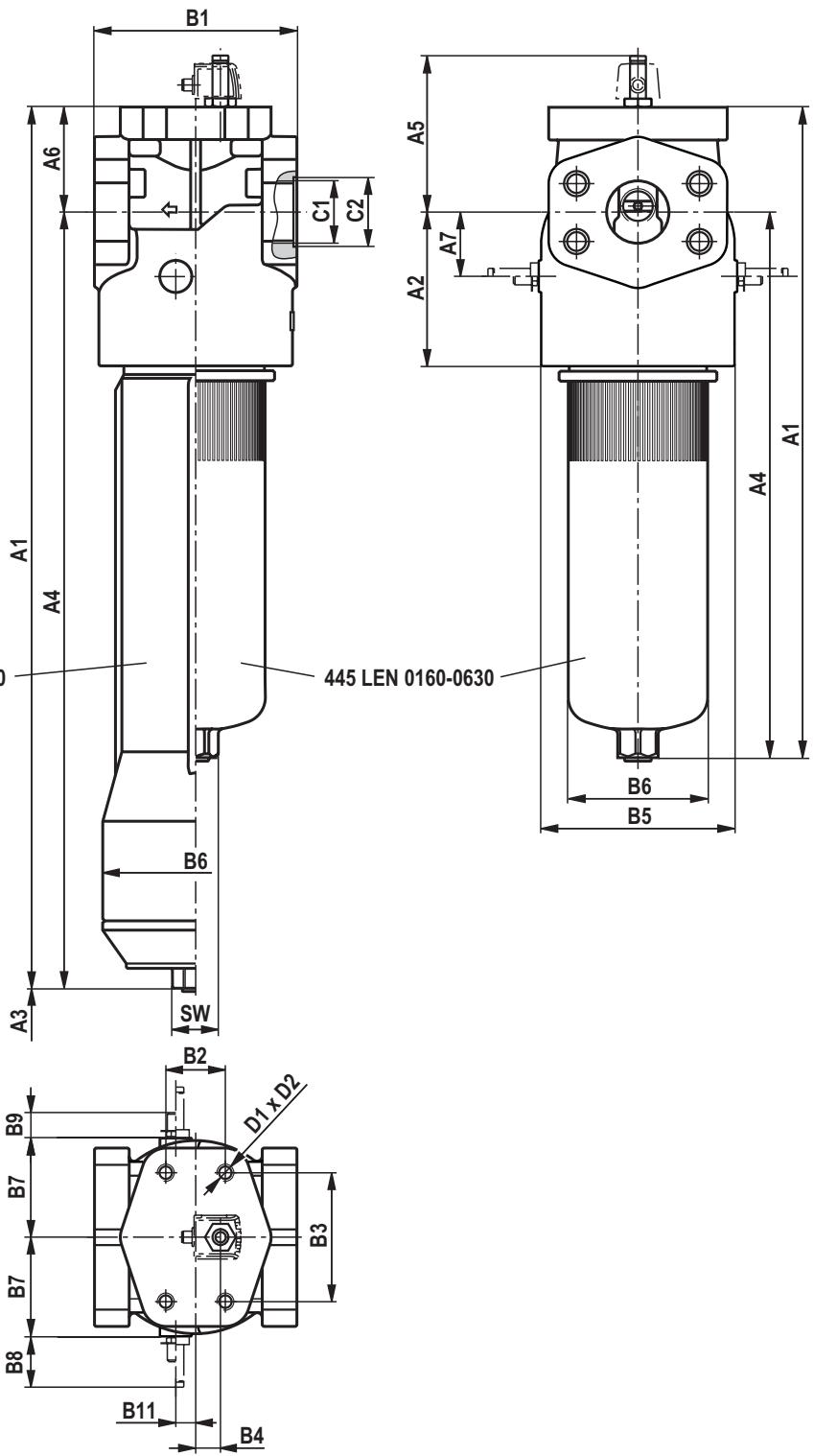
- **Biodegradable:** If filter materials made of filter paper are used, the filter life may be shorter than expected due to material incompatibility and swelling.

**Dimensions: Size 0040 ... NG1000**  
(dimensions in mm [inch])

445LEN0040 ... 0100



445LEN0160 ... 1000



**Dimensions: Size 0040 ... NG1000**

(dimensions in mm [inch])

445LEN...	A1	A2	A3 <sup>1)</sup>	A4	A5	A6	A7
<b>0040</b>	203 [7.99]	70 [2.76]	80 [3.15]	158 [6.22]	96.7 [3.81]	25 [0.98]	-
<b>0063</b>	266 [10.47]			221 [8.70]			
<b>0100</b>	356 [14.02]			311 [12.24]			
<b>0160</b>	344 [13.54]	110 [4.33]	120 [4.72]	262 [10.31]	133.7 [5.26]	82 [3.23]	46 [1.81]
<b>0250</b>	434 [17.09]			352 [13.86]			
<b>0400</b>	584 [22.99]			502 [19.76]			
<b>0630</b>	656 [25.83]	155 [6.10]	160 [6.30]	550 [21.65]	157.7 [6.21]	106 [4.17]	65 [2.56]
<b>1000</b>	893.5 [35.18]		630 [24.80]	787.5 [31.00]			

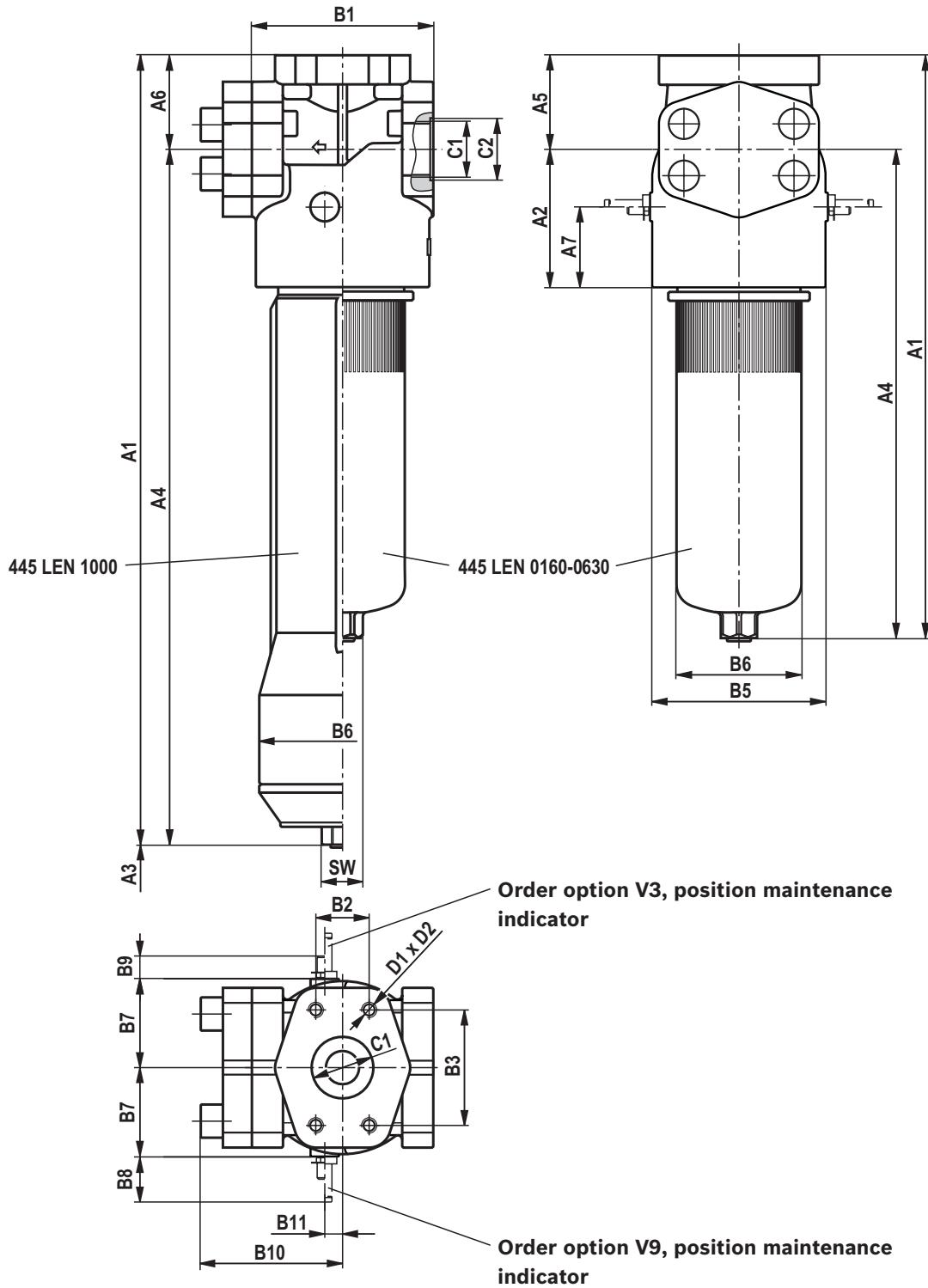
445LEN...	B1	B2	B3	B4	ØB5	ØB6	B7	B8	B9	B10	B11
<b>0040</b>	92 [3.62]	65 [2.56]	30 [1.18]	-	85 [3.35]	64 [2.52]	-	-	-	-	-
<b>0063</b>											
<b>0100</b>											
<b>0160</b>	164 [6.46]	55 [2.17]	105 [4.13]	30 [1.18]	150 [5.91]	114 [4.49]	80 [3.15]	51.7 [2.04]	29.3 [1.15]	128 [5.04]	20 [0.79]
<b>0250</b>											
<b>0400</b>											
<b>0630</b>	200 [7.87]	60 [2.36]	130 [5.12]	25 [0.98]	195 [7.68]	140 [5.51]	100 [3.94]		169 [6.65]		
<b>1000</b>						188 [7.40]					

445LEN...	C1 connection						D1	D2	SW					
	Standard R...	ØC2	Optional U...	ØC2	Optional S...	ØC2								
<b>0040</b>	G1/2	28 [1.10]	7/18-14 UNF-2B	34 [1.34]	-	-	M6	8 [0.31]	24 [0.94]					
<b>0063</b>	G1	41 [1.61]	1 1/16 UN-2B	41 [1.61]										
<b>0100</b>														
<b>0160</b>	G1 1/2	56 [2.20]	1 7/8-12 UN-2B	65 [2.56]	SAE 1 1/2"	38 [1.50]	M12	28 [1.10]	32 [1.26]					
<b>0250</b>					SAE 2"	51 [2.01]								
<b>0400</b>						M16	33 [1.30]	41 [1.61]						
<b>0630</b>	G2	72 [2.83]	-	-	SAE 2 1/2"				63 [2.48]					
<b>1000</b>														

<sup>1)</sup> Servicing height for filter element exchange.

## **Dimensions: Size 0160 ... Size 1000 version 7**

**445LEN0160 ... 1000 version 7  
Outlet top, outlet opposite inlet closed**



**Dimensions: Size 0160 ... Size 1000 version 7**

(dimensions in mm [inch])

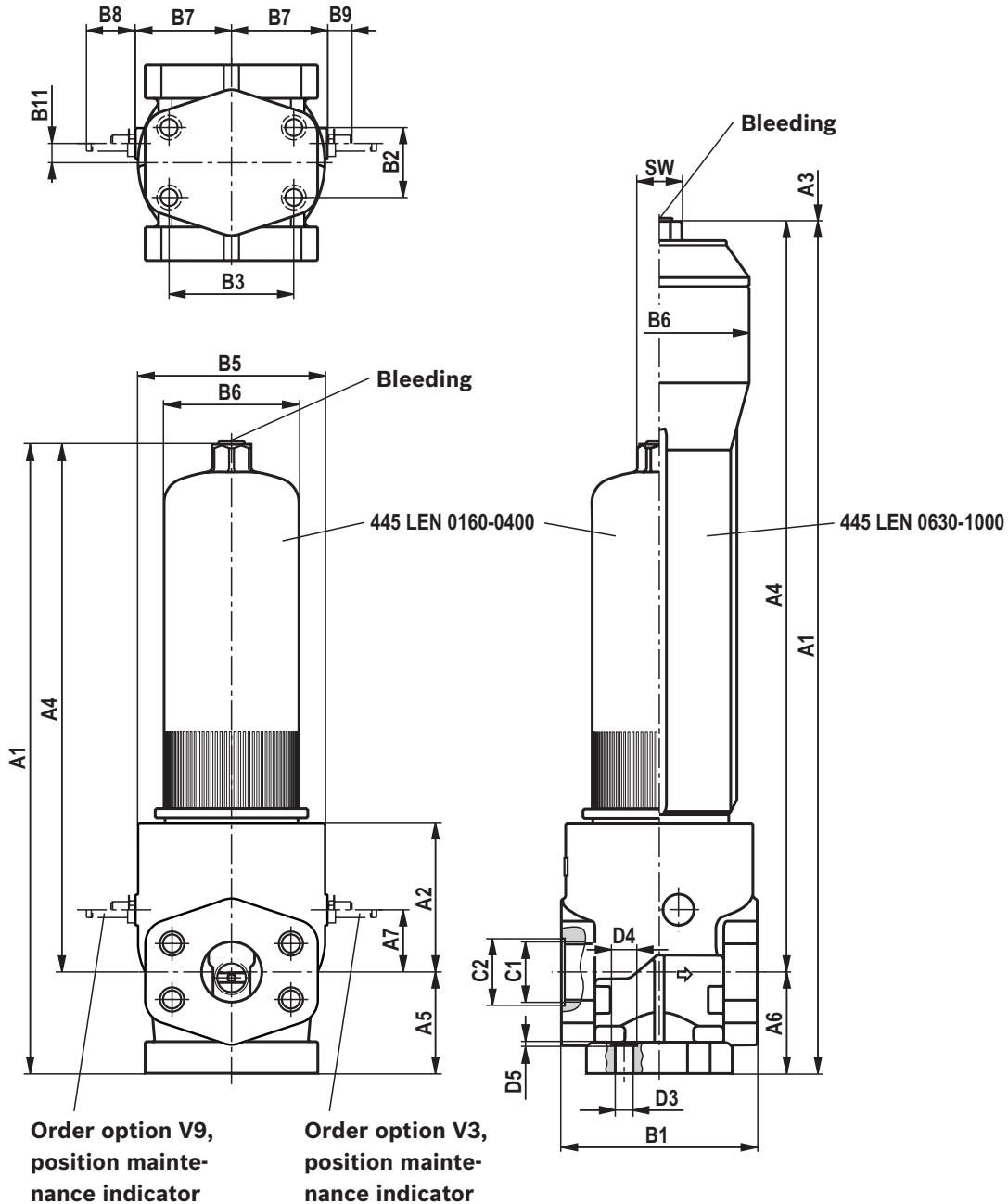
445LEN...	A1	A2	A3	A4	A5	A6	A7
0160...7	344 [13.54]	110 [4.33]	120 [4.72]	262 [10.31]	82 [3.23]	82 [3.23]	46 [1.81]
0250...7	434 [17.09]			352 [13.86]			
0400...7	584 [22.99]			502 [19.76]			
0630...7	656 [25.83]	155 [6.10]	160 [6.30]	550 [21.65]	106 [4.17]	106 [4.17]	65 [2.56]
1000...7	893.5 [35.18]		630 [24.80]	787.5 [31.00]			

445LEN...	B1	B2	B3	B4	ØB5	ØB6	B7	B8	B9	B10	B11
0160...7	164 [6.46]	55 [2.17]	105 [4.13]	30 [1.18]	150 [5.91]	114 [4.49]	80 [3.15]	51.7 [2.04]	29.3 [1.15]	128 [5.04]	20 [0.79]
0250...7											
0400...7											
0630...7	200 [7.87]	60 [2.36]	130 [5.12]	25 [0.98]	195 [7.68]	140 [5.51]	100 [3.94]	M16	33 [1.30]	169 [6.65]	41 [1.61]
1000...7						188 [7.40]					

445LEN...	C1 connection						D1	D2	SW
	Standard R...	ØC2	Optional U...	ØC2	Optional S...	ØC2			
0160...7	G1 1/2	56 [2.20]	1 7/8-12 UN-2B	65 [2.56]	-	-	M12	28 [1.10]	32 [1.26]
0250...7									
0400...7	-	-	-	-	SAE 2"	51 [2.01]	M16	33 [1.30]	41 [1.61]
0630...7					SAE 2 1/2"	63 [2.48]			
1000...7	-	-	-	-			M16	33 [1.30]	41 [1.61]

**Dimensions: Size 0160 ... Size 1000 version 9**  
(dimensions in mm [inch])

**445LEN0160 ... 1000 version 9**  
Filter rotated 180°, filter bowl can be unscrewed to the top



Type	Assembly position		
	Maintenance indicator	Bleeding	Draining
445LEN0160-1000...9-V3	V3	On the filter bowl, top, G1/4	Opposite maintenance indicator
445LEN0160-1000...9-V9	V9		

**Dimensions: Size 0160 ... Size 1000 version 9**(dimensions in mm [*inch*])

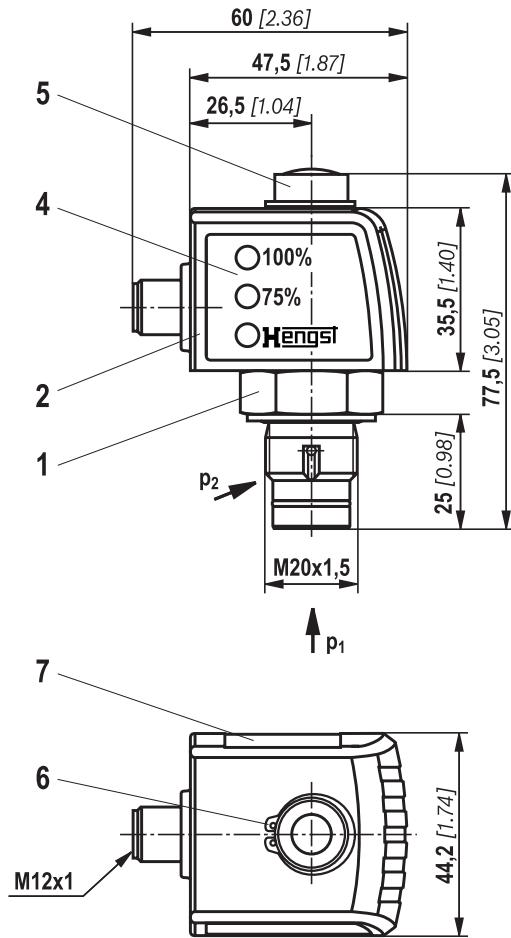
445LEN...	A1	A2	A3	A4	A5	A6	A7
<b>0160...9</b>	344 [13.54]	110 [4.33]	160 [6.30]	262 [10.31]	82 [3.23]	82 [3.23]	46 [1.81]
<b>0250...9</b>	434 [17.09]		250 [9.84]	352 [13.86]			
<b>0400...9</b>	584 [22.99]		400 [15.75]	502 [19.76]			
<b>0630...9</b>	656 [25.83]	155 [6.10]	160 [6.30]	550 [21.65]	106 [4.17]	106 [4.17]	65 [2.56]
<b>1000...9</b>	893.5 [35.18]		630 [24.80]	787.5 [31.00]			

445LEN...	B1	B2	B3	B4	ØB5	ØB6	B7	B8	B9	B10	B11
<b>0160...9</b>	164 [6.46]	55 [2.17]	105 [4.13]	30 [1.18]	150 [5.91]	114 [4.49]	80 [3.15]	51.7 [2.04]	29.3 [1.15]	128 [5.04]	20 [0.79]
<b>0250...9</b>											
<b>0400...9</b>											
<b>0630...9</b>	200 [7.87]	60 [2.36]	130 [5.12]	25 [0.98]	195 [7.68]	140 [5.51]	100 [3.94]			169 [6.65]	41 [1.61]
<b>1000...9</b>	-	-	-	-	-	SAE 2"	51 [2.01]	18 [0.71]	26 [1.02]		
						SAE 2 1/2"	63 [2.48]				

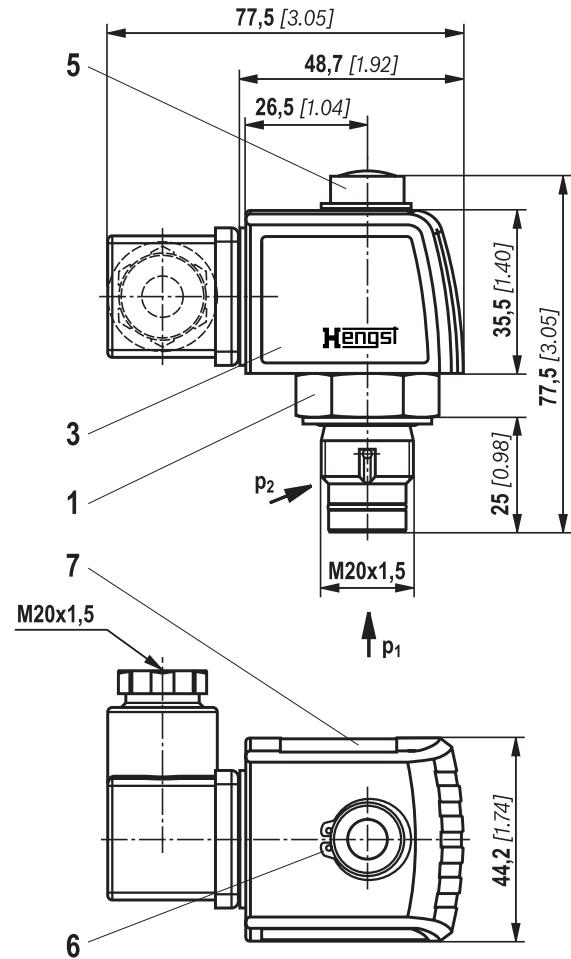
445LEN...	C1 connection						ØD3	ØD4	D5	SW
	Standard R...	ØC2	Optional U...	ØC2	Optional S...	ØC2				
<b>0160...9</b>	G1 1/2	56 [2.20]	1 7/8-12 UN-2B	65 [2.56]	-	-	14 [0.55]	20 [0.79]	1 [0.04]	32 [1.26]
<b>0250...9</b>										
<b>0400...9</b>										
<b>0630...9</b>	-	-	-	-	-	SAE 2"	51 [2.01]	18 [0.71]	26 [1.02]	41 [1.61]
<b>1000...9</b>						SAE 2 1/2"	63 [2.48]			

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

**Pressure differential indicator with mounted switching element M12 x 1**



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



- 1 Mechanical optical maintenance indicator; max. tightening torque  $M_{A\max} = 50 \text{ Nm} [36.88 \text{ lb-ft}]$
- 2 Switching element with locking ring for electrical maintenance indicator (rotatable by 360°); round plug-in connection M12 x 1, 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: 24V =
  - green: Stand-by
  - yellow: Switching point 75%
  - red: Switching point 100%
- 5 Visual indicator bistable
- 6 Locking ring DIN 471-16 x 1, **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
2.			-	-	0

### Filter element

01	Design	2.
----	--------	----

### Nominal size

02	LEN... (with filter element according to <b>DIN 24550</b> )	0040 0063 0100 0160 0250 0400 0630 1000
----	--	--

### Filter rating in µm

03	<b>Absolute (ISO 16889 ;</b> Glass fiber material, not cleanable $\beta_x(c) \geq 200$ )	PWR3 PWR6 PWR10 PWR20
	<b>Nominal</b> Stainless steel wire mesh, cleanable	G10 G25 G40 G60 G100

### Pressure differential

04	Max. permissible pressure differential of the filter element 30 bar [435 psi] – filter <b>with</b> bypass valve	A00
	Max. permissible pressure differential of the filter element 330 bar [4786 psi] – filter <b>without</b> bypass valve	B00

### Bypass valve

05	<b>without</b> bypass valve	0
----	-----------------------------	---

### Seal

06	NBR seal	M
	FKM seal	V

### Order example:

**2.0100 PWR3-A00-0-M**

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

### Preferred program replacement filter element

Replacement filter element 3 micron		Replacement filter element 6 micron		Replacement filter element 10 micron	
R928006645	2.0040 PWR3-A00-0-M	R928006646	2.0040 PWR6-A00-0-M	R928006647	2.0040 PWR10-A00-0-M
R928006699	2.0063 PWR3-A00-0-M	R928006700	2.0063 PWR6-A00-0-M	R928006701	2.0063 PWR10-A00-0-M
R928006753	2.0100 PWR3-A00-0-M	R928006754	2.0100 PWR6-A00-0-M	R928006755	2.0100 PWR10-A00-0-M
R928006807	2.0160 PWR3-A00-0-M	R928006808	2.0160 PWR6-A00-0-M	R928006809	2.0160 PWR10-A00-0-M
R928006861	2.0250 PWR3-A00-0-M	R928006862	2.0250 PWR6-A00-0-M	R928006863	2.0250 PWR10-A00-0-M
R928006915	2.0400 PWR3-A00-0-M	R928006916	2.0400 PWR6-A00-0-M	R928006917	2.0400 PWR10-A00-0-M
R928006969	2.0630 PWR3-A00-0-M	R928006970	2.0630 PWR6-A00-0-M	R928006971	2.0630 PWR10-A00-0-M
R928007023	2.1000 PWR3-A00-0-M	R928007024	2.1000 PWR6-A00-0-M	R928007025	2.1000 PWR10-A00-0-M

## Ordering code spare parts

### Mechanical optical maintenance indicator

01	02	03	04	05	06
<b>W</b>	<b>O</b>	<b>-</b>	<b>D01</b>	<b>-</b>	<b>-</b> <b>450</b>

01	<b>Maintenance indicator</b>	<b>W</b>
----	------------------------------	----------

02	<b>Mechanical optical indicator</b>	<b>O</b>
----	-------------------------------------	----------

### Version

03	Pressure differential, modular design	<b>D01</b>
----	---------------------------------------	------------

### Switching pressure

04	5.0 bar [72.5 psi]	<b>5,0</b>
	8.0 bar [116 psi]	<b>8,0</b>

### Seal

05	NBR seal	<b>M</b>
	FKM seal	<b>V</b>

### Max. operating pressure

06	Switching pressure 5.0 bar [72.5 psi], 450 bar [6527 psi]	<b>450</b>
	Switching pressure 8.0 bar [116.0 psi], 450 bar [6527 psi]	<b>450</b>

Mechanical optical maintenance indicator	Material no.
WO-D01-5.0-M-450	<b>R901025313</b>
WO-D01-5.0-V-450	<b>R901066235</b>
WO-D01-8.0-M-450	<b>R928038785</b>
WO-D01-8.0-V-450	<b>R928038784</b>

## Ordering code spare parts

### Seal kit

01	02	03	04
<b>D</b>	<b>350/445LEN</b>		

01	<b>Seal kit</b>	<b>D</b>
02	<b>Series 445LEN</b>	<b>350/445LEN</b>

### Nominal size

03	Size 0040-0100	<b>0040-0100</b>
	Size 0160-0400	<b>0160-0400</b>
	Size 0630	<b>0630</b>
	Size 1000	<b>1000</b>

### Seal

04	NBR seal	<b>M</b>
	FKM seal	<b>V</b>

Seal kit	Material no.
D350/445LEN0040-0100-M	<b>R928028527</b>
D350/445LEN0040-0100-V	<b>R928028528</b>
D350/445LEN0160-0400-M	<b>R928028532</b>
D350/445LEN0160-0400-V	<b>R928028533</b>
D350/445LEN0630-M	<b>R928028536</b>
D350/445LEN0630-V	<b>R928028529</b>
D350/445LEN1000-M	<b>R928028537</b>
D350/445LEN1000-V	<b>R928028534</b>

## Assembly, commissioning, maintenance

### Installation

- ▶ The max. operating pressure of the system must not exceed the max. permissible operating pressure of the filter (see type plate).
- ▶ 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") must be taken into account.
- ▶ Easy filter element exchange is guaranteed in the installation position filter bowl vertically downwards. For filters with order option - supplementary information 9 - the installation position of the filter bowl is vertically upwards. The maintenance indicator should be arranged in a visible manner.
- ▶ 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.

#### **Notice:**

There is no bleeding provided at the filter.

However, some sizes or variants have optional threaded couplings which may also be used for bleeding.

### Maintenance

- ▶ If at operating temperature, the red indicator pin extends out of the mechanical optical maintenance indicator and/or if the switching process in the electronic switching element is triggered, the filter element is contaminated and needs to be replaced and cleaned respectively. More details see data sheet 51450
- ▶ The material number of the corresponding replacement filter element is indicated on the name plate of the complete filter. It must comply with the material number on the filter element.
- ▶ Decommission the system.
- ▶ The operating pressure is to be released on the system side.

#### **Notice:**

There is no bleeding provided at the filter.

However, some sizes or variants have optional threaded couplings which may also be used for bleeding.

- ▶ Via the drain screw (from size 0160 fitted by default), the oil on the dirt side can be drained.
- ▶ Unscrew filter bowl (or base with size 1000).
- ▶ Remove the filter element from the spigot by rotating it slightly.
- ▶ Clean the filter components, if necessary.
- ▶ Check the seals at the filter bowl for damage and renew 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. **Please note:**  
Screw in the filter bowl to the stop, unscrew the filter bowl again by 1/8 to 1/2 rotation so that the filter bowl does not get stuck due to the pressure pulsation and can be loosened easily during maintenance work.
- ▶ The torque specifications ("Tightening torques" chapter) are to be observed.
- ▶ Commission the system and bleed the filter for order option - supplementary information 9

#### **WARNING!**

- ▶ Only with order option - supplementary information 9 - upwards installation position of the filter bowl is permitted. This variant guarantees safe bleeding.

## Assembly, commissioning, maintenance

### ⚠ WARNING!

- ▶ Assembly and disassembly only with depressurized system!
- ▶ Filter is under pressure!
- ▶ Remove the filter bowl only if it is not under pressure!
- ▶ Do not exchange the mechanical-optical maintenance indicator while the filter is under pressure!
- ▶ If the flow direction is not considered during assembly, the filter element will be destroyed. Particles get in system and damage the following components.

#### ⚠ Notices:

- ▶ All works at the filter only be trained specialists.
- ▶ Functioning 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.

## Tightening torques

(dimensions in mm [*inch*])

### Mounting

Series 445LEN...	0040	0063	0100	0160	0250	0400	0160	0250
Screw/tightening torque with $\mu_{\text{total}} = 0.14$		M6 / 10.4 Nm $\pm 10\%$		M12 / 37 Nm $\pm 10\%$		M16 / 90 Nm $\pm 10\%$		
Quantity				4				
Recommended property class of screw				8.8				
Minimum screw-in depth		6 mm + 2 mm [0.24 + 0.08]		18 mm + 4 mm [0.7 + 0.16]		24 mm + 4 mm [0.94 + 0.16]		

### Filter bowl and maintenance indicator

Series 445LEN...	0040	0063	0100	0160	0250	0400	0160	0250
Tightening torque filter bowl				Screw in the filter bowl to the stop, unscrew the filter bowl again by 1/8 to 1/2 rotation				
Tightening torque maintenance indicator					Max. 50 Nm			
Tightening torque cubic connector screw switching element EN-175301-803					M3/0.5 Nm			

## 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
$\Delta p$ (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

#### Directive

The inline filters for hydraulic applications according to 51423 are pressure holding equipment according to article 1, section 2.1.4 of the Pressure Equipment Directive 97/23/EC (PED). However, on the basis of 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. They do not receive a CE mark.

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

The inline filters according to 51423 are no 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-M12 x 1 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 inline filters and the electronic maintenance indicators described here can be used for the following explosive areas

	zone suitability	
Gas	1	2
Dust	21	22

## Directives and standardization

### Complete filter with mech./opt. Maintenance indicator

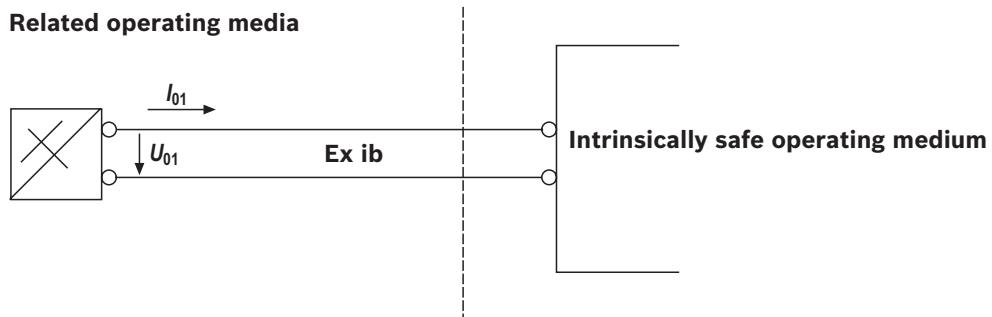
Use /assignment		Gas 2G	Dust 2D
Assignment		Ex II 2G c IIC TX	Ex II 2D c IIC TX
Conductivity of the medium pS/m	min	300	
Dust accumulation	max	–	0.5 mm

### 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 <sub>max</sub> 40 °C
	max	1.0 W T4 $T_{max}$ 80 °C	550 mW T <sub>max</sub> 100 °C
Surface temperature <sup>1)</sup>	max	–	100 °C
inner capacity Ci			negligible
inner inductivity Li			negligible
Dust accumulation	max	–	0.5 mm

<sup>1)</sup> The temperature depends on the temperature of the medium in the filter and must not exceed the value specified here.

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. permissible ignition temperature is not exceeded.
- ▶ When using the inline filters in accordance with 51423 in potentially explosive areas, appropriate equipotential bonding has to be ensured. The filter is preferably

to be earthed 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 potentially explosive area

### ⚠ Notices:

- ▶ Maintenance only by 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