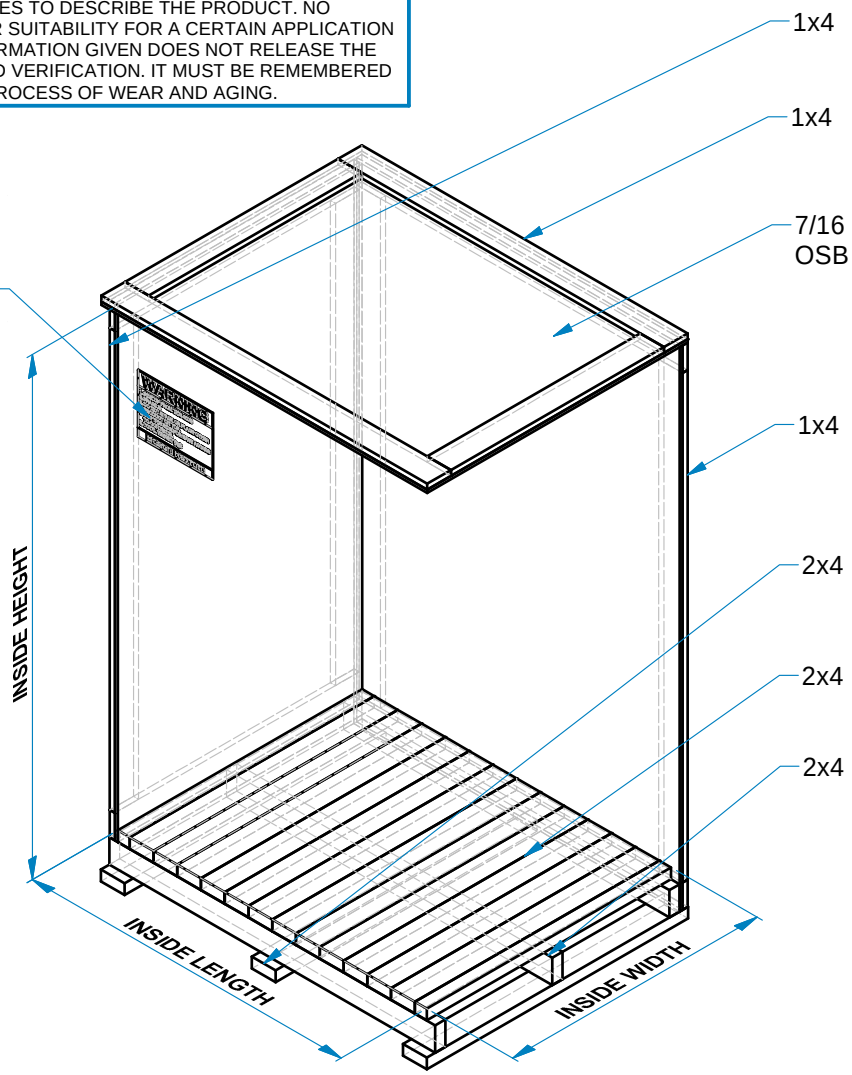
LIABILITY NOTICE

THE DATA SPECIFIED ON THIS DOCUMENT ONLY SERVES TO DESCRIBE THE PRODUCT. NO STATEMENTS CONCERNING A CERTAIN CONDITION OR SUITABILITY FOR A CERTAIN APPLICATION CAN BE DERIVED FROM OUR INFORMATION. THE INFORMATION GIVEN DOES NOT RELEASE THE USER FROM THE OBLIGATION OF OWN JUDGMENT AND VERIFICATION. IT MUST BE REMEMBERED THAT OUR PRODUCTS ARE SUBJECT TO A NATURAL PROCESS OF WEAR AND AGING.

NOTES:

1. PRODUCT LAG BOLTED TO RUNNERS (4x)
2. LOCATE WARNING LABEL ON THE SIDE THE LIFT TRUCK IS TO LIFT FROM.
3. WEIGHT OF THE PRODUCT (INCLUDING CRATE) ADDED TO LABEL WITH PERMANENT MARKER, IN kg.
4. SCREW THE SIDE WITH THE LABEL ON IT. ALL OTHER SIDES CAN BE NAILED.
5. CRATE SUITABLE FOR CROSS BORDER SHIPMENT.
6. FOR OUTSIDE DIMENSIONS, ADD 2.5" TO LENGTH AND WIDTH, 7.75 TO HEIGHT



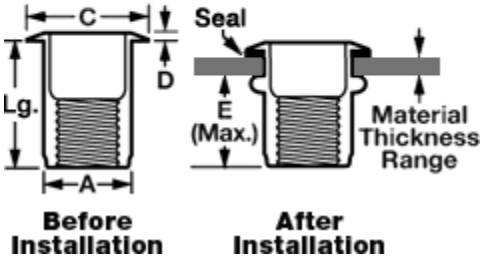
	43" High	Inside Width (in)					
Inside Length (in)		36	48	60	72	84	96
	33 1/2	R987422146					
	45 1/2	R987422147	R987422153				
	57 1/2	R987422148	R987422154	R987422158			
	69 1/2	R987422149	R987422155	R987422159	R987422162		
	81 1/2	R987422151	R987422156	R987422160	R987422163	R987422165	
	93 1/2	R987422152	R987422157	R987422161	R987422164	R987422166	R987422167

	67" High	Inside Width (in)					
Inside Length (in)		36	48	60	72	84	96
	33 1/2	R987422168					
	45 1/2	R987422169	R987422174				
	57 1/2	R987422170	R987422175	R987422179			
	69 1/2	R987422171	R987422176	R987422180	R987422183		
	81 1/2	R987422172	R987422177	R987422181	R987422184	R987422186	
	93 1/2	R987422173	R987422178	R987422182	R987422185	R987422187	R987422188

	91" High	Inside Width (in)					
Inside Length (in)		36	48	60	72	84	96
	33 1/2	R987422189					
	45 1/2	R987422190	R987422195				
	57 1/2	R987422191	R987422196	R987422200			
	69 1/2	R987422192	R987422197	R987422201	R987422204		
	81 1/2	R987422193	R987422198	R987422202	R987422205	R987422208	
	93 1/2	R987422194	R987422199	R987422203	R987422207	R987422209	R987422210

Threaded Inserts

Catalog Page | Bookmark



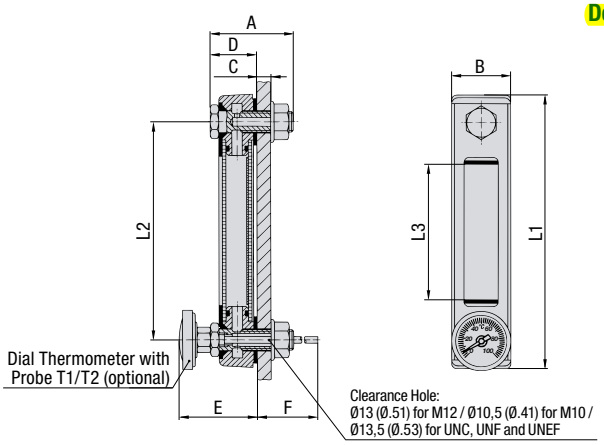
93484A752

Packs of 5

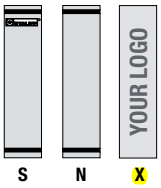
In stock for $10.51 per pack

Type	Rivet Nuts
Rivet Nut, Nut Insert, or Rivet-Type Stud Type	Open-End Knurled Rivet Nuts with Seal
For Use With	Metal
Application	Create New Threads
Material	Steel
Steel Type	C1008 - C1010
Finish/Coating	Zinc Yellow Chromate Plated
Threaded Type	Right-Hand Threaded
System of Measurement	Inch
Internal Thread Size	3/8"-16
Internal Thread Fit	2B
Insert Length	.805"
Drill Size	17/32"
Material Thickness Range	.115" - .250"
Dimension A	.53"
Dimension C	.685"
Dimension D	.035"
Dimension E	.425"
Rockwell Hardness	Not Rated
Minimum Tensile Strength	Not Rated
Specifications Met	Not Rated
Note	PVC foam seal bonded under the flange.
Installation Instructions	Determine material thickness. Thread nut onto mandrel of an installation tool, place in drilled hole of material, and crimp to create a backside flange. A secure permanent fit between the top flange and the crimped bottom section is formed.
Installation Tool	**95603A770**

Level Gauge ▪ Type SNA



Design of Scale Plates



Thermometer Options

Capillary Tube Thermometer with a dual Celsius / Fahrenheit scale up to +80 °C / +180 °F

Characteristics

Visual fluid level indication in hydraulic reservoirs with maximum tank pressures not exceeding 2 bar / 29 PSI

Nominal Sizes and Designs

- 6 nominal sizes from 76 mm / 2.99 in to 305 mm / 12.00 in
- Display either undivided (SNA 076 ... 176) or subdivided by strut(s) into 2 (SNA 254) or 3 sections (SNA 305)

Please see page E5 for alternative nominal sizes and designs.

Media Compatibility

- Suitable for use with Mineral and Petroleum based hydraulic fluids (HL and HLP)

Materials

- Housing made of Steel St 12, black epoxy-coated
- Sight tube and plugs made of Polyamide (PA)
- Sealings made of NBR (Buna-N®)
- Scale plate made of PVC

Special sight tube materials for improved UV or chemical resistance and use with special media (such as bio-degradable fluids, diesel oils, gasolines, etc.) as well as special sealing materials, e.g. FPM (Viton®), and scale plate materials, e.g. Aluminium, are available on request.

Please see page E5 for alternative housing materials.

Technical Data

- IP 65 protection rating: Dust tight and protected against water jets (IP 67 on request)
- Operating temperature range: -30 °C ... +80 °C / -22 °F ... +176 °F
- Recommended tightening torque: 8 N·m / 5 9 ft·lb

Accessories / Options

- Red / blue capillary tube thermometers with a dual Celsius / Fahrenheit scale and a temperature display range of up to +80 °C / +180 °F
- Dial thermometers with probe and a Celsius or a dual Celsius / Fahrenheit scale with a temperature display range of up to +100 °C / +212 °F
- Thermo Switches
- Temperature Sensors

Please see pages E8 and E9 for details.

Dimensions

Maximum admissible tolerance for the bolt center spacing (dimension L2) according to DIN ISO 2768-f: ±0,20 mm / .008 in for all nominal sizes.

Nominal Size	Dimensions (mm/in)									
	A	B	C (Max.)	D	E	F (with T1)	F (with T2)	L1	L2	L3
SNA 076	45	34,5	8	27	43,5	165,5	265,5	108	76	31
	1.77	1.36	.32	1.06	1.71	6.52	10.45	4.25	2.99	1.22
SNA 127	45	34,5	8	27	43,5	165,5	265,5	159	127	76
	1.77	1.36	.32	1.06	1.71	6.52	10.45	6.26	5.00	2.99
SNA 150	45	34,5	8	27	43,5	165,5	265,5	182	150	99
	1.77	1.36	.32	1.06	1.71	6.52	10.45	7.17	5.91	3.90
SNA 176	45	34,5	8	27	43,5	165,5	265,5	208	176	124
	1.77	1.36	.32	1.06	1.71	6.52	10.45	8.19	6.93	4.88
SNA 254	45	34,5	8	27	43,5	165,5	265,5	285	254	192
	1.77	1.36	.32	1.06	1.71	6.52	10.45	11.22	10.00	7.56
SNA 305	45	34,5	8	27	43,5	165,5	265,5	336	305	244
	1.77	1.36	.32	1.06	1.71	6.52	10.45	13.23	12.00	9.61

Order Codes

SNA 127 B - S - 0 - 12 - 0 - 60

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

① Type

Level Gauge with visual fluid level indication	SNA

② Nominal Size

SNA 076 (nominal size of 76 mm / 2.99 in)	076
SNA 127 (nominal size of 127 mm / 5.00 in)	127
SNA 150 (nominal size of 150 mm / 5.91 in)	150
SNA 176 (nominal size of 176 mm / 6 93 in)	176
SNA 254 (nominal size of 254 mm / 10.00 in)	254
SNA 305 (nominal size of 305 mm / 12.00 in)	305

Please see page E5 for alternative nominal sizes.

③ Sealing Material

NBR (Buna-N®) (standard option)	B
FPM (Viton®)	V

④ Design of Scale Plate

With STAUFF logo (standard option)	S
Neutral design without any logo	N
Custom-designed scale plate (please specify)	X

⑤ Thermometer Option

Supplied without thermometer	0
Red Capillary Tube thermometer on scale plate	T
Blue Capillary Tube thermometer on scale plate	TB
Dial thermometer with probe (200 mm / 7 87 in) and a Celsius scale up to 100 °C	T1C
Dial thermometer with probe (300 mm / 11.81 in) and a Celsius scale up to 100 °C	T2C
Dial thermometer with probe (200 mm / 7 87 in) and a dual scale up to 100 °C / 212 °F	T1CF
Dial thermometer with probe (300 mm / 11.81 in) and a dual scale up to 100 °C / 212 °F	T2CF

⑥ Banjo Bolt Size

Metric ISO thread M12 (standard option)	12
Metric ISO thread M10	10
Unified coarse thread 1/2–13 UNC	U1
Unified fine thread 1/2–20 UNF (special option)	U2
Unified extra-fine thread 1/2–28 UNEF (special option)	U3

⑦ Thermo Switch / Temperature Sensor Option

Supplied without Thermo Switch / Temperature Sensor	-
Thermo Switch TS-SNA/SNK; Break contact (normally closed); Equipped with standard connector	0
Thermo Switch TS-SNA/SNK; Break contact (normally closed); Equipped with connector M12	OD
Thermo Switch TS-SNA/SNK; Make contact (normally open); Equipped with standard connector	C
Thermo Switch TS-SNA/SNK; Make contact (normally open); Equipped with connector M12	CD
Temperature Sensor TS-SNA/SNK-PT100; Equipped with connector M12	PT100

Thermo Switches / Temperature Sensors only available for banjo bolt size M12. Please see pages E8 and E9 for details.

⑧ Switching Temperature

Contact switches at +60 °C / +140 °F	60
Contact switches at +70 °C / +158 °F	70
Contact switches at +80 °C / +176 °F	80
Contact switches at +90 °C / +194 °F	90

Only to be indicated when using a Thermo Switch.

Options T1C/T1CF and T2C/T2 CF are not available for banjo bolt size M10 and not be used in conjunction with Thermo Switches or Temperature Sensors.
Please see page E8 for details.

Dimensional drawings: All dimensions in mm (in).

rexroth
A Bosch Company

Breathing filter

Type FEF 0, FEF 1

RD 51513
Edition: 2019-12

- Size 0 ... 1
- Flow, max.: 400 l/min *[106 gpm]*
- Connection up to DN 30, up to DN 55
- Operating temperature –30 °C to +100 °C *[–22 °F to 212 °F]*

Features

- Special highly efficient filter materials
- Air filtration in hydraulic and lubricating oil tanks
- Prevention of initial damage of pumps, bearings and system components
- Filter rating optional 10 µm *[10 micron]* (paper) or 3 µm *[3 micron]* (micro glass)

Contents

Ordering code

Breathing filter Type FEF 1

01	02	03	04	05	06	07	08
FEF	**1**	**– 2X /**		**– M**	**– K**	**– ES100**	**–**

Design

01	Filling and breathering filter	**FEF**
02	Size	**1**

Component series

03	**Component series** 20 ... 29 (20 ... 29: unchanged installation and connection dimensions)	**2X**

Filter rating in µm

04	**Absolute**	Micro glass, not cleanable	**H3V3**
	Nominal	Filter paper, not cleanable	**P10**

Seal

05	NBR seals	**M**

Material

06	CED-coated steel	**K**

Supplementary information

07	Filling strainer, length 100 mm *[3.94 in]*	**ES100**
08	Chain	**KT**
	Side clip	**L**
	Backflow prevention	**R**

Order example and Preferred types[1)]

Order example		Preferred types	
Material number	**Description**	**Material number**	**Description**
R928052084	FEF1-2X/H3V3-M-K-ES100-L	**R928052084**	FEF1-2X/H3V3-M-K-ES100-L
		R928052088	FEF1-2X/H3V3-M-K-ES100
		R928052102	FEF1-2X/P10-M-K-ES100
		R928052112	FEF1-2X/H3V3-M-K-ES100-R
		R928058351	FEF1-2X/H3V3-M-K-ES100-KT
		R928058352	FEF1-2X/P10-M-K-ES100-KT
R928018808	FEF 0 P10-F00	**R928018808**	FEF 0 P10-F00

1) Further versions are available on request.

Function, section

Combination of flange-mounting filling filter and cap removable over the bayonet lock as air breather with internal filter element. The filter element must be exchanged with the cap. The breathing filters are used in hydraulic systems for filtration of the suction air of the fluid tank. They are designed for installation on fluid tanks.

Depending on the process cycles, the air and contamination are drawn into the fluid tank. By use of our breathing filters, air circulation at the fluid tank can still be ensured and the system be protected against contamination.

They basically consist of a cap (1) with bayonet lock including filter element (2) as well as a base (3) with filling strainer (4) for mounting at the tank.

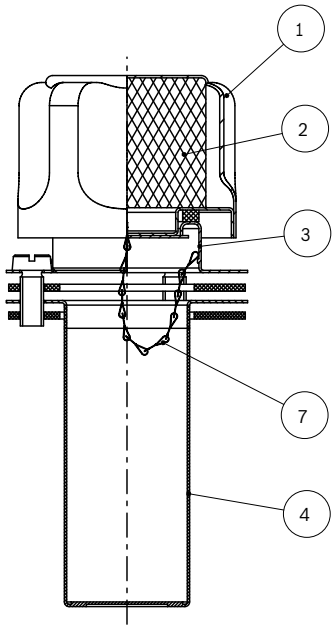
Via the bayonet lock, the cap (1) is connected to the base (3). The contaminated air flow is directed via opening (A) through the filter element and into the fluid tank (T). Before entering the fluid tank, any air is filtered. The outflowing air is also directed through the filter element.

Type FEF 0
By default, the cap (1) is connected via a chain (7) to the base (3).

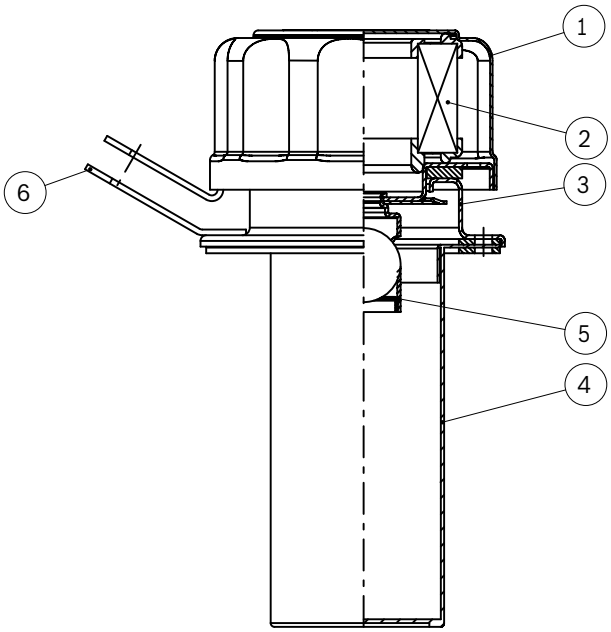
Type FEF 1
The filter is optionally available with return flow protection (amending specification of R (5)). Additionally, a configuration with lockable lateral clip (amending specification of L (6)) can be realized. The cap (1) can also be connected to the base (3) via a chain (amending specification of KT) to prevent loss of the cap.

The scope of delivery of both breathing filters includes slotted hexagon socket head cap screws, galvanized, M5x12 DIN84 4.8.

Type FEF 0



Type FEF 1



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

General				
Installation position			Vertical	
Operating temperature range		°C *[°F]*	–30...+100 *[–22...+212]*	
Ambient temperature range		°C *[°F]*	–30...+100 *[–22...+212]*	
Storage conditions		°C *[°F]*	–30...+100 *[–22...+212]*	
Connection		**NG**	**0**	**1**
		Standard	up to DN 30	up to DN 55
Material	▶ Cap		Galvanized steel Fibers (organic or inorganic); Polyurethane end disks	CED-coated steel Fibers (organic or inorganic); Polyurethane end disks
	▶ Seals		NBR-bound cellulose fibers	NBR
	▶ Flange		Galvanized steel	CED-coated steel
	▶ Filling strainer		Galvanized steel / rating 800 µm	Galvanized steel / rating 500 µm
	▶ Hexagon socket head cap screw		Cylinder head screw M5x12 DIN84 Material 4.8	
Weight		kg *[lbs]*	0,17 *[0.37]*	0,32 *[0.71]*

Compatibility with permitted hydraulic fluids

Hydraulic fluid	**Classification**	**Suitable sealing materials**	**Standards**
Mineral oil	HLP	NBR	DIN 51524

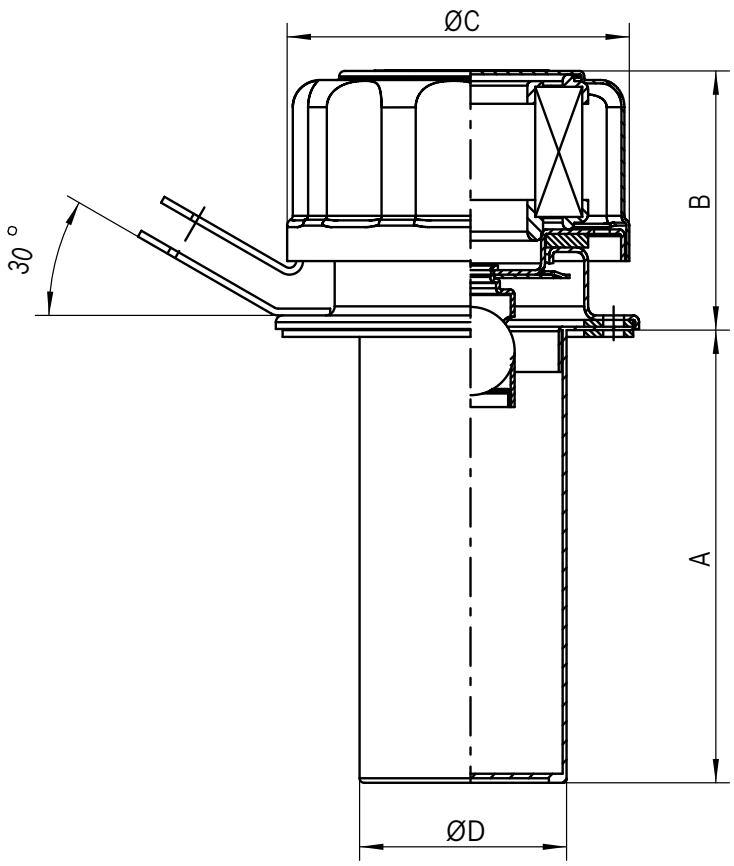
☞ **Important information on hydraulic fluids:**
- ▶ For more information and data on the use of other hydraulic fluids, please refer to data sheet 90220 or contact us.

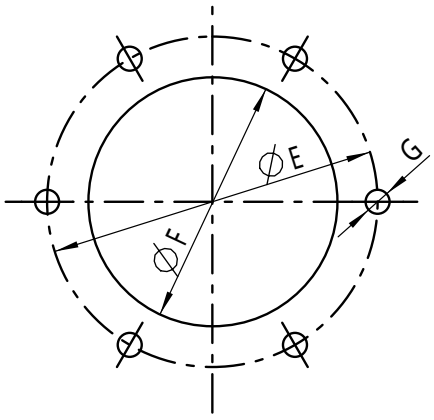
The following table shows the areas of application of the breathing and air bleed filter in hydraulic systems.

Type	**Capacity fluctuation** **Maximum air flow at a pressure differential of 0,01 bar *[0.15 psi]* l/min *[gpm]* at pure element**		**Comment**
	Standard hydraulic range	**Use in potentially explosive areas (see directive 2014/34/EU (ATEX))**	
FEF 0 P10-F00	42 l/min *[11.1 gpm]*	21 l/min *[5.5 gpm]*	–
FEF1-2X/*-M-K-ES100	400 l/min *[106 gpm]*	200 l/min *[52.8 gpm]*	* Includes all variants except versions with R
FEF1-2X/*-M-K-ES100-R	85 l/min *[22.5 gpm]*	42 l/min *[11.1 gpm]*	* Includes all variants including versions with R

Dimensions: FEF 1

(dimensions in mm *[inch]*)





A	B	Ø C	Ø D	Ø E	Ø F	G
100 *[3.94]*	56 *[2.2]*	81 *[3.19]*	49 *[1.93]*	73 *[2.87]*	55 *[2.17]*	M5

Mounting, Commissioning, Maintenance

Mounting

- Filter connection must correspond to the hole pattern (DIN 24557-2) at the tank.
- Position the seal on the hole pattern at the tank, insert the filling strainer and apply the second seal.
- Over the flange, all parts are fitted at the tank. For this purpose, the screws included in the scope of delivery (see tightening torques) must be used.
- Screw-in the cap in clockwise direction (see tightening torques).
- We recommend a minimum clearance of 140 mm *[5.51 inch]* between filter and oil level.

Commissioning

For commissioning of the system, no measures must be taken regarding the breathing filter.

Maintenance

Exchanging the cap:
The cap with integrated filter element must be replaced at least every 6 months. The degree of contamination of the filter element can be indicated by means of vacuum monitoring at the tank (see accessories). We recommend changing the cap at an underpressure of 0.05 bar *[0.73 psi]*.

Tightening torques

Cap		FEF...
Tightening torque with μ_{total} = 0.14	Nm *[lb-ft]*	30 *[22]*
Screws M5	Nm *[lb-ft]*	0,9 *[0.66]*

Exchanging the cap

Filter application range	Environmental conditions medium dust content	Maintenance interval
General mechanical engineering	9...25 mg/m³ *[0.05...0.14 oz/in³]*	4000 h
Heavy industry	50...80 mg/m³ *[0.29...0.46 oz/in³]*	3000 h
Mobile hydraulics	30...100 mg/m³ *[0.17...0.58 oz/in³]*	3000 h

Directives and standardization

Product validation

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

Filtration performance test (multipass test)	ISO 16889:2008-06
Compatibility with hydraulic fluid	ISO 2943:1998-11

The development, manufacture and assembly of Rexroth industrial filters and Rexroth filter elements is carried out within the framework of a certified quality management system in accordance with ISO 9001:2000.

Classification according to the Pressure Equipment Directive

Bosch Rexroth FEF1 breathing and air bleed filters according to data sheet 51513 are not classified as devices or components according to Pressure Equipment Directive 2014/68/EU (PED).

Use in potentially explosive areas according to directive 2014/34/EU:

This filter is not classified as device or component according to directive 2014/34/EU and does not bear a CE mark. It has been proven with the ignition risk analysis that this breathing filter does not have own ignition sources according to DIN EN ISO 80079-36.

The filter can be used for the following potentially explosive atmospheres:

	Zone suitability	
Gas	1	2
Dust	21	22

Breathing filter			
Use/assignment		**Gas 2G**	**Dust 2D**
Assignment		Ex h IIC T4...T1 Gb	Ex h IIC T100°C...T450°C Db [1]
Minimum conductivity of the medium pS/m	min	300	
Dust accumulation	max	–	0,5 mm *[0.019 inch]*

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

Intended use

This filter consists of a filter cap with bayonet lock and filter element, base and filling strainer which serve as components in the sense of the EC Machinery Directive 2006/42/EC in hydraulic machinery for the separation of dirt particles.

This filter may be used under the following boundary conditions and limits:
- Only in systems with fluids of group 2, according to Pressure Equipment Directive 2014/68/EU.
- Only according to the application and environmental conditions in the section “Technical data”
- Only in compliance with the specified performance limits in the section “Technical data“; extended operational durability/load cycles on request
- Only with hydraulic fluids and the intended seals according to the section „Compatibility with hydraulic fluids”
- Use in potentially explosive areas according to the section „Directives and standardization”.
- The notes regarding the operating modes according to the section „Assembly, commissioning, maintenance” must be observed.
- Compliance with application and environmental conditions according to the technical data.
- Compliance with the specified performance limits.
- Use in the original condition, without damage.
- For any maintenance including replacement of the filter cap, original Bosch Rexroth spare parts must always be used.
- Repair by the customer, particularly at pressurized components, is inadmissible.
- This filter is exclusively intended for professional use and not for private use.
- The filter cap may only be used as spare part if it is combined with the original Bosch Rexroth base.
- Regarding the installation position, it must be ensured that the filter cap is always aligned to „12 o‘clock“.

Improper use

Any use deviating from the intended use is improper and thus not admissible.
Improper use of the filters includes:
- Incorrect storage
- Incorrect transport
- Lack of cleanliness during storage, assembly and operation
- Incorrect installation
- Use of inappropriate/non-admissible hydraulic fluids
- Exceedance of the specified maximum pressures and load cycles
- Operation outside the approved temperature range
- Installation and operation in an inadmissible device group or category
- Operation outside the specified limits for the operating voltage, see the section „Technical data“

Bosch Rexroth AG does not assume any liability for damage caused by improper use. The user assumes all risks involved with improper use.

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filter-support@boschrexroth.de
www.boschrexroth.de

MANNESMANN REXROTH

Variable Displacement Pump A10VSO

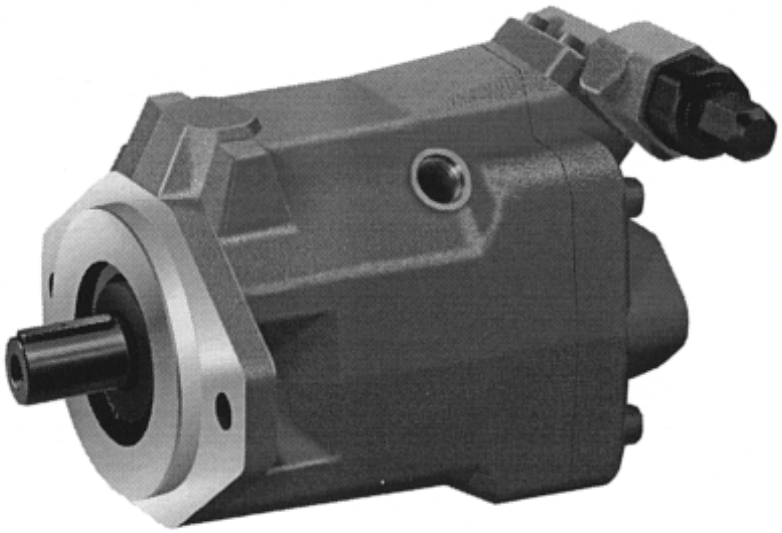
Series 52, open circuits,
Axial piston, swashplate design

Size 10 | Nominal pressure 3600 psi (250 bar) | Peak pressure 4600 psi (315 bar)

RA 92 713/01.98

A10VSO Nominal size 18 see RA 92712

AA10VSO Nominal size 28....140 see RA 92711

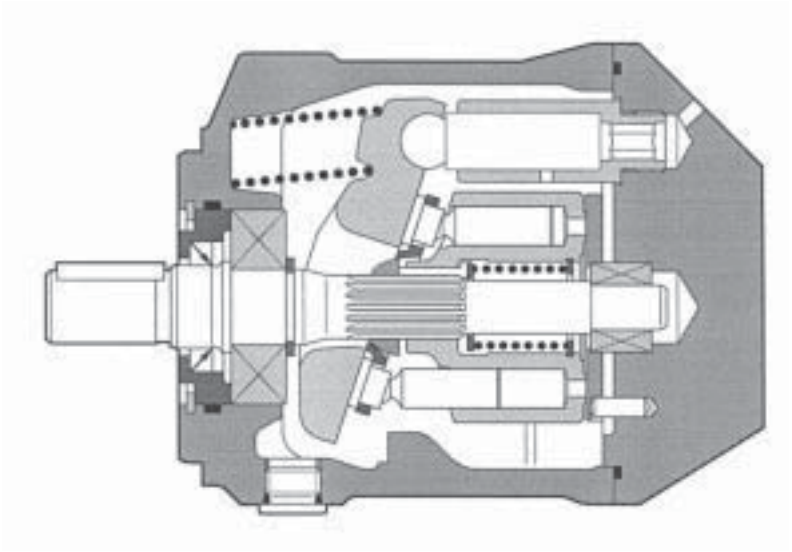


The variable displacement axial piston pump A10VSO in swashplate design was designed for hydrostatic drives in open circuits.

The pump is suitable for use in both stationary and mobile applications.

Volumetric flow is proportional to the drive speed and the displacement. By adjusting the position of the swashplate it is possible to vary the flow.

- Mounting flange and shaft per SAE–J74 and ISO
- Compact design
- High power-weight ratio
- Low noise level
- High efficiency
- Short control times
- Pressure and flow control
- High permissable speeds
- SAE-O-ring or metric threaded ports



Variable displacement pump A10VSO, Series 52

Ordering Code

A10VS	O	10		/	52		–	P				N00	

Fluid

Mineral oil (no desig.)

Axial piston unit

Variable, swashplate design SAE nominal pressure 250 bar, peak pressure 315 bar	A10VS

Mode of operation

Pump, open circuit	O

Size

≙ Displacement $V_{g\,max}$ 0.64 in³/rev (10.5 cm³/rev)	10

Control devices

Pressure control	DR
Remote pressure control	DRG
Pressure- and flow control	DFR1
Pressure- and flow control with LS bleed-of orifice	DFR

Series

	52

Direction of rotation

Looking at driveshaft	clockwise	R
	counter-clockwise	L

Seals

NBR (Nitrile rubber to DIN ISO 1629)	P

Shaft end

Cylindrical with shaft key 19-1(SAE A-B)	●	–	K
Cylindrical with shaft key DIN 6885		●	P
Splined shaft 9-4 (SAE A-B, 3/4" – 11 teeth)	●	–	S
Splined shaft 16-4 (SAE A, 5/8" – 9 teeth)	●	–	U

Mounting flange

SAE 2-bolt	●	–	C
ISO 2-bolt	●	–	A

Service ports

Pressure port B Inlet port S	UNF-straight thread O-ring ports rear	●	–	64
Pressure port B Inlet port S	metric thread rear	●	–	14

Through drive

without through drive	N00

Special options

No special options	–
Stroke limiter for 0.49 in³/rev (8 cm³/rev)	SO 858
Stroke limiter for 0.37 in³/rev (6 cm³/rev)	SO 857

= preferred program (with short delivery times) ● = available ○ = not available

Hydraulic fluid

Prior to project design, please see our catalog sheets RA 90 220 (mineral oils) and REA 90 221 (environmentally compatible fluids) for detailed information on the selection of hydraulic fluids and application conditions.
When operating with environmentally evaluated (EE) fluids certain limitations may apply. Please consult us.

Operating viscosity range
For optimum efficiency and service life, we recommend that the operating viscosity (at operating temperature) be selected in the range

ν_{opt} = optimum operating viscosity 16...36 mm²/s

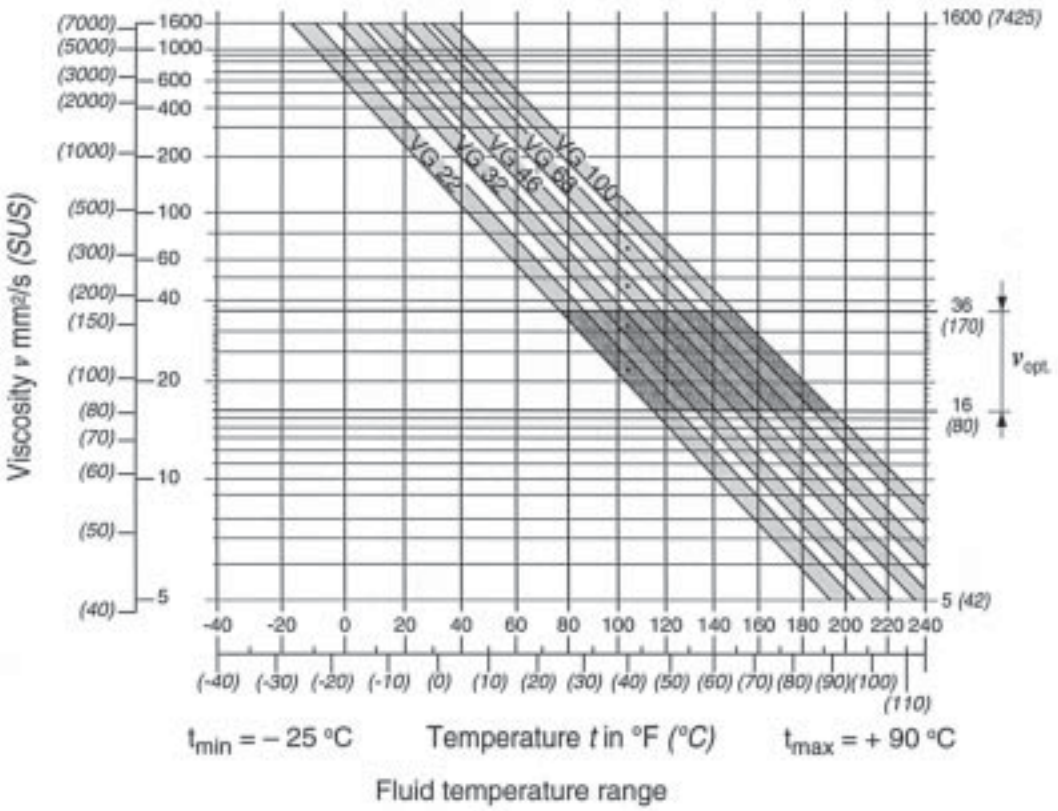
referred to tank temperature (open circuit).

Limits of viscosity range
The following values are valid for extreme operating conditions:
ν_{min} = 60 sus (10 mm²/s)
for short periods at max. leakage oil temperature of 195°F (90 °C).
ν_{max} = 4600 sus (1000 mm²/s)
for short periods during cold start.

Temperature range (see selection diagram)
t_{min} = –13°F (–25 °C)
t_{max} = +195°F (+90 °C)

Notes on the selection of the hydraulic fluid
For correct selection of the fluid it is assumed that the operating temperature in the tank is known (open circuits), in relation to the ambient temperature.
The hydraulic fluid should be selected so that, within the operating temperature range, the operating viscosity lies within the optimum range ν_{opt}, (see shaded section of selection diagram). We recommend that the higher viscosity grade is selected in each case.
Example: At an ambient temperature of X °F (°C) the operating temperature in the tank will be 140 °F (60° C). In the optimum operating viscosity range (ν_{opt}; shaded section) this corresponds to viscosity grade VG 46 or VG 68; VG 68 should be selected.
Important: The case drain oil temperature is influenced by pressure and speed and is always higher than the tank temperature. At no point in the system, however, may the temperature be higher than 195°F (90 °C).
If it is not possible to comply with the above conditions because of extreme operating parameters or a high ambient temperature, please consult us.

Selection diagram



Filtration
In order to ensure reliable operation, the hydraulic fluid must be maintained to a minimum cleanliness level of:
class 9 to NAS 1638 or
class 18/15 to ISO/DIS 4406
class 6 per SAE, ASTM, AIA

This may be achieved, for example with filterelement type...D010...(see RA 31278) with a minimum retention rate:

$ß_{10} \geq 100$

Technical Data

Operating pressure range - Inlet side
Absolute pressure at port S (inlet port)

$p_{abs\ min}$ ____ 12 psi (0.8 bar)
$p_{abs\ max}$ ____ 435 psi (30 bar)

Operating pressure range - Outlet side
pressure at port B
Nominal pressure p_N ____ 3600 psi (250 bar)
Peak pressure p_{max} ____ 4600 psi (315 bar)
(Pressure data to DIN 24312)

Direction of flow
S to B.

Case drain pressure
Maximum permissible pressure of leakage fluid (at port L, L_1): maximum 7 psi (0.5 bar) higher than the inlet pressure at port S, but not higher than 30 psi (2 bar) absolute.

Determination of inlet pressure p_{abs} at the inlet port, resp. the reduction in displacement for increasing speed.

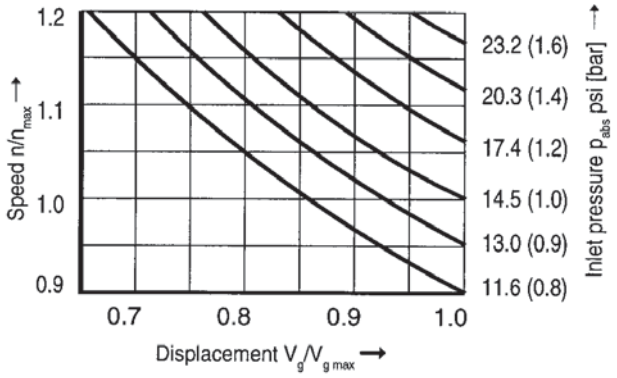
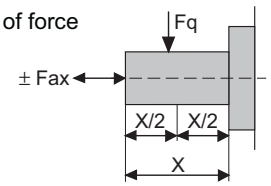


Table of values (theoretical values, without considering η_{mh} and η_v; values rounded)

Displacement		$V_{g\ max}$	0.64 in³	10.5 cm³
Optional maximum stroke-limiter	at V_{red}		0.49 in³	8 cm³
	at V_{red}		0.37 in³	6 cm³
Max. speed[1])	at $V_{g\ max}$	$n_{o\ max}$	3600 min⁻¹	3600 min⁻¹
Max. perm. speed (speed limit)	at increase in input pressure p_{abs} or $V_g < V_{g\ max}$	$n_{o\ max\ perm}$	4300 min⁻¹	4300 min⁻¹
Max. volumetric flow	at $n_{o\ max}$	$q_{v\ max}$	9.77 GPM	37 L/min
	at n_E = 1750 min⁻¹		4.78 GPM	18 L/min
Max. power (Δp = 3626 psi (250 bar))	at $n_{o\ max}$	$P_{o\ max}$	21 HP	16 kW
	at n_E = 1750 min⁻¹		10 HP	7.8 kW
Max. torque (Δp = 3626 psi (250 bar))	at $V_{g\ max}$	T_{max}	31 lb-ft	42 Nm
Moment of intertia about drive axis		J	0.014 lb-ft²	0.0006 kgm²
Fill capacity			0.05 gal.	0.2 L
Approx. weight (without oil fill)		m	17.6 lbs	8 kg
Permissible loading on drive shaft:				
max. perm. axial force		$F_{ax\ max}$	90 lbf	400 N
max. perm. radial force		$F_{q\ max}$	56 lbf	250 N

[1]) The values shown are valid provided there is an absolute pressure of 14.5 (1 bar) at suction inlet S.

Direction of force



Calculation of size

Volumetric flow $q_v = \frac{V_g \cdot n \cdot \eta_v}{231}$ gpm $\left(\frac{V_g \cdot n \cdot \eta_v}{1000} \right.$ L/min $\left. \right)$

Drive torque $T = \frac{V_g \cdot \Delta p}{24 \cdot \pi \cdot \eta_{mh}}$ lb-ft $\left(\frac{1.59 \cdot V_g \cdot \Delta p}{100 \cdot \eta_{mh}} \right.$ Nm $\left. \right)$

Drive power $P = \frac{T \cdot n}{5252} = \frac{Q \cdot \Delta p}{1714 \cdot \eta_t}$ HP $\left(\frac{2\pi \cdot T \cdot n}{60000} = \frac{T \cdot n}{9549} = \frac{Q \cdot \Delta p}{600 \cdot \eta_t} \right.$ kW $\left. \right)$

V_g = geometric displacement [in³ (cm³)] per revolution
Δp = pressure differential [psi (bar)]
n = speed [rpm]
η_v = volumetric efficiency
η_{mh} = mech.-hydr. efficiency
η_t = overall efficiency ($\eta_t = \eta_v \cdot \eta_{mh}$)

Installation Notes

Installation position is optional. Pror to start-up, pump housing must be completely filled with system fluid during commissioning, prior to start-up, and remain full when operating. In order to achieve the lowest noise value, all connections (suction, pressure, case drain ports) must be linked by flexible connections to tank.
Avoid placing a check valve in the case drain line.
This may, however, be permissible in individual cases, after consultation with us.

1. Vertical installation (shaft end upwards)
The following installation conditions must be taken into account:

1.1. Installation inside a tank
Before installation fill pump housing, keeping it in a horizontal position.

a) If the minimum fluid level is maintained equal to or above the pump mounting surface leave ports "L", "L_1" and "S" open (see Fig.1).

b) If the minimum fluid level is below the pump mounting surface pipe port "L_1", and possibly "S" according to Fig. 2.
Close port "L" with respect to conditions in 1.2.1.

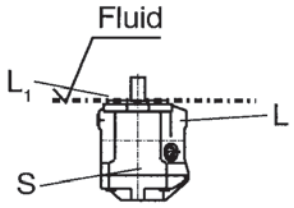


Fig. 1

1.2. Installation outside a tank
Before installing the pump, fill the pump with housing in the horizontal position.
For mounting above a tank see fig. 2.
Limiting conditions:
1.2.1. Minimum pump inlet pressure $p_{in\ min}$ = 12 psi (0.8 bar) both static and dynamic conditions.
Note: Avoid mounting above a tank wherever possible in order to achieve a low noise level.
The permissible suction height h is based on the overall pressure loss, but may **not** be greater than h_{max} = 31.5 in (800 mm) (immersion depth $h_{d\ min}$ = 7.9 in (200 mm)).

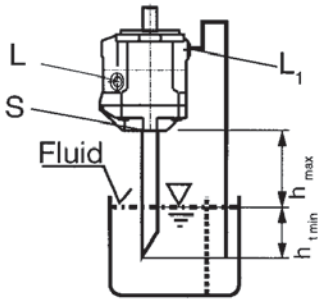


Fig. 2

Overall pressure loss $\Delta p_{total} = \Delta p_1 + \Delta p_2 + \Delta p_3 \leq (1 - p_{in.\ min})$ = 3 psi (0.2 bar)
Δp_1: Pressure loss in pipe due to accelerating column of fluid

$$\Delta p_1 = \frac{\rho \cdot l \cdot dv}{dt} \cdot 10^{-5}\ (bar)$$

ρ= density (kg/m³)
l = pipe length (m)
dv/dt = change in rate of fluid velocity (m/s²)

Δp_2: Pressure loss due to static head
$\Delta p_2 = h \cdot \rho \cdot g \cdot 10^{-5}$ (bar)
h = head (m)
ρ= density (kg/m³)
g = gravity. = 9.81 m/s²

Δp_3: Line losses (elbows etc.)

2. Horizontal installation
The pump must be installed, so that "L" or "L_1" is at the top.

2.1. Installation inside a tank
a) If the minimum fluid level is equal to or above the top of the pump, ports "L", "L_1" and "S" should remain open (see fig. 3).

b) If the minimum fluid level is below the top of the pump, pipe ports "L", "L_1" and possibly "S" as fig. 4. The conditions corres-pond to item 1.2.1.

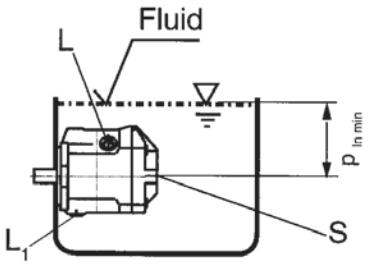


Fig. 3

2.2. Installation outside a tank
Fill the pump housing before commissioning.
Pipe ports "S" and the higher port "L" or "L_1".
a) When mounting above the tank, see fig. 4.
Conditions correspond to 1.2.1.

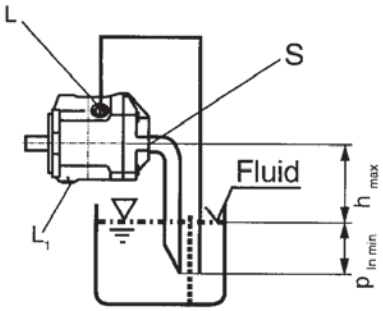


Fig. 4

b) Mounting below the tank
Pipe ports "L" and "S" according to fig.5.

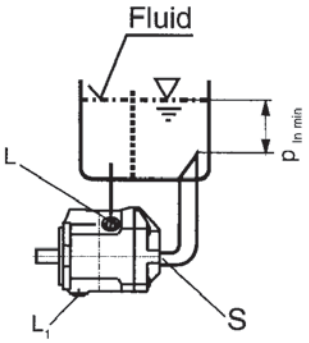


Fig. 5

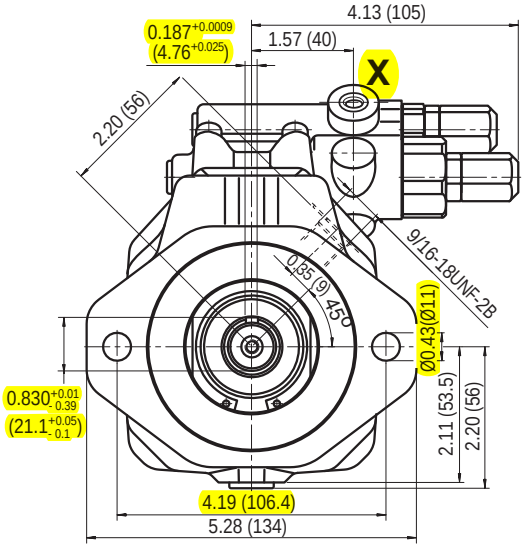
Dimensions size 10

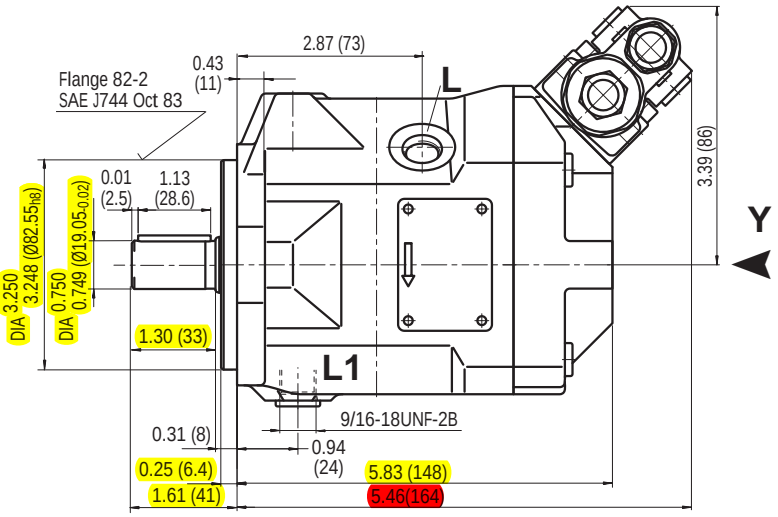
Shaft end "K"

DR

Version A10VSO 10 **DRG** /52 **R-** PKC64N00

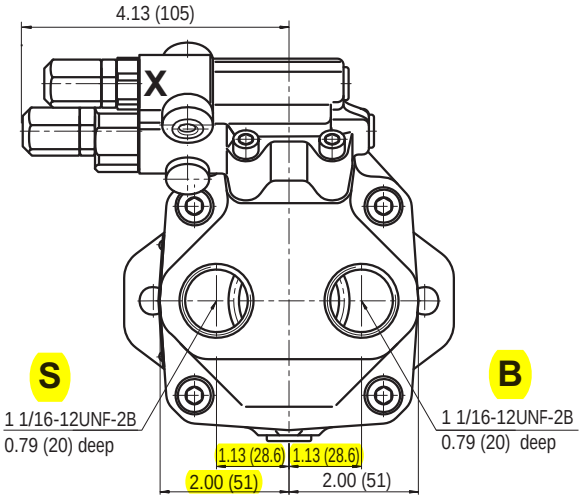
DFR1





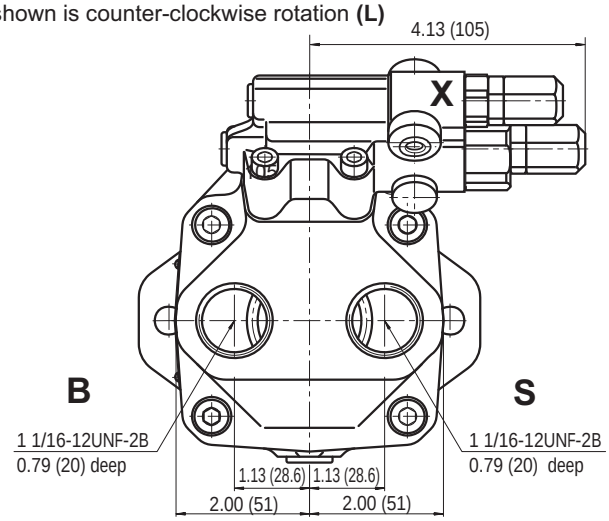
View Y

shown is clockwise rotation **(R)**

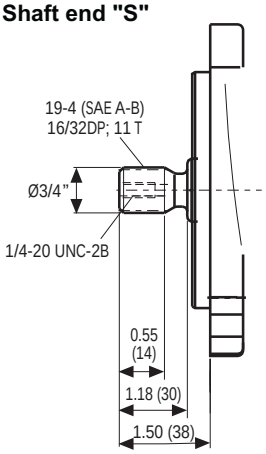


View Y

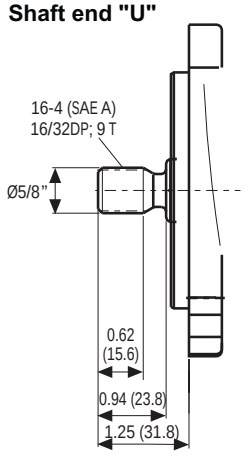
shown is counter-clockwise rotation **(L)**



Shaft end "S"



Shaft end "U"



Note: Alternate X-port may be used. (One side plugged)

Ports

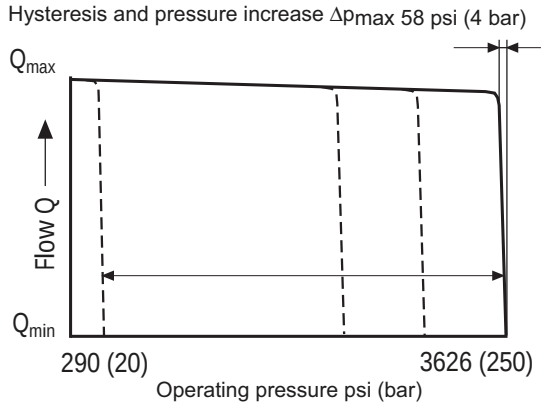
B	Pressure port	1 1/16-12UNF-2B
S	Inlet port	1 1/16-12UNF-2B
L/L_1	Case drain	9/16-18UNF-2B
X	Pilot port	7/16-20UNF-2B

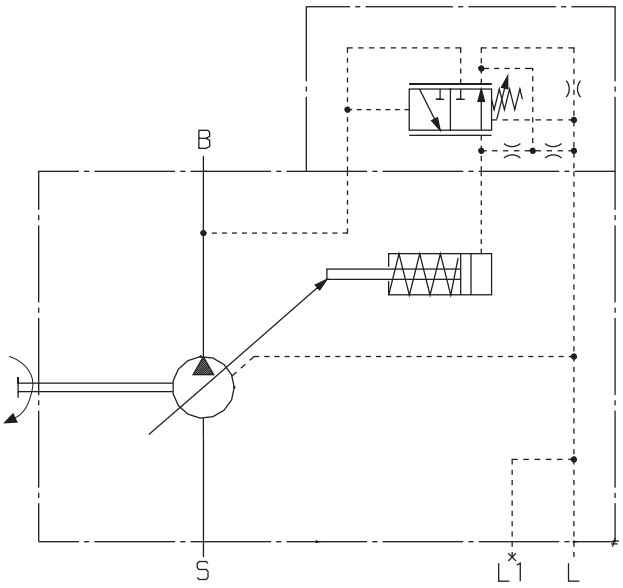
DR Pressure control

The pressure control serves to maintain a constant pressure in the hydraulic system, within the control range of the pump. The pump therefore supplies only the amount of hydraulic fluid required by the actuators. Pressure may be steplessly set at the pilot valve.

Dimensions see page 6.

Static characteristic
(at n_1 = 1500 rpm; t_{oil} = 122 °F (50 °C))

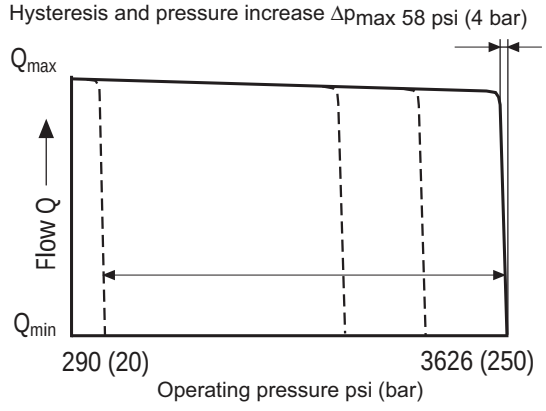


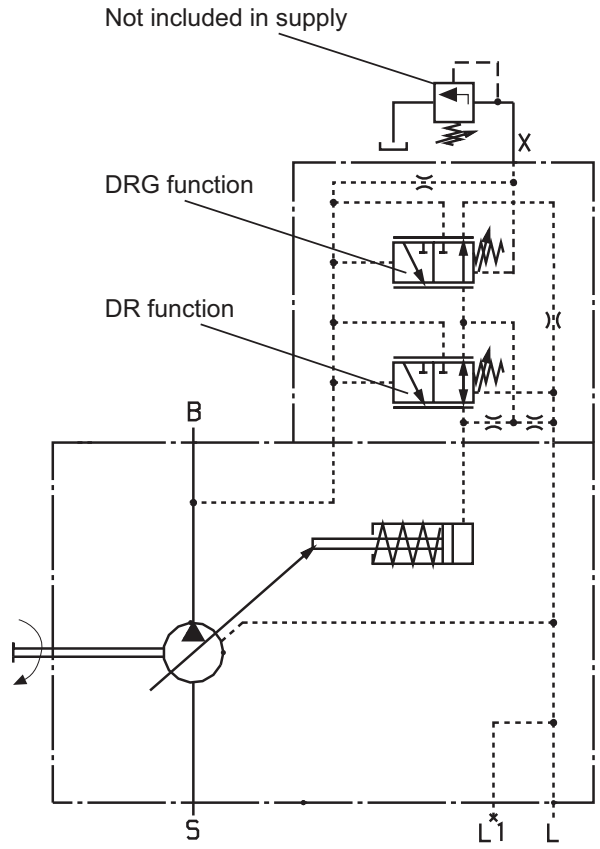


DRG Remote pressure control

Function and design as for DR.
The remote pressure control can be adjusted up to the pre set pressure level of the DR control.
A pressure relief valve may be externally piped to port X for remote control purposes. It is not, however, included with the DRG control.
The differential pressure at the pilot valve is set as standard to 290 psi (20 bar) and this results in a pilot flow of 0.5 GPM (1.5 L/min). If another setting is required (in the range 145—320 (10_20 bar), please state this in clear text.
We recommend that one of the following is used as the separate pressure relief valve:
DBDH 6 (hydraulic) to RA 25402
DBETR-SO 437 with 0.03 (0.8 mm) dia. nozzle in P (electrical) to RA 29166.
The length of piping must notDimensions see page 6.

Static characteristic
(at n_1 = 1500 rpm; t_{oil} = 122 °F (50 °C))





Dimensions see page 7.

Notes

Mannesmann Rexroth Corporation

***Rexroth Hydraulics Div., Industrial,* 2315 City Line Road, Bethlehem, PA 18017-2131 Tel. (610) 694-8300 Fax: (610) 694-8467**

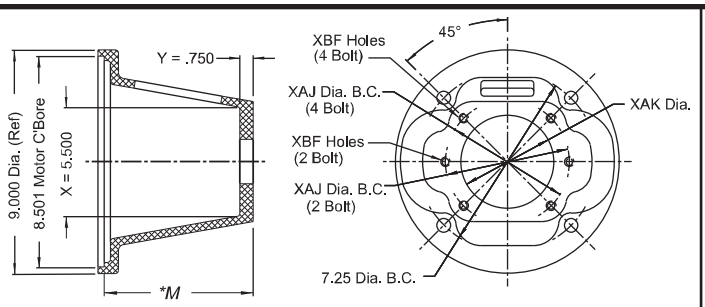
***Rexroth Hydraulics Div., Mobile,* 1700 Old Mansfield Road, Wooster, OH 44691-0394 Tel. (330) 263-3400 Fax: (330) 263-3333**

PUMP MOUNTS for ELECTRIC MOTORS

182TC thru 256TC

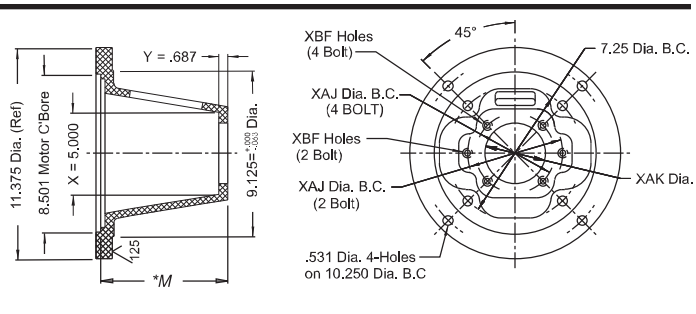
213UC thru 256UC

Motor Size	182TC	184TC	213TC	215TC	254TC	256TC	213UC	215UC	254UC	256UC
HP/1800 RPM	3	5	7-1/2	10	15	20	2	3	7-1/2	10
Shaft Diameter	1.125	1.125	1.375	1.375	1.625	1.625	1.125	1.125	1.375	1.375
Key Size	1/4	1/4	5/16	5/16	3/8	3/8	1/4	1/4	5/16	5/16
Shaft Length	2.625	2.625	3.125	3.125	3.750	3.750	2.750	2.750	3.500	3.500



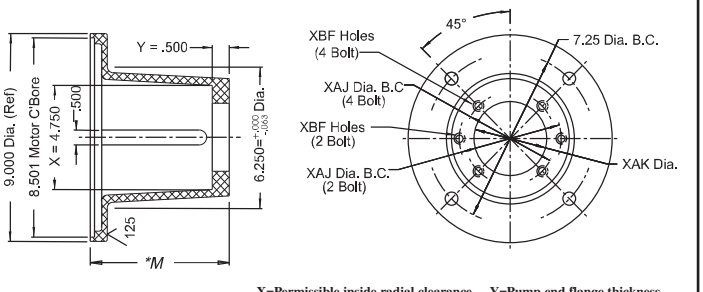
STYLE 5 ADAPTER

X=Permissible inside radial clearance Y=Pump end flange thickness
Horizontal Mounting Only



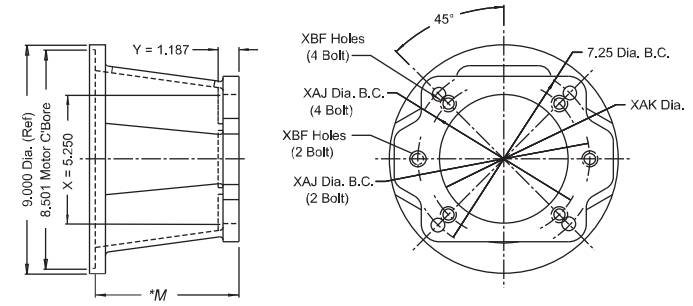
STYLE 6 ADAPTER

X=Permissible inside radial clearance Y=Pump end flange thickness
Vertical Mounting Only
(see page 145 for vertical mounting information & vertical mounting gasket)



STYLE 7 ADAPTER

X=Permissible inside radial clearance Y=Pump end flange thickness
Horizontal/Vertical Mounting Only
(see page 145 for vertical mounting information & vertical mounting gasket)



STYLE 8 ADAPTER

X=Permissible inside radial clearance Y=Pump end flange thickness
Horizontal Mounting Only

If your pump is not listed or is a non-standard pump, contact us for special machining and/or information. Not all pump mounting holes are supplied on every adapter.

Pump Type	Flange	XAJ Bolt Circle	XAK Pump Pilot	XBF Mounting Holes	Adapter Style	Mounting Horiz	Mounting Vert	Face to Face	Vescor Part Number
Standard SAE Pump Flanges									
					7	yes	yes	4.38	**2194**
					7	yes	yes	4.63	**3371**
					5	yes	no	5.00	**2000**
					7	yes	yes	5.00	**6033**
					6	no	yes	5.00	**6053**
USA4F17	4 Bolt	2.84	1.781	5/16-18	7	yes	yes	5.25	**168199+**
					7	yes	yes	5.44	**157199**
					6	no	yes	5.75	**6056**
					5	yes	no	5.81	**1965**
					7	yes	yes	5.88	**6037**
					7	yes	yes	6.88	**6041+**
					6	no	yes	6.81	**6059+**
					7	yes	yes	4.38	**2196**
SAE AA	2 Bolt	3.25	2.001	3/8-16	7	yes	yes	4.63	**3373**
					5	yes	no	5.00	**1994**

+NON-STOCK SPECIAL ORDER ITEM

(see page 142 for Motor Mounting Spacers, page 143 for Vertical Mounting Rings)

NOTE: WITH VESCORS' POLICY OF CONSTANTLY IMPROVING ITS PRODUCTS, SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

PUMP MOUNTS for ELECTRIC MOTORS

182TC thru 256TC

213UC thru 256UC

Pump Type	Flange	XAJ Bolt Circle	XAK Pump Pilot	XBF Mounting Holes	Adapter Style	Mounting Horiz	Mounting Vert	Face to Face	Vescor Part Number
Standard SAE Pump Flanges									
SAE AA	2 Bolt	3.25	2.001	3/8-16	7	yes	yes	5.00	**6031**
					6	no	yes	5.00	**6052**
					7	yes	yes	5.25	**168299**
					7	yes	yes	5.44	**157299**
					6	no	yes	5.75	**6057**
					7	yes	yes	5.88	**6035**
					7	yes	yes	6.88	**6039+**
					6	no	yes	6.81	**6060+**
SAE A	2 Bolt	4.19	3.251	3/8-16	7	yes	yes	4.38	**2198***
					7	yes	yes	4.63	**6026***
					5	yes	no	5.00	**1960**
					7	yes	yes	5.00	**6030***
					6	no	yes	5.00	**6054**
					7	yes	yes	5.25	**168399***
					7	yes	yes	5.44	**3364***
					6	no	yes	5.75	**6055**
					5	yes	no	5.81	**1959**
					7	yes	yes	5.88	**6034***
					8	yes	no	6.38	**3365**
					5	yes	no	6.81	**1950**
					6	no	yes	6.81	**6058**
					7	yes	yes	6.88	**6038***
					8	yes	no	7.38	**3361**
SAE B	2 Bolt 4 Bolt	5.75 5.00	4.001	1/2-13	5	yes	no	5.00	**1964**
					6	no	yes	5.00	**6032**
					8	yes	no	5.44	**254199**
					6	no	yes	5.75	**6036**
					5	yes	no	5.81	**1952**
					8	yes	no	6.38	**254299**
					5	yes	no	6.81	**1951**
					6	no	yes	6.81	**6040**
					8	yes	no	7.38	**254399**
SAE C	2 Bolt 4 Bolt	7.12 6.38	5.001	5/8-11 1/2-13	8	yes	no	5.44	**1946**
					8	yes	no	6.38	**1955**
					8	yes	no	7.38	**1956**
SAE D	2 Bolt 4 Bolt	9.00	6.001	3/4-10	Steel	yes	no	7.00	**1886**
					Steel	yes	no	8.25	**1884**

†NON-STOCK SPECIAL ORDER ITEM

*contains (2) SAE 45° mounting patterns

FLEXIBLE DRIVE COUPLINGS

Why You Should Specify Vescor Flexible Couplings.

Vescor uses stronger materials. Because flexible couplings are subjected to constant torque and stress, they eventually wear out. Obviously, the longer the coupling lasts, the more value you get for your money.

The key to flexible coupling longevity is the elastomeric element that is sandwiched between the coupling halves. Most flexible coupling manufacturers use compression-molded, rubber-like materials for their standard inserts. Reuland, however, uses a high-tech injection molded material called P380 for our standard inserts. Torque tests and shock loads prove P380 is stronger and more durable than most of our competitors' standard elastomeric elements.

Vescor flexible couplings cost less. P380 is priced like a standard insert while providing the performance and specifications of a premium selection. This allows us to offer you a superior product that saves you money when you purchase it and that continues to save you money with lowered maintenance and replacement costs.

Vescor's flexible couplings are made from lightweight aluminum. Our flexible couplings are lighter than steel and cast iron couplings, which helps prolong bearing and seal life on pumps, gear boxes and motors. Our lightweight aluminum coupling also cost less to ship to your location.

Vescor flexible couplings are precision machined. By maintaining tight tolerances, we help eliminate vibration and noise. Alignment is easily made with a straight edge and a feeler gage.

Vescor flexible couplings offer double set screws standard. Most manufacturers charge you extra for a double set screw option. Since our couplings are designed to be the finest on the market, we make double set screws standard on all coupling sizes. The extra set screw offers greater hoop stress generation, creating a more secure fit from coupling to shaft.

Rigorous Quality Control

We design and manufacture all flexible couplings ourselves. And we subject each one to exacting quality control inspections. This total control allows us to offer you higher quality at a lower price.

Specials, Metrics and Splines

Vescor stocks one of the industry's largest selections of Vescor flexible couplings. In addition, splines, metric bores and keys and other special options may be available from stock. If not, we can modify any flexible coupling to your exact specifications. please consult the factory for your specials needs.

The One Source for all Your Flexible Couplings and Pump/Motor Adapter Needs

When you connect a pump to a motor, you want a perfect alignment for optimal performance. And that's what you get when you specify Vescor flexible couplings and Vescor pump motor adapters. These two components work together to achieve near perfect concentricity. Together they reduce vibration, heat, noise and wear and tear. In short, they're your best guarantee for increased performance and life expectancy.

Fast Delivery

Vescor flexible couplings are stocked in Vescor's South Elgin facility for fast response and reduced transportation costs. Most orders are shipped within 24 hours of receiving your order.

The Vescor Guarantee

All Vescor products are covered by our quality and service guarantee.

How to Select a Coupling

Just because applications have the same horsepower doesn't mean they require the same size flexible couplings. If you follow these simple steps, you can easily find the flexible coupling in the following Selection Chart that's perfect for your application.

Step 1: Determine the Service Factor.

Motors with the same horsepower are assigned different Service Factors to reflect the different loads and stresses. For example, a 40HP motor running a standard hydraulic application with infrequent stops carries a Service Factor of 1.00 while another 40HP application on an injection molding machine has a Service Factor of 3.00. This means the second motor requires a larger flexible coupling than the first. Ignoring the Service Factor can cause you to buy a coupling too small for your application, leading to premature wear and maintenance.

For applications with intermittent starts and stops and no reversing, a 1.50 to 1.75 Service Factor would be appropriate. Applications with frequent starts and stops or reversing duty normally carry a 2.00 Service Factor. Typically, motors designed for high torque or reversing applications have a 3.00 Service Factor. Service Factors for other typical applications include:

Application	Service Factor
Hydraulics applications with infrequent stops	1.00-1.50
Hydraulic units with cycling loads	1.50-2.50
Conveyors	1.50-2.50
Internal combustion engines	1.75-2.50
Machine tool, textile, cranes and woodworking machinery	2.0
Saw mill machines	3.0
Injection molding machines	3.0

Note: The standard P380 insert is rated for Service Factors up to 1.5. For applications rated above 1.5, we highly recommend using our hytrel insert.

Step 2: Determine Minimum Torque Rating in Lbs.-In.

If the minimum Torque Rating is not known, it can be calculated using the HP and RPM: Minimum torque = (HP x 63000)/RPM.

Step 3: Multiply Full Load Torque by the Selected Service Factor.

Step 4: Determine Shaft Size.

A shaft diameter MUST NOT EXCEED a coupling's maximum bore. For example, RC3 flexible drive coupling has a $1^{5}/_{8}$" maximum bore (shaft diameter). Therefore, $1^{5}/_{8}$" is the largest shaft that can be installed in the coupling.

Step 5: Go to the Coupling Data Table.

Select the coupling size that meets or exceeds your minimum Torque and Service Factor calculation. Then go to the coupling Availability Chart to match Bore & Key. (Make sure the motor shaft does not exceed the coupling's maximum bore.)

Part Numbers

Vescor part numbering system is based on the coupling's size, bore & key or spline. The first three digits represent the coupling size. The next four digits refer to the bore or number of teeth/pitch (in inches or millimeters). The last grouping indicates keyways, clamps, set screws or spline options.

No Bore Example

RC2 - N B

- RC2: Coupling Size
- N: Bore No

Bore & Keyway Example

RC3 - 1375 - 375

- RC3: Coupling Size
- 375: 3/8" Keyway
- 1375: 1.375 Bore

Spline Example

RC5 - 1412 - A - S

- RC5: Coupling Size
- 1412: Number of Teeth
- A: A = Aluminum, S = Steel
- S: C = Clamp Type, S = Set Screw
- Pitch

FLEXIBLE DRIVE COUPLINGS

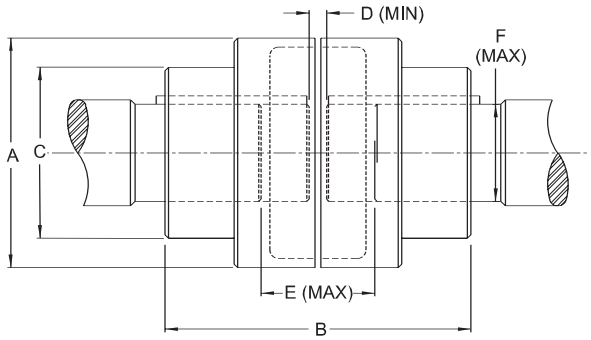
Coupling Data Table

Size	Maximum Bore Inches F	Dimensions Inches A	B	C	Distance Between Shafts Inches D (min)	E (max)	HP Torque lb.-in.	Rated HP at 100 RPM	1200 RPM	1800 RPM	Inertia lb.-ft.^{2}	Inserts
RC1	1.125	2.62	2.56	2.12	.06	0.75	473	0.75	9	13.5	0.005	P380
RC1	1.125	2.62	2.56	2.12	.06	0.75	630	1	12	18	0.005	Hytrel
RC2	1.375	2.91	3.17	2.31	.06	0.88	630	1	12	18	0.009	P380
RC2	1.375	2.91	3.17	2.31	.06	0.88	1103	1.75	21	31.5	0.009	Hytrel
RC3	1.625	3.44	3.60	2.97	.06	0.88	1261	2	24	36	0.022	P380
RC3	1.625	3.44	3.60	2.97	.06	0.88	2206	3.5	42	63	0.022	Hytrel
RC4	1.875	4.00	4.24	3.12	.06	1.12	1576	2.5	30	45	0.039	P380
RC4	1.875	4.00	4.24	3.12	.06	1.12	3309	5.25	63	94.5	0.039	Hytrel
RC5	2.375	4.81	4.68	4.06	.06	1.25	3466	5.5	66	99	0.100	P380
RC5	2.375	4.81	4.68	4.06	.06	1.25	6933	11	132	198	0.100	Hytrel
RC6	2.625	5.97	6.04	4.56	.06	1.38	7563	12	144	216	0.260	P380
RC6	2.625	5.97	6.04	4.56	.06	1.38	15756	25	300	450	0.260	Hytrel
RC7	2.875	6.91	7.01	5.25	.06	1.88	12605	20	240	360	0.480	P380
RC7	2.875	6.91	7.01	5.25	.06	1.88	28361	45	540	810	0.480	Hytrel
RC8	3.875	8.62	7.92	7.12	.06	2.00	31513	50	600	900	1.560	P380
RC8	3.875	8.62	7.92	7.12	.06	2.00	47269	75	900	1350	1.560	Hytrel

Spline Coupling Data*

Spline Specifications Number of Teeth	Pitch	SAE	Coupling Sizes
9	16/32	A, AA	RC1-RC5
13	8/16	D, E	RC4-RC8
13	16/32	B	RC1-RC6
14	12/24	C	RC2-RC8
15	8/16	F	RC4-RC8
15	16/32	BB	RC1-RC6
17	12/24	CC	RC3-RC8
21	16/32	-	RC3-RC8
23	16/32	-	RC3-RC8
27	16/32	-	RC4-RC8

•All splines are SAE 30° PA, flat root, side fit.



Nominal Bore Diameter From	To (Including)	Tolerance
.375	1.000	$^{+}.0008/^{+}.0003$
1.00	2.000	$^{+}.0013/^{+}.0005$
2.00	3.000	$^{+}.0018/^{+}.0008$
3.00	3.875	$^{+}.0020/^{+}.0010$

Insert Part Numbers

Size	Type P380	Hytrel
RC1	RG1-P9	RG1-H5
RC2	RG2-P9	RG2-H5
RC3	RG3-P9	RG3-H5
RC4	RG4-P9	RG4-H5
RC5	RG5-P9	RG5-H5
RC6	RG6-P9	RG6-H5
RC7	RG7-P9	RG7-H5
RC8	RG8-P9	RG8-H5

Insert Data

Type	Temperature Range	Misalignment Angular	Parallel Inches	Shore Hardness	Characteristics
P380	-30°F to 175°F	1°	.015	38D	Good for moderate cyclic loading, offers good oil and chemical resistance, misalignment and dampening capacity.
Hytrel	-60°F to 250°F	0.5°	.015	55D	Recommended for severe duty applications, excellent oil and chemical resistance. torsionally stiffer than P380.

Standard Bore and Key

Bore	KEY	Coupling Part Numbers							
		RC1	RC2	RC3	RC4	RC5	RC6	RC7	RC8
3/8	3/32	RC1-0375-094	RC2-0375-094						
7/16	3/32	RC1-0437-094	RC2-0437-094						
7/16	1/8	RC1-0437-125	RC2-0437-125						
1/2	1/8	RC1-0500-125	RC2-0500-125	RC3-0500-125					
9/16	1/8	RC1-0562-125	RC2-0562-125	RC3-0562-125					
5/8	5/32	RC1-0625-156	RC2-0625-156	RC3-0625-156					
5/8	3/16	RC1-0625-187	RC2-0625-187	RC3-0625-187	RC4-0625-187				
11/16	3/16	RC1-0687-187	RC2-0687-187	RC3-0687-187	RC4-0687-187				
3/4	1/8	RC1-0750-125	RC2-0750-125	RC3-0750-125	RC4-0750-125				
3/4	3/16	RC1-0750-187	RC2-0750-187	RC3-0750-187	RC4-0750-187	RC5-0750-187	RC6-0750-187		
7/8	3/16	RC1-0875-187	RC2-0875-187	RC3-0875-187	RC4-0875-187	RC5-0875-187	RC6-0875-187		
7/8	1/4	RC1-0875-250	RC2-0875-250	RC3-0875-250	RC4-0875-250	RC5-0875-250	RC6-0875-250		
15/16	1/4	RC1-0937-250	RC2-0937-250	RC3-0937-250	RC4-0937-250	RC5-0937-250	RC6-0937-250		
1	3/16	RC1-1000-187	RC2-1000-187	RC3-1000-187	RC4-1000-187	RC5-1000-187	RC6-1000-187		
1	1/4	RC1-1000-250	RC2-1000-250	RC3-1000-250	RC4-1000-250	RC5-1000-250	RC6-1000-250		
1 1/8	1/4	RC1-1125-250	RC2-1125-250	RC3-1125-250	RC4-1125-250	RC5-1125-250	RC6-1125-250	RC7-1125-250	
1 3/16	1/4		RC2-1187-250	RC3-1187-250	RC4-1187-250	RC5-1187-250	RC6-1187-250	RC7-1187-250	
1 1/4	1/4		RC2-1250-250	RC3-1250-250	RC4-1250-250	RC5-1250-250	RC6-1250-250	RC7-1250-250	RC8-1250-250
1 1/4	5/16		RC2-1250-312	RC3-1250-312	RC4-1250-312	RC5-1250-312	RC6-1250-312	RC7-1250-312	RC8-1250-312
1 3/8	5/16		RC2-1375-312	RC3-1375-312	RC4-1375-312	RC5-1375-312	RC6-1375-312	RC7-1375-312	RC8-1375-312
1 3/8	3/8		RC2-1375-375	RC3-1375-375	RC4-1375-375	RC5-1375-375	RC6-1375-375	RC7-1375-375	RC8-1375-375
1 7/16	3/8			RC3-1437-375	RC4-1437-375	RC5-1437-375	RC6-1437-375	RC7-1437-375	RC8-1437-375
1 1/2	5/16			RC3-1500-312	RC4-1500-312	RC5-1500-312	RC6-1500-312	RC7-1500-312	RC8-1500-312
1 1/2	3/8			RC3-1500-375	RC4-1500-375	RC5-1500-375	RC6-1500-375	RC7-1500-375	RC8-1500-375
1 5/8	3/8			RC3-1625-375	RC4-1625-375	RC5-1625-375	RC6-1625-375	RC7-1625-375	RC8-1625-375
1 3/4	3/8				RC4-1750-375	RC5-1750-375	RC6-1750-375	RC7-1750-375	RC8-1750-375
1 3/4	7/16				RC4-1750-437	RC5-1750-437	RC6-1750-437	RC7-1750-437	RC8-1750-437
1 7/8	1/2				RC4-1875-500	RC5-1875-500	RC6-1875-500	RC7-1875-500	RC8-1875-500
1 15/16	1/2					RC5-1937-500	RC6-1937-500	RC7-1937-500	RC8-1937-500
2	1/2					RC5-2000-500	RC6-2000-500	RC7-2000-500	RC8-2000-500
2 1/8	1/2					RC5-2125-500	RC6-2125-500	RC7-2125-500	RC8-2125-500
2 1/4	1/2					RC5-2250-500	RC6-2250-500	RC7-2250-500	RC8-2250-500
2 3/8	5/8					RC5-2375-625	RC6-2375-625	RC7-2375-625	RC8-2375-625
2 1/2	5/8						RC6-2500-625	RC7-2500-625	RC8-2500-625
2 5/8	5/8						RC6-2625-625	RC7-2625-625	RC8-2625-625
2 3/4	5/8							RC7-2750-625	RC8-2750-625
2 7/8	3/4							RC7-2875-750	RC8-2875-750
3	3/4								RC8-3000-750
3 1/4	3/4								RC8-3250-750
3 3/8	7/8								RC8-3375-875
3 1/2	7/8								RC8-3500-875
3 5/8	7/8								RC8-3625-875
3 3/4	7/8								RC8-3750-875
3 7/8	1								RC8-3875-100

FLEXIBLE DRIVE COUPLINGS

Why You Should Specify Vescor Flexible Couplings.

Vescor uses stronger materials. Because flexible couplings are subjected to constant torque and stress, they eventually wear out. Obviously, the longer the coupling lasts, the more value you get for your money.

The key to flexible coupling longevity is the elastomeric element that is sandwiched between the coupling halves. Most flexible coupling manufacturers use compression-molded, rubber-like materials for their standard inserts. Reuland, however, uses a high-tech injection molded material called P380 for our standard inserts. Torque tests and shock loads prove P380 is stronger and more durable than most of our competitors' standard elastomeric elements.

Vescor flexible couplings cost less. P380 is priced like a standard insert while providing the performance and specifications of a premium selection. This allows us to offer you a superior product that saves you money when you purchase it and that continues to save you money with lowered maintenance and replacement costs.

Vescor's flexible couplings are made from lightweight aluminum. Our flexible couplings are lighter than steel and cast iron couplings, which helps prolong bearing and seal life on pumps, gear boxes and motors. Our lightweight aluminum coupling also cost less to ship to your location.

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All Vescor products are covered by our quality and service guarantee.

How to Select a Coupling

Just because applications have the same horsepower doesn't mean they require the same size flexible couplings. If you follow these simple steps, you can easily find the flexible coupling in the following Selection Chart that's perfect for your application.

Step 1: Determine the Service Factor.

Motors with the same horsepower are assigned different Service Factors to reflect the different loads and stresses. For example, a 40HP motor running a standard hydraulic application with infrequent stops carries a Service Factor of 1.00 while another 40HP application on an injection molding machine has a Service Factor of 3.00. This means the second motor requires a larger flexible coupling than the first. Ignoring the Service Factor can cause you to buy a coupling too small for your application, leading to premature wear and maintenance.

For applications with intermittent starts and stops and no reversing, a 1.50 to 1.75 Service Factor would be appropriate. Applications with frequent starts and stops or reversing duty normally carry a 2.00 Service Factor. Typically, motors designed for high torque or reversing applications have a 3.00 Service Factor. Service Factors for other typical applications include:

Application	Service Factor
Hydraulics applications with infrequent stops	1.00-1.50
Hydraulic units with cycling loads	1.50-2.50
Conveyors	1.50-2.50
Internal combustion engines	1.75-2.50
Machine tool, textile, cranes and woodworking machinery	2.0
Saw mill machines	3.0
Injection molding machines	3.0

Note: The standard P380 insert is rated for Service Factors up to 1.5. For applications rated above 1.5, we highly recommend using our hytrel insert.

Step 2: Determine Minimum Torque Rating in Lbs.-In.

If the minimum Torque Rating is not known, it can be calculated using the HP and RPM: Minimum torque = (HP x 63000)/RPM.

Step 3: Multiply Full Load Torque by the Selected Service Factor.

Step 4: Determine Shaft Size.

A shaft diameter MUST NOT EXCEED a coupling's maximum bore. For example, RC3 flexible drive coupling has a $1^{5}/_{8}$" maximum bore (shaft diameter). Therefore, $1^{5}/_{8}$" is the largest shaft that can be installed in the coupling.

Step 5: Go to the Coupling Data Table.

Select the coupling size that meets or exceeds your minimum Torque and Service Factor calculation. Then go to the coupling Availability Chart to match Bore & Key. (Make sure the motor shaft does not exceed the coupling's maximum bore.)

Part Numbers

Vescor part numbering system is based on the coupling's size, bore & key or spline. The first three digits represent the coupling size. The next four digits refer to the bore or number of teeth/pitch (in inches or millimeters). The last grouping indicates keyways, clamps, set screws or spline options.

No Bore Example

RC2 - N B

- RC2: Coupling Size
- N: Bore No

Bore & Keyway Example

RC3 - 1375 - 375

- RC3: Coupling Size
- 375: 3/8" Keyway
- 1375: 1.375 Bore

Spline Example

RC5 - 1412 - A - S

- RC5: Coupling Size
- 1412: Number of Teeth
- A: A = Aluminum, S = Steel
- S: C = Clamp Type, S = Set Screw
- Pitch

FLEXIBLE DRIVE COUPLINGS

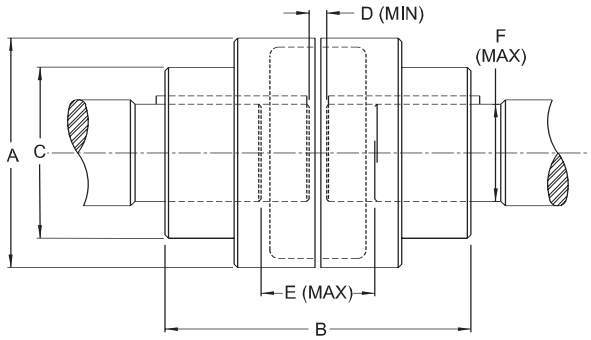
Coupling Data Table

Size	Maximum Bore Inches F	Dimensions Inches A	B	C	Distance Between Shafts Inches D (min)	E (max)	HP Torque lb.-in.	Rated HP at 100 RPM	1200 RPM	1800 RPM	Inertia lb.-ft.^{2}	Inserts
RC1	1.125	2.62	2.56	2.12	.06	0.75	473	0.75	9	13.5	0.005	P380
RC1	1.125	2.62	2.56	2.12	.06	0.75	630	1	12	18	0.005	Hytrel
RC2	1.375	2.91	3.17	2.31	.06	0.88	630	1	12	18	0.009	P380
RC2	1.375	2.91	3.17	2.31	.06	0.88	1103	1.75	21	31.5	0.009	Hytrel
RC3	1.625	3.44	3.60	2.97	.06	0.88	1261	2	24	36	0.022	P380
RC3	1.625	3.44	3.60	2.97	.06	0.88	2206	3.5	42	63	0.022	Hytrel
RC4	1.875	4.00	4.24	3.12	.06	1.12	1576	2.5	30	45	0.039	P380
RC4	1.875	4.00	4.24	3.12	.06	1.12	3309	5.25	63	94.5	0.039	Hytrel
RC5	2.375	4.81	4.68	4.06	.06	1.25	3466	5.5	66	99	0.100	P380
RC5	2.375	4.81	4.68	4.06	.06	1.25	6933	11	132	198	0.100	Hytrel
RC6	2.625	5.97	6.04	4.56	.06	1.38	7563	12	144	216	0.260	P380
RC6	2.625	5.97	6.04	4.56	.06	1.38	15756	25	300	450	0.260	Hytrel
RC7	2.875	6.91	7.01	5.25	.06	1.88	12605	20	240	360	0.480	P380
RC7	2.875	6.91	7.01	5.25	.06	1.88	28361	45	540	810	0.480	Hytrel
RC8	3.875	8.62	7.92	7.12	.06	2.00	31513	50	600	900	1.560	P380
RC8	3.875	8.62	7.92	7.12	.06	2.00	47269	75	900	1350	1.560	Hytrel

Spline Coupling Data*

Spline Specifications Number of Teeth	Pitch	SAE	Coupling Sizes
9	16/32	A, AA	RC1-RC5
13	8/16	D, E	RC4-RC8
13	16/32	B	RC1-RC6
14	12/24	C	RC2-RC8
15	8/16	F	RC4-RC8
15	16/32	BB	RC1-RC6
17	12/24	CC	RC3-RC8
21	16/32	-	RC3-RC8
23	16/32	-	RC3-RC8
27	16/32	-	RC4-RC8

•All splines are SAE 30° PA, flat root, side fit.



Nominal Bore Diameter From	To (Including)	Tolerance
.375	1.000	$^{+}.0008/^{+}.0003$
1.00	2.000	$^{+}.0013/^{+}.0005$
2.00	3.000	$^{+}.0018/^{+}.0008$
3.00	3.875	$^{+}.0020/^{+}.0010$

Insert Part Numbers

Size	Type P380	Hytrel
RC1	RG1-P9	RG1-H5
RC2	RG2-P9	RG2-H5
RC3	RG3-P9	RG3-H5
RC4	RG4-P9	RG4-H5
RC5	RG5-P9	RG5-H5
RC6	RG6-P9	RG6-H5
RC7	RG7-P9	RG7-H5
RC8	RG8-P9	RG8-H5

Insert Data

Type	Temperature Range	Misalignment Angular	Parallel Inches	Shore Hardness	Characteristics
P380	-30°F to 175°F	1°	.015	38D	Good for moderate cyclic loading, offers good oil and chemical resistance, misalignment and dampening capacity.
Hytrel	-60°F to 250°F	0.5°	.015	55D	Recommended for severe duty applications, excellent oil and chemical resistance. torsionally stiffer than P380.

Standard Bore and Key

Bore	KEY	Coupling Part Numbers							
		RC1	RC2	RC3	RC4	RC5	RC6	RC7	RC8
3/8	3/32	RC1-0375-094	RC2-0375-094						
7/16	3/32	RC1-0437-094	RC2-0437-094						
7/16	1/8	RC1-0437-125	RC2-0437-125						
1/2	1/8	RC1-0500-125	RC2-0500-125	RC3-0500-125					
9/16	1/8	RC1-0562-125	RC2-0562-125	RC3-0562-125					
5/8	5/32	RC1-0625-156	RC2-0625-156	RC3-0625-156					
5/8	3/16	RC1-0625-187	RC2-0625-187	RC3-0625-187	RC4-0625-187				
11/16	3/16	RC1-0687-187	RC2-0687-187	RC3-0687-187	RC4-0687-187				
3/4	1/8	RC1-0750-125	RC2-0750-125	RC3-0750-125	RC4-0750-125				
3/4	3/16	RC1-0750-187	RC2-0750-187	RC3-0750-187	RC4-0750-187	RC5-0750-187	RC6-0750-187		
7/8	3/16	RC1-0875-187	RC2-0875-187	RC3-0875-187	RC4-0875-187	RC5-0875-187	RC6-0875-187		
7/8	1/4	RC1-0875-250	RC2-0875-250	RC3-0875-250	RC4-0875-250	RC5-0875-250	RC6-0875-250		
15/16	1/4	RC1-0937-250	RC2-0937-250	RC3-0937-250	RC4-0937-250	RC5-0937-250	RC6-0937-250		
1	3/16	RC1-1000-187	RC2-1000-187	RC3-1000-187	RC4-1000-187	RC5-1000-187	RC6-1000-187		
1	1/4	RC1-1000-250	RC2-1000-250	RC3-1000-250	RC4-1000-250	RC5-1000-250	RC6-1000-250		
1 1/8	1/4	RC1-1125-250	RC2-1125-250	RC3-1125-250	RC4-1125-250	RC5-1125-250	RC6-1125-250	RC7-1125-250	
1 3/16	1/4		RC2-1187-250	RC3-1187-250	RC4-1187-250	RC5-1187-250	RC6-1187-250	RC7-1187-250	
1 1/4	1/4		RC2-1250-250	RC3-1250-250	RC4-1250-250	RC5-1250-250	RC6-1250-250	RC7-1250-250	RC8-1250-250
1 1/4	5/16		RC2-1250-312	RC3-1250-312	RC4-1250-312	RC5-1250-312	RC6-1250-312	RC7-1250-312	RC8-1250-312
1 3/8	5/16		RC2-1375-312	RC3-1375-312	RC4-1375-312	RC5-1375-312	RC6-1375-312	RC7-1375-312	RC8-1375-312
1 3/8	3/8		RC2-1375-375	RC3-1375-375	RC4-1375-375	RC5-1375-375	RC6-1375-375	RC7-1375-375	RC8-1375-375
1 7/16	3/8			RC3-1437-375	RC4-1437-375	RC5-1437-375	RC6-1437-375	RC7-1437-375	RC8-1437-375
1 1/2	5/16			RC3-1500-312	RC4-1500-312	RC5-1500-312	RC6-1500-312	RC7-1500-312	RC8-1500-312
1 1/2	3/8			RC3-1500-375	RC4-1500-375	RC5-1500-375	RC6-1500-375	RC7-1500-375	RC8-1500-375
1 5/8	3/8			RC3-1625-375	RC4-1625-375	RC5-1625-375	RC6-1625-375	RC7-1625-375	RC8-1625-375
1 3/4	3/8				RC4-1750-375	RC5-1750-375	RC6-1750-375	RC7-1750-375	RC8-1750-375
1 3/4	7/16				RC4-1750-437	RC5-1750-437	RC6-1750-437	RC7-1750-437	RC8-1750-437
1 7/8	1/2				RC4-1875-500	RC5-1875-500	RC6-1875-500	RC7-1875-500	RC8-1875-500
1 15/16	1/2					RC5-1937-500	RC6-1937-500	RC7-1937-500	RC8-1937-500
2	1/2					RC5-2000-500	RC6-2000-500	RC7-2000-500	RC8-2000-500
2 1/8	1/2					RC5-2125-500	RC6-2125-500	RC7-2125-500	RC8-2125-500
2 1/4	1/2					RC5-2250-500	RC6-2250-500	RC7-2250-500	RC8-2250-500
2 3/8	5/8					RC5-2375-625	RC6-2375-625	RC7-2375-625	RC8-2375-625
2 1/2	5/8						RC6-2500-625	RC7-2500-625	RC8-2500-625
2 5/8	5/8						RC6-2625-625	RC7-2625-625	RC8-2625-625
2 3/4	5/8							RC7-2750-625	RC8-2750-625
2 7/8	3/4							RC7-2875-750	RC8-2875-750
3	3/4								RC8-3000-750
3 1/4	3/4								RC8-3250-750
3 3/8	7/8								RC8-3375-875
3 1/2	7/8								RC8-3500-875
3 5/8	7/8								RC8-3625-875
3 3/4	7/8								RC8-3750-875
3 7/8	1								RC8-3875-100

FLEXIBLE DRIVE COUPLINGS

Why You Should Specify Vescor Flexible Couplings.

Vescor uses stronger materials. Because flexible couplings are subjected to constant torque and stress, they eventually wear out. Obviously, the longer the coupling lasts, the more value you get for your money.

The key to flexible coupling longevity is the elastomeric element that is sandwiched between the coupling halves. Most flexible coupling manufacturers use compression-molded, rubber-like materials for their standard inserts. Reuland, however, uses a high-tech injection molded material called P380 for our standard inserts. Torque tests and shock loads prove P380 is stronger and more durable than most of our competitors' standard elastomeric elements.

Vescor flexible couplings cost less. P380 is priced like a standard insert while providing the performance and specifications of a premium selection. This allows us to offer you a superior product that saves you money when you purchase it and that continues to save you money with lowered maintenance and replacement costs.

Vescor's flexible couplings are made from lightweight aluminum. Our flexible couplings are lighter than steel and cast iron couplings, which helps prolong bearing and seal life on pumps, gear boxes and motors. Our lightweight aluminum coupling also cost less to ship to your location.

Vescor flexible couplings are precision machined. By maintaining tight tolerances, we help eliminate vibration and noise. Alignment is easily made with a straight edge and a feeler gage.

Vescor flexible couplings offer double set screws standard. Most manufacturers charge you extra for a double set screw option. Since our couplings are designed to be the finest on the market, we make double set screws standard on all coupling sizes. The extra set screw offers greater hoop stress generation, creating a more secure fit from coupling to shaft.

Rigorous Quality Control

We design and manufacture all flexible couplings ourselves. And we subject each one to exacting quality control inspections. This total control allows us to offer you higher quality at a lower price.

Specials, Metrics and Splines

Vescor stocks one of the industry's largest selections of Vescor flexible couplings. In addition, splines, metric bores and keys and other special options may be available from stock. If not, we can modify any flexible coupling to your exact specifications. please consult the factory for your specials needs.

The One Source for all Your Flexible Couplings and Pump/Motor Adapter Needs

When you connect a pump to a motor, you want a perfect alignment for optimal performance. And that's what you get when you specify Vescor flexible couplings and Vescor pump motor adapters. These two components work together to achieve near perfect concentricity. Together they reduce vibration, heat, noise and wear and tear. In short, they're your best guarantee for increased performance and life expectancy.

Fast Delivery

Vescor flexible couplings are stocked in Vescor's South Elgin facility for fast response and reduced transportation costs. Most orders are shipped within 24 hours of receiving your order.

The Vescor Guarantee

All Vescor products are covered by our quality and service guarantee.

How to Select a Coupling

Just because applications have the same horsepower doesn't mean they require the same size flexible couplings. If you follow these simple steps, you can easily find the flexible coupling in the following Selection Chart that's perfect for your application.

Step 1: Determine the Service Factor.

Motors with the same horsepower are assigned different Service Factors to reflect the different loads and stresses. For example, a 40HP motor running a standard hydraulic application with infrequent stops carries a Service Factor of 1.00 while another 40HP application on an injection molding machine has a Service Factor of 3.00. This means the second motor requires a larger flexible coupling than the first. Ignoring the Service Factor can cause you to buy a coupling too small for your application, leading to premature wear and maintenance.

For applications with intermittent starts and stops and no reversing, a 1.50 to 1.75 Service Factor would be appropriate. Applications with frequent starts and stops or reversing duty normally carry a 2.00 Service Factor. Typically, motors designed for high torque or reversing applications have a 3.00 Service Factor. Service Factors for other typical applications include:

Application	Service Factor
Hydraulics applications with infrequent stops	1.00-1.50
Hydraulic units with cycling loads	1.50-2.50
Conveyors	1.50-2.50
Internal combustion engines	1.75-2.50
Machine tool, textile, cranes and woodworking machinery	2.0
Saw mill machines	3.0
Injection molding machines	3.0

Note: The standard P380 insert is rated for Service Factors up to 1.5. For applications rated above 1.5, we highly recommend using our hytrel insert.

Step 2: Determine Minimum Torque Rating in Lbs.-In.

If the minimum Torque Rating is not known, it can be calculated using the HP and RPM: Minimum torque = (HP x 63000)/RPM.

Step 3: Multiply Full Load Torque by the Selected Service Factor.

Step 4: Determine Shaft Size.

A shaft diameter MUST NOT EXCEED a coupling's maximum bore. For example, RC3 flexible drive coupling has a $1^5/_8$" maximum bore (shaft diameter). Therefore, $1^5/_8$" is the largest shaft that can be installed in the coupling.

Step 5: Go to the Coupling Data Table.

Select the coupling size that meets or exceeds your minimum Torque and Service Factor calculation. Then go to the coupling Availability Chart to match Bore & Key. (Make sure the motor shaft does not exceed the coupling's maximum bore.)

Part Numbers

Vescor part numbering system is based on the coupling's size, bore & key or spline. The first three digits represent the coupling size. The next four digits refer to the bore or number of teeth/pitch (in inches or millimeters). The last grouping indicates keyways, clamps, set screws or spline options.

No Bore Example

RC2 - N B

Coupling Size — Bore No

Bore & Keyway Example

RC3 - 1375 - 375

Coupling Size — 3/8" Keyway; 1.375 Bore

Spline Example

RC5 - 1412 - A - S

Coupling Size — Number of Teeth — Pitch — A = Aluminum, S = Steel — C = Clamp Type, S = Set Screw

FLEXIBLE DRIVE COUPLINGS

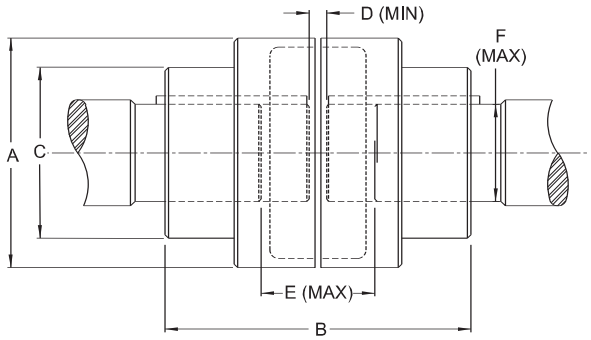
Coupling Data Table

Size	Maximum Bore Inches F	Dimensions Inches A	B	C	Distance Between Shafts Inches D (min)	E (max)	HP Torque lb.-in.	Rated HP at 100 RPM	1200 RPM	1800 RPM	Inertia $lb.-ft.^2$	Inserts
RC1	1.125	2.62	2.56	2.12	.06	0.75	473	0.75	9	13.5	0.005	P380
RC1	1.125	2.62	2.56	2.12	.06	0.75	630	1	12	18	0.005	Hytrel
RC2	1.375	2.91	3.17	2.31	.06	0.88	630	1	12	18	0.009	P380
RC2	1.375	2.91	3.17	2.31	.06	0.88	1103	1.75	21	31.5	0.009	Hytrel
RC3	1.625	3.44	3.60	2.97	.06	0.88	1261	2	24	36	0.022	P380
RC3	1.625	3.44	3.60	2.97	.06	0.88	2206	3.5	42	63	0.022	Hytrel
RC4	1.875	4.00	4.24	3.12	.06	1.12	1576	2.5	30	45	0.039	P380
RC4	1.875	4.00	4.24	3.12	.06	1.12	3309	5.25	63	94.5	0.039	Hytrel
RC5	2.375	4.81	4.68	4.06	.06	1.25	3466	5.5	66	99	0.100	P380
RC5	2.375	4.81	4.68	4.06	.06	1.25	6933	11	132	198	0.100	Hytrel
RC6	2.625	5.97	6.04	4.56	.06	1.38	7563	12	144	216	0.260	P380
RC6	2.625	5.97	6.04	4.56	.06	1.38	15756	25	300	450	0.260	Hytrel
RC7	2.875	6.91	7.01	5.25	.06	1.88	12605	20	240	360	0.480	P380
RC7	2.875	6.91	7.01	5.25	.06	1.88	28361	45	540	810	0.480	Hytrel
RC8	3.875	8.62	7.92	7.12	.06	2.00	31513	50	600	900	1.560	P380
RC8	3.875	8.62	7.92	7.12	.06	2.00	47269	75	900	1350	1.560	Hytrel

Spline Coupling Data*

Spline Specifications Number of Teeth	Pitch	SAE	Coupling Sizes
9	16/32	A, AA	RC1-RC5
13	8/16	D, E	RC4-RC8
13	16/32	B	RC1-RC6
14	12/24	C	RC2-RC8
15	8/16	F	RC4-RC8
15	16/32	BB	RC1-RC6
17	12/24	CC	RC3-RC8
21	16/32	-	RC3-RC8
23	16/32	-	RC3-RC8
27	16/32	-	RC4-RC8

•All splines are SAE 30° PA, flat root, side fit.



Nominal Bore Diameter From	To (Including)	Tolerance
.375	1.000	$^{+}.0008/^{+}.0003$
1.00	2.000	$^{+}.0013/^{+}.0005$
2.00	3.000	$^{+}.0018/^{+}.0008$
3.00	3.875	$^{+}.0020/^{+}.0010$

Insert Part Numbers

Size	Type P380	Hytrel
RC1	RG1-P9	RG1-H5
RC2	RG2-P9	RG2-H5
RC3	RG3-P9	RG3-H5
RC4	RG4-P9	RG4-H5
RC5	RG5-P9	RG5-H5
RC6	RG6-P9	RG6-H5
RC7	RG7-P9	RG7-H5
RC8	RG8-P9	RG8-H5

Insert Data

Type	Temperature Range	Misalignment Angular	Parallel Inches	Shore Hardness	Characteristics
P380	-30°F to 175°F	1°	.015	38D	Good for moderate cyclic loading, offers good oil and chemical resistance, misalignment and dampening capacity.
Hytrel	-60°F to 250°F	0.5°	.015	55D	Recommended for severe duty applications, excellent oil and chemical resistance. torsionally stiffer than P380.

	VJ Pamensky	No.:
		Date: 10-FEB-2014

Customer : Bosch-Rexroth

TECHNICAL PROPOSAL

Three-phase induction motor - Squirrel cage rotor

Product line : TEFC - W22 NEMA Premium Efficiency

Catalog Number :
List Price : $

Notes:
PART # CT010404NPW22
BOSCH #

Performed by:	Checked:

	VJ Pamensky	No.:
		Date: 10-FEB-2014

DATA SHEET
Three-phase induction motor - Squirrel cage rotor

Customer	: Bosch-Rexroth
Product line	: TEFC - W22 NEMA Premium Efficiency

Frame	: 213/5T
Output	: 10 HP
Frequency	: 60 Hz
Poles	: 4
Full load speed	: 1760
Slip	: 2.22 %
Voltage	: 208-230/460 V
Rated current	: 27.4-24.8/12.4 A
Locked rotor current	: 159/79.4 A
Locked rotor current (Il/In)	: 6.4
No-load current	: 11.3/5.65 A
Full load torque	: 29.4 lb.ft
Locked rotor torque	: 200 %
Breakdown torque	: 300 %
Design	: B
Insulation class	: F
Temperature rise	: 80 K
Locked rotor time	: 17 s (hot)
Service factor	: 1.25
Duty cycle	: S1
Ambient temperature	: -20°C - +40°C
Altitude	: 1000
Degree of Protection	: IP55
Approximate weight	: 172 lb
Moment of inertia	: 1.5104 sq.ft.lb
Noise level	: 58 dB(A)

	D.E.	N.D.E.
Bearings	NU-308 ZZ	6207 ZZ
Regreasing interval	---	---
Grease amount	---	---

Load	Power factor	Efficiency (%)
100%	0.83	91.7
75%	0.77	91.7
50%	0.66	90.2

Notes:
PART # CT010404NPW22
BOSCH #

Performed by	Checked

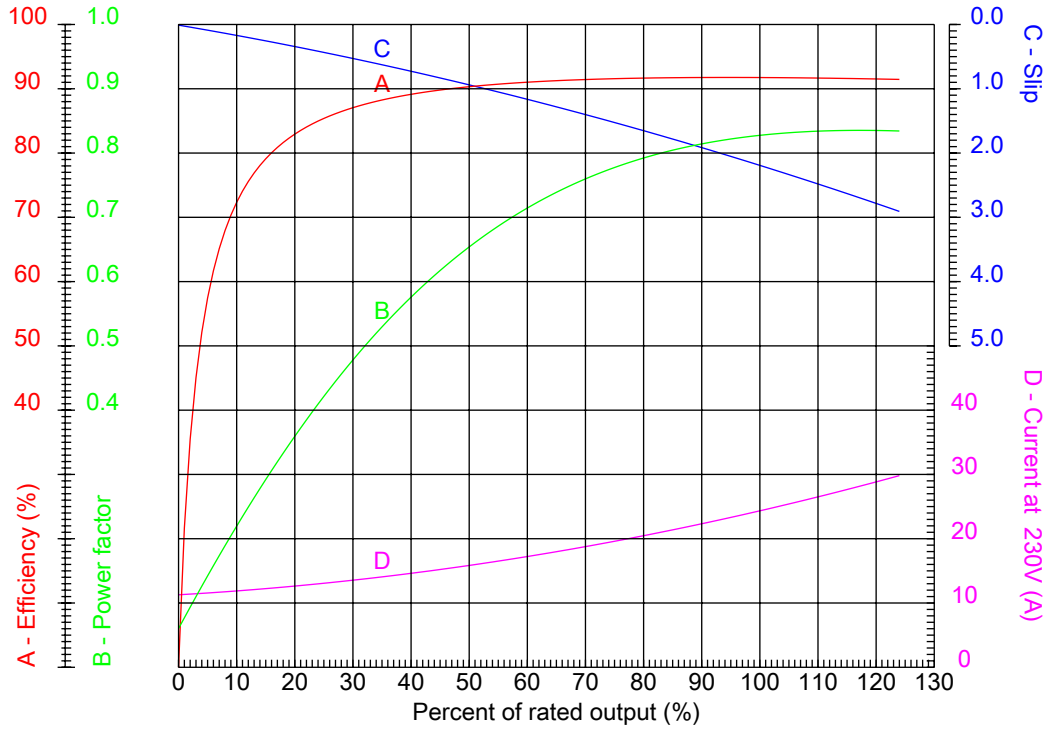
VJ Pamensky

No.:

Date: 10-FEB-2014

PERFORMANCE CURVES RELATED TO RATED OUTPUT

Three-phase induction motor - Squirrel cage rotor



Customer	: Bosch-Rexroth
Product line	: TEFC - W22 NEMA Premium Efficiency

Frame	: 213/5T	Locked rotor current (Il/In)	: 6.4
Output	: 10 HP	Duty cycle	: S1
Frequency	: 60 Hz	Service factor	: 1.25
Full load speed	: 1760	Design	: B
Voltage	: 208-230/460 V	Locked rotor torque	: 200 %
Rated current	: 27.4-24.8/12.4 A	Breakdown torque	: 300 %
Insulation class	: F		

Notes:
PART # CT010404NPW22
BOSCH #

Performed by	Checked

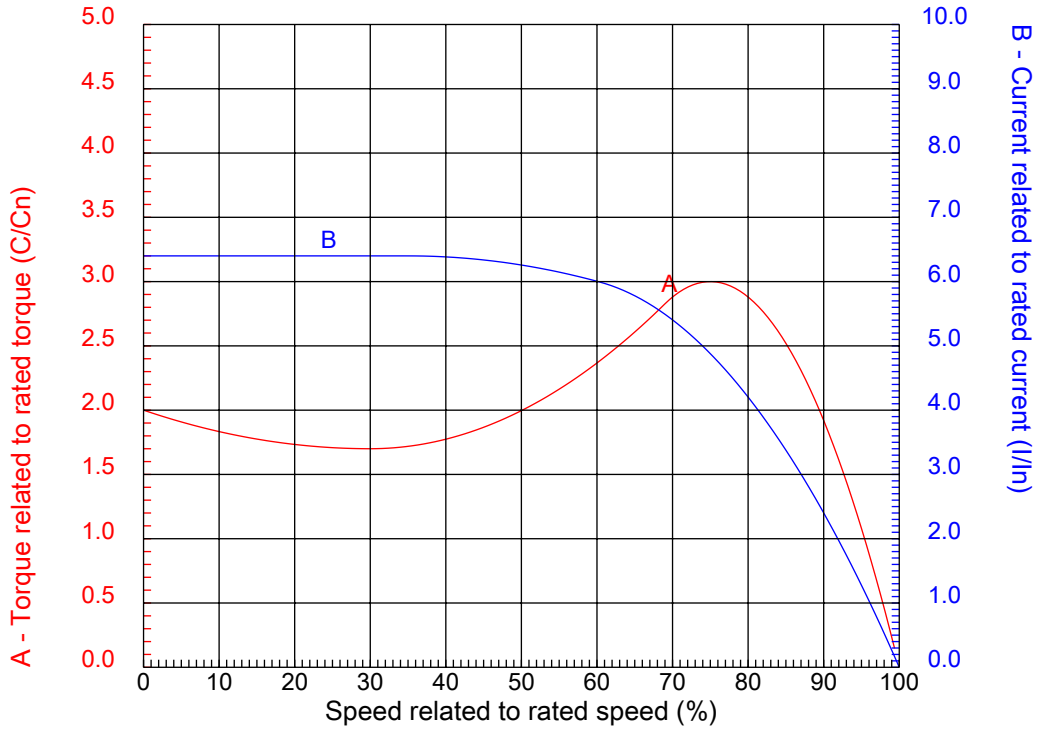
VJ Pamensky

No.:

Date: 10-FEB-2014

CHARACTERISTIC CURVES RELATED TO SPEED

Three-phase induction motor - Squirrel cage rotor

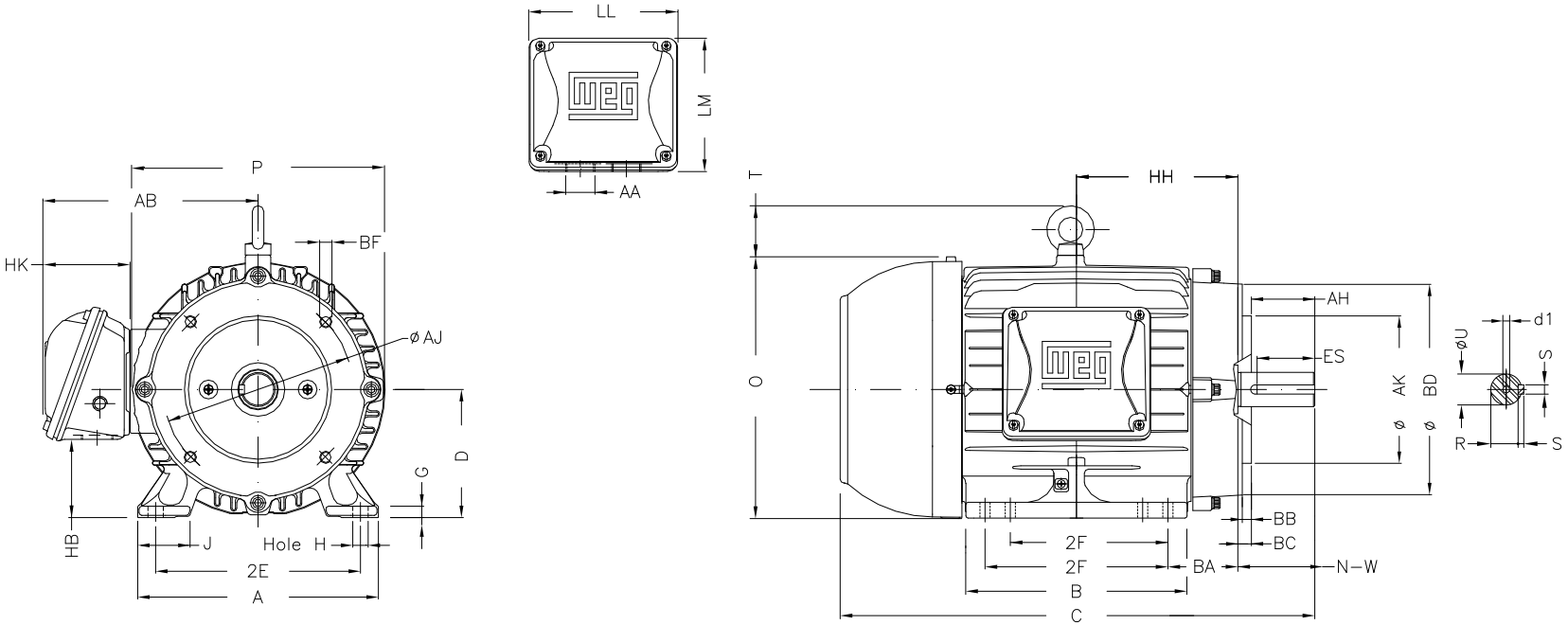


Customer	: Bosch-Rexroth
Product line	: TEFC - W22 NEMA Premium Efficiency

Frame	: 213/5T	Locked rotor current (Il/In)	: 6.4
Output	: 10 HP	Duty cycle	: S1
Frequency	: 60 Hz	Service factor	: 1.25
Full load speed	: 1760	Design	: B
Voltage	: 208-230/460 V	Locked rotor torque	: 200 %
Rated current	: 27.4-24.8/12.4 A	Breakdown torque	: 300 %
Insulation class	: F		

Notes:
PART # CT010404NPW22
BOSCH #

Performed by	Checked



2E 8.500	J 1.772	A 9.764	P 10.669	AB 8.583
2F 5.500/7.000	K 2.165	B 8.858	BA 3.500	FBA 5.921
U 1.375	N-W 3.375	ES 2.480	S 0.313	R 1.203
depth 0.313	D 5.250	G 0.669	HB 2.985	O 10.841
T 1.772	HF 5.250	HH 7.000	HK 3.150	H 0.406
C 19.517	FC 22.546	LL 5.512	LM 5.236	AA NPT 1"
d1 A 4	Flange FC-184	AJ 7.250	AK 8.500	BD 8.875
BF UNC 1/2"x13	BB 0.250	BC 0.250	AH 3.125	

Notes: PART # CT010404NPW22
BOSCH #

Performed by:

Checked:

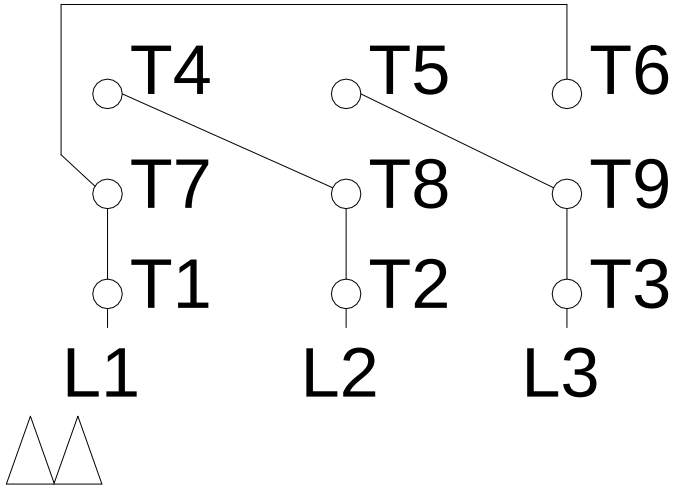
Customer: Bosch-Rexroth

TEFC - W22 NEMA Premium Efficiency

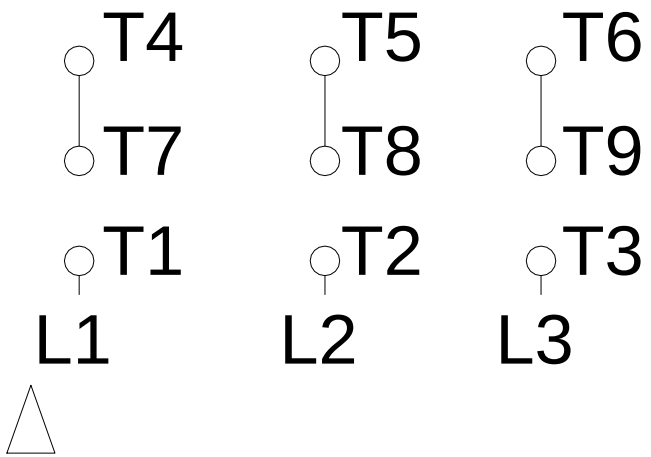
Three-phase induction motor
Frame 213/5T - IP55

10-FEB-2014

LOW VOLTAGE



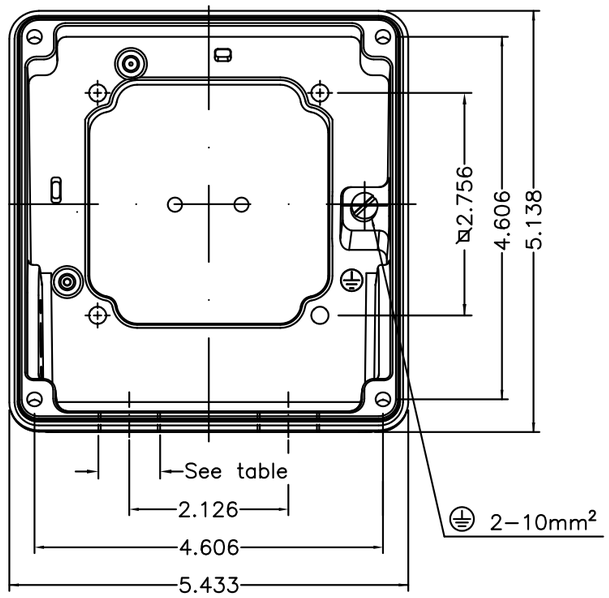
HIGH VOLTAGE

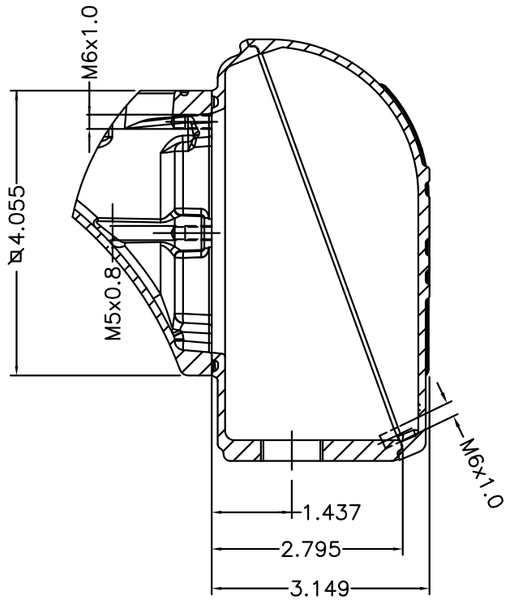


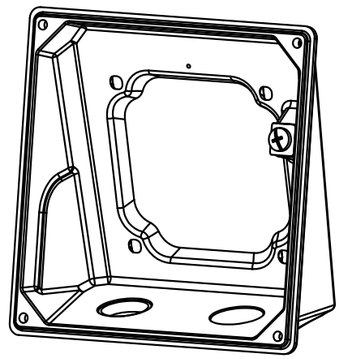
Notes: PART # CT010404NPW22 BOSCH #		
Performed by:		
Checked:		
Customer: Bosch-Rexroth		
TEFC - W22 NEMA Premium Efficiency		
Three-phase induction motor Frame 213/5T - IP55	10-FEB-2014	

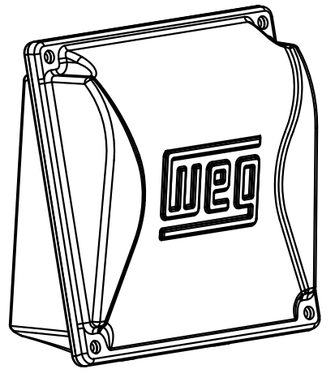
Dimensions in inches

THIS IS AN UPDATED REVISION, THE PREVIOUS ONE MUST BE DISREGARDED.









POWER CABLES ENTRY THREAD					
RWG (BRAZIL)	NPT (USA)	Metric (EUROPE) (LATIN AMER.)	Metric (AUSTRALIA)	Metric (AFRICA)	PG (OPTIONAL)
RWG 1”	NPT 1”	2xM32x1.5	M25x1.5	2xM25x1.5	2xPG21

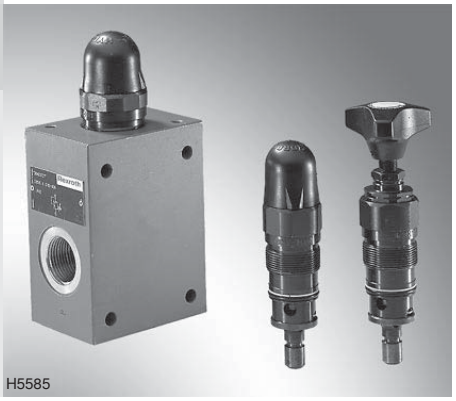
----------	--	ORIGINAL ISSUE	MARIA	ARTHUR	CASTELLA	17.05.2013	00
ECM *ECM*	LOC *LOC*	SUMMARY OF MODIFICATIONS *RESUMO MODIFICAÇÃO*	EXECUTED *EXECUTADO*	CHECKED *VERIFICADO*	RELEASED *LIBERADO*	DATE *DATA*	VER *VER*

EXECUTED/*EXEC.*	MARIA	TERMINAL BOX FRAME 215T	CX-200215T	
CHECKED/*VERIF.*	ARTHUR		ENG | 00	
RELEASED/*LIBER*	CASTELLA			
REL DT / *DATA LB*	17.05.2013	WMO JARAGUA DO SUL ENGENHARIA DE PRODUTO	SHEET / *FOLHA* 1 / 1	

Pressure relief valve, direct operated

RE 25402/10.10 1/16
Replaces: 02.09

Type DBD



Sizes 6 to 30
Component series 1X
Maximum operating pressure 630 bar *[9150 psi]*
Maximum flow 330 l/min *[87 US gpm]*

Table of contents

Features

- As screw-in cartridge valve
- For threaded connection
- For subplate mounting
- Adjustment types for pressure adjustment, optional:
  - Sleeve with hexagon and protective cap
  - Rotary knob / hand wheel
  - Lockable rotary knob

Information on available spare parts:
www.boschrexroth.com/spc

Ordering code

								DBD				**1X/**
Pressure relief valve, direct operated												
Type of adjustment for pressure adjustment	Size **6**	**8**	**10**	**15**	**20**	**25**	**30**					
Sleeve with hexagon and protective cap	●	●	●	●	●	●	●	**= S**				
Rotary knob [1]	●	●	●	●	●	–	–	**= H**				
Hand wheel [2]	–	–	–	–	–	●	●	**= H**				
Lockable rotary knob [1,3,5]	●	●	●	●	●	–	–	**= A**				
Size	**= 6**	**= 8**	**= 10**	**= 15**	**= 20**	**= 25**	**= 30**		E.g.			
(Port)	G1/4	G3/8	G1/2	G3/4	G1	G1 1/4	G1 1/2		**= 10**			
Type of connection												
As screw-in cartridge valve	●	–	●	–	●	–	●			**= K**		
For threaded connection [4]	●	●	●	●	●	●	●			**= G**		
For subplate mounting	●	–	●	–	●	–	●			**= P**		
Component series 10 to 1Z (10 to 1Z: unchanged installation and connection dimensions)											**= 1X**	
Pressure rating [6]												
Pressure setting up to 25 bar *[362 psi]*	●	●	●	●	●	●	●					**= 25**
Pressure setting up to 50 bar *[725 psi]*	●	●	●	●	●	●	●					**= 50**
Pressure setting up to 100 bar *[1450 psi]*	●	●	●	●	●	●	●					**= 100**
Pressure setting up to 200 bar *[2900 psi]*	●	●	●	●	●	●	●					**= 200**
Pressure setting up to 315 bar *[4568 psi]*	●	●	●	●	●	●	●					**= 315**
Pressure setting up to 400 bar *[5800 psi]*	●	●	●	●	●	–	–					**= 400**
Pressure setting up to 630 bar *[9150 psi]* [7]	–	–	●	–	–	–	–					**= 630**

● = Available

[1] With sizes 15 and 20, only available for pressure ratings 25, 50 or 100 bar.

[2] Only available for pressure ratings 25, 50 or 100 bar.

[3] Key with Material no. **R900008158** is included in the scope of supply.

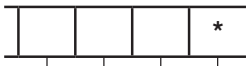
[4] Not available for type-tested safety valves of sizes 8, 15 and 25.

[5] Not available for type-tested safety valves.

[6] For the selection of the pressure rating, please observe the characteristic curves and notes on page 6!

[7] For versions “G“ and “P“, only available as “SO292“, see pages 7 and 10!

Standard types and components are shown in the EPS (standard price list).



Further details in clear text

PED

No code = Without type examination

E = Type-tested safety valve in accordance with PED 97/23/EC

Pipe connection

No code = Pipe thread to ISO 228/1

12 = SAE thread

Seal material

No code = NBR seals

V = FKM seals

(other seals on request)

Attention!

Observe compatibility of seals with hydraulic fluid used!

Function, section, symbol

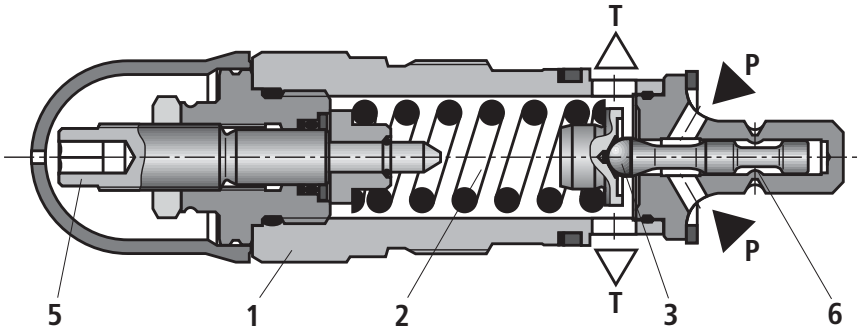
Pressure relief valves of type DBD are direct operated seat valves.

They serve to limit a system pressure.

These valves basically consist of sleeve (1), spring (2), poppet with damping piston (3) (pressure rating 25 to 400 bar) or ball (4) (pressure rating 630 bar) and adjustment element (5). The system pressure setting can be infinitely varied by means of adjustment element (5). Spring (2) presses poppet (3) or ball (4) onto its seat. Channel P is connected to the system. The pressure prevailing in the system acts on the poppet area (or ball).

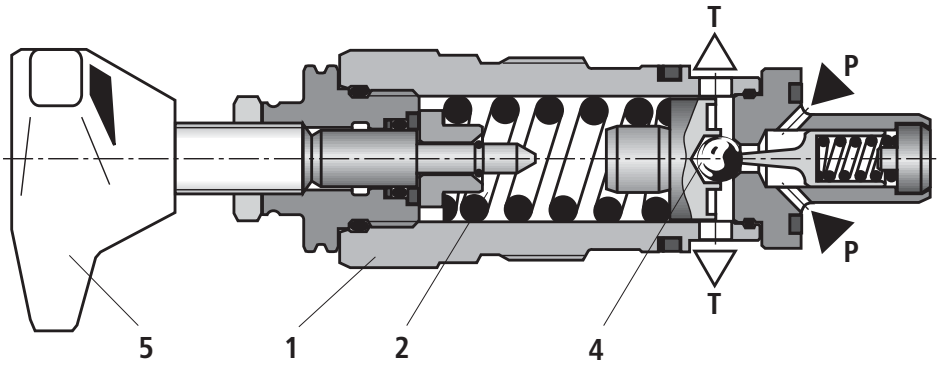
When the pressure in channel P rises above the value set on spring (2), poppet (3) or ball (4) opens against spring (2). Hydraulic fluid can now flow from channel P into channel T. The stroke of poppet (3) is limited by embossment (6).

To obtain good pressure settings over the entire pressure range, the entire pressure range was subdivided into 7 pressure ratings. A pressure rating corresponds to a certain spring, which can be used for setting a maximum operating pressure.



Type DBDS..K1X/...

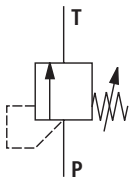
Version for pressure rating 25 to 400 bar (poppet seat valve)



Type DBDH 10 K1X/...

Version for pressure rating 630 bar (ball seat valve, NG10 only)

Symbol



Technical data (for applications outside these parameters, please consult us!)

General

Size	NG	6 and 8	10	15 and 20	25 and 30
Weight		See pages 7, 9 and 11			
Installation position		Optional			
Ambient temperature range	°C *[°F]*	–30 to +80 *[–22 to +176]* (NBR seals) –15 to +80 *[5 to 176]* (FKM seals)			
Minimum strength of housing materials		Housing materials must be selected so that sufficient safety is provided under all conceivable operating conditions (e.g. with regard to compressive strength, thread stripping strength and tightening torques).			

Hydraulic

Maximum operating pressure	– Inlet	bar *[psi]*	400 *[5800]*	630 *[9150]*	400 *[5800]*	315 *[4568]*
	– Outlet	bar *[psi]*	315 *[4568]*	315 *[4568]*	315 *[4568]*	315 *[4568]*
Maximum flow (standard valves)			See characteristic curves on page 6			
Hydraulic fluid			Mineral oil (HL, HLP) to DIN 51524 [1]; fast bio-degradable hydraulic fluids to VDMA 24568 (see also data sheet 90221); HETG (rape-seed oil) [1]; HEPG (polyglycols) [2]; HEES (synthetic esters) [2]; other hydraulic fluids on enquiry			
Hydraulic fluid temperature range		°C *[°F]*	–30 to +80 *[–22 to +176]* (NBR seals) –15 to +80 *[5 to 176]* (FKM seals)			
Viscosity range		mm^2/s *[SUS]*	10 to 800 *[60 to 3710]*			
Permissible max. degree of contamination of the hydraulic fluid - cleanliness class to ISO 4406 (c)			Class 20/18/15 [3]			

[1] Suitable for NBR and FKM seals

[2] Suitable only for FKM seals

[3] The cleanliness class stated for the components must be adhered too in hydraulic systems. Effective filtration prevents faults from occurring and at the same time increases the component service life.

For the selection of the filters see www.boschrexroth.com/filter.

For deviating technical data for type-tested safety valves, see page 13.

General notes

Hydraulic backpressures in port T add 1:1 to the response pressure of the valve set by means of the adjustment element.

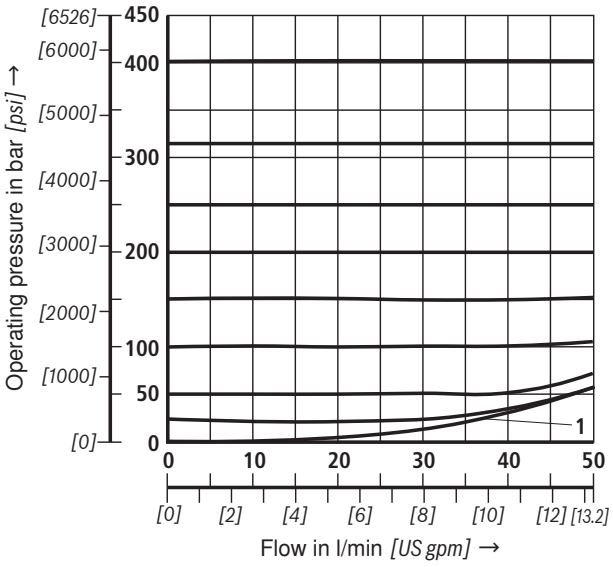
Example:

- Pressure adjustment of the valve by means of spring pretensioning (item 2 on page 4) p_{spring} **= 200 bar**
- Hydraulic backpressure in port T: $p_{hydraulic}$ **= 50 bar**

⇒ response pressure = $p_{spring} + p_{hydraulic}$ **= 250 bar**

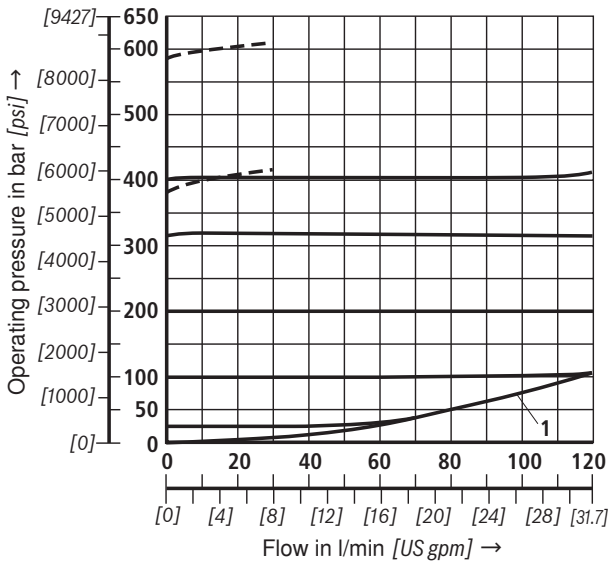
Characteristic curves (measured with HLP46, ϑ_{oil} = 40 °C ±5 °C *[104 °F ±9 °F]*)

NG6



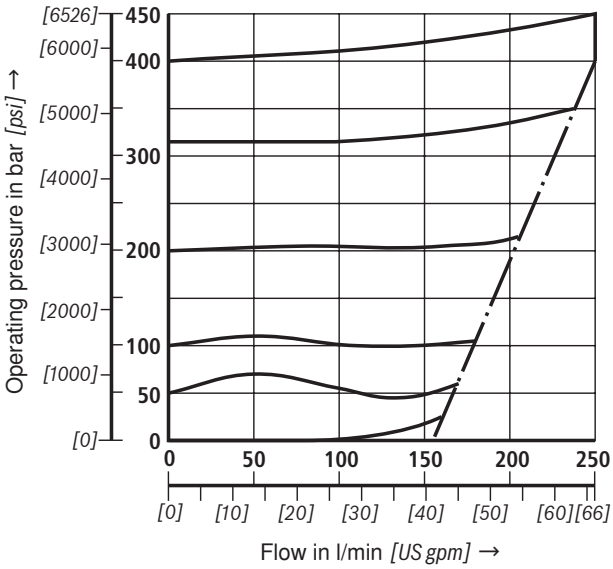
1 = lowest settable pressure

NG8 and 10

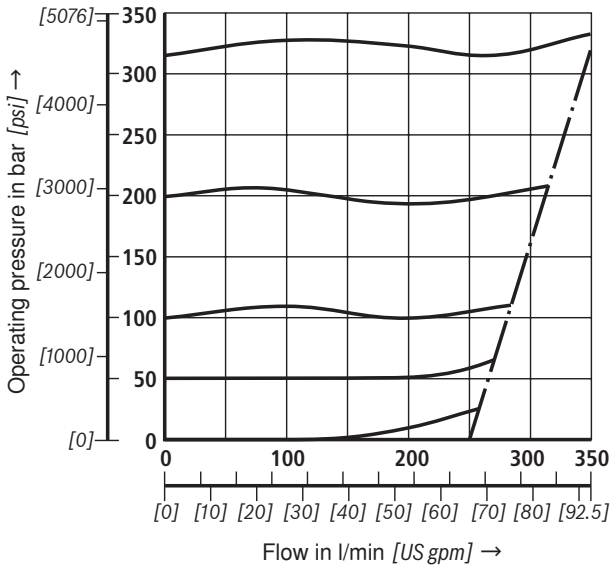


– – – – – = Pressure rating 630 bar *[9150 psi]* (NG10 only)

NG15 and 20



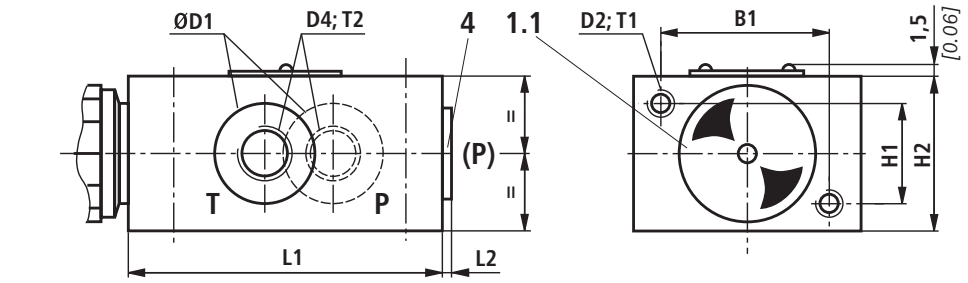
NG25 and 30

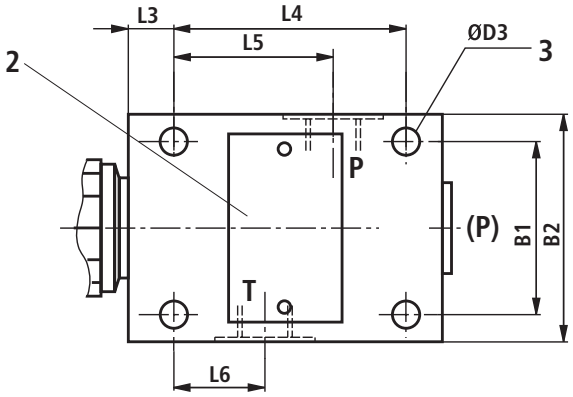


Attention!

- The characteristic curves are valid for output pressure = zero over the entire flow range and were measured without housing resistance!
- The characteristic curves are only valid under the specified ambient and temperature conditions. It must be noted that deviations in the boundary conditions have an influence on the characteristic curve!
- The characteristic curves refer to the given pressure ratings (e.g. 200 bar). The greater the difference between the set pressure value and the nominal pressure rating (e.g. < 200 bar), the greater is the pressure increase as the flow rises.

Unit dimensions: Threaded connection (dimensions in mm *[inch]*)





1.1 Adjustment element “S“ (example)
Set screw with hexagon and protective cap;
Hexagon socket (up to NG20)
Hexagon head (NG25 and 30)

2 Nameplate

3 4 valve mounting bores

4 Additional port (P), optional (e.g. for pressure measurement); not possible for NG10, pressure rating > 400 bar (= version “SO292“).
For dimensions, see D4, for tightening torques, see table below

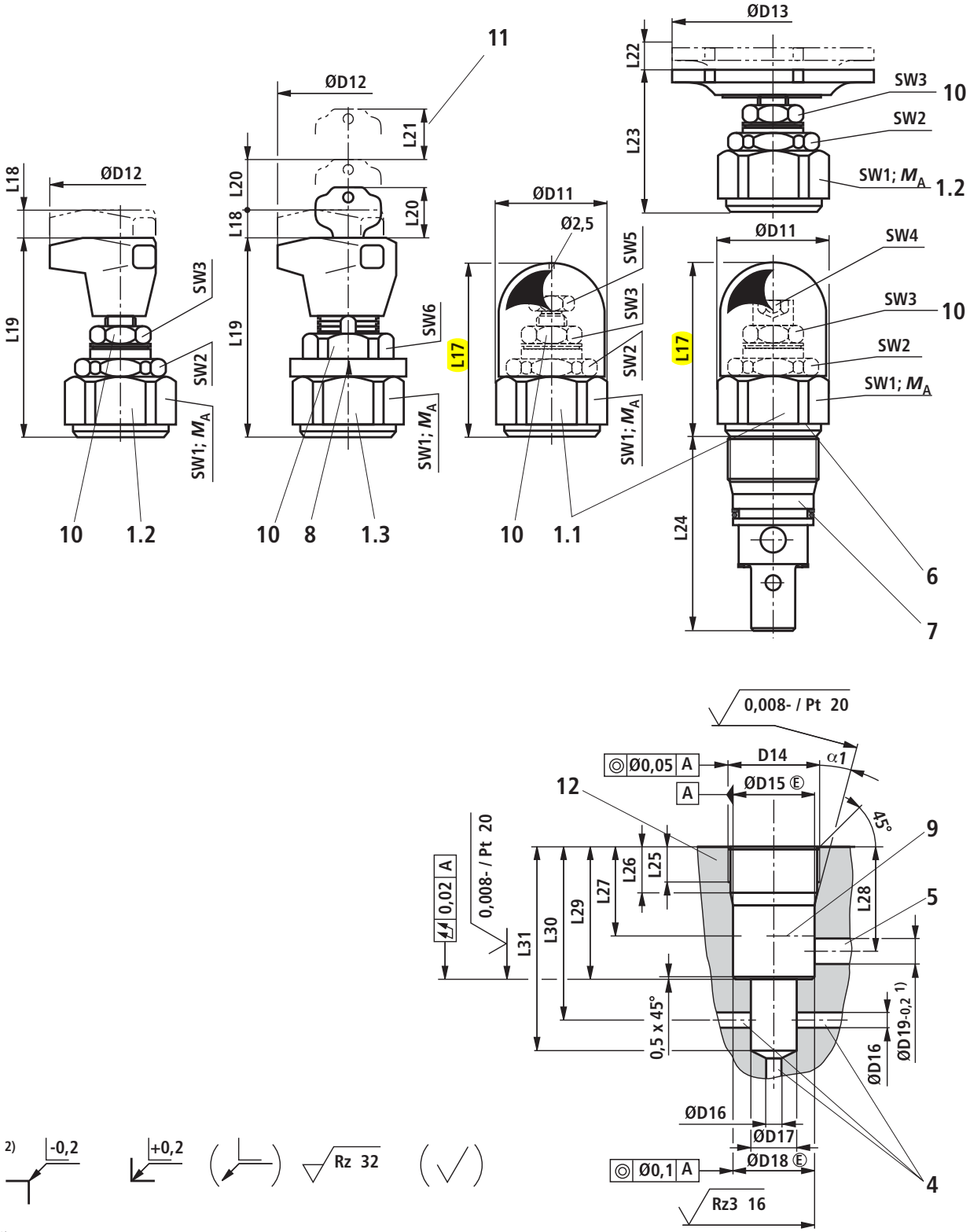
For versions and dimensions of the adjustment elements, see pages 8 and 9

NG	B1	B2	ØD1	D2	ØD3	D4	Tightening torques M_A in Nm *[ft-lbs]* for screws [1]	
							Plug screw (4)	Pipe fittings
6	45 *[1.77]*	60 *[2.36]*	25 *[0.98]*	M6	6,6 *[0.26]*	G1/4	30 *[22]*	60 *[44]*
8	60 *[2.36]*	80 *[3.15]*	28 *[1.10]*	M8	9 *[0.35]*	G3/8	40 *[29]*	90 *[66]*
10	60 *[2.36]*	80 *[3.15]*	34 *[1.34]*	M8	9 *[0.35]*	G1/2	60 *[44]*	130 *[95]*
15	70 *[2.76]*	100 *[3.94]*	42 *[1.65]*	M8	9 *[0.35]*	G3/4	80 *[59]*	200 *[147]*
20	70 *[2.76]*	100 *[3.94]*	47 *[1.85]*	M8	9 *[0.35]*	G1	135 *[99]*	380 *[280]*
25	100 *[3.94]*	130 *[5.12]*	56 *[2.21]*	M10	11 *[0.43]*	G1 1/4	480 *[354]*	500 *[368]*
30	100 *[3.94]*	130 *[5.12]*	65 *[2.56]*	M10	11 *[0.43]*	G1 1/2	560 *[413]*	600 *[442]*

NG	H1	H2	L1	L2	L3	L4	L5	L6	T1	T2	**Weight,** ca. in kg *[lbs]*
6	25 *[0.98]*	40 *[1.57]*	80 *[3.15]*	4 *[0.16]*	15 *[0.59]*	55 *[2.17]*	40 *[1.57]*	20 *[0.79]*	10 *[0.39]*	12 *[0.47]*	1.5 *[3.3]*
8	40 *[1.57]*	60 *[2.36]*	100 *[3.94]*	4 *[0.16]*	20 *[0.79]*	70 *[2.76]*	48 *[1.89]*	21 *[0.83]*	15 *[0.59]*	12 *[0.47]*	3.7 *[8.2]*
10	40 *[1.57]*	60 *[2.36]*	100 *[3.94]*	4 *[0.16]*	20 *[0.79]*	70 *[2.76]*	48 *[1.89]*	21 *[0.83]*	15 *[0.59]*	14 *[0.55]*	3.7 *[8.2]*
15	50 *[1.97]*	70 *[2.76]*	135 *[5.32]*	4 *[0.16]*	20 *[0.79]*	100 *[3.94]*	65 *[2.56]*	34 *[1.34]*	18 *[0.71]*	16 *[0.63]*	6.4 *[14.1]*
20	50 *[1.97]*	70 *[2.76]*	135 *[5.32]*	5.5 *[0.22]*	20 *[0.79]*	100 *[3.94]*	65 *[2.56]*	34 *[1.34]*	18 *[0.71]*	18 *[0.71]*	6.4 *[14.1]*
25	60 *[2.36]*	90 *[3.54]*	180 *[7.09]*	5.5 *[0.22]*	25 *[0.98]*	130 *[5.12]*	85 *[3.35]*	35 *[1.38]*	20 *[0.79]*	20 *[0.79]*	13.9 *[30.6]*
30	60 *[2.36]*	90 *[3.54]*	180 *[7.09]*	5.5 *[0.22]*	25 *[0.98]*	130 *[5.12]*	85 *[3.35]*	35 *[1.38]*	20 *[0.79]*	22 *[0.87]*	13.9 *[30.6]*

[1] The tightening torques are standard values, referred to the maximum operating pressure and under the assumption that a torque wrench is used (tolerance ≤ ±10%).

Unit dimensions: Cartridge valve (dimensions in mm *[inch]*)



1) Maximum dimensions

2) All seal ring insertion faces are rounded and free from burrs

Tolerance for all angles ±0.5°

For dimensional tables and explanations of items, see page 9.

Unit dimensions: Cartridge valve (dimensions in mm *[inch]*)

Cartridge valve

NG	ØD11	ØD12	ØD13	L17	L18	L19	L20	L21	L22	L23	L24
6	34 *[1.34]*	60 *[2.36]*	–	72 *[2.83]*	11 *[0.43]*	83 *[3.26]*	28 *[1.10]*	20 *[0.79]*	–	–	64.5 *[2.54]*
10	38 *[1.50]*	60 *[2.36]*	–	68 *[2.68]*	11 *[0.43]*	79 *[3.11]*	28 *[1.10]*	20 *[0.79]*	–	–	77 *[3.03]*
20	48 *[1.89]*	60 *[2.36]*	–	65 *[2.56]*	11 *[0.43]*	77 *[3.03]*	28 *[1.10]*	20 *[0.79]*	–	–	106 *[4.17]*
30	63 *[2.48]*	–	80 *[3.15]*	83 *[3.26]*	–	–	–	–	11 *[0.43]*	56 *[2.21]*	131 *[5.16]*

NG	SW1	SW2	SW3	SW4	SW5	SW6	Tightening torques M_A in Nm *[ft-lbs]* for cartridge valves [2] Pressure rating in bar *[psi]* up to 200 *[2900]*	up to 400 *[5800]*	up to 630 *[9150]*	Weight, ca. in kg *[lbs]*
6	32	30	19	6	–	30	50±5 *[37±3.7]*	80±5 *[59±4]*	–	0.4 *[0.88]*
10	36	30	19	6	–	30	100±5 *[74±3.5]*	150±10 *[110±3.5]*	200±10 *[148±7.5]*	0.5 *[1.10]*
20	46	36	19	6	–	30	150±10 *[111±7.5]*	300±15 *[221±11]*	–	1 *[2.21]*
30	60	46	19	–	13	–	350±20 *[258±19.5]*	500±30 *[369±22]*	–	2.2 *[4.85]*

[2] The tightening torques are recommended values assuming a friction coefficient of ca. 0.12 and the use of a torque wrench.

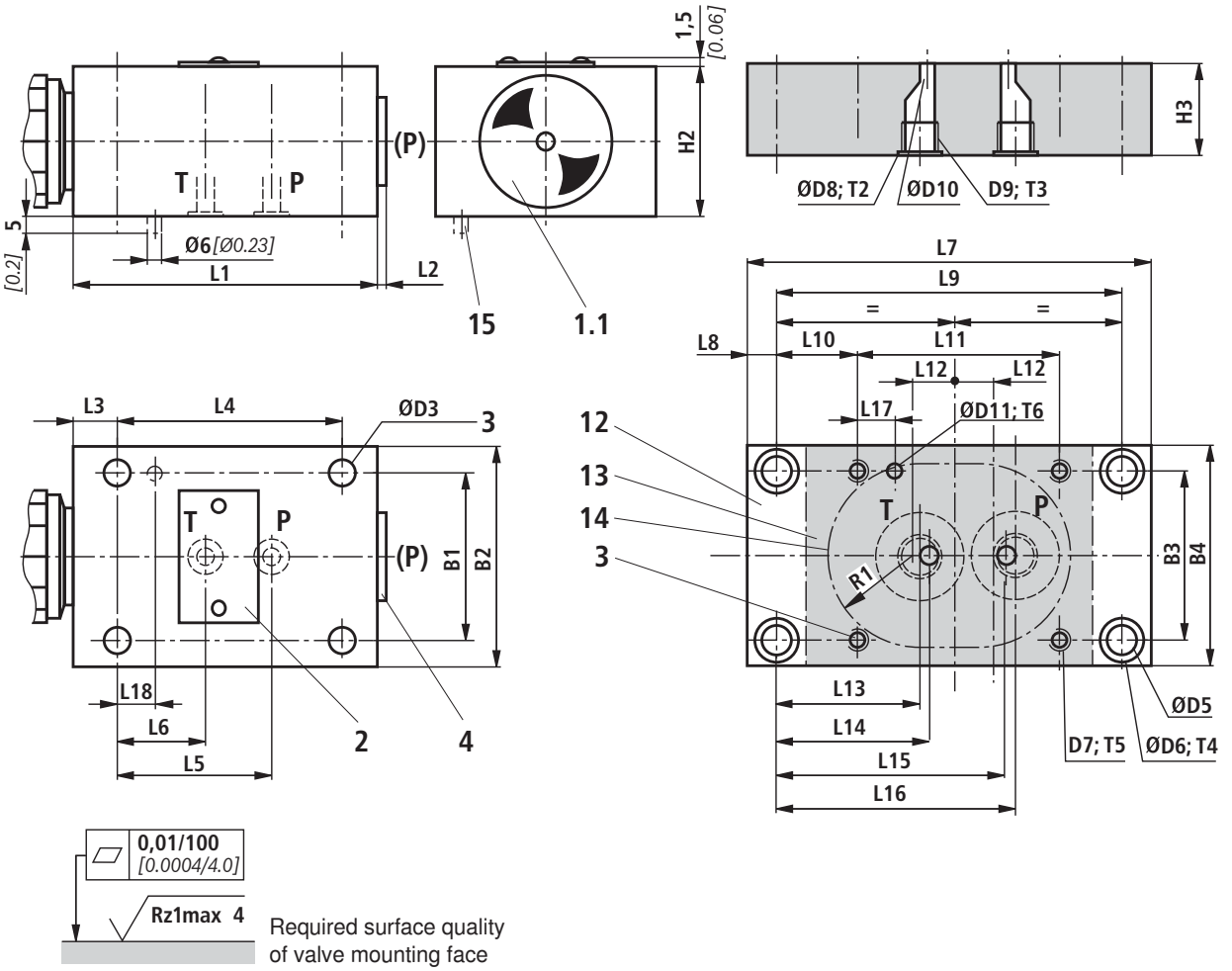
Mounting cavity

NG	D14	ØD15	ØD16	ØD17	ØD18	ØD19
6	M28 x 1.5	25H9 *[0.9843$^{+0.002}$]*	6 *[0.24]*	15 *[0.59]*	$24.9^{+0.152}_{-0.2}$ *[0.9803]* $^{[+0.006]}_{[-0.00786]}$	12 *[0.47]*
10	M35 x 1.5	32H9 *[1.2598$^{+0.0024}$]*	10 *[0.39]*	18.5 *[0.73]*	$31.9^{+0.162}_{-0.2}$ *[1.2559]* $^{[+0.0064]}_{[-0.0079]}$	15 *[0.59]*
20	M45 x 1.5	40H9 *[1.5748$^{+0.0024}$]*	20 *[0.79]*	24 *[0.95]*	$39.9^{+0.162}_{-0.2}$ *[1.5709]* $^{[+0.0063]}_{[-0.0079]}$	22 *[0.87]*
30	M60 x 2	55H9 *[2.1654$^{+0.0029}$]*	30 *[1.18]*	38.75 *[1.53]*	$54.9^{+0.174}_{-0.2}$ *[2.1614]* $^{[+0.0069]}_{[-0.0079]}$	34 *[1.34]*

NG	L25	L26	L27	L28	L29	L30	L31	α1
6	15 *[0.59]*	19 *[0.75]*	30 *[1.18]*	36 *[1.42]*	45 *[1.77]*	56.5±5.5 *[2.22±0.217]*	65 *[2.56]*	15°
10	18 *[0.71]*	23 *[0.91]*	35 *[1.38]*	41.5 *[1.63]*	52 *[2.05]*	67.5±7.5 *[2.66±0.295]*	80 *[3.15]*	15°
20	21 *[0.83]*	27 *[1.06]*	45 *[1.77]*	55 *[2.17]*	70 *[2.76]*	91.5±8.5 *[3.60±0.335]*	110 *[4.33]*	20°
30	23 *[0.91]*	29 *[1.14]*	45 *[1.77]*	63 *[2.48]*	84 *[3.31]*	113.5±11.5 *[4.47±0.453]*	140 *[5.51]*	20°

1.1 Adjustment element “S“ – set screw with hexagon and protective cap; hexagon socket (up to NG20), hexagon head (NG30)
1.2 Adjustment element “H“ – rotary knob (up to NG20), hand wheel (NG30)
1.3 Adjustment element “A“ – lockable rotary knob up to NG10 (NG20 to 100 bar *[1450 psi]*)
4 Port P, optional, on the circumference or front face
5 Port T, optional, on the circumference
6 Type designation
7 Pressure rating (impressed)
8 Marking (adjustment of the zero position after the valve was screwed in; then securing of the ring by shifting it horizontally until the plug screw locks into position on the 6 A/F plug screw)
9 Depth of fit
10 Locknut, tightening torque $M_T = 10^{+5}$ Nm *[7.4$^{+3.7}$ ft-lbs]*
11 Space required to remove key
12 Minimum strength of housing materials, see Technical data on page 5

Unit dimensions: Subplate mounting (dimensions in mm *[inch]*)



For versions and dimensions of the adjustment elements, see pages 8 and 9.

1.1 Adjustment element “S“ (example)
Set screw with hexagon and protective cap; hexagon socket (up to NG20), hexagon head (NG30)

2 Nameplate

3 4 valve mounting bores

4 Additional port (P), optional (e.g. for pressure measurement); not possible for NG10, pressure rating > 400 bar (= version “SO292“). For tightening torques, see table of dimensions on page 7)

12 Subplate (for type designation, see table on page 11)

13 Valve mounting face

14 Front panel cutout

15 Locating pin (only on type-tested safety valves)

For strength reasons, use exclusively the following valve mounting screws (separate order):

4 hexagon socket head cap screws ISO 4762 - flZn-240h-L [1)]
(friction coefficient μ_{total} = 0.09 to 0.14)

NG	Dimension	Strength class	M_T in Nm *[ft-lbs]* [2)]	Material number
6	M6 x 50	10.9	12,5 *[9.2]*	R913000151
10	M8 x 70	10.9	28 *[20.7]*	R913000149
20	M8 x 90	12.9	28 *[20.7]*	R913000150
30	M10 x 110	12.9	56 *[41.3]*	R913000148

4 hexagon socket head cap screws UNC on request

[1)] Alternatively, bolts appropriately specified in accordance with DIN 912 can be used.

[2)] For tightening, use a torque wrench having a tolerance of ≤10%.

Unit dimensions: Subplate mounting (dimensions in mm *[inch]*)

Pressure relief valve

NG	B1	B2	ØD3	H2	L1	L2	L3
6	45 *[1.77]*	60 *[2.36]*	6.6 *[0.26]*	40 *[1.57]*	80 *[3.15]*	4 *[0.16]*	15 *[0.59]*
10	60 *[2.36]*	80 *[3.15]*	9 *[0.35]*	60 *[2.36]*	100 *[3.94]*	4 *[0.16]*	20 *[0.79]*
20	70 *[2.76]*	100 *[3.94]*	9 *[0.35]*	70 *[2.76]*	135 *[5.32]*	5.5 *[0.22]*	20 *[0.79]*
30	100 *[3.94]*	130 *[5.12]*	11 *[0.43]*	90 *[3.54]*	180 *[7.09]*	5.5 *[0.22]*	25 *[0.98]*

NG	L4	L5	L6	L18	Port (P)	**Weight,** ca. in kg *[lbs]*
6	55 *[2.17]*	40 *[1.57]*	20 *[0.79]*	15 *[0.59]*	G1/4	1.5 *[3.3]*
10	70 *[2.76]*	45 *[1.77]*	21 *[0.83]*	15 *[0.59]*	G1/2	3.7 *[8.2]*
20	100 *[3.94]*	65 *[2.56]*	34 *[1.34]*	15 *[0.59]*	G3/4	6.4 *[14.1]*
30	130 *[5.12]*	85 *[3.35]*	35 *[1.37]*	15 *[0.59]*	G1 1/4	13.9 *[30.6]*

Subplates [3)]

NG	Type	B3	B4	ØD5	ØD6	D7	ØD8	D9
6	G300/01 *[G300/12]*	45 *[1.77]*	60 *[2.36]*	6.6 *[0.26]*	11 *[0.43]*	M6 *[1/4-20 UNC]*	25 *[0.98]*	G1/4 *[SAE 4; 7/16-20]*
10	G661//01	60 *[2.36]*	80 *[3.15]*	6.6 *[0.26]*	11 *[0.43]*	M8	25 *[0.98]*	G3/8
	G662/01	60 *[2.36]*	80 *[3.15]*	6.6 *[0.26]*	11 *[0.43]*	M8	34 *[1.34]*	G1/2
20	G303/01	70 *[2.76]*	100 *[3.94]*	11 *[0.43]*	18 *[0.71]*	M8	42 *[1.65]*	G3/4
	G304/01	70 *[2.76]*	100 *[3.94]*	11 *[0.43]*	18 *[0.71]*	M8	47 *[1.85]*	G1
30	G305/01	100 *[3.94]*	130 *[5.12]*	11 *[0.43]*	18 *[0.71]*	M10	56 *[2.20]*	G1 1/4
	G306/01	100 *[3.94]*	130 *[5.12]*	11 *[0.43]*	18 *[0.71]*	M10	65 *[2.56]*	G1 1/2

NG	ØD10	ØD11	H3	L7	L8	L9	L10	L11	L12
6	6 *[0.24]*	8 *[0.32]*	25 *[0.98]*	110 *[4.33]*	8 *[0.32]*	94 *[3.70]*	22 *[0.87]*	55 *[2.17]*	10 *[0.39]*
10	10 *[0.39]*	8 *[0.32]*	25 *[0.98]*	135 *[5.32]*	10 *[0.39]*	115 *[4.53]*	27.5 *[1.08]*	70 *[2.76]*	12.5 *[0.49]*
	10 *[0.39]*	8 *[0.32]*	25 *[0.98]*	135 *[5.32]*	10 *[0.39]*	115 *[4.53]*	27.5 *[1.08]*	70 *[2.76]*	12.5 *[0.49]*
20	15 *[0.59]*	8 *[0.32]*	40 *[1.57]*	170 *[6.69]*	15 *[0.59]*	140 *[5.51]*	20 *[0.79]*	100 *[3.94]*	20 *[0.79]*
	20 *[0.79]*	8 *[0.32]*	40 *[1.57]*	170 *[6.69]*	15 *[0.59]*	140 *[5.51]*	20 *[0.79]*	100 *[3.94]*	20 *[0.79]*
30	30 *[1.18]*	8 *[0.32]*	40 *[1.57]*	190 *[7.48]*	12.5 *[0.49]*	165 *[6.50]*	17.5 *[0.67]*	130 *[5.12]*	22.5 *[0.89]*

NG	L13	L14	L15	L16	L17	T2	T3	T4	T5
6	39 *[1.54]*	42 *[1.65]*	62 *[2.44]*	65 *[2.56]*	15 *[0.59]*	1 *[0.039]*	15 *[0.59]*	9 *[0.35]*	15 *[0.59]*
10	40.5 *[1.59]*	48.5 *[1.91]*	72.5 *[2.85]*	80.5 *[3.17]*	15 *[0.59]*	1 *[0.039]*	15 *[0.59]*	9 *[0.35]*	12 *[0.47]*
	40.5 *[1.59]*	48.5 *[1.91]*	72.5 *[2.85]*	80.5 *[3.17]*	15 *[0.59]*	1 *[0.039]*	16 *[0.63]*	9 *[0.35]*	15 *[0.59]*
20	45 *[1.77]*	54 *[2.13]*	85 *[3.35]*	94 *[3.70]*	15 *[0.59]*	1 *[0.039]*	20 *[0.79]*	13 *[0.51]*	22 *[0.87]*
	42 *[1.65]*	54 *[2.13]*	85 *[3.35]*	97 *[3.82]*	15 *[0.59]*	1 *[0.039]*	20 *[0.79]*	13 *[0.51]*	22 *[0.87]*
30	42 *[1.65]*	52.5 *[2.07]*	102.5 *[4.04]*	113 *[4.45]*	15 *[0.59]*	1 *[0.039]*	24 *[0.95]*	11.5 *[0.45]*	22 *[0.87]*

NG	T6	R1	**Weight,** ca. in kg *[lbs]*
6	6 *[0.24]*	25^{+2} *[0.98$^{+0.079}$]*	1.5 *[3.3]*
10	6 *[0.24]*	30^{+5} *[1.18$^{+0.197}$]*	2 *[4.4]*
20	6 *[0.24]*	40^{+3} *[1.57$^{+0.118}$]*	5.5 *[12.1]*
30	6 *[0.24]*	55^{+4} *[2.16$^{+0.157}$]*	8 *[17.6]*

[3)] **Attention!**
The subplates listed are **not** approved for use with type-tested safety valves according to Pressure Equipment Directive 97/23/EC!

Ordering code: Type-tested safety valves of type DBD [1)]

NG	Type designation	Component code
6	DBDS 6K1X/ ☐ E	TÜV.SV.■–849.5.F. α_w .p. G
	DBDH 6K1X/ ☐ E	
	DBDS 6G1X/ ☐ E	
	DBDH 6G1X/ ☐ E	
	DBDS 6P1X/ ☐ E	
	DBDH 6P1X/ ☐ E	
10	DBDS 10K1X/ ☐ E	TÜV.SV.■–850.6.F. α_w .p. G TÜV.SV.■–390.4,5.F.30.p. [2)]
	DBDH 10K1X/ ☐ E	
	DBDS 10G1X/ ☐ E	
	DBDH 10G1X/ ☐ E	
	DBDS 10P1X/ ☐ E	
	DBDH 10P1X/ ☐ E	

NG	Type designation	Component code
20	DBDS 20K1X/ ☐ E	TÜV.SV.■–361.10.F.α_w.p.
	DBDH 20K1X/ ☐ E	
	DBDS 20G1X/ ☐ E	
	DBDH 20G1X/ ☐ E	
	DBDS 20P1X/ ☐ E	
	DBDH 20P1X/ ☐ E	
	DBDS 30K1X/ ☐ E	
	DBDH 30K1X/ ☐ E	
	DBDS 30G1X/ ☐ E	
	DBDH 30G1X/☐ E	
	DBDS 30P1X/ ☐ E	
	DBDH 30P1X/ ☐ E	

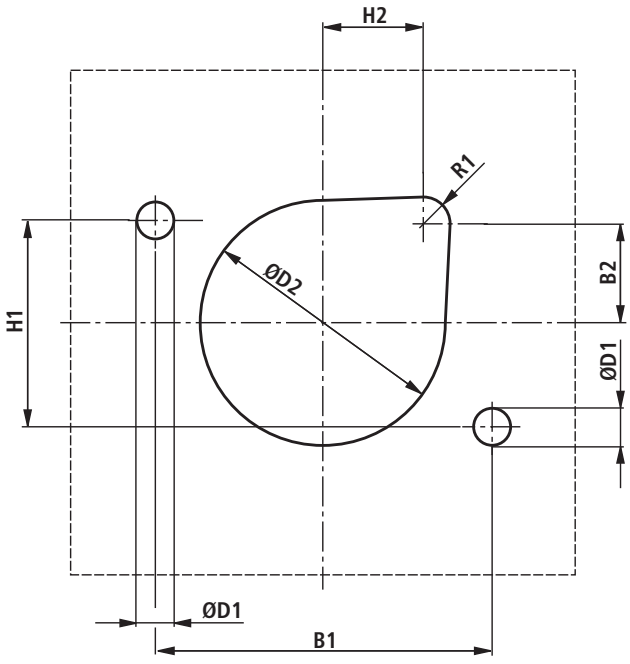
☐ The customer must enter the pressure in the type designation; pressure settings are possible ≥ 30 bar *[435 psi]* and in 5-bar *[72 psi]* increments.

■ Details are entered in the factory

[1)] Component series 1X, to Pressure Equipment Directive 97/23/EC

[2)] Component code for DBD. 10.1X/...;
400 bar *[5801 psi]* < ***p*** ≤ 630 bar *[9150 psi]*

Unit dimensions: Sheet metal cutout for front panel installation of type-tested safety valves of type DBD [1)] (dimensions in mm *[inch]*)



NG	B1	B2	H1	H2
6	45 *[1.77]*	12.5 *[0.49]*	25 *[0.98]*	22.5 *[0.89]*
10	60 *[2.36]*	20.5 *[0.81]*	40 *[1.57]*	20.5 *[0.81]*
20	70 *[2.76]*	24 *[0.94]*	50 *[1.97]*	24 *[0.94]*
30	100 *[3.94]*	29.5 *[1.16]*	60 *[2.36]*	29.5 *[1.16]*

NG	ØD1H13	ØD2H13	R1
6	7 *[0.27]*	40 *[1.57]*	8 *[0.32]*
10	9 *[0.35]*	44 *[1.73]*	8 *[0.32]*
20	9 *[0.35]*	55 *[2.17]*	8 *[0.32]*
30	11 *[0.43]*	73 *[2.87]*	8 *[0.32]*

☞ **Note!**

For valves of type DBDH.K..1X/..E the hand wheel must be removed and then refitted before the cartridge valve can be mounted on the valve panel.

[1)] Component series 1X, to Pressure Equipment Directive 97/23/EC

Deviating technical data: Type-tested safety valves of type DBD [1)]

Hydraulic

Maximum flow		See characteristic curves on pages 13 to 16
Hydraulic fluid		Mineral oil (HL, HLP) to DIN 51524-1 and DIN 51524-2
Hydraulic fluid temperature range	°C *[°F]*	–20 to +60 *[–4 to +140]* (NBR seals) –15 to +60 *[5 to 140]* (FKM seals)
Viscosity range	mm^2/s *[SUS]*	12 to 230 *[55 to 1066]*

[1)] Component series 1X, to Pressure Equipment Directive 97/23/EC (for applications outside these parameters, please consult us!)

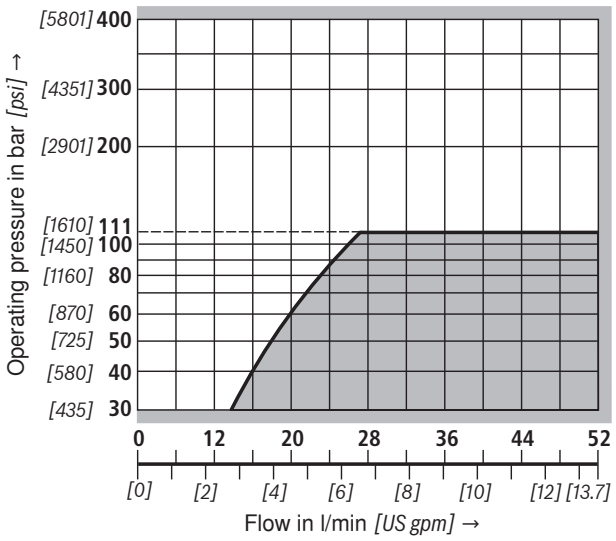
Characteristic curves: Type-tested safety valves of type DBD [1)]

[1)] Component series 1X, according to Pressure Equipment Directive 97/23/EC

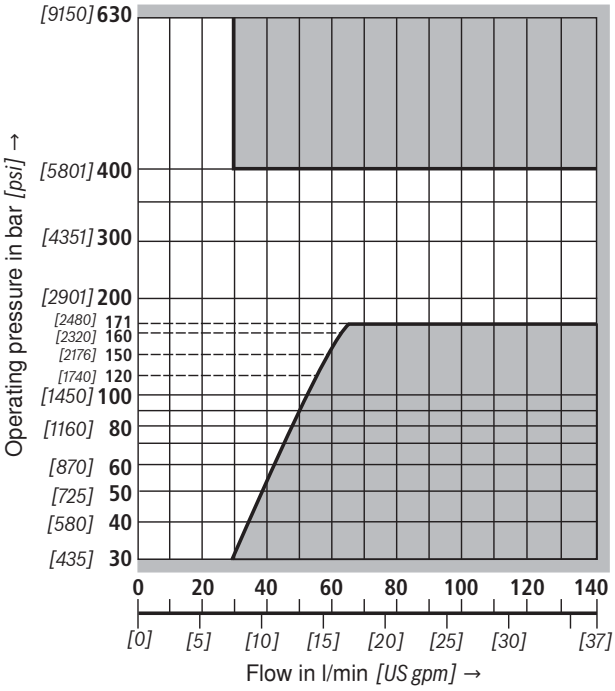
Note!

Values within the gray-shaded sections of the characteristic curves can**not** be achieved with this valve!

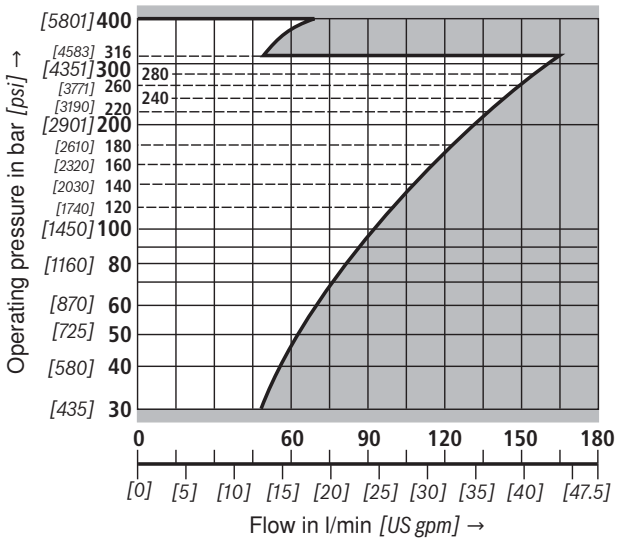
Size 6



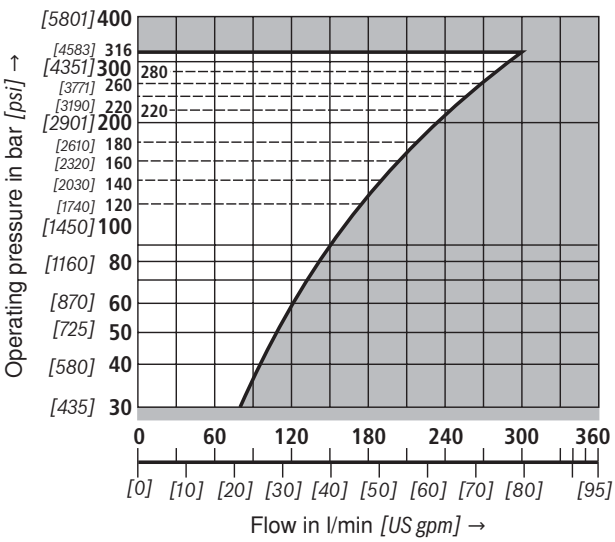
Size 10



Size 20



Size 30



Safety notes: Type-tested safety valves of type DBD [1)]

– Before ordering a type-tested safety valve, please note that at the desired **response pressure *p*** the permissible maximum **flow q_{Vmax}** of the safety valve is greater than the permissible maximum flow of the system / accumulator to be protected.

  The relevant regulations must be observed!

– According to **PED 97/23/EC** the increase in the system pressure caused by the flow must not exceed 10 % of the set response pressure (see component code).

  The permissible maximum flow q_{Vmax} specified in the component code must not be exceeded.

  Drain lines of safety valves must terminate without any risks. **No** fluid may accumulate in the drain system (see AD2000 - sheet A2).

☞ **Strictly observe notes on the operation!**

– The response pressure specified in the component code is factory-set at a flow of 2 l/min *[0.53 US gpm]*.

– The permissible maximum flow specified in the component code is valid for applications without backpressure in the drain line (port T).

– When the lead-seal is removed from the safety valve, the approval in accordance with PED becomes void!

– Generally, the requirements laid down in the Pressure Equipment Directive and in AD2000 sheet A2 must be observed!

– It is recommended that type-tested safety valves be secured against unauthorized removal from the housing/block by means of wires and lead-sealing (a bore is provided in the adjustment element).

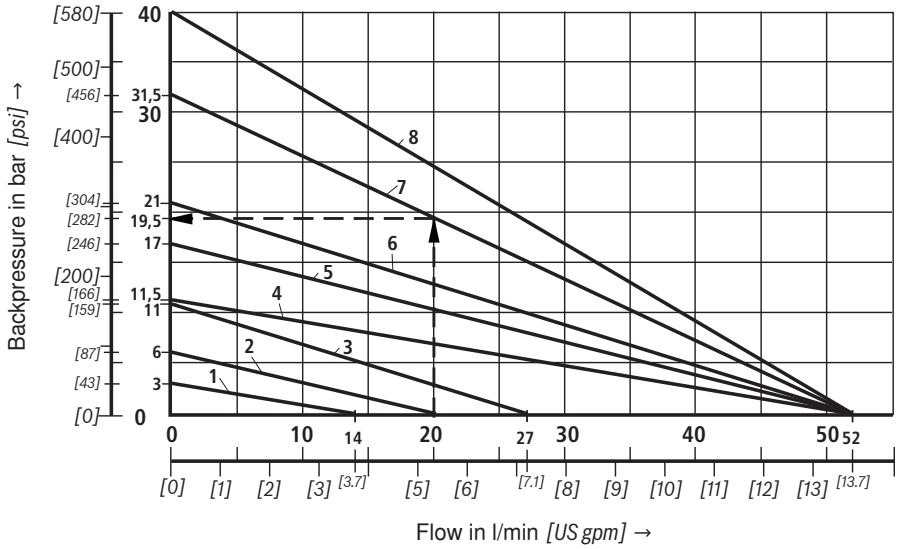
Attention!

As the flow rises, the system pressure increases by the backpressure in the drain line (port T). (Observe AD2000 - sheet A2, section 6.3!)

In order that this increase in the system pressure caused by the flow will not exceed 10 % of the set response pressure, the permissible flow must be reduced in dependence upon the backpressure in the drain line (port T) (see diagrams on pages 14 to 16).

Permissible maximum flow q_{Vmax} in dependence upon backpressure p_T in the drain line

Type DBD. 6 .1X/...E



Characteristic curves	Response pressure p_A in bar *[psi]*
1	30 *[435]*
2	60 *[870]*
3	110 *[1595]*
4	115 *[1668]*
5	170 *[2465]*
6	210 *[3046]*
7	315 *[4568]*
8	400 *[5800]*

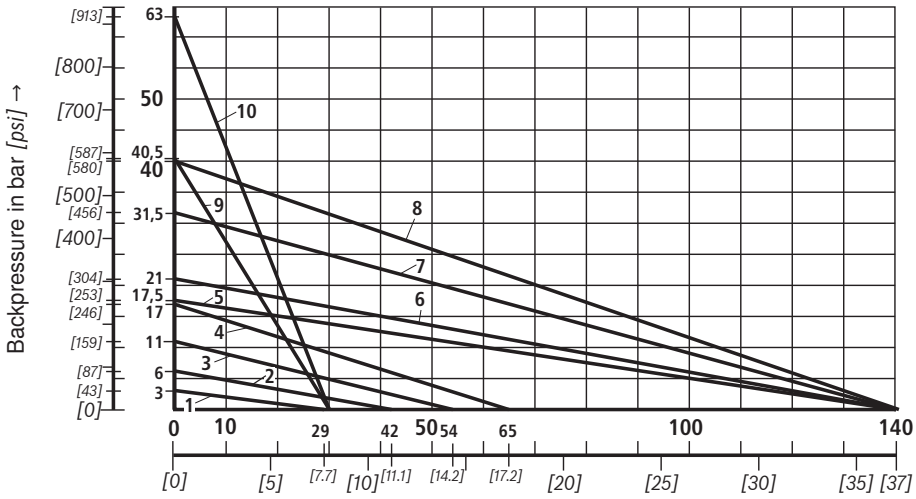
Characteristic curves for intermediate values can be generated by interpolation. Further explanations can be found on page 16.

[1)] Component series 1X, to Pressure Equipment Directive 97/23/EC

Safety notes: Type-tested safety valves of type DBD [1)]

Permissible maximum flow q_{Vmax} in dependence upon backpressure p_T in the drain line

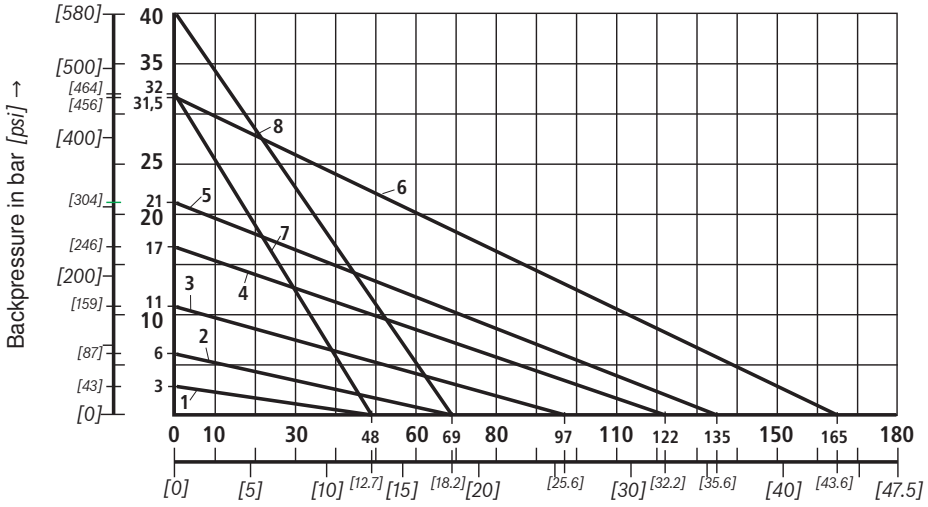
Type DBD. 10 .1X/...E



Characteristic curves	Response pressure p_A in bar [psi]
1	30 [435]
2	60 [870]
3	110 [1595]
4	170 [2465]
5	175 [2538]
6	210 [3046]
7	315 [4568]
8	400 [5800]
9	405 [5874]
10	630 [9150]

Characteristic curves for intermediate values can be generated by interpolation. Further explanations can be found on page 16.

Type DBD. 20 .1X/...E



Characteristic curves	Response pressure p_A in bar [psi]
1	30 [435]
2	60 [870]
3	110 [1595]
4	170 [2465]
5	210 [3046]
6	315 [4568]
7	320 [4641]
8	400 [5800]

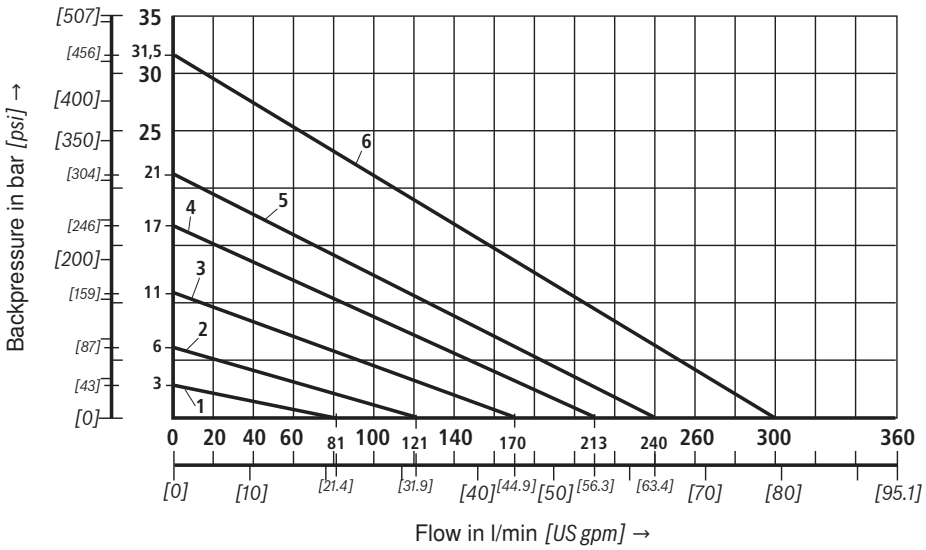
Characteristic curves for intermediate values can be generated by interpolation. Further explanations can be found on page 16.

[1)] Component series 1X, to Pressure Equipment Directive 97/23/EC

Safety notes: Type-tested safety valves of type DBD [1)]

Permissible maximum flow q_{Vmax} in dependence upon backpressure p_T in the drain line

Type DBD. 30 .1X/...E



Characteristic curves	Response pressure p_A in bar [psi]
1	30 [435]
2	60 [870]
3	110 [1595]
4	170 [2465]
5	220 [3191]
6	315 [4568]

Characteristic curves for intermediate values can be generated by interpolation. For further explanations, see below.

p_A = response pressure in bar

p_T = permissible maximum backpressure in bar (sum of all tank pressures; see also AD2000 - sheet A2)

$q_{V\,max}$ = permissible maximum flow in l/min

PED: $p_{T\,max}$ = 10 % x p_A (at q_V = 0)

Explanation of diagrams (Example: type DBD 6 …E, page 14):

Given: – flow of the system/accumulator to be protected q_{Vmax} = 20 l/min
– set response pressure of the safety valve p_A = 315 bar

Sought: $p_{T\,permissible}$

Solution: See arrows in the diagram on page 14 (type DBD 6 …E)
$p_{T\,permissible}$ (20 l/min; 315 bar) = 19.5 bar

[1)] Component series 1X, to Pressure Equipment Directive 97/23/EC

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Rexroth
Bosch Group

Pressure relief valve, direct operated

Type DBD, DBD...-E according to RE 25402

RE 25402-EVT/12.10

Material no.: R901292431

Setting instructions

Size 6 to 30
Component series 1X
Maximum operating pressure 630 bar *[9150 psi]*
Maximum flow 330 l/min *[87 US gpm]*

The data specified above only serve to describe the product. No statements concerning a certain condition or suitability for a certain application can be derived from our information. The information given does not release the user from the obligation of own judgment and verification. It must be remembered that our products are subject to a natural process of wear and aging.

The cover shows an example configuration. The product supplied may therefore differ from the photo shown.

Content

1 About this documentation

1.1 Validity of the documentation

These setting instructions apply to the pressure relief valve type DBD, component series 1X, sizes 6 to 30.

This documentation aims at commissioning personnel and service engineers.

This documentation contains important information for the safe and appropriate setting of the pressure relief valve type DBD.

1.2 Necessary and amending documentation

- The pressure setting at the pressure relief valve must not be changed until you have been provided with the documentation marked with the book symbol 🕮 and you have understood and observed it.

Table 1: Necessary and amending documentation

	Title	Document number	Document type
🕮	Pressure relief valve, direct operated	RE 25402	Data sheet
🕮	Safety valves direct operated	RE 25010-B	Operating instructions
🕮	General Operating Instructions for Hydraulic Power Units and Assemblies	RE 07009-B	Operating instructions
🕮	Installation, commissioning and maintenance of industrial valves	RE 07300	Data sheet

1.3 Illustration of information

Consistent safety instructions, symbols, terms and abbreviations are used so that you can quickly and safely work with your product using this documentation. For a better understanding, they are explained in the following sections.

1.3.1 Safety instructions

In this documentation, safety instructions are indicated whenever sequences of operations are explained which bear the risk of personal injury or damage to property. The measures described for preventing these dangers must be observed.

Safety instructions are set out as follows:

⚠ SIGNAL WORD

Type and source of danger

Consequences in case of non-compliance

- Measures for the prevention of dangers
- <Enumeration>

- **Warning sign:** Draws attention to the danger
- **Signal word:** Identifies the degree of danger
- **Type and source of danger:** Specifies the type or source of danger
- **Consequences:** Describes the consequences of non-compliance
- **Precautions:** Specifies how the danger can be prevented

Table 2: Risk classes according to ANSI Z535.6-2006

Warning sign, signal word	Meaning
⚠ DANGER	Indicates a dangerous situation which may cause death or severe personal injuries if not avoided.
⚠ WARNING	Indicates a dangerous situation which may cause death or severe personal injuries if not avoided.
⚠ CAUTION	Indicates a dangerous situation which may cause minor or medium personal injuries if not avoided.
NOTE	Damage to property: The product or the environment could be damaged.

1.3.2 Symbols

The following symbols indicate notes which are not safety-relevant but increase the understanding of the documentation.

Table 3: Meaning of the symbols

Symbol	Meaning
	If this information is not observed, the product cannot be used and/ or operated optimally.
▶	individual, self-dependent step
1. 2. 3.	Numbered instruction: The numbers indicate that the steps must be carried out one after the other.

1.3.3 Abbreviations

The following abbreviations are used in this documentation:

Table 4: Abbreviations

Abbreviation	Meaning
DBD	Pressure relief valve, direct operated
DBD...E	Type-tested pressure relief valve, direct operated

2 Setting the pressure relief valve

For setting the system pressure in your hydraulic system, safe procedures are necessary. You must therefore follow the instructions in the following sections.

2.1 Prerequisites for the safe pressure setting

Before starting settings at the pressure valve, the following prerequisites have to be satisfied:

- The valid hydraulic scheme must be available. The scheme must contain information on the setting of the system pressure.
- The system pressure at port "P" of the pressure relief valve must be permanently measured during the pressure setting.
- At port "T" of the pressure relief valve, free discharge of the entire oil volume must be guaranteed.
- During setting, the pressure change must be monitored.
- Familiarize with the scheme and check whether:
  - There is a pressure gauge or pressure measurement directly at port "P".
  - Free discharge is guaranteed at port "T".
  - Values for the pressure setting have been specified.
- Keep the necessary tools and measuring equipment (e.g. pressure gauge) ready.

How to proceed

1. Determine the admissible pressure settings.
2. Check the pressure setting at the valve.
3. Set the pressure at the valve.

2.2 Determining the admissible pressure settings

The admissible values for the pressure setting can be seen from the type designation. The type designation is impressed into the valve. The following figure shows the information relevant for the pressure setting. For a detailed explanation of the type designation refer to "Ordering code" in the data sheet RE 25402. Upon delivery, the pressure relief valve is either preset to 0 bar or to a certain pressure (pressure setting)

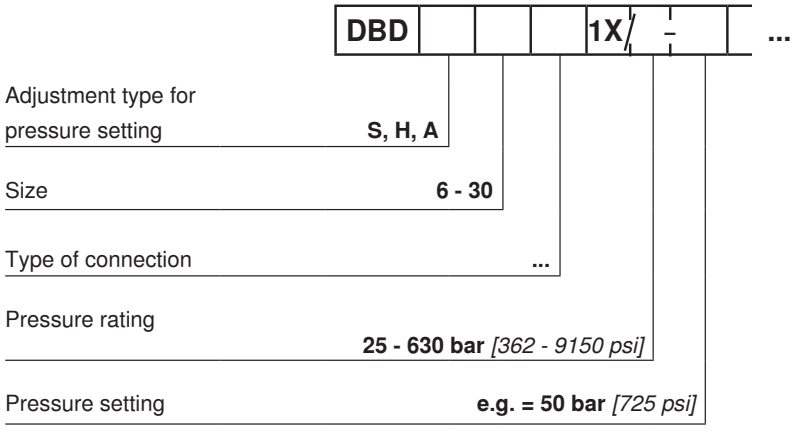


Fig. 1: Type designation - information on the pressure setting

Setting the pressure relief valve

Pressure rating The pressure rating specifies the maximum pressure that can be set. The pressure adjustment range is 0 bar to the specified pressure rating value.

Pressure setting If a value is specified for the pressure setting, the pressure relief valve has been "preset" upon delivery. The pressure relief valve is set to the specified value.

2.2.1 Pressure relief valves at manifolds or power units

Pressure relief valves mounted at manifolds or power units may have a preset pressure. In this case, the pressure setting can not be seen from the type designation but from the hydraulic scheme and the setting spindle position.

Observe the following to check whether a pressure setting has been made:

- Apart from the DBD symbol, the hydraulic scheme also contains the following information: "Set to".
- Check the position of the setting spindle according to table 6 "Pressure relief valve - Depressurized setting":
  If dimension "L" is less than specified in the table, the valve has already been preset to a certain pressure.

2.2.2 Type tested safety valves, type DBD...1X/...E

Type tested safety valves according to PED 97/23/EC have a tested pressure setting. With the correct design, they hold the system pressure at the set value. The pressure setting can be seen from the type designation.

Using the following figure, you can identify the set pressure. A detailed explanation of the type designation is contained in the "Ordering code": Type tested safety valves type DBD" in data sheet RE 25402.

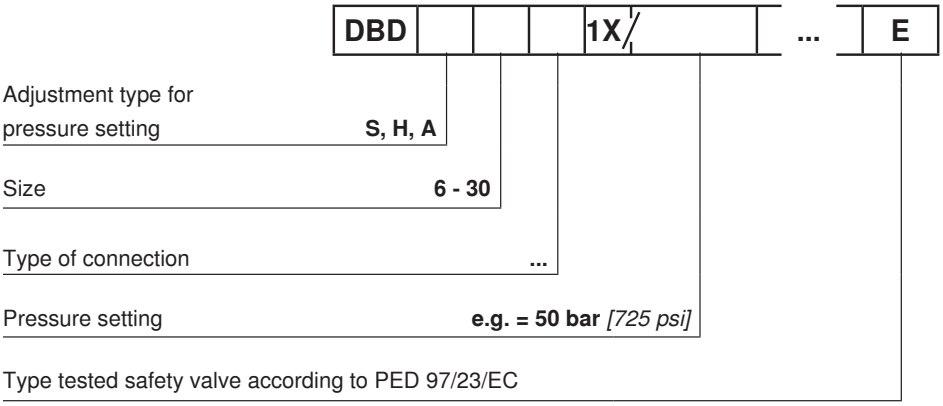


Fig. 2: Type designation - information on the pressure setting of type tested safety valves

Pressure setting The specified value is the tested pressure setting. In case of safety valves with adjustment type "H" (manual), this value must not be exceeded.

Safety valve Type DBDS … 1X/ .. E

Safety valves with adjustment type "S" are set to a fixed system pressure. They are protected against adjustment by means of lead seal and non-removable protective cap. At these valves, no pressure setting must be made.

If the protective cap is destroyed or the lead seal is removed, the warranty for the safety function will become void.

Safety valve Type DBDH … 1X/ .. E

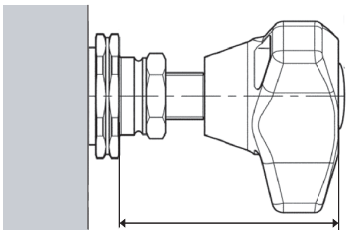
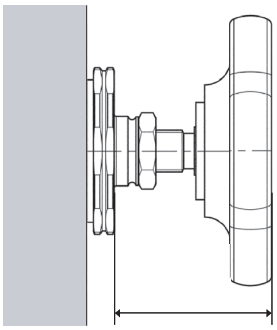
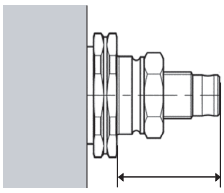
Safety valves with adjustment type "H" are set to the maximum system pressure. In case of adjustment, you may only set a lower pressure.

2.3 Checking the pressure setting at the valve

The pressure setting can be checked using the adjustment position. The following table shows the pressure relief valve with the different adjustment types with pressure setting 0 bar. The valve is in a depressurized condition.

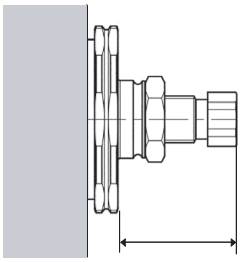
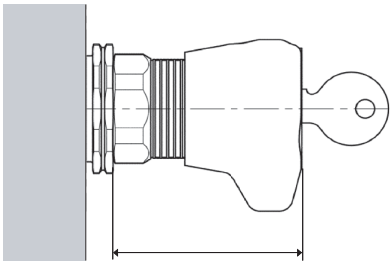
- ► Check the "L" dimension at your pressure relief valve. If the value is lower than specified in the table, a certain pressure has already been set at the valve.

Table 5: Pressure relief valve - Depressurized setting

Pressure relief valve, direct operated	Dimension "L" max. in mm *[inch]*	Type
	**57** *[2.24]*	**DBD H with rotary knob, sizes 6 - 25**
	**47** *[1.85]*	**DBD H with hand wheel, size 30**
	**30** *[1.18]*	**DBD S with internal hexagon and protective cap, sizes 6 - 20**

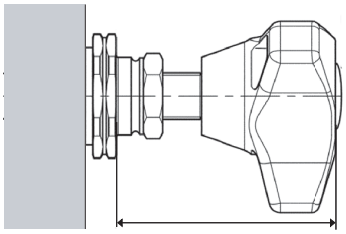
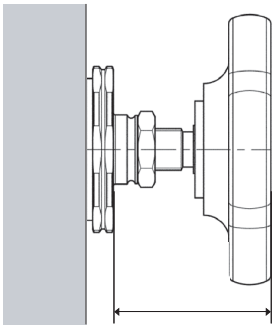
Setting the pressure relief valve

Table 5: Pressure relief valve - Depressurized setting

Pressure relief valve, direct operated	Dimension "L" max. in mm *[inch]*	Type
	**32** *[1.26]*	**DBD S with external hexagon and protective cap, sizes 25 and 30**
	**To the end of the scale ring**	**DBD A with lockable rotary knob, sizes 6 - 20**

2.3.1 Safety valve type DBDH ... 1X/ .. E

Table 6: Safety valve - Depressurized setting

Pressure relief valve, direct operated	Dimension "L" max. in mm *[inch]*	Type
	**63** *[2.48]*	**DBDH … 1X/ .. E with rotary knob, sizes 6, 10, 20**
	**54** *[2.13]*	**DBDH … 1X/ .. E with hand wheel, size 30**

2.4 Setting the pressure

The pressure is set by turning the setting spindle. The setting elements are shown under "Unit dimensions: screw-in valve" in the data sheet RE 25402.

2.4.1 Tools, tightening torque lock nut

Only use manual tools without extension for the pressure setting. Electrically or pneumatically driven tools must not be used!

Depending on the adjustment type and size, you need the following tools:

- Torque power screwdriver
- Open-end wrench SW 19
- Allen wrench SW 6
- Open-end wrench SW 13
- Open-end wrench SW 30

Tightening torque lock nut

The lock nut must be tightened applying a tightening torque of $M_A = 10^{+5}$ Nm with all adjustment types and sizes.

2.4.2 Increasing the pressure

The pressure at the pressure relief valve is increased by clockwise rotation.

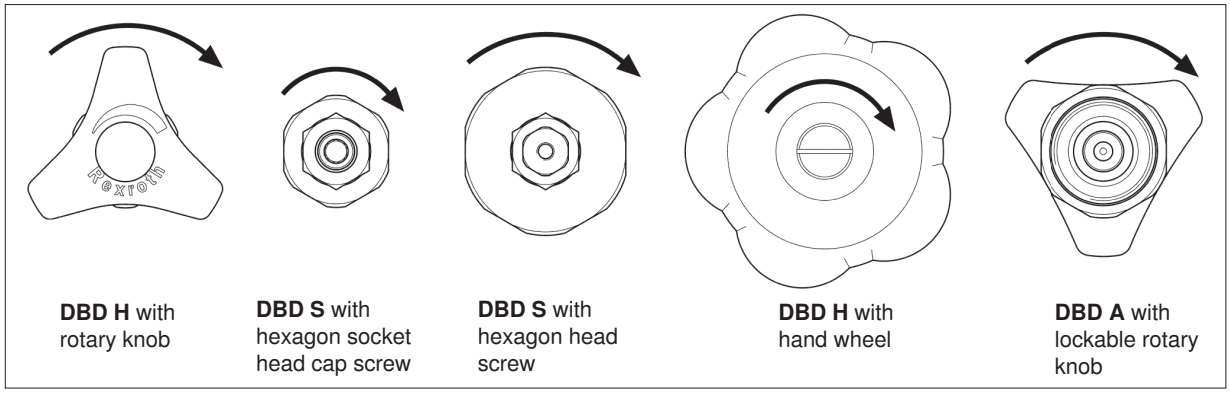


Fig. 3: Direction of rotation for pressure increase

DBD H - Valve with hand wheel or rotary knob without locking function

1. Loosen the lock nut at the pressure relief valve.

WARNING! Pressurized valve!!

Risk of injury from leaking oil or components.

- ► Stop the setting works immediately and depressurize the system
  - – if the valve does not behave as expected or
  - – if there is any leakage.
- ► Secure external loads.
- ► Find the fault and replace the leaking valve by a new one, if necessary.

Setting the pressure relief valve

2. Slowly turn the hand wheel clockwise until the pressure has been increased to the desired value. While doing so, observe the pressure gauge at the measuring device in the "P" line.
3. Fix the setting by tightening the lock nut by means of a torque power screwdriver.

   The pressure has been set.

DBD S - Valve with hexagon head or hexagon socket head cap screw

1. Loosen the lock nut at the pressure relief valve.

WARNING! Pressurized valve!!

Risk of injury from leaking oil or components.

- ► Stop the setting works immediately and depressurize the system
  - – if the valve does not behave as expected or
  - – if there is any leakage.
- ► Secure external loads.
- ► Find the fault and replace the leaking valve by a new one, if necessary.

2. Slowly turn the hexagon head and/or the hexagon socket head cap screw clockwise, using a suitable wrench, until the pressure increases to the desired value. While doing so, observe the pressure gauge at the measuring device in the "P" line.
3. Fix the setting by tightening the lock nut by means of a torque power screwdriver.

   The pressure has been set.

DBD A - Valve with lockable rotary knob

1. Loosen the lock nut at the pressure relief valve.
2. Firstly turn the key at the rotary knob of the pressure relief valve clockwise in order to enable the adjustment of the pressure setting.

WARNING! Pressurized valve!!

Risk of injury from leaking oil or components.

- ► Stop the setting works immediately and depressurize the system
  - – if the valve does not behave as expected or
  - – if there is any leakage.
- ► Secure external loads.
- ► Find the fault and replace the leaking valve by a new one, if necessary.

3. Slowly turn the rotary knob clockwise until the pressure has been increased to the desired value. While doing so, observe the pressure gauge at the measuring device in the "P" line.
4. Turn the key at the pressure relief valve counterclockwise again.
5. Remove the key from the rotary knob of the pressure relief valve and keep it in a safe place.

   The pressure has been set.

2.4.3 Reducing the pressure

Setting a lower pressure

The system pressure may in any case only be set in the pressure increase direction. When setting a lower pressure, you must first of all reduce the pressure to a value just under the system pressure to be set.

How to proceed

1. Reduce the pressure to a value just under the setting.
2. Increase the pressure to the necessary value.

The pressure at the pressure relief valve is reduced by counterclockwise rotation.

Please note that in the pressure reduction, the adjustment device may maximally be screwed out to the dimension "L". For the value of dimension "L", please refer to table 6 in chapter 2.3 "Checking the pressure setting at the valve".

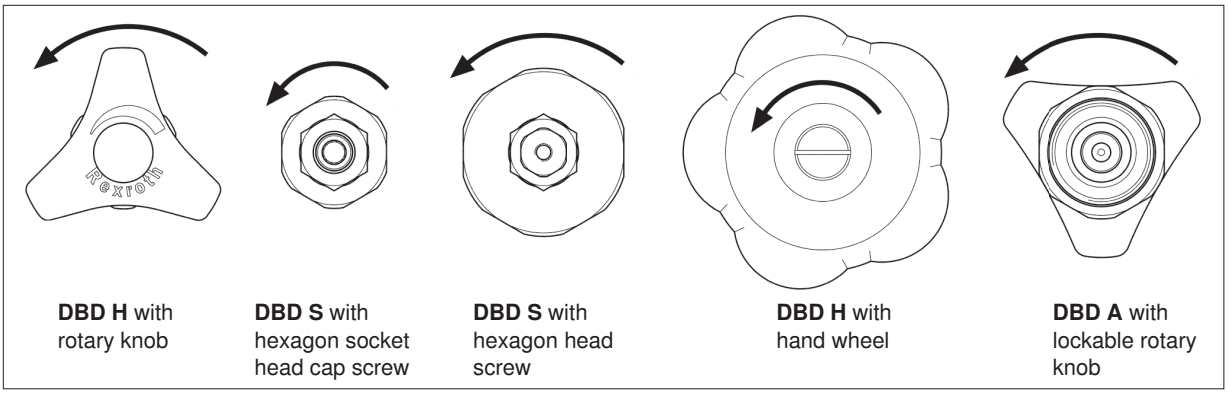


Fig. 4: Direction of rotation for pressure reduction

DBD H - Valve with hand wheel or rotary knob without locking function

WARNING

Pressurized valve! Risk of injury in case of incorrect setting if the adjustment type is screwed out against the internal stop!

Risk of injury from leaking oil or components.

- ▶ It must be possible to rotate the adjustment type smoothly.
- ▶ Only screw the adjustment device out of the valve to the maximum value of dimension "L". For the maximum value, please refer to table 6 in chapter 2.3 "Checking the pressure setting at the valve".

Pressurized valve!!

Risk of injury from leaking oil or components.

- ▶ Stop the setting works immediately and depressurize the system
  - – if the valve does not behave as expected or
  - – if there is any leakage.
- ▶ Secure external loads.
- ▶ Find the fault and replace the leaking valve by a new one, if necessary.

1. Loosen the lock nut at the pressure relief valve.

Setting the pressure relief valve

2. Slowly turn out the hand wheel counterclockwise until the pressure has been reduced to the desired value. While doing so, observe the pressure gauge at the measuring device in the "P" line.
3. If necessary, slowly turn the hand wheel in the opposite direction until the pressure has been increased to the desired value. While doing so, observe the pressure gauge at the measuring device in the "P" line.
4. Fix the setting by tightening the lock nut by means of a torque power screwdriver.

   The pressure has been set.

DBD S - Valve with hexagon head or hexagon socket head cap screw

WARNING

Pressurized valve! Risk of injury in case of incorrect setting if the adjustment type is screwed out against the internal stop!

Risk of injury from leaking oil or components.

- ▶ It must be possible to rotate the adjustment type smoothly.
- ▶ Only screw the adjustment device out of the valve to the maximum value of dimension "L". For the maximum value, please refer to table 6 in chapter 2.3 "Checking the pressure setting at the valve".

Pressurized valve!

Risk of injury from leaking oil or components.

- ▶ Stop the setting works immediately and depressurize the system
  - – if the valve does not behave as expected or
  - – if there is any leakage.
- ▶ Secure external loads.
- ▶ Find the fault and replace the leaking valve by a new one, if necessary.

1. Loosen the lock nut at the pressure relief valve.
2. Slowly turn the hexagon head and/or the hexagon socket head cap screw counterclockwise, using a suitable wrench, until the pressure is reduced to the desired value. While doing so, observe the pressure gauge at the measuring device in the "P" line.
3. Slowly turn the hexagon head and/or the hexagon socket head cap screw in the opposite direction, using a suitable wrench, until the pressure increases to the desired value. While doing so, observe the pressure gauge at the measuring device in the "P" line.
4. Fix the setting by tightening the lock nut by means of a torque power screwdriver.

   The pressure has been set.

Setting the pressure relief valve

DBD A - Valve with lockable rotary knob

WARNING

Pressurized valve! Risk of injury in case of incorrect setting if the adjustment type is screwed out against the internal stop!

Risk of injury from leaking oil or components.

- ▶ It must be possible to rotate the adjustment type smoothly.
- ▶ Only screw the adjustment device out of the valve to the maximum value of dimension "L". For the maximum value, please refer to table 6 in chapter 2.3 "Checking the pressure setting at the valve".

Pressurized valve!!

Risk of injury from leaking oil or components.

- ▶ Stop the setting works immediately and depressurize the system
  - – if the valve does not behave as expected or
  - – if there is any leakage.
- ▶ Secure external loads.
- ▶ Find the fault and replace the leaking valve by a new one, if necessary.

1. Loosen the lock nut at the pressure relief valve.
2. If necessary, turn the key at the rotary knob of the pressure relief valve counterclockwise first in order to enable the adjustment of the pressure setting.
3. Slowly turn out the rotary knob counterclockwise until the pressure has been reduced to the desired value. While doing so, observe the pressure gauge at the measuring device in the "P" line.
4. Slowly turn the rotary knob in the opposite direction until the pressure has been increased to the desired value. While doing so, observe the pressure gauge at the measuring device in the "P" line.
5. Fix the setting by tightening the lock nut by means of a torque power screwdriver.
6. Turn the key at the pressure relief valve counterclockwise again.
7. Remove the key from the rotary knob of the pressure relief valve and keep it in a safe place.

The pressure has been set.

2.5 Reducing the pressure at type tested safety valves

The pressure setting at type tested safety valves of type "H" may only be reduced.

DBDH...E - Valve with hand wheel or rotary knob

WARNING

Pressurized valve! Risk of injury in case of incorrect setting if the adjustment type is screwed out against the internal stop!

Risk of injury from leaking oil or components.

- ▶ It must be possible to rotate the adjustment type smoothly.
- ▶ Only screw the adjustment device out of the valve to the maximum value of dimension "L". For the maximum value, please refer to table 6 in chapter 2.3 "Checking the pressure setting at the valve".

Pressurized valve!!

Risk of injury from leaking oil or components.

- ▶ Stop the setting works immediately and depressurize the system
  - – if the valve does not behave as expected or
  - – if there is any leakage.
- ▶ Secure external loads.
- ▶ Find the fault and replace the leaking valve by a new one, if necessary.

1. Loosen the lock nut at the safety valve.
2. Slowly turn out the hand wheel counterclockwise until the pressure has been reduced to the desired value. While doing so, observe the pressure gauge at the measuring device in the "P" line.
3. If necessary, slowly turn the hand wheel in the opposite direction until the pressure has been increased to the desired value. While doing so, observe the pressure gauge at the measuring device in the "P" line.
4. Fix the setting by tightening the lock nut by means of a torque power screwdriver.

   The pressure has been set.

Rexroth
Bosch Group

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Bourdon Tube Pressure Gauges
Dry or Liquid Filled Gauge with SAE Connection
Type 212.53S - Dry Case
Type 213.53S - Liquid-filled Case

Applications

- Intended for adverse service conditions where pulsating or vibration exists (with liquid filling)
- Hydraulics & compressors
- Suitable for gaseous or liquid media that will not obstruct the pressure system

Special features

- Vibration and shock resistant (with liquid filling)
- 7/16" -20 SAE connection
- Pressure ranges up to 15,000 psi

Bourdon Tube Pressure Gauge Model 213.53S

Description

Design
ASME B40.100 & EN 837-1

Sizes
2½" (63 mm)

Accuracy class
± 2/1/2% of span (ASME B40.100 Grade A)

Ranges
Vacuum / Compound to 200 psi
Pressure from 15 psi to 15,000 psi
or other equivalent units of pressure or vacuum

Working pressure
Steady: 3/4 scale value
Fluctuating: 2/3 full scale value
Short time: full scale value

Operating temperature
Ambient: -40°F to +140°F (-40°C to +60°C) - dry
-4°F to +140°F (-20°C to +60°C) - glycerine filled
-40°F to +140°F (-40°C to +60°C) - silicone filled
Medium: +140°F (+60°C) maximum

Temperature error
Additional error when temperature changes from reference temperature of 68°F (20°C) ±0.4% for every 18°F (10°C) rising or falling. Percentage of span.

Weather protection
Weather tight (NEMA 4X / IP 65)

Pressure connection
Material: copper alloy
Lower mount (LM)
7/16" - 20 SAE with o-ring, washer and lock nut

Bourdon tube
Material: copper alloy
≤ 1,000 PSI: C-type
≥ 1,500 PSI: helical type

Movement
Copper alloy

Dial
White ABS with stop pin and with black lettering

Pointer
Black aluminum

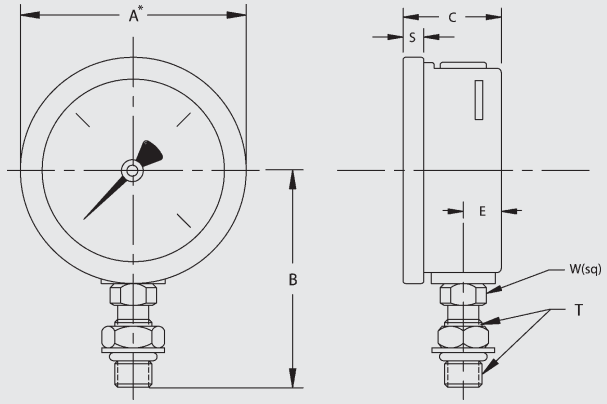
Case
304 stainless steel with vent plug and stainless steel crimp ring. Suitable for liquid filling. Case connection sealed with EPDM o-ring (glycerine filled) or Viton o-ring (dry or silicone filled).

Window
Polycarbonate with Buna-N gasket

Case fill
Glycerine 99.7% - Type 213.53S

Optional extras
- Brass restrictor
- External zero adjustment (2½" only)
- Red drag pointer or mark pointer
- Silicone or Fluorolube case filling
- Custom dial layout
- Other pressure scales available
  bar, kPa, MPa, kg/cm² and dual scales

Dimensions



Size		A	B	C	E	S	T	W	Weight
2.5"	mm	69	61.2	31	13	6		14	0.38 lb. dry
	in	2.69	2.41	1.23	0.51	0.24	7/16-20	0.55	0.46 lb. filled

Ordering information
Pressure gauge model / Nominal size / Scale range / Size of connection / Optional extras required
Specifications and dimensions given in this leaflet represent the state of engineering at the time of printing.
Modifications may take place and materials specified may be replaced by others without prior notice.

WIKA Instrument Corporation
1000 Wiegand Boulevard
Lawrenceville, GA 30045
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Fax (770) 338-5118
E-Mail info@wika.com
www.wika.com

Tank mounted return line filter

RE 51424/06.11 1/26
Replaces: 11.09

Type 10TEN0040 to 1000; 10TE2000/2500


H7855_d

Size according to **DIN 24550**: 0040 to 1000
Additional sizes: 2000, 2500
Nominal pressure 10 bar *[145 psi]*
Connection up to G 1 1/2; to SAE 4"; to SAE 24

Table of contents

Features

The tank mounted return line filters are designed for installation on fluid tanks. They serve the separation of solid materials from the whole fluid flowing back to the tanks.

They distinguish themselves by the following:

- Adsorption of very fine particles across a broad pressure differential range
- High dirt holding capacity thanks to large specific filter area
- Good chemical resistance of the filter elements
- High collapse resistance of the filter elements (e.g. in case of cold start)
- Filter ratings: 3…100 µm
- By default, the filters are equipped with a bypass valve
- Broad range of accessories, e.g. different maintenance indicators, outlet pipes, ...

Ordering code

of the filters of sizes 0040 to 0100

10	TEN	–	A	00	–	–	–

Pressure
10 bar *[145 psi]* **= 10**

Design
Return line filter, simple, with filter element according to DIN 24550 **= TEN**

Size
0040 **= 0040**
0063 **= 0063**
0100 **= 0100**

Filter rating in µm

nominal
Stainless steel wire mesh, cleanable
G10, G25, G40, G60, G100 **= G…**
Paper, non-cleanable
P10, P25 **= P…**

absolute (ISO 16889)
Micro glass, non-cleanable
H3XL, H6XL, H10XL, H20XL **= H…XL**

Pressure differential
Max. admissible pressure differential of the filter element
30 bar *[435 psi]* with bypass valve
(cracking pressure 3.5 bar *[51 psi]*) **= A**

Element model
Standard adhesive T = 100 °C *[212 °F]* **= 0…**
Standard material **= …0**

Maintenance indicator
Without **= 0**
Mechanical optical (polyamide, switching pressure 2.2 bar *[32 psi]*) **= P2,2**
Mechanical optical (aluminum, switching pressure 2.2 bar *[32 psi]*) **= V2,2**
Mechanical optical (aluminum, switching pressure 1.5 bar *[22 psi]*) **= V1,5**
Mechanical optical (aluminum, switching pressure 0.8 bar *[12 psi]*) **= V0.8**
Pressure gauge 0...6 bar *[0…87 psi]* right **= MR**
Mechanical optical + pressure gauge right **= MRV2,2**

Complementary details (if necessary)
NB = Without bypass
F = Ventilation filter
FN = Ventilation filter with surge protection
M = Minimess connection (not possible with pressure gauge)
R110 = Outlet pipe 110 mm *[4.3"]*
R150 = Outlet pipe 150 mm *[5.9"]*
R250 = Outlet pipe 250 mm *[9.8"]*
S = Filling port (not possible with mech.-opt. maintenance indicator)

Main inlet

	Port	Frame size 0040	Frame size 0063-0100
R3 =	G3/4	●	x
R4 =	G1	x	●
U4 =	1 1/16-12 UN-2B *[SAE 12]*	x	x
U9 =	1 5/16-12 UN-2B *[SAE 16]*	x	x

● = Standard port
x = Alternative port

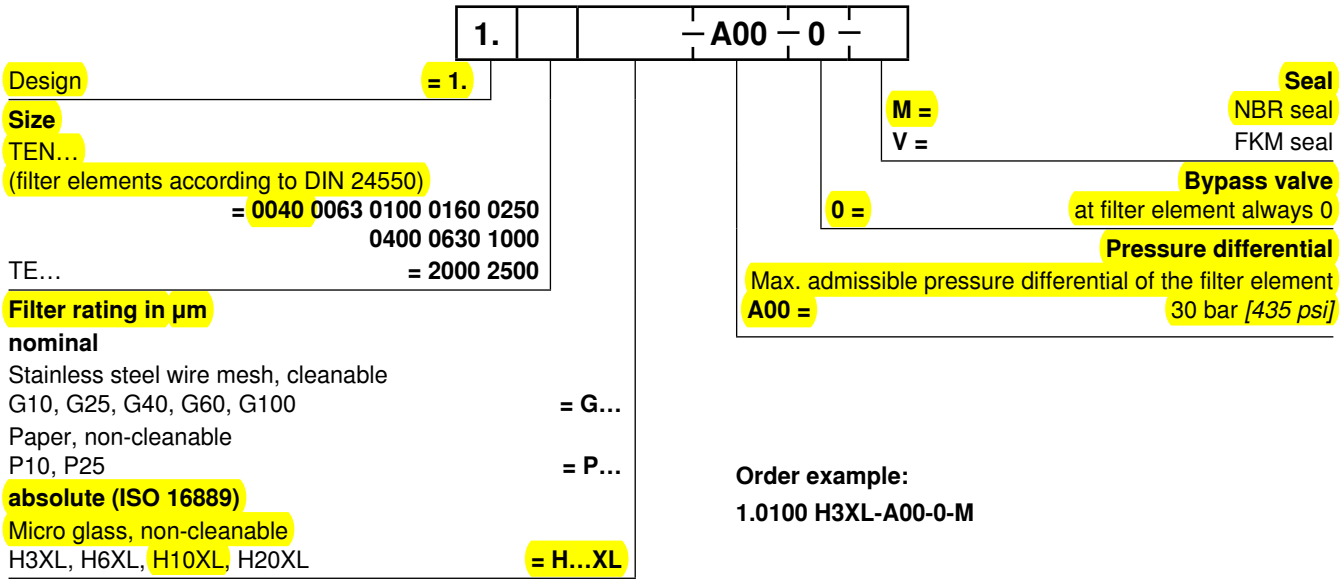
Seal
M = NBR seal
V = FKM seal

Example: **10TEN0040-H10XLA00-P2,2-M-R3**
10TEN0100-H10XLA00-MR-M-R4

Further models, e.g. filter media, connections, are available at request.

Ordering code

of the filter element



Order example:

1.0100 H3XL-A00-0-M

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

Standard types

Tank mounted return line filter, filter rating 3 µm, 10 µm and 20 µm

Filter type	Flow in l/min *[gpm]* with ν = 30 mm²/s *[142 SUS]* and Δp = 0.5 bar *[7.25 psi]*	Port/Material no.			
10TEN0040-H20XLA00-P2,2-M-…	62 *[16.4]*	..R3	**R928041199**	..U4	**R928041200**
10TEN0063-H20XLA00-P2,2-M-…	80 *[21.1]*	..R4	**R928041201**	..U9	**R928041202**
10TEN0100-H20XLA00-P2,2-M-…	95 *[25.1]*	..R4	**R928041203**	..U9	**R928041204**
10TEN0160-H20XLA00-P2,2-M-…	260 *[68.7]*	..R5	**R928041205**	..S5	**R928041206**
10TEN0250-H20XLA00-P2,2-M-…	320 *[84.5]*	..R6	**R928041208**	..S6	**R928041209**
10TEN0400-H20XLA00-P2,2-M-…	560 *[147.9]*	..S8	**R928041210**	..S9	**R928041211**
10TEN0630-H20XLA00-P2,2-M-…	630 *[166.4]*	..S9	**R928041223**	..S8	**R928041224**
10TEN1000-H20XLA00-P2,2-M-…	1270 *[335.5]*	..S10	**R928041225**	..S12	**R928041226**
10TE2000-H20XLA00-P2,2-M-…	1600 *[422.7]*	..S12	**R928041228**	..S10	**R928041229**
10TE2500-H20XLA00-P2,2-M-…	1680 *[443.8]*	..S12	**R928041230**	..S10	**R928041231**
10TEN0040-H10XLA00-P2,2-M-…	43 *[11.3]*	..R3	**R928041271**	..U4	**R928041272**
10TEN0063-H10XLA00-P2,2-M-…	62 *[16.4]*	..R4	**R928041273**	..U9	**R928041274**
10TEN0100-H10XLA00-P2,2-M-…	80 *[21.1]*	..R4	**R928041275**	..U9	**R928041276**
10TEN0160-H10XLA00-P2,2-M-…	190 *[50.2]*	..R5	**R928041277**	..S5	**R928041278**
10TEN0250-H10XLA00-P2,2-M-…	260 *[68.7]*	..R6	**R928041279**	..S6	**R928041280**
10TEN0400-H10XLA00-P2,2-M-…	460 *[121.5]*	..S8	**R928041281**	..S9	**R928041282**
10TEN0630-H10XLA00-P2,2-M-…	560 *[147.9]*	..S9	**R928041283**	..S8	**R928041284**
10TEN1000-H10XLA00-P2,2-M-…	970 *[256.2]*	..S10	**R928041285**	..S12	**R928041286**
10TE2000-H10XLA00-P2,2-M-…	1350 *[356.6]*	..S12	**R928041288**	..S10	**R928041289**
10TE2500-H10XLA00-P2,2-M-…	1450 *[383.0]*	..S12	**R928041290**	..S10	**R928041291**
10TEN0040-H3XLA00-P2,2-M-…	23 *[6.1]*	..R3	**R928041292**	..U4	**R928041293**
10TEN0063-H3XLA00-P2,2-M-…	35 *[9.2]*	..R4	**R928041294**	..U9	**R928041295**
10TEN0100-H3XLA00-P2,2-M-…	52 *[13.7]*	..R4	**R928041296**	..U9	**R928041297**
10TEN0160-H3XLA00-P2,2-M-…	105 *[27.7]*	..R5	**R928041298**	..S5	**R928041299**
10TEN0250-H3XLA00-P2,2-M-…	160 *[42.3]*	..R6	**R928041300**	..S6	**R928041301**
10TEN0400-H3XLA00-P2,2-M-…	290 *[76.6]*	..S8	**R928041302**	..S9	**R928041303**
10TEN0630-H3XLA00-P2,2-M-…	410 *[108.3]*	..S9	**R928041304**	..S8	**R928041305**
10TEN1000-H3XLA00-P2,2-M-…	560 *[147.9]*	..S10	**R928041306**	..S12	**R928041307**
10TE2000-H3XLA00-P2,2-M-…	900 *[237.7]*	..S12	**R928041308**	..S10	**R928041309**
10TE2500-H3XLA00-P2,2-M-…	1100 *[290.6]*	..S12	**R928041310**	..S10	**R928041311**

Standard types

Element type	Filter material/Material no.		
	H3XL	H10XL	H20XL
1.0040 …A00-0-M	**R928005835**	**R928005837**	**R928005838**
1.0063 …A00-0-M	**R928005853**	**R928005855**	**R928005856**
1.0100 …A00-0-M	**R928005871**	**R928005873**	**R928005874**
1.0160 …A00-0-M	**R928005889**	**R928005891**	**R928005892**
1.0250 …A00-0-M	**R928005925**	**R928005927**	**R928005928**
1.0400 …A00-0-M	**R928005961**	**R928005963**	**R928005964**
1.0630 …A00-0-M	**R928005997**	**R928005999**	**R928006000**
1.1000 …A00-0-M	**R928006033**	**R928006035**	**R928006036**
1.2000 …A00-0-M	**R928041312**	**R928040797**	**R928041313**
1.2500 …A00-0-M	**R928041314**	**R928040800**	**R928041315**

Ordering code, standard types: Electronic switching element for maintenance indicator

If an electric switching element with signal suppression up to 30 °C is used (WE-2SPSU-M12X1, **R928028411**), it has to be ensured that the aluminum version of the mechanical-optical maintenance indicator must be used. In the filter type key, these maintenance indicators are referred to 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.

WE — —

Maintenance indicator
Electronic switching element **= WE**

Type of signal
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
M12x1 = Round plug-in connection M12x1, 4-pin
EN 175301-803 = Rectangular plug-in connector, 2-pin design A according to EN-175301-803

Material numbers of the mechanical optical maintenance indicators

Material no.	Type	Signal	Switching points	Connector	LED
R928028409	WE-1SP-M12x1	Changeover	1	M12x1	No
R928028410	WE-2SP-M12x1	Normally open (at 75 %)/ normally closed contact (at 100 %)	2		3 pieces
R928028411	WE-2SPSU-M12x1				
R928036318	WE-1SP-EN175301-803	Normally closed contact	1	EN 175301-803	No

Order example:

Tank mounted return line filter with mechanical-optical maintenance indicator for $p_{nom.}$ = 10 bar *[145 psi]*, size 0100, with filter element 10 µm and electronic switching element M12x1 with 1 switching point for hydraulic fluid mineral oil HLP according to DIN 51524.

Filter: **10TEN0100-H10XLA00-P2,2-M-R4** **Material no.: R928041275**
El. maintenance indicator: **WE-1SP-M12x1** **Material no.: R928028409**

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

Function, section

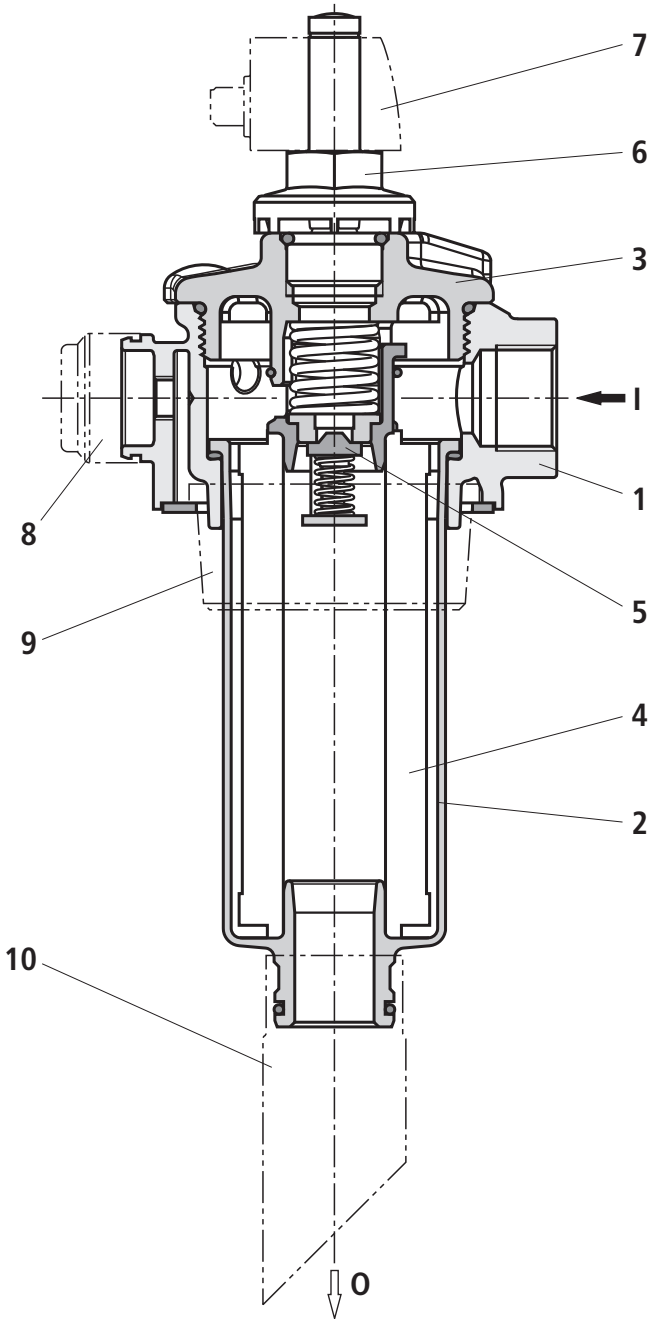
The tank mounted return line filters are designed for direct attachment to the fluid tank.

They basically consist of filter head (1), filter bowl (2), cover (3), filter element (4) as well as a serial bypass valve (5).

The filters can be configured with different maintenance indicators - here, you are shown a mechanical-optical maintenance indicator (6) in connection with an electronic switching element (7).

Depending on the filter size, more additional functions are available - e.g. a ventilation filter (8), surge protection (9) or return pipes in different lengths (10) – in this connection, also refer to the chapter "Spare parts and accessories".

During operation, the hydraulic fluid reaches the filter housing via port I, here flows through the filter element (4) in the flow direction from outside to inside and is cleaned according to the filter rating. The dirt particles filtered out settle in the filter element. Via the outlet opening 0, the filtered hydraulic fluid enters the tank.



Sample presentation using a 10TEN0063 filter.

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

general

Installation position			Vertical				
Ambient temperature range		°C *[°F]*	–10…+100 *[14…+212]* (shortly to –30 *[–22]*)				
Size		Size	0040	0063	0100	0160	0250
Weight		kg *[lbs]*	1.4 *[3.09]*	1.6 *[3.53]*	1.8 *[3.97]*	4.5 *[9.92]*	5.0 *[11.03]*
Size		Size	0400	0630	1000	2000	2500
Weight		kg *[lbs]*	8.0 *[17.64]*	10.0 *[22.05]*	18 *[39.7]*	21.5 *[47.42]*	27 *[59.55]*
Material	Filter cover		Carbon fiber reinforced plastic (sizes 0040...0100) Aluminum (sizes 0160...2500)				
	Filter head		Aluminum				
	Filter bowl		Carbon fiber reinforced plastic (sizes 0040...0630) Coated steel (sizes 1000...2500)				
	Optical maintenance indicator	(P2,2)	Plastic PA6				
		(V…)	Aluminum				
	Electronic switching element		Plastic PA6				
	Pressure gauge		Plastic				

hydraulic

Maximum operating pressure	bar *[psi]*	10 *[145]*
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 with max. operating pressure
Cracking pressure of the bypass valve	bar *[psi]*	3.5 ± 0.35 *[50.7 ± 5]*
Type of pressure measurement of the maintenance indicator		Backpressure
Response pressure of the P2,2 maintenance indicator	bar *[psi]*	2.2 (+0.45/–0.25) *[31.9 (+6.4/–3.6)]*
Response pressure of the V... maintenance indicator	bar *[psi]*	2.2 ± 0.25 *[31.9 ± 3.6]*, 1.5 ± 0.2 *[21.8 ± 2.9]*, 0.8 ± 0.15 *[11. 6 ± 2.2]*

electrical (electronic switching element)

Electrical connection			Round plug-in connection M12x1, 4-pin			Standard connection EN 175301-803
		Version	1SP-M12x1	2SP-M12x1	2SP-M12x1	1SP-EN175301-803
Contact load, direct voltage		$A_{max.}$	1			
Voltage range		$V_{max.}$	150 (AC/DC)	10-30 (DC)		250 (AC) / 200 (DC)
Max. switching power with resistive load		W	20			70
Switching type	75 % signal		–	Normally open contact		–
	100 % signal		Change-over	Normally closed contact		Normally closed contact
	2SPSU				Signal switching through at 30 °C *[86 °F]*, Return switching at 20 °C *[68 °F]*	
Display via LEDs in the electronic switching element 2SP...				Stand-by (LED green); 75 % switching point (LED yellow) 100 % switching point (LED red)		
Protection class according to EN 60529			IP 67			IP 65
Ambient temperature range		°C *[°F]*	–25…+85 *[–13…+185]*			
For direct voltage above 24 V, spark extinguishing is to be provided for protecting the switching contacts.						
Weight	Electronic switching element: – with round plug-in connection M12x1	kg *[lbs]*	0.1 *[0.22]*			

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

Filter element

Glass fiber paper H..XL		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	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

Admissible pressure differential	bar *[psi]*	30 *[435]*				
Size	Size	0040	0063	0100	0160	0250
Weight	kg *[lbs]*	0.20 *[0.44]*	0.30 *[0.66]*	0.35 *[0.77]*	0.8 *[1.76]*	1.1 *[2.42]*
Size	Size	0400	0630	1000	2000	2500
Weight	kg *[lbs]*	2.0 *[4.41]*	2.3 *[5.07]*	3.0 *[6.62]*	3.5 *[7.72]*	5.0 *[11.03]*

Seal material for hydraulic fluids

Mineral oils			Ordering code
Mineral oil	HLP	according to DIN 51524	M

Flame-resistant hydraulic fluids			Ordering code
Emulsions	HFA-E	according to DIN 24320	M
Synthetic water solutions	HFA-S	according to DIN 24320	M
Water solutions	HFC	according to VDMA 24317	M
Phosphoric acid esters	HFD-R	according to VDMA 24317	V
Organic esters	HFD-U	according to VDMA 24317	V

Fast biodegradable hydraulic fluids			Ordering code
Triglycerides (rape seed oil)	HETG	according to VDMA 24568	M
Synthetic esters	HEES	according to VDMA 24568	V
Polyglycols	HEPG	according to VDMA 24568	V

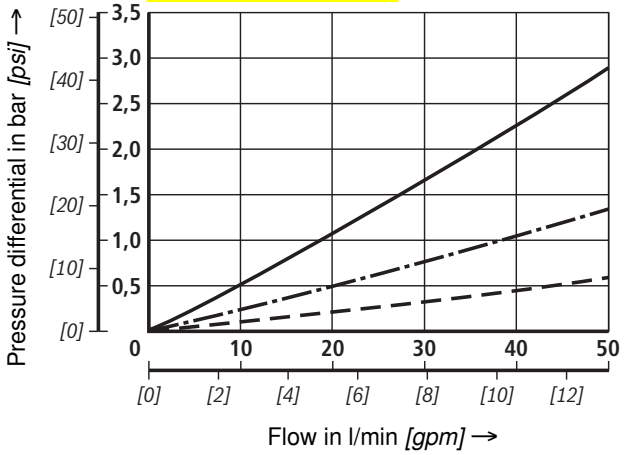
Characteristic curves (measured with mineral oil HLP46 according to DIN 51524 at T = 40 °C) *[104 °F]* H10XL

An optimal filter design and the design with other filter media and filtration ratings are enabled by our computer program "BR Filter Select".

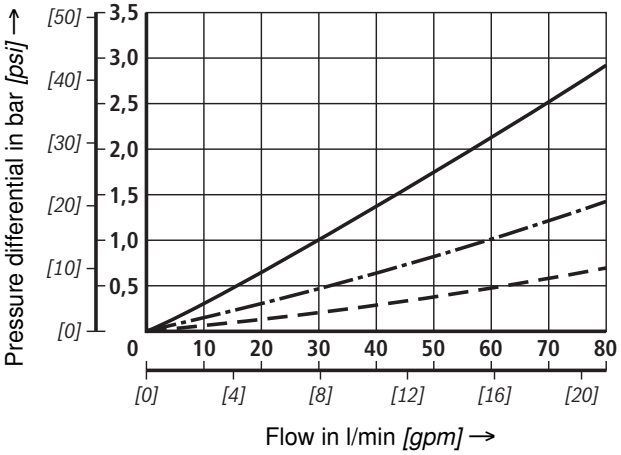
Oil viscosity:

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

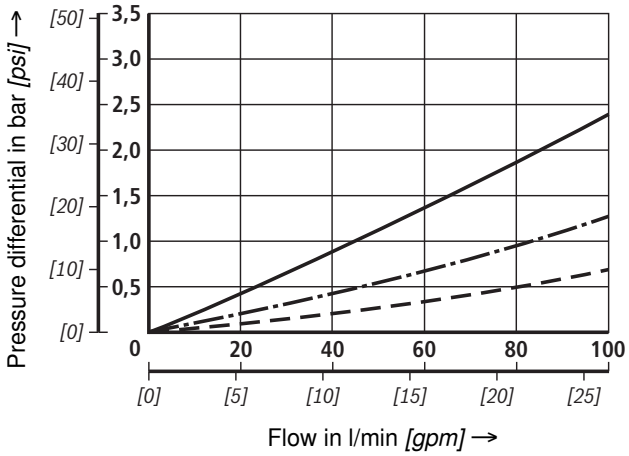
10TEN0040-H10XLA00...R3



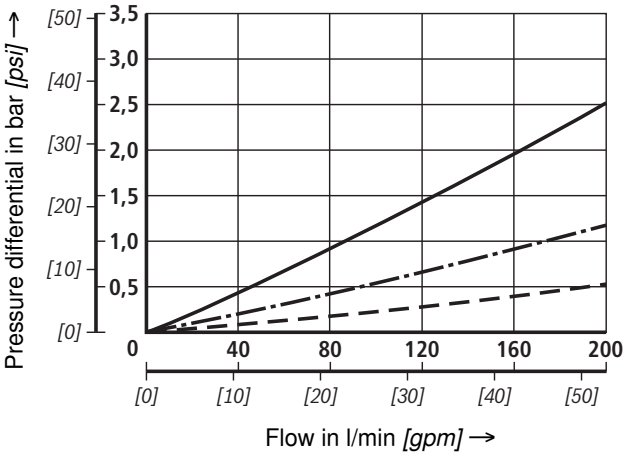
10TEN0063-H10XLA00...R4



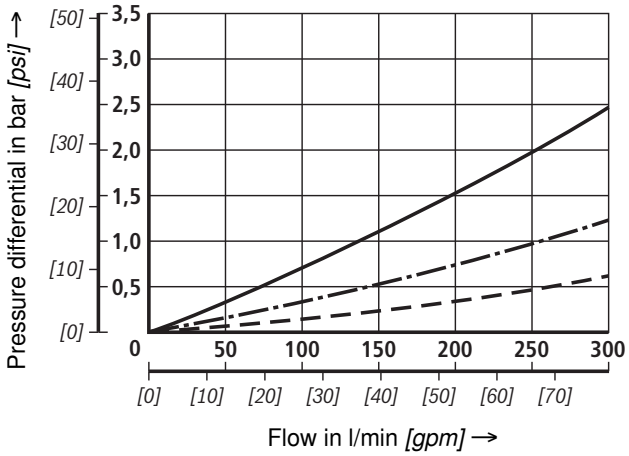
10TEN0100-H10XLA00...R4



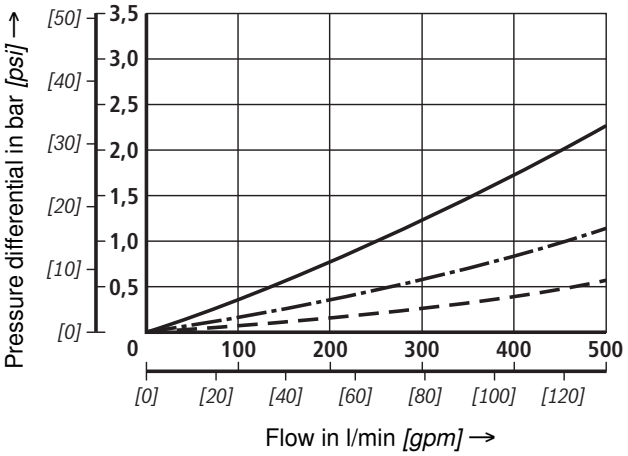
10TEN0160-H10XLA00...R5



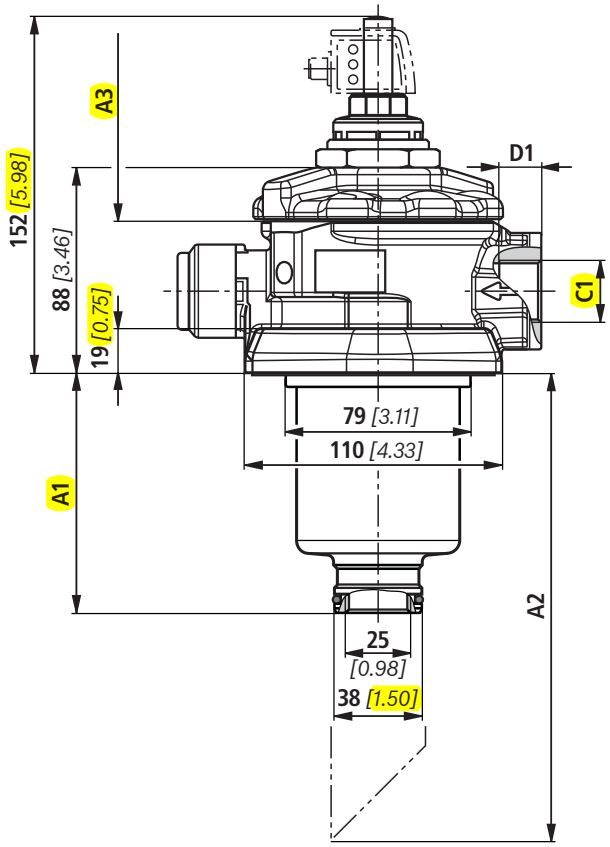
10TEN0250-H10XLA00...R6

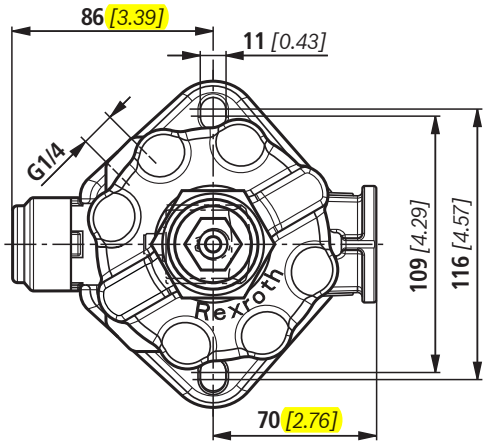


10TEN0400-H10XLA00...S8

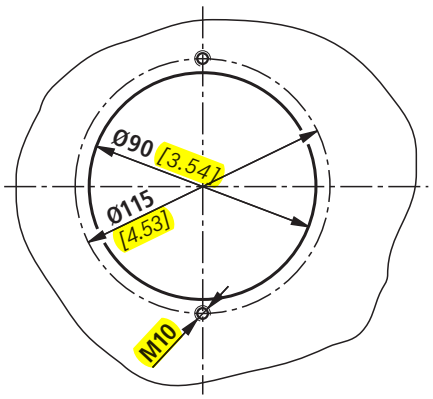


Unit dimensions size 0040...0100 (dimensions in mm *[inch]*)





Tank connection diagram:



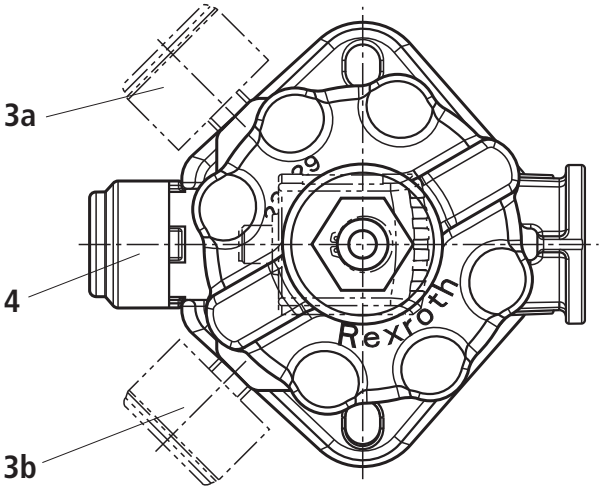
Filter housing for filter elements in accordance with DIN 24550

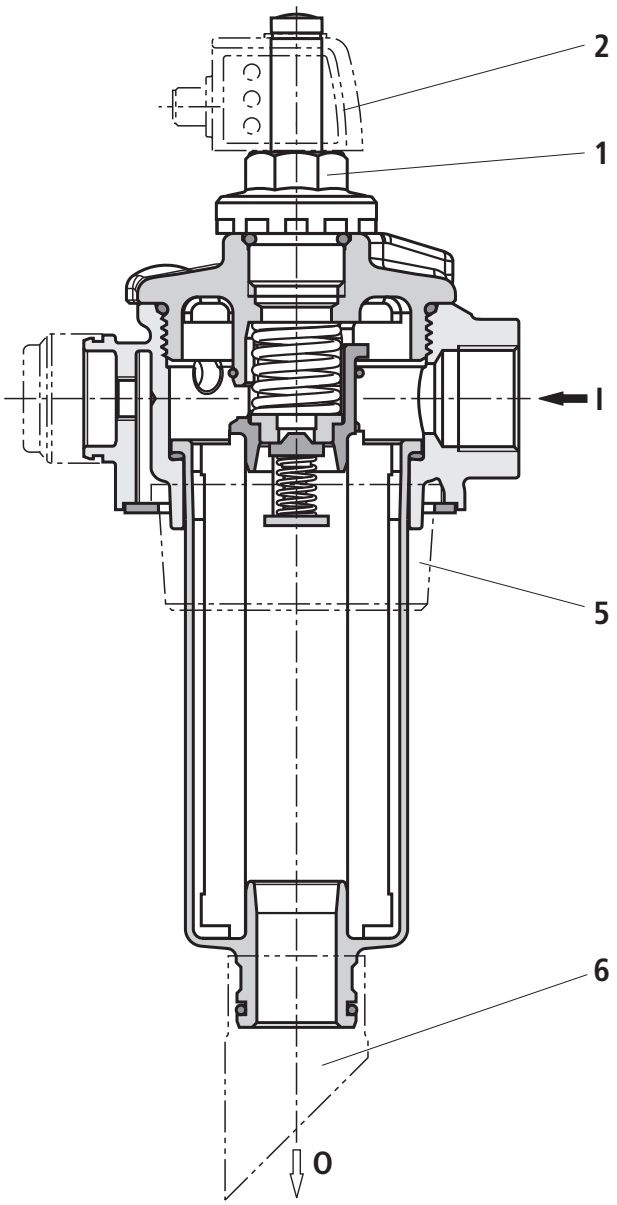
Type 10 TEN	Content in l *[gal]*	A1	A2 [1)]	A3 [2)]	C1 Standard	C1 Optional	D1
					Pipe thread according to ISO 228	Pipe thread according to SAE J1926	
0040	0.6 *[0.16]*	103 *[4.06]*	230 *[9.06]*	100 *[3.94]*	G3/4	SAE 12 1 1/16-12 UN-2B	16 *[0.63]*
0063	0.8 *[0.21]*	163 *[6.42]*	290 *[11.42]*	160 *[6.30]*	G1	SAE 16 1 5/16-12 UN-2B	18 *[0.71]*
0100	1.2 *[0.32]*	253 *[9.96]*	380 *[14.96]*	250 *[9.84]*			

1) With outlet pipe 150 mm *[5.9"]*

2) Servicing height for filter elements

Options





Sample presentation using a 10TEN0063 filter.

Options	Item	Ordering code	Filter size 0040…0100	0160…0630	1000…2500
Mechanical optical indicator	1	P2,2; V0,8; V1,5; V2,2	●	●	●
Pressure gauge right	3.a	MR	●	-	-
Pressure gauge left	3.b	ML	-	●	●
Mechanical optical + pressure gauge right	1 + 3.b	MRV2,2	●	●	●
Minimess connection	3.a or 3.b	M	●	●	●
Filling port (without maintenance indicator)	1	S	●	●	●
Outlet pipe [1)]	6	R	●	See chapter "Spare parts and accessories"	
Ventilation filter	4	F	●	-	-
Ventilation filter + surge protection	4 + 5	FN	●	-	-
Electronic switching element	2	See chapter "Ordering code, standard types"			

[1)] Outlet pipe for sizes 0040…0100 are only available pre-assembled through the complete filter.

Outlet pipes for other sizes must be ordered separately and are not pre-assembled.

For the ordering code refer to "Spare parts and accessories".

Spare parts and accessories

Mechanical optical maintenance indicator

W | O – S01 – – – 10 |

Maintenance indicator = W

Mechanical optical indicator = O

Design

Backpressure M30x1.5 = S01

Switching pressure

0.8 bar (not possible with PA version) = 0.8

1.5 bar (not possible with PA version) = 1.5

2.2 bar = 2.2

M = Seal: NBR seal

V = Seal: FKM seal

10 = Max. nominal pressure: 10 bar

PA = Housing material: Plastic

no code = Housing material: Aluminum

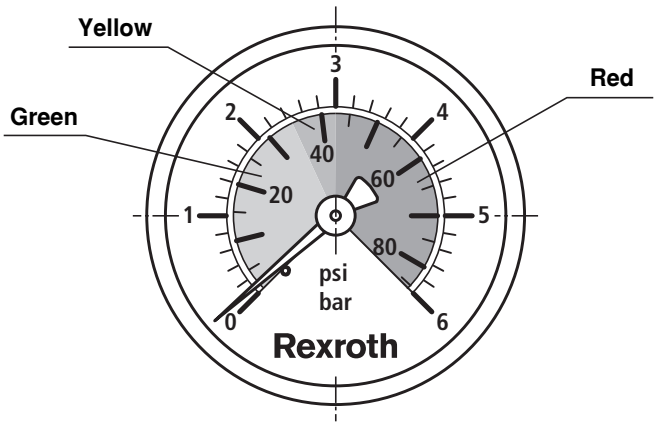
Mechanical optical maintenance indicator	Material no.
WO-S01-2,2-M-10	R901025310
WO-S01-2,2-V-10	R901066232
WO-S01-1,5-M-10	R928038776
WO-S01-1,5-V-10	R928038774
WO-S01-0,8-M-10	R928038773
WO-S01-0,8-V-10	R928038772
WO-S01-2,2-M-10-PA	R928038771
WO-S01-2,2-V-10-PA	R928038769

Ventilation filter element (only for 10TEN0040-0100)

Type	Material no.
71.001 P5-S00-0-0	R928019705

Pressure gauge

Type	Material no.
M010 0-6 bar	R928019224



Seal kit

D | 10TE | – |

Seal kit

Series 10 TE

Size

0040-0100	N0040-0100
0160-0250	N0160-0250
0400-0630	N0400-0630
1000	N1000
2000-2500	2000-2500

Seal

NBR seal = M

FKM seal = V

Seal kit	Material no.
D10TEN0040-0100-M	R928028013
D10TEN0160-0250-M	R928028014
D10TEN0400-0630-M	R928028015
D10TEN1000-M	R928039806
D10TE2000-2500-M	R928039807

Installation, commissioning and maintenance

Installation of the filter

When installing the filter make sure that

a) the required servicing height for removing the filter element and the filter bowl is available,

b) the installation opening for mounting the filter in the tank is not too large so that unobjectionable sealing is guaranteed,

c) the filter is assembled on the tank cover without tension stress, and

d) the filter housing is grounded.

The filter is designed with a two-part housing. It is to be installed into the tank with the filter bowl downward. It is recommended to lead drain pipes as of a length of 500 mm in a bracket in order to avoid oscillations caused by the fluid flow in the tank. It is to be ensured that in case of maintenance works, the filter bowl and the drain pipe are pulled out of the filter head together.

Connection of the electrical maintenance indicator

The electrical maintenance indicator is connected via the electrical 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.

When must the filter element be exchanged or cleaned respectively?

- After initial start-up of the system, the filter element is to be exchanged.
- Upon start-up in cold condition, the red pushbutton of the optical maintenance indicator may jump out and an electrical signal is output via the switching element. Only push the red pushbutton in again after the operating temperature has been reached. If it jumps out again immediately or if the electrical signal has not gone out at operating temperature, the filter element must be exchanged or cleaned respectively after the end of the shift.
- The filter element should be replaced or cleaned after max. 6 months.

Element exchange

- Switch off the system, discharge the filter on the pressure side.
- Remove the screws at the filter cover, loosen the filter cover and remove it upwards.
- Remove the filter element from the lower spigot in the filter bowl by turning it slightly.
- Check the seal rings at the filter cover and at the filter bowl for damage. If necessary, renew them. Also refer to seal kits in the "Spare parts and accessories" section.
- Renew filter element, 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 G… element also needs to be replaced.
- Check whether the type designation or material number on the replacement element corresponds to the type designation/material number on the name plate of the filter.
- Install the new or cleaned filter element on the spigot again by slightly turning it.
- Reassemble the filter in reverse order.

Classification according to pressure equipment directive 97/23/EC

The tank mounted return line filters according to 51425 are pressure holding equipment according to article 1, section 2.1.4 of the Pressure Equipment Directive 97/23/EC (PED). As the maximum operating pressure does not exceed 10 bar, they are - according to annex II diagram 4 of the PED - produced according to article 3 and not provided with a CE mark.

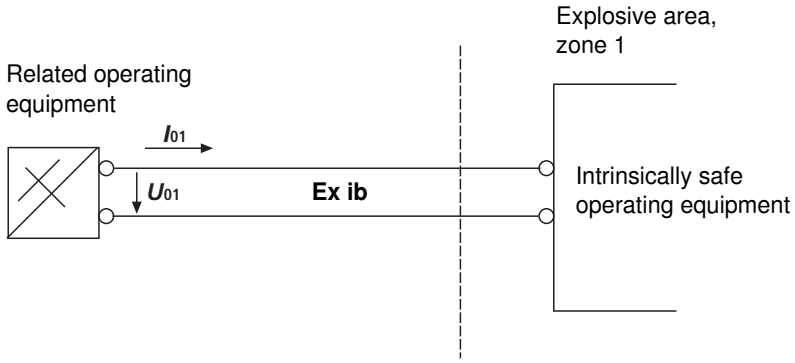
Use in explosive areas according to directive 94/9/EC (ATEX)

The tank mounted return line filters according to 51424 are no equipment or components in the sense of directive 94/9/EC and are not provided with a CE mark.

According to DIN EN 60079-11, the electronic maintenance indicators WE-1SP-M12x1 are simple, electronic operating equipment not having an own voltage source. This simple, electronic operating equipment may - according to DIN EN 60079-14 - in intrinsically safe electrical circuits (EEx ib) be used in systems for device group II, category 2G (zone 1) and category 3G (zone 2) without marking and certification. The operating equipment is assigned to explosion group II B and temperature class T5.

When using Rexroth filters in explosive areas, potential equalization must always be ensured.

Possible circuit according to DIN EN 60079-14



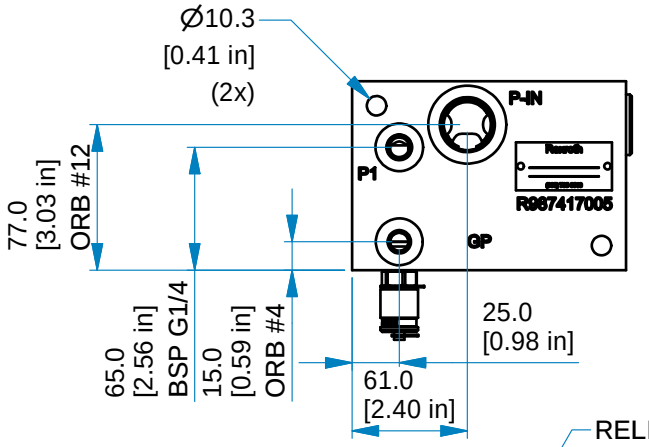
The manufacturer's declaration according to DIN EN 13463 is available for this filter separately, with Material no. R928028899.

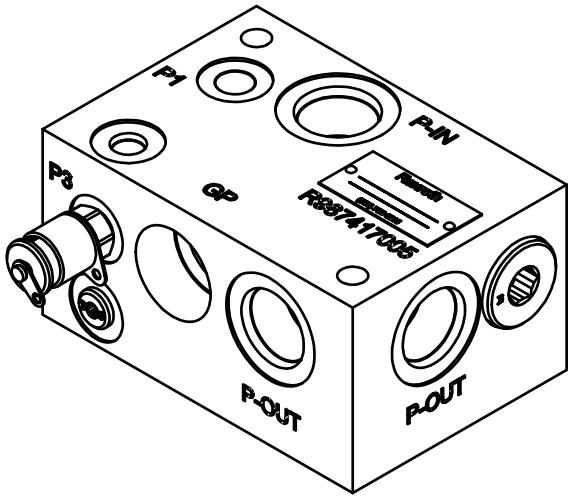
Notes

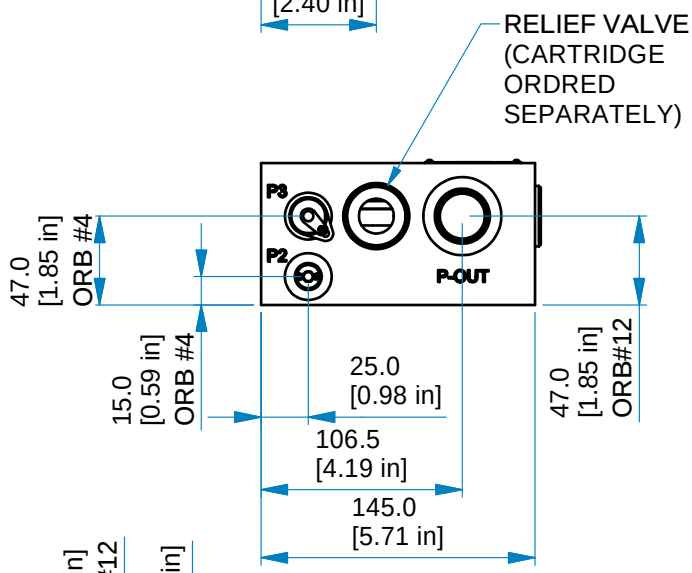
Bosch Rexroth Filtration Systems GmbH
Hardtwaldstraße 43, 68775 Ketsch, Germany
POB 1120, 68768 Ketsch, Germany
Phone +49 (0) 62 02 / 6 03-0
Fax +49 (0) 62 02 / 6 03-1 99
brfs-support@boschrexroth.de
www.eppensteiner.de

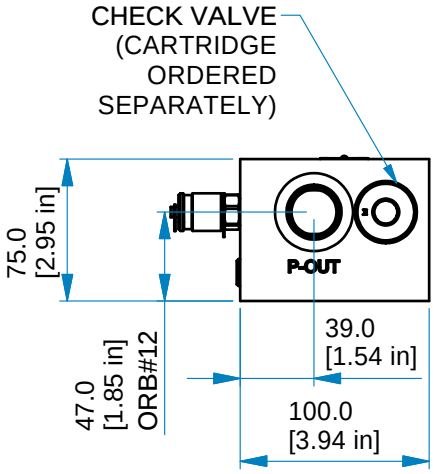
RexPak - Relief and Check Valve block (1 : 4)

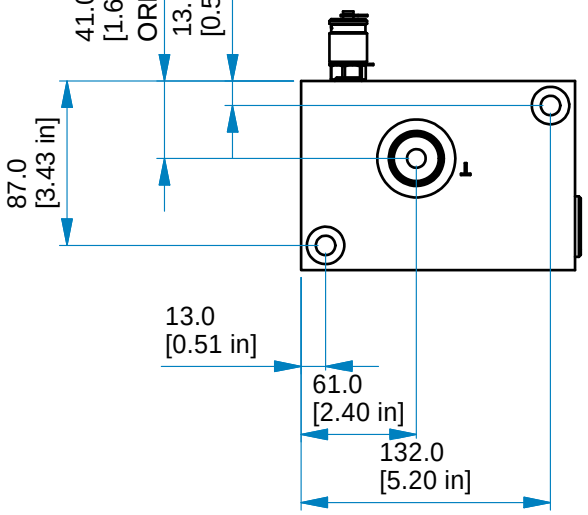
R987417005 (ELECTROLESS NICKEL COATING)

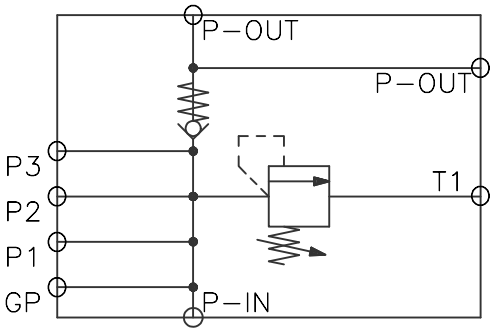








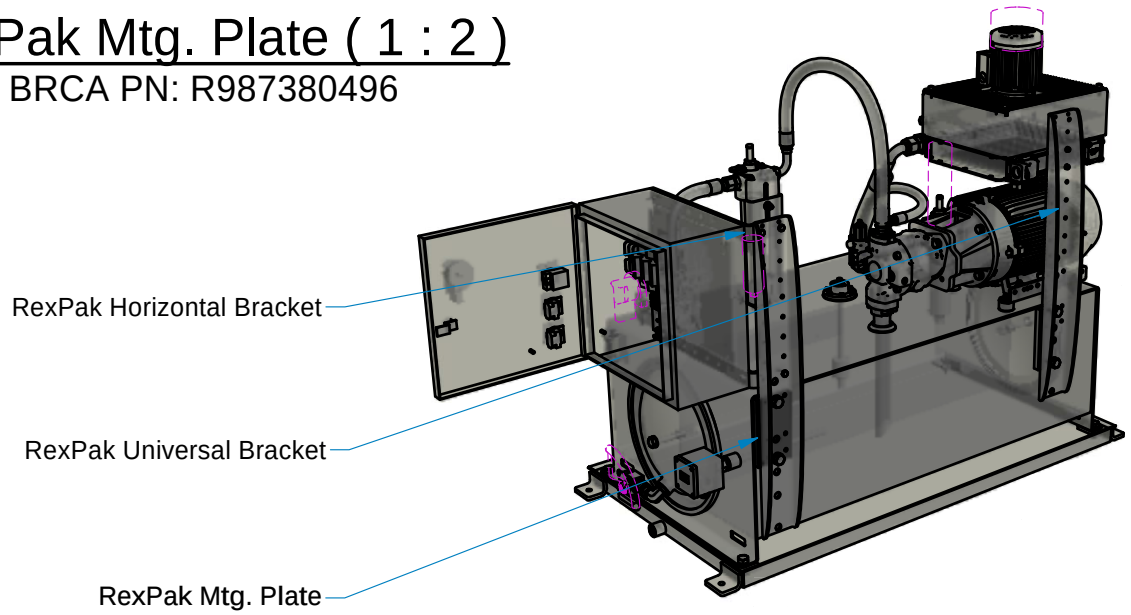


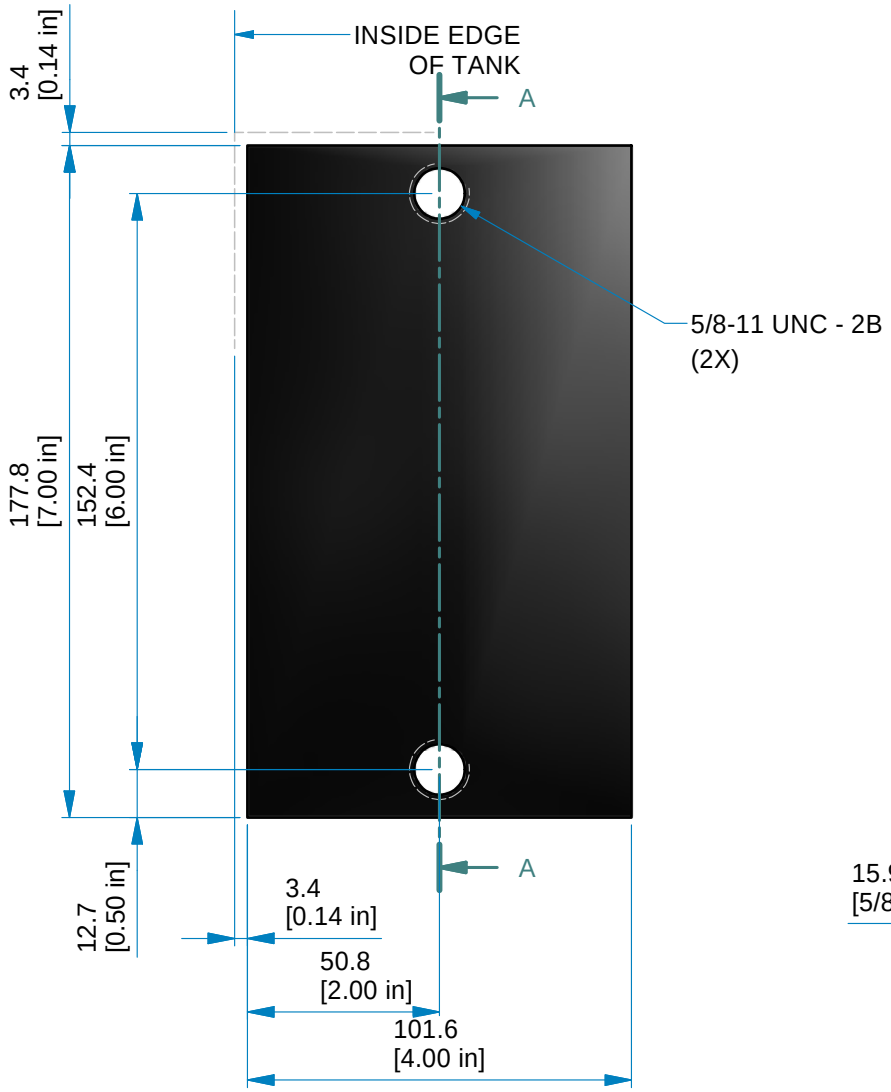


Flow	Pressure	Relief Valve	Check Valve	Weight
32 GPM	3500 PSI	DBD10K...	M-SR15KE...	16 lbs

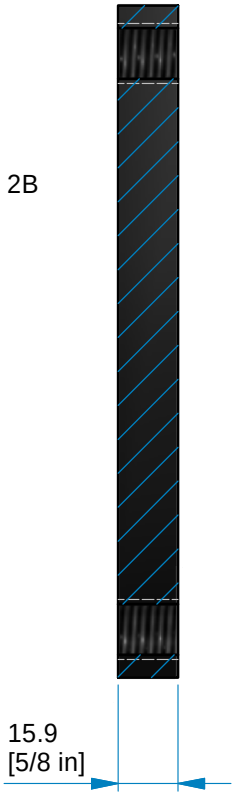
RexPak Mtg. Plate (1 : 2)

BRCA PN: R987380496





A-A (1 : 2)



Controls
Enclosed Non-Combination Starters - PESW Series

NEMA 4/4X Non Metallic Enclosure – Product Features

WEG offers non-reversing and non-combination NEMA-4X magnetic starter up to 75HP at 460V.

Featuring components that meet IEC design standards and UL horse-power ratings, incorporating WEG contactors and overload relays, the PESW magnetic starters are ideal to protect motors and ensure reliable operation year-after-year. Assembled together in a NEMA 4X enclosure with two options off the shelf: Start/Stop Pushbutton and RESET or just the RESET button on the cover for quick and easy operation.

WEG PESW starters are recommended for all single and three phase applications where across-the-line starters can be applied.

Certifications

Controls
Enclosed Non-Combination Starters - PESW Series

Start/Stop **contacts independent** from main contactor and from thermal overload relay

Ground and Neutral
(supplied as standard)

Thermal overload relay reset integrated to the stop button up to 30Hp, 460V

Enclosure:
NEMA 4X

MAIN CHARACTERISTICS AND FEATURES

- High horsepower ratings in four compact sizes
- Bimetallic Overload Relays
- Adjustable trip current
- Direct heated bimetallic elements – class 10
- Ambient temperature compensated
- Phase-loss sensitivity protection
- Selectable Manual or Automatic RESET
- Electrically isolated NO-NC auxiliary contacts
- NEMA 4X polymeric enclosure with knockouts

Controls
Enclosed Non-Combination Starters - PESW Series

Catalog part number composition

STARTER TYPE

PESW: Enclosed Starter WEG - Non-Combination, Non-reversing

P	E	S	W	S	-	5	0	V	2	4	A	X	-	R	M	3	8

No. OF PHASES

BLANK: Three-phase
S: Single-phase. Assembled with 2 pole special contactors and overlaods

CWM SERIES

9 : CWM9
12 : CWM12
18 : CWM18
25 : CWM25
32 : CWM32
40 : CWM40
50 : CWM50
65 : CWM65
80 : CWM80
95 : CWM95
105 : CWM105

CONTROL VOLTAGE

V18: 120V
V24: 208-240V
V47: 480V

PILOT DEVICE

A: Start & Stop/Reset Pushbutton
E: Reset Pushbutton

ENCLOSURE TYPE

X: Type 4X - Outdoor

OVERLOAD RELAY AMPERE RANGE

SINGLE-PHASE Class 10

RM26: RW27-1D2-U004 (2.8 - 4.0A)
RM27: RW27-1D2-D063 (4.0 - 6.3A)
RM28: RW27-1D2-U008 (5.6 - 8.0A)
RM29: RW27-1D2-U010 (7.0 - 10A)
RM30: RW27-1D2-D125 (8.0 - 12.5A)
RM31: RW27-1D2-U015 (10 - 15A)
RM32: RW27-1D2-U017 (11 - 17A)
RM33: RW27-1D2-U023 (15 - 23A)
RM34: RW27-1D2-U032 (22 - 32A)
RM35: RW67-1D2-U040 (25 - 40A)
RM36: RW67-2D2-U040 (25 - 40A)
RM37: RW67-1D2-U050 (32 - 50A)
RM38: RW67-2D2-U050 (32 - 50A)

OVERLOAD RELAY AMPERE RANGE

THREE-PHASE Class 10

R23: RW27-1D3-D012 (0.8 - 1.2A)
R24: RW27-1D3-D018 (1.2 - 1.8A)
R25: RW27-1D3-D028 (1.8 - 2.8A)
R26: RW27-1D3-U004 (2.8 - 4.0A)
R27: RW27-1D3-D063 (4.0 - 6.3A)
R28: RW27-1D3-U008 (5.6 - 8.0A)
R29: RW27-1D3-U010 (7.0 - 10A)
R30: RW27-1D3-D125 (8.0 - 12.5A)
R31: RW27-1D3-U015 (10 - 15A)
R32: RW27-1D3-U017 (11 - 17A)
R33: RW27-1D3-U023 (15 - 23A)
R34: RW27-1D3-U032 (22 - 32A)
R35: RW67-1D3-U040 (25 - 40A)
R36: RW67-2D3-U040 (25 - 40A)
R37: RW67-1D3-U050 (32 - 50A)
R38: RW67-2D3-U050 (32 - 50A)
R39: RW67-2D3-U057 (40 - 57A)
R40: RW67-2D3-U063 (50 - 63A)
R41: RW67-2D3-U070 (57 - 70A)
R42: RW67-2D3-U080 (63 - 80A)
R43: RW117-2D3-U080 (63 - 80A)
R44: RW117-1D3-U097 (75 - 97A)
R45: RW117-1D3-U112 (90 - 112A)

Controls
Enclosed Non-Combination Starters - PESW Series

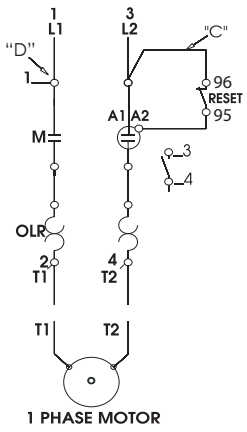
PESW Series - Non-combination Across the line starter											
Three-Phase Enclosure Type - 4X											
Max. UL Horsepower				Box	Setting Range	Coil Voltage	RESET only[5]		START/STOP + RESET		Multiplier Symbol
200V	230V	460V	575V				Catalog Number	List Price	Catalog Number	List Price	
-	1/3	1/2	-	04	0.8 - 1.2	120	PESW-9V18EX-R23	$148	PESW-9V18AX-R23	$163	Z3
						208-240	PESW-9V24EX-R23		PESW-9V24AX-R23		
						480	PESW-9V47EX-R23		PESW-9V47AX-R23		
-	-	1	1	04	1.2 - 1.8	120	PESW-9V18EX-R24	$148	PESW-9V18AX-R24	$163	Z3
						480	PESW-9V47EX-R24		PESW-9V47AX-R24		
1/2	3/4	1-1/2	2	04	1.8 - 2.8	120	PESW-9V18EX-R25	$148	PESW-9V18AX-R25	$163	Z3
						208-240	PESW-9V24EX-R25		PESW-9V24AX-R25		
						480	PESW-9V47EX-R25		PESW-9V47AX-R25		
1	1	2	3	04	2.8 - 4.0	120	PESW-9V18EX-R26	$148	PESW-9V18AX-R26	$163	Z3
						208-240	PESW-9V24EX-R26		PESW-9V24AX-R26		
						480	PESW-9V47EX-R26		PESW-9V47AX-R26		
1-1/2	1-1/2	3	5	04	4.0 - 6.3	120	PESW-9V18EX-R27	$148	PESW-9V18AX-R27	$163	Z3
						208-240	PESW-9V24EX-R27		PESW-9V24AX-R27		
						480	PESW-9V47EX-R27		PESW-9V47AX-R27		
2	2	5	-	04	5.6 - 8.0	120	PESW-9V18EX-R28	$148	PESW-9V18AX-R28	$163	Z3
						208-240	PESW-9V24EX-R28		PESW-9V24AX-R28		
						480	PESW-9V47EX-R28		PESW-9V47AX-R28		
3	3	-	7-1/2	04	7.0 - 10	120	PESW-9V18EX-R29	$148	PESW-9V18AX-R29	$163	Z3
						208-240	PESW-9V24EX-R29		PESW-9V24AX-R29		
-	-	7-1/2	10	04	8.0 - 12.5	120	PESW-12V18EX-R30	$165	PESW-12V18AX-R30	$180	Z3
						480	PESW-12V47EX-R30		PESW-12V47AX-R30		
5	5	10	15	04	11 - 17	120	PESW-18V18EX-R32	$179	PESW-18V18AX-R32	$194	Z3
						208-240	PESW-18V24EX-R32		PESW-18V24AX-R32		
						480	PESW-18V47EX-R32		PESW-18V47AX-R32		
7-1/2	7-1/2	15	-	04	15 - 23	120	PESW-25V18EX-R33	$204	PESW-25V18AX-R33	$219	Z3
						208-240	PESW-25V24EX-R33		PESW-25V24AX-R33		
						480	PESW-25V47EX-R33		PESW-25V47AX-R33		
10	10	20	25	06	22 - 32	120	PESW-32V18EX-R34	$262	PESW-32V18AX-R34	$277	Z3
						208-240	PESW-32V24EX-R34		PESW-32V24AX-R34		
						480	PESW-32V47EX-R34		PESW-32V47AX-R34		
10	15	30	-	06	25 - 40	120	PESW-40V18EX-R35	$321	PESW-40V18AX-R35	$336	Z3
						208-240	PESW-40V24EX-R35		PESW-40V24AX-R35		
						480	PESW-40V47EX-R35		PESW-40V47AX-R35		
15	15	30	40	08	32 - 50	120	PESW-50V18EX-R38	$564	PESW-50V18AX-R38	$579	Z3
						208-240	PESW-50V24EX-R38		PESW-50V24AX-R38		
						480	PESW-50V47EX-R38		PESW-50V47AX-R38		
20	20	40	50	08	40 - 57	120	PESW-65V18EX-R39	$589	PESW-65V18AX-R39	$604	Z3
						208-240	PESW-65V24EX-R39		PESW-65V24AX-R39		
						480	PESW-65V47EX-R39		PESW-65V47AX-R39		
-	25	50	60	08	57 -70	120	PESW-80V18EX-R41	$635	PESW-80V18AX-R41	$650	Z3
						208-240	PESW-80V24EX-R41		PESW-80V24AX-R41		
						480	PESW-80V47EX-R41		PESW-80V47AX-R41		
25	30	60	75	10	63 - 80	120	PESW-95V18EX-R43	$1,085	PESW-95V18AX-R43	$1,100	Z3
						208-240	PESW-95V24EX-R43		PESW-95V24AX-R43		
						480	PESW-95V47EX-R43		PESW-95V47AX-R43		
30	-	75	-	10	75 - 97	120	PESW-105V18EX-R44	$1,184	PESW-105V18AX-R44	$1,199	Z3
						480	PESW-105V47EX-R44		PESW-105V47AX-R44		
-	40	-	-	10	90 -112	120	PESW-105V18EX-R45	$1,184	PESW-105V18AX-R45	$1,199	Z3
						208-240	PESW-105V24EX-R45		PESW-105V24AX-R45		

Notes:
1) OLR must be set with FLA of the motor
2) 3-phase starters with 120V coil are wired for separate control
3) 3-phase starters can be wired for single-phase applications
4) 575V starters are available only with 120V coil
5) Only starters with 120V coil are stocked. Availability on other voltages under request.

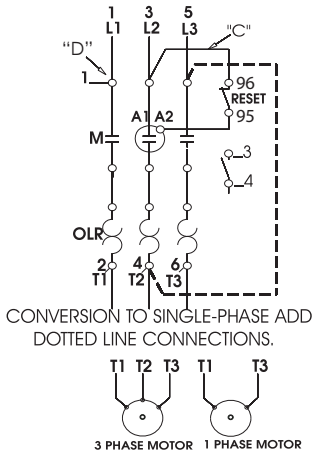
Controls
Enclosed Non-Combination Starters - PESW Series

WIRING DIAGRAM

Single-phase Starter



Three-phase Starter

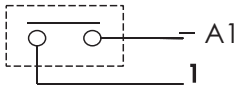


Separate Control

FOR SEPARATE CONTROL, REMOVE WIRES "C" AND "D" IF SUPPLIED AND CONNECT SEPARATE CONTROL LINES TO TERMINAL Nº 96 ON THE OVERLOAD RELAY AND TO TERMINAL Nº _3 ON THE AUX. CONTACT BLOCK (FOR 3 WIRE CONTROL) OR TO THE CONTACTOR COIL Nº A1 (FOR 2 WIRE CONTROL).

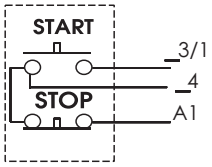
Pilot Devices

2 Wire Control



NOT FOR USE WITH AUTO RESET OL RELAYS.

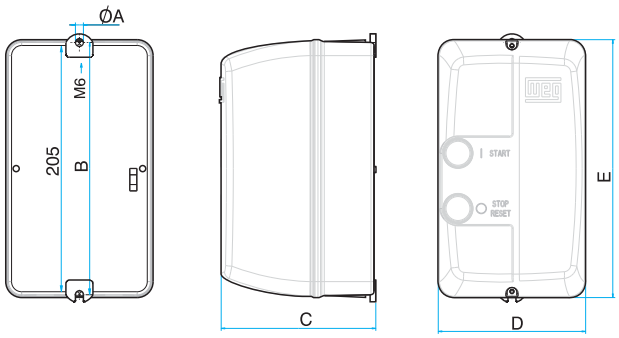
3 Wire Control



DIMENSIONS

SIZE 04 mm(in)	SIZE 06 mm (in)	SIZE 08 mm (in)	SIZE 10 mm (in)
øA = 4.5 (0.2)	øA = 6.5 (0.3)	øA = 6.0 (0.2)	øA = 7.0 (0.3)
B = 180 (7.1)	B = 205 (8.1)	B = 275 (10.8)	B = 355 (14.0)
C = 111 (4.4)	C = 126 (5.0)	C = 143 (5.6)	C = 167 (6.6)
D = 105 (4.1)	D = 120 (4.7)	D = 180 (7.1)	D = 250 (9.9)
E = 185 (7.3)	E = 210 (8.3)	E = 280 (11.0)	E = 360 (14.2)

Provision for cable gland fitting	Standard		
	Top	Bottom	Back
Size 04	2 x 1/2"	2 x 1/2"	ø18mm (0.7in)
Size 06	2 x 1/2" and 3/4"	2 x 1/2" and 3/4"	ø22mm (0.9in)
Size 08	2 x 3/4" and 1"	2 x 3/4" and 1"	-
Size 10	2 x 3/4" and 1"	2 x 3/4" and 1"	-
	1 x 1" and 1 1/4"	1 x 1" and 1 1/4"	-



For wall mounting on starters size 08 and 10, four screws with the following characteristics should be used:
- Pan, dome or rounded shaped head;
- Starter size 08:
  - Screws size 1/4 (or M6 – ISO Standard);
  - Dimensions: diameter thread shall be maximum 1/4 in and diameter head shall be maximum 15/64 in.
- Starter size 10:
  - Screws size 12 (or M5 – ISO Standard);
  - Dimensions: diameter thread shall be maximum 0.236 in and diameter head shall be maximum 0.394 in.

Check valve, cartridge type

RE 20380/03.11 1/8
Replaces: 11.10

Type M-SR

Sizes 6 to 30
Component series 1X
Maximum operating pressure 315 bar
Maximum flow 400 l/min


H7004

Table of contents

Features

- For installation in manifold blocks
  - as angle valve
  - as straight valve
- Leak-free closure in one direction
- Various cracking pressures, optional (see ordering code)

Information on available spare parts:
www.boschrexroth.com/spc

Ordering code

M-SR | | | **–1X/** | *

Check valve, cartridge design **= M-SR**

Size 6 (not as angle valve) **= 6**
Size 8 **= 8**
Size 10 **= 10**
Size 15 **= 15**
Size 20 **= 20**
Size 25 **= 25**
Size 30 **= 30**

Component design
Angle valve **= KE**
Straight valve **= KD**

Further details in clear text

Seal material
No code = NBR seals
V = FKM seals (with angle valve only)
Important!
Observe compatibility of seals with hydraulic fluid used!

1X = Component series 10 to 19 (10 to 19: unchanged installation and connection dimensions)

Cracking pressure (see characteristic curves on pages 4 and 5)
00 = Without spring (not for straight valve)
02 =
05 = (Standard)
15 =
30 =
50 =

Standard types

Type	Material number
M-SR 6 KD05-1X/	R900301889
M-SR 8 KE02-1X/	R900357438
M-SR 8 KE05-1X/	R900346083
M-SR 10 KE05-1X/	R900344549
M-SR 15 KE02-1X/	R900348943
M-SR 15 KE05-1X/	R900345372

Type	Material number
M-SR 20 KE02-1X/	R900345744
M-SR 20 KE05-1X/	R900340979
M-SR 25 KE05-1X/	R900344778
M-SR 30 KE05-1X/	R900344919

Further standard types and components can be found in the EPS (standard price list).

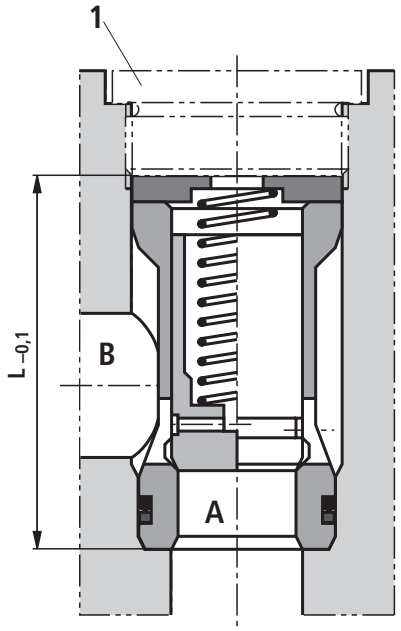
Symbols

With spring

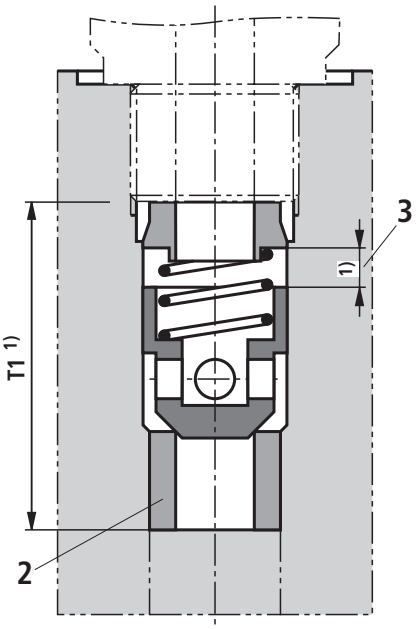
Without spring

Sections

Angle valve



Straight valve



Size	$L_{-0,1}$
8	36,3
10	39,3
15	45,8
20	55,3
25	74,3
30	83,3

1 Plug screws, separate order, see page 6 and 7

2 Seat, shrink-fit at –60 °C

3 Poppet stroke

1) For dimensions, see installation drawing

Technical data (for applications outside these parameters, please consult us!)

General

Sizes	Size	6	8	10	15	20	25	30
Weight – Angle valve	kg	–	0.03	0.05	0.08	0.14	0.32	0.47
– Straight valve	kg	0.05	0.05	0.05	0.1	0.2	0.25	0.3
Installation orientation		Optional						
Ambeint temperature range	°C	–20 to +80 (NBR seals) –20 to +80 (FKM seals)						

Hydraulic

Maximum operating pressure	bar	315
Cracking pressure	bar	See characteristic curves on pages 4 and 5
Maximum flow	l/min	See characteristic curves on pages 4 and 5
Hydraulic fluid		Mineral oil (HL, HLP) to DIN 51524 [1]; fast bio-degradable hydraulic fluids to VDMA 24568 (see also data sheet 90221); HETG (rape seed oil) [1]; HEPG (polyglycols) [2]; HEES (synthetic esters) [2]; other hydraulic fluids on enquiry
Hydraulic fluid temperature range	°C	–30 to +80 (for NBR seals) –20 to +80 (for FKM seals)
Viscosity range	mm^2/s	2.8 to 500
Max. permissible degree of contamination of the hydraulic fluid - cleanliness class to ISO 4406 (c)		Class 20/18/15 [3]

1) Suitable for NBR and FKM seals

2) Suitable only for FKM seals

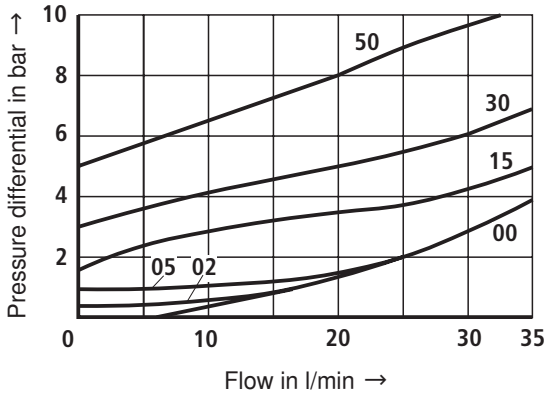
3) The cleanliness class stated for the components must be adhered too in hydraulic systems. Effective filtration prevents faults from occurring and at the same time increases the component service life.

For the selection of the filters see www.boschrexroth.com/filter.

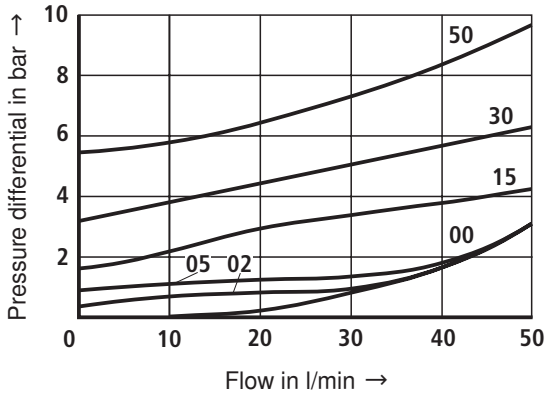
Characteristic curves (measured with HLP46, ϑ_{oil} = 40 °C ± 5 °C) – angle valve

Pressure differential *Δp* in dependence upon flow q_V at cracking pressure

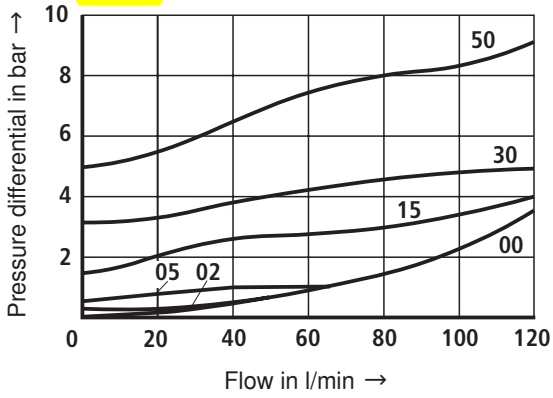
Size 8



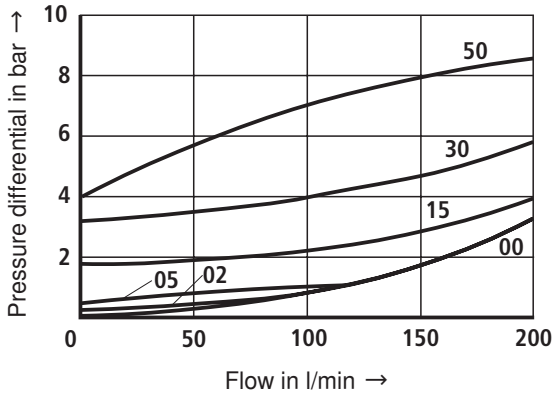
Size 10



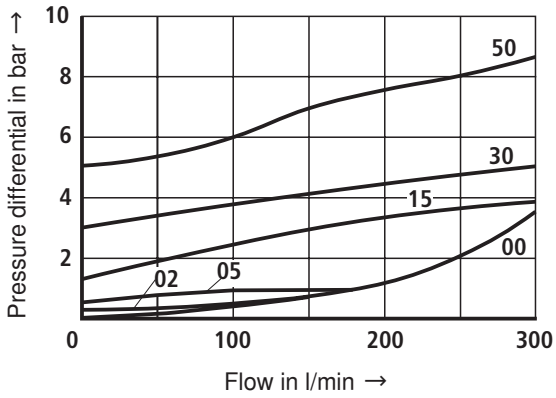
Size 15



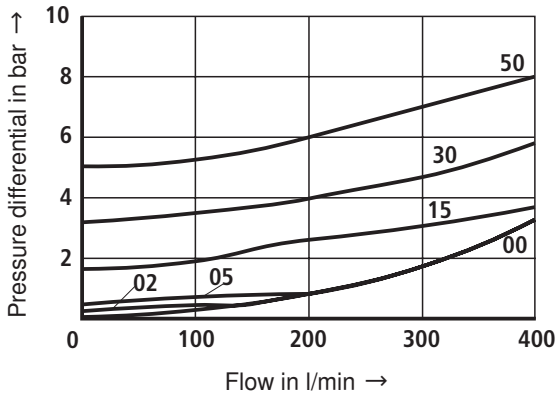
Size 20



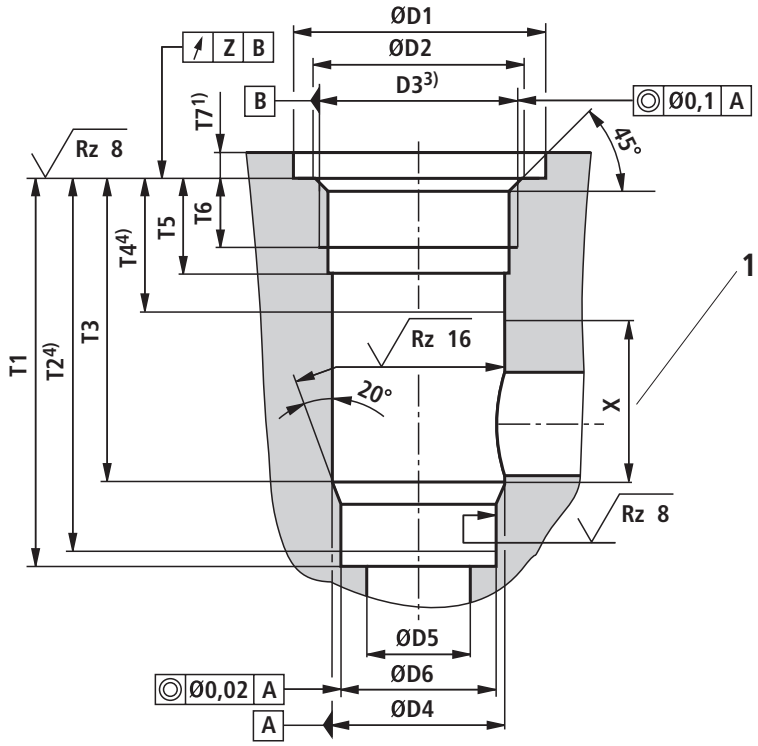
Size 25



Size 30



Mounting cavity: Angle valve **for plug screw to RN 143.21** (dimensions in mm)



1 Area for drain bore

Size	Plug screws 2) Material no.	p_N in bar	ØD1	ØD2	D3	ØD4H8	ØD5	ØD6H7
8	R900002423	315	23	17.1	G3/8 3)	14	8	13
10	R900002422	315	28	21.4	G1/2 3)	18	10	17
15	R900012091	315	33	26.8	G3/4 3)	24	15	22
20	R900002424	315	41	33.8	G1 3)	30	20	28
25	R900012411	250	51	42.5	G1 1/4 3)	38	25	36
30	R900012412	250	56	48.5	G1 1/2 3)	44	30	42

Size	T1 +0.1	T2	T3	T4	T5	T6	T7 +0.5	T8 +0.2	X	Z
8	48.5	47.5	38.5	20	15	12	6	–	18	0.05
10	53.5	52.5	43.5	24	18	14	6	–	19	0.05
15	62	60.5	50	26	20.5	16	6	–	24	0.05
20	71.5	70	56.5	26	20.5	16	7	–	30	0.05
25	90.5	88	72.5	28	22	16	7	–	43	0.1
30	99.5	96.5	79.5	31	22	16	7	–	48	0.1

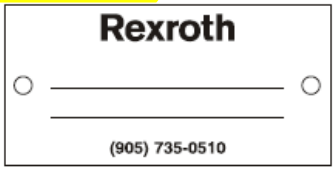
1) Dimension for countersinking the screw head. When installing the cartridge more deeply, extend dimension T7 accordingly.

2) Order separately, with NBR seal

3) Pipe thread "G…" to ISO 228/1

4) Depth of fit

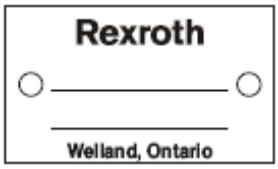
2.3 Nameplate for Standard Manifold Assemblies



Part Number: 219176
Model Code: NAMEPLATE - REXROTH - ALUM - 51mmx25mm
Material: Aluminum with two rivet holes

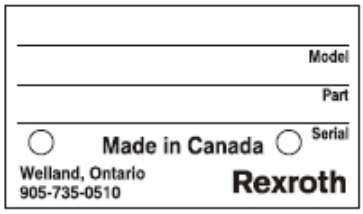
Part Number: 219182
Model Code: NAMEPLATE - REXROTH - 304SS - 51mmx25mm
Material: 304 Stainless Steel with two rivet holes

2.4 Nameplate for Small Manifold Assemblies



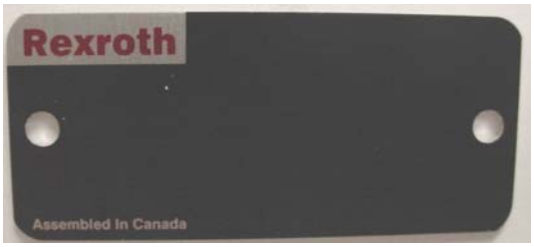
Part Number: 219178
Model Code: NAMEPLATE - REXROTH - ALUM - 32mmx19mm
Material: Aluminum with two rivet holes

2.5 Nameplate for MP18 Valve Assemblies - Used for sander control boxes and dual conveyor boxes



Part Number: 219181
Model Code: NAMEPLATE - REXROTH - SS - MP18 VALVE
Material: Stainless Steel, 2B finish with two rivet holes

2.6 Nameplate for M4 Valve Assemblies



Part Number: 216028
Model Code: NAMEPLATE - REXROTH -ALUM- M4 22mmX50mm
Material: Aluminum with two rivet holes

Screw plugs

analog ISO 11926, with hexagon socket, UNF-, UN- threads and O-ring

Edition: 2014-08-01
Editor: DC/ESP1
Reference: -
Ref.-Edition: -

Mechanical systems and Components

Replacement for
ZN 10007 : 2012-01-11

Table of contents

Amendments

Compared to ZN 10007 : 2012-01-11 following essential modifications were carried out:

a) Section 5 Introduced marking thread
Footnote 4 and 6 supplemented
Radius of the undercut 0.3 +0.2 changed in to 0.5

b) Section 5.1 table 1: dimensions d_4 and t_3 to size 1 3/16-12 UN deleted
dimensions d_4 adjusted to RNM 02106
dimensions t_1 adjusted to RNM 02106
dimensions s adjusted to RNM 02106
Material number R902650717 supplemented

c) Section 5.2 coating system in the procedure corrected

d) Technical specification supplemented

e) Normative references updated

f) Editorial changes

Document language: en Translation: de → en Dept.: DC/ESP1
Original language: de Date: 2014-08-01 Name: -
In case of doubt the original language edition of this standard applies.

Bosch Rexroth AG
P.O. Box
97814 Lohr a. Main
Germany

	created	*checked*	*approved*
Dept.:	DC/ESP11	DC/ESP11	DC-MA/ENP
Name:	M. Hascher	M. Langer	Dr. B. Menz (per e-mail)
BWN:	718	718	CN3

Former editions

Table 1

RNM 02106-000 : 2005-04-14 ▷	**ZN 10007-000 : 2011-05-20** ▷	**ZN 10007-000 : 2012-01-11**

1 Aim

This standard describes screw plugs with screwed ends analog ISO 11926-4 for sealing of thread holes according to ISO 11926 UNF-, UN- thread according to ANSI/ASME B 1.1.

The pressures and tightening torques in table 2 are based on a minimum tensile strength of $R_{m\,min}$ = 250 MPa for the steel/cast steel material of the screw plug hole.
The screw plugs are sealed by a O-ring according to N 02.079.

2 Scope

This standards applies within Bosch Rexroth AG (including indirect assigned companies), its subsidiaries and regional subsidiary for the product area of following Business unit:

- Mobile Applications
  - Pumps and Motors

For affiliated companies it is recommended to adopt the directive by own resolution correspondingly.

3 Terminology and abbreviations

Terminology database
You will find DC-comprehensive abbreviations, terms and their definitions in the terminology database:
https://rb-wam.bosch.com/socos-dc/TERMOS/START_EN

Abbreviations

BNR	= Term code (*according to ZN 01210*)

DC organizational units

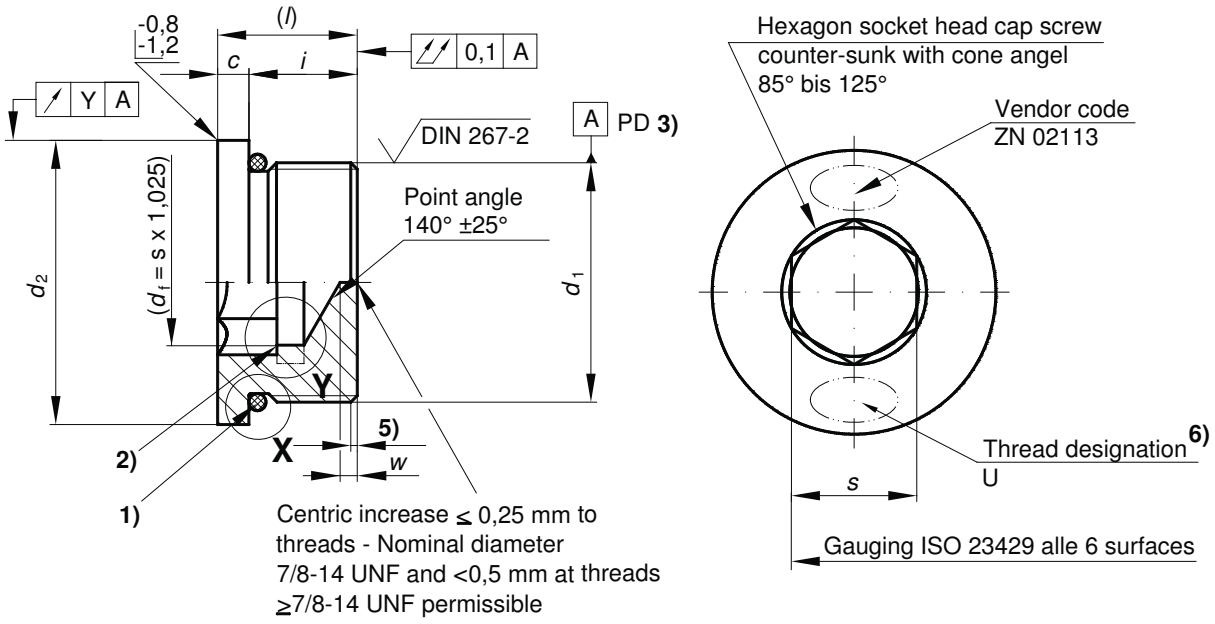
DC	= Drive and Control Technology
DC/ESP1	= Engineering Standards and Processes, Organization and Company Standards
DC/ESP2	= Engineering Standards and Processes, Material Master and Classification
DC-MA	= Business Unit Mobile Applications
DC-MA/NE1	= Vice President Engineering Pumps and Motors

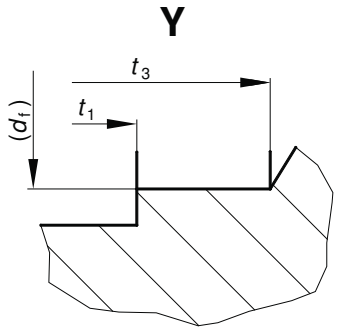
4 Responsibilities

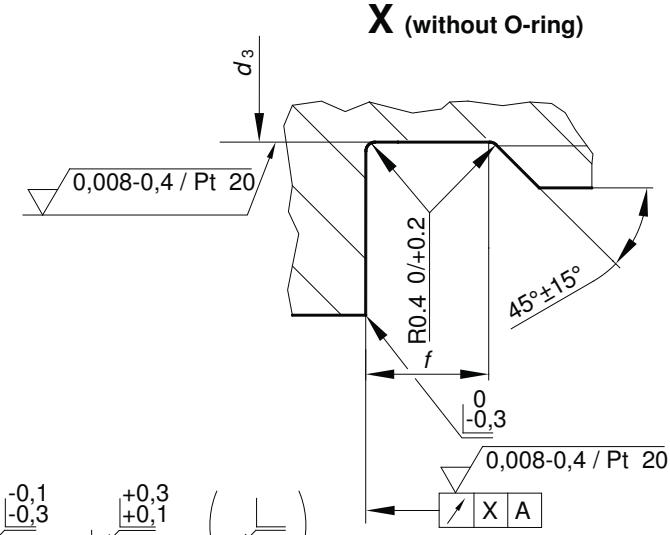
- **DC-MA/NE1** is responsible for the content of this standard.
- **DC/ESP1** is responsible for preparation and the care of this standard. A change/extension of this standard is allowed only in arrangement with DC/ESP1.
  mailto:br.normenstelle@boschrexroth.de
- **DC/ESP2** is responsible for setting up and the care of the DC-uniform material numbers.

5 Dimensions

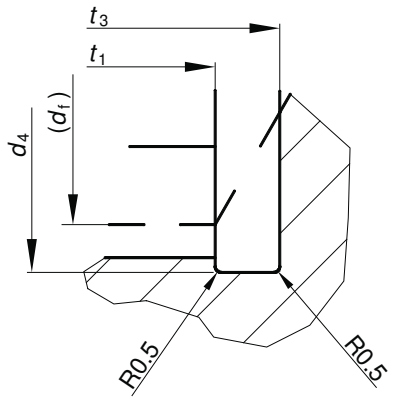
Note: all data in the drawing and tables in mm

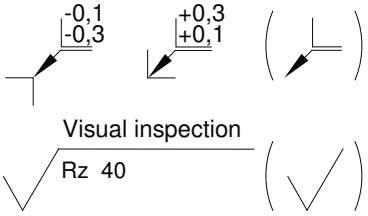






alternative Y 4)





Sizes ISO 14405-1 (LP)
General tolerances ISO 2768-mH

Surface protection: table 3

1) Dimensions for O-rings N 02.079
2) Hexagon socket and -basement freely of loose and firm borings
3) PD = Thread effective diameter
4) Backing off with the measures of t_3 and d_4, with the sizes 1 5/16-12 UN, 1 5/8-12 UN and 1 7/8-12 UN allowed. To manufacture the hexagonal without span the passage from pilot hole to undercut can be performed by a 30 ° slope. In this case the hexagonal depth t_1 and the measure t_3 is to comply.
5) up to core diameter with 45° chamfered
6) Alternative "un" at still existing tool allowed

Figure 1

5.1 Screw plugs with hexagon socket

Table 2

d_1 Tol.-Klasse 2A according to ANSI B 1.1 in	d_1 mm	c -0,25	d_2 ±0,15	d_3 +0,05 -0,08	d_4 +0,5	f ±0,15	l basic dimen-sion	i ±0,2	t_1 min.	t_3 max.	s +0,13mm in	s mm	w min.	X	Y	PN in MPa	M_A in Nm ±10%	Material number NBR 90	Material number FKM 90
5/16-24 UNF	7,94	2,75	11,1	6,35	-	1,60	10,25	7,5	4	-	1/8	3,18	2	0,04	0,1	40	7	R909154938	R902601300
3/8-24 UNF	9,53	2,75	12,7	7,95	-	1,75	10,25	7,5	5	-	5/32	3,96	2	0,04	0,1	53,2	10	R902600247	R902650717
7/16-20 UNF	11,112	2,9	14,3	9,25	-	2,05	12	9,1	5,5	-	3/16	4,78	2	0,04	0,1	63	18	R909154478	R910764647
1/2-20 UNF[a)]	12,7	2,9	15,85	10,85	-	2,05	12	9,1	6	-	7/32	5,56	2	0,04	0,1	63	27	R909153368	R902650493
9/16-18 UNF	14,288	2,9	17,45	12,24	-	2,05	12,9	10	6	-	1/4	6,35	2,5	0,04	0,1	63	35	R909153371	R909157039
3/4-16 UNF	19,05	3,75	22,2	16,76	-	2,25	14,85	11,1	6,5	-	5/16	7,94	3	0,04	0,1	63	70	R909153338	R910901969
7/8-14 UNF	22,225	3,95	25,4	19,63	-	2,85	16,65	12,7	6,5	-	3/8	9,52	3	0,04	0,1	63	110	R909153339	R910967343
1 1/16-12 UN	26,988	4,6	31,75	24	-	3,35	19,7	15,1	8	-	9/16	14,3	3,8	0,08	0,2	40	170	R909154480	R910967351
1 3/16-12 UN	30,162	4,6	34,9	27,18	-	3,35	19,7	15,1	8	-	9/16	14,3	3,8	0,08	0,2	40	215	R909157170	-
1 5/16-12 UN	33,338	4,6	38,1	30,35	18,8	3,35	19,7	15,1	9,5	12,7	5/8	15,88	4,8	0,08	0,2	40	270	R909153378	R902601857
1 5/8-12 UN	41,275	4,6	47,6	38,28	22,2	3,35	19,7	15,1	9,5	12,7	3/4	19,05	4,8	0,08	0,2	40	320	R909153418	R910903872
1 7/8-12 UN	47,625	4,6	53,95	44,6	22,2	3,35	19,7	15,1	9,5	12,7	3/4	19,05	6,4	0,08	0,2	40	390	R909157392	R902650452

[a)] This size is blocked for new applications

5.2 Technical delivery terms

Table 3

Material[a)]		11SMnPb30+C (1.0718) alternative 11SMnPb37+C (1.0737) according to DIN EN 10087 and DIN EN 10277-3
		Type 12L14 according to ASTM-A 108
		Y12 (U71122) e.g. Y12Pb (U72122) according to GB T 8731
General requirements		ISO 8992 (DIN ISO 8992)
Surface protection	General requirements	according to N38A SR1.1 Without sliding coating, $\mu_{ges.}$ 0,14 – 0,22
	coating system in the procedure	CM-FE-ZN-8-CN-T0-L-B (Bosch part number 5 001 100 016) according to N67F CM-ZN
		CM-FE-ZN-8-CN-T0-L-R (Bosch part number 5 001 100 018) (preferable from 7/8-14 UNF) according to N67F CM-ZN
Acceptance inspection		Acceptance inspection according to ISO 3269 (DIN EN ISO 3269)
Thread		ANSI/ASME B1.1 (2003) Unified Inch Screw Threads, UN and UNR Thread Form
Vendors code[b)]		According to ZN 02113

[a)] The materials opposite are exchangeable under one material number
[b)] permanent marking

6 Technical specification *(SAP material description)*

6.1 BNR- Short text

BNR-Short text	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Example:	S	C	R	E	W	•	P	L	U	G								

Subject
Screw plug *(BNR: 109606)*

6.2 Type short description

Type short description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Example:	Z	N	1	0	0	7	-	1	•	1	/	6	-	1	2	-	N	B	R																						

Standard reference
ZN 10007..... = ZN10007

Nominal size (*according to Table 2*)
e. g. 1 1/6-12 UN ..... = 1 1/6-12

Material of the O-ring
Acrylnitril-Butadien-Kautschuk -NBR.....=NBR
Fluorkautschuk with Fluor - FKM.....=FKM

Note:
„•“ = blank

6.3 SAP-material classification

Material class *R0M_2-11* according to ZN 04000-2

7 Normative references

Column „Note“: - = please consider document

Publication	Edition	Title	Note
Central standards			
N 02.079	-	O-rings for general application - Dimensions, material and pressure assignment	-
ZN 01210	-	Term code - Definition and handling	-
ZN 02113	-	Vendor's code - Short term of vendor´s number	-
ZN 04000-2	-	Screws and Nuts - Classes and characteristics	-
Bosch Standards			
N38A SR1.1	2006-12	Parts order specification; Thread parts with Cr(VI)-free coatings	-
N67F CM-ZN	2011-05	Surface finishing; Coatings of zinc and zinc alloys; Structure of the Bosch designation	-
Standards			
DIN EN 10088-2	2005-09	Stainless steels - Part 2: Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes; German version EN 10088-2:2005	-
DIN EN 10277-3	2008-06	Bright steel products - Technical delivery conditions - Part 3: Free-cutting steels; German version EN 10277-3:2008	-
DIN EN ISO 3269	2000-11	Fasteners - Acceptance inspection (ISO 3269:2000); German version EN ISO 3269:2000	-
DIN EN ISO 14405-1	2011-06	Geometrical product specifications (GPS) - Fundamentals - Concepts, principles and rules	-
DIN EN ISO 23429	2004-05	Gauging of hexagon sockets (ISO 23429:2004); German version EN ISO 23429:2004	-
DIN ISO 8992	2005-09	Fasteners - General requirements for bolts, screws, studs and nuts (ISO 8992:2005)	-
DIN ISO 2768-1	1991-06	General tolerances; tolerances for linear and angular dimensions without individual tolerance indications; identical with ISO 2768-1:1989	-
DIN ISO 2768-2	1991-04	General tolerances; geometrical tolerances for features without individual tolerances indications; identical with ISO 2768-2:1989	-
ISO 11926-ff.	-	Connections for general use and fluid power - Ports and stud ends with ISO 725 threads and O-ring sealing	-
ASME B1.1	2003	Unified Inch Screw Threads, UN and UNR Thread Form	-

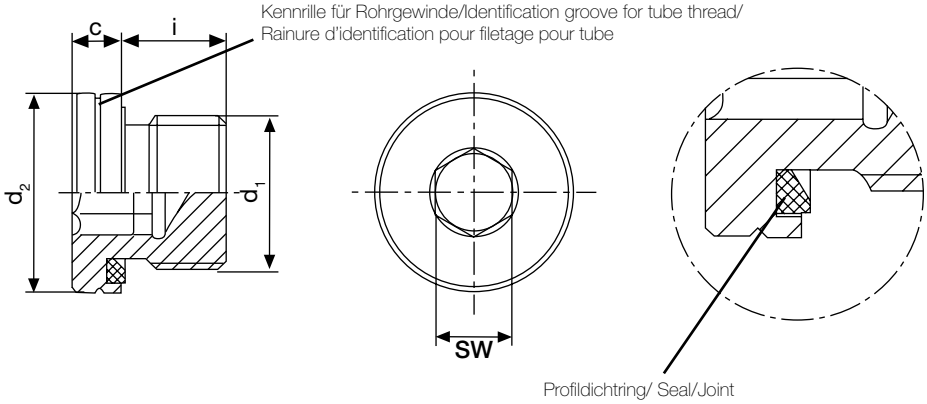
Via the Quick search in the DC area “Guidelines & Standards” the documents can be searched. You will find external standards and Bosch standards in the NormMaster.

HN8-WD

Verschlussschraube
mit elastischer Dichtung

Plug
with sealing formring

Bouchon
avec joint d'étanchéité



Einsatzbereich/using/utilisation: Maschinen-, Getriebe-, Motorenbau/machine-, gear-, motor construction/ construction de machines, engrenages, moteurs

Profildichtring/seal/joint DIN 3869
Einsatztemperatur/temperature:
- NBR 85 Shore -30° C – +100° C/-22 F – +210 F
- FKM 80 Shore -20° C – +200° C/-4 F – +390 F
- andere Temperaturbereiche auf Anfrage/ others on demand/ autres sur demande

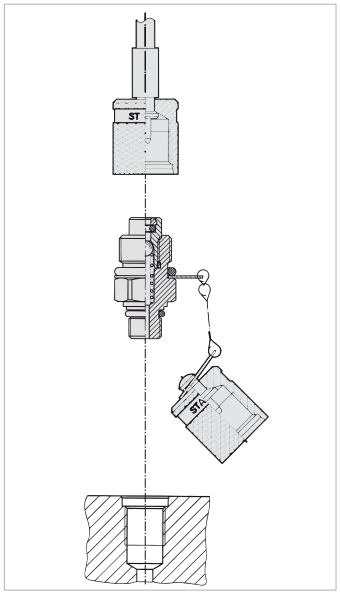
Werkstoff/material/matériau:
- Stahl/steel/acier 11SMnPb(Te)30+C DIN/ EN10277-3 ultraschall- und riss-geprüft/ ultrasonic tested/contrôlé
- andere Werkstoffe auf Anfrage/ others on demand/autres sur demande

Beschichtung/coating/revêtement:
- Cr-(VI)-frei/Cr-(VI)-free/sans Cr-(VI): nanopassiviert A3K/Zn Nano (ISO 4042)
- verzinkt gelb chromatiert (A3L ISO4042)/ yellow zinc chromate plating/zingué jaune chromaté
- andere Beschichtungen auf Anfrage/ others on demand/autres sur demande

Betriebsdruck Pressure Pression	d_1		d_2	c	i	SW	Anziehdrehmo-ment Prevailing torque Couple de serrage	Gewicht Weight Poids
	Metrisches Feingewinde Fine pitch thread Filetage à pas fin	Rohrgewinde Tube thread Filetage pour tube						kg per 100 St/pcs (7,85 kg/dm³)
	DIN 13	DIN ISO 228	h14	±0,3	±0,2	D12	Nm*	
400 bar / 5.800 psi	M 8 x 1	—	12	4	8	4	8	0,50
	M 10 x 1	G 1/8" A	14	4	8	5	12	0,68
	M 12 x 1,5	—	17	5	12	6	25	1,33
	—	G 1/4" A	18,9	5	12	6	30	1,82
	M 14 x 1,5	—	19	5	12	6	35	1,90
	M 16 x 1,5	—	21,9	5	12	8	50	2,20
	—	G 3/8" A	22	5	12	8	55	2,63
	M 18 x 1,5	—	23,9	5	12	8	60	3,13
	M 20 x 1,5	—	25,9	5	14	10	70	4,02
	—	G 1/2" A	26,9	5	14	10	80	4,43
	M 22 x 1,5	—	27	5	14	10	80	5,00
	M 24 x 1,5	—	29,9	5	14	12	95	5,80
	M 26 x 1,5	—	31,9	5	16	12	120	7,52
	M 27 x 2	G 3/4" A	32	5	16	12	135	7,65
	M 30 x 1,5	—	36,9	6,5	16	17	190	10,80
	M 33 x 2	G 1" A	39,9	6,5	16	17	225	12,60
315 bar / 4.500 psi	M 42 x 2	G 1 1/4" A	49,9	6,5	16	22	360	20,00
	M 48 x 2	G 1 1/2" A	55	6,5	16	24	400	25,00
400 bar / 5.800 psi	M 42 x 2	G 1 1/4" A	49,9	8	20	22	360	26,00
	M 48 x 2	G 1 1/2" A	55	8	22	24	400	33,00

Nm* = Richtwert, Verhalten abhängig von Material, Beschichtung und Beschaffenheit des Gegenstücks/ guidance level/ valeur indicative

Test Coupling with Ball Check



Fast Coupling for

- Monitoring and control of pressure
- Venting
- Sampling in high- and low-pressure systems

Advantages

- Test system at working pressure
- Leak proof connection before **ball check** is open
- Simple connection to measurement, control and switching devices
- Self locking metal protective cap

Working Pressure

- Max. working pressure 630 bar / 9137 PSI
  For SMK Type G and K the recommended working pressure of fitting manufacturer should be noted.
- Connection under pressure up to 400 bar / 5801 PSI max.

Materials

- **Metal Parts:**
  Standard material: Steel, zinc/nickel-plated = **C6F (CrVI-free)**
  Optional:
  Stainless Steel **V2A** (1.4305 / AISI 303) on request
  Stainless Steel **V4A** (1.4571 / AISI 316Ti) on request

  For ordering "V2A" or "V4A" please replace "C6F" with "V2A" or "V4A".

- **Ball:** Stainless Steel

- **Sealings:**
  P = NBR (Buna-N®)
  (Temperature range -20 °C ... +100 °C / -4 °F ... +212 °F)
  Note: Internal sealings made of FPM, even for standard NBR-type.

  V = FPM (Viton®)*
  (Temperature range -20 °C ... +200 °C / -4 °F ... +392 °F)

  *** Standard option for North America is FPM (Viton®)**

  E = EPDM Ethylene Propylene Diene Monomer Rubber
  (for Brake fluid,
  Temperature range -40 °C ... +150 °C / -40 °F ... +302 °F)

  For ordering NBR or EPDM sealings please replace "V" with "P" or "E".

  Vibration safety O-ring made of NBR (Buna-N®) (standard).

Media

- Suitable for hydraulic oils and other Mineral oil based fluids
  (Check compatibility of sealing material)
- For use with other liquid media please consult STAUFF

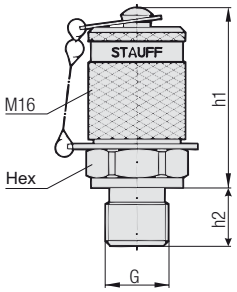
Protection Cap

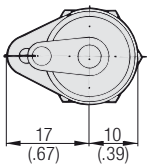
- The complete STAUFF-Test-20-type-SMK range is also available with a hexagonal protection cap made of steel or plastic protection cap.

  For ordering the hexagonal protection cap version please add "-SK" to the order code.
  (e.g. SMK20-M10x1-VA-**SK**-C6F)
  For ordering the plastic protection cap version please add "-KK" to the order code.
  (e.g. SMK20-M10x1-VA-**KK**-C6F)

SMK20 Test Coupling with Port Connection	**SMK20 Type G** Test Coupling complete with Straight Fitting	**SMK20 Type K** Test Coupling for 24° Cone Fittings	**SMK20-JIC** Test Coupling SMK-JIC Connection (to SAE J514)	**SSK20** Bulkhead
				

Test Coupling with Port Connection SMK20





Thread G	Sealing	Working Pressure (bar/PSI)	Dimensions (mm/in) h1	h2	Hex	Order Codes NBR	FPM* (Standard Option-North America)
M8 x 1	Type A	250	38	8,5	17	SMK20-M8x1-PA-C6F	SMK20-M8x1-VA-C6F
		3625	1.50	.33	.67		
M10 x 1		630	38	9,8	17	SMK20-M10x1-PA-C6F	SMK20-M10x1-VA-C6F
		9137	1.50	.39	.67		
M10 x 1	Type B	400	37	8	17	SMK20-M10x1-PB-C6F	SMK20-M10x1-VB-C6F
		5801	1.46	.31	.67		
M12 x 1,5		630	37	12	17	SMK20-M12x1,5-PB-C6F	SMK20-M12x1,5-VB-C6F
		9137	1.46	.47	.67		
M14 x 1,5		630	37	12	19	SMK20-M14x1,5-PB-C6F	SMK20-M14x1,5-VB-C6F
		9137	1.46	.47	.75		
M16 x 1,5		630	37	12	22	SMK20-M16x1,5-PB-C6F	SMK20-M16x1,5-VB-C6F
		9137	1.46	.47	.87		
G1/8		400	39	8	17	SMK20-G1/8-PB-C6F	SMK20-G1/8-VB-C6F
		5801	1.54	.31	.67		
G1/4		630	37	12	19	SMK20-G1/4-PB-C6F	SMK20-G1/4-VB-C6F
		9137	1.46	.47	.75		
G3/8		630	37	12	22	SMK20-G3/8-PB-C6F	SMK20-G3/8-VB-C6F
		9137	1.46	.47	.87		
M10 x 1	Type C	400	39	8	17	SMK20-M10x1-PC-C6F	SMK20-M10x1-VC-C6F
		5801	1.54	.31	.67		
M12 x 1,5		630	37	12	17	SMK20-M12x1,5-PC-C6F	SMK20-M12x1,5-VC-C6F
		9137	1.46	.47	.67		
M14 x 1,5		630	37	12	19	SMK20-M14x1,5-PC-C6F	SMK20-M14x1,5-VC-C6F
		9137	1.46	.47	.75		
M16 x 1,5		630	37	12	22	SMK20-M16x1,5-PC-C6F	SMK20-M16x1,5-VC-C6F
		9137	1.46	.47	.87		
G1/8		400	39	8	17	SMK20-G1/8-PC-C6F	SMK20-G1/8-VC-C6F
		5801	1.54	.31	.67		
G1/4		630	37	12	19	SMK20-G1/4-PC-C6F	SMK20-G1/4-VC-C6F
		9137	1.46	.47	.75		
G3/8		630	37	12	22	SMK20-G3/8-PC-C6F	SMK20-G3/8-VC-C6F
		9137	1.46	.47	.87		
G1/2		630	39	14	27	SMK20-G1/2-PC-C6F	SMK20-G1/2-VC-C6F
		9137	1.54	.55	1.06		
R1/8 K	Type D	400	37	8	17	SMK20-R1/8K-PD-C6F	SMK20-R1/8K-VD-C6F
		5801	1.46	.31	.67		
R1/4 K		630	35	12	17	SMK20-R1/4K-PD-C6F	SMK20-R1/4K-VD-C6F
		9137	1.38	.47	.67		
1/8 NPT		400	36	10	17	SMK20-1/8NPT-PD-C6F	SMK20-1/8NPT-VD-C6F
		5801	1.42	.39	.67		
1/4 NPT		630	35	15	17	SMK20-1/4NPT-PD-C6F	SMK20-1/4NPT-VD-C6F
		9137	1.38	.59	.67		
5/16–24 UNF	Type E	400	38	7,5	17	SMK20-5/16UNF-PE-C6F	SMK20-5/16UNF-VE-C6F
		5.801	1.50	.30	.67		
7/16–20 UNF		630	38	9,1	17	SMK20-7/16UNF-PE-C6F	SMK20-7/16UNF-VE-C6F
		9137	1.50	.36	.67		
1/2–20 UNF		630	38	9,2	17	SMK20-1/2UNF-PE-C6F	SMK20-1/2UNF-VE-C6F
		9137	1.50	.36	.67		
9/16–18 UNF		630	37	10	19	SMK20-9/16UNF-PE-C6F	SMK20-9/16UNF-VE-C6F
		9137	1.46	.39	.75		
3/4–16 UNF		630	37	11.1	19	SMK20-3/4UNF-PE-C6F	SMK20-3/4UNF-VE-C6F
		9137	1.46	.44	.75		
M10 x 1		630	38	9,5	17	SMK20-M10x1-PE-C6F	SMK20-M10x1-VE-C6F
		9137	1.50	.37	.67		
M12 x1,5		630	37	11	17	SMK20-M12x1,5-PE-C6F	SMK20-M12x1,5-VE-C6F
		9137	1.46	.43	.67		
M14 x 1,5		630	38	11	19	SMK20-M14x1,5-PE-C6F	SMK20-M14x1,5-VE-C6F
		9137	1.50	.43	.75		

Metal Parts

Standard material: Steel, zinc/nickel-plated = **C6F (CrVI-free)**
For ordering V2A (1.4305 / AISI 303) replace "C6F" with "V2A".
For ordering V4A (1.4571 / AISI 316Ti) replace "C6F" with "V4A".

Sealings

For ordering NBR sealings replace "V" with "P".
For ordering EPDM sealings replace "V" with "E".

*** Standard option for North America is FPM (Viton®).**

Sealing Details


O-ring Type A


Metal Joint Type B


Elastomeric Sealing Type C


Taper Type D
(suitable sealant required)


O-ring Type E

Protection Cap

Standard material: Steel
For ordering the hexagonal protection cap version please add "-SK" to the order code. (e.g. SMK20-M10x1-VA-SK-C6F)
For ordering the plastic protection cap version please add "-KK" to the order code. (e.g. SMK20-M10x1-VA-KK-C6F)

For further information on materials, sealings or protection caps, please see page B4.

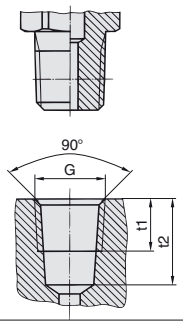
Other port connections and sealings on request.
Please consult STAUFF for further information.

Dimensional drawings: All dimensions in mm (in).

Port Connections and Sealing Details

Type D

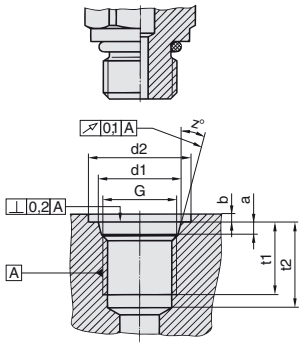
Type D - Taper threaded port according to ANSI/ASME B1.20.1-1983 (NPT)
Sealing: Taper Type D suitable sealant required



Thread	Dimensions (mm/in)	
G	t1 min.	t2 min.
1/8–27 NPT	6,9	11,6
	.27	.46
1/4–18 NPT	10	16,4
	.39	.65
1/2–14 NPT	13,6	22,6
	.54	.89

Type E

Type E - Threaded port according to ISO 6149-1 (metric); ISO 11926-1 (UNF)
Sealing: O-ring Type E



Thread	Dimensions (mm/in)						
G	d1 +0,1	d2 min.	t1 min.	t2 min.	a +0,4	b max.	z° ±1°
M10 x 1	11,1	16	10	11,5	1,6	1	12°
	.44	.63	.39	.45	.06	.04	
M12 x 1,5	13,8	19	11,5	14	2,4	1,5	15°
	.54	.75	.45	.55	.09	.06	
M14 x 1,5	15,8	21	11,5	14	2,4	1,5	15°
	.62	.83	.45	.55	.09	.06	
M16 x 1,5	17,8	24	13	15,5	2,4	1,5	15°
	.70	.94	.51	.61	.09	.06	
M22 x 1,5	23,8	29	15,5	18	2,4	2	15°
	.94	1.14	.61	.71	.09	.08	
M27 x 2	29,4	34	19	22	3,1	2	15°
	1.16	1.34	.75	.87	.91	.08	
5/16–24 UNF	9,1	17	10	12	1,9	1,6	12°
	.36	.67	.39	.47	.07	.06	
7/16–24 UNF	12,4	21	11,5	14	2,4	1,6	12°
	.49	.83	.45	.55	.09	.06	
1/2–20 UNF	14	23	11,5	14	2,4	1,6	12°
	.55	.91	.45	.55	.09	.06	
9/16–18 UNF	15,65	25	12,7	15,5	2,5	1,6	12°
	.62	.98	.50	.61	.10	.06	
7/8–14 UNF	23,95	34	16,7	20	2,5	2,4	15°
	.94	1.34	.66	.79	.10	.09	

Dimensional drawings: All dimensions in mm (in).