

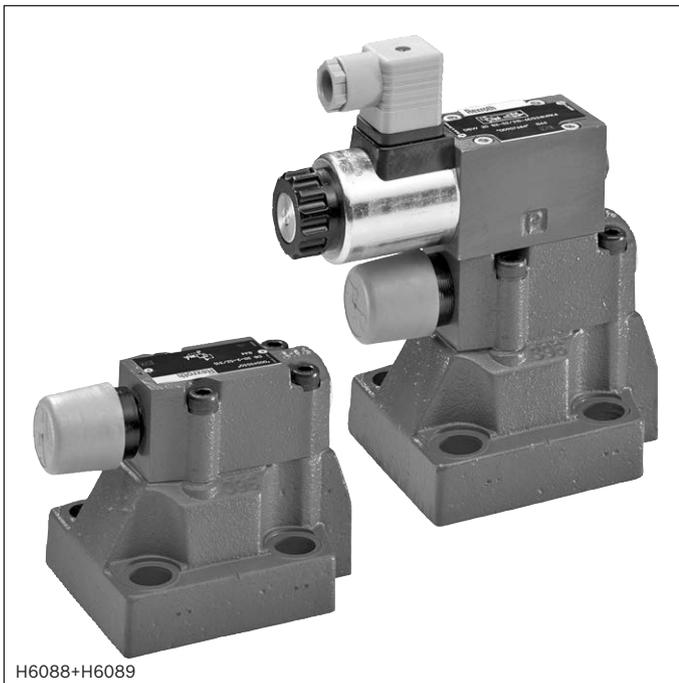
# Pressure relief valve, pilot-operated

## Type DB and DBW

**RE 25802**

Edition: 2017-03

Replaces: 2016-12



H6088+H6089

- ▶ Size 10 ... 32
- ▶ Component series 5X
- ▶ Maximum operating pressure 350 bar
- ▶ Maximum flow 650 l/min

### Features

- ▶ For subplate mounting
- ▶ Porting pattern according to ISO 6264-06-09 (NG10), ISO 6264-08-13 (NG25) and ISO 6264-10-17 (NG32)
- ▶ For threaded connection
- ▶ As cartridge valve (cartridge)
- ▶ 4 adjustment types for pressure adjustment, optionally:
  - Rotary knob
  - Bushing with hexagon and protective cap
  - Lockable rotary knob with scale
  - Rotary knob with scale
- ▶ 5 pressure ratings
- ▶ Solenoid-actuated unloading via an installed directional spool valve or directional seat valve
- ▶ High-power solenoid
- ▶ Explosion-protected solenoid (upon request)
- ▶ Switching shock damping, optional (DBW type only)
- ▶ Corrosion-protected design

### Contents

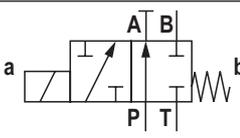
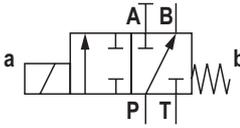
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### **Type-examination tested safety valves type DB(W)...E, component series 5X according to Pressure Equipment Directive 2014/68/EU**

Ordering code	16
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**Ordering code**

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	
<b>DB</b>								<b>5X</b>	/													*

01	Pressure relief valve	<b>DB</b>
02	<b>Without</b> directional valve	<b>no code</b>
	<b>With</b> built-on directional valve	<b>W</b>
03	Pilot-operated valve (complete)	<b>no code</b>
	Pilot control valve <b>without</b> main spool insert (do <b>not</b> enter any size)	<b>C</b>
	Pilot control valve <b>with</b> main spool insert (enter size 10 or 30)	<b>C</b>
	Pilot control valve <b>without</b> main spool insert for subplate mounting (do <b>not</b> enter any size)	<b>T</b> <sup>1)</sup>
04	<b>- Size 10</b>	
	Subplate mounting "no code"	<b>10</b>
	Threaded connection "G" (G1/2)	<b>10</b>
	<b>- Size 16</b>	
	Threaded connection "G" (G3/4)	<b>15</b>
	<b>- Size 25</b>	
	Subplate mounting "no code"	<b>20</b>
	Threaded connection "G" (G1)	<b>20</b>
	Threaded connection "G" (G1 1/4)	<b>25</b>
	<b>- Size 32</b>	
Subplate mounting "no code"	<b>30</b>	
Threaded connection "G" (G1 1/2)	<b>30</b>	
05	 Normally closed	<b>A</b> <sup>2)</sup>
	 Normally open	<b>B</b> <sup>2)</sup>

**Type of connection**

06	Subplate mounting or cartridge valve	<b>no code</b>
	Threaded connection	<b>G</b>

**Adjustment type for pressure adjustment**

07	Rotary knob (not for version "C" and "T")	<b>1</b>
	Bushing with hexagon and protective cap	<b>2</b>
	Lockable rotary knob with scale	<b>3</b> <sup>3)</sup>
	Rotary knob with scale	<b>7</b>
08	Main spool Ø24 mm (all sizes)	<b>-</b>
	Main spool Ø28 mm (only NG32)	<b>N</b>
09	Component series 50 ... 59 (50 ... 59: unchanged installation and connection dimensions)	<b>5X</b>

**Pressure rating**

10	Set pressure up to 50 bar	<b>50</b>
	Set pressure up to 100 bar	<b>100</b>
	Set pressure up to 200 bar	<b>200</b>
	Set pressure up to 315 bar	<b>315</b>
	Set pressure up to 350 bar	<b>350</b>

## Ordering code

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	
<b>DB</b>								<b>5X</b>	/													*

### Pilot oil supply and pilot oil return (see also Symbols on page 4)

11	Pilot oil supply and pilot oil return internal	- 4)
	Pilot oil supply external, pilot oil return internal 5)	<b>X</b>
	Pilot oil supply internal, pilot oil return external	<b>Y</b>
	Pilot oil supply and pilot oil return external 5)	<b>XY</b>
12	Standard version	<b>no code</b>
	Valve for minimum cracking pressure (not for version without main spool insert and not suitable for mutual relief function)	<b>U</b> 6)
13	<b>Without</b> switching shock damping	<b>no code</b>
	<b>With</b> switching shock damping (only version "DBW")	<b>S</b>
14	<b>Without</b> directional valve	<b>no code</b>
	<b>With</b> directional spool valve (data sheet 23178)	<b>6E</b> 2)
	<b>With</b> directional seat valve (data sheet 22058)	<b>6SM</b> 2)
15	Direct voltage 24 V	<b>G24</b> 2)
	Alternating voltage 230 V 50/60 Hz	<b>W230</b> 2)
16	<b>With</b> concealed manual override (standard)	<b>N9</b> 2)
	<b>With</b> manual override	<b>N</b> 2)
	<b>Without</b> manual override	<b>no code</b>

### Electrical connection

17	<b>Without</b> mating connector; connector DIN EN 175301-803	<b>K4</b> 2; 7)
18	Nozzle Ø 1.2 mm in channel B of the directional spool valve (version "6E")	<b>R12</b> 8)
	Nozzle Ø 1.2 mm in channel P of the directional seat valve (version "6SM")	<b>B12</b> 8)

### Corrosion resistance

19	None	<b>no code</b>
	Improved corrosion protection (240 h salt spray test according to EN ISO 9227); (only version "without directional valve" and "2", however without protective cap)	<b>J3</b>

### Seal material

20	NBR seals	<b>no code</b>
	FKM seals	<b>V</b>
	Observe compatibility of seals with hydraulic fluid used! (Other seals upon request)	

### Equipment Directive

21	<b>Without</b> type-examination procedure	<b>no code</b>
	Type-examination tested safety valves according to Pressure Equipment Directive 2014/68/EU 9)	<b>E</b>
22	For further information, see the plain text	

1) "DBT/DBWT" corresponds to "DBC/DBWC", however with closed central bore

2) Ordering code only necessary with version with mounted directional valve ("DBW").

3) H-key with material no. **R900008158** is included in the scope of delivery.

4) Dash "-" only necessary with version with mounted directional valve ("DBW"), without specification of "U" or "S".

5) **Not** with version "DBC/DBWC"

6) Only possible up to pressure rating 315 bar

7) Mating connectors, separate order, see page 21.

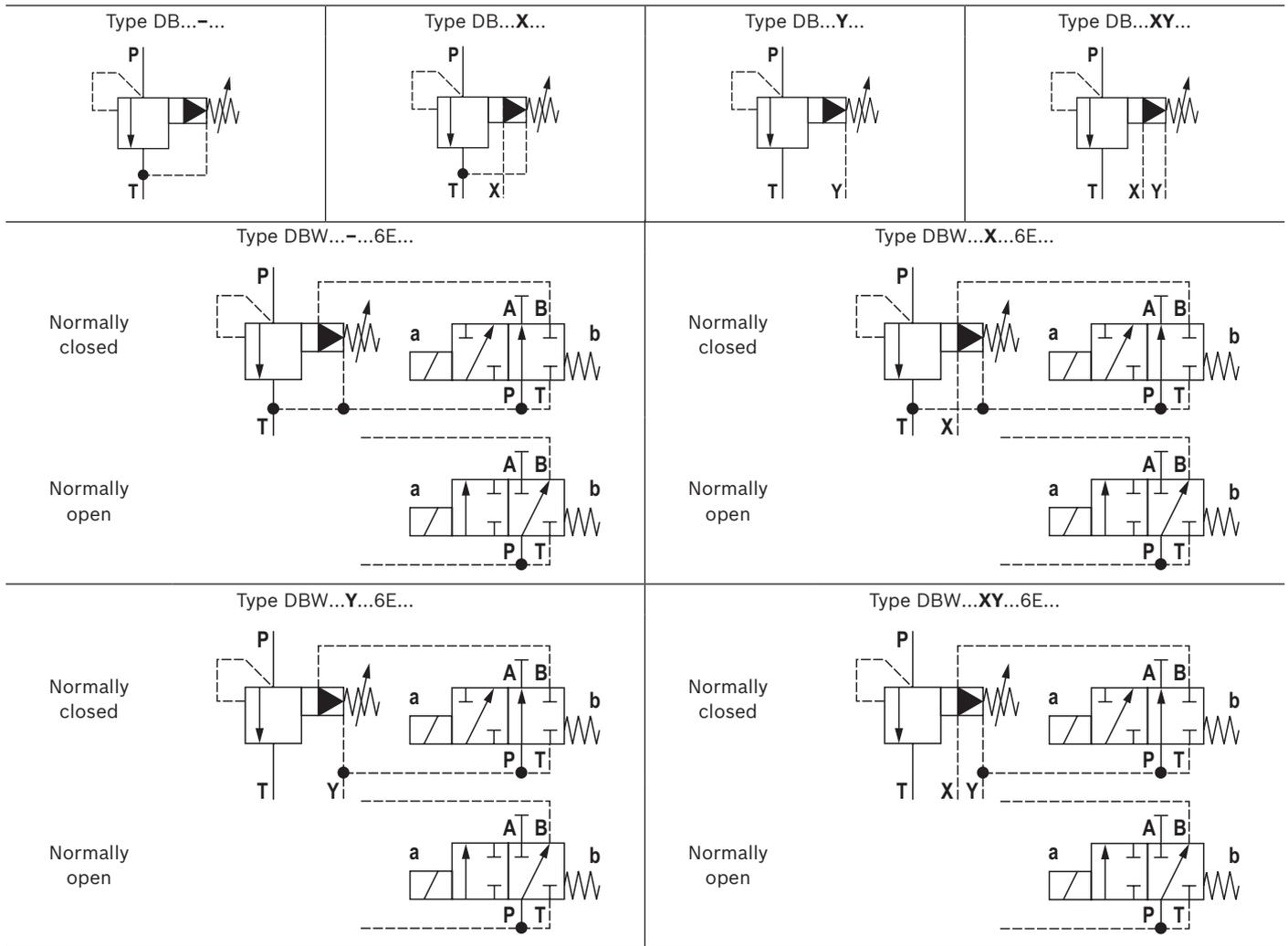
8) Ordering code only necessary with version with attached directional valve and switching shock damping ("DBW.../...S...").

9) See ordering code on page 16.



**Notice:** Preferred types and standard units are contained in the EPS (standard price list).

## Symbols



**Function, section: Type DB...**

**General**

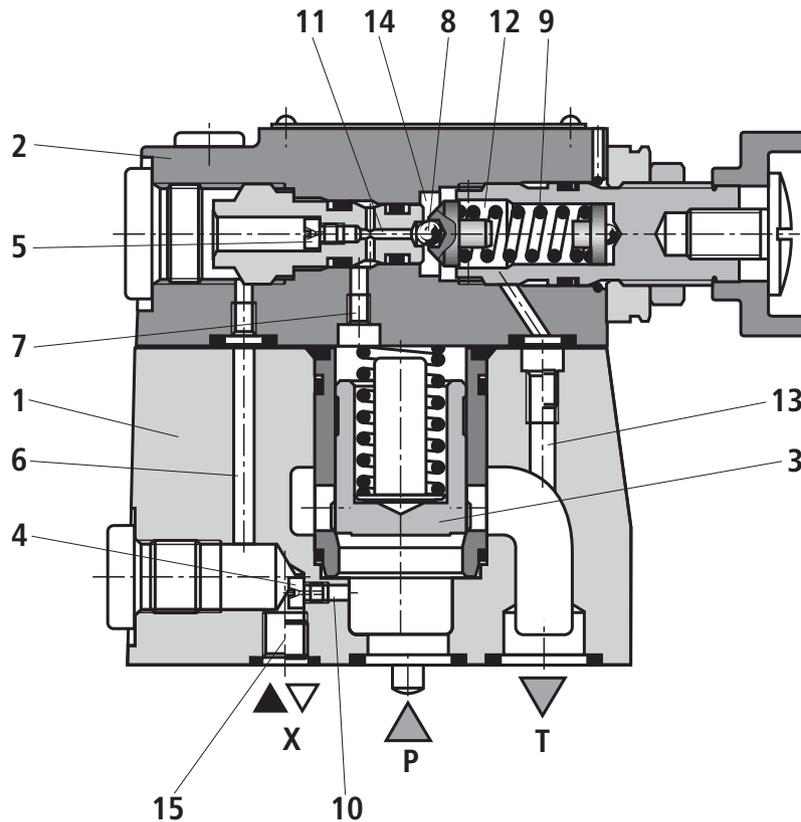
Pressure valves of type DB and DBW are pilot-operated pressure relief valves. They are used for limiting (DB) or limiting and magnetically unloading (DBW) the operating pressure.

The pressure relief valves (DB) basically consist of the main valve (1) with main spool insert (3) and pilot control valve (2) with pressure adjustment element.

**Pressure relief valve type DB**

The pressure applied to channel P acts on the main spool (3). At the same time, pressure is applied to the spring-loaded side of the main spool (3) and to the ball (8) in the pilot control valve (2) via the control lines (6) and (7) which are equipped with nozzles (4) and (5). If the pressure in channel P exceeds the value set at the spring (9), the ball (8) opens against the spring (9). The signal for this is provided internally from channel P via control lines (10) and (6). The hydraulic fluid on the spring-loaded side of main spool (3) now flows via the control line (7), nozzle bore (11) and ball (8) into the spring chamber (12). From here, it is fed into the tank, either internally for type DB ...- via control line (13), or externally for type DB...Y via control line (14). Nozzles (4) and (5) cause a pressure drop to occur at the main spool (3), hence the connection from channel P to channel T opens. The hydraulic fluid now flows from channel P to channel T, whilst the set operating pressure is maintained.

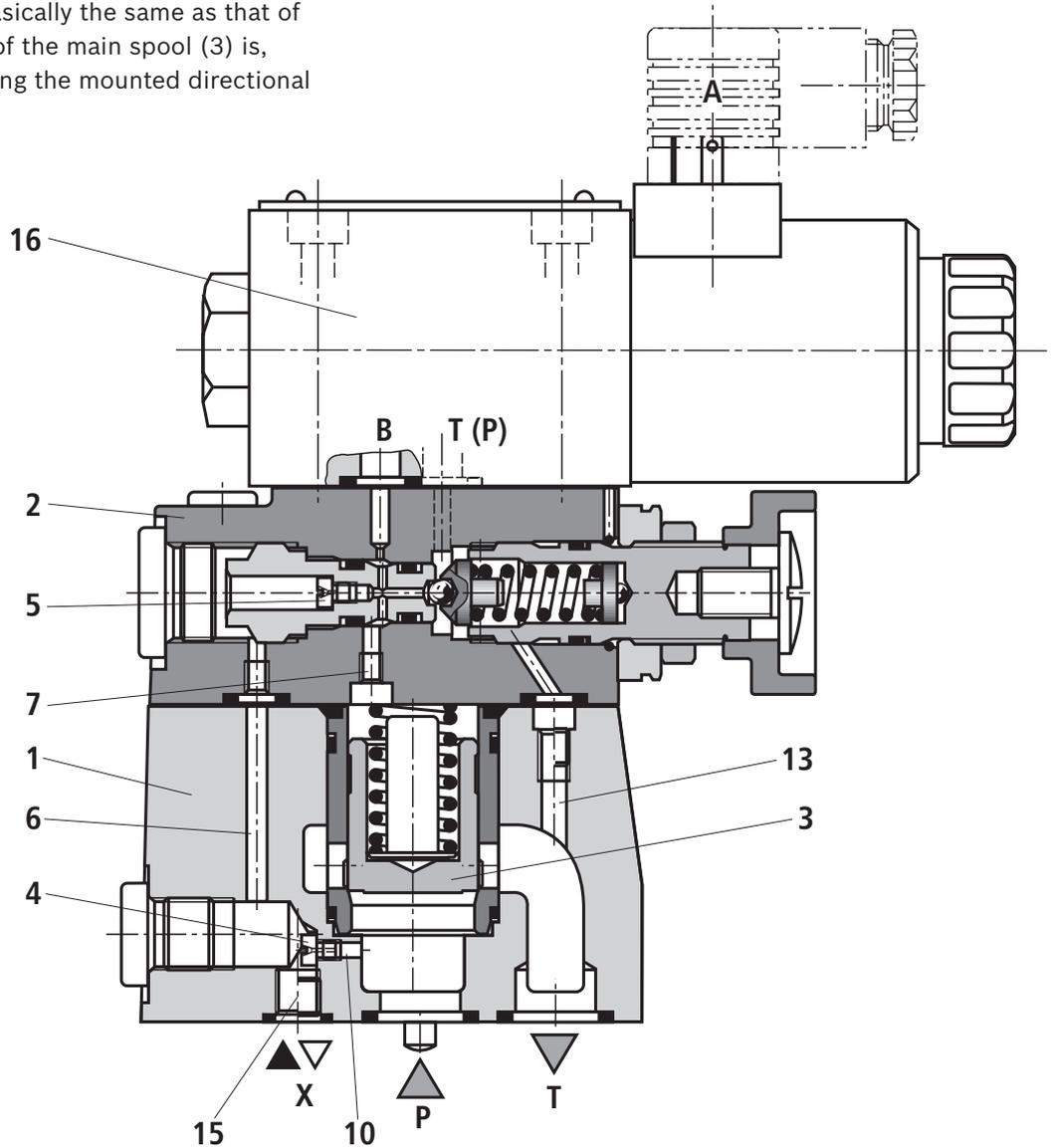
The pressure relief valve can be unloaded or switched to another pressure (second pressure rating) via port X (15).



**Function, section: Type DBW...**

**Pressure relief valve type DBW**

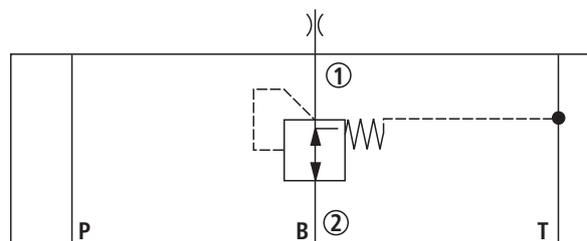
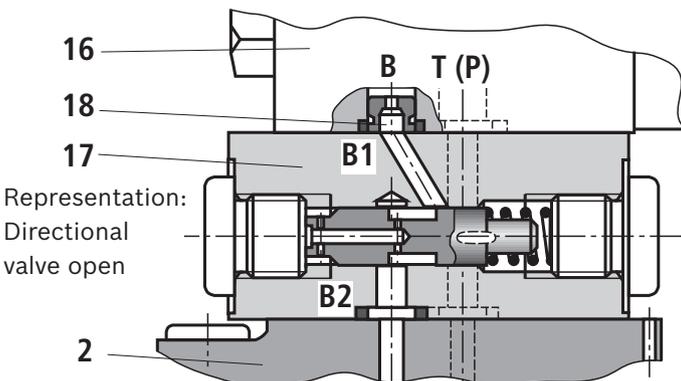
The function of this valve is basically the same as that of valve type DB. The unloading of the main spool (3) is, however, achieved by controlling the mounted directional spool valve (16).



**Pressure relief valve with switching shock damping (sandwich plate), version "DBW.../..S6E...R12"**

The opening of the connection from B2 to B1 is delayed by means of the switching shock damping valve (17). Pressure peaks and acoustic decompression shocks in the

return line can thus be avoided. It is installed between the pilot control valve (2) and the directional valve (16). The degree of damping (decompression shock) is determined by the size of the nozzle (18). Nozzle  $\varnothing 1.2 \text{ mm}$  (ordering code ..R12..) is recommended.



**Technical data**

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

<b>general</b>									
Sizes				NG10	NG16	NG25 "DB.. 20"	NG25 "DB.. 25"	NG32	
Weight	▶ Subplate mounting	– DB...	kg	2.6	–	3.5	–	4.4	
		– DBW...	kg	4.05	–	4.95	–	5.85	
		– DBC...	kg	1.2					
		– DBWC...	kg	2.65					
		– DBC10 or 30 ...	kg	1.5					
		– DBWC 10 or 30 ...	kg	2.95					
	▶ Threaded connection	– DB...G	kg	5.3	5.2	5.1	5.0	4.8	
		– DBW...G	kg	6.75	6.65	6.55	6.45	6.25	
Installation position				Any					
Ambient temperature range		▶ DB...	°C	–30 ... +80 (NBR seals) –15 ... +80 (FKM seals)					
		▶ DBW...	°C	–30 ... +50 (NBR seals) –15 ... +50 (FKM seals)					
Minimum stability of the housing materials (for subplate mounting and version "DBC/DBWC")				Housing materials are to be selected so that there is sufficient safety for all imaginable operating conditions (e.g. with regard to pressure resistance, thread stripping strengths and tightening torques).					
<b>hydraulic</b>									
Maximum operating pressure		▶ Port P, X	bar	350					
		▶ Port T	bar	315					
Maximum counter pressure		▶ Port Y (DB)	bar	315					
		▶ Port Y, T (DBW)	bar	210 with DC solenoid 160 with AC solenoid					
Maximum set pressure			bar	50; 100; 200; 315; 350					
Minimum set pressure				Flow-dependent (see characteristic curves page 9)					
Maximum flow		▶ Subplate mounting	l/min	250	–	500	–	650	
		▶ Threaded connection	l/min	250	500	500	500	650	
Hydraulic fluid				See table page 8					
Hydraulic fluid temperature range			°C	–30 ... +80 (NBR seals) –15 ... +80 (FKM seals)					
Viscosity range			mm <sup>2</sup> /s	10 ... 800					
Maximum admissible degree of contamination of the hydraulic fluid cleanliness class according to ISO 4406 (c)				Class 20/18/15 <sup>1)</sup>					

<sup>1)</sup> The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and simultaneously increases the life cycle of the components.  
For the selection of the filters, see [www.boschrexroth.com/filter](http://www.boschrexroth.com/filter).

**Notes:**

- ▶ Tank preloading adds to the minimum set pressure (ports T and Y)
- ▶ Technical data for directional seat valve see data sheet 22058, for directional spool valve data sheet 23178.
- ▶ Deviating technical data for type-examination tested safety valves can be found on page 17.

**Technical data**

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

Hydraulic fluid	Classification	Suitable sealing materials	Standards	Data sheet
Mineral oils	HL, HLP	NBR, FKM	DIN 51524	90220
Bio-degradable <sup>2)</sup>	▶ Insoluble in water	HETG	ISO 15380	90221
		HEES		
	▶ Soluble in water	HEPG	ISO 15380	
Flame-resistant	▶ Water-free	HFDU (glycol base)	ISO 12922	90222
		HFDU (ester base) <sup>2)</sup>		
	▶ Containing water <sup>3)</sup>	HFC (Fuchs Hydrotherm 46M, Petrofer Ultra Safe 620)	NBR	ISO 12922

**Important information on hydraulic fluids:**

- ▶ For further information and data on the use of other hydraulic fluids, please refer to the data sheets above or contact us.
- ▶ There may be limitations regarding the technical valve data (temperature, pressure range, life cycle, maintenance intervals, etc.).
- ▶ The ignition temperature of the hydraulic fluid used must be 50 K higher than the maximum solenoid surface temperature.

**▶ Flame-resistant – containing water:**

- Maximum operating pressure 210 bar, otherwise increased cavitation erosion
- Life cycle as compared to operation with mineral oil HL, HLP 30 ... 100%
- Maximum hydraulic fluid temperature 60 °C

- ▶ **Bio-degradable and flame-resistant:** If this hydraulic fluid is used, small amounts of dissolved zinc may get into the hydraulic system.

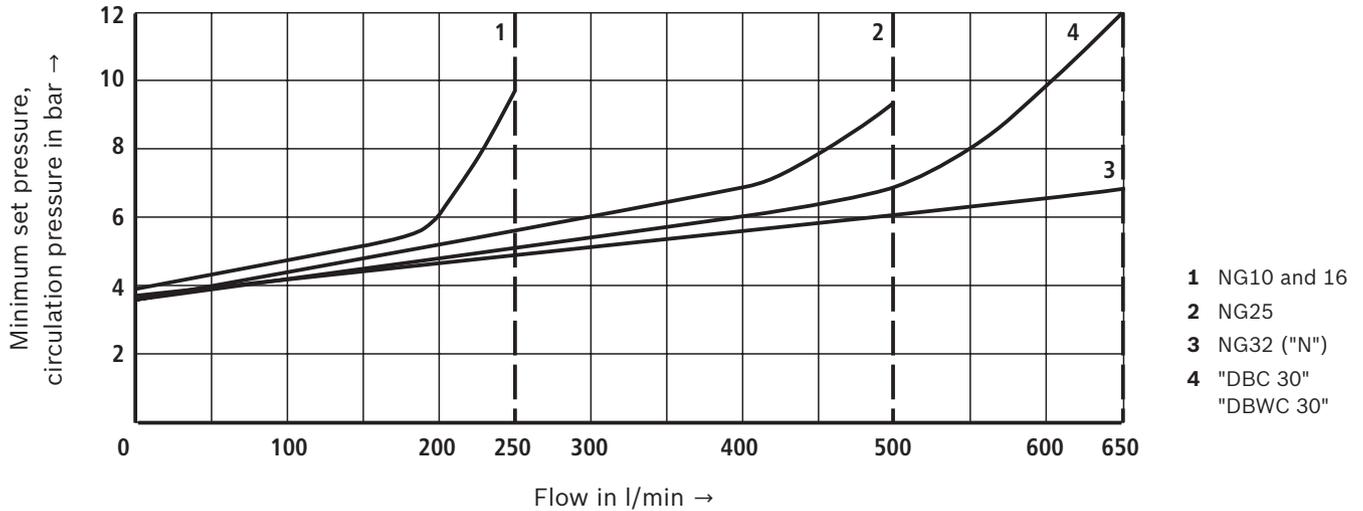
<sup>2)</sup> Not recommended for corrosion-protected version "J3"

<sup>3)</sup> Not for version "DBW"

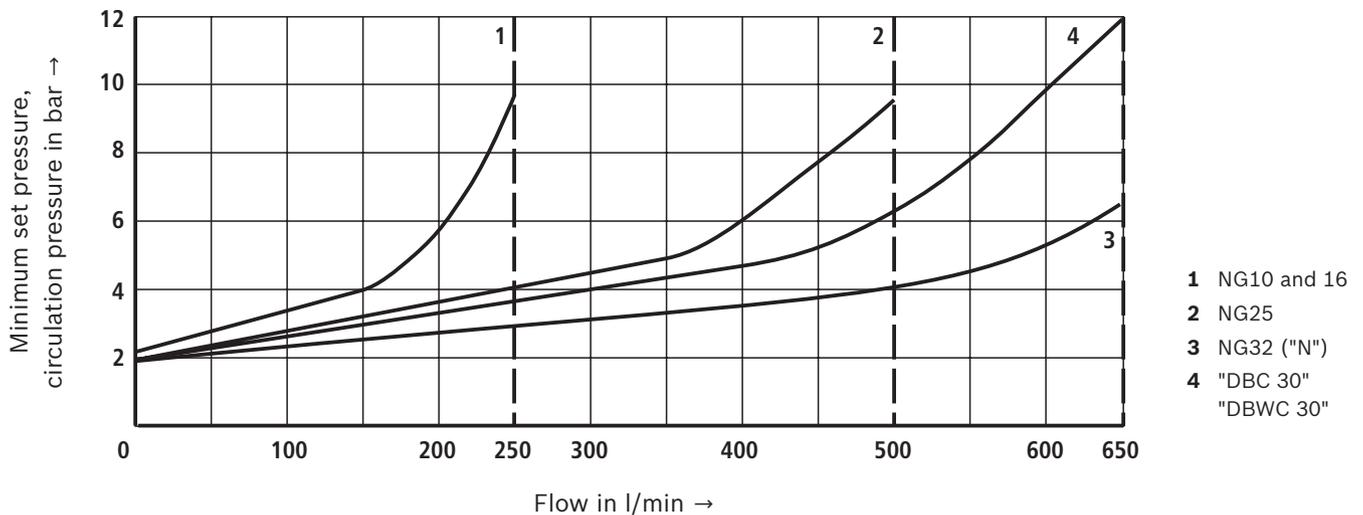
### Characteristic curves

(measured with HLP46,  $\vartheta_{oil} = 40 \pm 5^\circ\text{C}$ )

**Minimum set pressure and circulation pressure dependent on the flow <sup>1)</sup>**  
**Standard version**



**Minimum set pressure and circulation pressure dependent on the flow <sup>1)</sup>**  
**Version "U"**



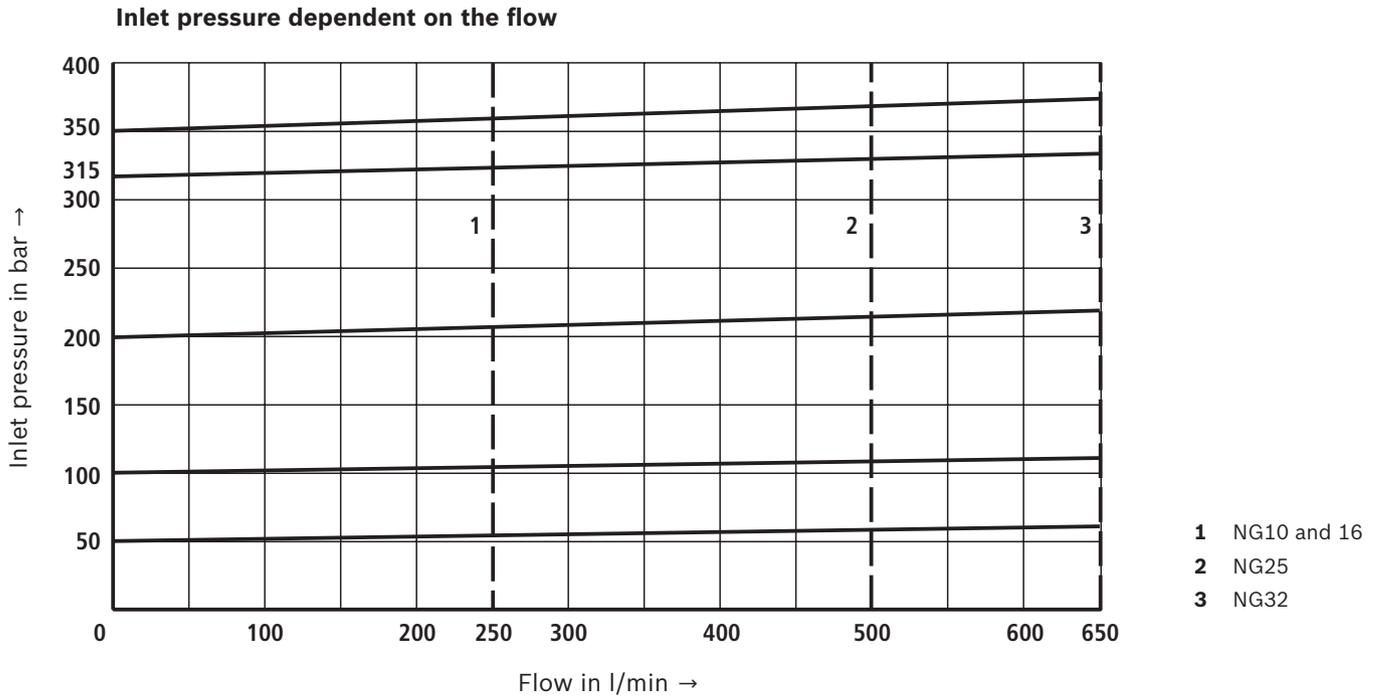
**Notice:**

The characteristic curves were measured with **external, depressurized pilot oil return**.  
 With internal pilot oil return, the inlet pressure increases by the output pressure present in port T.

<sup>1)</sup> The characteristic curves apply for output pressure  $p_T = 0$  bar in the entire flow range

### Characteristic curves

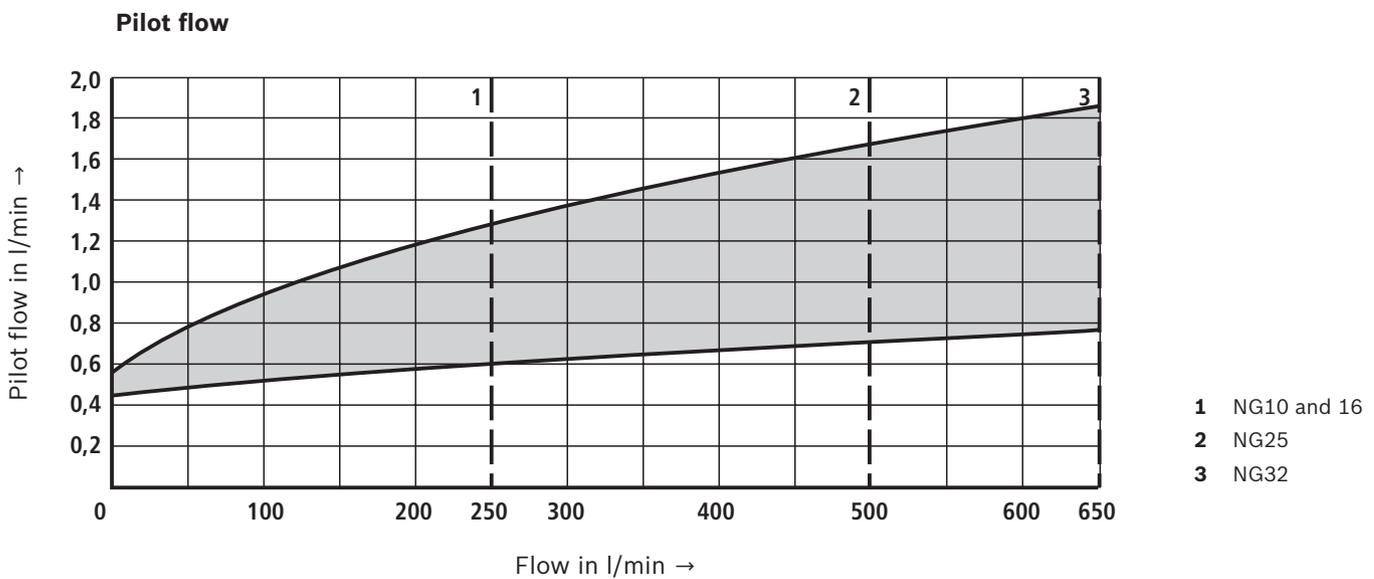
(measured with HLP46,  $\vartheta_{oil} = 40 \pm 5^\circ\text{C}$ )



**Notice:**

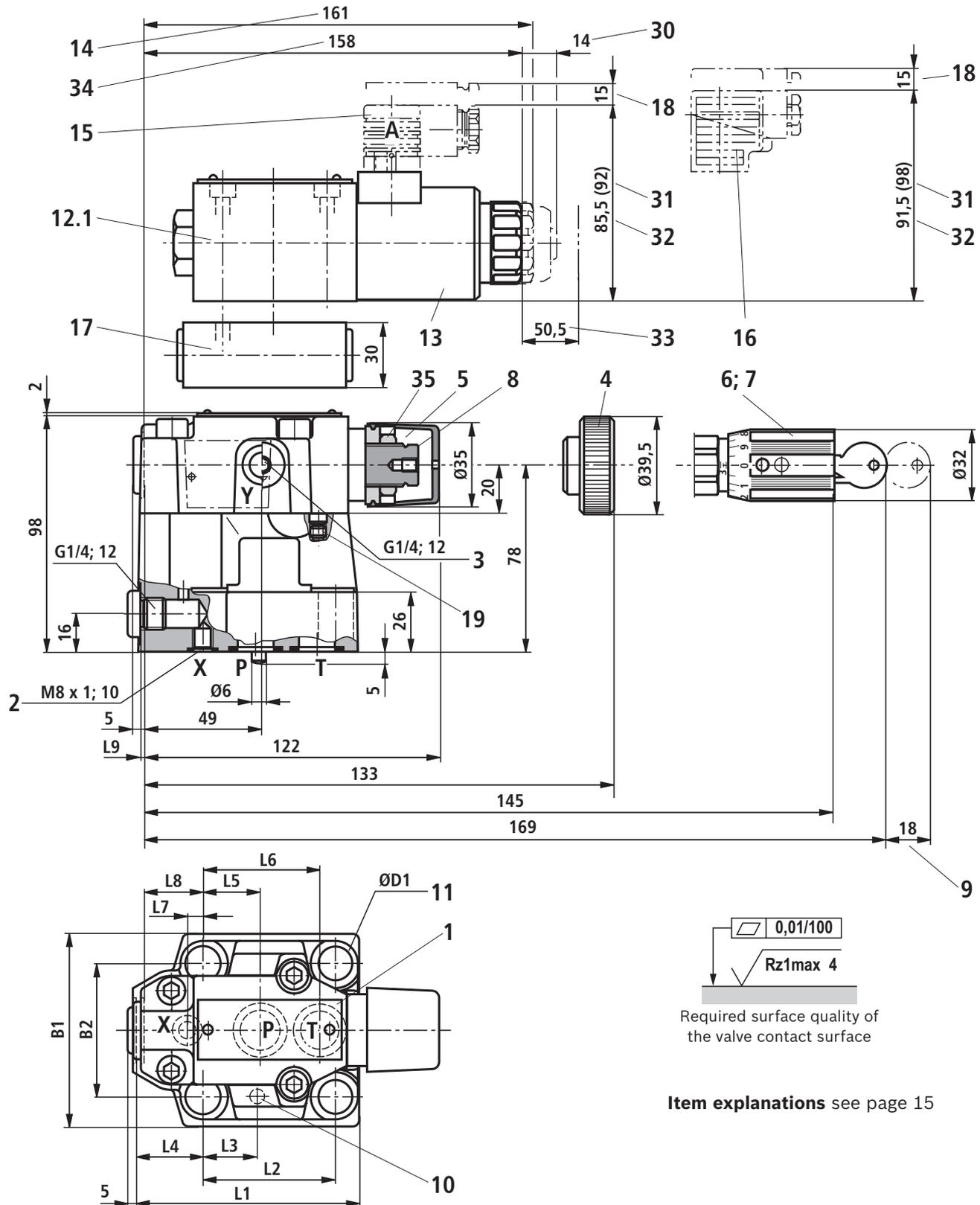
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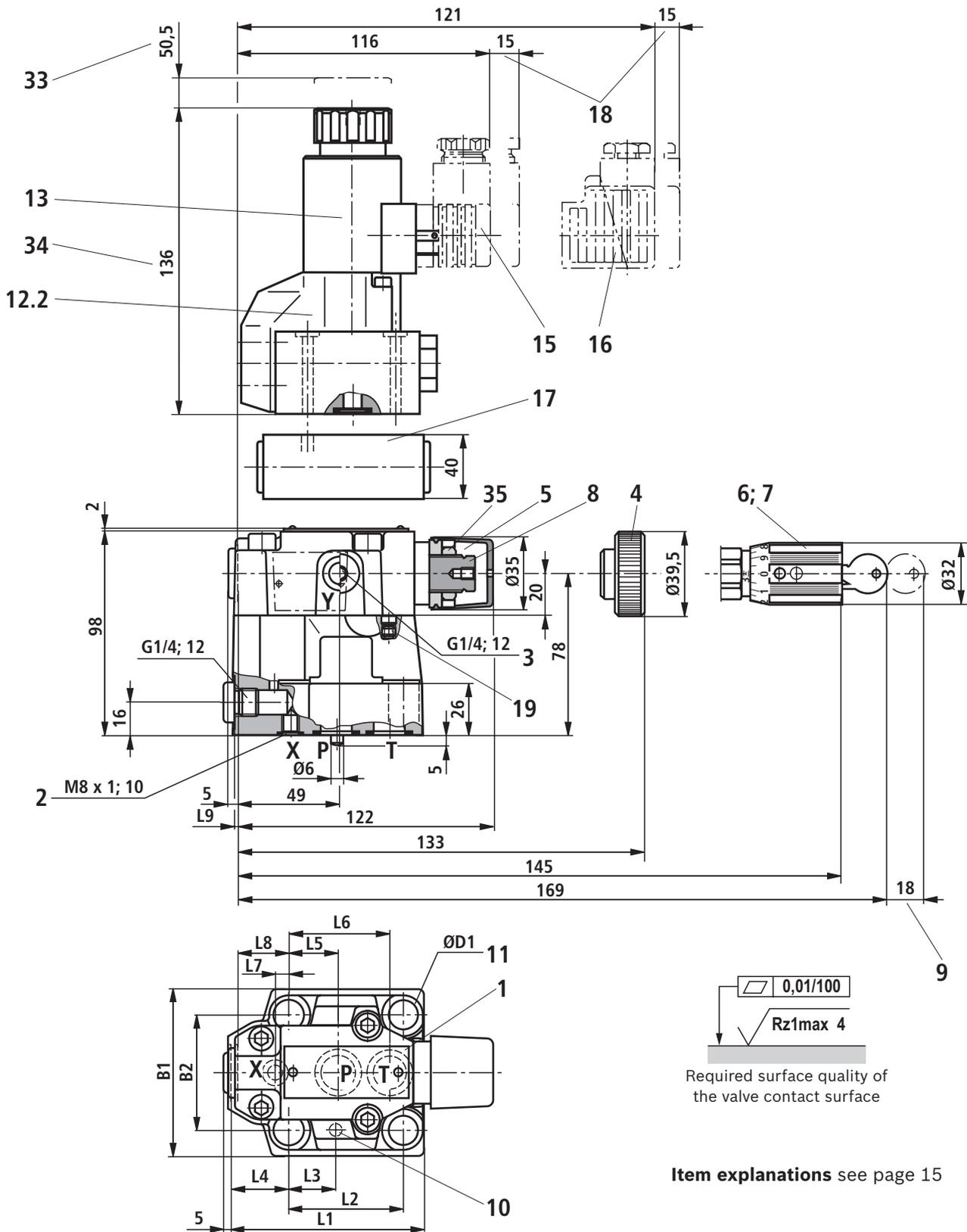


**Dimensions:** Subplate mounting with directional spool valve "DBW...6E"  
(dimensions in mm)



Version	L1	L2	L3	L4	L5	L6	L7	L8	L9	B1	B2	ØD1
"DBW 10"	91	53.8	22.1	27.5	22.1	47.5	0	25.5	2	78	53.8	14
"DBW 20"	116	66.7	33.4	33.3	11.1	55.6	23.8	22.8	10.5	100	70	18
"DBW 30"	147.5	88.9	44.5	41	12.7	76.2	31.8	20	21	115	82.6	20

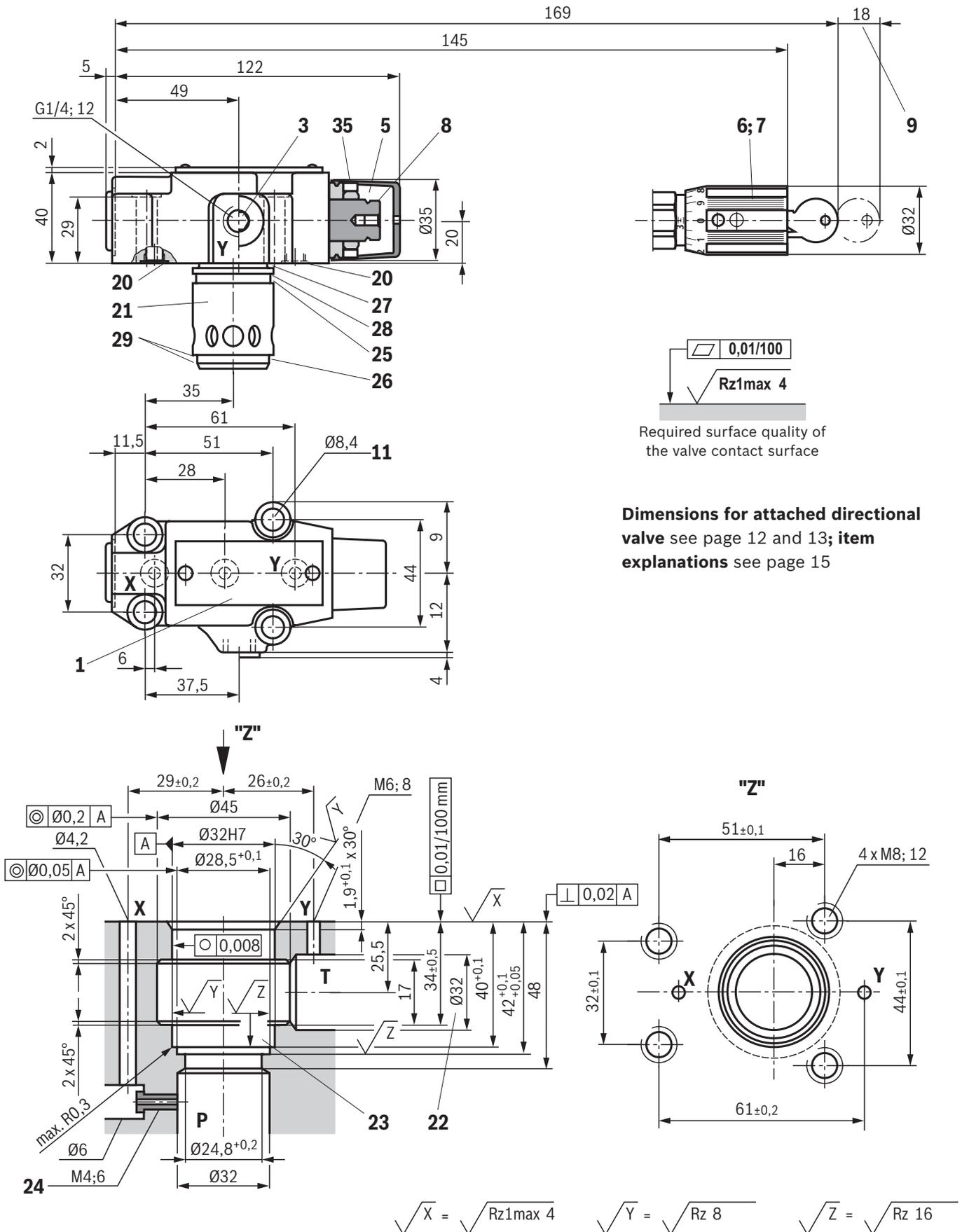
**Dimensions:** Subplate mounting with directional seat valve "DBW...6SM"  
(dimensions in mm)



Item explanations see page 15

Version	L1	L2	L3	L4	L5	L6	L7	L8	L9	B1	B2	ØD1
"DBW 10"	91	53.8	22.1	27.5	22.1	47.5	0	25.5	2	78	53.8	14
"DBW 20"	116	66.7	33.4	33.3	11.1	55.6	23.8	22.8	10.5	100	70	18
"DBW 30"	147.5	88.9	44.5	41	12.7	76.2	31.8	20	21	115	82.6	20

**Dimensions:** Pilot control valve with ("DBC 10 or 30") or without main spool insert ("DBC, DBT") (dimensions in mm)



**Dimensions for attached directional valve** see page 12 and 13; **item explanations** see page 15

## Dimensions

- 1 Name plate
- 2 X port for pilot oil supply, external
- 3 Y port for pilot oil return, external
- 4 Adjustment type "1"
- 5 Adjustment type "2"
- 6 Adjustment type "3"
- 7 Adjustment type "7"
- 8 Hexagon wrench size 10
- 9 Space required to remove the key
- 10 Locking pin
- 11 Valve mounting bore
- 12.1 Directional spool valve NG6, see data sheet 23178
- 12.2 Directional seat valve NG6, see data sheet 22058
- 13 Solenoid "a"
- 14 Dimension for valve without manual override
- 15 Mating connector **without** circuitry (separate order, see page 21)
- 16 Mating connector **with** circuitry (separate order, see page 21)
- 17 Switching shock damping valve, optional
- 18 Space required for removing the mating connector
- 19 Omitted with internal pilot oil return
- 20 Seal ring
- 21 Main spool insert
- 22 Bore  $\varnothing 32$  may intersect  $\varnothing 45$  at any point. However, it must be observed that the connection bore X and the mounting bore are not damaged.
- 23 Support ring and seal ring are to be inserted before the assembly of the main spool into this bore.
- 24 Nozzle (separate order; recommended nozzle  $\varnothing 1.0$ )
- 25 Seal ring
- 26 Seal ring
- 27 Seal ring
- 28 Support ring
- 29 Support ring
- 30 Dimension for valve with manual override "N"
- 31 Dimension ( ) for valve with AC solenoid
- 32 Dimension for valve with DC solenoid
- 33 Space required to remove the solenoid coil
- 34 Dimension for valve with concealed manual override "N9"
- 35 Lock nut, wrench size 17, tightening torque  $M_A = 10^{+5}$  Nm

**Subplates** (separate order) with porting pattern according to ISO 6264 see data sheet 45100.



### Notice:

The specified subplates are not approved for use with type-examination tested safety valves according to Pressure Equipment Directive 2014/68/EU.

**Valve mounting screws** (separate order)

For reasons of stability, exclusively the following valve mounting screws may be used:

- ▶ Version "DB/DBW 10"  
**4 x ISO 4762 - M12 x 50 - 10.9-flZn/nc/480h/C**  
 with friction coefficient  $\mu_{\text{total}} = 0.09 \dots 0.14$ ,  
 tightening torque  $M_A = 75 \text{ Nm} \pm 10\%$ ,  
 material no. **R913015611**
- ▶ Version "DB/DBW 20"  
**4 x ISO 4762 - M16 x 50 - 10.9-flZn/nc/480h/C**  
 with friction coefficient  $\mu_{\text{total}} = 0.09 \dots 0.14$ ,  
 tightening torque  $M_A = 185 \text{ Nm} \pm 10\%$ ,  
 material no. **R913015664**
- ▶ Version "DB/DBW 30"  
**4 x DIN 912 - M18 x 50 - 10.9-flZn/nc/480h/C**  
 with friction coefficient  $\mu_{\text{total}} = 0.09 \dots 0.14$ ,  
 tightening torque  $M_A = 248 \text{ Nm} \pm 10\%$ ,  
 material no. **R913015903**
- ▶ Version "DBC/DBWC", "DBC 10/DBWC 10",  
 "DBC 30/DBWC 30" and "DBT/DBWT"  
**4 x ISO 4762 - M8 x 40 - 10.9-flZn/nc/480h/C**  
 with friction coefficient  $\mu_{\text{total}} = 0.09 \dots 0.14$ ,  
 tightening torque  $M_A = 31 \text{ Nm} \pm 10\%$ ,  
 material no. **R913015798**



### Notice:

The tightening torques stated are guidelines when using screws with the specified friction coefficients and when using a manual torque wrench (tolerance  $\pm 10\%$ ).

**Ordering code:** Type-examination tested safety valves, version "DB(W)...E" <sup>1)</sup>

NG	Designation	Component marking	Maximum flow $q_{Vmax}$ in l/min with pilot oil return		Set response overpressure $p$ in bar
			external "Y"	internal "-"	
10	DB 10      2 3      4 5 7 <input type="checkbox"/> <input type="checkbox"/> -5X/ <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> E	TÜV.SV. <input type="checkbox"/> - 851.12.F.G.p	170	130	30 ... 60
	230		200	61 ... 110	
25	DBW 10    1 2 3      4 5      6 7 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> -5X/ <input type="checkbox"/> <input type="checkbox"/> 6 <input type="checkbox"/> <input type="checkbox"/> E	TÜV.SV. <input type="checkbox"/> - 852.22.F.G.p	230	200	111 ... 210
	230		200	211 ... 350	
25	DB 20      2 3      4 5 7 <input type="checkbox"/> <input type="checkbox"/> -5X/ <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> E	TÜV.SV. <input type="checkbox"/> - 852.22.F.G.p	250	180	30 ... 60
	270		210	61 ... 110	
32	DBW 20    1 2 3      4 5      6 7 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> -5X/ <input type="checkbox"/> <input type="checkbox"/> 6 <input type="checkbox"/> <input type="checkbox"/> E	TÜV.SV. <input type="checkbox"/> - 853.22.F.G.p	420	320	111 ... 210
	450		400	211 ... 350	
32	DB 30      2 3      4 5 7 <input type="checkbox"/> <input type="checkbox"/> N5X/ <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> E	TÜV.SV. <input type="checkbox"/> - 853.22.F.G.p	600	225	30 ... 60
	600		340	61 ... 110	
32	DBW 30    1 2 3      4 5      6 7 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> N5X/ <input type="checkbox"/> <input type="checkbox"/> 6 <input type="checkbox"/> <input type="checkbox"/> E	TÜV.SV. <input type="checkbox"/> - 853.22.F.G.p	650	540	111 ... 210
	700		580	211 ... 350	

<input type="checkbox"/>	1	Directional valve, normally closed	<b>A</b>
		Directional valve, normally open	<b>B</b>

<input type="checkbox"/>	2	Subplate mounting	<b>no code</b>
		Threaded connection	<b>G</b>

**Adjustment type for pressure adjustment**

<input type="checkbox"/>	3	Hand wheel (pressure adjustment sealed, unloading or setting of a lower response pressure possible)	<b>1</b>
		With sealed protective cap (no adjustment/unloading possible)	<b>2</b>

**Pressure**

<input type="checkbox"/>	4	To be entered by the customer, e.g. pressure adjustment $\geq 30$ bar and in 5 bar steps possible	<b>e.g. 150</b>
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**Pilot oil supply and pilot oil return**

<input type="checkbox"/>	5	Pilot oil supply and pilot oil return internal	- 2; 3)
		Pilot oil supply internal, pilot oil return external (recommendation)	<b>Y</b> <sup>3)</sup>

**Electrical specifications**

<input type="checkbox"/>	6	See page 3	<b>e.g. EG24N9K4</b>
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**Seal material**

<input type="checkbox"/>	7	NBR seals	<b>no code</b>
		FKM seals	<b>V</b>

<input type="checkbox"/>		Information is entered at the factory	
--------------------------	--	---------------------------------------	--

<sup>1)</sup> Component series 5X, according to Pressure Equipment Directive 2014/68/EU

<sup>2)</sup> Dash "-" **only** necessary with version with attached directional valve (DBW)

<sup>3)</sup> Pilot oil supply external "X" not possible

**Deviating technical data:** Type-examination tested safety valves, version "DB(W)...E" <sup>1)</sup>

<b>hydraulic</b>						
Version			"DB../.."	"DB../..Y"	"DBW../.."	"DBW../..Y"
Maximum counter pressure	▶ Port Y	bar	–	0	–	0
	▶ Port T	bar	<sup>2)</sup>	$p_T < 15$	<sup>2)</sup>	$p_T < 15$
Maximum flow	See table page 16 as well as characteristic curves page 18 ... 20					
Hydraulic fluid	Mineral oil (HL, HLP) according to DIN 51524					
Hydraulic fluid temperature range	°C	–10 ... +60				
Viscosity range	mm <sup>2</sup> /s	12 ... 230				

<sup>1)</sup> Component series 5X, according to Pressure Equipment Directive 2014/68/EU (For applications outside these parameters, please consult us!)

<sup>2)</sup> See characteristic curves and explanatory notes for maximum admissible counter pressures on page 18 ... 20

**Safety instructions:** Type-examination tested safety valves, version "DB(W)...E" <sup>1)</sup>

- ▶ Before ordering a type-examination tested safety valve, it must be observed that for the desired **response overpressure  $p$** , the maximum admissible **flow  $q_{V \max}$**  of the safety valve must be larger than the maximum possible flow of the system/accumulator to be secured.
- ▶ According to the Pressure Equipment Directive **2014/68/EU**, the increase in the system pressure due to the flow must not exceed 10% of the set response pressure (see component marking page 16).
- ▶ Discharge lines (ports T and Y) of safety valves must end in a risk-free manner. An accumulation of fluids in the discharge system must **not** be possible (see data sheet AD2000 A2).
- ▶ If a lead seal at the safety valve is removed, the approval according to the PED will become invalid!
- ▶ The requirements of the Pressure Equipment Directives **2014/68/EU** and of data sheet AD2000 A2 must be generally observed!

 **It is imperative to observe the application notes!**

- ▶ In the plant, the response pressure specified in the component marking is set with a flow of 11 l/min.
- ▶ The maximum admissible flow stated in the component marking (= numerical value instead of the character "G" in the component marking, see page 16) must not be exceeded.

It applies to:

- Pilot oil return **external ("Y") without counter pressure** in the **discharge line Y**; admissible counter pressure in the discharge line (port T) < 15 bar
- Pilot oil return **internal ("no code")**. The maximum flow is only admissible **without counter pressure** in the **discharge line** (port T).

With internal pilot oil return, the system pressure increases by the counter pressure in the discharge line (port T) due to the increasing flow (observe AD2000 - data sheet; A2, item 6.3!)

To ensure that this increase in system pressure caused by the flow does not exceed 10% of the set response pressure, the admissible flow has to be reduced dependent on the counter pressure in the discharge line (port T) see diagrams page 18 ... 20).

 **Notice:**

Possible unloading via the directional valve must not be applied for safety-relevant functions! If unloading is required for safety-relevant functions, an additional unloading valve must be installed.

<sup>1)</sup> Component series 5X, according to Pressure Equipment Directive 2014/68/EU

## Characteristic curves: Counter pressure in the discharge line

In principle, the valve should be operated without counter pressure in the discharge line, if possible. In case of counter pressure in the discharge line, the maximum possible flow is reduced. There is a relationship between maximum counter pressure  $p_T$  in the discharge line and flow  $q_V$ , which can be seen from the following characteristic curve. Characteristic curves for intermediate values of the response pressure which are not listed must be determined by means of interpolation.

When the flow approaches zero, the maximum counter pressure  $p_T$  is in each case 10% of the response pressure. With increasing flow, the maximum counter pressure  $p_T$  decreases.

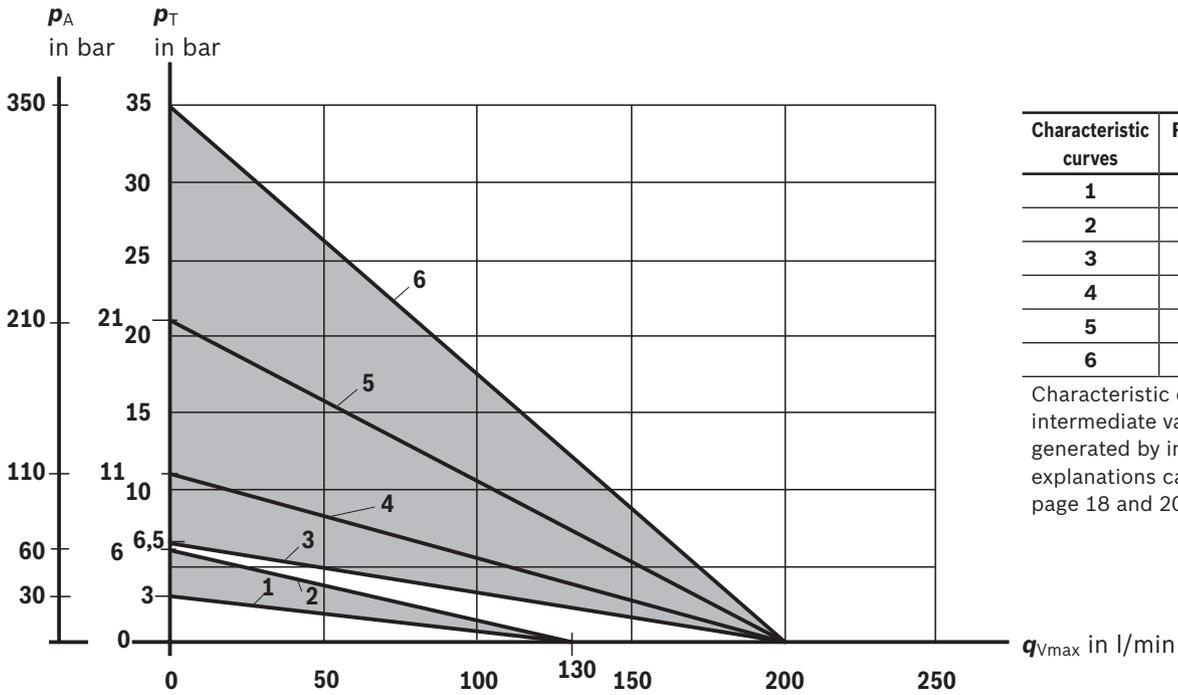
### Interpolation of intermediate values from the diagram

1. At the axis  $p_T$ , mark 1/10 of the value of  $p_A$ .
2. Determine the next lower and the next higher characteristic curve for this point. The point marked at  $p_T$  divides the section between lower and higher characteristic curve on the  $p_T$  axis with a certain percentage.
3. At the  $q_{Vmax}$  axis, divide the section between next lower and next higher characteristic curve in the same percentage as the section at the  $p_T$  axis. From the zero position flow on the  $q_{Vmax}$  axis determined in that way, draw a straight line to the value on the  $p_T$  axis marked before.
4. Mark the system flow to be secured at the  $q_{Vmax}$  axis.
5. Read off the maximum counter pressure for this value using the line at the  $p_T$  axis drawn before.

### Characteristic curves: Counter pressure in the discharge line

Diagram for determining the maximum counter pressure  $p_T$  in the discharge line at port T of the valve dependent on the flow  $q_{Vmax}$  for valves DB(W) ...-5X/...E with different response pressures  $p_A$ .

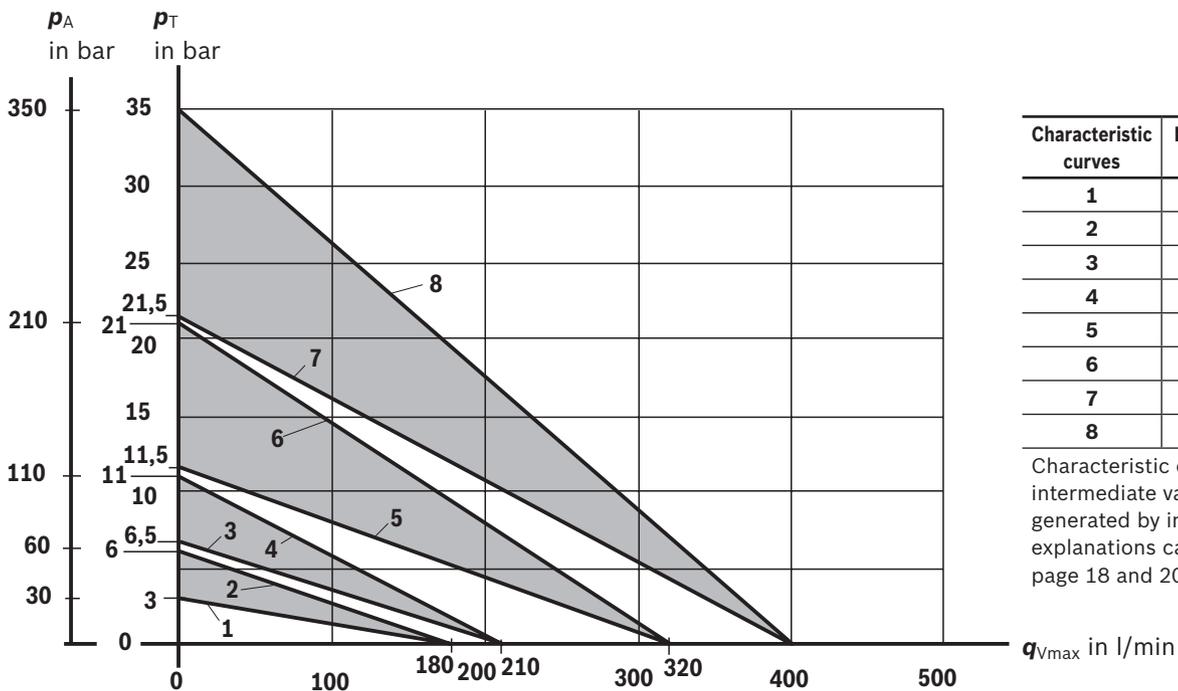
Version "DB(W) 10 ...-5X/...E"



Characteristic curves	Response pressure $p_A$ in bar
1	30
2	60
3	65
4	110
5	210
6	350

Characteristic curves for intermediate values can be generated by interpolation. Further explanations can be found on page 18 and 20.

Version "DB(W) 20 ...-5X/...E"

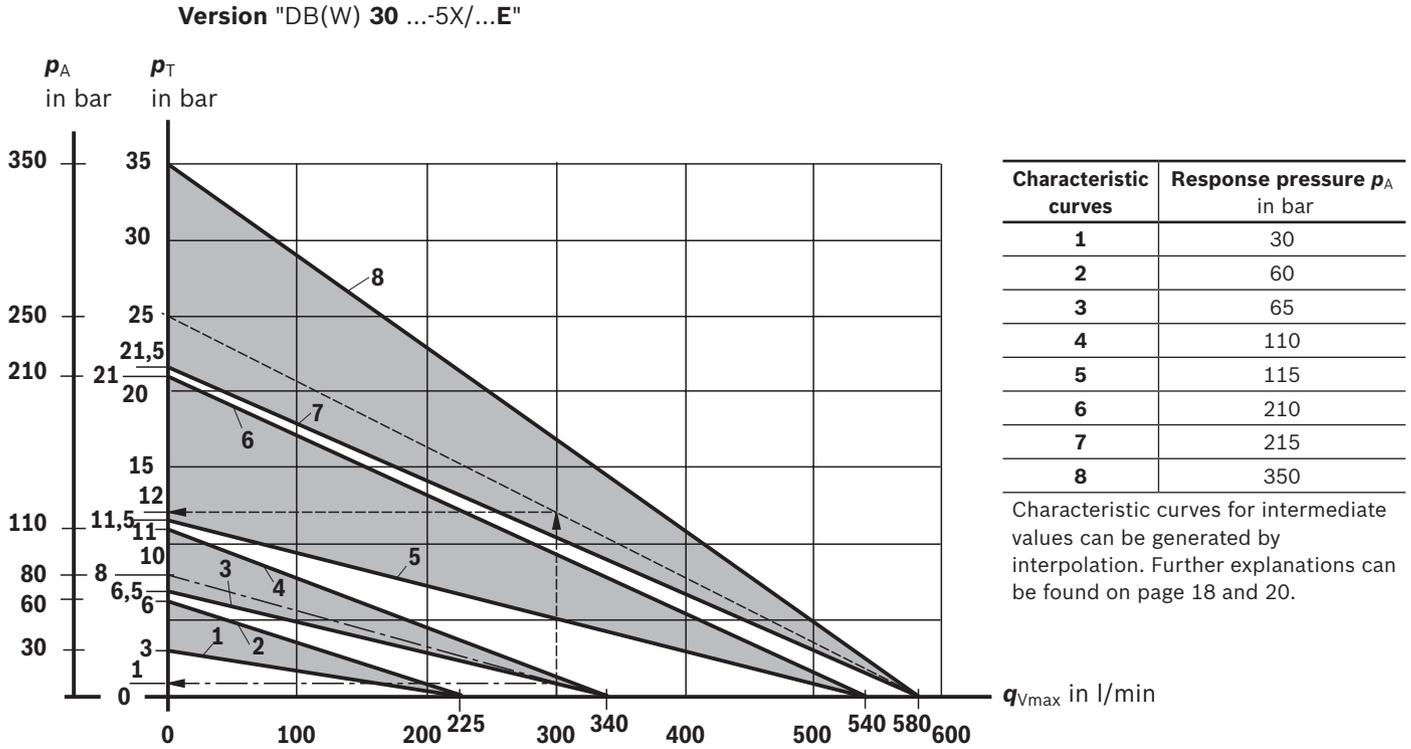


Characteristic curves	Response pressure $p_A$ in bar
1	30
2	60
3	65
4	110
5	115
6	210
7	215
8	350

Characteristic curves for intermediate values can be generated by interpolation. Further explanations can be found on page 18 and 20.

**Characteristic curves: Counter pressure in the discharge line**

Diagram for determining the maximum counter pressure  $p_T$  in the discharge line at port T of the valve dependent on the flow  $q_{Vmax}$  for valves DB(W) ...-5X/...E with different response pressures  $p_A$ .



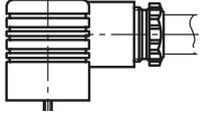
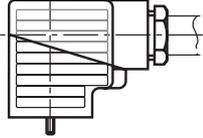
- $p_A$  Response pressure in bar
- $p_T$  Maximum counter pressure in the discharge line (port T) in bar  
(sum of all possible counter pressures; also see AD2000 data sheet - A2)  
 $p_{Tmax} = 10\% \times p_A$  (with  $q_V = 0$  l/min) according to PED 2014/68/EU
- $q_{Vmax}$  Maximum flow in l/min

**Determination of the maximum counter pressure**

**Example 1** (with already existing characteristic curve):  
 Flow of the system / accumulator to be secured:  $q_{Vmax} = 300$  l/min  
 Safety valve set to:  $p_A = 250$  bar.  
 Read off the maximum counter pressure  $p_T$  of approx. 12 bar from the diagram (see arrows, dashed line "-----").

**Example 2** (with interpolated characteristic curve):  
 Flow of the system / accumulator to be secured:  $q_{Vmax} = 300$  l/min  
 Safety valve set to:  $p_A = 80$  bar.  
 Value to be marked at the axis referred to as  $p$ :  
 $1/10 \times 80$  bar = 8 bar.  
 Read off the maximum counter pressure  $p_T$  of approx. 1 bar from the diagram (see arrows, dashed/dotted line "- \_ \_ - \_").

**Mating connectors** according to DIN EN 175301-803

For details and more mating connectors see data sheet 08006				
	<b>Material no.</b>			
<b>Color</b>	Without circuitry	With indicator light 12 ... 240 V	With rectifier 12 ... 240 V	With indicator light and Zener diode suppression circuit 24 V
gray	<b>R901017010</b>	-	-	-
black	<b>R901017011</b>	<b>R901017022</b>	<b>R901017025</b>	<b>R901017026</b>

**General information**

- ▶ The unloading function (directional valve function with version "DBW") must not be used for safety functions!
- ▶ With version "**B**", the lowest adjustable pressure (circulation pressure) is set in case of power failure or cable break. With version "**A**", the pressure limiting function is set in case of power failure or cable break.
- ▶ Hydraulic counter pressures in port T with internal pilot oil return and/or port Y with external pilot oil return add 1:1 to the response pressure of the valve set at the pilot control.

Example:

Pressure adjustment of the valve by spring preload (item 9 on page 5) in the pilot control valve/adjustment type

$$p_{\text{spring}} = \mathbf{200 \text{ bar}}$$

Hydraulic counter pressure in port T with internal pilot oil return  $p_{\text{hydraulic}} = \mathbf{50 \text{ bar}}$

$$\Rightarrow \text{Response pressure} = p_{\text{spring}} + p_{\text{hydraulic}} = \mathbf{250 \text{ bar}}$$

## Further information

- ▶ Directional spool valve Data sheet 23178
- ▶ Directional seat valve Data sheet 22058
- ▶ Subplates Data sheet 45100
- ▶ Hydraulic fluids on mineral oil basis Data sheet 90220
- ▶ Environmentally compatible hydraulic fluids Data sheet 90221
- ▶ Flame-resistant, water-free hydraulic fluids Data sheet 90222
- ▶ Flame-resistant hydraulic fluids - containing water (HFAE, HFAS, HFB, HFC) Data sheet 90223
- ▶ Hydraulic valves for industrial applications Operating instructions 07600-B
- ▶ Selection of the filters [www.boschrexroth.com/filter](http://www.boschrexroth.com/filter)
- ▶ Information on available spare parts [www.boschrexroth.com/spc](http://www.boschrexroth.com/spc)

Bosch Rexroth AG  
Hydraulics  
Zum Eisengießer 1  
97816 Lohr am Main, Germany  
Phone +49 (0) 93 52/18-0  
[documentation@boschrexroth.de](mailto:documentation@boschrexroth.de)  
[www.boschrexroth.de](http://www.boschrexroth.de)

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## Notes

Bosch Rexroth AG  
Hydraulics  
Zum Eisengießer 1  
97816 Lohr am Main, Germany  
Phone +49 (0) 93 52/18-0  
documentation@boschrexroth.de  
www.boschrexroth.de

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Hydraulics  
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www.boschrexroth.de

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