

RE 25802

Edition: 2021-10

Replaces: 2017-03

**rexroth**  
A Bosch Company

## Pressure relief valve, pilot-operated

### Type DB and DBW



- ▶ 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
- ▶ Solenoid-actuated unloading via an installed directional spool valve or directional seat valve
- ▶ High-power solenoid
- ▶ Switching shock damping, optional (DBW type only)
- ▶ Corrosion-protected design
- ▶ CE conformity according to the Low-Voltage Directive 2014/35/EU for electrical voltages > 50 VAC or > 75 VDC
- ▶ Solenoid coil as approved component with UR marking according to UL 906, edition 1982, optional

#### Contents

Features	1
Ordering code	2, 3
Symbols	4
Function, section	5, 6
Technical data	7, 8
Characteristic curves	9, 10
Dimensions	11 ... 15
Accessories	21
General information	21
Further information	22

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

Ordering code	16
Deviating technical data	17
Safety instructions	17
Characteristic curves	18 ... 20

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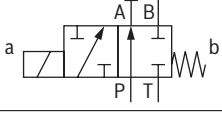
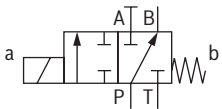
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2/22 DB; DBW | Pressure relief valve

## Ordering code

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22
DB								5X	/							K4					

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

## Type of connection

06	Subplate mounting or cartridge valve	no code ♦
	Threaded connection	G

## Adjustment type for pressure adjustment

07	Rotary knob (not for version "C" and "T")	1
	Sleeve with hexagon and protective cap	2 ♦
	Lockable rotary knob with scale	3 <sup>3)</sup>
	Rotary knob with scale	7

08	Main spool Ø24 mm (all sizes)	- ♦
	Main spool Ø28 mm (only NG32)	N

09	Component series 50 ... 59 (50 ... 59: unchanged installation and connection dimensions)	5X
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## Pressure rating

10	Set pressure up to 50 bar	50
	Set pressure up to 100 bar	100 ♦
	Set pressure up to 200 bar	200 ♦
	Set pressure up to 315 bar	315 ♦
	Set pressure up to 350 bar	350 ♦

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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
DB								5X	/							K4					

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

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

### Electrical connection

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

### Corrosion resistance

19	None	no code ◇
	Improved corrosion protection (240 h salt spray test according to EN ISO 9227); (only version "2", however, without protective cap)	J3

### Seal material (observe compatibility of seals with hydraulic fluid used, see page 8)

20	NBR seals	no code ◇
	FKM seals	V

### Equipment Directive

21	Without type-examination procedure	no code
	Type-examination tested safety valves according to Pressure Equipment Directive 2014/68/EU <sup>9)</sup>	E
22	Standard version	no code ◇
	Solenoid coil is an approved component with UR-marking according to UL 906	=UR

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

<sup>2)</sup> Ordering code only necessary with version with mounted directional valve ("DBW").

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

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

<sup>5)</sup> **Not** with version "DBC/DBWC"

<sup>6)</sup> Only possible up to pressure rating 315 bar

<sup>7)</sup> Mating connectors, separate order, see page 21.

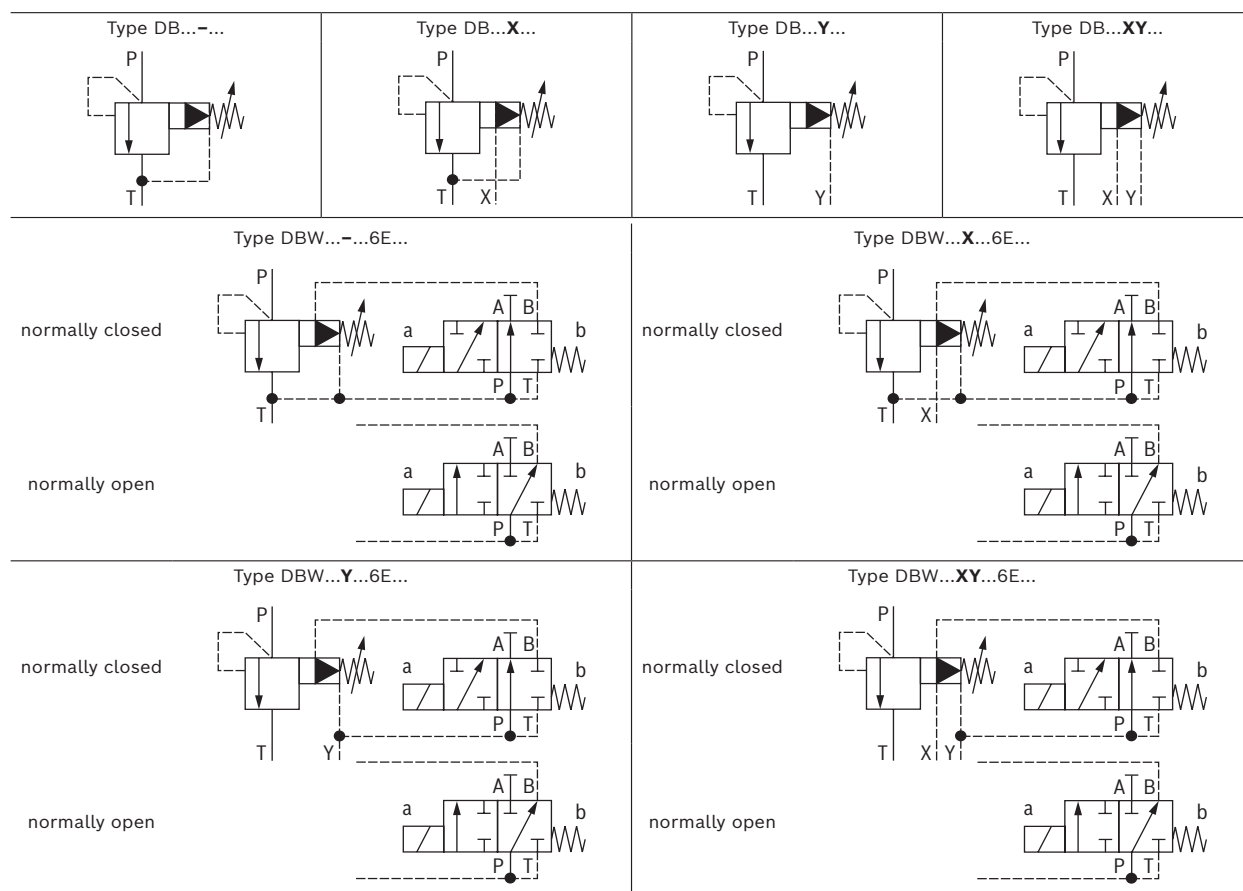
<sup>8)</sup> Ordering code only necessary with version with attached directional valve and switching shock damping ("DBW.../...S...").

<sup>9)</sup> See ordering code on page 16.

 **Notice:** ◇ = Preferred type

4/22 **DB; DBW** | Pressure relief valve

## Symbols



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## Function, section: Type DB...

### General

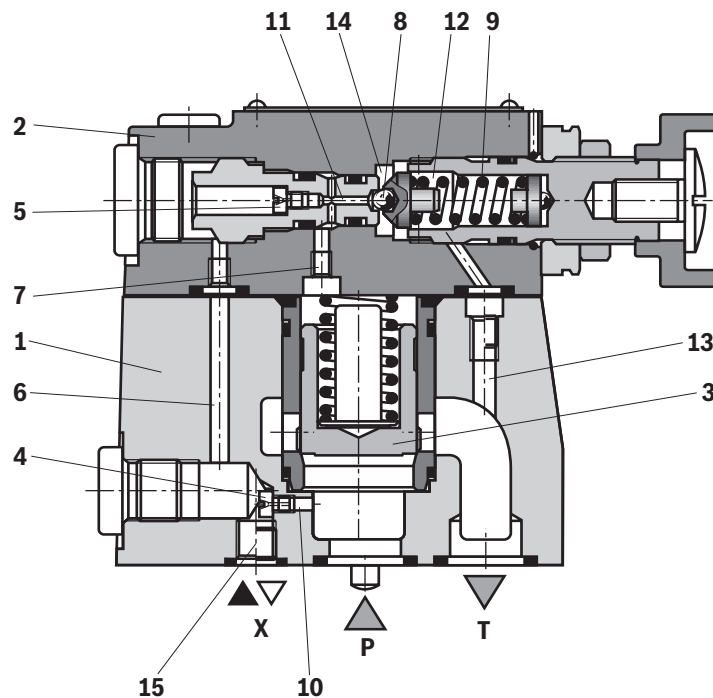
Pressure valves of type DB and DBW are pilot-operated pressure relief valves. They are used for limitation (DB) or limitation and solenoid-actuated unloading (DBW) of the operating pressure.

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).



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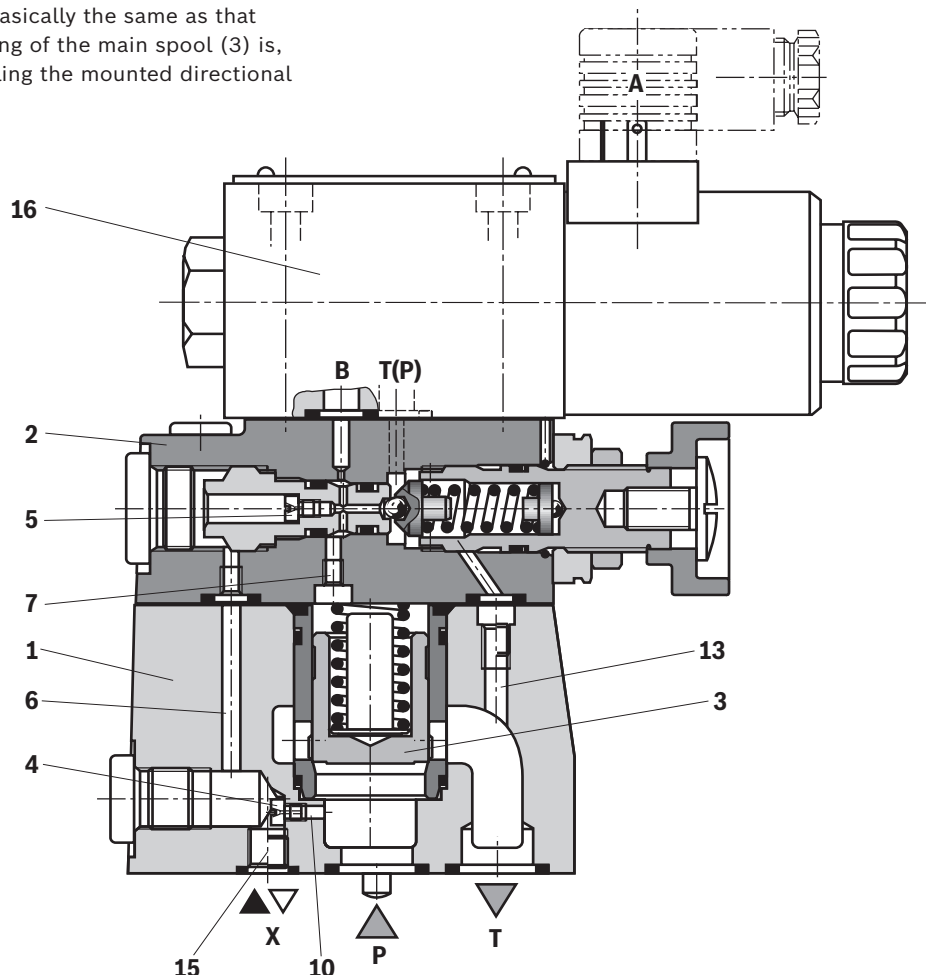
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6/22 DB; DBW | Pressure relief valve

## Function, section: Type DBW...

### Pressure relief valve type DBW

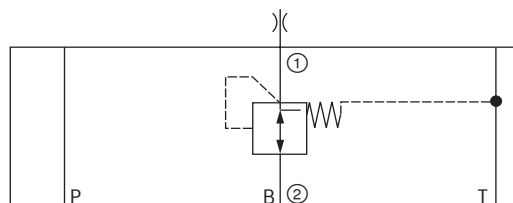
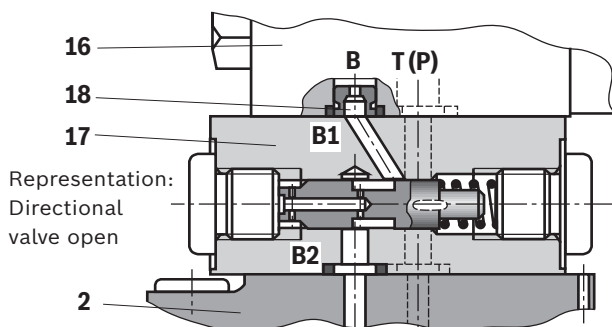
The function of this valve is basically the same as that of valve type DB. The unloading of the main spool (3) is, however, achieved by controlling the mounted directional spool valve (16).



### 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 Ø 1.2mm (ordering code ..R12..) is recommended.



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## Technical data

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

General									
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	–20 ... +80 (NBR seals) –15 ... +80 (FKM seals)					
		▶ DBW...	°C	–20 ... +50 (NBR seals) –15 ... +50 (FKM seals)					
Conformity		▶ CE according to Low-Voltage Directive 2014/35/EU, tested according to		EN 60204-1:2006-01 and DIN VDE 0580, classified as component					

Hydraulic							
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	–20 ... +80 (NBR seals) –15 ... +80 (FKM seals)				
Viscosity range		mm²/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 at the same time increases the life cycle of the components.



### Notice:

- ▶ 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.

8/22 **DB; DBW** | Pressure relief valve

## 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	► 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)		
		HFDR		
	► Containing water	HFC (Fuchs: Hydrotherm 46M, Renosafe 500; Petrofer: Ultra Safe 620; Houghton: Safe 620; Union: Carbide HP5046)	ISO 12922	90223



### 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 surface temperature.
- **Bio-degradable and flame-resistant – containing water:**  
 If components with galvanic zinc coating (e.g. version "J3" or "J5") or parts containing zinc are used, small amounts of dissolved zinc may get into the hydraulic system and cause accelerated aging of the hydraulic fluid. Zinc soap may form as a chemical reaction product, which may clog filters, nozzles and solenoid valves – particularly in connection with local heat input.

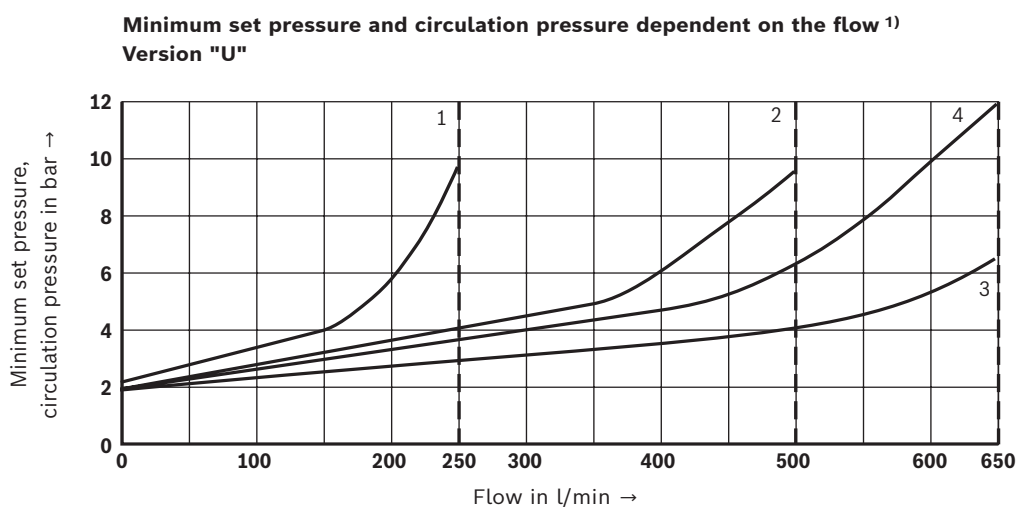
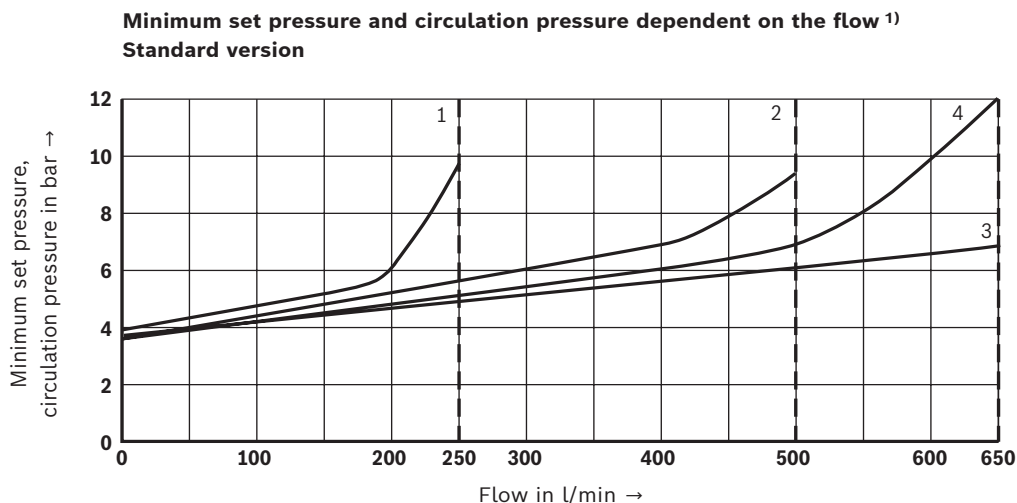
### ► Flame-resistant – containing water:

- Due to the increased cavitation tendency with HFC hydraulic fluids, the life cycle of the component may be reduced by up to 30% as compared to the use with mineral oil HLP. In order to reduce the cavitation effect, it is recommended – if possible specific to the installation – backing up the return flow pressure in ports T to approx. 20% of the pressure differential at the component.
- Dependent on the hydraulic fluid used, the maximum ambient and hydraulic fluid temperature must not exceed 50 °C. In order to reduce the heat input into the component, a maximum duty cycle of 50% in continuous operation has to be set for on/off valves (measuring time 300 s). If this is not possible due to the function, an energy-reducing control of these components is recommended, e.g. via a PWM plug-in amplifier.



## Characteristic curves

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



### Notice:

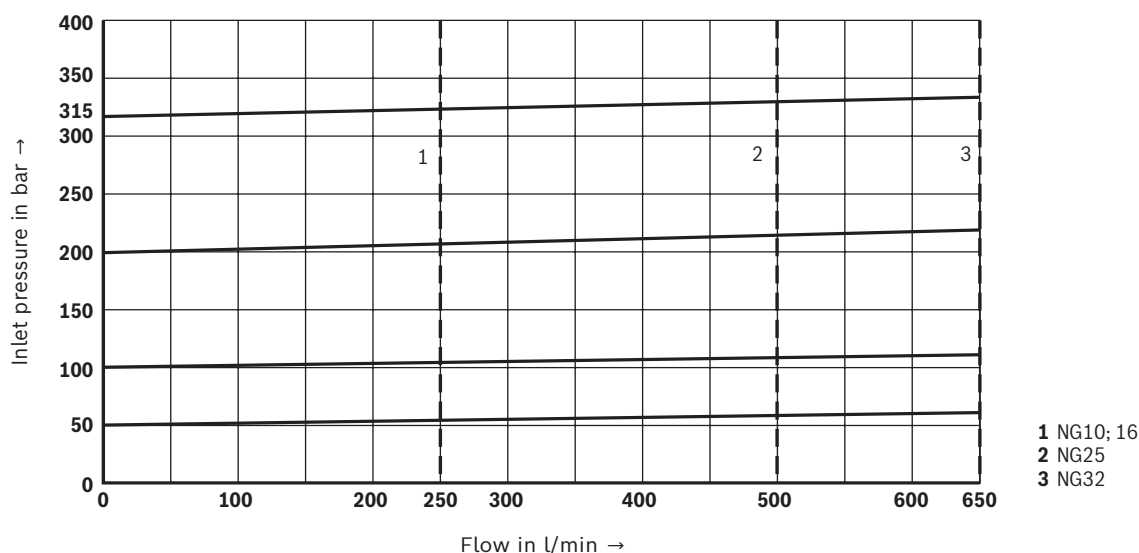
- The characteristic curves were measured with **external, depressurized pilot oil return**.  
With internal pilot oil return, the inlet pressure increases by the output pressure present in port T.
- The characteristic curves apply to the pressure at the valve output  $p_T = 0$  bar across the entire flow range.

10/22 DB; DBW | Pressure relief valve

## Characteristic curves

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

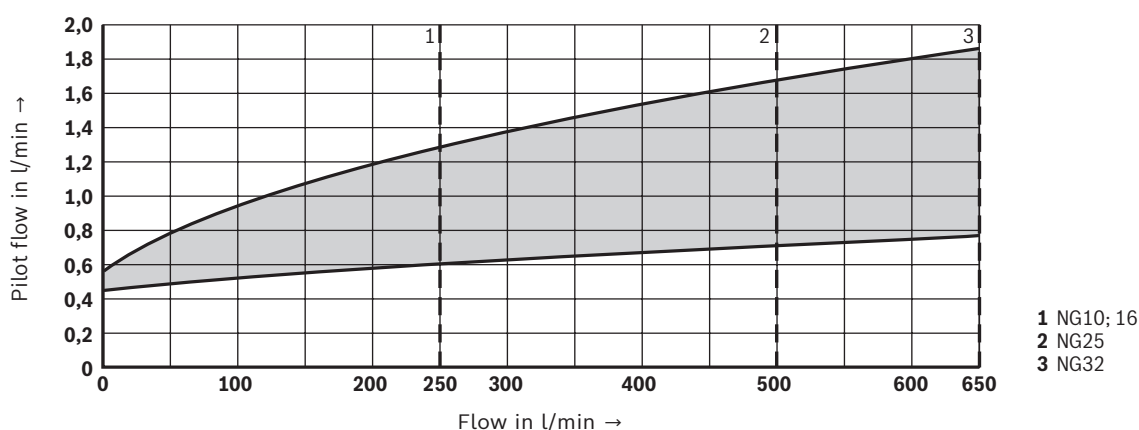
Inlet pressure dependent on the flow



### 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.

Pilot flow

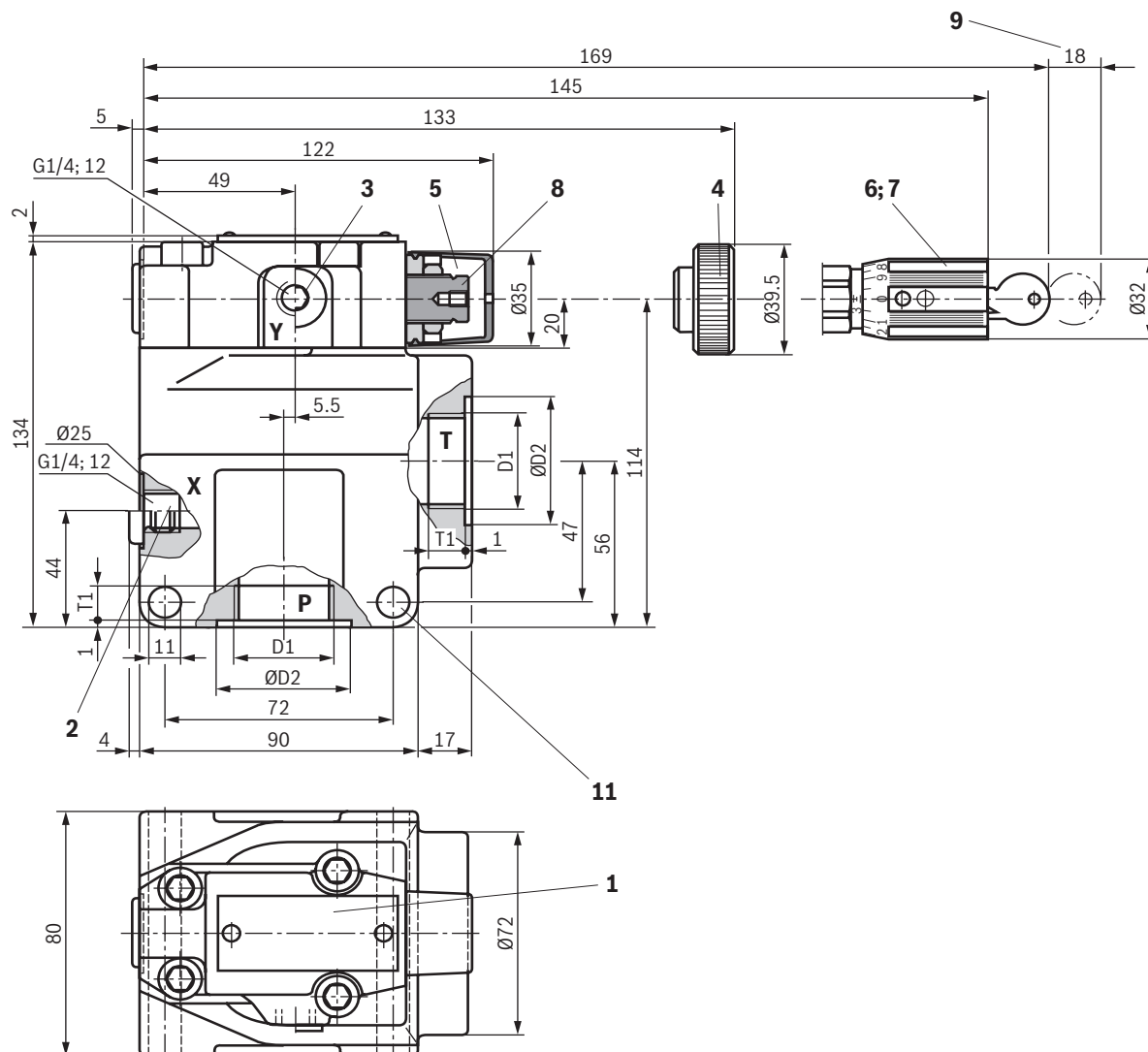


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**Dimensions:** Threaded connection  
(dimensions in mm)

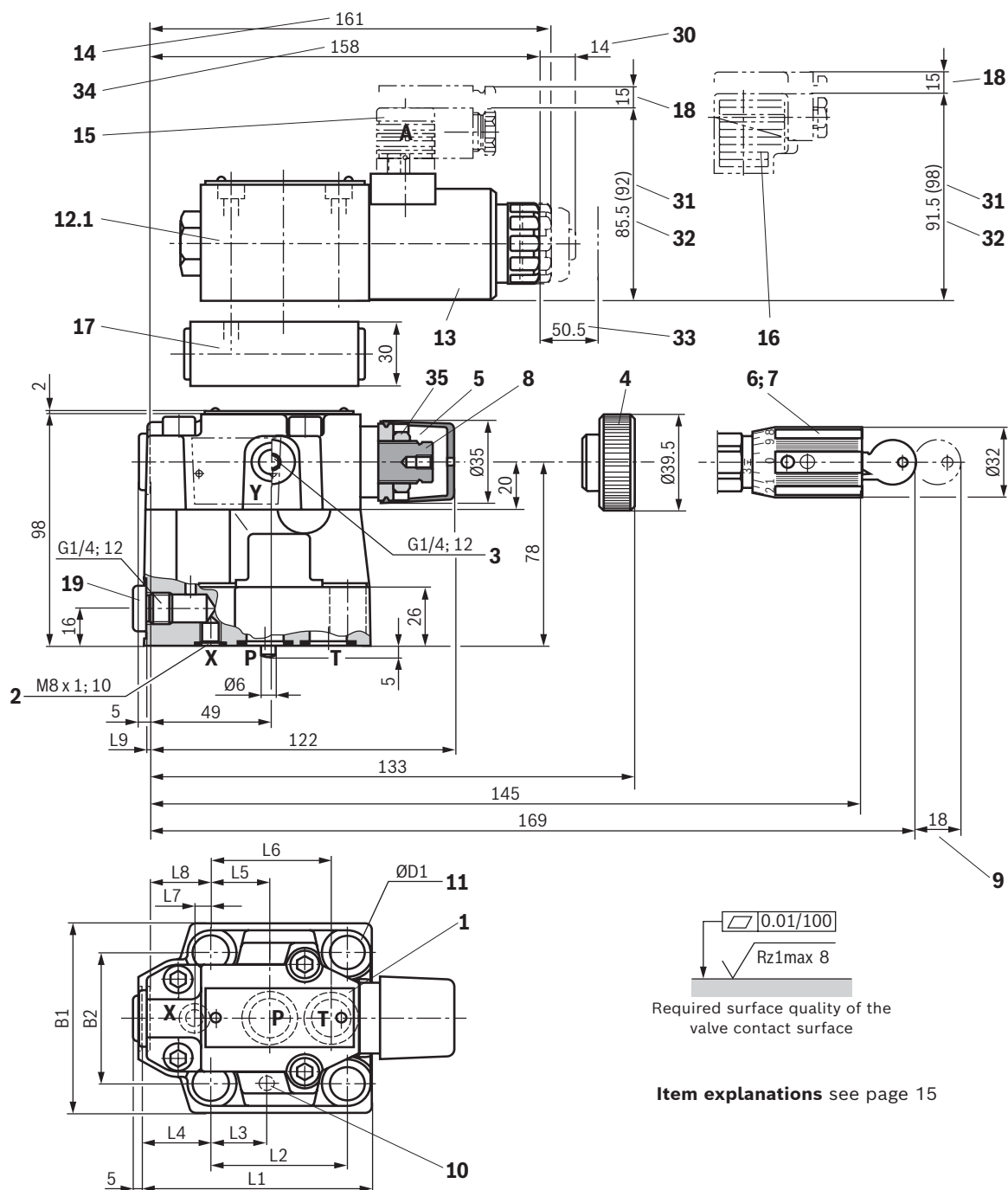


Version	D1	ØD2	T1
"DB 10 G"	G1/2	34	14
"DB 15 G"	G3/4	42	16
"DB 20 G"	G1	47	18
"DB 25 G"	G1 1/4	58	20
"DB 30 G"	G1 1/2	65	22

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

12/22 **DB; DBW** | Pressure relief valve

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



Item explanations see page 15

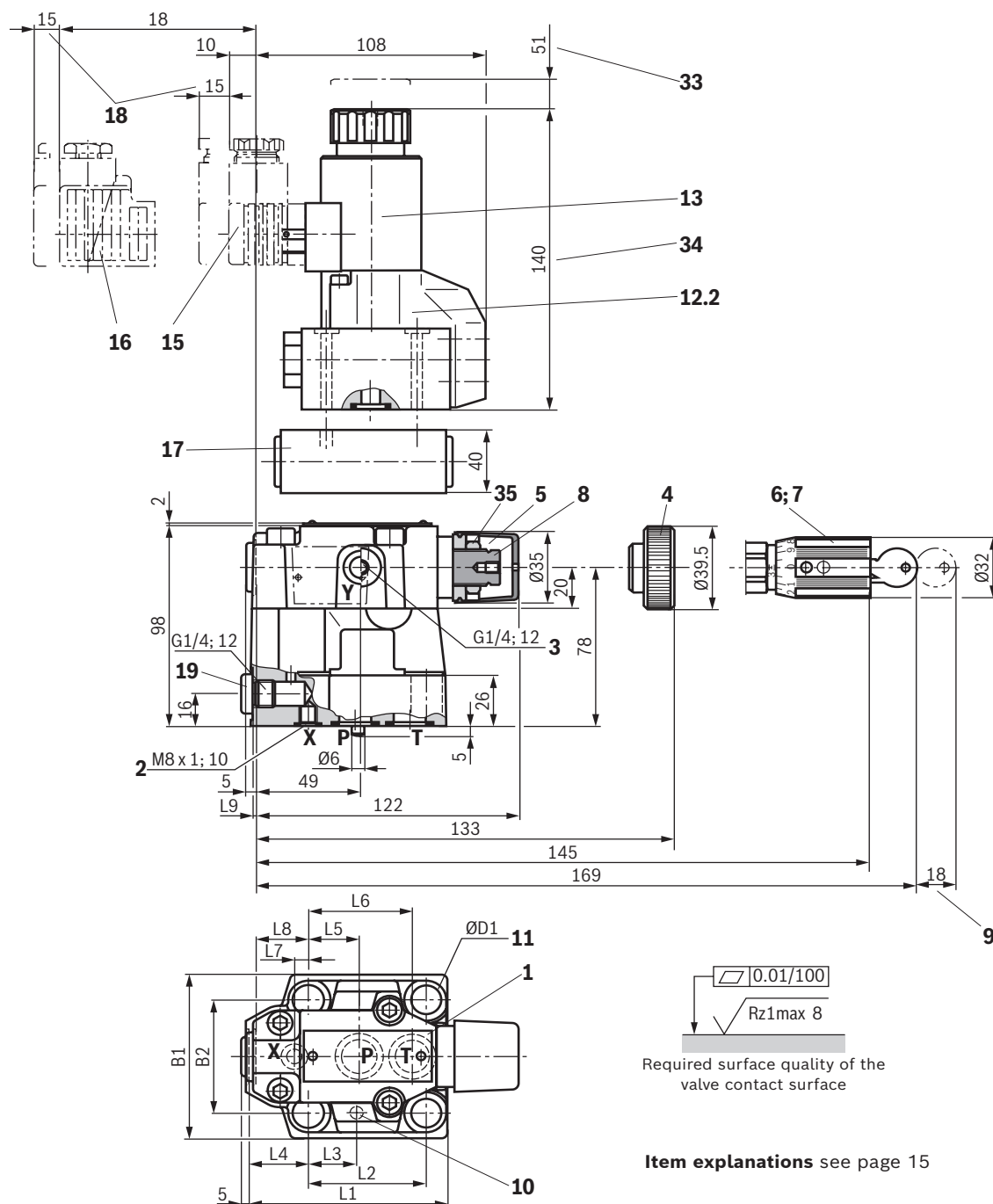
Version	L1	L2	L3	L4	L5	L6	L7	L8	L9	B1	B2	ØD1
"DBW 10"	91	53.8	22.1	27.5	22.1	47.5	0	25.5	2	78	53.8	14
"DBW 20"	116	66.7	33.4	33.3	11.1	55.6	23.8	22.8	10.5	100	70	18
"DBW 30"	147.5	88.9	44.5	41	12.7	76.2	31.8	20	21	115	82.6	20

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**Dimensions:** Subplate mounting with directional seat valve "DBW...6SM"  
(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

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



## Dimensions

- 1 Name plate
- 2 X port for external pilot oil supply
- 3 Port Y for external pilot oil return
- 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 to remove the mating connector
- 19 Measuring port
- 20 Seal ring
- 21 Main spool insert
- 22 Bore Ø32 may intersect Ø45 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 Ø1.0)
- 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

## Valve mounting screws (separate order)

Version	Quantity	Hexagon socket head cap screws	Material number
"DB/DBW 10"	4	ISO 4762 - M12 x 50 - 10.9 Friction coefficient $\mu_{\text{total}} = 0.09 \dots 0.14$ ; tightening torque $M_A = 75 \text{ Nm} \pm 10\%$	R913015611
"DB/DBW 20"	4	ISO 4762 - M16 x 50 - 10.9 Friction coefficient $\mu_{\text{total}} = 0.09 \dots 0.14$ ; tightening torque $M_A = 185 \text{ Nm} \pm 10\%$	R913015664
"DB/DBW 30"	4	DIN912 - M18 x 50 - 10.9 Friction coefficient $\mu_{\text{total}} = 0.09 \dots 0.14$ ; tightening torque $M_A = 248 \text{ Nm} \pm 10\%$	R913015903
"DBC/DBWC"; "DBC 10/ DBWC 10"; "DBC 30/ DBWC 30"; "DBT/DBWT"	4	ISO 4762 - M8 x 40 - 10.9 Friction coefficient $\mu_{\text{total}} = 0.09 \dots 0.14$ ; tightening torque $M_A = 30 \text{ Nm} \pm 10\%$	R913015798



### Notice:

- For reasons of stability, exclusively the specified valve mounting screws may be used.
- The tightening torques stated are guidelines when using screws with the specified friction coefficients and when using a manual torque wrench (tolerance  $\pm 10\%$ ).

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

16/22 DB; DBW | Pressure relief valve

**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 <input type="text"/> <input type="text"/> <input type="text"/> -5X/ <input type="text"/> <input type="text"/> <input type="text"/> E	TÜV.SV. <input type="text"/> - 1151.12.F.G.p	170	130	30 ... 60
	DBW 10 <input type="text"/> <input type="text"/> <input type="text"/> -5X/ <input type="text"/> <input type="text"/> <input type="text"/> 6 <input type="text"/> <input type="text"/> E		230	200	61 ... 110
25	DB 20 <input type="text"/> <input type="text"/> <input type="text"/> -5X/ <input type="text"/> <input type="text"/> <input type="text"/> E	TÜV.SV. <input type="text"/> - 1151.22.F.G.p	230	200	111 ... 210
	DBW 20 <input type="text"/> <input type="text"/> <input type="text"/> -5X/ <input type="text"/> <input type="text"/> <input type="text"/> 6 <input type="text"/> <input type="text"/> E		230	200	211 ... 350
32	DB 30 <input type="text"/> <input type="text"/> <input type="text"/> N5X/ <input type="text"/> <input type="text"/> <input type="text"/> E	TÜV.SV. <input type="text"/> - 1151.22.F.G.p	250	180	30 ... 60
	DBW 30 <input type="text"/> <input type="text"/> <input type="text"/> N5X/ <input type="text"/> <input type="text"/> <input type="text"/> 6 <input type="text"/> <input type="text"/> E		270	210	61 ... 110
32	DB 30 <input type="text"/> <input type="text"/> <input type="text"/> N5X/ <input type="text"/> <input type="text"/> <input type="text"/> E	TÜV.SV. <input type="text"/> - 1151.22.F.G.p	420	320	111 ... 210
	DBW 30 <input type="text"/> <input type="text"/> <input type="text"/> N5X/ <input type="text"/> <input type="text"/> <input type="text"/> 6 <input type="text"/> <input type="text"/> E		450	400	211 ... 350
32	DB 30 <input type="text"/> <input type="text"/> <input type="text"/> N5X/ <input type="text"/> <input type="text"/> <input type="text"/> E	TÜV.SV. <input type="text"/> - 1151.22.F.G.p	600	225	30 ... 60
	DBW 30 <input type="text"/> <input type="text"/> <input type="text"/> N5X/ <input type="text"/> <input type="text"/> <input type="text"/> 6 <input type="text"/> <input type="text"/> E		600	340	61 ... 110
32	DB 30 <input type="text"/> <input type="text"/> <input type="text"/> N5X/ <input type="text"/> <input type="text"/> <input type="text"/> E	TÜV.SV. <input type="text"/> - 1151.22.F.G.p	650	540	111 ... 210
	DBW 30 <input type="text"/> <input type="text"/> <input type="text"/> N5X/ <input type="text"/> <input type="text"/> <input type="text"/> 6 <input type="text"/> <input type="text"/> E		700	580	211 ... 350

1	Directional valve, normally closed	A
	Directional valve, normally open	B
2	Subplate mounting	no code
	Threaded connection	G

#### Adjustment type for pressure adjustment

3	Hand wheel (pressure adjustment sealed, unloading or setting of a lower response pressure possible)	1
	With sealed protective cap (no adjustment/unloading possible)	2

#### Pressure

4	To be entered by the customer, e.g. pressure adjustment $\geq 30$ bar and in 5 bar steps possible	e.g. 150
---	---	----------

#### Pilot oil supply and pilot oil return

5	Internal pilot oil supply and pilot oil return	- 2; 3)
	Internal pilot oil supply, external pilot oil return (recommendation)	Y 3)

#### Electrical specifications

6	See page 3	e.g. EG24N9K4
---	------------	---------------

#### Seal material

7	NBR seals	no code
	FKM seals	V
<input type="checkbox"/>	Value entered at the factory	

- 1) Component series 5X, according to the Pressure Equipment Directive 2014/68/EU
- 2) Dash "-" **only** necessary with version with attached directional valve (DBW)
- 3) External pilot oil supply "X" not possible!



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

Hydraulic					
Version		"DB../.."	"DB../..Y"	"DBW../.."	"DBW../..Y"
Maximum counter pressure	► Port Y	bar	–	0	–
	► Port T	bar	2)	$p_T < 15$	2)
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 (= TS)	°C –10 ... +60				
Viscosity range	mm <sup>2</sup> /s 12 ... 230				
Conformity	CE according to Pressure Equipment Directive 2014/68/EU				

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

<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"

- 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 becomes void.
- The requirements of the Pressure Equipment Directives **2014/68/EU** and of data sheet AD2000 A2 must be generally observed!



### Application notes must always be observed

- 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:
  - **External** pilot oil return ("**Y**") **without counter pressure** in the **discharge line Y**; admissible counter pressure in the discharge line (port T) < 15 bar
  - **Internal** pilot oil return ("**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) with 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).
- Possible unloading via the directional valve must not be applied for safety-relevant functions! If unloading is required for safety-relevant functions, an additional safety valve must be installed.

18/22 DB; DBW | Pressure relief valve

## 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.

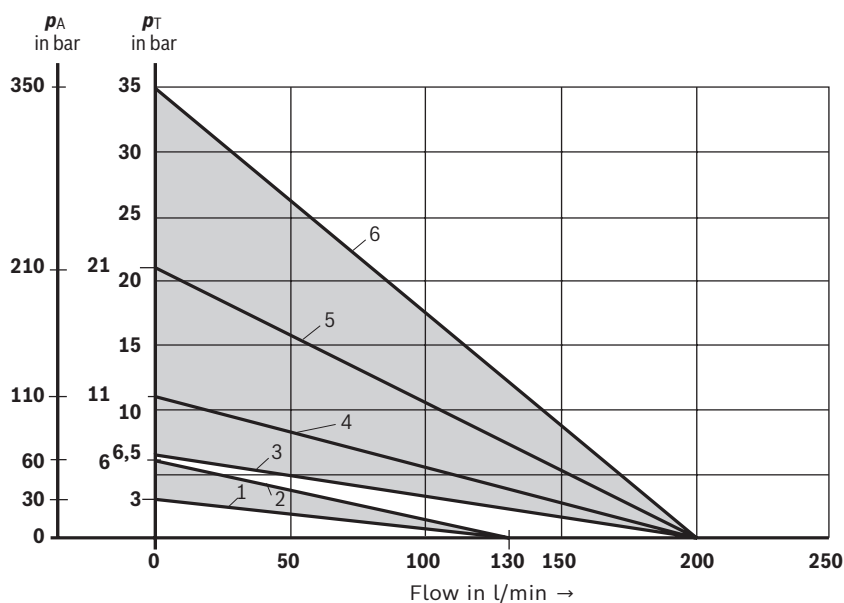
### Interpolation of intermediate values from the diagram

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  $p_A$ .

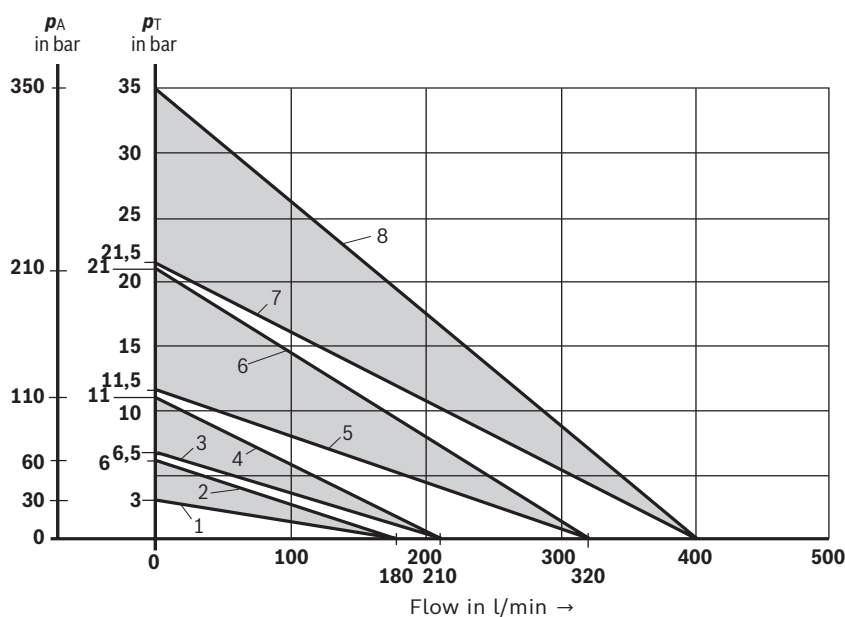
Version "DB(W) 10 ...-5X/...E"



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

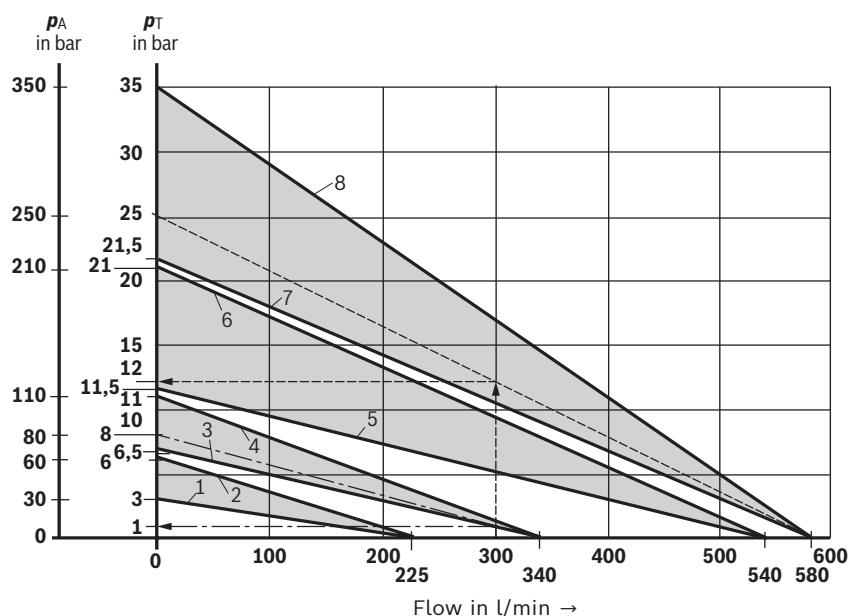
Characteristic curves for intermediate values can be generated by interpolation. Further explanations can be found on page 18 and 20.

20/22 DB; DBW | Pressure relief valve

## 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) 30 ...-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.

$p_A$  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  $p_T$ :  
 $1/10 \times 80$  bar = 8 bar.  
Read off the maximum counter pressure  $p_T$  of approx. 1 bar from the diagram (see arrows, dashed/dotted line "- - - -").

## Accessories (separate order)

### Mating connectors and cable sets

Pos. <sup>1)</sup>	Designation	Version	Short designation	Material number	Data sheet
15, 17	Mating connector; for valves with "K4" connector, 2-pole + PE, design A	Without circuitry, M16 x 1.5, 12 ... 240 V, "a"	Z4	<b>R901017010</b>	08006
		Without circuitry, M16 x 1.5, 12 ... 240 V, "b"		<b>R901017011</b>	
		With indicator light, M16 x 1.5, 12 ... 240 V	Z5L	<b>R901017022</b>	
		With rectifier, M16 x 1.5, 80 ... 240 V	RZ5	<b>R901017025</b>	
		With indicator light and Z-diode-suppressor, M16 x 1.5, 24 V	Z5L1	<b>R901017026</b>	

<sup>1)</sup> See dimensions on page 12 and 13.

## 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 age 5) in the pilot control valve/adjustment type

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

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

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

22/22 **DB; DBW** | Pressure relief valve

## 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                               |                  |
| ▶ Information on available spare parts                                       |                  |

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