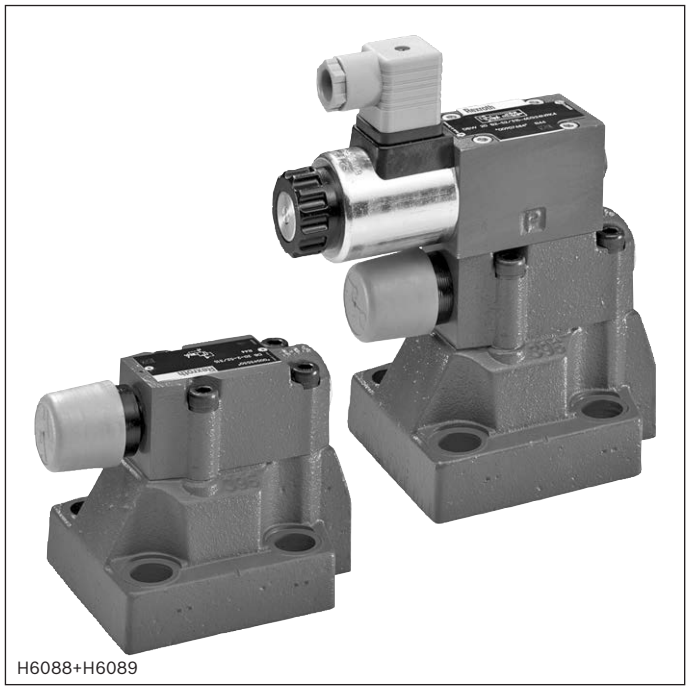
RE 25802
Edition: 2021-10
Replaces: 2017-03

rexroth
A Bosch Company

Pressure relief valve, pilot-operated

Type DB and DBW


H6088+H6089

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

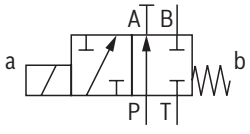
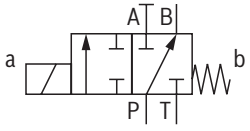
Features

- 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
- 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

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 **without** main spool insert (do **not** enter any size)	**C**
	Pilot control valve **with** main spool insert (enter size 10 or 30)	**C**
	Pilot control valve **without** main spool insert for subplate mounting (do **not** enter any size)	**T** [1]
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	 normally closed	**A** [2] **◊**
	 normally open	**B** [2] **◊**

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** [3]
	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**

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 ◊**

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 [5]	**X**
	Internal pilot oil supply, external pilot oil return	**Y**
	External pilot oil supply and pilot oil return [5]	**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** [6]
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** [2] ◊
	With directional seat valve (data sheet 22058)	**6SM** [2]
15	Direct voltage 24 V	**G24** [2] ◊
	Alternating voltage 230 V 50/60 Hz	**W230** [2]
16	**With** concealed manual override (standard)	**N9** [2] ◊
	With manual override	**N** [2]
	Without manual override	**no code**

Electrical connection

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

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

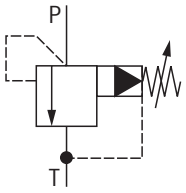
21	**Without** type-examination procedure	**no code**
	Type-examination tested safety valves according to Pressure Equipment Directive 2014/68/EU [9]	**E**
22	Standard version	**no code** ◊
	Solenoid coil is an approved component with UR-marking according to UL 906	**=UR**

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.

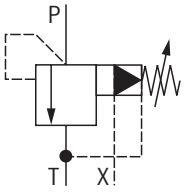
☞ **Notice:** ◊ = Preferred type

Symbols

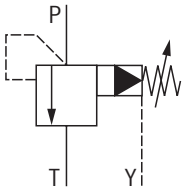
Type DB...**–**...



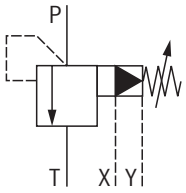
Type DB...**X**...



Type DB...**Y**...

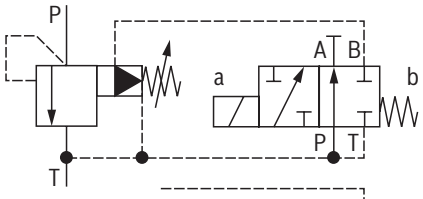


Type DB...**XY**...

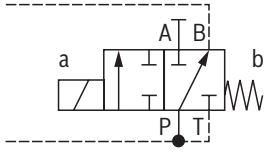


Type DBW...**–**...6E...

normally closed

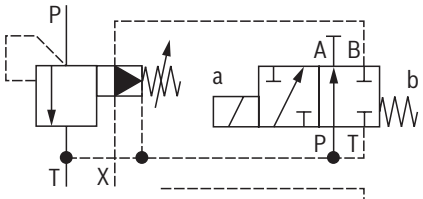


normally open

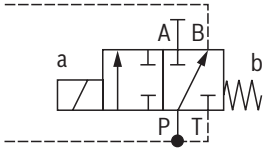


Type DBW...**X**...6E...

normally closed

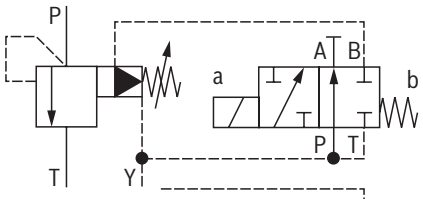


normally open

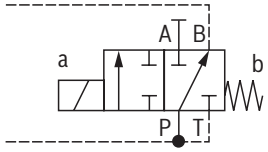


Type DBW...**Y**...6E...

normally closed

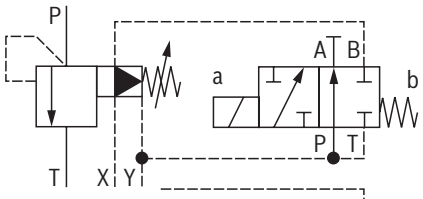


normally open

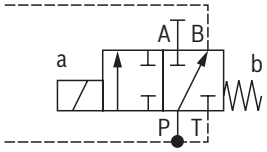


Type DBW...**XY**...6E...

normally closed



normally open



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.

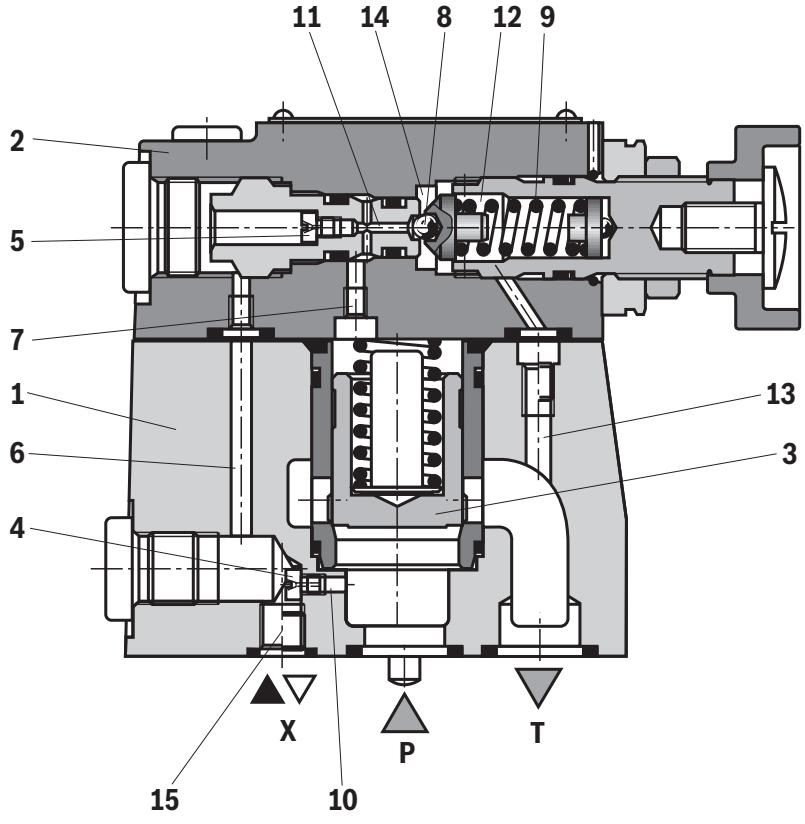
The pressure relief valves (DB) basically consist of the main valve (1) with main spool insert (3) and pilot control valve (2) with pressure adjustment element.

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).

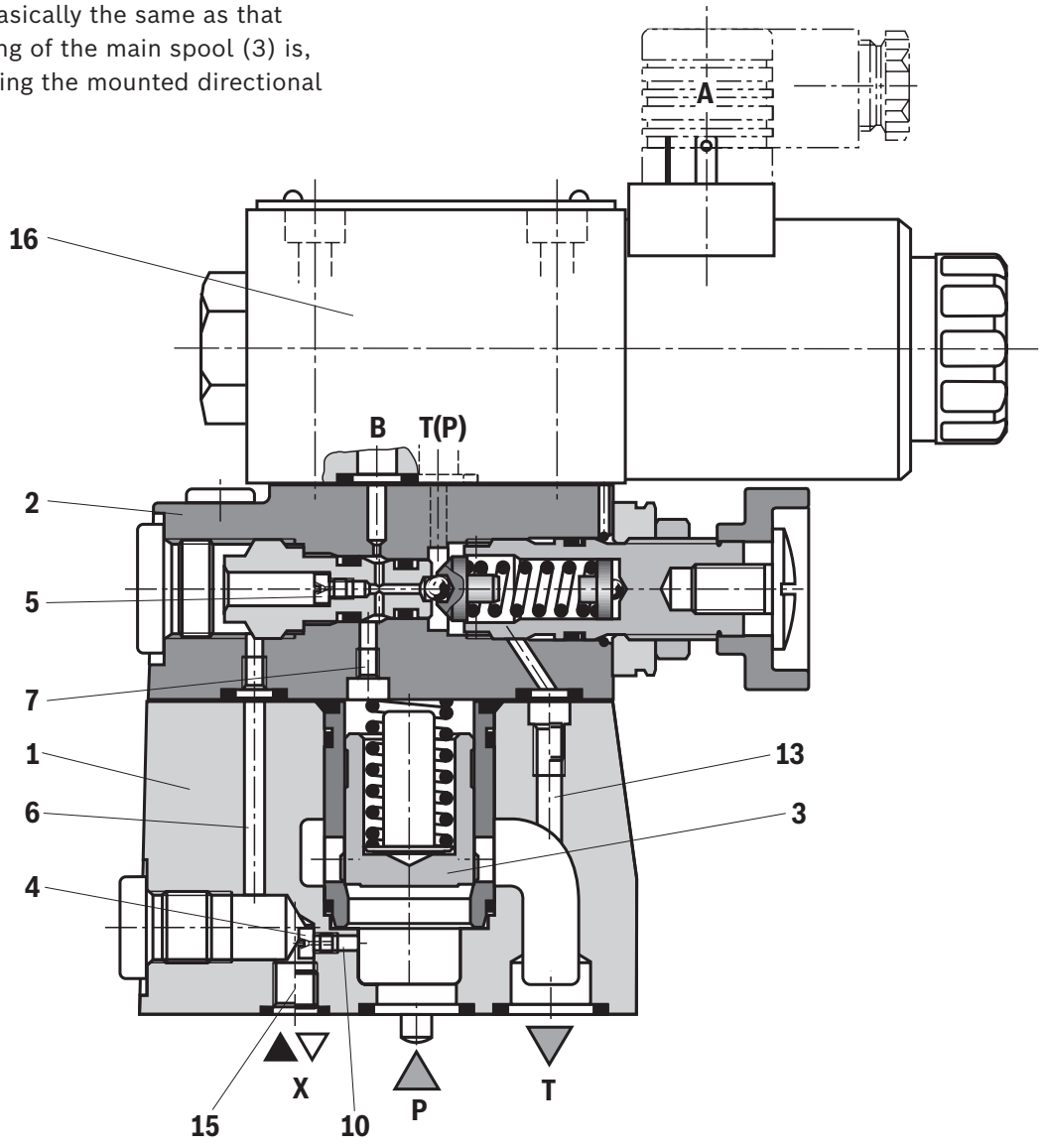
Nozzles (4) and (5) cause a pressure drop to occur at the main spool (3), hence the connection from channel P to channel T opens. The hydraulic fluid now flows from channel P to channel T, whilst the set operating pressure is maintained.

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

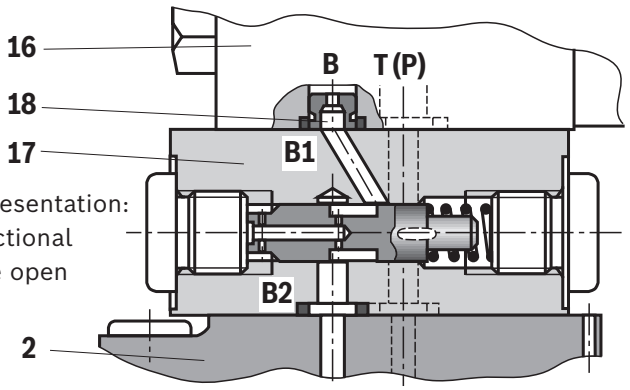


Function, section: Type DBW...

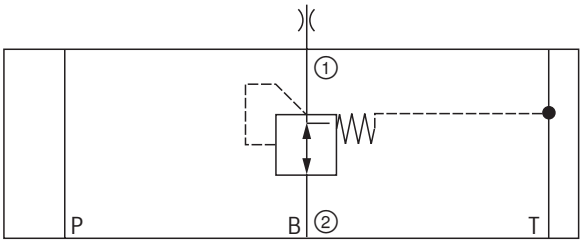
Pressure relief valve type DBW
The function of this valve is basically the same as that of valve type DB. The unloading of the main spool (3) is, however, achieved by controlling the mounted directional spool valve (16).



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.



Representation:
Directional valve open



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			mm^2/s	10 ... 800				
Maximum admissible degree of contamination of the hydraulic fluid, cleanliness class according to ISO 4406 (c)				Class 20/18/15 [1]				

[1] 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.

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	FKM	ISO 15380	90221
		HEES	FKM		
	▶ Soluble in water	HEPG	FKM	ISO 15380	
Flame-resistant	▶ Water-free	HFDU (glycol base)	FKM	ISO 12922	90222
		HFDU (ester base)	FKM		
		HFDR	FKM		
	▶ Containing water	HFC (Fuchs: Hydrotherm 46M, Renosafe 500; Petrofer: Ultra Safe 620; Houghton: Safe 620; Union: Carbide HP5046)	NBR	ISO 12922	90223

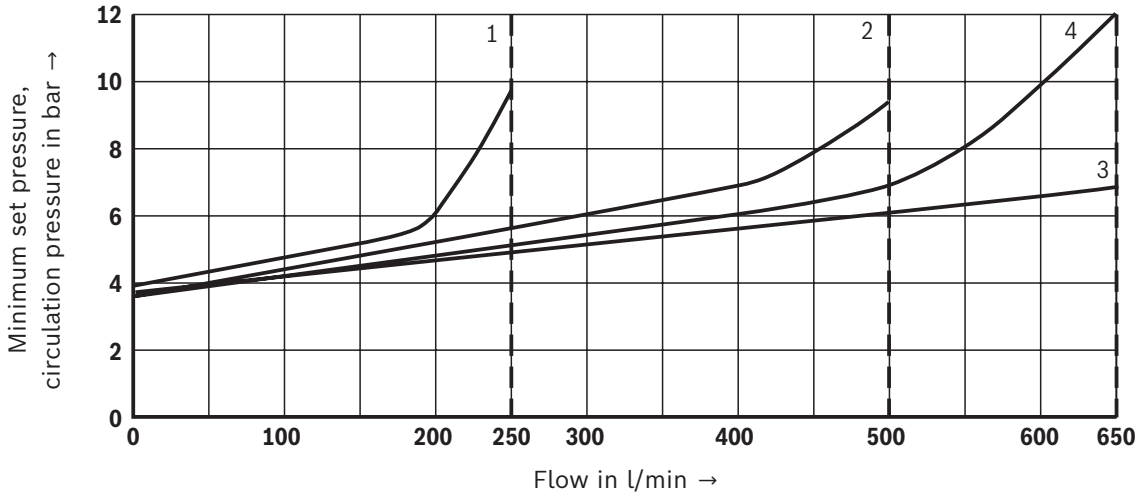
☞ **Important information on hydraulic fluids:**

- 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

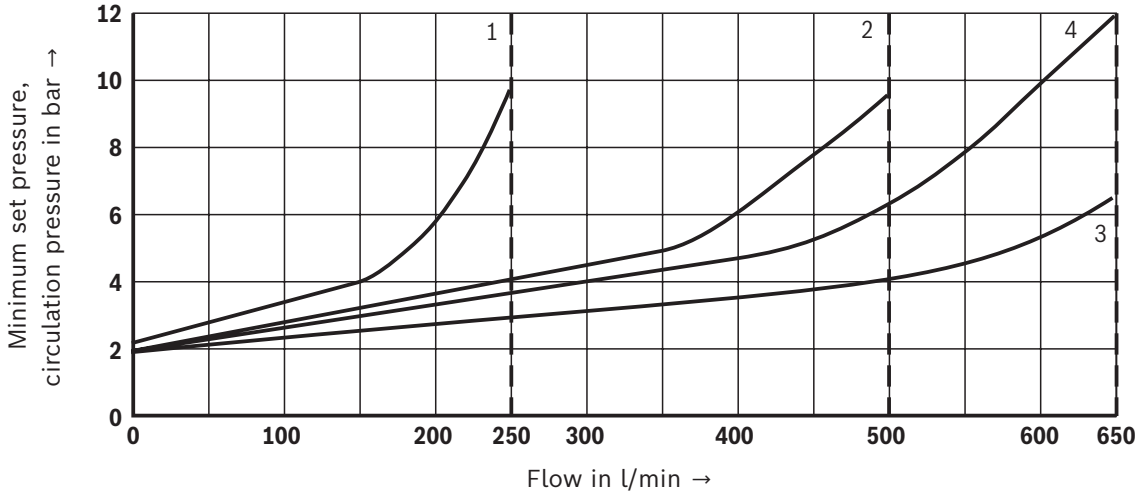
(measured with HLP46, ϑ_{oil} = 40 ±5 °C)

Minimum set pressure and circulation pressure dependent on the flow [1)]
Standard version



1 NG10; 16
2 NG25
3 NG32 (“N“)
4 NG32

Minimum set pressure and circulation pressure dependent on the flow [1)]
Version "U"



1 NG10; 16
2 NG25
3 NG32 (“N“)
4 NG32

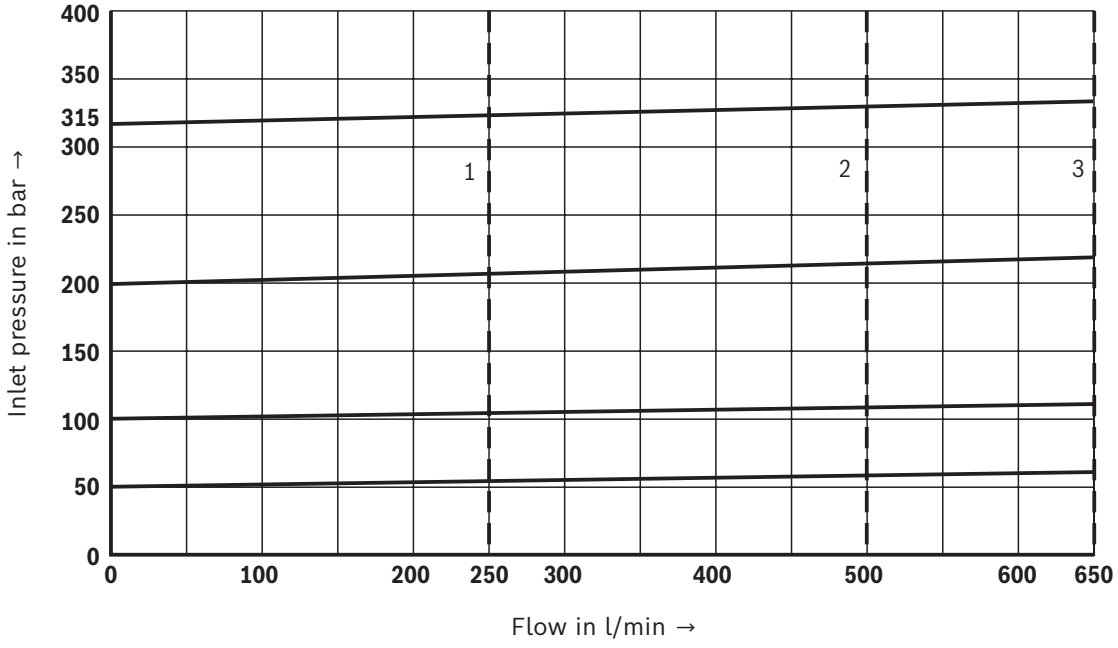
☞ **Notice:**

- 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.

Characteristic curves

(measured with HLP46, ϑ_{oil} = 40 ±5 °C)

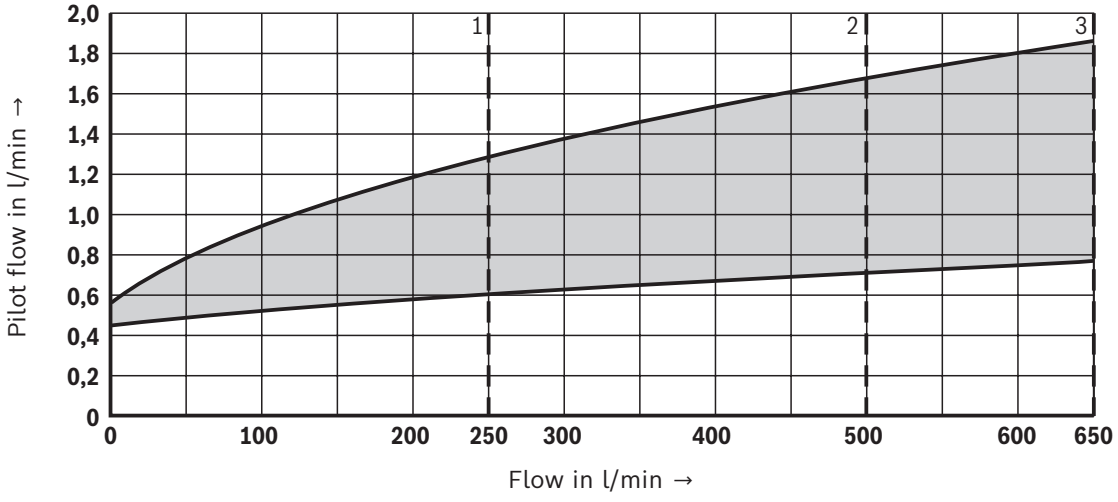
Inlet pressure dependent on the flow



1 NG10; 16
2 NG25
3 NG32

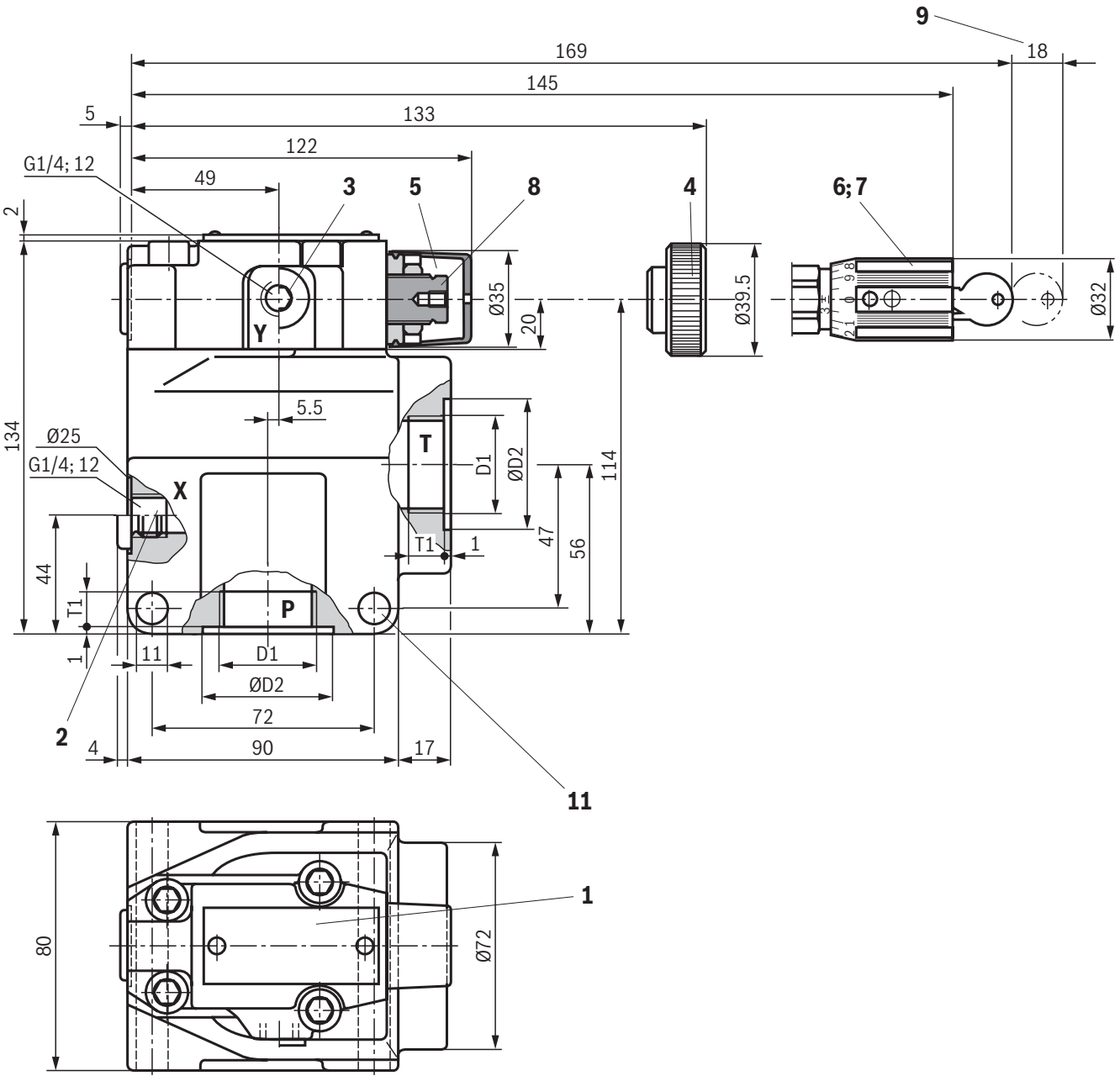
☞ **Notice:**
The characteristic curves were measured with **external, depressurized pilot oil return**.
With internal pilot oil return, the inlet pressure increases by the output pressure present in port T.

Pilot flow



1 NG10; 16
2 NG25
3 NG32

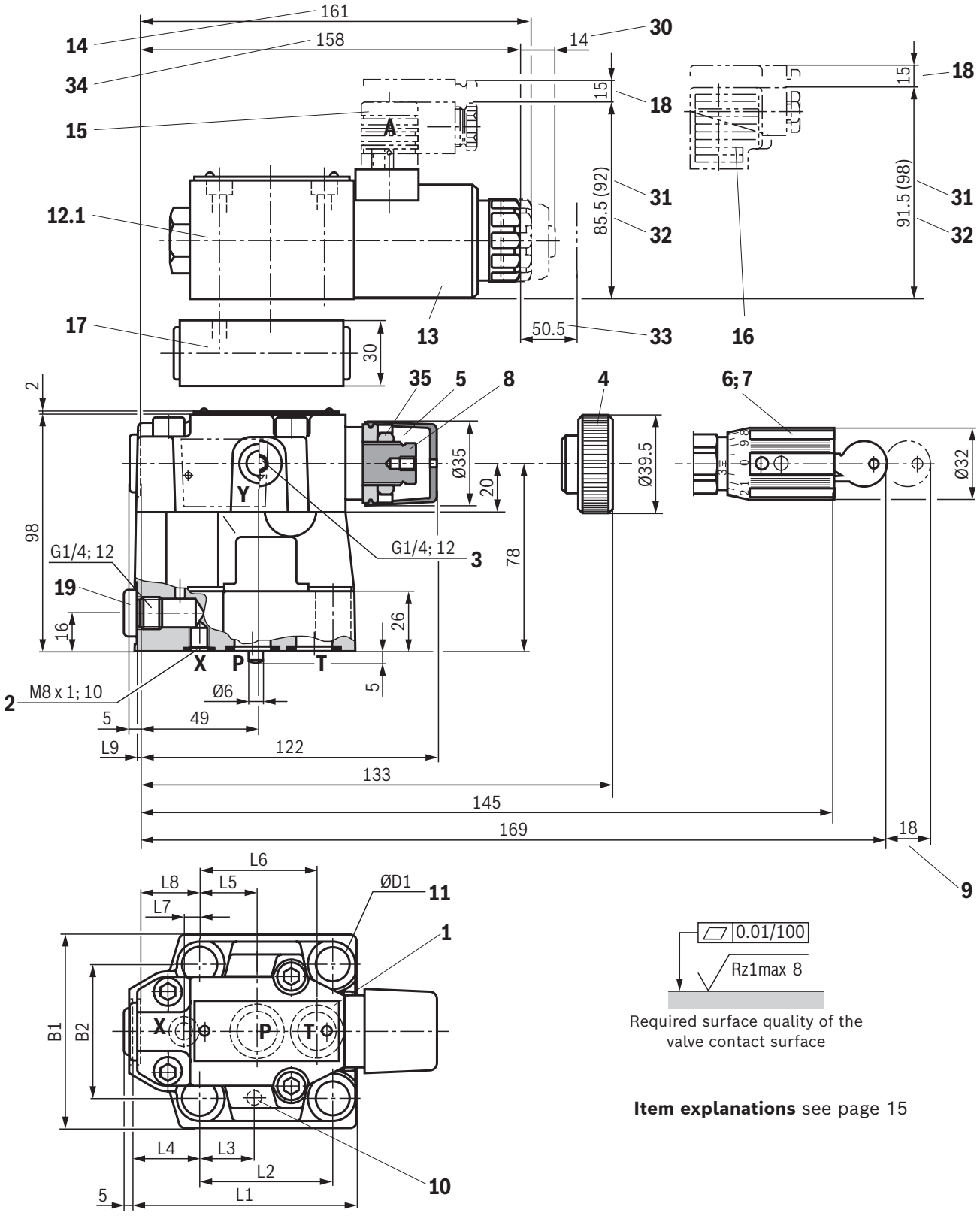
Dimensions: Threaded connection
(dimensions in mm)



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

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

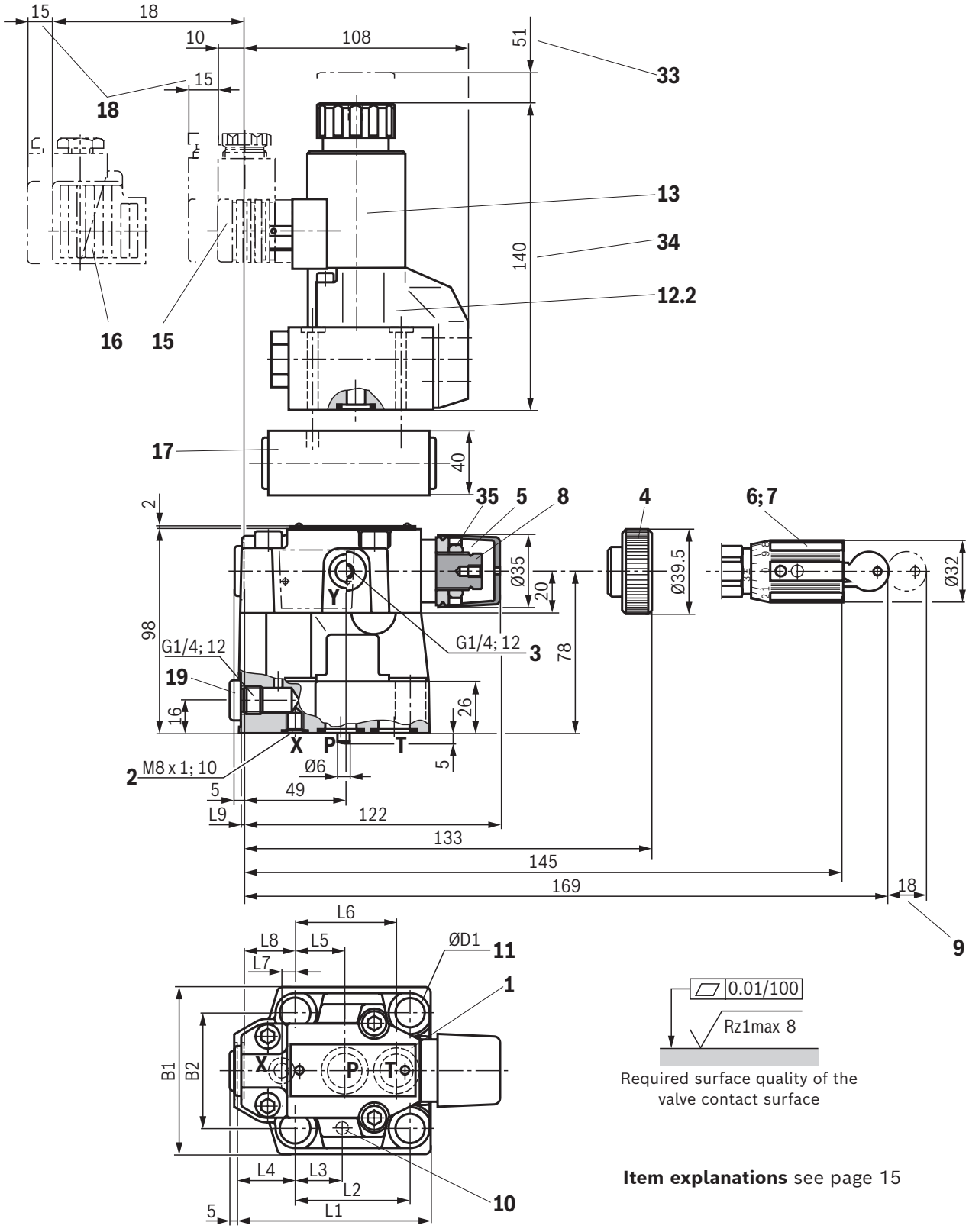


Required surface quality of the valve contact surface

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

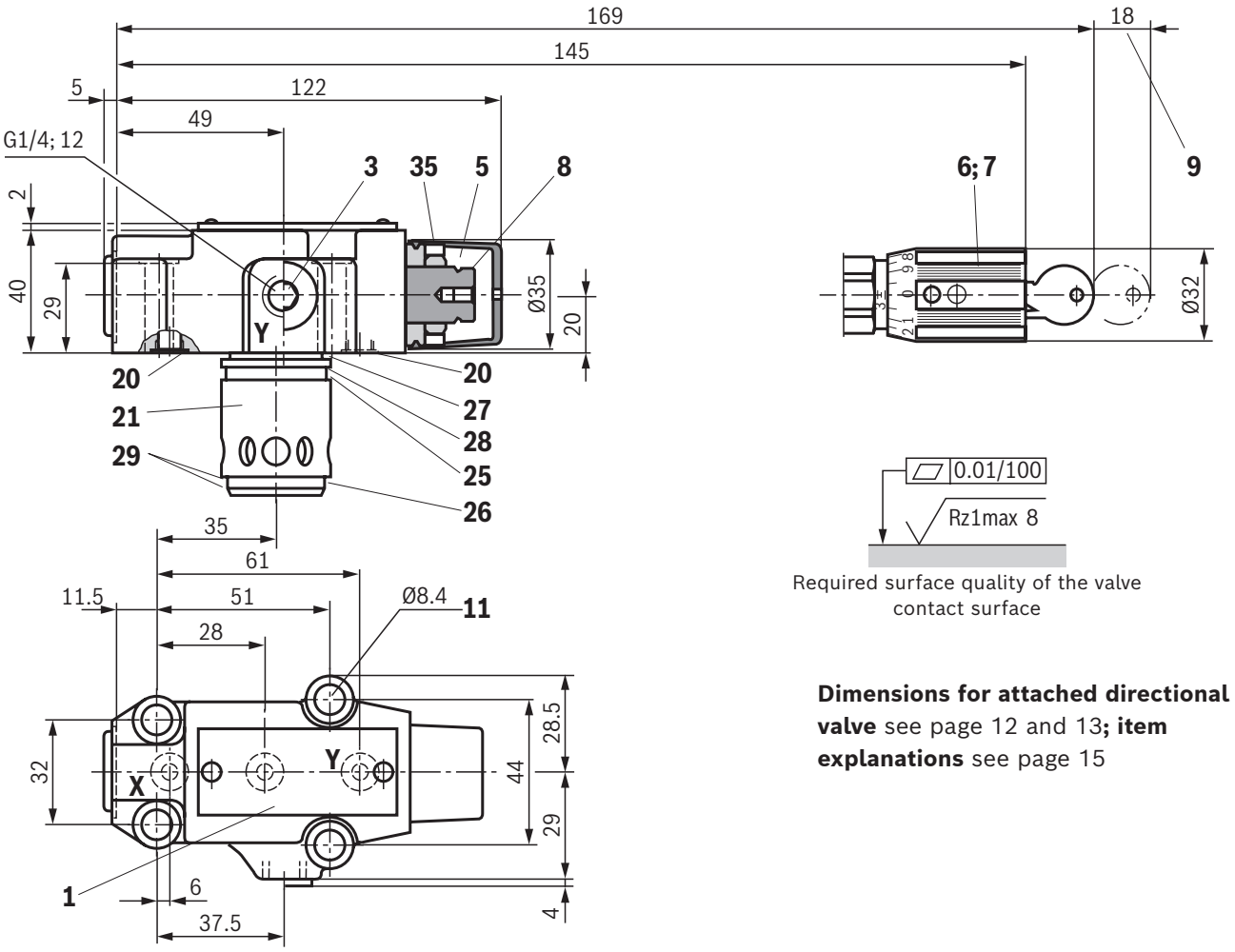


Required surface quality of the valve contact surface

Item explanations see page 15

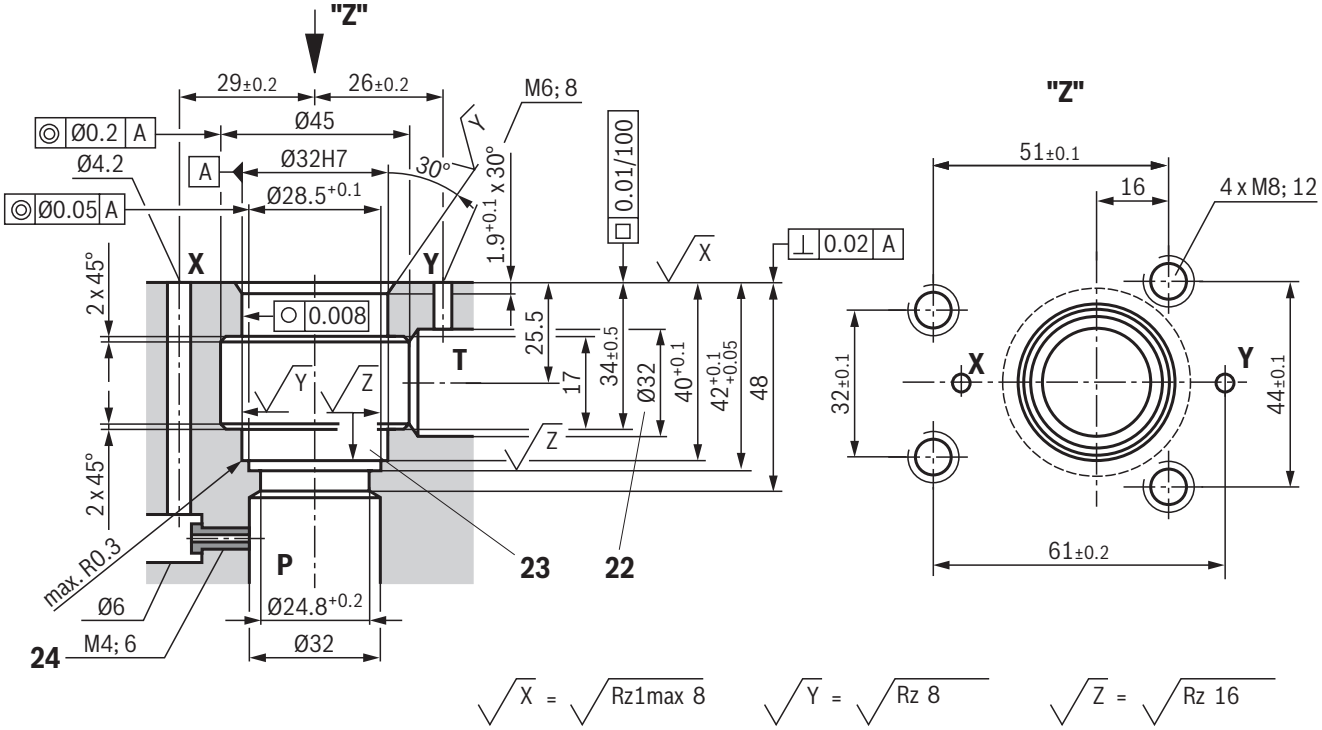
Version	L1	L2	L3	L4	L5	L6	L7	L8	L9	B1	B2	ØD1
"DBW 10"	91	53.8	22.1	27.5	22.1	47.5	0	25.5	2	78	53.8	14
"DBW 20"	116	66.7	33.4	33.3	11.1	55.6	23.8	22.8	10.5	100	70	18
"DBW 30"	147.5	88.9	44.5	41	12.7	76.2	31.8	20	21	115	82.6	20

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



Required surface quality of the valve contact surface

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



$\sqrt{X} = \sqrt{Rz1max\ 8}$ $\sqrt{Y} = \sqrt{Rz\ 8}$ $\sqrt{Z} = \sqrt{Rz\ 16}$

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 μ_{total} = 0.09 ... 0.14; tightening torque M_A = 75 Nm ±10%	**R913015611**
"DB/DBW 20"	4	**ISO 4762 - M16 x 50 - 10.9** Friction coefficient μ_{total} = 0.09 ... 0.14; tightening torque M_A = 185 Nm ±10%	**R913015664**
"DB/DBW 30"	4	**DIN912 - M18 x 50 - 10.9** Friction coefficient μ_{total} = 0.09 ... 0.14; tightening torque M_A = 248 Nm ±10%	**R913015903**
"DBC/DBWC"; "DBC 10/ DBWC 10"; "DBC 30/ DBWC 30"; "DBT/DBWT"	4	**ISO 4762 - M8 x 40 - 10.9** Friction coefficient μ_{total} = 0.09 ... 0.14; tightening torque M_A = 30 Nm ±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 ± 10%).

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

Ordering code: Type-examination tested safety valves, version "DB(W)...E" [1)]

NG	Designation	Component marking	Maximum flow q_{Vmax} in l/min with pilot oil return external "Y"	Maximum flow q_{Vmax} in l/min with pilot oil return internal "–"	Set response overpressure p in bar
10	DB 10 2 3 –5X/ 4 5 7 E	TÜV.SV. ☐ – 1151.12.F.G.p	170 230 230 230	130 200 200 200	30 ... 60 61 ... 110 111 ... 210 211 ... 350
	DBW 10 1 2 3 –5X/ 4 5 6 6 7 E				
25	DB 20 2 3 –5X/ 4 5 7 E	TÜV.SV. ☐ – 1151.22.F.G.p	250 270 420 450	180 210 320 400	30 ... 60 61 ... 110 111 ... 210 211 ... 350
	DBW 20 1 2 3 –5X/ 4 5 6 6 7 E				
32	DB 30 2 3 N5X/ 4 5 7 E	TÜV.SV. ☐ – 1151.22.F.G.p	600 600 650 700	225 340 540 580	30 ... 60 61 ... 110 111 ... 210 211 ... 350
	DBW 30 1 2 3 N5X/ 4 5 6 6 7 E				

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 ≥ 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**

▩	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" [1)]

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

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

2) 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.

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.

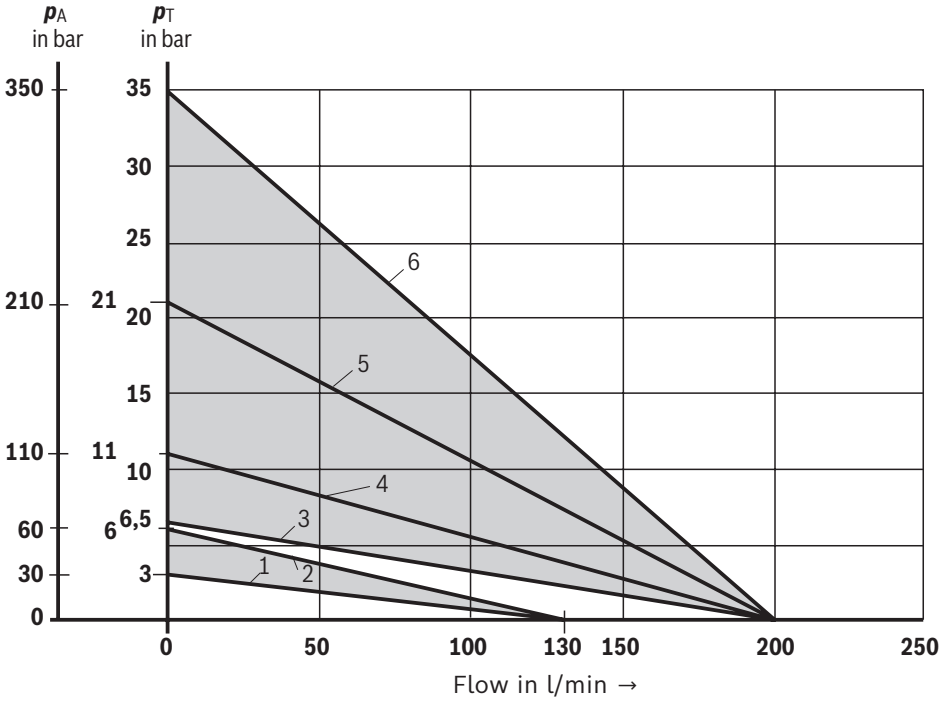
Interpolation of intermediate values from the diagram

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.

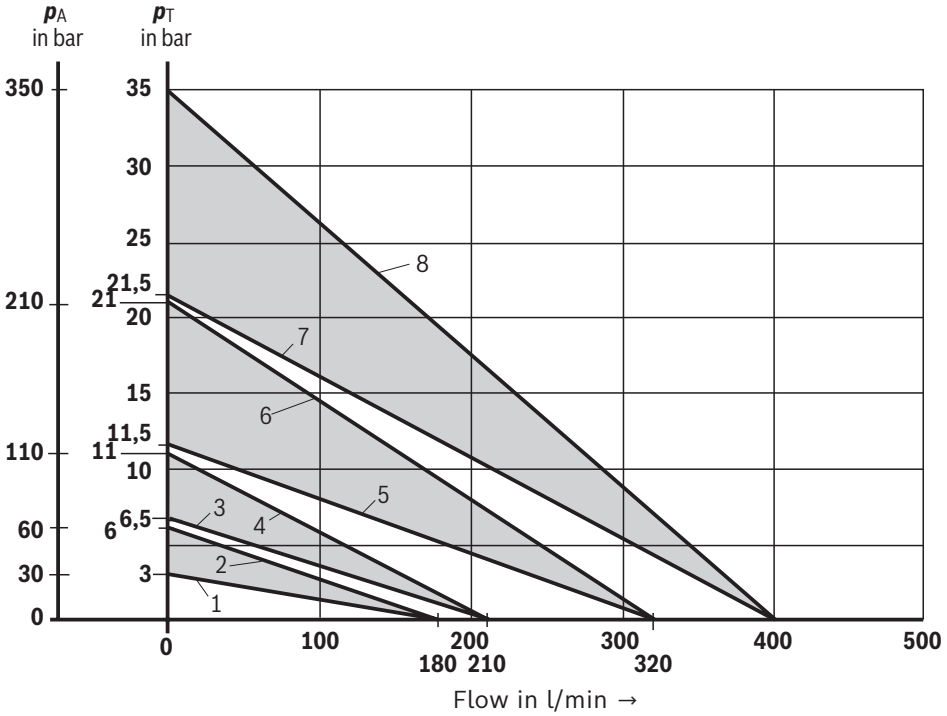
Version "DB(W) **10** ...-5X/...**E**"



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**"



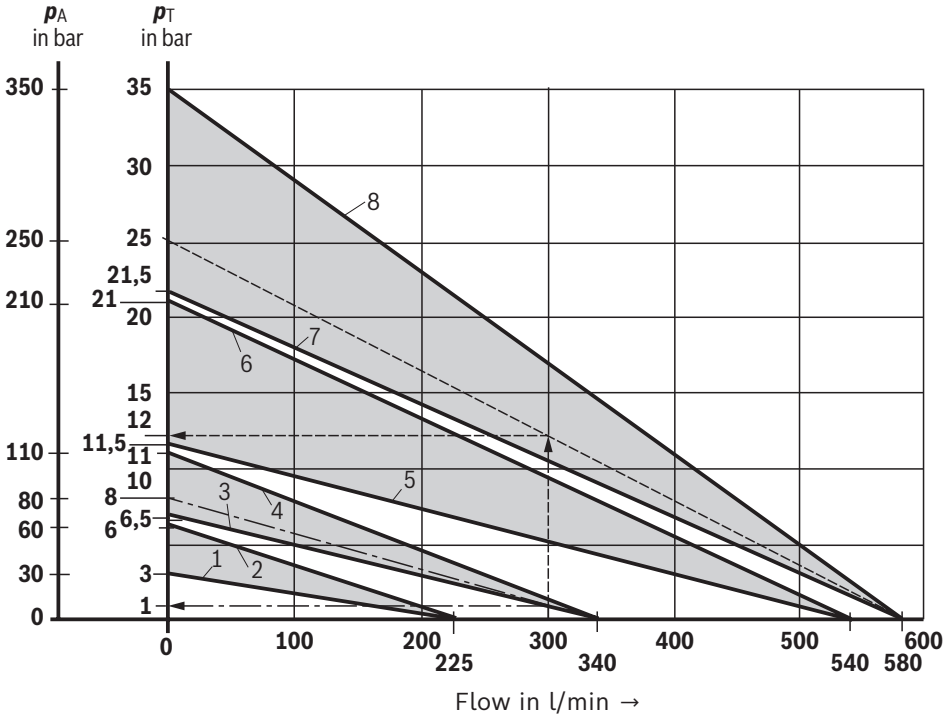
Characteristic curves	Response pressure p_A in bar
1	30
2	60
3	65
4	110
5	115
6	210
7	215
8	350

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.

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)
$p_{T\,max}$ = 10% x 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 x 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. [1]	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	**R901017010**	08006
		Without circuitry, M16 x 1.5, 12 ... 240 V, "b"		**R901017011**	
		With indicator light, M16 x 1.5, 12 ... 240 V	Z5L	**R901017022**	
		With rectifier, M16 x 1.5, 80 ... 240 V	RZ5	**R901017025**	
		With indicator light and Z-diode-suppressor, M16 x 1.5, 24 V	Z5L1	**R901017026**	

[1] 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_{spring} **= 200 bar**

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

=> Response pressure = p_{spring} **+** $p_{hydraulic}$ **= 250 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
▶ Information on available spare parts	www.boschrexroth.com/spc

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