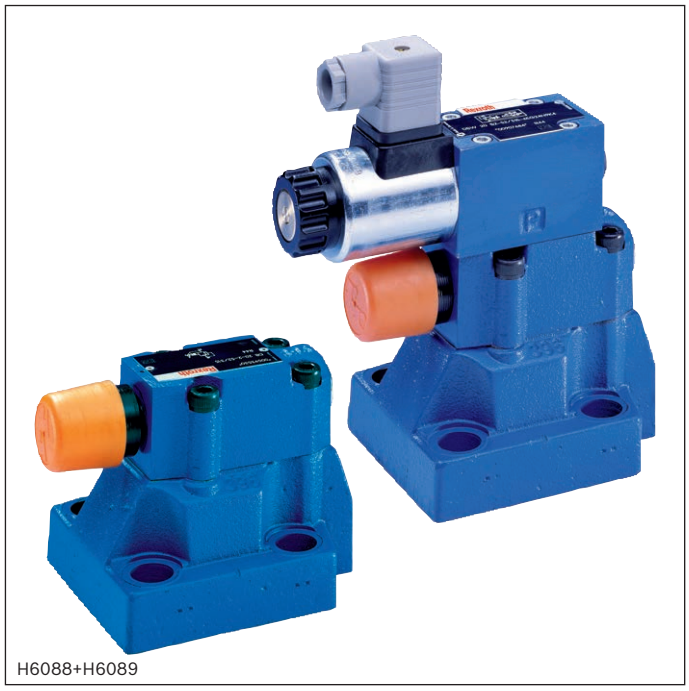
RE 25802
Edition: 2024-12
Replaces: 2021-10

rexroth
A Bosch Company

Pressure relief valve, pilot-operated

Types 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
- For threaded connection
- Solenoid-actuated unloading via an installed directional spool valve or directional seat valve
- 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
- UKCA conformity according to the "Electrical Equipment (Safety) Regulations SI 2016/1101" 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

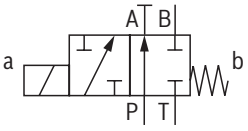
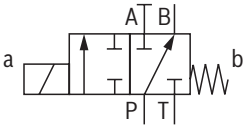
01	02	03	04	05	06	07	08	09		10	11	12	13	14	15	16	17	18	19	20	21	22
DB								**5X**	**/**								**K4**					

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 flow (see also symbols on page 4)

11	Internal pilot oil supply, internal 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, external 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] ◇
	AC 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	Connector 3-pole (2 + PE) according to 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**

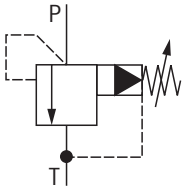
22	Standard version	**no code** ◇
	Solenoid coil is an approved component with UR-marking according to UL 906	**=UR**

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 up to pressure rating 315 bar
7) Mating connectors, separate order, see data sheet 08006
8) Ordering code only necessary with version with attached directional valve and switching shock damping ("DBW.../...S...").
9) See ordering code on page 16.

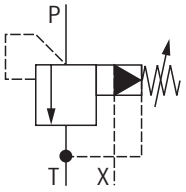
☞ **Notice:** ◇ = Preferred type

Symbols

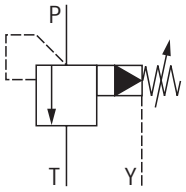
Type DB...**–**...



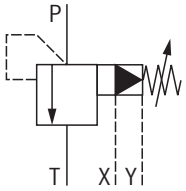
Type DB...**X**...



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



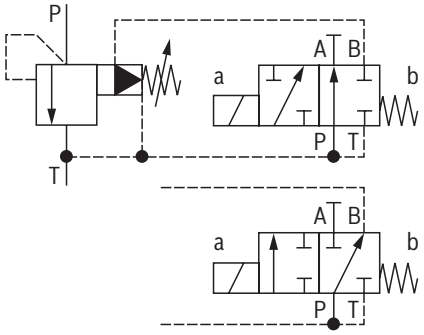
Type DB...**XY**...



Type DBW...**–**...6E...

normally closed

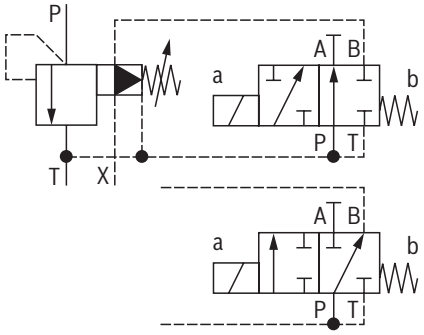
normally open



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

normally closed

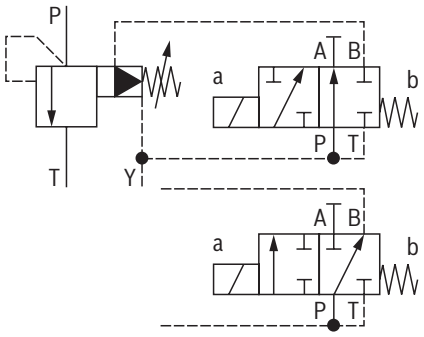
normally open



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

normally closed

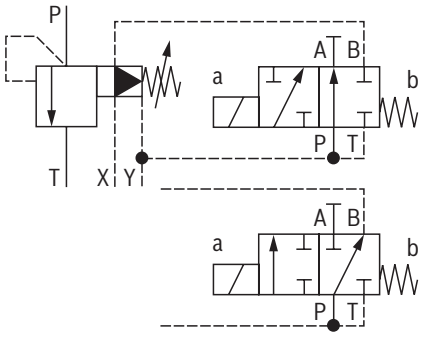
normally open



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

normally closed

normally open



Function, section: Type DB...

General

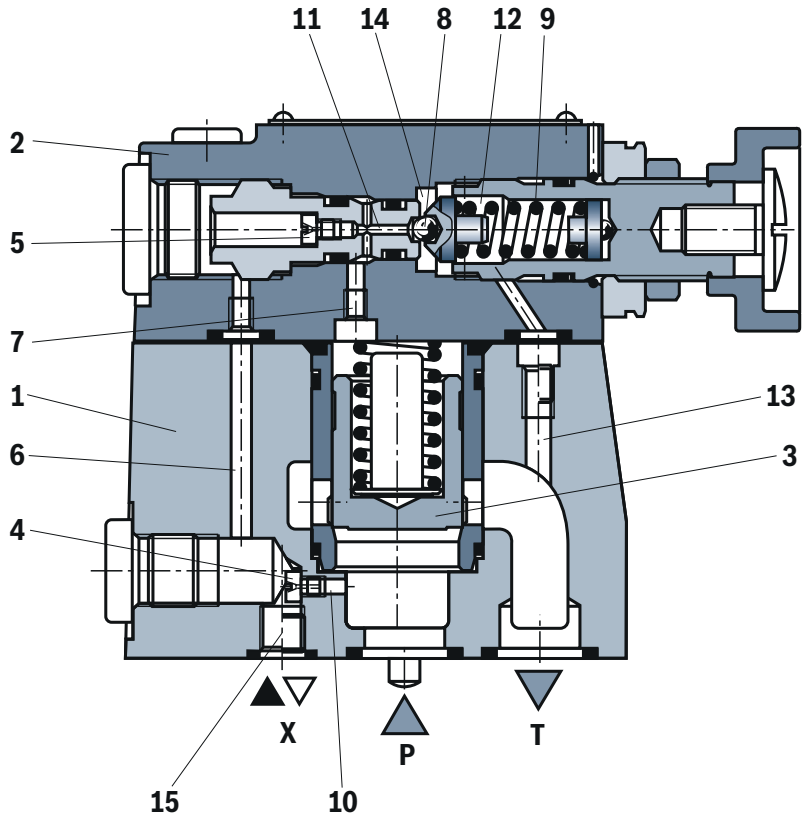
Pressure valves of type DB and DBW are pilot-operated pressure relief valves. They are used for limitation (DB) or limitation and solenoid-actuated unloading (DBW) of the operating pressure.

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

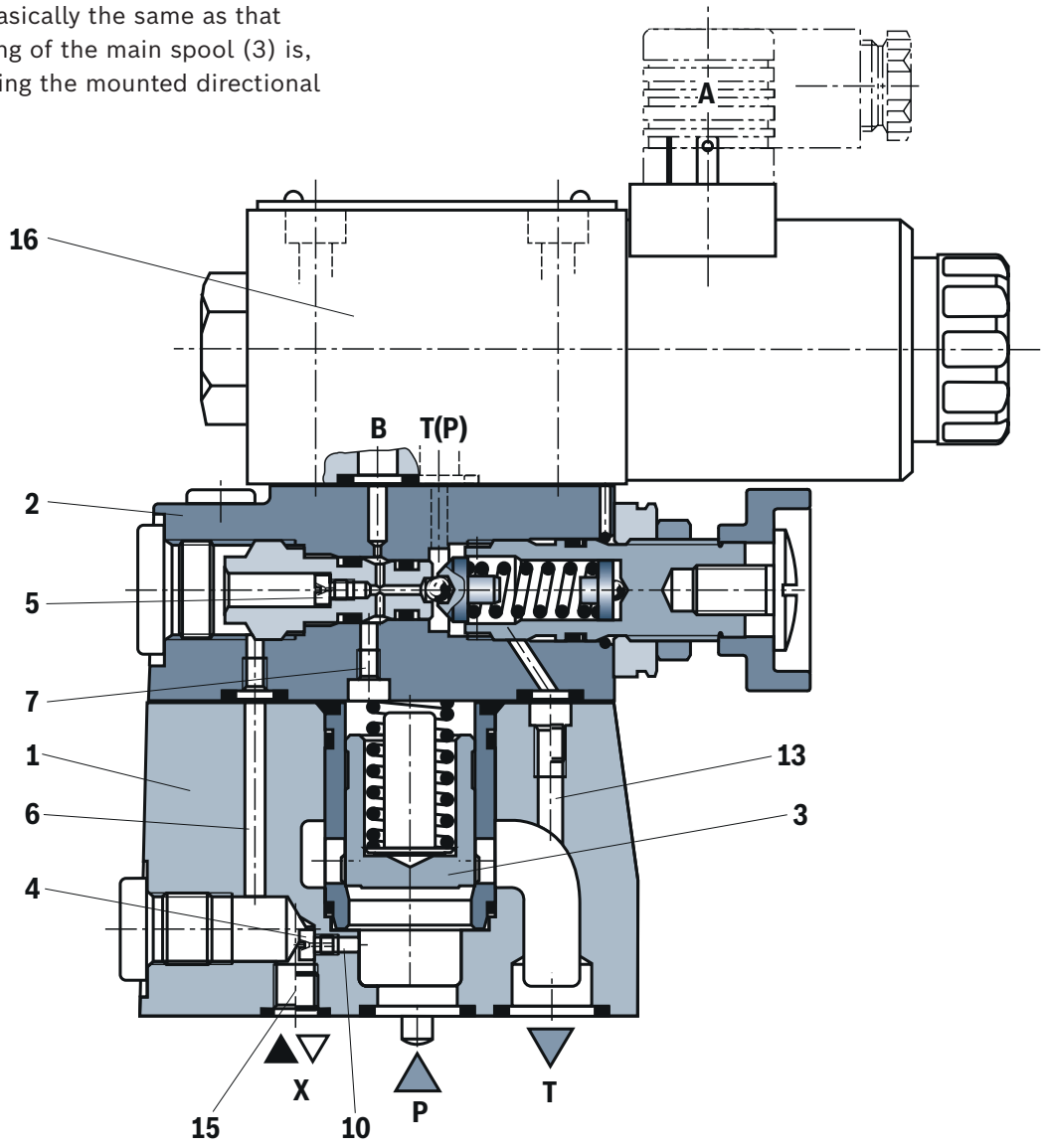
The pressure applied to channel P acts on the main spool (3). At the same time, pressure is applied to the spring-loaded side of the main spool (3) and to the ball (8) in the pilot control valve (2) via the control lines (6) and (7) which are equipped with nozzles (4) and (5). If the pressure in channel P exceeds the value set at the spring (9), the ball (8) opens against the spring (9). The corresponding signal comes internally, via the control lines (10) and (6) from channel P. 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).

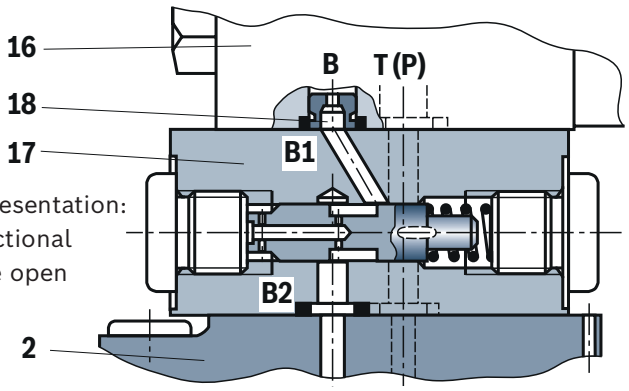


Function, section: Type DBW...

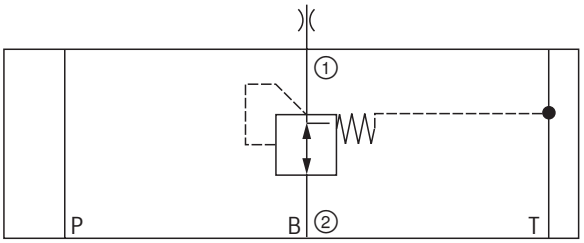
Pressure relief valve type DBW
The function of this valve is basically the same as that of valve type DB. The unloading of the main spool (3) is, however, achieved by controlling the mounted directional spool valve (16).



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
Type of connection				Subplate mounting; threaded connection				
Porting pattern				ISO 6264-06-09-*-97	–	ISO 6264-08-13-*-97	–	ISO 6264-10-17-*-97
Mass	▶ Subplate mounting	– Type DB...	kg	2.6	–	3.5	–	4.4
		– Type DBW...	kg	4.05	–	4.95	–	5.85
		– Type DBC...	kg	1.2				
		– Type DBWC...	kg	2.65				
		– Type DBC10 or 30 ...	kg	1.5				
		– Type DBWC 10 or 30 ...	kg	2.95				
	▶ Threaded connection	– Type DB...G	kg	5.3	5.2	5.1	5.0	4.8
		– Type DBW...G	kg	6.75	6.65	6.55	6.45	6.25
Installation position				any				
Ambient temperature range		▶ Type DB...	°C	–20 ... +80 (NBR seals) –15 ... +80 (FKM seals)				
		▶ Type DBW...	°C	–20 ... +50 (NBR seals) –15 ... +50 (FKM seals)				
Conformity		▶ CE according to Low-Voltage Directive 2014/35/EU [1], tested according to		EN 61000-6-2 and EN 61000-6-3 (classified as component)				
		▶ UKCA according to "Electrical Equipment (Safety) Regulations SI 2016/1101" [1], tested according to		EN 61000-6-2 and EN 61000-6-3 (classified as component)				

Hydraulic								
Maximum operating pressure	▶ Port P, X		bar	350				
	▶ Port T		bar	315				
	▶ Port Y	– Type DB	bar	315				
	▶ Port Y, T	– Type DBW	bar	210 (version "6EG") 180 (version "6EG...=UR") 160 (version "6EW" and "6EW...=UR") 100 (version "6SM")				
Hydraulic fluid				see table on page 8				
Hydraulic fluid temperature range (at the valve working ports)			°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 [2]				
Maximum flow	▶ Subplate mounting		l/min	250	–	500	–	650
	▶ Threaded connection		l/min	250	500	500	500	650
Maximum set pressure			bar	50; 100; 200; 315; 350				
Minimum set pressure				flow-dependent (see characteristic curves page 9)				

1) Type DBAW with nominal voltages >50 VAC or >75 VDC.

2) 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, HLPD, HVLP, HVLPD	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

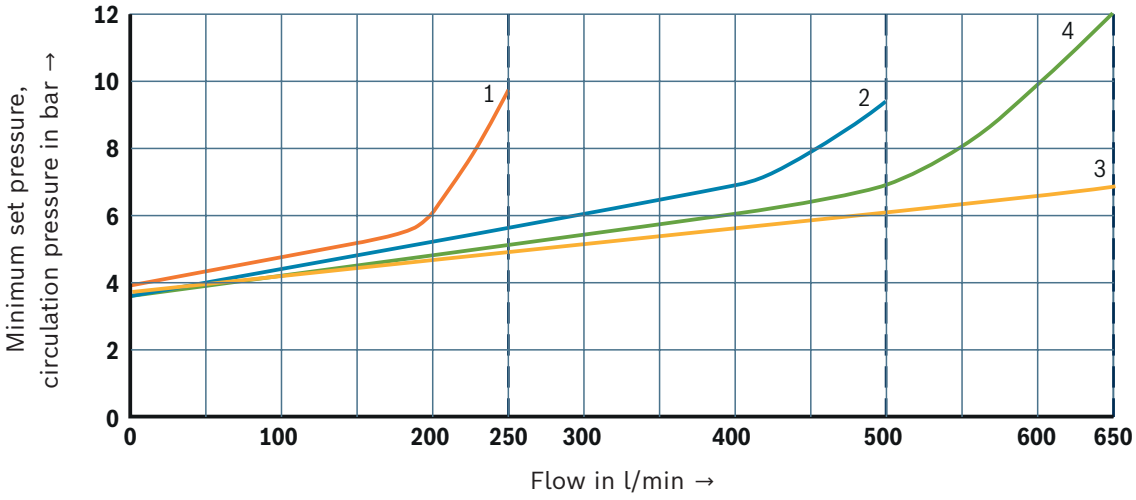
☞ **Important information on hydraulic fluids:**

- ▶ 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 the use of 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 for functional reasons, 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)

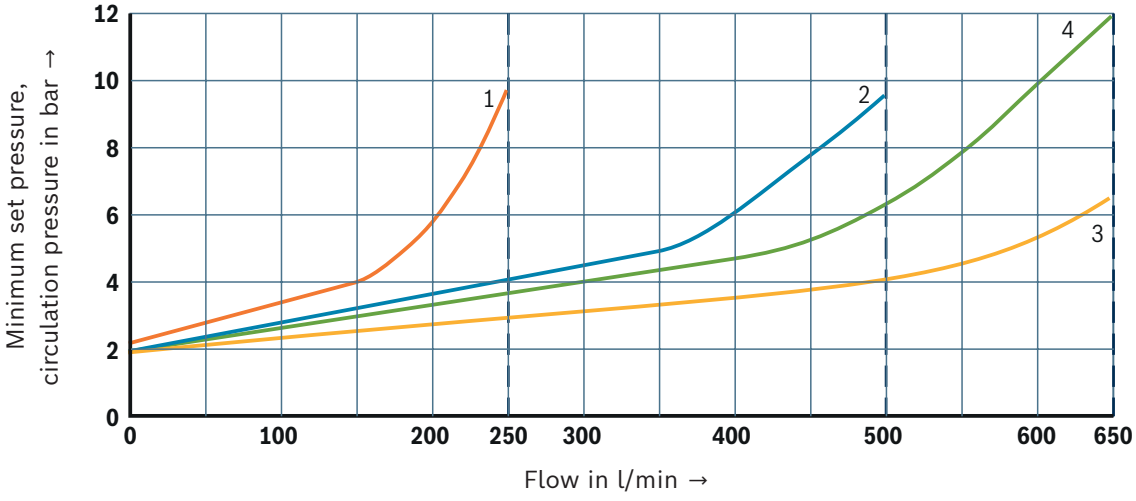
Minimum set pressure and circulation pressure dependent on the flow

Standard version



1 NG10; 16
2 NG25
3 NG32 (“N“)
4 NG32

Version "U"

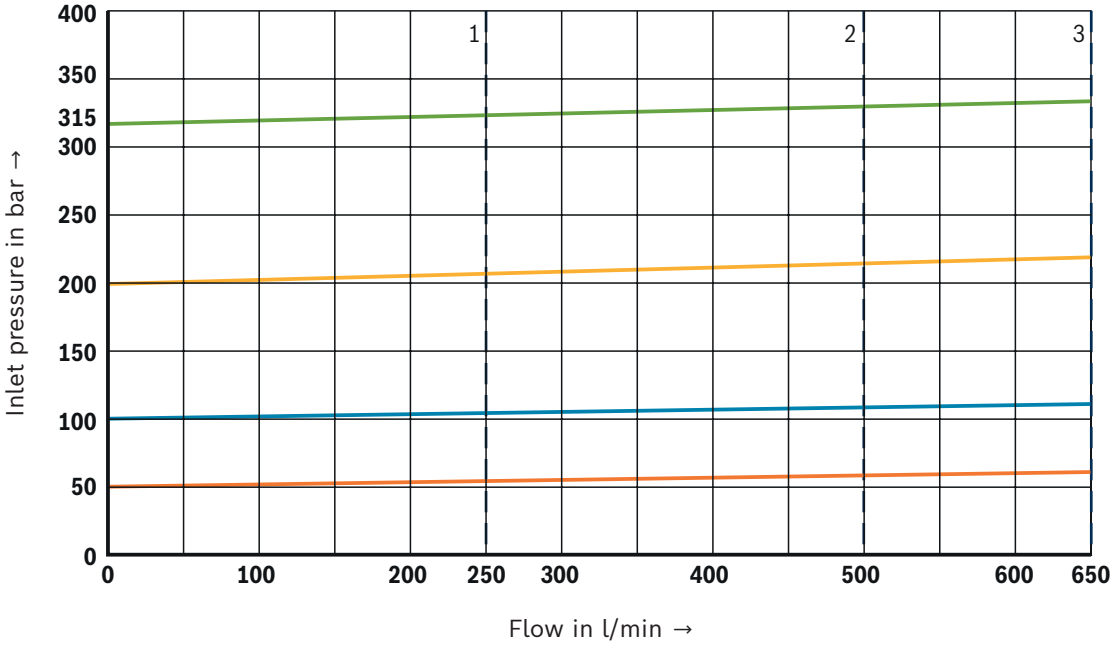


1 NG10; 16
2 NG25
3 NG32 (“N“)
4 NG32

☞ **Notice:**
- The characteristic curves were measured with an **external, depressurized pilot oil return**.
  With internal pilot oil returns, the inlet pressure increases by the output pressure present in port T.
- The characteristic curves apply for output pressure p_T = 0 bar in the entire flow range.
- Typical characteristic curves which are subject to tolerance variations.

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

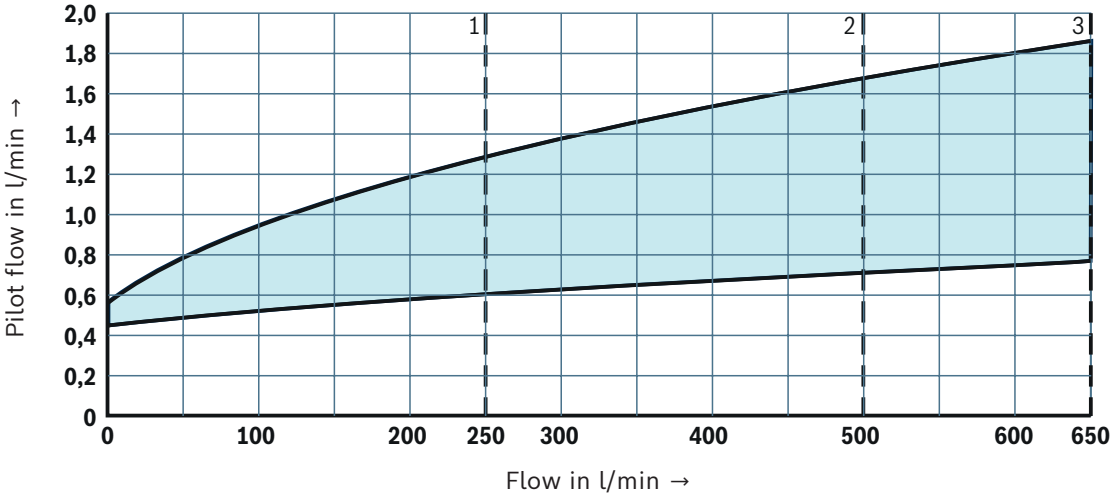
Inlet pressure dependent on the flow



1 NG10; 16
2 NG25
3 NG32

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

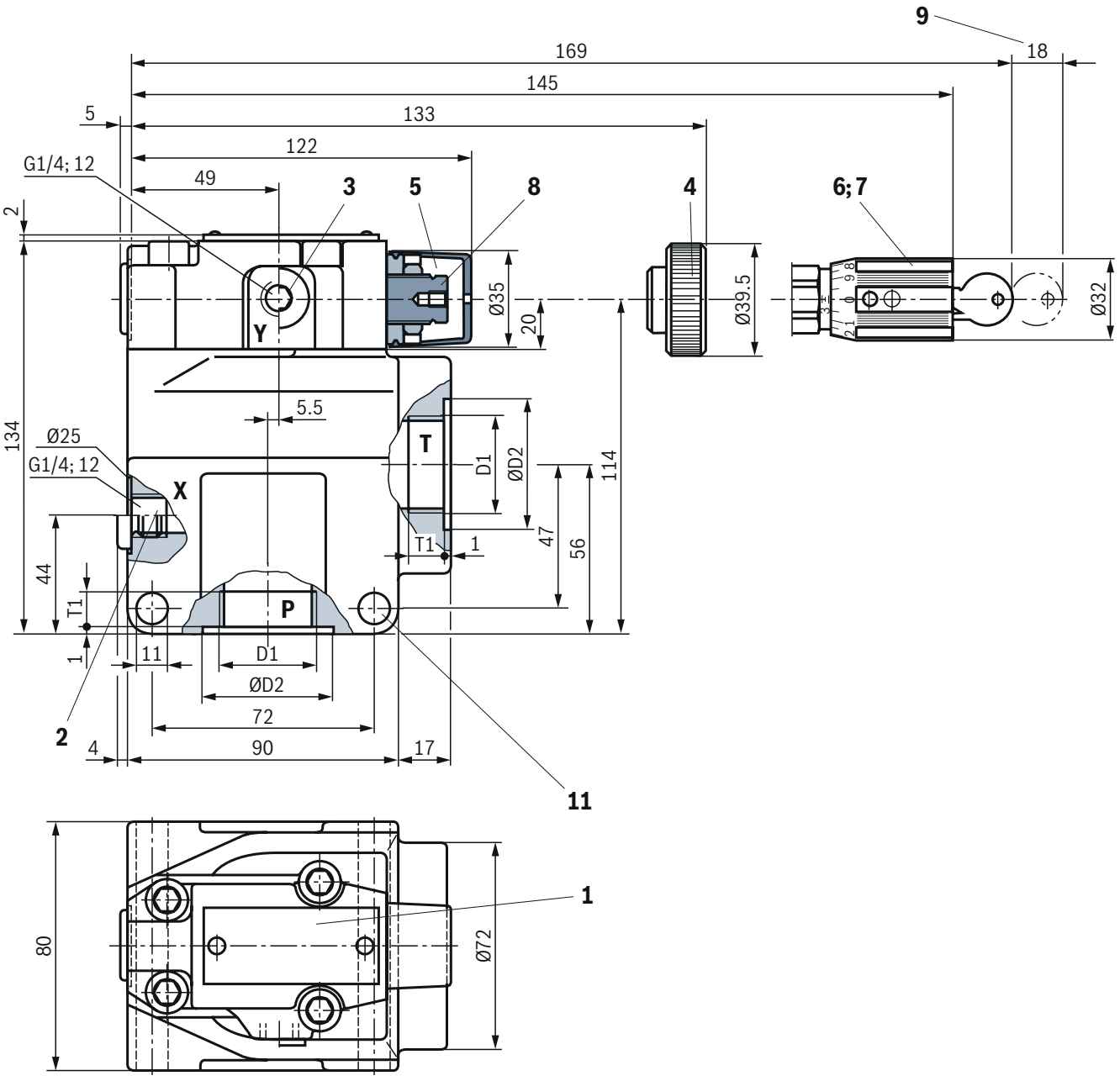
Pilot flow



1 NG10; 16
2 NG25
3 NG32

☞ **Notice:**
Typical characteristic curves which are subject to tolerance variations.

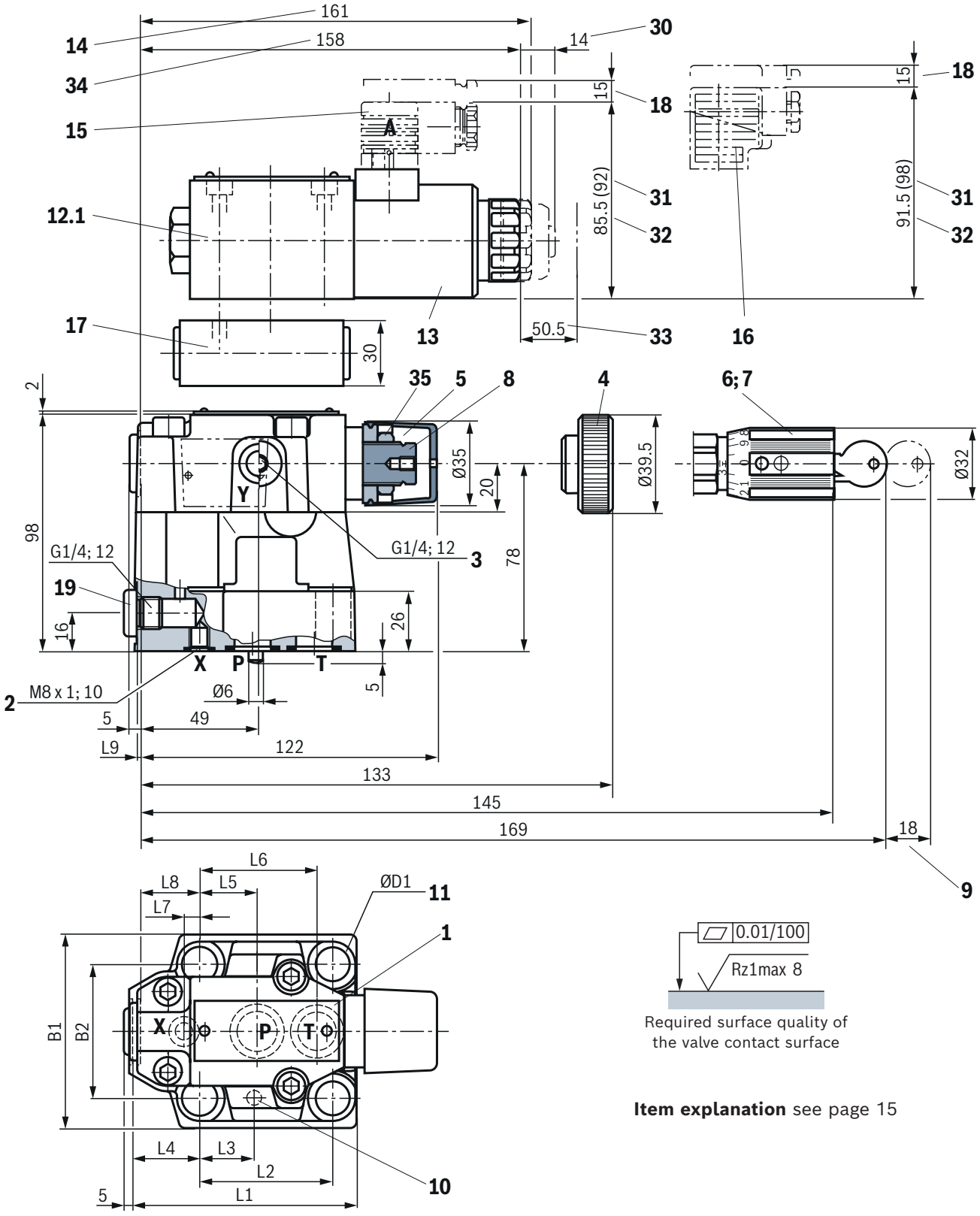
Dimensions: Threaded connection (dimensions in mm)



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 assembled directional valve
see page 12 and 13; **item explanations** see page 15

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

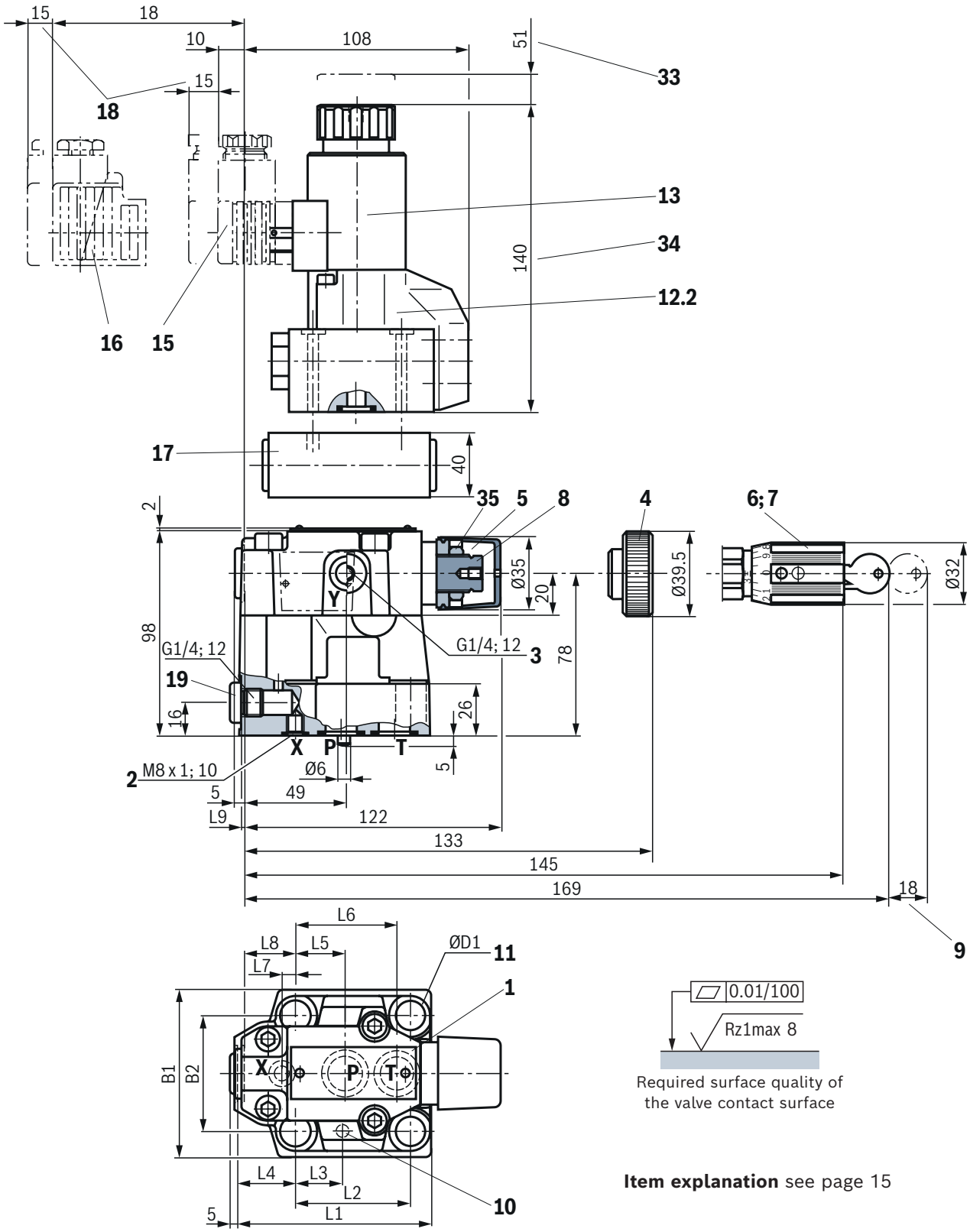


Required surface quality of the valve contact surface

Item explanation see page 15

Version	L1	L2	L3	L4	L5	L6	L7	L8	L9	B1	B2	ØD1
"DB/DBW 10"	91	53.8	22.1	27.5	22.1	47.5	0	25.5	2	78	53.8	14
"DB/DBW 20"	116	66.7	33.4	33.3	11.1	55.6	23.8	22.8	10.5	100	70	18
"DB/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)

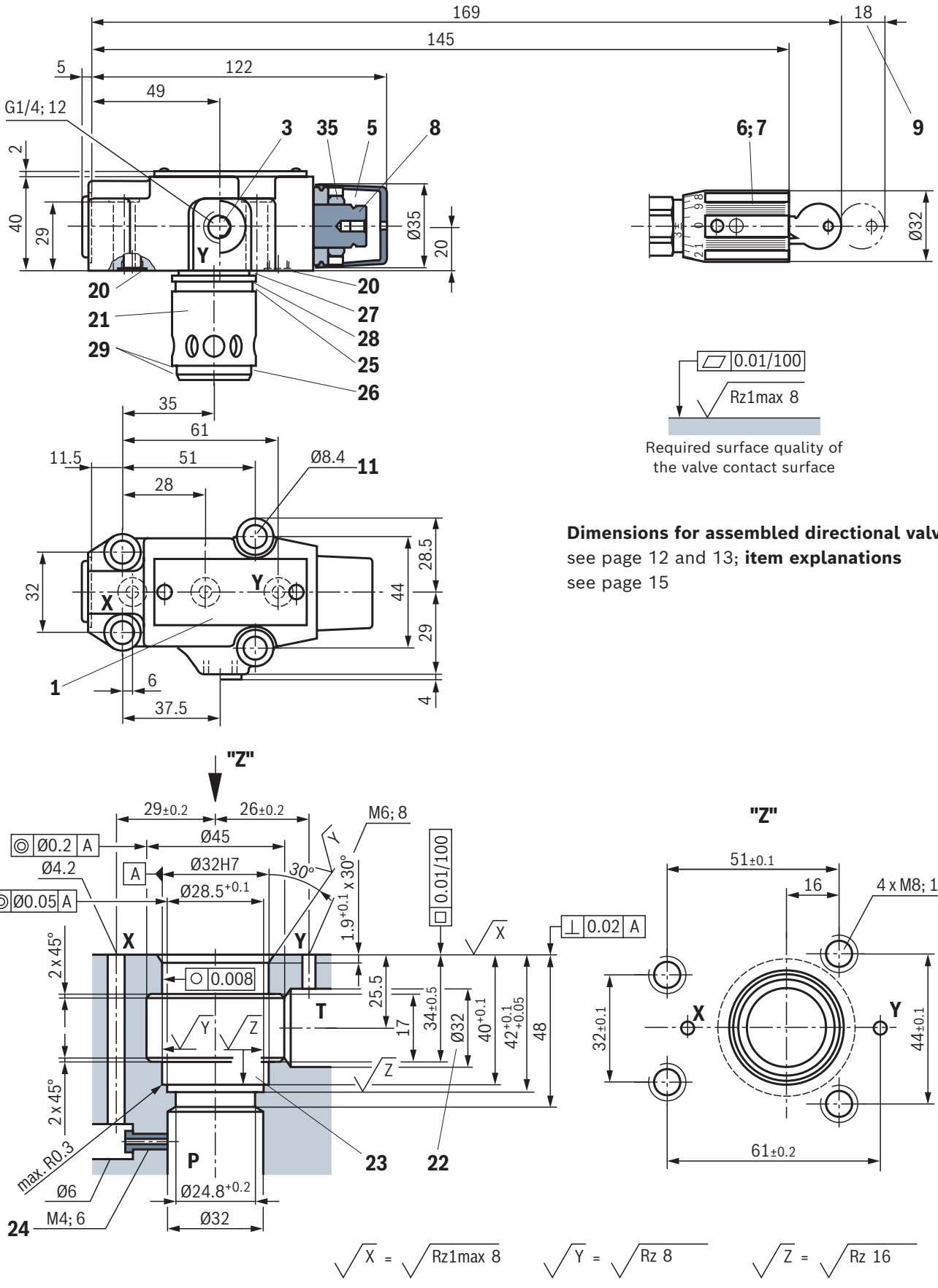


Required surface quality of the valve contact surface

Item explanation see page 15

Version	L1	L2	L3	L4	L5	L6	L7	L8	L9	B1	B2	ØD1
"DB/DBW 10"	91	53.8	22.1	27.5	22.1	47.5	0	25.5	2	78	53.8	14
"DB/DBW 20"	116	66.7	33.4	33.3	11.1	55.6	23.8	22.8	10.5	100	70	18
"DB/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 assembled directional valve see page 12 and 13; **item explanations** see page 15

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 Dimensions for valve without manual override
15 Mating connector without circuitry (separate order, see data sheet 08006)
16 Mating connector with circuitry (separate order, see data sheet 08006)
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 (order separately; recommended nozzleØ1.0, material number R900334978, tightening torque $M_A = 0{,}8^{+0{,}2}$ Nm)
25 Seal ring
26 Seal ring
27 Seal ring
28 Support ring
29 Support ring
30 Dimensions for valve with manual override "N"
31 Dimensions () for valve with AC solenoid
32 Dimensions for valve with DC solenoid
33 Space required to remove the solenoid coil
34 Dimensions for valve with concealed manual override "N9"
35 Lock nut, wrench size SW17, 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	**DIN 912 – 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 type "DB(W)...E", component series 5X according to Pressure Equipment Directive 2014/68/EU

NG	Designation	Component marking
10	DB 10 [2][3] –5X/ [4][5][7] E	TÜV.SV. ☐ – 1151.12.F.G.p
	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
	DBW 20 [1][2][3] –5X/ [4][5] 6 [6][7] E	
32	DB 30 [2][3] N5X/ [4][5][7] E	TÜV.SV. ☐ – 1151.32.F.G.p
	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 flow

5	Internal pilot oil supply, internal pilot oil return	**–** [1; 2]
	Internal pilot oil supply, external pilot oil return (recommendation)	**Y** [2]

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) Dash "–" **only** necessary with version with attached directional valve (DBW)

2) External pilot oil supply "X" not possible

Deviating technical data: Type-examination tested safety valves, version "DB(W)...E" according to Pressure Equipment Directive 2014/68/EU

General	
Conformity	CE according to Pressure Equipment Directive 2014/68/EU
	CE according to Low-Voltage Directive 2014/35/EU (only type "DBAW...E" with nominal voltages >50 VAC or >75 VDC)

Hydraulic						
Version			"DB..."	"DB...Y"	"DBW..."	"DBW...Y"
Maximum counter pressure	▶ Port Y	bar	–	0	–	0
	▶ Port T	bar	[1]	p_T < 15	[1]	p_T < 15
Hydraulic fluid			see table on page 18			
Hydraulic fluid temperature range (= TS)		°C	–10 ... +80			
Viscosity range		mm^2/s	12 ... 230			
Maximum flow			see table below and diagrams page 20 ... 22			
Set response pressure			see table below			

	Maximum flow $q_{V\,max}$ in l/min Pilot oil return				**Set response pressure p_A** in bar
	external "Y"		internal "–"		
Size	HL, HLP	HFDU, HFC	HL, HLP	HFDU, HFC	
10	170	150	130	115	30 ... 60
	230	205	200	180	61 ... 110
	230	205	200	180	111 ... 210
	230	205	200	180	211 ... 350
25	250	225	180	160	30 ... 60
	270	240	210	185	61 ... 110
	420	375	320	285	111 ... 210
	450	400	400	360	211 ... 350
32	600	540	225	200	30 ... 60
	600	540	340	305	61 ... 110
	650	585	540	485	111 ... 210
	700	630	580	520	211 ... 350

[1] See characteristic curves and explanatory notes for maximum admissible counter pressures on page 20 ... 22

Deviating technical data: Type-examination tested safety valves, version "DB(W)...E" according to Pressure Equipment Directive 2014/68/EU

Hydraulic fluid		Classification	Suitable sealing materials	Standards	Data sheet
Mineral oils		HL, HLP	FKM	DIN 51524	90220
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:**

- ▶ The ignition temperature of the hydraulic fluid used must be 50 K higher than the maximum surface temperature.
- ▶ **Flame-resistant – containing water:**
  - – Due to the increased cavitation tendency with the use of 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.
  - – Dependent on the hydraulic fluid used, the maximum ambient and hydraulic fluid temperature must not exceed 50 °C.

Safety instructions: Type-examination tested safety valves, version "DB(W)...E" according to Pressure Equipment Directive 2014/68/EU

- Before ordering a type-examination tested safety valve, it must be observed that for the desired **response pressure p_A,** the maximum admissible **flow $q_{V\ max}$** of the safety valve must be larger than the maximum possible flow of the system to be secured.
- According to **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.
- Basically, the requirements of Pressure Equipment Directive 2014/68/EU and of AD 2000 data sheet A 2 have to be 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) <15bar
  - **Internal** pilot oil return **"–"**. The maximum flow is only admissible without counter pressure in the discharge line (port T).
    With internal pilot oil return, the system pressure increases with increasing volume flow according to the counter pressure in the discharge line (connection T) (note AD 2000 Data Sheet A 2, para. 6.3).
    To ensure that this increase in system pressure due to the volume flow does not exceed 10% of the set response pressure, the admissible volume flow must be reduced dependent on the counter pressure in the discharge line (connection T) (see following diagrams on page 20 ... 22.
- 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 p_A, 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. As the flow increases, the maximum counter pressure p_T decreases.

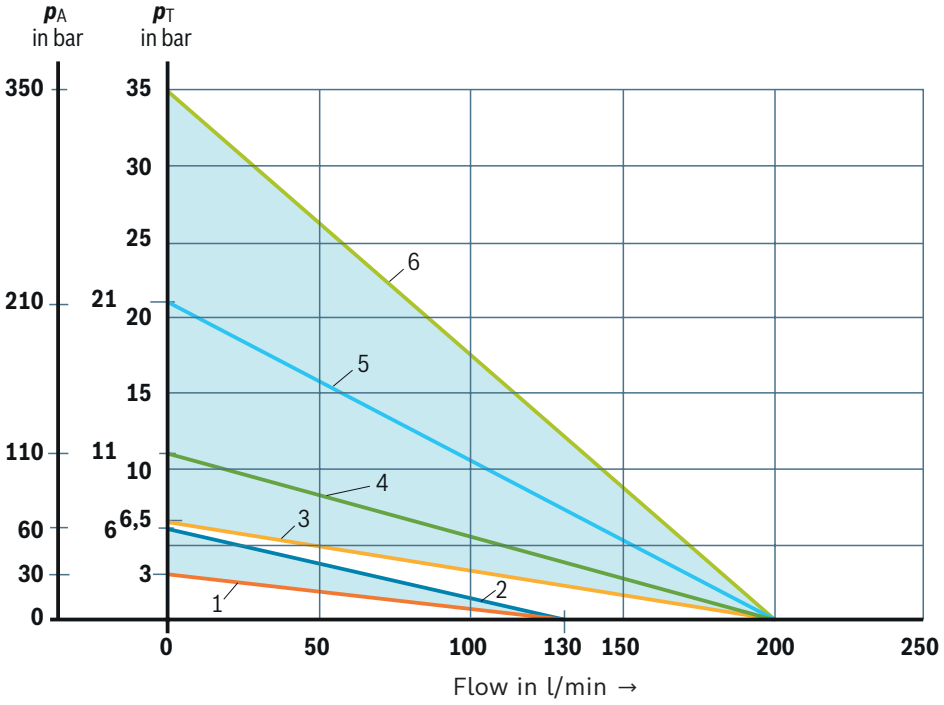
Interpolation of intermediate values from the diagram

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 the lower and higher characteristic curve on the p_T axis with a certain percentage.
3. At the q_V axis, divide the section between the 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_V 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_V axis.
5. Read 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

Maximum counter pressure p_T in the discharge line (port T) dependent on the flow q_V with different response pressures p_A.

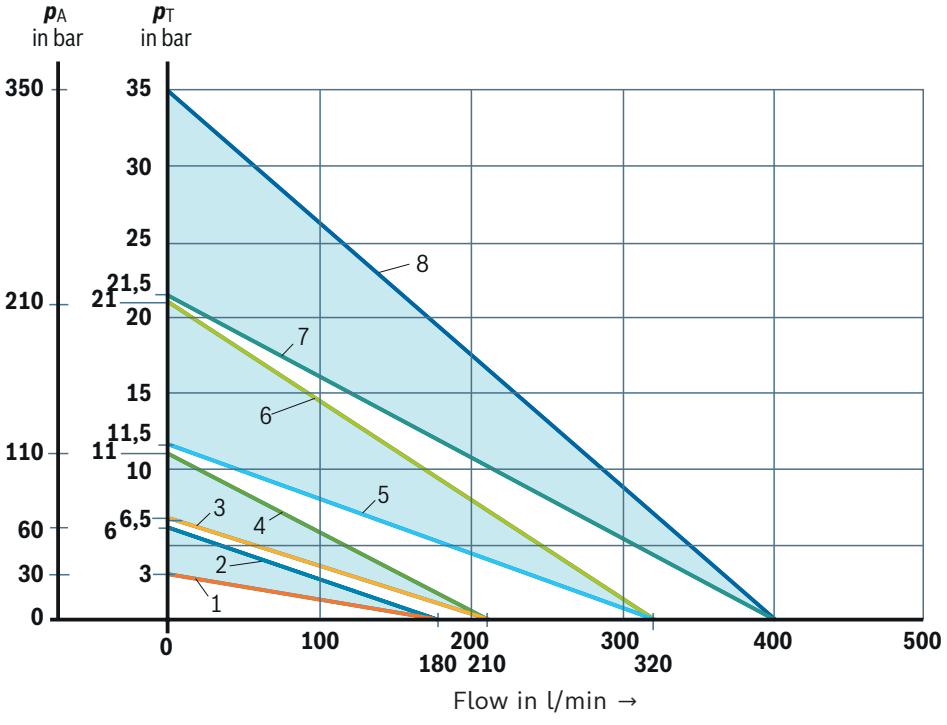
Version "DB(W) **10**...**E**"



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 20 and 22.

Version "DB(W) **20**...**E**"



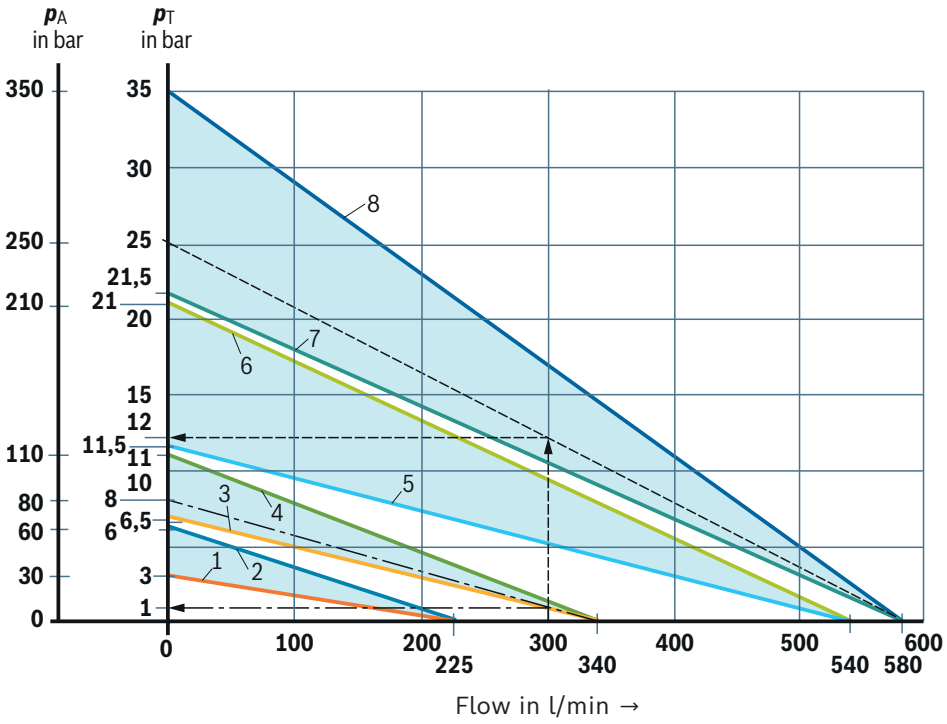
Characteristic curves	Response pressure p_A in bar
1	30
2	60
3	65
4	110
5	115
6	210
7	215
8	350

Characteristic curves for intermediate values can be generated by interpolation. Further explanations can be found on page 20 and 22.

Characteristic curves: Counter pressure in the discharge line

Maximum counter pressure p_T in the discharge line (port T) dependent on the flow $q_{V\,max}$ with different response pressures p_A.

Version "DB(W) **30**...**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 20 and 22.

p_A Response pressure in bar

p_T Maximum counter pressure in the discharge line (port T) in bar (total of all possible counter pressures, see also AD 2000 leaflet A 2)
$p_{T\,max}$ = 10% x p_A (with q_V = 0 l/min) according to PED 2014/68/EU

$q_{V\,max}$ 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 "_ ___ _ _").

Project planning information

- The unloading function (directional valve function with version "W") 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 $\boldsymbol{p}_{\text{spring}}$ **= 200 bar**

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

=> Response pressure = $\boldsymbol{p}_{\text{spring}}$ **+** $\boldsymbol{p}_{\text{hydraulic}}$ **= 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
▶ Mating connectors and cable sets for valves and sensors	Data sheet 08006
▶ Pressure relief valve, pilot-operated	Operating instructions 25802-B
▶ Hydraulic valves for industrial applications	Operating instructions 07600-B
▶ Information on available spare parts	www.boschrexroth.com/spc

Notes

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