

Bosch Rexroth DB20-1-5X/100X pilot-operated pressure-relief valve

Manufacturer: Bosch Rexroth

Manufacturer part number / published order designation: R901044543

Published model: DB20-1-5X/100X

About this compilation

Prepared by Hydmaster from selected manufacturer documentation. Original technical pages follow without cropped drawings, rewritten data or altered units. This cover and index are Hydmaster editorial material, not a manufacturer-issued exact-execution datasheet.

Coverage: selected pages relevant to the identified size and configuration. Other options or neighbouring models retained on an original page apply only where explicitly identified.

Execution notes and conditions

Source mounting figure includes an optional DBW unloading assembly. Only the shared DB20 base mounting table applies; no DBW attachment or overall assembly envelope is claimed.

Source-page index

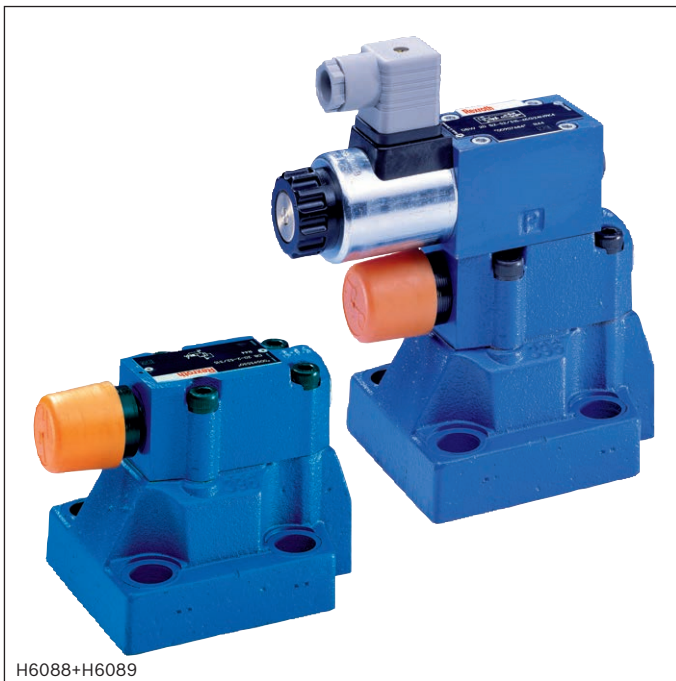
Source page numbers below are physical pages of each complete original PDF. The original printed page labels and technical content remain unchanged. Compiled page numbers count this cover/index.

Source A: Bosch Rexroth Pressure Relief Valve Pilot Operated Re25802

Original pages	Compiled pages	Relevant content
1-5	2-6	DB pressure-relief overview; Existing DB20 type: nominal size25, adjustment and pressure-stage decoding; Actual X/Y pilot supply and return separately, plus seal execution; Actual DB hydraulic symbol with relevant X/Y connections; no electrical DBW unloading; Pilot-operated DB hydraulic function
7-10	7-10	DB-specific P/X/T/Y limits and nominal-size25 subplate flow/conditions; Fluid compatibility and restrictions; Applicable nominal-size25 flow-dependent minimum and circulation-pressure curves; Relevant pressure/flow and pilot-flow curves with return-counterpressure qualification
12	11	Shared DB/DBW20 base mounting table only; illustrated DBW solenoid assembly is not included in this DB execution
15	12	Shared base-body mounting legend and DB20 screw requirements
23	13	Pilot-return counterpressure and project-planning references

Pressure relief valve, pilot-operated

Types DB and DBW



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



Features

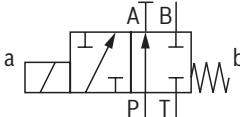
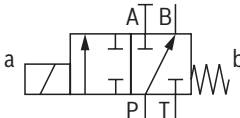
- For subplate mounting
- Porting pattern according to ISO 6264
- For threaded connection
- Solenoid-actuated unloading via an installed directional spool valve or directional seat valve
- Switching shock damping, optional (DBW type only)
- Corrosion-protected design
- CE conformity according to the 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

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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					

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

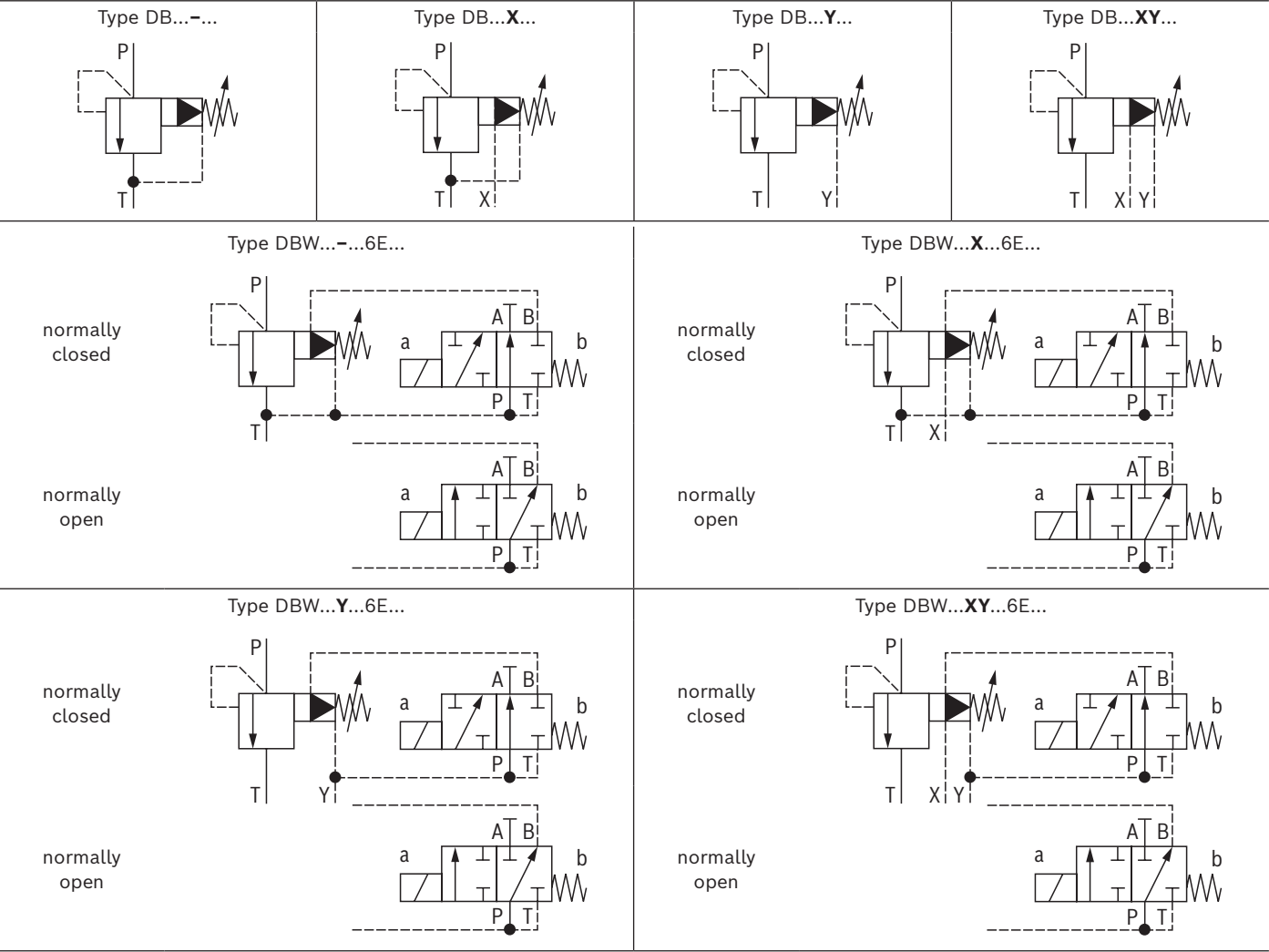
8) Ordering code only necessary with version with attached directional valve and switching shock damping ("DBW.../...S...").

9) See ordering code on page 16.



Notice: ◇ = Preferred type

Symbols



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

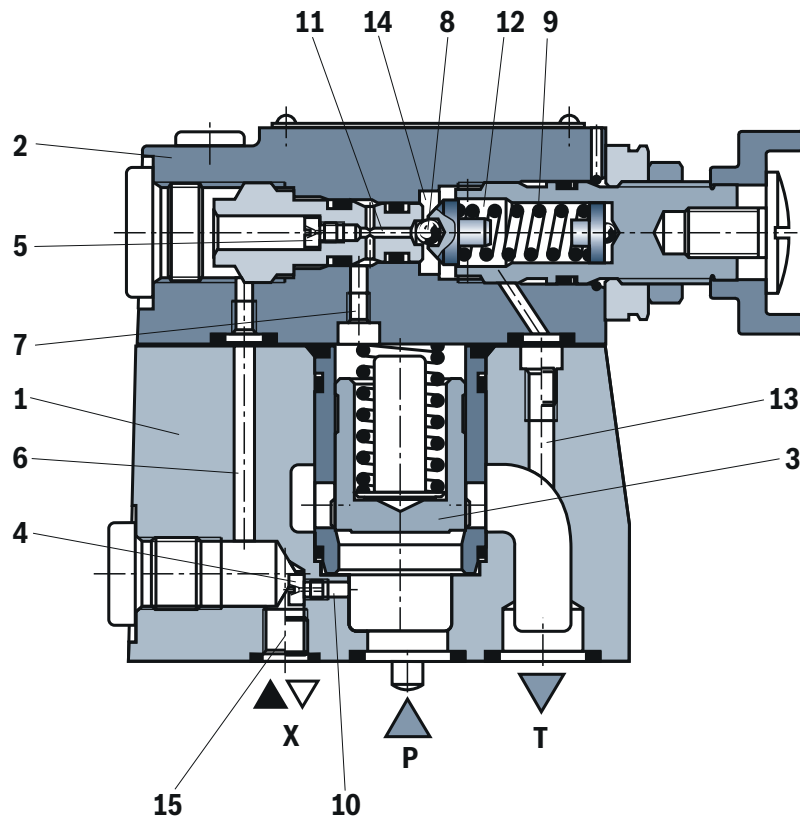
Pressure valves of type DB and DBW are pilot-operated pressure relief valves. They are used for limitation (DB) or limitation and solenoid-actuated unloading (DBW) of the operating pressure.

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).



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		mm²/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.

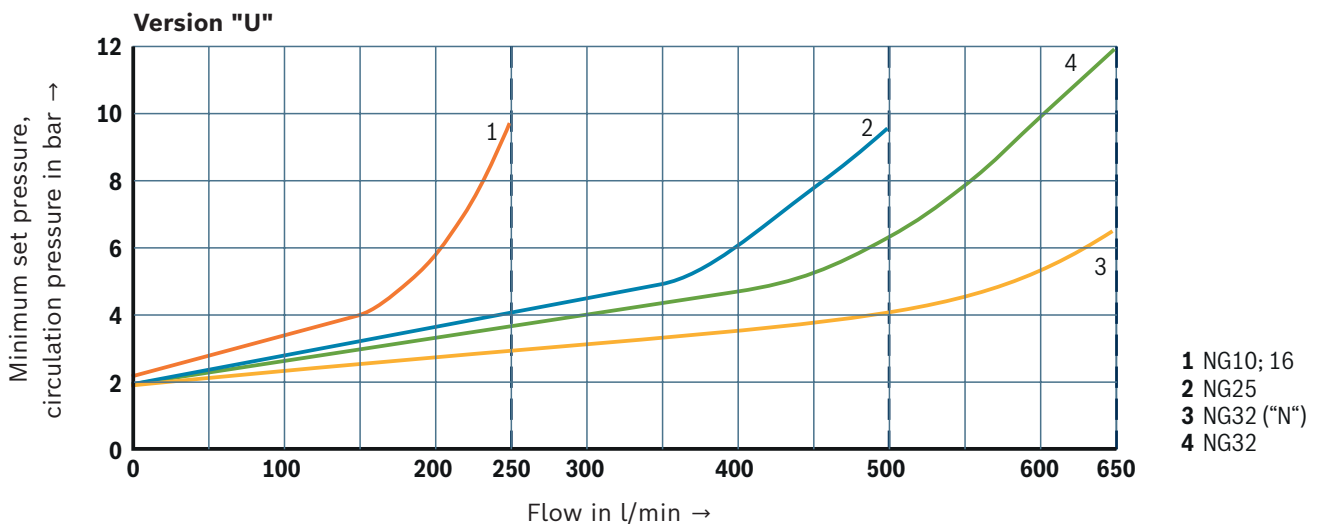
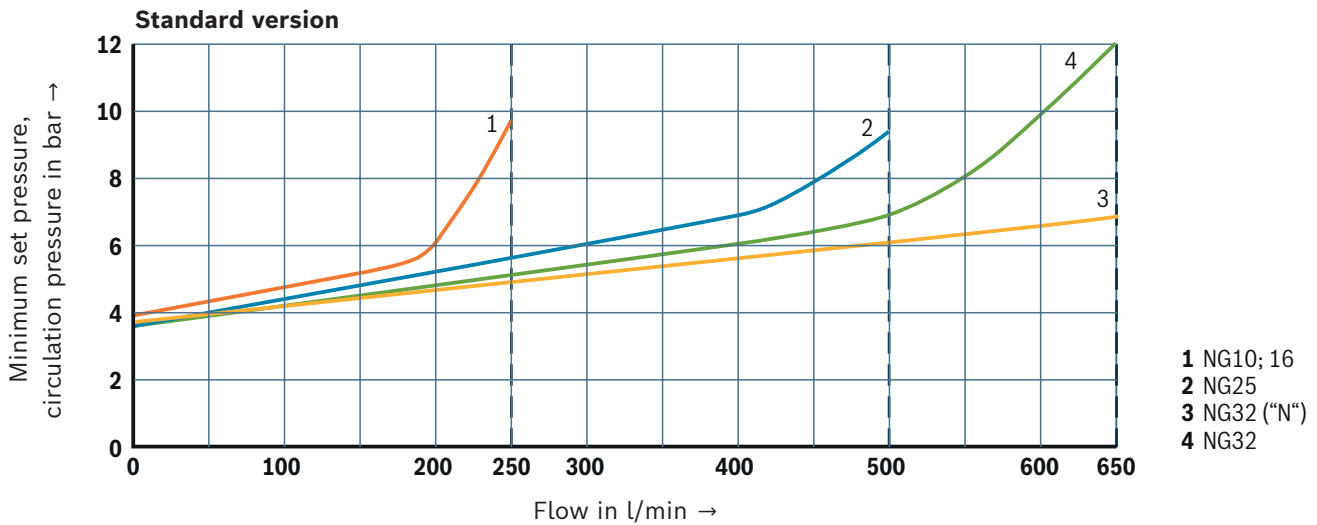
► Flame-resistant – containing water:

- 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, $\vartheta_{\text{oil}} = 40 \pm 5 \text{ }^{\circ}\text{C}$)

Minimum set pressure and circulation pressure dependent on the flow



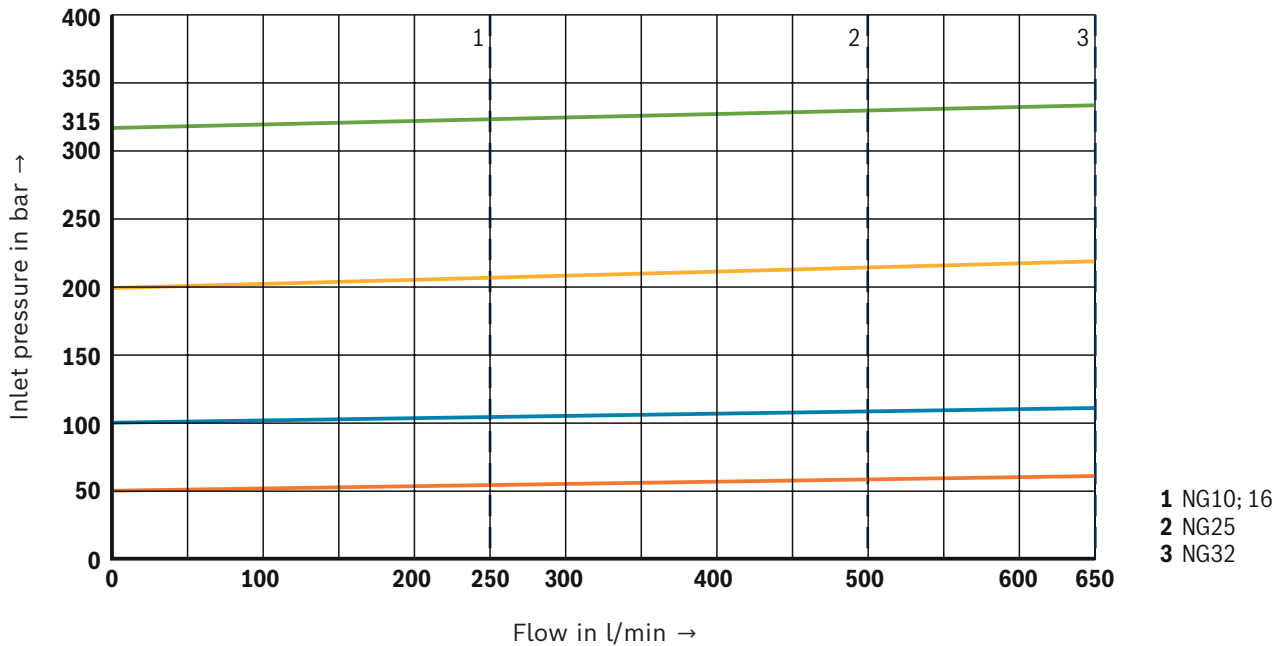
Notice:

- 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, $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$)

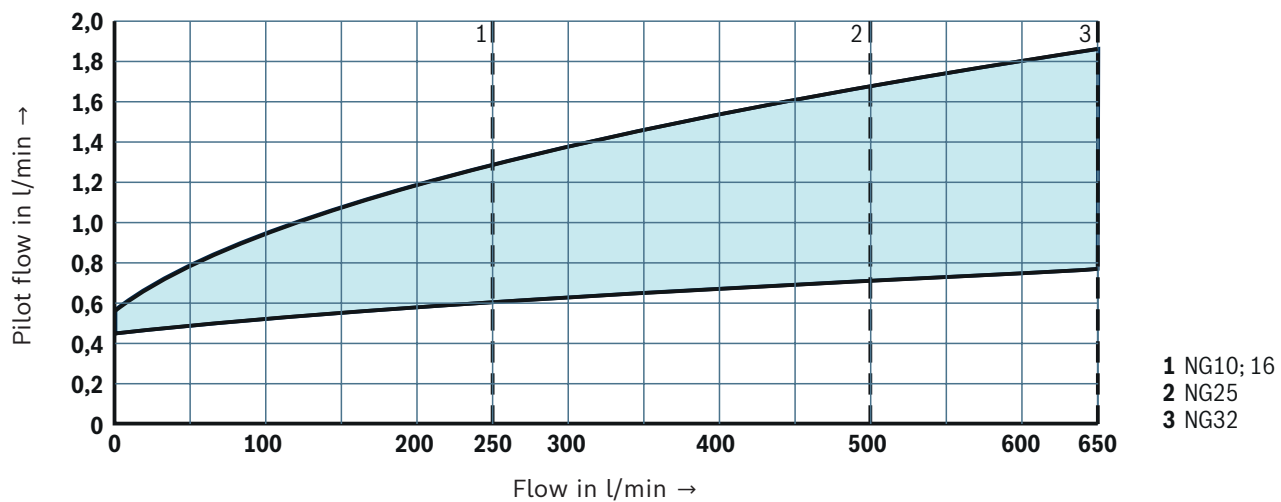
Inlet pressure dependent on the flow



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.

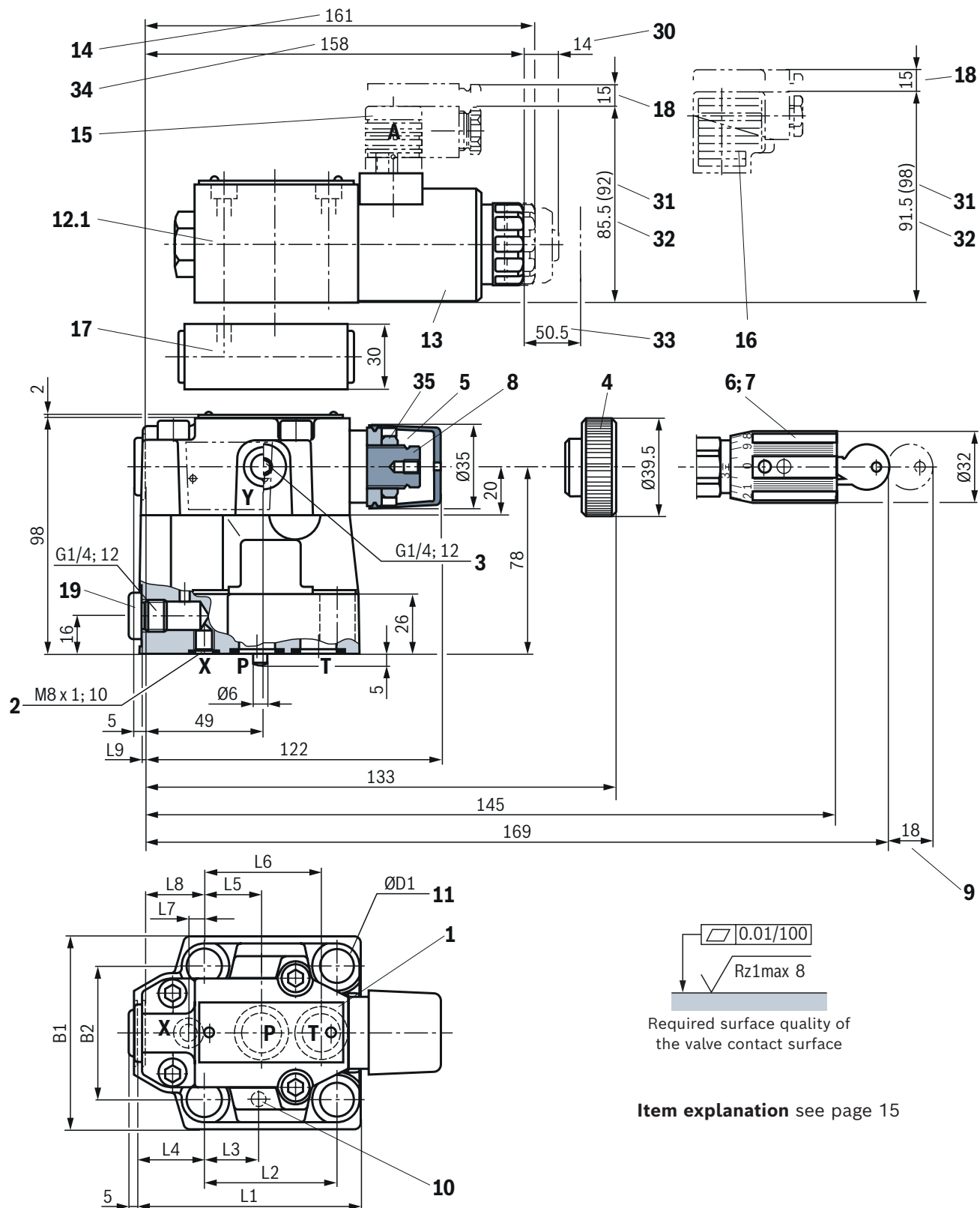
Pilot flow



Notice:

Typical characteristic curves which are subject to tolerance variations.

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



Version	L1	L2	L3	L4	L5	L6	L7	L8	L9	B1	B2	ØD1
"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

- 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 nozzle Ø1.0, 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 $\mu_{\text{total}} = 0.09 \dots 0.14$; 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	DIN 912 – 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.

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

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

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

Further information

- ▶ Directional spool valve
- ▶ Directional seat valve
- ▶ Subplates
- ▶ Hydraulic fluids on mineral oil basis
- ▶ Environmentally compatible hydraulic fluids
- ▶ Flame-resistant, water-free hydraulic fluids
- ▶ Flame-resistant hydraulic fluids – containing water (HFAG, HFAS, HFB, HFC)
- ▶ Mating connectors and cable sets for valves and sensors
- ▶ Pressure relief valve, pilot-operated
- ▶ Hydraulic valves for industrial applications
- ▶ Information on available spare parts

Data sheet 23178

Data sheet 22058

Data sheet 45100

Data sheet 90220

Data sheet 90221

Data sheet 90222

Data sheet 90223

Data sheet 08006

Operating instructions 25802-B

Operating instructions 07600-B

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