

## Pressure relief valve, pilot-operated

### Type DB ...XC



- ▶ Size 10, 25, 32
- ▶ Component series 5X
- ▶ Maximum operating pressure 350 bar



#### ATEX units For potentially explosive atmospheres



##### Information on explosion protection:


- ▶ Area of application in accordance with the Explosion Protection Directive 2014/34/EU **I M2; II 2G; II 2D**
- ▶ Type of protection valve:
  - Ex h I Mb X according to EN 80079-38
  - Ex h IIC T4 Gb X according to 80079-36
  - Ex h IIIC T103°C Db X according to 80079-36

#### 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
- ▶ Adjustment type: rotary knob
- ▶ 5 pressure ratings

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 **Notice:** The documentation version with which the product was supplied is valid.

## Ordering code

01	02	03	04	05	06	07	08	09	10	11
DB			1		5X	/			XC	V

01	Pressure relief valve	<b>DB</b>
02	Size 10	<b>10</b>
	Size 25	<b>20</b>
	Size 32	<b>30</b>

### Type of connection

03	Subplate mounting	-
	Threaded connection	<b>G</b>

### Adjustment type for pressure adjustment

04	Rotary knob	<b>1</b>
05	Main spool Ø24 mm (NG10 and 25)	-
	Main spool Ø28 mm (only NG32)	<b>N</b>
06	Component series 50 ... 59 (50 ... 59: unchanged installation and connection dimensions)	<b>5X</b>

### Pressure rating

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

### Pilot oil supply and pilot oil return (see also "Symbols")

08	Internal pilot oil supply and pilot oil return	-
	External pilot oil supply, internal pilot oil return	<b>X</b>
	Internal pilot oil supply, external pilot oil return	<b>Y</b>
	External pilot oil supply and pilot oil return	<b>XY</b>
09	Standard version	<b>no code</b>
	Valve for minimum cracking pressure (only up to pressure rating "315")	<b>U</b>

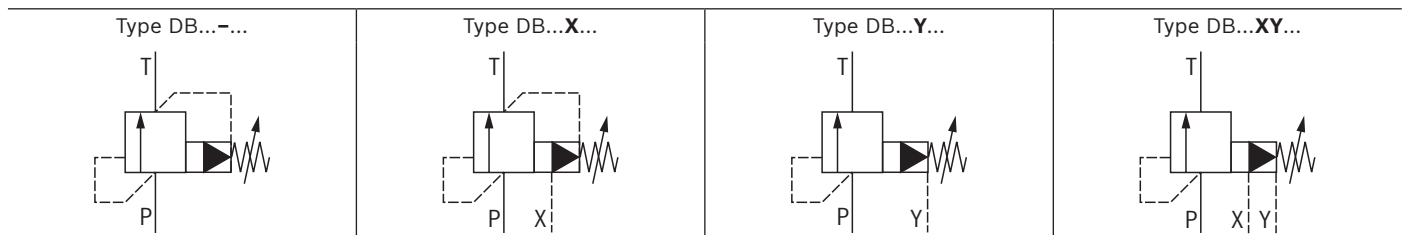
### Explosion protection

10	"Structural safety"	<b>XC</b>
	For details, see information on the explosion protection, page 5	

### Seal material (observe compatibility of seals with hydraulic fluid used, see page 5)

11	FKM seals	<b>V</b>
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## Symbols



## Function, section

Pressure valves of type DB are pilot-operated pressure relief valves. They are used for limiting the operating pressure.

The pressure relief valves mainly consist of the main valve (1) with main spool insert (3), the pilot control valve (2) and the closing plate (16).

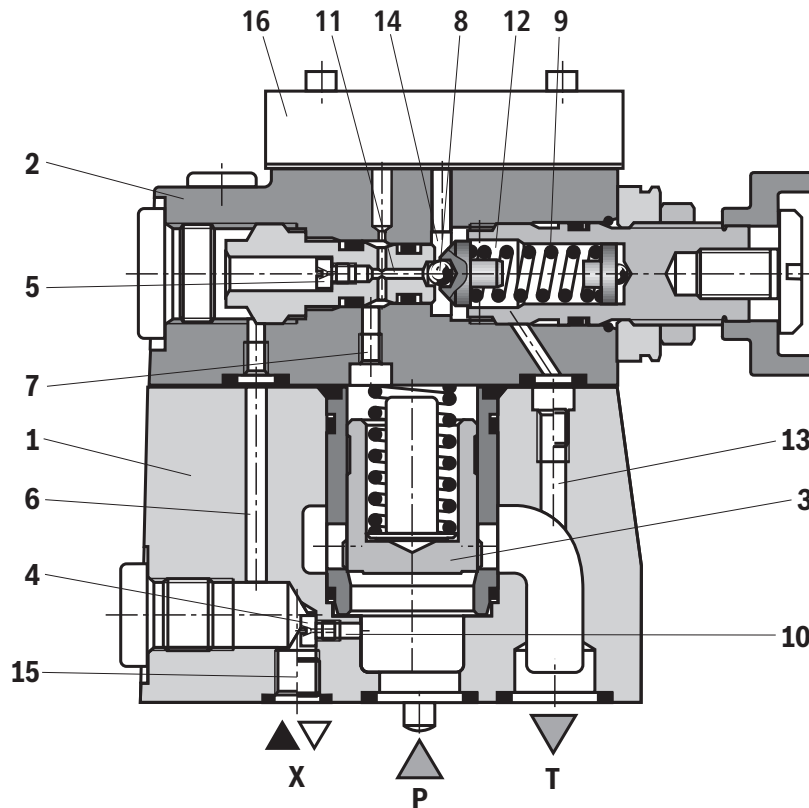
The pressure in channel P acts on the main spool (3). Simultaneously, the pressure is applied via the control lines (6) and (7), which are equipped with nozzles (4) and (5), to the spring-loaded side of the main spool (3) and to the ball (8) in the pilot control valve (2). If the pressure in channel P is increased due to the value which is 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 passed on to the container internally with type DB...-... via control line (13) or externally with type DB...Y... via control line (14). Due to nozzles (4) and (5), there is a pressure drop at the main spool (3). The connection from channel P to channel T is free. Now, the hydraulic fluid flows from channel P to channel T while the set operating pressure is maintained.

Via port X (15), the pressure relief valve can be relieved or switched to a different pressure (second pressure rating).

### Notice:

With the attachment of an additional directional spool valve type 3WE 6..., the valve can be extended for solenoid-actuated unloading (see page 10 and 11).



Type DB 10...XC...

**Technical data**

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

<b>general</b>					
Sizes		NG10	NG25	NG32	
Weight	▶ Subplate mounting	kg	2.6	3.5	4.4
	▶ Threaded connection	kg	5.3	5.1	4.8
Installation position	any				
Ambient temperature range	°C	-15 ... +80			
Storage temperature range	°C	+5 ... +40			
Surface protection	Painting, galvanic coating, blued, stainless steel				

<b>hydraulic</b>					
Maximum operating pressure	▶ Port P, X	bar	350		
	▶ Port T	bar	315		
Maximum counter pressure	▶ Port Y	bar	315		
	▶ Port Y, T	bar	see "Solenoid-actuated unloading" page 10 and 11		
Maximum set pressure <sup>1)</sup>		bar	50; 100; 200; 315; 350		
Minimum set pressure <sup>1)</sup>	flow-dependent (see characteristic curve on page 6)				
Maximum flow	▶ Subplate mounting	l/min	250	500	650
	▶ Threaded connection	l/min	250	500	650
Hydraulic fluid	see table page 5				
Hydraulic fluid temperature range	°C	-15 ... +80			
Viscosity range	mm <sup>2</sup> /s	10 ... 800			
Maximum admissible degree of contamination of the hydraulic fluid; cleanliness class according to ISO 4406 (c)	Class 20/18/15 <sup>2)</sup>				

<sup>1)</sup> The maximum admissible response pressure must not be exceeded. It must thus be checked using a suitable measuring device during adjustments.

<sup>2)</sup> The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and simultaneously increases the life cycle of the components.

Available filters can be found at [www.boschrexroth.com/filter](http://www.boschrexroth.com/filter).

**Notice:**

Tank preloading adds to the minimum set pressure (ports T and Y)

## 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	ISO 15380	90221
		HEES		
	▶ Soluble in water	HEPG	ISO 15380	



### 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.

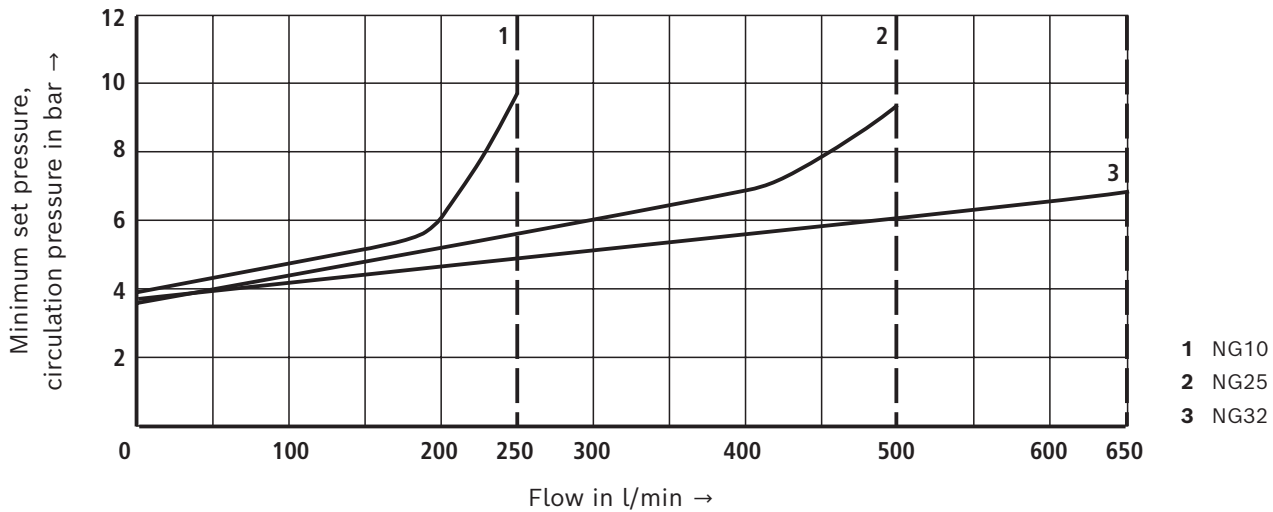
Information on the explosion protection	
Area of application according to directive 2014/34/EU	I M2, II 2G, II 2D
Type of protection of valve according to EN 80079-37	c (structural safety)
▶ Gas according to EN 80079-36/37	Ex h IIC T4 Gb X
▶ Dust according to EN 80079-36/37	Ex h IIIC T103°C Db X
▶ Methane, carbon dust according to EN 80079-38	Ex h I Mb X
Maximum surface temperature <sup>3)</sup>	°C 103
Temperature class	T4

<sup>3)</sup> If a directional spool valve is attached (magnetic unloading), the temperature specifications of the corresponding operating instructions and the standards ISO 13732-1 and ISO 4413 (contact protection) must be observed.

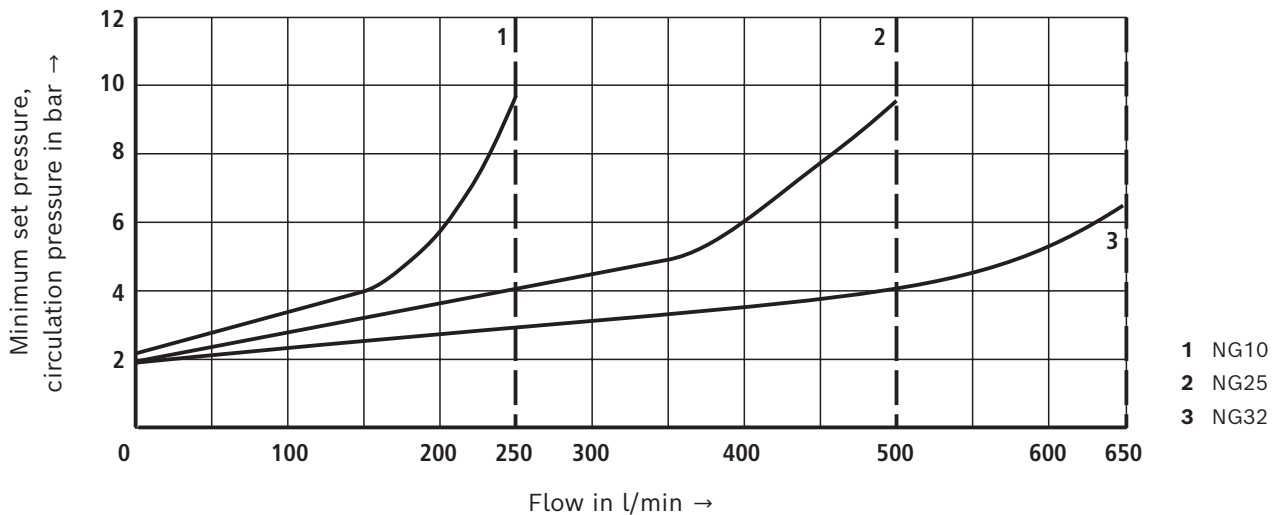
## Characteristic curves


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

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



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



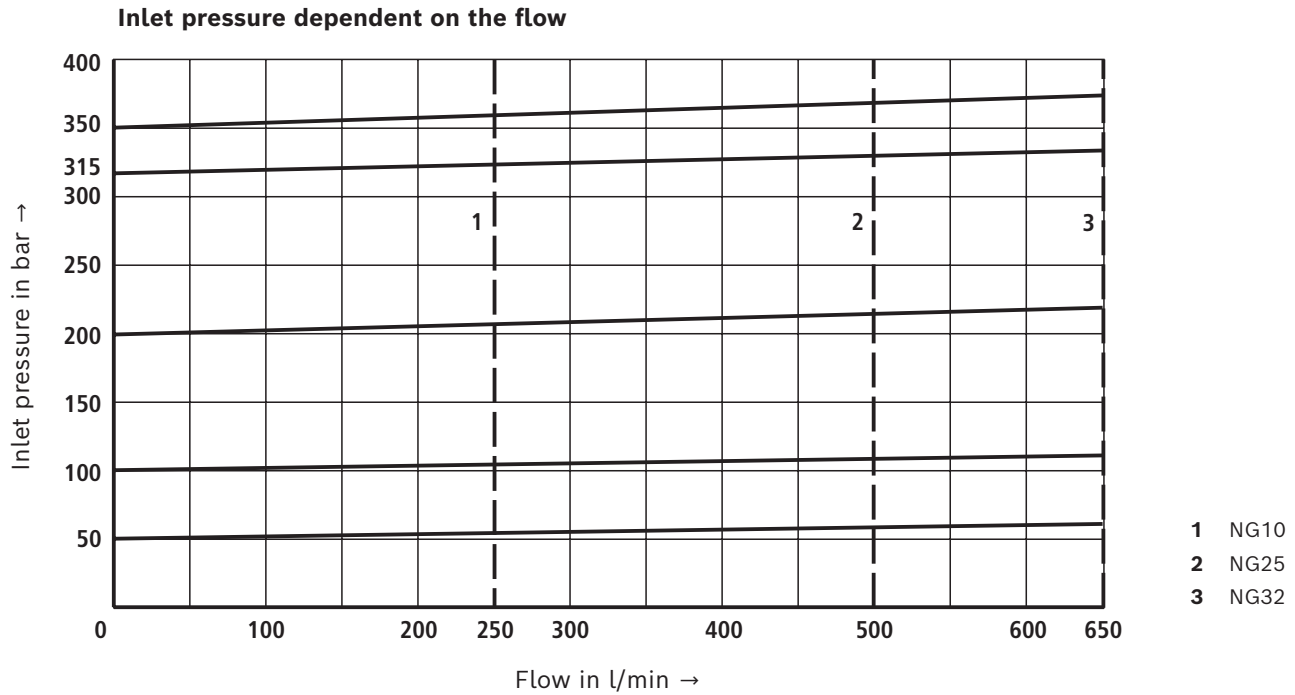
 **Notice:**

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

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

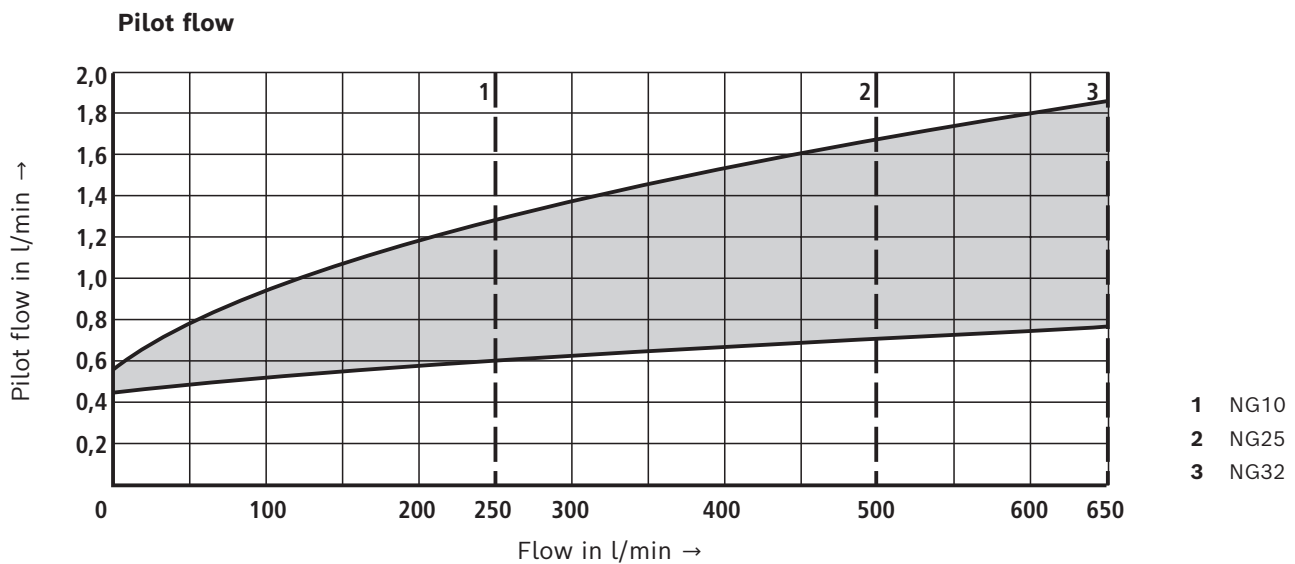
### Characteristic curves

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

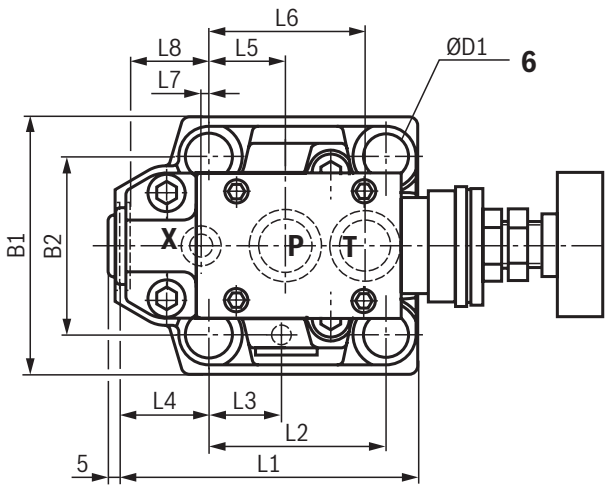
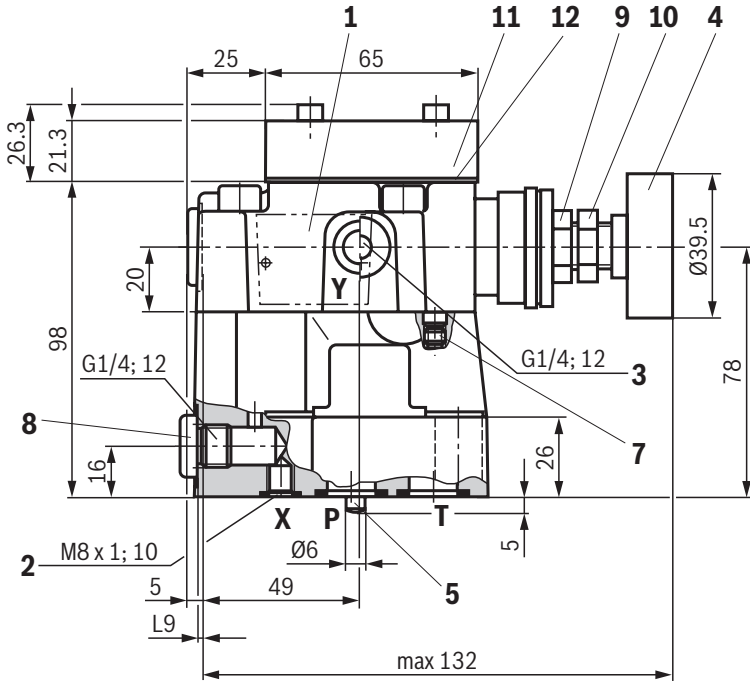


**Notice:**

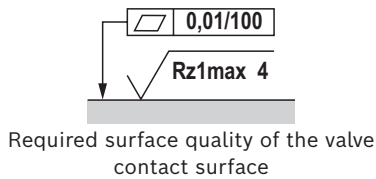
The characteristic curves were measured with **external, depressurized pilot oil return**.  
With internal pilot oil return, the inlet pressure increases by the output pressure at port T.



**Dimensions:** Subplate mounting  
(dimensions in mm)



- 1 Name plate
- 2 Port X for external pilot oil supply
- 3 Port Y for external pilot oil return
- 4 Adjustment type "1"
- 5 Locking pin
- 6 Valve mounting bore
- 7 Not applicable with internal pilot oil return
- 8 Measuring port, tightening torque  $M_A = 30^{±3}$  Nm
- 9 Lock nut, wrench size 17, tightening torque  $M_A = 10^{+5}$  Nm
- 10 Lock nut, wrench size 17, tightening torque  $M_A = 10^{+5}$  Nm
- 11 Cover plate
- 12 Sealing plate



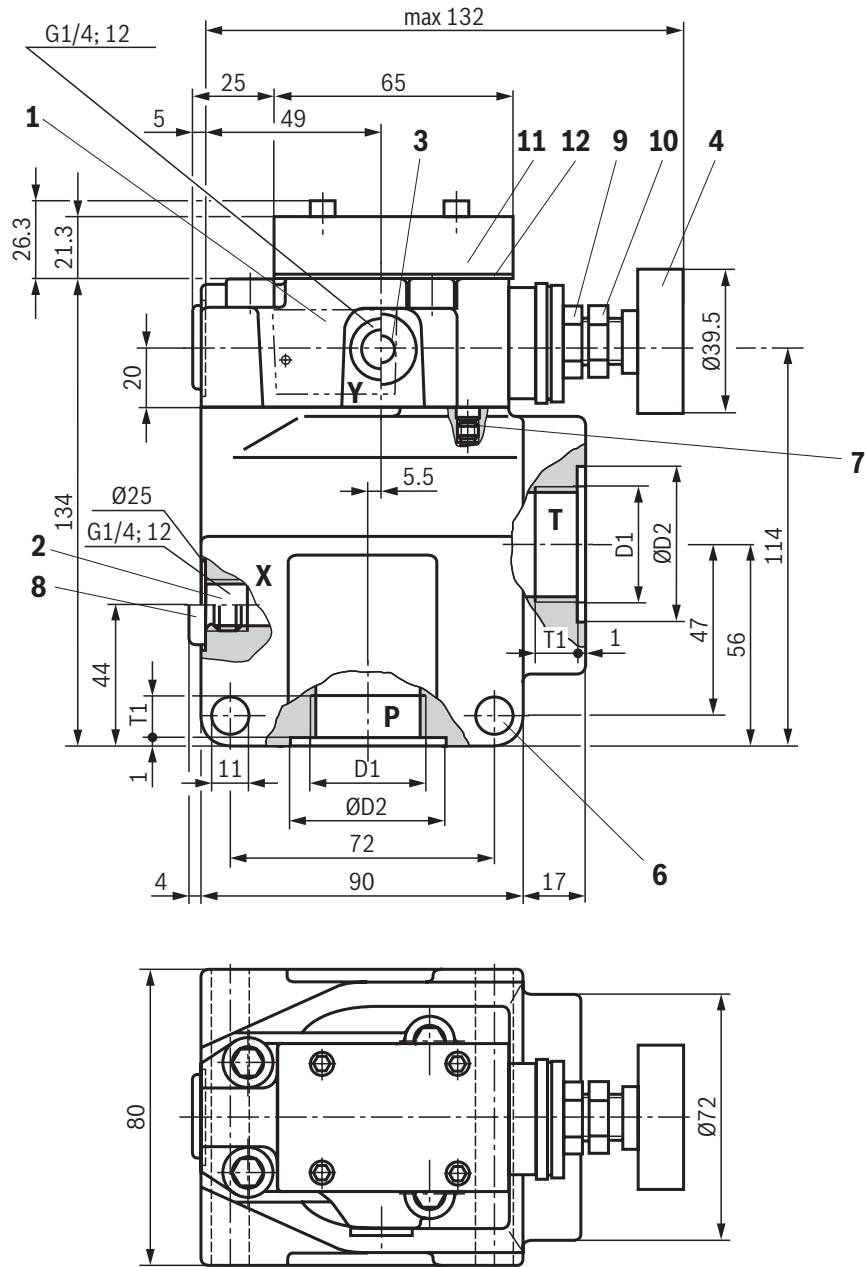
**Subplates** (separate order) with porting pattern according to ISO 6264 see data sheet 45100.

**Valve mounting screws** see page 10.

Size	L1	L2	L3	L4	L5	L6	L7	L8	L9	B1	B2	ØD1
10	91	53.8	22.1	27.5	22.1	47.5	0	25.5	2	78	53.8	14
25	116	66.7	33.4	33.3	11.1	55.6	23.8	22.8	10.5	100	70	18
32	147.5	88.9	44.5	41	12.7	76.2	31.8	20	21	115	82.6	20



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



- 1 Name plate
- 2 Port X for external pilot oil supply
- 3 Port Y for external pilot oil return
- 4 Adjustment type “1”
- 6 Valve mounting bore
- 7 Not applicable with internal pilot oil return
- 8 Measuring port, tightening torque  $M_A = 30^{±3}$  Nm
- 9 Lock nut, wrench size 17, tightening torque  $M_A = 10^{+5}$  Nm
- 10 Lock nut, wrench size 17, tightening torque  $M_A = 10^{+5}$  Nm
- 11 Cover plate
- 12 Sealing plate


Size	D1	ØD2	T1
10	G1/2	34	14
25	G1	47	18
32	G1 1/2	65	22

**Valve mounting screws, if required:**  
2x M10 x ...

## Dimensions

### Valve mounting screws - subplate mounting (separate order)

Size	Quantity	Hexagon socket head cap screws	Material number
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
25	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
32	4	DIN912 - M18 x 50 - 10.9 Tightening torque $M_A = 248 \text{ Nm} \pm 10\%$	R900002245

 **Notice:**

Only use valve mounting screws with the listed thread diameters and strength properties. Observe the screw-in depth.

## Solenoid-actuated unloading

By attaching a type 3WE 6... directional spool valve, the valve can be modified so that it can be switched to depressurized circulation by electric control (main control spool unloaded).

Before attaching a directional spool valve type 3WE6... to a pilot-operated pressure relief valve type DB...XC, it must be checked whether the category and protection class which result from this combination meet the requirements of the relevant potentially explosive area. The directional spool valves which are suitable for attachment and the resulting categories and protection classes are shown in the table below.

### Important information:

- ▶ The unloading function with directional valve may not be used for safety functions.
- ▶ In the assembly, the corresponding operating instructions included in the scope of delivery of the directional spool valves are to be observed.
- ▶ Any mounting and/or modification without operating instructions is not admissible.
- ▶ Before the assembly, all parts are to be identified using the relevant name plates.

### The directional spool valve determines the category according to the explosion protection directive 2014/34/EU:

Directional spool valve	Category according to 2014/34/EU	EPL according to 80079-36/37	Data sheet
3WE 6...5X/...XH	II 2G	Gb	23177-XH
3WE 6...5X/...XM	I M2	Mb	23177-XH
3WE 6...6X/...XD	I M2; II 2G	Mb; Gb	23178-XD
3WE 6...6X/...XE	II 2G	Gb	23178-XE
3WE 6...6X/...XN	II 3G; II 3D	Gc; Dc	23178-XN

Example:

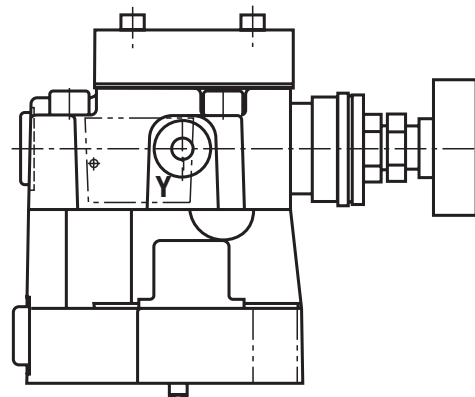
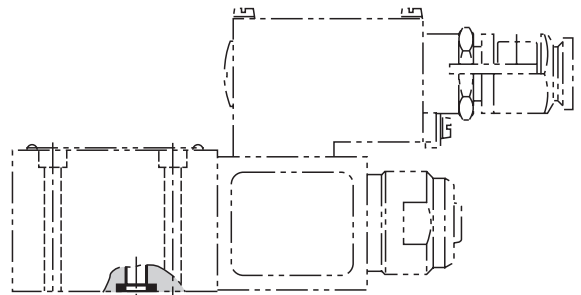
Type DB...XC plus 3WE 6 ...6X/...XN <sup>1)</sup> results in a possible use in category II 3G; II 3D (Gc; Dc)

<sup>1)</sup> Please also observe the possible circuit variations on page 11 when selecting a valve.

Example:

Attachment of a directional spool valve type 3WE 6...6X/...XE

The installation of the directional valve (disassembly of the closing plate) is described in the operating instructions 25802-XC-B.

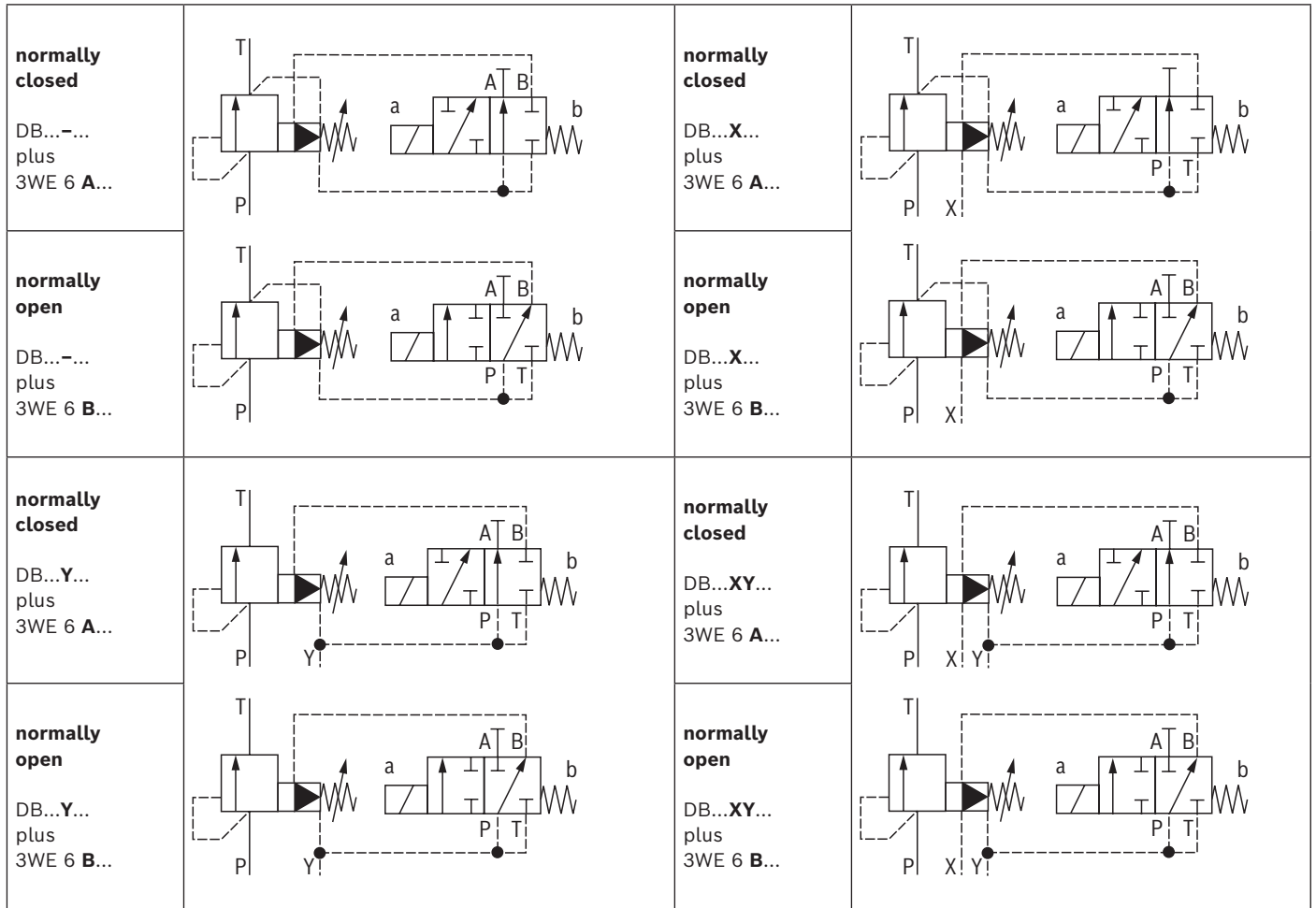


### Solenoid-actuated unloading: circuit variations

For each type of pilot oil supply of a pressure relief valve, two circuit variations for solenoid-actuated unloading are possible:

- ▶ normally closed
- ▶ normally open

The required circuit variation is determined by the control spool selected for the directional spool valve type 3WE 6...



### General information

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 12 on page 3) in the pilot control valve/adjustment type

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

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

$$\Rightarrow \text{response pressure} = p_{\text{Spring}} + p_{\text{Hydraulic}} = 250 \text{ bar}$$

## Further information

- ▶ Directional spool valve
- ▶ Subplates
- ▶ Hydraulic fluids on mineral oil basis
- ▶ Environmentally compatible hydraulic fluids
- ▶ Hydraulic valves for industrial applications
  
- ▶ Selection of filters
- ▶ Information on available spare parts

Data sheet 23178

Data sheet 45100

Data sheet 90220

Data sheet 90221

Operating instructions  
07600-B

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