

## Pump safety block

### Type DBA, DBAW, DBAE, DBAEE, DBAEA



- ▶ Size 16, 25, 32
- ▶ Component series 2X
- ▶ Maximum operating pressure 350 bar
- ▶ Maximum flow 400 l/min



#### Features

- ▶ Depressurized start-up and circulation of the pump
- ▶ Intended for direct mounting onto the SAE pressure port of the pump
- ▶ Low circulation pressure due to short distance
- ▶ Low compression volume for soft switching to depressurized circulation
- ▶ Low noise level due to direct flange mounting onto the pump
- ▶ 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

Features	1
Ordering code	2, 3
Model code	4
General circuit example set-up	5
Circuit examples	6 ... 9
Function, sections	10 ... 12
Technical data	13 ... 15
Characteristic curves	16, 17
Dimensions	18 ... 25
Admissible pumps	26, 27
Project planning information	33
Further information	33

#### **Type-examination tested safety valves type DBA...E according to Pressure Equipment Directive 2014/68/EU**

Ordering code	28
Deviating technical data:	29
Safety instructions	30
Counter pressure in the discharge line	31, 32

## Ordering code

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	
DBA							2X	/												

01	Pump safety block	DBA	
02	Without directional valve	no code	◇
	With mounted directional spool valve (data sheet 23178)	W	◇
	With mounted proportional pressure relief valve for external control electronics, type DBET-6X/.Y... <sup>1)</sup> (data sheet 29162)	E	
	With mounted proportional pressure relief valve with on-board control electronics, type DBETE-6X/.Y... <sup>1)</sup> (data sheet 29162)	EE	
	With mounted proportional pressure relief valve (pressure-controlled) with on-board control electronics, type DBETA-6X/... (data sheet 29262)	EA	
03	Size 16	15	◇
	Size 25	25	◇
	Size 32	30	◇
04	Without directional valve	no code	◇
	With mounted directional valve, normally closed	A <sup>2)</sup>	
	With mounted directional valve, normally open; generally type DBAE(E)(A)	B <sup>2)</sup>	◇

Type of connection / SAE flange<sup>3)</sup>

05	Standard flange (250 ... 350 bar)	F	◇
	High-pressure flange (350 bar)	H	◇

Adjustment type for pressure adjustment<sup>4)</sup>

06	Rotary knob	1	
	Sleeve with hexagon and protective cap	2	◇
	Lockable rotary knob with scale	3 <sup>5)</sup>	
	Rotary knob with scale	7	
07	Without pressure switch	-	
	With mounted pressure switch type HED 8 OH ... (connector according to EN 175301-803, without mating connector), (data sheet 50061)	D <sup>6)</sup>	
08	Component series 20 ... 29 (20 ... 29: unchanged installation and connection dimensions)	2X	

Pressure rating<sup>8)</sup>

09	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 250 bar (only NG32 and standard flange "F")	250	
	Set pressure up to 315 bar	315	◇
	Set pressure up to 350 bar	350	◇
10	Without additional pressure relief valve	no code	◇
	With mounted pressure relief valve type ZDB 6 VB...-4X/..SO2 (data sheet 25751)	Z <sup>7; 8)</sup>	
	With mounted pressure relief valve type Z2DB 6 VC...-4X/..SO2 (data sheet 25751)	ZZ <sup>7; 9)</sup>	
11	Standard version	no code	◇
	Valve for minimum cracking pressure (not with type DBAE(E)(A))	U	
12	Without directional valve	no code	◇
	With directional spool valve (only type DBAW)	6E <sup>2)</sup>	◇
13	DC voltage 24 V (in general with version "DBAE(E)(A)...")	G24 <sup>2)</sup>	◇
	DC voltage 205 V	G205 <sup>2)</sup>	
	AC voltage 230 V 50/60 Hz	W230 <sup>2)</sup>	

## Ordering code

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	
<b>DBA</b>							<b>2X</b>	/												

14	With concealed manual override (standard)	<b>N9</b> <sup>10; 11)</sup>	◇
	With manual override	<b>N</b> <sup>10; 11)</sup>	
	Without manual override	<b>no code</b>	◇

### Electrical connection <sup>1)</sup>

15	Connector 3-pole (2 + PE) according to EN 175301-803	<b>K4</b> <sup>6)</sup>	◇
	Connector 7-pole (6 + PE) according to EN 175201-804 (only version "DBAEE" and "DBAEA")	<b>K31</b> <sup>6)</sup>	

### Electronics interface

16	Without electronics (versions "DBA" and "DBAW")	<b>no code</b>	◇
	Command value 0 ... 10 V (only versions "DBAEE" and "DBAEA")	<b>A1</b>	
	Command value 4 ... 20 mA (only versions "DBAEE" and "DBAEA")	<b>F1</b>	
	External control electronics (only version "DBAE")	<b>H1</b>	

### Nozzle fitting

17	<b>Displacement pumps</b>		
	Lateral channel closed, transverse channel open, pilot oil bore open; (standard for displacement pumps; pure DB-/DBW function)	<b>no code</b>	◇
	<b>Variable displacement pumps</b>		
	Lateral channel closed, transverse channel open; pilot oil bore closed (e.g. for axial piston variable displacement pump type A4VSO140 with DRG controller)	<b>A00</b>	
	Nozzle Ø0.8 mm in lateral channel, transverse channel open; pilot oil bore closed (standard for control pumps with DFR1 or DFLR controller)	<b>A08</b> <sup>12)</sup>	◇
	Nozzle Ø1.0 mm in lateral channel, transverse channel open; pilot oil bore closed (for nozzle fitting of the block, refer to the circuit examples on page 6 ... 8)	<b>A10</b> <sup>12)</sup>	

### Seal material (observe compatibility of seals with hydraulic fluid used, see page 15)

18	NBR seals	<b>no code</b>	◇
	FKM seals	<b>V</b>	

### Type-examination procedure

19	Without type-examination procedure	<b>no code</b>	◇
	Type-examination tested safety valve according to PED 2014/68/EU	<b>E</b>	
20	Standard solenoid coil	<b>no code</b>	◇
	Solenoid coil is an approved component with UR-marking according to UL 906 (only version "6E")	<b>= UR</b>	

1) Externally discharge the pilot oil from the proportional pressure relief valve type DBET(E)

2) Ordering code only necessary for versions with mounted directional spool valve "DBAW" or proportional pressure relief valve "DBAE", "DBAEE" and "DBAEA".

3) Please observe pressure ratings and connection dimensions on page 24.

4) Adjustment type for pressure switch type HED 8 in brackets.

5) H-key with material no. **R900008158** is included in the scope of delivery.

6) Mating connectors, separate order, see data sheet 08006 and/or page 22 for versions "DBAEE" and "DBAEA".

7) The same pressure rating at pressure limitation screw-in cartridge valves type DB 20 K, pressure relief valves (sandwich plate valves) type Z(2)DB 6 and pressure switches type HED 8. With versions "Z" and "ZZ" in combination with pressure rating "350", the maximum pressure at the port X = 315 bar.


8) Not version "DBA..A"

9) Only if used for pressure limitation and control of variable displacement pumps type A10VSO

10) **Notice:** Accidental activation of the manual override may lead to uncontrolled machine movements.

11) Ordering code only required for versions with mounted directional spool valve "DBAW".

12) If used on variable displacement pumps with DFLR controllers, the nozzle at port X of the pump control must be removed.

 **Notice:** ◇ = Preferred type

Model code

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
DBA							2X	/											*

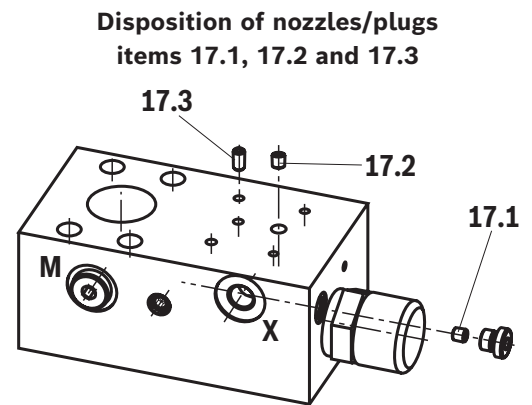
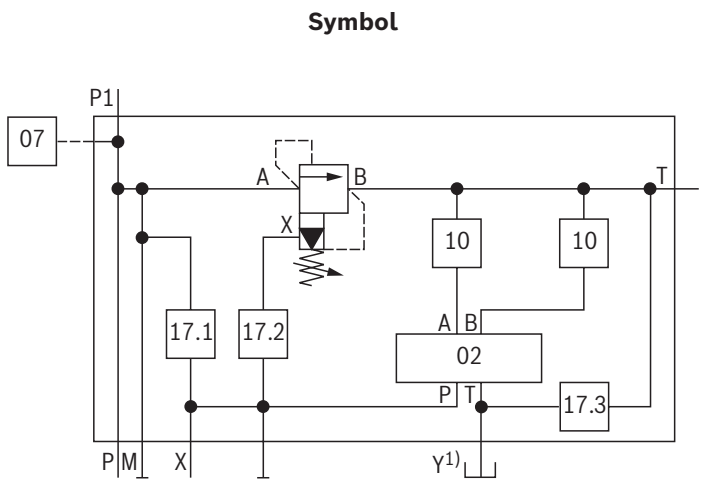
		02				07	10	17.1		17.2		17.3					
		Cover plate HSA 06 A 001 ...	4WE 6 H 6X..	4WE 6 HB 6X..	4WE 6 L37B.6X/..	DBET-6X/Y.K4	DBETE-6X/Y.K31	DBETA-6X/...	HED 8 OH 2X/...K14..	ZDB 6 VB.-4X/...S02	Z2DB 6 VC.-4X/...S02	Nozzle Ø0.8 in lateral channel	Nozzle Ø1.0 in lateral channel	Plug in lateral channel	Plug in pilot oil bore/cartridge	Nozzle Ø0.8 in pilot oil bore/cartridge	Plug in pilot oil bore
01	DBA	X															
02	W		X	X	X												
	E					X											X
	EE						X										X
	EA							X				X	X				
04	A (normally closed)			X													
	B (normally open)		X <sup>1)</sup>	X <sup>2)</sup>		X <sup>3)</sup>	X <sup>4)</sup>										
07	- (without pressure switch)								-								
	D (with pressure switch)								X								
10	- (standard valve <sup>5)</sup> )									-	-						
	Z (max. 2 pressure limitations)									X							
	ZZ (max. 3 pressure limitations)										X						
17	no code <sup>6)</sup>													X			
	A00													X	X		
	A08										X				X		
	A10											X			X		
	C08													X		X	

- 1) For version "DBAW" with pressure relief valve type Z(2)DB
- 2) For version "DBAW" without pressure relief valve type Z(2)DB
- 3) For version "DBAE" for external electronic controls/ amplifier card
- 4) For version "DBAEE" with internal electronic controls/amp- lifier card

- 5) Only 1 pressure limitation
- 6) Standard for displacement pumps

General circuit example set-ups can be found on page 5.

### General circuit example set-up

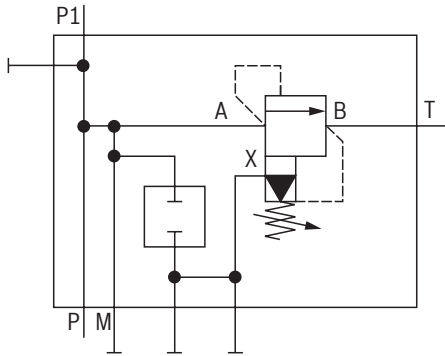


<sup>1)</sup> Only type DBAE(E)

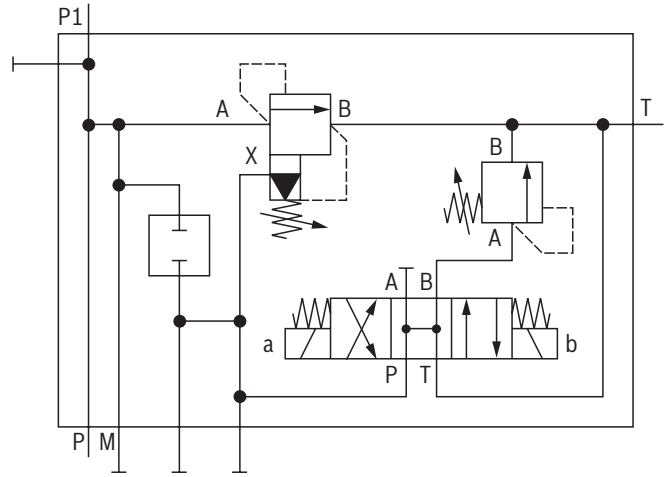
**Model codes can be found on page 4.**

**Circuit examples:** for displacement pumps (selection)

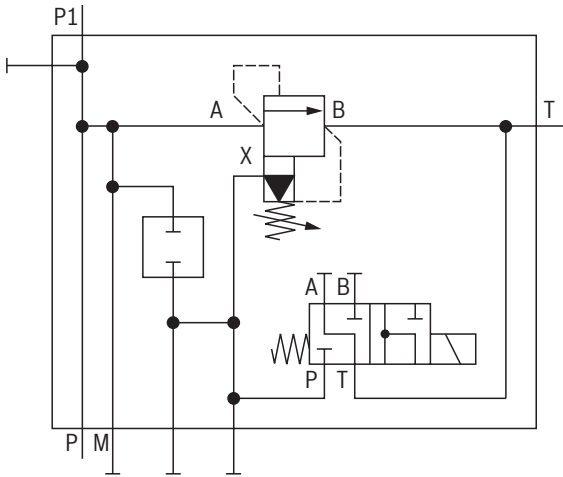
"DBA..."



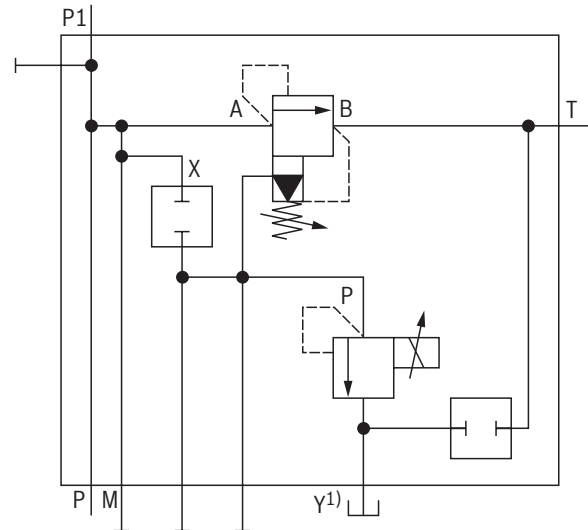
"DBAW.B...Z"



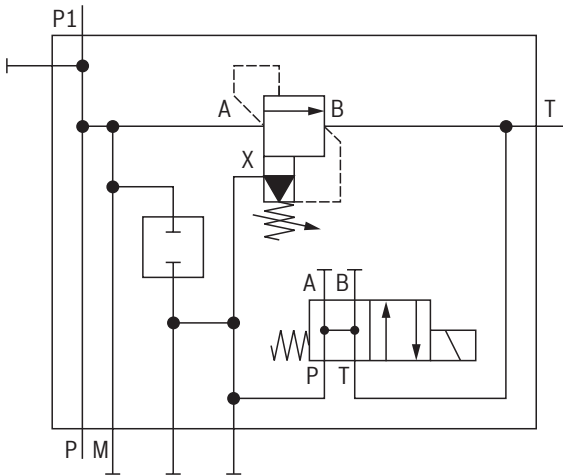
"DBAW.A..."



"DBAE(E)..."



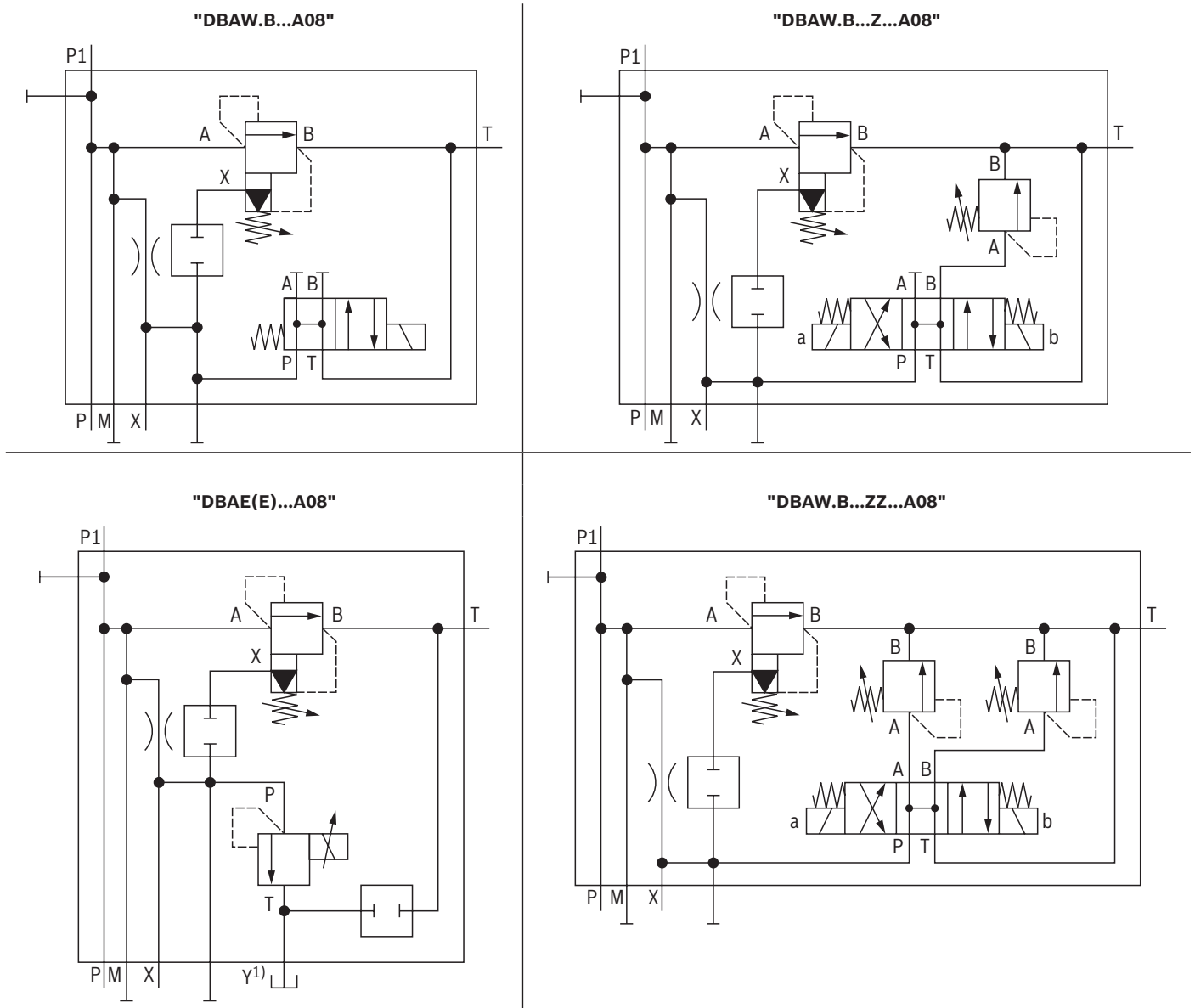
"DBAW.B..."



1) **Notice:**  
Port Y of the proportional pressure relief valve type DBET mounted on the pump safety block type DBA must be connected to the tank in a depressurized way (possibly by means of the drain line of the hydraulic system).

**Circuit examples:** for variable displacement pumps (selection)

► Preferably for axial piston variable displacement pumps type A10VSO with DR, DFR1 or DFLR controller<sup>2)</sup>

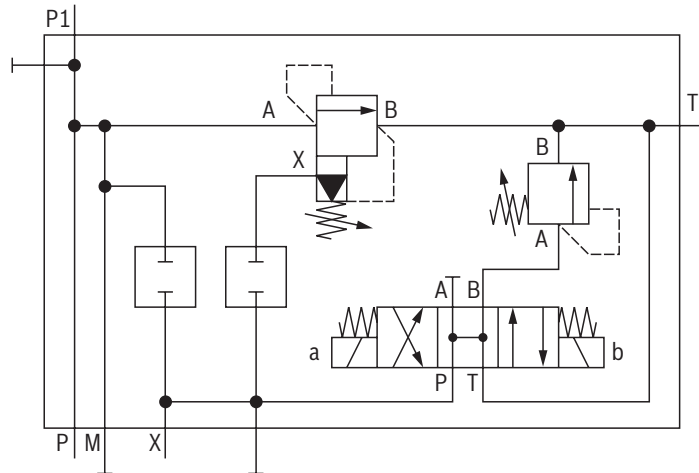


- 1) **Notice:**  
Port Y of the proportional pressure relief valve type DBET mounted on the pump safety block type DBA must be connected to the tank in a depressurized way (possibly by means of the drain line of the hydraulic system).
- 2) **Notice:**  
If used on variable displacement pumps with DFLR controllers, the nozzle at port X of the pump control must be removed.

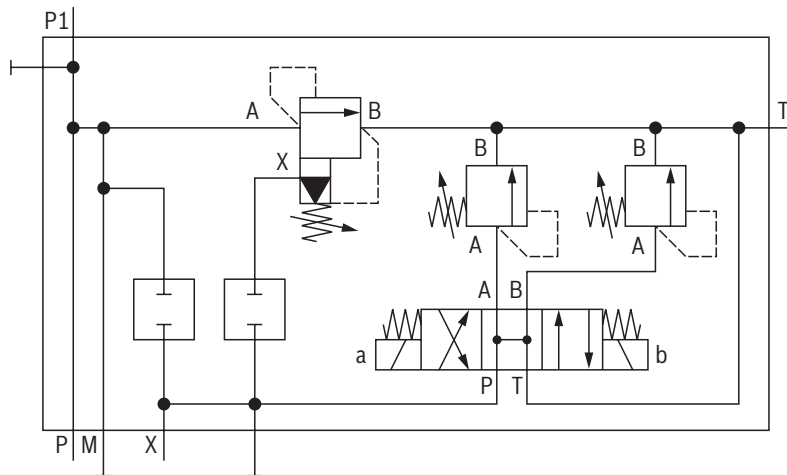
**Circuit examples:** for variable displacement pumps (selection)


► Preferably for axial piston variable displacement pumps type A10VSO with DRG controller

"DBAW.B...Z...A00"



"DBAW.B...ZZ...A00"

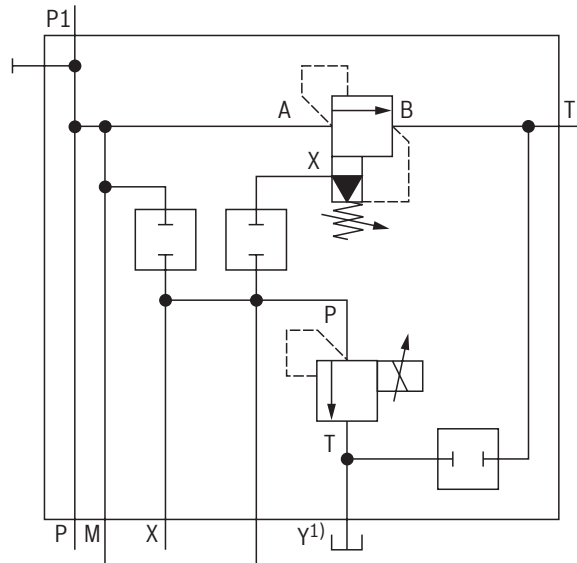
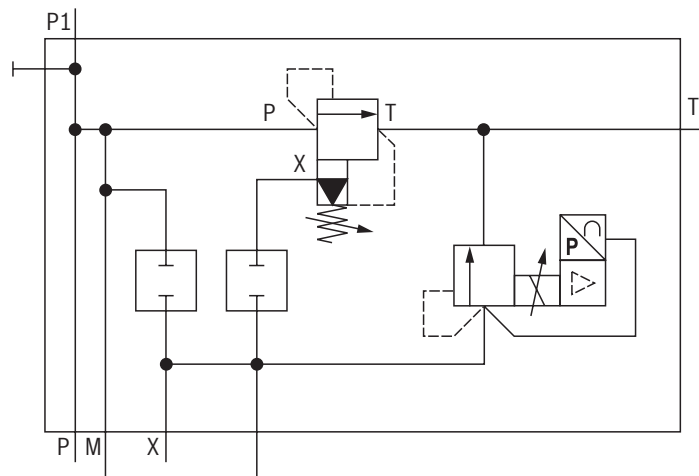


1)  **Notice:**  
 Port Y of the proportional pressure relief valve type DBET mounted on the pump safety block type DBA must be connected to the tank in a depressurized way (possibly by means of the drain line of the hydraulic system).



**Circuit examples:** for variable displacement pumps (selection)

- Preferably for axial piston variable displacement pumps type A10VSO with DRG controller

**"DBAE(E)...A00"****"DBAEA...A00"**1)  **Notice:**

Port Y of the proportional pressure relief valve type DBET mounted on the pump safety block type DBA must be connected to the tank in a depressurized way (possibly by means of the drain line of the hydraulic system).

**Function, sections: type DBA...**

**General**

Pump safety blocks type DBA are pilot-operated pressure relief valves which are integrated into a block and intended to be mounted directly onto SAE pressure ports of pumps.

They are used for limiting (type DBA) or limiting and solenoid-actuated unloading (type DBAW, DBAE) of the operating pressure.

Pump safety blocks generally consist of valve block (1) and pressure limitation screw-in cartridge valve type DB 20 K (2) (data sheet 25818). Optionally, a pressure switch type HED 8 (3) (data sheet 50061) can be installed on the valve block.

The valve housing is equipped with a port P for hydraulic fluid input and port P1 for hydraulic fluid output.

In a branch of the through connection between these two ports, the pressure limitation screw-in cartridge valve can be found. By opening this valve, a connection to port T (tank line) is established.

In standard version, connection diagram NG6 is covered with the cover plate (4). The pressure in the through connection (P→P1) has an effect on the main control spool (5) of the pressure limitation screw-in cartridge valve. Via the nozzle bores (6 and 7), the pressure is at the same time applied to the poppet (8). If the pressure in port P exceeds the value set at spring (9), the poppet (8) opens against the spring (9).

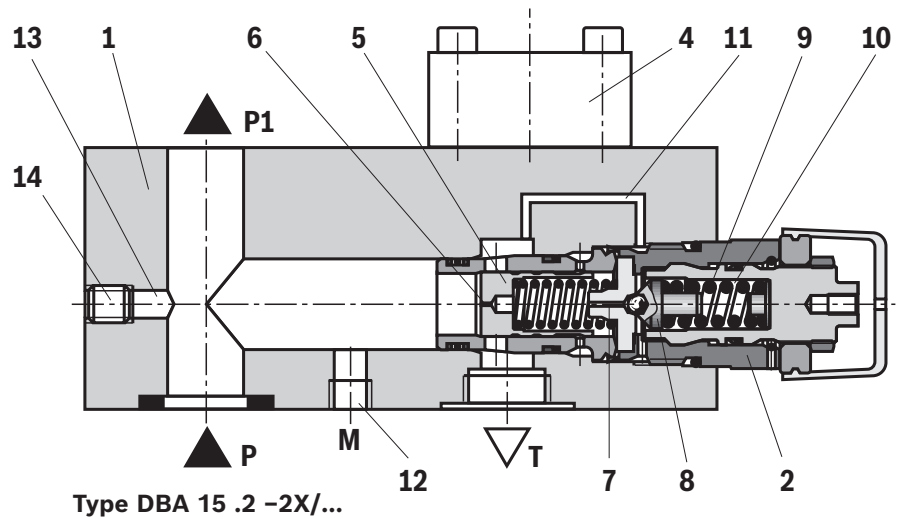
Via the nozzle bores (6 and 7), the hydraulic fluid from channel P flows into the spring chamber (10) and is here internally directed via the control line (11) into the tank. Due to the state of equilibrium at the main control spool (5), hydraulic fluid flows from channel P→T, maintaining the set operating pressure.

A pressure gauge connection (12) allows for the control of the operating pressure.

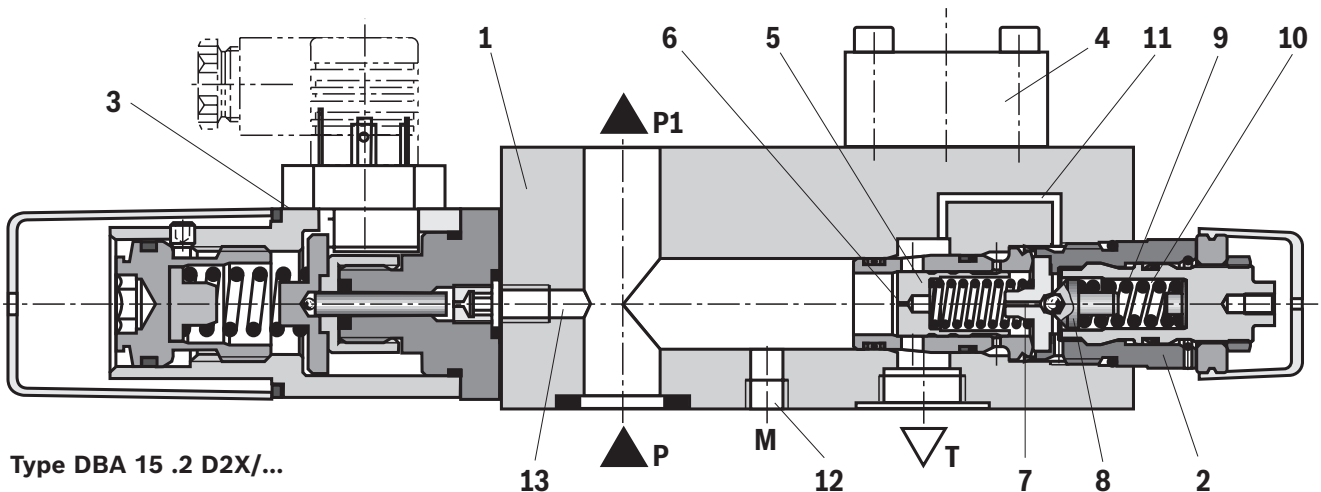
**Pump safety block "DBA...D" (with pressure switch)**

The use of an electrical pressure switch type HED 8 (3) (data sheet 50061) enables activation and deactivation of an electric circuit via the control line (13).

In its basic design, the control line (13) is closed with a plug screw (14).



The pressure gauge connection M and tank port T are illustrated with an offset of 90°.



**Function, sections: type DBAW...**

**Pump safety block "DBAW"**

The function of this block basically corresponds to the function of block type DBA... Relief of the main control spool, however, is achieved by controlling the mounted directional valve (15). In this case, no cover plate (4) is required.

**Pump safety block "DBAW.B...Z..." for displacement pumps (with pressure relief valve)**

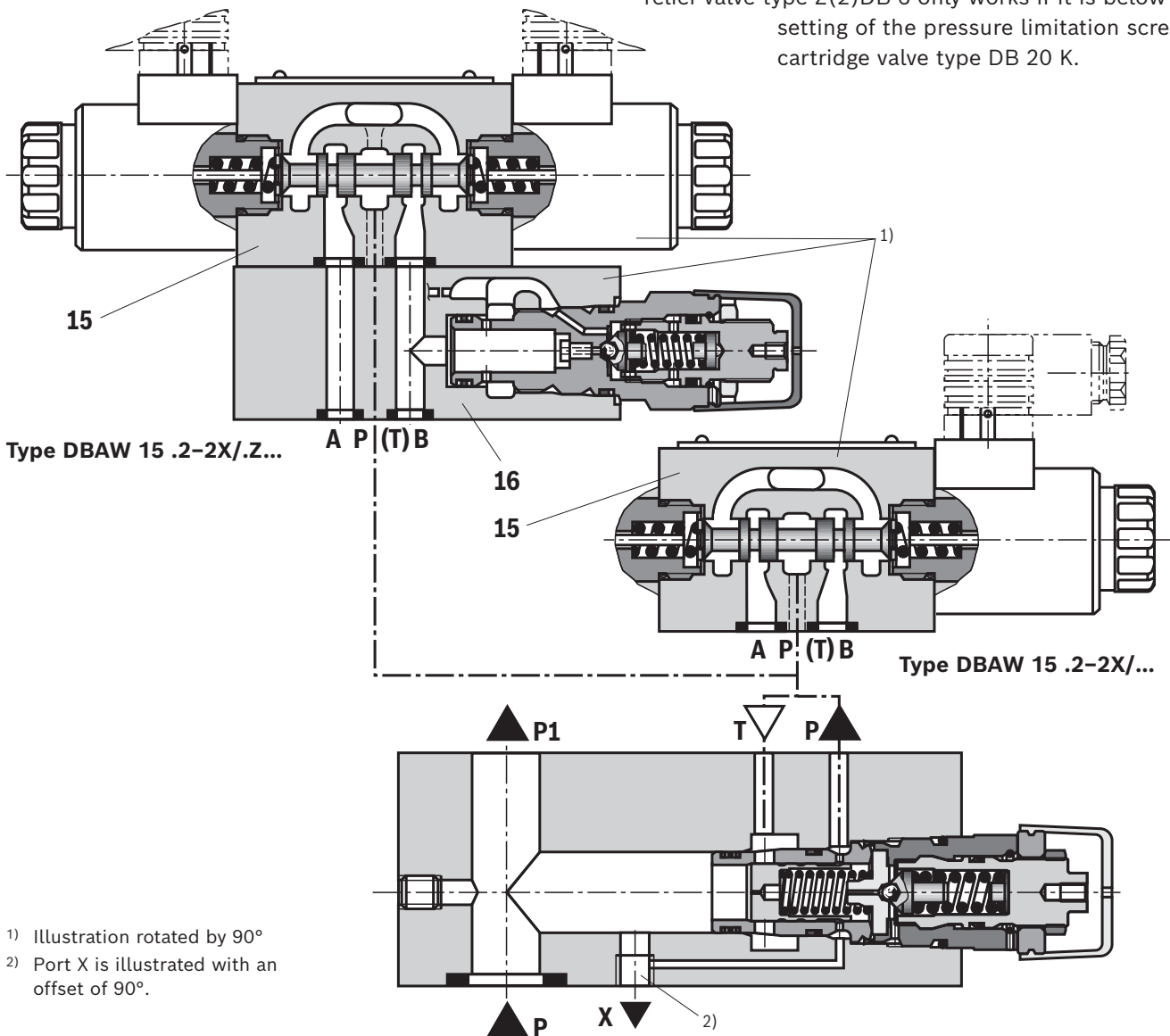
In general, the function corresponds to type DBAW... By means of the pressure relief valve type ZDB 6 (16) (data sheet 25751) and actuation of the directional valve (15), the pilot control of the pressure limitation screw-in cartridge valve type DB 20 K is deactivated and the pressure set at the pressure relief valve type ZDB 6 is activated. The pressure adjustment at the pressure relief valve type ZDB 6 only works if it is below the setting of the pressure limitation screw-in cartridge valve type DB 20 K.

**Pump safety block "DBAW.B...Z...A" for control pump A10V ... (with pressure relief valve)**

In general, the function corresponds to type DBAW... By means of the pressure relief valve type ZDB 6 (16) (data sheet 25751) and by actuation of the directional valve (15), a pressure change is achieved at control port X. The pressure change set at the pressure relief valve type ZDB 6 acts on the controller of the pump. The pressure adjustment at the pressure relief valve type ZDB 6 only works if it is below the setting of the pressure limitation screw-in cartridge valve type DB 20 K.

**Pump safety block "DBAW.B...ZZ...A" for control pump A10V.. (with pressure relief valve)**

In general, the function corresponds to type DBAW... By means of the pressure relief valve type Z(2)DB 6 (16) (data sheet 25751) and by actuation of the directional valve (15), two pressure adjustments are possible at control port X. The pressure adjustment at the pressure relief valve type Z(2)DB 6 only works if it is below the setting of the pressure limitation screw-in cartridge valve type DB 20 K.



**Function, sections:** type DBAE(E)... and DBAEA...

**Pump safety block "DBAE(E)"** for displacement pump (with proportional pressure relief valve)  
 In general, the function corresponds to type DBA...  
 Relief at the main control spool, however, is achieved by control of the mounted proportional pressure relief valve type DBET(E)-6X/.Y... (17) (data sheet 29162).  
 The cover plate (4) is not required.

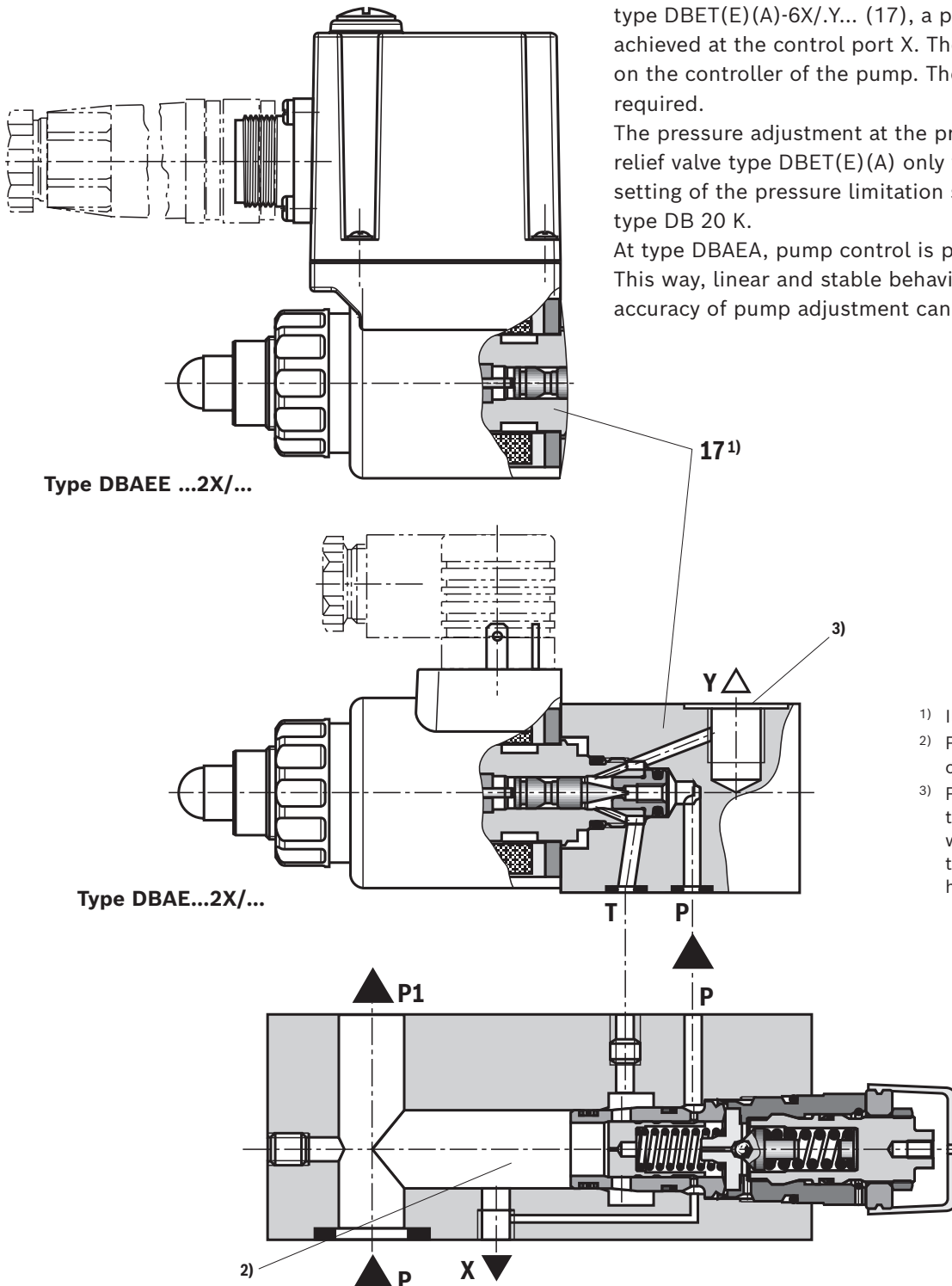
The pressure adjustment at the proportional pressure relief valve type DBET(E) only works if it is below the setting of the pressure limitation screw-in cartridge valve type DB 20 K.

**Pump safety block "DBAE(E)" and "DBAEA"** for variable displacement pumps type A10V.. (with proportional pressure relief valve)

In general, the function corresponds to type DBA...  
 By means of the proportional pressure relief valve type DBET(E)(A)-6X/.Y... (17), a pressure change is achieved at the control port X. The pressure change acts on the controller of the pump. The cover plate (4) is not required.

The pressure adjustment at the proportional pressure relief valve type DBET(E)(A) only works if it is below the setting of the pressure limitation screw-in cartridge valve type DB 20 K.

At type DBAEA, pump control is pressure-controlled. This way, linear and stable behavior as well as increased accuracy of pump adjustment can be achieved.



- 1) Illustration rotated by 90°
- 2) Port X is illustrated with an offset of 90°.
- 3) Port Y must be connected to the tank in a depressurized way (possibly by means of the drain line of the hydraulic system).

**Technical data**

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

General								
Size	NG	16		25		32		
Type of connection	Flange connection							
Porting pattern	▶ Version "F"	ISO 6162-1						
	▶ Version "H"	ISO 6162-2						
Weight	Version	"F"	"H"	"F"	"H"	"F"	"H"	
	▶ Pump safety block							
	– Type DBA...	kg	5.4	5.4	5.4	5.3	5.4	6.0
	– Type DBAW...	kg	6.1	6.1	6.1	6.0	6.1	6.7
	– Type DBAW...Z...	kg	7.9	7.9	7.9	7.8	7.9	8.5
	– Type DBAW...ZZ...	kg	8.1	8.1	8.1	8.0	8.1	8.7
	– Type DBAE...	kg	6.4	6.4	6.4	6.3	6.4	7.0
– Type DBAEE..., DBAEA...	kg	7.0	7.0	7.0	6.9	7.0	7.6	
▶ Pressure switch	– Type HED 8...	kg	+0.8					
Installation position	Any							
Ambient temperature range	▶ Type DBA...	°C	-20 ... +80 (NBR seals) -15 ... +80 (FKM seals)					
	▶ Type DBAW...	°C	-20 ... +50 (NBR seals) -15 ... +50 (FKM seals)					
	▶ Type DBAE...	°C	-20 ... +70 (NBR seals) -15 ... +70 (FKM seals)					
	▶ Type DBAEE..., DBAEA...	°C	-20 ... +60 (NBR seals) -15 ... +60 (FKM seals)					
Conformity	▶ CE according to Low-Voltage Directive 2014/35/EU <sup>1)</sup> , 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" <sup>1)</sup> , tested according to	EN 61000-6-2 and EN 61000-6-3 (classified as component)						

1) Type DBAW with nominal voltages &gt;50 VAC or &gt;75 VDC.

**Technical data**

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

Hydraulic					
Size	NG	16	25	32	
Maximum operating pressure	► Port P	bar	350		
Maximum counter pressure	– Type DBA...	bar	250		
	► Port T	– Type DBAW...	bar	210 with DC solenoids (180 for version "=UR") 160 with AC solenoids	
		– Type DBAEA...	bar	30 <sup>2)</sup>	
	► Port Y	– Type DBAE(E)...	bar	Depressurized to the tank	
Hydraulic fluid			See table page 15		
Hydraulic fluid temperature range		°C	–20 ... +80 (NBR seals) –15 ... +80 (FKM seals)		
Viscosity range	► Type DBA(W)...	mm <sup>2</sup> /s	10 ... 800		
	► Type DBAE(E)(A)...	mm <sup>2</sup> /s	20 ... 380, preferably 30 ... 46		
Maximum admissible degree of contamination of the hydraulic fluid; cleanliness class according to ISO 4406 (c)			Class 20/18/15 <sup>3)</sup>		
Maximum flow		l/min	300	400	400
Minimum set pressure		bar	Flow-dependent (see characteristic curves page 17)		
Maximum set pressure		bar	50; 100; 200; 250; 315; 350		

<sup>2)</sup> Tank preloading (30 bar) to be added to the minimum set pressure. A short-time, static pressure of 300 bar is admissible.

<sup>3)</sup> The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the life cycle of the components.

**For more technical data refer to the data sheets:**

Directional spool valve	23178
Pressure relief valve (sandwich plate)	25751
Pressure relief valve (screw-in cartridge valve)	25818
Proportional pressure relief valve	29162, 29262
Pressure switch	50061

Deviating technical data for type-examination tested safety valves can be found on page 29.

## 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 <sup>1)</sup>	NBR, FKM	DIN 51524	90220
Bio-degradable	▶ Insoluble in water	HETG <sup>1)</sup> HEES	FKM	90221
	▶ Soluble in water	HEPG <sup>1)</sup>	FKM	
Flame-resistant	▶ Water-free	HFDU (glycol base)	FKM	90222
		HFDU (ester base)	FKM	
		HFDR <sup>1)</sup>	FKM	
	▶ Containing water	HFC (Fuchs: Hydrotherm 46M, Renosafe 500; Petrofer: Ultra Safe 620; Houghton: Safe 620; Union: Carbide HP5046)	NBR	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, the command value profile is to be adjusted for proportional and high-response valves.
- 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.

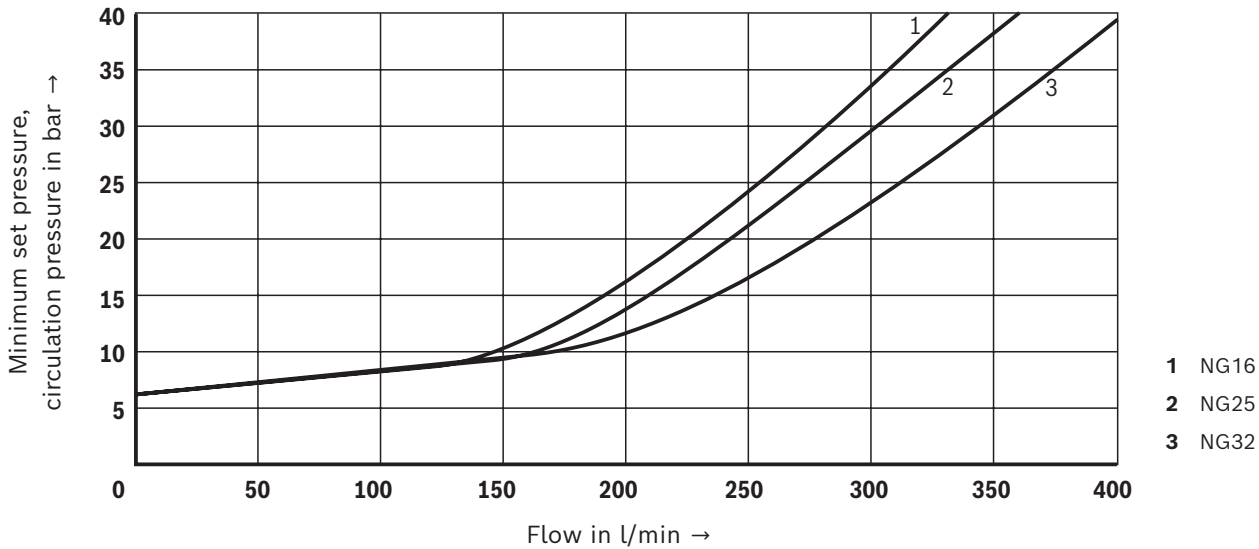
<sup>1)</sup> Not version "DBAE(E)" and "DBAEA"

## Characteristic curves

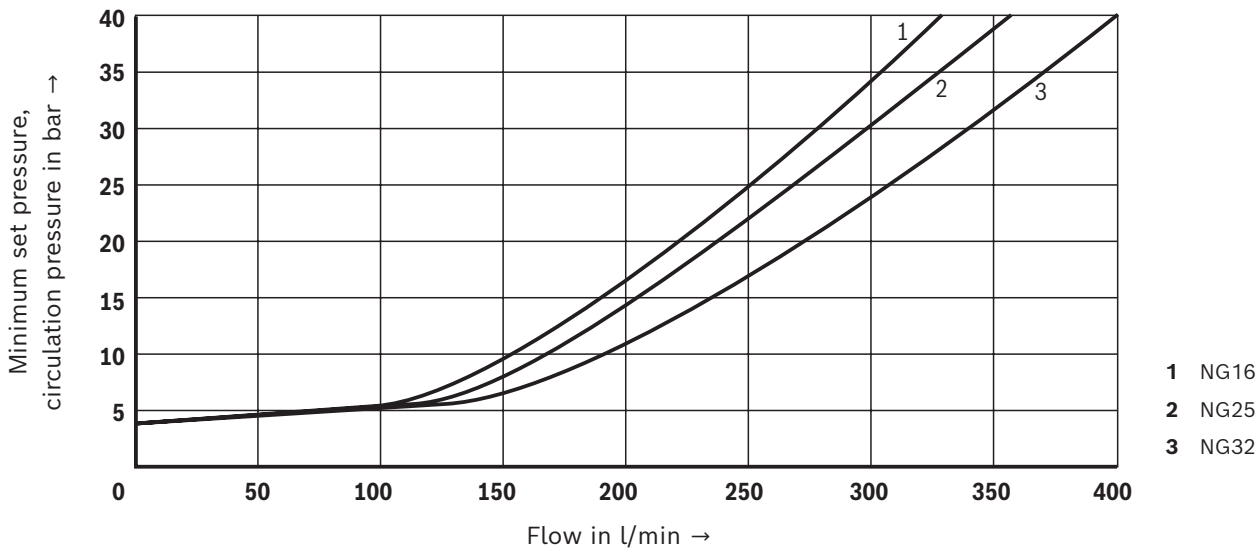
(measured with HLP46,  $\vartheta_{oil} = 40 \pm 5 \text{ } ^\circ\text{C}$ )

### Minimum set pressure and circulation pressure dependent on the flow

#### Standard version



#### Version "U"



#### Notice:

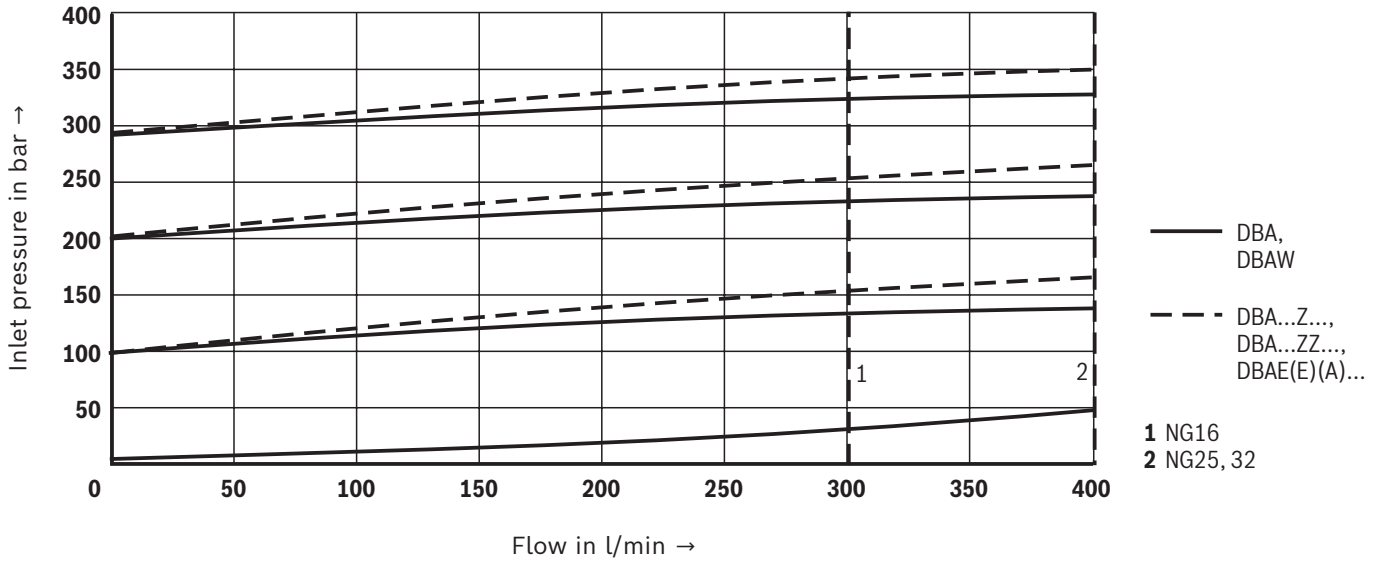
- ▶ The characteristic curves were measured with **internal pilot oil return**. With internal pilot oil return, the inlet pressure increases by the output pressure present in port T.
- ▶ The characteristic curves apply for output pressure  $p_T = 0$  bar in the entire flow range.
- ▶ Typical characteristic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



### Characteristic curves

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

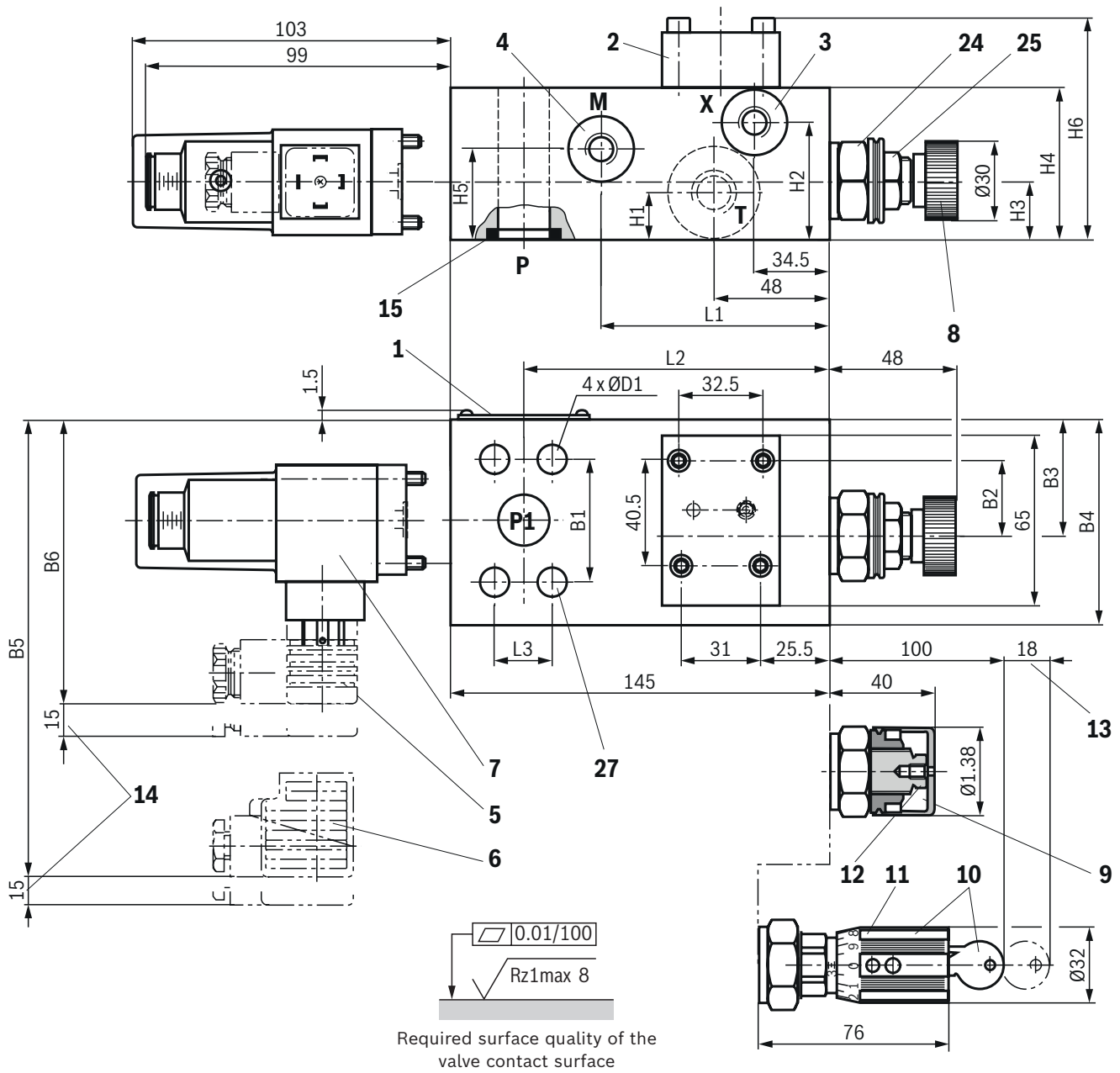
#### Inlet pressure dependent on the flow



**Notice:**

- ▶ The characteristic curves were measured with **internal pilot oil return**. With internal pilot oil return, 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.

**Dimensions:** type DBA...  
(dimensions in mm)



**Standard flanges type DBA...F...**

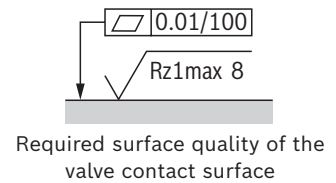
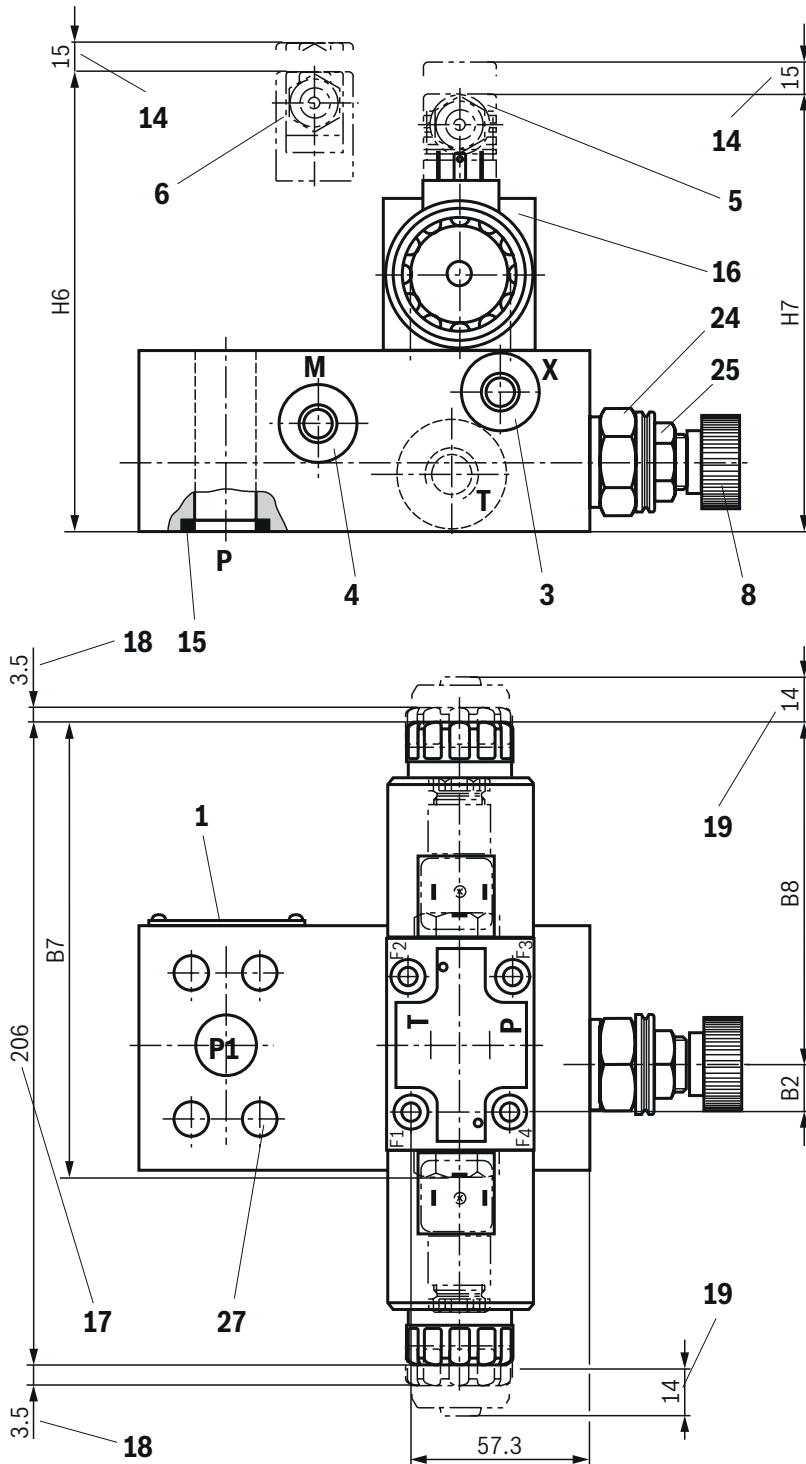
NG	L1	L2	L3	B1	B2	B3	B4	B5	B6	H1	H2	H3	H4	H5	H6	ØD1
16	88	117	22.2	47.6	28.5	45	80	110	105	24	47	22	60	37	85	11
25	88	115.5	26.2	52.4	28.5	45	80	110	105	24	47	22	60	37	85	11
32	108.5	108.5	30.2	58.7	30.5	47	80	110	105	29.5	47	20	64	41	89	11.5

**High-pressure flanges type DBA...H...**

NG	L1	L2	L3	B1	B2	B3	B4	B5	B6	H1	H2	H3	H4	H5	H6	ØD1
16	88	117	23.8	50.8	28.5	45	80	110	105	24	47	22	60	37	85	11
25	84	115.5	27.8	57.2	28.5	45	80	110	105	24	47	22	60	37	85	13
32	108.5	108.5	31.8	66.7	26	52	90	115	110	29.5	50	20	64	41	89	15

Item explanations can be found on page 25.

**Dimensions:** type DBAW...  
(dimensions in mm)



**Item explanations** can be found on page 25, **dimensions** for pump safety block, pressure switch type HED 8 and further adjustment types can be found on page 18.

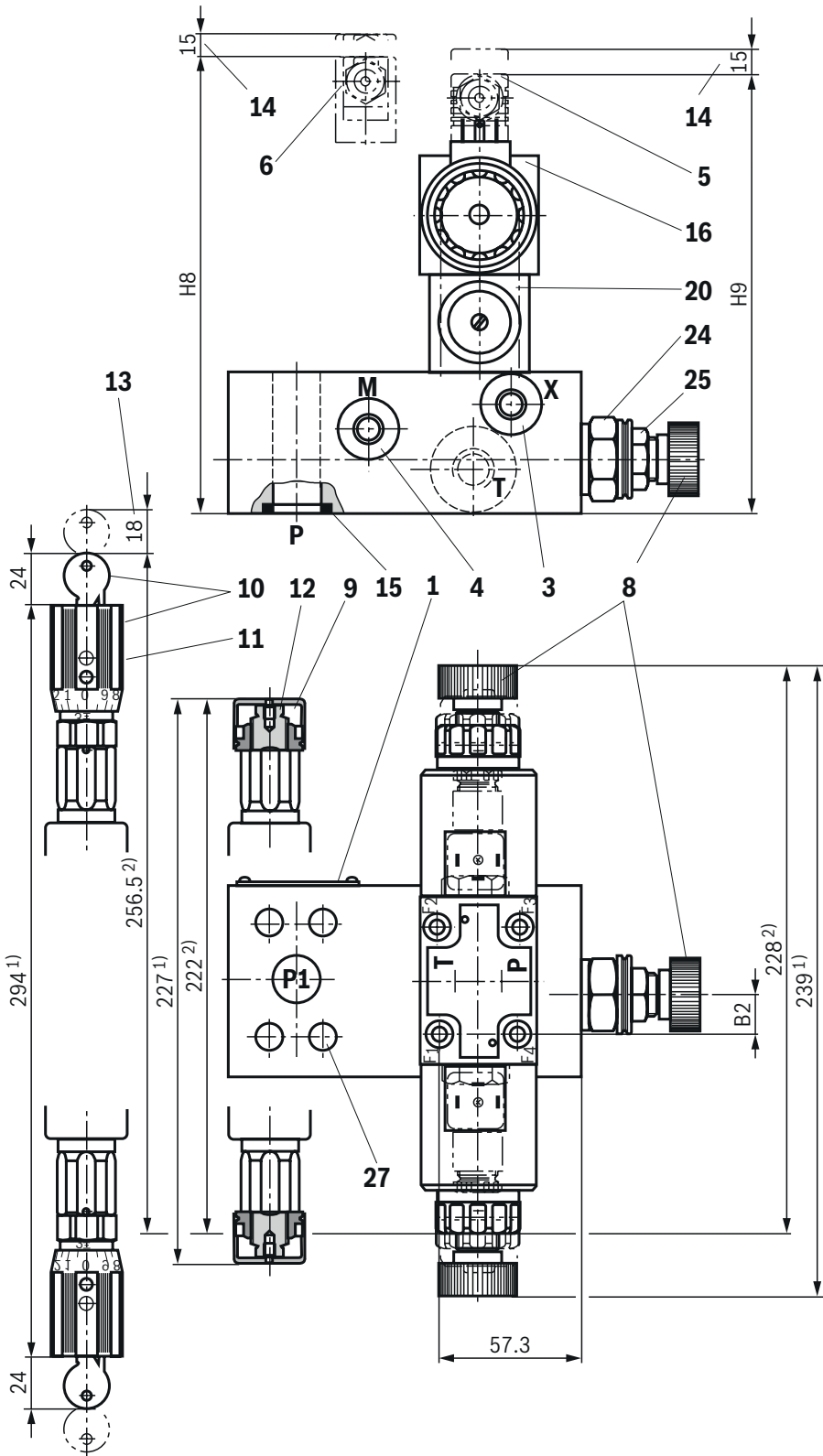
**Standard flanges** type DBAW...F...

NG	B2	B7	B8	H6	H7
16	12	144.5	109.5	159	153
25	12	144.5	109.5	159	153
32	10	144.5	111.5	159	153

**High-pressure flanges** type DBAW...H...

NG	B2	B7	B8	H6	H7
16	12	144.5	109.5	159	153
25	12	144.5	109.5	159	153
32	14.5	145	107	163	157

**Dimensions:** type DBAW...Z...  
(dimensions in mm)



Required surface quality of the valve contact surface

**Item explanations** can be found on page 25, **dimensions** for pump safety block, pressure switch type HED 8 and other adjustment types can be found on page 18, **dimensions** for directional spool valves type WE can be found on page 19.

- 1) Version "ZZ"
- 2) Version "Z"

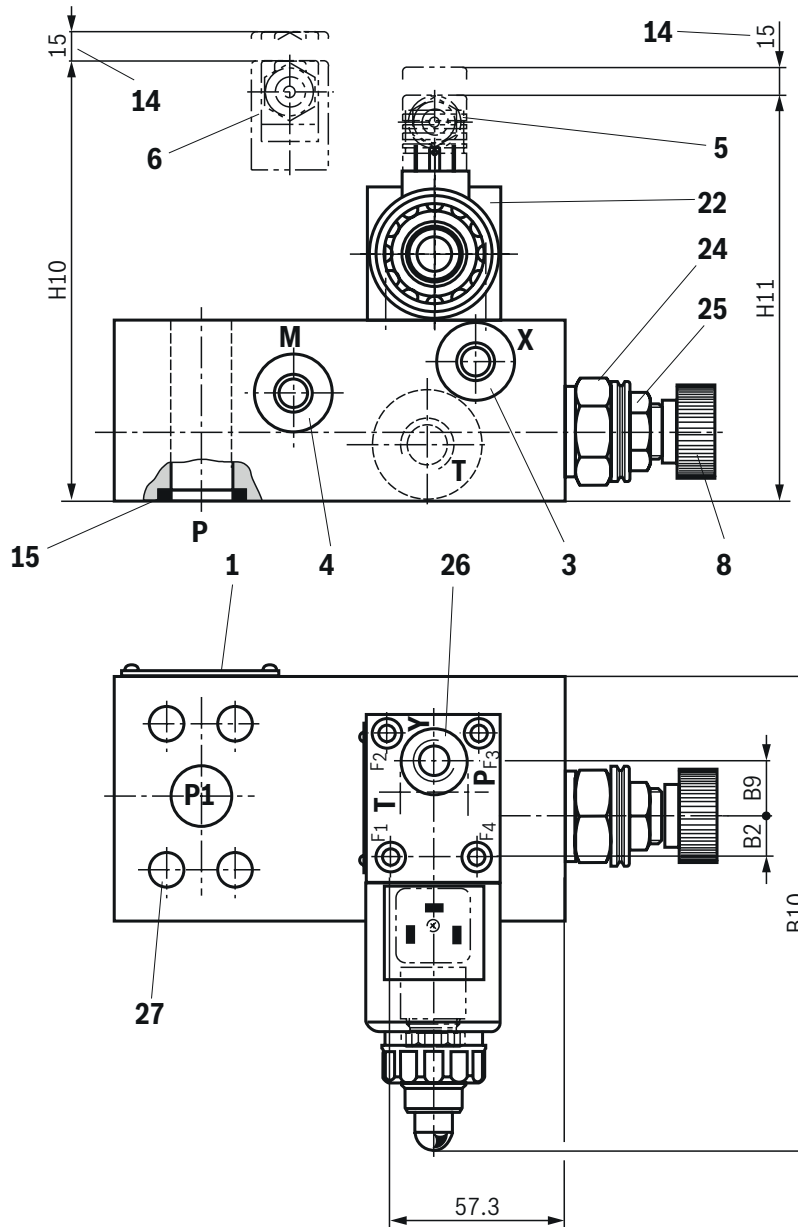
**Standard flanges type DBAW..F...Z...**

NG	B2	H8	H9
16	12	199	193
25	12	199	193
32	10	199	193

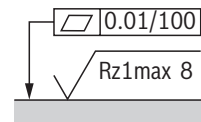
**High-pressure flanges type DBAW..H...Z...**

NG	B2	H8	H9
16	12	199	193
25	12	199	193
32	14.5	203	197

**Dimensions:** type DBAE...  
(dimensions in mm)



**Item explanations** can be found on page 25,  
**dimensions** for pump safety block, pressure switch  
type HED 8 and further adjustment types can be found  
on page 18.



Required surface quality of the  
valve contact surface

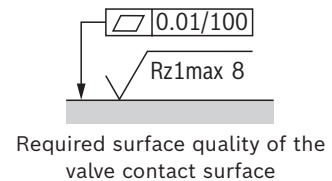
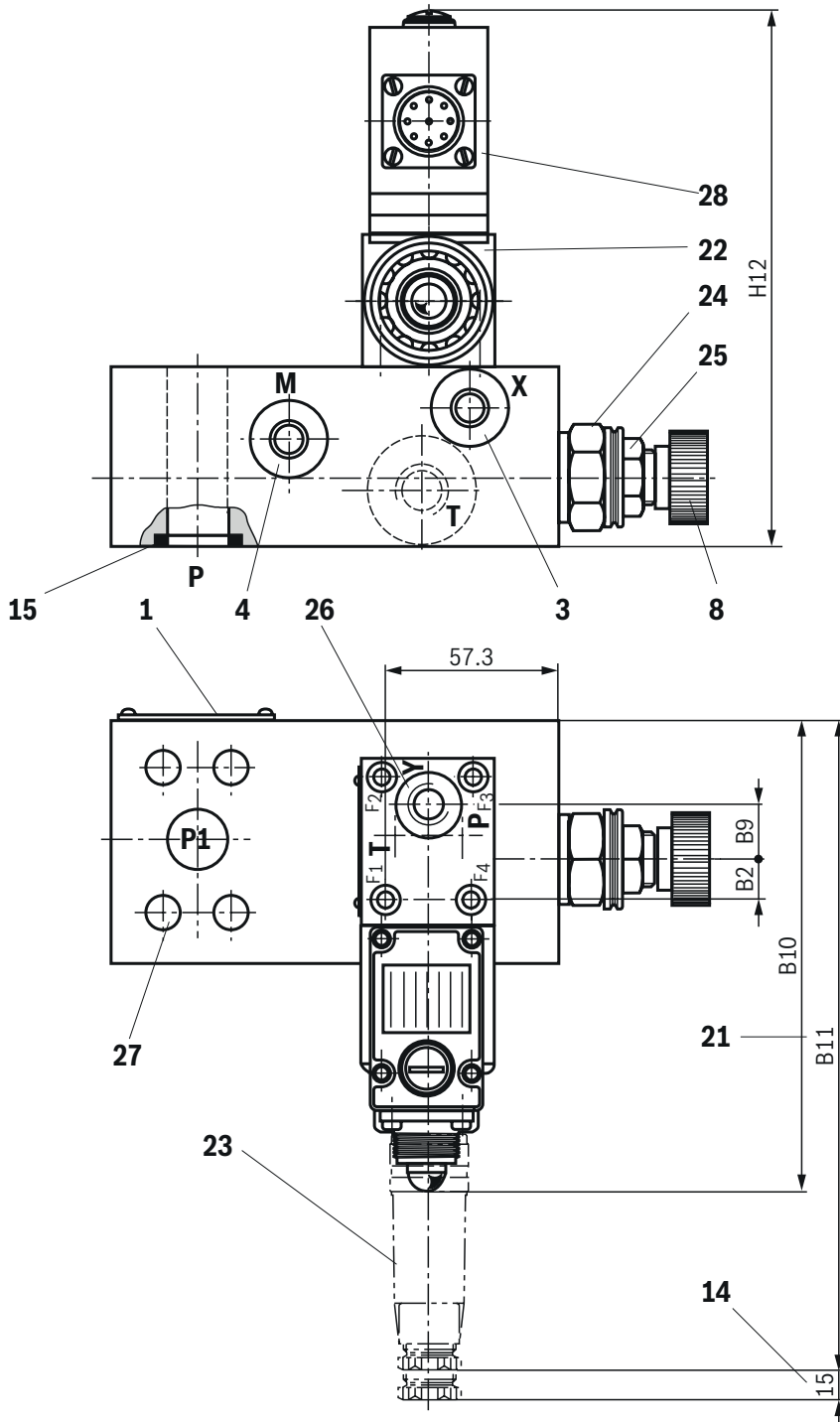
**Standard flanges** type DBAE(E)...F

NG	B2	B9	B10	H10	H11
16	12	18.8	158	161	155
25	12	18.8	158	161	155
32	10	20.8	158	161	155

**High-pressure flanges** type DBAE(E)...H

NG	B2	B9	B10	H10	H11
16	12	18.8	158	161	155
25	12	18.8	158	161	155
32	14.5	16.3	169	166	160

**Dimensions:** type DBAEE...  
(dimensions in mm)



**Item explanations** can be found on page 25, **dimensions** for pump safety block, pressure switch type HED 8 and further adjustment types can be found on page 18.

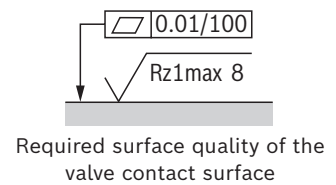
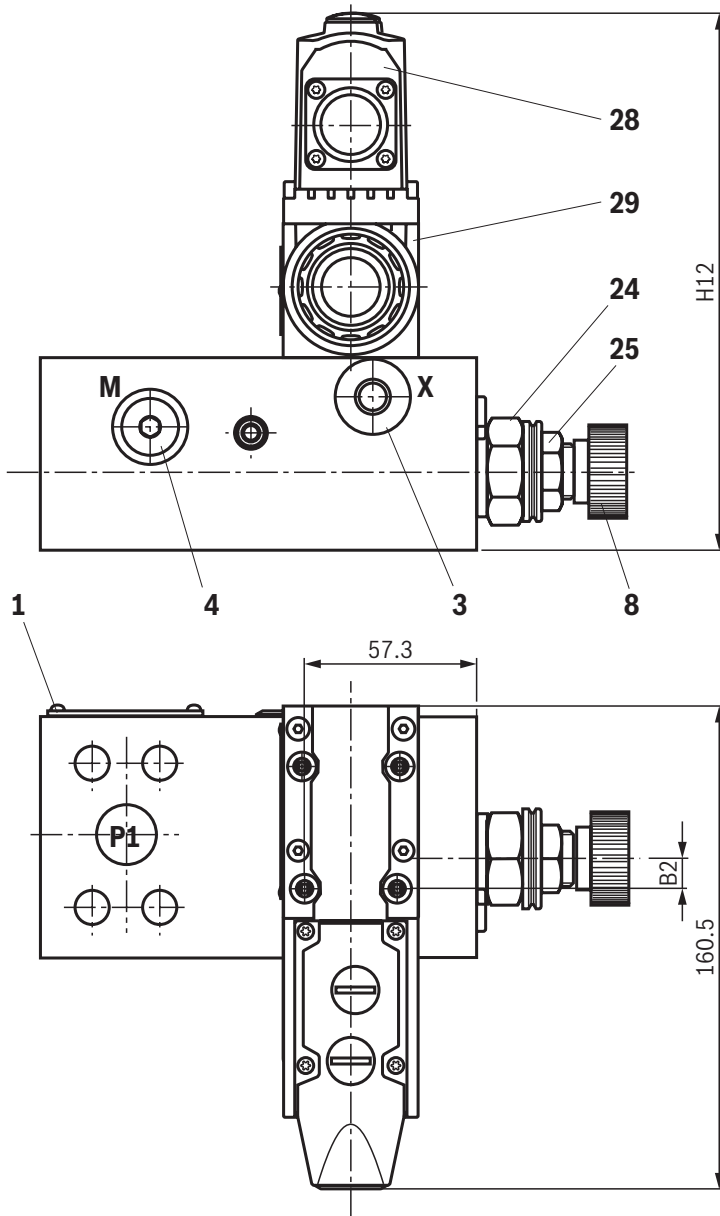
**Standard flanges type DBAE(E)...F**

NG	B2	B9	B10	B11	H12
16	12	18.8	158	225	175
25	12	18.8	158	225	175
32	10	20.8	158	225	175

**High-pressure flanges type DBAE(E)...H**

NG	B2	B9	B10	B11	H12
16	12	18.8	158	225	175
25	12	18.8	158	225	175
32	14.5	16.3	169	235	179

**Dimensions:** type DBAEA...  
(dimensions in mm)



**Item explanations** can be found on page 25, **dimensions** for pump safety block, pressure switch type HED 8 and further adjustment types can be found on page 18.

**Standard flanges** type DBAEA...F

NG	B2	H12
16	12	174.5
25	12	174.5
32	10	174.5

**High-pressure flanges** type DBAEA...H

NG	B2	H12
16	12	174.5
25	12	174.5
32	14.5	178.5

## Dimensions

(dimensions in mm)


### Standard flanges, version "DBA...F" according to ISO 6162-1

NG	Line connections			4 hexagon socket head cap screws ISO 4762 - 10.9 <sup>1)</sup>		Tightening torque $M_A$ in Nm <sup>2)</sup>	Admissible pressures (flange connections according to ISO 6162-1)	
	P and P1	T	X, M		Material no.		in psi	in bar
16	SAE 3/4"	G3/4	G1/4	M10 x 95	R913015585	52	5000	350
25	SAE 1"	G1	G1/4	M10 x 95	R913015585	52	4500	315
32	SAE 1 1/4"	G1 1/4	G1/4	M10 x 95	R913015585	52	3600	250

### High-pressure flanges, version "DBA...H" according to ISO 6162-2


NG	Line connections			4 hexagon socket head cap screws ISO 4762 - 10.9 <sup>1)</sup>		Tightening torque $M_A$ in Nm <sup>2)</sup>	Admissible pressures (flange connections according to ISO 6162-1)	
	P and P1	T	X, M		Material no.		in psi	in bar
16	SAE 3/4"	G3/4	G1/4	M10 x 95	R913015585	52	5000	350
25	SAE 1"	G1	G1/4	M12 x 105	R913000659	66	5000	350
32	SAE 1 1/4"	G1 1/4	G1/4	M14 x 105	R913000660	113	5000	350

<sup>1)</sup> **Valve mounting screws** (separate order)  
(friction coefficient  $\mu_{\text{total}} = 0.09 \dots 0.14$ )

 **Notice:**

For reasons of stability, exclusively the specified valve mounting screws may be used.

Depending on the operating pressure, flange height and thread depth of the pump plate, other screw lengths may be necessary.

<sup>2)</sup>  **Notice:**

The tightening torques stated are guidelines when using screws with the specified friction coefficients and when using a manual torque wrench (tolerance  $\pm 10\%$ ).



## Dimensions

- 1** Name plate
- 2** Cover plate type HSA 06 A001-3X... (data sheet 48042)
- 3** Port X for variable displacement pump type A10VSO (otherwise closed); G1/4
- 4** Internal hexagon SW6, tightening torque  $M_A = 30$  Nm (For tightening, a manual torque wrench with a tolerance of  $\leq 10\%$  must be used.)
- 5** Mating connector without circuitry (separate order, see data sheet 08006)
- 6** Mating connector with circuitry (separate order, see data sheet 08006)
- 7** Pressure switch type HED 8 OH... (data sheet 50061)
- 8** Adjustment type "1" <sup>1)</sup>
- 9** Adjustment type "2" <sup>1)</sup>
- 10** Adjustment type "3" <sup>1)</sup>
- 11** Adjustment type "7" <sup>1)</sup>
- 12** Hexagon SW10
- 13** Space required to remove the key
- 14** Space required for removing the mating connector
- 15** Seal ring
- 16** Directional spool valve type WE 6 (data sheet 23178)
- 17** Dimensions for solenoid **with concealed** manual override "**N9**" (standard) – The manual override can only be operated up to approx. 50 bar tank pressure. Avoid damage to the bore of the manual override. (Special tool for the operation, separate order, material no. **R900024943**)
- 18** Dimensions for valve with manual override "N"
- 19** Dimensions for valve without manual override
- 20** Pressure relief valve (sandwich plate) type Z(2)DB 6... (data sheet 25751)
- 21** Dimensions for valve with on-board electronics type DBAEE...
- 22** Proportional pressure relief valve type DBET(E)-6X.Y... (data sheet 29162)
- 23** Mating connector for type DBAEE according to EN 175201-804 (separate order, material no. **R90021267**)
- 24** Pressure relief valve type DB 20 K...XY... (data sheet 25818)
- 25** Lock nut SW22, tightening torque  $M_A = 10 \pm 5$  Nm
- 26** Port Y (G1/4) must be connected to the tank in a depressurized way (possibly by means of the leakage line L of the hydraulic system)
- 27** Valve mounting bores
- 28** On-board electronics (OBE)
- 29** Proportional pressure relief valve type DBETA-6X... (data sheet 29262)

<sup>1)</sup> **Type DBAW...Z:**  
Identical adjustment types for pressure limitation screw-in cartridge valve type DB 20 K and pressure relief valve type Z(2)DB 6.

**Admissible pumps:** standard flange "F"

Pump safety block			NG16	NG25	NG32
	Port P	Data sheet	SAE 3/4"	SAE 1"	SAE 1 1/4"
Pump type	► <b>Variable displacement pump</b>				
	Type A10VO, series 31	92701	A10VO28 -	A10VO45 A10VO71	- -
	Type A10VO, series 5X	92703	A10VO28 -	A10VO45 A10VO60	- -
	Type A10VSO, series 31	92711	A10VO28 - AV10SO18	A10VSO45 A10VSO71 -	- - -
	Type A10VSO, series 32	92714	-	A10VSO71	-
	► <b>Internal gear pump</b>				
	Type PGF3, component series 3X <sup>1)</sup>	10213	PGF3-3X/020 PGF3-3X/025 PGF3-3X/032 PGF3-3X/040	- - - -	- - - -
	Type PGP3, component series 3X <sup>1)</sup>	10231	PGP3-3X/032	-	-
	► <b>Vane pump</b> <sup>2)</sup>				
Type PV7, component series 1X	10515	- -	- -	PV7-1X/63-71 PV7-1X/63-94	

<sup>1)</sup> When using the pump in combination with a SAE flange as pressure connection, the ordering code of the pump contains "..07..".

<sup>2)</sup> Depending on the drive motor, a distance plate is required, e.g. height = 23 mm, material no. **R900058716**, or alternatively a 90° plate: height = 40 mm, material no. **R900241813**

## Admissible pumps: high-pressure flange "H"

Pump safety block		NG16	NG25	NG32	
Port P	Data sheet	SAE 3/4"	SAE 1"	SAE 1 1/4"	
Pump type	► <b>Displacement pump</b>				
	Type A2FO, series 6	91401	A2FO45 A2FO56 A2FO63 – –	A2FO80 A2FO90 A2FO107 – –	A2FO125 A2FO160 A2FO180 A2FO200 A2FO250
	Type A4FO, series 1	91455	–	A4FO71	–
	Type A4FO, series 3	91455	A4FO16 A4FO22 A4FO40	– –	A4FO125 –
	► <b>Variable displacement pump</b>				
	Type A4VSO, series 1	92050	A4VSO40	A4VSO71	–
	Type A4VSO, series 3	92050	– –	– –	A4VSO125 A4VSO180
	Type A11VO, series 1	92500	A11VO40 A11VO60 –	A11VO75 A11VO95 A11VO130 <sup>3)</sup> A11VO145 <sup>3)</sup>	A11VLO130 <sup>2)</sup> A11VLO145 <sup>2)</sup> – –
	Type A10VSO, series 31	92711	–	–	A10VSO100
	Type A10VSO, series 32	92714	–	–	A10VSO140
	Type A10VO, series 31	92701	– –	– –	A10VO100 A10VO140
	Type A10VO, series 5X <sup>1)</sup>	92703	–	–	A10VO85
	Type A7VO, series 6 <sup>1)</sup>	92202	A7VO28 A7VO55	A7VO80 A7VO107	A7VO160 –
	Type A7VO, series 6 <sup>1)</sup>	92203	–	–	A7VO250
	► <b>Adjustable double pump</b>				
	Type A8VO, series 6X	93010	A8VO55 – –	A8VO80 A8VO107 A8VO140	A8VO200 – –
	► <b>Internal gear pump</b>				
	Type PGH4, PGH5, component series 2X	10223	PGH4-2X/020 PGH4-2X/025 PGH4-2X/032 PGH4-2X/040	PGH4-2X/050 PGH5-2X/063 – –	PGH5-2X/080 PGH5-2X/100 PGH5-2X/125 –
	Type PGH4, PGH5, component series 3X	10227	PGH4-3X/020 PGH4-3X/025 –	PGH4-3X/032 PGH4-3X/040 PGH4-3X/050	PGH5-3X/063 PGH5-3X/080 –

<sup>1)</sup> A direct pressure switch attachment opposite of the pressure limitation screw-in cartridge valve type DB 20 K is not possible.

<sup>2)</sup> With charging pump

<sup>3)</sup> Without charging pump

**Ordering code:** type-examination tested safety valves, version "DBA...E", component series 2X according to Pressure Equipment Directive 2014/68/EU

NG	Type designation	Component marking								
16	DBA 15 <table style="display: inline-table; border: none;"><tr><td style="border: 1px solid black; width: 20px; height: 20px;"></td><td style="border: 1px solid black; width: 20px; height: 20px;"></td><td style="border: 1px solid black; width: 20px; height: 20px;"></td></tr></table> 2X/ <table style="display: inline-table; border: none;"><tr><td style="border: 1px solid black; width: 20px; height: 20px;"></td><td style="border: 1px solid black; width: 20px; height: 20px;"></td><td style="border: 1px solid black; width: 20px; height: 20px;"></td></tr></table> E							TÜV.SV. <table style="display: inline-table; border: none;"><tr><td style="border: 1px solid black; width: 20px; height: 20px;"></td></tr></table> -1001.14,4.F.G.p		
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25	DBA 25 <table style="display: inline-table; border: none;"><tr><td style="border: 1px solid black; width: 20px; height: 20px;"></td><td style="border: 1px solid black; width: 20px; height: 20px;"></td><td style="border: 1px solid black; width: 20px; height: 20px;"></td></tr></table> 2X/ <table style="display: inline-table; border: none;"><tr><td style="border: 1px solid black; width: 20px; height: 20px;"></td><td style="border: 1px solid black; width: 20px; height: 20px;"></td><td style="border: 1px solid black; width: 20px; height: 20px;"></td></tr></table> E							TÜV.SV. <table style="display: inline-table; border: none;"><tr><td style="border: 1px solid black; width: 20px; height: 20px;"></td></tr></table> -1001.14,4.F.G.p		
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1	Directional valve, normally closed	<b>A</b>
	Directional valve, normally open	<b>B</b>

2	Standard flange (250 bar)	<b>F</b>
	High-pressure flange (350 bar)	<b>H</b>

**Adjustment type for pressure adjustment**

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

4	With mounted pressure switch type HED 8 OH ... (without mating connector)	<b>D</b>
	Without pressure switch	<b>-</b>

**Pressure**

5	To be entered by the customer, e.g. pressure adjustment ≥ 30 bar and in 5 bar steps possible	e.g. <b>150</b>
---	--	-----------------

**2nd/3rd pressure limiting function**

(see circuit example on page 6 ... 8)

6	Without additional pressure relief valve	<b>no code</b>
	With mounted pressure relief valve type ZDB 6 VB...-4X/..SO2 (data sheet 25751)	<b>Z<sup>1)</sup></b>
	With mounted pressure relief valve type Z2DB 6 VC...-4X/..SO2 (data sheet 25751)	<b>ZZ<sup>1)</sup></b>
	Versions DBAW...Z(Z)E and DBAE(E)...E are only available with ordering code "A00", "A08" or "A10"	

**Electrical specifications**

*	See page 2 and 3.	e.g. <b>EG24N9K4</b>
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**Seal material**

7	NBR seals	<b>no code</b>
	FKM seals	<b>V</b>

	Value entered at the factory	
--	------------------------------	--

<sup>1)</sup> In combination with pressure rating "350", the maximum pressure at the port X = 315 bar.

**Important safety instructions can be found on page 30.**

**Deviating technical data:** type-examination tested safety valves, version "DBA...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	
Hydraulic fluid	See table below
Hydraulic fluid temperature range (= TS)	°C -10 ... +80
Viscosity range	mm <sup>2</sup> /s 12 ... 230
Maximum flow (with pilot oil return)	See table below and diagrams on page 31 and 32
Set response pressure	See table below

Hydraulic fluid	Classification	Suitable sealing materials	Standards	Data sheet
Mineral oils	HL, HLP	FKM	DIN 51524	90220
Flame-resistant	▶ Water-free	HFDU (glycol base)	ISO 12922	90222
		HFDU (ester base)		
	▶ Containing water	HFC (Fuchs: Hydrotherm 46M, Renosafe 500; Petrofer: Ultra Safe 620; Houghton: Safe 620; Union: Carbide HP5046)	ISO 12922	90223



**Important information on hydraulic fluids:**

- ▶ 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 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.

Size	Maximum flow $q_{V \max}$ in l/min		Set response pressure $p_A$ in bar
	HL, HLP	HFDU, HFC	
16	60	50	30 ... 60
	100	90	61 ... 110
	150	135	111 ... 210
	200	180	211 ... 315
	250	225	316 ... 350
25, 32	70	60	30 ... 60
	100	90	61 ... 110
	150	135	111 ... 210
	200	180	211 ... 315
	300	270	316 ... 350

## Safety instructions: Type-examination tested safety valves, version "DBA...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  $q_{V \max}$**  must be larger than the maximum possible flow of the system to be secured.  
In this respect, the applicable regulations must be observed.
- ▶ 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).
- ▶ The maximum flow stated in the component marking  **$q_{V \max}$**  (= numerical value instead of the character "G" in the component marking, see page 28) must not be exceeded.
- ▶ Discharge lines of safety valves must end in a risk-free manner. The accumulation of fluids in the discharge lines must **not** be possible.
- ▶ 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.
- ▶ Options DBAE/DBAEE or 2nd/3rd pressure limiting function (  6 ) are only possible for pressure relief valves for variable displacement pumps (also see page 3).
- ▶ The relief function (DBAW../DBAE../DBAEE..) must not be used for safety functions.
- ▶ Possible relief 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.

### **Application notes must always be observed**

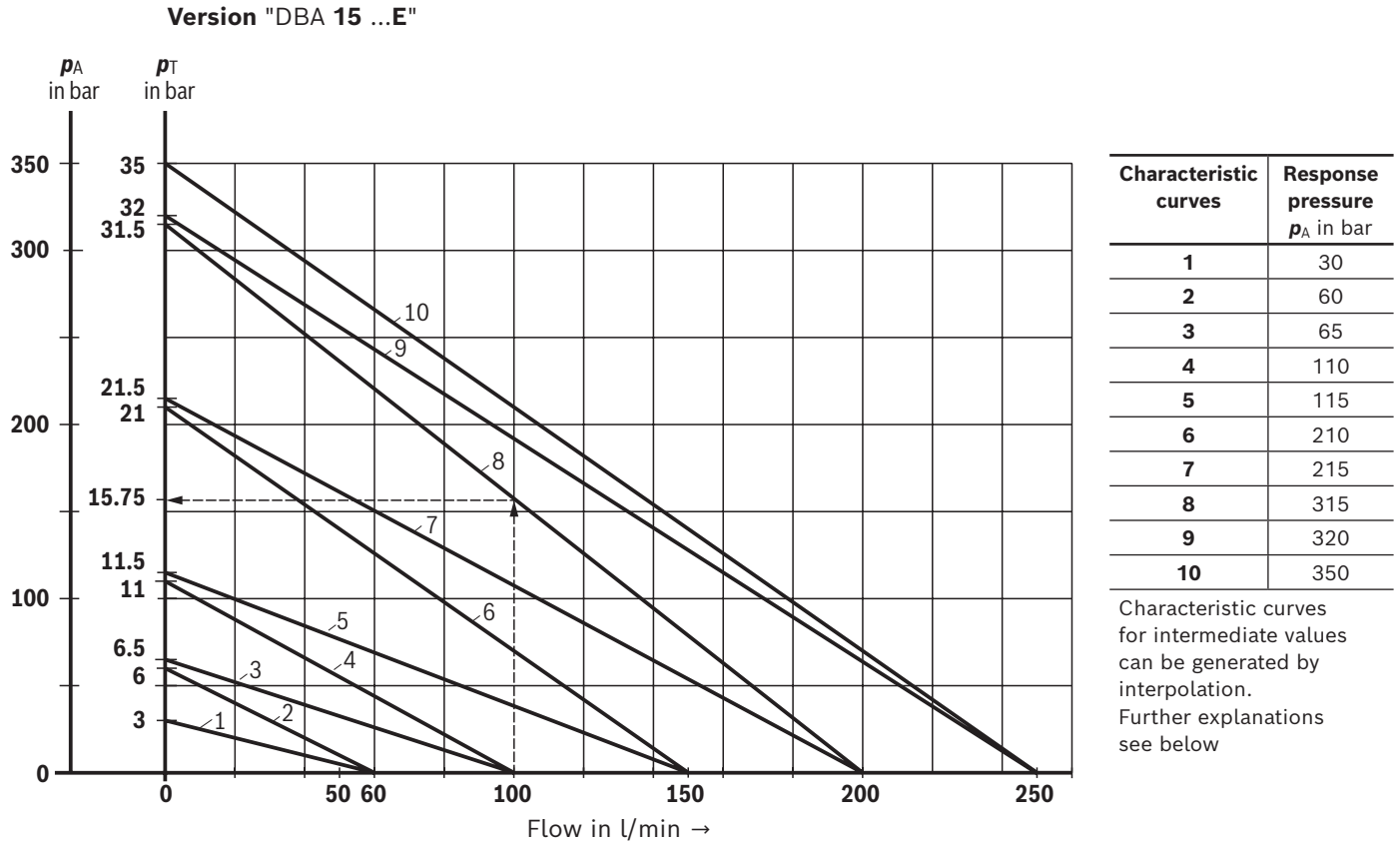
- ▶ In the plant, the response pressure specified in the component marking is set with a flow of 11 l/min.
- ▶ The maximum admissible flow stated in the component marking applies for applications without counter pressure in the discharge line (port T).

### **Notice:**

The system pressure increases by the counter pressure in the discharge line (port T) with increasing flow (observe the AD 2000 data sheet A 2, point 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 according to the counter pressure in the discharge line (port T) (see following diagrams on pages 31 and 32).

### 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  $p_A$ .



- $p_A$  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 AD 2000 data sheet A 2)  
 $p_{T \max} = 10\% \times p_A$  (with  $q_V = 0$  l/min) according to PED 2014/68/EU
- $q_{V \max}$  Maximum flow in l/min

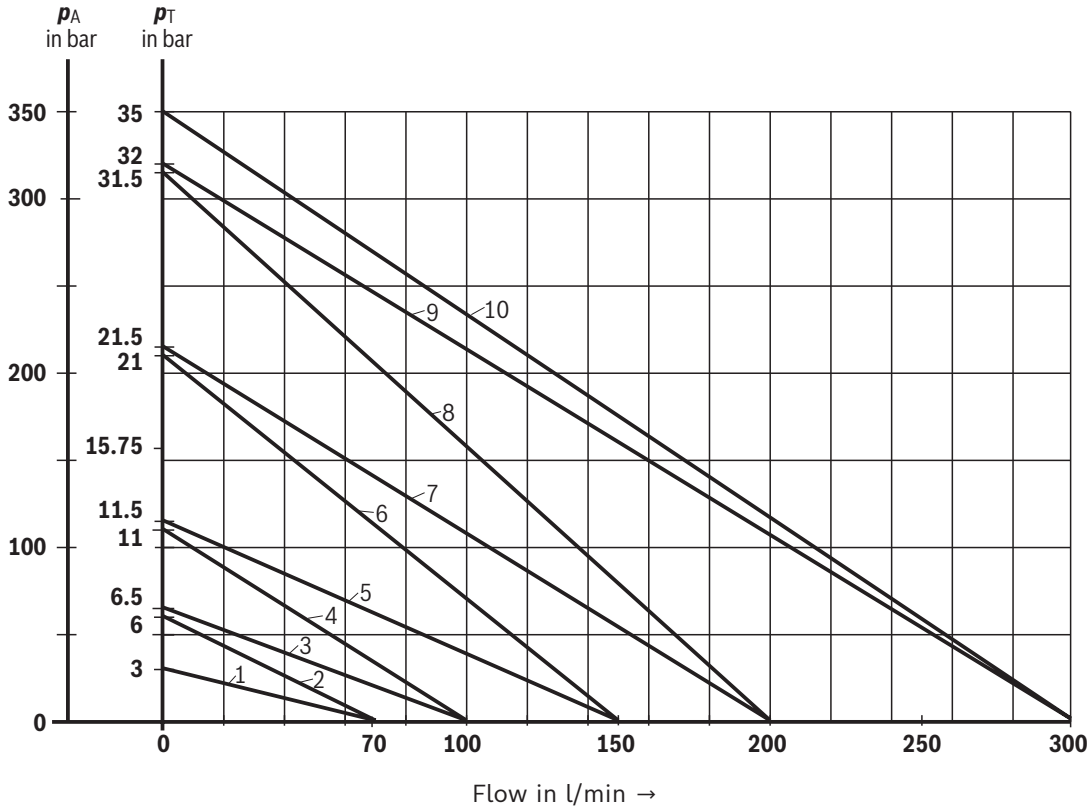
**Explanation of the diagrams** (example: type DBA 15...E):

- known: Flow of the system/accumulator that has to be secured  $q_{V \max} = 100$  l/min  
Set response pressure of the safety valve  $p_A = 315$  bar
- unknown:  $p_{T \text{ admissible}}$
- Solution:** See arrows in diagram above  
 $p_{T \text{ admissible}} (100 \text{ l/min}; 315 \text{ bar}) = 15.75 \text{ bar}$

**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 "DBA 25 ...E" and "DBA 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	315
9	320
10	350

Characteristic curves for intermediate values can be generated by interpolation. Further explanations can be found on page 31.

- $p_A$  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 AD 2000 data sheet A 2)  
 $p_{T \max} = 10\% \times p_A$  (with  $q_V = 0$  l/min) according to PED 2014/68/EU
- $q_{V \max}$  Maximum flow in l/min



## Project planning information

- ▶ With versions "DBAW.B" and "DBAE/DBAEE/DBAEA", the lowest adjustable pressure (circulation pressure) is set at the pressure relief valve in case of a power failure or cable break. With version "DBAW..A", the pressure limiting function is activated.
- ▶ The relief function (DBAW/DBAE/DBAEE/DBAEA) must not be used for safety functions.

## Further information

- |  |  |
|--|--|
| ▶ Directional spool valve  | Data sheet 23178   |
| ▶ Proportional pressure relief valve type DBET(E)                            | Data sheet 29162   |
| ▶ Proportional pressure relief valve type DBETA                              | Data sheet 29262   |
| ▶ Pressure switch type HED 8 OH...   | Data sheet 50061   |
| ▶ Pressure relief valve type Z(2)DB...                                       | Data sheet 25751   |
| ▶ Pressure relief valve type DB 20 K...                                      | Data sheet 25818   |
| ▶ 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   |
| ▶ Hydraulic valves for industrial applications                               | Operating instructions 07600-B   |
| ▶ Information on available spare parts                                       | <a href="http://www.boschrexroth.com/spc">www.boschrexroth.com/spc</a> |

## Notes

## Notes

## Notes

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