

RE 25 402/02.03

Replaces: 06.02

Material No.: 00772631b**Pressure relief valve,
direct operated
Type DBD**

Nominal sizes 6 to 30

Series 1X

Maximum operating pressure 630 bar

Maximum flow 330 L/min



H5585

Type DBD...1X/...

Overview of contents

Contents	Page
Features	1
Ordering details	2
Preferred types	3 and 4
Function, section, symbol	4
Technical data	5
Characteristic curves	6
Unit dimensions	7 to 10
Design tested pressure relief valves	10 to 14

Features

- As cartridge valve (cartridge)
- For threaded connections
- For manifold mounting
- 3 pressure adjustment elements, optional:
 - Set screw with hexagon and protective cap
 - Rotary knob / hand wheel
 - Lockable rotary knob

Note:

Design tested pressure relief valves to directive 97/23/EG
(abbreviated to DGRL in any further text)

Type DBD...E, series 1X.

For ordering details and characteristic curves, see pages 10 to 14.



© 2003
by Bosch Rexroth AG, Industrial Hydraulics, D-97813 Lohr am Main

All rights reserved. No part of this document may be reproduced or stored, processed, duplicated or circulated using electronic systems, in any form or by means, without the prior written authorisation of Bosch Rexroth AG. In the event of contravention of the above provisions, the contravening party is obliged to pay compensation.

Ordering details

DBD				1X/			*
-----	--	--	--	-----	--	--	---

Pressure relief valve, direct operated

Adjustment element	Nominal size							
	6	8	10	15	20	25	30	
Set screw with hexagon and protective cap	●	●	●	●	●	●	●	= S
Rotary knob ¹⁾	●	●	●	●	●	–	–	= H
Hand wheel ²⁾	–	–	–	–	–	●	●	= H
Lockable rotary knob ^{1, 3)}	●	●	●	●	●	–	–	= A

¹⁾ With nominal sizes 15 and 20 only available for pressure stages 25, 50 or 100 bar.

²⁾ Only available for pressure stages 25, 50 or 100 bar.

³⁾ Key with Material No. **R900008158** is included within the scope of supply.

Nominal size	= 6	= 8	= 10	= 15	= 20	= 25	= 30	E.g.
(connection)	G1/4	G3/8	G1/2	G3/4	G1	G1 1/4	G1 1/2	= 10

Connection type

As cartridge valve (cartridge)	●	–	●	–	●	–	●	= K
For threaded connections	●	●	●	●	●	●	●	= G
For manifold mounting	●	–	●	–	●	–	●	= P

Series 10 to 19

(10 to 19: unchanged installation and connection dimensions)

= 1X

Pressure stage

Pressure setting up to 25 bar	●	●	●	●	●	●	●	= 25
Pressure setting up to 50 bar	●	●	●	●	●	●	●	= 50
Pressure setting up to 100 bar	●	●	●	●	●	●	●	= 100
Pressure setting up to 200 bar	●	●	●	●	●	●	●	= 200
Pressure setting up to 315 bar	●	●	●	●	●	●	●	= 315
Pressure setting up to 400 bar	●	●	●	●	●	–	–	= 400
Pressure setting up to 630 bar	–	–	●	–	–	–	–	= 630

NBR seals

= No code

FKM seals

= V

(other seals on request)

⚠ Attention!

The compatibility of the seals and pressure fluid has to be taken into account!

Design testing

Without design testing

= No code

Safety valve with design testing to DGRL 97/23/EG

= E

Further details in clear text

● = Available

Preferred types (readily available)

Material No.	Type	Material No.	Type
R900423780	DBDA 6 K1X/25	R900432465	DBDA 6 G1X/25
R900425083	DBDA 6 K1X/50	R900424177	DBDA 6 G1X/50
R900425080	DBDA 6 K1X/100	R900425076	DBDA 6 G1X/100
R900425081	DBDA 6 K1X/200	R900426477	DBDA 6 G1X/200
R900425082	DBDA 6 K1X/315	R900426478	DBDA 6 G1X/315
R900428387	DBDA 6 K1X/400	R900428382	DBDA 6 G1X/400
R900427600	DBDH 6 K1X/25	R900426897	DBDH 6 G1X/25
R900424734	DBDH 6 K1X/50	R900424198	DBDH 6 G1X/50
R900424199	DBDH 6 K1X/100	R900424195	DBDH 6 G1X/100
R900424200	DBDH 6 K1X/200	R900424196	DBDH 6 G1X/200
R900424201	DBDH 6 K1X/315	R900424197	DBDH 6 G1X/315
R900424202	DBDH 6 K1X/400	R900424348	DBDH 6 G1X/400
R900420245	DBDS 6 K1X/25	R900430378	DBDH 6 P1X/25
R900423727	DBDS 6 K1X/50	R900428385	DBDH 6 P1X/50
R900423723	DBDS 6 K1X/100	R900424246	DBDH 6 P1X/100
R900423724	DBDS 6 K1X/200	R900427242	DBDH 6 P1X/200
R900423725	DBDS 6 K1X/315	R900424266	DBDH 6 P1X/315
R900423726	DBDS 6 K1X/400	R900434128	DBDH 6 P1X/400
R900430305	DBDA 10 K1X/25	R900423718	DBDS 6 G1X/25
R900425966	DBDA 10 K1X/50	R900423722	DBDS 6 G1X/50
R900425161	DBDA 10 K1X/100	R900423717	DBDS 6 G1X/100
R900425162	DBDA 10 K1X/200	R900423719	DBDS 6 G1X/200
R900425164	DBDA 10 K1X/315	R900423720	DBDS 6 G1X/315
R900425165	DBDA 10 K1X/400	R900423721	DBDS 6 G1X/400
R900426835	DBDA 10 K1X/630	R900429414	DBDS 6 P1X/25
R900435222	DBDH 10 K1X/25	R900423732	DBDS 6 P1X/50
R900424185	DBDH 10 K1X/50	R900423728	DBDS 6 P1X/100
R900423891	DBDH 10 K1X/100	R900423729	DBDS 6 P1X/200
R900424190	DBDH 10 K1X/200	R900423730	DBDS 6 P1X/315
R900424183	DBDH 10 K1X/315	R900423731	DBDS 6 P1X/400
R900424184	DBDH 10 K1X/400	R900424180	DEDH 10 G1X/50
R900433807	DBDH 10 K1X/630	R900424188	DBDH 10 G1X/100
R900420276	DBDS 10 K1X/25	R900424178	DBDH 10 G1X/200
R900424153	DBDS 10 K1X/50	R900424189	DBDH 10 G1X/315
R900424147	DBDS 10 K1X/100	R900423739	DBDH 10 G1X/630
R900424149	DBDS 10 K1X/200	R900426901	DBDH 10 P1X/100
R900424150	DBDS 10 K1X/315	R900424186	DBDH 10 P1X/200
R900424152	DBDS 10 K1X/400	R900424187	DBDH 10 P1X/315
R900427601	DBDS 10 K1X/630	R900423743	DBDS 10 G1X/25
R900423028	DBDH 20 K1X/25	R900424745	DBDS 10 G1X/50
R900424112	DBDH 20 K1X/50	R900424738	DBDS 10 G1X/100
R900424109	DBDH 20 K1X/100	R900424140	DBDS 10 G1X/200
R900422542	DBDS 20 K1X/25	R900424742	DBDS 10 G1X/315
R900424205	DBDS 20 K1X/50	R900424744	DBDS 10 G1X/400
R900424267	DBDS 20 K1X/100	R900426905	DBDS 10 P1X/25
R900424271	DBDS 20 K1X/315	R900424155	DBDS 10 P1X/100
R900424203	DBDS 20 K1X/400	R900424158	DBDS 10 P1X/315
R900445875	DBDH 30 K1X/25	R900425660	DBDS 10 P1X/400
R900424193	DBDH 30 K1X/50		
R900422543	DBDS 30 K1X/25		
R900424282	DBDS 30 K1X/50		
R900424284	DBDS 30 K1X/100		
R900424286	DBDS 30 K1X/200		
R900424288	DBDS 30 K1X/315		

Continued onto page 4!

**Further preferred types and standard components
can be found in the EPS (Standard Price List).**

Preferred types (readily available)

Material No.	Type	Material No.	Type
R900424162	DBDS 15 G1X/100	R900433929	DBDS 25 G1X/25
R900424163	DBDS 15 G1X/200	R900424263	DBDS 25 G1X/100
R900424165	DBDS 15 G1X/315	R900424264	DBDS 25 G1X/200
R900424108	DBDH 20 G1X/50	R900424265	DBDS 25 G1X/315
R900424103	DBDH 20 G1X/100	R900427243	DBDS 30 G1X/25
R900422544	DBDS 20 G1X/25	R900424262	DBDS 30 G1X/50
R900424276	DBDS 20 G1X/50	R900423763	DBDS 30 G1X/100
R900424170	DBDS 20 G1X/100	R900424281	DBDS 30 G1X/200
R900424172	DBDS 20 G1X/200	R900424261	DBDS 30 G1X/315
R900424174	DBDS 20 G1X/315	R900429711	DBDS 30 P1X/25
R900424274	DBDS 20 P1X/100	R900423714	DBDS 30 P1X/200
R900424277	DBDS 20 P1X/200	R900423715	DBDS 30 P1X/315
R900424278	DBDS 20 P1X/315		

Function, section, symbol

The DBD pressure relief valves are direct operated poppet seat valves. They are used to limit the pressure in a hydraulic system.

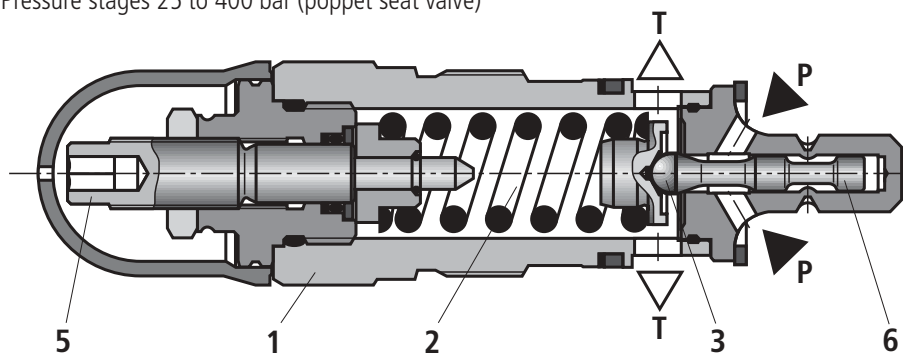
The valves mainly consists of sleeve (1), spring (2), poppet with damping spool (3) (pressure stages 25 to 400 bar) or ball (4) (pressure stage 630 bar) and adjustment element (5). The setting of the system pressure is infinitely variable via the adjustment element (5). The spring (2) pushes the poppet (3) or ball (4) onto the seat. The P channel is connected to the system. The pressure present in the system is applied to the poppet area (or ball).

If the pressure in channel P rises above the value set at the spring (2), then the poppet (3) or ball (4) opens against the spring (2). Now pressure fluid flows from channel P into channel T. The stroke of the poppet (3) is limited by a pin (6).

In order to obtain good pressure settings over the entire pressure range, the pressure range is split into 7 pressure stages. A pressure stage corresponds to a certain spring for a maximum operating pressure which may be set with it.

Type DBDH..K 1X/...

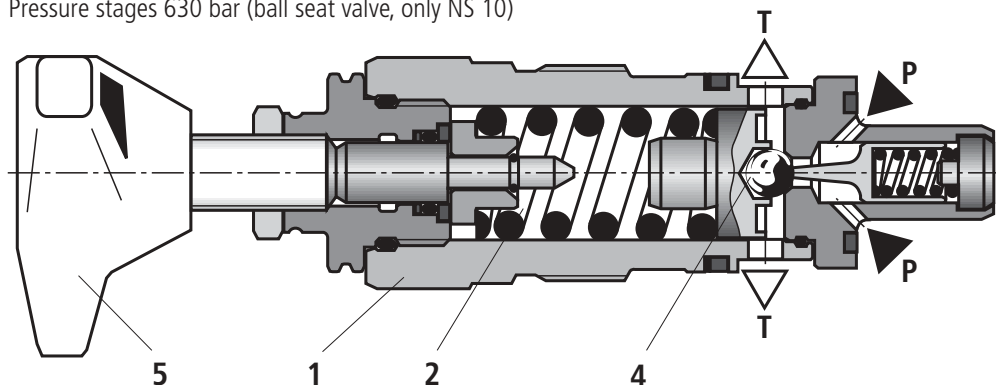
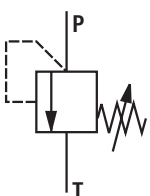
Pressure stages 25 to 400 bar (poppet seat valve)



Type DBDH 10 K1X/...

Pressure stages 630 bar (ball seat valve, only NS 10)

Symbol



Technical data (for applications outside these parameters, please consult us!)

General

Installation	Optional
Ambient temperature range	°C – 30 to +80 (NBR seals) – 15 to +80 (FKM seals)
The minimum housing material strength	Housing materials are to be so selected that adequate safety is ensured for all conceivable operating pressures (e.g. with reference to the compressive strength, thread strength and tightening torques).
Weight	See pages 7 to 9

hydraulic

Operating pressure range	NS	6 and 8	10	15 and 20	25 and 30	
	Inlet	bar	Up to 400	Up to 630	Up to 400	Up to 315
	Outlet	bar	315	315	315	315
Maximum flow (standard valves)	See characteristic curves on page 6					
Pressure fluid	Mineral oil (HL, HLP) to DIN 51 524 ¹⁾ ; Fast bio-degradable pressure fluids to VDMA 24 568 (also see RE 90 221); HETG (rape seed oil) ¹⁾ ; HEPG (polyglycole) ²⁾ ; HEES (synthetic ester) ²⁾ ; other pressure fluids on request					
Pressure fluid temperature range	°C	– 30 to + 80 (for NBR seals) – 15 to + 80 (for FKM seals)				
ISO code cleanliness class	Maximum permissible degree of contamination of the pressure fluid is to ISO 4406 (C) class 20/18/15 ³⁾					
Viscosity range	mm ² /s	10 to 800				

¹⁾ Suitable for NBR **and** FKM seals

²⁾ **Only** suitable for FKM seals

³⁾ The cleanliness class stated for the components must be adhered too in hydraulic systems. Effective filtration prevents faults from occurring and at the same time increases the component service life.

For the selection of filters see catalogue sheets:
RE 50 070, RE 50 076 and RE 50 081.

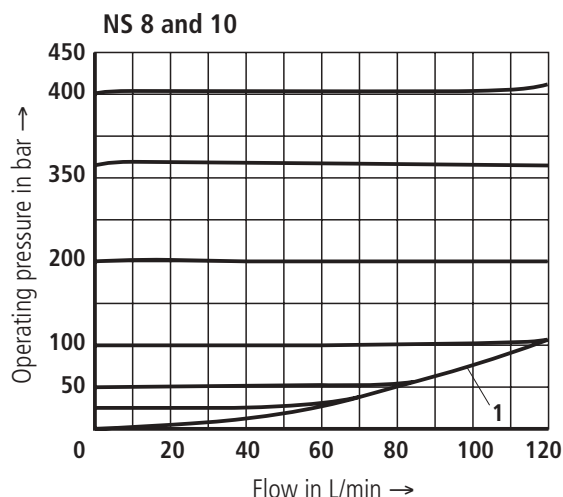
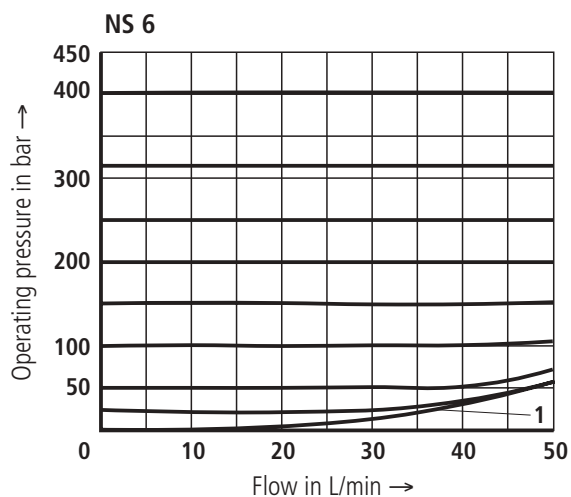
Deviating technical data for design tested pressure relief valves ⁴⁾

Hydraulic

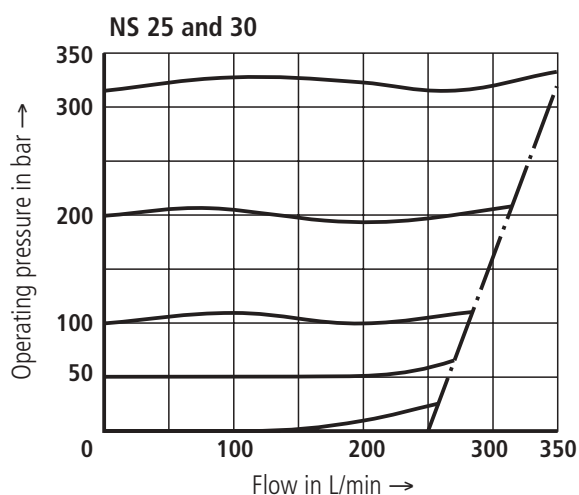
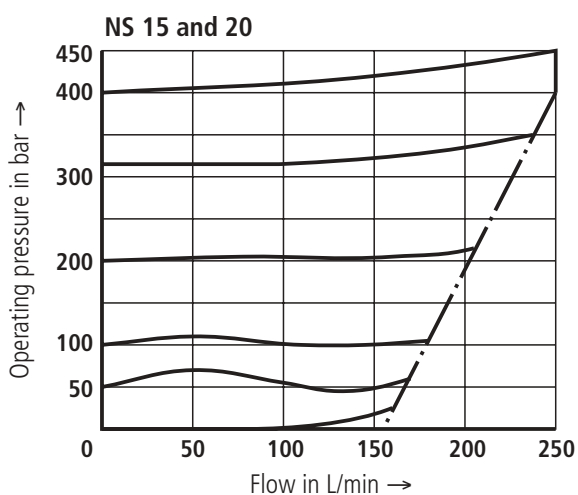
Maximum flow	See characteristic curves on pages 11 to 14
Pressure fluid	Mineral oil (HL, HLP) to DIN 51 524 and DIN 51 525
Pressure fluid temperature range	°C – 20 to + 60 (for NBR seals) – 15 to + 60 (for FKM seals)
Viscosity range	mm ² /s 12 to 230

⁴⁾ For applications outside these parameters, please consult us!

Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40\text{ °C} \pm 5\text{ °C}$)



1 Lowest settable pressure



⚠ Attention!

- The characteristic curves are valid for the output pressure = zero over the entire flow range and are measured without consideration of the housing pressure drop!

- The characteristic curves refer to the given pressure stages (e.g. 200 bar). The further the pressure setting value is from the nominal pressure stage (e.g. < 200 bar), the greater the pressure increase with the flow.

General guidelines

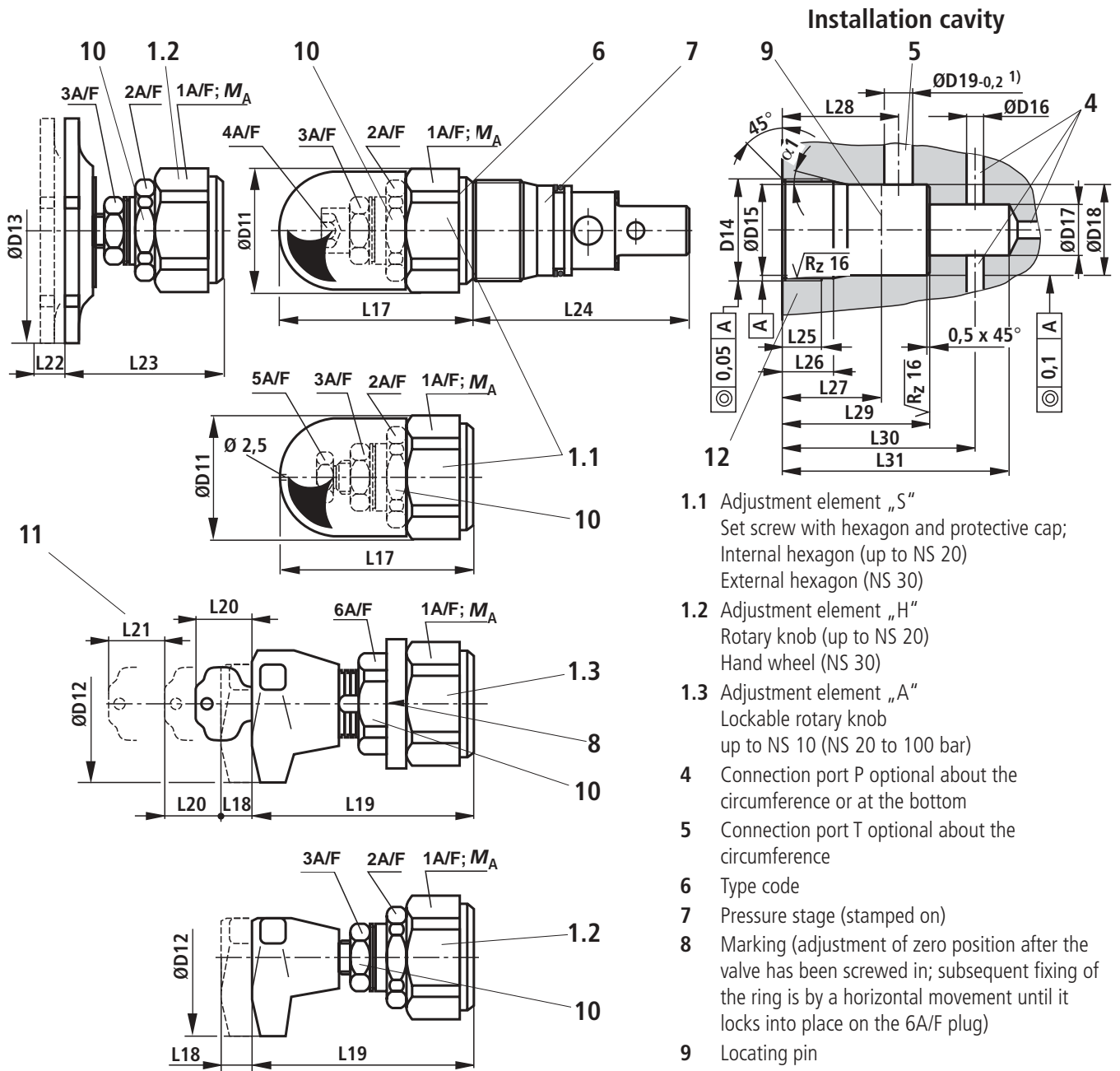
Any hydraulic back pressures in port T are added 1:1 to the response pressure set at the pilot control of the valve.

Example:

- The valve pressure setting resulting from the spring loading (Pos. 2 on page 4) $p_{spring} = 200\text{ bar}$
- Hydraulic back pressure in port T $p_{hydraulic} = 50\text{ bar}$

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

Unit dimensions: cartridge valve (cartridge, dimensions in mm)



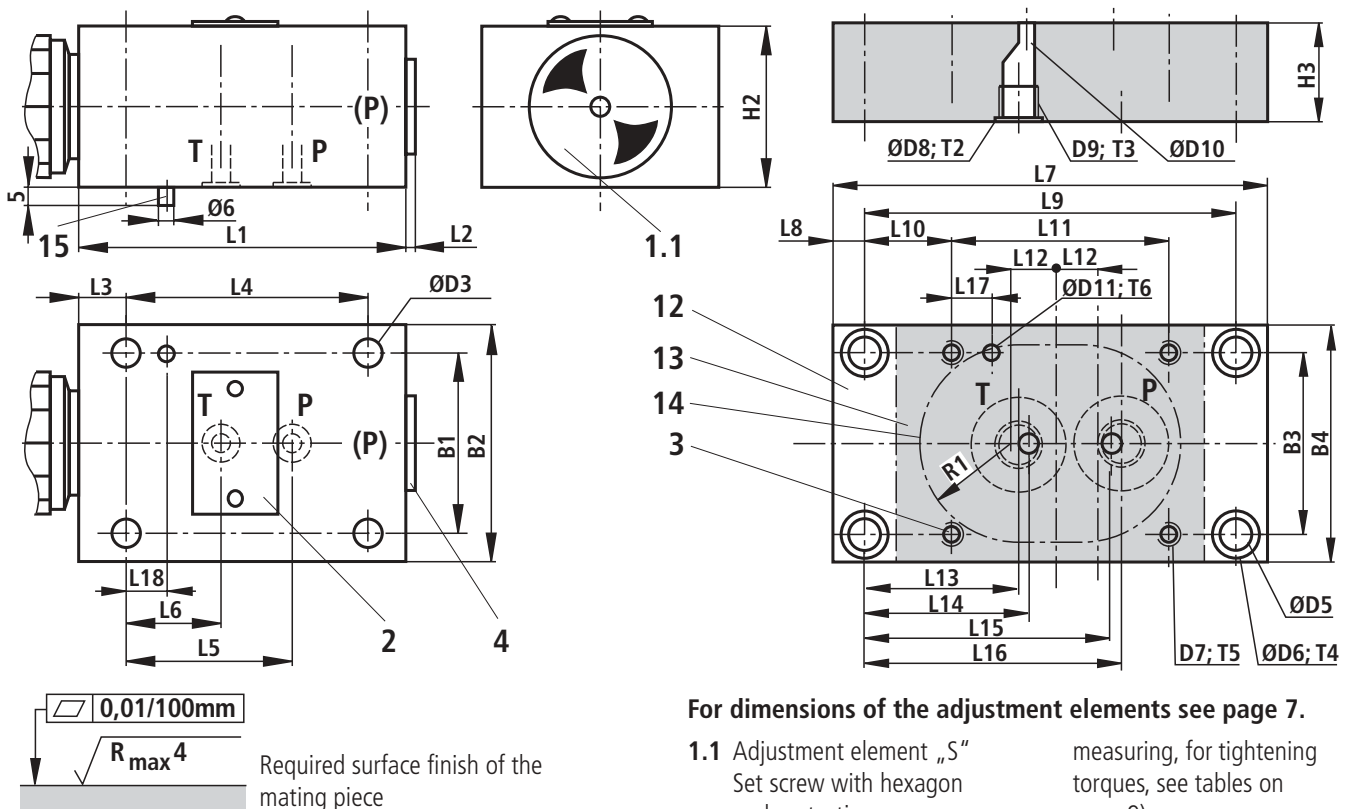
1) Max. dim.

- 1.1 Adjustment element „S“
Set screw with hexagon and protective cap;
Internal hexagon (up to NS 20)
External hexagon (NS 30)
- 1.2 Adjustment element „H“
Rotary knob (up to NS 20)
Hand wheel (NS 30)
- 1.3 Adjustment element „A“
Lockable rotary knob
up to NS 10 (NS 20 to 100 bar)
- 4 Connection port P optional about the circumference or at the bottom
- 5 Connection port T optional about the circumference
- 6 Type code
- 7 Pressure stage (stamped on)
- 8 Marking (adjustment of zero position after the valve has been screwed in; subsequent fixing of the ring is by a horizontal movement until it locks into place on the 6A/F plug)
- 9 Locating pin
- 10 Locknut
- 11 Space required to remove the key
- 12 Minimum tensile strength of the housing material, see technical data on page 5

Cartridge valve																			
NS	ØD11	ØD12	ØD13	L17	L18	L19	L20	L21	L22	L23	L24	1A/F	M _A	2A/F	3A/F	4A/F	5A/F	6A/F	Weight
6	34	60	–	72	11	83	28	20	–	–	64,5	32	See table on page 9	30	19	6	–	30	approx.0.4 kg
10	38	60	–	68	11	79	28	20	–	–	77	36		30	19	6	–	30	approx.0.5 kg
20	48	60	–	65	11	77	28	20	–	–	106	46		36	19	6	–	30	approx. 1 kg
30	63	–	80	83	–	–	–	–	11	56	131	60		46	19	–	13	–	approx.2.2 kg

Installation cavity														
NS	D14	ØD15	ØD16	ØD17	ØD18	ØD19	L25	L26	L27	L28	L29	L30	L31	α1
6	M28 x 1.5	25 ^{H9}	6	15	24.9 ^{+0,152} _{-0,2}	12	15	19	30	36	45	56.5±5.5	65	15°
10	M35 x 1.5	32 ^{H9}	10	18.5	31.9 ^{+0,162} _{-0,2}	15	18	23	35	41.5	52	67.5±7.5	80	15°
20	M45 x 1.5	40 ^{H9}	20	24	39.9 ^{+0,162} _{-0,2}	22	21	27	45	55	70	91.5±8.5	110	20°
30	M60 x 2	55 ^{H9}	30	38.75	54.9 ^{+0,174} _{-0,2}	34	23	29	45	63	84	113.5±11.5	140	20°

Unit dimensions: subplate mounting (dimensions in mm)



For dimensions of the adjustment elements see page 7.

- 1.1 Adjustment element „S“ measuring, for tightening torques, see tables on page 9
 Set screw with hexagon and protective cap
 Internal hex. (up to NS 20)
 External hex. (NS 25, 30)
- 2 Name plate
- 3 4 off valve threaded fixing holes
- 4 Connection port P, optional (e.g. for pressure)
- 12 For subplate type codes see below
- 13 Valve contact area
- 14 Panel cut-out
- 15 Locating pin (only for design tested valves)

Valve fixing screws (must be ordered separately)			M_A in Nm
NG 6	M6 x 50	DIN 912-10.9	Approx. 14
NG 10	M8 x 70	DIN 912-10.9	Approx. 34
NG 20	M8 x 90	DIN 912-10.9	Approx. 34
NG 30	M10 x 110	DIN 912-10.9	Approx. 68

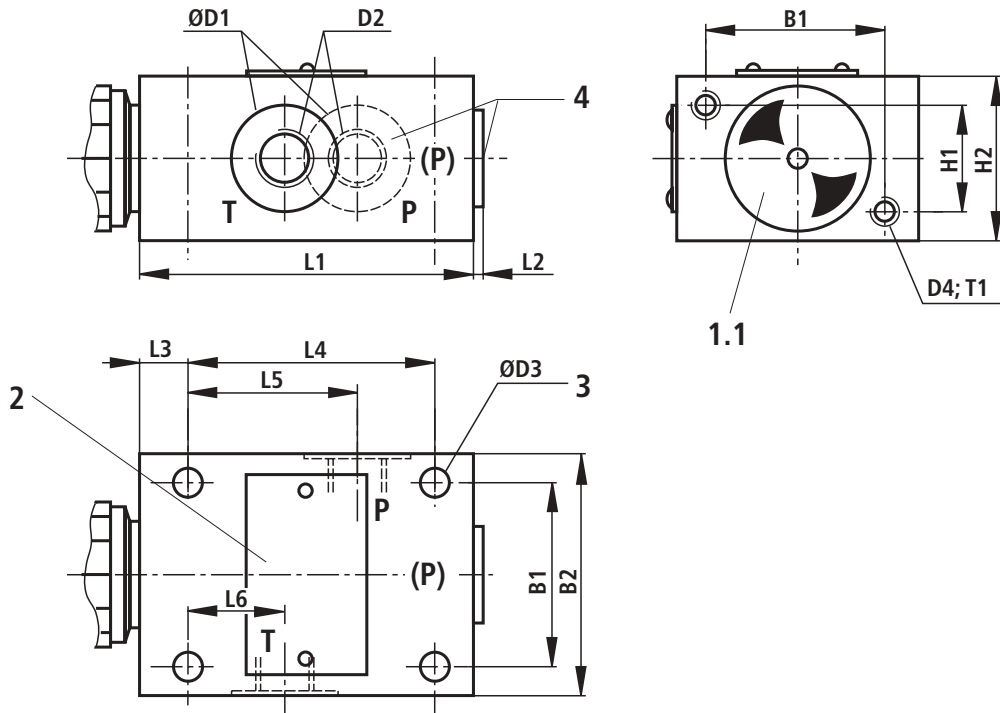
NS	Pressure relief valve											Port (P)	Weight
	B1	B2	ØD3	H2	L1	L2	L3	L4	L5	L6	L18		
6	45	60	6,6	40	80	4	15	55	40	20	15	G 1/4	Approx. 1.5 kg
10	60	80	9	60	100	4	20	70	45	21	15	G 1/2	Approx. 3.7 kg
20	70	100	9	70	135	5,5	20	100	65	34	15	G 3/4	Approx. 6.4 kg
30	100	130	11	90	180	5,5	25	130	85	35	15	G 1 1/4	Approx. 13.9 kg

NS	Type	Subplates ¹⁾										H3
		B3	B4	ØD5	ØD6	D7	ØD8	D9	ØD10	ØD11		
6	G 300/01	45	60	7	11	M6	25	G 1/4	6	7.5	25	
10	(G 301/01) G 302/01	60	80	7	11	M8	(28) 34	(G 3/8) G 1/2	10	7.5	25	
20	(G 303/01) G 304/01	70	100	11.5	17.5	M8	(42) 47	(G 3/4) G 1	(15) 20	7.5	40	
30	(G 305/01) G 306/01	100	130	11.5	17.5	M10	(56) 61	(G 1 1/4) G 1 1/2	30	7.5	40	

NS	Subplates ¹⁾																Weight	
	L7	L8	L9	L10	L11	L12	L13	L14	L15	L16	L17	T2	T3	T4	T5	T6		R1
6	110	8	94	22	55	10	39	42	62	65	15	1	15	9	15	6.5	25 ⁺²	1.5 kg
10	135	10	115	27.5	70	12.5	40.5	48.5	72.5	80.5	15	1	(15) 16	9	15	6.5	30 ⁺⁵	2 kg
20	170	15	140	20	100	20	(45) 42	54	85	(94) 97	15	1	20	13	(12) 22	6.5	40 ⁺³	5.5 kg
30	190	12.5	165	17.5	130	22.5	42	52.5	102.5	(113) 117	15	1	24	11,5	22	6.5	55 ⁺⁴	8 kg

¹⁾ The stated subplates are not permitted for use with design tested pressure relief valves to the pressure component directive 97/23/EG!

Unit dimensions: threaded connections (dimensions in mm)



- 1.1** Adjustment element „S“
Set screw with hexagon and protective cap
Internal hexagon (up to NS 20)
External hexagon (NS 25, 30)
- 2** Name plate
- 3** 4 off valve threaded fixing holes
- 4** Connection port P, optional (e.g. for pressure measuring)
For dimensions, see dimension D2,
for tightening torques, see table

Tightening torques M_A in Nm for fittings

	Plug (Pos. 4)	Plug
G 1/4	30	60
G 3/8	40	90
G 1/2	60	130
G 3/4	80	200
G 1	135	380
G 1 1/4	480	500
G 1 1/2	560	600

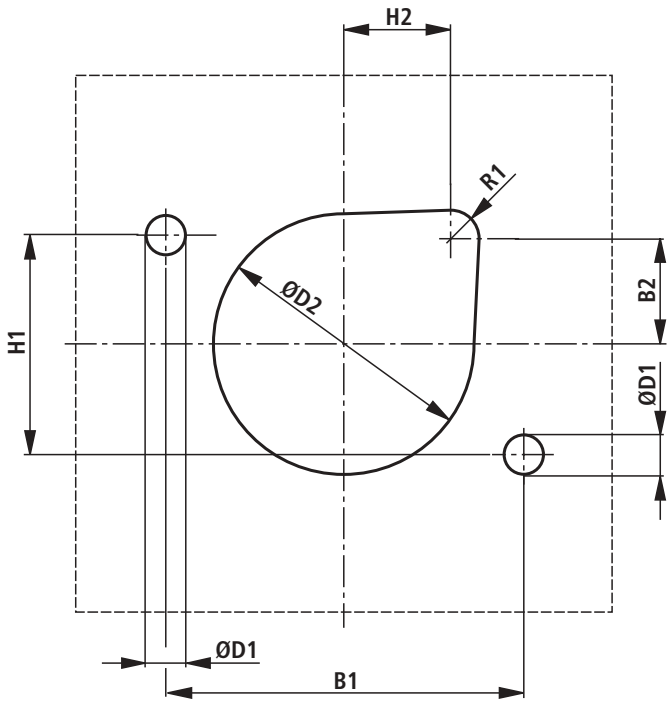
Tightening torques M_A in Nm for cartridges:

Nom. size	Pressure stage in bar		
	Up to 200	Up to 400	Up to 630
6	50	80	–
10	100	150	200
20	150	300	–
30	350	500	–

NG	B1	B2	ØD1	D2	ØD3	D4	H1	H2	L1	L2	L3	L4	L5	L6	T1	Weight
6	45	60	25	G 1/4	6,6	M6	25	40	80	4	15	55	40	20	10	Approx. 1.5 kg
(8) + 10	60	80	(28) 34	(G 3/8) G 1/2	9	M8	40	60	100	4	20	70	49	21	20	Approx. 3.7 kg
(15) + 20	70	100	(42) 47	(G 3/4) G 1	9	M8	50	70	135	(4) 5,5	20	100	65	34	20	Approx. 6.4 kg
(25) + 30	100	130	(56) 61	(G 1 1/4) G 1 1/2	11	M10	60	90	180	5.5	25	130	85	35	25	Approx. 13.9 kg

For types and dimensions of the adjustment elements, see page 7.

Unit dimensions: valve panel cut-out for design tested valves (dimensions in mm)



NS	B1	B2	H1	H2	ØD1 ^{H13}	ØD2 min	R1 min
6	45	22.5	25	12.5	7	40	8
8	60	20.5	40	20.5	9	44	8
10	60	20.5	40	20.5	9	44	8
15	70	24	50	24	9	55	8
20	70	24	50	24	9	55	8
25	100	29.5	60	29.5	11	73	8
30	100	29.5	60	29.5	11	73	8

Note: For the valve types DBDH.K./...E the hand wheel has to be removed, subsequently refitted, before fitting the cartridge onto the valve panel.

Ordering details for design tested pressure relief valves type DBD../...E in accordance to the pressure component directive 97/23/EG

NS	Designation	Component identification
6	DBDS 6K1X/ <input type="text"/> E	TÜV.SV. <input type="text"/> -849.5.F. α_w .p.
	DBDH 6K1X/ <input type="text"/> E	
	DBDS 6G1X/ <input type="text"/> E	
	DBDH 6G1X/ <input type="text"/> E	
	DBDS 6P1X/ <input type="text"/> E	
	DBDH 6P1X/ <input type="text"/> E	
10	DBDS 8G1X/ <input type="text"/> E	TÜV.SV. <input type="text"/> -850.6.F. α_w .p. TÜV.SV. <input type="text"/> -390.4,5.F.30.p. ¹⁾
	DBDH 8G1X/ <input type="text"/> E	
	DBDS 10K1X/ <input type="text"/> E	
	DBDH 10K1X/ <input type="text"/> E	
	DBDS 10G1X/ <input type="text"/> E	
	DBDH 10G1X/ <input type="text"/> E	
	DBDS 10P1X/ <input type="text"/> E	
	DBDH 10P1X/ <input type="text"/> E	

NS	Designation	Component identification
20	DBDS 15G1X/ <input type="text"/> E	TÜV.SV. <input type="text"/> -361.10.F. α_w .p.
	DBDH 15G1X/ <input type="text"/> E	
	DBDS 20K1X/ <input type="text"/> E	
	DBDH 20K1X/ <input type="text"/> E	
	DBDS 20G1X/ <input type="text"/> E	
	DBDH 20G1X/ <input type="text"/> E	
	DBDS 20P1X/ <input type="text"/> E	
	DBDH 20P1X/ <input type="text"/> E	
30	DBDS 25G1X/ <input type="text"/> E	TÜV.SV. <input type="text"/> -362.15.F. α_w .p.
	DBDH 25G1X/ <input type="text"/> E	
	DBDS 30K1X/ <input type="text"/> E	
	DBDH 30K1X/ <input type="text"/> E	
	DBDS 30G1X/ <input type="text"/> E	
	DBDH 30G1X/ <input type="text"/> E	
	DBDS 30P1X/ <input type="text"/> E	
	DBDH 30P1X/ <input type="text"/> E	

Pressure in the type code must be entered by the customer; Pressure adjustments ≥ 30 bar and in 5 bar steps are possible.

Details entered by the manufacturing plant

¹⁾ Component identification for DBD. 10.1X/...; 400 bar $< p \leq 630$ bar