

2-way cartridge valves,
pressure relief function

Type-examination tested safety valves according
to Pressure Equipment Directive 97/23/EC

RE 21055

Edition: 2014-04



- ▶ Size 40 ... 63
- ▶ Component series 7X
- ▶ Maximum operating pressure 400 bar
- ▶ Maximum flow 5,000 l/min

Features

- ▶ Installation bore according to ISO 7368
- ▶ Response pressure 50 ... 400 bar

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Ordering code

01	02	03	04	05	06	07	08
LFA		DB		-	7X	/	E

01	Cartridge valve	LFA
02	Size 40	40
	Size 50	50
	Size 63	63
03	Pressure limiting function	DB

Adjustment types

04	Rotary knob	1
	Hexagon with protective cap	2
05	Component series 70 to 79 (70 to 79: unchanged installation and connection dimensions)	7X

Response pressure (50 ... 400 bar, in 10 bar increments, maximum flow see table below)

06	50 bar	050
	60 bar	060
	... bar	...
	400 bar	400

Seal material

07	NBR seals	N
	FKM seals	F
	Attention! Observe compatibility of seals with the hydraulic fluid used!	
08	Type-examination tested safety valve according to Pressure Equipment Directive 97/23/EC	E

Size	Component marking	Maximum flow $q_{V \max}$ in l/min Q	Response pressure p in bar p
40	TÜV.SV.□-1138.38.F.Q.p	900	50 ... 90
		1,500	100 ... 190
		2,000	200 ... 290
		2,400	300 ... 400
50	TÜV.SV.□-1138.48.F.Q.p	1,400	50 ... 90
		2,000	100 ... 190
		2,600	200 ... 290
		3,600	300 ... 400
63	TÜV.SV.□-1138.61.F.Q.p	1,750	50 ... 90
		2,500	100 ... 190
		3,600	200 ... 290
		5,000	300 ... 400

□ Value entered at factory

Order example:

 $q_V = 2,200$ l/min, $p = 270$ bar→ Type LFA **50** DB.-7X/**270**.E→ TÜV.SV.□-1138.48.F.**2600.270**

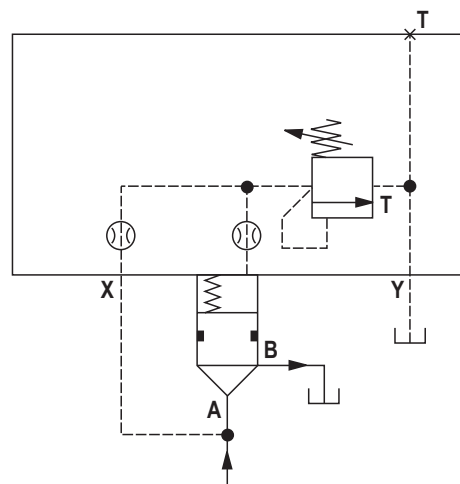
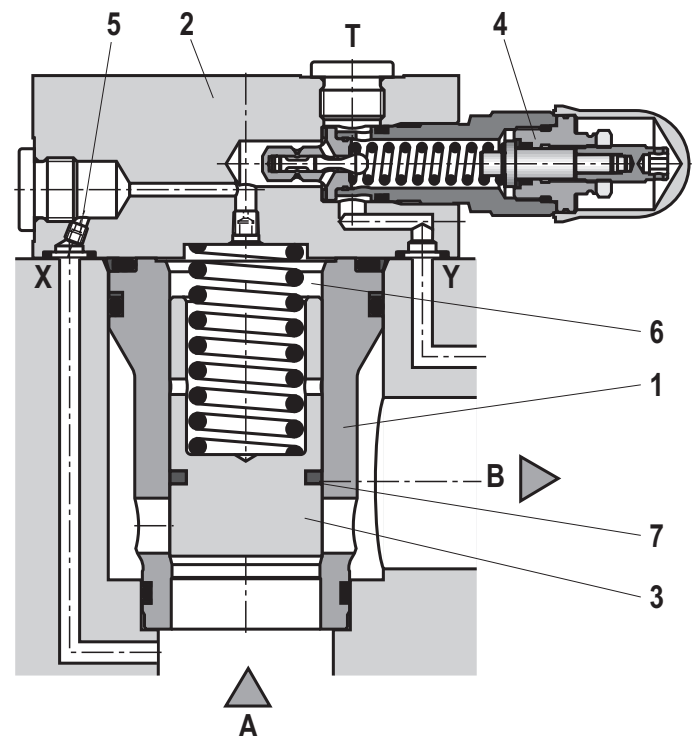
Function, section, symbol

General

Type-examination tested safety valves according to Pressure Equipment Directive 97/23/EC are pilot operated 2-way cartridge valves in seat design with fixed set relief pressure.

The overall valve consists of a cartridge valve (1) for installation bores according to ISO 7368 and a matching control cover (2) with integrated sealed pressure limitation unit (4).

The cartridge valve (1) is a seat valve without surface difference. The relief pressure active on port A is fed via the channel (5) to the spring side (6) of the cartridge valve (1) and to the pressure limitation unit (4). The piston sealing (7) prevents a leak from the spring side (6) to port B. Below the pressure value set on the pressure limitation unit (4), the piston (3) is pressure-compensated and the valve closed leak-tight by the spring force. When the pressure is exceeded on port A, the pressure limitation unit (4) limits the pressure via the tank port Y or T, which opens the piston (3). The hydraulic fluid flows off directly into channel B. The pressure increase over the permissible flow range on the valve is safely kept within 10 % of the set relief pressure.



Technical data

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

General					
Ambient temperature range			°C	−10 ... +80	
Hydraulic					
Size			40	50	63
Maximum operating pressure	– Port B	bar	15		
	– Port T and Y	bar	depressurized to the tank		
Maximum response pressure	– Port A and X	bar	400		
Maximum flow	– Port A to B	l/min	2,400	3,600	5,000
Maximum pilot flow	– Port Y; T	l/min	4	15	23
Hydraulic fluid			see table below		
Hydraulic fluid temperature range			°C	−10 ... +60	
Viscosity range			mm²/s	12 ... 380	
Maximum permissible degree of contamination of the hydraulic fluid, cleanliness class according to ISO 4406 (c)			Class 20/18/15 ¹⁾		

Hydraulic fluid	Classification	Suitable sealing materials	Standards
Mineral oils and related hydrocarbons	HL, HLP, HLPD, HVLP, HVLDP	NBR, FKM	DIN 51524
Biodegradable – insoluble in water	HETG	NBR, FKM	VDMA 24568
	HEES	FKM	
– soluble in water	HEPG	FKM	VDMA 24568
Flame-resistant – water-free	HFDU, HFDR	FKM	ISO 12922
	HFC (Fuchs Hydrotherm 46M, Petrofer Ultra Safe 620)	NBR	ISO 12922

**Important information on hydraulic fluids!**

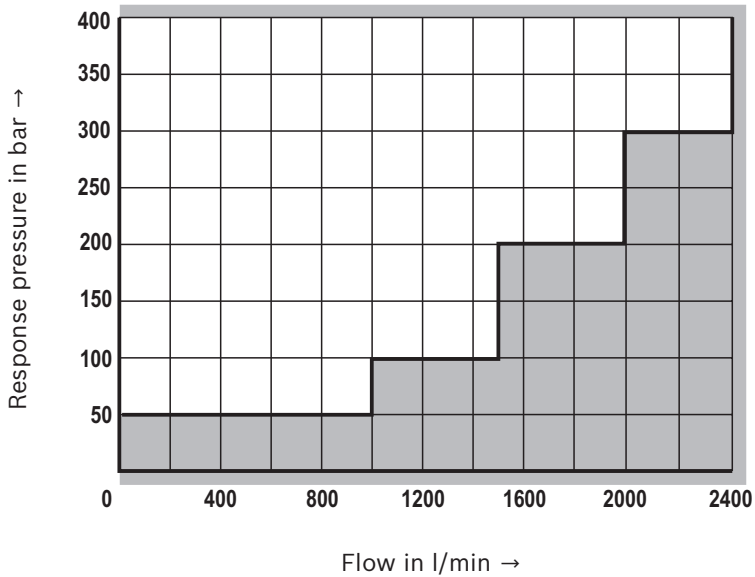
- For more information and data on the use of other hydraulic fluids, please refer to data sheet 90220 or contact us!

- There may be limitations regarding the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)!
- The flash point of the hydraulic fluid used must be 40 K higher than the maximum solenoid surface temperature.

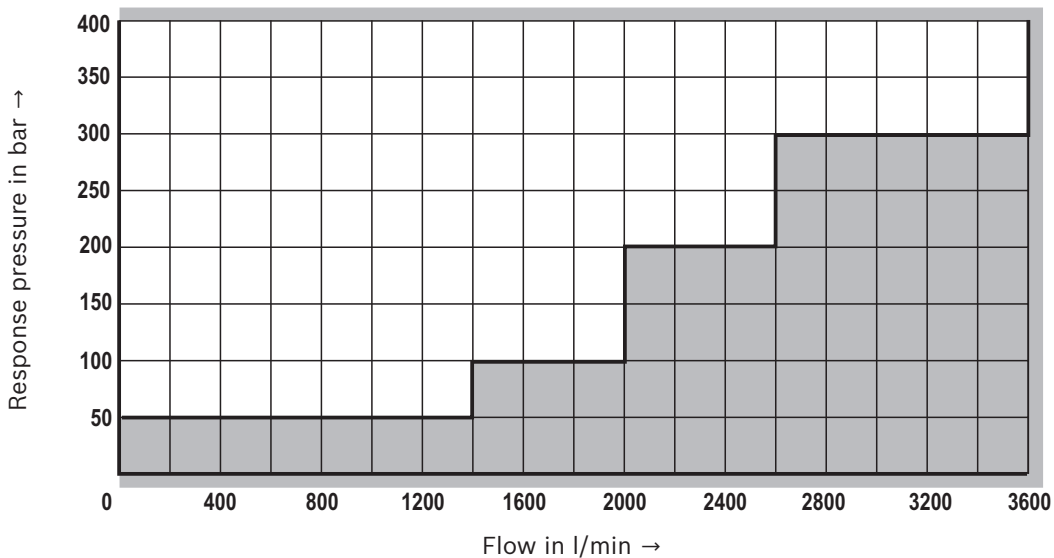
¹⁾ The cleanliness classes stated for the components has to be maintained in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.

For the selection of the filters see www.boschrexroth.com/filter.

Characteristic curves: Permissible flow ranges, size 40
(measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$)



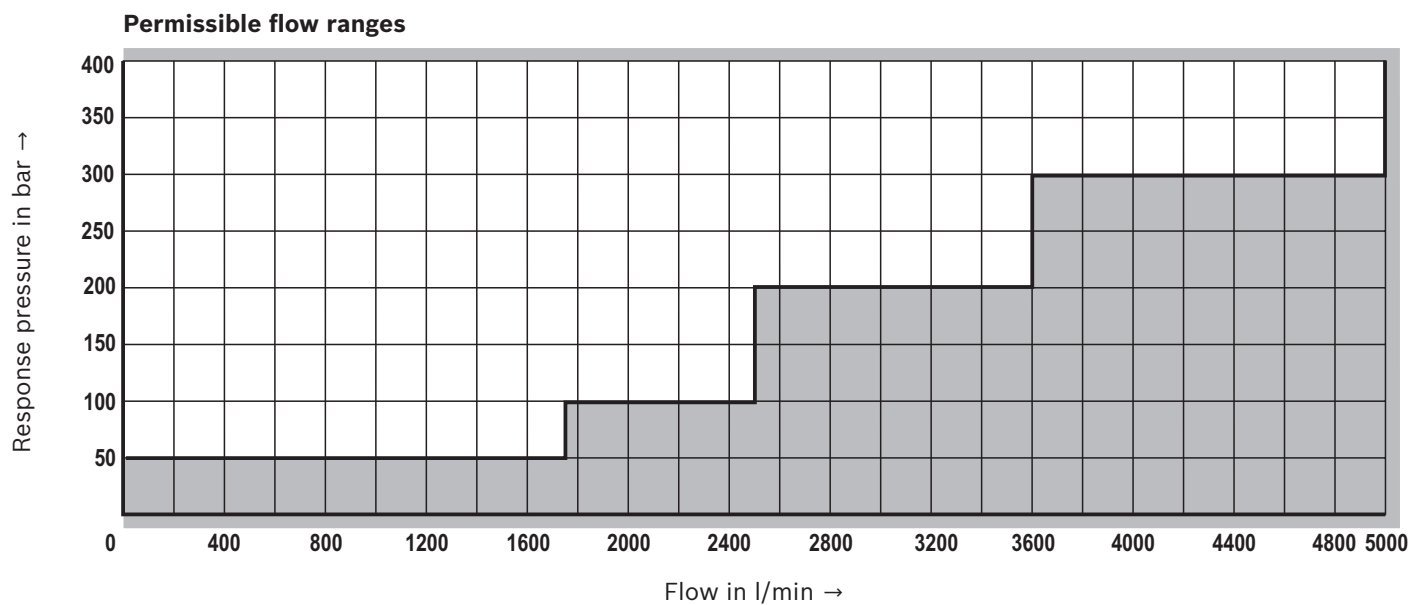
Characteristic curves: Permissible flow ranges, size 50
(measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$)



Notices:

- The flow values are only valid with depressurized pilot oil return.
- Working points in the areas of the characteristic curves that are highlighted in grey are **not** permitted with this valve.
- Comply with the permissible flows of the system!

Characteristic curves: Permissible flow ranges, size 63
(measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$)

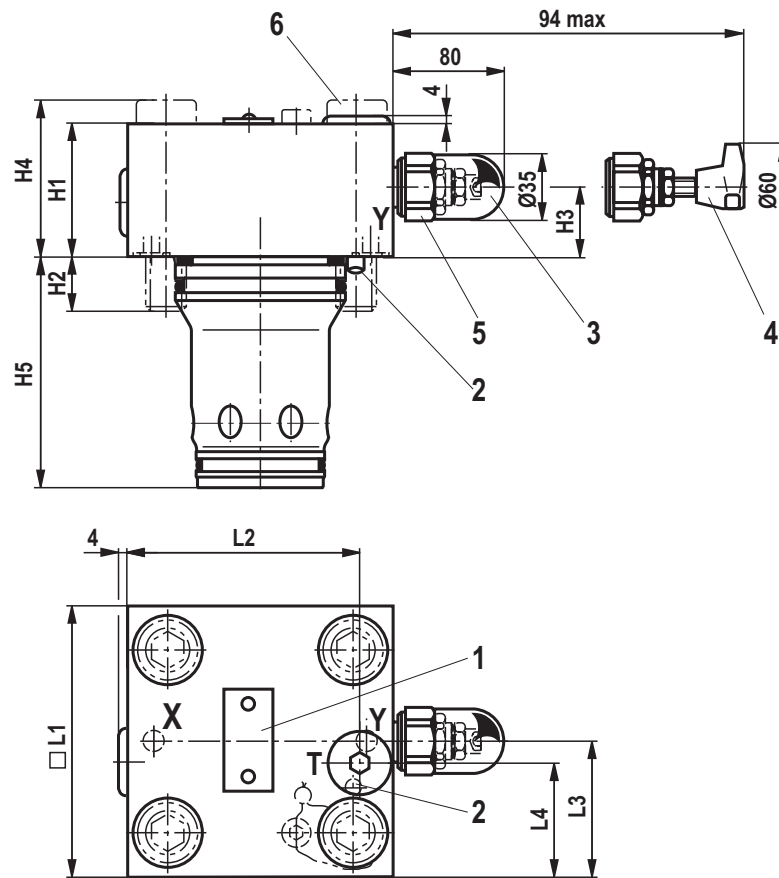


Notices:

- The flow values are only valid with depressurized pilot oil return.
- Working points in the areas of the characteristic curves that are highlighted in grey are **not** permitted with this valve.
- Comply with the permissible flows of the system!

Dimensions

(dimensions in mm)



- 1 Name plate
- 2 Locating pin
- 3 Adjustment type "2"
- 4 Adjustment type "1"
- 5 Pressure relief valve type DBD.6K..., data sheet 25402
- 6 Valve mounting screws see on the right

Valve mounting screws (separate order)

► Sizes 40 and 50:

4 hexagon socket head cap screws

ISO 4762 - M20 x 80 - 10.9-f1Zn-240h-L

(Friction coefficient $\mu_{\text{total}} = 0.09$ to 0.14);

Tightening torque $M_A = 480 \text{ Nm} \pm 10 \%$

Material no. **R901362574** ¹⁾

► Size 63:

4 hexagon socket head cap screws

ISO 4762 - M30 x 110 - 10.9-f1Zn-240h-L

(Friction coefficient $\mu_{\text{total}} = 0.09$ to 0.14);

Tightening torque $M_A = 1,600 \text{ Nm} \pm 10 \%$

Material no. **R901362575** ¹⁾



Notice:

For reasons of stability, only the valve mounting screws listed above may be used:

¹⁾ Includes 4 valve mounting screws and material for sealing

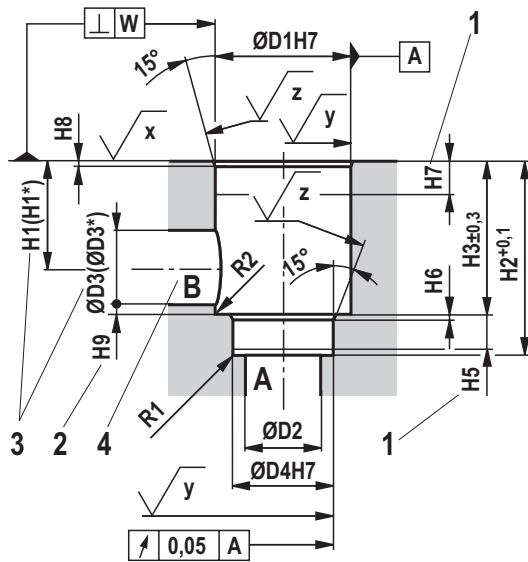
Size	40	50	63
H1	60	60	82
H2	32	34	50
H3	27	31	40
H4	69	67	91
H5	105	122	155
□ L1	125	140	180
L2	89	105	144
L3	76	84	90
L4	60	70	90



Notice:

The dimensions are nominal dimensions which are subject to tolerances.

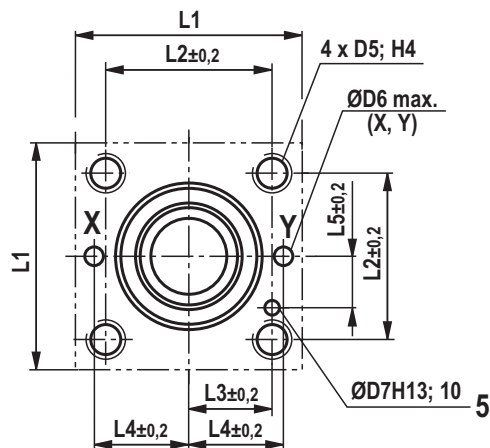
Installation bore and connection dimensions according to ISO 7368 (main pressure relief valve) (dimensions in mm)



$$\sqrt{x} = \sqrt{Rz1\max \ 4}$$

$$\sqrt{y} = \sqrt{Rz1\max \ 8}$$

$$\sqrt{z} = \sqrt{0,0025 - / P_{\max} \ 16}$$



- 1 Depth of fit
- 2 Control dimension
- 3 If the diameter for port B is a different one than ØD3 (ØD3^*), the distance from the cover contact surface to the center of the bore must be calculated. To keep the counter pressure in port B as low as possible, production of ØD3^* is recommended.
- 4 Port B may be positioned around the central axis of port A. However, it must be ensured that the mounting bores and the control bores are not damaged.
- 5 Bore for locating pin

Size	40	50	63
$\text{ØD1H7}^{1)}$	75	90	120
ØD2	40	50	63
ØD3	40	50	63
(ØD3^*)	50	63	80
$\text{ØD4H7}^{1)}$	55	68	90
D5	M20	M20	M30
$\text{ØD6}^{2)}$	10	10	12
ØD7H13	6	8	8
H1	64	72	95
$(H1^*)$	59	65.5	86.5
H2	105	122	155
H3	87	100	130
H4	45	45	65
H5	15	17	20
H6	3	3	4
H7	30	35	40
H8	3	4	4
H9	2,5	2,5	3
L1	125	140	180
L2	85	100	125
L3	42.5	50	62.5
L4	50	58	75
L5	23	30	38
W	0.1	0.1	0.2
R1 ²⁾	1	1	1
R2 ²⁾	4	4	4

1) Deviating from ISO 7368

2) Maximum dimension

Safety instructions

- ▶ Before ordering a type-examination tested safety valve, it must be ensured that, for the desired **response pressure p** , the maximum permissible **flow q_{Vmax}** of the safety valve is greater than the maximum possible flow of the system/accumulator to be secured.
According to the Pressure Equipment Directive **97/23/EC**, the increase of system pressure due to the flow must not exceed 10 % of the set response pressure (see component marking table page 2).
- ▶ The maximum permissible flow **q_{Vmax}** specified in the part identification must not be exceeded.
- ▶ Discharge lines of safety valves must end in a risk-free manner. Accumulation of fluids in the discharge lines must **not** be possible (see AD 2000 data sheet A 2).
- ▶ Safety valves with an adjustment type rotary knob may only be unloaded during maintenance work! Operation outside the specified pressure ranges is not permitted!



It is imperative to observe the application notes!

- ▶ At the plant, the response pressure specified in the component marking is set with a flow of 12 l/min and a hydraulic fluid with viscosity 46 mm²/s. The response pressure can vary by + 3 % (380 mm²/s) to - 3 % (12 mm²/s) within the permissible viscosity range.
- ▶ The maximum flow stated in the component marking applies for applications without counter pressure in the control line (port Y).
- ▶ Removing a lead seal on the safety valve, invalidates approval according to the Pressure Equipment Directive!
- ▶ The requirements of the Pressure Equipment Directive and data sheet AD 2000 A 2 must be observed!
- ▶ It is advisable to secure type-examination-tested safety valves against unauthorized disassembly by wiring and sealing a valve mounting screw.

More information

- ▶ Type-examination tested safety valves according to Pressure Equipment Directive 97/23/EC
- ▶ Safety equipment to protect against excessive pressure – safety valves
- ▶ Mineral-oil-based hydraulic fluids
- ▶ Hydraulic valves for industrial applications
- ▶ Filter range

Operating instructions 21055-B
AD 2000 data sheet A 2
Data sheet 90220
Operating Instructions 07600-B
www.boschrexroth.com/filter

Notes

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