RE 21055
Edition: 2021-02
Replaces: 2019-01

rexroth
A Bosch Company

2-way cartridge valves, pressure relief function

Type-examination tested safety valves according to Pressure Equipment Directive 2014/68/EU

H8061

- Size 32 ... 63
- Component series 7X
- Maximum operating pressure 420 bar
- Maximum flow 5000 l/min

Features

- Installation bore according to ISO 7368 (main pressure relief valve)
- Response pressure 50 ... 420 bar
- Additional directional valve connection surface (version "DBW"), optional
- Two adjustment types, optionally:
  - Hexagon
  - Rotary knob
- Mounting set (sealable) as accessories

Contents

Ordering code

01	02	03	04		05		06	07	08
LFA				**–**	**7X**	**/**			**E**

01	Control cover	**LFA**
02	Size 32	**32**
	Size 40	**40**
	Size 50	**50**
	Size 63	**63**
03	Pressure limiting function (only NG40 ... 63)	**DB**
	Pressure limiting function with connection surface for directional valve	**DBW**

Adjustment types

04	Rotary knob	**1**
	Hexagon	**2**
05	Component series 70 ... 79 (70 ... 79: unchanged installation and mounting dimensions)	**7X**

Response pressure (50 ... 420 bar, in 10 bar steps, maximum flow see table page 3)

06	50 bar	**050**
	60 bar	**060**
	... bar	**...**
	400 bar	**400**
	410 bar (only NG32)	**410**
	420 bar (only NG32)	**420**

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

07	NBR seals	**N**
	FKM seals	**F**
08	Type-examination tested safety valve according to Pressure Equipment Directive 2014/68/EU	**E**

Ordering code

Size	Component marking	Maximum flow $q_{V\,max}$ in l/min ("Q")		Response pressure ***p*** in bar ("p")
		Mineral oils: HL, HLP	Other approved hydraulic fluids (see page 5)	
32	TÜV.SV.□–1138.31.F.Q.p	550	500	50 ... 90
		900	800	100 ... 190
		1200	1100	200 ... 290
		1500	1350	300 ... 420
40	TÜV.SV.□–1138.38.F.Q.p	900	800	50 ... 90
		1500	1350	100 ... 190
		2000	1800	200 ... 290
		2400	2150	300 ... 400
50	TÜV.SV.□–1138.48.F.Q.p	1400	1400	50 ... 90
		2000	2000	100 ... 190
		2600	2600	200 ... 290
		3600	3600	300 ... 400
63	TÜV.SV.□–1138.61.F.Q.p	1750	1550	50 ... 90
		2500	2250	100 ... 190
		3600	3600	200 ... 290
		5000	5000	300 ... 400

□ Information is entered at the factory

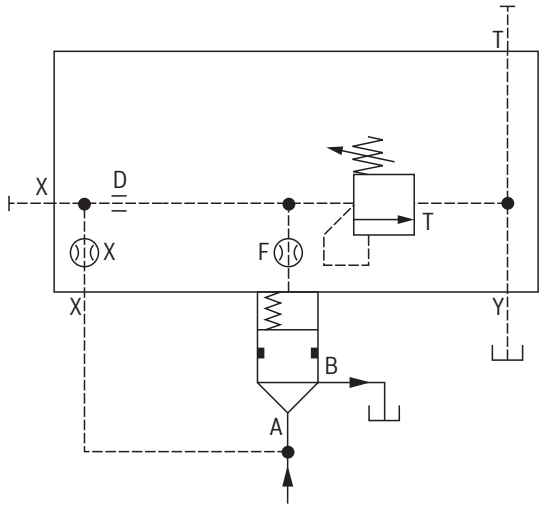
Order example:
q_V = 2200 l/min, ***p*** = 270 bar

→ Type LFA **50** DB.–7X/**270**.E

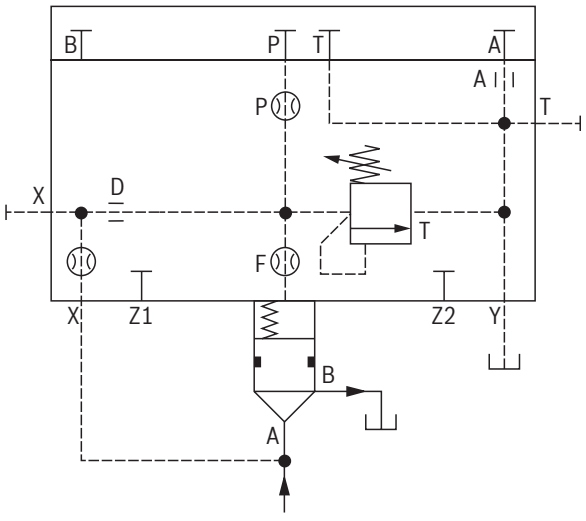
→ TÜV.SV.□–1138.48.F.**2600**.**270**

Symbols

Version "DB"



Version "DBW"

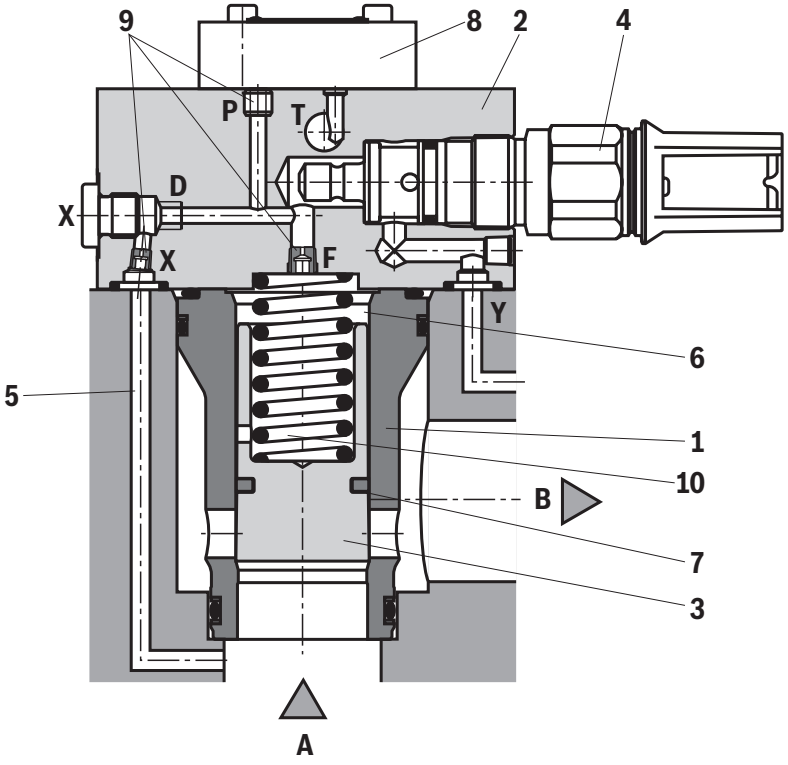


Function, section

Type-examination tested safety valves
type LFA . DB (W)...E according to Pressure Equipment Directive 2014/68/EU are pilot-operated 2-way cartridge valves in seat design with set relief pressure setting p_{max}. The complete valve generally consists of one cartridge valve (1) for installation bores according to ISO 7368 and one respective control cover (2) with integrated sealed pressure limitation unit (4).

As amendment to version "DB", version "DBW" offers a connection possibility closed by a cover plate (8) for a directional valve with porting pattern according to ISO 4401-03-02-0-05. By attaching a suitable directional valve at the position of the cover plate, an additional function like "depressurized start-up" can be realized. The use of this additional function requires a special set-up of the overall circuitry in order to maintain compatibility with the Pressure Equipment Directive 2014/68/EU.

The factory nozzle fitting (9) ("X", "F", "P") as well as the installed compression spring (10) must not be changed. The installation position ("D") is not fitted.
The cartridge valve (1) is designed as seat valve without area difference. The relief pressure effective at port A is directed to the spring chamber (6) of the cartridge valve (1) and to the pressure limitation unit (4) via channel X (5). The piston sealing (7) prevents an internal leakage from the spring chamber (6) to port B and thus increases the operational safety by avoiding gap filtration. Under the pressure value set at the pressure limitation unit (4), the spool (3) is pressure-compensated and remains closed in a seat-tight manner due to the spring force of the compression spring (10). The pressure equilibrium at the spool (3) is only changed when the relief pressure at port A is reached, namely by opening the pressure limitation unit (4), so that excessive hydraulic fluid directly flows to channel B via the spool (3) and the pressure in A is limited to the set pressure value.
The pressure limitation unit (4) is optionally available with rotary knob. This allows for a manual reduction of the pressure adjustment without changing the relief pressure setting. This simplifies a regular functional test.



Technical data
(For applications outside the stated values, please ask us!)

general		
Ambient temperature range	°C	–10 ... +80

hydraulic						
Size			32	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	420	400		
Maximum flow [1]	▶ Port A to B	l/min	1500	2400	3600	5000
Maximum pilot flow	▶ Port Y and T	l/min	4		15	23
Hydraulic fluid			see table below			
Hydraulic fluid temperature range (= TS)		°C	–10 ... +60			
Viscosity range		mm^2/s	12 ... 230			
Maximum admissible degree of contamination of the hydraulic fluid, cleanliness class according to ISO 4406 (c)			Class 20/18/15 [2]			

Hydraulic fluid		**Classification**	**Suitable sealing materials**	**Standards**	**Data sheet**
Mineral oils		HL, HLP	NBR, FKM	DIN 51524	90220
Bio-degradable	▶ Insoluble in water	HETG	FKM	ISO 15380	90221
		HEES	FKM		
	▶ Soluble in water	HEPG	FKM	ISO 15380	
Flame-resistant	▶ Water-free	HFDU (glycol base)	FKM	ISO 12922	90222
		HFDU (ester base)	FKM		
		HFDR	FKM		
	▶ Containing water	HFC (Fuchs: Hydrotherm 46M, Fuchs Renosafe 500; Petrofer: Ultra Safe 620; Houghton: Safe 620; Union: Carbide HP5046)	NBR	ISO 12922	90223

☞ **Important information on hydraulic fluids:**

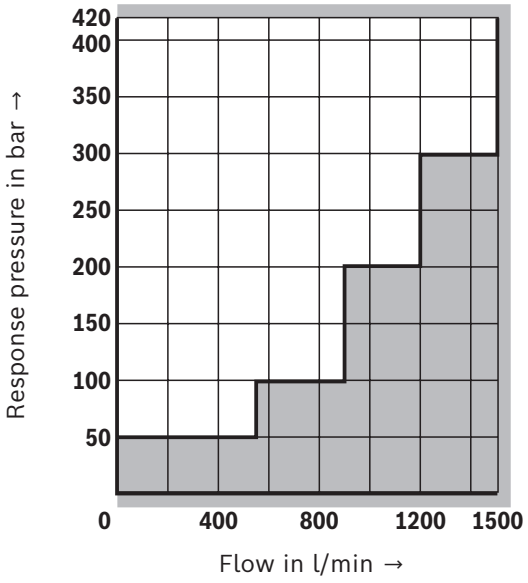
- For further information and data on the use of other hydraulic fluids, please refer to the data sheets above or contact us.
- There may be limitations regarding the technical valve data (temperature, pressure range, life cycle, maintenance intervals, etc.).
- **Bio-degradable and flame-resistant – 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 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.

[1] With mineral oil

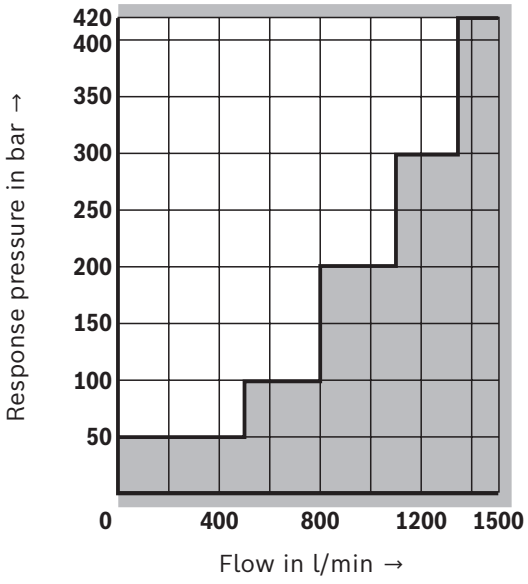
[2] The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and simultaneously increases the life cycle of the components.
For the selection of filters, see www.boschrexroth.com/filter.

Characteristic curves: Admissible flow ranges – size 32

Mineral oil
(measured with HLP46, ϑ_{oil} = 40 ±5 °C)



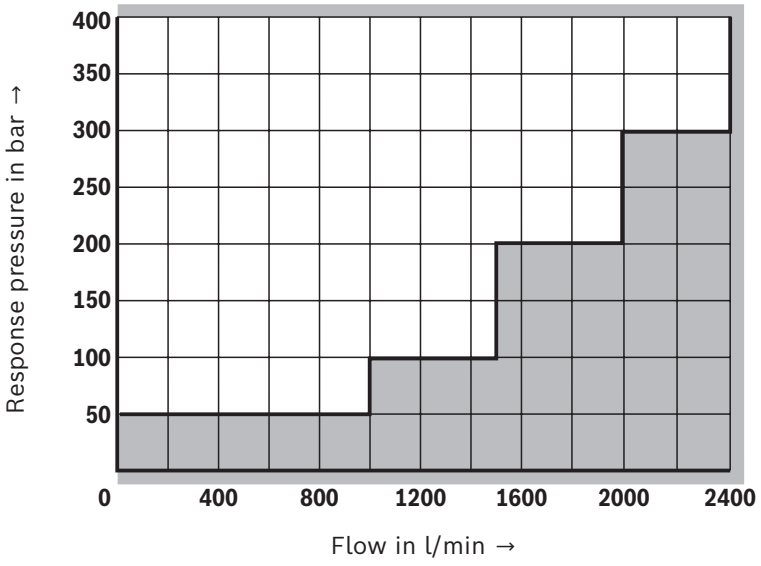
Other approved hydraulic fluids (see page 5)
(simulated; kinetic viscosity 40 mm²/s)



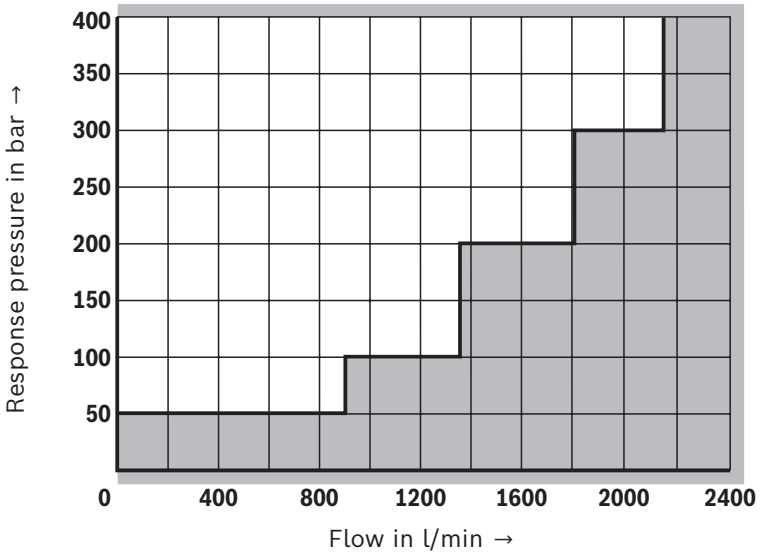
Notes:
- The flow values only apply for depressurized pilot oil return.
- Operating points in the gray areas of the characteristic curves are **not** admissible with this valve!
- Observe the admissible flows of the overall system.

Characteristic curves: Admissible flow ranges – size 40

Mineral oil
(measured with HLP46, ϑ_{oil} = 40 ±5 °C)



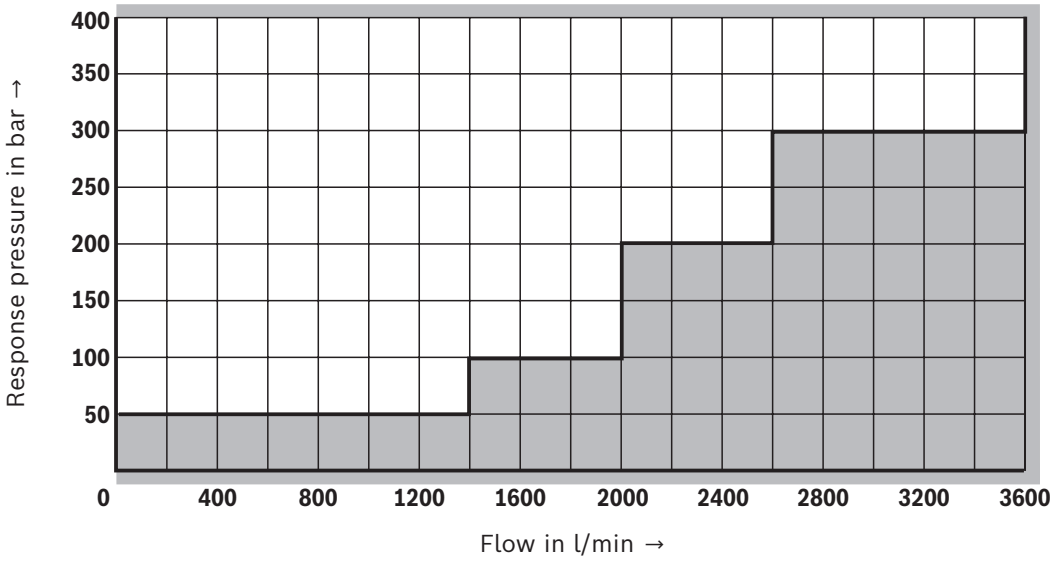
Other approved hydraulic fluids (see page 5)
(simulated; kinetic viscosity 40 mm²/s)



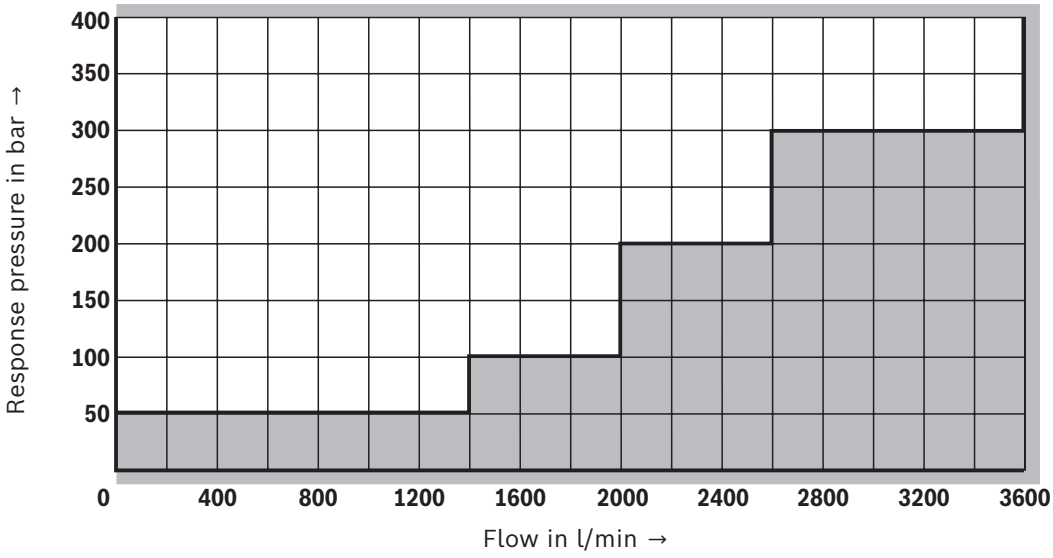
Notes:
- The flow values only apply for depressurized pilot oil return.
- Operating points in the gray areas of the characteristic curves are **not** admissible with this valve!
- Observe the admissible flows of the overall system.

Characteristic curves: Admissible flow ranges – size 50

Mineral oil
(measured with HLP46, ϑ_{oil} = 40 ±5 °C)



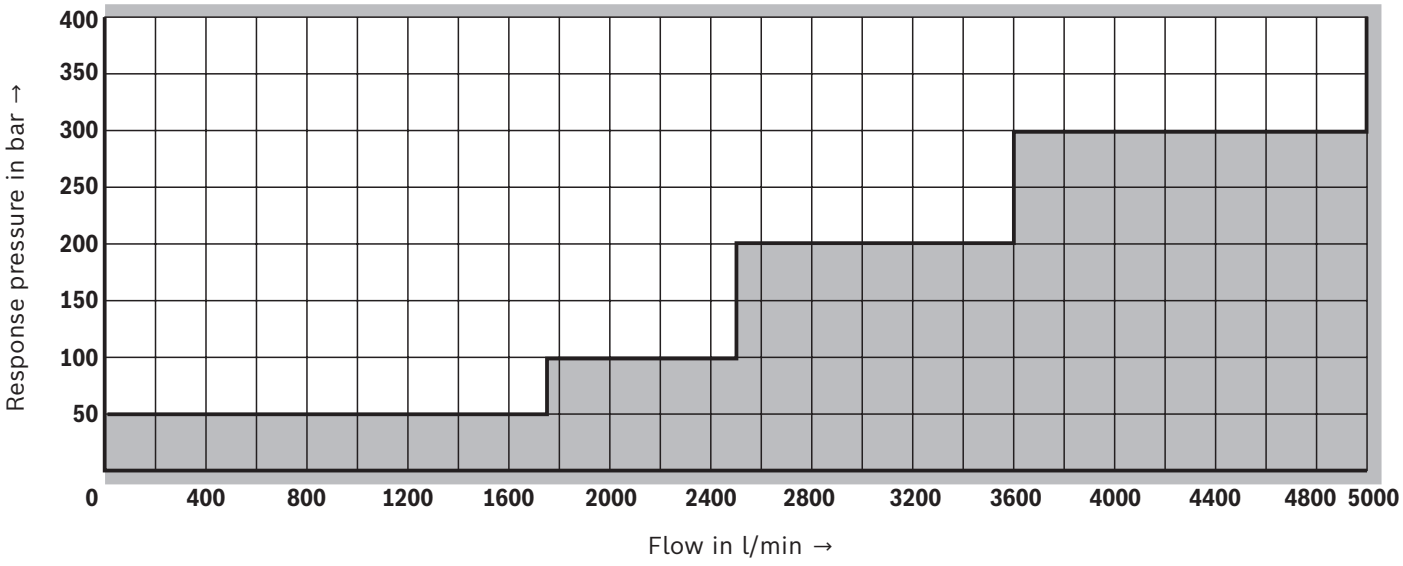
Other approved hydraulic fluids (see page 5)
(simulated; kinetic viscosity 40 mm²/s)



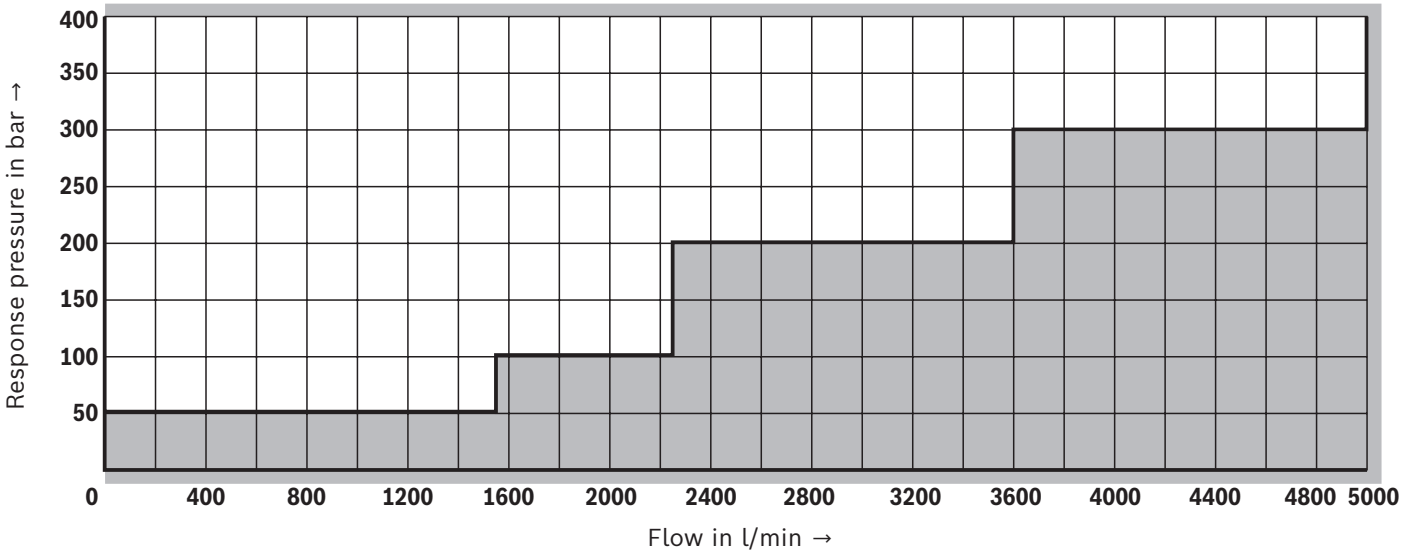
Notes:
- The flow values only apply for depressurized pilot oil return.
- Operating points in the gray areas of the characteristic curves are **not** admissible with this valve!
- Observe the admissible flows of the overall system.

Characteristic curves: Admissible flow ranges – size 63

Mineral oil
(measured with HLP46, ϑ_{oil} = 40 ±5 °C)

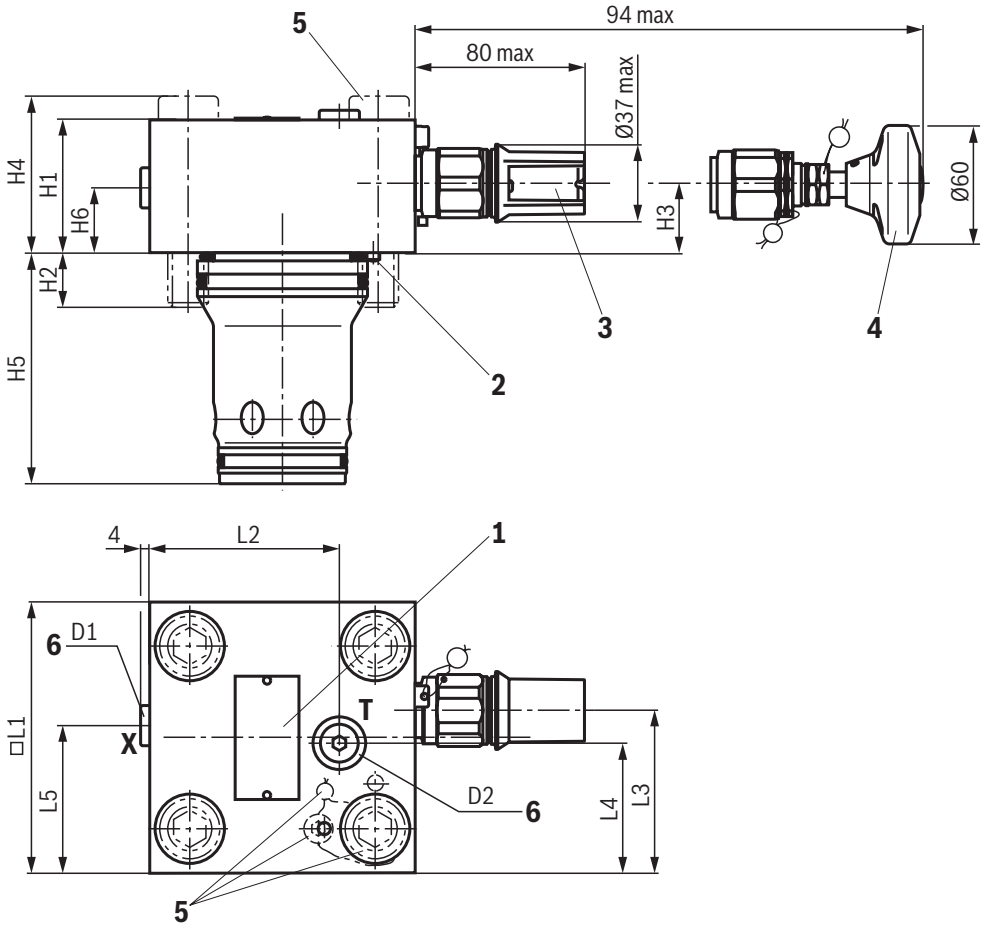


Other approved hydraulic fluids (see page 5)
(simulated; kinetic viscosity 40 mm²/s)



Notes:
- The flow values only apply for depressurized pilot oil return.
- Operating points in the gray areas of the characteristic curves are **not** admissible with this valve!
- Observe the admissible flows of the overall system.

Dimensions: Version "DB"
(dimensions in mm)

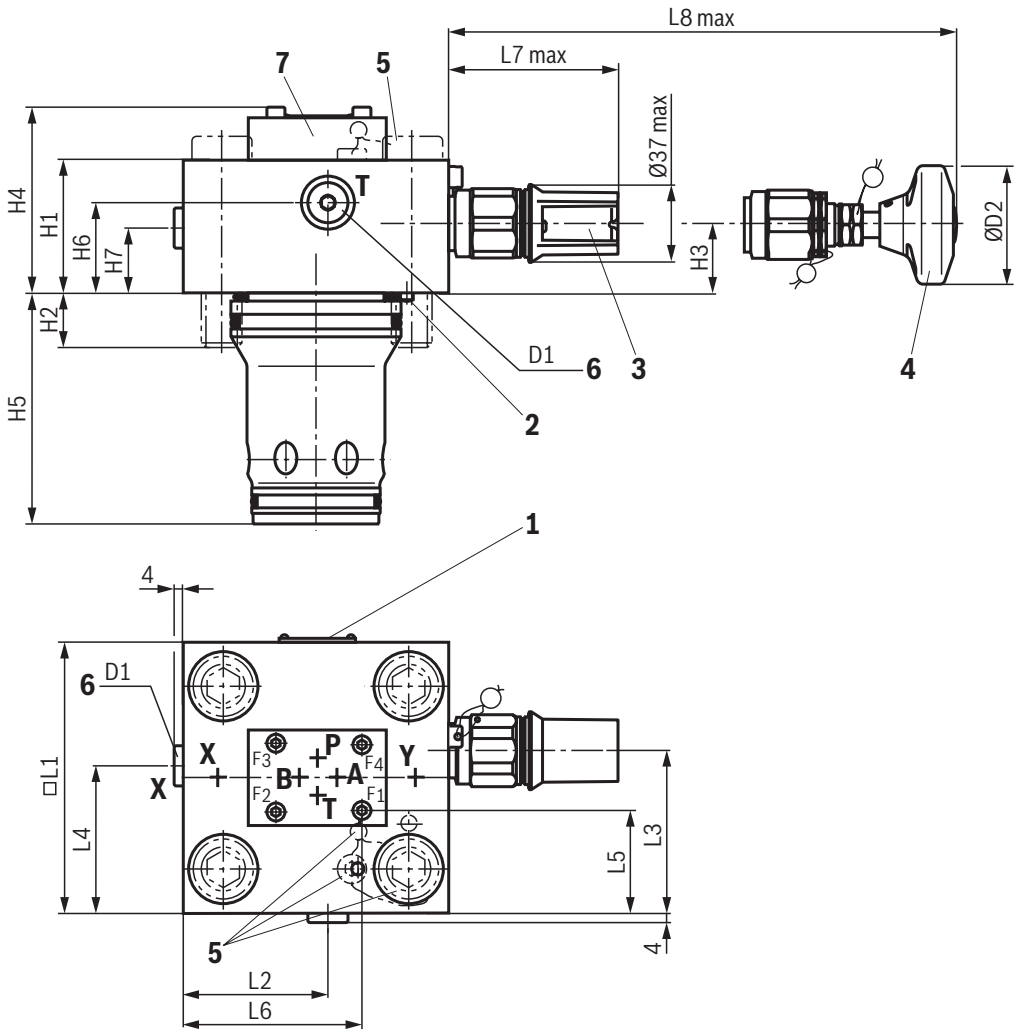


1 Name plate
2 Locating pin
3 Pilot control valve, adjustment type "2"
4 Pilot control valve, adjustment type "1"
5 Valve mounting set, see page 13
6 External connections

NG	40	50	63
H1	60	60	82
H2	32	34	50
H3	27	31	40
H4	69	67	91
H5	105	122	155
H6	28	23	30
□ L1	125	140	180
L2	89	105	144
L3	76	84	90
L4	60	70	90
L5	68	79	90
D1	G1/4	G1/2	G1/2
D2	G1/4	G1/4	G1/2

☞ **Notice:**
The dimensions are nominal dimensions which are subject to tolerances.

Dimensions: Version "DBW"
(dimensions in mm)

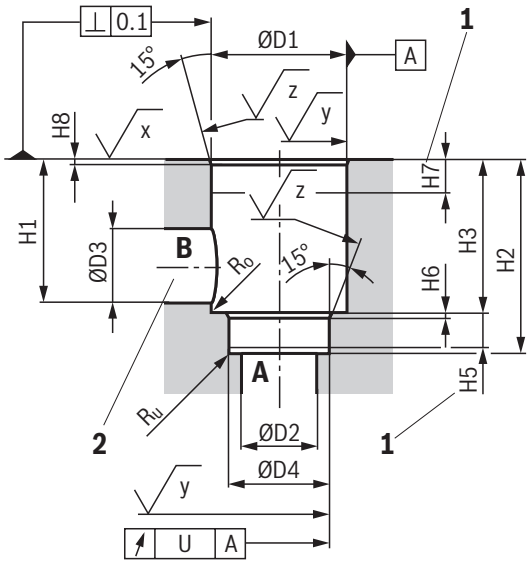


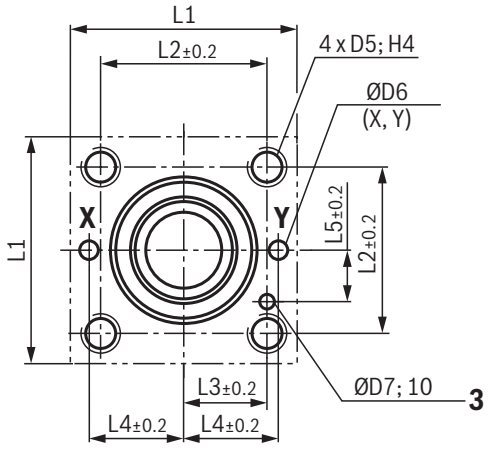
1 Name plate
2 Locating pin
3 Pilot control valve, adjustment type "2"
4 Pilot control valve, adjustment type "1"
5 Valve mounting set, see page 13
6 External connections
7 Cover plate

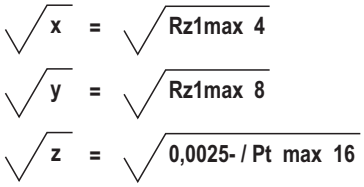
NG	32	40	50	63
H1	50	60	60	82
H2	28	32	34	50
H3	26	27	35	49
H4	75	85	85	107
H5	85	105	122	155
H6	37	40	44	64
H7	26	22	32	30
□ L1	100	125	140	180
L2	60	68	75	95
L3	57	76	84	104
L4	57	66	82	99
L5	35	47	55	75
L6	72	84	92	112
L7	41	80	80	80
L8	57	94	94	94
D1	G1/4	G1/4	G3/8	G1/2
ØD2	37	60	60	60

☞ **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)







NG	32	40	50	63
ØD1H7	60	75	90	120
ØD2	32	40	50	63
ØD3	32	40	50	63
ØD3 max [1]	40	50	63	80
ØD4H7	45	55	68	90
D5	M16	M20	M20	M30
ØD6	8	10	10	12
ØD7H13	6	6	8	8
H1	68.5	84.5	97.5	127
H2	$85^{+0.1}$	$105^{+0.1}$	$122^{+0.1}$	$155^{+0.1}$
H3	$70^{\pm0.3}$	$87^{\pm0.3}$	$100^{\pm0.3}$	$130^{\pm0.3}$
H4	35	45	45	65
H5	13	15	17	20
H6	2.5	3	3	4
H7	30	30	35	40
H8	2.5	3	4	4
H9	1.5	2.5	2.5	3
L1	102	125	140	180
L2	70	85	100	125
L3	35	42.5	50	62.5
L4	41	50	58	75
L5	17	23	30	38
R_o max	2	4	4	4
R_u max	1	1	1	1
U	0.03	0.05	0.05	0.05

[1] Recommendation deviating from the standard.

1 Depth of fit

2 Port B can be positioned arbitrarily, radially to port A, observing the tapped holes and pilot oil bores.

3 Bore for locating pin (main pressure relief valve)

Accessories (separate order)

Valve mounting set (separate order)

Size	Quantity	Consisting of	Material number
32	4	**Hexagon socket head cap screws ISO 4762 - M16 x 60 - 10.9-flZn/nc/480h/C** (thereof 1 special screw with bore) Tightening torque M_A = 240 Nm ±10%	**R901476528**
	1	**Sealing material**	
40, 50	4	**Hexagon socket head cap screws ISO 4762 - M20 x 80 - 10.9-flZn/nc/480h/C** (thereof 1 special screw with bore) Tightening torque M_A = 480 Nm ±10%	**R901362574**
	1	**Sealing material**	
63	4	**Hexagon socket head cap screws ISO 4762 - M30 x 110 - 10.9-flZn/nc/480h/C** (thereof 1 special screw with bore) Tightening torque M_A = 1600 Nm ±10%	**R901362575**
	1	**Sealing material**	

☞ **Notes:**
- For reasons of stability, exclusively the specified valve mounting screws may be used.
- The specified tightening torques were calculated with total friction coefficient μ_{total} = 0.09 ... 0.14; adjust in case of modified surfaces.
- The specified tightening torques stated are guidelines when using screws with the specified friction coefficients and when using a manual torque wrench (tolerance ± 10%).

Safety instructions

- When selecting a type-examination tested safety valve, it must be observed that for the desired response pressure ***p***, the maximum possible flow lies below the admissible flow q_{Vmax}.
  According to the Pressure Equipment Directive 2014/68/EU, the increase in the system pressure due to the discharged flow must not exceed 10% of the set response pressure (see component marking table on page 2).
- The maximum admissible flow q_{Vmax} stated in the component marking must not be exceeded.
- Discharge lines of safety valves must end in a risk-free manner. An accumulation of fluids in the discharge system must **not** be possible
  (see data sheet AD2000 A 2).
- Safety valves with adjustment type "1" (rotary knob) may only be unloaded in case of maintenance!
  Operation outside the specified pressure ranges is not admissible.

☞ **It is imperative to observe the application notes:**
The response pressure with a flow of 12 l/min and a hydraulic fluid viscosity of 46 mm^2/s specified in the component marking is set by default. Within the admissible viscosity range, the response pressure may vary by +3% (230 mm^2/s) to -3% (12 mm^2/s).

- The maximum flow stated in the component marking applies for applications without counter pressure in the control line (port Y).
- By removing the lead seal at the safety valve, the approval according to the Pressure Equipment Directive becomes void!
- The nozzle fittings installed at the factory as well as the main spool compression spring must not be changed.
- Basically, the requirements of the Pressure Equipment Directive and of data sheet AD 2000 A 2 have to be observed!
- In order to prevent unauthorized assembly, the valve assembly can be additionally secured by means of the valve mounting set (sealing) (separate order, see page 10 and 11).

Further information

▶ Type-examination tested safety valves according to Pressure Equipment Directive 2014/68/EU	Operating instructions 21055-B
▶ Safety equipment against excessive pressure – safety valves	Data sheet AD 2000 A 2
▶ Hydraulic fluids on mineral oil basis	Data sheet 90220
▶ Hydraulic valves for industrial applications	Operating instructions 07600-B
▶ Selection of filters	www.boschrexroth.com/filter

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Notes

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Notes

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