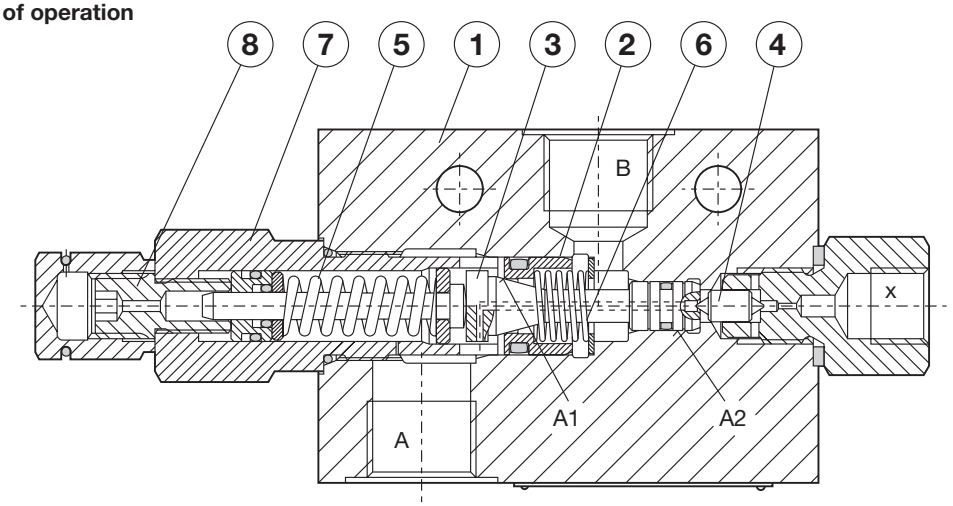
CHECK-Q-METER type BZV

- NS 6
- to 350 bar
- to 60 l/min

- Direct operated
- Hermetically sealing at closed flow path
- Minimum pressure losses when the medium flows from port A towards port B
- When the medium flows from port B towards port A the speed of load lowering is controlled with respect to the medium flow rate supplied to the opposite side of the hydraulic motor or cylinder. With operating cylinders the characteristic ratio of surface areas must be taken into account
- For building into pipe-lines
- Threaded connections to ISO 9974, ISO 1179

BZV-6-D, BZV-6-E

Description of operation



The check-Q-meter is used for maintaining constant speed during the lowering of loads by means of hydraulic cylinders or hydromotors in the systems where load changes with time. It prevents uncontrolled falling of load if defects occur in the pipeline between the directional control valve and the check-Q-meter or if there is no pilot pressure. When it is installed in combination with a directional control valve with negative change-over in intermediate positions, it has the function of a holding valve. If the load on hydraulic cylinders or hydromotors does not change the sign, a single check-Q-meter must be used.
The check-Q-meter consists of a housing (1), main poppet (2), auxiliary spool (3), pilot poppet (4), spring (5), insert housing (7) and setting screw (8).

Technical data

Flow rate		l/min	60
Operating pressure	spring 200 bar	bar	150
	spring 350 bar	bar	270
Pilot pressure	spring 200 bar	bar	4 to 50
	spring 350 bar	bar	6 to 85
Cracking pressure		bar	2,2
Pilot ratio	R=A2/A1-A2		4,25
Oil temp. range		°C	-20 to +70
Viscosity range		mm^2/s	15 to 380
Filtration		NAS 1638	8
Mass	BZV-6-E	kg	1,5
	BZV-6-D	kg	2,4

Lifting the load
The hydraulic fluid flows from port A towards port B with minimum pressure losses, the main poppet (2) being lifted.
In the case of a pressure drop and an interruption in the hydraulic fluid supply to port A, the main poppet (2) closes, holding the load in position.
Lowering the Load (see also the hydraulic circuit diagram with differential cylinder, page 11.4.2). With the directional control valve in position (a) the hydraulic fluid flows to the annulus side of the hydraulic cylinder, which provokes a certain pilot pressure on the auxiliary spool (3). The check-Q-meter opens and thereby a free hydraulic fluid flow from port B towards port A occurs, when the main poppet (2) leans against the insert housing (7), where as the auxiliary spool (3) still performs a part of the controlled move which depends on the quantity of the hydraulic fluid supplied in a unit of time to the annulus side of the operating cylinder. In the opening direction, also the load pressure works on the circle of the predefined surface. The pilot pressure required for the opening of the check-Q-meter is

$$\text{required pilot press.} = \frac{\text{safety valve setting - load pressure}}{4{,}25}$$

In case that the hydraulic cylinder piston starts to move faster than permitted by the hydraulic fluid supply, the pilot pressure on the port X drops and the auxiliary spool (3) under the effect of spring (5) moves in the valve closing and shutting-off direction, respectively.
Because of the reduction in flow cross-section the resistances increase, which causes an increase in the pilot pressure and thereby a larger opening of the check-Q-meter. In this manner, the check-Q-meter is continuously balanced during lowering.
The spring (5) setting force must be set at least 1.3 -times higher than the maximum force due to the operating pressure (pressure due to load):

$$\text{maximum operating pressure} = \frac{350\ \text{bar}}{1{,}3} = 270\ \text{bar}$$

Ordering code

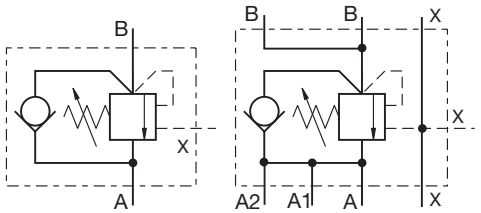
BZV - 6 - - - - - *

- Symbol type
- Control range
- Mounting method
- Seal type
- Special requirements to be briefly specified

Symbol type

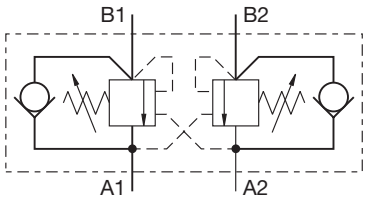
BZV-6-E = E

single
check-Q-meter

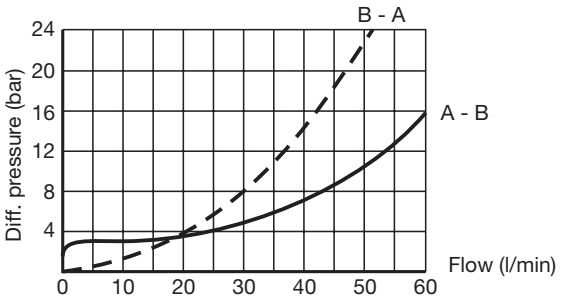


BZV-6-D = D

double
check-Q-meter



Δp - Q Performance curves
(measured at t = 50 °C and υ = 32 mm²/s)



Control range

from 60 to 200 bar **= 200**
from 100 to 350 bar **= 350**

Mounting method

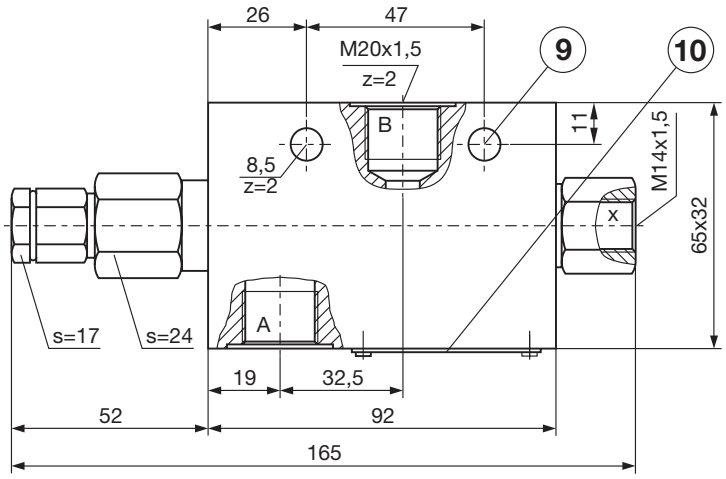
building into pipeline (M20x1,5 / M14x1,5) **= C**
building into pipeline (G3/8) **= CG**
building direct on hydraulic cilinder **= CDG**

Seal type

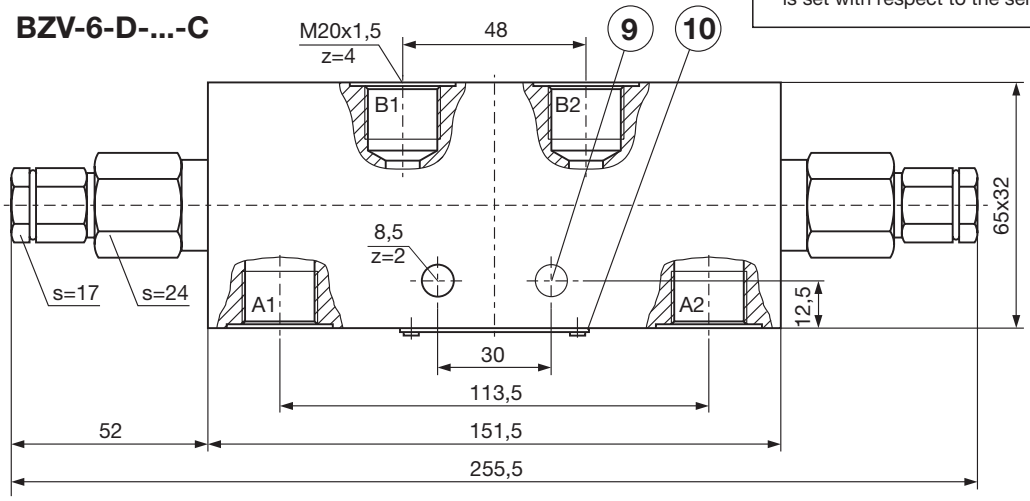
NBR seals for mineral oil HL, HLP, to DIN 51524 **= no desig.**
FPM seals for HETG, HEES, HEPG to VDMA 24568 and ISO 15380 **= E**

Dimensions (mm)

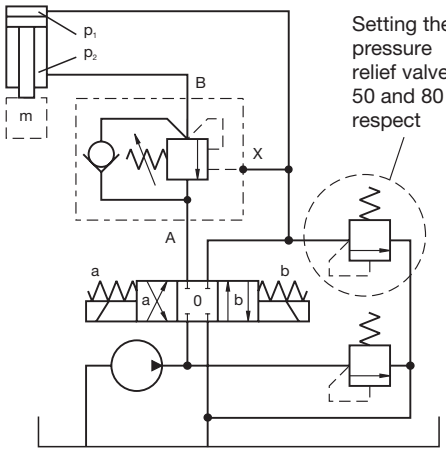
BZV-6-E-...-C



BZV-6-D-...-C



Circuit diadgram with hydraulic cylinder



Setting the pressure relief valve to 50 and 80 bar, respect

Because of the multiplication of pressure in hydraulic cylinder by the difference of surface areas

$$p_2=p_m+p_1 x \varphi \qquad \varphi=\frac{A1}{A2}>1$$

it is recommended to protect the circuit by means of a pressure relief valve, the cracking pressure of which is set with respect to the selected spring (5) in the

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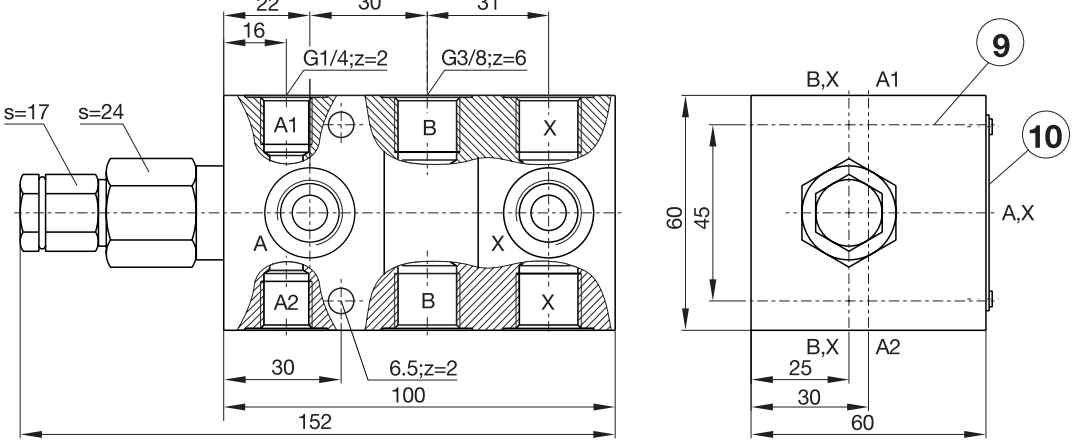
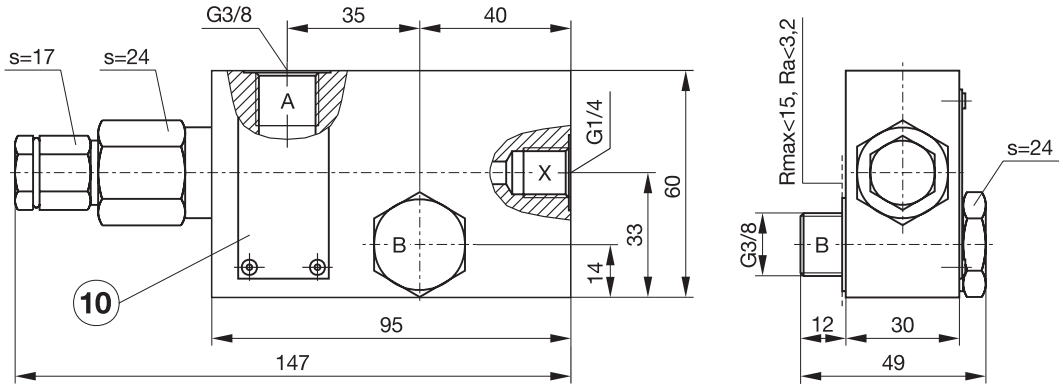
BZV-6-E-...-CG



BZV-6-E-...-CDG

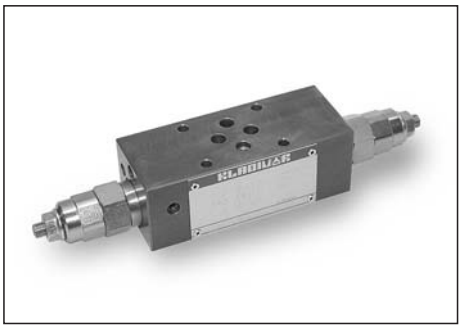


9. Fixing screw
10. Nameplate

CHECK - Q - METER MODULAR VALVE type VP-BZV

- NS 6
- to 350 bar
- to 30 l/min

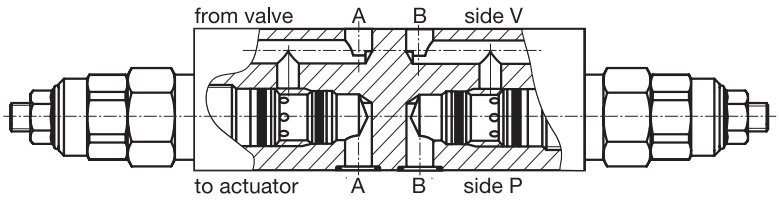
- Connecting dimensions to ISO 4401
- Modular plate design for vertical stacking
- Hight and width of the valve according to ISO 7790



VP-BZV-6

Operating description

Modular check-Q-meter valve in combination with other stacking elements gives static and dynamic load control by regulating the flow into and out of hydraulic actuators. It prevents load uncontrol run away and allows thermal expansion relief of the hydraulic fluid.
Flow in line B (A) from side P to V is allowed when the required pilot pressure in line A (B) is induced. For stabile valve function the valve must be set (P_S) at least 1.3 - times higher than maximum expected load pressure (P_L).



$$P_R = \frac{P_S - P_L}{R}$$

P_R ..... Required pilot pressure (bar)
P_S ..... Counterbalance valve setting (bar)
P_L ..... Load pressure (bar)
R ..... Pilot ratio

Technical data

Nominal size		6
Flow rate	l/min	30
Operating pressure	bar	270
Cracking pressure	bar	1
Oil temperature range	°C	-20 to +70
Oil viscosity range	mm^2/s	15 to 380
Filtration	NAS 1638	8
Weigh (double valve)	kg	1,8
Weigh (single valve)	kg	1,3

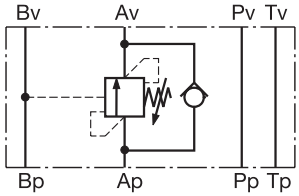
Ordering code

VP - BZV - 6 - - - 04 - - - *

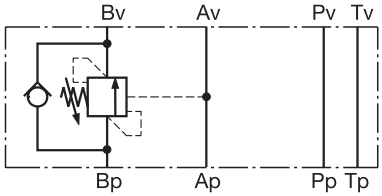
Nominal size
Built in valve type
Pressure setting range
Pilot ratio
Tamperproff cap
Seal type
Special requirements to be briefly specified

Built in valve type

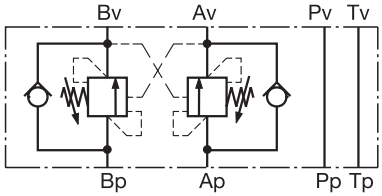
Single standard type valve
= EAN



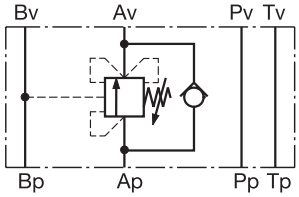
Single standard type valve
= EBN



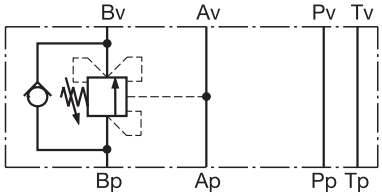
Double standard type valve
= DN



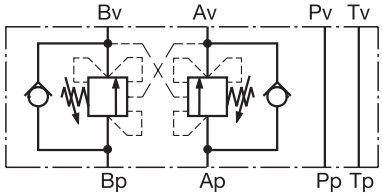
Single relief compensated type valve
= EAP



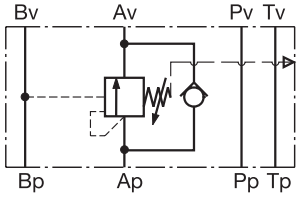
Single relief compensated type valve
= EBP



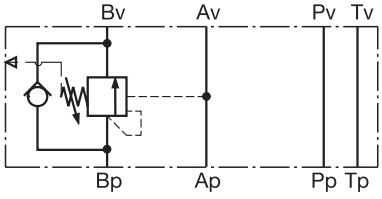
Double relief compensated type valve
= DP



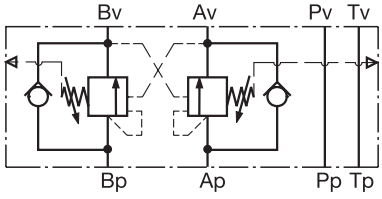
Single atmospheric vented type valve
= EAT



Single atmospheric vented type valve
= EBT



Double atmospheric vented type valve
= DT



Pressure setting range

Code	Adj. pressure range [bar]	Pressure increase [bar/turn]	Standard setting [bar (Q=5l/min)]
20	100-210	109	200
35	200-350	137	350

Pilot ratio

- Standard pilot ratio 4:1 = 04

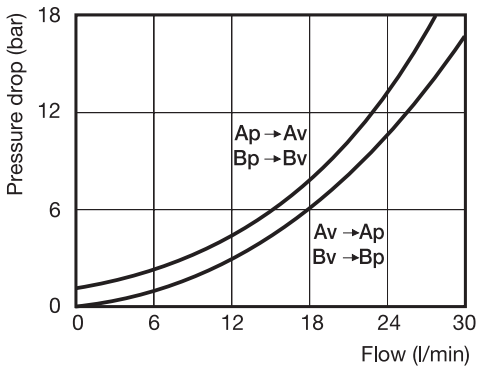
Tamperproff cap

- Without tamperproff cap = no desig.
- With tamperproff cap = RC

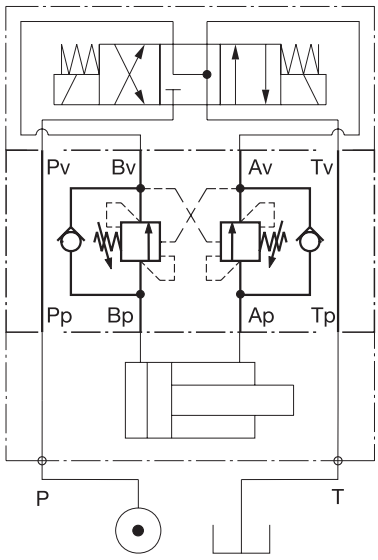
Seal type

- NBR seals for mineral oil HL, HLP, to DIN 51524 = no design.
- FPM seals for HETG, HEES, HEPG to VDMA 24568 and ISO 15380 = E

Δp-Q performance curve
(measured at t= 50 °C and υ= 32 mm²/s)

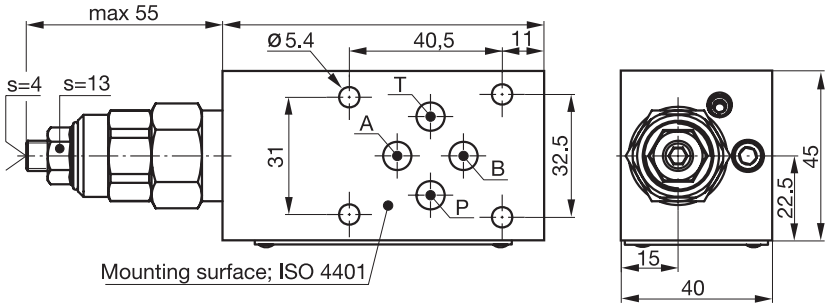


Mounting example

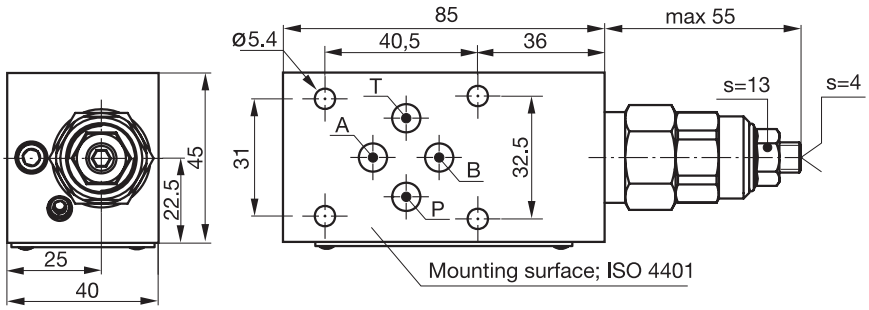


Dimensions (mm)

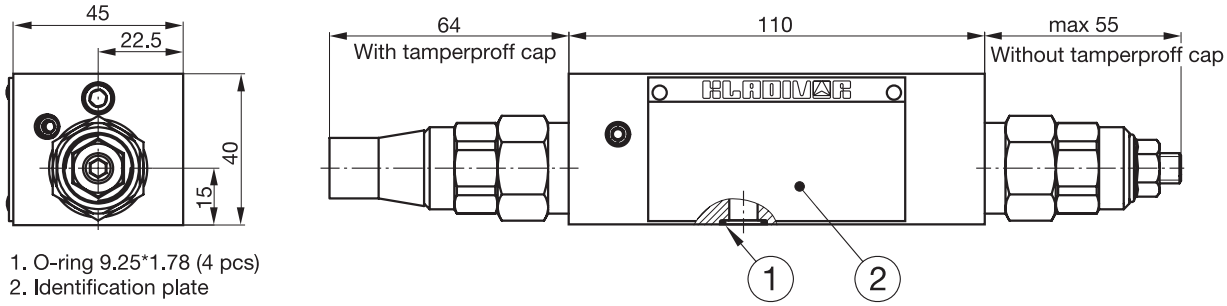
Dimensions for EAN, EAP and EAT valves



Dimension for EBN, EBP and EBT valves



Dimension for DN, DP and DT valves



1. O-ring 9.25*1.78 (4 pcs)
2. Identification plate

Required quality of the mating surface