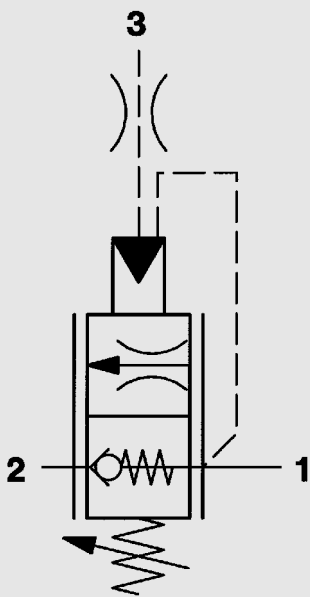


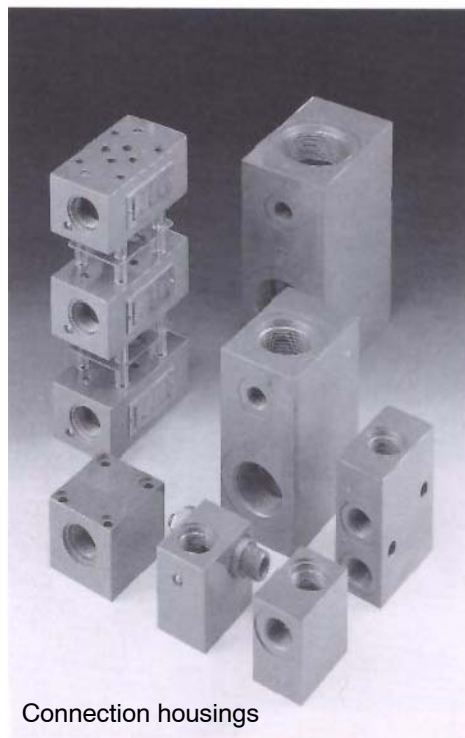
Over-Centre Valves SBVE



up to 350 bar
up to 100 l/min



Cartridge valves



Connection housings

1. DESCRIPTION

1.1. GENERAL

HYDAC over-centre valves SBVE belong to the group of check valves. These are valves for oil-hydraulic systems, on which the shut-off function can be cancelled hydraulically or when a particular setting pressure is reached.

Over-centre valves perform the following functions:

- Control the speed of the user unit according to the inlet flow.
 - Prevent user unit speeding ahead if there are retracting loads.
 - Flow paths closed in shut-off position, therefore user units are held in position.
 - Restrict user unit pressure (max. load pressure) to the respective setting pressure.
 - Act as a hose break valve if the user supply line or control line break.
 - Allow free inlet flow to user unit due to built-in check valve.
- Further advantages are:
- Cartridge valves with standardised installation dimensions.
 - Compact design allows direct installation in cylinder bases, control blocks, housings etc.
 - Optimum system adaptation due to two sizes.

1.2. FUNCTION

HYDAC over-centre valves SBVE are direct-operated piston seat valves for oil-hydraulic systems. They enable smooth action in users if there are retracting or extending loads.

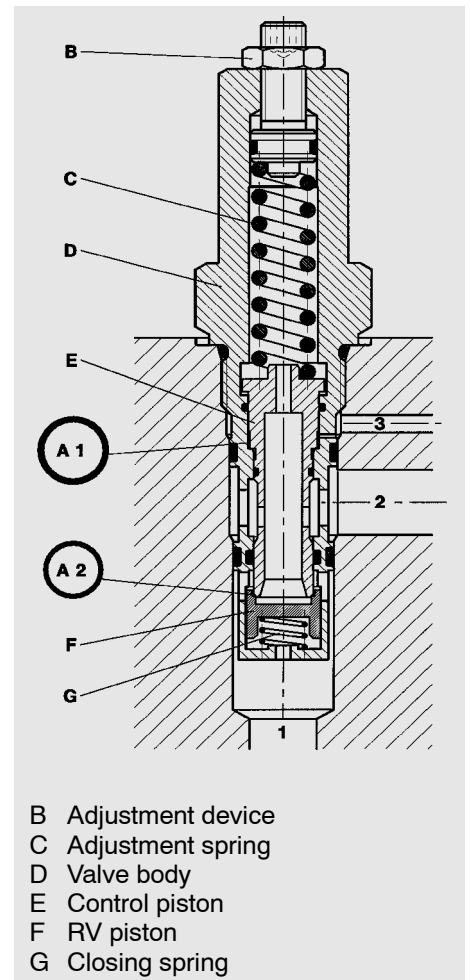
The valves basically consist of a valve body, check valve piston (RV piston), closing spring, adjustment spring, the adjustment device for setting the spring tension and a hardened and polished control piston.

To raise the load, flow is permitted through the valve from port 2 to port 1 via the built-in check valve. The RV piston is thereby pushed against the closing spring and frees the corresponding cross-section for low-loss flow.

In the shut-off position the user unit is held in place. The RV piston is thereby pushed against the control piston by the resulting load pressure and seals at the seat edge. It must be ensured that the control port 3 is released of pressure in the shut-off position.

The user pressure (load pressure) across port 1 acts within the valve on a control piston ring surface A 2 and therefore against the force of the adjustment spring. The control piston moves up and away from the RV piston so that flow is permitted through the valve from 1 to 2. It is therefore possible to restrict the user pressure (load pressure). The maximum user setting pressure should be at least **20 %** above the highest load pressure occurring during normal operation (see point 2.2.10).

When the load is lowered (flow direction from port 1 to port 2) the valve is controlled via the feed pressure resulting at control port 3. The load flow rate is controlled at the leading edge of the control piston according to the user unit's feed pressure (supply flow rate). The load cannot therefore speed ahead.



B Adjustment device
C Adjustment spring
D Valve body
E Control piston
F RV piston
G Closing spring

1.3. APPLICATION

HYDAC over-centre valves SBVE are used in conjunction with double-acting user units (cylinders, hydraulic motors) for safety and control functions.

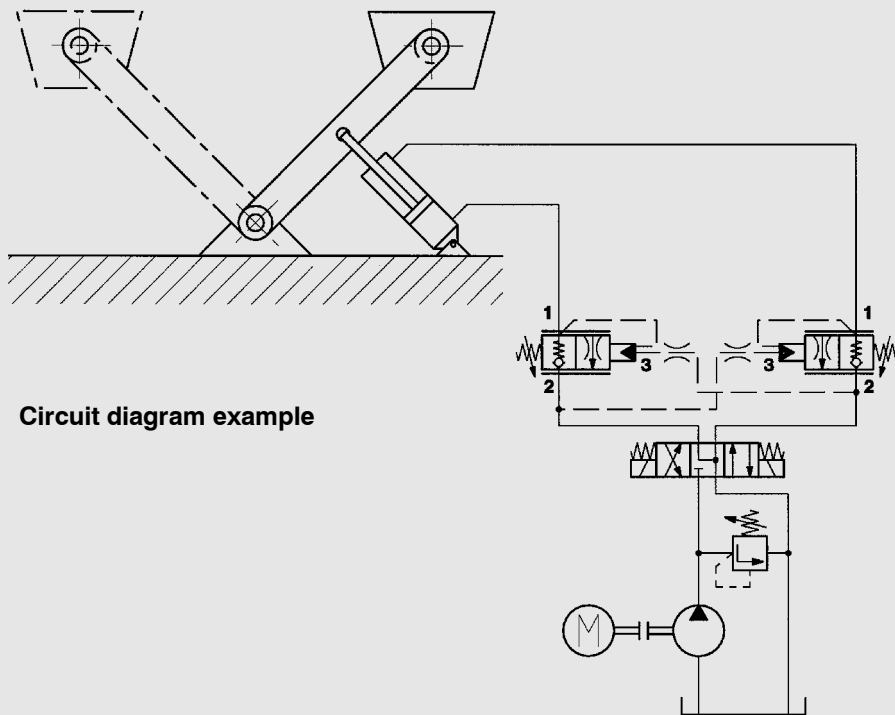
An over-centre valve SBVE must always be fitted to the user outlet side, i.e. where the direction of load and movement changes, an over-centre valve must be used at each user outlet.

HYDAC over-centre valves SBVE carry out controlled load lowering and speed control where the load direction changes (no speeding ahead of the load), as well as acting as safety valves for load holding purposes (pipe and hose break protection).

Usual areas of application are:

- Elevating platforms
- Mobile hydraulics
- Loading cranes
- Fork-lift trucks
- Cable winches
- Injection-moulding machines
- Steel industry
- Off-shore industry
- Ship-building industry

1.4. RECOMMENDATIONS



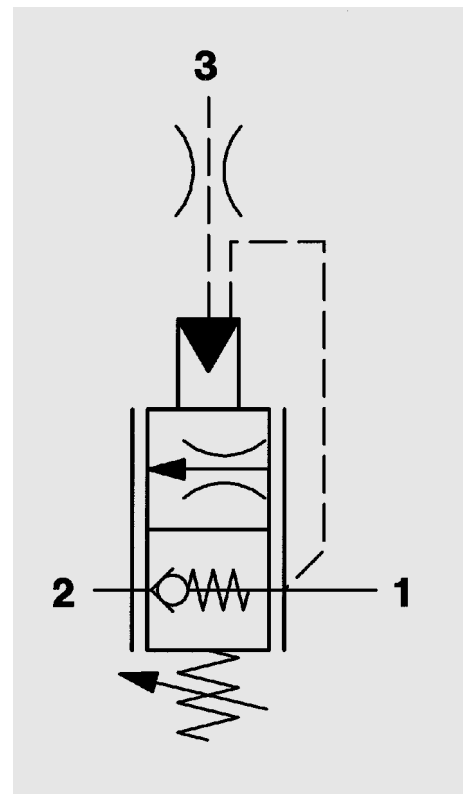
Circuit diagram example

- When fitting the valves into control blocks and housings the recommended torque ratings must be taken into account (see point 3).
- Dynamic pressure across port 2 acts against the control pressure across port 3 (see point 2.2.11).
- When selecting an appropriate directional valve it must be ensured that the control line (port 3) is released in the load holding function and port 2 is connected to the tank in order to guarantee the load pressure safety (see circuit diagram example).
- To avoid unwanted and uncontrolled movements of a loaded user unit in the event of line breaks, e.g. if a hose breaks on weighted cylinders, the over-centre valves must be positioned between the line and the user unit to be protected. This can be achieved by fitting the valve directly in the cylinder base.

2. TECHNICAL SPECIFICATIONS

2.1. GENERAL

2.1.1. Designation and symbol Over-centre valve



2.1.2. Model code

(also order example)

SBVE - R!@ 01 X - 200 V

Over-centre valve _____

Size _____

R!@

R 1

Type _____

01 = technical specifications as per this brochure

11 = control surface ratio $j = 7.5$
(only on SBVE-R!@)

Series _____

(determined by manufacturer)

Setting pressure _____

(see point 2.2.10.)
if no details are given, valve will not be pre-set

Type of adjustment _____

V ... can be adjusted (standard)

Standard models

Stock no. (= order no.)	Model code
710100	SBVE-R!@01X-XXXV
710101	SBVE-R1 -01X-XXXV

Please quote stock number when ordering.
Delivery for non-standard models is longer and the price is higher.

2.1.3. Type of construction

Piston seat valve,
direct-operated

2.1.4. Type of mounting

Cartridge valve

2.1.5. Mounting position

Optional

2.1.6. Weight

SBVE-R1/2 ... 0.20 kg
SBVE-R1 ... 0.77 kg

2.1.7. Direction of flow

From 2 to 1 free flow
From 1 to 2 valve shut-off

Pressure relief function if the setting pressure is exceeded. The shut-off function can be cancelled hydraulically (pressure across port 3).

2.1.8. Ambient temperature range

Min. - 20 °C
Max. + 80 °C

2.1.9. Materials

Valve body:
free-cutting steel
RV piston:
high tensile steel
Control piston:
hardened and polished steel
Seals:
FPM and PTFE

2.1.10. Type of connection

Suitable connection housings with installation dimensions 08021 and 16021 are available (see separate housing brochure No. E 5.252.../..)

2.2. HYDRAULIC DETAILS

2.2.1. Nominal pressure

$p_N = 350$ bar
across all ports

2.2.2. Pressure fluid

Hydraulic oil to DIN 51524
Part 1 and 2

2.2.3. Temperature range of pressure fluid

Min. - 20 °C
Max. + 80 °C

2.2.4. Viscosity range

Min. 2.8 mm²/s
Max. 380 mm²/s

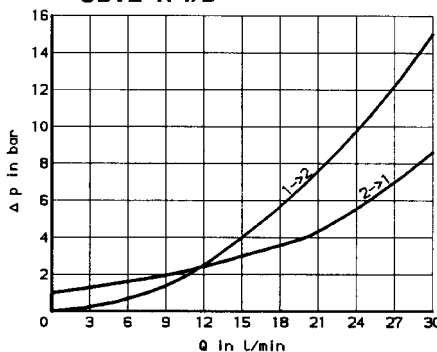
2.2.5. Filtration

Max. permissible contamination level of the operating fluid to ISO 4406 class 21/19/16 (NAS 1638 Class 10). We therefore recommend a filter with a minimum retention rate of $b_{20} \geq 100$. The fitting of filters and regular replacement of elements guarantees correct functioning, reduces wear and tear and increases the service life.

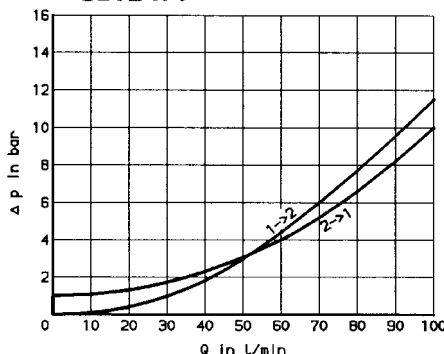
2.2.6. Pressure drop, dependent on flow rate

Measured at $v = 36$ mm²/s and $t_{oil} = 45$ °C

SBVE-R 1/2



SBVE-R 1



2.2.7. Cracking pressure

Flow direction from 2 to 1
 $p_o = 1$ bar

2.2.8. Control volume

SBVE-R1/2 ... 0.05 cm³
SBVE-R1 ... 0.20 cm³

2.2.9. Control surface ratio

(Control ratio)

$$\varphi = \frac{A_1}{A_2}$$

SBVE-R 1/2-01X ... $\varphi = 4.6$

SBVE-R 1/2-11X ... $\varphi = 7.5$

SBVE-R 1 -01X ... $\varphi = 4.8$

2.2.10. Setting pressure p_e

The adjustment spring must be set to a value at least 1.2 times higher than the pressure (load pressure) required to move max. load.

p_e = setting pressure in bar
 p_1 = maximum pressure to move the maximum load (load pressure) in bar.

$$p_{1max} = p_n = 350 \text{ bar}$$

$$p_e \geq p_1 \times 1.2$$

$$p_e = \text{max. } 420 \text{ bar}$$

$$p_{emin} = 50 \text{ bar}$$

2.2.11. Control pressure p_{co}

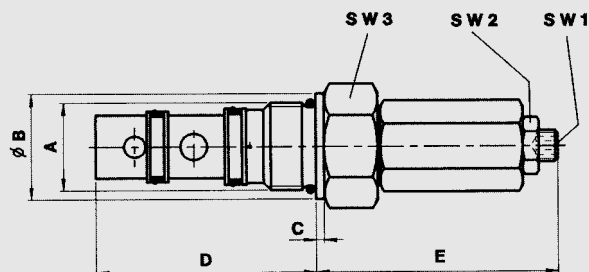
Calculation of the required control pressure p_{co} across port 3 to cancel the shut-off function of the valve (free flow from 1 to 2)

p_{co} = required control pressure in bar across port 3 to cancel shut-off

p_2 = pressure across port 2 in bar

$$p_{co} = \frac{p_e - p_1}{\varphi} + p_2$$

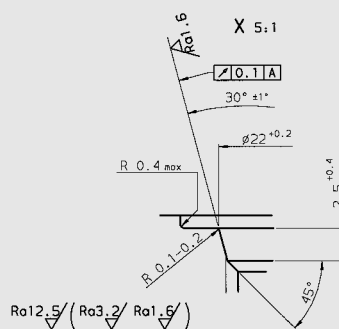
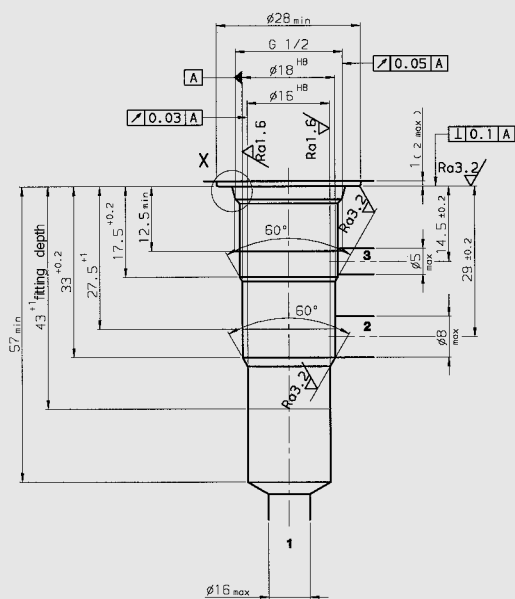
3. DIMENSIONS



Nominal size	A (ISO 228)	ØB	C	D	E _{max}	SW1	SW2	SW3	Torque (SW3)
SBVE-R1/2	G 1/2	24	4	56.5	56	4	13	24	30 + 5 Nm
SBVE-R1	G 1	40	3	82	94	6	19	41	150 +10 Nm

3.1. INSTALLATION DIMENSIONS FOR CARTRIDGE VALVES

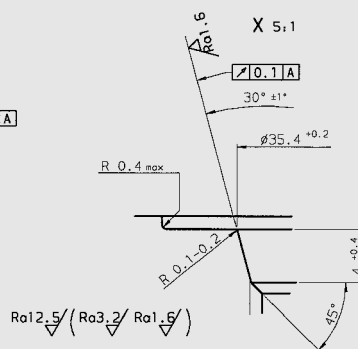
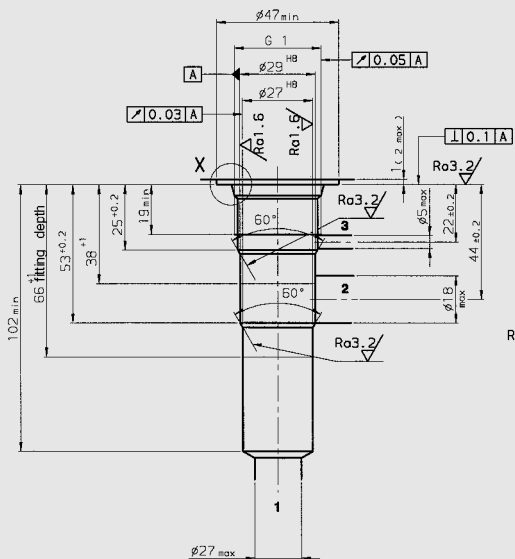
Installation dimensions 08021 (SBVE-R 1/2)



Cartridge form tools

Tool	Stock no.
Countersink	170031
Reamer	169962
Tap	1002667
Plug gauge	169939

Installation dimensions 16021 (SBVE-R 1)



Cartridge form tools

Tool	Stock no.
Countersink	170035
Reamer	169965
Tap	1002661
Plug gauge	174879

The information in this brochure relates to the operating conditions and applications described. For applications or operating conditions not described, please contact the relevant technical department. Subject to technical modifications.