

# Safety for Hydraulics

## Leak-free double check valve, pilot operated, series DERV

Cartridge type, two stage



DERV 8

DERV 10

### 1 General description

- spring-closed, pilot-operated, cartridge-type poppet valve
- it holds the load in neutral position without leakage
- prevents a load from falling if a burst occurs in feed pipe A or B

- DERV 8: hardened seat and poppet
- DERV 10: hardened and ground seat and poppet
- prevents creep of hydraulically clamped actuators
- working circuits can be shut-off in either direction and their pressure maintained

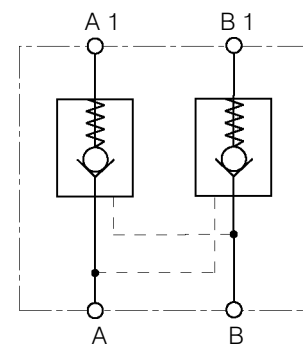
### 2 Advantages

- pilot-operated check valve and pipe-rupture valve function integrated in one unit
- soft opening thanks to optimized decompression (pre-opening) function
- suitable bodies with threaded ports or a combination of threaded/manifold ports are available – please consult Bucher Hydraulics
- minimal space requirement thanks to compact design

### 3 Application

- for direct installation in cylinders
- for installation in manifold block designs
- as a line-mounting valve installation kit

### 4 Symbol



### 5 Main characteristics (for applications outside these parameters, contact Bucher Hydraulics)

#### 5.1 General

Type	spring-closed poppet valve with hydraulic piloting
Mounting method	screw-in cartridge
Ports	DERV 8 A, A1, B, B1 = $\varnothing$ 8 mm DERV 10 A, A1, B, B1 = $\varnothing$ 10 mm
Mounting position	any
Flow direction	A → A1, B → B1 free flow A1 → A, B1 → B blocked flow is enabled by pressure in the opposite line
Weight	DERV 8 0.5 kg DERV 10 0.87 kg
Opening ratio	$\frac{\text{pilot piston area}}{\text{pilot spool area}} = \frac{18}{1}$
Opening pressure	$\frac{\text{load pressure}}{18} + 3 \text{ bar}$
Closing pressure	3 bar

## 5.2 Hydraulic characteristics

Size	8, 10
Rated flow rate	
DERV 8	70 l/min.
DERV 10	100 l/min.
Working pressure max.	350 bar
Load pressure (A1/B1) closed position max.	500 bar
Hydraulic fluids	Mineral oil to DIN 51524 and DIN 51525 (HL/HLP). Other fluids - consult Bucher Hydraulics
Operating temperature range	-20°C...+80°C, for other temperatures, consult Bucher Hydraulics
Temperature rating - seal materials	
Nitrile (standard)	-20°C...+80°C
Nitrile (low temperature)	-50°C...+80°C
Viton	-20°C...+200°C
Viscosity range	10 - 380 mm <sup>2</sup> /s (cSt) recommended
min. viscosity	2.8 mm <sup>2</sup> /s (cSt)
max. viscosity	1500 mm <sup>2</sup> /s (cSt)
Filtration/cleanliness class	NAS 1638 class 9, $\beta$ 10 $\geq$ 75 ISO 4406 class 18/15

## 6 Safety information

- this valve must only be used for the purpose for which it has been designed
- before removing or disassembling the valve, all hydraulic pressure must be vented from the system - double check!
- the valve must not be opened without the express permission of the manufacturer.

## 7 Installation information

- observe all port designations (see section 10)
- protect seals against becoming damaged
- observe the tightening torques (see section 10)
- bleed the hydraulic system before putting it into operation

## 8 Functional description, sectional view

### 8.1 Neutral position (load pressure at A1 or B1, ports A and B depressurized)

The control spool and pilot ball are closed from A1 to A and B1 to B, free of leaks, by the force of the compression spring and the load pressure that acts on the rear side of the pilot ball and control spool.

### 8.2 Check valve position (flow from A → A1, B → B1)

If pressure is applied to the valve seat of the control spool via port A or B, the control spool, together with the pilot ball, is opened against the yielding compression spring. When this check valve operates, the control spool moves

in the opening direction but the pilot ball valve, due to its small effective area, does not open.

### 8.3 Hydraulic piloting (flow from A1 → A, B1 → B)

#### 8.3.1 Decompression

When control pressure A or B is being built up, the pilot piston is forced against the pilot ball. If the opening force is greater than the sum of the compression-spring force and the load pressure at the pilot seat, the pilot ball opens and decompresses the pressure behind the control spool.

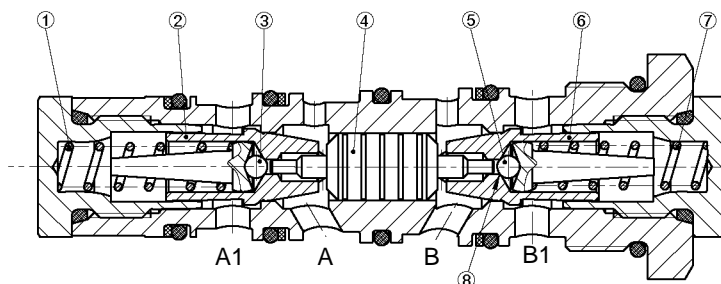
#### 8.3.2 Opening the control spool

Due to the pressure decay (decompression) behind the control spool, the pilot piston now only acts against the yielding compression spring. This means that the control spool is opened by the pilot piston without any great increase in control pressure. Flow from A1 to A or from B1 to B is guaranteed.

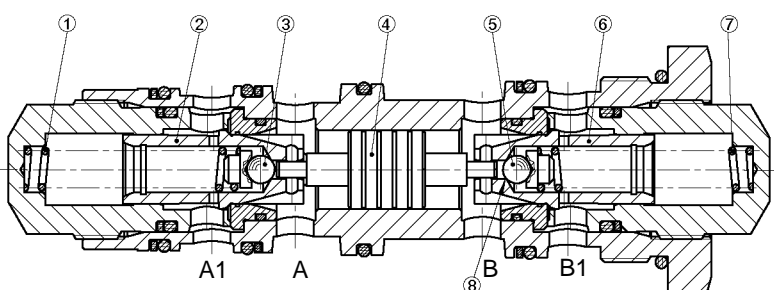
#### 8.3.3 Closing the control spool

When the control pressure is relieved at the pilot piston, the control spool is closed by the force of the spring and the delta p of the decompression fluid flowing through. This means that the closing pressure remains almost constant for all load pressures.

DERV 8



DERV 10



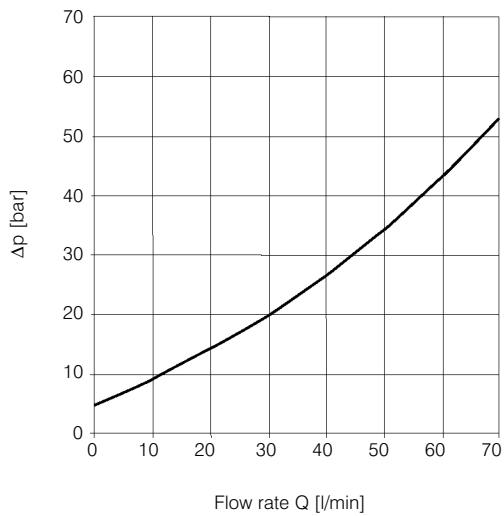
- ① spring
- ② control spool
- ③ pilot ball
- ④ pilot piston
- ⑤ pilot ball
- ⑥ control spool
- ⑦ spring
- ⑧ pilot seat

## 9 Characteristic curves (measured at 33 mm<sup>2</sup>/s (cSt))

### 9.1 DERV 8

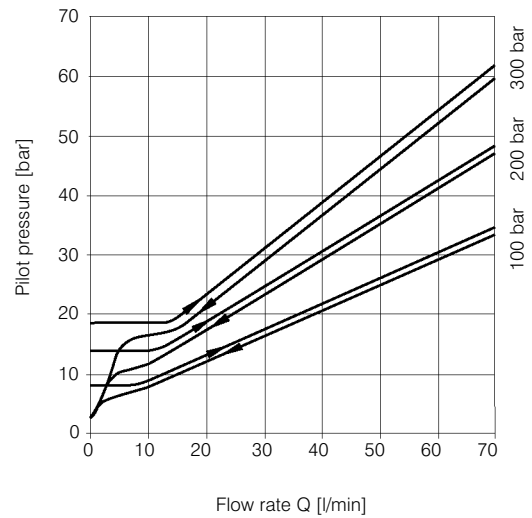
Lift (check valve function) / Lower (fully opened)

A → A1 / A1 → A  
B → B1 / B1 → B



Opening characteristic

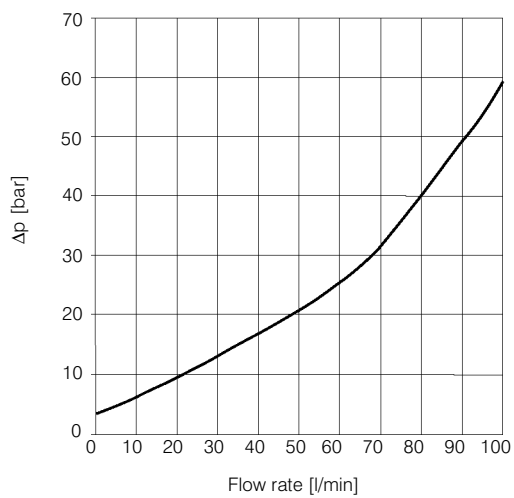
A1 → A  
B1 → B



### 9.2 DERV 10

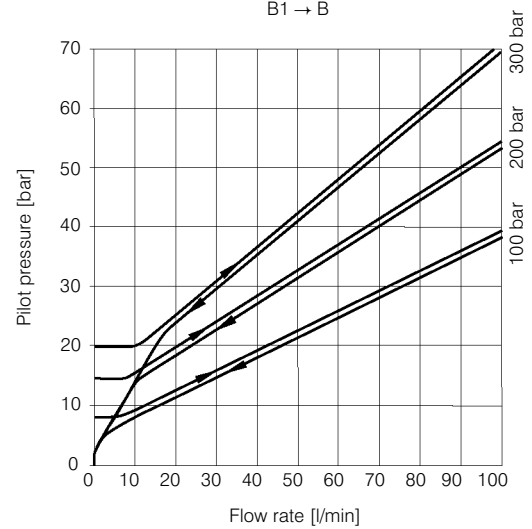
Lift (check valve operation) / Lower (fully opened)

A → A1 / A1 → A  
B → B1 / B1 → B



Opening characteristic

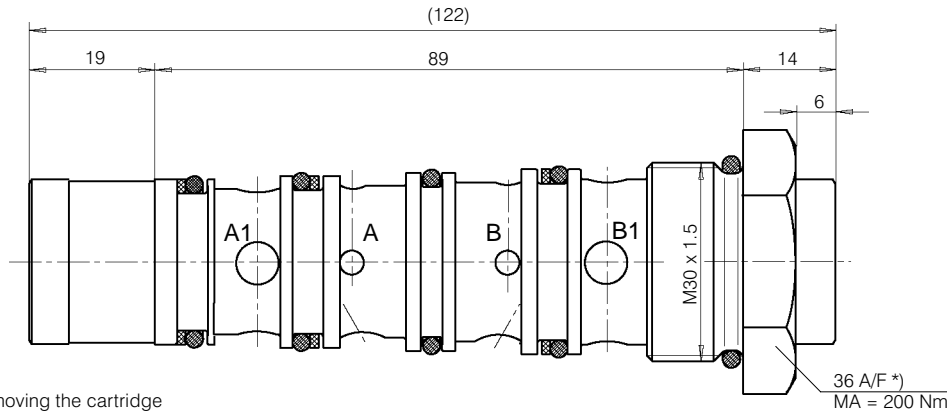
A1 → A  
B1 → B



## 10 Dimensions, mounting cavity

### 10.1 DERV 8

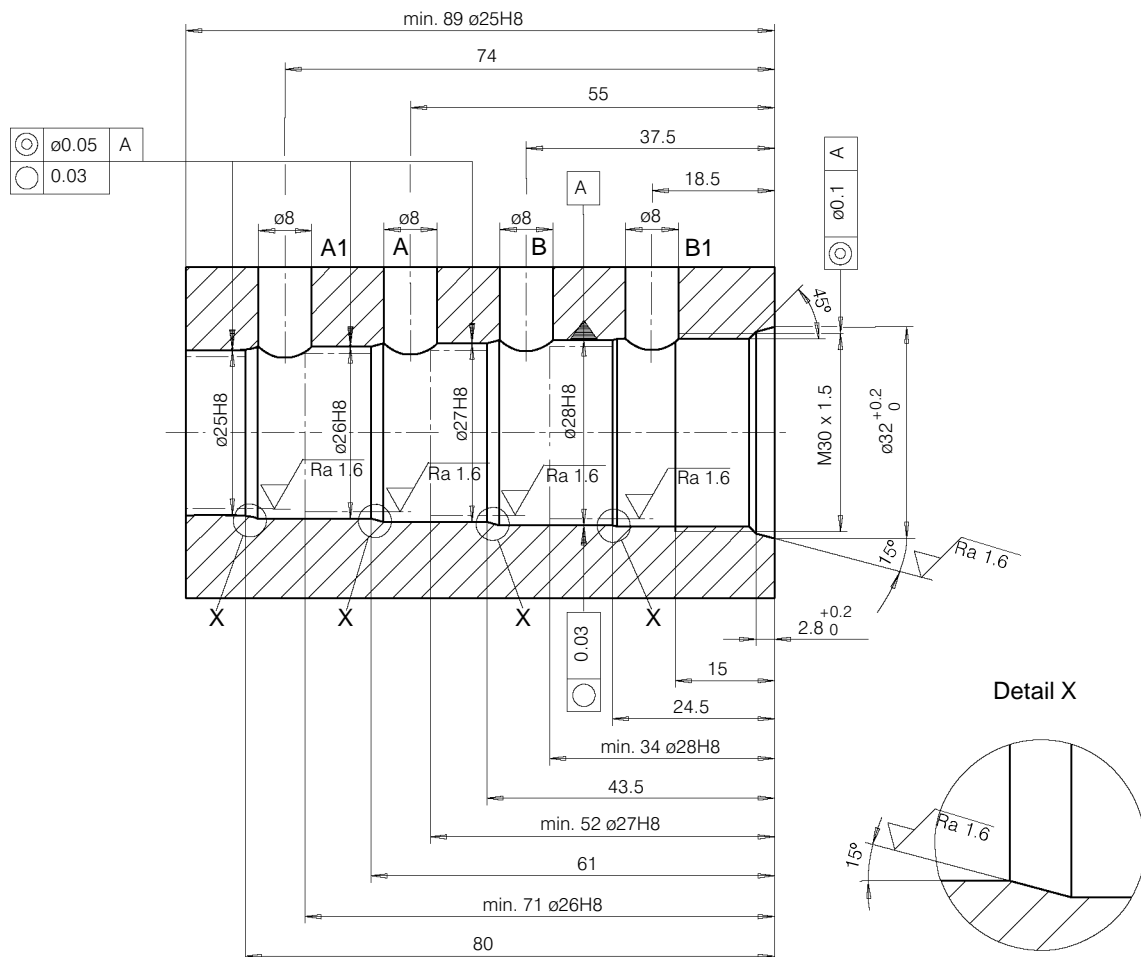
#### 10.1.1 Cartridge



\*) For fitting and removing the cartridge

36 A/F \*)  
MA = 200 Nm

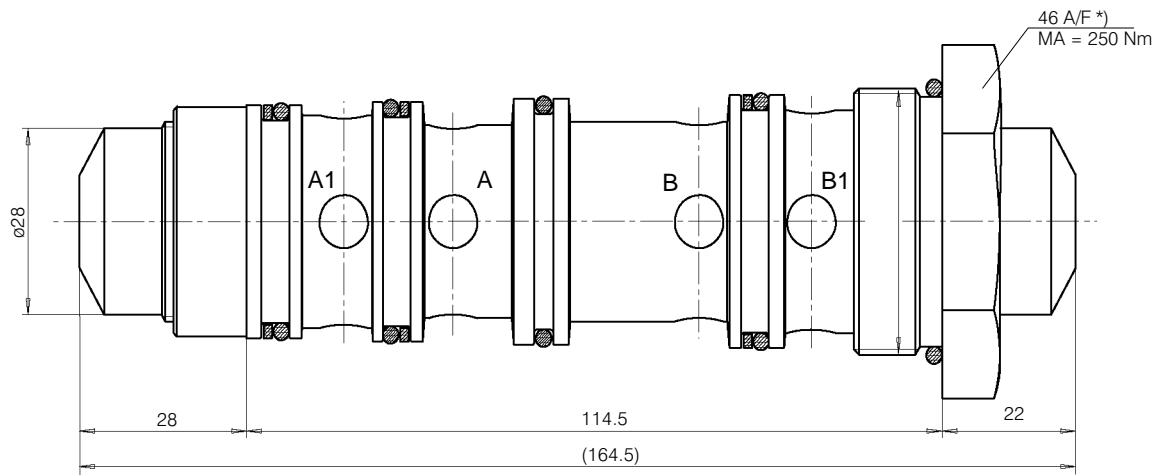
#### 10.1.2 Mounting cavity



**Note:** Bores A, A1, B and B1 can be positioned anywhere around the circumference.

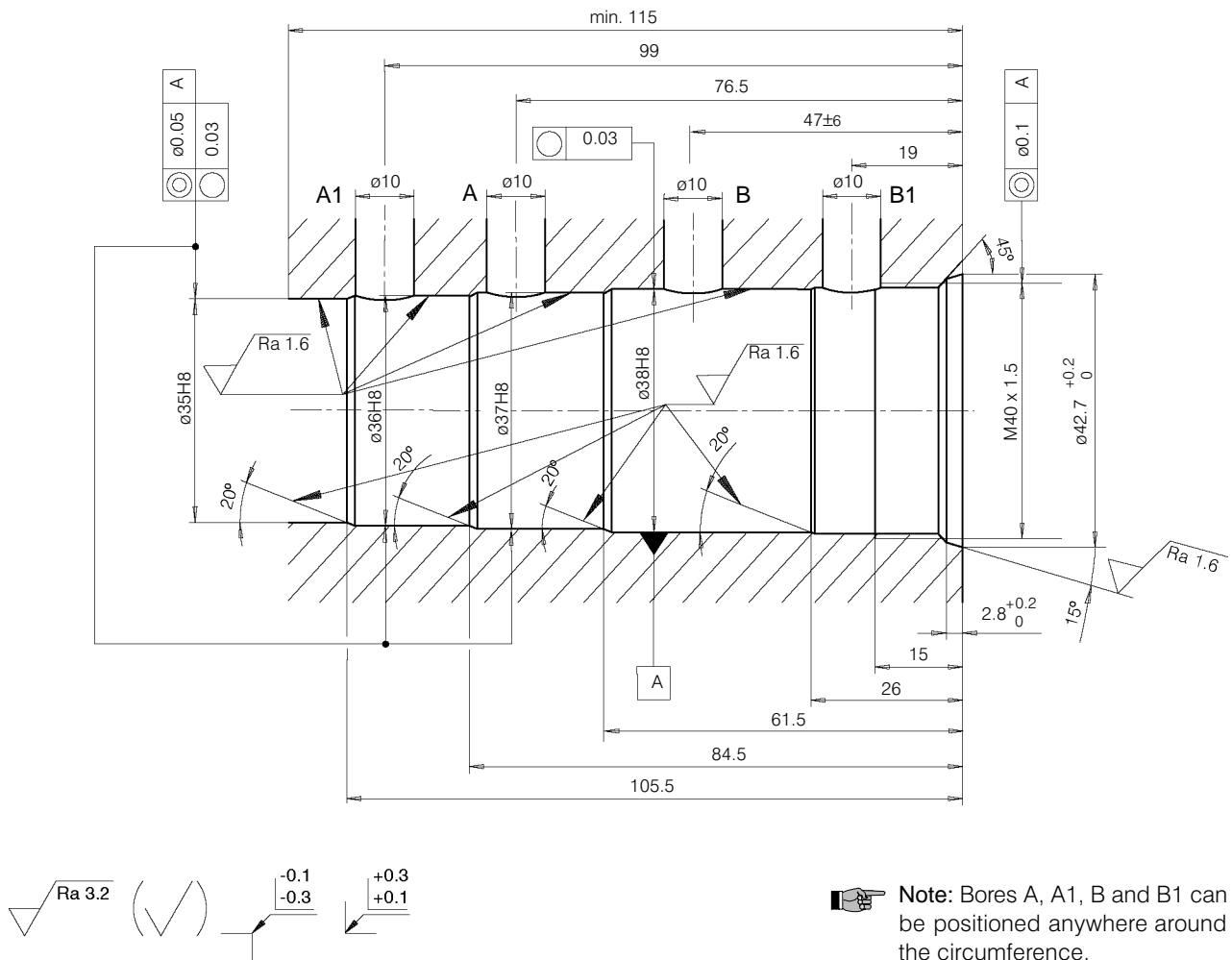
## 10.2 DERV 10

### 10.2.1 Cartridge

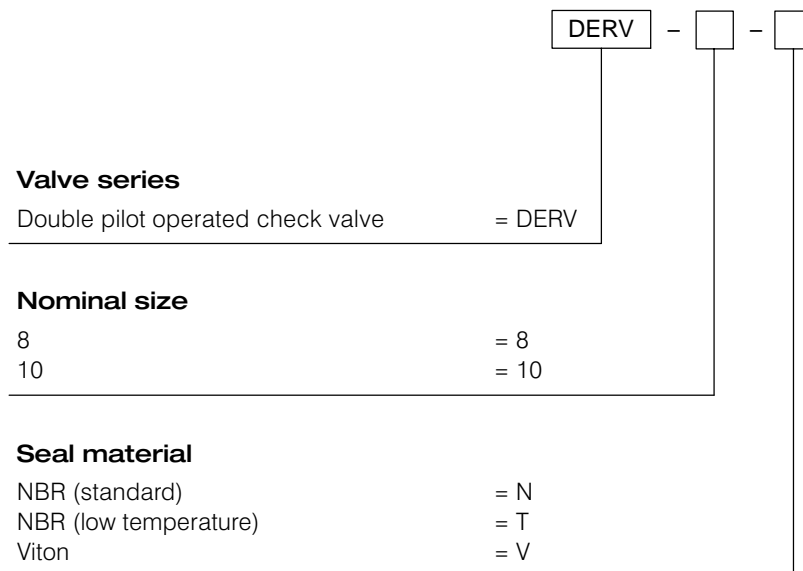


\*) For fitting and removing the cartridge

### 10.2.2 Mounting cavity



## 11 Model code key



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