

# Check valves type CRK, CRB, and CRH

to screw-in into simple to manufacture tapped holes

Pressure  $p_{\max}$  = 500 bar  
Flow  $Q_{\max}$  = 80 lpm

Other valves with similar lay-out:

● Pressure valves type CMV, CSV	D 7710 MV
● Pressure controlled 2-way directional valve type CNE	D 7710 NE
● Check valves and throttles type CAV	D 7711
● Throttle and restrictor check valves type CQ, CQR, and CQV	D 7713
● Flow control valves type CSJ	D 7736
● Pressure reducing valves type CDK	D 7745
● Pressure-dependent shut-off valves type CDSV	D 7876

## 1. General information

These check valves fall into two groups:

- Check valves type CRK (B) and
- Releasable check valves type CRH.

In principle all these valves are to be screwed into simply shaped tapped holes of a manifold body. The sealing of the inlet to the outlet takes place at the contact area between the facial sealing edge of the screwed-in end of the valve body and the stepped shoulder of the core diameter the location thread. Any standard steel drill (point angle 118°) automatically forms this stepped shoulder when the core diameter is drilled. Therefore reaming of the hole and bevels to help the seals slip in are not necessary. The sealing of the attached valve and its fixing at the manifold body are via a sealing nut featuring a special thread seal and an O-ring.

### ● Check valves type CRK and CRB

These valves enable free flow in one direction and block flow in opposite direction. Type CRK blocks in direction of  $B \rightarrow A$ , type CRB in direction of  $A \rightarrow B$ .

For system pressure up to 500 bar and max. flow from 30, 50, and 80 lpm (depending on size). Their field of application are all standard control purposes within hydraulic circuits where directional valves are operated more or less regularly. These check valves must not be utilized in circuits with a high frequent load changes.

### ● Releasable check valves type CRH

These valves enable free flow in direction  $B \rightarrow A$  and block it in direction  $A \rightarrow B$ . The blocked flow direction  $A \rightarrow B$  may be opened hydraulically (released).

For system pressure up to 500 bar and max. flow of 20, 30, and 55 lpm (depending on size).

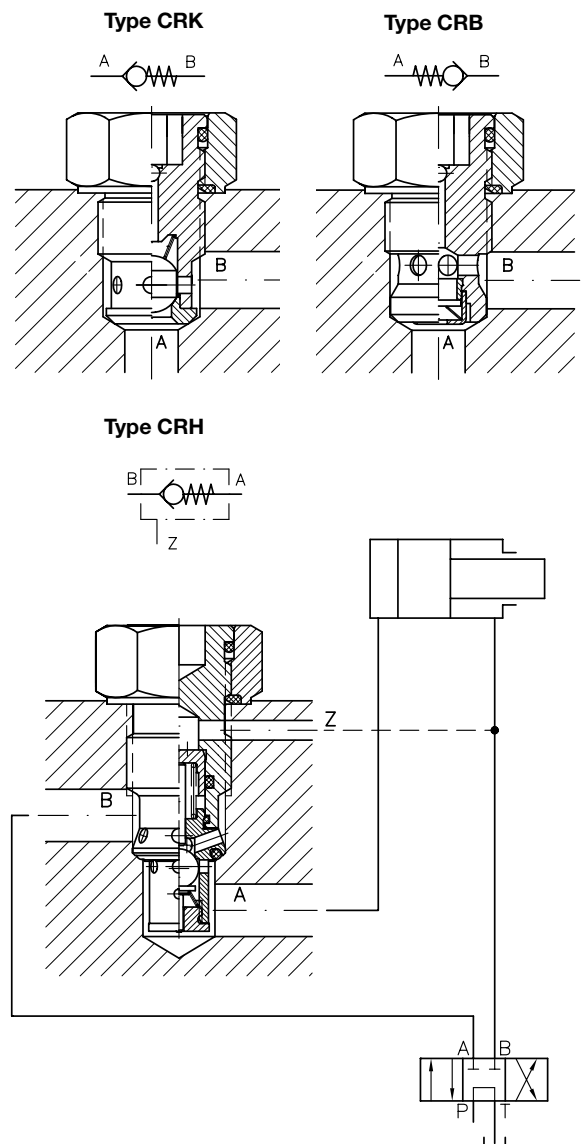
#### Application:

To block circuits with zero leakage where leakagefree hydraulic cylinders are used together with directional spool valves with inherent leakage.

As return flow aid: If the return flow of a double acting cylinder exceeds the permissible flow of the directional valve, due to unequal area ratios, during retracting operations. As a hydraulically drain or idle circulation valve.

The full flow cross-section is quickly opened, when the valve is hydraulically released. The diameter of the control duct in the manifold body should be quite small, giving the same effect as a throttling pipe. This prevents pressure surges, when the valve is quickly opened at high pressure. The throttling section is located in the inlet Z of valves size 3.

Size 3 is also available with pre-release for high pressure and high consumer volumes. A small check valve is opened, sufficiently and smoothly reducing the pressure via the throttle section within the consumer before the main valve is opened. An additional throttle within the control duct increases the effectivity of the pre-release.



## 2. Available versions, main data

Order examples:

**CRK 1 - 1/4**

Check valve

Version with connection block (only with type CRK 1 and CRB 1)

Ports A and B DIN ISO 228/1 (BSPP)

- 1/4 = G 1/4

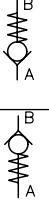

- 3/8 = G 3/8

**CRH 2**

Releasable check valve

**CRH 3 V**

Releasable check valve with pre-release

Nomenclature and symbol	Basic type and size	Pressure $p_{\max}$ (bar)	Flow $Q_{\max}$ approx. (lpm)	Release ratio		Tapped journal metric ISO-fine thread DIN 13 T6	Max. torque	
				Main - valve	Pre-release		Valve body (Nm)	Sealing nut (Nm)
Check valve 	<b>CRK 1</b>	500	30	---	---	M 16x1.5	40	35
	<b>CRK 1/1.3</b>							
	<b>CRK 2</b>		50	---	---	M 20x1.5	50	40
	<b>CRK 3</b>	500	80	---	---	M 24x1.5	70	60
	<b>CRB 1</b>		30	---	---	M 16x1.5	40	35
Releasable check valve ...3V is with pre-release 	<b>CRB 2</b>		50	---	---	M 20x1.5	50	40
	<b>CRH 1</b>	500	20	2.6:1	---	M 16x1.5	40	35
	<b>CRH 11<sup>2)</sup></b>							
	<b>CRH 2</b>		30	2.6:1	---	M 20x1.5	50	40
	<b>CRH 21<sup>2)</sup></b>							
	<b>CRH 3</b>		55	2.5:1	---	M 24x1.5	70	60
	<b>CRH 31<sup>2)</sup></b>							
	<b>CRH 3V<sup>1)</sup></b>	500	55	2.5:1	10:1	M 24x1.5	70	60
	<b>CRH 31V<sup>2)</sup></b>							

1) Version with pre-relief

2) Version with additional thread and control piston seal

## 3. Further data

Nomenclature

Design

Material

Installation position

Port coding

Mass (weight)

Static overload capacity

Leakage with type CRH 1(2,3)

Direction of flow

Pressure

Opening pressure

A → B resp. B → A

Control pressure  $p_{\text{contr}}$ 

(guideline) with type CRH

Spring loaded check valve cartridge

Depending on type either ball seated or disc design

Steel body gas nitrided, sealing nut zinc galvanized, internal functional parts hardened and ground, balls made of bearing quality steel

Any

A, B = Consumer connections

Z = Control connection with type CRH

Only for circuit diagrams and assembly instructions, see schematic drawings sect. 1 or dimensional drawings sect. 4. The port codings are not stamped onto the valve body.

Type CRK(B) 1 = 70 g      Type CRH 1 = 60 g      Connection block - 1/4 = +260 g

CRK(B) 2 = 110 g      CRH 2 = 90 g      - 3/8 = +260 g

CRK 3 = 130 g      CRH 3(V) = 150 g

Approx.  $2 \times p_{\max}$  at tightened state and with sealing nut locked

There is a negligible leakage between connections Z → B due to the thread clearance, but this doesn't effect the blocked consumer side A, not apparent with type CRH 11(21,31)

Type CRH: A → B free flow, B → A blocked state

CRB: A → B blocked, B → A free flow state

CRH: B → A free flow state

A → B is blocked leakagefree in idle position (connection Z not pressurized), if pressure at B is none or lower than at A

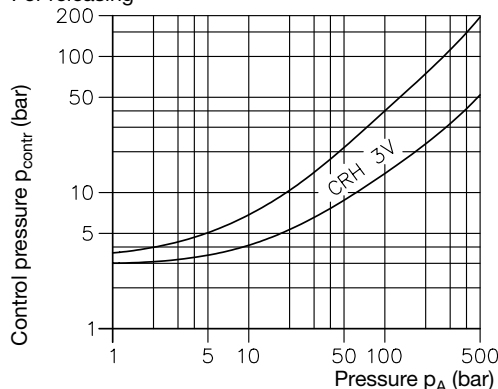
A → B free flow, if control pressure at Z opens the valve

(also see control pressure  $p_{\text{contr}}$ ) $p_{\max} = 500$  bar see also sect. 2)

Type CRK: approx. 0.5 bar (CRK 1/1.3: approx. 1.3 bar), Type CRB: approx. 0.07 ... 0.1 bar

CRH: approx. 0.5 bar

For releasing



to maintain open position

 $p_{\text{contr}} = p_B + \Delta p + k$  $p_B$  = pressure at B $\Delta p$  = flow resistance A → B acc. to  $\Delta p$ -Q-curve

k = 4.5 type CRH 1

4.0 type CRH 2

2.5 type CRH 3

## Pressure fluid

Hydraulic oil conforming DIN 51524 part 1 to 3: ISO VG 10 to 68 conforming DIN 51519.

Viscosity limits: min. approx. 4, max. approx. 1500 mm<sup>2</sup>/s;

opt. operation approx. 10... 500 mm<sup>2</sup>/s.

Also suitable are biologically degradable pressure fluids type HEPG (Polyalkylenglycol) and HEES (Synth. Ester) at service temperatures up to approx. +70 °C.

## Temperature

Ambient: approx. -40 ... +80 °C

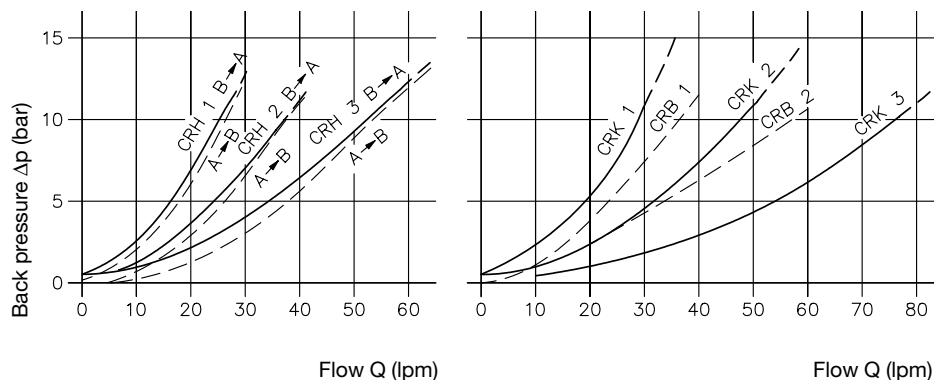
Fluid: -25 ... +80 °C, Note the viscosity range !

Permissible temperature during start: -40 °C (observe start viscosity!), as long as the service temperature is at least 20K higher for the following operation.

Biologically degradable pressure fluids: Observe manufacturer's specifications. By consideration of the compatibility with seal material not over +70 °C.

 $\Delta p$ -Q curves

Viscosity during measurements approx. 60 mm<sup>2</sup>/s

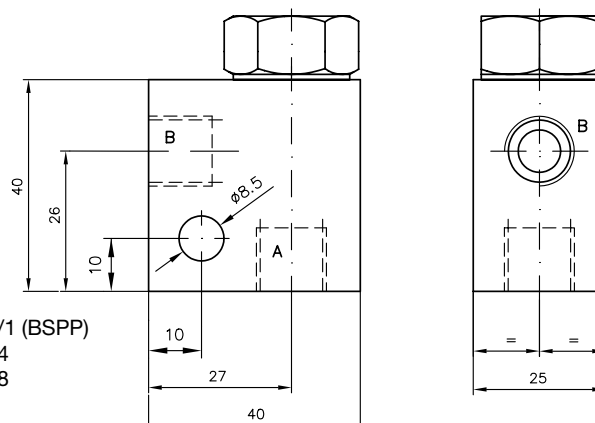
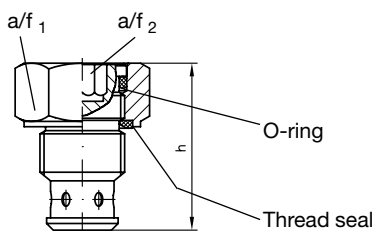


## 4. Unit dimensions

All dimension in mm and subject to change without notice!

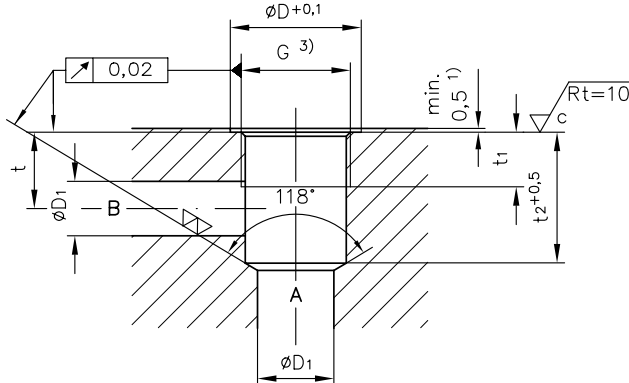
### 4.1 Check valves type CRK and CRB

Version with connection block  
CRK1. (CRB1) - 1/4 (3/8)



Ports A and B DIN ISO 228/1 (BSPP)  
CRK 1 (CRB 1) - 1/4 = G 1/4  
CRK 1 (CRB 1) - 3/8 = G 3/8  
Surface zinc galvanized

## Mounting hole

**Note:**

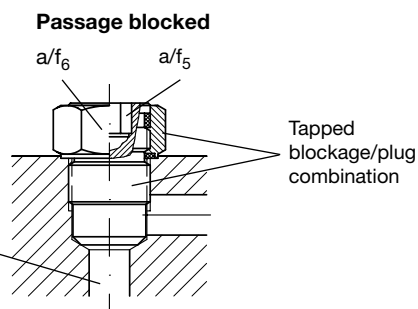
For tapped plugs for the mounting hole, see section 4.3

1) A sinking is required, if the pressure at B exceeds 100 bar!

2) This applies to manifolds made of steel, nodular cast iron or other common materials, e.g. light alloy.

3) Sinking<sub>max</sub>     $\varnothing 16^{+0.2}$  type CRK1, CRB1  
                          $\varnothing 20^{+0.2}$  type CRK2, CRB2  
                          $\varnothing 24^{+0.2}$  type CRK3, CRB3

Type	G	D	D <sub>1</sub>	h	t	t <sub>1</sub>	t <sub>2</sub>	a/f 1	a/f 2	Max. torque (Nm) <sup>2)</sup>	Thread seal	O-ring AU 90 Sh
CRK 1. CRB 1	M 16x1.5	22	8	31	13	11	18	22	8	35	Kantseal DKAR00016-N90	14x1.78
CRK 2 CRB 2	M 20x1.5	24	10	35	14	13	20	24	10	40	Kantseal DKAR00018-N90	17.17x1.78
CRK 3	M 24x1.5	30	11	38	16	13	22	30	12	60	Kantseal DKAR00021-N90	21.95x1.78



Type and size	Passage open			Seal ring	Passage blocked				
	Tapped plug				Tapped blockage/plug combination complete <sup>3)</sup>				
	DIN 910	SW4	Max. torque (Nm) <sup>2)</sup>	DIN 7603-Cu	Drawing no.	Tapped part		Counter/sealing nut	
						a/f5	Max. torque (Nm) <sup>2)</sup>	a/f6	Max. torque (Nm) <sup>2)</sup>
CRK 1. CRB 1	M 16x1.5	17	40	A 16x22x1.5	Z 7712 003	8	40	22	35
CRH 1 CRH 11					Z 7735 011				
CRK 2 CRB 2	M 20x1.5	19	50	A 20x24x1.5	Z 7712 013	10	50	24	40
CRH 2 CRH 21					Z 7715 019				
CRK 3	M 24x1.5	22	70	A 25x30x2	Z 7710 029	12	70	30	60
CRH 3 CRH 3V CRH 31					Z 7715 029				
Mass (weight)	M 16x1.5 + seal ring = approx. 40 g M 20x1.5 + seal ring = approx. 60 g M 24x1.5 + seal ring = approx. 100 g				Z 7712 003 = approx. 60 g Z 7735 011 = approx. 65 g Z 7712 013 = approx. 85 g		Z 7715 019 = approx. 95 g Z 7710 029 = approx. 140 g Z 7715 029 = approx 140 g		

1) A sinking is required, if the pressure at B exceeds 100 bar!

2) This applies to manifolds made of steel, nodular cast iron or other common materials, e.g. light alloy

3) For thread seals and O-rings see sect 4.1 and 4.2