

Restrictor check valve type BC

Product documentation



Screw-in valve

Operating pressure p_{\max} :

700 bar

Flow rate Q_{\max} :

60 l/min



© by HAWE Hydraulik SE.

The reproduction and distribution of this document, as well as the use and communication of its contents to others without explicit authorization, is prohibited.

Offenders will be held liable for the payment of damages.

All rights reserved in the event of patent or utility model applications.

Brand names, product names and trademarks are not specifically indicated. In particular with regard to registered and protected names and trademarks, usage is subject to legal provisions.

HAWE Hydraulik respects these legal provisions in all cases.

HAWE Hydraulik cannot provide individual guarantees that the stated circuits or procedures (including in part) are not subject to the intellectual property rights of third parties.

Printing date / document generated on: 2024-12-04

Table of Contents

1	Overview of restrictor check valve type BC.....	4
2	Available versions.....	5
2.1	Basic type and size.....	6
2.2	Orifices.....	7
2.3	Versions.....	8
3	Parameters.....	9
3.1	General data.....	9
3.2	Weight.....	10
3.3	Characteristic lines.....	11
4	Dimensions.....	13
4.1	Screw-in valve.....	13
4.2	Housing version.....	14
4.3	Creating the mounting hole.....	14
5	Installation, operation and maintenance information.....	15
5.1	Intended use.....	15
5.2	Assembly information.....	15
5.3	Operating instructions.....	15
5.4	Maintenance information.....	16

1**Overview of restrictor check valve type BC**

Restrictors are a type of flow valve. They are used as a local flow resistance that suddenly reduces the line cross-section. The reduction in the cross-section is very short. As a result, the flow rate is only dependent on the pressure difference and not on the viscosity.

The restrictor check valve type BC combines the function of a flow valve with a check valve. The valve is available as a perforated restrictor or as a slotted restrictor. It limits the flow during the switching of directional valves. E.g. it limits the flow rate or prevents excessively quick accumulator emptying.

Features and advantages

- Up to 700 bar
- Simple design and assembly

Intended applications

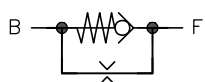
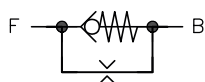
- General hydraulics
- Winch controls
- Hydraulic pilot systems



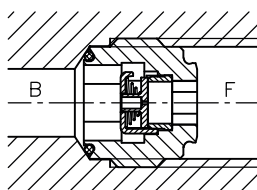
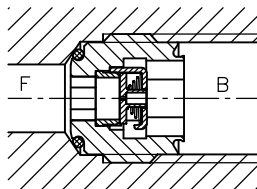
Screw-in valve Type BC

2 Available versions

Circuit symbol



Section view



i INFORMATION

Delivery condition: Fit O-ring on B-side.

O-ring can be removed depending on the installation position.

Ordering examples

BC 2	-0,8	
BC 1	-0,6	-G

2.3 "Versions"

2.2 "Orifices"

2.1 "Basic type and size"

2.1 Basic type and size

Version with spring

Type	Flow rate Q_P (l/min)	Pressure p_{max} (bar)	Ports	Opening pressure (bar)
BC 1	20	700	G 1/4 A	0.05 ... 0.07
BC 2	35	700	G 3/8 A	0.05 ... 0.07
BC 3	60	500	G 1/2 A	0.05 ... 0.07
BC 14	20	700	M14x1.5	0.05 ... 0.07
BC 26	35	700	M16x1.5	0.05 ... 0.07
BC 28	35	700	M18x1.5	0.05 ... 0.07
BC 30	60	500	M20x1.5	0.05 ... 0.07
BC 32	60	500	M22x1.5	0.05 ... 0.07

Version without spring

Type	Flow rate Q_P (l/min)	Pressure p_{max} (bar)	Ports
BC 1 X	20	700	G 1/4 A
BC 2 X	35	700	G 3/8 A
BC 3 X	60	500	G 1/2 A
BC 14 X	20	700	M14x1.5
BC 26 X	35	700	M16x1.5
BC 28 X	35	700	M18x1.5
BC 30 X	60	500	M20x1.5
BC 32 X	60	500	M22x1.5

2.2 Orifices


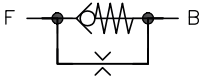
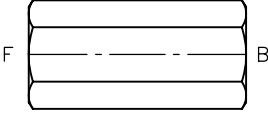
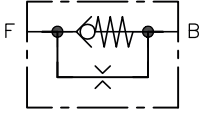
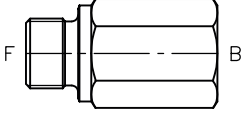
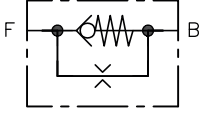
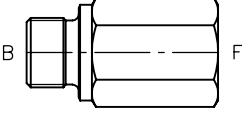
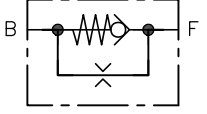
Type	Perforated restrictor Depth in 1/1000 (mm)				
	20	30	40	60	80
BC 1 BC 14	●	●	●	●	●

Type	Perforated restrictor \varnothing (mm)									
	0.2	0.4	0.5	0.6	0.8	1.0	1.2	1.5	1.8	2.0
BC 1 BC 14	●	●	●	●	●	●	●			
BC 2 BC 26 BC 28		●		●	●	●	●	●		
BC 3 BC 30 BC 32		●		●	●	●	●	●	●	●

Type	Perforated restrictor \varnothing (mm)									
	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.8
BC 1 X	●	●	●	●	●	●	●	●	●	
BC 14 X									●	
BC 2 X BC 26 X BC 28 X									●	●
BC 3 X BC 30 X BC 32 X										

Type	Perforated restrictor \varnothing (mm)							
	2.0	2.1	2.2	2.4	2.5	3.0	3.5	4.0
BC 1 X	●				●			
BC 14 X	●				●			
BC 2 X BC 26 X BC 28 X	●	●	●	●	●			
BC 3 X BC 30 X BC 32 X	●				●	●	●	●

2.3 Versions

Model	Description	View	Circuit symbol
without coding	Screw-in valve		
G	Pipe connection on both sides		
E	Tapped journal on one side		
F			

3 Parameters

3.1 General data

Designation	Restrictor check valve
Design	<ul style="list-style-type: none"> ▪ Type BC small manifold check valve, spring-loaded with valve plate in the form of slotted or perforated restrictor ▪ Type BC.X plate check valve, without spring with valve plate in the form of perforated restrictor
Model	Screw-in valve, Housing version
Material	Steel; Hardened and ground functional inner parts
Installation position	As desired
Flow direction	<ul style="list-style-type: none"> ▪ F → B = free flow
Hydraulic fluid	<p>Hydraulic fluid, according to DIN 51524 Parts 1 to 3; ISO VG 10 to 68 according to DIN ISO 3448</p> <p>Viscosity range: 4 - 1500 mm²/s</p> <p>Optimal operating range: approx. 10 - 500 mm²/s</p> <p>Also suitable for biologically degradable hydraulic fluids type HEPG (polyalkylene glycol) and HEES (synthetic ester) at operating temperatures up to approx. +70°C.</p>
Cleanliness level	<p>ISO 4406</p> <hr style="width: 25%; margin-left: 0;"/> <p>21/18/15...19/17/13</p>
Temperatures	<p>Environment: approx. -40 to +80 °C, hydraulic fluid: -25 to +80 °C, pay attention to the viscosity range.</p> <p>Start temperature: down to -40 °C is permissible (take account of the start viscosities!), as long as the steady-state temperature is at least 20 K higher during subsequent operation.</p> <p>Biologically degradable hydraulic fluids: note manufacturer specifications. With consideration for the seal compatibility, not above +70°C.</p>

3.2 Weight

Screw-in valve	Type	
	BC 1 (X), BC 14 (X)	= 6 g
	BC 2 (X), BC 26 (X), BC 28 (X)	= 15 g
	BC 3 (X), BC 30 (X), BC 32 (X)	= 25 g
Housing version	Type	
	BC 1 .. - G	= 75 g
	BC 2 .. - G	= 105 g
	BC 3 .. - G	= 170 g
	BC 1 .. - E, BC 1 .. - F	= 60 g
	BC 2 .. - E, BC 2 .. - F	= 85 g
	BC 3 .. - E, BC 3 .. - F	= 145 g

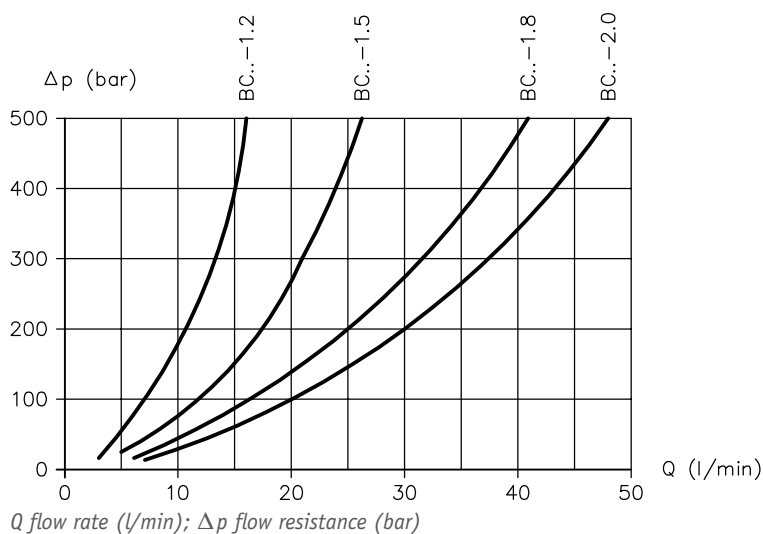
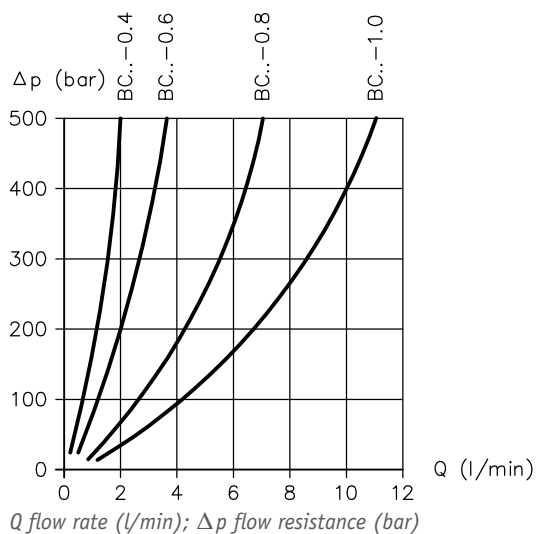
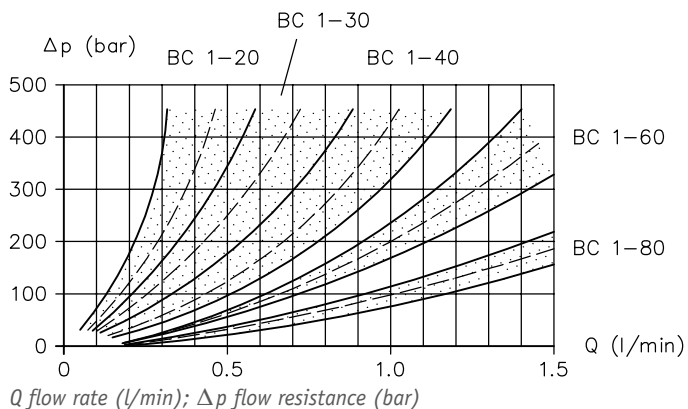
3.3 Characteristic lines

Viscosity of the hydraulic fluid approx. 62 mm²/s

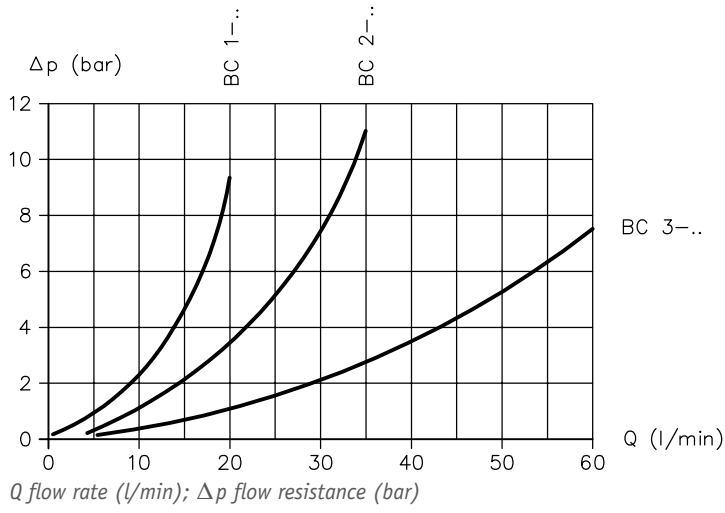
NOTICE

At viscosities above approx. 500 mm²/s the Δp values deviate increasingly upwards.

Throttled flow B → F



Free flow F → B



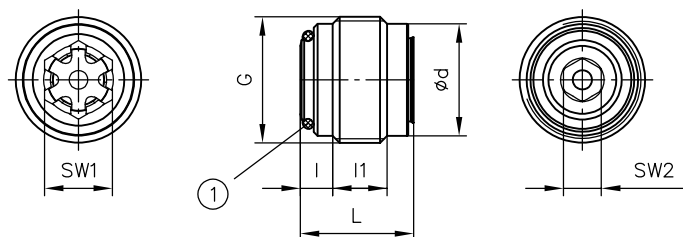
4 Dimensions

All dimensions in mm, subject to change.

4.1 Screw-in valve

Large wrench size
for assembly (connection B)

Small wrench size
for assembly (connection F)



SW = Width across flats

1 O-ring

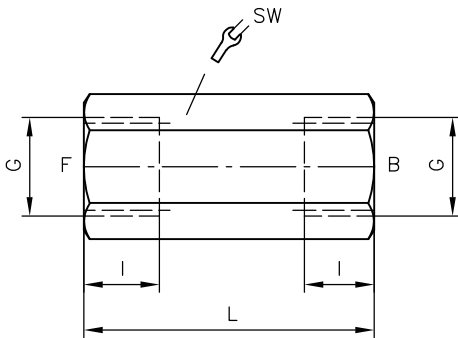
NOTICE

Do not insert key with force during assembly to ensure the inner parts of the valve are not damaged.

Type	G	L	l	l1	Ød	SW1	SW2	O-ring NBR 90 Sh	Max. tightening torque M _A (Nm)
BC 1 (X)	G 1/4 A	13	3.5	6	11.7	8	4	9x1	9
BC 14 (X)	M14x1.5	13	3.5	6	12.2	8	4	9x1	9
BC 2 (X)	G 3/8 A	15	4.3	7.2	14.8	9	5	10x1.5	15
BC 26 (X)	M16x1.5	15	4.3	7.2	14.2	9	5	10x1.5	15
BC 28 (X)	M18x1.5	15	4.3	7.2	16	9	5	10x1.5	15
BC 3 (X)	G 1/2 A	18	5	8	18.5	12	8	14x1.5	40
BC 30 (X)	M20x1.5	18	5.5	7	18.2	12	8	14x1.5	40
BC 32 (X)	M22x1.5	18	5	8	20	12	8	14x1.5	40

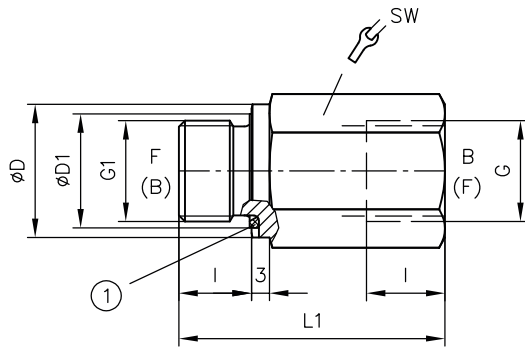
4.2 Housing version

BC ... G



SW = Width across flats

BC ... E, BC ... F

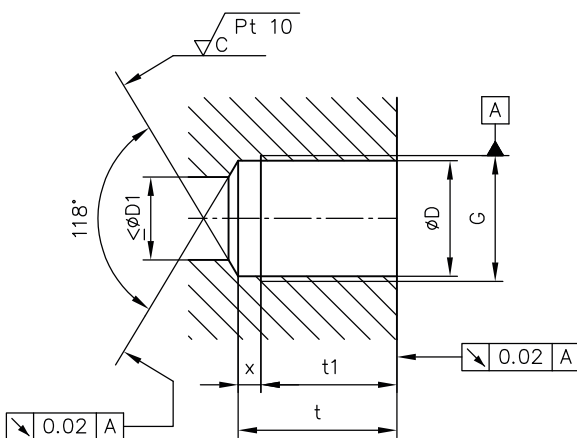


1 Thread seal

For type BC 1... with fitting seal G 1/4 NBR, all others with cutting edge.

Type	G	G1	øD	øD1	L	L1	l	SW	Tightening torque (Nm)
BC 1 (X)	G 1/4	G 1/4 A	19	--	46	43	12	19	40
BC 14 (X)	M14x1.5	M14x1.5	19	16	46	42	12	19	40
BC 2 (X)	G 3/8	G 3/8 A	22	20.5	50	44	12	22	80
BC 26 (X)	M16x1.5	M16x1.5	22	20	50	44	12	22	80
BC 28 (X)	M18x1.5	M18x1.5	24	22	50	44	12	24	80
BC 3 (X)	G 1/2	G 1/2 A	26	24	56	52	14	27	150
BC 30 (X)	M20x1.5	M20x1.5	25	24	56	52	14	27	150
BC 32 (X)	M22x1.5	M22x1.5	27	26	56	52	14	30	150

4.3 Creating the mounting hole



Type	G	øD	øD1	t	t1	x
BC 1 (X)	G 1/4	11.8 +0.1 -0.05	8	25.5	22.5	3
BC 14 (X)	M14x1.5	12.5 ±0.1	8	25.5	22.5	3
BC 2 (X)	G 3/8	15.25 ±0.1	9	27	24	3
BC 26 (X)	M16x1.5	14.5 ±0.1	9	27	24	3
BC 28 (X)	M18x1.5	16.5 ±0.1	9	27	24	3
BC 3 (X)	G 1/2	19 ±0.1	12	32.5	28.5	3.5
BC 30 (X)	M20x1.5	18.5 ±0.1	12	32.5	28.5	3.5
BC 32 (X)	M22x1.5	20.5 ±0.1	12	32.5	28.5	3.5

5 Installation, operation and maintenance information

Observe the document B 5488 "General operating instructions for assembly, commissioning, and maintenance."

5.1 Intended use

This product is intended exclusively for hydraulic applications (fluid technology).

The user must observe the safety measures and warnings in this document.

Essential requirements for the product to function correctly and safely:

- ▶ All information in this documentation must be observed. This applies in particular to all safety measures and warnings.
- ▶ The product must only be assembled and put into operation by specialist personnel.
- ▶ The product must only be operated within the specified technical parameters described in detail in this document.
- ▶ All components must be suitable for the operating conditions when using an assembly.
- ▶ The operating instructions for the components, assemblies and the specific complete system must also always be observed.

If the product can no longer be operated safely:

1. Remove the product from operation and mark it accordingly.
 - ✓ It is then not permitted to continue using or operating the product.

5.2 Assembly information

The product must only be installed in the complete system with standard and compliant connection components (screw fittings, hoses, pipes, fixtures etc.).

The product must be shut down correctly prior to disassembly (in particular in combination with hydraulic accumulators).

DANGER

Sudden movement of the hydraulic drives when disassembled incorrectly

Risk of serious injury or death

- ▶ Depressurise the hydraulic system.
- ▶ Perform safety measures in preparation for maintenance.

5.3 Operating instructions

Observe product configuration and pressure/flow rate.

The statements and technical parameters in this document must be strictly observed.

The instructions for the complete technical system must also always be followed.

NOTICE

- ▶ Read the documentation carefully before usage.
- ▶ The documentation must be accessible to the operating and maintenance staff at all times.
- ▶ Keep documentation up to date after every addition or update.

CAUTION

Overloading components due to incorrect pressure settings.

Risk of minor injury. Parts may burst or fly off, and uncontrolled leakage of hydraulic fluid.

- Pay attention to the maximum operating pressure of the pump, valves and fittings.
- Always monitor the pressure gauge when setting and changing the pressure.

Purity and filtering of the hydraulic fluid

Fine contamination can significantly impair the function of the product. Contamination can cause irreparable damage.

Examples of fine contamination include:

- Swarf
- Rubber particles from hoses and seals
- Dirt due to assembly and maintenance
- Mechanical debris
- Chemical ageing of the hydraulic fluid

! NOTICE

New hydraulic fluid from the manufacturer may not have the required purity.

Damage to the product is possible.

- ▶ Filter new hydraulic fluid to a high quality when filling.
- ▶ Do not mix hydraulic fluids. Always use hydraulic fluid that is from the same manufacturer, of the same type, and with the same viscosity properties.

For smooth operation, pay attention to the cleanliness level of the hydraulic fluid (cleanliness level [see Chapter 3, "Parameters"](#)).

Additionally applicable document: [D 5488/1](#) oil recommendations

5.4 Maintenance information

Check regularly (at least once a year) by visual inspection whether the hydraulic connections are damaged. If external leakages are found, shut down and repair the system.

Clean the surface of the device regularly (at least once a year) (dust deposits and dirt).

References

Additional versions

- Check valves, type RC: D 6969 R
- Pressure-reducing valve type CDK: D 7745
- Check valve type RE: D 7555 R
- Check valve type CRK, CRB and CRH: D 7712

