

Throttle valve and throttle check valve type CQ, CQR and CQV

Product documentation



Screw-in valve

Operating pressure p_{\max} :

700 bar

Flow rate Q_{\max} :

50 lpm



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Contents

1	Overview of throttle valve and throttle check valve type CQ, CQR and CQV.....	4
2	Available versions, main data.....	5
2.1	Screw-in valve (basic version).....	5
2.2	Version with single connection block.....	6
3	Parameters.....	7
4	Dimensions.....	10
4.1	Screw-in valve (basic version).....	10
4.2	Version with single connection block.....	11
4.3	Tapped plugs.....	12
5	Assembly, operation and maintenance recommendations.....	13
5.1	Intended use.....	13
5.2	Assembly information.....	14
5.2.1	Screwing in the screw-in valve (basic version).....	14
5.2.2	Adjusting the throttle.....	14
5.2.3	Mounting hole.....	14
5.3	Operating instructions.....	15
5.4	Maintenance information.....	15
6	Other information.....	16
6.1	Accessories, spare parts and separate components.....	16

1 Overview of throttle valve and throttle check valve type CQ, CQR and CQV

Throttle valves are a type of flow valve. They affect the flow rate for single and double-acting consumers.

The valve type CQ, CQR and CQV can be screwed-in and can be integrated into control blocks. The necessary mounting holes are straightforward to make.

Features and benefits:

- Leak-free adjustment under pressure
- Operating pressure up to 700 bar

Intended applications:

- Speed regulation in hydraulic lifting devices



Throttle valve and throttle check valve type CQ, CQR and CQV

2 Available versions, main data

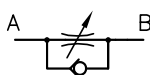
2.1 Screw-in valve (basic version)

Circuit symbol:

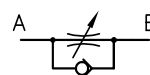
CQ



CQR



CQV



Order coding examples:

CQ 2
 CQR 2 D

Adjustability in operation ["Table 2"](#)

Basic type and size ["Table 1"](#)

Table 1 Basic type and size

Type	Description		Pressure p_{\max} (bar)	Flow rate Q_{\max} (lpm)
CQ 2	Single throttle Throttling A → B and B → A largely the same	Standard	700	50
CQR 2	Restrictor check valve Throttling B → A			
CQV 2	Restrictor check valve Throttling A → B			
CQ 22	Single throttle Throttling A → B and B → A largely the same	with precision control range	700	30
CQR 22	Restrictor check valve Throttling B → A			
CQV 22	Restrictor check valve Throttling A → B			
CQ 23	Single throttle Throttling A → B and B → A largely the same	with strong precision control range	700	10
CQR 23	Restrictor check valve Throttling B → A			
CQV 23	Restrictor check valve Throttling A → B			

Table 2 Adjustability in operation

Coding	Description
No designation	Fixed, tool adjustable, not for type CQ 23, CQR 23, CQV 23
D	Turn knob, not for type CQ 23, CQR 23, CQV 23
D3	Turn knob $\varnothing 35$ mm, only for type CQ 23, CQR 23, CQV 23

2.2 Version with single connection block

Coding	Description	Circuit symbol
- 1/4	Pipe connection, G 1/4 ISO 228-1 (BSPP)	
- 3/8	Pipe connection, G 3/8 ISO 228-1 (BSPP)	
- 3/8 JIS	Pipe connection, G 3/8 JIS B 2351 (0) (BSPP)	
- P-DW	Manifold mounting Flow control function P → A Flow direction A → P in accordance with built-in CQ 2 valve Only in combination with type CQ 2. and CQV 2. $Q_{max} =$ CQ 2 ~ 30 lpm CQ 22 ~ 30 lpm CQ 23 ~ 10 lpm	

3 Parameters

General information

Designation	Throttle and throttle check valve
Design	Slotted throttle
Model	Screw-in valve, valve for pipe connection, manifold mounting valve
Material	Steel; valve housing galvanized zinc plated; hardened and ground functional inner parts
Tightening torques	See Chapter 4, "Dimensions"
Installation position	As desired
Surface	<ul style="list-style-type: none"> • Nitrided housing • Electro-galvanised sealing nut
Flow direction	In a throttled direction: depending on the setting, see Δp -Q characteristics The flow rate values are viscosity-dependent.
Hydraulic fluid	Hydraulic oil: according to Part 1 to 3; ISO VG 10 to 68 according to DIN ISO 3448 Viscosity limits: min. approx. 4, max. approx. 1500 mm ² /s opt. operation approx. 10... 500 mm ² /s. Also suitable for biologically degradable hydraulic fluids type HEPG (polyalkylene glycol) and HEES (synthetic ester) at operating temperatures up to approx. +70°C.
Cleanliness level	ISO 4406 <hr/> 21/18/15...19/17/13
Temperatures	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.

Pressure and flow rate

Operating pressure	$p_{\max} = 700 \text{ bar}$
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Characteristic curves

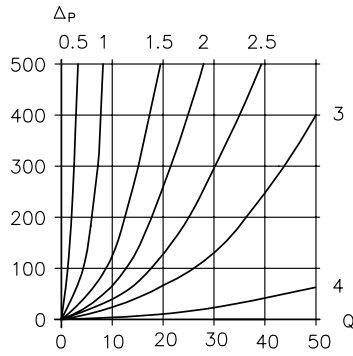
Oil viscosity approx. 50 mm²/s

Δp -Q characteristics

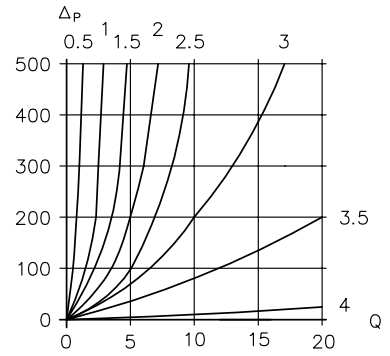
Throttled flow direction

Reference values per revolution of the adjusting spindle counted from the closed state

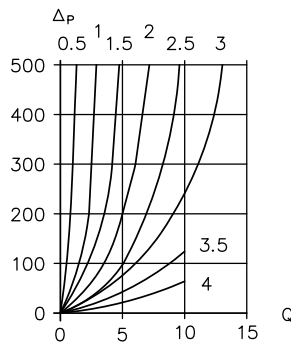
CQ. 2



CQ. 22



CQ. 23

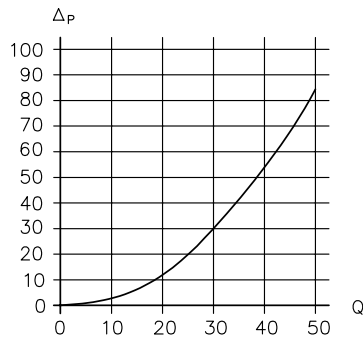


Q flow rate (lpm); Δp throttle resistance (bar)

Free flow

A → B (type CQR)

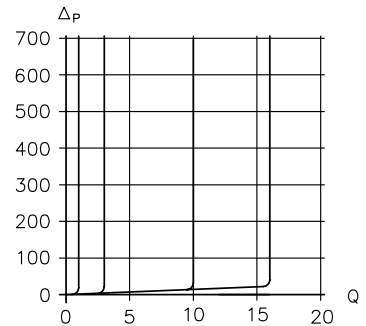
B → A (type CQV)



Q flow rate (lpm); Δp throttle resistance (bar)

CQ. 2. - P-DW

(flow control function)



Characteristic curves

Adjustment values Type CQ 2. - P-DW	Revolution	Flow rate (lpm) reference values		
		CQ. 2	CQ. 22	CQ. 23
	0.5	0.7	0.15	0.15
	1.0	2.4	0.45	0.45
	1.5	3.8	0.75	0.75
	2.0	5.2	1.05	0.9
	2.5	7.0	1.4	1.3
	3.0	9.8	2.1	1.95
	3.5	15.4	4.1	3.6
	4.0	29.5	29.5	5.6
	4.5	29.5	29.5	8.35
	open	29.5	29.5	10.3

Weight

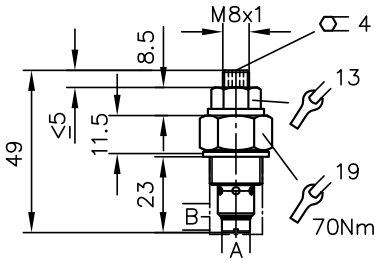
Single valve	Type	
	CQ 2	= 90 g
	CQR 2	= 90 g
	CQV 2	= 90 g
Single connection block	Coding	
	- 1/4	= 320 g
	- 3/8	= 320 g
	- P-DW	= 450 g

4 Dimensions

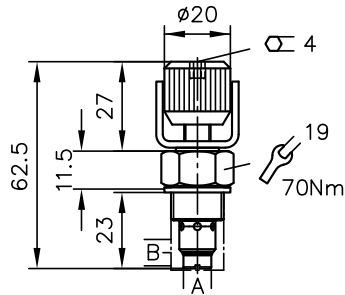
All dimensions in mm, subject to change.

4.1 Screw-in valve (basic version)

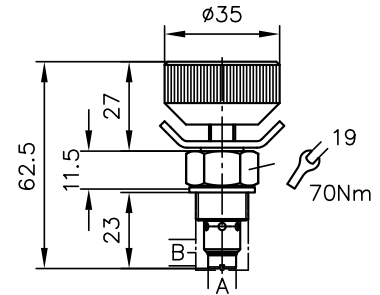
Fixed version



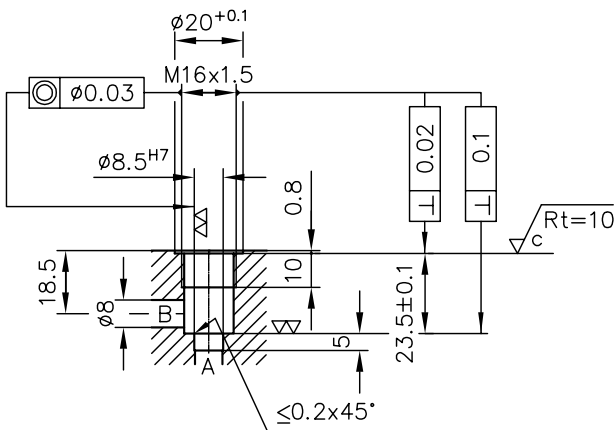
Coding D
turn knob



Coding D3
turn knob



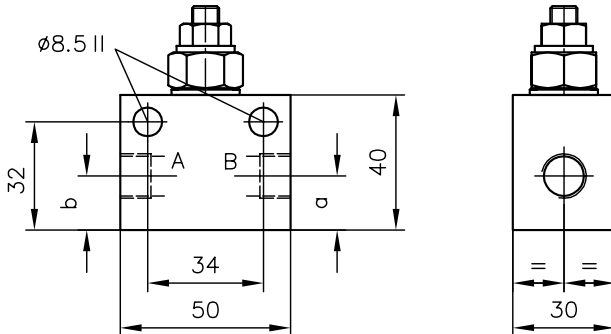
Mounting hole



4.2 Version with single connection block

Pipe connection

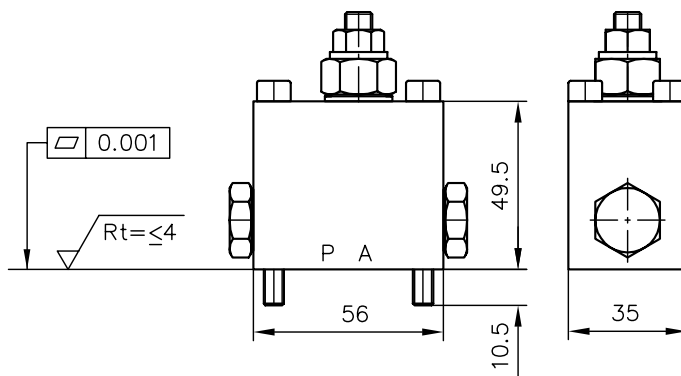
Coding - 1/4, - 3/8, - 3/8 JIS



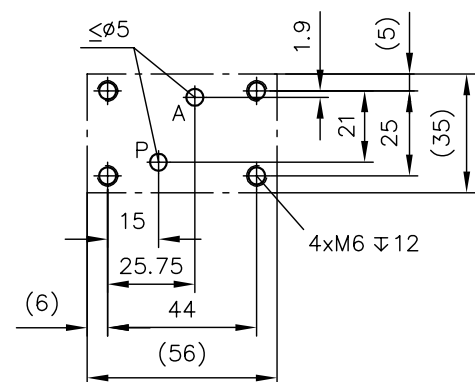
Coding	Ports A and B (BSPP)	a	b
- 1/4	G 1/4	18	15
- 3/8	G 3/8	16	16
- 3/8 JIS	G 3/8 JIS	16	16

Manifold mounting

Coding - P-DW



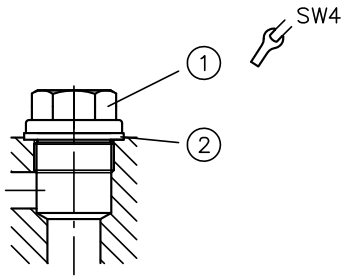
Hole pattern



4.3 Tapped plugs

The mounting holes can be sealed with tapped plugs if necessary; for example, if the assembly of standardised basic bodies is to be carried out with or without screw-in valves as required.

Passage open



- 1 Tapped plug
- 2 Sealing ring

Type and size	Passage open			
	Tapped plug			Sealing ring
	DIN 910	SW4	Tightening torque (Nm)	DIN 7603-Cu
CQ ..2..	M16x1.5	17	40	A16x22x1.5

$$SW = a/f$$

5**Assembly, operation and maintenance recommendations****5.1 Intended use**

This valve is exclusively intended for hydraulic applications (fluid engineering).

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

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 qualified personnel.
- The product must only be operated within the specified technical parameters. The technical parameters are described in detail in this documentation.
- All components must be suitable for the operating conditions in the event of application in an assembly.
- The operating and maintenance manual of 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 dismantling (in particular in combination with hydraulic accumulators).

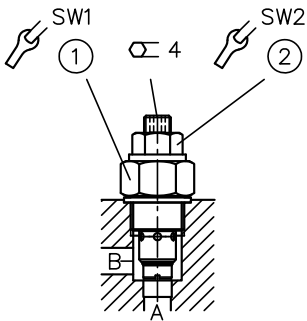
⚠ DANGER

Risk to life caused by sudden movement of the hydraulic drives when dismantled incorrectly!

Risk of serious injury or death.

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

5.2.1 Screwing in the screw-in valve (basic version)



- 1 Lock nuts and sealing nuts
2 Valve

SW = a/f

1. in the valve, loosen the lock nut and sealing nut until the travel stop.
2. Screw in the valve and tighten to the specified torque. The metallic sealing of the inlet to the outlet is formed between the facial sealing edge of the valve and the shoulder of the stepped hole in the basic body.
3. counter/sealing nut to the specified torque.

Type	Valve		Lock nuts and sealing nuts	
	SW2	Tightening torque (Nm)	SW1	Tightening torque (Nm)
CQ 2. CQR 2. CQV 2.	13	23 ⁺³	19	70

5.2.2 Adjusting the throttle

- 1 Loosen lock nut 13, hold sealing nut 19
- 2 Adjust throttle valve 4

Adjustment

To adjust the throttle screw using a hex wrench, it is sufficient to loosen the lock nut slightly.

The double spindle sealing ensures leakage-free adjustment.

5.2.3 Mounting hole

See description in [Chapter 4, "Dimensions"](#).

5.3 Operating instructions

Note product configuration and pressure / flow rate

The statements and technical parameters in this documentation must be strictly observed.
The instructions for the complete technical system must also always be followed.

i NOTE

- 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

Risk of injury due to unexpected movement processes in the machine due to incorrect flow setting!

Risk of minor injury

- Be prepared for unexpected, fast movements. On changing the flow settings, consumers will move more slowly or more quickly.
- Always monitor the pressure gauge when setting or changing the flow.

Purity and filtering of the hydraulic fluid

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

Examples of fine contamination include:

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

i NOTE

Neue Druckflüssigkeit vom Hersteller hat nicht unbedingt die erforderliche Reinheit.
Beim Einfüllen von Druckflüssigkeit ist diese zu filtern.

In order to maintain faultless operation, ensure that the cleanliness level of the hydraulic fluid is correct.
(See Cleanliness level in [Chapter 3, "Parameters"](#))

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

5.4 Maintenance information

Check that the product is securely fastened in the mounting hole at regular intervals, but at least once per year.

Conduct a visual inspection at regular intervals, but at least once per year, to check if the hydraulic connections are damaged. If external leakages are found, shut down and repair the system.

Clean the device surface of dust deposits and dirt at regular intervals, but at least once per year.

6 Other information

6.1 Accessories, spare parts and separate components

Single connection blocks

Coding	Order coding
- 1/4	7713 216
- 3/8	7713 215
- 3/8 JIS	7713 217

Seal

Sealing ring DIN 7603-A8x13x1-St-ZnNi8

Sealing ring DIN 7603-A16x20x1.5-St-ZnNi8

Further information

Additional versions

- Pressure valve type CMV, CMVZ, CSV and CSVZ: D 7710 MV
- Pressure-controlled shut-off valve type CNE: D 7710 NE
- Check valve type CRK, CRB and CRH: D 7712
- Flow control valve type CSJ: D 7736
- Pressure-reducing valve type CDK: D 7745
- Pressure-dependent shut-off valve type CDSV: D 7876
- Throttle valve and throttle check valve type Q, QR and QV: D 7730
- Throttle valve and throttle check valve type FG: D 7275