

Throttle valve and throttle check valve type Q, QR and QV

Product documentation



Screw-in valve

Operating pressure p_{\max} :

400 bar

Flow rate Q_{\max} :

120 lpm



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1 Overview of throttle valve and throttle check valve type Q, QR and QV

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

The throttle valve type Q and the restrictor check valve type QR and QV are, as slotted throttles, insensitive to micro contamination. The restrictor check valve type QR and QV combines the function of a flow valve with a check valve. It regulates in one flow direction and permits free flow in the other direction. The valve type Q, QR and QV can be integrated into control blocks or into the pipework as a banjo screw version.

Features and benefits:

- Different installation options
- Simple design

Intended applications:

- General hydraulic systems

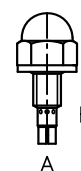
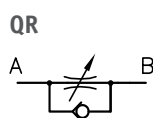
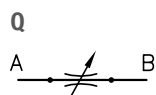


Throttle valve and throttle check valve type Q, QR and QV

2 Available versions, main data

2.1 Throttle screw

Circuit symbol:



Order coding examples:

Q 20
 QR 30
 QV 60

Basic type and size Table 1 Basic type and size

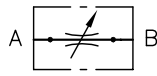
Table 1 Basic type and size

Throttle screw	Flow rate Q_{max} (lpm)
Single throttle, throttling $A \rightarrow B$ and $B \rightarrow A$, largely the same	
Q 20	12
Q 30	25
Q 40	50
Q 50	90
Q 60	120
Restrictor check valve, throttling $B \rightarrow A$	
QR 20	12
QR 30	25
QR 40	50
QR 50	90
QR 60	120
Restrictor check valve, throttling $A \rightarrow B$	
QV 20	8
QV 30	12
QV 40	20
QV 50	30
QV 60	50

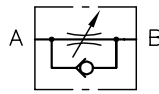
2.2 Throttle valve for pipe installation (angle valve)

Circuit symbol:

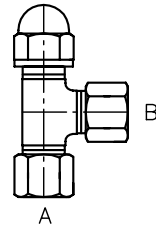
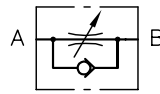
Q .. T



QR .. T



QV .. T



Order coding examples:

Q 20 T6

Basic type and size Table 2 Basic type and size

Table 2 Basic type and size

Throttle screw for in-line installation		Flow rate Q_{max} (lpm)
Angle valve		
	Pipe \varnothing (mm)	
Single throttle, throttling A → B and B → A largely the same		
Q 20 T6	6	12
Q 30 T8	8	25
Q 40 T10	10	50
Q 50 T12	12	90
Restrictor check valve, throttling B → A		
QR 20 T6	6	12
QR 30 T8	8	25
QR 40 T10	10	50
QR 50 T12	12	90
Restrictor check valve, throttling A → B		
QV 20 T6	6	8
QV 30 T8	8	12
QV 40 T10	10	20
QV 50 T12	12	30

2.3 Banjo bolt version

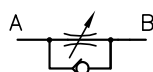
2.3.1 Banjo bolt

Circuit symbol:

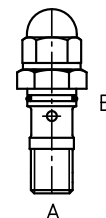
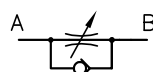
Q .. H



QR .. H



QV .. H



Order coding examples:

Q 20 H

Basic type and size Table 3 Basic type and size

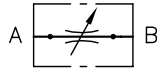
Table 3 Basic type and size

Banjo bolt	Flow rate Q_{max} (lpm)
Single throttle, throttling $A \rightarrow B$ and $B \rightarrow A$ largely the same	
Q 20 H	12
Q 30 H	25
Q 40 H	50
Q 50 H	90
Q 60 H	120
Restrictor check valve, throttling $B \rightarrow A$	
QR 20 H	12
QR 30 H	25
QR 40 H	50
QR 50 H	90
QR 60 H	120
Restrictor check valve, throttling $A \rightarrow B$	
QV 20 H	8
QV 30 H	12
QV 40 H	20
QV 50 H	30
QV 60 H	50

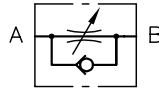
2.3.2 Swivel fitting

Circuit symbol:

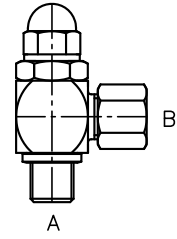
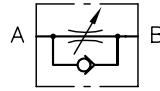
Q .. H..



QR .. H..



QV .. H..



Order coding examples:

Q 20 H	6
Q 40 H	12K

Swivel fitting

Basic type and size Table 3 Basic type and size

Table 3 Basic type and size

Basic type and size	Swivel fitting			Flow rate Q_{max} (lpm)	
	With sealing edge ring	With plastic ring	Pipe \varnothing (mm)	Q, QR	QV
Q 20 H QR 20 H QV 20 H	6	6K	6	12	8
	8 L8	8K L8K	8		
	L10	L10K	10		
Q 30 H QR 30 H QV 30 H	10	10K	10	25	12
Q 40 H QR 40 H QV 40 H	12	12K	12	50	20
Q 50 H QR 50 H QV 50 H	16	16K	16	90	30
Q 60 H QR 60 H QV 60 H	20	20K	20	120	50

3 Parameters

General information

Designation	Throttle valve, throttle check valve
Design	Slotted throttle
Model	Screw-in valve, banjo bolt valve, valve for pipe installation
Tightening torques	See Chapter 4, "Dimensions"
Installation position	As desired
Line connection	Screw directly into mounting hole of manifold body or pipe connection
Surface treatment	Housing versions <ul style="list-style-type: none"> ▪ Electrogalvanised
Cleanliness level	ISO 4406 <hr style="width: 50%; margin-left: 0;"/> 21/18/15...19/17/13
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.
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.

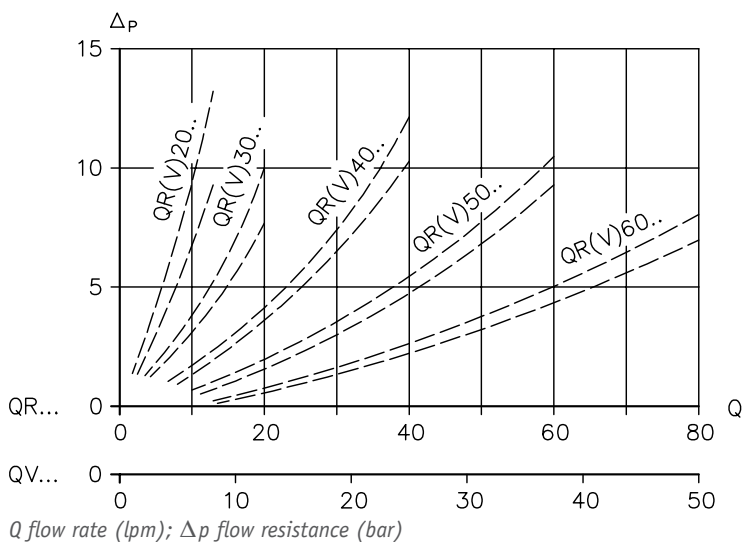
Weight

Throttle screw	Type	
	Q 20, QR 20, QV 20	= 15 g
	Q 30, QR 30, QV 30	= 25 g
	Q 40, QR 40, QV 40	= 40 g
	Q 50, QR 50, QV 50	= 55 g
	Q 60, QR 60, QV 60	= 100 g
Angle valve	Type	
	Q 20 T6, QR 20 T6, QV 20 T6	= 115 g
	Q 30 T8, QR 30 T8, QV 30 T8	= 135 g
	Q 40 T10, QR 40 T10, QV 40 T10	= 180 g
	Q 50 T12, QR 50 T12, QV 50 T12	= 255 g
Banjo bolt	Type	
	Q 20 H, QR 20 H, QV 20 H	= 40 g
	Q 30 H, QR 30 H, QV 30 H	= 70 g
	Q 40 H, QR 40 H, QV 40 H	= 90 g
	Q 50 H, QR 50 H, QV 50 H	= 130 g
	Q 60 H, QR 60 H, QV 60 H	= 230 g
Swivel fitting	Type	
	Q 20 H., QR 20 H., QV 20 H.	= 150 g
	Q 30 H., QR 30 H., QV 30 H.	= 250 g
	Q 40 H., QR 40 H., QV 40 H.	= 290 g
	Q 50 H., QR 50 H., QV 50 H.	= 470 g
	Q 60 H., QR 60 H., QV 60 H.	= 830 g

Characteristics

Oil viscosity approx. 60 mm²/s

Δp -Q characteristics
(Flow resistance due to the check valve) in direction
A → B for type QR..
B → A for type QV..

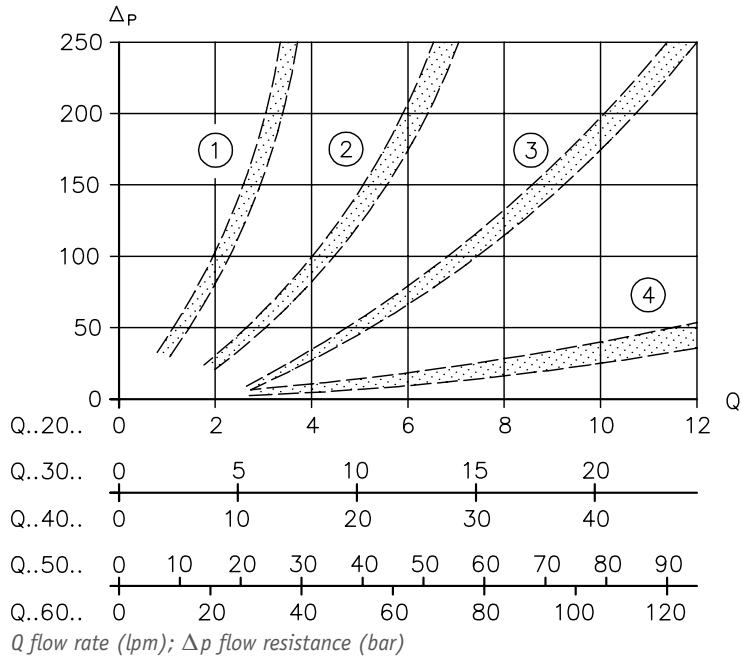


The flow resistance depends on the throttle opening and lies between a limit curve with the throttle closed up to the fully opened throttle according to the above characteristics. Characteristics indicate the tendency of a throttle opening with 3 revolutions.

Throttle characteristic Δp -Q

The characteristics must only to be understood as reference values for the Δp - Q ratio within the respective adjustment area.

The revolutions for opening are counted from the closed state.



- 1 1 revolution
- 2 2 revolutions
- 3 3 revolutions
- 4 4 revolutions

The throttle setting of the valve must always be carried out with a pressure gauge at the installation site because the flow resistance extends from the theoretical value ∞ (throttle closed) to a lower limit value, which is determined by the inherent resistance of the angle deflection A \rightarrow B.

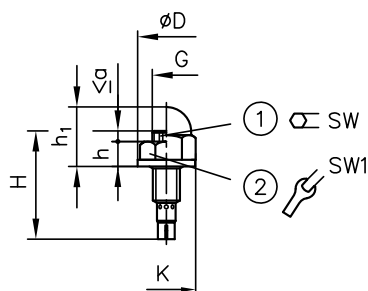
i NOTE

Max. adjustment travel visible due to ring marking. Observe information in [Chapter 5.2.1, "Maximum adjustment travel"](#). Throttle screws are not suitable for a zero-leakage closed position.

4 Dimensions

All dimensions in mm, subject to change.

4.1 Throttle screw

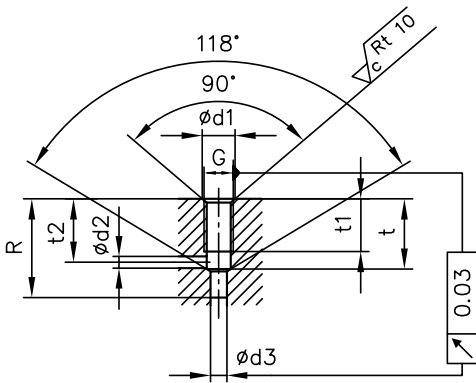


- 1 Throttle screw
 2 Seal-lock ® nut

Type	G	ØD	H	a _{max}	h	h ₁	K	SW	SW1	
									Tightening torque (Nm)	
Q 20 QR 20 QV 20	M8x1	17	32	5	8.5	18	17	4	13	8
Q 30 QR 30 QV 30	M10x1	21	36		9	24	22	5	17	14
Q 40 QR 40 QV 40	M12x1.5	23	41		10	26	24	6	19	22
Q 50 QR 50 QV 50	M14x1.5	27	46	6	11	28	28	8	22	50
Q 60 QR 60 QV 60	M16x1.5	30	58		18	32	31	10	24	70

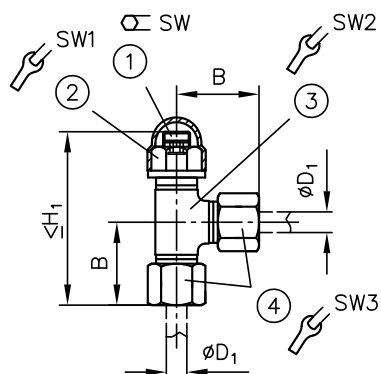
SW = a/f

Mounting hole



Type	G	$\varnothing d_1^{+0.3}$	$\varnothing d_2$	$\varnothing d_3^{H11}$	$t^{+0.5}$	t_1	t_2	R
Q 20 QR 20 QV 20	M8x1	10.2	5.5	5	18	14	15	25
Q 30 QR 30 QV 30	M10x1	12.4	6.5	6.5	20.5	16	17	30
Q 40 QR 40 QV 40	M12x1.5	15.2	7.5	8	23.5		19.5	32
Q 50 QR 50 QV 50	M14x1.5	16.8	9	9	27	19	22	37
Q 60 QR 60 QV 60	M16x1.5	19	11	11	32	22	26	41

4.2 Throttle valve for pipe installation (angle valve)



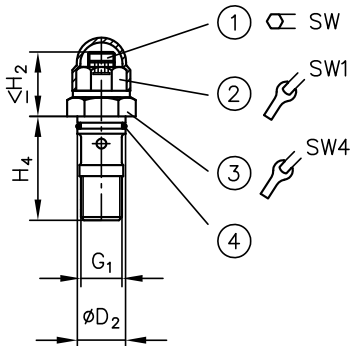
- 1 Throttle screw
- 2 Seal-lock ® nut
- 3 Angle valve
- 4 Union nut

Type	B	H ₁	ØD ₁	SW	SW1	SW2	SW3
Q 20 T6 QR 20 T6 QV 20 T6	31	56.5	6	4	13	14	17
Q 30 T8 QR 30 T8 QV 30 T8	32	58.5	8	5	17	17	19
Q 40 T10 QR 40 T10 QV 40 T10	34	63.5	10	6	19	19	22
Q 50 T12 QR 50 T12 QV 50 T12	38	72.5	12	8	22	22	24

SW = a/f

4.3 Banjo bolt version

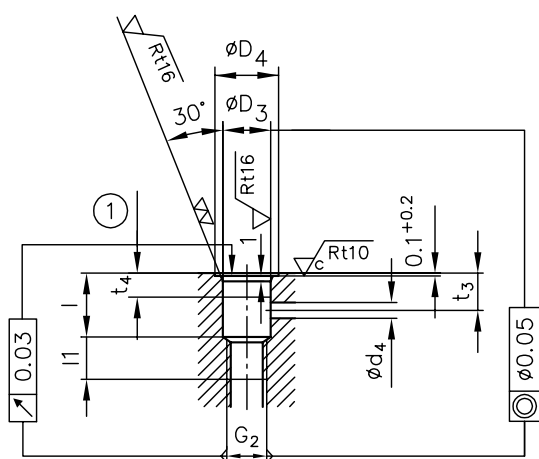
4.3.1 Banjo bolt



- 1 Throttle screw
- 2 Seal-lock ® nut
- 3 Banjo bolt
- 4 O-ring

Type	G ₁ (BSPP)	ØD ₂	H ₂	H ₄	SW	SW1	SW4		O-ring NBR 90 Sh
								Tightening torque max. (Nm)	
Q 20 H QR 20 H QV 20 H	G 1/4 A	15.45	20	33	4	13	19	50	12.5x1.5
Q 30 H QR 30 H QV 30 H	G 3/8 A	18.95	21	38	5	17	24	75	16x1.5
Q 40 H QR 40 H QV 40 H	G 3/8 A	18.95	23.5	38	6	19	24	75	16x1.5
Q 50 H QR 50 H QV 50 H	G 1/2 A	22.95	27	49.5	8	22	30	130	20x1.5
Q 60 H QR 60 H QV 60 H	G 3/4 A	28.95	34	59.5	10	24	36	250	25x1.5

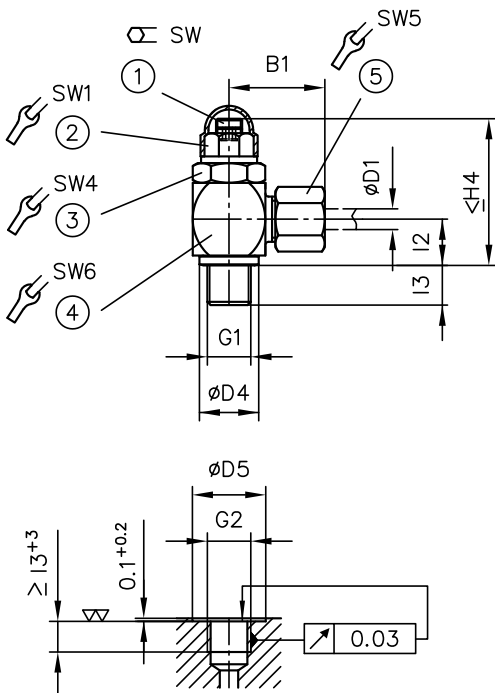
SW = a/f

Mounting hole


1 Reaming depth

Type	G_2 (BSPP)	$\varnothing D_3^{H9}$	$\varnothing D_4$	$\varnothing d_4$	L	L_1	t_3	t_4
Q 20 H QR 20 H QV 20 H	G 1/4	15.5	20	5	23	10	10	7
Q 30 H QR 30 H QV 30 H	G 3/8	19	25	8	27	12	13	9
Q 40 H QR 40 H QV 40 H	G 3/8	19	25	12	27	12	13	9
Q 50 H QR 50 H QV 50 H	G 1/2	23	30	12	35	15	14	9
Q 60 H QR 60 H QV 60 H	G 3/4	29	35	15	43	18	20	10

4.3.2 Swivel fitting



- 1 Throttle screw
- 2 Seal-lock ® nut
- 3 Banjo bolt
- 4 Swivel fitting
- 5 Union nut

Type	G ₁ (BSPP)	G ₂ (BSPP)	B ₁	∅D ₁	∅D ₄	∅D ₅	H ₄	l ₂	l ₃
Q. 20 H 6 (K)	G 1/4 A	G 1/4	31	6	18.9	20	42.5	14	9
Q. 20 H 8 (K)			29	8					
Q. 20 H L8 (K)			30	10					
Q. 20 H L10 (K)			35	12					
Q. 30 H 10 (K)	G 3/8 A	G 3/8	40	16	22	25	50	16.5	14
Q. 40 H 12 (K)	G 1/2 A	G 1/2	48	20			62.5		
Q. 50 H 16 (K)	G 3/4 A	G 3/4	48	20	32.9	35	78	24	16

Type	SW	SW1	SW5	SW6	SW4	
					Tightening torque approx. (Nm)	
Q. 20 H 6 (K)	4	13	17	22	19	50
Q. 20 H 8 (K)			19			
Q. 20 H L8 (K)			17			
Q. 20 H L10 (K)			19			
Q. 30 H 10 (K)	5	17	22	27	24	75
Q. 40 H 12 (K)	6	19	24			
Q. 50 H 16 (K)	7	22	30	32	30	130
Q. 60 H 20 (K)	10	24	36	41	36	250

SW = a/f

5 Assembly, operation and maintenance recommendations

5.1 Intended use

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

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).



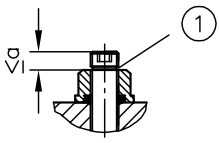
DANGER

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 Maximum adjustment travel

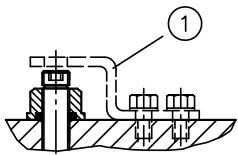


1 Red ring

For the largest adjustment travel (general figure a), the ring marking becomes visible. Unscrewing further does not change (decrease) the flow cross section that is influencing the Δp value any more.

An internal stopper to prevent further or complete unscrewing is not structurally possible. The red ring marking thus represents the end of the permissible adjustment travel. If this is exceeded, the number of load-bearing thread turns is reduced and if it is unscrewed too far there is a risk that the throttle screw may be ripped out under high pressure. If necessary, this point must be listed in the operating manual or in the operating and maintenance manual of the system.

Type	a
Q 20, QR 20, QV 20	5
Q 30, QR 30, QV 30	5
Q 40, QR 40, QV 40	6
Q 50, QR 50, QV 50	6
Q 60, QR 60, QV 60	6

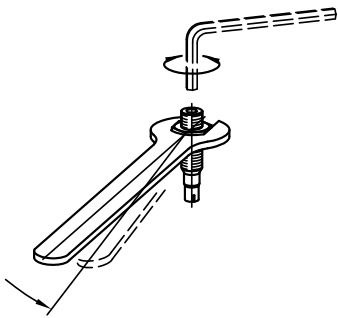


DANGER

Sudden movement of the hydraulic drives.

Risk of serious injury or death.

- Do not unscrew the throttle screw via the red marking ring.
- Attach safety parts to the manifold body (1).



- 1 Adjust release of the seal-lock nut slightly
- 2 Adjust using hex wrench
- 3 Tighten seal-lock nut

5.2.2 Creating the 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

Fresh hydraulic fluid from the drum does not always have the necessary degree of purity.
When pouring in hydraulic fluid, filter it.

Pay attention to the cleanliness level of the hydraulic fluid to maintain faultless operation.
(See also cleanliness level in [Chapter 3, "Parameters"](#))

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

5.4 Maintenance information

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.

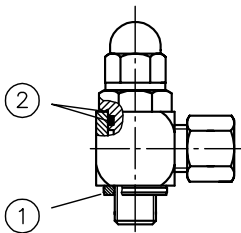
6 Other information

6.1 Accessories, spare parts and separate components

Banjo bolt	Pipe \varnothing $\varnothing d_a$	Slewing housing	Sealing edge ring	Plastic ring	Cutting and wedge ring	Union nut
Q 20 H QR 20 H QV 20 H	6	XWH 6-SR-A3C	DKA 1/4	KD 1/4	DPR 6-L/S	M 6-S-A3C
	8	XWH 8-SM/SR-A3C			DPR 8-L/S	M 8-S-A3C
Q 20 HL QR 20 HL QV 20 HL	8	XWH 8-LR-A3C	DKA 1/4	KD 1/4	DPR 8-L/S	M 8-S-A3C
	10	XWH 10-LR-A3C			DPR 10-L/S	M 10-S-A3C
Q 30 H QR 30 H QV 30 H	10	XWH 10-SM/SR-A3K	DKA 3/8	KD 3/8	DPR 10-L/S	M 10-S-A3C
Q 40 H QR 40 H QV 40 H	12	XWH 12-SR-A3C	DKA 3/8	KD 3/8	DPR 12-L/S	M 12-S-A3C
Q 50 H QR 50 H QV 50 H	16	XWH 16-SR-A3C	DKA 1/2x4.5	KD 1/2	DPR 16-L/S	M 16-S-A3C
Q 60 H QR 60 H QV 60 H	20	XWH 20-SM/SR-A3C	DKA 3/4	KD 3/4	DPR 20-L/S	M 20-S-A3C

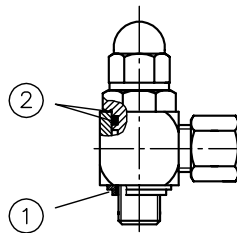
Swivel fittings

Q ...H...
QR ...H...
QV ...H...



- 1 Sealing through sealing edge ring DKA
- 2 Sealing through sealing edge and O-ring

Q ...H...K
QR ...H...K
QV ...H...K



- 1 Sealing through sealing edge ring KDS
- 2 Sealing through sealing edge and O-ring

Further information

Additional versions

- Throttle valve and throttle check valve type FG: D 7275
- Throttle valve and throttle check valve type CQ, CQR and CQV: D 7713
- Restrictor check valve type BC: D 6969 B
- Restrictor check valve type BE: D 7555 B
- Throttle valve and throttle check valve type ED, RD and RDF: D 7540