

Throttle valve type ED, throttle restrictor check valve type RD and RDF

Product documentation



Operating pressure p_{\max} :	500 bar
Flow rate Q_{\max} :	130 lpm



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1 Overview of throttle valves type ED, restrictor check valves type RD and RDF

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

The restrictor check valve type RD and RDF 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. Type ED and RD is adjustable.

The valve type ED, RD and RDF can be integrated directly in the line.

Features and benefits:

- Sensitively adjustable
- Wear-resistant

Intended applications:

- General hydraulic systems



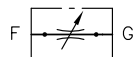
Figure 1: Throttle valve

2 Available versions, main data

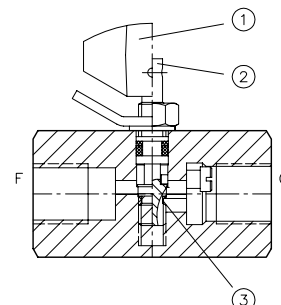
Type ED

Single throttle valve

Circuit symbol:



Section view:

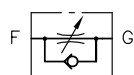


- 1 Manual adjustment
- 2 Adjusting spindle (coding K) adjustable with tool (pin)
- 3 Annular gap throttle, consisting of bore edge and truncated cone (hardened)

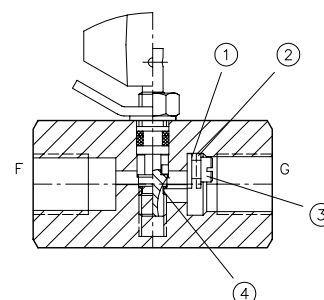
Type RD

restrictor check valve

Circuit symbol:



Section view:

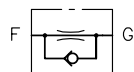


- 1 Check valve plate: closed position (throttled)
open position (free flow)
- 2 Bearing screw for check valve with travel stop journal to prevent unscrewing of adjusting spindle
- 3 Annular gap throttle, consisting of bore edge and truncated cone (hardened)

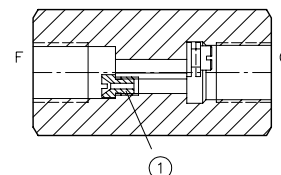
Type RDF

Throttle check valve with fixed throttle

Circuit symbol:



Section view:



- 1 RDF 11: Orifice M4x0.4 ... 1.8
RDF 21: Orifice M5x0.5 ... 2.0
Orifice secured with screw locking
RDF 31 to 51: orifice disc $\varnothing 0.8 \dots 5.5$ with retaining screw

Order coding example:

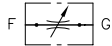
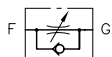
ED 31		K
RD 11		
RDF 21	/1,0	

Adjustability Table 3 Adjustment

Fixed throttle for type RDF Table 2 Fixed throttle for type RDF

Basic type and size Table 1 Basic type and size

Table 1 Basic type and size

Basic type and size	Description	Volumetric flow Q (lpm)	Pressure p _{max} (bar)	Thread (BSPP)	Circuit symbol
ED 11	Single throttle valve F ↔ G throttling in both flow directions	12	500	G 1/4	
ED 21		30		G 3/8	
ED 31		60		G 1/2	
ED 41		80		G 3/4	
ED 51		130		G 1	
RD 11, RD 112	restrictor check valve F → G free flow F ← G throttled	12	500	G 1/4	
RD 11 JIS		12		G 1/4 JIS	
RD 21	30	G 3/8			
RD 21 JIS	30	G 3/8 JIS			
RD 31	Type RD 112 - precision throttle see Chapter 3, "Parameters" "Characteristic curves"	60		G 1/2	
RD 41		80		G 3/4	
RD 51		130		G 1	
RDF 11/..		Throttle check valve with fixed throttle F → G free flow F ← G throttled	12	500	G 1/4
RDF 21/..	30		G 3/8		
RDF 31/..	60		G 1/2		
RDF 41/..	80		G 3/4		
RDF 51/..	130		G 1		


Note

Thread in accordance with ISO 228/1 (BSPP) (-UNF) or JIS B 2351(0)

Table 2 Fixed throttle for type RDF

	Ø (mm)									
	0.4	0.5	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0
RDF 11/...	●	●	●	●	●	●	●	●	●	
RDF 21/...		●	●	●	●	●	●	●	●	●

	Ø (mm)													
	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5
RDF 31/...	●	●	●	●	●	●	●	●	●	●	●	●		
RDF 41/...	●	●	●	●	●	●	●	●	●	●	●	●	●	●
RDF 51/...	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Table 3 Adjustment for type ED and RD

Coding	Description
No designation	Manual (wing bolt/lock nut)
K	With tool (adjusting spindle/lock nut)

3.1 General

Designation	Throttle valves, throttle check valves
Design	Slotted throttle, annular gap throttle, orifice nozzles
Model	Housing version
Material	Steel; hardened, ground functional inner parts Electrogalvanised surface
Installation position	As desired
Volumetric flow direction	Type RD, RDF: free volumetric flow F → G throttled G → F Type ED: throttled G → F, F → G
Hydraulic fluid	Hydraulic oil conforming DIN 51 524 part 1 to 3; ISO VG 10 to 68 conforming DIN 51 519 Viscosity limits: min. approx. 4, max. approx. 1500 mm ² /s opt. operation approx. 10... 500 mm ² /s. Also suitable are biologically degradable pressure fluids types HEPG (Poly-alkylenglycol) and HEES (Synth. Ester) at service 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.

Characteristic curves

Oil viscosity during the measurement:
approx. 54 mm²/s

Type ED and RD
Throttle direction G → F

Type ED 11, RD 11

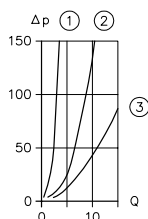


Figure 2: Q volumetric flow (lpm); Δp flow resistance (bar)

- 1 1 revolution
- 2 2 revolutions
- 3 Full opening

Type RD 112

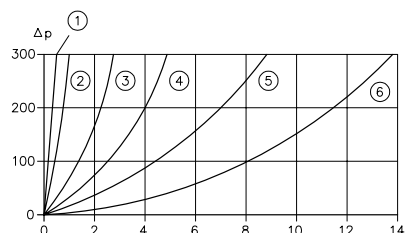


Figure 3: Q volumetric flow (lpm); Δp flow resistance (bar)

- 1 1/8 revolution
- 2 1/4 revolution
- 3 1 revolution
- 4 1 1/4 revolutions
- 5 1 1/2 revolutions
- 6 1 3/4 revolutions

Type ED 21, RD 21

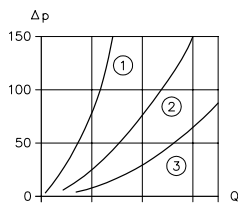


Figure 4: Q volumetric flow (lpm); Δp flow resistance (bar)

- 1 1 revolution
- 2 2 revolutions
- 3 Full opening

Type ED 31, RD 31

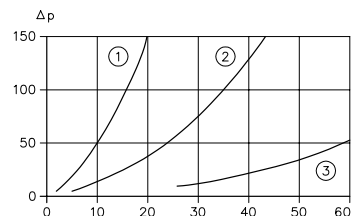


Figure 5: Q volumetric flow (lpm); Δp flow resistance (bar)

- 1 1 revolution
- 2 2 revolutions
- 3 Full opening

Type ED 41, RD 41

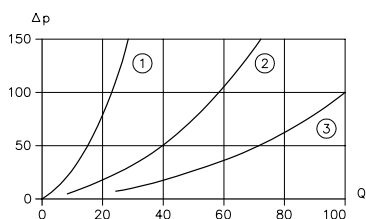


Figure 6: Q volumetric flow (lpm); Δp flow resistance (bar)

- 1 1 revolution
- 2 2 revolutions
- 3 Full opening

Type ED 51, RD 51

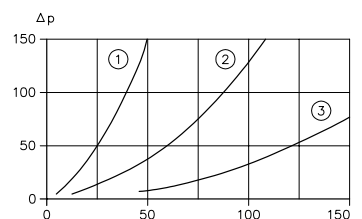


Figure 7: Q volumetric flow (lpm); Δp flow resistance (bar)

- 1 1 revolution
- 2 2 revolutions
- 3 Full opening

Oil viscosity during the measurement:
approx. 54 mm²/s

Type RDF
Throttle direction G → F

Type RDF

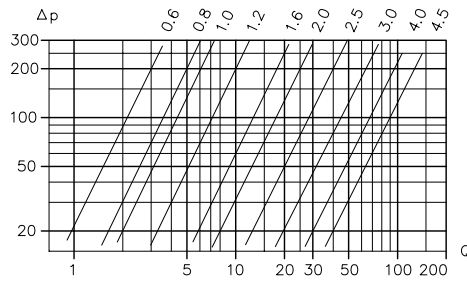


Figure 8: Q volumetric flow (lpm); Δp flow resistance (bar)

Δp ≈ 3 bar at approx. 0.5 Q_{max}

Δp ≈ 8 bar at approx. Q_{max}

Q_{max} see main data in Table 1, Section 2

Type RD and RDF
Free flow F → G

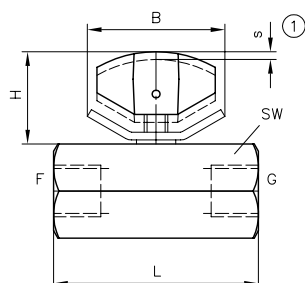
Weight

Type ED 11	= approx. 180 g
Type ED 21	= approx. 220 g
Type ED 31	= approx. 350 g
Type ED 41	= approx. 660 g
Type ED 51	= approx. 840 g
Type RD 11, RD 112	= approx. 180 g
Type RD 11 JIS	= approx. 180 g
Type RD 21	= approx. 220 g
Type RD 21 JIS	= approx. 220 g
Type RD 31	= approx. 350 g
Type RD 41	= approx. 660 g
Type RD 51	= approx. 840 g
Type RDF 11/..	= approx. 180 g
Type RDF 21/..	= approx. 220 g
Type RDF 31/..	= approx. 350 g
Type RDF 41/..	= approx. 660 g
Type RDF 51/..	= approx. 840 g

4 Dimensions

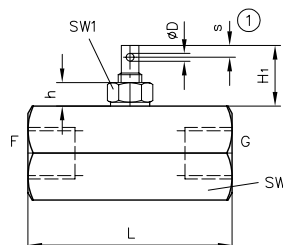
All dimensions in mm, subject to change!

Type ED.. and RD..



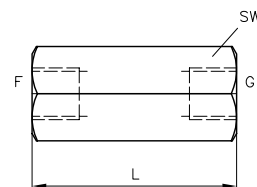
1 Adjustment travel

Type ED..K and RD..K



1 Adjustment travel

Type RD../..



Coding	Ports F and G (BSPP)	L	H	H ₁	h	D	B	SW	SW1	Adjustment travel s approx.	Revolution approx.
ED 11(K), RD 11(K), RDF 11/..	G 1/4	52	2.5	15.5	6	2	32	24	10	2.25	2 1/4
RD 112	G 1/4	52	23.5	15.5	6	2	32	24	10	2.25	2 1/4
RD 11 JIS	G 1/4 JIS	52	23.5	15.5	6	2	32	24	10	2.25	2 1/4
ED 21(K), RD 21(K), RDF 21/..	G 3/8	52	24	16.5	6	2	32	27	10	2.5	2 1/2
RD 21 JIS	G 3/8 JIS	52	24	16.5	6	2	32	27	10	2.5	2 1/2
ED 31(K), RD 31(K), RDF 31/..	G 1/2	62	32.5	21.5	7.5	3	45	32	13	3	3
ED 41(K), RD 41(K), RDF 41/..	G 3/4	72	41	25.5	7.5	3.5	55.5	41	17	4.5	3
ED 51(K), RD 51(K), RDF 51/..	G 1	82	46.5	26.5	7.5	4	61	46	19	4.5	3

5.1 Designated use

This fluid-power product has been designed, manufactured and tested acc. to standards and regulations generally applicable in the European Union and left the plant in a safe and fault-free condition.

To maintain this condition and ensure safe operation, operators must observe the information and warnings in this documentation.

This fluid-power product must be installed and integrated in a hydraulic system by a qualified staff who is familiar with and observes the general engineering principles and relevant applicable regulations and standards.

In addition, application-specific features of the system or installation location must be taken into account if relevant.

This product may only be used within oil-hydraulic systems.

The product must be operated within the specified data. This documentation contains the technical parameters for various product versions.

**Note**

Non-compliance will void any warranty claims made against HAWE Hydraulik.

5.2 Assembly information

The hydraulic accumulator must be integrated in the system via state of the art connection components (screw fittings, hoses, pipes, etc.). The hydraulic system must be shut down as a precautionary measure prior to dismantling; this applies in particular to systems with hydraulic accumulators.

5.3 Operating instructions

Product, pressure and/or flow settings

All statements in this documentation must be observed for all product, pressure and/or flow settings on or in the hydraulic system.



Caution

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

On changing the flow settings loads will move more slowly or more quickly.
The consequence can be unexpected movements.

- Only make flow settings or changes in a controlled manner!

Filtering and purity of the hydraulic fluid

Soiling in the fine range, e.g. abraded material and dust, or in the macro range, e.g. chips, rubber particles from hoses and seals, can cause significant malfunctions in a hydraulic system. It is also to be noted that new hydraulic fluid "from the drum" does not necessarily meet the highest purity requirements.

For trouble-free operation pay attention to the purity of the hydraulic fluid (see also purity class in [Chapter 3, "Parameters"](#)).

5.4 Maintenance information

This product is largely maintenance-free.

Conduct a visual inspection to check the hydraulic connections for damage at regular intervals, but at least once per year. If external leaks are found, shut down and remedy.

Check the device surfaces for dust deposits at regular intervals (but at least annually) and clean the device if required.

Additional versions

- Restrictor check valve type BC - Screw-in valve: D 6969 B
- Restrictor check valve type BE - Screw-in valve: D 7555 B
- Throttle valve and throttle check valve type Q, QR and QV: D 7730
- Throttle valve and throttle check valve type FG: D 7275
- Throttle valve and throttle check valve type CQ, CQR and CQV: D 7713