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

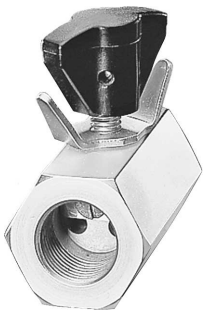
D 7540
11-2014-1.3

HAWE HYDRAULIK

Contents

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 flow rate 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. Types ED and RD are adjustable.
The valve type ED, RD and RDF can be integrated directly in the line.



Throttle valve type ED

Features and benefits:

- Sensitively adjustable
- Wear-resistant

Intended applications:

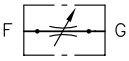
- General hydraulic systems

2 Available versions, main data

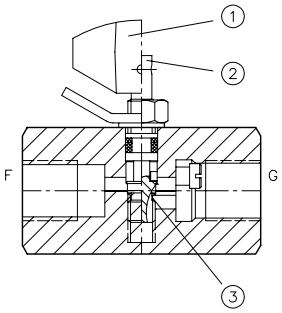
Type ED

Single throttle valve

Circuit symbol:



Section view:

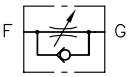


1 Manual adjustment
2 Adjusting spindle (coding K) adjustable with tool (pin)
3 Annular gap throttle, consisting of bore edge and truncated cone (hardened)

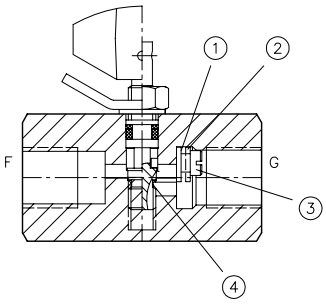
Type RD

Restrictor check valve

Circuit symbol:



Section view:

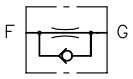


1 Check valve plate: closed position (throttled)
2 open position (free flow)
3 Bearing screw for check valve with travel stop journal to prevent unscrewing of adjusting spindle
4 Annular gap throttle, consisting of bore edge and truncated cone (hardened)

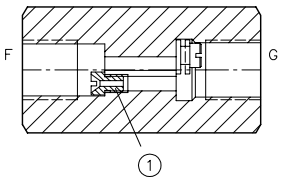
Type RDF

Restrictor 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 ∅0.8 ... 5.5 with retaining screw

Order coding example:

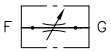
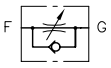
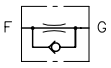
ED 31 **RD 11** **RDF 21**	**/1,0**	**K**

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	Type RD 112 - precision throttle see Chapter 3, "Parameters" "Characteristic curves"	30		G 3/8 JIS	
RD 31		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 DIN EN ISO 228-1, SAE J 514 (-UNF) or JIS B 2351-1.

Table 2 Fixed throttle for type RDF

	∅ (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/...		●	●	●	●	●	●	●	●	●

	∅ (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 Parameters

3.1 General

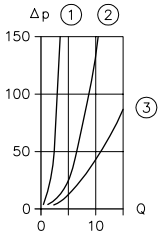
Designation	Throttle valves, throttle check valves
Design	Slotted throttle, annular gap throttle, orifice nozzles
Model	Housing version
Material	Steel; hardened, ground functional inner parts Electrogalvanised surface
Installation position	As desired
Volumetric flow direction	Type RD, RDF: free volumetric flow F → G throttled G → F Type ED: throttled G → F, F → G
Hydraulic fluid	Hydraulic oil: according to DIN 51524-1 Part 1 to 3; 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** 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

Type ED and RD
Throttle direction G → F

Oil viscosity approx. 54 mm²/s

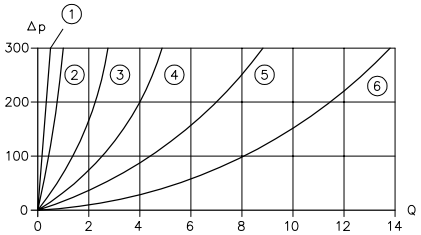
Type ED 11, RD 11



Q flow rate (lpm); #p flow resistance (bar)

1 One revolution
2 Two revolutions
3 Full opening

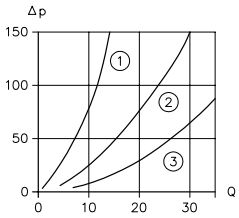
Type RD 112



Q flow rate (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

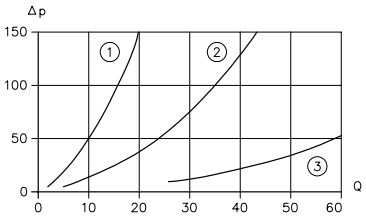
Type ED 21, RD 21



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

1 1 revolution
2 2 revolutions
3 Full opening

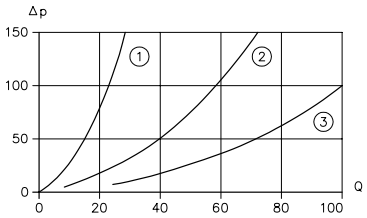
Type ED 31, RD 31



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

1 1 revolution
2 2 revolutions
3 Full opening

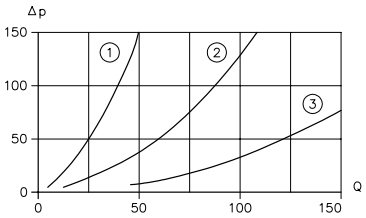
Type ED 41, RD 41



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

1 1 revolution
2 2 revolutions
3 Full opening

Type ED 51, RD 51



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

1 1 revolution
2 2 revolutions
3 Full opening

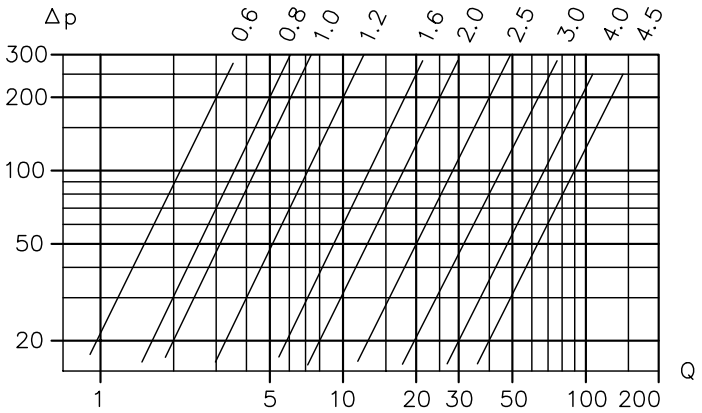
Characteristic curves

Type RDF
Throttle direction G → F

Type RD and RDF
Free flow F → G

Oil viscosity approx. 54 mm²/s

Type RDF



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

Δp ≈ 3 bar at approx. 0.5 Q_{max}
Δp ≈ 8 bar at approx. Q_{max}
For Q_{max} see Table 1 in Chapter 2, "Available versions, main data"

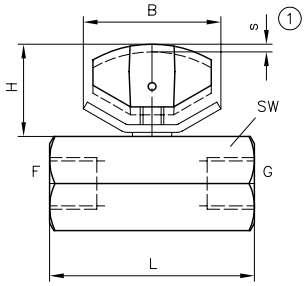
Weight

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

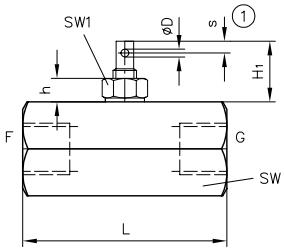
4 Dimensions

All dimensions in mm, subject to change.

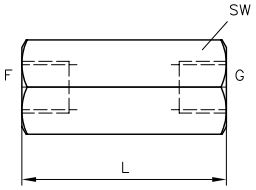
Type ED.. and RD..



Type ED..K and RD..K



Type RD../..



1 Adjustment travel

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

SW = a/f

5 Installation, operation and maintenance information

5.1 Intended application

This valve is intended exclusively for hydraulic applications (fluid engineering). The valve meets high technical safety standards and regulations for fluid.

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.
- The operating and maintenance manual of the specific complete system must also always be observed.

If the product can no longer be operated safely:

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 connection components that comply with market requirements (screw fittings, hoses, pipes, etc.).

The hydraulic system must be shut down correctly prior to dismounting; this applies in particular to hydraulic systems 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.

5.3 Operating instructions

Product configuration and setting the pressure and 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.

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 a hydraulic power pack. 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

Note

Fresh hydraulic fluid from the drum does not always have the highest degree of purity. Under some circumstances the fresh hydraulic fluid must be filtered before use.

Pay attention to the cleanliness level of the hydraulic fluid in order to maintain faultless operation.
(Also see cleanliness level in Chapter 3, "Parameters".)

5.4 Maintenance information

This product is largely maintenance-free.

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.

Further information

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

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