Throttles type ED
Restrictor check valves type RD and RDF

Operating pressure p_{max} = 500 bar
Flow Q_{max} = 70 lpm

Other valves with same design
Type ED, RD, and RDF (11 ... 51) acc. to D 7540

1. General

According to DIN standard 1219-1, restrictor valves belong to the flow control group of valves. In hydraulic installations they are used as resistance valves. By adjustment of the restriction area, their flow resistance is changed, which together with the actuator back pressure, causes a pressure limiting valve at the inlet side to crack, part of the pump delivery flow (residual flow) is bypassed via this valve, whereas only the remaining partial flow reaches the actuator via the restrictor as effective flow. If the actuator back pressure changes, the flow changes in turn, the setting of the restrictor valve remaining the same. Combined restrictor and check valves allow free flow in the opposite direction.

2. Available versions, main data

Order examples:

ED 1 Throttle
RDF 2/1,0 Restrictor check valve

Table 2: Non-adjustable throttle with type RDF../..

∅ (mm)	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.5	3.0	4.0
Coding	0,6	0,8	1,0	1,2	1,4	1,6	1,8	2,0	2,5	3,0	4,0
	Carburetor jet Ø, SOLEX M 5 x ...										without [1]

[1] The throttle hole ∅4 is identical with the core diameter for M5.

Table 1: Basic type , size

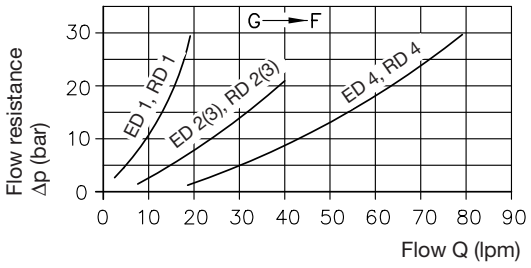
Version	Coding	Ports acc. to ISO 228/1 (BSPP) G and F	Pressure p_{max} (bar)	Flow Q_{max} approx. (lpm)	Mass (weight) approx. (g)
Restrictor valve Restriction preferable G → F	**ED 1**	G 1/4	500	15	360
	ED 2	G 3/8		25	450
	ED 3	G 1/2		40	400
	ED 4	G 3/4		70	530
Restrictor check valve G → F throttled flow F → G free flow	**RD 1**	G 1/4	500	15	360
	RD 2	G 3/8		25	450
	RD 3	G 1/2		40	400
	RD 4	G 3/4		70	530
Restrictor check valve Non-adjustable throttle G → F throttled flow F → G free flow	**RDF 1/..**	G 1/4	500	15	360
	RDF 2/..	G 3/8		25	450
	RDF 3/..	G 1/2		40	400
	RDF 4/..	G 3/4		70	530

3. Additional characteristic data

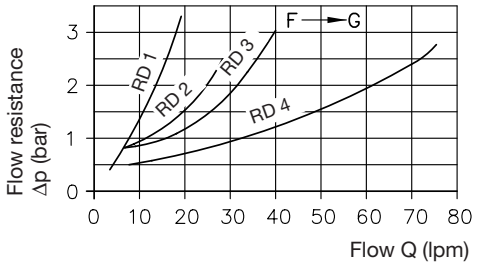
Design	Poppet restrictor valve - Type ED.. Poppet restrictor valve with bypass check valve - Type RD.. Fixed restrictor valve with bypass check valve - Type RDF..
Installed position	as desired
Pressure fluid	Fluids acc. to DIN 51524 table 1 to 3; ISO VG 10 to 68 acc. to DIN 51519 Viscosity range: min. approx. 4; max. approx. 1500 mm^2/sec; Optimal operation range: approx. 10...500 mm^2/sec Also suitable are biologically degradable pressure fluids of the type HEPG (Polyalkylenglycol) and HEES (synth. Ester) at operation temperatures up to approx. +70°C.
Temperature	Ambient: approx. -40 ... +80°C Fluid: -25...+80°C; take note of viscosity ranges! Start temperature down to -40°C are allowable (Pay attention to the viscosity range during start!), as long as the operation temperature during subsequent running is at least 20 K (Kelvin) higher. Biological degradable pressure fluids: Pay attention to manufacturer's information. With regard to the compatibility with sealing materials do not exceed +70°C.

Δp-Q-characteristics

Throttle direction G → F



Throttle direction F → G



Oil viscosity during test approx. 50 mm^2/s

Attention: The throttles show a certain viscosity dependence, the Δp-Q curves can differ more or less strongly when used beyond the optimal range.

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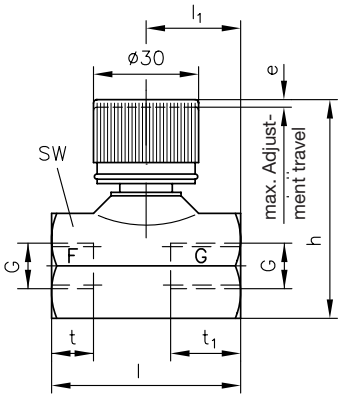
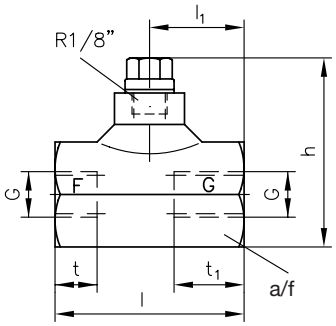
4. Unit dimensions

All dimensions in mm, subject to change without notice!

Type ED.. and RD..



Type RDF..



Type	Ports ISO 228/1 (BSPP) F and G	l	l1	h approx.	t	t1	a/f	Travel e approx.
ED 1 and RD 1	G 1/4	54	27	65	12	21	30	4
ED 2 and RD 2	G 3/8	62	31	67	12	24	32	3.5
ED 3 and RD 3	G 1/2	62	31	67	14	23	32	3.5
ED 4 and RD 4	G 3/4	78	39	74	18	25	36	4
RDF 1	G 1/4	54	27	55	12	21	30	--
RDF 2	G 3/8	62	31	57	12	24	32	--
RDF 3	G 1/2	62	31	57	14	23	32	--
RDF 4	G 3/4	78	39	61	18	25	36	--

5. Appendix

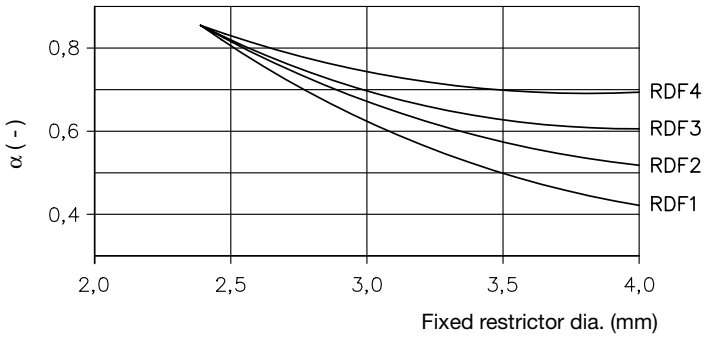
5.1 Determining fixed restrictor bore

For hydraulic oil ρ = 870 ... 900 kg/m³ and given flow Q (lpm) and desired flow resistance Δp (bar)

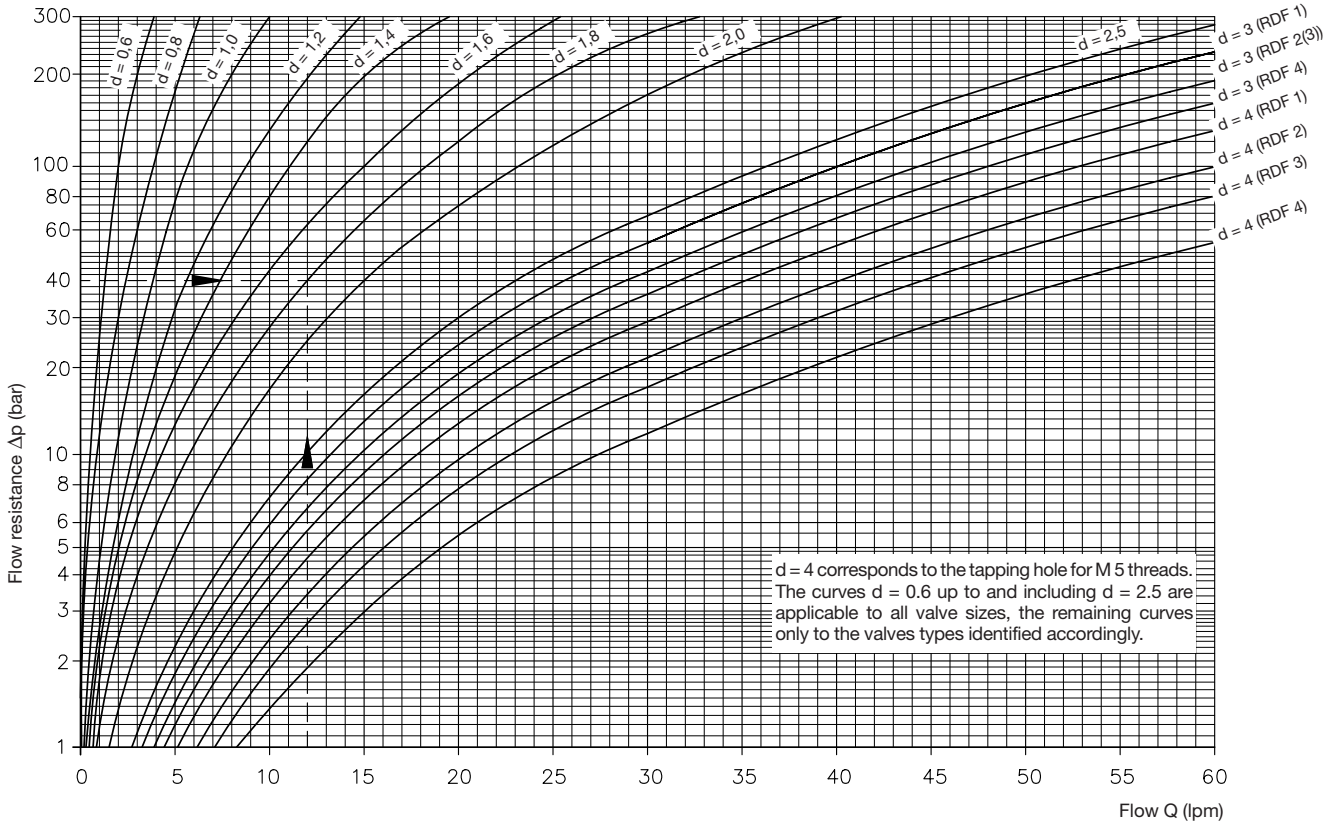
$$d \approx 1{,}2 \sqrt{\frac{Q}{\alpha \sqrt{\Delta p}}}$$

d (mm) = Fixed restrictor bore
α (-) Flow coeefficient
= 0.82 to approx. 2.5 dia.

The α values have been determined experimentally with hydraulic oil, viscosity 36 mm²/s at 50°C and apply only to type RDF.



5.2 Quick selection



Example: For a gliven flow of 12 lpm a flow resitance of Δp = 40 bar is required.
The necessary fixed restrictor bore is d = 1.8 mm.