

Directional Control Valves ND 4

manually, mechanically or pressure operated, max. operating pressure 500 bar



Types of operation* mechanical manual pressure operated Sensing roller Sensing pin hydraulic Rotary handle Sensing lever pneumatic D K Ρ Н [] a а γa a a a a Page 2 Page 3 Page 4

0,01 / 100 mm

R tmax = 4

Valve without operation



Application

The directly operated directional control valves are used to control hydraulic elements when a power supply is not possible or reasonable.

These directional control valves can directly control hydraulic consumers or be used as pilot valves for hydraulically-operated switching devices.

The closed directions of flow are hermetically tight. The switching operation is smooth and shock-free.

A strainer insert in the pressure port protects the valve seats from coarse impurities.

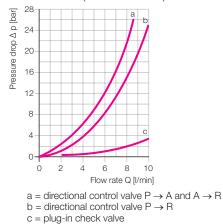
Technical data

Туре	Ball-type poppet valve hermetically sealed
Type of connection	Mounting plate (see accessories)
Port size	G 1/4
Mounting position	any vertical preferred

Hydraulic characteristics

Max. operating pressure	500 bar
Max. flow rate	8 l/min
Flow direction	only in the direction of the arrow, as in the symbol
Hydraulic oil	as per DIN 51524
Adm. oil temperature	-25+80°C
Adm. oil viscosity	ISO VG 10 to 68 as per DIN 51519
Recommendation for room temperature 1040°C	HLP 22

 Δ p-Q characteristic curve for kinematic viscosity of 53 x 10⁻⁶ m²/s (HLP 22 at 20 °C)



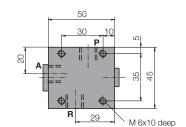
View from below

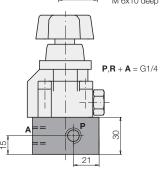
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Accessory

Part no.	3534039
Weight	0.45 kg
Single mounting plate	3 x G 1/4
Single mounting plate	$3 \times G \frac{1}{4}$

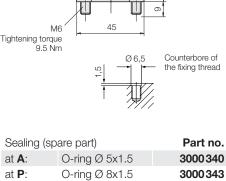




Example with directional control valve "D"

*) Electrical operation see C 2.360

52



oballing (oparo part)		i artiio.
at A :	O-ring Ø 5x1.5	3000 340
at P:	O-ring Ø 8x1.5	3000 343
at R:	O-ring Ø 8x1.5	3000 343
Plug-in check valve (spare part)		3815002

Connecting holes max. Ø4.5 mm

Important notes!

The ports A (consumer port), P (pump) and R (return) are fixed by the ball seating principle and cannot be interchanged at will.

Due to the negative overlap, all ports are briefly connected to each other during the switching process.

The built-in strainer insert in the P port protects against coarse impurities but is not a substitute for the usual hydraulic filters in the power unit.

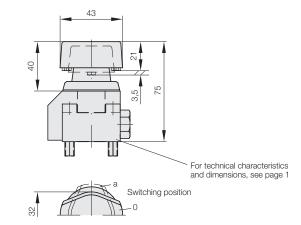
When using the Δp -Q diagram, it should be noted that during the return stroke of double-acting differential cylinders, a much higher flow rate flows back through the valve than during the operating stroke.

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Manual operating elements

Rotary handle D





Operation		Denomination	Switching symbol	Part no.
Rotary handle Rotary angle Operating torque	latching 4 x 90° approx. 0.63 Nm	2/2 directional control valve DR 2-1		2321 302
Weight Note	approx. 0.4 kg	3/2 directional control valve DZ3-1		2321 201
For valve combination acting, see data sheet	0	3/2 directional control valve DZ3-1R		2321 300

Other functions on request

Sensing lever F

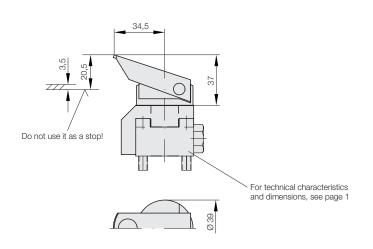


Operation

Sensing lever

Switching stroke Switching force Weight

not latching with return spring max. 20.5 mm 25...28 N approx. 0.4 kg



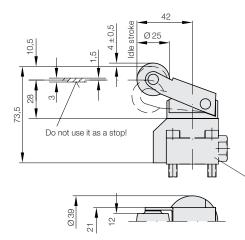
Denomination	Switching symbol	Part no.
2/2 directional control valve FR2-1		2323 302
3/2 directional control valve FZ3-1R		2323 301
3/2 directional control valve F3-1R		2323 201

Other functions on request

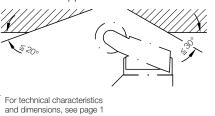
Mechanical operating elements

Sensing roller K





Switching curve for roller lever



Denomination	Switching symbol	Part no.
2/2 directional control valve KR 2-1		2341803
3/2 directional control valve KZ3-1		2341 101
3/2 directional control valve KZ3-1R		2341201
3/2 directional control valve K3-1		2341 102
3/2 directional control valve K3-1R		2341 301

Operation

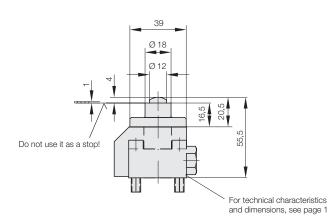
Roller lever Functional path Switching force Weight with return spring 10.5 mm 25...28 N approx. 0.4 kg





Operation

Sensing pin Switching stroke Switching force Weight with return spring max. 4 mm 51...57 N approx. 0.4 kg

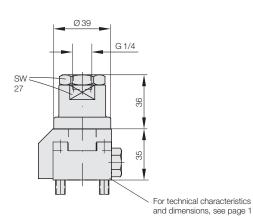


Denomination	Switching symbol	Part no.
2/2 directional control valve TR 2-1		2322 302
3/2 directional control valve TZ3-1		2322 203
3/2 directional control valve TZ3-1R		2322 201
3/2 directional control valve T3-1		2322 200
3/2 directional control valve T3-1R		2322 301

Pressure operated elements

Hydraulics H

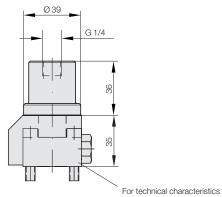




	Denomination	Switching symbol	Part no.
with return spring approx. 0.4 cm ³ 12 500 bar approx. 0.5 kg -4080 °C	2/2 directional control valve HR 2-1		2331 401
	3/2 directional control valve HZ3-1		2351 220
	3/2 directional control valve HZ3-1R		2351 320
	3/2 directional control valve H3-1		2351 201
	3/2 directional control valve H3-1R		2351 301

Operation





and dimensions, see page 1

	Denomination	Switching symbol	Part no.
eturn spring x. 1 cm ³ 5 bar ted and filtered x. 0.4 kg + 70°C	2/2 directional control valve PR 2-1		2331 301
	3/2 directional control valve PZ3-1R		2331 100
	3/2 directional control valve P3-1		2332 200
	3/2 directional control valve P3-1R		2332 300

Operation

Operation	
Pneumatic piston	with return spr
Operating volume	approx. 1 cm ³
Control pressure	4 15 bar
Compressed air	lubricated and
Weight	approx. 0.4 kg
Adm. temperature range	−20+70°C
(environment and medium))

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Subject to modifications

4