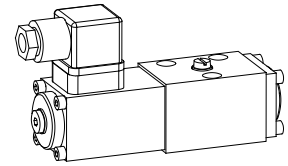


**Solenoid operated spool valve with soft switching**

- 4/2-way with 2 solenoids
- 4/3-way with spring centred mid position
- 4/2-way with spring reset
- $Q_{max} = 10 \text{ l/min}$ ,  $p_{max} = 315 \text{ bar}$

**NG4-Mini<sup>®</sup>**

**DESCRIPTION**

Direct operated solenoid valve with 4 ports in 5 chamber design. Spool with spring reset. The valve's with soft switching characteristic is achieved by means of an optimum combination of removable orifice and piston design. Precise spool fit, low leakage, long life time. Spool made from hardened steel, body from high quality cast steel. Wide range of standard and special voltages. The body made of high grade hydraulic casting for long service life is painted. The solenoid and the cover are zinc coated. The socket head screws are zinc coated.

**FUNCTION**

- 4/2-way  
Two solenoids and 2 switch settings. 100 % ED holds the switch setting on the solenoid (no mechanical detente).
- 4/3-way spool valve:  
2 solenoids and 3 spool positions, spring centered. With the solenoids deenergised the spool returns to the center position.
- 4/2-way spool valve:  
1 solenoid and 2 spool positions, spring off set. With the solenoid deenergised the spool returns to the offset position.

**APPLICATION**

Normal solenoid spool valves switch very quickly. This can induce shocks in the hydraulic system which can cause mechanical wear and have a negative effect on performance. The soft switching valves slow down and dampen the switching movements. All starting, stopping and oscillating movements are done softly, which benefits the system. Optimum results can be achieved if all ports are connected and the valve is properly bleed of air. Miniature valves are used where both, reduced dimensions and weight are important.

**Important:** at the time the valve is taken into service, the valve must be vented under pressure (max. 2 revolutions of screw E).

**TYPE CODE**

B  W 4  -  /  #

Interface acc. to Wandfluh standard

Economy solenoid  E

Medium solenoid  M

Soft switching

Number of control ports

Description of symbols acc. to table

Nominal voltage $U_N$	12 VDC	<input type="checkbox"/> G12	110 VAC	<input type="checkbox"/> R110
	24 VDC	<input type="checkbox"/> G24	115 VAC	<input type="checkbox"/> R115
			230 VAC	<input type="checkbox"/> R230

Orifice area  $\varnothing 0,3 \text{ mm}$  (Standard)

$\varnothing 0,2 \text{ mm}$   0,2

Design-Index (Subject to change)

**GENERAL SPECIFICATIONS**

Description	4/2-, 4/3-way spool valve
Nominal size	NG4-Mini to Wandfluh-standard
Construction	Direct operated spool valve
Operations	Solenoid
Mounting	Flange 3 fixing holes for socket head screw M5x40
Connections	Threaded connection plates Multi-flange subplates Longitudinal stacking system
Ambient temperature	-20...+50 °C
Mounting position	any, preferably horizontal
Fastening torque	$M_0 = 5,5 \text{ Nm}$ (screw quality 8.8)

**HYDRAULIC SPECIFICATIONS**

Fluid	Mineral oil, other fluid on request
Contamination efficiency	ISO 4406:1999, class 18/16/13 (Required filtration grade $\beta_{6...10} \geq 75$ ) refer to data sheet 1.0-50/2
Viscosity range	12 mm <sup>2</sup> /s...320 mm <sup>2</sup> /s
Fluid temperature	-20...+70 °C
Working pressure in port P, A, B	Economy: $p_{max} = 250 \text{ bar}$ Medium: $p_{max} = 315 \text{ bar}$
Tank pressure in port T	$p_{max} = 100 \text{ bar}$
Max. volume flow	$Q_{max} = 10 \text{ l/min}$ , see characteristics
Leakage volume flow	see characteristics

Weight	Economy	Medium
4/2-way (2 solenoid)	m = 1,2 kg	m = 1,4 kg
4/3-way	m = 1,2 kg	m = 1,4 kg
4/2-way (1 solenoid)	m = 0,83 kg	m = 0,93 kg

**ELECTRICAL CONTROL**

Construction	Solenoid, wet pin push type, pressure tight
Standard-nominal voltage	$U_N = 12 \text{ VDC}, 24 \text{ VDC}$ $U_N = 110 \text{ VAC}^*, 115 \text{ VAC}^*, 230 \text{ VAC}^*$ $AC = 50 \text{ to } 60 \text{ Hz}$ * Rectifier integrated in the plug, other nominal voltages and nominal performances on request.
Voltage tolerance	$\pm 10\%$ of nominal voltage
Protection class	IP 65 to EN 60 529
Relative duty factor	100% DF (see data sheet 1.1-430)
Switching cycles	Since switching is damped and slow, the switching frequency is of secondary importance.
Operating life	$10^7$ (number of switching cycles, theoretically)
Connection/Power supply	Over device plug connection to ISO 4400/DIN 43650, (2P+E), other connections on request.

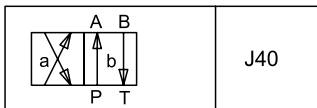
**SOLENOID DESCRIPTION**

With respect to the selection of the solenoid, the following statements are important:

- The solenoid is the most expensive component of the solenoid spool valve.
- For this reason, it is not economical to use the same solenoid for all applications.
- Depending on the application, sales area, and customer, the requirements for solenoid spool valves and solenoids differ very considerably.
- In order to be able to offer the customer an optimum, we can supply our solenoid spool valves NG4 in 2 different versions:
  - Economy BEIIV (data sheet 1.1-100)
  - Medium SIN35V (data sheet 1.1-105)

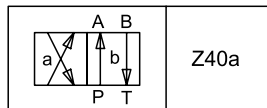
**TYPE LIST / DESIGNATION OF SYMBOLS**

4/2-way valve with 2 solenoids



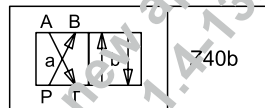
J40

4/2-way valve with spring reset operation A-side



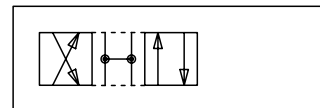
Z40a

operation B-side

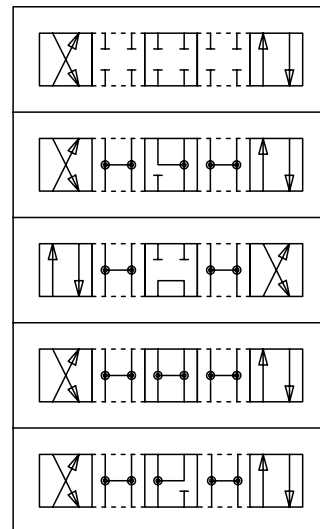
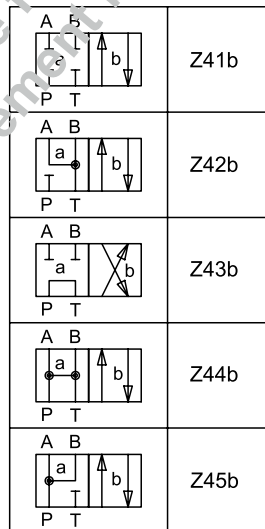
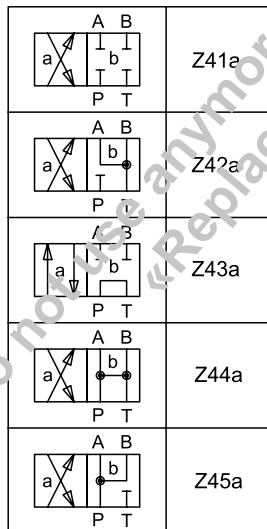
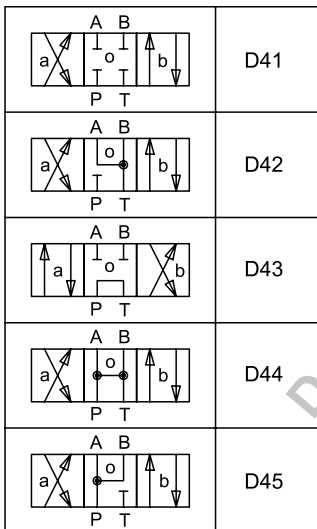


Z40b

Transitional functions

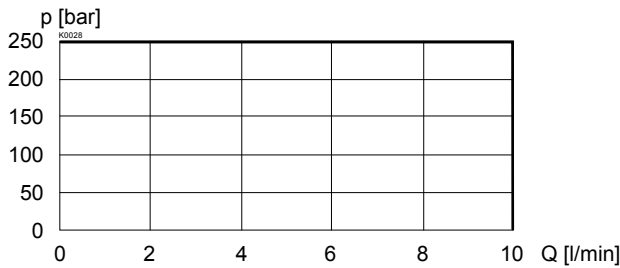


4/3-way valve spring centered

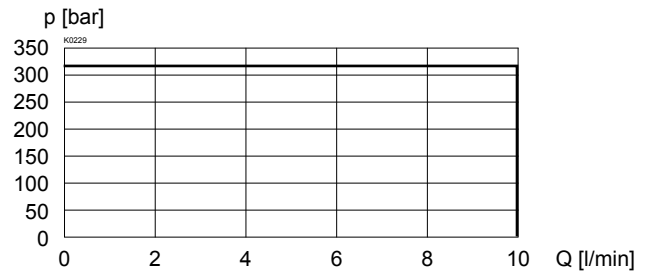


**CHARACTERISTICS** Oil viscosity  $\nu = 30 \text{ mm}^2/\text{s}$ 

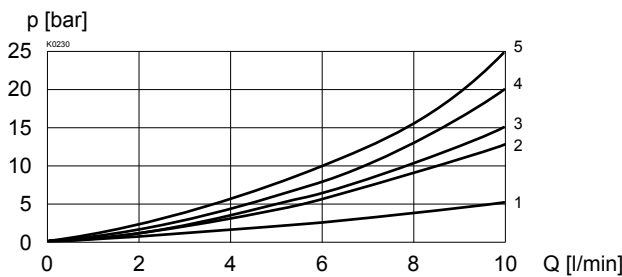
$p = f(Q)$  Performance limits  
 with standard voltage -10%  
 Economy



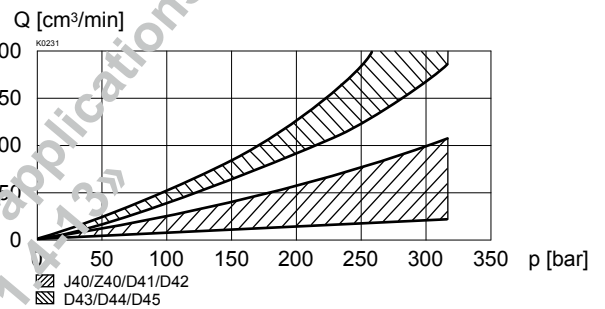
$p = f(Q)$  Performance limits  
 with standard voltage -10%  
 Medium



$\Delta p = f(Q)$  Pressure drop volume flow characteristics

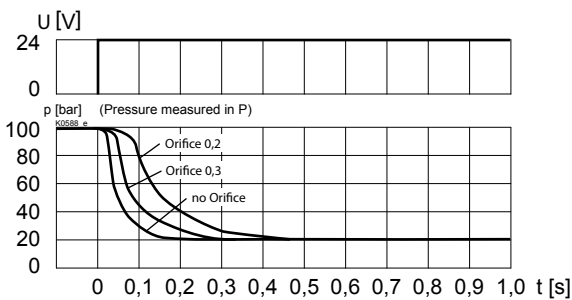


$Q_L = f(p)$  Leakage volume flow characteristics  
 per control edge



Symbol	Pressure drop curve no.	Volume flow direction				
		P - A	P - B	P - T	A - T	B - T
Z40/J40	5	5	5	-	5	5
D41/Z41	5	5	5	-	5	5
D42/Z42	5	5	5	-	1	1
D43/Z43	3	3	3	2	3	3
D44/Z44	1	1	1	-	1	1
D45/Z45	1	1	1	-	4	4

Shifting times, Influence of orifices on shifting  
 Measured with BMW4D41-G24,  $Q = 5 \text{ l/min}$   
 Solenoid energised



Shifting times, Influence of orifices on shifting  
 Measured with BMW4D41-G24,  $Q = 5 \text{ l/min}$   
 Solenoid deenergised

