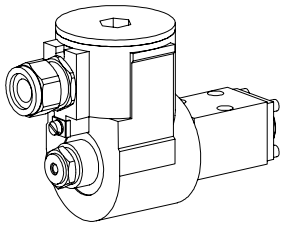
Solenoid operated spool valve
- **4/2-way impulse valve**
- **4/3-way with spring centred mid position**
- **4/2-way spring reset**
- **Q_{max} = 20 l/min, p_{max} = 315 bar**

NG4-Mini®

II 2 G
EEx d II C



DESCRIPTION

Spool valve flange type NG4-Mini with 4 connections. Direct solenoid operated spool valve with a 5 annular chamber body design. Activated with explosion proof solenoid. Spool detented or with spring reset. Wet pin solenoid. Precise spool fit, low leak, long service life. Spool made from hardened steel. Valve body made from high grade hydraulic cast iron.
EEx: in accordance with european standards EN 50014, EN 50018
d: flameproof enclosure
Group II C: (gas group II A, II B) for all applications except mining
Zone 1 (and 2): explosive mixtures present intermittently
EC-type examination certificate:
Execution T4: PTB 98 ATEX 1009
Execution T6: PTB 98 ATEX 1008

FUNCTION

The energised solenoid shifts the spool into the corresponding position.
• 4/2-way impulse valve detented:
Two solenoids and 2 detented positions. With the solenoid deenergised the spool remains in the last switched position.
• 4/3-way spool valve:
Two solenoids and 3 positions, spring centered. With the solenoids deenergised the spool returns to the center position by spring force.
• 4/2-way spool valve:
One solenoid and 2 positions, spring offset. With the solenoid deenergised the spool returns to the offset position by spring force.

APPLICATION

Solenoid operated spool valves are mainly used to control the direction of movement and retain hydraulic cylinders and motors. The direction of flow through the valve is determined by the spool symbol. Switching performance and possible leakage must be taken into considaration when designing a system. These valves are suitable for hazardeous areas in off-shore and ship-building applications as well as in chemical, oil and gas industry.

CONTENT

TYPE CODE

B EXd 4 [ ] - S1788 - [ ] / [ ] # [ ]

- Interface
- Explosion proof solenoid
- Number of control ports
- Description of symbols acc. to table 1.3-22/2
- Terminal box without cable
- Standard nominal voltage U_N: 24 VDC [G24] / 115 VAC [R115] / 230 VAC [R230]
- Execution: T1…T4 [T4] / T1…T6 [T6]
- Design-Index (Subject to change)

GENERAL SPECIFICATIONS

Description	4/2-, 4/3-spool valve
Nominal size	NG4-Mini to Wandfluh-standard
Construction	Direct operated spool valve
Operation	Solenoid
Mounting	Flange 3 fixing holes for socket head cap screws M5x40 M5x60 with distance plate BDP4/20
Connections	Threaded connection plates Multi-flange subplates Longitudinal stacking system
Admissible ambient temp. *:	
Execution T4	-20…+40 °C
Execution T6	-20…+90 °C (operation as T1…T4) -20…+40 °C (operation as T5 / T6)
Mounting position	any, preferably horizontal
Fastening torque	M_D= 5,5 Nm (quality 8.8)
Weight: 4/2-way imbulse	m = 4,8 kg
4/3-way	m = 4,8 kg
4/2-way (1 solenoid)	m = 2,8 kg

HYDRAULIC SPECIFICATIONS

Fluid	Mineral oil, other fluid on request
Contamination efficiency	ISO 4406:1999, classe 20/18/14 (Required filtration grade ß10...16≥75) refer to data sheet 1.0-50/2
Viscosity range	12 mm²/s...320 mm²/s
Admissible fluid temp. *:	
Execution T4	-20…+40 °C
Execution T6	-20…+70 °C (operation as T1…T4) -20…+40 °C (operation as T5 / T6)
Working pressure in port P, A, B	p_{max} = 315 bar
Tank pressure in port T	p_{max} = 100 bar
Max. volume flow	Q_{max} = 20 l/min
Leakage volume flow	see characteristics

* Deviating pressure medium - or ambient temperatures are possible for special arrangements after checking and authorisation by a responsible inspector. Measures for the prevention of the exceeding of the admissible solenoid surface - and internal temperatures can be: a good ventilation, low ambient temperatures (for higher pressure medium temperatures), limitation of the maximum possible power supply voltage, a short switching-on duration, installation on large heat dissipating blocks, etc. The responsibility in all cases lies with the operator, resp. with his inspector.

ELECTRICAL CONTROL

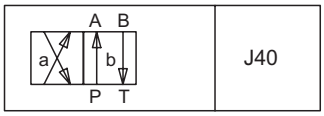
Construction	Solenoid, wet pin push type, pressure tight
Standard-nominal voltage	U_N = 24 VDC U_N = 115 VAC, U_N = 230 VAC DC wired with VDR AC = 50 bis 60 Hz ±2%; with half wave rectifier and recovery diode
Voltage tolerance	±10 % of rated voltage
Protection class	IP 65 acc. to EN 60 529
Relative duty factor	100% DF
Switching cycles	12'000/h
Operating life	10^7 (number of switching cycles, theoretically)
Connection/Power supply	Through cable entry for cable diameter 11...14 mm
Temperature class:	(acc. to EN 50014)
Execution T4	T1…T4
Execution T6	T1…T6
Nominal power:	
Execution T4	22 W (DC), 35 VA (AC)
Execution T6	7 W (DC), 12 VA (AC)

START-UP

Information concerning the installation and commissioning is contained in the operating instructions supplied together with the solenoid coil.

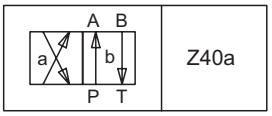
TYPE LIST/DESIGNATION OF SYMBOLS

4/2-way valve impulse



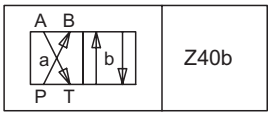
J40

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



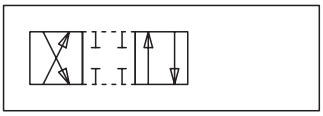
Z40a

operation B-side

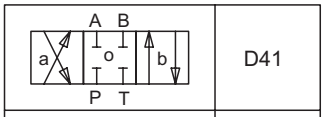
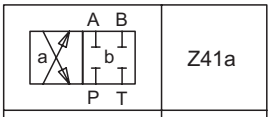
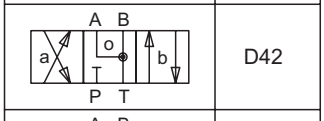
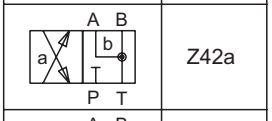
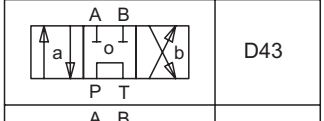
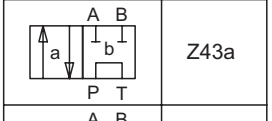
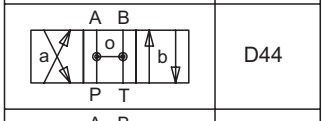
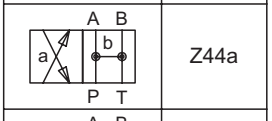
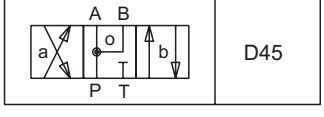
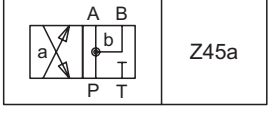


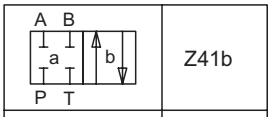
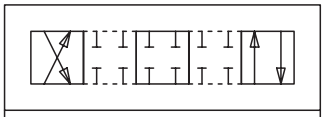
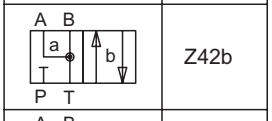
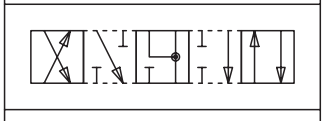
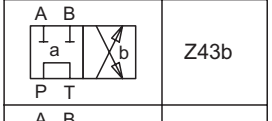
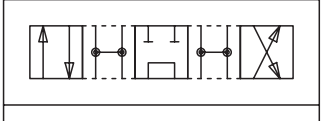
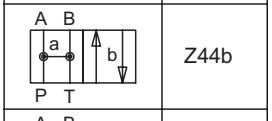
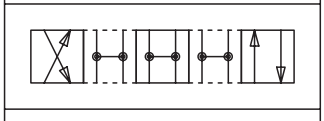
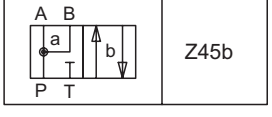
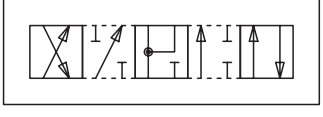
Z40b

Transitional functions



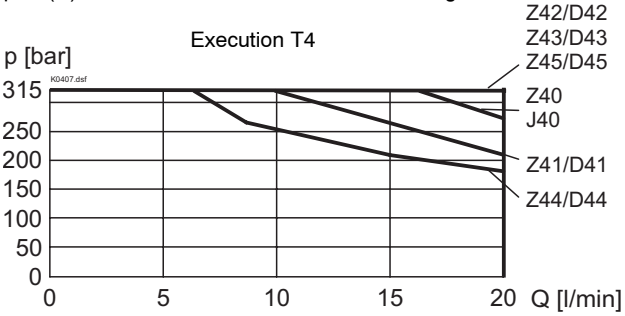
4/3-way valve spring centred

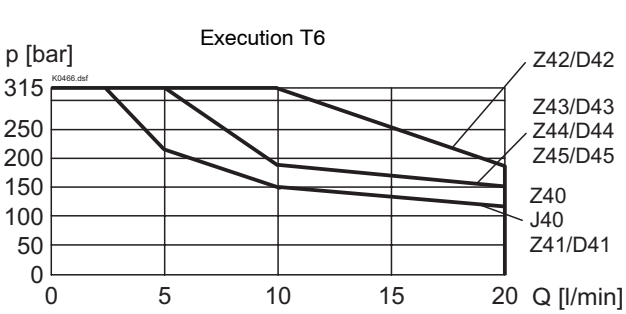
	D41		Z41a
	D42		Z42a
	D43		Z43a
	D44		Z44a
	D45		Z45a

	Z41b	
	Z42b	
	Z43b	
	Z44b	
	Z45b	

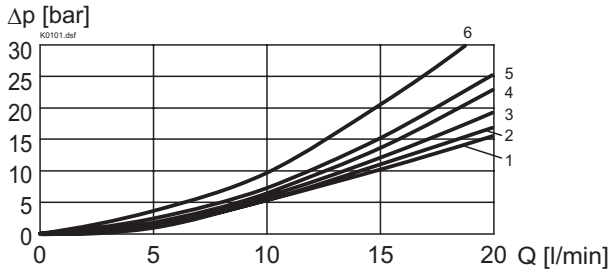
CHARACTERISTICS Oil viscosity υ = 30 mm²/s

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



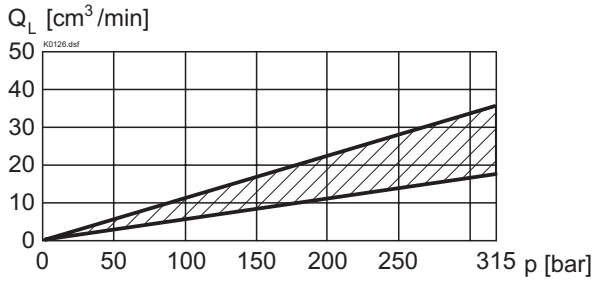


Δp = f (Q) Pressure drop volume flow characteristics



Symbol \ Pressure drop Curve no.	Volume flow direction P-A	P-B	P-T	A-T	B-T
Z40/J40	5	5	-	2	2
Z41/D41	5	5	-	2	2
Z42/D42	5	5	-	1	1
Z43/D43	4	4	6	2	2
Z44/D44	4	4	3	2	2
Z45/D45	4	4	-	2	2

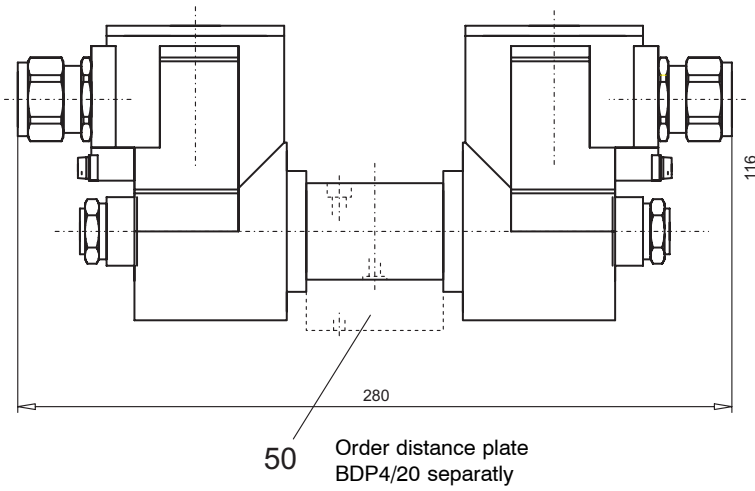
Q_L = f (p) Leakage volume flow characteristics per control edge



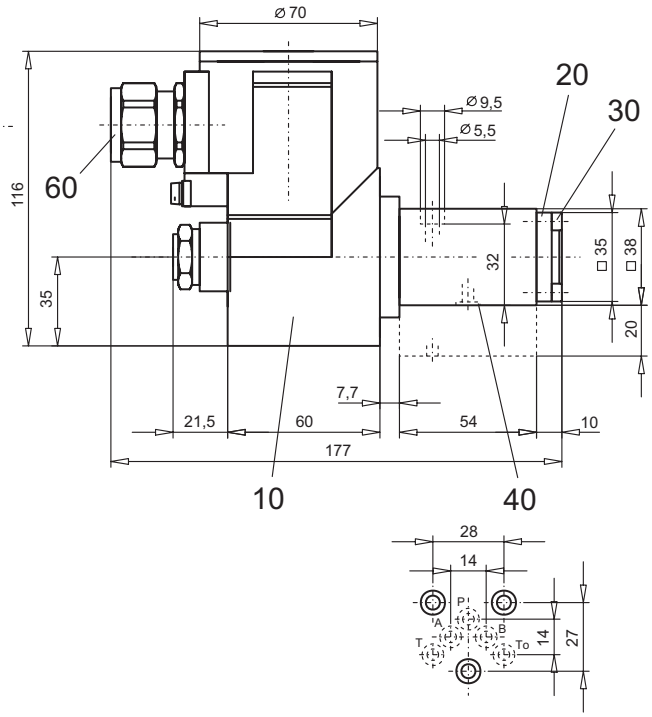
Envelop curve for spool J40/Z40/D41/D42/D44/D45

DIMENSIONS

4/3-way valve (spring centred)
4/2-way valve (impulse)



4/2-way valve (spring offset)



PARTS LIST

Position	Article	Description
10	207.5 ...	Coil type EExd
20	57.4202	Cover
30	246.1113	Socket head cap screw M4x12 DIN 912
40	160.2052	O-ring ID 5,28x1,78
50	173.1451	Distance plate BDP4/20
60	111.1080	Cable entry brass M20

ACCESSORIES

Threaded connecting plates, multi-flange subplates and longitudinal stacking system see reg. 2.9

Technical explanation see data sheet 1.0-100E