

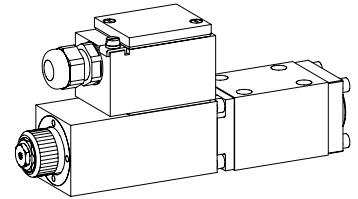


Solenoid operated spool valve intrinsically safe NG6
ATEX and IECEx certified

ISO 4401-03

- 4/2-way impulse valve
- 4/3-way with spring centred mid position
- 4/2-way spring reset
- $Q_{max} = 20 \text{ l/min}$, $p_{max} = 300 \text{ bar}$

Ex ia I Ma
Ex ia II C T5/T6 Ga

II 1 G Ex ia II C T6, T5

I M1 Ex ia I Ma

DESCRIPTION

Spool valve NG6, flange type with 4 ports. Direct operated spool in 5 chamber body. Actuated by an explosion-proof solenoid. Intrinsic safety is achieved by limiting the electric energy in the solenoid supply circuit by means of a separate certified intrinsically safe power supply. Spool detented or with spring reset. Wet pin solenoid, precise spool fit, low leak, long service life. Spool made of hardened steel. Valve body made of high grade hydraulic cast iron.

FUNCTION

When energised the solenoid pushes the spool into the corresponding shifted position.

- 4/2-way detented spool valve:
2 solenoids and 2 detented spool positions.
- 4/3-way spool valve:
2 solenoids and 3 spool positions.
- 4/2-way spool valve:
1 solenoid and 2 spool positions.

APPLICATION

Solenoid operated directional spool valves are mainly used to control the direction of movement and holding of hydraulic cylinders and motors. The direction of movement is defined by the symbol. For the layout of the hydraulic system, leakage and valve performance must be taken into consideration. The valves are designed for areas where flammable gases are present continuously or intermittently. The intrinsically safe electric circuit prevents sparking.

Intrinsically safe valves are used in:

- Shipping- and offshore industry
- Oil- and gas industry
- Chemical industry
- the mining application

CERTIFICATES

in accordance with	Surface	Mining
ATEX	x	x
IECEX	x	x

The certificates can be found on www.wandfluh.com / DOWNLOADS / Accompanying Ex-proof / M.Z45

TYPE CODE

	A	EXi	4		-		#	
International mounting interface ISO								
Protection type intrinsically safe								
Number of control ports								
Description of symbols acc. to table 1.3-40/2								
Coil resistance	100 Ω	<input type="text" value="100"/>						
	152 Ω	<input type="text" value="152"/>						
								only symbols J60, Z60 und D62
Equipment group	II (Surface)	<input type="text" value="/ T6"/>						
	I (Mining)	<input type="text" value="- M233"/>						only in combination with coil resistance 100 Ω
Design-Index (Subject to change)								

GENERAL SPECIFICATIONS

Designation	4/2-, 4/3-spool valve
Nominal size	NG6 according to ISO 4401-03
Construction	Direct operated spool valve
Operation	Solenoid
Mounting	Flange
	4 fixing holes for socket
	head cap screws M5x45
Connections	Threaded connection plates
	Multi-flange subplates
	Longitudinal stacking system
Admissible ambient temp.	-20...+45 °C (operation as T6)
	-20...+60 °C (operation as T1...T5)
Mounting position	any, preferable horizontal
Fastening torque	$M_D = 5,5 \text{ Nm}$ (quality 8.8)
Masse: 4/2-way impulse	$m = 5,3 \text{ kg}$
4/3-way	$m = 5,3 \text{ kg}$
4/2-way (1 solenoid)	$m = 3,2 \text{ kg}$

HYDRAULIC SPECIFICATIONS

Fluid	Mineral oil, other fluid on request
Contamination efficiency	ISO 4406:1999, class 20/18/14 (Required filtration grade $\beta_{10} \dots 16 \geq 75$) refer to data sheet 1.0-50/2
Viscosity range	12 mm ² /s...320 mm ² /s
Admissible fluid temperature	-20...+45 °C (operation as T6)
	-20...+60 °C (operation as T1...T5)
Working pressure in port P, A, B	$p_{max} = 300 \text{ bar}$
Tank pressure in port T	$p_{max} = 100 \text{ bar}$
Max. volume flow	$Q_{max} = 20 \text{ l/min}$
Leakage volume flow	see characteristics

ELECTRICAL CONTROL

Construction	Solenoid, wet pin push type, pressure tight
Coil resistance	100Ω or 152Ω
P_{min} / I_{min}	100Ω: 0,81W / 90mA 152Ω: 0,62W / 64mA
Protection class	IP65 acc. to EN 60 529 (after correct installation)
Duty time	Continuous
Switching cycles	1800/h
Life time	10^7 (cycles per solenoid, theoretically)
Connection/power supply	Cable entry for cable $\varnothing 6...12$ mm 2 leads for +/- and 1 for ground
Temperature class	T1...T6 to EN 60 079-0
Slip-on coil	rotatable in steps of 90°, easily exchangeable

SAFETY RELEVANT DATA

 Technical safety
 limit values

Device group	I	II
U_i	30 V	30 V
I_i	2,5 A	0,8 A
P_i		3 W
L_i	0mH	0mH
C_i	0nF	0nF

The inductance and capacitance of the solenoid coils are made ineffective.

Other electrical specifications see data sheet 1.1-185 (M.Z45)

SAFE OPERATION

Intrinsically safe valves must be operated from suitable, certified power supplies which are located outside the hazardous area (see operating instructions). The selection of the power supply and wiring work must be executed by trained specialists.

RECOMMENDED ELECTRIC POWER SUPPLY

Electric power supply					Valve	
Type	Manufacturer	Number of outputs	I_{max}	Equipment group	Required coil resistance	P_{min} / I_{min}^{**}
BXNE3412	Georgin	1	95mA	II	100Ω	0,81W / 90mA
BXNE3422	Georgin	2	95mA	II	100Ω	0,81W / 90mA
KFD0-SD2-EX2.1245	Pepper+Fuchs	(1) *	90mA *	I and II	100Ω	0,81W / 90mA
BXNE3712	Georgin	1	125mA	II	100Ω	1,21W / 110mA
BXNE3722	Georgin	2	125mA	II	100Ω	1,21W / 110mA
LB6115/FB6215***	Pepper+Fuchs	4	80mA	II	152Ω	0,62W / 64mA

Further characteristic values refer to data sheet of the power supply manufacturer

* Parallel switching of both outputs.

 ** The minimum drive powers resp. currents have to be adhered to, otherwise the power limit, resp. function cannot be assured.
 Attention: The line resistance also has to be taken into account.

 *** Maximum line resistance 3Ω (corresponds to 80m line length in case of a 1mm² cross section).

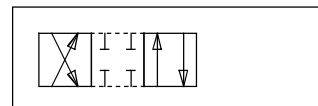
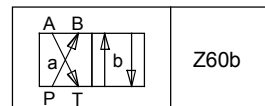
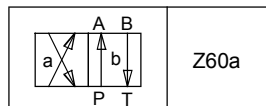
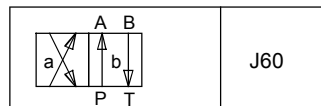
TYPE LIST / DESIGNATION OF SYMBOLS

4/2-way valve impulse

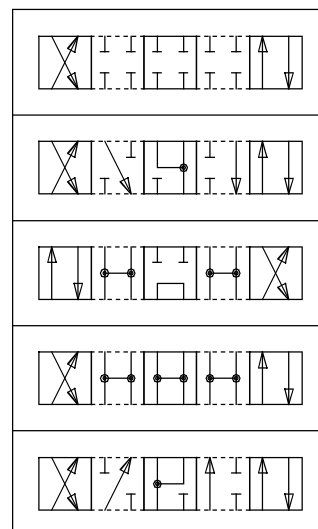
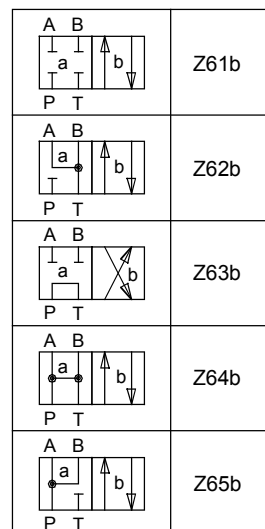
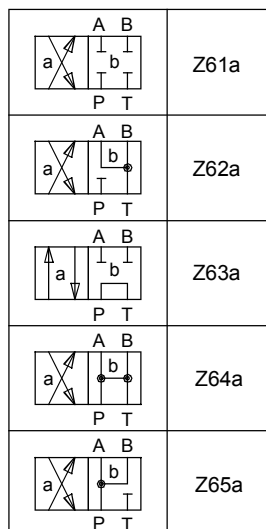
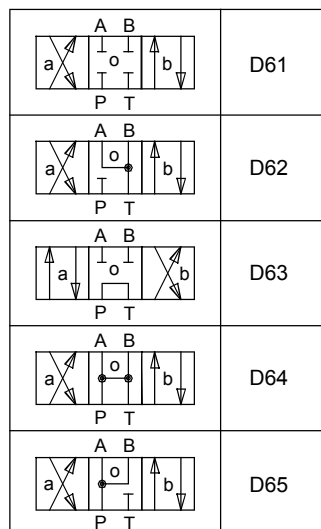
 4/2-way valve with spring reset
 Operation A-side

Operation B-side

Transitional functions

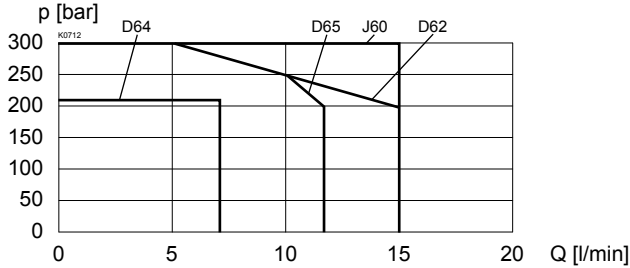


4/3-way valve spring centred

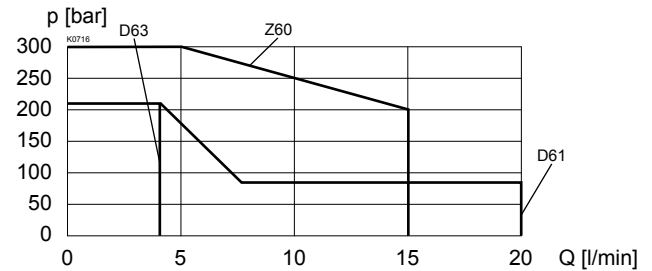


CHARACTERISTICS Oil viscosity $\nu = 30 \text{ mm}^2/\text{s}$

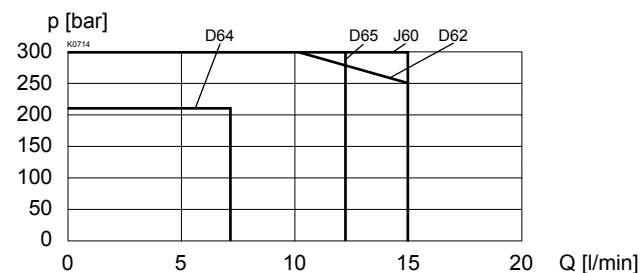
$p = f(Q)$ Performance limit
with $P \geq 0,81\text{W}$ (90 mA, 100 Ω)



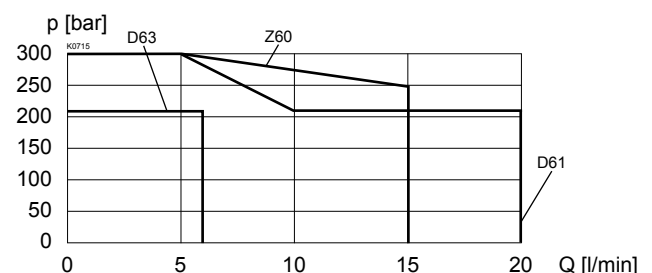
$p = f(Q)$ Performance limit
with $P \geq 0,81\text{W}$ (90 mA, 100 Ω)



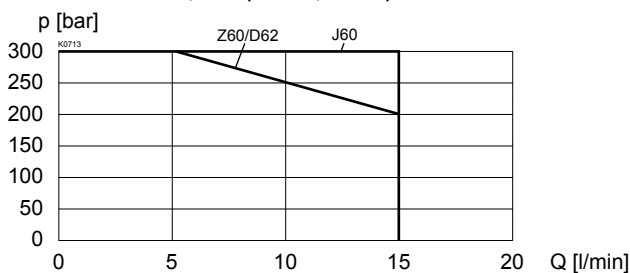
$p = f(Q)$ Performance limit
with $P \geq 1,21\text{W}$ (110 mA, 100 Ω)



$p = f(Q)$ Performance limit
with $P \geq 1,21\text{W}$ (110 mA, 100 Ω)



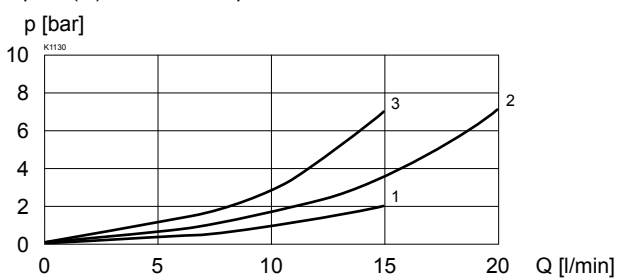
$p = f(Q)$ Performance limit
with $P \geq 0,62\text{W}$ (64 mA, 152 Ω)



If, because of the given operating conditions, during the switching process volume flows occur which exceed the power limit of the valve, these have to be limited by a throttle or a diaphragm in connection P.

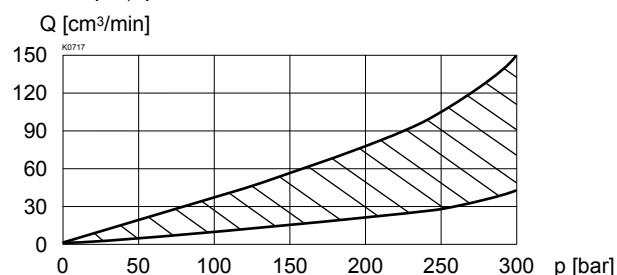
In case of a continuous flow through, the throttle or orifice, depending on the system behaviour, an additional heating-up of the valve is possible. This has to be appropriately taken into account by the user.

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



Pressure drop curve no.	Volume flow direction				
	P - A	P - B	P - T	A - T	B - T
Z60	3	3	-	3	3
J60	2	2	-	2	2
D61/Z61	2	2	-	2	2
D62/Z62	2	2	-	1	1
D63/Z63	3	3	2	3	3
D64/Z64	1	1	-	1	1
D65/Z65	1	1	-	2	2

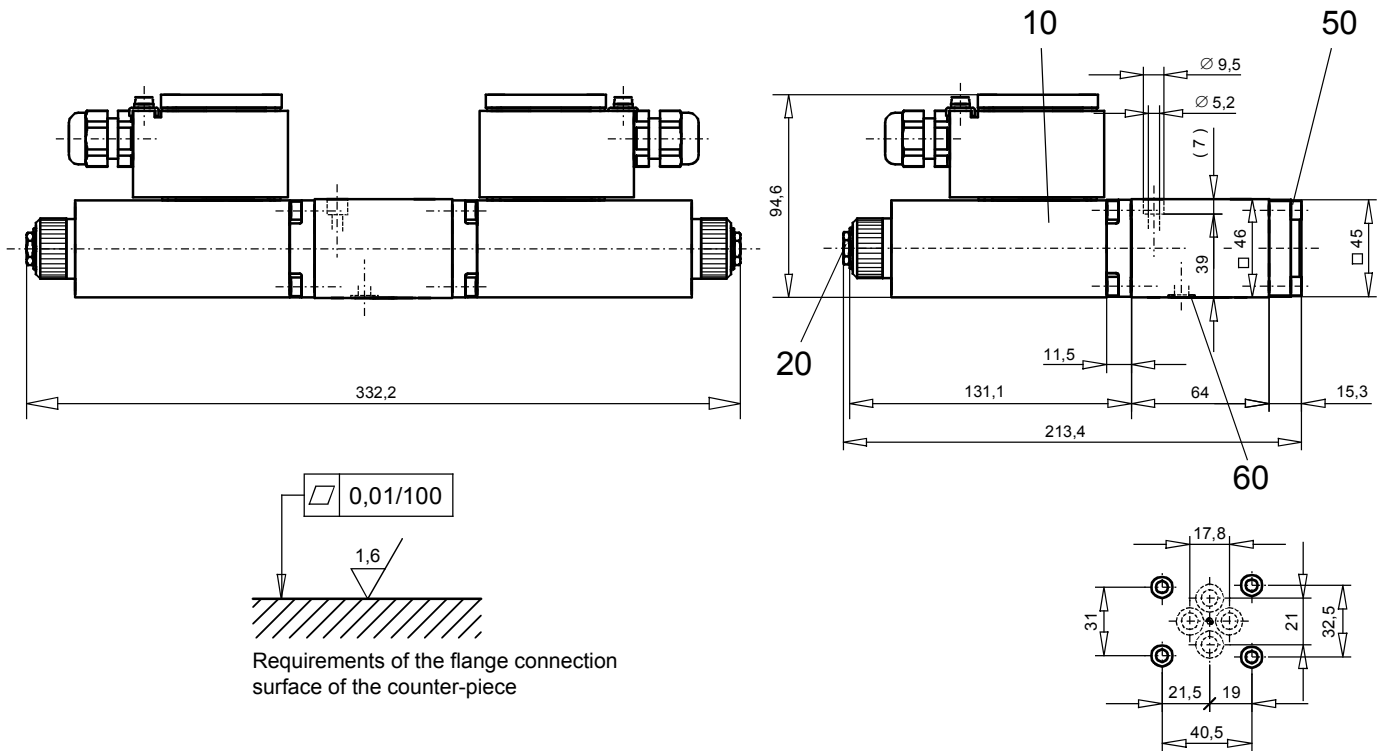
$Q_L = f(p)$ Leakage volume flow characteristics
P \rightarrow T



DIMENSIONS

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

4/2-way valve (spring reset)


PARTS LIST

Position	Article	Description
10	263.6...	Solenoid coil type MKZ45
20	253.8000	plug with integrated manual override HB4,5
50	246.1117	Socket head cap screw M5x16 DIN 912
60	160.2093	O-ring ID 9,25x1,78

ACCESSORIES

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

Technical explanation see data sheet 1.0-100