
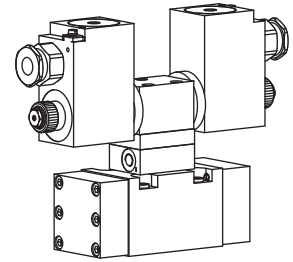


**Spool valve pilot operated**

- 4/2-way Impulse version detented
- 4/3-way with spring centred mid position
- 4/2-way with spring reset
- $Q_{max} = 100 \text{ l/min}$ ,  $p_{max} = 315 \text{ bar}$

**NG10**  
 ISO 4401-05

 **II 2 G Ex d II C**  
**II 2 D Ex tD A21 IP65**


**DESCRIPTION**

Pilot operated spool valve in flange type NG10 with 4 connections. Pilot valve as direct operated spool valve in a 5 chamber system. Spool made from hardened steel, valve body made from high grade hydraulic cast iron.

The solenoid coil is zinc/nickel-coated.

Solenoid coil in accordance with EC-Directive 94/9 (ATEX) for explosion-hazard zones.

**Ex:** In accordance with European standards EN 60079-0, EN 60079-1 (gas)

EN 61241-0, EN 61241-1 (dust)

**d:** Flameproof enclosures

**tD:** Protection by enclosure

**Device group II:** For all explosion-hazard zones, except mining

**Gas group IIC:** Gas groups IIA + IIB included

**Device cat. 2G:** For zones 1 and 2 (gas)

**Device cat. 2D:** For zones 21 and 22 (dust)

**Zones:** 1/21 and 2/22

**EC-Type examination certificate:**

**PTB 07 ATEX 1023**

**FUNCTION**

By the actuation of the pilot control valve the spool of the main valve is brought into the corresponding switching position.

- 4/2-way impulse version detented
- 4/3-way with spring-centred mid position
- 4/2-way with spring reset

(See data sheet of pilot valve 1.3-23)

The actuation of the pilot valve can be internal or external, depending on the type of pilot operation.

**APPLICATION**

Spool valves are mainly utilised for controlling the direction of movement and for holding hydraulic cylinders and motors. The direction of movement is determined by the symbol. Pilot operated valves are utilised where large volume flows have to be controlled. These valves are suitable for hazardous areas in shipbuilding- and off-shore-applications as well as in chemical, oil and gas industry.

**TYPE CODE**

	A	EXd	VP	4		-		-		-	L9	#	
International connection standard ISO													
Pilot operated valve:													
Explosion proof version													
Pilot operated spool valve													
No. of control ports													
Symbols designation acc. to table 1.9-37/2													
Pilot control types:													
Pressure supply (x) and drain (y) internal											ti		
Pressure supply (x) and drain (y) external											te		
Pressure supply (x) internal drain (y) external											pi		
Pressure supply (x) external drain (y) internal											pe		
Standard nominal voltage $U_N$ :	12 VDC										G12		
	24 VDC										G24		
	115 VAC										R115		
	230 VAC										R230		
Nominal power $P_N$ :											9W	L9	
Design-Index (Subject to change)													

Ambient temp. up to:  
 40°C or 90°C

**GENERAL SPECIFICATIONS**

Description	4/2-, 4/3-way valve
Nominal size	NG10 to ISO 4401-05
Construction	Pilot operated spool valve
Actuation	Solenoid actuated
Pilot valve	BEXd4.4. Data sheet 1.3-23
Mounting	Flange mounting 4 holes for socket cap screws M6x65
Connections	Threaded connection plates Multi-flange plates Longitudinal stacking system
Admissible ambient temp.	-20...+40°C (operation as T1...T6/T80°C) -20...+90°C (operation as T1...T4/T130°C) In case of $U_N < 20V$ , the max. ambient temperature has to be reduced by 10°C.
Mountin position	any, preferably horizontal
Fastering torque	$M_D = 9,5 \text{ Nm}$ (screw quality 8.8)
Weight: Main valve	$m = 3,6 \text{ kg}$
Sandwich plate	$m = 0,4 \text{ kg}$
Pilot valve	$m = 2,6...4,4 \text{ kg}$ depending on the valve type

**HYDRAULIC SPECIFICATIONS**

Fluid	Mineral oil, other fluid on request
Contamination efficiency	ISO 4406:1999, class 20/18/14 (Required filtration grade $\beta_{10...16} \geq 75$ ) refer to data sheet 1.0-50/2
Viscosity range	12 mm <sup>2</sup> /s...320 mm <sup>2</sup> /s
Admissible fluid temp.	-20...+40°C (operation as T1...T6/T80°C) -20...+70°C (operation as T1...T4/T130°C)
Operating pressure in port P, A, B	$p_{max} = 315 \text{ bar}$
Tank pressure in port T	$p_{Tmax} = 160 \text{ bar}$ at pilot supply te and pi $p_{Tmax} = 100 \text{ bar}$ at pilot supply ti and pe $p_{Tmin}$ minimum 12 bar lower than $p_v$
Pilot over sandwich plate	$p_{vmin} = 12 \text{ bar}$
Max. volume flow	$p_{vmax} = 315 \text{ bar}$ $Q_{max} = 100 \text{ l/min}$
Leakage volume flow	see characteristics

**ELECTRICAL CONTROL**

Construction	Solenoid, wet pin push type, pressure-proof
Standard-nominal voltage	$U_N = 12 \text{ VDC}, 24 \text{ VDC}$ $U_N = 115 \text{ VAC}, U_N = 230 \text{ VAC}$ AC = 50 to 60 Hz $\pm 2\%$ ; with built-in two-way rectifier and recovery diode
Voltage tolerance	$\pm 10\%$ of rated voltage
Protection class	IP65/IP67 acc. to EN 60 529
Relative duty factor	100 % DF
Switching cycles	12000/h
Operating life	$10^7$ (number of switching cycles, theoretically)
Connection/Power supply	Through cable gland for cable diameter 11...14 mm
Temperature class:	T1...T6 (acc. to EN 60079-0)
Nominal power:	9 W

For further electrical characteristics, refer to the data sheet of the solenoid coil 1.1-183

**SECURITY OPERATED**


The solenoid coil must only be put into operation, if the requirements of the operating instructions supplied are observed to their full extent.  
In case of non-observance, no liability can be assumed.

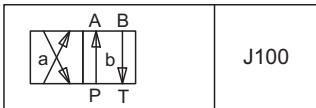
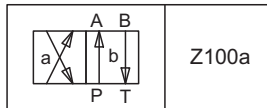
**INSTALLATION**

Tightening torque of the coil fixing nut  $M_0 = 15 \text{ Nm}$ . For stack assembly please observe the remarks in the operating instructions.

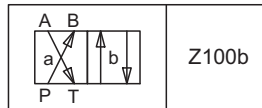
**DESIGNATION**

Execution L6:	II 2 G Ex d IIC T6	$T_a = -25...40^\circ\text{C}$
	II 2 D Ex tD A21 IP65 T80 °C	
	II 2 G Ex d IIC T4	$T_a = -25...90^\circ\text{C}$
	II 2 D Ex tD A21 IP65 T130 °C	

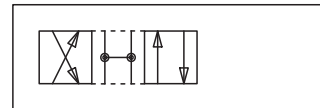
**TYPE LIST/DESIGNATION OF SYMBOLS**

 4/2-way-valve  
with 2 solenoids

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


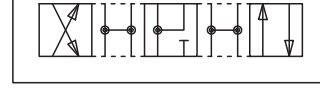
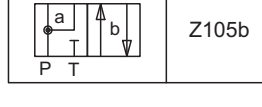
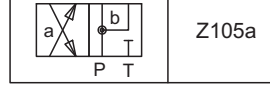
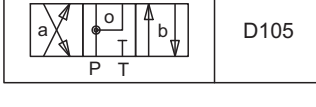
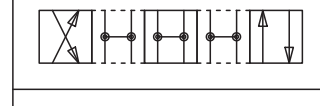
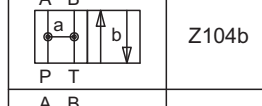
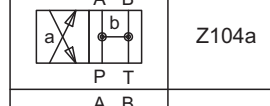
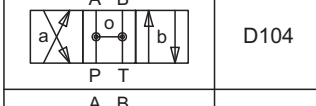
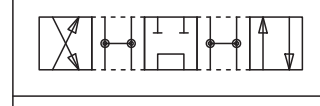
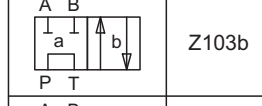
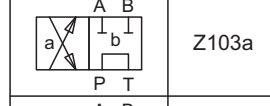
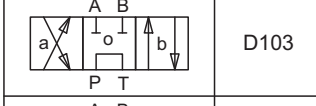
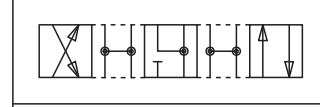
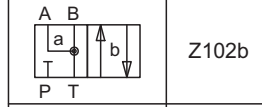
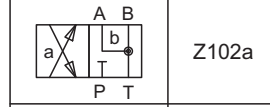
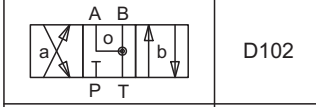
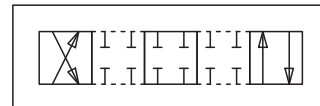
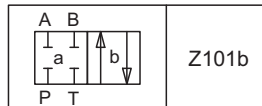
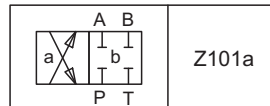
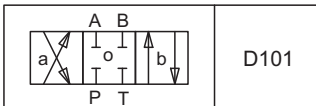
actuation B-side

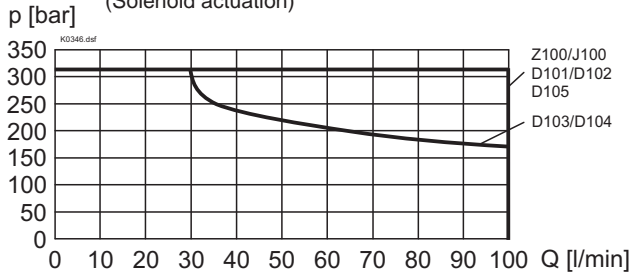
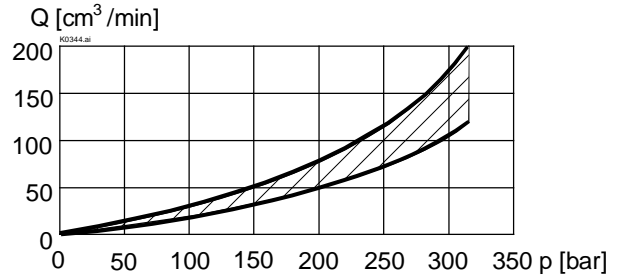
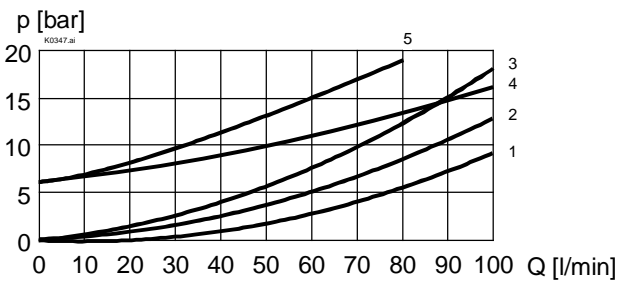


Transitional functions



4/3-way-valve spring centered

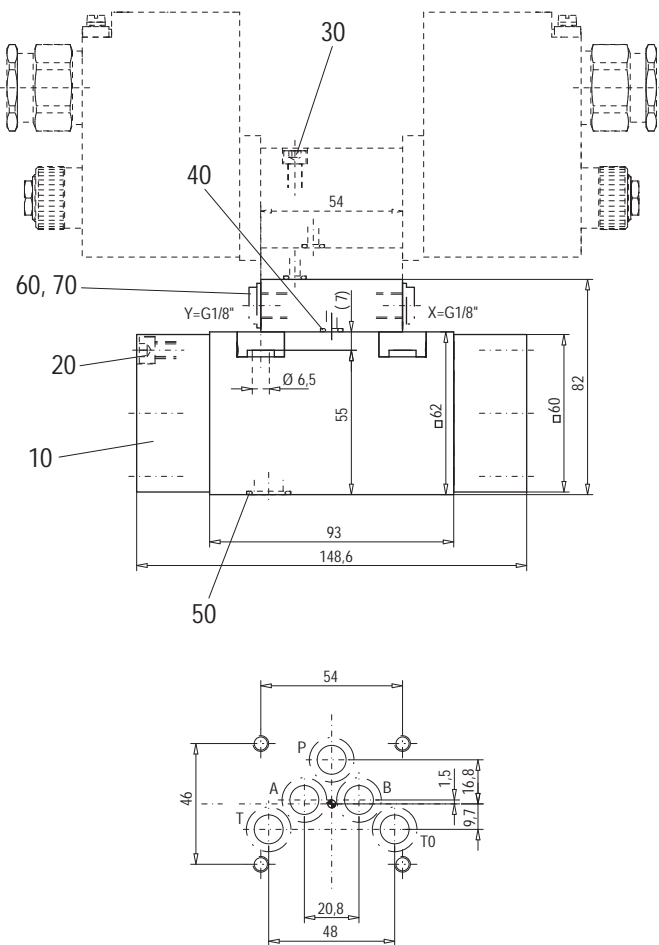


**CHARACTERISTICS** Oil viscosity  $\nu = 30 \text{ mm}^2/\text{s}$ 
 $p = f(Q)$  Performance limits with standard voltage -10%  
 (Solenoid actuation)

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

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

 For pilot control types  $t_i$  and  $p_i$ 

Symbol	Pressure drop curve no.	Volume flow direction				
		P - A	P - B	P - T	A - T	B - T
Z100/J100		1	1	-	1	2
D101/Z101		1	1	-	1	2
D102/Z102		1	1	-	1	2
D103/Z103		4	4	5	1	2
D104/Z104		4	4	-	1	2
D105/Z105		1	1	-	1	2

 For pilot control types  $t_e$  and  $p_e$ 

Symbol	Pressure drop curve no.	Volume flow direction				
		P - A	P - B	P - T	A - T	B - T
Z100/J100		1	1	-	1	2
D101/Z101		1	1	-	1	2
D102/Z102		1	1	-	1	2
D103/Z103		1	1	3	1	2
D104/Z104		1	1	-	1	2
D105/Z105		1	1	-	1	2

**DIMENSIONS**

**PARTS LIST**

Position	Article	Description
10	059.2206	Cover
20	246.3131	Socket head cap screw M6x30 DIN 912
30	246.2160	Socket head cap screw M5x60 DIN 912 for pilot supply ti
	246.2180	Socket head cap screw M5x80 DIN 912 for pilot supply te, pi and pe
40	160.2052	O-ring ID 5,28x1,78
50	160.2140	O-ring ID 14,00x1,78
60	238.1202	Plug screw DIN 908 G1/8"
70	049.2102	Bonded seal ID 10,7x17x1,5

**ACCESSORIES**

Threaded connecting plates, Multi-flange subplates and Longitudinal stacking system see Reg. 2.9

Technical explanation see data sheet 1.0-100

**Mounting instruction**

To screw the main valve body ( $M_D = 9,5$  Nm, quality 8.8) to the base plate the pilot valve ( $M_D = 5,5$  Nm, quality 8.8) must be taken off.