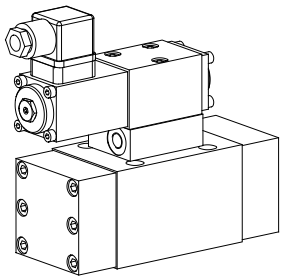
Spool valve pilot operated
- **4/2-way impuls version detended**
- **4/3-way with spring centred mid position**
- **4/2-way with spring reset**
- **Q_{max} = 100 l/min, p_{max} = 315 bar**

NG10
ISO 4401-05



DESCRIPTION
Pilot operated spool valve in flange design NG10 to ISO 4401-05 with a size NG4 pilot valve. Options for operation are solenoid, handlever and pneumatic. The valve bodies, the actuators (M) and (K) and the covers are zinc coated. The actuator (H) is phosphated.

FUNCTION
By operating the pilot valve pressure will be applied to one end of the main spool and move it into activated position as indicated on lable.
- 4/2-way impuls valve
- 4/3-way spring centred
- 4/2-way spring reset

(see data sheets of the corresponding pilot valves) Pilot pressure supply and drain either internal or as an option external through a ported sandwich plate between main and pilot valve.

APPLICATION
Pilot operated spool valves are mainly used to operate hydraulic cylinders and motors with high oil consumption. Pilot valve type depends on application. Pneumatic and lever operated valves are well suited in hazardouns areas as met in chemical or mining industry but may also be used for any industrial application.

TYPE CODE

A ☐ VP 4 ☐ - ☐ - ☐ # ☐

International standard interface ISO				
Pilot valve				
Solenoid operated	M			
Hand lever	H			
Pneumatically operated	K			
Spool valve, pilot operated				
Number of control ports				
Description of symbols acc. to table				
Pilot control type				
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
Nominal voltage U_N	12VDC	G12	110VAC	R110
	24VDC	G24	115VAC	R115
			230VAC	R230
Lever or pneumatically operated valves				
Design-Index (Subject to change)				

GENERAL SPECIFICATIONS

Description	4/2-, 4/3-way valve
Nominal size	NG10 to ISO 4401-05
Construction	Pilot operated spool valve
Operations	Pilot operated valve
Pilot supply valves	M: BM4.4. Data sheet 1.2-31 H: BH4.4. Data sheet 1.5-20 K: BK4.4. Data sheet 1.6-20
Mounting	Flange 4 holes for socket cap screws M6 x 65
Connections	Threaded connection plates Multi-flange plates Longitudinal stacking system
Ambient temperature	-20…+50 °C
Mounting position	any, preferably horizontal
Fastening torque	M_D = 9,5 Nm (screw quality 8.8)
Weight: Main valve	m = 3,6 kg
Sandwich plate	m = 0,4 kg
Pilot valve	m = 0,6…1,4 kg depending on the valve typ

HYDRAULIC SPECIFICATIONS

Fluid	Mineral oil, other fluid on request
Contamination efficiency	ISO 4406:1999, class 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
Fluid temperature	-20…+70 °C
Operating pressure in port P, A, B	p_{max} = 315 bar
Tank pressure in port T	at pilot supply t e and pi $p_{T\,max}$ = 100 bar at pilot supply ti and pe p_T minimum 12 bar below p_v
Pilot over sandwich plate	$p_{v\,min}$ = 12 bar $p_{v\,max}$ = 315 bar
Max. volume flow	Q_{max} = 100 l/min
Leakage volume flow	see characteristics

ELECTRICAL CONTROL

Construction	Solenoid, wet pin push type, pressure tight
Standard-nominal voltage	U_N = 12 VDC U_N = 24 VDC U_N = 110 VAC∗ U_N = 115 VAC∗ U_N = 230 VAC∗ AC = 50 bis 60 Hz ∗ Rectifier integrated in the plug, other nominal voltages and nominal performances on request
Voltage tolerance	±10 % of nominal voltage
Protection class	IP 65 to EN 60529
Relative duty factor	100 % DF (see data sheet 1.1-430)
Switching cycles	15'000/h
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 version:	SIN35V (data sheet 1.1-105)

MECHANICAL CONTROL

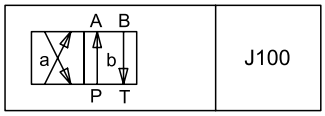
Angle	α_b = 5,7°/ side
Force	F_b = 15–20 N

CONTROL PNEUMATIC operated with control head

Min. pilot pressure	$p_{st,\ min}$	= 2,5 bar with p_T = 20 bar
	$p_{st,\ min}$	= 5 bar with p_T = 160 bar
Control volume	V_{st}	= 2,5 cm³

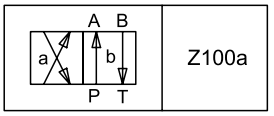
TYPE LIST / DESIGNATION OF SYMBOLS

4/2-way valve with 2 solenoids



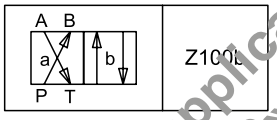
J100

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



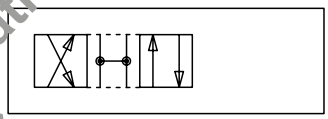
Z100a

operation B-side

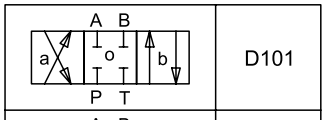
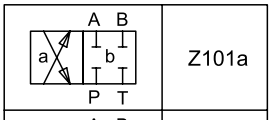
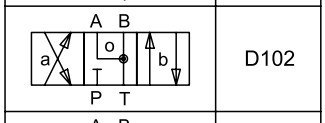
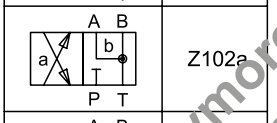
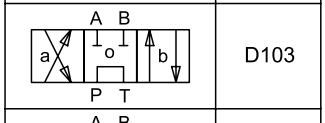
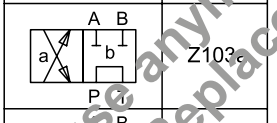
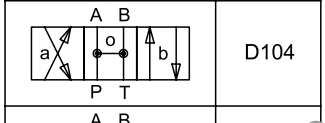
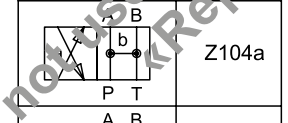
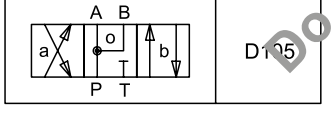
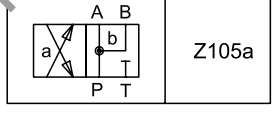


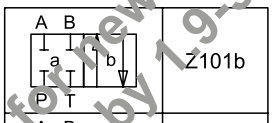
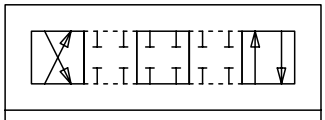
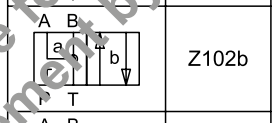
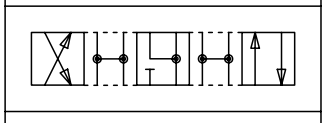
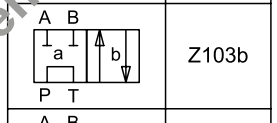
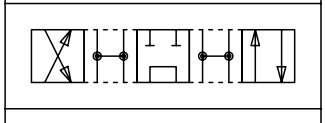
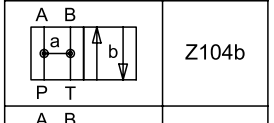
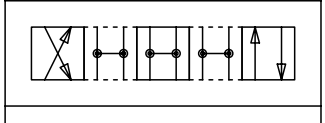
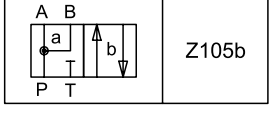
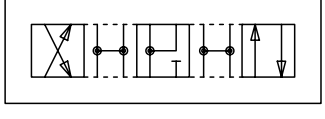
Z100b

Transitional functions



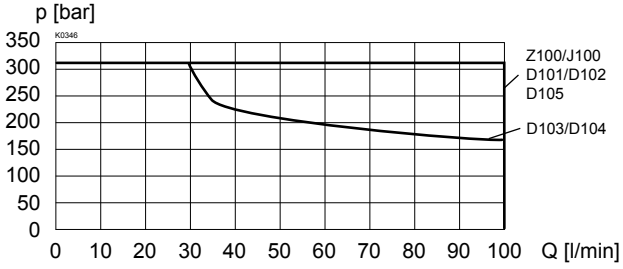
4/3-way valve spring centered

	D101		Z101a
	D102		Z102a
	D103		Z103a
	D104		Z104a
	D105		Z105a

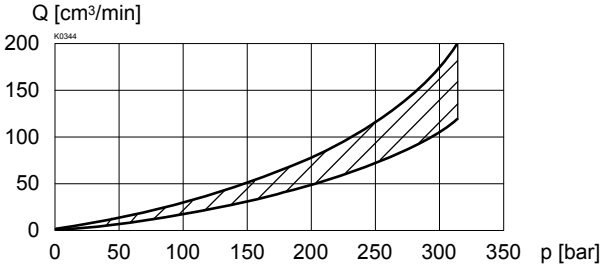
	Z101b	
	Z102b	
	Z103b	
	Z104b	
	Z105b	

CHARACTERISTICS Oil viscosity υ = 30 mm²/s

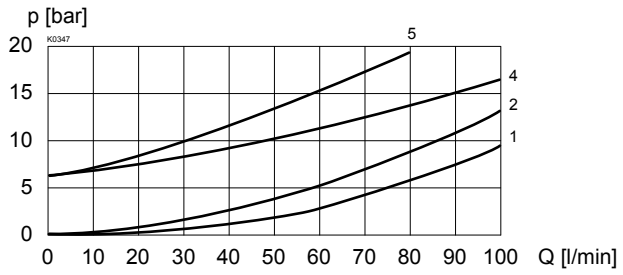
p = f (Q) Performance limits with standard voltage -10% (Solenoid operated)



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



Δp = f (Q) Pressure drop volume flow characteristics



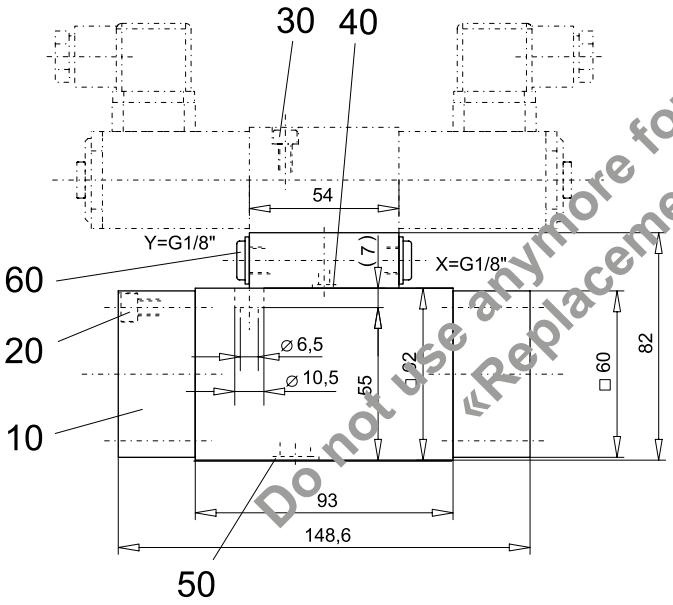
Pilot supply ti and pi

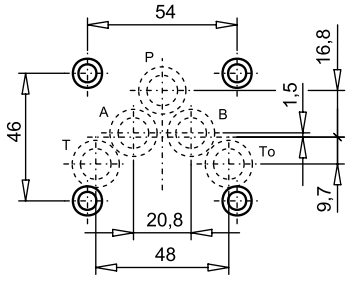
Symbol / Pressure drop curve no.	Volume flow direction P - A	P - B	P - T	A - T	B - T
Z100/J100	1	1	-	1	2
D101/Z101	1	1	-	1	2
D102/Z102	1	1	-	1	2
D103/Z103	4	4	5	1	2
D104/Z104	4	4	-	1	2
D105/Z105	1	1	-	1	2

Pilot supply te and pe

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





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.

PARTS LIST

Position	Article	Description
10	059.2206	Cover
20	246.3131	Socket head cap screw M6x30 DIN 912
40	246.2141	Socket head cap screw M5x40 DIN 912 for pilot supply ti
	246.2160	Socket head cap screw M5x60 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	238.1405	Plug screw G1/8"

ACCESSORIES

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

Technical explanation see data sheet 1.0-100