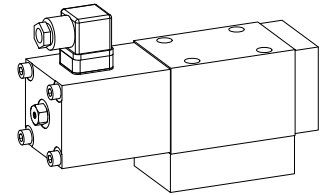


Proportional directional valve

- pressure compensated
- $Q_{\max} = 60 \text{ l/min}$
- $p_{\max} = 250 \text{ bar}$

NG10
ISO 4401-05



DISCRIPTION

Directly controlled spool valve, actuated by a Wandfluh proportional solenoid (VDE standard 0580), in five chamber design. Wet solenoid in oil. Spools with precision machined oil passages control the oil volume wich is proportional to the solenoid current. Reduced pressure drop achieved by optimised flow channels. Precise spool fit, long life. Spool made of hardened steel, valve body made of high quality cast iron suitable for hydraulic valves. Flange type, threaded connection by means of a connecting plate.

FUNCTION

Spool stroke, aperture and volume flow increase proportionally to the increase in the electric current at the proportional solenoid. This special design senses and compensates load induced flow changes. Flow remains constant with varying pressure. The optimised shape of the spool results in a good resolution of flow important for sensitive motion control. To control the valve Wandfluh proportional amplifiers are available (see register 1.13).

APPLICATION

Because of the high resolution and low hysteresis, these valves are particularly suitable for demanding tasks. Applications: handling operations, robots, actuators, remote controlled vehicles, tool making and paper production machines, in other words anywhere where precise control systems are needed.

CONTENT

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TYPE CODE

VWS	4	-	-	TF	-	#	
Proportional control valve							
Number of control ports							
Symbol type see chart on page 2							
Nominal volume flows:							
$Q_N = 30 \text{ l/min}$	<input type="text" value="30"/>	$Q_N = 50 \text{ l/min}$	<input type="text" value="50"/>				
$Q_N = 40 \text{ l/min}$	<input type="text" value="40"/>	$Q_N = 60 \text{ l/min}$	<input type="text" value="60"/>				
Normally closed							
Standard nominal voltage U_N :							
12 VDC <input type="text" value="G12"/>							
24 VDC <input type="text" value="G24"/>							
Design-Index (Subject to change)							

GENERAL SPECIFICATIONS

Nominal size	NG10 acc. to ISO 4401-05
Designation	4/2-, 4/3-way proportional control valve
Construction	Direct operated spool valve
Mounting	Flange, 4 holes for socket cap screws M6x90
Fastening torque	$M_D = 9,5 \text{ Nm}$ (screw quality 8.8)
Pipe connection	Connection plates, Multi-station flange subplate, Longitudinal stacking system
Mounting position	any, preferably horizontal
Ambient temperature	-20...+50°C
Weight: 4/2-way	$m = 5,5 \text{ kg}$
4/3-way	$m = 6,9 \text{ kg}$

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 ² /s...320 mm ² /s
Fluid temperature	-20...+70°C
Working pressure in port P, A, B	$p_{\max} = 250 \text{ bar}$
Tank pressure in port T	$p_{\max} = 100 \text{ bar}$
Nominal volume flows	$Q_N = 30 \text{ l/min}$ $Q_N = 50 \text{ l/min}$ $Q_N = 40 \text{ l/min}$ $Q_N = 60 \text{ l/min}$
Min. volume flow	$Q_{\min} = 0,5 \text{ l/min}$
Resolution	1 mA *
Repeatability	≤ 1 % *
Hysteresis	≤ 2 % *
	* by optimal dithersignal

ELECTRICAL SPECIFICATIONS

Construction	Proportional solenoid, wet pin push type, pressure tight.		
Standard-Nominal voltage	<table border="1"> <tr> <td>U = 12 VDC</td> <td>U = 24 VDC</td> </tr> </table>	U = 12 VDC	U = 24 VDC
U = 12 VDC	U = 24 VDC		
Limiting current	<table border="1"> <tr> <td>$I_G = 2300 \text{ mA}$</td> <td>$I_G = 1150 \text{ mA}$</td> </tr> </table>	$I_G = 2300 \text{ mA}$	$I_G = 1150 \text{ mA}$
$I_G = 2300 \text{ mA}$	$I_G = 1150 \text{ mA}$		
Relative duty factor	100% DF (see data sheet 1.1-430)		
Protection class	IP 65 to EN 60 529		
Connection/Power supply	Over device plug connection to ISO 4400 / DIN 43650 (2P+E)		
Other electrical specifications	see data sheet 1.1-155 (PI60V)		

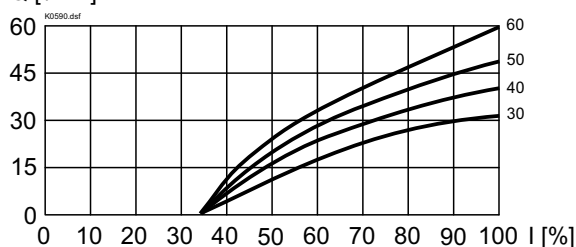
TYPE CHARTS / DESIGNATIONS OF SYMBOLS

	D101
	Z101a
	Z101b
	D102
	Z102a
	Z102b

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

$Q = f(I)$ Volume flow-signal-characteristics

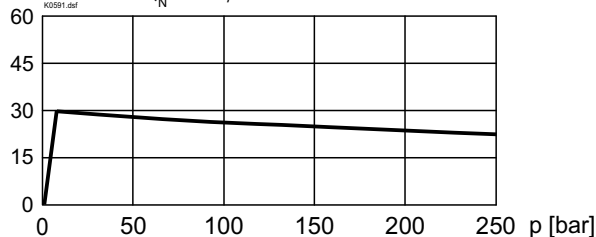
$Q [\text{l/min}]$



$Q = f(p)$ Volume flow-pressure-characteristics

$Q [\text{l/min}]$

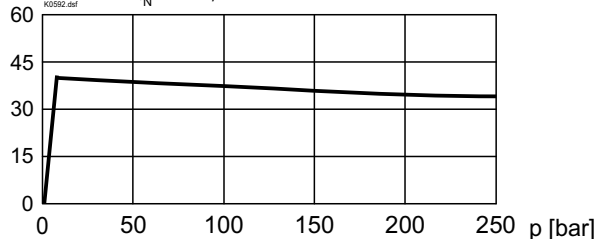
$Q_N = 30 \text{ l/min}$



$Q = f(p)$ Volume flow-pressure-characteristics

$Q [\text{l/min}]$

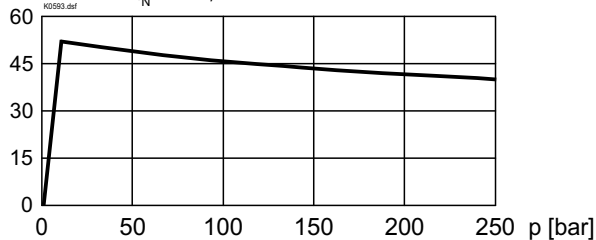
$Q_N = 40 \text{ l/min}$



$Q = f(p)$ Volume flow-pressure-characteristics

$Q [\text{l/min}]$

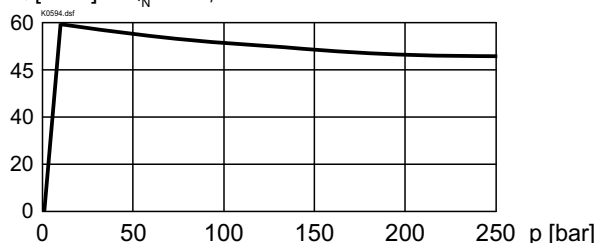
$Q_N = 50 \text{ l/min}$



$Q = f(p)$ Volume flow-pressure-characteristics

$Q [\text{l/min}]$

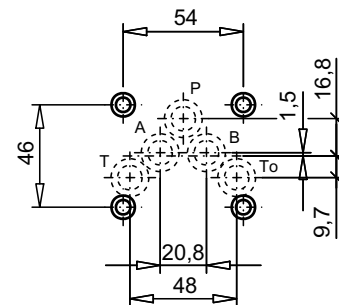
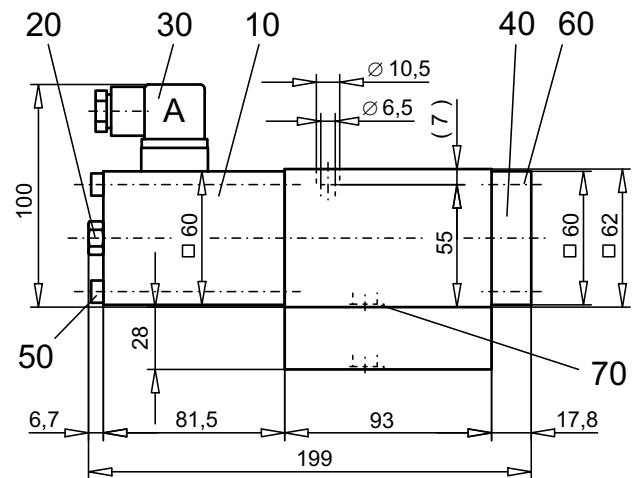
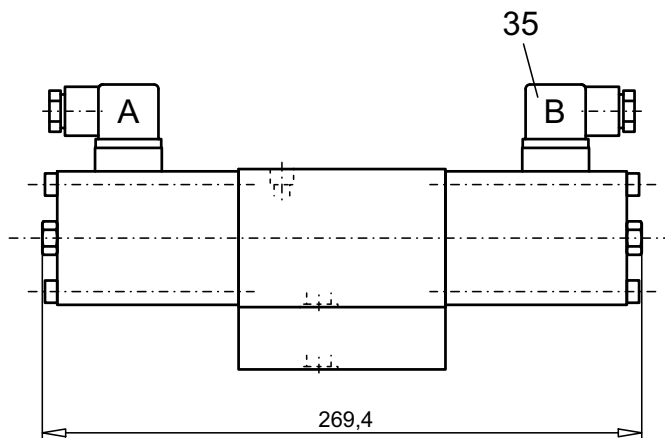
$Q_N = 60 \text{ l/min}$



DIMENSIONS

4/3-way valve

4/2-way valve



PARTS LIST

Position	Article	Description
10	256.5454 256.5418	Proportional solenoid PI60V-G24-M40 Proportional solenoid PI60V-G12-M40
20	253.8002	Plug with integrated manual override HB8,5
30	219.2001	Plug A (grey)
35	219.2002	Plug B (black)
40	059.2205	Cover
50	246.3190	Socket head cap screw M6x90 DIN 912
60	246.3121	Socket head cap screw M6x20 DIN 912
70	160.2140	O-ring ID 14,00x1,78

ACCESSORIES

Sub-plates
Proportional-amplifier

register 1.9
register 1.13

Technical explanation see data sheet 1.0-100E