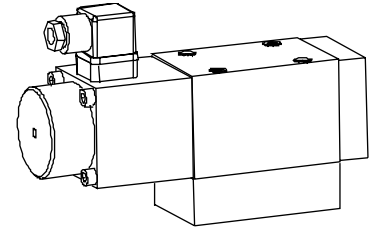


Proportional directional valve

- 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 proportional solenoid, in five chamber design. Wet solenoid in oil. Spools with precision machined oil passages control the oil volume which 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 operate proportional directional valves Wandfluh electronic amplifiers are required. (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, radar controlled vehicles, tool making and paper production machines, in other words anywhere where precise control systems are needed.

CONTENT

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CHARACTERISTICS	1.10-20/2
DIMENSIONS	1.10-20/3
PARTS LIST	1.10-20/3
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TYPE CODE

VWS 4 - - TF - #

Proportional control valve

Number of control ports

Symbol type see chart on page 1.10-20/2

Nominal volume flows:

$Q_N = 30 \text{ l/min}$	<input type="checkbox"/>	$Q_N = 50 \text{ l/min}$	<input type="checkbox"/>
$Q_N = 40 \text{ l/min}$	<input type="checkbox"/>	$Q_N = 60 \text{ l/min}$	<input type="checkbox"/>

Normally closed

Supply voltage

12 VDC	<input type="checkbox"/>
24 VDC	<input type="checkbox"/>

Design-Index (Subject to change)

GENERAL SPECIFICATIONS

Nominal size	NG10 with 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 M6x65
Fastening torque	$M_0 = 9,5 \text{ Nm}$ (screw quality 8.8)
Pipe connection	Connection plates, Multi-station flange subplate, Longitudinal stacking system
Mounting position	any, preferably horizontal
Ambient temperature	$-20...+50^\circ\text{C}$
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 class 16/13 (Required filtration grade $\beta_{6...10} \geq 75$) refer to data sheet 1.0-50/2
Viscosity range	$12 \text{ mm}^2/\text{s}...320 \text{ mm}^2/\text{s}$
Fluid temperature	$-20...+70^\circ\text{C}$
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	$\leq 1\% ^*$
Hysteresis	$\leq 2\% ^*$

* by optimal dithersignal

ELECTRICAL SPECIFICATIONS

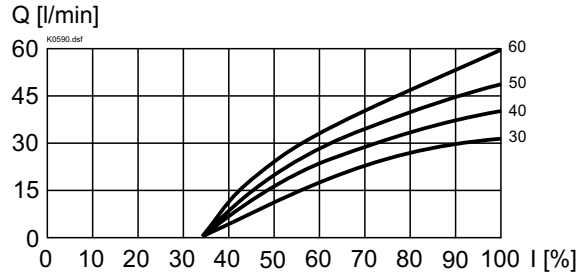
Construction	Proportional solenoid, wet pin push type, pressure tight	
Standard-Nominal voltage	$U = 12 \text{ VDC}$	$U = 24 \text{ VDC}$
Limiting current	$I_G = 2400 \text{ mA}$	$I_G = 1110 \text{ mA}$
Relative duty factor	100% DF (see data sheet 1.1-430)	
Protection class	IP 54 to DIN 40050	
Connection / Power supply	Over device plug connection to ISO 4400/DIN 43650 (2P+E)	

TYPE CHARTS / DESIGNATIONS OF SYMBOLS

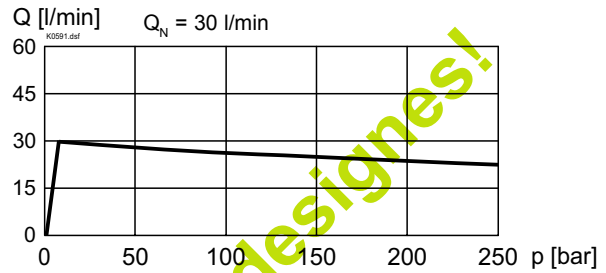
	D101
	Z101a
	Z101b
	D102
	Z102a
	Z102b

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

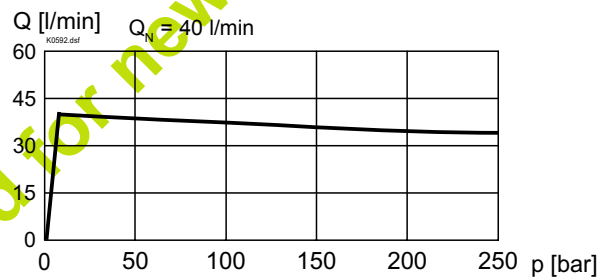
$Q = f(I)$ Volume flow-signal-characteristics



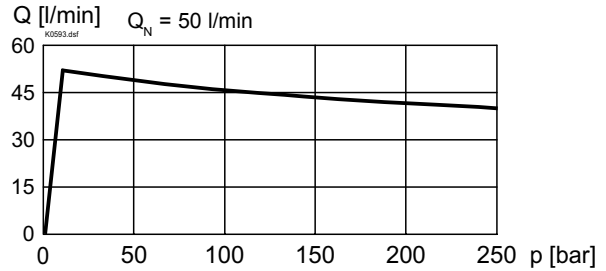
$Q = f(p)$ Volume flow-pressure-characteristics



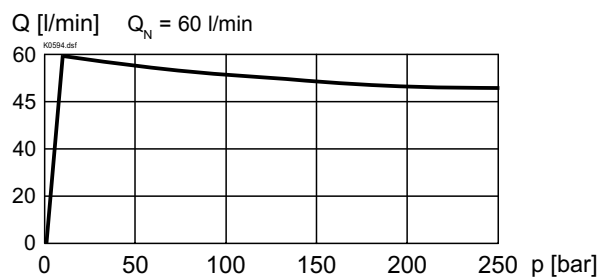
$Q = f(p)$ Volume flow-pressure-characteristics



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



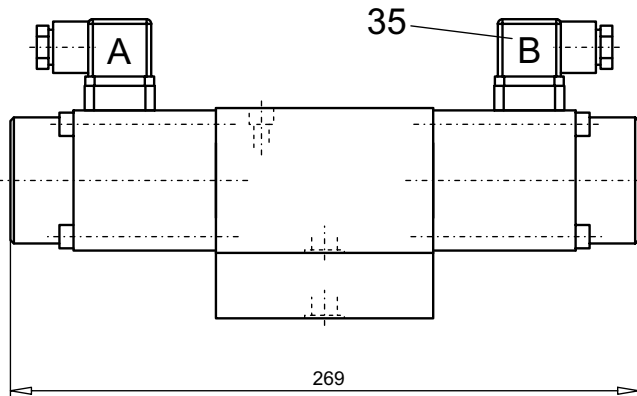
$Q = f(p)$ Volume flow-pressure-characteristics



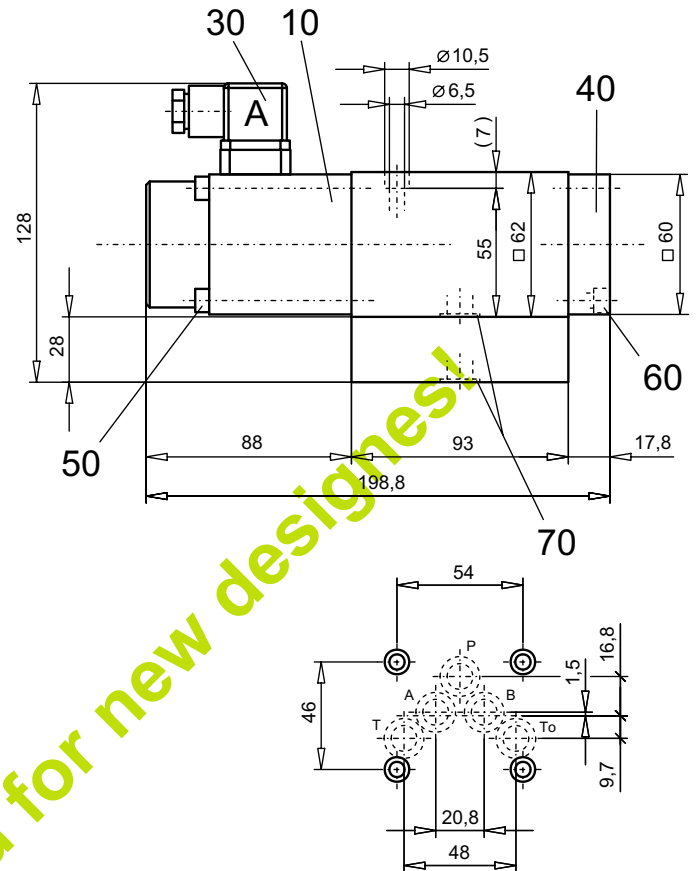
Not recommended for new designs!

DIMENSIONS

4/3-way valve



4/2-way valve


PARTS LIST

Position	Article	Description
10	177.7502 177.7501	Proportional solenoid GRFY060 24V= Proportional solenoid GRFY060 12V=
30	219.2001	Plug A (grey)
35	219.2002	Plug B (black)
40	059.2205	Cover
50	246.3170	Socket head cap screw M6x70 DIN 912
60	246.3120	Socket head cap screw M6x20 DIN 912
70	160.2140	O-ring ID 14,00x1,78

ACCESSORIES

Sub-plates	register 1.9
Proportional-amplifier	register 1.13

Technical explanation see data sheet 1.0-100E