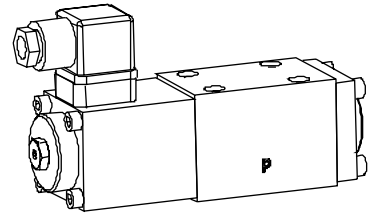


Proportional directional valve

- not pressure compensated
- $Q_{max} = 40 \text{ l/min}$
- $p_{max} = 350 \text{ bar}$

NG6
ISO 4401-03

DISCRIPTION

Directly controlled spool valve, actuated by a proportional solenoid, in five chamber design. Wet solenoid in oil. Spool with precisely machined notches on control edges produce a progressive volume flow characteristic similar to proportional flow valves. 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. Proportional directional valves NG6 are not load-compensated. Meter-in, meter-out and symmetrical flow control options available. The optimum spool shape and progressive characteristics curve allow fine motion control. Wandfluh power amplifiers are needed to activate the proportional directional valves (register 1.13).

APPLICATION

Because of the high resolution, high volume flow 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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TYPE CODE

Proportional-directional control valve	WDP	F	A06	-	-	-	-	-	-	#
Flange										
Nominal size 6										
Symbol type see chart on page 3										
Control mode										
Symmetrical										
Meter-in										
Meter-out										
Nominal flow at 10 bar pressure drop over 2 metering edges										
$Q_N = 5 \text{ l/min}$										
$Q_N = 10 \text{ l/min}$										
$Q_N = 16 \text{ l/min}$										
$Q_N = 32 \text{ l/min}$										
Supply voltage										
12VDC										
24VDC										
Design-Index (Subject to change)										

GENERAL SPECIFICATIONS

Nominal size	NG6 to ISO 4401-03 / 7790
Designation	4/2-, 4/3- Proportional-control valve
Construction	Direct operated spool valve
Mounting	Flange, 4 fixing holes for socket head cap screws M5x45
Fastening torque	$M_D = 5,5 \text{ Nm}$ (screw quality 8.8)
Pipe connection	Connection plates, Multi-station flange
Mounting position	subplate, Longitudinal stacking system
Ambient temperature	-20...+50°C
Weight	1 solenoid-version $m = 1,9 \text{ kg}$ 2 solenoid-version $m = 2,4 \text{ kg}$

HYDRAULIC SPECIFICATIONS

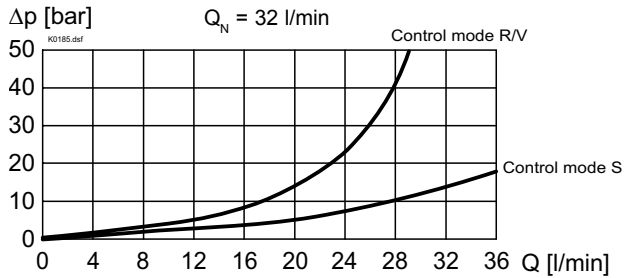
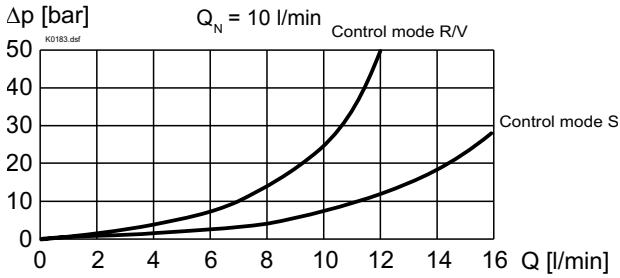
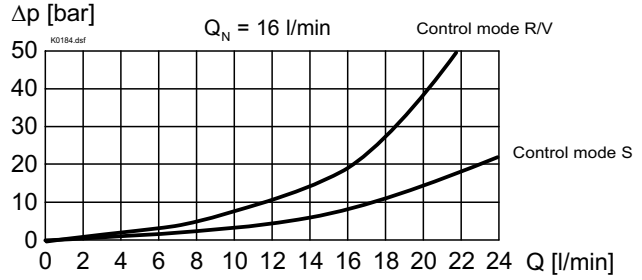
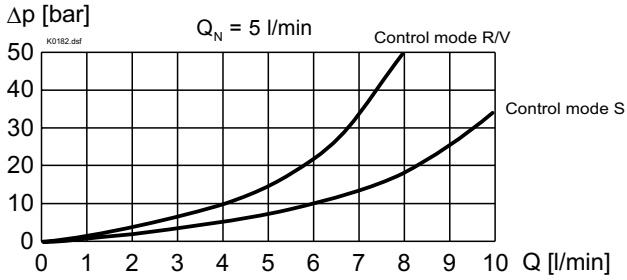
Fluid	Mineral oil, other fluid on request
Contamination	ISO class 16/13
efficiency	(Required filtration grade $\beta_{6...10} \geq 75$) refer to data sheet 1.0-50/2
Viscosity range	12 mm ² /s...320 mm ² /s
Fluid temperature	-20...+70°C
Working pressure	$p_{max} 350 \text{ bar}$ (Connection P, A, B)
Tank pressure	Max tank pressure in T $p_{max} 160 \text{ bar}$
Nominal volume flow	$Q_N = 5 \text{ l/min}$ ($Q_{max} = 11 \text{ l/min}$) $Q_N = 10 \text{ l/min}$ ($Q_{max} = 16 \text{ l/min}$) $Q_N = 16 \text{ l/min}$ ($Q_{max} = 32 \text{ l/min}$) $Q_N = 32 \text{ l/min}$ ($Q_{max} = 40 \text{ l/min}$) at 10 bar pressure drop over 2 metering edges. For values which deviate from the nominal flow Q_N the valve pressure drop Δp can be calculated by following formula:
	$\Delta p = \Delta p_N \cdot \left(\frac{Q}{Q_N}\right)^2$
	$Q_N =$ Nominal volume flow $Q =$ Effective volume flow $\Delta p_N =$ Nominal pressure drop 10 bar
Min. volume flow	$Q_{min} = 20 \text{ cm}^3/\text{min}$
Leakage volume flow	request
Resolution	1 mA*
Repeatability	$\leq 1 \%$ *
Hysteresis	$\leq 2 \%$ *
	* by optimal dithersignal

ELECTRICAL SPECIFICATIONS

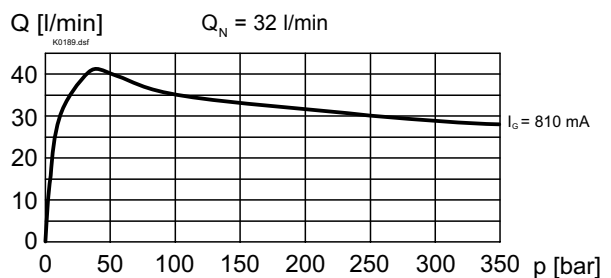
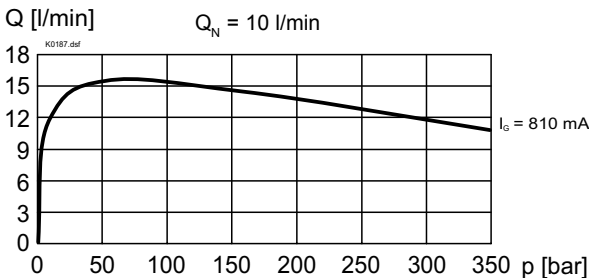
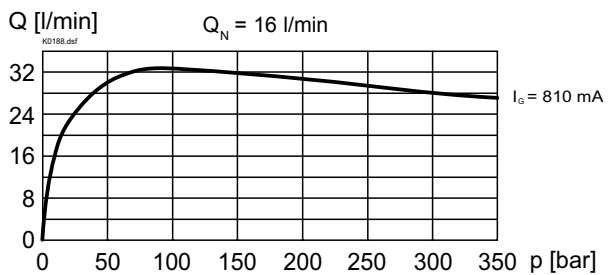
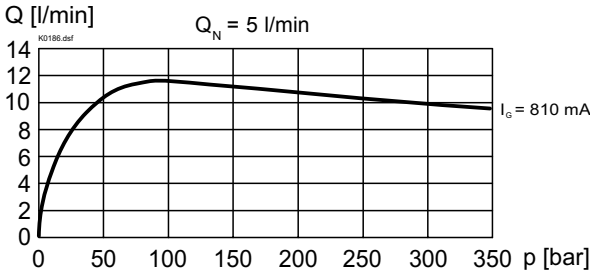
Construction	Proportional solenoid, wet pin push type, pressure tight.	
Standard-Nominal voltage	U = 12 VDC	U = 24 VDC
Limiting current	$I_G = 1780 \text{ mA}$	$I_G = 810 \text{ mA}$
Relative duty factor	100% DF (see data sheet 1.1-430)	
Protection class	IP 65 to DIN 40050	
Connection/Power supply	Over device plug connection to ISO 4400/ DIN 43650 (2P+E)	
Other electrical specifications	see data sheet 1.1-130 (PI45V)	

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

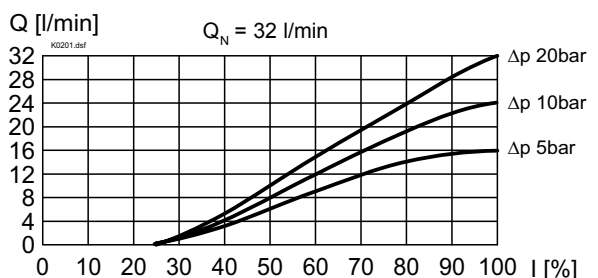
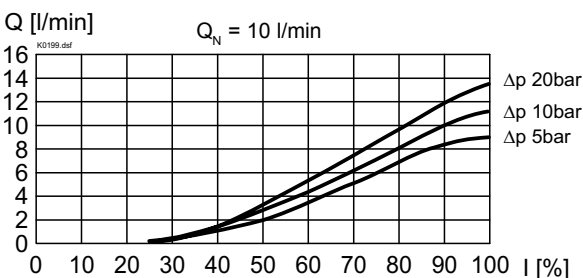
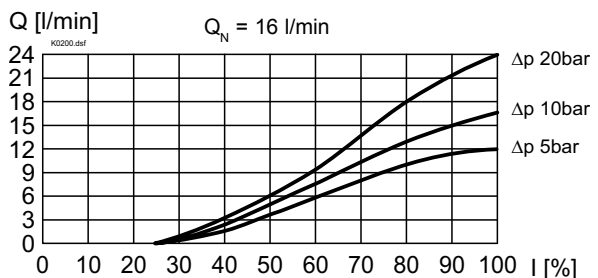
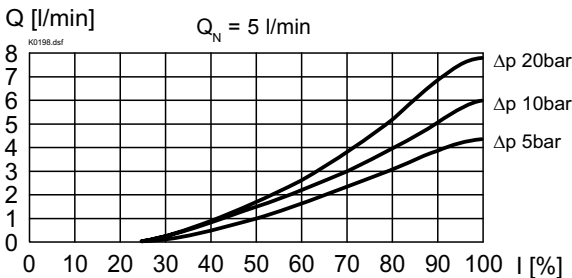
$\Delta p = f(Q)$ Pressure loss/flow-characteristics over 2 metering edges



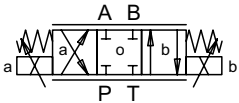
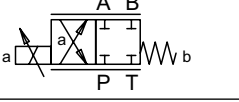
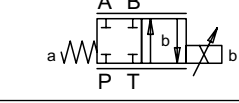
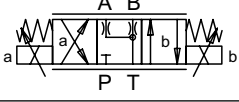
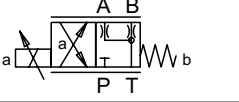
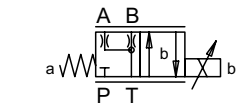
$Q = f(p)$ Leakage-characteristics



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

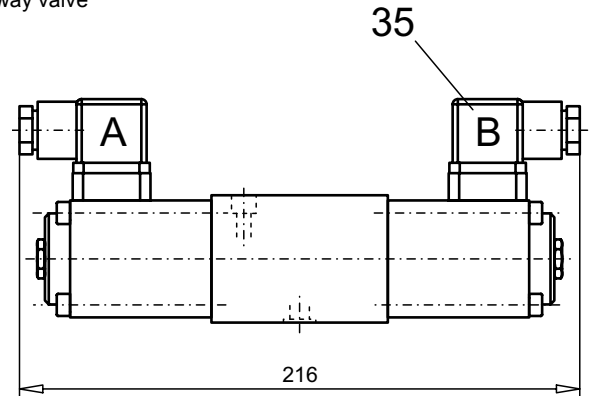


TYPE CHARTS / DESIGNATIONS OF SYMBOLS

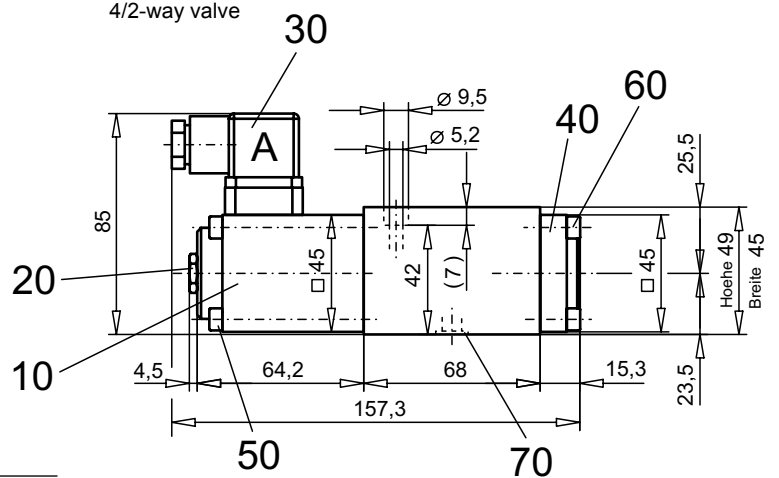
	ACB - $\begin{matrix} S \\ V \\ R \end{matrix}$
	AC1 - $\begin{matrix} S \\ V \\ R \end{matrix}$
	CB2 - $\begin{matrix} S \\ V \\ R \end{matrix}$
	ADB - v
	AD1 - v
	DB2 - v

DIMENSIONS

4/3-way valve



4/2-way valve


CONTROL MODE

Symmetrical	S	
Meter-in	V	
Meter-out	R	

PARTS LIST

Position	Article	Description
10	256.4453 256.4417	Proportional solenoid PI45V-G24 Proportional solenoid PI45V-G12
20	253.8001	Plug with integrated manual override HB6
30	219.2001	Plug A (grey)
35	219.2002	Plug B (black)
40	058.4211	Cover
50	249.2000	Socket head cap screw M5x60
60	246.2116	Socket head cap screw M5x16 DIN 912
70	160.2093	O-ring ID 9,25x1,78

ACCESSORIES

Sub-plates	register 1.9
Proportional-amplifier	register 1.13

Technical explanation see data sheet 1.0-100E