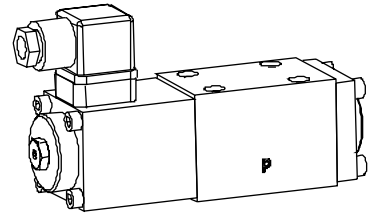


Proportional directional valve

- 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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| HYDRAULIC SPECIFICATIONS | 1.10-75/1 |
| ELECTRICAL SPECIFICATIONS | 1.10-75/1 |
| CHARACTERISTICS | 1.10-75/2 |
| TYPE CHARTS/ DESIGNATIONS OF SYMBOLS | 1.10-75/3 |
| CONTROL MODE | 1.10-75/3 |
| DIMENSIONS | 1.10-75/3 |
| PARTS LIST | 1.10-75/3 |
| ACCESSORIES | 1.10-75/3 |

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

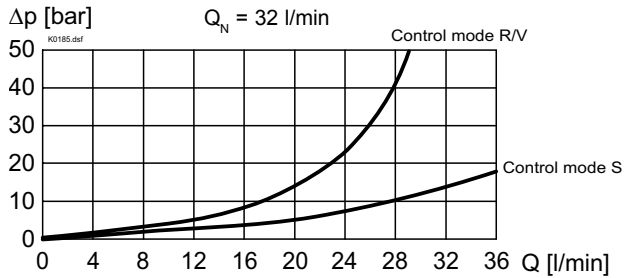
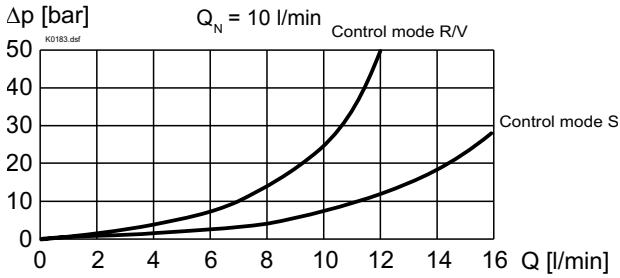
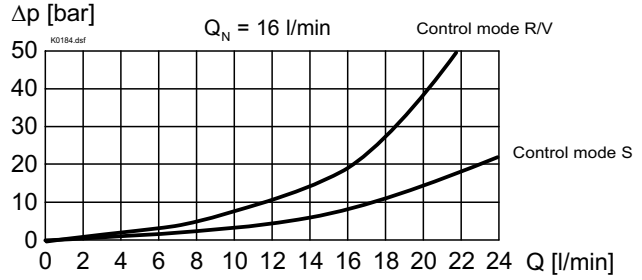
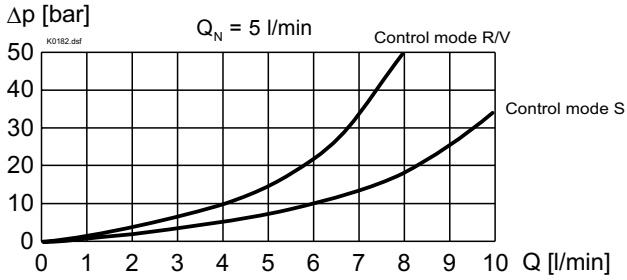
| | |
|---------------------|---|
| Fluid | Mineral oil, other fluid on request |
| Contamination | ISO class 16/13 |
| efficiency | (Required filtration grade $\beta_{6...10} \geq 75$) refer to data sheet 1.0-50/2 |
| Viscosity range | 12 mm ² /s...320 mm ² /s |
| Fluid temperature | -20...+70°C |
| 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

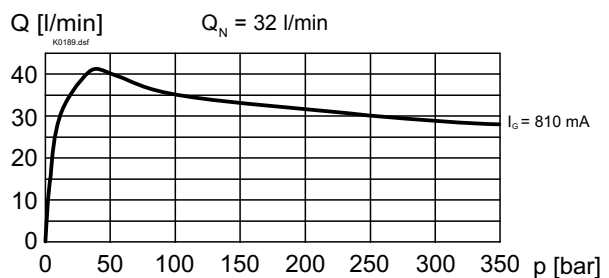
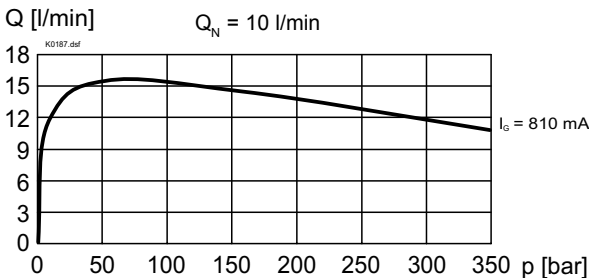
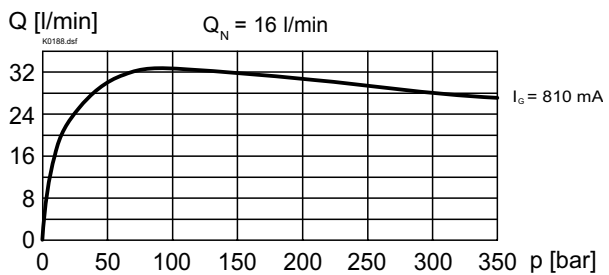
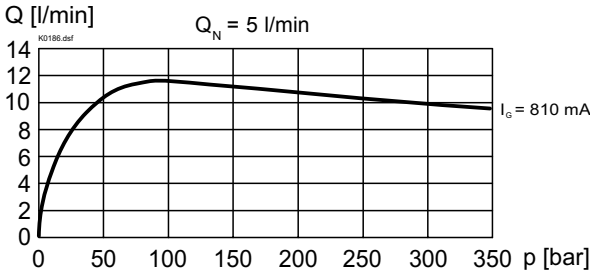
| | | |
|---------------------------------|---|------------------------|
| Construction | Proportional solenoid, wet pin push type, pressure tight. | |
| Standard-Nominal voltage | U = 12 VDC | U = 24 VDC |
| Limiting current | $I_G = 1780 \text{ mA}$ | $I_G = 810 \text{ mA}$ |
| Relative duty factor | 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 $\nu = 30 \text{ mm}^2/\text{s}$

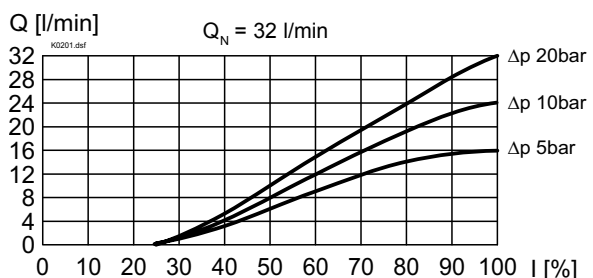
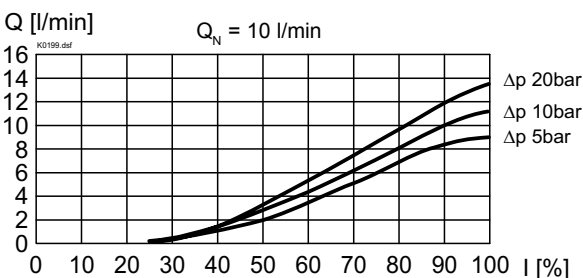
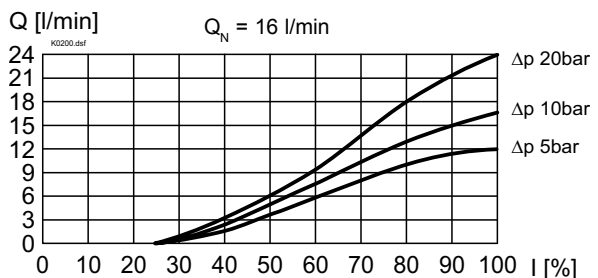
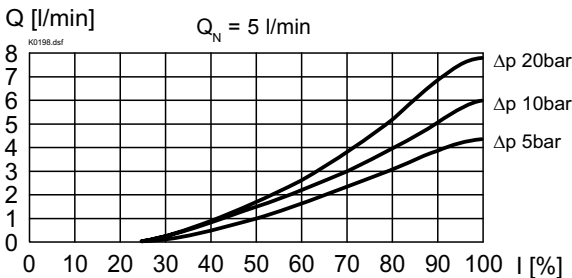
$\Delta p = f(Q)$ Pressure loss/flow-characteristics over 2 metering edges



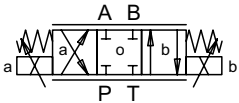
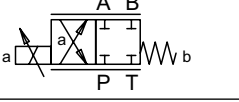
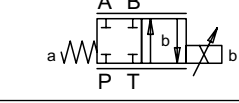
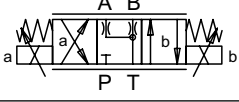
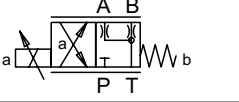
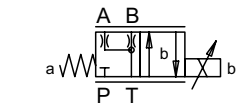
$Q = f(p)$ Leakage-characteristics



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

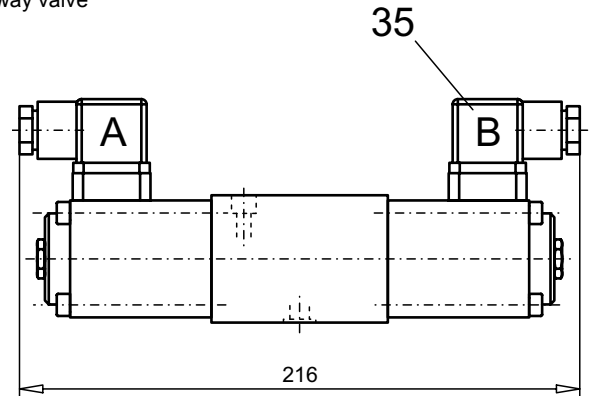


TYPE CHARTS / DESIGNATIONS OF SYMBOLS

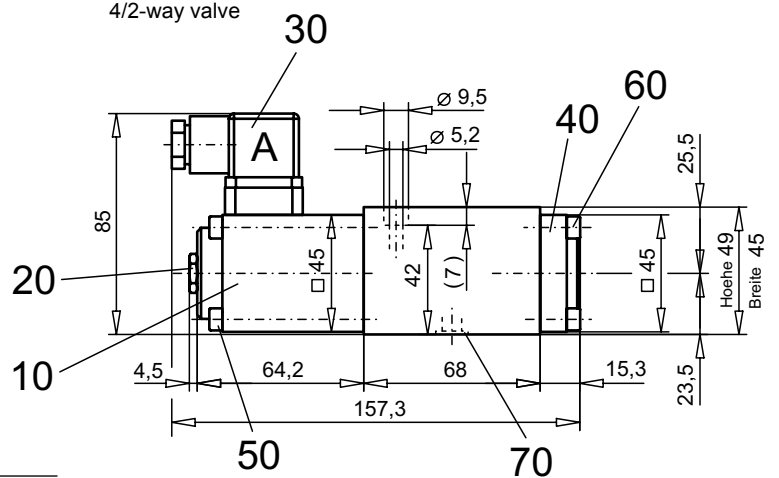
| | |
|---|--|
|  | ACB - $\begin{matrix} S \\ R \end{matrix}$ |
|  | AC1 - $\begin{matrix} S \\ R \end{matrix}$ |
|  | CB2 - $\begin{matrix} S \\ R \end{matrix}$ |
|  | ADB - v |
|  | AD1 - v |
|  | DB2 - v |

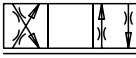


DIMENSIONS

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