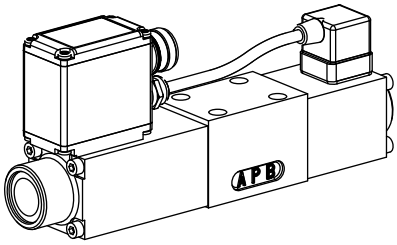
Proportional directional control valve
- **Integrated amplifier**
- **Integrated spool position control with LVDT**
- **Direct operated, not pressure compensated**
- **Q_{max} = 40 l/min**
- **Q_N = 32 l/min**
- **p_{max} = 350 bar**

NG6
ISO 4401-03

DSV DIGITAL SMART VALVE



DESCRIPTION
Direct operated proportional spool valve with integrated electronics in flange design NG6 acc. to ISO 4401-03/7790 with 4 ports. The valve possesses an integrated positional control of the valve spool. This assures a minimal hysteresis and improved dynamic characteristics. Housing for electronics with protection class IP67 for harsh environment. The spool valve is designed acc. to the 5 chamber principle. The volume flow is adjusted by Wandfluh proportional solenoids (VDE standard 0580). Low pressure drop due to the body design and spool profiling. The spool is made of hardened steel. The body made of high grade hydraulic casting is painted. The solenoids are zinc coated and the housing for the elctronics is made of aluminium.

FUNCTION
With the integrated spool position sensor (LVDT) the actual position of the spool is continuously recorded and made to follow the set-point value transmitted in an analogue manner. By means of this internal positional control, a minimal hysteresis and excellent dynamic characteristics are assured. With an increasing set-point value signal, the valve opening and therefore the volume flow increases and vice versa. Parameter setting and diagnosis with the free-of-charge software «PASO». Data are stored in a non volatile memory. Even after an electric power failure settings can easily be reproduced and transmitted.

APPLICATION
Proportional directional control valves with integrated electronics are highly suitable for demanding applications thanks to a high resolution, large volume flow, minimal hysteresis and very good dynamic characteristics. They are implemented in systems calling for good valve-to-valve reproducibility, easy installation, comfortable operation and high precision in industrial hydraulics as well as in mobile hydraulics for the smooth control of actuators. Application examples: pitch control of wind generators, forest and earth moving machines, machine tools and paper production machines with position controls, robotics and fan control.

CONTENT

TYPE CODE

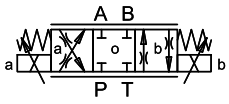
WD R F A06 - [ ] - [ ] - [ ] - 24 A2 # [ ]

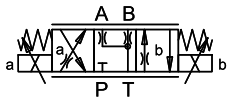
- Directional control valve, direct operated
- Proportional valve with integrated electronics
- Flange version
- International standard interface ISO, nominal size 6
- Designation of symbols acc. to table 1.10-82/2
- Nominal volume flow ranges Q_N: 5 l/min [5], 10 l/min [10], 16 l/min [16], 32 l/min [32]
- Standard nominal voltage U_N: 24 VDC
- Configuration: With analog signal (-10…+10 V factory set)
- Functions:Design-Index (Subject to change)

GENERAL SPECIFICATIONS

Designation	4/3-way proportional valve with integrated electronics
Nominal size	NG6-Mini acc. to ISO 4401-03/7790
Construction	Direct operated spool valve
Operations	Proportional solenoid, wet pin push type, pressure tight
Mounting	Flange, 4 fixing holes for socket head cap screws M5x50
Connections	Threaded connection plates, multi-flange subplates, longitudinal stacking system
Ambient temperature	-20…+65 °C (typical) (The upper temperature limit is a guideline value for typical applications, in individual cases it may also be higher or lower. The electronics of the valve limit the power in case of a too high electronics temperature. More detailed information can be obtained from the operating instructions «DSV».)
Mounting position	any, preferably horizontal
Fastening torque	M_D = 5,5 Nm (quality 8.8)
Weight	m = 2,8 kg

TYPE CHARTS / DESIGNATIONS OF SYMBOLS

	**ACB - S** S = Symmetrical control mode

	**ADB - V** V = Meter-in control mode

HYDRAULIC SPECIFICATIONS

Fluid	Mineral oil, other fluid on request
Contamination efficiency	ISO 4406:1999, class 18/16/13 (Required filtration grade β 6…10 ≥ 75) refer to data sheet 1.0-50/2
Viscosity range	12 mm²/s…320 mm²/s
Fluid temperature	-20…+70 °C
Working pressure	p_{max} = 350 bar (connections P, A, B)
Tank pressure	p_{max} = 160 bar (connections T)
Nominal volume flow	Q_N = 5 l/min, 10 l/min, 16 l/min, 32 l/min
Max. volume flow	see characteristic
Leakage volume flow	on request
Hysteresis	< 0,4 %
Repeatability	< 0,4 %
Jump response	typically 25 ms from 10 to 90 %
Frequency response	see characteristics

ELECTRICAL SPECIFICATIONS

Protection class	IP 67 acc. to EN 60 529 with suitable connector and closed electronic housing
Supply voltage	24 VDC
Ramps (amplifier only)	separate adjustment for up and down for each solenoid
Serial interface	RS 232 C für «PASO» (under cover of electronic housing settings adjusted at factory)
Analog interface	
Device receptacle (male)	M23, 12-poles
Mating connector	Plug (female), M23, 12-poles (not incl. in delivery)
Preset value signal:	Voltage / current selected with software
Parameter setting:	via RS 232 C

NOTE!
Detailed electrical characteristics and description of «DSV» electronics are shown on data sheet **1.13-75**.

START-UP

Normally there is no need to adjust settings by the customer. The connectors have to be wired according to the chapter «Connector wiring diagram».

Axis controllers will be supplied configurated as amplifiers. Switching into controller mode and setting of the adjustments of the controller must be done by the customer using the set-up software (Serial interface.)

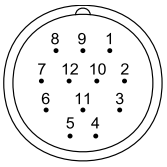
Additional information can be found on our website:
«www.wandfluh.com»

Free-of-charge download of the «PASO»-software and the instruction manual for the **«DSV»** hydraulic valves as well as the operation instruction **CANopen** protocol with device profile DSP-408 for **«DSV»**.

CONNECTOR WIRING DIAGRAM

Analog interface:

Device receptacle (male) X1



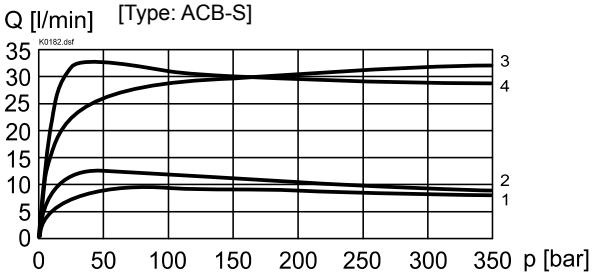
1 = Supply voltage +
2 = Supply voltage 0 VDC
3 = Stabilised output voltage
4 = Preset value voltage +
5 = Preset value voltage -
6 = Preset value current +
7 = Preset value current -
8 = Reserved for extensions
9 = Reserved for extensions
10 = Enable control (Digital input)
11 = Error signal (Digital output)
12 = Chassis

Preset value voltage (PIN 4/5) resp. current (PIN 6/7) are selected with set-up and diagnosis software.
Factory setting: Voltage (-10…+10 V), (PIN 4/5)

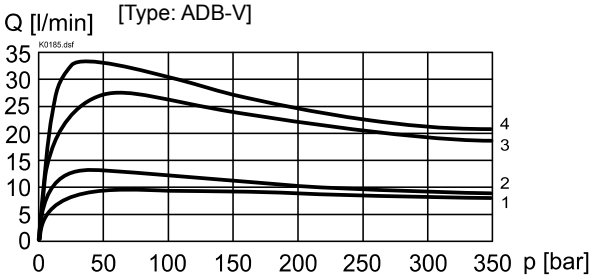
NOTE!
The mating connetor and the cable to adjust the settings are not part of the delivery. To order the cable, look up the article no. in the chapter «Accessories».

CHARACTERISTICS Oil viscosity ν = 30 mm²/s

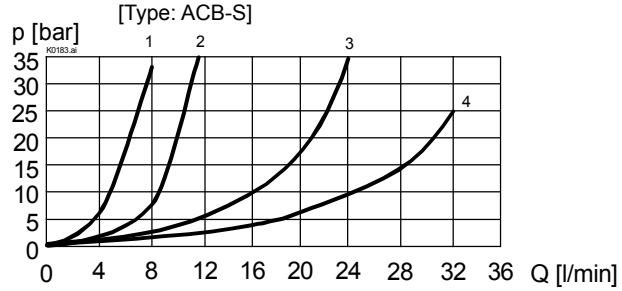
Q = f (p) Volume flow pressure characteristics (s = 100 %)
[Type: ACB-S]



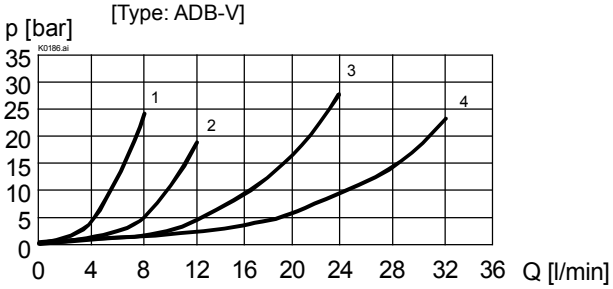
Q = f (p) Volume flow pressure characteristics (s = 100 %)
[Type: ADB-V]



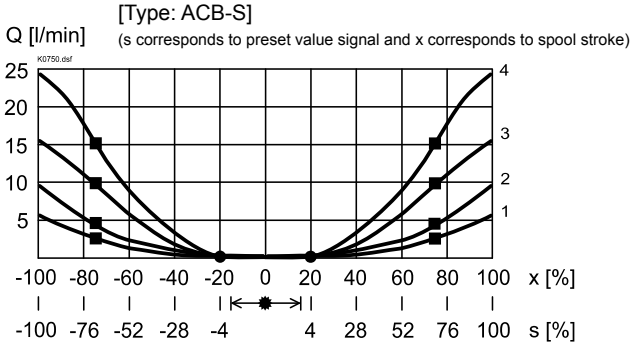
Δp = f (Q) Pressure loss/flow characteristics (s = 100 %)
[Type: ACB-S]



Δp = f (Q) Pressure loss/flow characteristics (s = 100 %)
[Type: ADB-V]



Q = f (s, x) Volume flow-signal-characteristics (Δp = 10 bar)
[Type: ACB-S]
(s corresponds to preset value signal and x corresponds to spool stroke)



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[Type: ADB-V]
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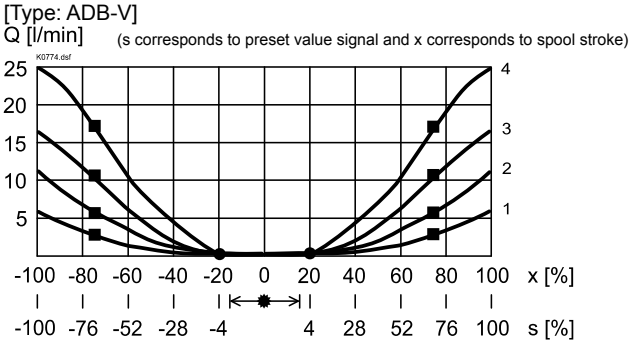
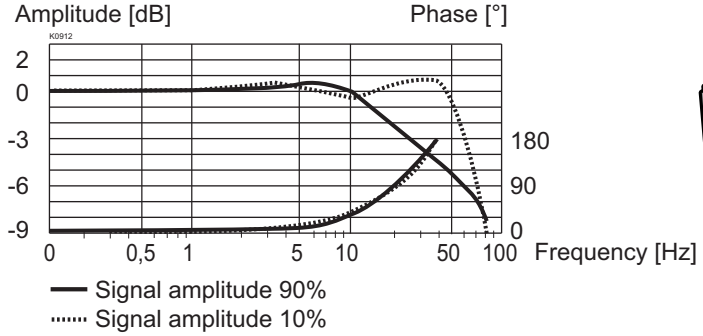


Factory settings:
- ✹ = Deadband: Both solenoids switched off with command signal -2 %…+2 %
- ● = Opening point: at command signal ± 4 %
- ■ = Flow at Δp = 10 bar over 2 metering edges at command signal ±70 %
  15,0 l/min for Q_N = 32 l/min
  9,4 l/min for Q_N = 16 l/min
  4,4 l/min for Q_N = 10 l/min
  2,7 l/min for Q_N = 5 l/min

Factory settings:
- ✹ = Deadband: Both solenoids switched off with command signal -2 %…+2 %
- ● = Opening point: at command signal ± 4 %
- ■ = Flow at Δp = 10 bar over 2 metering edges at command signal ±70 %
  16,5 l/min for Q_N = 32 l/min
  10,5 l/min for Q_N = 16 l/min
  5,5 l/min for Q_N = 10 l/min
  3,0 l/min for Q_N = 5 l/min

Legend: **1:** Q_N = 5 l/min **3:** Q_N = 16 l/min
2: Q_N = 10 l/min **4:** Q_N = 32 l/min

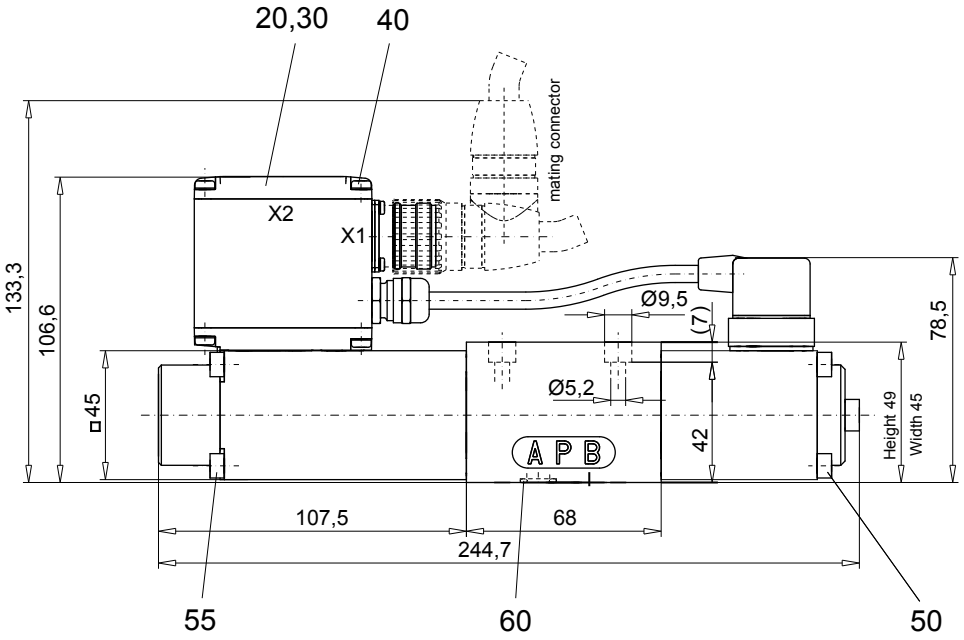
Frequency response [all types] (s = 10%, s = 90%)

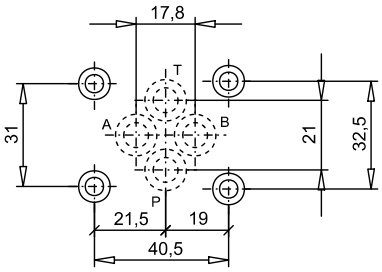


NOTE!
All values measured over 2 metering edges, A and B ports linked.

DIMENSIONS

With analog interface





NOTE!
The cable connector is not part of the delivery. The dimensions refer to those of the cable connector in the chapter «Accessories».

PARTS LIST

Position	Article	Description
20	062.0100	Cover
30	072.0021	Gasket 33x2x59,9x2
40	208.9110	Pan head screw M4x10
50	246.2160	Socket head cap screw M5x60 DIN 912
55	246.2190	Socket head cap screw M5x90 DIN 912
60	160.2093	O-ring ID 9,25x1,78

Technical explanation see data sheet 1.0-100E

ACCESSORIES

- Set-up software — see start-up
- Cable to adjust the settings through interface RS232 C
  (from RJ10 to D-SUB 9 poles, female, 5 m) — article no. 068.3002
- Cable connector for analog interface:
  – straight, soldering contact — article no. 219.2330
  – 90°, soldering contact — article no. 219.2331
  Recommended cable size:
  – Outer diameter 9…10,5 mm
  – Single wire max. 1 mm²
  – Recommended wire size:
  0…25 m = 0,75 mm² (AWG18)
  25…50 m = 1 mm² (AWG17)