Proportional directional control valve
• Integrated amplifier
• Integrated spool position control with LVDT
• Direct operated, not pressure compensated

Q_max = 20 l/min
Q_n = 8 l/min
p_max = 315 bar

DESCRIPTION
Direct operated proportional spool valve with integrated electronics in flange design NG4-Mini acc. to Wandfluh standard 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 electronics 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.

TYPE CODE
Interface acc. to Wandfluh standard
Integrated electronics, position control
Spool valve, direct operated
Nominal volume flow Q_n 4 l/min 4
8 l/min 8
Nominal voltage U_n 24 VDC
Hardware configuration
With analog signal (-10…+10 V factory set) A2
With CANopen acc. to DSP-408 C1
With Proflbus DP acc. to Fluid Power Technology P1

GENERAL SPECIFICATIONS
Designation 4/3-way proportional valve with integrated electronics
Nominal size NG4-Mini acc. to Wandfluh standard
Construction Direct operated spool valve
Operations Proportional solenoid, wet pin push type, pressure tight
Mounting Flange, 3 fixing holes for socket head cap screws M5x40
Connections Threaded connection plates, multi-flange subplates, longitudinal stacking system

Ambient temperature -20...+65 °C (typical)
Mounting position any, preferably horizontal
Fastening torque M_s = 5.5 Nm (quality 8.8)
Weight m = 1.95 kg
Proportional spool valves

**HYDRAULIC SPECIFICATIONS**

- **Fluid**: Mineral oil, other fluid on request
- **Contamination efficiency**: ISO 4406:1999, class 18/16/13
- **Viscosity range**: 12 mm²/s...320 mm²/s
- **Fluid temperature**: -20...+70 °C
- **Working pressure**: $P_{\text{max}} = 315$ bar (connections P, A, B)
- **Tank pressure**: $P_{\text{max}} = 160$ bar (connections T)
- **Nominal volume flow**: $Q_N = 4$ l/min, 8 l/min
- **Max. volume flow**: see characteristic
- **Leakage volume flow**: on request
- **Hysteresis**: < 0.4 %
- **Repeatability**: < 0.4 %
- **Frequency response**: see characteristics

**ELECTRICAL SPECIFICATIONS**

- **Protection class**: IP 67 acc. to EN 60 529
- **Supply voltage**: 24 VDC
- **Parameterisation**: via fieldbus or USB
- **Interface**:
  - **Device receptacle (male) X1**: Plug (male), M12, 5-poles
  - **Device receptacle (male) X3**: Plug (male), M12, 5-poles
  - **Device receptacle CANopen (male) X3**: Plug (male), M12, 5-poles
  - **Device receptacle Profibus (male) X3**: Plug (male), M12, 5-poles
- **Preset value signal**: Fieldbus

**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».

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

Factory setting: Voltage (-10...+10 V), (PIN 4/5) are selected with set-up and diagnosis software.

**Fieldbus interface**:

- Device receptacle supply (male) X1
  - MAIN
    - 1 = Supply voltage +
    - 2 = Reserved for extensions
    - 3 = Supply voltage 0 VDC
    - 4 = Chassis

- Device receptacle CANopen (male) X3
  - CAN
    - 1 = not connected
    - 2 = not connected
    - 3 = CAN Gnd
    - 4 = CAN High
    - 5 = CAN Low

- Device receptacle Profibus (male) X3
  - PROFIBUS
    - 1 = VP
    - 2 = RsD / TxD - N
    - 3 = DGND
    - 4 = RxD / TxD - P
    - 5 = Shield

**NOTE!**

The mating connector 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».

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Illustrations not obligatory
Data sheet no. 1.10-70E 2/4
Edition 12 23
CHARACTERISTICS

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

Volume flow pressure characteristics

$Q = f(p)$

- Type: S4D41-08 $S = 100\%$
- Type: S4D41-04 $S = 100\%$
- Type: V4D42-08 $S = 100\%$
- Type: V4D42-04 $S = 100\%$

Volume flow-signal-characteristics ($\Delta p = 10 \text{ bar}$)

- Type: S4D41
  
- Type: V4D42

Factory settings:

- $/$GAE = Deadband: Both solenoids switched off with command signal $-2\%...+2\%$
- $/$G6C = Opening point: at command signal $\pm 4\%$
- Flow at $\Delta p = 10 \text{ bar}$ over 2 metering edges at command signal $\pm 70\%$
  - $4.5 \text{ l/min}$ for $Q_N = 8 \text{ l/min}$
  - $2.1 \text{ l/min}$ for $Q_N = 4 \text{ l/min}$

Frequency response

$\Delta p = 10 \text{ bar}$

Amplitude [dB]  Phase [°]

NOTE!

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

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<tr>
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<th>Article</th>
<th>Description</th>
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<td>062.0102</td>
<td>Cover</td>
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<td>21</td>
<td>223.1317</td>
<td>Dummy plug M16x1,5</td>
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<tr>
<td>22</td>
<td>160.6131</td>
<td>O-ring ID 13.00x1,5</td>
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<td>30</td>
<td>072.0021</td>
<td>Gasket 33x2x59,9x2</td>
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<td>40</td>
<td>208.0100</td>
<td>Socket head cap screw M4x10</td>
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<td>50</td>
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<td>Socket head cap screw M4x60 DIN 912</td>
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<td>55</td>
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<td>60</td>
<td>160.2052</td>
<td>O-ring ID 5,28x1,78</td>
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ACCESSORIES

- Set-up software: see start-up
- Cable to adjust the settings through interface USB
  (from plug type A to Mini B, 3m) article no. 219.2896
- 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)

Technical explanation see data sheet 1.0-100