

Proportional spool valve

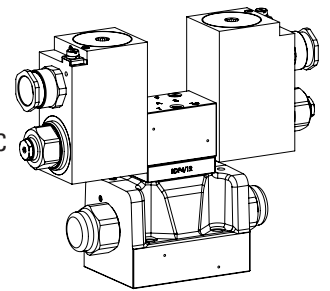
Flange construction

- ◆ pilot operated
- ◆ $Q_{max} = 200$ l/min
- ◆ $Q_{Nmax} = 90$ l/min
- ◆ $p_{max} = 350$ bar

NG10

ISO 4401-05

- ⊕ II 2 G Ex db IIC T6, T4
- ⊕ II 2 D Ex tb III C T80 °C, T130 °C
- ⊕ I M2 Ex db I Mb
- Class I Division 1
- Class I Zone 1



DESCRIPTION

Pilot operated proportional spool valve with 4 connections in 5-chamber system. Very compact construction with corresponding low weight and high flow values. The function of the pilot and main valve as well as the interaction of both valves can be found in the hydraulic diagram. Proportional to the solenoid current, the spool stroke, the spool opening and the valve volume flow increase. The pressure tight encapsulated Ex-protection solenoid coil prevents an explosion on the inside penetrating to the outside as well as an ignitable surface temperature. For the control, Wandfluh proportional pressure valves (see register 2.3) and Wandfluh proportional amplifiers (see register 1.13) are available.

APPLICATION

These valves are suitable for applications in explosion-hazard areas, open cast and also in mines. Pilot operated valves are used where large volume flows have to be controlled. Due to the large flow range and the high stiffness of the actuation as a result of the pilot control, these valves are suitable for applications where fast acceleration and deceleration processes, high speeds and sensitive motion sequences are required. The applications are in the industrial as well as in the mobile hydraulics for the smooth control of hydraulic actuators.

CERTIFICATES

| | Surface | Mining | Standard -25 °C to ... | M248 Electronic |
|-----------|---------|--------|------------------------------|--------------------|
| ATEX | x | x | x | x |
| IECEx | x | x | x | x |
| CCC | x | x | x | x |
| EAC | x | x | x | x |
| Australia | x | x | x | |
| MA | | x | x | x |
| UL / CSA | x | | x | |

The certificates can be found on www.wandfluh.com

ACTUATION

Pressure reducing valve

MDBFA04-P / AB-25 for BCA-S / BDA-V

MDBFA04-P / B-25 for BC1-S / BD1-V

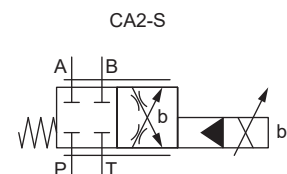
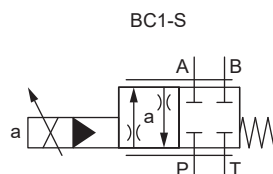
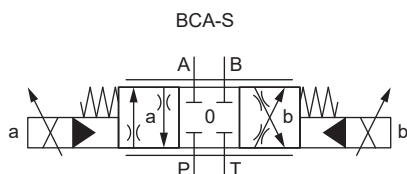
MDBFA04-P / A-25 for CA2-S / DA2-V

Attention! The UL execution is always supplied without cable gland

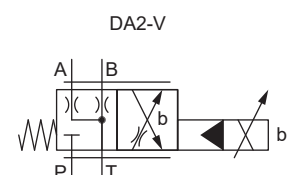
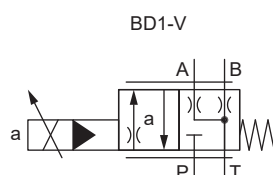
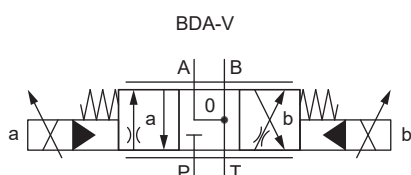


SYMBOL

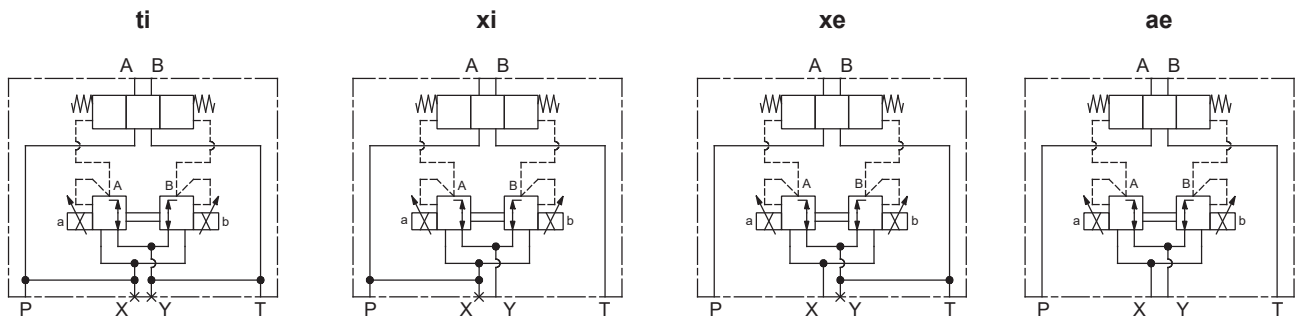
Symmetrical control



Meter-in control



Types of pilot operation


TYPE CODE

WVB F A10 - - - - / #

Spool valve, pilot operated, proportional, ex-protection execution Ex d

Flange construction

International standard interface ISO NG10

Designation of symbols acc. to table

Nominal volume flow 60 l/min (L9)
 90 l/min (L15 / 17)

Type of pilot operation:
 Control oil supply (x) (x) and (y) internally
 and drain (y) (x) and (y) externally
 (x) internally (y) externally
 (x) externally (y) internally

Nominal voltage U_N 12 VDC
 24 VDC

Nominal power P_N 9 W *Ambient temperature up to:*
 15 W 40 °C or 90 °C
 17 W 70 °C
 70 °C (only UL / CSA)

Certification ATEX, IECEx, CCC, EAC
 Australia UL / CSA MA

Sealing material NBR
 FKM (Viton)

Amplifier

Design index (subject to change)
 1.10-3520

ACCESSORIES

| | |
|----------------------------|--------------------|
| Fixing screws | Data sheet 1.0-60 |
| Threaded subplates | Data sheet 2.9-40 |
| Multi-station subplates | Data sheet 2.9-70 |
| Horizontal mounting blocks | Data sheet 2.9-110 |
| Technical explanations | Data sheet 1.0-100 |
| Filtration | Data sheet 1.0-50 |

STANDARDS

| | |
|--------------------------|---------------------------------|
| Explosion protection | Directive 2014 / 34 / EU (ATEX) |
| Flameproof enclosure | EN / IEC / UL 60079-1, 31 |
| Cable entry | EN 60079-0, 1, 7, 15, 31 |
| Mounting interface | ISO 4401-05 |
| Protection class | EN 60 529 |
| Contamination efficiency | ISO 4406 |

GENERAL SPECIFICATIONS

| | |
|---------------------|--|
| Designation | Proportional spool valve |
| Construction | Pilot operated |
| Mounting | Flange construction |
| Nominal size | NG10 according to ISO 4401-05 |
| Actuation | Ex-protection proportional solenoid |
| Ambient temperature | Operation as T6 -25...+40 °C (L9) Operation as T4 -25...+90 °C (L9) -25...+70 °C (L15 / L17) |
| Weight | 5,2 kg (1 solenoid) 7,0 kg (2 solenoids) |
| MTTFd | 150 years |

HYDRAULIC SPECIFICATIONS

| | |
|--------------------------|--|
| Working pressure | $p_{max} = 350$ bar |
| Tank pressure | $p_{Tmax} = 160$ bar (type of pilot operation ae and xi) $p_{Tmax} = 100$ bar (type of pilot operation ti and xe) |
| Pilot pressure | $p_v = 25...350$ bar Connection X: $p_v = 25...200$ bar |
| Pressure pilot oil drain | Minimum 25 bar lower than p_v |
| Maximum volume flow | $Q_{max} = 200$ l/min, see characteristics |
| Leakage oil | See characteristics |
| Fluid | Mineral oil, other fluid on request |
| Viscosity range | 12 mm ² /s...320 mm ² /s |
| Temperature range fluid | Operation as T6 NBR -25...+40 °C (L9) FKM -20...+40 °C (L9) Operation as T4 NBR -25...+70 °C (L9 or L15 / L17) FKM -20...+70 °C (L9 or L15 / L17) |
| Contamination efficiency | Class 18 / 16 / 13 |
| Filtration | Required filtration grade $\beta_{6...10} \geq 75$, see data sheet 1.0-50 |

Attention! With the execution L9 for ambient temperatures up to 90 °C (L9/90 °C), Q_N is not reached



ELECTRICAL SPECIFICATIONS

| | |
|---------------------------|--|
| Protection class | IP65 / 66 / 67 |
| Relative duty factor | 100 % DF |
| Voltage tolerance | ± 10 % with regard to nominal voltage |
| Standard nominal voltage | 12 VDC, 24 VDC |
| Limiting current at... °C | L9, 40 °C $I_G = 625$ mA (12 VDC) $I_G = 305$ mA (24 VDC) L15 / 17, 50 °C $I_G = 950$ mA (12 VDC) $I_G = 450$ mA (24 VDC) L15 / 17, 70 °C $I_G = 910$ mA (12 VDC) $I_G = 420$ mA (24 VDC) |
| Standard nominal power | 9 W, 15 W, 17 W |
| Temperature class | Nominal power 9 W: T1...T6 Nominal power 15 W / 17 W: T1...T4 |

Note! Other electrical specifications see data sheet 1.1-183 and 1.1-184



MANUAL OVERRIDE

HB4,5 as standard
Optionally: HN (K)
→ see data sheet 1.1-311

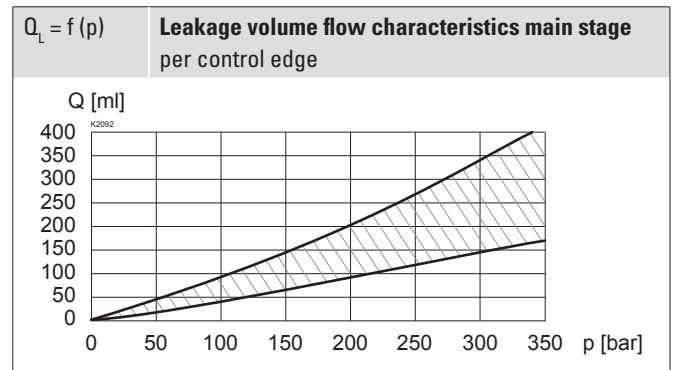
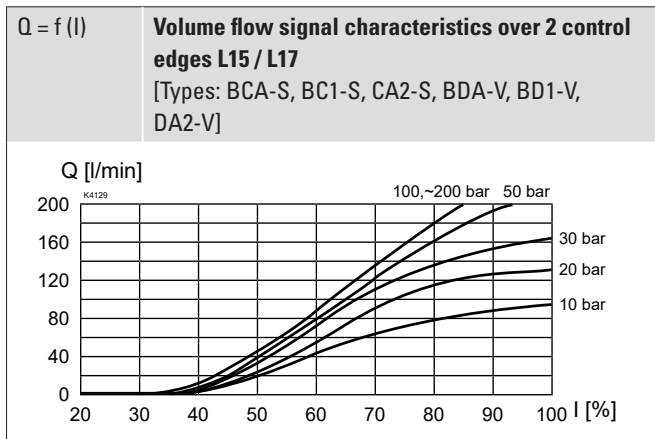
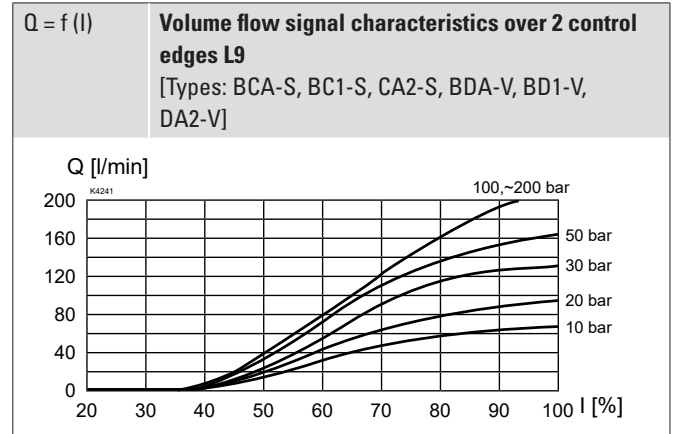
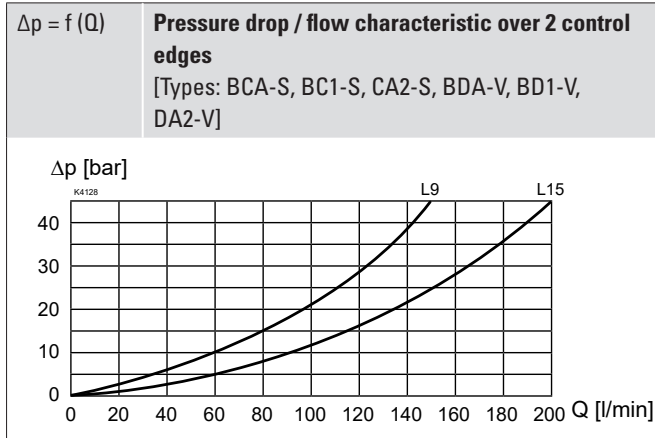
SURFACE TREATMENT

- ◆ The main valve body, the distance plate, the screw plugs, the slip-on coil and the armature tube are zinc-nickel coated
- ◆ The pilot valve body is coated with a two component paint

SEALING MATERIAL

NBR or FKM (Viton) as standard, choice in the type code

PERFORMANCE SPECIFICATIONS

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


$Q_L = f(p)$ **Leakage volume flow pilot control stage**

| | |
|------------------------------|------------|
| @ 350 bar, p_{red} 0 bar: | 100 ml/min |
| @ 350 bar, p_{red} 25 bar: | 320 ml/min |



Note! All values were measured over two control edges. The connections A and B were short-circuited.

INSTALLATION NOTES

| | |
|-------------------|--|
| Mounting type | Flange mounting 4 fixing holes for socket head screws M6 x 40 |
| Mounting position | Any, preferably horizontal |
| Tightening torque | $M_D = 13.5 \text{ Nm} \pm 10 \%$, quality min. 10.9 $M_D = 10.5 \text{ Nm} \pm 10 \%$, quality 8.8: <ul style="list-style-type: none"> ◆ maximum tank pressure without external connections: 80 bar ◆ maximum tank pressure and maximum pressure external connections: 35 bar |



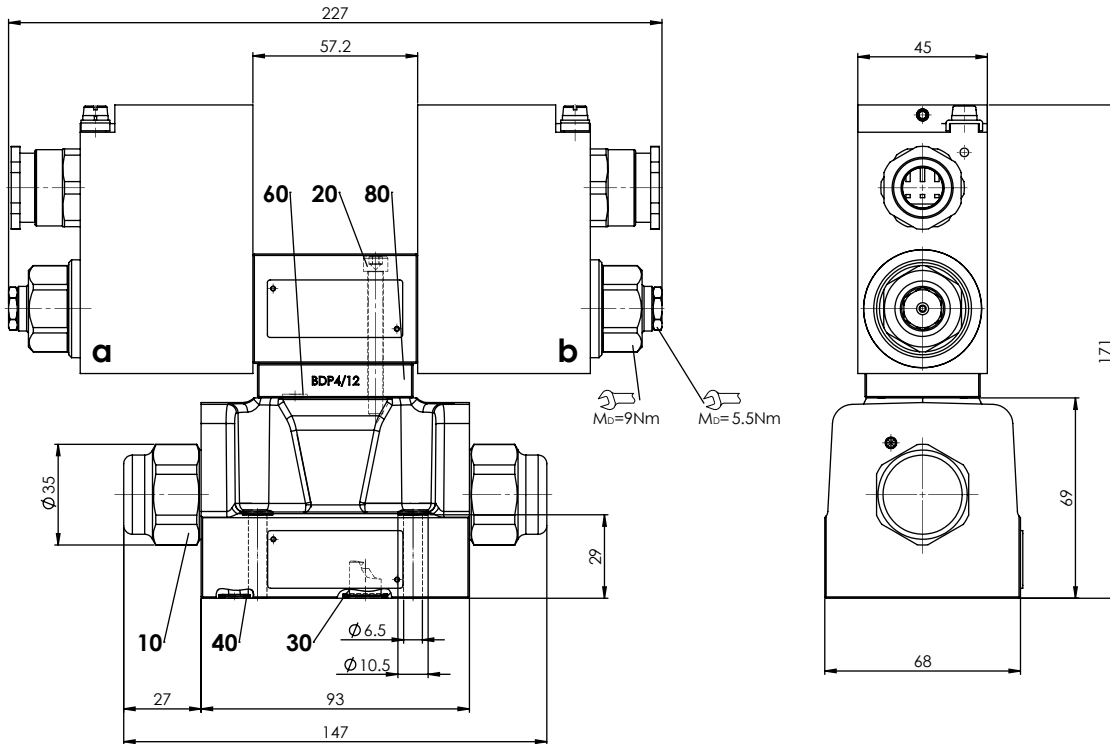
The length of the fixing screw depends on the base material of the connection element.

PARTS LIST

| Position | Article | Description |
|----------|----------|-----------------------------------|
| 10 | 239.7203 | Screw plug |
| 20 | 246.2146 | Socket head screw M5 x 45 DIN 912 |
| 30 | 160.2120 | O-ring ID 12,42 x 1,78 (NBR) |
| | 160.8124 | O-ring ID 12,42 x 1,78 (FKM) |
| 40 | 160.2076 | O-ring ID 7,65 x 1,78 (NBR) |
| | 160.8076 | O-ring ID 7,65 x 1,78 (FKM) |
| 60 | 160.2052 | O-ring ID 5,28 x 1,78 (NBR) |
| | 160.6052 | O-ring ID 5,28 x 1,78 (FKM) |
| 80 | 173.1450 | Distance plate BDP4 / 12 |

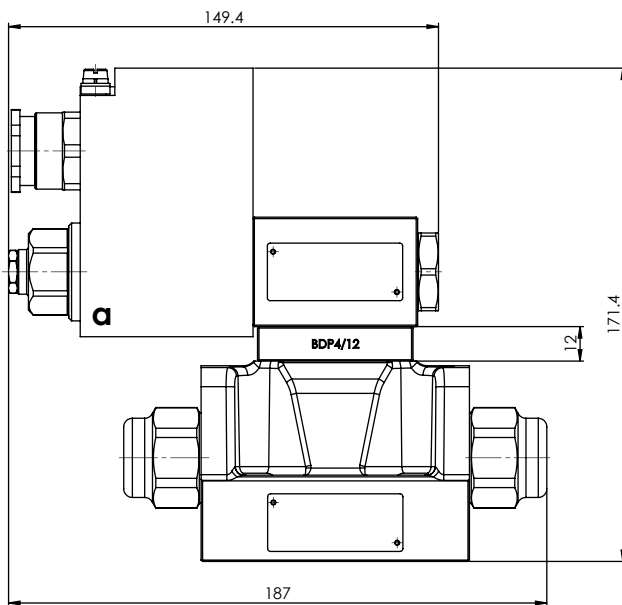
DIMENSIONS

4/3-way spool valve (spring centring)



Dimensions of the solenoid coil, refer to data sheet 1.1-183 and 1.1-184

4/2-way with spring reset



HYDRAULIC CONNECTION

