

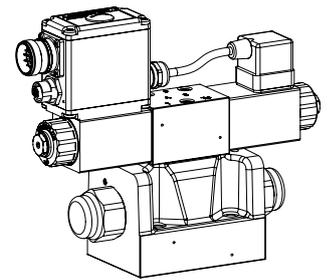
Proportional spool valve with integrated electronics

Flange construction

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

NG10
 ISO 4401-05

DSV
 DIGITAL VALVE
 MART



DESCRIPTION

Pilot operated proportional spool valve with 4 connections in 5-chamber system and integrated electronics. Precise spool fit, low leakage, long service life time. Very compact construction with corresponding low weight. The pilot valve is a proportional solenoid operated pressure reducing valve. 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 control takes place via an analogue interface or a fieldbus interface (CANopen, J1939 or Profibus DP). The parameterisation takes place by means of the free of cost parameterisation and diagnostics software «PASO» or via fieldbus interface. As an option, these valves are available with integrated controller. As feedback value generators sensors with voltage or current output can be connected directly. The available controller structures are optimised for applications with hydraulic actuations.

APPLICATION

Proportional spool valves are perfectly suitable for demanding tasks due to the high resolution, large volume flow and low hysteresis. 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 actuations.

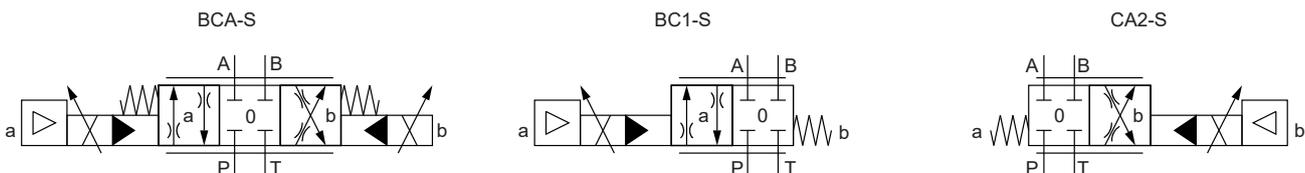
Note!



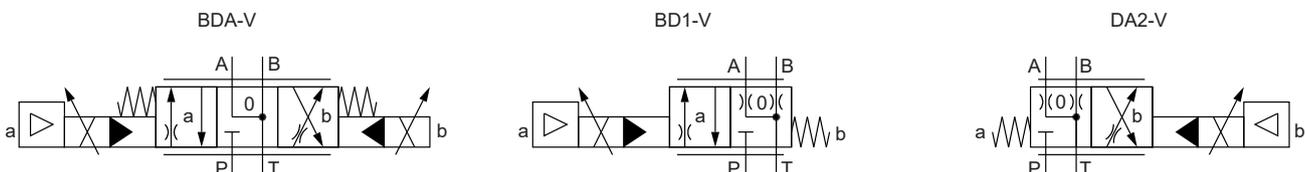
„PASO“ is a Windows programm in the flow diagram style, which enables the intuitive adjustment and storing of all variable parameters. The data remain saved in case of a power failure and can also be reproduced and transferred to other DSV.

SYMBOL

Symmetrical control

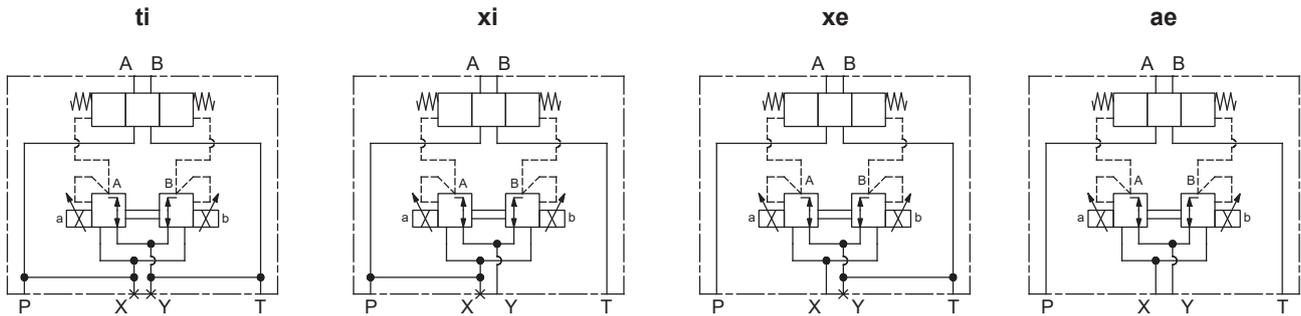


Meter-in control



SYMBOL

Types of pilot operation


TYPE CODE

Spool valve, pilot operated, proportional		WVP F A10 -		<input type="text"/>	-	90	-	<input type="text"/>	-	<input type="text"/>	/	M	E	<input type="text"/>	-	<input type="text"/>	#	<input type="text"/>	
Flange construction																			
International standard interface ISO NG10																			
Designation of symbols acc. to table																			
Nominal volume flow																			
Type of pilot operation:																			
Control oil supply (x)	(x) and (y) internally	<input type="text"/>		ti															
and drain (y)	(x) and (y) externally	<input type="text"/>		ae															
	(x) internally (y) externally	<input type="text"/>		xi															
	(x) externally (y) internally	<input type="text"/>		xe															
Nominal voltage U _N	12 VDC	<input type="text"/>		G12															
	24 VDC	<input type="text"/>		G24															
Slip-on coil	Metal housing square																		
Connection execution	Integrated electronics																		
Hardware configuration																			
Analog command value signal	12 pole	<input type="text"/>		A2		7 pole		<input type="text"/>		D2		(-10 ... 10 V preset)							
Analog command value signal	12 pole	<input type="text"/>		A4		7 pole		<input type="text"/>		D4		(4 ... 20 mA preset)							
CANopen according to DSP-408		<input type="text"/>		C1															
Profibus DP according to Fluid Power Technology		<input type="text"/>		P1															
CAN J1939 (on request)		<input type="text"/>		J1															
Function																			
Amplifier		<input type="text"/>																	
Controller with current feedback value signal (0 ... 20 mA / 4 ... 20 mA)		<input type="text"/>		R1															
Controller with voltage feedback value signal (0 ... 10 V)		<input type="text"/>		R2															
Sealing material	NBR	<input type="text"/>																	
	FKM (Viton)	<input type="text"/>		D1															
Design index (subject to change)																			

1.10-3510

GENERAL SPECIFICATIONS

Designation	Proportional spool valve
Construction	Pilot operated
Mounting	Flange construction
Nominal size	NG10 according to ISO 4401-05
Actuation	Proportional solenoid
Ambient temperature	-20...+65 °C The upper temperature limit is a guideline 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“.
Weight	3,5 kg (1 solenoid) 3,9 kg (2 solenoids)
MTTFd	150 years

ELECTRICAL SPECIFICATIONS

Protection class	IP67 with suitable mating connector and closed housing cover
Ramps	Adjustable
Parameterisation	Via fieldbus or USB
Supply voltage	12 VDC, 24 VDC

Note!  Exact electrical specifications and detailed description of «DSV» electronics can be found on data sheet 1.13-76.

ACCESSORIES

Parameterisation software	See start-up
Parameterisation cable for interface USB (from plug type A on Mini B, 3 m)	Article no. 219.2896
Mating connector (plug female) for analog interface	
straight, soldering contact M23, 12 pole	Article no. 219.2330
straight, soldering contact, 7 pole	Article no. 219.2335
angled, soldering contact M23, 12 pole	Article no. 219.2331
Technical explanations	Data sheet 1.0-100
Hydraulic fluids	Data sheet 1.0-50
Filtration	Data sheet 1.0-50
Relative duty factor	Data sheet 1.1-430

Note!  Auxiliary conditions for the cable:
 – External diameter 12 pol: 3,5...14,7 mm
 – External diameter 7 pol: 8...10 mm
 – Wire cross section max. 1 mm²
 – Recommended wire cross section:
 0...25 m = 0,75 mm² (AWG18)
 25...50 m = 1 mm² (AWG17)

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	-20...+70 °C (NBR) -20...+70 °C (FKM)
Contamination efficiency	Class 18 / 16 / 13
Filtration	Required filtration grade $\beta_{6...10} \geq 75$, see data sheet 1.0-50

ACTUATION

Pressure reducing valve
 MDPFA04-P / AB-25 for BCA-S / BDA-V
 MDPFA04-P / A-25 for BC1-S / BD1-V
 MDPFA04-P / B-25 for CA2-S / DA2-V
 via device receptacle

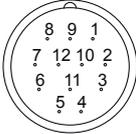
COMMISSIONING

For DSV amplifiers as a rule no parameter adjustments by the customer are required. The plugs have to be connected in accordance with the chapter «Electrical connection».

Controllers are supplied configured as amplifiers. The adjustment of the mode of control and of the controller are carried out by the customer by means of the software adjustment (USB interface, Mini B). Further information can be found on: «www.wandfluh.com». Free- of charge download of the «PASO» software and the operation instructions for «DSV» hydraulic valves as well as the operation instructions CANopen Protocol resp. Profibus DP Protocol, with Device Profile DSP-408 for «DSV».

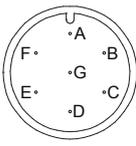
Note!  The mating connectors and the parameterisation cable are not part of the delivery. Refer to chapter «Accessories».

ELECTRICAL CONNECTION

X1	Analog interface (Main)
Device receptacle	M23, 12 pole male
	1 = Supply voltage + 2 = Supply voltage 0 VDC 3 = Stabilised output voltage 4 = Command value signal voltage + 5 = Command value signal voltage - 6 = Command value signal current + 7 = Command value signal current - 8 = Reserved for extensions 9 = Reserved for extensions 10 = Enable signal (Digital input) 11 = Error signal (Digital output) 12 = Chassis
Command value signal voltage (PIN 4/5) resp. current (PIN 6/7) are selected with parameterisation and diagnostics software PASO.	

X1	Fieldbus interface (Main)
Device receptacle	M12, 4 pole male
	1 = Supply voltage + 2 = Reserved for extensions 3 = Supply voltage 0 VDC 4 = Chassis

X2	Parameterisation interface
USB, Mini B	Under the screw plug of the housing cover
	Factory set

X1	Analog interface (Main)
Device receptacle	Connector DIN EN 175201 - 804
	7 pole male A = Supply voltage + B = Supply voltage 0 VDC C = Not connected D = Command value signal + E = Command value signal - F = Not connected G = Chassis
Command value signal: current (D4) or voltage (D2) to specify when placing the order	

X3	Profibus interface according to IEC 947-5-2
Device receptacle	M12, 5 pole female B-coded
	1 = VP 2 = RxD / TxD - N 3 = DGND 4 = RxD / TxD - P 5 = Shield

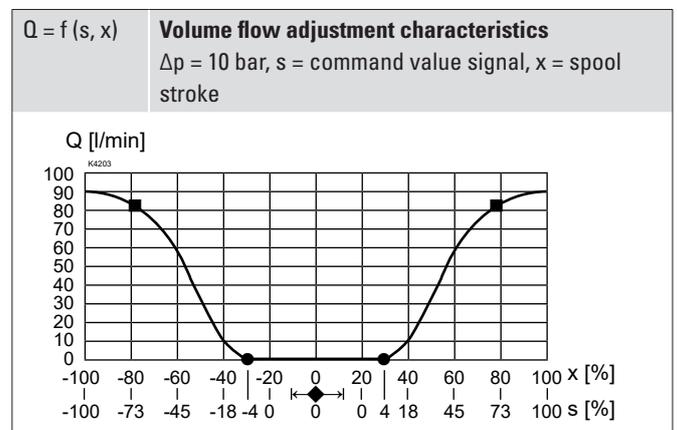
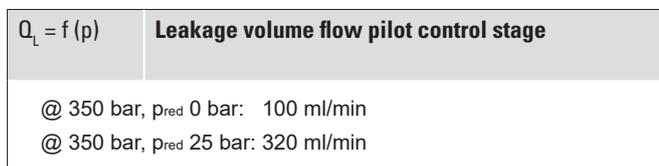
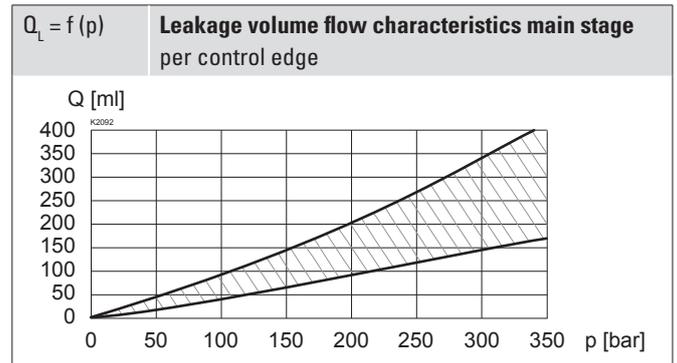
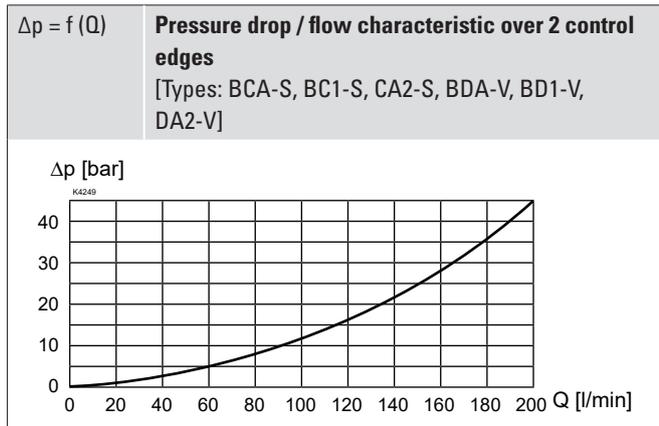
X3	CANopen interface according to DRP 303-1
Device receptacle	M12, 5 pole male
	1 = Not connected 2 = Not connected 3 = CAN Gnd 4 = CAN High 5 = CAN Low

X4 (controller only)	Feedback value interface (sensor)
Device receptacle	M12, 5 pole female
	1 = Supply voltage (output) + 2 = Feedback value signal + 3 = Supply voltage 0 VDC 4 = Not connected 5 = Stabilised output voltage
Feedback value signal: current (R1) or voltage (R2) to specify when placing the order	

Note! The mating connector is not included in the delivery



PERFORMANCE SPECIFICATIONS

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


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


FACTORY SETTINGS

Dither set for optimum hysteresis

- ◆ = Deadband: Both solenoids switched off at command value signal -2%... 2%
- = Opening pressure at command value signal + / - 4%
- = Flow at $\Delta p = 10 \text{ bar}$ over two control edges + / - 70% command value signal

STANDARDS

CANopen	DRP 303-1
Profibus DP	IEC 947-5-2
Mounting interface	ISO 4401-05
Protection class	EN 60 529
Contamination efficiency	ISO 4406

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: ◆ maximum tank pressure without external connections: 80 bar ◆ maximum tank pressure and maximum pressure external connections: 35 bar

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



