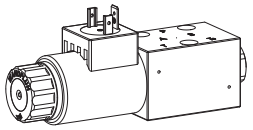
Proportional spool valve

Flange construction

- Q_{max} = 20 l/min
- 3 volume flow levels
- $Q_{N\,max}$ = 12 l/min
- p_{max} = 350 bar

NG4-Mini

Wandfluh standard



DESCRIPTION

Direct operated proportional spool valve with 4 connections in 5-chamber system. Precise spool fit, low leakage, long service life time. The volume flow adjustment takes place by a Wandfluh proportional solenoid. Proportional to the solenoid current, the spool stroke, the spool opening and the valve volume flow increase. For the control, Wandfluh proportional amplifiers are available (see register 1.13).

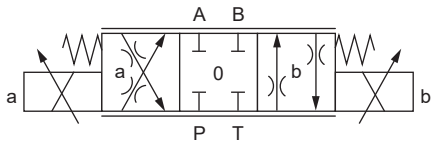
APPLICATION

Proportional spool valves are perfectly suitable for demanding tasks due to the high resolution, large volume flow and low hysteresis. The applications are in the industry as well as in the mobile hydraulics for the smooth control of hydraulic actuators. Some examples: rotor blades control of wind generators, forestry and earth moving machines, machine tools and paper production machines with simple position control, robotics and fan control. Miniature values are used where both, reduced dimensions and weight are important.

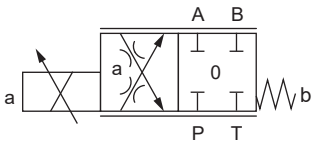
SYMBOL

Symmetrical control

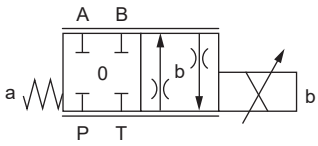
ACB-S



AC1-S

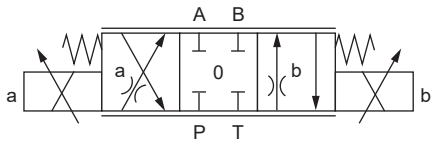


CB2-S

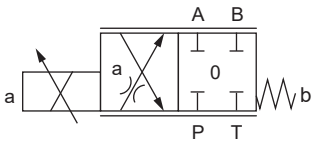


Meter-in control

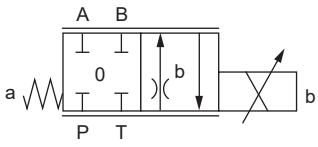
ACB-V



AC1-V

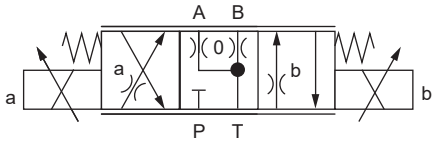


CB2-V

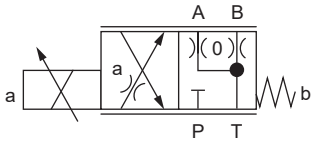


Meter-in control

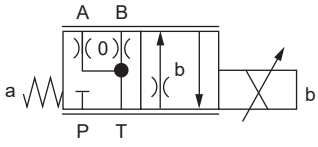
ADB-V



AD1-V

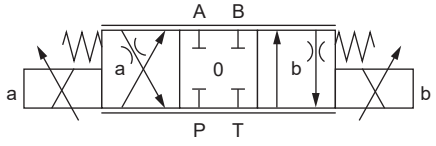


DB2-V

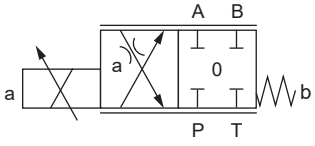


Meter-out control

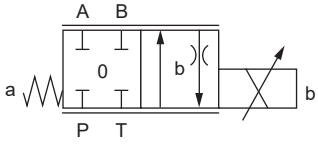
ACB-R



AC1-R



CB2-R



TYPE CODE

W D P F A04 - [ ] - [ ] - [ ] - [ ] / [ ] [ ] - [ ] [ ] # [ ]

Spool valve, directly operated, proportional		
Flange construction		
Mounting interface acc. to Wandfluh standard, NG4-Mini		
Designation of symbols acc. to table		
Nominal volume flow rate Q_N	4 l/min	4
	8 l/min	8
	12 l/min	12
Nominal voltage U_N	12 VDC	G12
	24 VDC	G24
	without coil	X5
Slip-on coil	Metal housing, round with one-sided collar	V
	Metal housing, square with one-sided collar	N
Connection execution	Connector socket EN 175301-803 / ISO 4400	D
	Connector socket AMP Junior-Timer	J
	Connector Deutsch DT04-2P	G
Sealing material	NBR	
	FKM (Viton)	D1
Manual override	Integrated	
	Push-button	HF1
	Spindle	HS1
Design index (subject to change)		

1.10-73

GENERAL SPECIFICATIONS

Designation	Proportional spool valve
Construction	Direct operated
Mounting	Flange construction
Nominal size	NG4-Mini according to Wandfluh standard
Actuation	Proportional solenoid
Ambient temperature	-25…+70 °C
Weight	0,90 kg (1 solenoid) 1,25 kg (2 solenoids)

ELECTRICAL SPECIFICATIONS

Protection class	Connection execution D: IP65 Connection execution J: IP66 Connection execution G: IP67 and IP69K
Relative duty factor	100 % DF
Standard nominal power	12 VDC, 24 VDC
Limiting current at 50 °C	I_G = 620 mA (U_N = 24 VDC) I_G = 1'200 mA (U_N = 12 VDC)

Note! Other electrical specifications see data sheet 1.1-168 (slip-on coil V) and 1.1-175 (slip-on coil N)

ACTUATION

Actuation	Proportional solenoid, wet pin push type, pressure tight
Execution	V.E37 / 19 x 50 (Data sheet 1.1-168) N.S35 / 19 x 50 (Data sheet 1.1-175)
Connection	Connector socket EN 175301 – 803 Connector socket AMP Junior-Timer Connector Deutsch DT04 - 2P

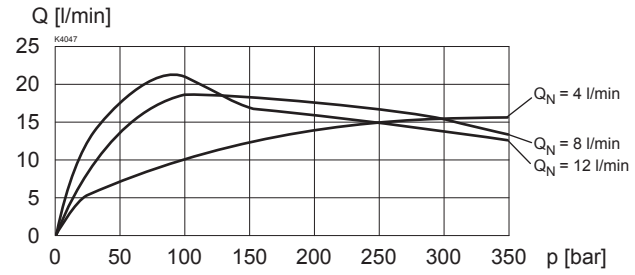
HYDRAULIC SPECIFICATIONS

Working pressure	p_{max} = 350 bar (p_T < 20 bar) p_{max} = 315 bar (p_T > 20 bar)
Tank pressure	$p_{T\,max}$ = 160 bar
Maximum volume flow	Q_{max} = 20 l/min, see characteristics
Nominal volume flow	Q_N = 4 l/min, 8 l/min, 12 l/min
Leakage oil	On request
Hysteresis	≤ 5 % at optimal dither signal
Fluid	Mineral oil, other fluid on request
Viscosity range	12 mm²/s…320 mm²/s
Temperature range fluid	-25…+70 °C (NBR) -20…+70 °C (FKM)
Contamination efficiency	Class 18 / 16 / 13
Filtration	Required filtration grade ß 6…10 ≥ 75, see data sheet 1.0-50

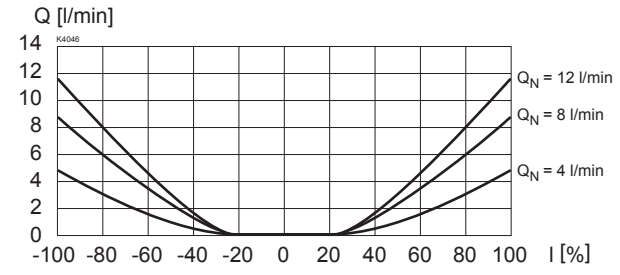
PERFORMANCE SPECIFICATIONS

Oil viscosity υ = 30 mm²/s

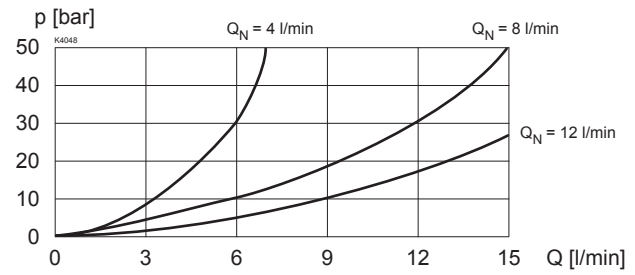
Q = f (p) **Volume flow pressure characteristics**
$I = I_G$
ACB-S, AC1-S, CB2-S



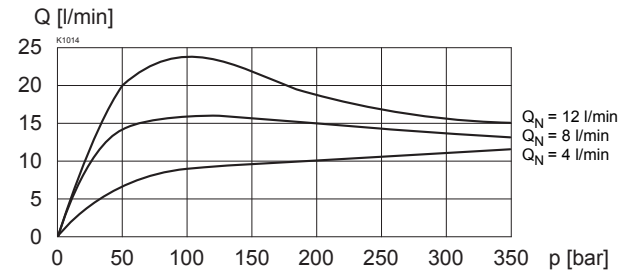
Q = f (I) **Volume flow adjustment characteristics**
Δp = 10 bar
ACB-V, AC1-V, CB2-V, ADB-V, AD1-V, DB2-V



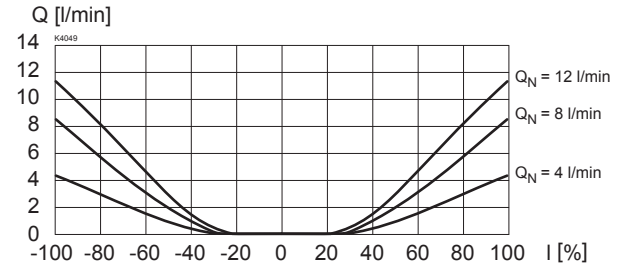
Δp = f (Q) **Pressure drop volume flow characteristics**
$I = I_G$
ACB-S, AC1-S, CB2-S



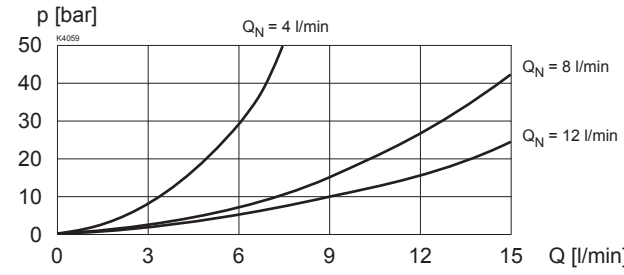
Q = f (p) **Volume flow pressure characteristics**
$I = I_G$
ACB-R, AC1-R, CB2-R



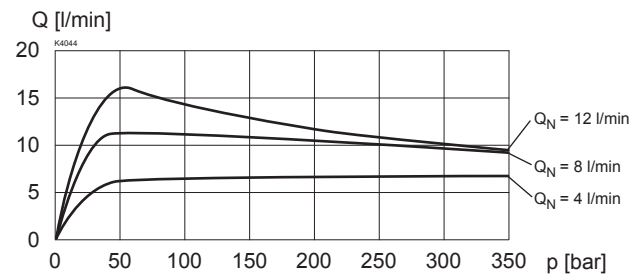
Q = f (I) **Volume flow adjustment characteristics**
Δp = 10 bar
ACB-S, AC1-S, CB2-S



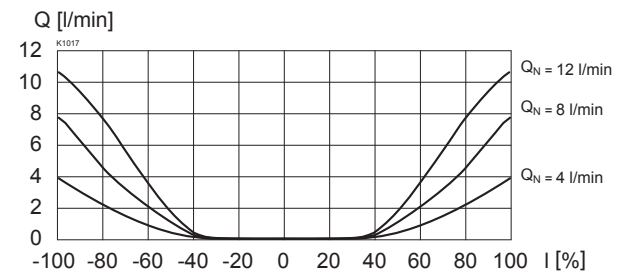
Δp = f (Q) **Pressure drop volume flow characteristics**
$I = I_G$
ACB-R, AC1-R, CB2-R



Q = f (p) **Volume flow pressure characteristics**
$I = I_G$
ACB-V, AC1-V, CB2-V, ADB-V, AD1-V, DB2-V



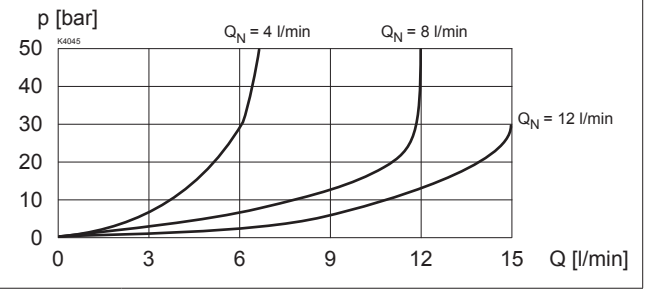
Q = f (I) **Volume flow adjustment characteristics**
Δp = 10 bar
ACB-R, AC1-R, CB2-R



PERFORMANCE SPECIFICATIONS

Oil viscosity υ = 30 mm²/s

Δp = f (Q)	**Pressure drop volume flow characteristics** I = I_G ACB-V, AC1-V, CB2-V, ADB-V, AD1-V, DB2-V

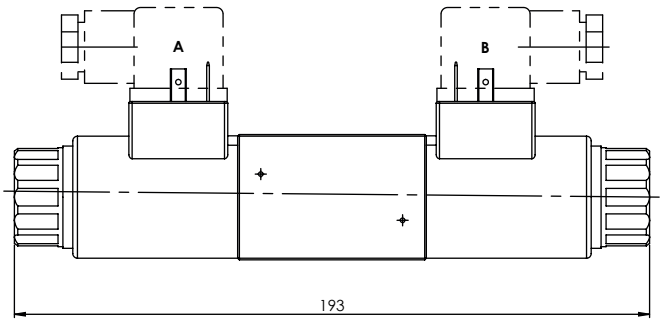


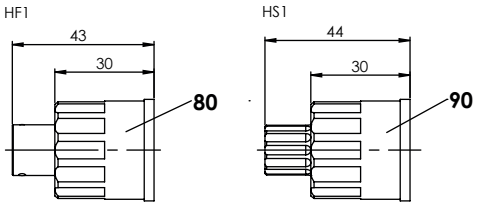
Note!

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

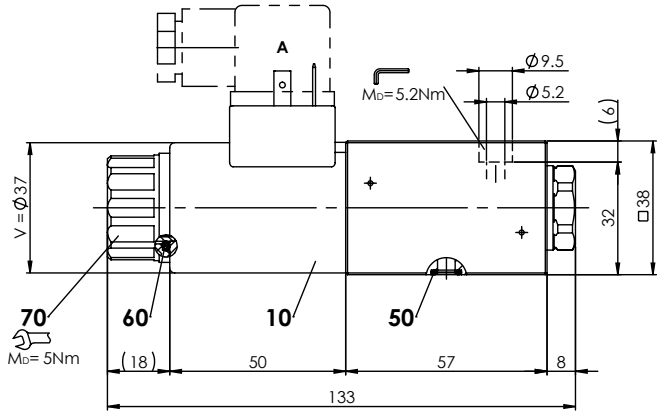
DIMENSIONS

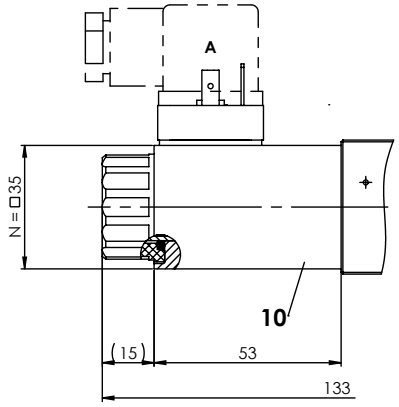
4/3-way spool valve (spring centred)





4/2-way spool valve





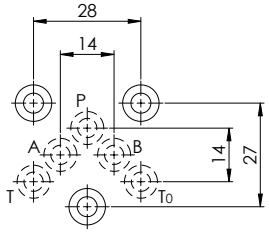
PARTS LIST

Position	Article	Description
10	206.2... 260.5...	V.E37 / 19 x 50 N.S35 / 19 x 50
70	154.2700	Knurled nut
80	253.7001	HF1-M19
90	253.7000	HS1-M19
	251.0814	Seal kit WD.FA04
	251.0816	Seal kit WD.FA04-D1

Seal kit consisting of:

50	O-Ring	ID 5,28 x 1,78
60	O-Ring	ID 18,72 x 2,62

HYDRAULISCHER ANSCHLUSS



INSTALLATION NOTES

Mounting type	Flange mounting 3 fixing holes for socket head screws M5 x 40
Mounting position	Any, preferably horizontal
Tightening torque	M_D = 5,2 Nm (screw quality 8.8, zinc coated) Fixing screws M_D = 5 Nm knurled nut

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

MANUAL OVERRIDE

- Integrated (–) Actuation pin integrated in the armature tube. Actuation by pressing the pin
- Push-button (HF1) Integrated in the knurled nut. Actuation by pressing the push-button
- Spindle (HS1) Integrated in the knurled nut. Actuation by turning the spindle (continuously variable valve actuation)

Attention! The actuation of the manual override is possible up to a tank pressure of:
160 bar Integrated (–)
160 bar Push-button (HF1)
160 bar Spindle (HS1)

STANDARDS

Mounting interface	Wandfluh standard
Solenoids	DIN VDE 0580
Connection execution D	EN 175301 – 803
Protection class	EN 60 529
Contamination efficiency	ISO 4406

ACCESSORIES

Mating connector grey (A)	Article no. 219.2001
Mating connector black (B)	Article no. 219.2002
Threaded subplates	Data sheet 2.9-10
Multi-station subplates	Data sheet 2.9-50
Horizontal mounting blocks	Data sheet 2.9-90
Explications techniques	Data sheet 1.0-100
Filtration	Data sheet 1.0-50
Relative duty factor	Data sheet 1.1-430
Proportional amplifier	Register 1.13

SURFACE TREATMENT

Standard:
-The valve body, the armature tube, the slip-on coil and the plug screw are zinc-nickel coated

ISO 9227 (800 h) salt spray test

SEALING MATERIAL

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