Proportional spool valve stainless

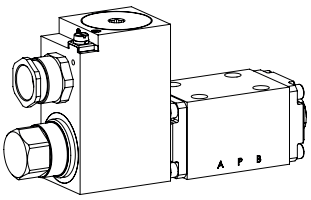
Flange construction

- Q_{max} = 30 l/min
- 3 volume flow levels
- $Q_{N\,max}$ = 20 l/min
- p_{max} = 350 bar

NG6

ISO 4401-03

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



DESCRIPTION

Direct operated proportional spool valve with 4 connections in 5-chamber system. Precise spool fit, low leakage, long service life time. 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.

APPLICATION

These valves are suitable for applications in explosion-hazard areas, open cast and also in mines. The stainless execution is especially suitable for the use in wet and salty environment. 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 industrial as well as in the mobile hydraulics for the smooth control of hydraulic actuations.

CERTIFICATES

	Surface	Mining	Standard -25 °C to…	M248 Electronic
ATEX	x	x	x	x
IECEx	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

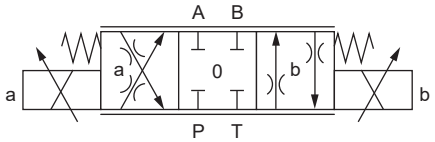
Actuation	Proportional solenoid, wet pin push type, pressure tight
Execution	MKY45 / 18x60 (data sheet 1.1-183) MKU45 / 18x60 (data sheet 1.1-184)
Connection	Cable gland for cable Ø 6,5…14 mm

Attention! The UL execution is always supplied without cable gland

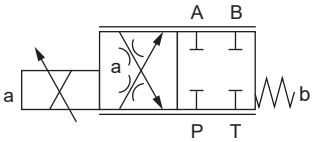
SYMBOL

Symmetrical control

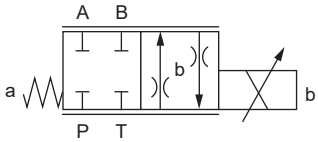
ACB-S



AC1-S

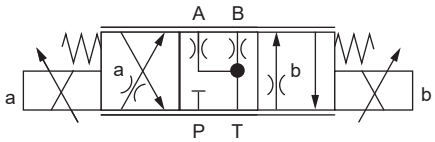


CB2-S

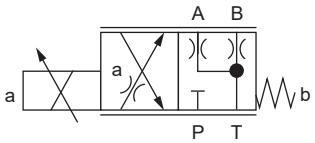


Meter-in control

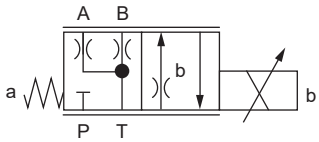
ADB-V



AD1-V



DB2-V



TYPE CODE

WD B F A06 - [ ] - [ ] - [ ] / [ ] / [ ] - [ ] [ ] K9 # 1

Spool valve, direct operated

Proportional, explosion proof execution Ex d

Flange construction

International standard interface ISO, NG6

Designation of symbols acc. to table

Nominal volume flow Q_N

	L15 / L17		L9 ACB-S		L9 ADB-V	
	6 l/min	6	3 l/min	3	5 l/min	5
	12 l/min	12	7 l/min	7	10 l/min	10
	20 l/min	20	14 l/min	14	16 l/min	16

Nominal voltage U_N

12 VDC	G12	
24 VDC	G24	

Nominal power P_N

		Ambient temperature up to:
9 W	L9	40 °C or 90 °C
15 W	L15	70 °C
17 W	L17	70 °C (only UL / CSA)

Certification

ATEX, IECEx, EAC				
Australia	AU	UL / CSA	UL	
MA	MA			

Sealing material

NBR	
FKM (Viton)	D1

Amplifier: M248

Stainless

Design index (subject to change)

1.10-88S

GENERAL SPECIFICATIONS

Designation	Proportional spool valve
Construction	Direct operated
Mounting	Flange construction
Nominal size	NG6 according to ISO 4401-03
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) In case of U_N = 12 VDC, the max. ambient temperature has to be reduced by 10 °C
Weight	3,1 kg (1 solenoid) 4,9 kg (2 solenoids)
MTTFd	150 years

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	**L15 / L17 / 70 °C:** I_G = 445 mA (U_N = 24VDC) I_G = 890 mA (U_N = 12VDC) **L9 / 40 °C:** I_G = 305 mA (U_N = 24VDC) I_G = 610 mA (U_N = 12VDC) **L9 / 90 °C:** I_G = 265 mA (U_N = 24VDC) I_G = 530 mA (U_N = 12VDC)
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

HYDRAULIC SPECIFICATIONS

Working pressure	p_{max} = 350 bar
Tank pressure	$p_{T\,max}$ = 160 bar
Maximum volume flow	Q_{max} = 30 l/min, see characteristics
Nominal volume flow	Q_N = 6 l/min, 12 l/min, 20 l/min (L15 / L17) Q_N = 3 l/min, 7 l/min, 14 l/min (L9 ACB-S) Q_N = 5 l/min, 10 l/min, 16 l/min (L9 ADB-V)
Leakage oil	On request
Hysteresis	L15 / 70°C: ≤ 10 % at optimal dither signal L9 / 40°C: ≤ 12 % at optimal dither signal L9 / 90°C: ≤ 14 % at optimal dither signal
Fluid	Mineral oil, other fluid on request
Viscosity range	12 mm²/s…320 mm²/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 (L15 / L17) FKM -20…+90 °C (L9)
Contamination efficiency	Class 18 / 16 / 13
Filtration	Required filtration grade ß 6…10 ≥ 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

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 4401-03
Protection class	EN 60 529
Contamination efficiency	ISO 4406

SURFACE TREATMENT

- The valve body, the cover and the socket head screws are made of stainless steel
- The slip-on coil and the armature tube are zinc nickel coated

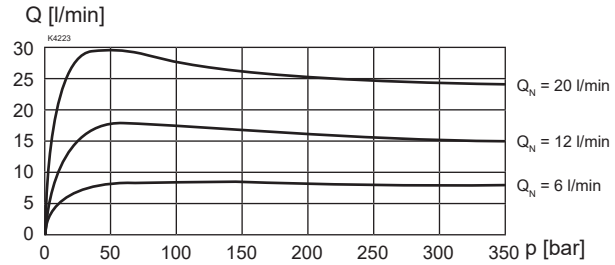
SEALING MATERIAL

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

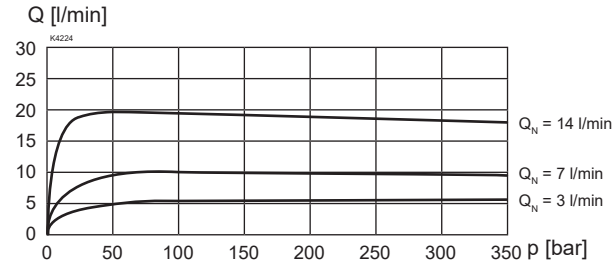
PERFORMANCE SPECIFICATIONS

Oil viscosity υ = 30 mm²/s

Q = f (p) **Volume flow pressure characteristics**
I = I_G
Measured at 50 °C
ACB-S, AC1-S, CB2-S
Execution L15 / L17

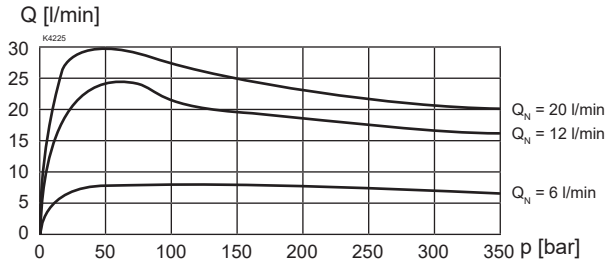


Q = f (p) **Volume flow pressure characteristics**
I = I_G
Measured at 50 °C
ACB-S, AC1-S, CB2-S
Execution L9



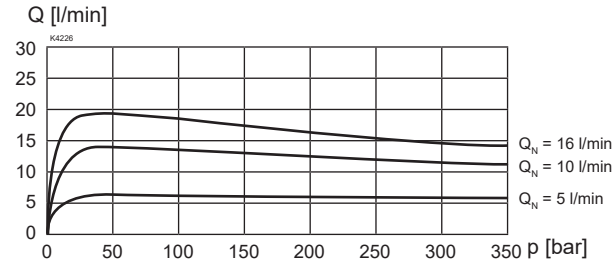
Q = f (p)

Volume flow pressure characteristics
$I = I_G$
Measured at 50 °C
ADB-V, AD1-V, DB2-V
Execution L15 / L17



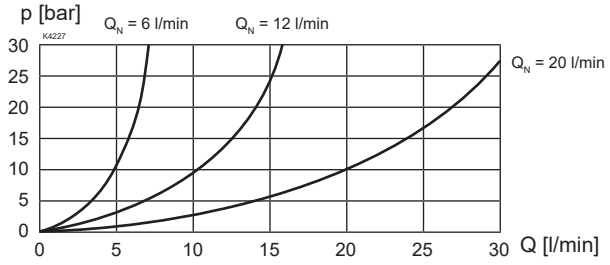
Q = f (p)

Volume flow pressure characteristics
$I = I_G$
Measured at 50 °C
ADB-V, AD1-V, DB2-V
Execution L9



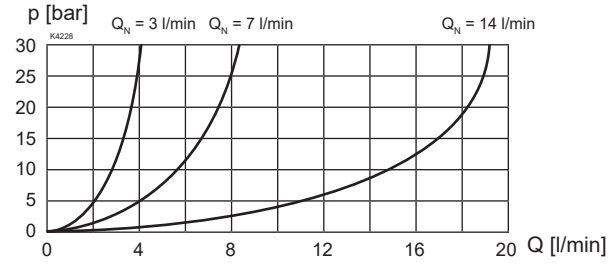
Δp = f (Q)

Pressure drop volume flow characteristics
$I = I_G$
Measured at 50 °C
ACB-S, AC1-S, CB2-S
Execution L15 / L17



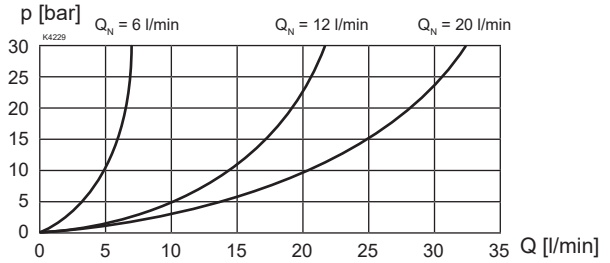
Δp = f (Q)

Pressure drop volume flow characteristics
$I = I_G$
Measured at 50 °C
ACB-S, AC1-S, CB2-S
Execution L9



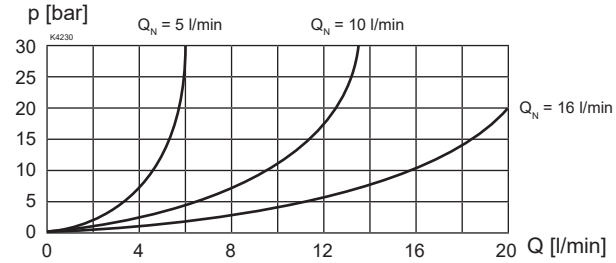
Δp = f (Q)

Pressure drop volume flow characteristics
$I = I_G$
Measured at 50 °C
ADB-V, AD1-V, DB2-V
Execution L15 / L17



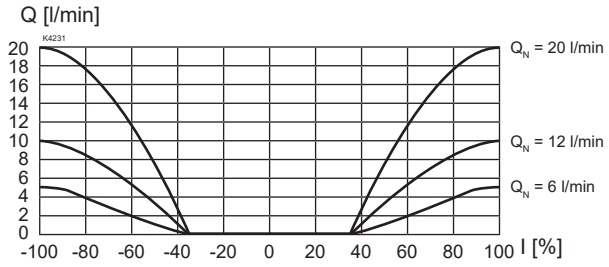
Δp = f (Q)

Pressure drop volume flow characteristics
$I = I_G$
Measured at 50 °C
ADB-V, AD1-V, DB2-V
Execution L9



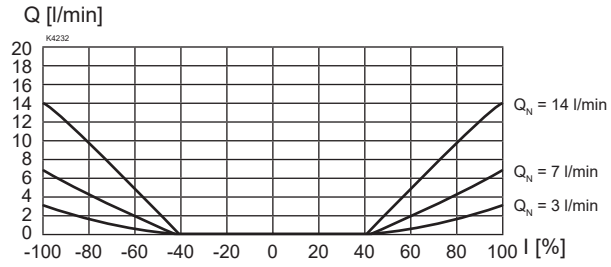
Q = f (I)

Volume flow adjustment characteristics
Δp = 10 bar
Measured at 50 °C
ACB-S, AC1-S, CB2-S
Execution L15 / L17



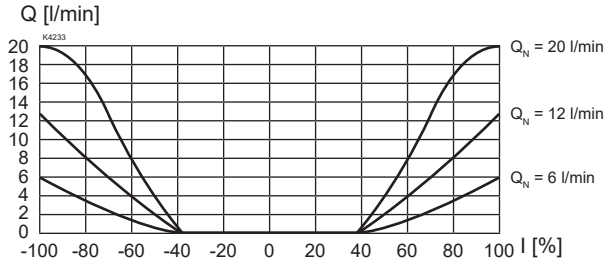
Q = f (I)

Volume flow adjustment characteristics
Δp = 10 bar
Measured at 50 °C
ACB-S, AC1-S, CB2-S
Execution L9



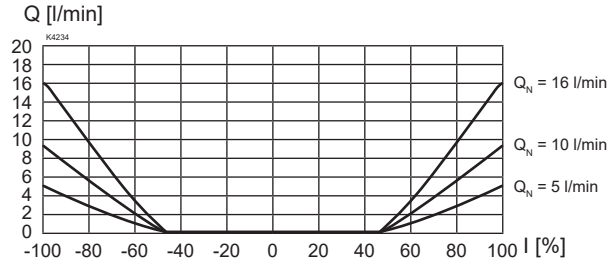
Q = f (I)

Volume flow adjustment characteristics
Δp = 10 bar
Measured at 50 °C
ADB-V, AD1-V, DB2-V
Execution L15 / L17



Q = f (I)

Volume flow adjustment characteristics
Δp = 10 bar
Measured at 50 °C
ADB-V, AD1-V, DB2-V
Execution L9

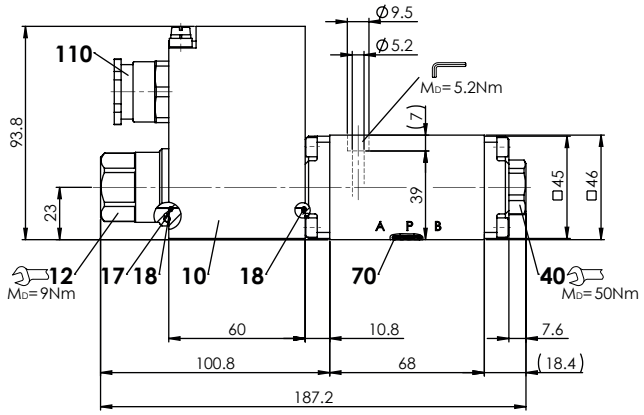


Note!

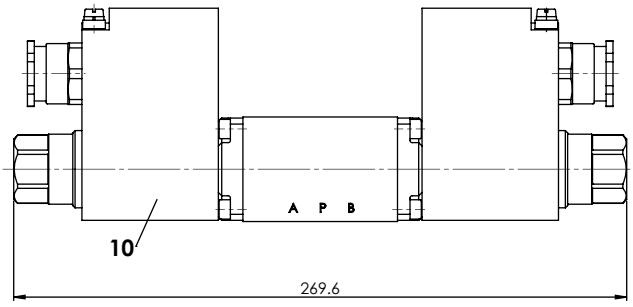
All values were measured over two control edges. The connections A and B were short-circuited.

DIMENSIONS

4/2-way spool valve

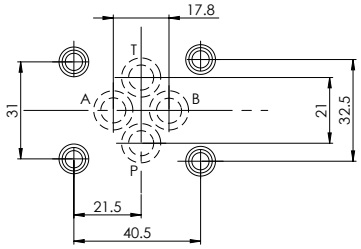


4/3-way spool valve



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

HYDRAULIC CONNECTION



PARTS LIST

Position	Article	Description
10	263.6...	Solenoid coil MK.45 / 18 x 60
12	154.2201	Knurled nut Ex M18 x 1,5 x 30
17	160.2251	O-ring ID 25,07 x 2,62 (NBR)
18	160.2170	O-ring ID 17,17 x 1,78 (NBR)
40	239.2214	Socket head screw M20 x 1
70	160.2093	O-ring ID 9,25 x 1,78 (NBR)
	160.8092	O-ring ID 9,25 x 1,78 (FKM)
110	111.1080	Cable gland M20 x 1,5

INSTALLATION NOTES

Mounting type	Flange mounting 4 fixing holes for socket head screws M5 x 45
Mounting position	Any, preferably horizontal
Tightening torque	Fixing screws M_D = 5,2 Nm (screw quality A4) M_D = 9 Nm knurled nut

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

Attention! For stack assembly please observe the remarks in the operating instructions

ACCESSORIES

Technical explanations	Data sheet 1.0-100
Filtration	Data sheet 1.0-50
Relative duty factor	Data sheet 1.1-430

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