


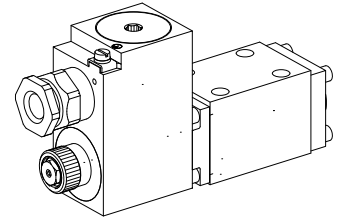


**Proportional directional valve**

- not pressure compensated
- $Q_{max} = 35 \text{ l/min}$
- $Q_{Nmax} = 25 \text{ l/min}$
- $p_{max} = 350 \text{ bar}$

**NG6**  
 ISO 4401-03

-  II 2 G Ex d IIC
-  II 2 D Ex tD A21 IP65
-  I M2 Ex d I Mb


**DESCRIPTION**
**For explosion-hazard zones**

Direct operated proportional spool valve in flange design NG6 acc. to ISO 4401-03/7790 with 4 ports. The spool valve is designed to the 5 chamber principle. The volume flow is adjusted by an explosion proof proportional solenoid of Wandfluh. Low pressure drop due to the body design and spool profiling. The spool is made of hardened steel. The valve body made of a high quality casting for hydraulic systems is spray-coated with a two-component varnish. Solenoid coil in acc. with directive 94/9/EC (ATEX) for explosion-hazard zones. The flameproof enclosures (acc. to EN/IEC 60079-1/31 and EN/IEC 61241-1) prevents an explosion in the interior from getting outside. The design prevents a surface temperature capable of igniting.

**CERTIFICATES**

in accordance with	Surface gas + dust	Mining
ATEX	x	x
IECEX	x	x
GOST Ex	x	
Australia	x	x
Inmetro	x	x

The certificates can be found on [www.wandfluh.com](http://www.wandfluh.com) / DOWNLOADS / Accompanying Ex-proof / MKY45/18-.-L..

**FUNCTION**

Proportionally to the solenoid current spool stroke, spool opening and valve volume flow will increase. By means of the special control edge geometries, together with the flow forces, it is achieved that the characteristic curves comprise a limited residual compensation. The optimum spool shape and progressive characteristics curve allow fine motion control. To control the valve Wandfluh proportional amplifiers are available (see register 1.13).

**APPLICATION**

These valves are suitable for applications in explosion-hazard zones, open cast and also in mines. Proportional directional spool valves are well suited for demanding applications where high resolution, high volume flow and low hysteresis are requested. The ability to remote control the valve electrically, in association with process control systems, enables economical problem solutions with reproducible process sequences.

**TYPE CODE**

WD B F A06 -  -  -  -  /  /  #

Proportional Spool valve, direct operated

Proportional explosion proof, execution Ex d IIC

Flange construction

International standard interface ISO, nominal size 6

Description of symbols acc. to table 1.10-77/2

Nominal volume flow $Q_N$ :	5 l/min	<input type="checkbox"/> 5
	10 l/min	<input type="checkbox"/> 10
	16 l/min	<input type="checkbox"/> 16
	25 l/min	<input type="checkbox"/> 25

Standard nominal voltage $U_N$ :	12 VDC	<input type="checkbox"/> G12
	24 VDC	<input type="checkbox"/> G24

Execution:	15W	<input type="checkbox"/> L15	Ambient temp. up to 70 °C
	9W	<input type="checkbox"/> L9	

Bescheinigung

ATEX, IECEX, GOST Ex

Australia  AU


Inmetro  IM

Design-Index (Subject to change)

**GENERAL SPECIFICATIONS**

Nominal size	NG6 acc. to ISO 4401-03/7790
Designation	4/2-, 4/3-way proportional directional valve
Construction	Direct operated spool valve
Mounting	Flange, 4 fixing holes for socket head cap screws M5x50
Fastening torque	$M_D = 5,5 \text{ Nm}$ (quality 8.8) for fixing screw $M_D = 5 \text{ Nm}$ for knurled nut
Line connection	Connection plates Multiple flange plates Stacking system
Mounting position	Any, preferably horizontal
Admissible ambient temp.	Execution L15: -20...+70 °C (operation as T1...T4 / T130 °C) Execution L9: -20...+40 °C (operation as T1...T6 / T80 °C) -20...+90 °C (operation as T1...T4 / T130 °C)
Weight:	4/2-way m = 2,8 kg 4/3-way m = 4,8 kg

**HYDRAULIC SPECIFICATIONS**

Fluid	Mineral oil, other fluid on request
Contamination efficiency	ISO 4406:1999, class 18/16/13 (Required filtration grade $\beta_{6...10} \geq 75$ ) refer to data sheet 1.0-50/2
Viscosity range	12 mm <sup>2</sup> /s...320 mm <sup>2</sup> /s
Admissible fluid temp.	Execution L15: -20...+70 °C (operation as T1...T4/T130 °C) Execution L9: -20...+40 °C (operation as T1...T6/T80 °C) -20...+70 °C (operation as T1...T4/T130 °C)
Working pressure	$p_{max} = 350 \text{ bar}$ (connections P, A, B)
Tank pressure	$p_{max} = 160 \text{ bar}$ (connection T)
Nominal volume flow	$Q_N = 5 \text{ l/min}, 10 \text{ l/min}, 16 \text{ l/min}, 25 \text{ l/min}$ With the version L9 for Ambient temp. up to 90 °C (L6/90 °C), $Q_N$ is not reached see characteristics
Max. volume flow	 on request
Leakage volume flow	on request
Hysteresis	L15/70 °C: $\leq 10\% *$ L9/40 °C: $\leq 12\% *$ L9/90 °C: $\leq 14\% *$ * at optimal dither signal

**ELECTRICAL SPECIFICATIONS**

Construction	Proportional solenoid, wet pin push type, pressure tight	
Standard-nominal voltage	$U_N = 12\text{VDC}, 24\text{VDC}$	
Limiting current	12VDC	24VDC
	L15/70 °C: $I_G = 890\text{ mA}$	445 mA
	L9/40 °C: $I_G = 610\text{ mA}$	305 mA
Voltage tolerance	L9/90 °C: $I_G = 530\text{ mA}$	265 mA
	+ 10 % of with respect to nominal voltage	
Relative duty factor	100% DF	
Protection class	IP67 acc. to EN60529	
Connection/Power supply	Through cable gland for cable $\varnothing 6,5...14\text{mm}$ (nach EN 60079-0)	
Temperature class	(nach EN 60079-0)	
Execution L9:	T1...T6	
Execution L15:	T1...T4	
Performance limit	$U_N \cdot I_G$	
For further electrical characteristics, refer to the data sheet of the solenoid coil: 1.1-183		

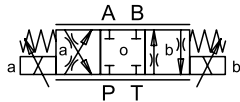
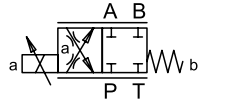
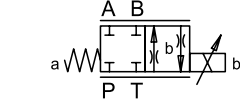
**SECURITY OPERATED**

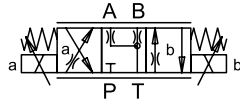

The solenoid coil must only be put into operation, if the requirements of the operating instructions supplied are observed to their full extent.  
 In case of non-observance, no liability can be assumed.

**INSTALLATION**

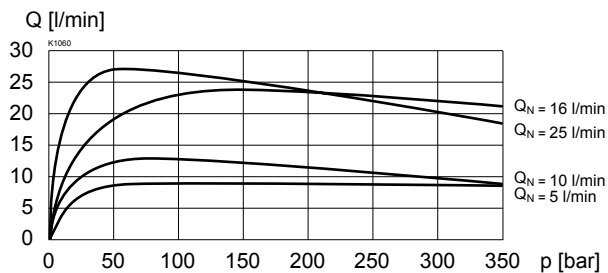
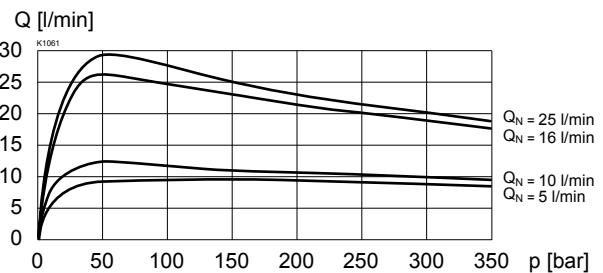
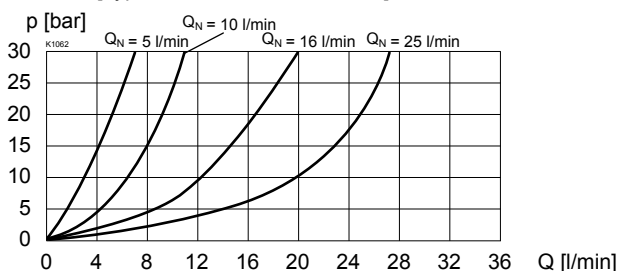
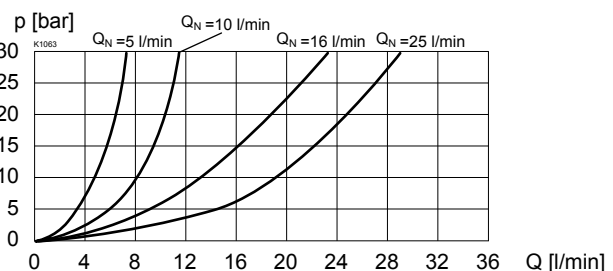
For stack assembly please observe the remarks in the operating instructions.

**TYPE CHARTS / DESIGNATIONS OF SYMBOLS**

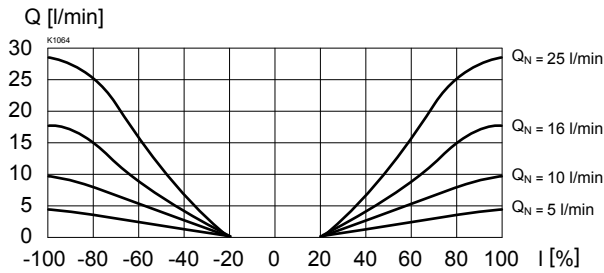
	<b>ACB - S</b> S = Symmetrical control mode
	<b>AC1 - S</b> S = Symmetrical control mode
	<b>CB2 - S</b> S = Symmetrical control mode

	<b>ADB - V</b> V = Meter-in control mode
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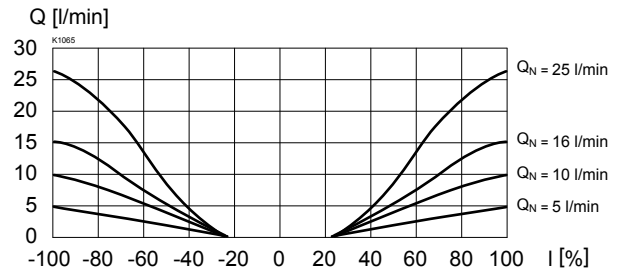
**CHARACTERISTICS** oil viscosity  $\nu = 30\text{ mm}^2/\text{s}$ 
**Execution L15** (measured at 50 °C)

**Q = f (p)** Volume flow pressure characteristics ( $l = l_G$ )  
 [Types: ACB-S, AC1-S, CB2-S]

**Q = f (p)** Volume flow pressure characteristics ( $l = l_G$ )  
 [Type: ADB-V]

 **$\Delta p = f (Q)$**  Pressure loss/flow characteristics ( $l = l_G$ )  
 [Types: ACB-S, AC1-S, CB2-S]

 **$\Delta p = f (Q)$**  Pressure loss/flow characteristics ( $l = l_G$ )  
 [Type: ADB-V]


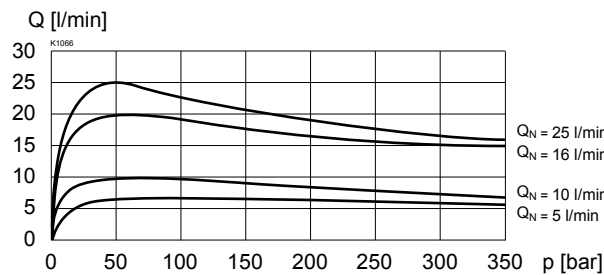
$Q = f(I)$  Volume flow adjustment characteristics ( $\Delta p = 20 \text{ bar}$ )  
 [Types: ACB-S, AC1-S, CB2-S]



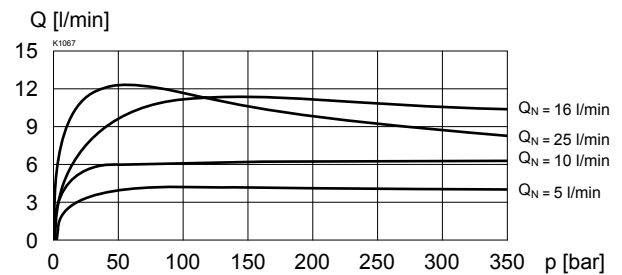
$Q = f(I)$  Volume flow adjustment characteristics ( $\Delta p = 20 \text{ bar}$ )  
 [Type: ADB-V]



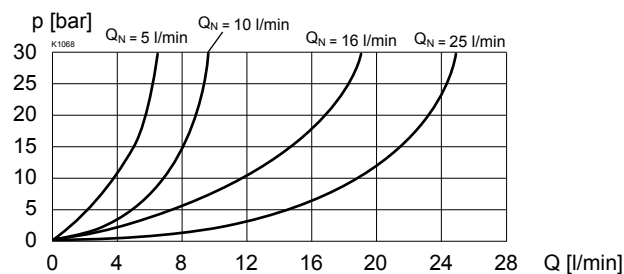
**Execution L9/40°C** (measured at 40°C)  
 $Q = f(p)$  Volume flow pressure characteristics ( $I = I_G$ )  
 [Types: ACB-S, AC1-S, CB2-S]



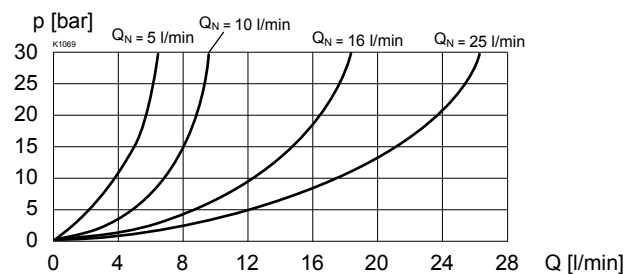
$Q = f(p)$  Volume flow pressure characteristics  
 [Type: ADB-V]



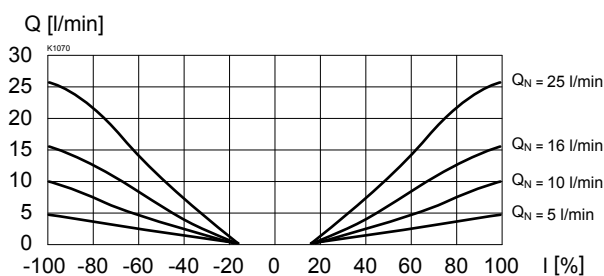
$\Delta p = f(Q)$  Pressure loss/flow characteristics ( $I = I_G$ )  
 [Types: ACB-S, AC1-S, CB2-S]



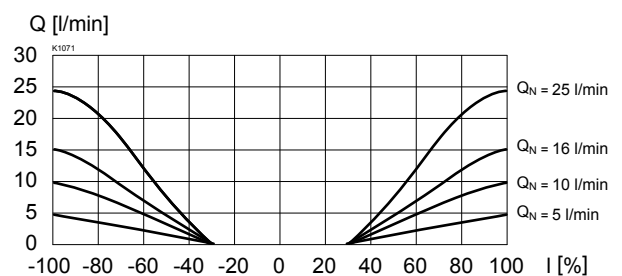
$\Delta p = f(Q)$  Pressure loss/flow characteristics ( $I = I_G$ )  
 [Type: ADB-V]



$Q = f(I)$  Volume flow adjustment characteristics ( $\Delta p = 20 \text{ bar}$ )  
 [Types: ACB-S, AC1-S, CB2-S]



$Q = f(I)$  Volume flow adjustment characteristics ( $\Delta p = 20 \text{ bar}$ )  
 [Type: ADB-V]

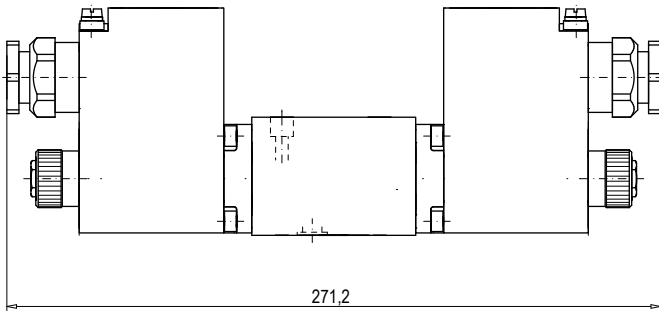


**NOTE!**

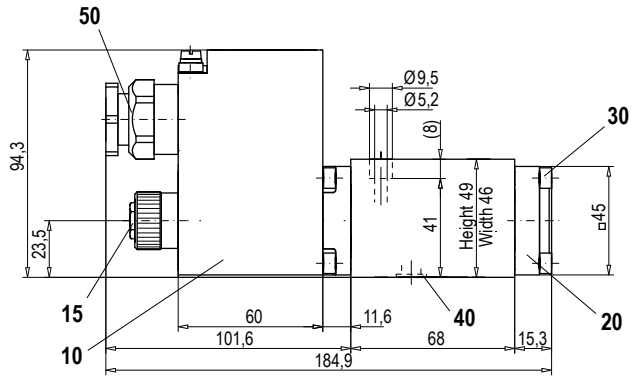
All values were measured over 2 control edges.  
 The connections A and B were short-circuited.

**DIMENSIONS**

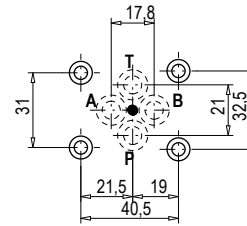
4/3-way valve



4/2-way valve



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


**PARTS LIST**

Position	Article	Description
10	263.6...	Spool MKY45/18x60-...
15	253.8000	Plug with integrated manual override HB4,5
20	058.4211	Cover
30	246.2117	Socket head cap screw M5x16 DIN 912
40	160.2093	O-ring ID 9,25x1,78
50	111.1080	Cable gland brass M20

**ACCESSORIES**

Sub-plates

Register 2.9

Technical explanation see data sheet 1.0-100