

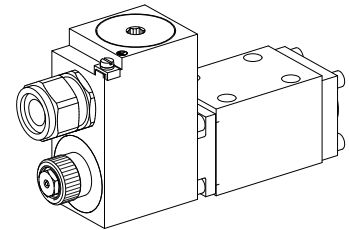
**Proportional directional valve**

• not pressure compensated

- $Q_{max}$  = 40 l/min
- $Q_{Nmax}$  = 25 l/min
- $p_{max}$  = 350 bar

**NG6**

ISO 4401-03


**II 2 G Ex d II C**  
**II 2 D Ex tD A21 IP65**

**DESCRIPTION**

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.

The solenoid spool is zinc- / nickel-coated.

Solenoid coil in accordance with directive 94/9/EC (ATEX) for explosion-hazard zones.

**Ex:** In accordance with European standards EN 60079-0, EN 60079-1 (gas) EN 61241-0, EN 61241-1 (dust)

**d:** Flameproof enclosures

**tD:** Protection by enclosure

**Device group II:** For all explosion-hazard zones, except mining

**Gas group IIC:** Gas groups IIA + IIB included

**Device category 2G:** For zones 1 and 2 (gas)

**Device category 2D:** For zones 21 and 22 (dust)

**Zones:** 1/21 and 2/22

**EC-type examination certificate:**

**PTB 07 ATEX 1023**

**FUNCTION**

Proportionally to the solenoid current spool stroke, spool opening and valve volume flow will increase. Proportional directional valves NG6 are not load-compensated. 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**

Proportional directional spool valves are well suited for demanding applications where high resolution, high volume flow and low hysteresis are requested. The facility for remote control and signal processing from process control systems enable elegant, comfortable solutions to problems. These valves are suitable for hazardous areas in off-shore and ship-building applications as well as in chemical, oil and gas industry.

**TYPE CODE**

	WD	B	F	A06	-	-	-	-	-	#	
Spool valve, direct operated											
Proportional explosion proof, execution Ex d II C											
Flange construction											
International standard interface ISO, nominal size 6											
Description of symbols acc. to table 1.10-77/2											
Nominal volume flow $Q_N$ :	Execution: L12		L6								
[l/min]	24	16	10	5	14	10	5	3			
Standard nominal voltage $U_N$ :	12 VDC		24 VDC		G12		G24				
Execution:	12W		6W		L12		L6		Ambient temp. by: 70 °C		
Design-Index (Subject to change)									40 °C or 90 °C		

**CONTENT**

GENERAL SPECIFICATIONS.....	1
HYDRAULIC SPECIFICATIONS.....	1
ELECTRICAL SPECIFICATIONS.....	2
TYPE CHARTS/ DESIGNATIONS OF SYMBOLS.....	2
CHARACTERISTICS.....	2-4
DIMENSIONS.....	5
PARTS LIST.....	5
ACCESSORIES.....	5

**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	$M_D = 5,5$ Nm (screw qual. 8.8)
Line connection	Connection plates Multiple flange plates Longitudinal stacked system
Mounting position	Any, preferably horizontal
Admissible ambient temp.	Execution L12: -20...+70 °C (operation as T1...T4/T130 °C) Execution L6: -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 L12: -20...+70 °C (operation as T1...T4/T130 °C) Execution L6: -20...+40 °C (operation as T1...T6/T80 °C) -20...+70 °C (operation as T1...T4/T130 °C)
Working pressure	$p_{max} = 350$ bar (connections P, A, B)
Tank pressure	$p_{max} = 160$ bar (connection T)
Nominal volume flow at 20 bar valve pressure drop	Execution L12: $Q_N = 5$ l/min, 10 l/min, 16 l/min, 24 l/min Execution L6: $Q_N = 3$ l/min, 5 l/min, 11 l/min, 14 l/min With the version L6 for Ambient temp. up to 90 °C (L6/90 °C), $Q_N$ is not reached.
Max. volume flow	see characteristics
Leakage volume flow	on request
Hysteresis	L12/70 °C: $\leq 10\%$ * L6/40 °C: $\leq 12\%$ * L6/90 °C: $\leq 14\%$ * * at optimal dither signal



**ELECTRICAL SPECIFICATIONS**

Construction	Proportional solenoid, wet pin push type, pressure tight	
Standard-nominal voltage	$U_N = 12\text{VDC}, 24\text{VDC}$	
	12VDC	24VDC
Limiting current	L12/70 °C: $I_G =$	710 mA 355 mA
	L6/40 °C: $I_G =$	410 mA 202 mA
	L6/90 °C: $I_G =$	355 mA 175 mA
Voltage tolerance	+ 10 % of rated voltage	
Relative duty factor	100% DF	
Protection class	IP65/IP67 acc. to EN 60529	
Connection/Power supply	Through cable gland for cable $\varnothing 11...14\text{mm}$	
Temperature class (acc. to EN 60079-0)	Execution L12: T1...T4	
	Execution L6: T1...T6	
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.

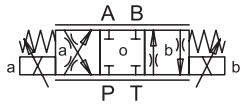
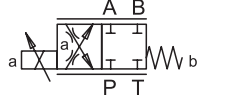
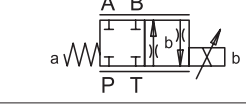
**INSTALLATION**

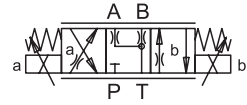
Tightening torque of the coil fixing nut  $M_b = 15\text{ Nm}$ . Installation in battery arrangement: Please observe the remarks in the operating instructions.

**DESIGNATION**

Execution L6:	II 2 G Ex d IIC T6	$T_a = -25..40\text{ °C}$
	II 2 D Ex tD A21 IP65 T80 °C	
	II 2 G Ex d IIC T4	$T_a = -25..90\text{ °C}$
	II 2 D Ex tD A21 IP65 T130 °C	
Execution L12:	II 2 G Ex d IIC T4	$T_a = -25..70\text{ °C}$
	II 2 D Ex tD A21 IP65 T130 °C	

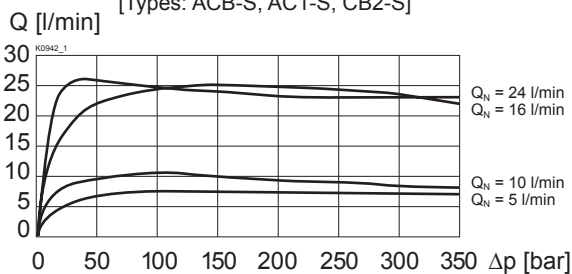
**TYPE CHARTS / DESIGNATIONS OF SYMBOLS**

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

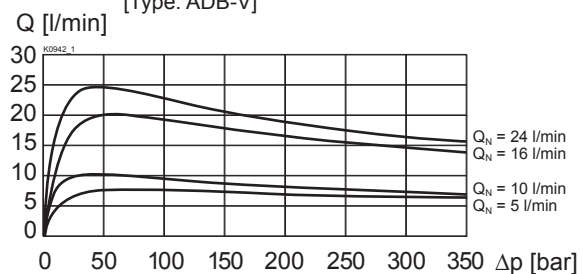
	<b>ADB - V</b> V = Meter-in control mode
--	---

**CHARACTERISTICS** oil viscosity  $\nu = 30\text{ mm}^2/\text{s}$ 

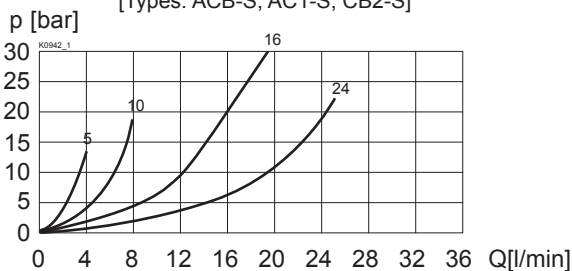
**Execution L12/70 °C** (measured at 70 °C)  
 $Q = f(p)$  Volume flow pressure characteristics ( $l = l_0$ )  
 [Types: ACB-S, AC1-S, CB2-S]



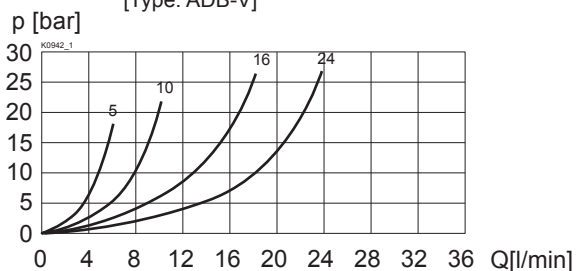
$Q = f(p)$  Volume flow pressure characteristics ( $l = l_0$ )  
 [Type: ADB-V]



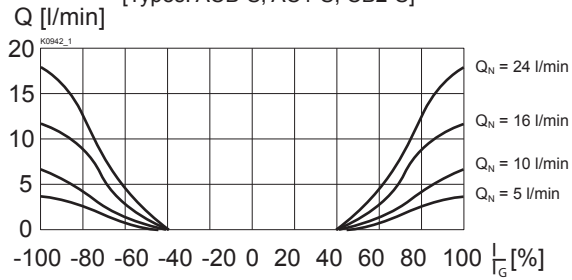
$\Delta p = f(Q)$  Pressure loss/flow characteristics ( $l = l_0$ )  
 [Types: ACB-S, AC1-S, CB2-S]



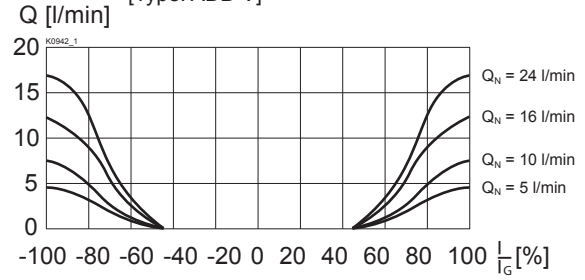
$\Delta p = f(Q)$  Pressure loss/flow characteristics ( $l = l_0$ )  
 [Type: ADB-V]



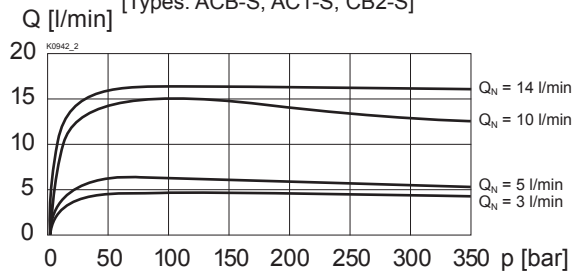
Q = f (l) Volume flow adjustment characteristics ( $\Delta p = 10$  bar)  
[Types: ACB-S, AC1-S, CB2-S]



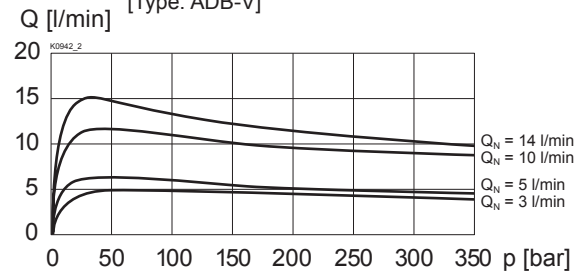
Q = f (l) Volume flow adjustment characteristics ( $\Delta p = 10$  bar)  
[Type: ADB-V]



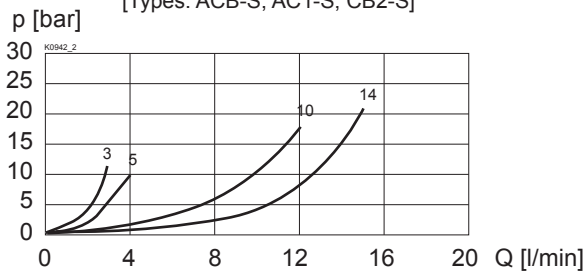
**Execution L6/40°C** (measured at 40°C)  
Q = f (p) Volume flow pressure characteristics ( $l = l_G$ )  
[Types: ACB-S, AC1-S, CB2-S]



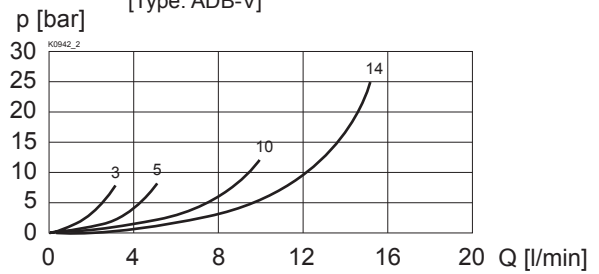
Q = f (p) Volume flow pressure characteristics  
[Type: ADB-V]



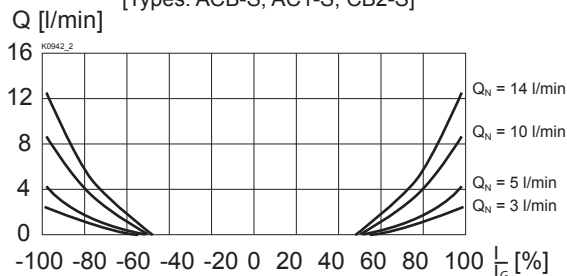
$\Delta p = f(Q)$  Pressure loss/flow characteristics ( $l = l_G$ )  
[Types: ACB-S, AC1-S, CB2-S]



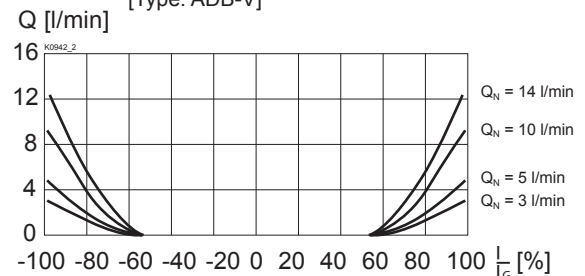
$\Delta p = f(Q)$  Pressure loss/flow characteristics ( $l = l_G$ )  
[Type: ADB-V]



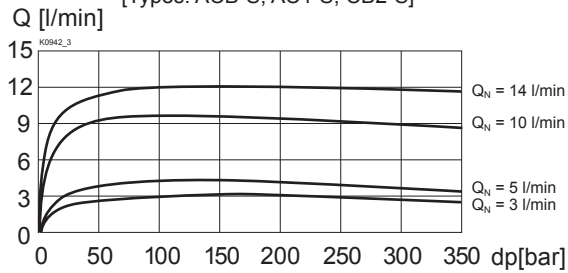
Q = f (l) Volume flow adjustment characteristics ( $\Delta p = 10$  bar)  
[Types: ACB-S, AC1-S, CB2-S]



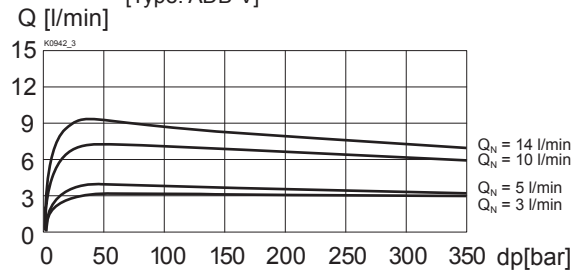
Q = f (l) Volume flow adjustment characteristics ( $\Delta p = 10$  bar)  
[Type: ADB-V]



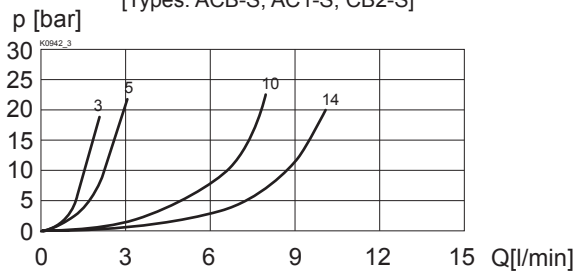
**Execution L6/90°C** (measured at 90 °C)  
 $Q = f(p)$  Volume flow pressure characteristics ( $l = l_G$ )  
 [Types: ACB-S, AC1-S, CB2-S]



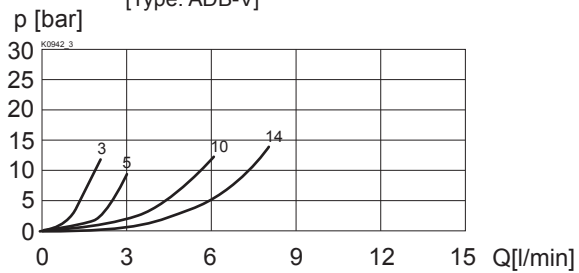
$Q = f(p)$  Volume flow pressure characteristics ( $l = l_G$ )  
 [Type: ADB-V]



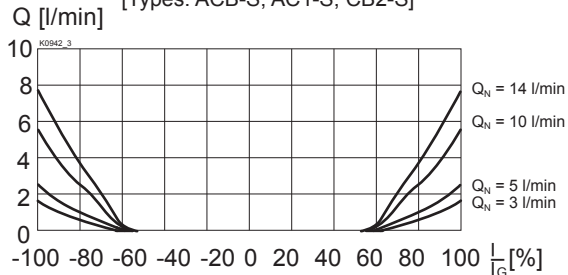
$\Delta p = f(Q)$  Pressure loss/flow characteristics ( $l = l_G$ )  
 [Types: ACB-S, AC1-S, CB2-S]



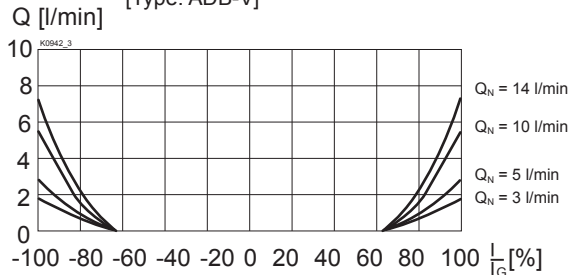
$\Delta p = f(Q)$  Pressure loss/flow characteristics ( $l = l_G$ )  
 [Type: ADB-V]



$Q = f(l)$  Volume flow adjustment characteristics ( $\Delta p = 10 \text{ bar}$ )  
 [Types: ACB-S, AC1-S, CB2-S]



$Q = f(l)$  Volume flow adjustment characteristics ( $\Delta p = 10 \text{ bar}$ )  
 [Type: ADB-V]

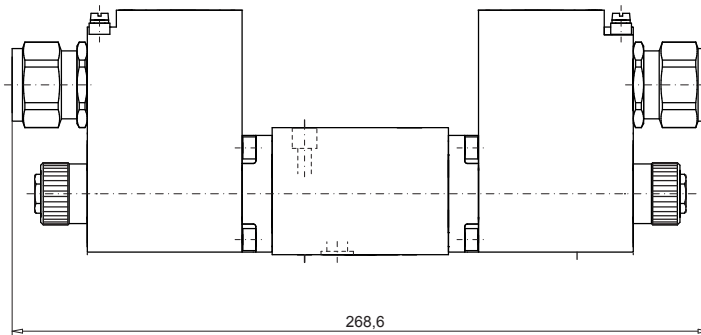


**NOTE!**

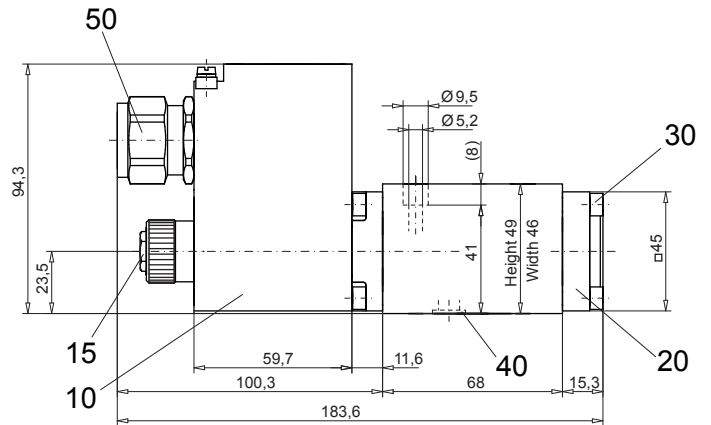
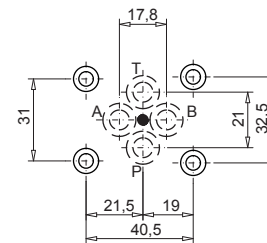
All values measured over 2 metering edges,  
 A and B ports linked.

**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 1.9  
 Proportional-amplifier Register 1.13

Technical explanation see data sheet 1.0-100