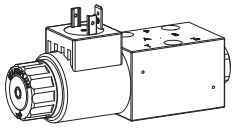
Solenoid operated spool valve

Flange construction

- 4/2-way impulse execution, dentented
- 4/3-way with spring centered mid position
- 4/2-way with spring reset
- Q_{max} = 30 l/min
- p_{max} = 350 bar

NG4-Mini



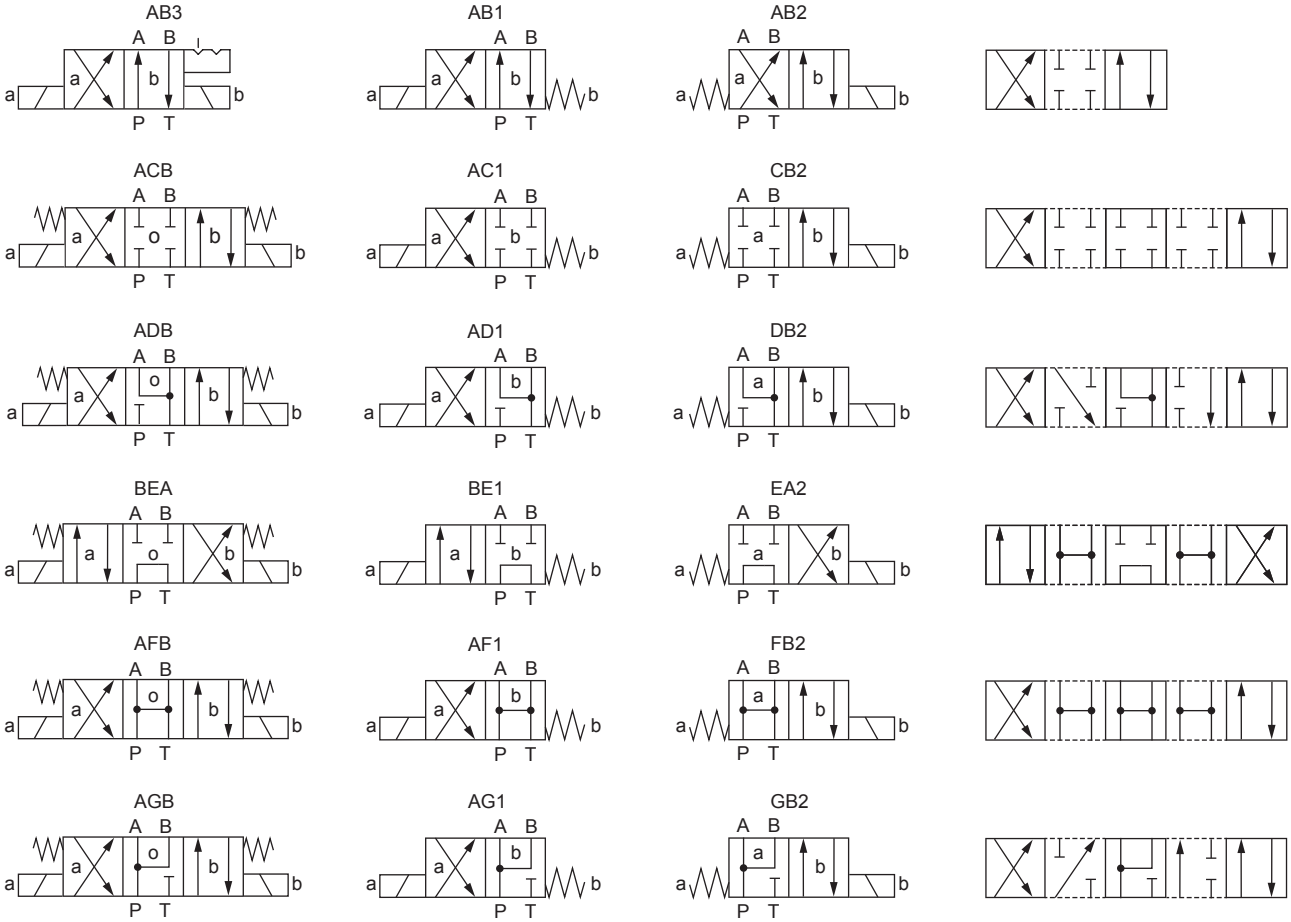
DESCRIPTION

Direct operated solenoid spool valve with 4 connections in 5 chamber design. Spool detented or with spring. With the solenoids deenergised, the spool is held in the center position by the spring (4/3), or switched back to the offset position (4/2). With the impulse spool (4/2), the spool is held in the switching position by the detent. Precise spool fit, low leakage, long service life time. Spool made from hardened steel, body from high quality hydraulic cast steel. Wide range of standard and special voltages.

APPLICATION

Spool valves are mainly used for controlling direction of movement and stopping of hydraulic cylinders and motors. Direction of movement depends on the position of spool and its flow symbol. Switching performance limits and leakage of the valves must be taken into account when designing the system. Solenoid operated spool valves are suitable for machine tools and handling systems of any kind. Miniature values are used where both, reduced dimensions and weight are important.

SYMBOL



TYPE CODE

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

Spool valve, direct operated					
Slip-on coil, Economy		E			
Slip-on coil, Medium		M			
Flange construction					
Mounting interface acc. to Wandfluh standard, NG4-Mini					
Designation of symbols acc. to table					
Spool specification	Standard				
	Low Leakage	1/x	(only Economy)		
Nominal voltage U_N	12 VDC	G12	115 VAC	R115	
	24 VDC	G24	230 VAC	R230	
	without coil	X5			
Slip-on coil	Metal housing, round with one-sided collar			V	
	Metal housing, square with one-sided collar			N	(only Medium)
Connection execution	Connector socket EN 175301-803 / ISO 4400			D	
	Connector socket AMP Junior-Timer			J	(only for $U_N \leq 75$ VDC)
	Connector Deutsch DT04 - 2P			G	(only for $U_N \leq 75$ VDC)
Sealing material	NBR				
	FKM (Viton)			D1	
Manual override	Integrated				
	Push-button			HF1	
	Spindle			HS1	
Design index (subject to change)					

1.2.-33

GENERAL SPECIFICATIONS

Designation	4/2-, 4/3-spool valve
Construction	Direct operated
Mounting	Flange construction
Nominal size	NG4-Mini according to Wandfluh standard
Actuation	Switching solenoid
Ambient temperature	-25…+70 °C (NBR) -20…+70 °C (FKM) if > +50 °C, then no undervoltage is admissible
Weight	0,83 kg (1 solenoid Economy) 0,90 kg (1 solenoid Medium) 1,12 kg (2 solenoids Economy) 1,24 kg (2 solenoids Medium)
MTTFd	150 years

ACTUATION

Actuation	Switching solenoid, wet pin push type, pressure tight
Execution	Economy: V.E37 / 19 x 40 (Data sheet 1.1-168) Medium: 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

ELECTRICAL SPECIFICATIONS

Protection class	Connection execution D: IP65 Connection execution J: IP66 Connection execution G: IP67 and IP69K
Relative duty factor	100 % DF
Switching frequency	15'000 / h
Service life time	10^7 (number of switching cycles, theoretically)
Voltage tolerance	± 10 % with regard to nominal voltage
Standard nominal power	12 VDC, 24VDC, 115 VAC, 230 VAC AC = 50 to 60 Hz, rectifier integrated in the connector socket

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

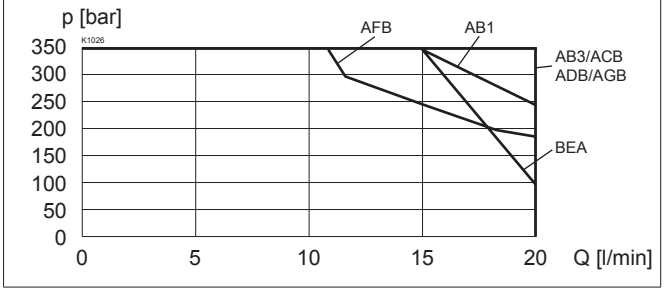
HYDRAULIC SPECIFICATIONS

Working pressure	p_{max} = 350 bar (P_T < 20 bar) p_{max} = 315 bar (P_T > 20 bar)
Tank pressure	p_{Tmax} = 100 bar
Maximum volume flow	Q_{max} = 30 l/min, see characteristics
Leakage volume flow	See characteristics
Fluid	Mineral oil, other fluid on request
Viscosity range	12 mm²/s…320 mm²/s
Temperature range fluid	-20…+70 °C
Contamination efficiency	Class 20 / 18 / 14
Filtration	Required filtration grade ß 10…16 ≥ 75, see data sheet 1.0-50

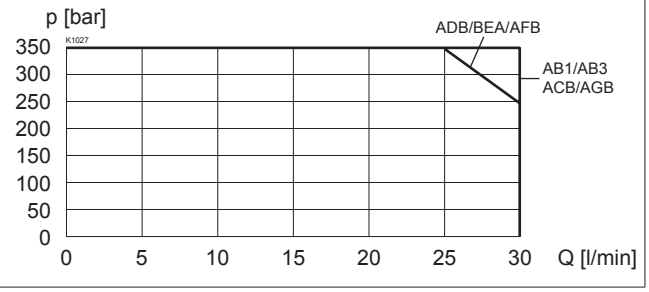
PERFORMANCE SPECIFICATIONS

Oil viscosity υ = 30 mm²/s

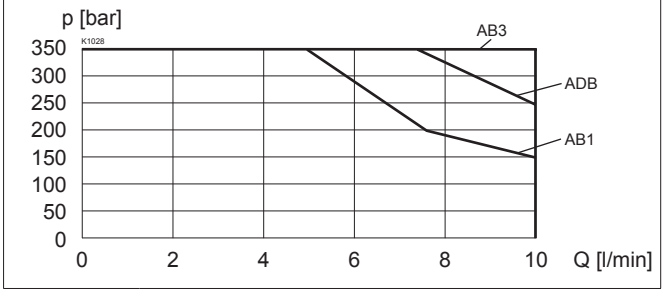
p = f (Q) **Performance limits**
Measured with nominal voltage -10 %
Economy



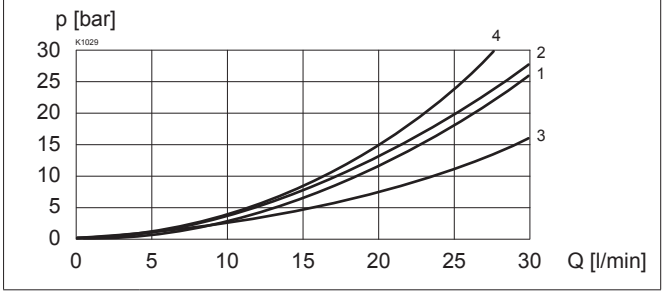
p = f (Q) **Performance limits**
Measured with nominal voltage -10 %
Medium



p = f (Q) **Performance limits**
Measured with nominal voltage -10 %
Low Leakage



Δp = f (Q) **Pressure drop volume flow characteristics**
Economy / Medium

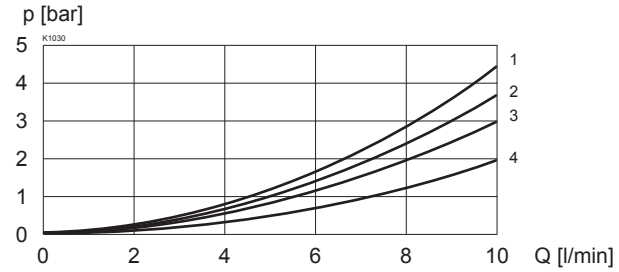


	Volume flow direction				
Symbol	P - A	P - B	P - T	A - T	B - T
AB1	2	2	-	1	1
AB3	2	2	-	1	1
ACB	2	2	-	1	1
ADB	2	2	-	1	1
BEA	1	1	4	1	1
AFB	1	1	3	1	1
AGB	1	1	-	1	1

PERFORMANCE SPECIFICATIONS

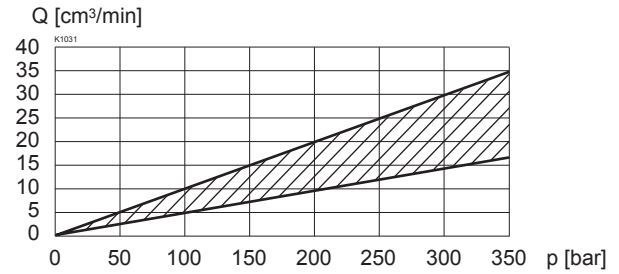
Oil viscosity υ = 30 mm²/s

Δp = f (Q) **Pressure drop volume flow characteristics**
Low Leakage

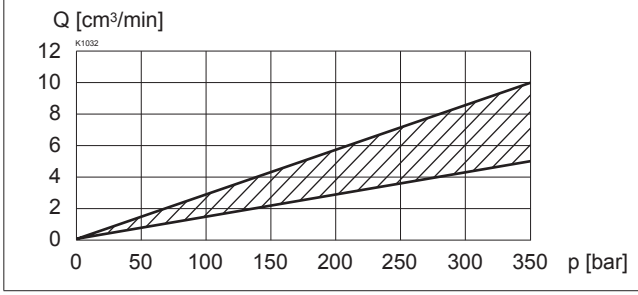


	Volume flow direction				
Symbol	P - A	P - B	P - T	A - T	B - T
AB1	1	1	-	1	2
AB3	1	1	-	1	2
ADB	1	1	-	4	3

Q_L = f (Q) **Leakage volume flow characteristics**
per control edge
Economy/Medium



Q_L = f (Q) **Leakage volume flow characteristics**
per control edge
Low Leakage



STANDARDS

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

SEALING MATERIAL

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

SURFACE TREATMENT

- The valve body is painted with a two component paint
- The armature tube, the slip-on coil and the plug screw are zinc-nickel coated

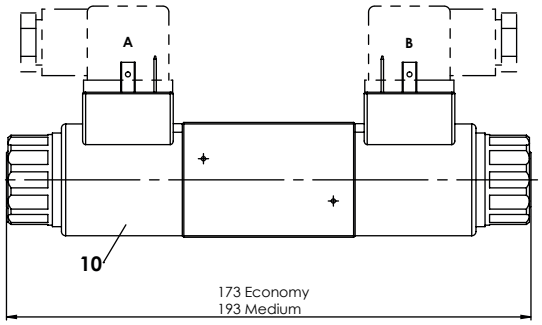
INSTALLATION NOTES

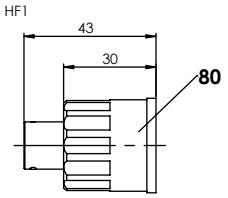
Mounting type	Flange mounting 3 fixing holes for socket head screws M5 x 40
Mounting position	Any, preferably horizontal
Tightening torque	M_D = 5,2 Nm (screw quality 8.8, zinc coated) Fixing screws M_D = 5 Nm knurled nut

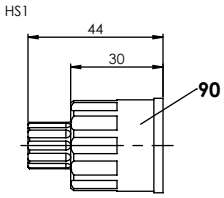
Note! The length of the fixing screw depends on the base material of the connection element.

DIMENSIONS

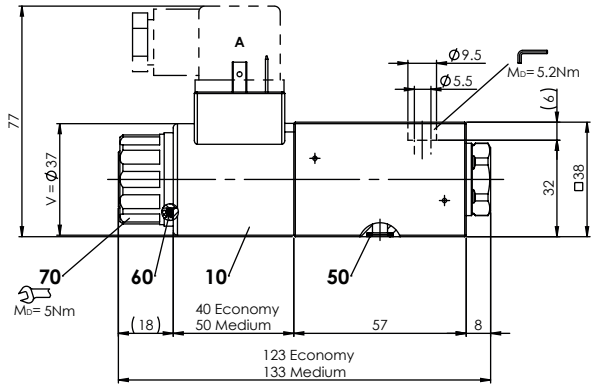
4/3-way valve (spring centred)
4/2-way valve (impulse)

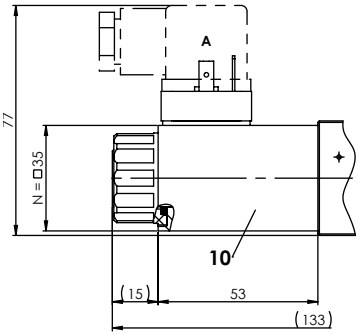




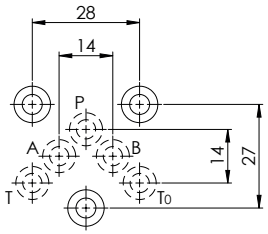


4/2-way valve (spring reset)





HYDRAULIC CONNECTION



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:
40 bar Integrated (–)
40 bar Push-button (HF1)
100 bar Spindle (HS1)

PARTS LIST

Position	Article	Description
10	206.2...	V.E37 / 19 x 40
		V.E37 / 19 x 50
	260.5...	N.S35 / 19 x 50
50	160.2052	O-ring ID 5,28 x 1,78 (NBR)
	160.6052	O-ring ID 5,28 x 1,78 (FKM)
60	160.2187	O-ring ID 18,72 x 2,62 (NBR)
	160.6187	O-ring ID 18,72 x 2,62 (FKM)
70	154.2700	Knurled nut
80	253.7001	Push-button
90	253.7000	Spindle

ACCESSORIES

Mating connector grey (A)	Article no. 219.2001
Mating connector black (B)	Article no. 219.2002
Mounting screws	Data sheet 1.0-60
Threaded subplates	Data sheet 2.9-10
Multi-station subplates	Data sheet 2.9-50
Horizontal mounting blocks	Data sheet 2.9-90
Technical explanations	Data sheet 1.0-100
Hydraulic fluids	Data sheet 1.1-50
Filtration	Data sheet 1.1-50
Relative duty factor	Data sheet 1.1-430

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