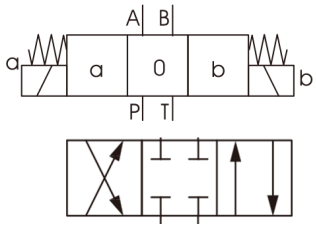
Solenoid Operated ED-10 Series

Nominal Size NG10 · Up to 320 bar
Recommended Flow up to 150 L/min





Hydraulic Symbol (Spool E)

Description & Operation

ROBUST ED-10 valves are 3-way or 4-way direct-operated, solenoid-actuated directional spool valves. They control the start, stop and direction of flow of the hydraulic fluid. Wet-pin DC solenoids move the control spool against return springs; a concealed manual override allows the valve to be switched without energising the coil.

Contents

Description & Operation, Features	1
Technical Data	2
Symbols	3
Dimensions	4 – 6
Function and Sectional View	7
Characteristic Curves and Performance Limits	8
Ordering Code	9

Technical Data

Item	Value
Nominal size	NG10 (CETOP 5)
Max. operating pressure, ports P, A, B	320 bar
Max. operating pressure, port T	210 bar
Max. flow (recommended / permitted)	150 / 160 L/min
Weight, one / two solenoids	3.9 / 5.5 kg
Solenoid voltages	12, 24 V DC · 110, 220 V AC/DC
Protection class (EN 60529)	IP65 (D, S) · IP69K (T)

Features

- 4/3, 4/2 or 3/2 directional spool valve design
- Porting pattern to ISO 4401-05-04-0-05
- Wet-pin DC solenoids, rotatable coil
- Coil can be changed without opening the pressure-tight chamber
- Individual electrical connection
- Concealed manual override as standard

Technical Data

For applications outside these values, please consult us.

General		Value
Weight	Valve with one solenoid	3.9 kg
	Valve with two solenoids	5.5 kg
Installation position		Any
Mounting screws	Socket head cap screw M6×40, grade 12.9	4 off, torque 12.5 Nm ±10 %
Ambient temperature		-20 … +50 °C
Protection (EN 60529)		IP65 (connection D / S), IP69K (connection T)

Hydraulic		Value
Max. operating pressure	Ports A, B, P	320 bar
	Port T	210 bar*
Hydraulic fluid		Mineral oil HL, HLP, HLPD, HVLP, HVLPD to DIN 51524, NBR seals
Fluid temperature (at valve)		-30 … +80 °C
Viscosity range		2.8 … 500 mm²/s
Max. contamination (ISO 4406 c)		Class 20/18/15
Max. flow	Permitted / recommended	160 / 150 L/min

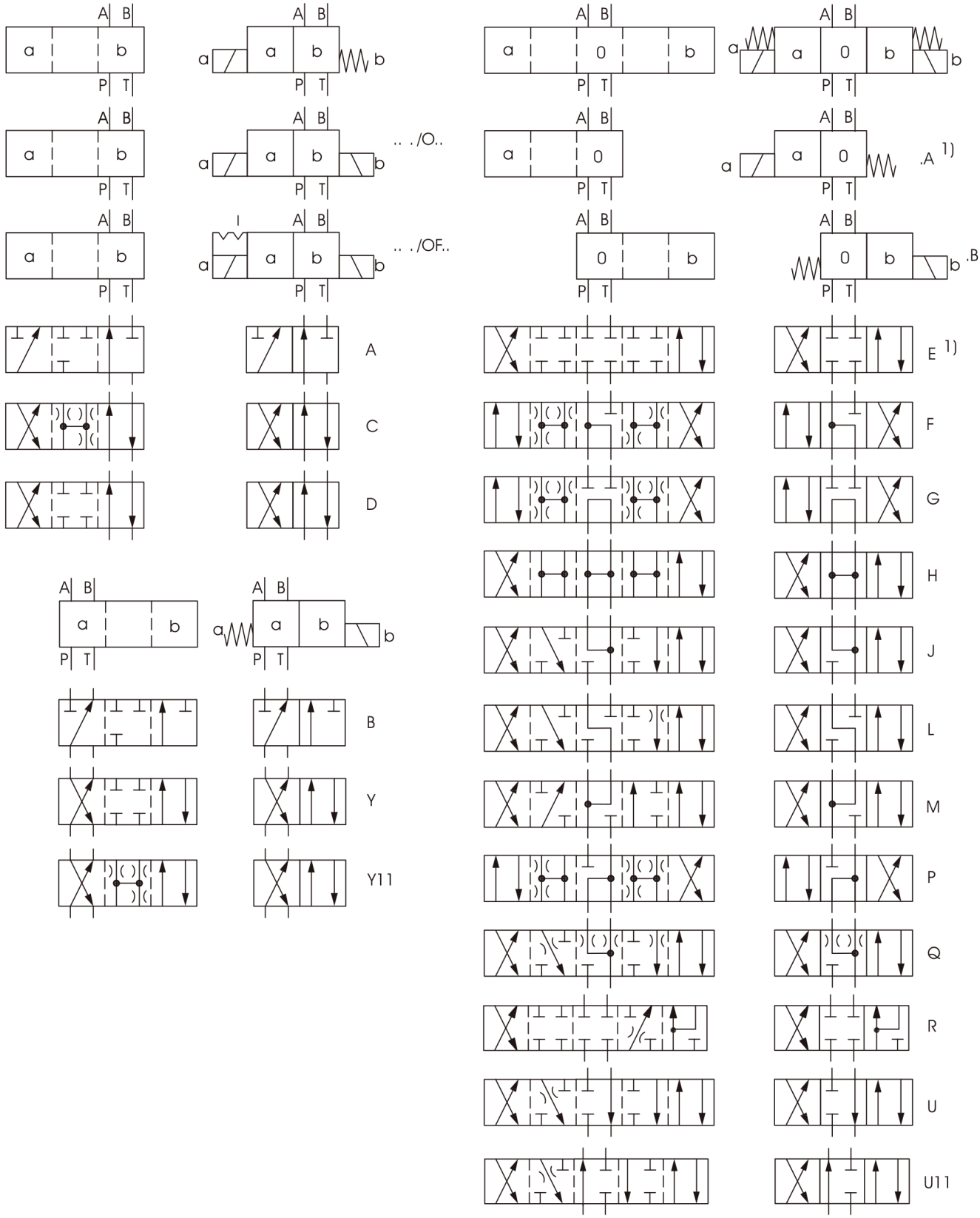
* With symbols A and B, port T must be used as a leakage port if the operating pressure exceeds the permitted tank pressure. The flash point of the fluid must be 50 K above the maximum solenoid surface temperature.

Electrical	12 V DC	24 V DC	110 V AC/DC	220 V AC/DC
Voltage tolerance	±10 %	±10 %	±10 %	±10 %
Power consumption	36 W	36 W	–	–
Duty cycle	S1 (continuous)	S1 (continuous)	S1 (continuous)	S1 (continuous)
Switching time ON	90 … 105 ms	90 … 105 ms	90 … 105 ms	90 … 105 ms
Switching time OFF	25 … 35 ms	25 … 35 ms	200 … 220 ms	200 … 220 ms
Max. switching frequency	15000 /h	15000 /h	15000 /h	15000 /h
Max. coil temperature	180 °C	180 °C	180 °C	180 °C
Insulation class (VDE 0580)	H	H	H	H

Notes: the manual override may only be operated with a round tool (Ø 3 mm) and only up to 50 bar tank pressure; the solenoid must not be energised while the manual override is locked; do not energise both solenoids at the same time; connect the protective earth (PE) correctly. Flows above 150 L/min increase the pressure drop — see the characteristic curves.

Symbols

Symbols to DIN ISO 1219-1. Hydraulic intermediate positions are shown dashed. Spool types A, C and D are also available as 4/2 valves (spring offset, without spring return "/O" or with detent "/OF"); spool types B, Y and Y11 are 4/2 valves with one solenoid. 3-way (3/2) valves are available with spools A and B only.

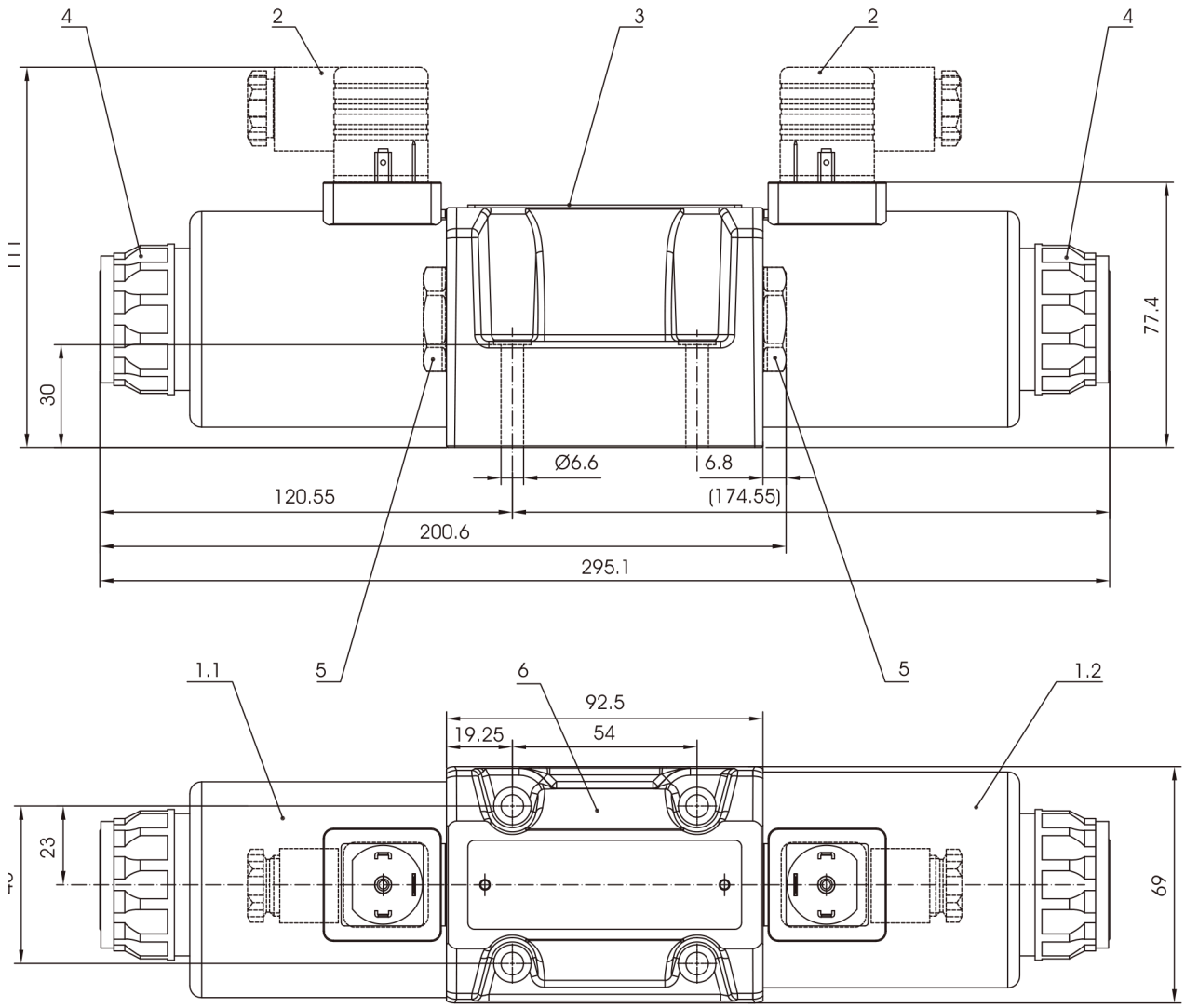


Example: spool symbol E with spool position "a" — ordering code ..EA..

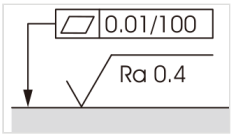
Dimensions

Dimensions · Electrical Connection D (DIN)

Dimensions in mm. Dimensions are nominal and subject to tolerances.



1.1 Solenoid "a"
1.2 Solenoid "b"
2 Connector for connection D (not included; cable Ø 8–10 mm, conductor max. 1.5 mm², lock nut must be tightened)
3 Nameplate
4 Lock nut, tightening torque MA = 10 ±1 Nm
5 Cap (valves with one solenoid)
6 Porting pattern to ISO 4401-05-04-0-05

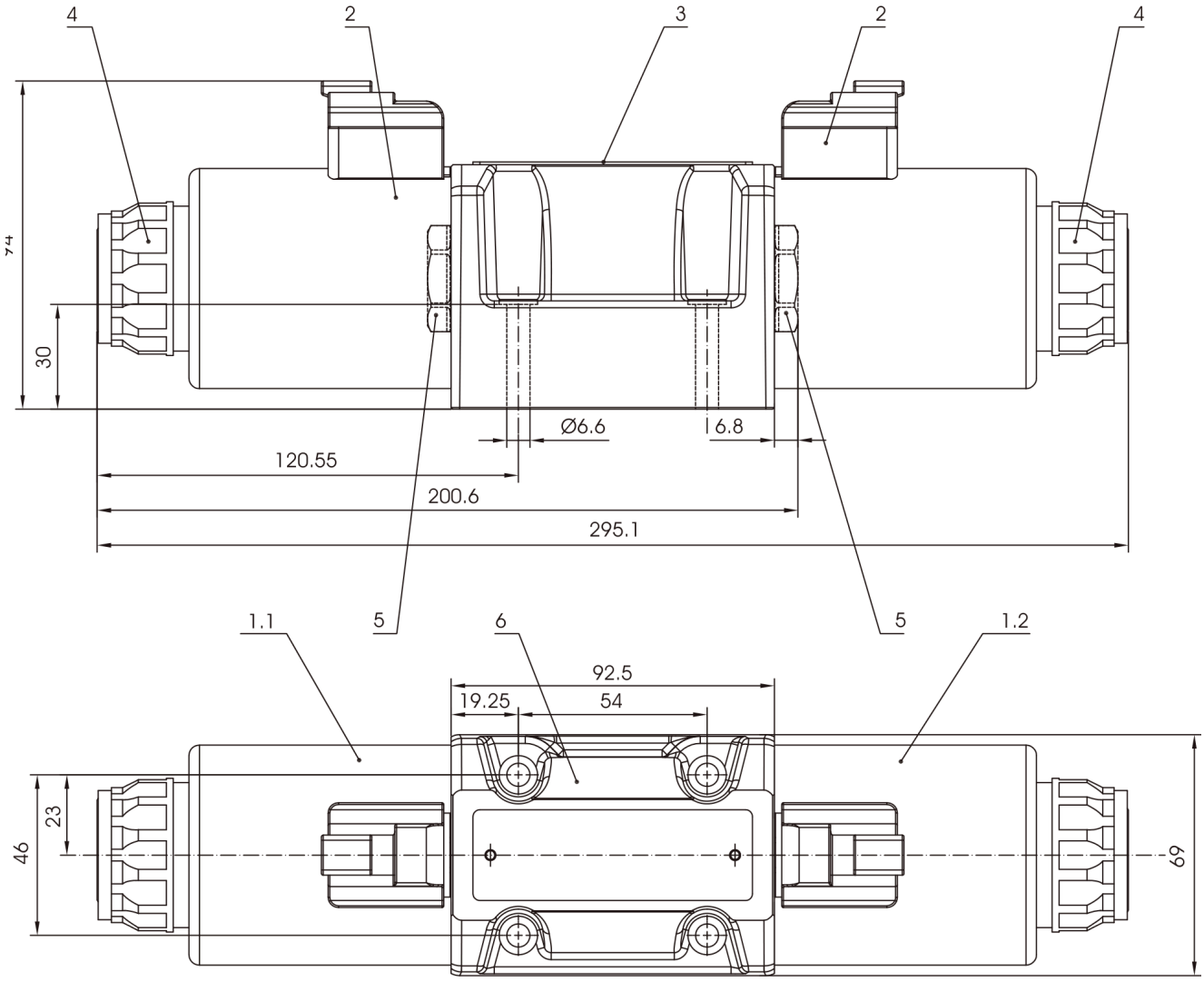


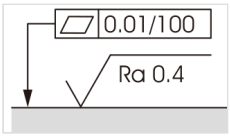
Required surface finish of the valve mounting face.

Dimensions

Dimensions · Electrical Connection T (Deutsch)

Dimensions in mm. Dimensions are nominal and subject to tolerances.





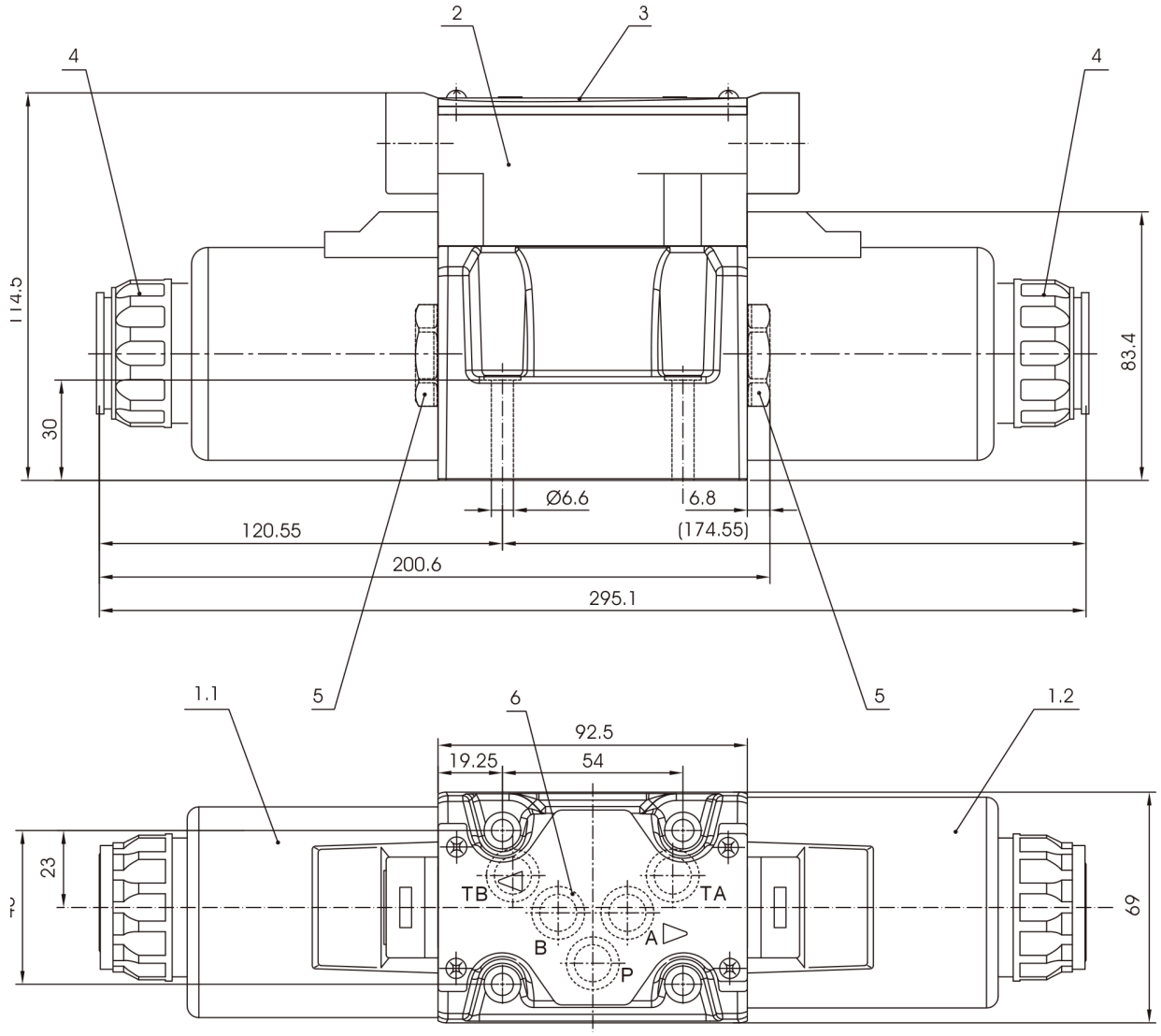
Required surface finish of the valve mounting face.

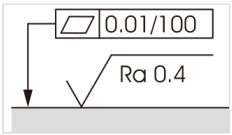
1.1 Solenoid "a"
1.2 Solenoid "b"
2 Connector for connection T, DT04-2PA (Deutsch)
3 Nameplate
4 Lock nut, tightening torque MA = 10 ±1 Nm
5 Cap (valves with one solenoid)
6 Porting pattern to ISO 4401-05-04-0-05

Dimensions

Dimensions · Electrical Connection L (Terminal Box)

Dimensions in mm. Dimensions are nominal and subject to tolerances.





Required surface finish of the valve mounting face.

1.1 Solenoid "a"
1.2 Solenoid "b"
2 Solenoid terminal box with indicator lamp
3 Nameplate
4 Lock nut, tightening torque MA = 10 ±1 Nm
5 Cap (valves with one solenoid)
6 Porting pattern to ISO 4401-05-04-0-05

Function and Sectional View

Type ED directional valves are solenoid-operated directional spool valves. They control the start, stop and direction of flow. The valve consists of the housing (1), one or two solenoids (2), the control spool (3) and the return springs (4).

In the de-energised condition the control spool (3) is held in the centre or initial position by the return springs (4), except for type "O". When a wet-pin solenoid (2) is energised it pushes the control spool from its rest position into the required end position, giving the selected flow direction. When the solenoid is de-energised the spool returns to its centre or initial position (except valves with "OF" detent and valves without return springs).

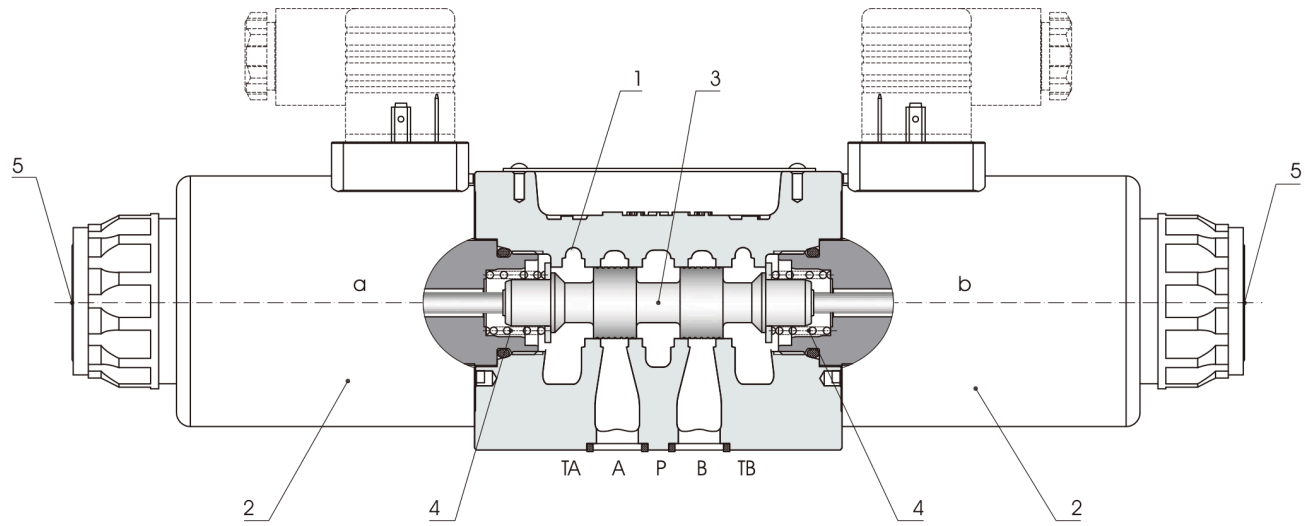
The manual override (5) allows the valve to be switched without energising the solenoid. For trouble-free operation the hydraulic system must be properly bled.

Without spring return "O" (spool types A, C and D only): the valve has two spool positions and two solenoids, without detent. With the solenoids de-energised the spool has no defined initial position.

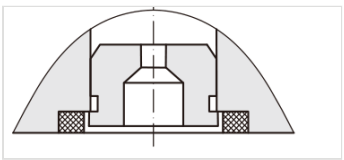
Without spring return, with detent "OF" (spool types A, C and D only): the detent holds the spool in its switched position, so the solenoid need not stay energised during operation — saving energy.

> **Note:** with detented valves, pressure peaks in a tank line shared by two or more valves can cause unwanted spool movement; we recommend a separate return line or a check valve in the tank line. By design some internal leakage is unavoidable and may increase over the service life.

Sectional View · Type 4ED-10-E...



1 Housing
2 Solenoid
3 Control spool
4 Return spring
5 Manual override

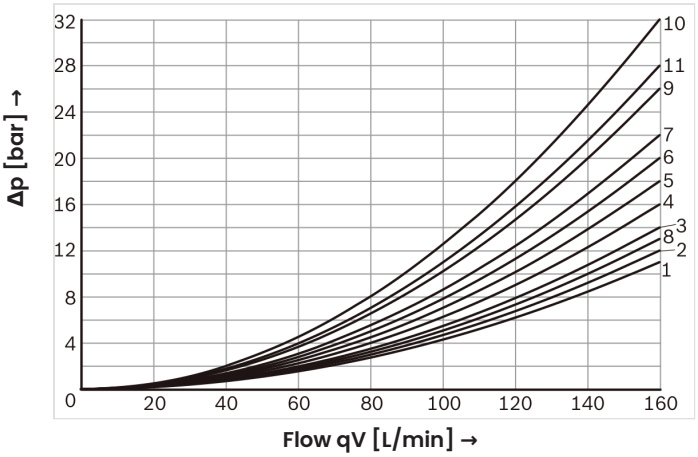


Throttle insert — required where, due to operating conditions, flows during switching could exceed the performance limit of the valve.

Characteristic Curves

Δp–qV Characteristic Curves

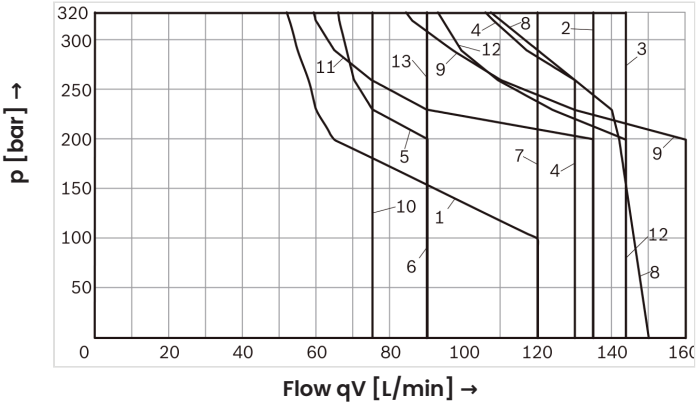
Measured with HLP46, oil temperature 40 ± 5 °C.



Spool	Curve No. for Flow Direction			
	P–A	P–B	A–T	B–T
A, B	5	5	–	–
C	1	2	4	5
D	2	2	4	5
E	3	8	5	7
F	2	3	7	9
G	4	4	10	10
H	1	1	7	7
J	3	3	7	11
L	3	3	7	7
M	1	1	5	5
P	3	2	7	9
Q	8	3	4	6
U	3	3	5	11
Y	3	8	4	7

Performance Limits

Measured with HLP46, oil temperature 40 ± 5 °C; solenoids at operating temperature, 10 % undervoltage, no tank pre-load.



Curve	Spool
1	A, B
2	C, D
3	D/OF
4	E
5	F, P
6	G
7	H
8	J
9	L
10	M
11	Q
12	U
13	Y

The switching limits apply to use with two flow directions (e.g. P to A with simultaneous return flow B to T). With only one flow direction (e.g. P to A with port B plugged) the limit can be considerably lower because of flow forces in the valve.

Ordering Code

*	E	D	–	1	0	–	*	*	*	–	*	*	*	–	*	–	*	–	*	*
	Series			Size NG10																

Number of Ways	
3	3-way valve — spools A and B only
4	4-way valve — all other spools

Spool Type	
A ... Y11	See symbols on page 3
...O	Without spring return, e.g. CO (A, C, D)
...OF	Without spring return, with detent, e.g. COF
EA / EB	Spool E, single solenoid "a" / "b"

Coil Voltage	
D12	12 V DC
D24	24 V DC
A11	110 V AC/DC (with rectifier)
A22	220 V AC/DC (with rectifier)

Design No.	
01	Design series 01

Seals	
N	NBR
V	FPM (Viton)

Electrical Connection	
D	DIN EN 175301-803, 3-pin (2+PE)
S	DIN connector with suppressor diode
T	DT04-2PA (Deutsch), 2-pin
L	Terminal box with indicator lamp

On Requirement

- **Throttle insert in P, A, B or T (Ø0.8 / 1.0 / 1.2 / 2.0 mm)**
- **Manual override with rubber cap**
- **Extended switching time**

Note

***Standard: concealed manual override, spring return, wet-pin solenoids with rotatable coil.**

***For spool symbols please refer to page 3.**

Example: 4ED-10-E-D24-D-V-01 — 4-way, 3-position directional control valve NG10, spool E, spring centred, 24 V DC, DIN connector, FPM seals, design 01.