

4/3 4/2 Directional valve elements with or without secondary relief valves, with or without LS connections

L8_10... (ED1-Z)



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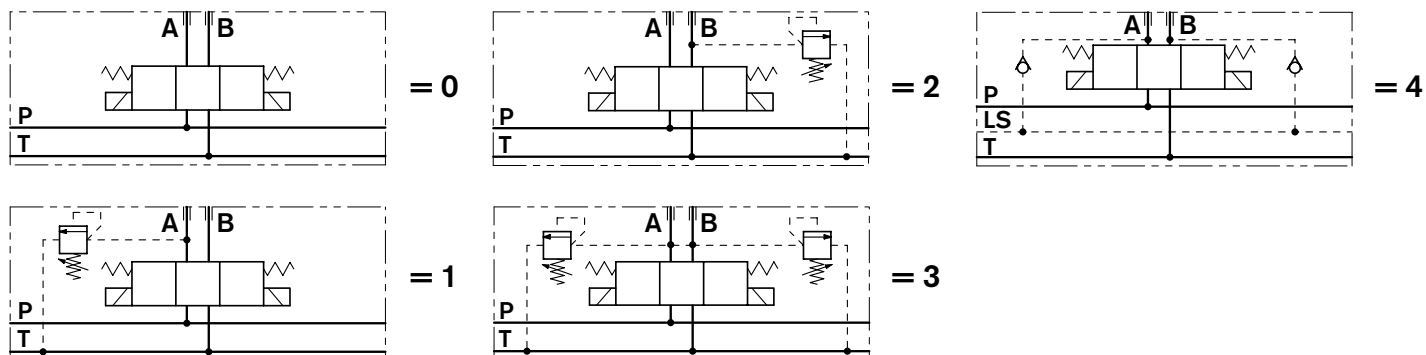
General specifications

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|------|---|
| | — Valve elements with solenoid operated directional spool. |
| 1 | — Control spools operated by screwed-in solenoids with extractable coils. |
| 2 | |
| 2 | — In the de-energized condition, the control spool is held in the central position by return springs. |
| 3 | |
| 4 | — Wet pin tubes for DC coils, with push rod for mechanical override; nickel plated surface. |
| 4 | |
| 4 | — Coils can be rotated 360° around the tube; they can be energized by AC current through special connectors with rectifier (RAC). |
| 6 | |
| 7 | — Manual override (push-button or screw type) available upon request. |
| 10 | — Plug-in connectors available: EN 175301-803 (Was DIN 43650); AMP Junior; DT04-2P (Deutsch), free leads. |

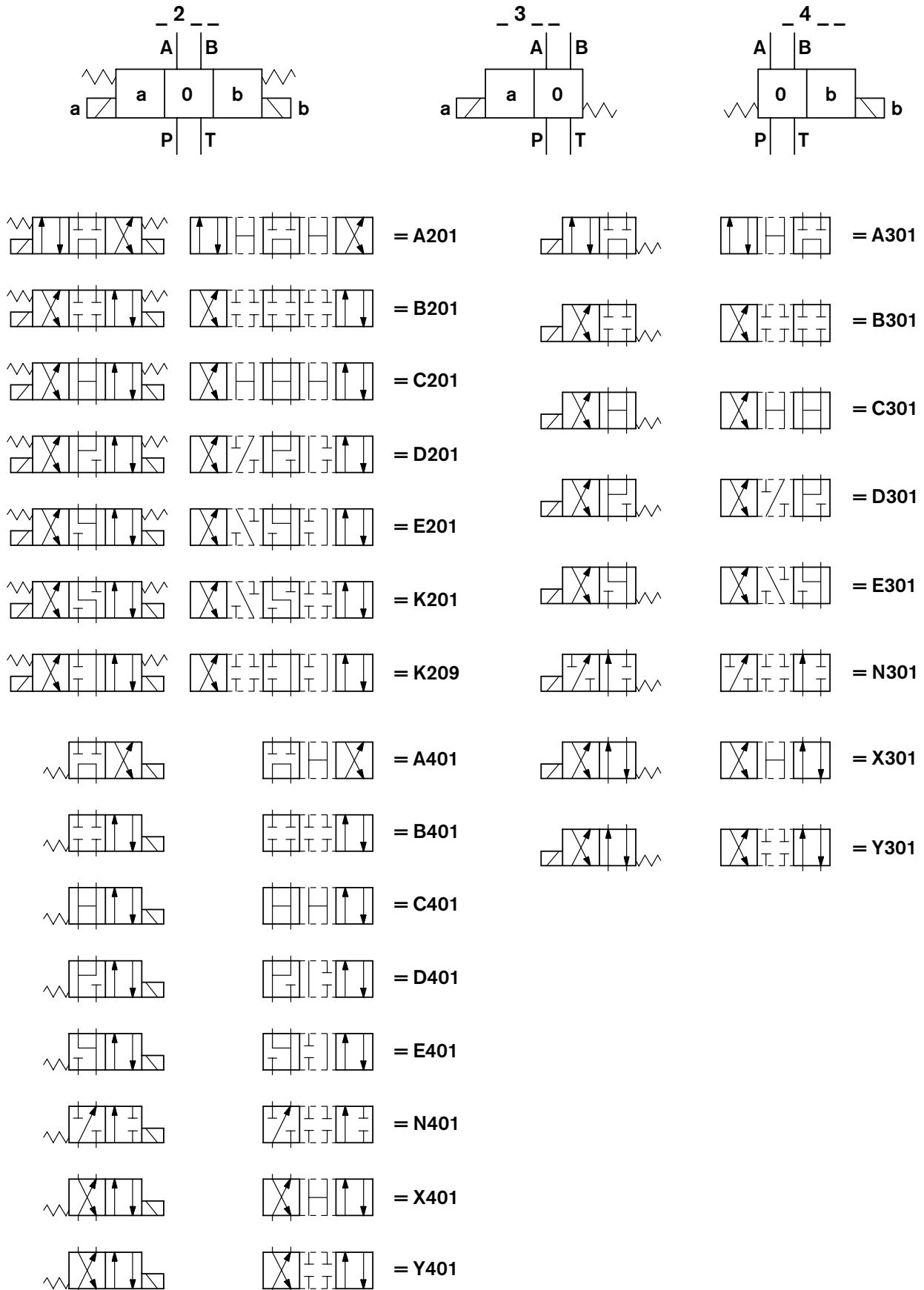
Ordering Details

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Configuration



Spool variants



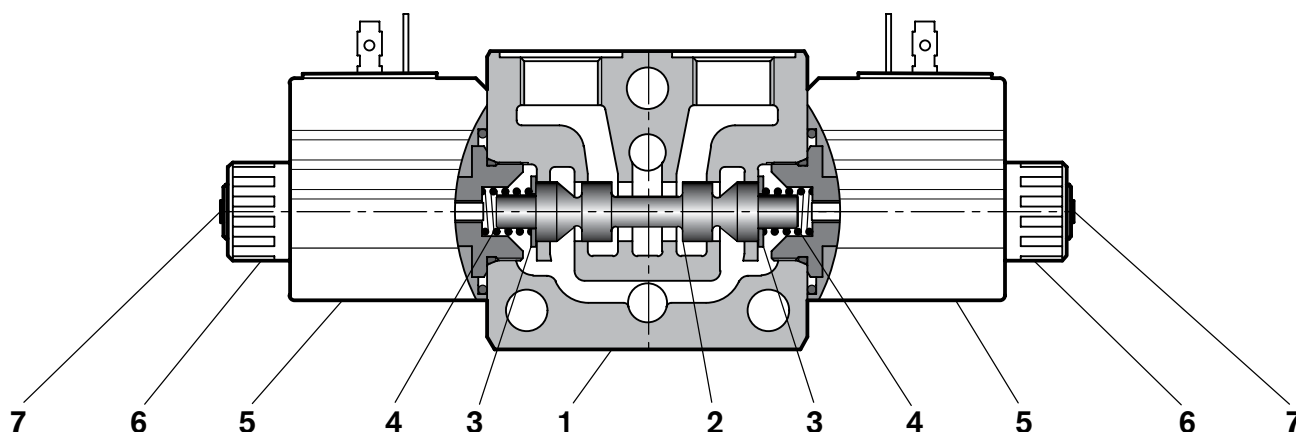
Principles of operation, cross section

The sandwich plate design directional valve elements L8_10... are compact direct operated solenoid valves which control the start, the stop and the direction of the oil flow. These elements basically consist of a stackable housing (1) with a control spool (2), one or two solenoids (5), and one or two return springs (4).

When energized, the force of the solenoid (5) pushes the control spool (2) from its neutral-central position "0" to the required end position "a" or "b", and the required flow from P to A (with B to T),

or P to B (with A to T) is achieved. Once the solenoid is de-energized, the return spring (4) pushes the spool thrust washer (3) back against the housing and the spool returns in its neutral-central position.

Each coil is fastened to the solenoid tube by a ring nut (6). A pin (7) allows to push the spool (2) in emergency conditions, when the solenoid cannot be energized, like in case of voltage shortage.



Technical Data (for applications with different specifications consult us)

General

Valve element with 2 solenoids	kg (lbs)	1.55 (3.42)
Valve element with 1 solenoid	kg (lbs)	1.25 (2.76)
Valve element with 2 solenoid with lever override	kg (lbs)	1.9 (4.2)
Valve element with 1 solenoid with lever override	kg (lbs)	1.6 (3.5)
Ambient Temperature	°C (°F)	-20....+50 (-4....+122) [NBR seals]

Hydraulic

Maximum pressure at P, A, and B ports	bar (PSI)	310 (4500)
Maximum dynamic pressure at T	bar (PSI)	180 (2610)
Maximum dynamic pressure, with lever type emergency at T	bar (PSI)	100 (1450)
Maximum static pressure at T	bar (PSI)	210 (3045)
Maximum inlet flow	l/min (GPM)	30 (7.9)
Hydraulic fluid General properties: it must have physical lubricating and chemical properties suitable for use in hydraulic systems such as, for example:		Mineral oil based hydraulic fluids HL (DIN 51524 part 1). Mineral oil based hydraulic fluids HLP (DIN 51524 part 2). For use of environmentally acceptable fluids (vegetable or polyglycol base) please consult us.
Fluid Temperature	°C (°F)	-20....+80 (-4....+176) [NBR seals]
Permissible degree of fluid contamination		ISO 4572: $\beta_{x \geq 75} X=12...15$ ISO 4406: class 20/18/15 NAS 1638: class 9
Viscosity range	mm²/s	5....420

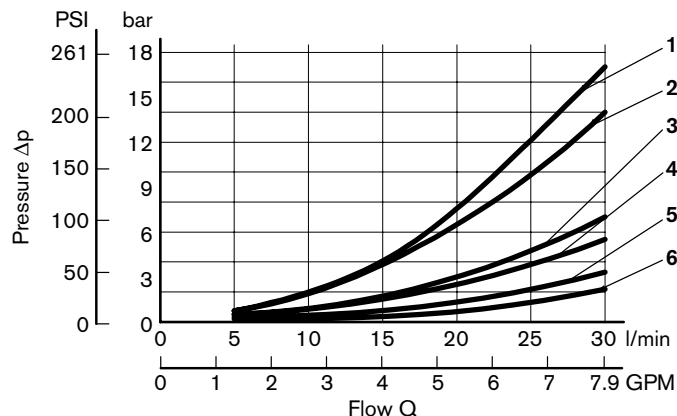
Technical Data (for applications with different specifications consult us)**Electrical**

Voltage type		DC (AC only with RAC)								
Voltage tolerance (nominal voltage)	%	−10 +10								
Duty		Continuous, with ambient temperature ≤ 50°C (122°F)								
Maximum coil temperature	°C (°F)	150 (302)								
Insulation class		H								
Compliance with		Low Voltage Directive LVD 73/23/EC (2006/95/EC), 2004/108/EC								
Coil weight with connection EN 175301-803	kg (lbs)	0.215 (0.44)								
Voltage	V	12	13	24	27	48	110	24 +RAC (21.5)	110 +RAC (98)	230 +RAC (207)
Voltage type		DC	DC	DC	DC	DC	DC	AC	AC	AC
Power consumption	W	26	26	26	26	26	26	29	29	29
Current ¹⁾	A	2.15	2.00	1.10	1.00	0.54	0.27	1.20	0.29	0.14
Resistance ²⁾	Ω	5.5	6.5	22	28	89	413	18	338	1430

1) Nominal 2) ± 7% at temperature 20°C (68°F)

	Voltage (V)	Connector type	Coil description	Marking	Coil Mat no.
=OB 01 =OB 02	12 DC	EN 175301-803 (Ex. DIN 43650)	C3601 12DC	12 DC	R933000044
=OB 03	12 DC	AMP JUNIOR	C3603 12DC	12 DC	R933000047
=OB 04	12 DC	AMP JUNIOR Horizontal	C3604 12DC	12 DC	R933002913
=OB 07	12 DC	DEUTSCH DT 04-2P	C3607 12DC	12 DC	R933000048
=OB 31	12 DC	Cable 350 mm long	C3631 12DC	12 DC	R933000045
=AD 01 =AD 02	13 DC	EN 175301-803 (Ex. DIN 43650)	C3601 13DC	13 DC	R933000051
=AD 07	13 DC	DEUTSCH DT 04-2P	C3607 13DC	13 DC	R933000049
=OC 01 =OC 02	24 DC	EN 175301-803 (Ex. DIN 43650)	C3601 24DC	24 DC	R933000053
=OC 03	24 DC	AMP JUNIOR	C3603 24DC	24 DC	R933000057
=OC 04	24 DC	AMP JUNIOR Horizontal	C3604 24DC	24 DC	R933002914
=OC 07	24 DC	DEUTSCH DT 04-2P	C3607 24DC	24 DC	R933000058
=OC 31	24 DC	Cable 350 mm long	C3637 24DC	24 DC	R933000055
=AC 01 =AC 02	27 DC	EN 175301-803 (Ex. DIN 43650)	C3601 27DC	27 DC	R933000056
=AC 07	27 DC	DEUTSCH DT 04-2P	C3607 27DC	27 DC	R933000050
=OD 01 =OD 02	48 DC	EN 175301-803 (Ex. DIN 43650)	C3601 48DC	48 DC	R933000059
=OD 04	48 DC	AMP JUNIOR Horizontal	C3604 48DC	48 DC	R933002915
=OE 01 =OE 02	110 DC	EN 175301-803 (Ex. DIN 43650)	C3601 110DC	110 DC	R933000061
=OV 01 =OV 02	24 RAC	EN 175301-803 (Ex. DIN 43650)	C3601 21.5DC	21.5 DC	R933000054
=OW 01 =OW 02	110 RAC	EN 175301-803 (Ex. DIN 43650)	C3601 98DC	98 DC	R933000060
=OZ 01 =OZ 02	230 RAC	EN 175301-803 (Ex. DIN 43650)	C3601 207DC	207 DC	R933000062

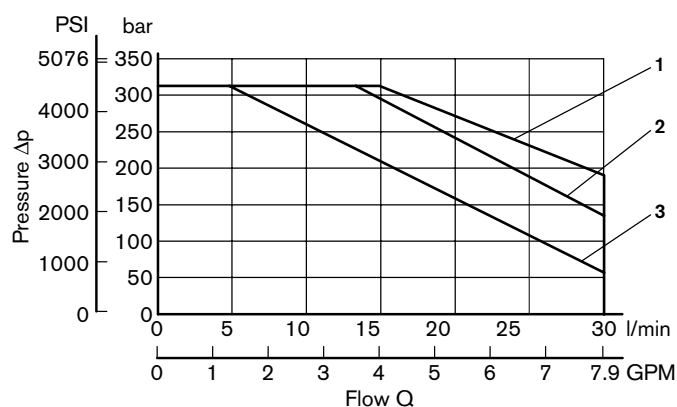
Characteristic curves



Measured with hydraulic fluid ISO-VG32 at
 $45^{\circ} \pm 5^{\circ} \text{ C}$ ($113^{\circ} \pm 9^{\circ} \text{ F}$); ambient temperature 20° C (68° F).

Spool Variant	Curve No.				
	P > T	P > A	P > B	A > T	B > T
A201, A301, A401	3	2	2	1	1
X301, X401		4	4	5	5
Y301, Y401		4	4	5	5
B201, B301, B401		5	5	5	5
C201, C301, C401	5	4	4	6	6
D201, D301, D401		5	5	4	4
E201, E301, E401		4	4	6	6
N301, N401		4	4		
K201, K209		4	4	4	4

Performances limits

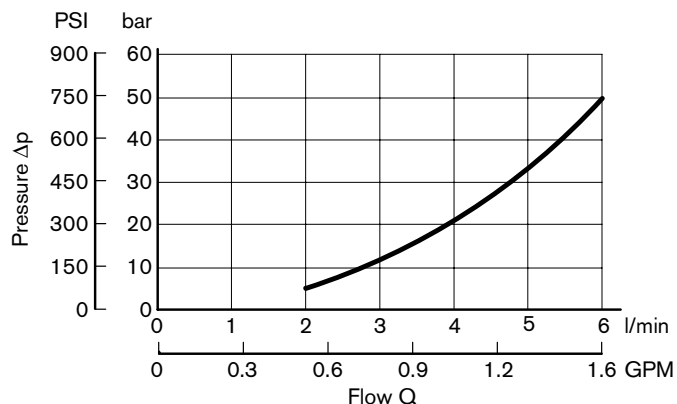


Measured with the solenoids at their operating temperature,
 10% under voltage and without pre-loading of the tank.

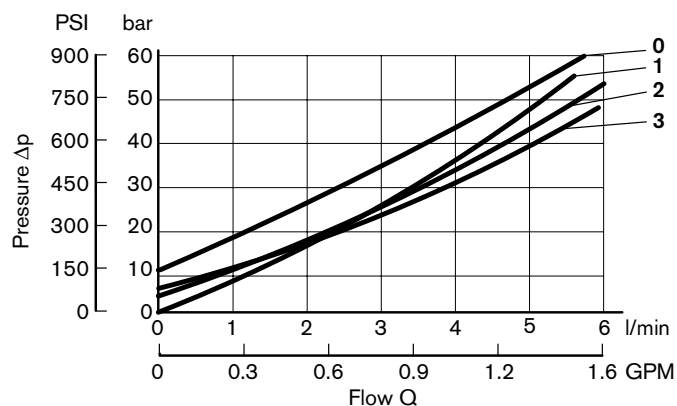
Spool Variant	Curve No.
A201-A301-A401-B201-B301-B401- X301-X401-Y301-Y401 C201-C301-C401-D201-D301-D401	1
K201-E201-E301-E401	2
N301, N401	3

The performance curves are measured with flow going across and coming back, like P>A and B>T. With "lever type" emergency control, the performance limits are slightly lower.

Minimum flow for efficiency of LS control

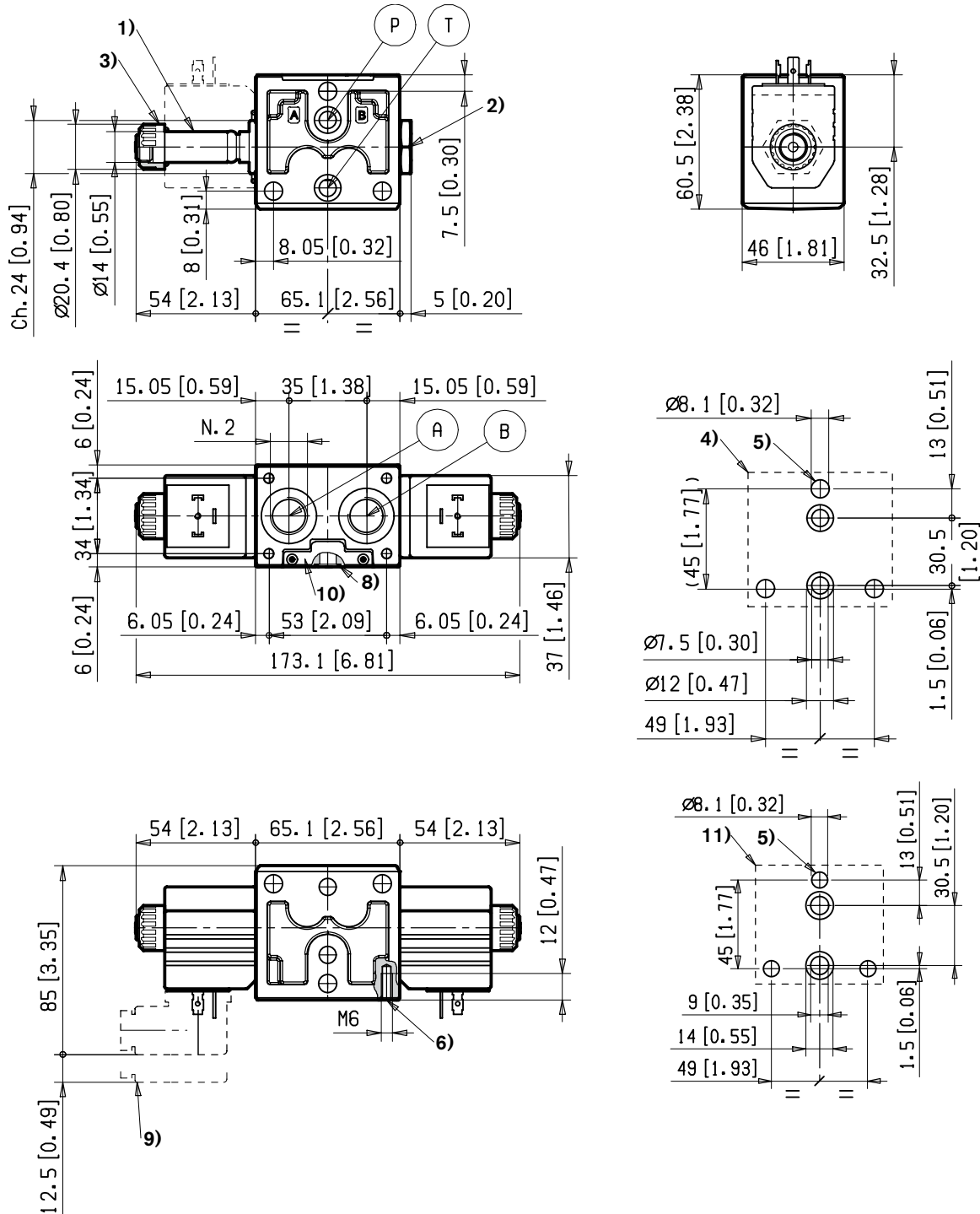


Lowest pressure setting curve for secondary valves



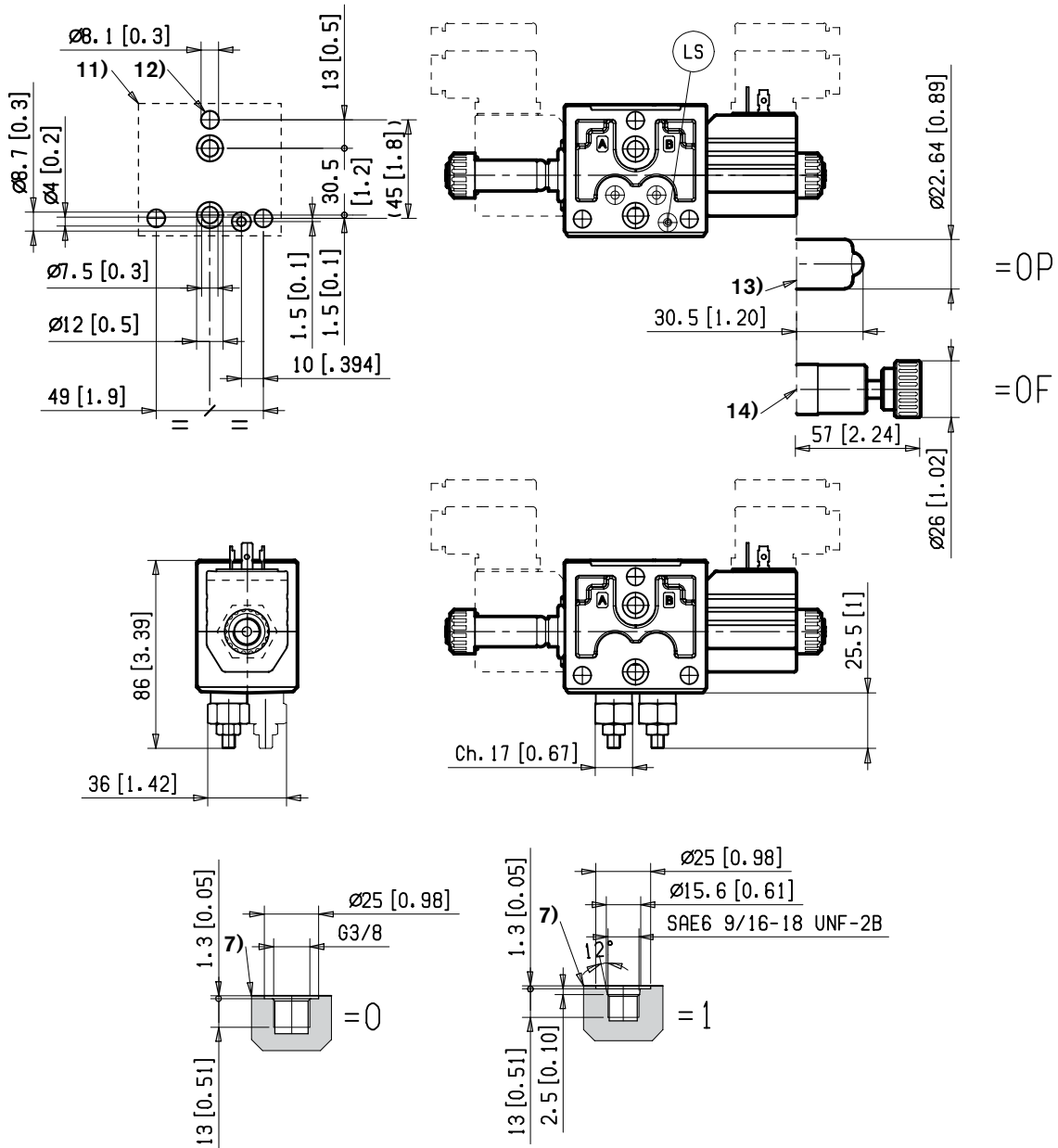
Secondary valve setting	Curve No.
50–210 bar (700–2950 PSI)	0
100–310 bar (1400–4500 PSI)	1
25–50 bar (350–700 PSI)	2
50–100 bar (700–2950 PSI)	3

External Dimensions and Fittings



- 1 Solenoid tube hex 24 mm (0.94 inch). Torque 22–24 Nm (16.2–17.7 ft-lb).
- 2 Plug for 2 positions versions (4/2); hex 24 mm. Torque 22–24 Nm (16.2–17.7 ft-lb).
- 3 Ring nut for coil locking (OD 24 mm); torque 3–4 Nm (2.2–3 ft-lb).
- 4 Flange specifications for coupling to ED intermediate elements with ports SAE 06.
- 5 Three through holes for coupling of the ED Directional Valve Elements. Recommended tie rods M8 with strength class DIN 8.8. Torque 20–22 Nm (14.7–16.2 ft-lb).
- 6 Four threaded holes M5 for fitting a secondary flangeable element (for elements with SAE 6 ports). Four threaded holes M6 for fitting a secondary flangeable element (for elements with SAE 8 ports). Bolts with recommended strength class DIN 8.8: torque 9–12 Nm (6.5–9 ft-lb).
- 7 A and B ports.
- 8 O-Rings for P and T ports.
- 9 Clearance needed for connector removal.
- 10 Identification label.
- 11 Flange specifications for coupling to ED intermediate elements with ports SAE 08.

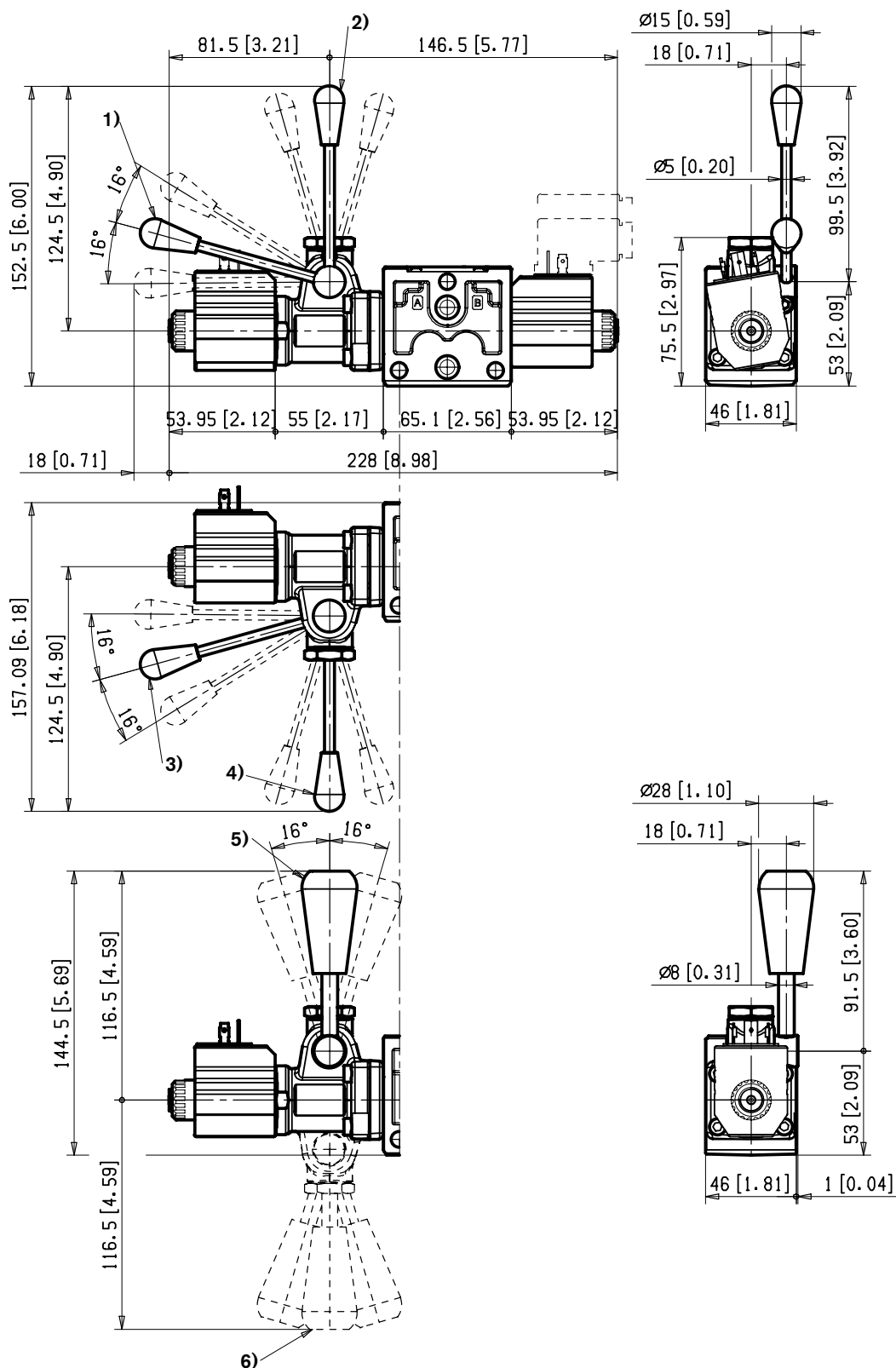
External Dimensions and Fittings



- 11 Flange specifications for coupling to ED intermediate elements.
- 12 Three through holes for coupling of the ED Directional Valve Elements. Recommended tie rods M8 with strength class DIN 8.8. Torque 20–22 Nm (14.75–16.2 ft-lb).

- 13 Optional push-button emergency, EP type, for spool opening: it is pressure stuck to the ring nut for coil locking. Material no. R933000042
- 14 Optional screw type emergency, EF type, for spool opening: it is screwed (torque 6–7 [4.4–5.2 ft-lb]) to the tube as replacement of the coil ring nut. Material no. R933000021.

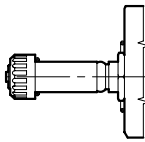
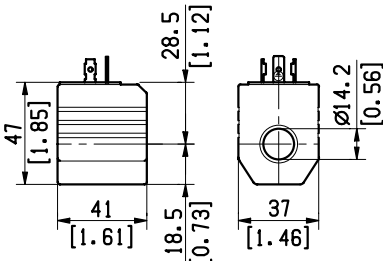
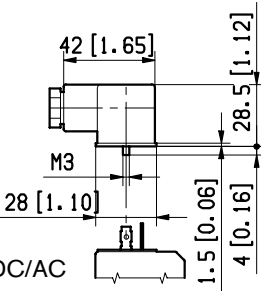
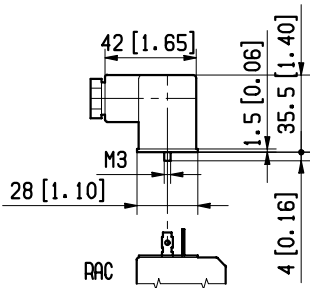
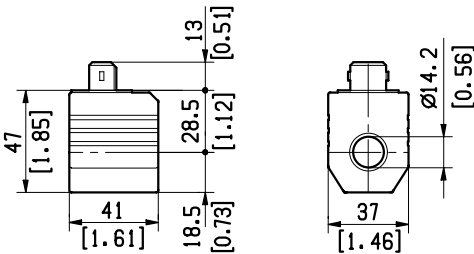
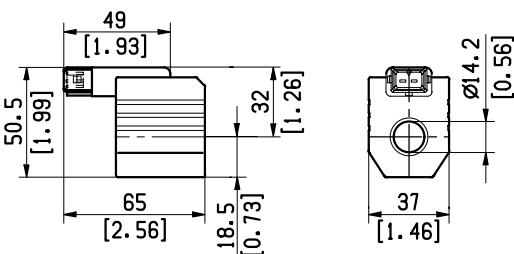
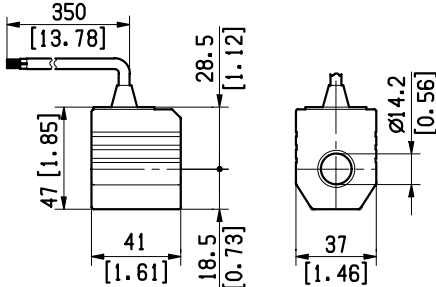
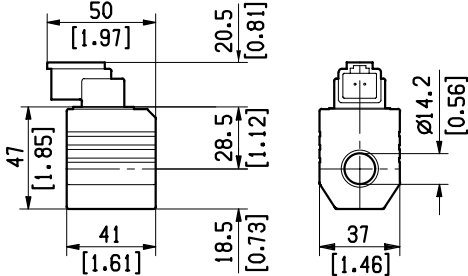
External Dimensions and Fittings



- 1 Ordering Details: HA (if fitted to side A)
or HB (if fitted to side B)
- 2 Ordering Details: VA (if fitted to side A)
or VB (if fitted to side B)
- 3 Ordering Details: H1 (if fitted to side A)
or H9 (if fitted to side B)

- 4 Ordering Details: V1 (if fitted to side A)
or V9 (if fitted to side B)
- 5 Ordering Details: XA (if fitted to side A)
or XB (if fitted to side B)
- 6 Ordering Details: X1 (if fitted to side A)
or X9 (if fitted to side B)

Electric connection (or connections, in case of two solenoids)

= 00	<p>Without coils, but with ring nut and O-Rings for coil fitting (solution recommended for flexible stock handling)</p> 	= 01	<p>With coils having plug-in pins EN 175301-803, without connectors</p> 
= 02	<p>With coils and with connectors non-assembled, type EN 175301-803.</p> <p>Protection class: IP 65 when connector with seal is properly screwed down, and cable clamp is correctly tightened.</p> <p>182-09: Standard. 182-LED-T-A1: with LED monitoring presence of voltage. 182-09-G-DO-2-1: with VDR (Voltage Dependent Resistor), to prevent input voltage over-shootings.</p> <p>Material No. Description R933002885 182-09 GRAY R933002889 182-09 BLACK R933002893 182-LED-T-A1 12 DC/AC R933002894 182-LED-T-A1 24 DC/AC R933002896 182-LED-T-A1 48 DC/AC R933002897 182-LED-T-A1 110 DC/AC R933002898 182-LED-T-A1 230 DC/AC R933002886 182-09-G-DO-2-1 12DC with VDR R933002887 182-09-G-DO-2-1 24DC with VDR</p> 		<p>532-09 RAC: special connectors with rectifier (RAC) for AC applications.</p>  <p>Material No. Description R933002892 532-09 RAC GRAY R933002891 532-09 RAC BLACK</p>
= 03	<p>With coils having AMP Junior connector, and with bi-directional diode.</p> <p>Protection class: IP 65 with female connector properly fitted (see drawing).</p> 	= 04	<p>With coils having Horizontal AMP Junior connector, and with bi-directional diode.</p> <p>Protection class: IP 65 with female connector properly fitted (see drawing).</p> 
= 31	<p>With coils having bi-directional diode and bipolar sheathed free lead, 350 mm long, without pins.</p> 	= 07	<p>With coils having DEUTSCH DT 04-2P connector, and with bi-directional diode.</p> <p>Protection class: IP 69 K with female connector properly fitted (see drawing).</p> 

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