RA 18301-02/10.11

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

L8_11… (ED2-DZ)

Summary

General specifications

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

Ordering Details

L	8	_	1	1	_ _ _ _	_ _	_ _	_	_	_ _

Family
Directional Valve elements ED

Type
Size 6

Configuration [1]

Standard	= 0
With secondary valve on A	= 1
With secondary valve on B	= 2
With sec. valves on A and B	= 3
With channels for Load Sensing	= 4

Coil type
C45

Spool Variants [2]

4/3 operated on both sides a and b	= _ 2 _ _
4/2 operated on side a only	= _ 3 _ _
4/2 operated on side b only	= _ 4 _ _
	= _ 5 _ _

Voltage supply

Without coil	■				= 00
12V DC		■	■	■	= OB
13V DC		■	■	■	= AD
24V DC		■	■		= OC
27V DC		■	■	■	= AC
48V DC		■	■		= OD
110V DC		■	■		= OE
(21.5 DC) 24V AC		■	■		= OV
(98 DC) 110V AC		■	■		= OW
(207 DC) 230V AC		■	■		= OZ
	00	01	02	03	07

Available connections

Optional fittings

_ _ =	Lever type emergency [3]
0P =	Push-button type emergency
0F =	Screw type emergency

Secondary valves setting*

0* =	50–210 bar (725–3045 PSI)
1 =	100–310 bar (1450–4500 PSI)
2 =	25–50 bar (362–725 PSI)
3 =	50–100 bar (725–1450 PSI)

Ports**

3 =	3/4-16 UNF 2-B (SAE8)

Electric connection

00 =	Without coils
01 =	With coils, without connectors
02 =	With coils and with non-assembled connectors, type EN 175301-803.
03 =	With coils having AMP Junior connector
07 =	With coils having DEUTSCH DT 04-2P connector

* Without secondary valves (versions L80__; L84__), the standard configuration corresponds to “0”.

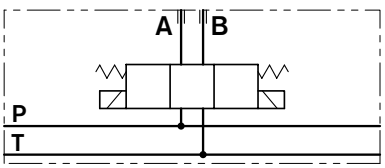
** Additional ports on request.

1) The secondary valves, with maximum flow capacity of 6 l/min [1.6 gpm].

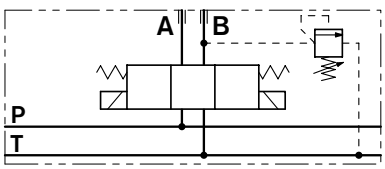
2) The required hydraulic symbol and spool variant can be chosen by consulting page 3.

3) Each different option for the type of emergency chosen implies a specific ordering code (refer to page 9).

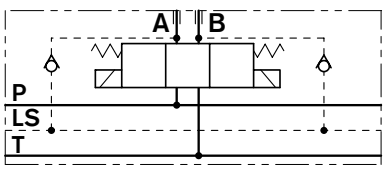
Configuration



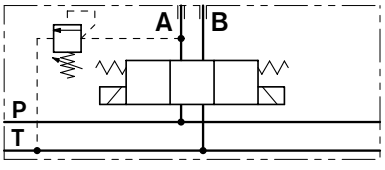
= 0



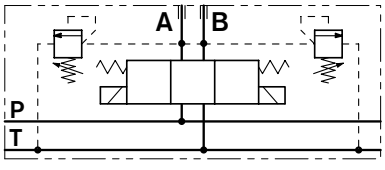
= 2



= 4

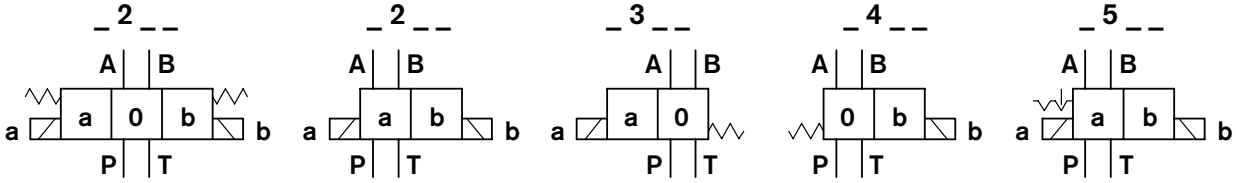


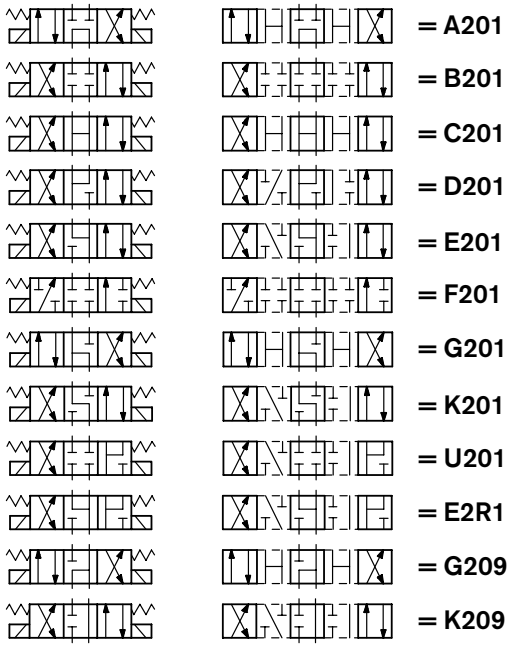
= 1

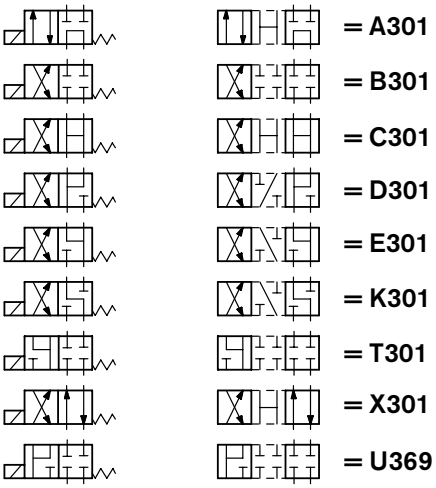


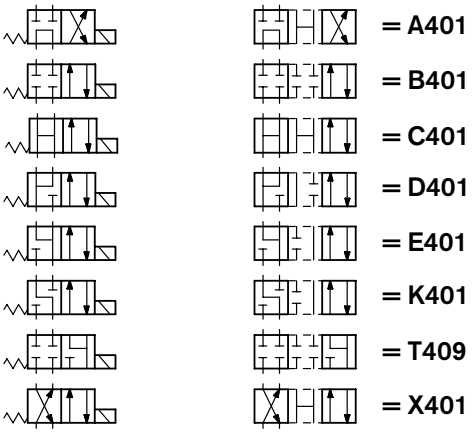
= 3

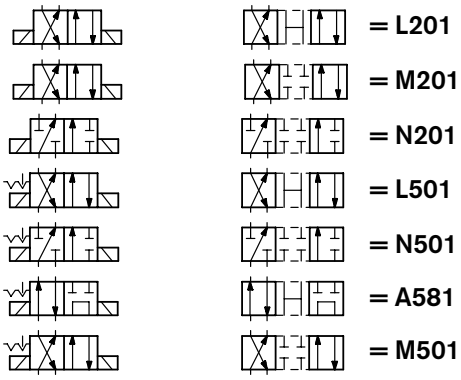
Spool variants

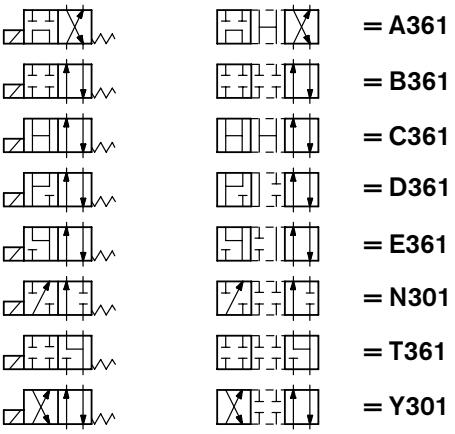


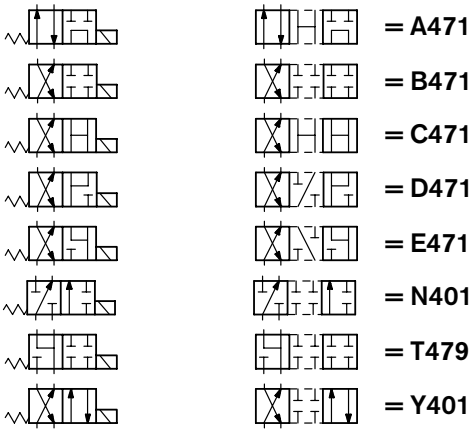










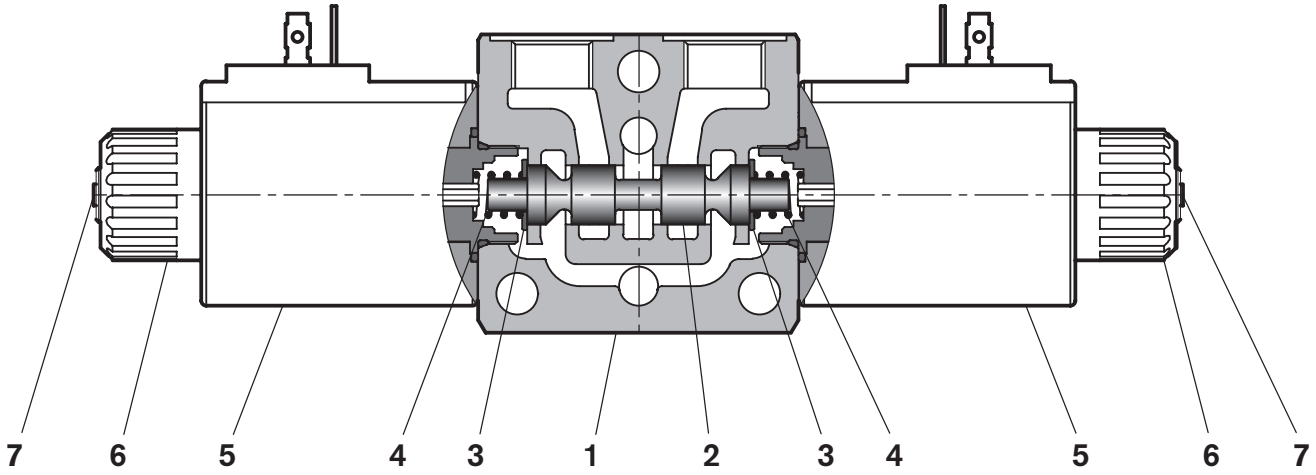


Principles of operation, cross section

The sandwich plate design directional valve elements L8_11… 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)	1.95 (4.3)
Valve element with 1 solenoid	kg (lbs)	1.45 (3.2)
Valve element with 2 solenoid with lever override	kg (lbs)	2.2 (4.85)
Valve element with 1 solenoid with lever override	kg (lbs)	1.7 (3.75)
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)	250 (3625)
Maximum dynamic pressure, with lever override at T	bar (PSI)	100 (1450)
Maximum static pressure at T	bar (PSI)	310 (4500)
Maximum static pressure, with lever override at T	bar (PSI)	290 (4200)
Maximum inlet flow	l/min (GPM)	50 (13.2)
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	mm^2/s	5....420

Technical Data (for applications with different specifications consult us)

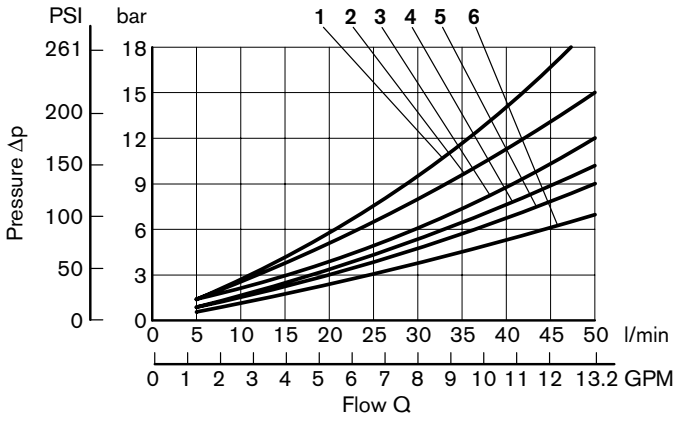
Electrical

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)	0.335 (0.74)								
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	33	31	33	33	33	35	33	33	35
Current [1]	A	2.80	2.30	1.40	1.20	0.70	0.32	1.60	0.34	0.16
Resistance [2]	Ω	4.24	5.42	17.0	21.8	69.8	341.8	13.6	285.0	1229.0

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

	Voltage (V)	Connector type	Code	Marking	Coil Mat no.
=OB 01 =OB 02	12 DC	EN 175301-803 (Ex. DIN 43650)	C4501 12DC	12 DC	R933000026
=OB 03	12 DC	AMP JUNIOR	C4503 12DC	12 DC	R933000027
=OB 07	12 DC	DEUTSCH DT 04-2P	C4507 12DC	12 DC	R933000030
=AD 01 =AD 02	13 DC	EN 175301-803 (Ex. DIN 43650)	C4501 13DC	13 DC	R933000028
=AD 03	13 DC	AMP JUNIOR	C4503 13DC	13 DC	R933000029
=AD 07	13 DC	DEUTSCH DT 04-2P	C4507 13DC	13 DC	R933000031
=OC 01 =OC 02	24 DC	EN 175301-803 (Ex. DIN 43650)	C4501 24DC	24 DC	R933000034
=OC 03	24 DC	AMP JUNIOR	C4503 24DC	24 DC	R933003630
=OC 07	24 DC	DEUTSCH DT 04-2P	C4507 24DC	24 DC	R933000032
=AC 01 =AC 02	27 DC	EN 175301-803 (Ex. DIN 43650)	C4501 27DC	27 DC	R933000035
=AC 03	27 DC	AMP JUNIOR	C4503 27DC	27 DC	R933000036
=AC 07	27 DC	DEUTSCH DT 04-2P	C4507 27DC	27 DC	R933000033
=OD 01 =OD 02	48 DC	EN 175301-803 (Ex. DIN 43650)	C4501 48DC	48 DC	R933000037
=OE 01 =OE 02	110 DC	EN 175301-803 (Ex. DIN 43650)	C4501 110DC	110 DC	R933000040
=OV 01 =OV 02	24 RAC	EN 175301-803 (Ex. DIN 43650)	C4501 21.5DC	21.5 DC	R933000038
=OW 01 =OW 02	110 RAC	EN 175301-803 (Ex. DIN 43650)	C4501 98DC	98 DC	R933000039
=OZ 01 =OZ 02	230 RAC	EN 175301-803 (Ex. DIN 43650)	C4501 207DC	207 DC	R933000041

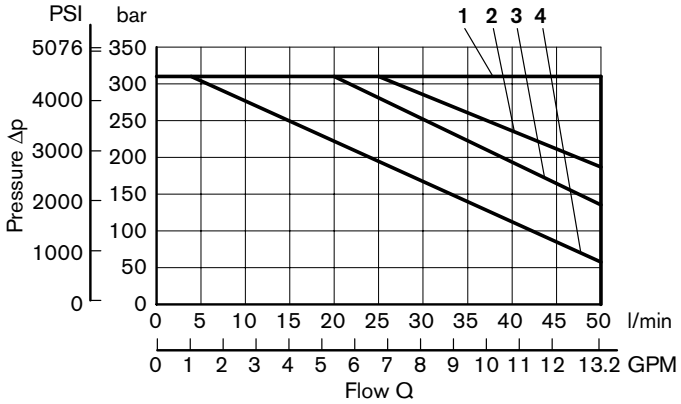
Characteristic curves



Measured with hydraulic fluid ISO-VG32 at
45° ± 5° C (113° ± 9° F); ambient temperature 20° C (68° F).

Spool Variant	Curve No.				
	P > T	P > A	P > B	A > T	B > T
A201-A301-A401-A401-A471-A361-G201-G209	2	1	1	1	1
B201-B301-B401-B471-B361-L201-M201-U201-L501-M501		4	4	4	4
C201-C301-C401-C471-C361	6	5	5	6	6
D201-D301-D471-D401-D361		6	6	5	5
E201-E301-E401-E471-E361-E2R1-T301-T409		5	5	6	6
K201-K209-K301-T361-K401-T479		5	5	3	3
X301-X401-Y301-Y401		4	4	4	4
N301-N201-N401-F201-U361-N501		4	4		

Performances limits

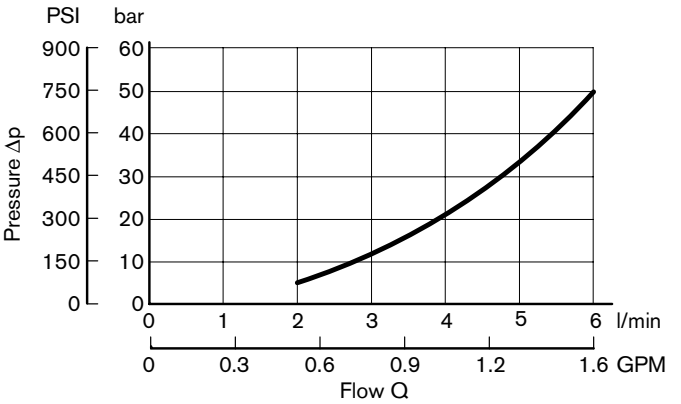


Measured with the solenoids at their operating temperature, 10% under voltage and without pre-loading of the tank.

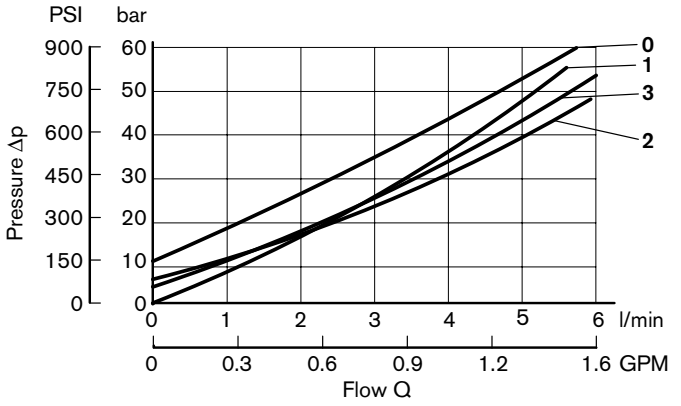
Spool Variant	Curve No.
A201-A301-A401-A471-A361- C201-C301-C401-C471-C361-G201-G209 - T301- T401-T479- T361	1
B201-B301-B401-B471-B361- D201-D301-D401-D471-D361 -K201-K209-K301-K401	2
X301-X401-Y301-Y401-M201-L201-U201-U369 - E201-E301-E401-E471-E361-E2R1	3
N301-N401-N201-N501-L501-M501-F201	4

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

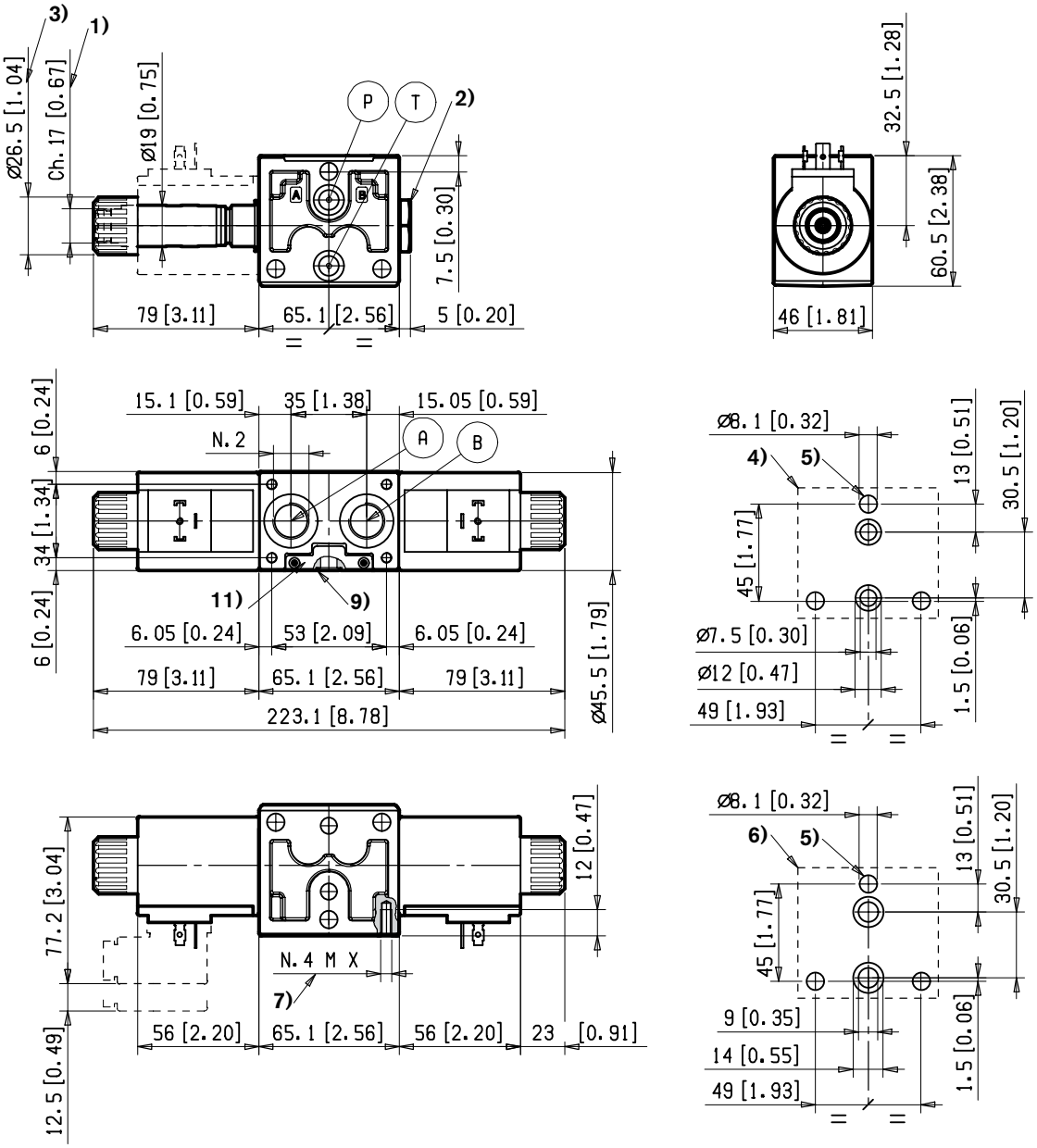


Lowest pressure setting curve for secondary valves



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 17 mm (0.7 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 26.5 mm); torque 3–4 Nm (2.2–3 ft-lb).

4 Flange specifications for coupling to ED intermediate elements with ports G 3/8 and SAE 6.

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 Flange specifications for coupling to ED intermediate elements with ports G 1/2 and SAE 8.

7 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).

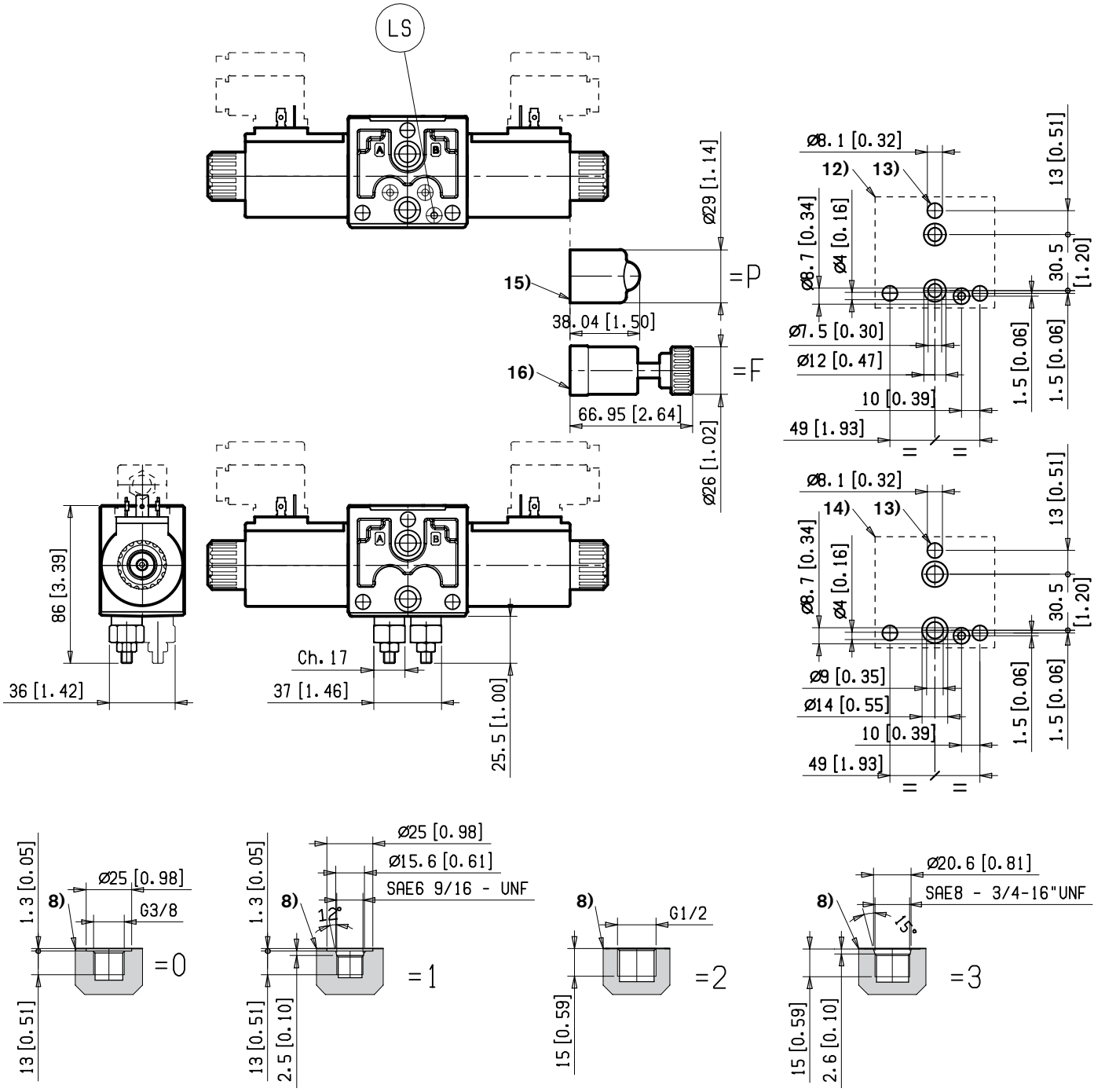
8 A and B ports.

9 O-Rings for P and T ports.

10 Clearance needed for connector removal.

11 Identification label.

External Dimensions and Fittings



12 Flange specifications for coupling to the ED intermediate elements with LS channels (for port sizes G 3/8 and SAE6).

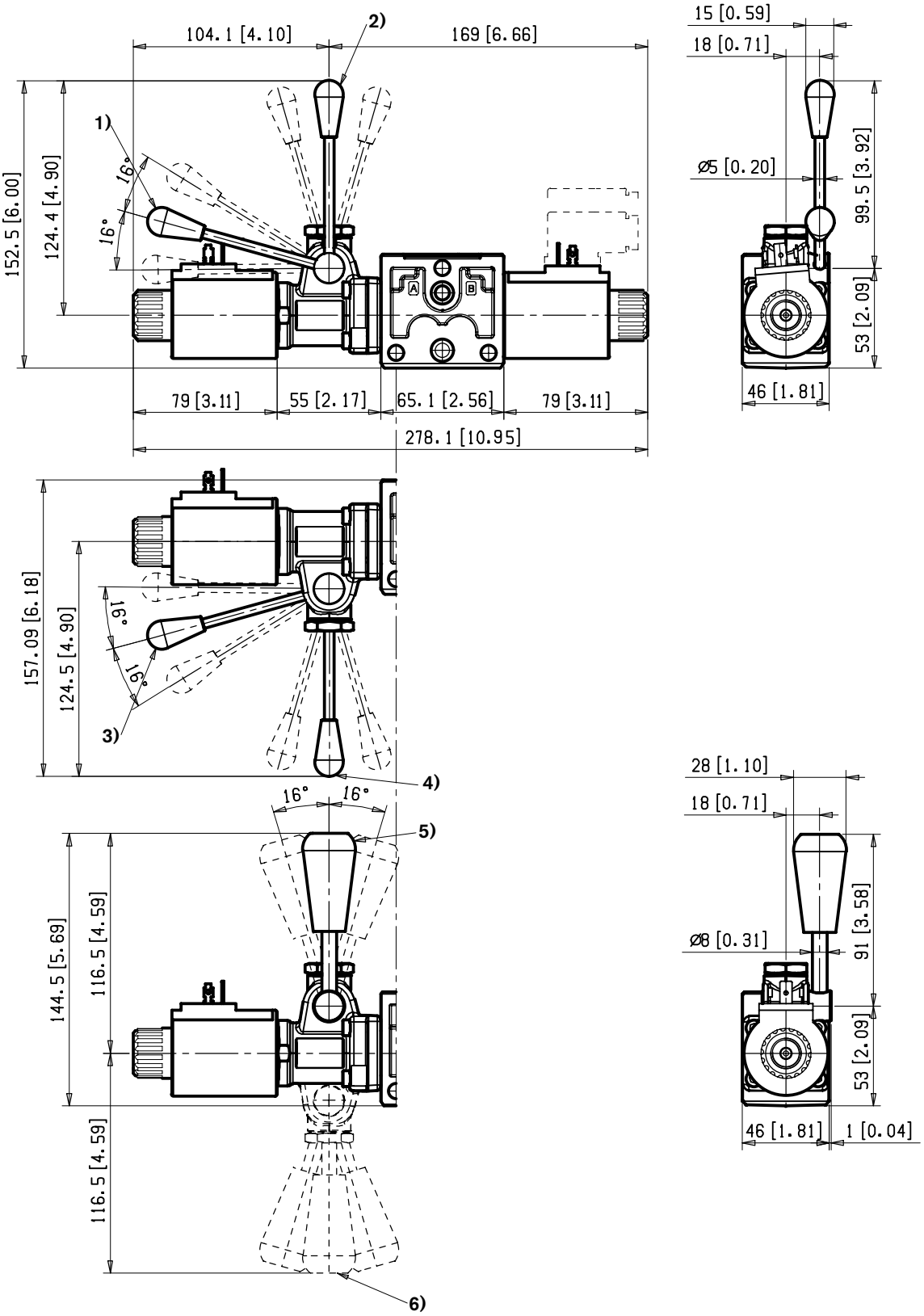
13 Three through holes for coupling of the ED Directional Valve Elements. Recommended tie rods M8 with strength class: DIN 8.8. Torque 20–22 Nm (14.7–16.2 ft-lb).

14 Flange specifications for coupling to the ED intermediate elements with LS channels (for port sizes G 1/2 and SAE 8)

15 Optional push-button emergency, EP type, for spool opening: it is pressure stuck to the ring nut for coil locking. Material no. R933000043.

16 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. R933007215

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)

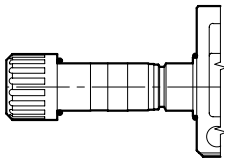
5 Ordering Details: XA (if fitted to side A) or XB (if fitted to side B)

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)

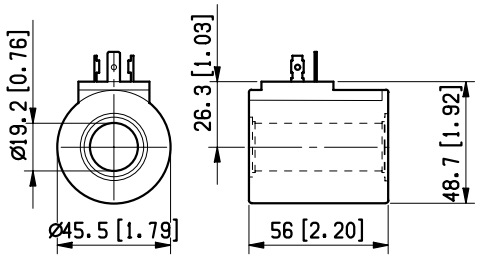
= 00

Without coils, but with ring nut and O-Rings for coil fitting (solution recommended for flexible stock handling)



= 01

With coils having plug-in pins EN 175301-803, without connectors



= 02

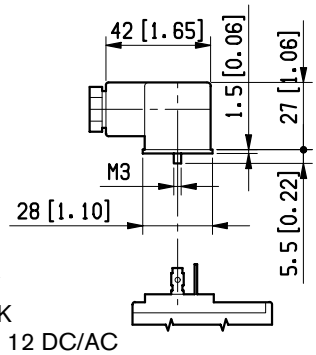
With coils and with connectors non-assembled, type EN 175301-803.

Protection class: IP 65 when connector with seal is properly screwed down, and cable clamp is correctly tightened.

182-09: Standard.

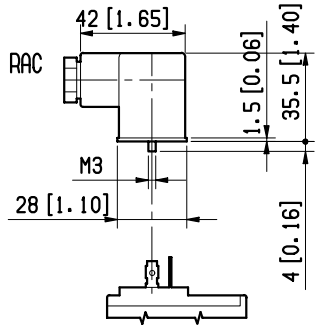
182-LED-T-A1: with LED monitoring presence of voltage.

182-09-G-DO-2-1: with VDR (Voltage Dependent Resistor), to prevent input voltage over-shootings.



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

532-09 RAC: special connectors with rectifier (RAC) for AC applications.

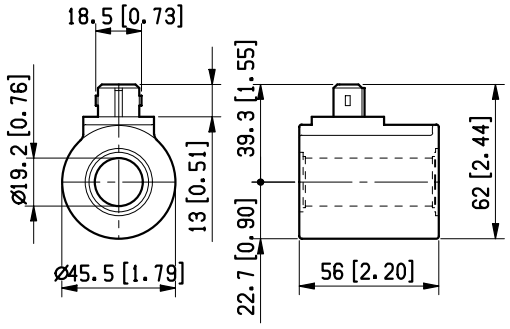


Material No.	Description
R933002892	532-09 RAC GRAY
R933002891	532-09 RAC BLACK

= 03

With coils having AMP Junior connector, and with bi-directional diode.

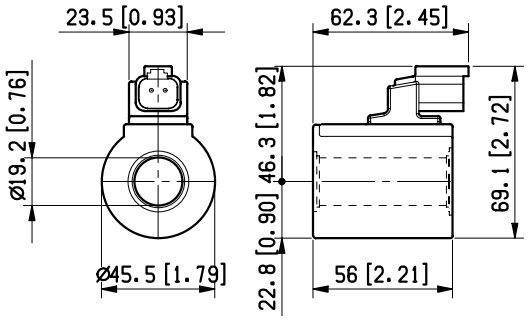
Protection class: IP 65 with female connector properly fitted (see drawing).



= 07

With coils having DEUTSCH DT 04-2P connector, and with bi-directional diode.

Protection class: IP 69 K with female connector properly fitted (see drawing).



Bosch Rexroth Corp.
Hydraulics
2315 City Line Road
Bethlehem, PA 18017-2131
USA
Telephone (610) 694-8300
Facsimile (610) 694-8467
www.boschrexroth-us.com