

Part number:

**HYDROMA**

HYDRAULICKÉ SYSTÉMY

**HIDROMA  
SYSTEMS**

UKŁADY HYDRAULICZNE

**HYDROMA**

ГИДРАВЛИЧЕСКИЕ СИСТЕМЫ

## 3/2 ways/positions flow diverters

RE 18302-01/12.09

L700... (VS70)

Size 4  
Series 00  
Maximum operating pressure 310 bar [4500 psi]  
Maximum flow 20 l/min [5.3 gpm]  
Ports G 1/4



### Summary

|  |  |
|--|--|
| Description                              |  |
| General specifications                   |  |
| Ordering details                         |  |
| Spool variants                           |  |
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| Technical data                           |  |
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| External dimensions and fittings         |  |
| Electric connections                     |  |

### General specifications

|             |   |
|-------------|---|
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|             | - 3 way 2 position valve.   |
| 1           | - Directional spool valve with direct solenoid control.   |
| 2           | - Upon request, hydraulic / pneumatic pilot , or manual push and twist control.                       |
| 2           |   |
| 3           | - Control spool operated by screwed-in solenoid, with easily extractable coil fastened by a ring nut. |
| 3           |   |
| 5           | - Wet pin tube for DC coil, with push rod for mechanical override in case of voltage shortage.        |
| 6           | - Unrestricted 360° orientation of DC coil.   |
| 7           | - Control spool held in normal position by return spring.   |
|             | - Optional manual override (push-button or screw type).   |
|             | - Connectors available: DIN 43650 – ISO 4400, AMP Junior, DT04-2P (Deutsch), Free leads               |

## Ordering details

L 7 00 2 \_ \_ \_ \_ \_ 0

### Family

Compact directional valve

### Type

Flow Diverters

### Ports

G 1/4 DIN3852

### Control type

Solenoid (coil C36) without emergency = 10  
 Solenoid (coil C36) with push-button type emergency = 1P  
 Solenoid (coil C36) with screw type emergency = 1F  
 Hydraulic / pneumatic control = P1

### Spool variants

Transitory position closed = 3A  
 Transitory position open = 3N

### Drain type

Internal drain = I  
 External drain = E

### Electric connections

00 = Without coil  
 01 = With coil, without connector  
 02 = With coil and with non-assembled connector, type DIN 43650 – ISO 4400  
 03 = With coil having AMP Junior connector  
 04 = With coil having AMP Junior Horiz. connector  
 07 = With coil having DEUTSCH DT 04-2P connect.  
 31 = With coil and bipolar sheathed lead 350mm [13.8"] long

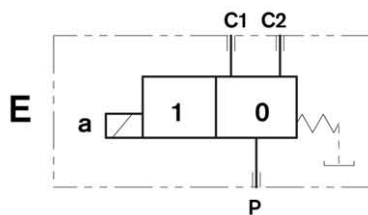
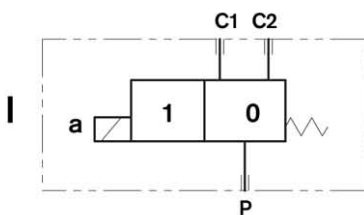
### Voltage supply

|      |   |   |   |   |   |   |   |   |   |              |
|------|---|---|---|---|---|---|---|---|---|--------------|
| 00 = |   |   |   |   |   |   |   |   |   | Without coil |
| OB = | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | 12V DC       |
| AD = |   | ■ |   |   |   |   |   |   |   | 13V DC       |
| OC = | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | 24V DC       |
| AC = |   | ■ |   |   |   |   |   |   |   | 27V DC       |
| OD = |   |   | ■ |   |   |   |   |   |   | 48V DC       |
| OE = |   |   |   |   |   |   |   |   |   | 110V DC      |

31 07 04 03 02 01 00

Available connections

## Spool variants



3N

## Principles of operation, cross section

A valve basically consists of a housing (1), a control spool (2), a return spring (3) and a solenoid (5). It is designed to select which one of two circuits (C1 or C2) is to be supplied with the oil delivered from one single hose (P): with spool in position "0", when the solenoid is de-energized, the flow goes from P to C1, with spool in position "1", when the solenoid is energized the flow goes from P to C2.

With the coil de-energized, the return spring (3) pushes back

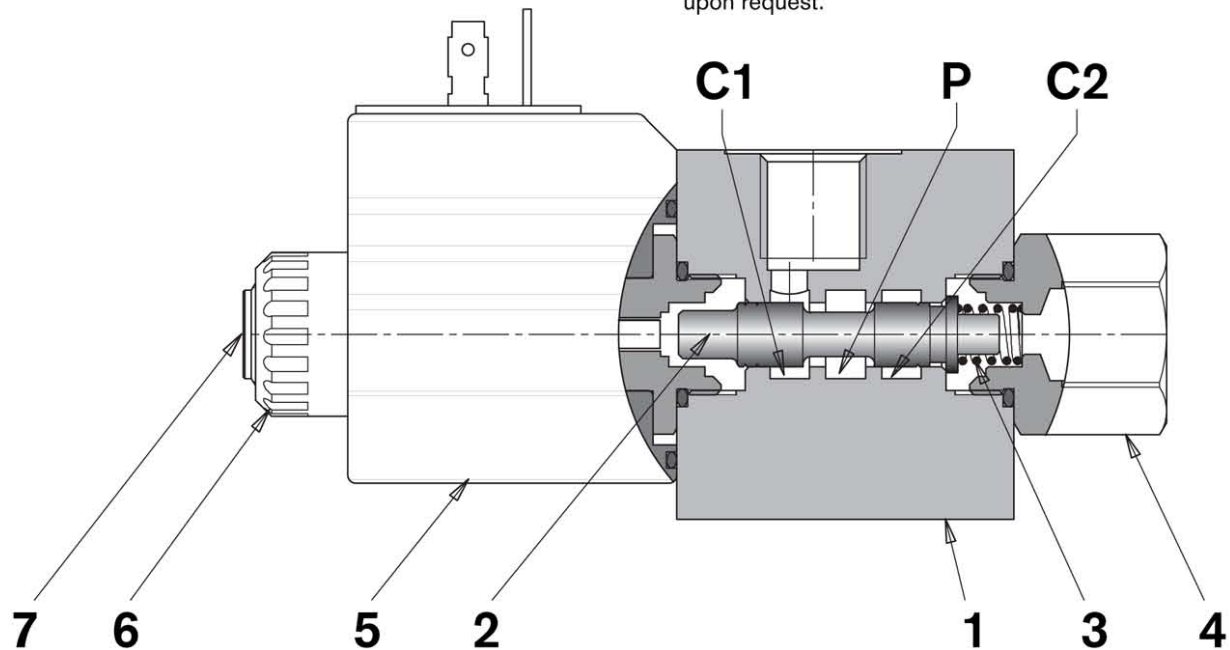
the spool (2) and holds it in position "0".

The coil (5) is fastened to the tube by the ring nut (6).

The manual override (7) allows to shift the spool (2) also in case of voltage shortage.

An external drain (4), to be connected to tank, ensures shifting operations also at higher working pressure.

Hydraulic / pneumatic pilot control for spool shifting is available upon request.



## Technical Data (for applications with different specifications consult us)

### General

|                     |          |                                     |
|---------------------|----------|-------------------------------------|
| Valve weight        | kg [lbs] | 0.89 [1.960]                        |
| Ambient Temperature | °C [°F]  | -20....+50 [-4....+122] (NBR seals) |

### Hydraulic

|  |                               |   |
|--|-------------------------------|---|
| Maximum pressure with external drain                             | bar [psi]                     | 310 [4500]  |
| Maximum pressure with internal drain                             | bar [psi]                     | 250 [3625]  |
| Maximum flow   | l/min [gpm]                   | 20 [5.3]  |
| Hydraulic fluid  |                               | Mineral oil based hydraulic fluids HL (DIN 51524 part 1).<br>Mineral oil based hydraulic fluids HLP (DIN 51524 part 2).<br>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<br>ISO 4406: class 20/18/15<br>NAS 1638: class 9  |
| Viscosity range  | mm <sup>2</sup> /s            | 5....420  |
| Internal leakage with 100 bar [1450 psi] secondary pressure at C | cc/min [in <sup>3</sup> /min] | min.7 [0.43] max. 15 [0.74]   |

**Electrical**

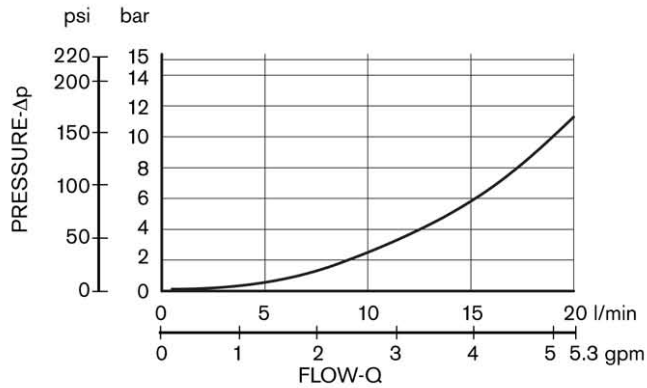
|   |  |              |      |      |      |      |      |  |  |  |
|---|--|--------------|------|------|------|------|------|--|--|--|
| Voltage type                              | DC   |              |      |      |      |      |      |  |  |  |
| Voltage tolerance (nominal voltage)       | %  | -10 .... +10 |      |      |      |      |      |  |  |  |
| Duty                                      | Continuous, with ambient temperature $\leq 50^{\circ}\text{C}$ [122°F] |              |      |      |      |      |      |  |  |  |
| Maximum coil temperature                  | $^{\circ}\text{C}$ [°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  |  |  |  |
| Voltage type                              |  | DC           | DC   | DC   | DC   | DC   | DC   |  |  |  |
| Power consumption                         | W  | 26           | 26   | 26   | 26   | 26   | 26   |  |  |  |
| Current <sup>(1)</sup>                    | A  | 2.15         | 2.00 | 1.10 | 1.00 | 0.54 | 0.27 |  |  |  |
| Resistance <sup>(2)</sup>                 | $\Omega$   | 5.5          | 6.5  | 22   | 28   | 89   | 413  |  |  |  |

<sup>1)</sup> Nominal - <sup>2)</sup>  $\pm 7\%$  at temperature  $20^{\circ}\text{C}$  [68°F]

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

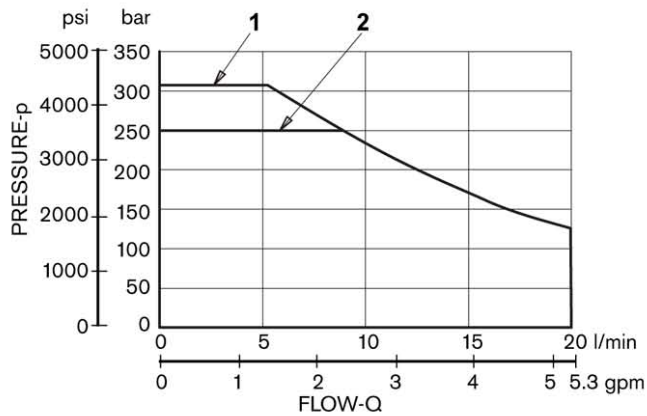
## Characteristic curves

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



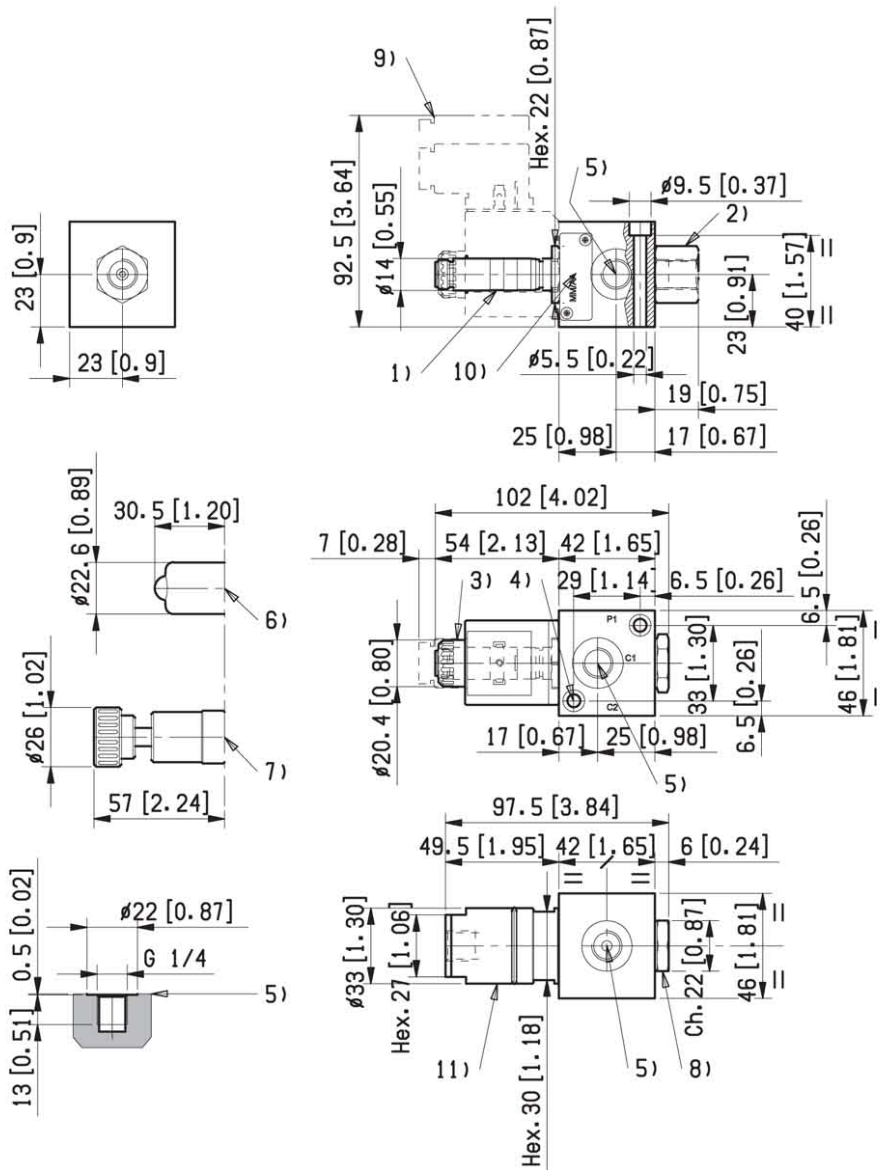
## Performances limits

The performance limits refer to the following conditions: coils at operating temperature, voltage supply 10% below nominal, no back pressure in the tank line.



| Curve n. | Drain type     |
|----------|----------------|
| 1        | External (-E-) |
| 2        | Internal (-I-) |

## External Dimensions and Fittings



1 Solenoid tube hex 22 mm. Torque 20-22Nm [14.7-16.2 ft-lb].

2 Plug for version with external drain hex 22 mm.  
Torque 20-22Nm [14.7-16.2 ft-lb].

3 Ring nut for coil locking OD 20,4 mm [8 in].  
Torque 3 – 4 Nm [2.2 – 3.0 ft-lb].

4 Two through holes for installation. Recommended screws  
M5 with strength class DIN 8.8. Torque 5-6Nm [3.6-4.4 ft-lb].

5 Ports P, C1, C2, External drain, hydraulic/pneumatic pilot port  
G 1/4.

6 Optional push-button type emergency for spool opening: it  
is pressure stuck to the ring nut 5-6Nm [3.7-4.4 ft-lb] for coil  
locking. Mat no. R933000042.

7 Optional screw type emergency for spool opening: it  
is screwed torque 6-7Nm [4.4-5.2 ft-lb] to the tube as  
replacement of the coil ring nut. Mat no. R933000021 .

8 Plug for version with internal drain hex 22 mm.  
Torque 20-22Nm [14.7-16.2 ft-lb].

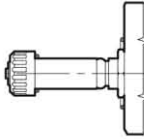
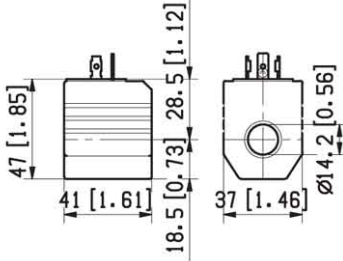
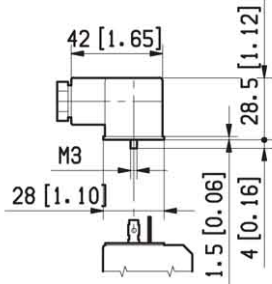
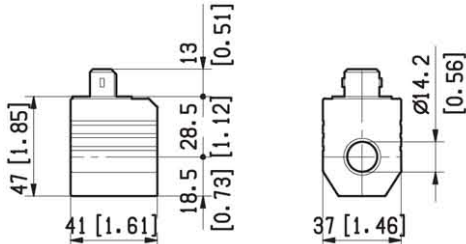
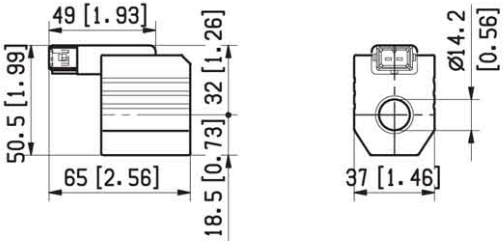
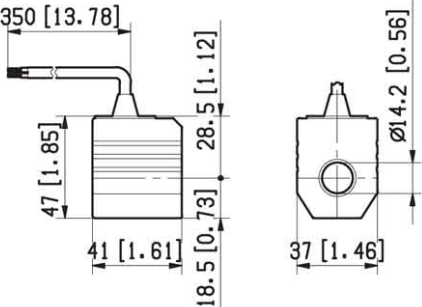
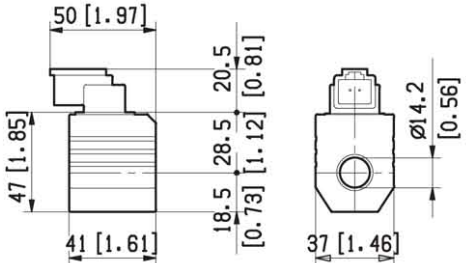
9 Minimum clearance needed for connector removal.

10 Identification label.

11 Hydraulic, or pneumatic pilot connector: hex 30 mm.  
Torque 20-22 Nm [14.7-16.2 ft-lb].



## Electric connection

| <p>=00</p> | <p>Without coils, but with ring nut and O-Rings for coil fitting (solution recommended for flexible stock handling)</p>    | <p>=01</p> | <p>With coils having plug-in pins EN 175301-803, without connectors</p>   |             |            |             |            |              |            |                    |            |                    |            |                    |            |                     |            |                               |            |                               |  |
|------------|---|------------|--|-------------|------------|-------------|------------|--------------|------------|--------------------|------------|--------------------|------------|--------------------|------------|---------------------|------------|-------------------------------|------------|-------------------------------|--|
| <p>=02</p> | <p>With coils and with connectors non-assembled, type EN 175301-803.<br/>                 Protection class: IP 65 when connector with seal is properly screwed down, and cable clamp is correctly tightened.</p> <p><b>182-09:</b> Standard.<br/> <b>182-LED-T-A1:</b> with LED monitoring presence of voltage.<br/> <b>182-09-G-DO-2-1:</b> with VDR (Voltage Dependent Resistor), to prevent input voltage over-shootings.</p> <table border="1" data-bbox="272 923 810 1181"> <thead> <tr> <th>Mat. No.</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>R933002885</td> <td>182-09 GRAY</td> </tr> <tr> <td>R933002889</td> <td>182-09 BLACK</td> </tr> <tr> <td>R933002893</td> <td>182-LED-T-A1 12 DC</td> </tr> <tr> <td>R933002894</td> <td>182-LED-T-A1 24 DC</td> </tr> <tr> <td>R933002896</td> <td>182-LED-T-A1 48 DC</td> </tr> <tr> <td>R933002897</td> <td>182-LED-T-A1 110 DC</td> </tr> <tr> <td>R933002886</td> <td>182-09-G-DO-2-1 12DC with VDR</td> </tr> <tr> <td>R933002887</td> <td>182-09-G-DO-2-1 24DC with VDR</td> </tr> </tbody> </table> |            | Mat. No.   | Description | R933002885 | 182-09 GRAY | R933002889 | 182-09 BLACK | R933002893 | 182-LED-T-A1 12 DC | R933002894 | 182-LED-T-A1 24 DC | R933002896 | 182-LED-T-A1 48 DC | R933002897 | 182-LED-T-A1 110 DC | R933002886 | 182-09-G-DO-2-1 12DC with VDR | R933002887 | 182-09-G-DO-2-1 24DC with VDR |  |
| Mat. No.   | Description   |            |  |             |            |             |            |              |            |                    |            |                    |            |                    |            |                     |            |                               |            |                               |  |
| R933002885 | 182-09 GRAY   |            |  |             |            |             |            |              |            |                    |            |                    |            |                    |            |                     |            |                               |            |                               |  |
| R933002889 | 182-09 BLACK  |            |  |             |            |             |            |              |            |                    |            |                    |            |                    |            |                     |            |                               |            |                               |  |
| R933002893 | 182-LED-T-A1 12 DC  |            |  |             |            |             |            |              |            |                    |            |                    |            |                    |            |                     |            |                               |            |                               |  |
| R933002894 | 182-LED-T-A1 24 DC  |            |  |             |            |             |            |              |            |                    |            |                    |            |                    |            |                     |            |                               |            |                               |  |
| R933002896 | 182-LED-T-A1 48 DC  |            |  |             |            |             |            |              |            |                    |            |                    |            |                    |            |                     |            |                               |            |                               |  |
| R933002897 | 182-LED-T-A1 110 DC   |            |  |             |            |             |            |              |            |                    |            |                    |            |                    |            |                     |            |                               |            |                               |  |
| R933002886 | 182-09-G-DO-2-1 12DC with VDR   |            |  |             |            |             |            |              |            |                    |            |                    |            |                    |            |                     |            |                               |            |                               |  |
| R933002887 | 182-09-G-DO-2-1 24DC with VDR   |            |  |             |            |             |            |              |            |                    |            |                    |            |                    |            |                     |            |                               |            |                               |  |
| <p>=03</p> | <p>With coils having AMP Junior connector, and with bi-directional diode.<br/>                 Protection class: IP 65 with female connector properly fitted (see drawing).</p>    | <p>=04</p> | <p>With coils having Horizontal AMP Junior connector, and with bi-directional diode.<br/>                 Protection class: IP 65 with female connector properly fitted (see drawing).</p>           |             |            |             |            |              |            |                    |            |                    |            |                    |            |                     |            |                               |            |                               |  |
| <p>=31</p> | <p>With coils having bi-directional diode and bipolar sheathed free lead, 350 mm long, without pins.</p>   |            | <p>=07</p> <p>With coils having DEUTSCH DT 04-2P connector, and with bi-directional diode.<br/>                 Protection class: IP 69 K with female connector properly fitted (see drawing).</p>  |             |            |             |            |              |            |                    |            |                    |            |                    |            |                     |            |                               |            |                               |  |

# 6/2 ways/positions flow diverters, 6 to 10/2 ways/positions flow diverters

RE 18302-04/12.09

L710... (VS120-VS125-VS129)

Size 4  
Series 00  
Maximum operating pressure 310 bar [4500 psi]  
Maximum flow 25 l/min [6.6 gpm]  
Ports G 1/4 - SAE4 - JIS B 1/4



## Summary

### Description

General specifications  
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Principles of operation, cross section  
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 $\Delta p$ - $Q_v$  characteristic curves  
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Electric connection

### Page

- 1 - 6 way 2 position valve.
- 1 - Directional spool valve with direct solenoid control.
- 2 - Upon request, hydraulic / pneumatic pilot.
- 2 - Control spool operated by screwed-in solenoid, with easily extractable coil fastened by a ring nut.
- 3 - Wet pin tube for DC coil, with push rod for mechanical override in case of voltage shortage.
- 3 - Unrestricted 360° orientation of DC coil.
- 5 - Control spool held in normal position by return spring.
- 6 - Optional manual override (push-button or screw type).
- 9 - Connectors available: DIN 43650 – ISO 4400, AMP Junior, DT04-2P (Deutsch), Free leads.

## General specifications



## Ordering details

|   |  | L | 7 | 1 | 0 | - | - | - | - | - | 0 |
|---|--|---|---|---|---|---|---|---|---|---|---|
| <b>Family</b><br>Compact directional valve  |  |   |   |   |   |   |   |   |   |   |   |
| <b>Type</b><br>Flow Diverters   |  |   |   |   |   |   |   |   |   |   |   |
| <b>Ports</b><br>G 1/4 DIN3852<br>9/16-18 UNF2-B (SAE6)<br>JIS B G 1/4   |  |   |   |   |   |   |   |   |   |   |   |
|   |  |   |   |   |   |   |   |   |   |   |   |
| <b>Control type</b><br>Solenoid (coil C36) without emergency<br>Solenoid (coil C36) with push-button type emergency<br>Solenoid (coil C36) with screw type emergency<br>Hydraulic / pneumatic control |  |   |   |   |   |   |   |   |   |   |   |
|   |  |   |   |   |   |   |   |   |   |   |   |
| <b>Spool Variants</b><br>6 way / 2 position P1 side<br>6 way / 2 position P2 side   |  |   |   |   |   |   |   |   |   |   |   |
|   |  |   |   |   |   |   |   |   |   |   |   |
| <b>Drain type</b><br>Internal drain<br>External drain   |  |   |   |   |   |   |   |   |   |   |   |
|   |  |   |   |   |   |   |   |   |   |   |   |

**Electric connections**

00 = Without coil  
 01 = With coil, without connector  
 02 = With coil and with non-assembled connector, type DIN 43650 – ISO 4400  
 03 = With coil having AMP Junior connector  
 04 = With coil having AMP Junior Horiz. connector  
 07 = With coil having DEUTSCH DT 04-2P connect.  
 31 = With coil and bipolar sheathed lead 350mm [13.8"] long

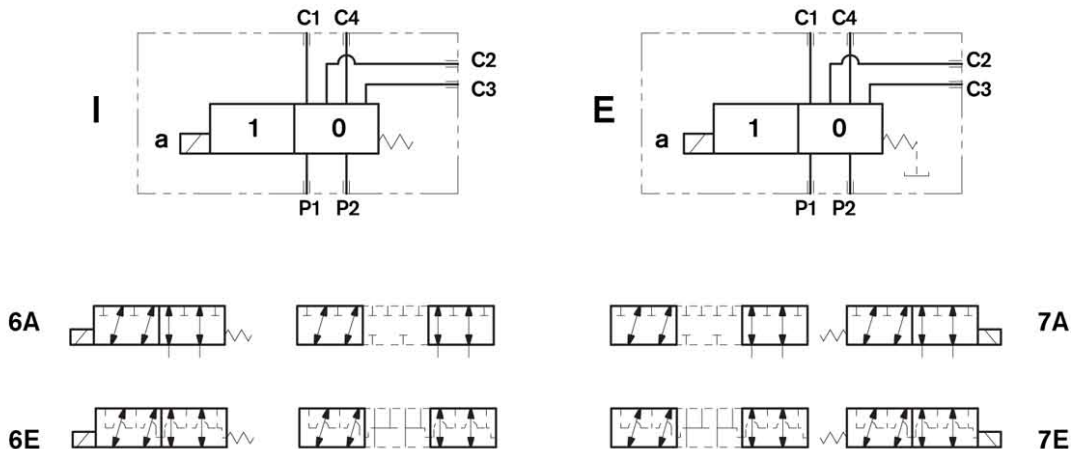
**Voltage supply**

Without coil  
 12V DC  
 13V DC  
 24V DC  
 27V DC  
 48V DC  
 110V DC

|      |    |    |    |    |    |    |    |  |  |  |  |
|------|----|----|----|----|----|----|----|--|--|--|--|
| 00 = |    |    |    |    |    |    |    |  |  |  |  |
| OB = |    |    |    |    |    |    |    |  |  |  |  |
| AD = |    |    |    |    |    |    |    |  |  |  |  |
| OC = |    |    |    |    |    |    |    |  |  |  |  |
| AC = |    |    |    |    |    |    |    |  |  |  |  |
| OD = |    |    |    |    |    |    |    |  |  |  |  |
| OE = |    |    |    |    |    |    |    |  |  |  |  |
|      | 31 | 07 | 04 | 03 | 02 | 01 | 00 |  |  |  |  |

Available connections

## Spool variants



## Principles of operation, cross section

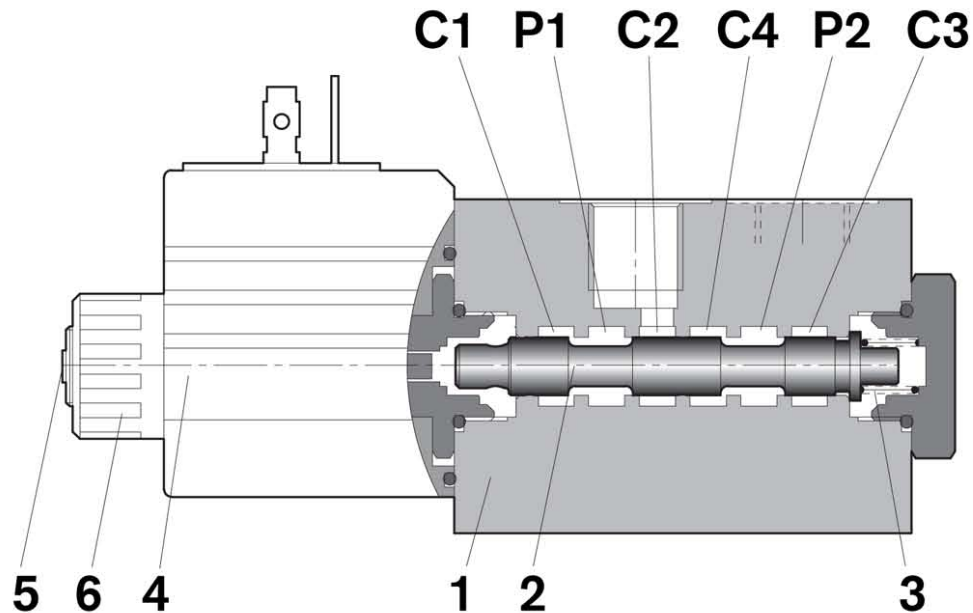
A valve basically consists of a housing (1), a control spool (2), a return spring (3) and a solenoid (4). It is designed to connect two inlet lines P1 – P2 (normally a set of hoses) and divert them to either the outlet ports (C1 – C4) with spool in position "0", when the solenoid is de-energized, or to the outlet ports (C2 – C3) with spool in position "1", when the solenoid is energized.

With the coil de-energized, the return spring (3) pushes back the spool (2) and holds it in position "0"

The coil (4) is fastened to the tube by the ring nut (6).

The manual override (6) allows to shift the spool (2) also in case of voltage shortage.

Hydraulic / pneumatic pilot control for spool shifting is available upon request.



## Technical Data (for applications with different specifications consult us)

### General

|                     |          |                                     |
|---------------------|----------|-------------------------------------|
| Valve weight        | kg [lbs] | 1.13 [2.5]                          |
| Mounting position   |          | unrestricted                        |
| Ambient Temperature | °C [°F]  | -20....+50 [-4....+122] (NBR seals) |

### Hydraulic

|  |                               |   |
|--|-------------------------------|---|
| Maximum pressure with external drain                             | bar [psi]                     | 310 [4500]  |
| Maximum pressure with internal drain                             | bar [psi]                     | 250 [3625]  |
| Maximum inlet flow   | l/min [gpm]                   | 25 [6.6]  |
| Hydraulic fluid  |                               | Mineral oil based hydraulic fluids HL (DIN 51524 part 1).<br>Mineral oil based hydraulic fluids HLP (DIN 51524 part 2).<br>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<br>ISO 4406: class 20/18/15<br>NAS 1638: class 9  |
| Viscosity range  | mm <sup>2</sup> /s            | 5....420  |
| Internal leakage with 100 bar [1450 psi] secondary pressure at C | cc/min [in <sup>3</sup> /min] | min.7 [0.43] max. 15 [0.74]   |

**Electrical**

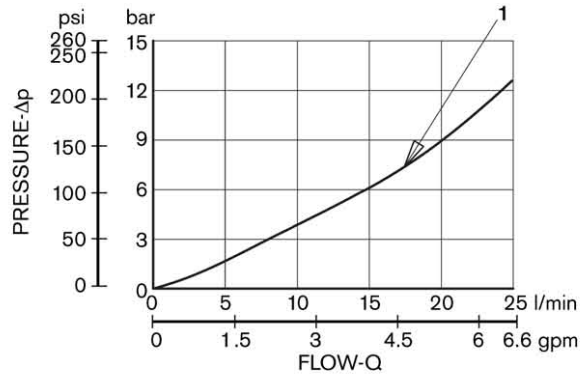
|   |          |  |      |      |      |      |      |  |  |
|---|----------|--|------|------|------|------|------|--|--|
| Voltage type                              |          | DC   |      |      |      |      |      |  |  |
| Voltage tolerance (nominal voltage)       | %        | -10 .... +10   |      |      |      |      |      |  |  |
| 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  |  |  |
| Voltage type                              |          | DC   | DC   | DC   | DC   | DC   | DC   |  |  |
| Power consumption                         | W        | 26   | 26   | 26   | 26   | 26   | 26   |  |  |
| Current <sup>(1)</sup>                    | A        | 2.15   | 2.00 | 1.10 | 1.00 | 0.54 | 0.27 |  |  |
| Resistance <sup>(2)</sup>                 | Ω        | 5.5  | 6.5  | 22   | 28   | 89   | 413  |  |  |

1) Nominal - 2) ± 7% at temperature 20°C [68°F]

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

### Characteristic curves

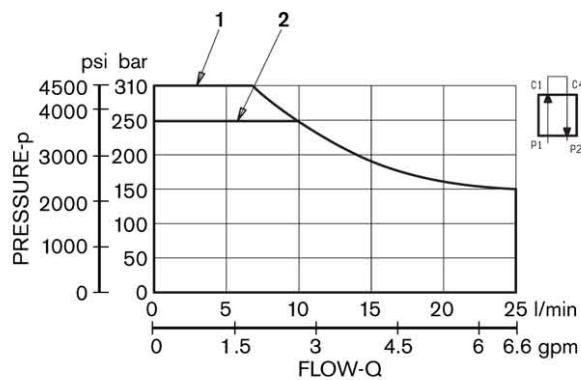
Measured with hydraulic fluid ISO-VG32 at  $45^{\circ} \pm 5^{\circ} \text{ C}$  [ $113^{\circ} \pm 9^{\circ} \text{ F}$ ]; ambient temperature  $20^{\circ} \text{ C}$  [ $68^{\circ} \text{ F}$ ].



| Flow path | Curve No. |
|-----------|-----------|
| P1>C1     | 1         |
| P1>C2     | 1         |
| P2>C3     | 1         |
| P2>C4     | 1         |

### DI-DE performance limits

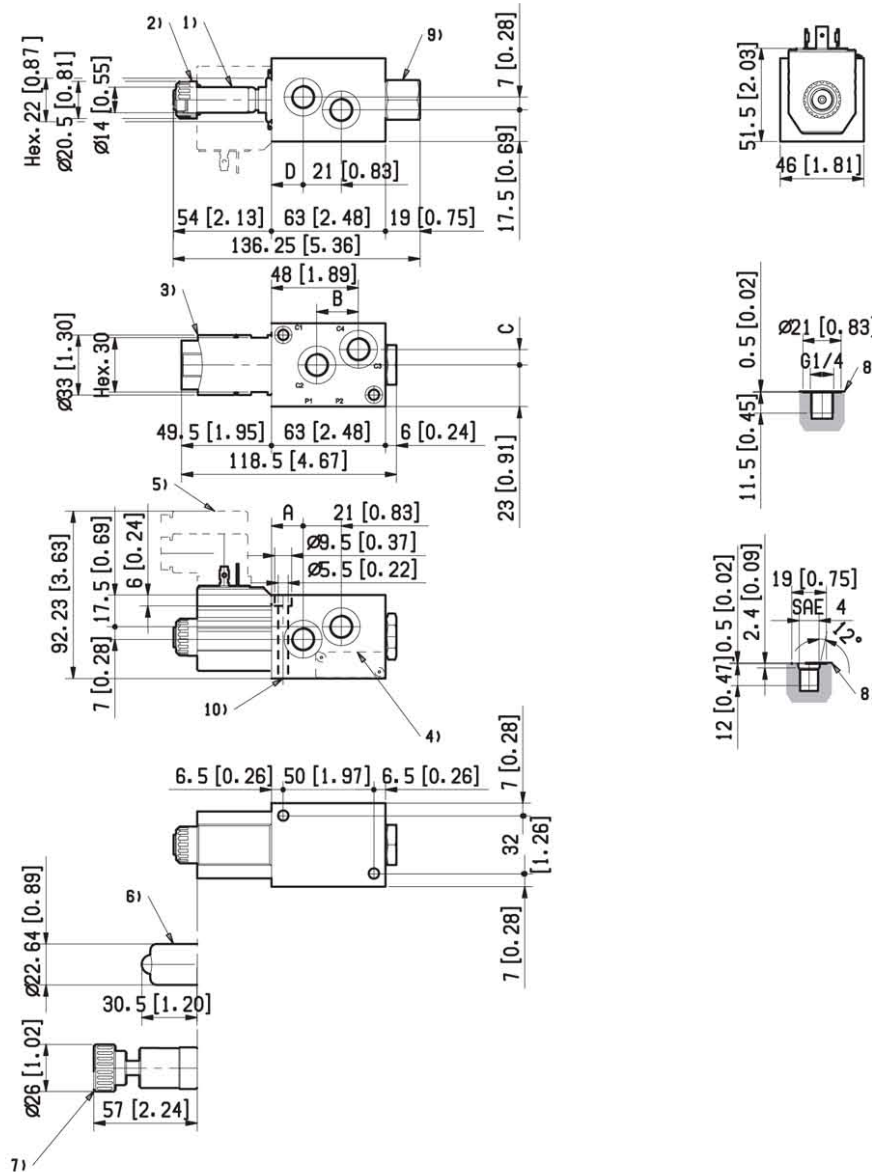
The performance limits refer to the following conditions: coils at operating temperature, voltage supply 10% below nominal, no back pressure in the tank line.



| Drain type     | Curve No. |
|----------------|-----------|
| External (-E-) | 1         |
| Internal (-I-) | 2         |

Flow across both ways: forward across P1>C1 and reverse across C4>P2

## External Dimensions and Fittings

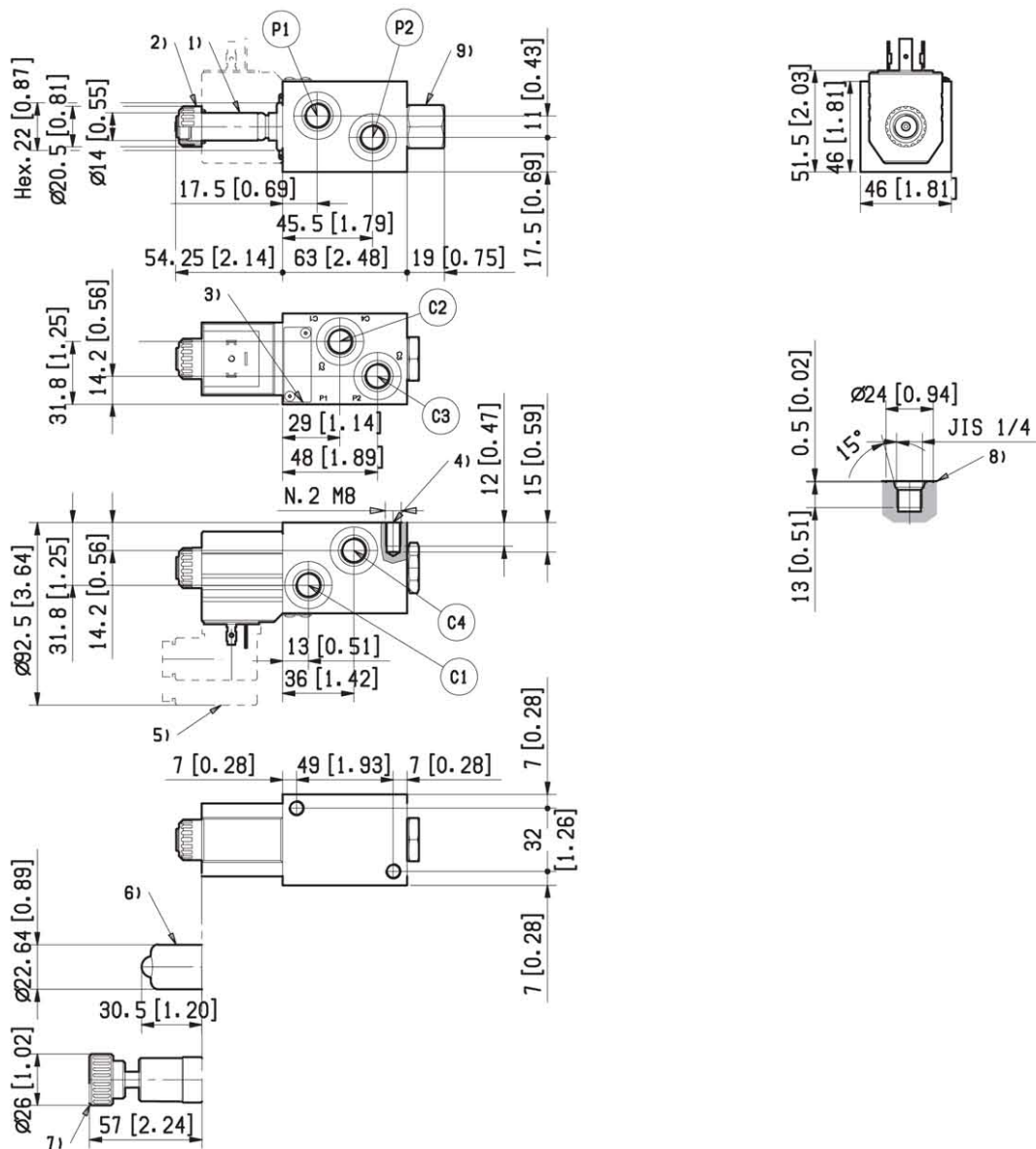


| Measure     | VS120 (G1/4) | VS125 (SAE 4) |
|-------------|--------------|---------------|
| A mm [inch] | 17.5 [0.69]  | 16.5 [0.65]   |
| B mm [inch] | 23 [0.91]    | 22.5 [0.89]   |
| C mm [inch] | 8.5 [0.33]   | 7.5 [0.30]    |
| D mm [inch] | 17.5 [0.69]  | 18.5 [0.73]   |

- Solenoid tube hex 22 mm.  
Torque 20-22Nm [14.6-16.2 ft-lb].
- Ring nut for coil locking OD 20.5 mm [1.04 in].  
Torque 3-4 Nm [2.2-3.0 ft-lb].
- Optional hydraulic / pneumatic piloted version.  
Pilot port plug available with G 1/4; hex 30 mm.  
Torque 20 – 22 Nm [14.7 – 16.2 ft-lb].
- Identification label.
- Minimum clearance needed for connector removal.
- Optional push-button, EP type, emergency for spool opening: it is pressure stuck to the ring nut for coil locking. Mat no. R933000042.
- Optional screw, EF type, emergency for spool opening: it is screwed (torque 6-7 Nm [4.4-5.5 ft-lb]) to the tube as replacement of the coil ring nut. Mat no. R933000021 .
- Ports P1, P2, C1, C2, C3, C4.
- External drain plug available with G 1/4 and SAE 4 port.  
Hex 22mm, torque 20-22 Nm [14.7-16.2 ft-lb].
- Two fixation holes Use M5 screws with strength class DIN 8.8. Torque 5-6 Nm [3.6-4.4 ft-lb].



## External Dimensions and Fittings



1 Solenoid tube hex 22 mm.

Torque 20-22Nm [14.6-16.2 ft-lb].

2 Ring nut for coil locking OD 20.5 mm [1.04 in].

Torque 3-4 Nm [2.2-3.0 ft-lb].

3 Identification label.

4 Two fixation holes M8.

5 Minimum clearance needed for connector removal.

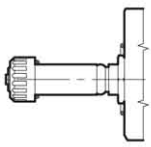
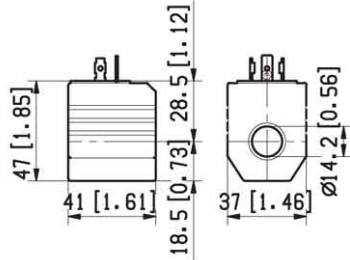
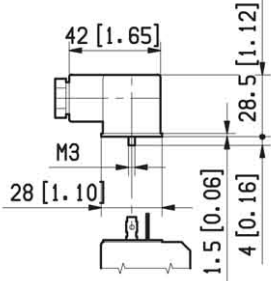
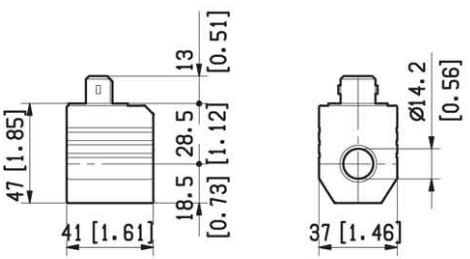
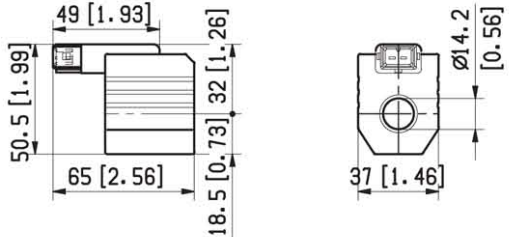
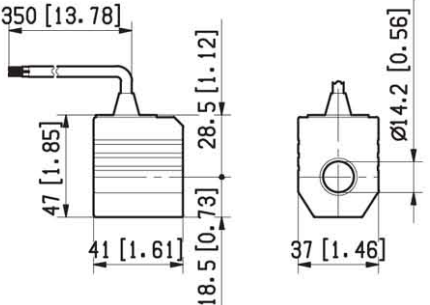
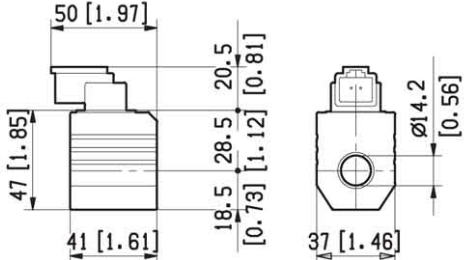
6 Optional push-button, EP type, emergency for spool opening: it is pressure stuck to the ring nut for coil locking. Mat no. R933000042

7 Optional screw, EF type, emergency for spool opening: it is screwed (torque 6-7 Nm [4.4-5.5 ft-lb]) to the tube as replacement of the coil ring nut. Mat no. R933000021.

8 Ports P1, P2, C1, C2, C3, C4.



Electric connection

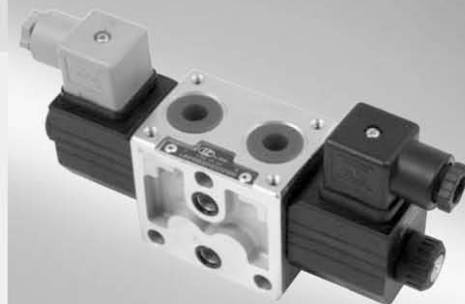
| <p>=00</p> <p>Without coils, but with ring nut and O-Rings for coil fitting (solution recommended for flexible stock handling)</p>   | <p>=01</p> <p>With coils having plug-in pins EN 175301-803, without connectors</p>   |          |             |            |             |            |              |            |                    |            |                    |            |                    |            |                     |            |                               |            |                               |
|---|--|----------|-------------|------------|-------------|------------|--------------|------------|--------------------|------------|--------------------|------------|--------------------|------------|---------------------|------------|-------------------------------|------------|-------------------------------|
| <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><b>182-09:</b> Standard.<br/> <b>182-LED-T-A1:</b> with LED monitoring presence of voltage.<br/> <b>182-09-G-DO-2-1:</b> with VDR (Voltage Dependent Resistor), to prevent input voltage over-shootings.</p> <p>=02</p> <table border="1" data-bbox="159 840 702 1108"> <thead> <tr> <th>Mat. No.</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>R933002885</td> <td>182-09 GRAY</td> </tr> <tr> <td>R933002889</td> <td>182-09 BLACK</td> </tr> <tr> <td>R933002893</td> <td>182-LED-T-A1 12 DC</td> </tr> <tr> <td>R933002894</td> <td>182-LED-T-A1 24 DC</td> </tr> <tr> <td>R933002896</td> <td>182-LED-T-A1 48 DC</td> </tr> <tr> <td>R933002897</td> <td>182-LED-T-A1 110 DC</td> </tr> <tr> <td>R933002886</td> <td>182-09-G-DO-2-1 12DC with VDR</td> </tr> <tr> <td>R933002887</td> <td>182-09-G-DO-2-1 24DC with VDR</td> </tr> </tbody> </table>  |  | Mat. No. | Description | R933002885 | 182-09 GRAY | R933002889 | 182-09 BLACK | R933002893 | 182-LED-T-A1 12 DC | R933002894 | 182-LED-T-A1 24 DC | R933002896 | 182-LED-T-A1 48 DC | R933002897 | 182-LED-T-A1 110 DC | R933002886 | 182-09-G-DO-2-1 12DC with VDR | R933002887 | 182-09-G-DO-2-1 24DC with VDR |
| Mat. No.  | Description  |          |             |            |             |            |              |            |                    |            |                    |            |                    |            |                     |            |                               |            |                               |
| R933002885  | 182-09 GRAY  |          |             |            |             |            |              |            |                    |            |                    |            |                    |            |                     |            |                               |            |                               |
| R933002889  | 182-09 BLACK   |          |             |            |             |            |              |            |                    |            |                    |            |                    |            |                     |            |                               |            |                               |
| R933002893  | 182-LED-T-A1 12 DC   |          |             |            |             |            |              |            |                    |            |                    |            |                    |            |                     |            |                               |            |                               |
| R933002894  | 182-LED-T-A1 24 DC   |          |             |            |             |            |              |            |                    |            |                    |            |                    |            |                     |            |                               |            |                               |
| R933002896  | 182-LED-T-A1 48 DC   |          |             |            |             |            |              |            |                    |            |                    |            |                    |            |                     |            |                               |            |                               |
| R933002897  | 182-LED-T-A1 110 DC  |          |             |            |             |            |              |            |                    |            |                    |            |                    |            |                     |            |                               |            |                               |
| R933002886  | 182-09-G-DO-2-1 12DC with VDR  |          |             |            |             |            |              |            |                    |            |                    |            |                    |            |                     |            |                               |            |                               |
| R933002887  | 182-09-G-DO-2-1 24DC with VDR  |          |             |            |             |            |              |            |                    |            |                    |            |                    |            |                     |            |                               |            |                               |
| <p>=03</p> <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>   | <p>=04</p> <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>  |          |             |            |             |            |              |            |                    |            |                    |            |                    |            |                     |            |                               |            |                               |
| <p>=31</p> <p>With coils having bi-directional diode and bipolar sheathed free lead, 350 mm long, without pins.</p>    | <p>=07</p> <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>     |          |             |            |             |            |              |            |                    |            |                    |            |                    |            |                     |            |                               |            |                               |

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

RE 18301-01/10.09  
Replaces: RIE00159/01.06

L8\_10... (ED1-Z)

Size 6  
Series 00  
Maximum operating pressure 310 bar [4500 psi]  
Maximum flow 30 l/min [7.9 gpm]  
Ports connection G 3/8 - SAE6



DVI0008

## Summary

### Description

General specifications  
Ordering details  
Configuration  
Spool variants  
Principles of operation, cross section  
Technical Data  
 $\Delta p$ - $Q_v$  characteristic curves  
Performance limits  
External Dimensions and Fittings  
Electric connection

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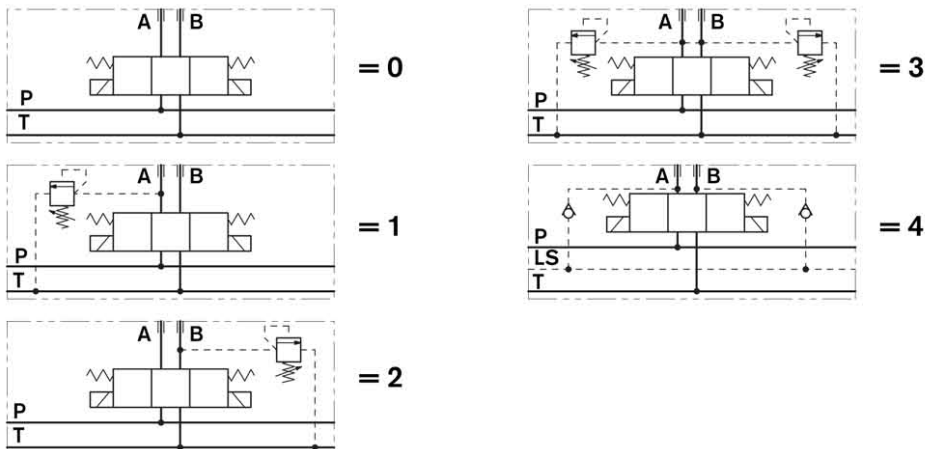
## General specifications

- 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.

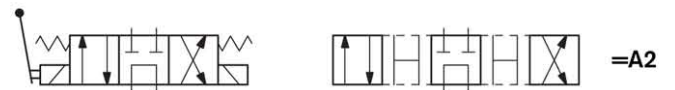
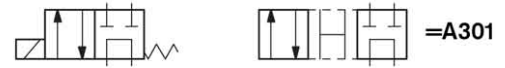
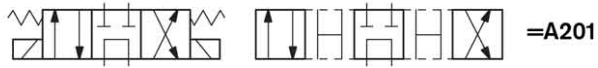
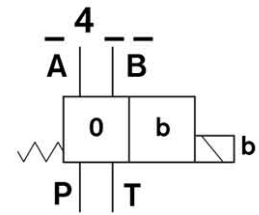
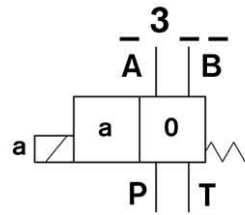
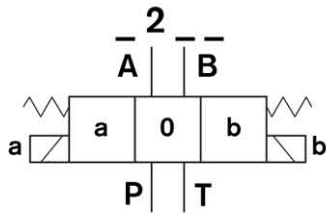
## Ordering Details

| L 8 _ 1 0 _ _ _ _ _ _ _ _   |    |   |      |    |    |    |    |    |    |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |
|---|----|---|------|----|----|----|----|----|----|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|
| <b>Family</b><br>Directional Valves<br>element ED   |    | <b>Optional fittings</b><br>__ = Lever type emergency <sup>3)</sup><br>0P = Push-button type emergency<br>0F = Screw type emergency<br><br><b>Secondary valves setting</b><br>0* = 50-210 bar [725-3045 psi]<br>1 = 100-310 bar [1450-4500 psi]<br>2 = 25-50 bar [362-725 psi]<br>3 = 50-100 bar [725-1450 psi]   |      |    |    |    |    |    |    |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |
| <b>Type</b><br>Size 6   |    |   |      |    |    |    |    |    |    |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |
| <b>Configuration</b> <sup>1)</sup>  |    | <b>Ports</b><br>0 = G 3/8 DIN 3852<br>1 = 9/16-18 UNF 2-B (SAE6)  |      |    |    |    |    |    |    |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |
| Standard = 0<br>With secondary valve on A = 1<br>With secondary valve on B = 2<br>With sec. valve on A and B = 3<br>With channels for Load S. = 4   |    |   |      |    |    |    |    |    |    |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |
| <b>Coil type</b><br>C36   |    | <b>Electric connection</b><br>00 = Without coils<br>01 = With coils, without connectors<br>02 = With coils and with non-assembled connectors, type EN 175301-803<br>03 = With coils having AMP Junior connector<br>04 = With coils having horizontal AMP Junior connector<br>07 = With coils having DEUTSCH DT 04-2P connector<br>31 = With coils and bipolar sheathed lead 350mm [13.8 in] long  |      |    |    |    |    |    |    |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |
| <b>Spool variants</b> <sup>2)</sup>   |    |   |      |    |    |    |    |    |    |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |
| 4/3 operated on both sides a and b = _ 2 _ _<br>4/2 operated on side a only = _ 3 _ _<br>4/2 operated on side b only = _ 4 _ _  |    | <b>Voltage supply</b><br>Without coils<br>12V DC<br>13V DC<br>24V DC<br>27V DC<br>48V DC<br>110V DC<br>(21.5 DC) 24V AC<br>(98 DC) 110V AC<br>(207 DC) 230V AC  |      |    |    |    |    |    |    |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |
| * Without secondary valves (versions L80__ ; 84__), the standard configuration corresponds to "0"<br>1) The secondary valves have a maximum flow capacity of 6 l/min [1.6 gpm]<br>2) The required hydraulic symbol and spool variant can be chosen by consulting page 3<br>3) Each different option for the type of emergency chosen implies a specific ordering code (refer to page 9) |    | <table border="1"> <tr><td>00 =</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>01 =</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>02 =</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>03 =</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>04 =</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>07 =</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>31 =</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table> | 00 = |    |    |    |    |    |    |  |  |  | 01 = |  |  |  |  |  |  |  |  |  | 02 = |  |  |  |  |  |  |  |  |  | 03 = |  |  |  |  |  |  |  |  |  | 04 = |  |  |  |  |  |  |  |  |  | 07 = |  |  |  |  |  |  |  |  |  | 31 = |  |  |  |  |  |  |  |  |  |
| 00 =  |    |   |      |    |    |    |    |    |    |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |
| 01 =  |    |   |      |    |    |    |    |    |    |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |
| 02 =  |    |   |      |    |    |    |    |    |    |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |
| 03 =  |    |   |      |    |    |    |    |    |    |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |
| 04 =  |    |   |      |    |    |    |    |    |    |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |
| 07 =  |    |   |      |    |    |    |    |    |    |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |
| 31 =  |    |   |      |    |    |    |    |    |    |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |
|   |    | <table border="1"> <tr><td>31</td><td>07</td><td>04</td><td>03</td><td>02</td><td>01</td><td>00</td></tr> </table> Available connections  | 31   | 07 | 04 | 03 | 02 | 01 | 00 |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |
| 31  | 07 | 04  | 03   | 02 | 01 | 00 |    |    |    |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |

## Configuration



## Spool variants



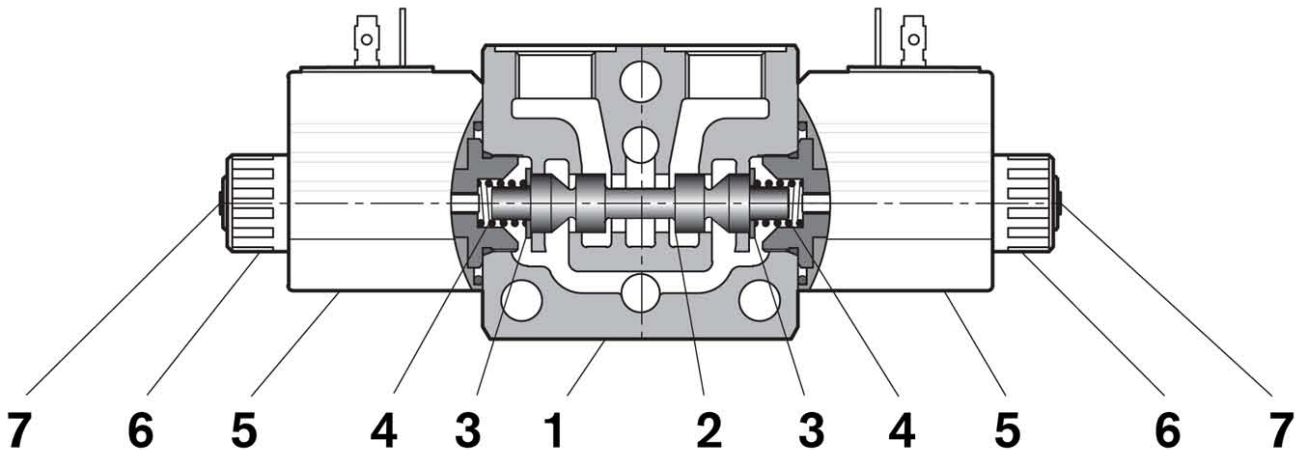
## Principles of operation, cross section

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,<br>with lever type emergency | kg [lbs] | 1.9 [4.2]                           |
| Valve element with 1 solenoid,<br>with lever type emergency | 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]   |
| Max dynamic pressure,<br>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   |                    | Mineral oil based hydraulic fluids HL (DIN 51524 part 1).<br>Mineral oil based hydraulic fluids HLP (DIN 51524 part 2).<br>For use of environmentally acceptable fluids (vegetable or polyglycol base)<br>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<br>ISO 4406: class 20/18/15<br>NAS 1638: class 9   |
| Viscosity range   | mm <sup>2</sup> /s | 5....420   |



**Electrical**

|   |  |              |      |      |      |      |      |                      |                     |                      |
|---|--|--------------|------|------|------|------|------|----------------------|---------------------|----------------------|
| Voltage type                              | DC (AC only with RAC connection)                                       |              |      |      |      |      |      |                      |                     |                      |
| Voltage tolerance (nominal voltage)       | %  | -10 ... +10  |      |      |      |      |      |                      |                     |                      |
| Duty                                      | Continuous, with ambient temperature $\leq 50^{\circ}\text{C}$ [122°F] |              |      |      |      |      |      |                      |                     |                      |
| Maximum coil temperature                  | $^{\circ}\text{C}$ [°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<br>+RAC<br>(21,5) | 110<br>+RAC<br>(98) | 230<br>+RAC<br>(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 <sup>(1)</sup>                    | A  | 2.15         | 2.00 | 1.10 | 1.00 | 0.54 | 0.27 | 1.20                 | 0.29                | 0.14                 |
| Resistance <sup>(2)</sup>                 | $\Omega$   | 5.5          | 6.5  | 22   | 28   | 89   | 413  | 18                   | 338                 | 1430                 |

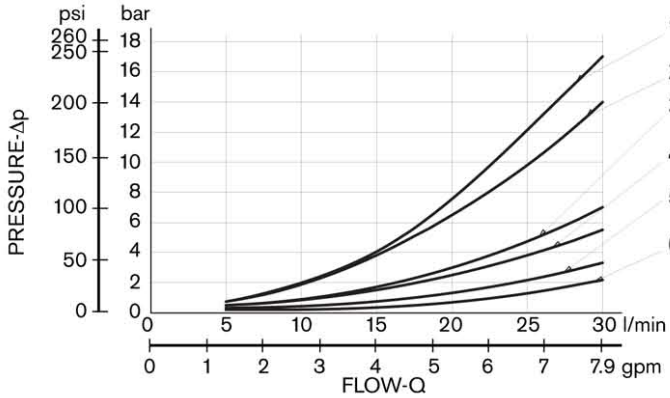
<sup>1)</sup> Nominal - <sup>2)</sup>  $\pm 7\%$  at temperature  $20^{\circ}\text{C}$  [68°F]

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



## Characteristic curves

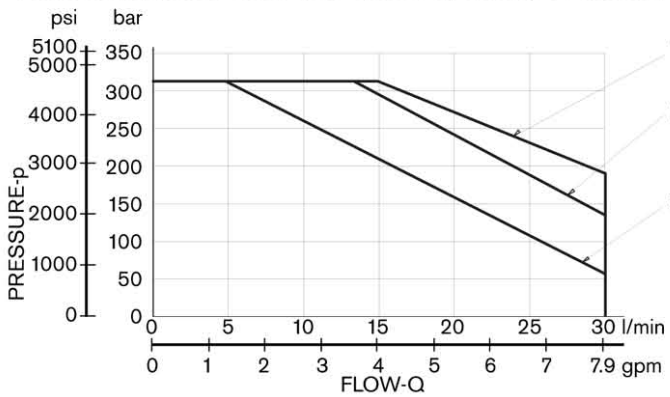
Measured with hydraulic fluid ISO-VG32 at  $45^{\circ} \pm 5^{\circ} \text{ C}$  [ $113^{\circ} \pm 9^{\circ} \text{ F}$ ]; ambient temperature  $20^{\circ} \text{ C}$  [ $68^{\circ} \text{ F}$ ].



| 1 | SPOOL VARIANT    | Curve No. |     |     |     |     |
|---|------------------|-----------|-----|-----|-----|-----|
|   |                  | P>T       | P>A | P>B | A>T | B>T |
| 2 | A201, A301, A401 | 3         | 2   | 2   | 1   | 1   |
| 3 | X301, X401       |           | 4   | 4   | 5   | 5   |
| 4 | Y301, Y401       |           | 4   | 4   | 5   | 5   |
| 5 | B201, B301, B401 |           | 5   | 5   | 5   | 5   |
| 6 | 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

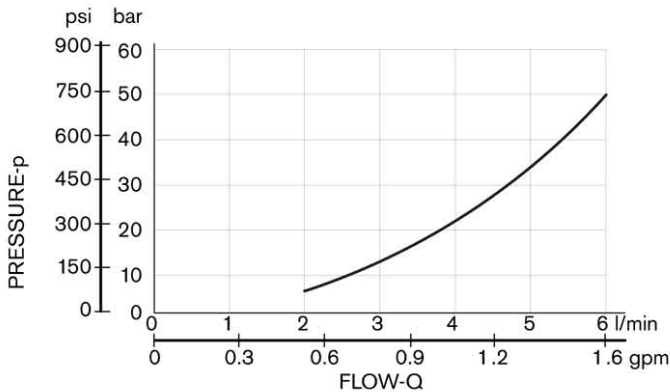
Measured with the solenoids at their operating temperature, 10% under voltage and without pre-loading of the tank.



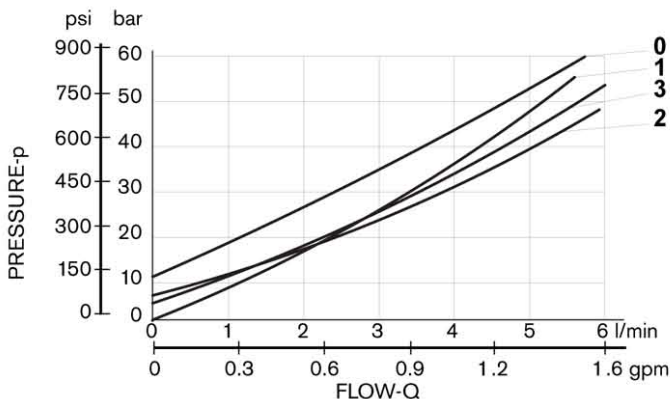
| 1 | SPOOL VARIANT                                     | Curve No. |
|---|---|-----------|
| 2 | A201-A301-A401-B201-B301-B401-Y401-X401-X301-Y301 | 1         |
| 3 | C201-C301-C401-D201-D301-D401                     |           |
|   | K201-E201-E301-E401                               | 2         |
|   | 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

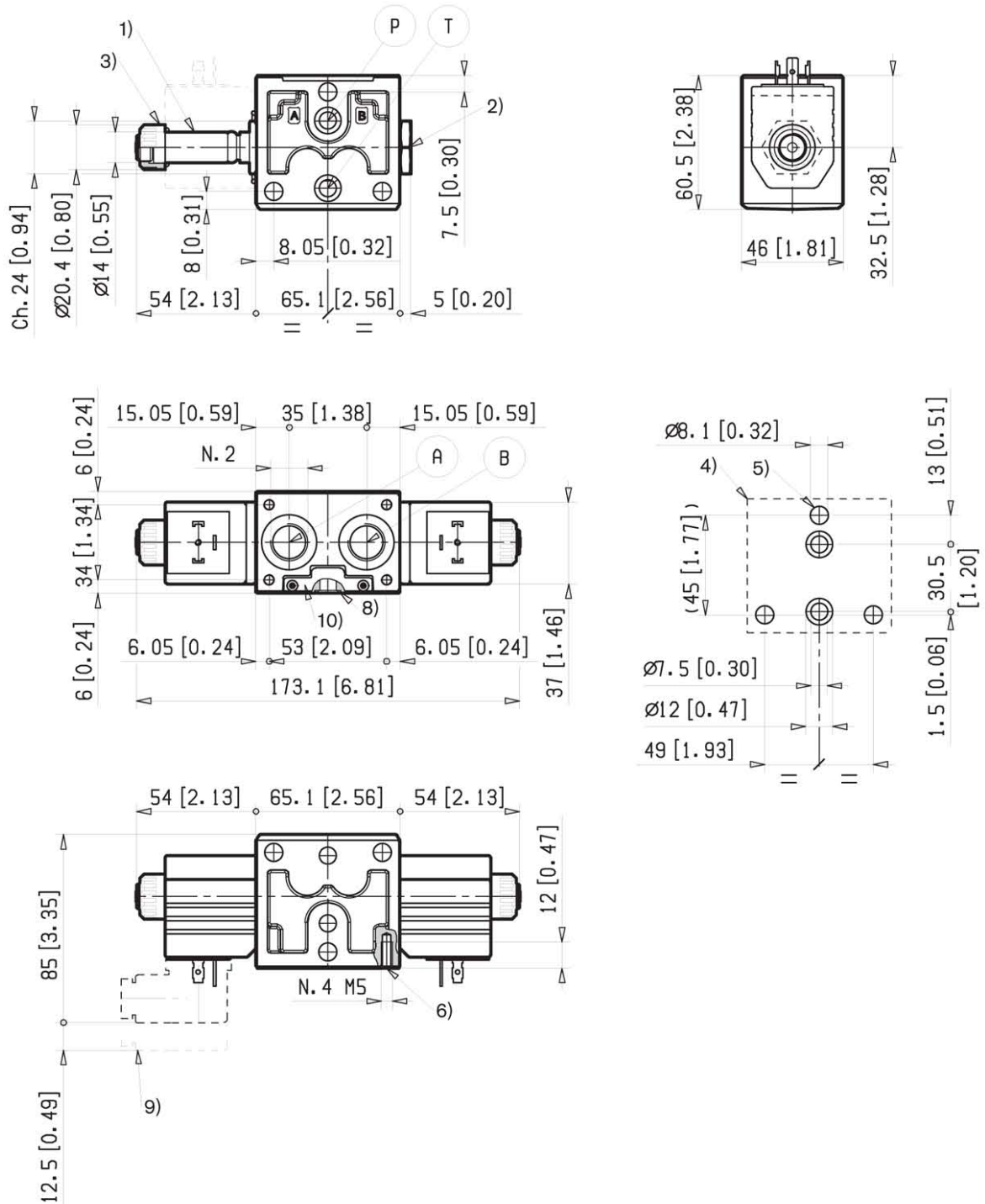


## Lowest pressure setting curve for secondary valves



| 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 3-4Nm [2.2-3 ft-lb].

4 Flange specifications for coupling to ED intermediate  
elements.

5 Three through holes for coupling of the ED Directional Valve

Elements. Recommended tie rods M8 with strength class  
DIN 8.8. Torque 17-19 Nm [12.5-14.0 ft-lb].

6 Four threaded holes M5 for fitting a secondary flangeable  
element. Bolts M5 with recommended strength class DIN  
8.8: torque 5-6 Nm [3.6-4.4 ft-lb].

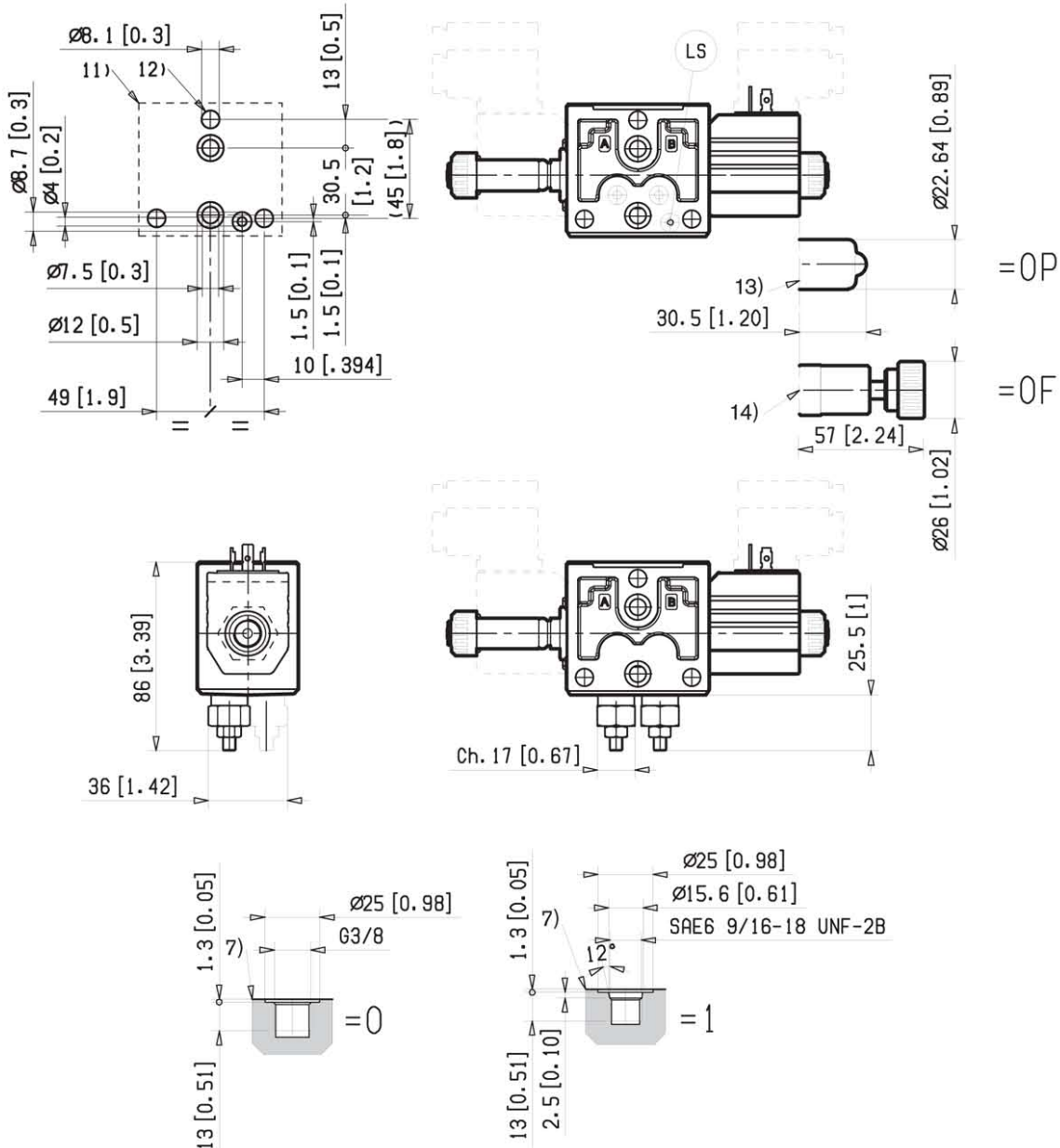
7 A and B ports.

8 O-Rings for P and T ports.

9 Clearance needed for connector removal.

10 Identification label.

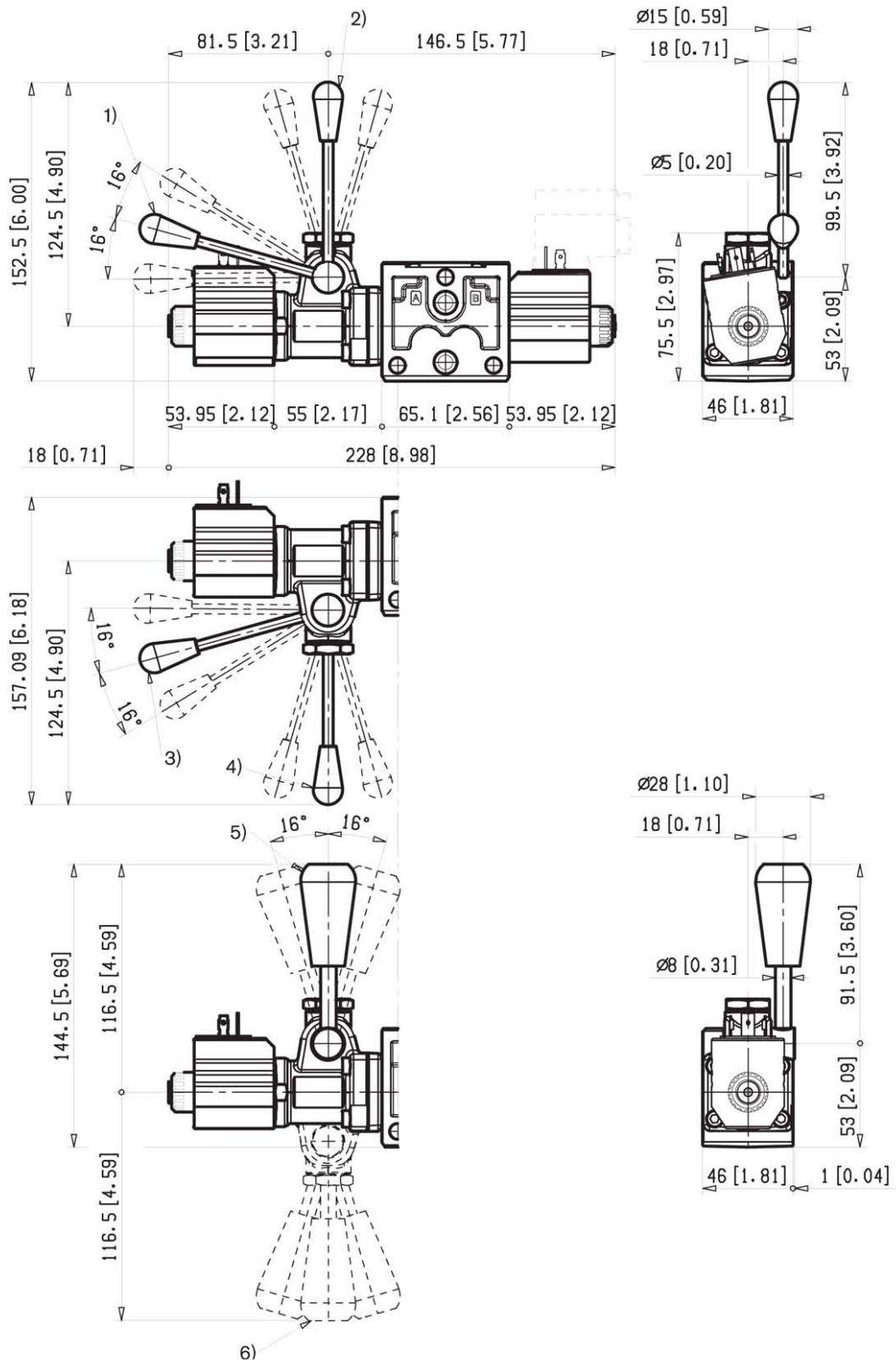
## External Dimensions and Fittings



- 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. Mat 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. Mat no. R933000021.

## External Dimensions and Fittings

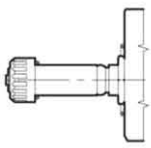
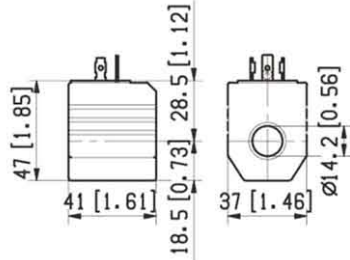
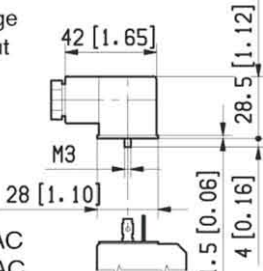
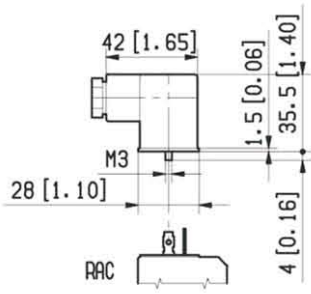
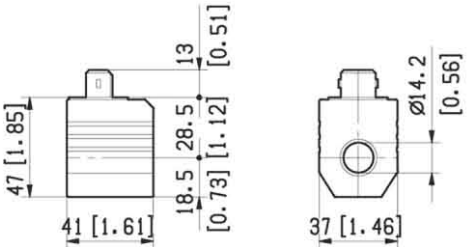
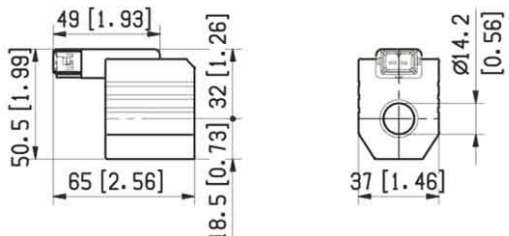
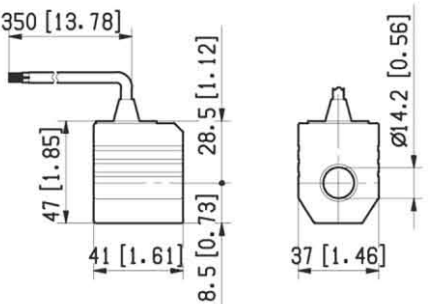
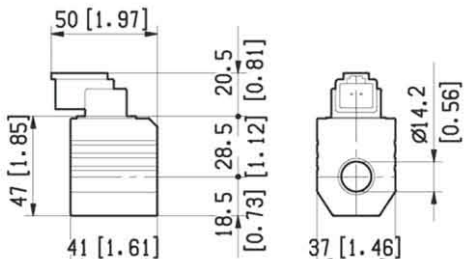


- 1 Ordering Details: HA (if fitted to side A) or HB (if fitted to side B)
- 2 Ordering Details: VA (if fitted to side A) or VB (if fitted to side B)
- 3 Ordering Details: H1 (if fitted to side A) or H9 (if fitted to side B)

- 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)

| <p>Without coils, but with ring nut and O-Rings for coil fitting (solution recommended for flexible stock handling)</p>  <p><b>=00</b></p>  | <p>With coils having plug-in pins EN 175301-803, without connectors</p>  <p><b>=01</b></p>  |          |             |            |             |            |              |            |                       |            |                       |            |                       |            |                        |            |                        |            |                               |            |                               |          |             |            |                 |            |                  |
|--|---|----------|-------------|------------|-------------|------------|--------------|------------|-----------------------|------------|-----------------------|------------|-----------------------|------------|------------------------|------------|------------------------|------------|-------------------------------|------------|-------------------------------|----------|-------------|------------|-----------------|------------|------------------|
| <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> <div style="display: flex; justify-content: space-between;"> <div data-bbox="71 593 869 1220"> <p><b>182-09:</b> Standard.<br/> <b>182-LED-T-A1:</b> with LED monitoring presence of voltage.<br/> <b>182-09-G-DO-2-1:</b> with VDR (Voltage Dependent Resistor), to prevent input voltage over-shootings.</p> <table border="1"> <thead> <tr> <th>Mat. No.</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>R933002885</td> <td>182-09 GRAY</td> </tr> <tr> <td>R933002889</td> <td>182-09 BLACK</td> </tr> <tr> <td>R933002893</td> <td>182-LED-T-A1 12 DC/AC</td> </tr> <tr> <td>R933002894</td> <td>182-LED-T-A1 24 DC/AC</td> </tr> <tr> <td>R933002896</td> <td>182-LED-T-A1 48 DC/AC</td> </tr> <tr> <td>R933002897</td> <td>182-LED-T-A1 110 DC/AC</td> </tr> <tr> <td>R933002898</td> <td>182-LED-T-A1 230 DC/AC</td> </tr> <tr> <td>R933002886</td> <td>182-09-G-DO-2-1 12DC with VDR</td> </tr> <tr> <td>R933002887</td> <td>182-09-G-DO-2-1 24DC with VDR</td> </tr> </tbody> </table>  </div> <div data-bbox="869 593 1406 1220"> <p><b>532-09 RAC:</b> special connectors with rectifier (RAC) for AC applications.</p>  <table border="1"> <thead> <tr> <th>Mat. No.</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>R933002892</td> <td>532-09 RAC GRAY</td> </tr> <tr> <td>R933002891</td> <td>532-09 RAC BLACK</td> </tr> </tbody> </table> </div> </div> |   | Mat. 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 | Mat. No. | Description | R933002892 | 532-09 RAC GRAY | R933002891 | 532-09 RAC BLACK |
| Mat. 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   |          |             |            |             |            |              |            |                       |            |                       |            |                       |            |                        |            |                        |            |                               |            |                               |          |             |            |                 |            |                  |
| Mat. No.   | Description   |          |             |            |             |            |              |            |                       |            |                       |            |                       |            |                        |            |                        |            |                               |            |                               |          |             |            |                 |            |                  |
| R933002892   | 532-09 RAC GRAY   |          |             |            |             |            |              |            |                       |            |                       |            |                       |            |                        |            |                        |            |                               |            |                               |          |             |            |                 |            |                  |
| R933002891   | 532-09 RAC BLACK  |          |             |            |             |            |              |            |                       |            |                       |            |                       |            |                        |            |                        |            |                               |            |                               |          |             |            |                 |            |                  |
| <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>  <p><b>=03</b></p>  | <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>  <p><b>=04</b></p> |          |             |            |             |            |              |            |                       |            |                       |            |                       |            |                        |            |                        |            |                               |            |                               |          |             |            |                 |            |                  |
| <p>With coils having bi-directional diode and bipolar sheathed free lead, 350 mm long, without pins.</p>  <p><b>=31</b></p>   | <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>  <p><b>=07</b></p>    |          |             |            |             |            |              |            |                       |            |                       |            |                       |            |                        |            |                        |            |                               |            |                               |          |             |            |                 |            |                  |