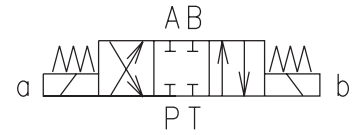


4/3-, 4/2- way directional control sandwich valves with solenoid control

Solenoids can be turned around their axis to any position

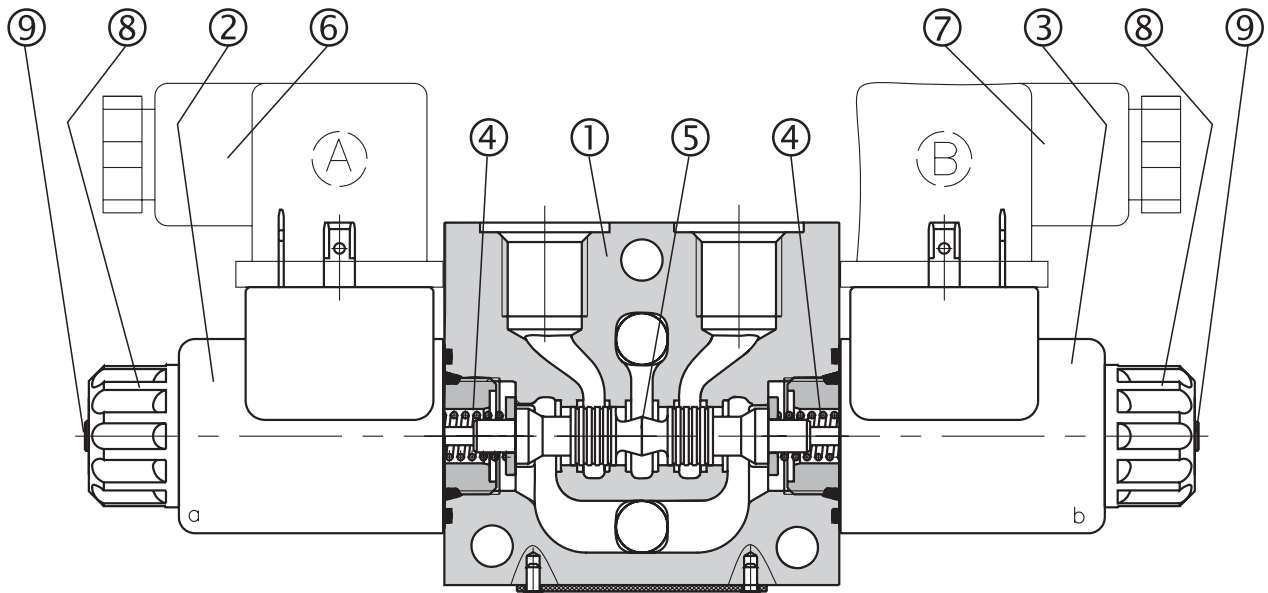
Push button manual override



## Functional Description

The RPEK1-03 directional control valves consist of ductile iron housing (1), control spool (5) with two centering springs (4) and operating solenoids (2, 3). The three-position directional valves are fitted with two solenoids and two springs. Two-position directional valves have either one solenoid and one return spring or two solenoids and a detent assembly. The operating solenoids are DC solenoids supplied through connectors A, B (6, 7). By loosening the nut (8),

the solenoid can be turned around its axis up to 360°. For AC supply the solenoids are provided with a rectifiers which are integrated in the DIN connector socket. In the case of solenoid malfunction or power failure, the spool of the valve can be repositioned by manual override (9), provided the pressure in the T-port does not exceed 363 PSI (25 bar). The valve housing (1) is phosphate coated and the solenoids (2, 3) are zinc coated.



# Order Code

**RPEK1-03**    /

**Directional control valves solenoid operated**

**no designation**  
**V**

**Seals**  
NBR  
FPM (Viton)

**Valve size**                    **3/16 (03)**

**Type of connection**

**no designation**

**Manual override**  
standard

SAE4

**S**

**Number of valve positions**

two positions  
three positions

**2**  
**3**

**E1**

**Type of solenoid coil**  
with terminal for the connector,  
EN 1745301-803

**Spool symbols**

see the table spool symbols

**Rated supply voltage of solenoids \***

(at the coil terminals)

12 V DC / 1.83 A

24 V DC / 0.92 A

\*106 V DC / 0.2 A

Other voltages per request

**01200**

**02400**

**10600**

**Note:** Electrical connectors have to be ordered separately - see page 10.

\*Recommended solenoid coils used with electrical connector with rectifiers - type designation K3, K4, see page 6.

Rated supply source voltage  
(permissible rated voltage variation ± 10 %)

Type designation of the solenoid voltage

120 V AC / 0.2 A / 50 (60) Hz

10600

## Technical Data

|   |                          |  |
|---|--------------------------|--|
| Valve size  | US (mm)                  | 3/16 (03)  |
| Maximum flow  | GPM (L/min)              | see p-Q characteristics  |
| Maximum operating pressure at ports P, A, B                   | PSI (bar)                | 3600 (250)   |
| Maximum operating pressure at port T                          | PSI (bar)                | 3000 (210)   |
| Pressure drop   | PSI (bar)                | see $\Delta p$ -Q characteristics                              |
| Hydraulic fluid   |                          | Petroleum oils (HM, HL, HLP)<br>Phosphate ester fluids (HFD-R) |
| Fluid temperature range NBR /FMP ( Viton)                     | °F (°C)                  | -22 ... +176 (-30 ... +80) / -4 ... +176 (-20 ... +80)         |
| Ambient temperature, max.                                     | °F (°C)                  | +122 (+50)   |
| Viscosity range   | SUS (mm <sup>2</sup> /s) | 98 ... 1840 (20 ... 400)                                       |
| Maximum degree of fluid contamination                         |                          | Class 21/18/15 to ISO 4406 (1999)                              |
| Maximum allowable voltage variation                           | %                        | AC: $\pm 10$ DC: $\pm 10$                                      |
| Maximum switching frequency                                   | 1/h                      | 15 000   |
| Switching time, ON; at $v = 156$ SUS (32 mm <sup>2</sup> /s)  | ms                       | 30 ... 50  |
| Switching time, OFF; at $v = 156$ SUS (32 mm <sup>2</sup> /s) | ms                       | AC: 70 ... 100                      DC: 30 ... 50              |
| Duty cycle  | %                        | 100  |
| Service life  | cycles                   | 10 <sup>7</sup>  |
| Enclosure type to EN 60 529                                   |                          | IP 65  |
| Weight - valve with 1 solenoid<br>- valve with 2 solenoid     | lbs (kg)                 | 1.98 (0.9)<br>2.32 (1.05)                                      |
| Mounting position   |                          | any  |

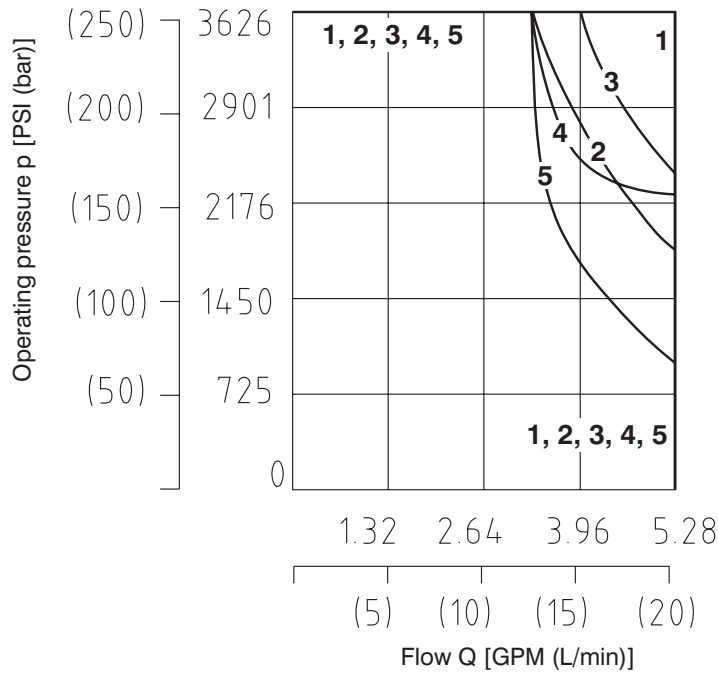
## Spool Symbols

| Type | Symbol | Crossover | Type | Symbol | Crossover |
|------|--------|-----------|------|--------|-----------|
| Z11  |        |           | R21  |        |           |
| C11  |        |           | Y51  |        |           |
| H11  |        |           | C51  |        |           |
| Y11  |        |           | Z51  |        |           |
| R11  |        |           | H11  |        |           |

### p-Q Characteristic

Measured at  $v = 156 \text{ SUS (32 mm}^2/\text{s)}$  and  $t = 104 \text{ }^\circ\text{F (40 }^\circ\text{C)}$

Operating limits for maximum hydraulic power transferred by the directional valve. For respective spool type - see spool symbols.

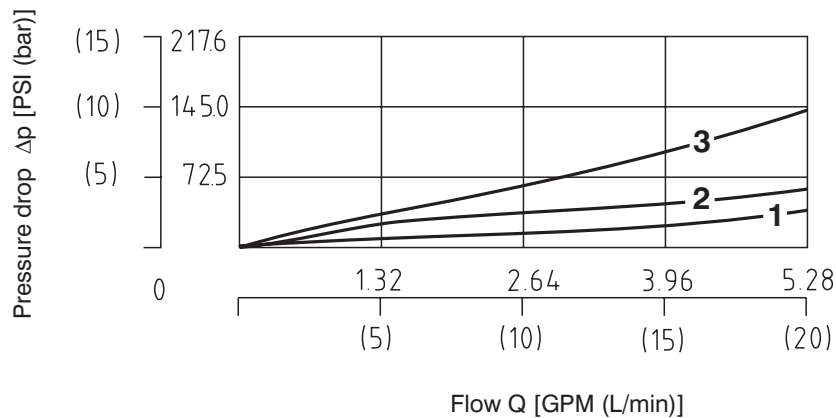


|     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Z11 | Z51 | R11 | R21 | C11 | C51 | H11 | Y11 | Y51 |
| 1   | 1   | 1   | 5   | 2   | 2   | 3   | 4   | 4   |

### Δp-Q Characteristic

Measured at  $v = 156 \text{ SUS (32 mm}^2/\text{s)}$  and  $t = 104 \text{ }^\circ\text{F (40 }^\circ\text{C)}$

Pressure drop  $\Delta p$  related to flow rate.

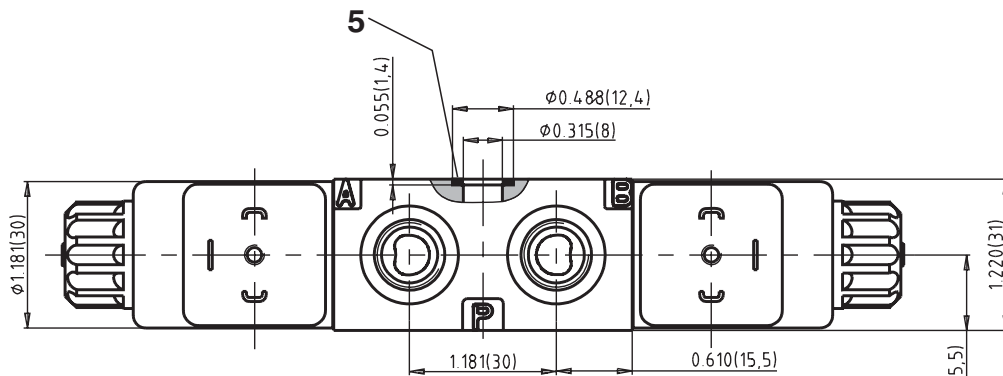
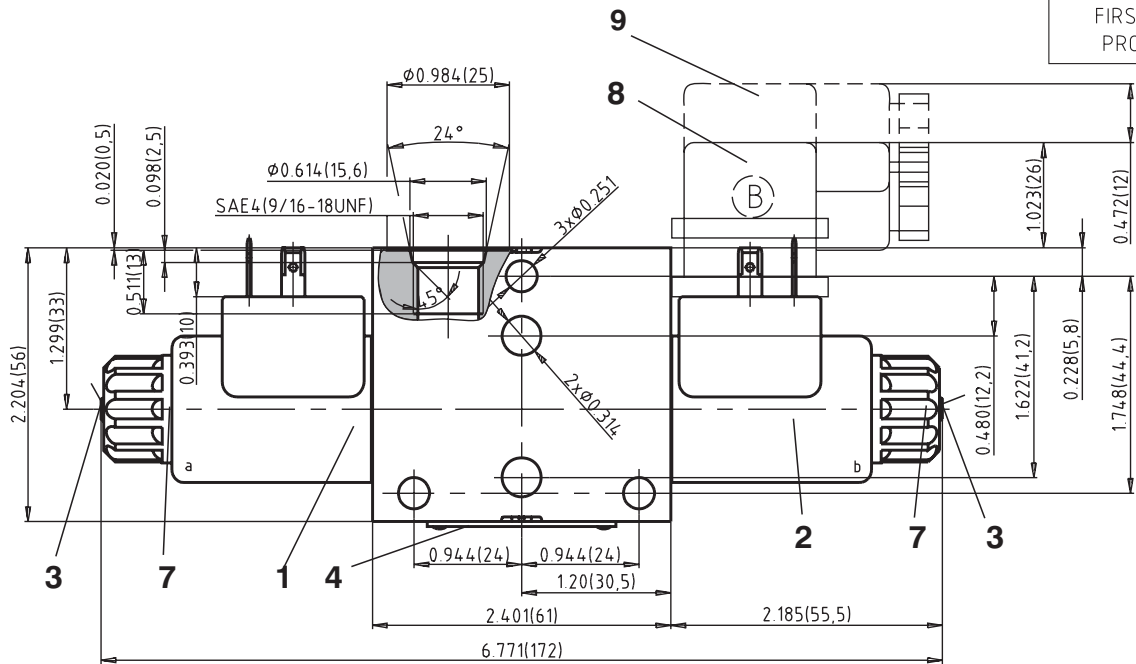
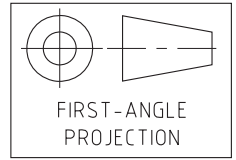


|     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|     | Z11 | C11 | H11 | Y11 | R11 | R21 | Y51 | C51 | Z51 |
| P-A | 1   | 3   | 1   | 1   | 2   | 2   |     | 3   |     |
| P-B | 1   | 3   | 1   | 1   | 2   | 2   | 1   |     | 1   |
| A-T | 1   | 3   | 1   | 1   | 2   | 2   | 1   |     | 1   |
| B-T | 1   | 3   | 1   | 1   | 2   | 2   |     | 3   |     |
| P-T |     | 2   | 2   |     |     |     |     | 2   |     |

# Valve Dimensions

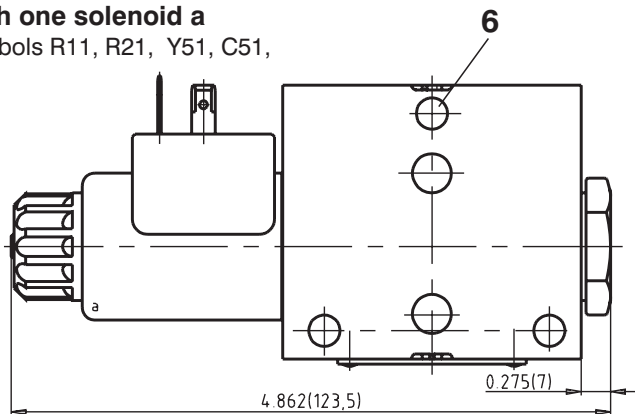
Dimensions in inches and millimeters (in brackets)

## Valve with two solenoids



### Valve with one solenoid a

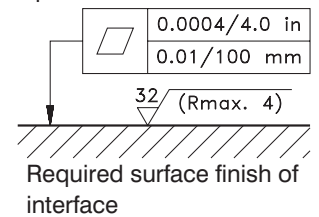
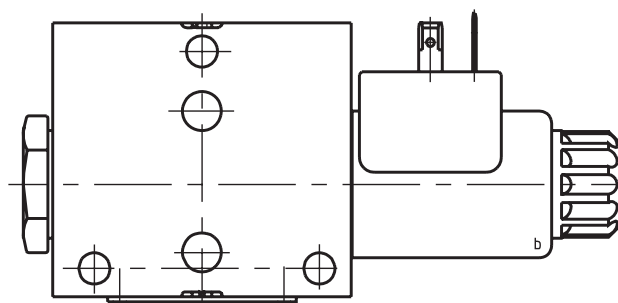
Spool symbols R11, R21, Y51, C51, Z51



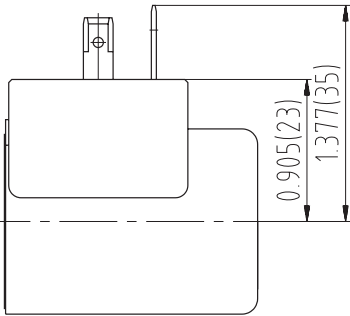
- 1 Solenoid a
- 2 Solenoid b
- 3 Manual override
- 4 Name plate
- 5 Square ring 9.25 x 1.68 (2 pcs.) supplied with valve
- 6 4 mounting holes
- 7 Retaining nut of the solenoid [Nut torque 2.21 ft-lbs. (3Nm)]
- 8 Electrical connector, EN 1745301-803
- 9 Space required to remove connector

### Valve with one solenoid b

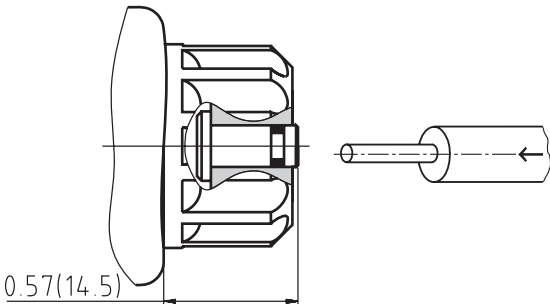
Spool symbols H11



## Type of the Solenoid Coil

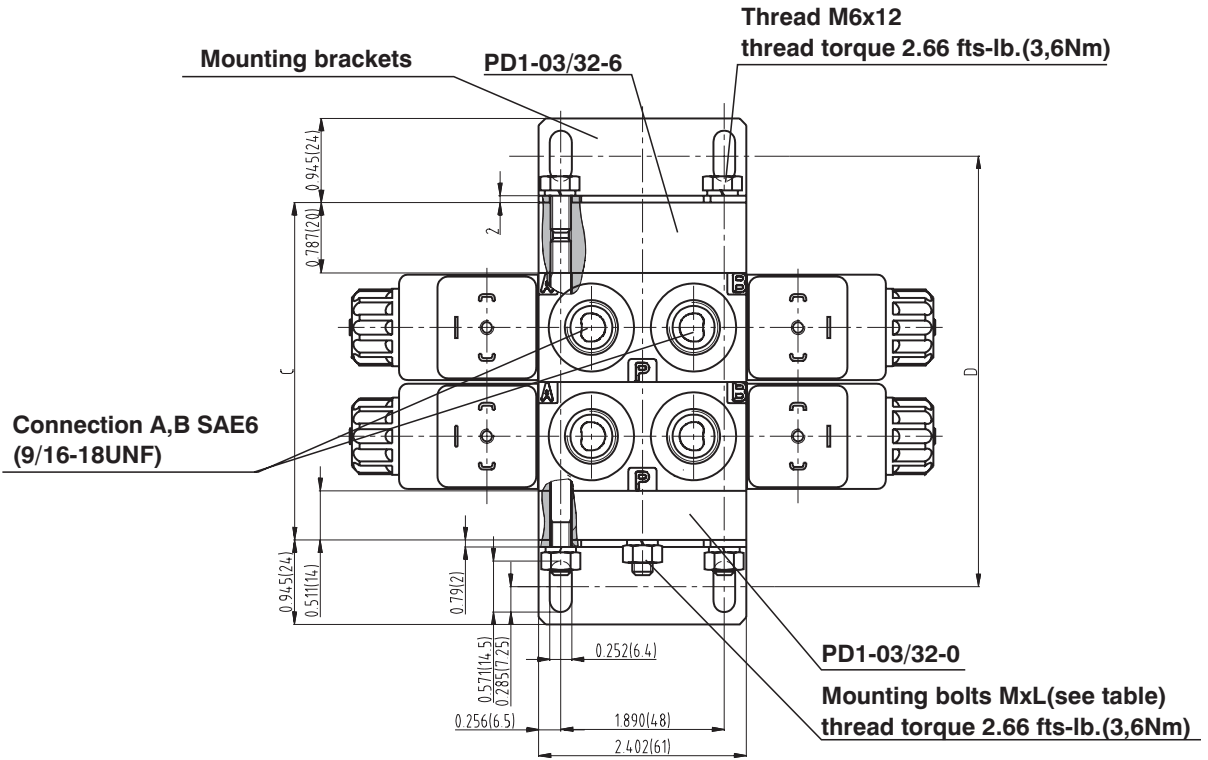
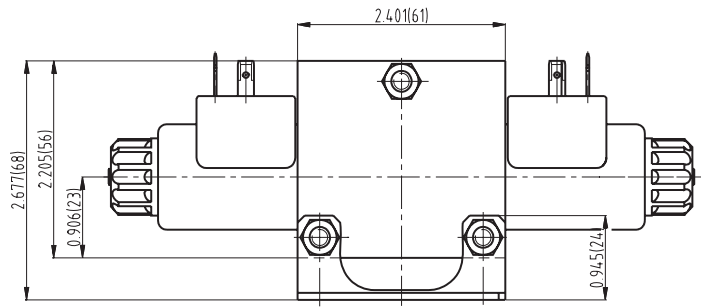
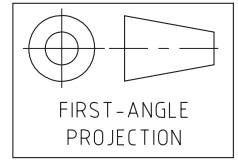
| Designation      | Dimensional sketch   | Description  |
|------------------|--|--|
| <p><b>E1</b></p> |  <p>A technical drawing of a solenoid coil. It shows a rectangular coil with a terminal on top. Two dimensions are indicated: 0.905(23) for the height of the coil body and 1.377(35) for the total height including the terminal. A dashed line indicates the bottom edge of the coil.</p> | <p>Solenoid coil with terminal for the electrical connector, EN 1745301-803.</p> |

## Manual Override

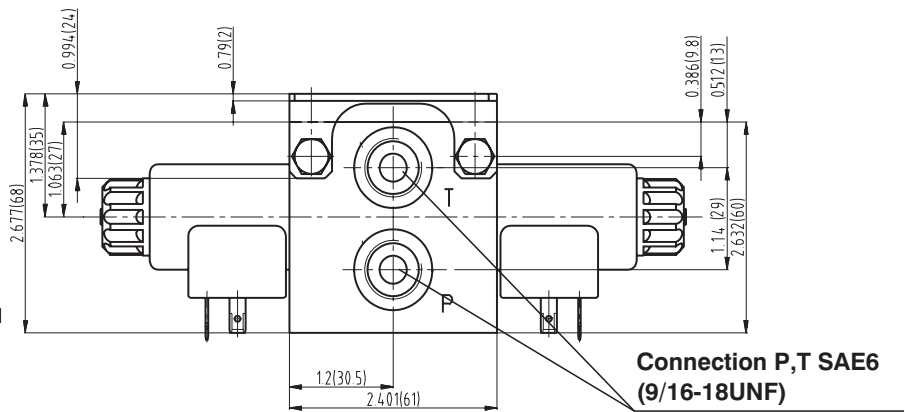
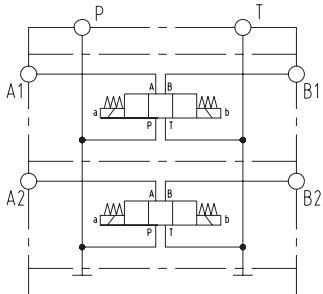
| STANDARD                   | Dimensional sketch  | Description   |
|----------------------------|---|---|
| <p>Without designation</p> |  <p>A technical drawing of a manual override. It shows a cross-section of the override mechanism on the left and a separate retaining nut on the right. A dimension of 0.57(14.5) is shown for the width of the override mechanism.</p> | <p>Standard model of the manual override.<br/>Standard retaining nut of the solenoid.</p> |

# Stack Assembly

Dimensions in inches and millimetres (in brackets)



Connection diagram

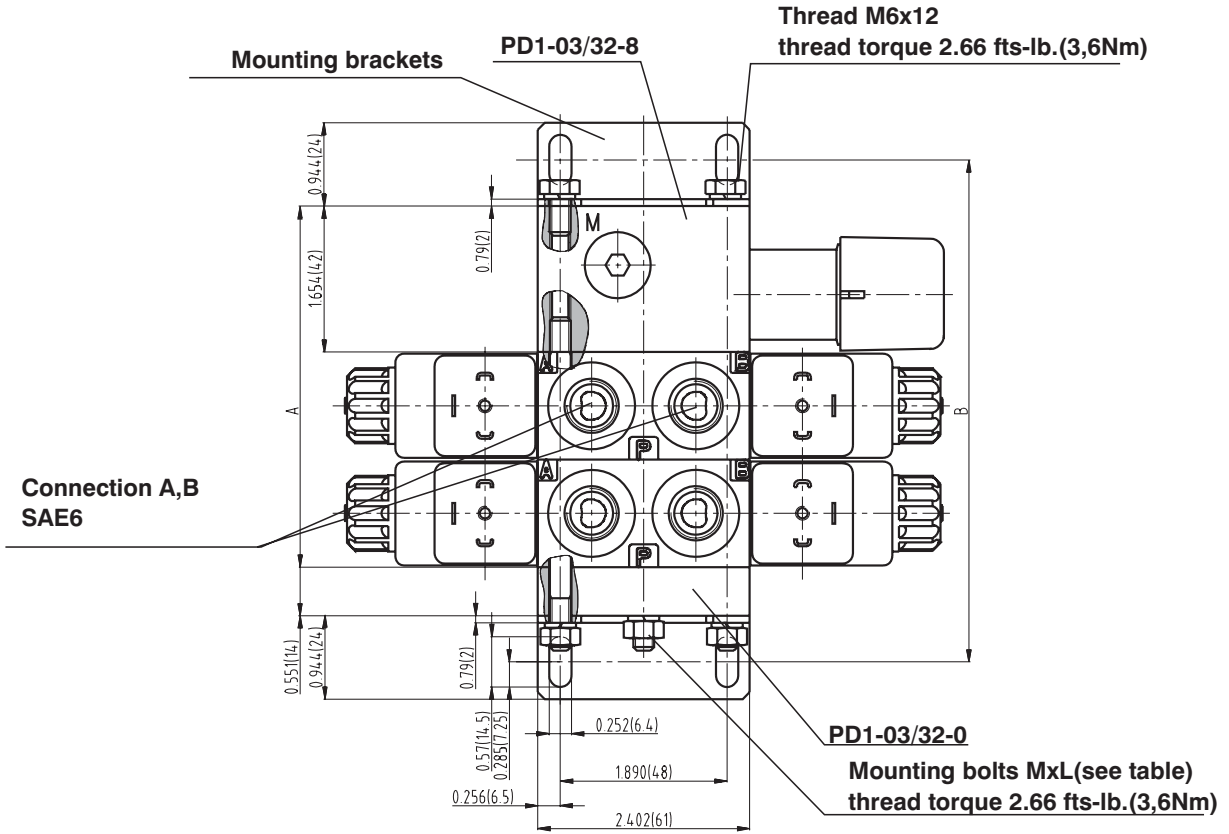
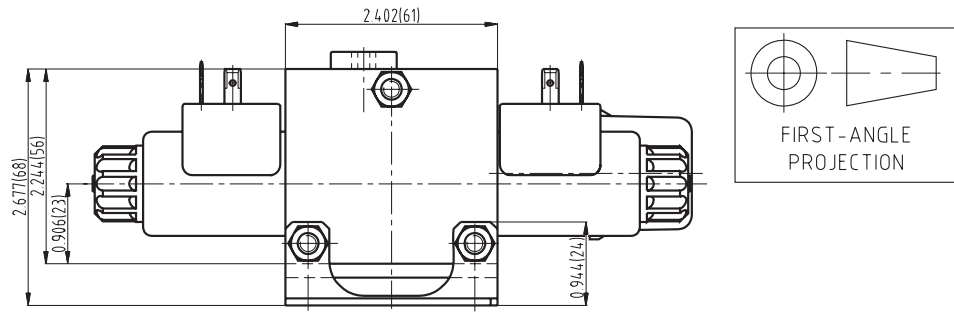


## Dimensions

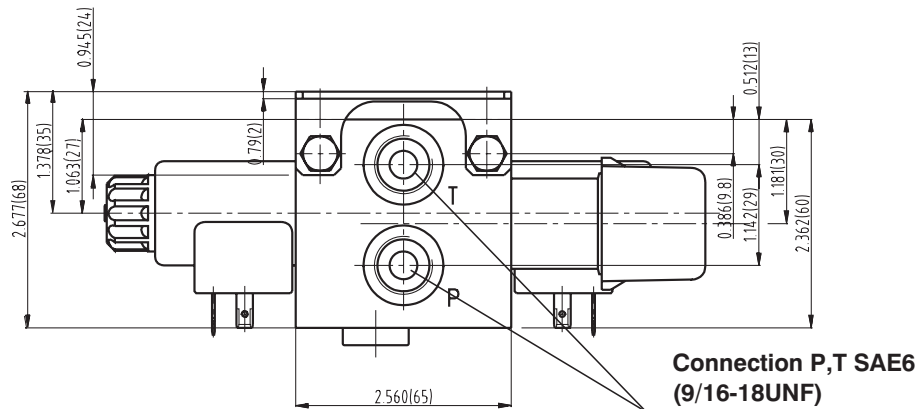
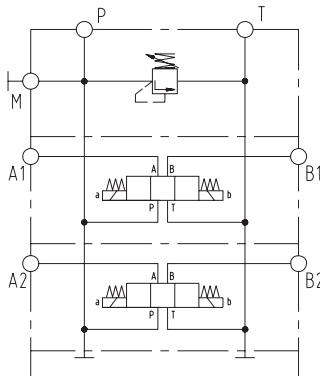
| Number of section        | 1               | 2                | 3                | 4                | 5                | 6                 | 7                 | 8                 |
|--------------------------|-----------------|------------------|------------------|------------------|------------------|-------------------|-------------------|-------------------|
| Dimension C inch<br>(mm) | 2.560<br>(65)   | 3.780<br>(96)    | 5<br>(127)       | 6.220<br>(158)   | 7.441<br>(189)   | 8.661<br>(220)    | 9.881<br>(251)    | 11.102<br>(282)   |
| Dimension D inch<br>(mm) | 3.602<br>(91.5) | 4.822<br>(122.5) | 6.043<br>(153.5) | 7.264<br>(184.5) | 8.484<br>(215.5) | 10.413<br>(264.5) | 10.925<br>(277.5) | 12.146<br>(308.5) |
| Dimension L inch<br>(mm) | 2.165<br>(55)   | 3.937<br>(100)   | 5.236<br>(133)   | 6.417<br>(163)   | 7.638<br>(194)   | 8.819<br>(224)    | 10.079<br>(256)   | 11.299<br>(287)   |

# Stack Assembly

Dimensions in inches and millimetres (in brackets)



Connection diagram

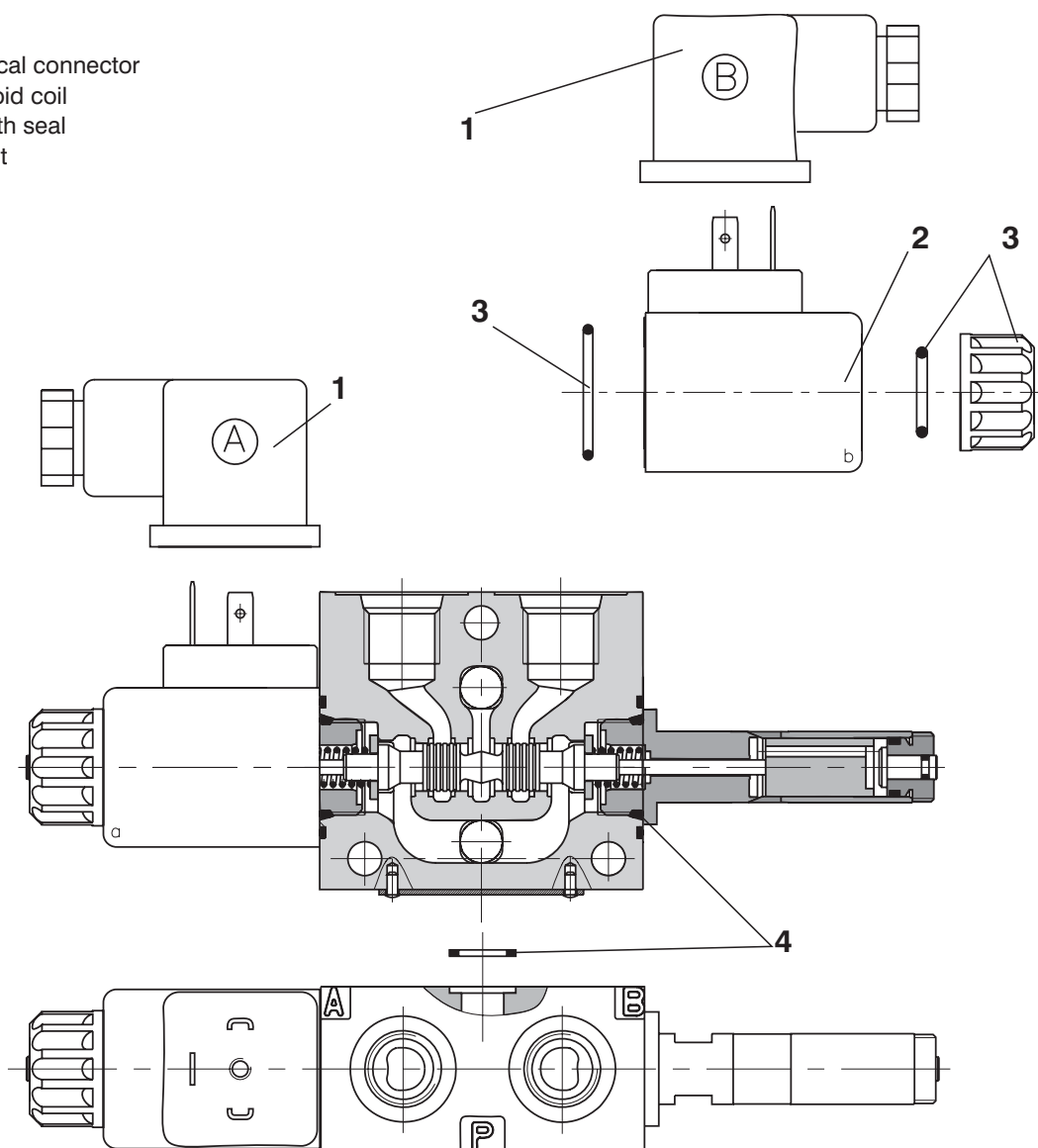


## Dimensions

| Number of section     | 1                | 2                | 3                | 4                | 5                | 6                 | 7                 | 8                 |
|-----------------------|------------------|------------------|------------------|------------------|------------------|-------------------|-------------------|-------------------|
| Dimension A inch (mm) | 3.425<br>(87)    | 4.646<br>(118)   | 5.866<br>(149)   | 7.087<br>(180)   | 8.307<br>(211)   | 9.528<br>(242)    | 10.748<br>(273)   | 11.968<br>(304)   |
| Dimension B inch (mm) | 4.468<br>(113.5) | 5.689<br>(144.5) | 6.909<br>(175.5) | 8.130<br>(206.5) | 9.744<br>(237.5) | 10.570<br>(268.5) | 11.791<br>(299.5) | 13.011<br>(330.5) |
| Dimension L inch (mm) | 2.165<br>(55)    | 3.937<br>(100)   | 5.236<br>(133)   | 6.417<br>(163)   | 7.638<br>(194)   | 8.819<br>(224)    | 10.079<br>(256)   | 11.299<br>(287)   |

# Spare Parts

- 1 Electrical connector
- 2 Solenoid coil
- 3 Nut with seal
- 4 Seal kit



## Endplates and Bolt Kits

| Subplates                    |   |                 |
|------------------------------|---|-----------------|
| Number                       | Type  | Ordering number |
| Subplate No. 6               | PD1 - 03 / 32 - 6 ( SAE 6 )   | 479-9106        |
| Subplate No. 8               | PD1 - 03 / 32 - 8 ( SAE 6 VPP2-04/S-32S )*  | 479-9108        |
| Endplate No. 0               | PD1 - 03 / 32 - 0   | 479-9102        |
| Mounting bracket and bolts** |   |                 |
| Number of section            | 3 pcs. Bolt + 3 pcs. Nut + 3 pcs. Washer thread torque 2.66 fts-lb.( 3,6 Nm)                        | Ordering number |
| 1                            | M6 x 55   | 479-9001        |
| 2                            | M6 x 100  | 479-9002        |
| 3                            | M6 x 133  | 479-9003        |
| 4                            | M6 x 163  | 479-9004        |
| 5                            | M6 x 194  | 479-9005        |
| 6                            | M6 x 224  | 479-9006        |
| 7                            | M6 x 256  | 479-9007        |
| 8                            | M6 x 287  | 479-9008        |
|                              | 2 pcs. Mounting angle + 2 pcs. Thread (M6 x 12) + 2 pcs. Washer thread torque 2.66 fts-lb. (3,6 Nm) | 479-9900        |

\*For other pressure steps see ARGO-HYTOS data sheet HU 5093

\*\* Bolt kit for 1 section consist of 3 pcs. of bolts and 3 pcs. of washers. Bolt kit for sections 2 - 8 consists of 3 pcs. of studs, 3 pcs. of nuts and 3 pcs. of washers.

## Spare Parts

### Solenoid retaining nut with seal

| Type of the nut | Seal ring |              | Order number |
|-----------------|-----------|--------------|--------------|
| Standard nut    | 13 x 2    | 21.95 x 1.78 | 479-9502     |

### Electrical connector, EN 1745301-803

| Type | Model   | Max. input voltage | Connector A<br>Gray | Connector B<br>Black |
|------|---|--------------------|---------------------|----------------------|
|      |   |                    | Order number        |                      |
| K1   | without rectifier - M16x1,5<br>bushing bore $\varnothing$ 0.24-0.31 in ( $\varnothing$ 6-8 mm)                                | 120 V AC/DC        | 936-9902            | 936-9901             |
| K2   | without rectifier with LED and guenching diode<br>-M16x1,5<br>bushing bore $\varnothing$ 0.24-0.31 in ( $\varnothing$ 6-8 mm) | 12...24 V DC       | 936-9908            | 936-9907             |
| K3   | with rectifier - M16x1,5<br>bushing bore $\varnothing$ 0.24-0.31 in ( $\varnothing$ 6-8 mm)                                   | 120 V AC           | 936-9904            | 936-9903             |
| K4   | with rectifier with LED and guenching diode<br>-M16x1,5<br>bushing bore $\varnothing$ 0.24-0.31 in ( $\varnothing$ 6-8 mm)    | 120 V AC           | 936-9912            | 936-9911             |
| K5   | without rectifier - M16x1,5<br>bushing bore $\varnothing$ 0.16-0.24 in ( $\varnothing$ 4-6 mm)                                | 120 V AC/DC        | 936-9906            | 936-9905             |

### Seal kit

| Type            | Dimensions, quantity |                    | Order number |
|-----------------|----------------------|--------------------|--------------|
|                 | Square ring          | O - ring           |              |
| Standard NBR 70 | 9.25 x 1.68 (2 pcs.) | 1.6 x 1.8 (2 pcs.) | 479-9500     |
| Viton           | 9.25 x 1.78 (2 pcs.) | 1.6 x 2 (2 pcs.)   | 479-9501     |

### Solenoids

| Type         | E1       | E1       | E1       |
|--------------|----------|----------|----------|
| Voltage      | 01200    | 02400    | 10600    |
| Order number | 941-1005 | 941-1007 | 941-1010 |

## Caution!

- For directional valves with two solenoids, one solenoid must be without power before the other solenoid can be powered. Switching time for directional valves with detent assembly (impulse control) should not be shorter than 60 ms.
- Other spool symbols on request.
- The plastic packaging foil is recyclable.
- Mounting bolts, studs and EN-connectors must be ordered separately.
- Certified documentation is available per request.

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