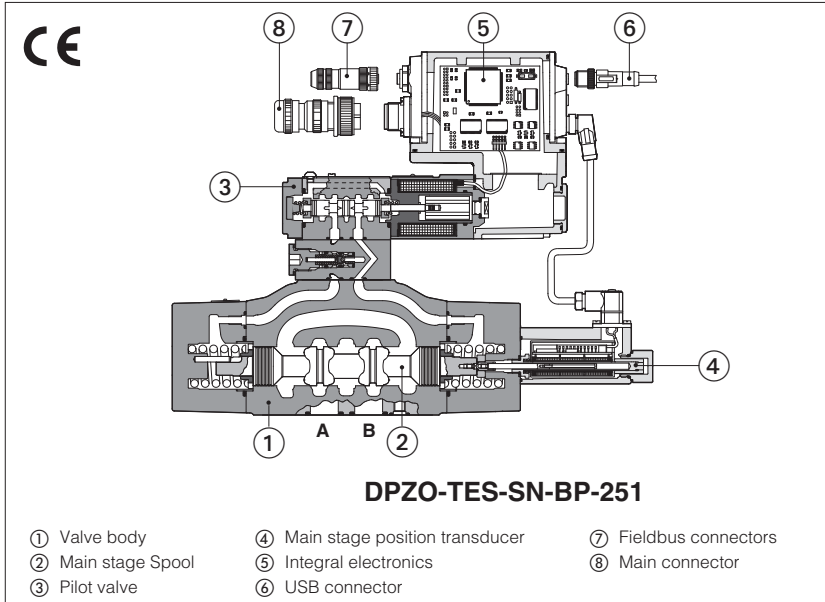


# Two stage proportional directional valves

digital, with position transducers and **positive spool overlap**



### DPZO-TEB, DPZO-TEs

Two stage digital proportional valves specifically designed for directional and speed controls.

They are equipped with main stage LVDT position transducer and positive spool overlap for best dynamics in directional controls and not compensated flow regulations.

The integral digital electronic driver performs the valve's hydraulic regulation according to the reference signal and assures valve-to-valve interchangeability thanks to the factory presetting.

The valves are available in TEB basic execution with analog reference signals and USB port for software functional parameters setting or in TES full execution which includes also optional fieldbus interfaces for functional parameters setting, reference signals and real-time diagnostics.

Size: **10 to 32**  
 Max flow: **180 to 1600 l/min**  
 Max pressure: **350 bar**

#### 1 MODEL CODE for STANDARD SPOOLS

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |   |          |   |           |   |           |   |           |   |          |   |           |   |          |   |          |   |   |   |   |   |   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|----------|---|-----------|---|-----------|---|-----------|---|----------|---|-----------|---|----------|---|----------|---|---|---|---|---|---|
| <b>DPZO</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | - | <b>T</b> | - | <b>ES</b> | - | <b>SN</b> | - | <b>NP</b> | - | <b>2</b> | - | <b>71</b> | - | <b>L</b> | / | <b>5</b> | / | * | / | * | / | * |
| <p>Two stage proportional directional valve</p> <p><b>T</b> = closed-loop one LVDT transducer</p> <p><b>Integral digital drivers:</b><br/> <b>EB</b> = basic (1)<br/> <b>ES</b> = full</p> <p><b>Alternated P/Q controls</b><br/> <b>SN</b> = none</p> <p><b>Fieldbus interfaces</b> USB port always present:<br/> <b>NP</b> = Not present (1)<br/> <b>BC</b> = CANopen      <b>BP</b> = PROFIBUS DP<br/> <b>EH</b> = EtherCAT      <b>EW</b> = POWERLINK</p> <p><b>Valve size ISO 4401:</b><br/> <b>1</b> = 10    <b>2</b> = 16    <b>4</b> = 25    <b>6</b> = 32</p> |   |          |   |           |   |           |   |           |   |          |   |           |   |          |   |          |   |   |   |   |   |   |
| <p>Seals material, see sect. 5, 6:<br/>                 - = NBR<br/> <b>PE</b> = FKM<br/> <b>BT</b> = HNBR</p> <p>Series number</p>                                                                                                                                                                                                                                                                                                                                                                                                                                    |   |          |   |           |   |           |   |           |   |          |   |           |   |          |   |          |   |   |   |   |   |   |

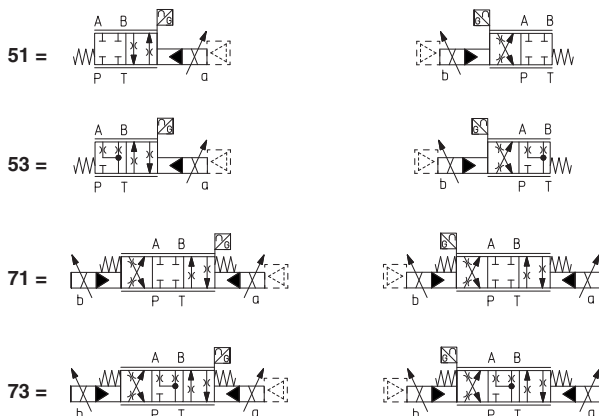
**Hydraulic options**, see section 9:  
**B** = solenoid, integral electronics and position transducer at side of port A of the main stage  
**D** = internal drain  
**E** = external pilot (through port X)

**Electronic options**, see sections 11  
**I** = current reference input and monitor 4÷20 mA (omit for standard voltage reference input and monitor ±10 V)  
**F** = fault signal  
**Q** = enable signal  
**Z** = double power supply (2), enable, fault and monitor signals (12 pin connector)

#### Configuration:

##### Standard

##### Option /B

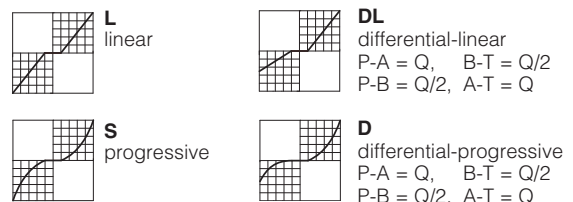


#### Spool size 3 (L,S,D) 5 (L,DL,S,D) 5 (L,S,D)

|        |   |     |     |     |
|--------|---|-----|-----|-----|
| DPZO-1 | = | -   | 100 | -   |
| DPZO-2 | = | 160 | 250 | -   |
| DPZO-4 | = | -   | 480 | -   |
| DPZO-6 | = | -   | -   | 640 |

Nominal flow (l/min) at Δp 10bar P-T

#### Spool type - regulating characteristics:

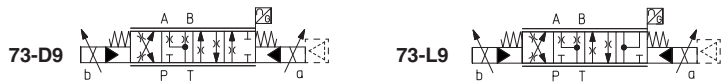
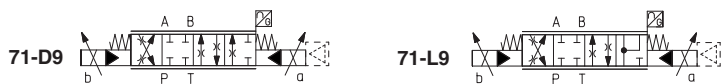


(1) TEB is available only in version SN-NP (2) double power supply only for TES

**2 MODEL CODE for SPECIAL SPOOLS** - refer to section 1 for valve model code and options

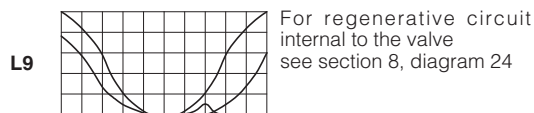
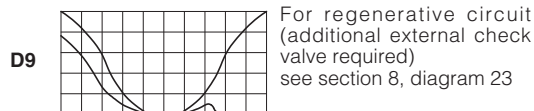
**DPZO** - **T** **ES** - **SN** - **NP** - **2** **71-L9** / \* / \* / \*

**Configuration, spool type and size:**



|                   |           |           |                   |           |           |
|-------------------|-----------|-----------|-------------------|-----------|-----------|
| <b>Spool size</b> | <b>D9</b> | <b>L9</b> | <b>Spool size</b> | <b>D9</b> | <b>L9</b> |
| DPZO-1 =          | 100       | -         | DPZO-4 =          | 480       | -         |
| DPZO-2 =          | 250       | 250       |                   |           |           |

Nominal flow (l/min) at  $\Delta p$  10bar P-T



**3 GENERAL NOTES**

DPZO-TEB, TES proportional valves are CE marked according to the applicable Directives (e.g. Immunity/Emission EMC Directive and Low Voltage Directive). Installation, wirings and start-up procedures must be performed according to the general prescriptions shown in table F003 and in the installation notes supplied with relevant components. The electrical signals of the valve (e.g. monitor signals) must not be directly used to activate safety functions, like to switch-ON/OFF the machine's safety components, as prescribed by the European standards (Safety requirements of fluid technology systems and components-hydraulics, EN-982).

**WARNING**

To avoid overheating and possible damage of the electronic driver, the valves must be never energized without hydraulic supply to the pilot stage. In case of prolonged pauses of the valve operation during the machine cycle, it is always advisable to disable the driver (option /Q or /Z). A safety fuse 2,5 A installed on 24VDC power supply of each valve is always recommended, see also Power supply note at sections 11

**4 FIELDBUS** - only for **TES**

Fieldbus allows the direct communication of the proportional valve with machine control unit for digital reference signal, diagnostics and settings of functional parameters. Analog reference signal remain available on the main connector for quick commissioning and maintenance. For detailed information about fieldbus features and specification see tech table **GS510**.

**5 MAIN CHARACTERISTICS** - based on mineral oil ISO VG 46 at 50 °C

|                                        |                                                                                                                                                   |                                   |                                   |                                         |
|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-----------------------------------|-----------------------------------------|
| Assembly position                      | Any position                                                                                                                                      |                                   |                                   |                                         |
| Subplate surface finishing             | Roughness index, Ra 0,4 flatness ratio 0,01/100 (ISO 1101)                                                                                        |                                   |                                   |                                         |
| MTTFd valves according to EN ISO 13849 | 75 years, see technical table P007                                                                                                                |                                   |                                   |                                         |
| Ambient temperature range              | standard execution = -20°C ÷ +60°C<br>/BT option = -40°C ÷ +60°C                                                                                  |                                   |                                   |                                         |
| Storage temperature range              | Standard execution = -20°C ÷ +70°C<br>/BT option = -40°C ÷ +70°C                                                                                  |                                   |                                   |                                         |
| Coil resistance R at 20°C              | 3 ÷ 3,3 Ω                                                                                                                                         |                                   |                                   |                                         |
| Max. solenoid current                  | 2,6 A                                                                                                                                             |                                   |                                   |                                         |
| Max. power                             | 50 Watt                                                                                                                                           |                                   |                                   |                                         |
| Insulation class                       | H (180°) Due to the occurring surface temperatures of the solenoid coils, the European standards ISO 13732-1 and EN982 must be taken into account |                                   |                                   |                                         |
| Protection degree to DIN EN60529       | IP66/67 with mating connector                                                                                                                     |                                   |                                   |                                         |
| Tropicalization                        | Tropical coating on electronics PCB                                                                                                               |                                   |                                   |                                         |
| Duty factor                            | Continuous rating (ED=100%)                                                                                                                       |                                   |                                   |                                         |
| EMC, climate and mechanical load       | See technical table G004                                                                                                                          |                                   |                                   |                                         |
| Communication interface                | USB<br>Atos ASCII coding                                                                                                                          | CANopen<br>EN50325-4 + DS408      | PROFIBUS DP<br>EN50170-2/IEC61158 | EtherCAT,<br>POWERLINK<br>IEC 61158     |
| Communication physical layer           | not insulated<br>USB 2.0 + USB OTG                                                                                                                | optical insulated<br>CAN ISO11898 | optical insulated<br>RS485        | Fast Ethernet, insulated<br>100 Base TX |

| Valve model                  | DPZO-*-1                                                                         | DPZO-*-2               | DPZO-*-4          | DPZO-*-6               |
|------------------------------|----------------------------------------------------------------------------------|------------------------|-------------------|------------------------|
| Pressure limits [bar]        | ports <b>P, A, B, X</b> = 350; <b>T</b> = 250 (10 for option /D); <b>Y</b> = 10; |                        |                   |                        |
| Spool type                   | standard                                                                         | <b>L5, DL5, S5, D5</b> | <b>L3, S3, D3</b> | <b>L5, DL5, S5, D5</b> |
|                              | special                                                                          | <b>D9</b>              |                   | <b>D9, L9</b>          |
| Nominal flow (1) [l/min]     | $\Delta p = 10$ bar                                                              | 100                    | 160               | 250                    |
|                              | $\Delta p = 30$ bar                                                              | 160                    | 270               | 430                    |
| Max permissible flow [l/min] | 180                                                                              | 400                    | 550               | 1000                   |
| Piloting pressure [bar]      | min. = 25; max = 350 (option /G advisable for pilot pressure > 200 bar)          |                        |                   |                        |
| Piloting volume [cm³]        | 1,4                                                                              | 3,7                    | 9,0               | 21,6                   |
| Piloting flow (2) [l/min]    | 1,7                                                                              | 3,7                    | 6,8               | 14,4                   |
| Leakage (3)                  | Pilot [cm³]                                                                      | 100/300                | 100/300           | 200/500                |
|                              | Main stage [l/min]                                                               | 0,15/0,5               | 0,2/0,6           | 0,3/1,0                |
| Response time (4) [ms]       | < 60                                                                             | < 75                   | < 80              | < 120                  |
| Hysteresis                   | ≤ 0,1 [% of max regulation]                                                      |                        |                   |                        |
| Repeatability                | ± 0,1 [% of max regulation]                                                      |                        |                   |                        |
| Thermal drift                | zero point displacement < 1% at $\Delta T = 40^\circ C$                          |                        |                   |                        |

**Notes:**

above performance data refer to valves coupled with Atos electronic drivers, see section 8.

(1) for different  $\Delta p$ , see section 9.2 (2) with step reference input signal 0 ÷ 100 % (3) at p = 100/350 bar (4) see detailed diagrams in section 8.3

**6 SEALS AND HYDRAULIC FLUID** - for other fluids not included in below table, consult our technical office

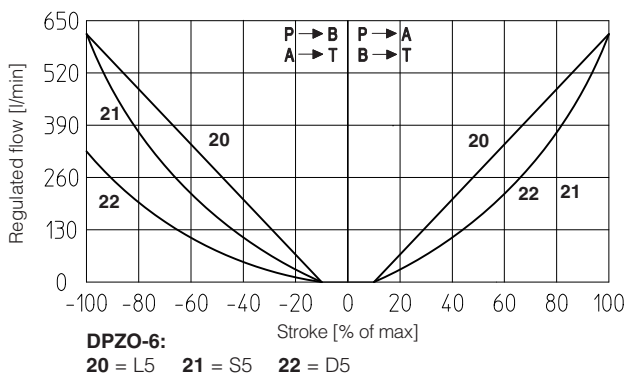
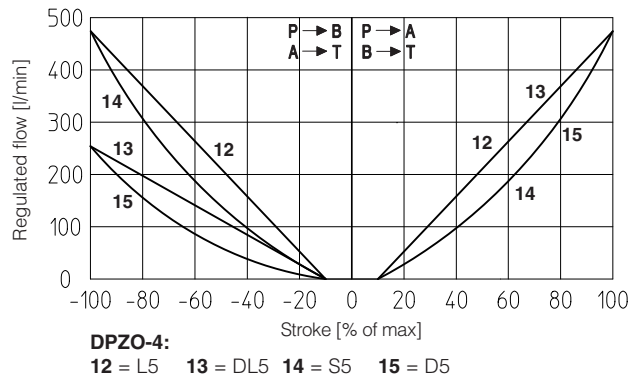
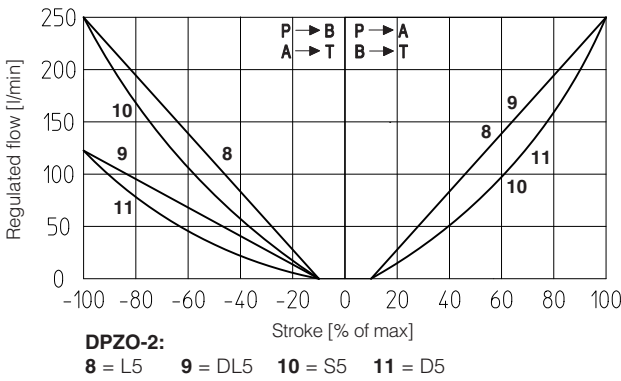
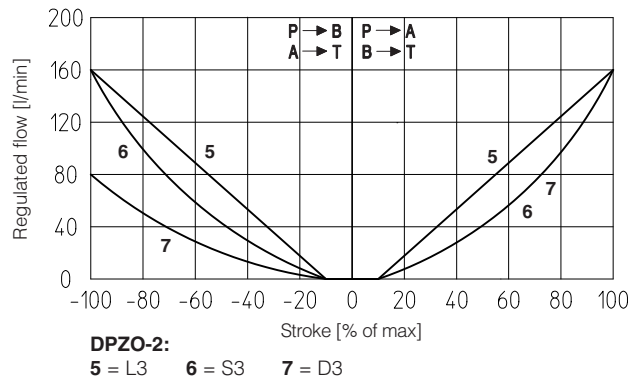
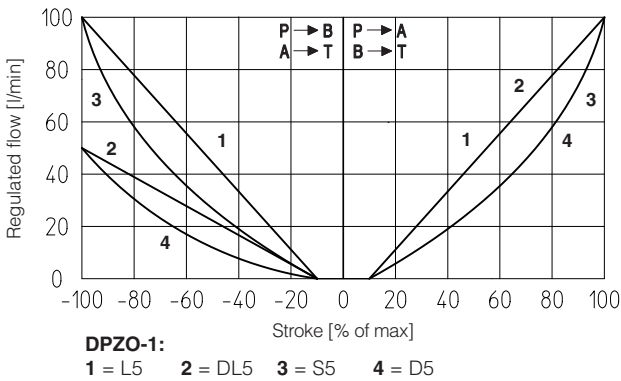
|                                      |                                                                                                                                                                                                                 |                            |                      |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------------------|
| Seals, recommended fluid temperature | NBR seals (standard) = -20°C ÷ +60°C, with HFC hydraulic fluids = -20°C ÷ +50°C<br>FKM seals (/PE option) = -20°C ÷ +80°C<br>HNBR seals (/BT option) = -40°C ÷ +60°C, with HFC hydraulic fluids = -40°C ÷ +50°C |                            |                      |
| Recommended viscosity                | 20 ÷ 100 mm <sup>2</sup> /s - max allowed range 15 ÷ 380 mm <sup>2</sup> /s                                                                                                                                     |                            |                      |
| Fluid contamination class            | ISO 4406 class 20/18/15 NAS 1638 class 9, in line filters of 10 µm (β10 ≥75 recommended)                                                                                                                        |                            |                      |
| <b>Hydraulic fluid</b>               | <b>Suitable seals type</b>                                                                                                                                                                                      | <b>Classification</b>      | <b>Ref. Standard</b> |
| Mineral oils                         | NBR, FKM, HNBR                                                                                                                                                                                                  | HL, HLP, HLPD, HVLP, HVLPD | DIN 51524            |
| Flame resistant without water        | FKM                                                                                                                                                                                                             | HFDU, HFDR                 | ISO 12922            |
| Flame resistant with water           | NBR, HNBR                                                                                                                                                                                                       | HFC                        |                      |

**7 ELECTRONIC DRIVERS** - for main and communication connector see sections **13**, **14**

|               |                   |            |
|---------------|-------------------|------------|
| Valve model   | <b>TEB</b>        | <b>TES</b> |
| Drivers model | E-RI-TEB-N        | E-RI-TES-N |
| Type          | Digital           |            |
| Format        | Integral to valve |            |
| Data sheet    | GS208             | GS210      |

**8 DIAGRAMS** (based on mineral oil ISO VG 46 at 50 °C)

**8.1 Regulation diagrams** (values measure at Δp 10 bar P-T)



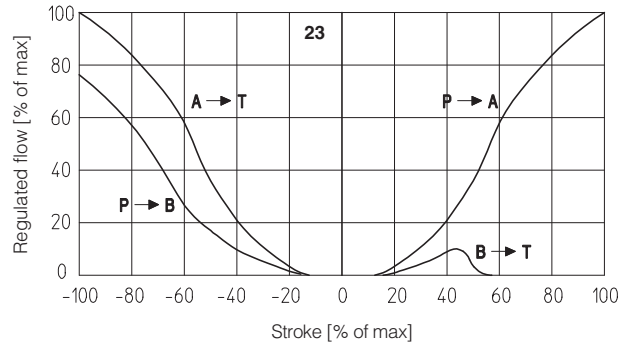
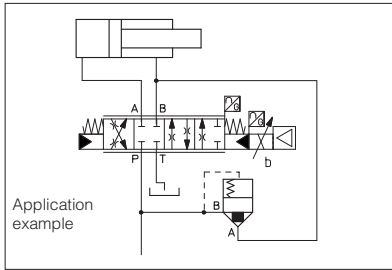
**Note:**

Hydraulic configuration vs. reference signal (standard and option /B)

Reference signal  $\left. \begin{array}{l} 0 \div +10 \text{ V} \\ 12 \div 20 \text{ mA} \end{array} \right\} \text{P} \rightarrow \text{A} / \text{B} \rightarrow \text{T}$

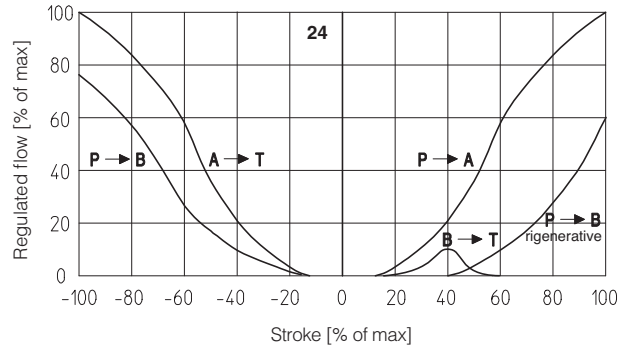
**23** = differential - regenerative spool **D9**  
(not available for valve size 32 and 35)

D9 spool type with a fourth position specific to regenerative circuit, performed by means of an additional external check valve.



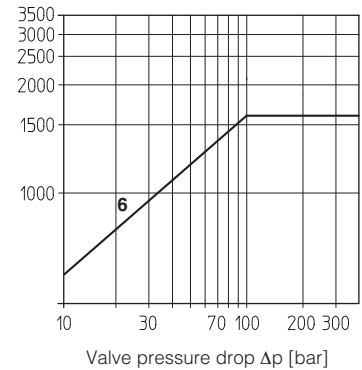
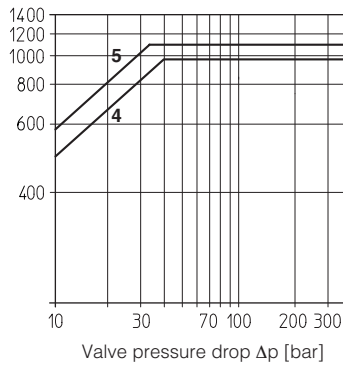
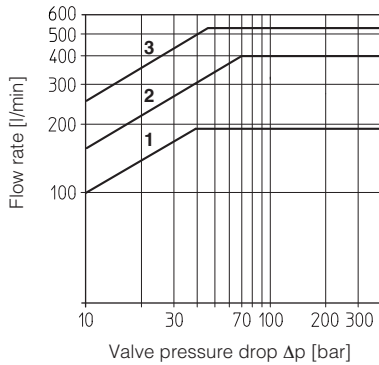
**24** = linear - internal regenerative spool **L9**  
(available only for valve size 16)

L9 spool type with a fourth position specific to perform a regenerative circuit internal to the valve.



### 8.2 Operating diagrams

**Flow /Δp diagram** stated at 100% of spool stroke



**DPZO-1:**

**1** = spools L5, S5, D5, DL5, D9

**DPZO-2:**

**2** = spools L3, S3, D3

**3** = spools L5, S5, D5, DL5, D9, L9

**DPZO-4:**

**4** = spools L5, S5, D5, DL5, D9

**DPZO-4M:**

**5** = spools L5, S5, D5, DL5, D9

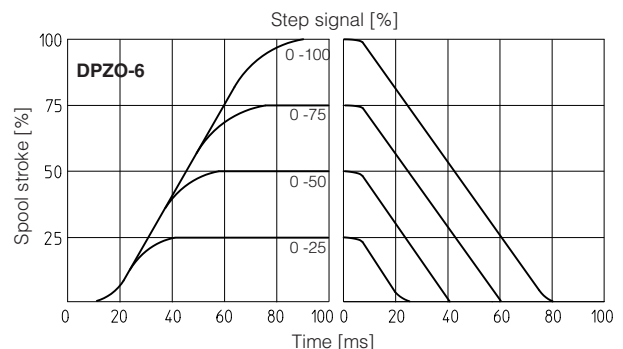
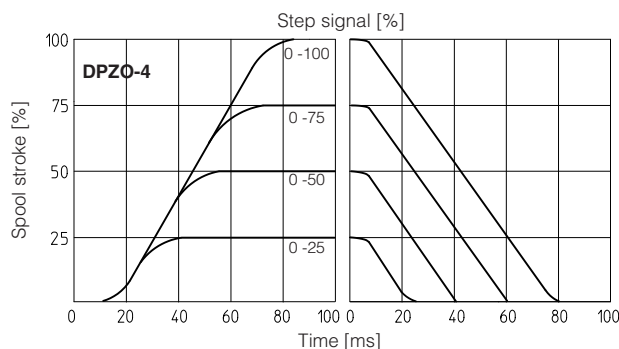
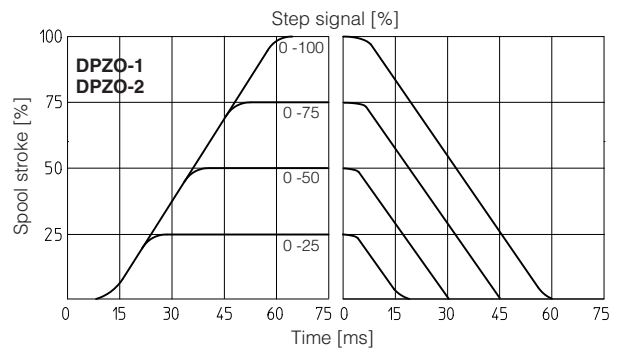
**DPZO-6:**

**6** = L5, S5, D5

### 8.3 Response time

The response times in below diagrams are measured at different steps of the reference input signal. They have to be considered as average values.

For the valves with digital electronics the dynamics performances can be optimized by setting the internal software parameters.



## 9 HYDRAULIC OPTIONS

### 9.1 Option /B

Solenoid, integral electronics and position transducer at side of port A of the main stage.  
For hydraulic configuration vs reference signal, see section 8.1

### 9.2 Pilot and drain configuration

The pilot / drain configuration can be modified as shown in the functional scheme here aside, for detailed view of plugs position, see section 15

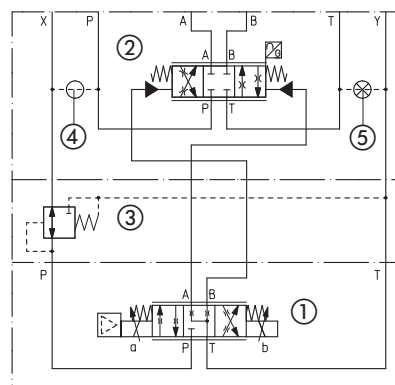
The valve's standard configuration provides internal pilot and external drain.

For different pilot / drain configuration select:

**Option /E** External pilot (through port X)

**Option /D** Internal drain (through port T)

**FUNCTIONAL SCHEME**  
example of configuration 71



① Pilot valve

② Main stage

③ Pressure reducing valve

④ Plug to be added for external pilot trough port X

⑤ Plug to be removed for internal drain through port T

## 10 ELECTRONIC OPTIONS

Standard driver execution provides on the 7 pin main connector:

**Power supply** - 24 VDC must be appropriately stabilized or rectified and filtered; **2.5 A** fuse is time lag required in series to each driver power supply. Apply at least a 10000  $\mu$ F/40 V capacitance to single phase rectifiers or a 4700  $\mu$ F/40 V capacitance to three phase rectifiers

**Reference input signal** - analog differential input with  $\pm 10$  VDC nominal range (pin D, E), proportional to desired valve spool position

**Monitor output signal** - analog output signal proportional to the actual valve's spool position with  $\pm 10$ VDC nominal range

**Note:** a minimum booting time between 400 and 800 ms has been considered from the driver energizing with the 24 Vdc power supply before the valve has been ready to operate. During this time the current to the valve coils is switched to zero.

### 10.1 Option /F

It provides a Fault output signal in place of the Monitor output signal, to indicate fault conditions of the driver (cable interruption of spool transducers or reference signal - for /I option): Fault presence corresponds to 0 VDC, normal working corresponds to 24 Vdc

### 10.2 Option /I

It provides 4  $\div$  20 mA current reference and monitor signals, instead of the standard  $\pm 10$  V.

Input signal can be reconfigured via software selecting between voltage and current, within a maximum range of  $\pm 10$  V or  $\pm 20$  mA.

It is normally used in case of long distance between the machine control unit and the valve or where the reference signal can be affected by electrical noise; the valve functioning is disabled in case of reference signal cable breakage.

### 10.3 Option /Q

It provides the possibility to enable or disable the valve functioning without cutting the power supply (the valve functioning is disabled but the driver current output stage is still active). To enable the driver supply a 24 VDC on the enable input signal.

### 10.4 Option /Z

It provides, on the 12 pin main connector, the following additional features:

#### Enable Input Signal

To enable the driver, supply 24 VDC on pin 3 referred to pin 2: when the Enable signal is set to zero the valve functioning is disabled (zero current to the solenoid) but the driver current output stage is still active.

#### Fault Output Signal

Fault output signal indicates fault conditions of the driver (solenoid short circuits/not connected, reference signal cable broken for 4-20mA input, etc.). Fault presence corresponds to 0 VDC, normal working corresponds to 24VDC (pin 11 referred to pin 2): Fault status is not affected by the Enable input signal

#### Power supply for driver's logics and communication - only for TES

Separated power supply for the solenoid (pin 1, 2) and for the digital electronic circuits (pin 9, 10).

Cutting solenoid power supply allows to interrupt the valve functioning but keeping energized the digital electronics thus avoiding fault conditions of the machine fieldbus controller. This condition aids to realize safety systems in compliance with European Norms EN13849-1 (ex EN954-1).

### 10.5 Possible combined options

/FI, /IQ and /IZ

## 11 ELECTRONIC CONNECTIONS AND LEDS

### 11.1 Main connector signal - 7 pin - standard, /F and /Q options (A1)

| PIN | Standard                            | /Q     | /F    | TECHNICAL SPECIFICATIONS                                                                                                                         | NOTES                                                |
|-----|-------------------------------------|--------|-------|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|
| A   | V+                                  |        |       | Power supply 24 Vdc                                                                                                                              | Input - power supply                                 |
| B   | V0                                  |        |       | Power supply 0 Vdc                                                                                                                               | Gnd - power supply                                   |
| C   | AGND                                |        | AGND  | Analog ground                                                                                                                                    | Gnd - analog signal                                  |
|     |                                     | ENABLE |       | Enable (24 Vdc) or disable (0 Vdc) the valve, referred to V0                                                                                     | Input - on/off signal                                |
| D   | Q_INPUT+                            |        |       | Flow reference input signal: $\pm 10$ Vdc / $\pm 20$ mA maximum range<br>Defaults are $\pm 10$ Vdc for standard and $4 \div 20$ mA for /I option | Input - analog signal<br><b>Software selectable</b>  |
| E   | INPUT-                              |        |       | Negative reference input signal for Q_INPUT+                                                                                                     | Input - analog signal                                |
| F   | Q_MONITOR referred to:<br>AGND   V0 |        |       | Flow monitor output signal: $\pm 10$ Vdc / $\pm 20$ mA maximum range<br>Defaults are $\pm 10$ Vdc for standard and $4 \div 20$ mA for /I option  | Output - analog signal<br><b>Software selectable</b> |
|     |                                     |        | FAULT | Fault (0 Vdc) or normal working (24 Vdc)                                                                                                         | Output - on/off signal                               |
| G   | EARTH                               |        |       | Internally connected to the driver housing                                                                                                       |                                                      |

### 11.2 Main connector signal - 12 pin - /Z option (A2)

| PIN      | TEB-SN /Z                      | TES-SN /Z | TECHNICAL SPECIFICATIONS                                                                                                                         | NOTES                                               |
|----------|--------------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
|          | V+                             |           | Power supply 24 Vdc                                                                                                                              | Input - power supply                                |
| 1        | V0                             |           | Power supply 0 Vdc                                                                                                                               | Gnd - power supply                                  |
| 2        | ENABLE referred to:<br>V0      | V0        | Enable (24 Vdc) or disable (0 Vdc) the valve                                                                                                     | Input - on/off signal                               |
| 3        |                                | VL0       |                                                                                                                                                  |                                                     |
| 4        | Q_INPUT+                       |           | Flow reference input signal: $\pm 10$ Vdc / $\pm 20$ mA maximum range<br>Defaults are $\pm 10$ Vdc for standard and $4 \div 20$ mA for /I option | Input - analog signal<br><b>Software selectable</b> |
| 5        | INPUT-                         |           | Negative reference input signal for Q_INPUT+                                                                                                     | Input - analog signal                               |
| 6        | Q_MONITOR referred to:<br>AGND | VL0       | Flow monitor output signal: $\pm 10$ Vdc / $\pm 20$ mA maximum range<br>Defaults are $\pm 10$ Vdc for standard and $4 \div 20$ mA for /I option  | Input - analog signal<br><b>Software selectable</b> |
|          | 7                              | AGND      |                                                                                                                                                  |                                                     |
| 8        |                                | NC        | Analog ground                                                                                                                                    | Output - analog signal                              |
|          | R_ENABLE                       |           | Do not connect                                                                                                                                   | Gnd - analog signal                                 |
| 9        |                                | NC        | Repeat enable, output repeter signal of enable input, referred to V0                                                                             |                                                     |
|          |                                | NC        | Do not connect                                                                                                                                   | Output - on/off signal                              |
| 10       | NC                             |           | Do not connect                                                                                                                                   |                                                     |
|          |                                | VL+       | Power supply 24 Vdc for driver's logic and communication                                                                                         | Input - power supply                                |
| 11<br>PE | NC                             |           | Do not connect                                                                                                                                   |                                                     |
|          | FAULT referred to:<br>V0       | VL0       | Power supply 0 Vdc for driver's logic and communication                                                                                          | Gnd - power supply                                  |
|          |                                |           | Fault (0 Vdc) or normal working (24 Vdc)                                                                                                         | Output - on/off signal                              |
|          | EARTH                          |           | Internally connected to the driver housing                                                                                                       |                                                     |

**Note:** do not disconnect VL0 before VL+ when the driver is connected to PC USB port

### 11.3 Communications connectors (B) - (C)

| (B) USB connector - M12 - 5 pin always present |         |                                     |
|------------------------------------------------|---------|-------------------------------------|
| PIN                                            | SIGNAL  | TECHNICAL SPECIFICATION (1)         |
| 1                                              | +5V_USB | Supply for external USB Flash Drive |
| 2                                              | ID      | USB Flash Drive identification      |
| 3                                              | GND_USB | Signal zero data line               |
| 4                                              | D-      | Data line -                         |
| 5                                              | D+      | Data line +                         |

| (C1) (C2) BC fieldbus execution, connector - M12 - 5 pin |          |                                         |
|----------------------------------------------------------|----------|-----------------------------------------|
| PIN                                                      | SIGNAL   | TECHNICAL SPECIFICATION (1)             |
| 1                                                        | CAN_SHLD | Shield                                  |
| 2                                                        | not used | (C1) - (C2) pass-through connection (2) |
| 3                                                        | CAN_GND  | Signal zero data line                   |
| 4                                                        | CAN_H    | Bus line (high)                         |
| 5                                                        | CAN_L    | Bus line (low)                          |

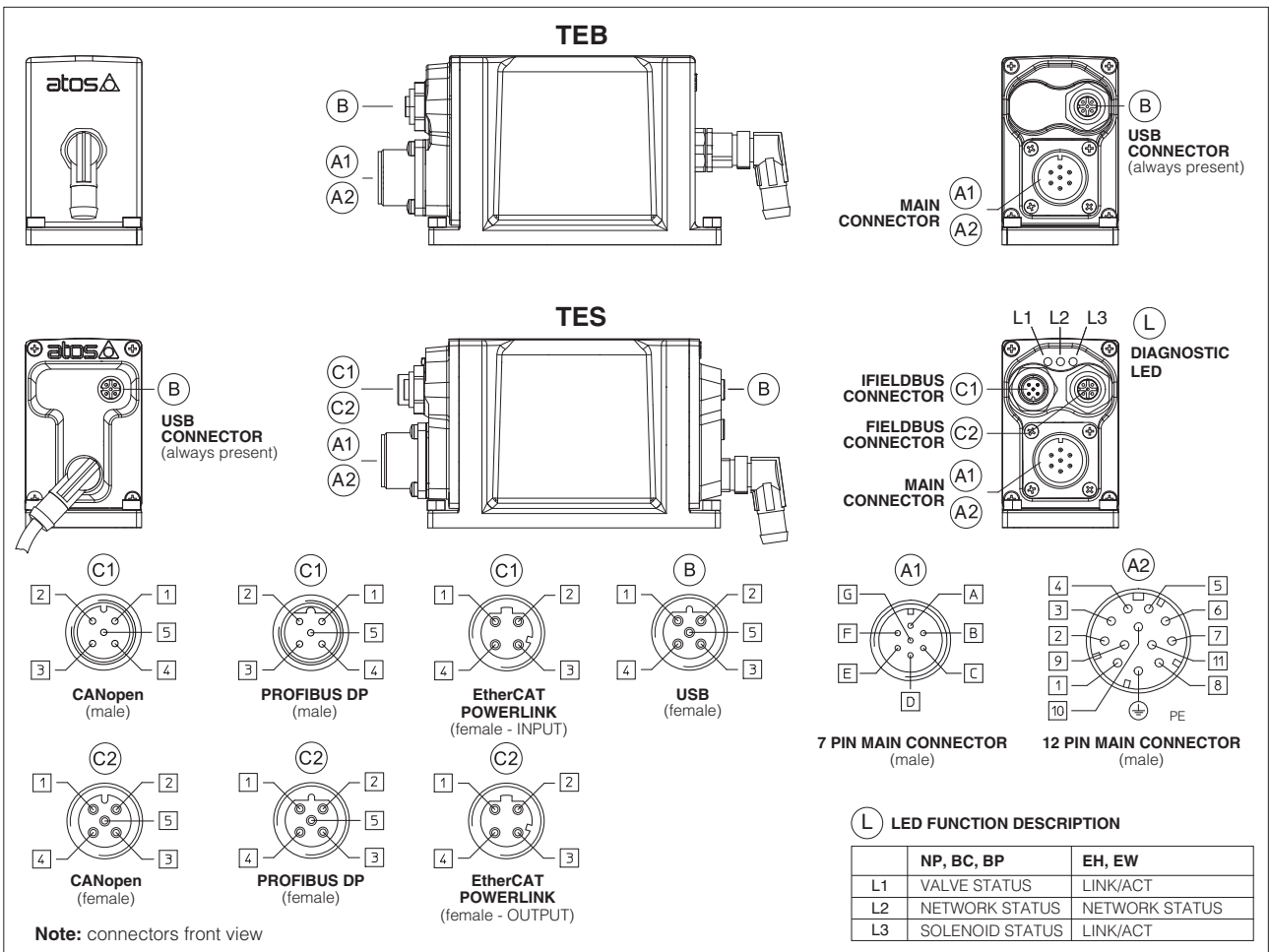
| (C1) (C2) BP fieldbus execution, connector - M12 - 5 pin |        |                                       |
|----------------------------------------------------------|--------|---------------------------------------|
| PIN                                                      | SIGNAL | TECHNICAL SPECIFICATION (1)           |
| 1                                                        | +5V    | Termination supply signal             |
| 2                                                        | LINE-A | Bus line (high)                       |
| 3                                                        | DGND   | Data line and termination signal zero |
| 4                                                        | LINE-B | Bus line (low)                        |
| 5                                                        | SHIELD |                                       |

| (C1) (C2) EH, EW fieldbus execution, connector - M12 - 4 pin |        |                             |
|--------------------------------------------------------------|--------|-----------------------------|
| PIN                                                          | SIGNAL | TECHNICAL SPECIFICATION (1) |
| 1                                                            | TX+    | Transmitter                 |
| 2                                                            | RX+    | Receiver                    |
| 3                                                            | TX-    | Transmitter                 |
| 4                                                            | RX-    | Receiver                    |
| Housing                                                      | SHIELD |                             |

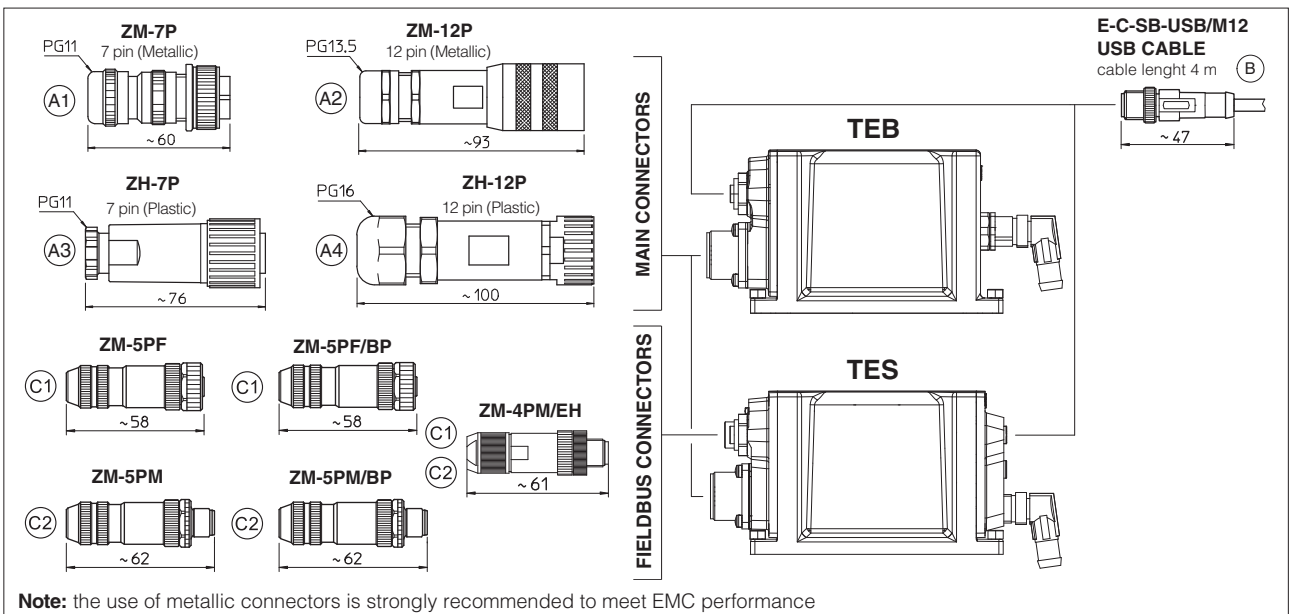
**Notes:** (1) shield connection on connector's housing is recommended

(2): pin 2 can be fed with external +5V supply of CAN interface

## 11.4 Connections layout



## 11 CONNECTORS



## 13 MODEL CODES OF MAIN CONNECTORS AND COMMUNICATION CONNECTORS - to be ordered separately

| VALVE VERSION     | TEB<br>TES         | TEB /Z<br>TES /Z | BC - CANopen | BP - PROFIBUS DP | EH - EtherCat<br>EW - POWERLINK |
|-------------------|--------------------|------------------|--------------|------------------|---------------------------------|
| CONNECTOR CODE    | ZM-7P (A1)         | ZM-12P (A2)      | ZM-5PF (C1)  | ZM-5PF/BP (C1)   | ZM-4PM/E (C1)                   |
|                   | ZH-7P (A3)         | ZH-12P (A4)      | ZM-5PM (C2)  | ZM-5PM/BP (C2)   | ZM-4PM/E (C2)                   |
| PROTECTION DEGREE | IP67               |                  |              |                  |                                 |
| DATA SHEET        | GS208, GS210, K500 |                  |              |                  |                                 |

only for TES



**14 PROGRAMMING TOOLS** - see table **GS500**

Valve's functional parameters and configurations, can be easily set and optimized using Atos E-SW programming software connected via USB port to the digital driver. For fieldbus versions, the software permits valve's parameterization through USB port also if the driver is connected to the central machine unit via fieldbus.

The software is available in different versions according to the driver's options:

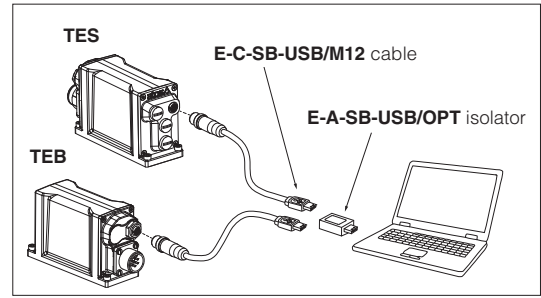
**E-SW-BASIC** support: NP (USB) PS (Serial) IR (Infrared)  
**E-SW-FIELDBUS** support: BC (CANopen) BP (PROFIBUS DP) EH (EtherCAT)  
 EW (POWERLINK)

**E-SW-\*/PQ** support: valves with SP, SF, SL alternated control (e.g. E-SW-BASIC/PQ)

**WARNING: drivers USB port is not isolated!**

The use of isolator adapter is highly recommended for PC protection (see table **GS500**)

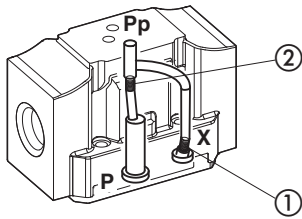
**USB connection**



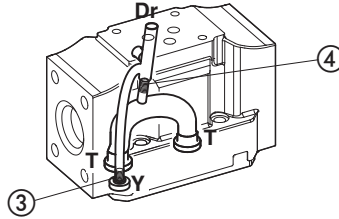
**15 PLUGS LOCATION FOR PILOT/DRAIN CHANNELS**

Depending on the position of internal plugs, different pilot/drain configurations can be obtained as shown below. To modify the pilot/drain configuration, proper plugs must only be interchanged. The plugs have to be sealed using loctite 270. Standard valves configuration provides internal pilot and external drain

**DPZO-1 Pilot channels**

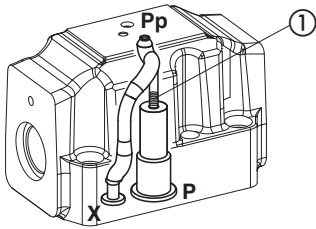


**Drain channels**

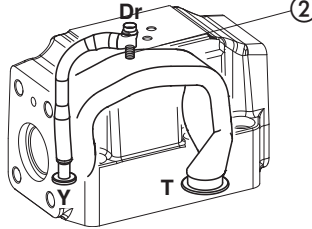


**Internal piloting:** blinded plug SP-X300F ① in X;  
**External piloting:** blinded plug SP-X300F ② in Pp;  
**Internal drain:** blinded plug SP-X300F ③ in Y;  
**External drain:** blinded plug SP-X300F ④ in Dr.

**DPZO-2 Pilot channels**

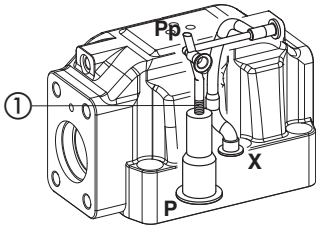


**Drain channels**

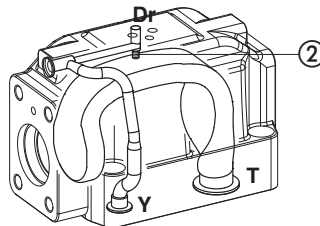


**Internal piloting:** Without blinded plug SP-X300F ①;  
**External piloting:** Add blinded plug SP-X300F ①;  
**Internal drain:** Without blinded plug SP-X300F ②;  
**External drain:** Add blinded plug SP-X300F ②.

**DPZO-4 Pilot channels**

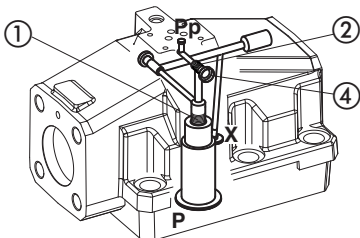


**Drain channels**

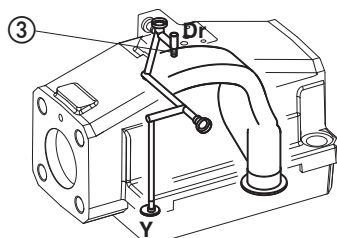


**Internal piloting:** Without blinded plug SP-X500F ①;  
**External piloting:** Add blinded plug SP-X500F ①;  
**Internal drain:** Without blinded plug SP-X300F ②;  
**External drain:** Add blinded plug SP-X300F ②.

**DPZO-6 Pilot channels**

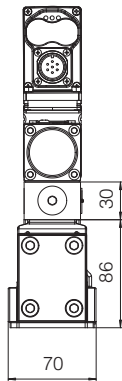


**Drain channels**

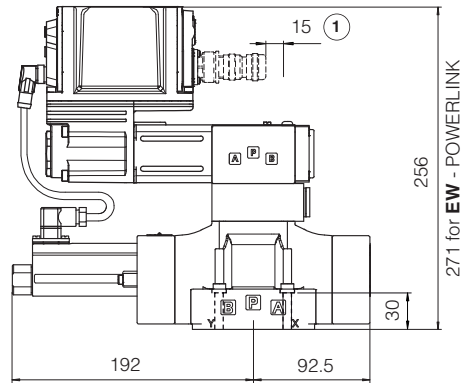


**Internal piloting:** Without plug ①;  
**External piloting:** Add DIN-908 M16x1,5 in pos ①;  
**Internal drain:** Without blinded plug SP-X300F ③;  
**External drain:** Add blinded plug SP-X300F ③.





**DPZO-TEB\*-15\***  
**DPZO-TES\*-15\***



271 for **EW** - POWERLINK

Mass 9 kg

**DPZO-TEB\*-17\***  
**DPZO-TES\*-17\***

**ISO 4401: 2005**

**Mounting surface: 4401-05-05-0-05**

(see table P005)

Fastening bolts:

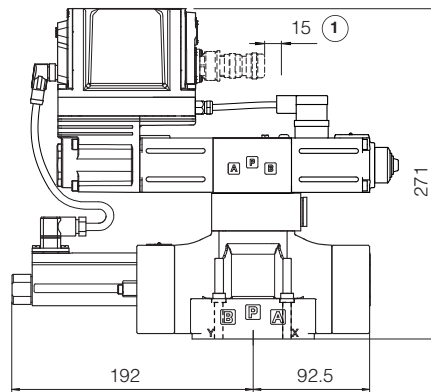
4 socket head screws M6x40 class 12.9

Tightening torque = 15 Nm

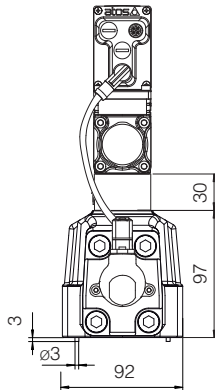
Seals: 5 OR 2050; 2 OR 108

Diameter of ports A, B, P, T:  $\varnothing = 11$  mm;

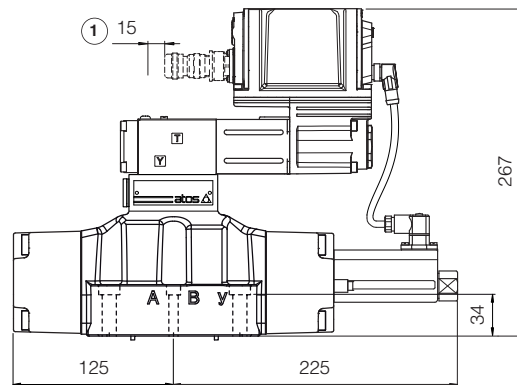
Diameter of ports X, Y:  $\varnothing = 5$  mm;



Mass 9,8 kg



**DPZO-TEB\*-25\***  
**DPZO-TES\*-25\***



282 for **EW** - POWERLINK

Mass 14 kg

**DPZO-TEB\*-27\***  
**DPZO-TES\*-27\***

**ISO 4401: 2005**

**Mounting surface: 4401-07-07-0-05**

(see table P005)

Fastening bolts:

4 socket head screws M10x50 class 12.9

Tightening torque = 70 Nm

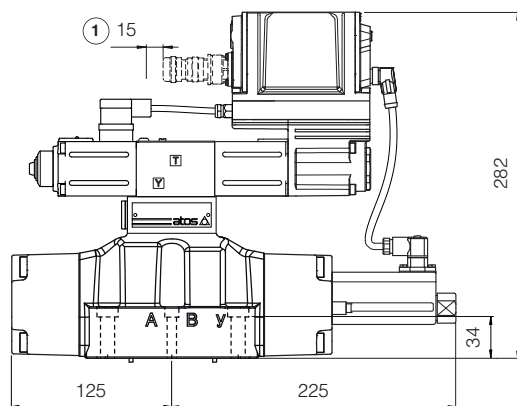
2 socket head screws M6x45 class 12.9

Tightening torque = 15 Nm

Seals: 4 OR 130; 2 OR 2043

Diameter of ports A, B, P, T:  $\varnothing = 20$  mm;

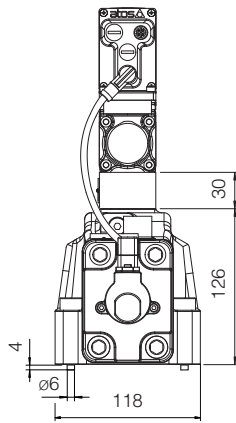
Diameter of ports X, Y:  $\varnothing = 7$  mm;



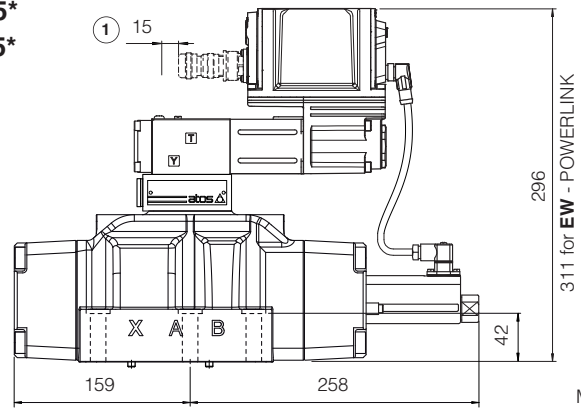
Mass 14,8 kg

① = Space to remove the 7 or 12 pin main connector

For main and communication connectors see section 13, 14



**DPZO-TEB\*-45\***  
**DPZO-TES\*-45\***



Mass 18,5 kg

**ISO 4401: 2005**

**Mounting surface: 4401-08-08-0-05**

(see table P005)

Fastening bolts:

6 socket head screws M12x60 class 12.9

Tightening torque = 125 Nm

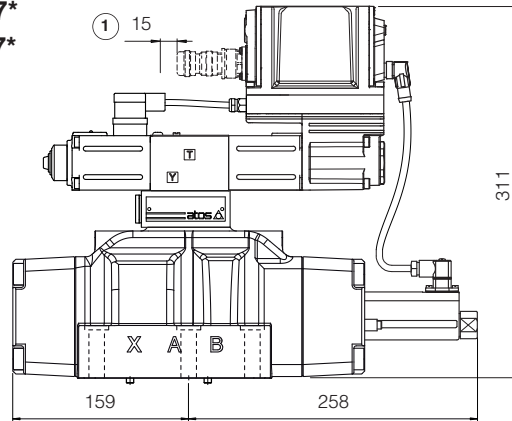
**DPZO-4**

Seals: 4 OR 4112; 2 OR 3056

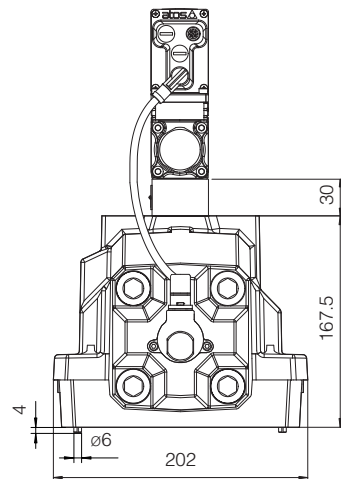
Diameter of ports A, B, P, T:  $\varnothing = 24$  mm;

Diameter of ports X, Y:  $\varnothing = 7$  mm;

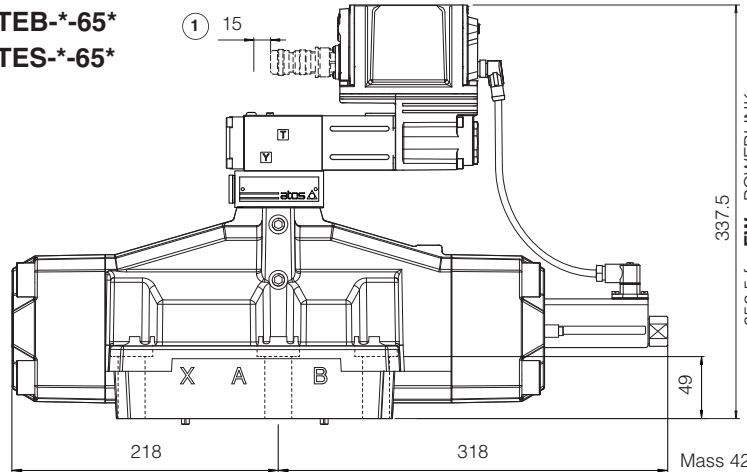
**DPZO-TEB\*-47\***  
**DPZO-TES\*-47\***



Mass 19,3 kg



**DPZO-TEB\*-65\***  
**DPZO-TES\*-65\***



Mass 42,5 kg

**ISO 4401: 2005**

**Mounting surface: 4401-10-09-0-05**

(see table P005)

Fastening bolts:

6 socket head screws M20x90 class 12.9

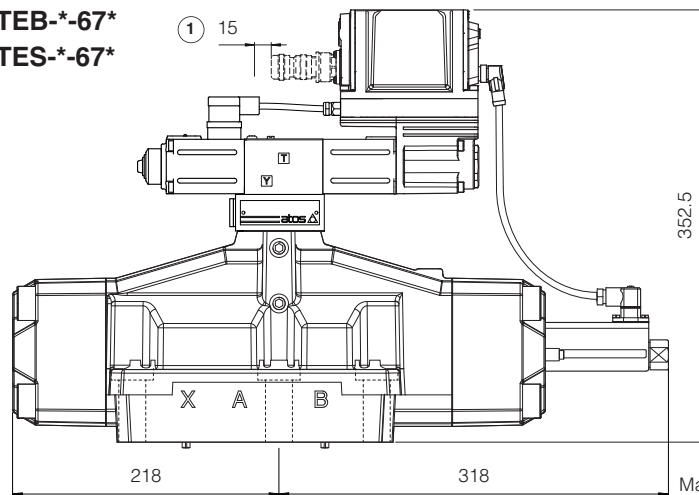
Tightening torque = 600 Nm

Diameter of ports A, B, P, T:  $\varnothing = 34$  mm;

Diameter of ports X, Y:  $\varnothing = 7$  mm;

Seals: 4 OR 144, 2 OR 3056

**DPZO-TEB\*-67\***  
**DPZO-TES\*-67\***



Mass 43,3 kg

① = Space to remove the 7 or 12 pin main connector

For main and communication connectors see section 13, 14