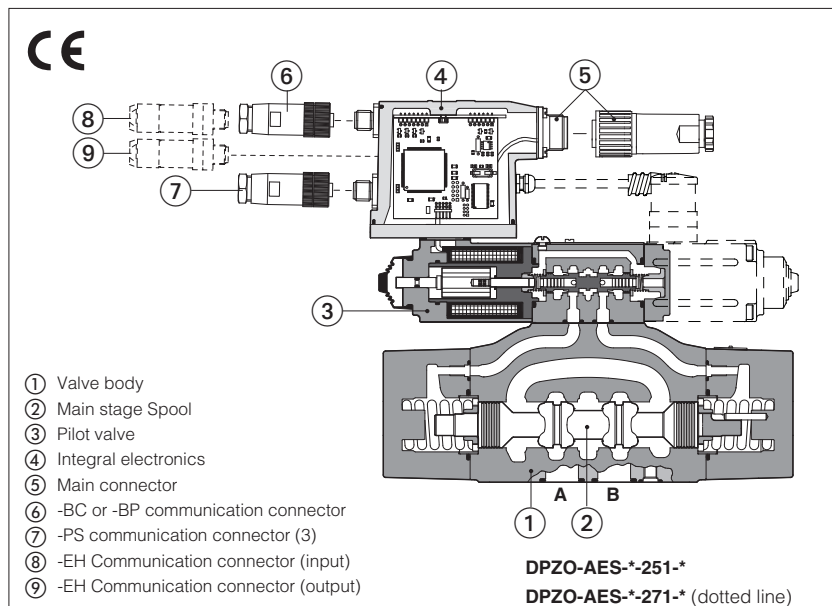


# Proportional directional valves type DPZO-AES

two stage without position transducer, ISO 4401 sizes 10, 16, 25 and 32



## 1 MODEL CODE

**DPZO - AES- PS - 2 7 1 - D 5 / \* \* \*** /\*

Piloted proportional directional valve

**A** = without position transducer  
**AE** = as A plus integral electronics  
**AES** = as A plus integral digital electronics  
**AEG** = as AES plus internal reference generation (1)  
**AEZ** = as AES plus internal cycle generator (2)

Communication interfaces (only for digital electronics)  
**PS** = Serial (3)  
**BC** = CANopen (only AES)  
**BP** = PROFIBUS DP (only AES)  
**EH** = EtherCAT (only AES)

Valve size:  
**1** = 10 **2** = 16 **3** = 25  
**4** = 25 (high flow) **6** = 32

Configuration, see section 3:  
**5** = external plus central position, spring centered  
**7** = 3 positions; spring centered

Spool overlapping in central position, see section 3:  
**1** = P, A, B, T positive overlapping (4)  
**3** = P positive overlapping A, B, T negative overlapping

Spool type  
**L** = linear  
**S** = progressive  
**D** = as **S**, but with P-A = Q, P-B = Q/2

### Notes:

- (1) For detailed description of proportional valves with AEG integral reference generation, see tab. F220
- (2) For detailed description of proportional valves with AEZ integral cycle generation, see tab. F220
- (3) Serial interface always present, also for -BC and -BP and -EH options
- (4) Overlapping = 20% of spool stroke for type **S** and **D**, 10% of spool stroke for type **L**

Seals material:  
omit for NBR (mineral oil & water glycol)  
**PE** = FPM

Series number

**Coil voltage (only for -A execution)**  
see section 4:  
**-** = standard coil for 24V<sub>DC</sub> Atos drivers  
**6** = optional coil for 12V<sub>DC</sub> Atos drivers  
**18** = optional coil for low current drivers

**Hydraulic options**, see section 4:  
**B** = solenoid and integral electronics at side of port B of the main stage;  
**D** = internal drain  
**E** = external pilot  
**G** = pressure reducing valve for piloting

**Electronics options for -AE execution**, see section 8:  
**I** = current reference input (4÷20 mA)  
**Q** = enable signal

**Electronics options for -AES execution**, see section 10:  
**Q** = enable signal  
**Z** = double power supply, enable fault and monitor (12 pin connector)  
**W** = power limitation function (12 pin connector) see section 11.3

Spool size: **3** and **5**, see section 3

DPZO-A\* are two stage proportional valves without position transducer, which provide both directional and non compensated flow control according to the electronic reference signal.

They operate in association with electronic drivers, see section 2, which supply the proportional valves with correct current signal to align valve regulation to the reference signal supplied to the electronic driver.

They are available in different executions:

- -A, without position transducer;
- -AE, -AES as -A plus analogue (AE) or digital (AES) integral electronics 4;

The 4-way spool 2, sliding into a 5-chambers body 1, is piloted in open loop by the proportional pressure reducing valve 3 type DHRZO.

The integral electronics 4 ensures factory presetting, fine functionality plus valve-to-valve interchangeability and simplified wiring and installation.

The electronic main connector 5 is fully interchangeable for -AE and -AES executions.

Standard 7 pin main connector is used for power supply, analog input reference and monitor signals.

12 pin connector is used for options /Z, /W (AES).

Following communication interfaces 6, 7 are available for the digital -AES execution:

- standard -PS, Serial communication interface for configuration, monitoring and firmware updating through Atos PC software - always present, also for -BC, -BP and -EH options
- optional -BC, CANopen interface
- optional -BP, PROFIBUS DP interface
- -EH, EtherCAT interface

The valves with -BC and -BP interfaces can be integrated into a fieldbus communication network and thus digitally operated by the machine control unit.

The coils are fully plastic encapsulated with insulation class H.

Surface mounting: ISO 4401 size 10, 16, 25 and 32.

Max flow respectively up to 160 l/min, 430 l/min, 680 l/min, 730 l/min and 1030 l/min with valve differential pressure Δp = 30 bar, see section 3.

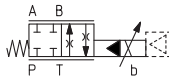
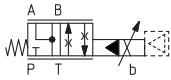
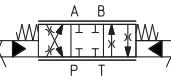

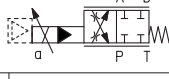
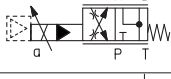
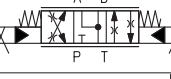

Max pressure: 350 bar.

## 2 ELECTRONIC DRIVERS FOR DPZO-A\*

Valve model	-A						-AE	-AES
Drivers model	E-MI-AC-0°F	E-MI-AS-IR	E-BM-AC-0°F	E-BM-AS-PS	E-ME-AC-0°F	E-RP-AC-0°F	E-RI-AE	E-RI-AES
Data sheet	G010	G020	G025	G030	G035	G100	G110	G115

Note: for power supply and communication connector see section 14

### 3 HYDRAULIC CHARACTERISTICS (based on mineral oil ISO VG 46 at 50 °C)

Hydraulic symbols																	
																	
Valve model	DPZO-1			DPZO-2			DPZO-3			DPZO-4			DPZO-6				
Spool overlapping	1, 3			1, 3			1, 3			1, 3			1, 3				
Spool type and size	L5	S5	D5	S3	D3	L5	S5	D5	L5	S5	D5	L5	S5	D5	L5	S5	D5
Max flow (1) [l/min]	100	100	100:60	160	160:98	250	225	225:160	390	360	360:220	420	400	400:245	600	600	600:370
at $\Delta p = 10$ bar (P-T)	160	160	160:100	270	270:160	430	390	390:280	680	620	620:380	730	690	690:420	1030	1030	1030:635
at $\Delta p = 30$ bar (P-T)	180	180	180:110	600	600:370	880	800	800:580	1350	1250	1250:760	1450	1380	1380:845	1600	1600	1600:990
max permissible flow																	
Pressure limits (2) [bar]	ports P, A, B, X = 350; T = 250 (5 for option /D); Y = 5																
Response time [ms] (3)	< 80			< 100			< 120			< 120			< 180				
Hysteresis [%]	$\leq 5\%$																
Repeatability	$\pm 1\%$																

#### Notes:

- For version DPZO-A and DPZO-AE, configuration /B, see the notes at section 4.1
- Above performance data refer to valves coupled with Atos electronic drivers, see section 2.
- In case of long time shutdown of the hydraulic supply to the pilot valve, the driver has to be switched off to avoid its overheating.
- The flow regulated by the directional proportional valves is not pressure compensated, thus it is affected by the load variations. To keep constant the regulated flow under different load conditions, modular pressure compensators are available (see tab. D150).

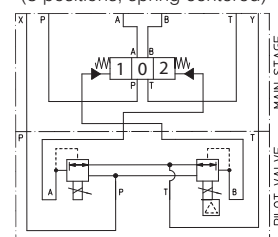
(1) For different  $\Delta p$ , the max flow is in accordance to the diagrams in section 14.2

(2) Minimum piloting pressure = 30 bar

(3) 0-100% step signal

#### FUNCTIONAL SCHEME

example of configuration 7  
(3 positions, spring centered)



### 4 MAIN CHARACTERISTICS

Assembly position	Any position		
Subplate surface finishing	Roughness index Ra 0,4 - flatness ratio 0,01/100 (ISO 1101)		
Ambient temperature	-20°C ÷ +70°C for -A execution; -20°C ÷ +60°C for -AE, -AES, -AEG and -AEZ executions		
Fluid	Hydraulic oil as per DIN 51524 ... 535 for other fluids see section 1		
Recommended viscosity	15 ÷ 100 mm²/s at 40°C (ISO VG 15÷100)		
Fluid contamination class	ISO 4406 class 20/18/15 NAS 1638 class 9, in line filters of 10 µm ( $\beta_{10} \geq 75$ recommended)		
Fluid temperature	-20°C +60°C (standard seals) -20°C +80°C (/PE seals)		
Coil code	Standard	Option /6	Option /18
Coil resistance R at 20°C	3 ÷ 3,3 Ω	2 ÷ 2,2 Ω	13 ÷ 13,4 Ω
Max. solenoid current	1,9 A	2,35 A	0,9 A
Max. power	30 Watt for -A execution; 50 Watt for -AE, -AES, -AEG and -AEZ executions		
Protection degree (CEI EN-60529)	IP65 for -A execution; IP67 for -AE, -AES, -AEG and -AEZ executions		
Duty factor	Continuous rating (ED=100%)		

### 5 GENERAL NOTES

DPZO-A\* 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).

### 6 HYDRAULIC OPTIONS

**6.1 Option /B** DPZO-\*5 = solenoid and integral electronics at side of port B of the main stage.

DPZO-\*7 = integral electronics at side of port B of the main stage.

For hydraulic configuration vs. reference signal, see section 14.1

**6.2 Pilot and drain configuration** -The pilot / drain configuration can be modified as shown in the table E085 section 12.

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.

**Option /G** Pressure reducing valve with fixed setting (= 40 bar for DPZO-1 and -2; 100 bar for DPZO-3, -4 and -6) installed between pilot valve and main body.

It is advisable for valves with internal pilot in case of system pressure higher than 200 bar.

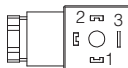
## 7 OPTIONS FOR -A EXECUTION

**7.1 Option /6** optional coil to be used with Atos drivers with power supply 12 Vdc

**7.2 Option /18** optional coil to be used with electronic drivers not supplied by Atos

## 8 CONNECTIONS FOR -A EXECUTION

SOLENOID POWER SUPPLY CONNECTOR		
PIN	Signal description	
1	SUPPLY	
2	SUPPLY	
3	GND	



## 9 ANALOG INTEGRAL DRIVERS -AE - OPTIONS

Standard driver execution provides on the 7 pin main connector:

**Power supply** - 24Vdc must be appropriately stabilized or rectified and filtered; a 2,5 A safety fuse is required in series to the 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 coil current.

**Monitor output signal** - analog output signal proportional to the actual valve's coil current (1V monitor = 1A coil current)

Following options are available to adapt standard execution to special application requirements:

### 9.1 Option /I

It provides the 4÷20 mA current reference signal instead of the standard  $\pm 10$  Vdc. Monitor output signal is still the standard  $\pm 10$  Vdc.

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.

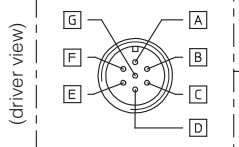
### 9.2 Option /Q

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 24Vdc on the enable input signal.

### 9.3 Possible combined options: /IQ

## 10 ANALOG INTEGRAL DRIVERS -AE - MAIN FUNCTIONS AND ELECTRONIC CONNECTIONS

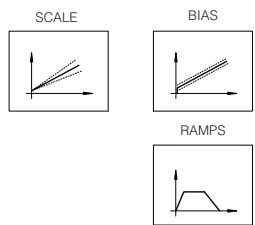
**MAIN CONNECTOR**  
**7 PIN - STANDARD**



Selector SW				Dither frequency [Hz]
SW1	SW2	SW3	SW4	
				100
ON				130
	ON			160
		ON		<b>200 (Standard)</b>
ON		ON		230
	ON	ON		270
ON	ON	ON		300
ON	ON		ON	380
ON		ON	ON	430
	ON	ON	ON	470
ON	ON	ON	ON	500

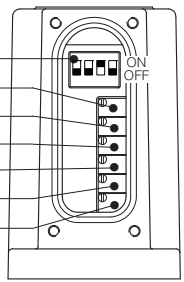
The dither frequency is factory pre-set at 200 Hz and its regulation may be adjusted after contact with Atos technical department

**CURRENT TO COIL S2**  
(only for double solenoid valves)



**B1:** positive bias adjust  
**B2:** negative bias adjust (only for double solenoid valves)  
**S1:** positive scale adjust  
**S2:** negative scale adjust (only for double solenoid valves)  
**RU:** ramp for increasing reference signal  
**RD:** ramp for decreasing reference signal  
**SW:** dither frequency selector (see table beside)

**REGULATIONS AND SWITCHES**  
(remove the rear cover)



### 10.1 ELECTRONIC CONNECTIONS - 7 PIN MAIN CONNECTORS

PIN	SIGNAL	TECHNICAL SPECIFICATIONS	NOTES
A	V+	Power supply 24 Vdc for solenoid power stage and driver logic	Input - power supply
B	V0	Power supply 0 Vdc for solenoid power stage and driver logic	Gnd - power supply
C <sup>(1)</sup>	AGND	Ground - signal zero for MONITOR signal	Gnd - analog signal
	ENABLE	Enable (24 Vdc) or disable (0 Vdc) the driver (for /Q option)	Input - on/off signal
D	INPUT+	Reference analog differential input: $\pm 10$ Vdc maximum range (4 ÷ 20 mA for /I option) Default setting for single solenoid valves: 0÷+10 Vdc	Input - analog signal
E	INPUT -	Default setting for double solenoid valves: $\pm 10$ Vdc	
F	MONITOR	Monitor analog output: $\pm 5$ Vdc maximum range; 1 V = 1 A	Output - analog signal
G	EARTH	Internally connected to the driver housing	

**Note:** (1) with /Q option ENABLE signal replaces AGND on pin C; MONITOR signal is referred to pin B.

A minimum time of 60ms to 160ms have be considered between the driver energizing with the 24 Vdc power supply and when the valve is ready to operate. During this time the current to the valve coils is switched to zero

## 11 DIGITAL INTEGRAL DRIVERS -AES - OPTIONS

Standard driver execution provides on the 7 pin main connector:

- Power supply** - 24Vdc must be appropriately stabilized or rectified and filtered; a 2,5 A safety fuse is required in series to each driver power supply. Apply at least a 10000 µF/40 V capacitance to single phase rectifiers or a 4700 µF/40 V capacitance to three phase rectifiers.
- Reference input signal** - analog differential input with ±10Vdc nominal range (pin D,E), proportional to desired coil current (4÷20 mA with cable break detection, ±10 mA, ±20 mA or 0÷20 mA software selectable)
- Monitor output signal** - analog output signal proportional to the actual valve's coil current (1V monitor = 1A coil current)

Following options are available to adapt standard execution to special application requirements:

**11.1 Option /Q** - To enable the driver, supply 24Vdc on pin C referred to pin B: when the enable signal is set to zero the valve status is software selectable, by factory default the valve functioning is disabled (zero current to the solenoid) but the driver current output stage is still active. For the complete list of selectable status, see tab. G115.

**11.2 Option /Z** - It provides, on the 12 pin main connector, the following additional features:

### Logic power supply

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 allows to realize safety systems in compliance with European Norms EN13849-1 (ex EN954-1).

### Enable Input Signal

To enable the driver, supply 24Vdc on pin 3 referred to pin 2: when the enable signal is set to zero the valve status is software selectable, by factory default the valve functioning is disabled (zero current to the solenoid) but the driver current output stage is still active. For the complete list of selectable status, see tab. G115.

### 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

**11.3 Option /W** - only for valves coupled with pressure compensator type HC-011 or KC-011 (see tab. D150).

It provides, on the 12 pin main connector, the above option /Z features plus the hydraulic power limitation function.

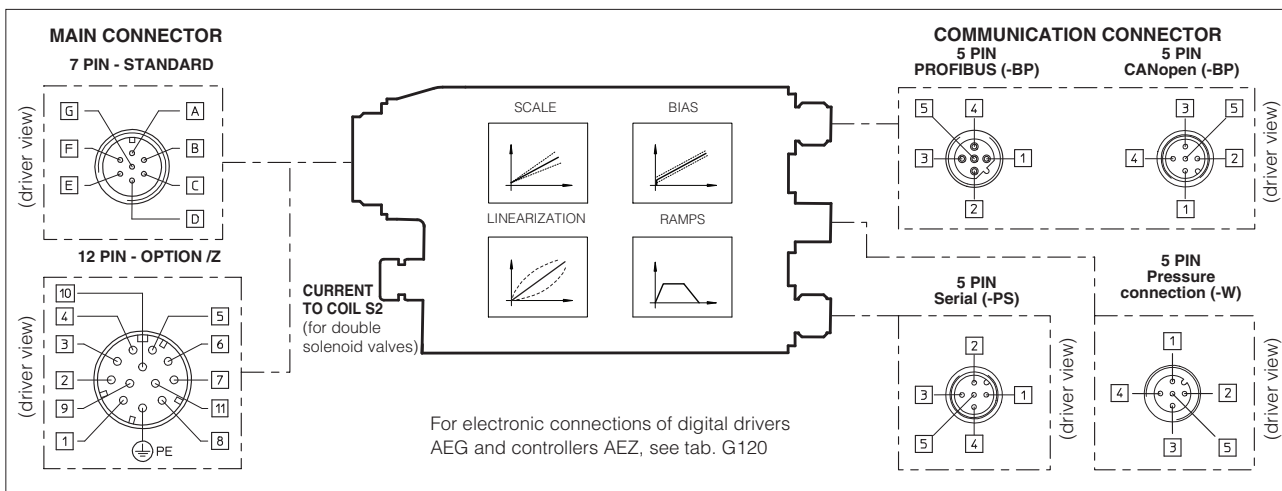
The driver receives the flow reference signal by the analog external input INPUT+ and a pressure transducer remotely installed in the hydraulic system, has to be connected to the driver's analog input TR.

When the actual requested hydraulic power  $p \times Q$  (TR x INPUT+) reaches the max power limit ( $p1 \times Q1$ ), internally set by software, the driver automatically reduces the flow regulation of the valve. The higher is the pressure feedback the lower is the valve's regulated flow:

$$\text{Flow regulation} = \text{Min} \left( \frac{\text{PowerLimit [sw setting]}}{\text{Transducer Pressure [TR]}} ; \text{Flow Reference [INPUT+]} \right)$$

For detailed information on hydraulic power limitation, see tab. G115

## 12 DIGITAL INTEGRAL DRIVERS -AES - MAIN FUNCTIONS AND ELECTRONIC CONNECTIONS



### 12.1 7 or 12 PIN MAIN CONNECTORS (-AES standard, /Q, /Z, /W options)

Standard 7pin	/Z, /W options 12pin	SIGNAL	TECHNICAL SPECIFICATIONS	NOTES
A	1	V+	Power supply 24 Vdc for solenoid power stage (and for driver logic on 7 pin connection)	Input - power supply
B	2	V0	Power supply 0 Vdc for solenoid power stage (and for driver logic on 7 pin connection)	Gnd - power supply
C (option /Q)	3	ENABLE	Enable (24 Vdc) or disable (0 Vdc) the driver	Input - on/off signal
D	4	INPUT+	Reference analog input: ±10 Vdc ±20 mA maximum range software selectable	Input - analog signal
E	-	INPUT -	Default setting for single solenoid valves: 0÷+10 Vdc, differential input Default setting for double solenoid valves: ±10 Vdc, differential input /Z and /W options: common mode INPUT+ referred to AGND	
C	5	AGND	Ground - signal zero for MONITOR signal (INPUT+ signal only for /Z and /W options)	Gnd - analog signal
F	6	MONITOR	Monitor analog output: ±5 Vdc maximum range; Default setting 1V = 1A	Output - analog signal
-	7	NC	do not connect	
-	8	MONITOR 2	2nd monitor analog output: ±5 Vdc maximum range (only for /W option)	Output - analog signal
-	9	VL+	Power supply 24 Vdc for driver logic	Input - power supply
-	10	VL0	Power supply 0 Vdc for driver logic	Gnd - power supply
-	11	FAULT	Fault (0 Vdc) or normal working (24 Vdc)	Output - on/off signal
G	PE	EARTH	Internally connected to the driver housing	

**Note:** A minimum time of 270 to 340 ms have to be considered between the driver energizing with the 24 VDC power supply and when the valve is ready to operate. During this time the current to the valve coils is switched to zero.

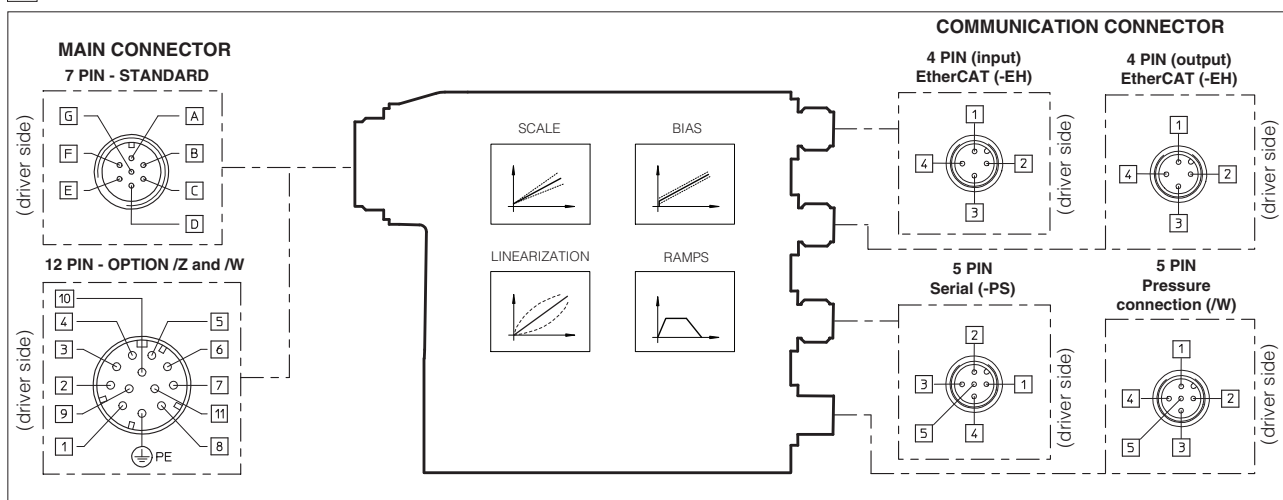
## 12.2 ELECTRONIC CONNECTIONS - 5 PIN COMMUNICATION AND PRESSURE TRANSDUCER CONNECTORS

Serial (-PS)			CANopen (-BC)		PROFIBUS DP (-BP)	
PIN	SIGNAL	TECHNICAL SPECIFICATION	SIGNAL	TECHNICAL SPECIFICATION	SIGNAL	TECHNICAL SPECIFICATION
1	NC	do not connect	CAN_SHLD	Shield	+5V	for termination
2	NC	do not connect	NC	do not connect	LINE-A	Bus line (high)
3	RS_GND	Signal zero data line	CAN_GND	Signal zero data line	DGND	data line and termination Signal zero
4	RS_RX	Valves receiving data line	CAN_H	Bus line (high)	LINE-B	Bus line (low)
5	RS_TX	Valves transmitting data line	CAN_L	Bus line (low)	SHIELD	do not connect

### 12.3 5 PIN M12 PRESSURE CONNECTOR (only for /W option)

PIN	Input Voltage (Software selectable)		Input Current (Software selectable)	
1	VT	Remote transducer power supply 24 Vdc	VT	Remote transducer power supply 24 Vdc
2	TR	Remote transducer signal (0 ÷ 10 Vdc)	TR	Remote transducer signal (0 ÷ 20 mA)
3	AGND	signal zero for power supply and signal	NC	do not connect
4	NC	do not connect	NC	do not connect
5	NC	do not connect	NC	do not connect

## 13 DIGITAL INTEGRAL DRIVER -AES-EH - MAIN FUNCTIONS AND ELECTRONIC CONNECTIONS



**Note:** for the electronic connections of 7 or 12 pin main connector, see section 12.1  
for pressure transducer electronic connector (option /W) see section 12.3)

### 13.1 4 & 5 PIN M12 COMMUNICATION CONNECTORS

Serial (-PS)			EtherCAT (-EH)		
PIN	SIGNAL	TECHNICAL SPECIFICATION	PIN	SIGNAL	TECHNICAL SPECIFICATION
1	NC	do not connect	1	TX+	Transmitter
2	NC	do not connect	2	RX+	Receiver
3	RS_GND	Signal zero data line	3	TX-	Transmitter
4	RS_RX	Valves receiving data line	4	RX-	Receiver
5	RS_TX	Valves transmitting data line	Housing	Shield	Positioned on control cabinet side

## 14 MODEL CODES OF POWER SUPPLY AND COMMUNICATION CONNECTORS (to be ordered separately)

VALVE VERSION	-A	-AE, -AES		-AES/Z	-AES/W -AEZ	-Serial (-PS) or CANopen (-BC)	PROFIBUS DP (-BP)	EtherCAT (-EH)
CONNECTOR CODE	666	ZH-7P	ZM-7P	ZH-12P	ZH-5PM	ZH-5P	ZH-5P/BP	ZM-4PM/EH
PROTECTION DEGREE	IP65	IP67	IP67	IP67	IP67	IP67	IP67	IP67
DATA SHEET	K500	G110, G115, K500			G115, K500	G115, K500		

connectors supplied with the valve

## 15 SOFTWARE TOOLS

The driver configuration and parameters can be easily set with the Atos E-SW programming software, available in four different versions according to the driver's communication execution: E-SW-PS (Serial), E-SW-BC (CANopen), E-SW-BP (PROFIBUS DP), E-SW-EH (EtherCAT). Programming software E-SW-BC, E-SW-BP, E-SW-EH for BC, BP and -EH drivers, can be also used to modify the valve's parameterization through the serial communication interface, without disconnecting the valve from the machine's bus line.

For a more detailed description of software interface, PC requirements, adapters, cables and terminators, please refer to technical table G500.

**Programming software, must be ordered separately:**

**E-SW-\*** (mandatory - first supply) = Dvd including E-SW-\* software installer and operator manuals; it allows the registration to Atos digital service

**E-SW-\*-N** (optional - next supplies) = as above but not allowing the registration to Atos digital service

On first supply of the E-SW-\* software, it is required to apply for the registration in the Atos download area: [www.download.atos.com](http://www.download.atos.com).

Once the registration is completed, the password will be sent by email.

The software remains active for 10 days from the installation date and then it stops until the user inputs his password.

With the password you can also download, in your personal area, the latest releases of the Atos software, manuals, drivers and configuration files.

## 16 DIAGRAMS (based on mineral oil ISO VG 46 at 50 °C)

### 16.1 Regulation diagrams

DPZO-1:

- 1 = linear spool L5  
2 = differential spool S5, D5

DPZO-2:

- 3 = progressive spool S3, D3  
4 = progressive spool S5, D5  
5 = linear spool L5

DPZO-3:

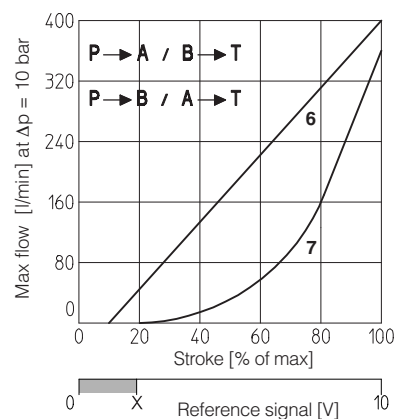
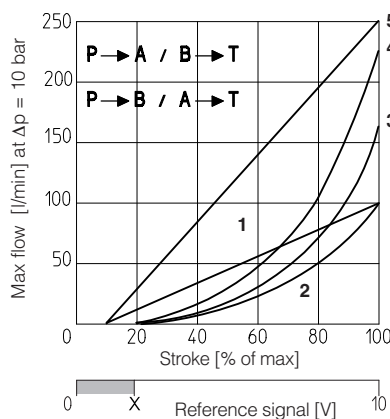
- 6 = linear spool L5  
7 = progressive spool S5, D5

DPZO-4:

- 8 = linear spool L5  
9 = progressive spool S5, D5

DPZO-6:

- 10 = linear spool L5  
11 = progressive spool S5, D5



#### Note:

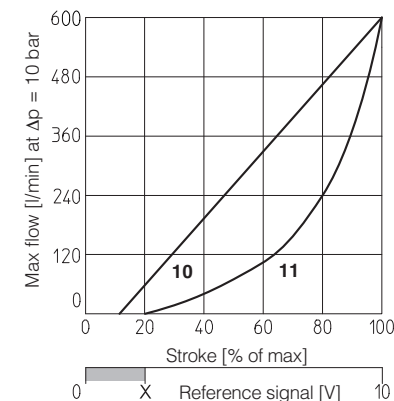
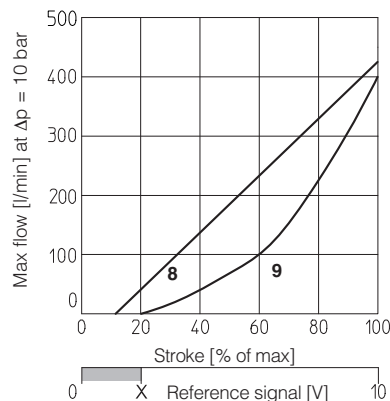
Hydraulic configuration vs reference signal for:  
- double solenoid valves (standard and option /B)

Reference signal  $0 \div +10 \text{ V}$  }  $P \rightarrow A / B \rightarrow T$   
                           $12 \div 20 \text{ mA}$  }  
Reference signal  $0 \div -10 \text{ V}$  }  $P \rightarrow B / A \rightarrow T$   
                           $4 \div 12 \text{ mA}$  }

Hydraulic configuration vs reference signal  
for single solenoid valves:

Reference signal:  
 $0 \div +10 \text{ V}$  }  $P \rightarrow A / B \rightarrow T$  (standard)  
 $4 \div 20 \text{ mA}$  }  $P \rightarrow B / A \rightarrow T$  (option /B)

X = Threshold for bias activation depending to the valve type and amplifier type



### 16.2 Flow /Δp diagram

Stated at 100% of valve stroke

DPZO-1:

- 1 = spool L5, S5, D5

DPZO-2:

- 2 = spool L5, S5, D5  
3 = spool S3, D3

DPZO-3:

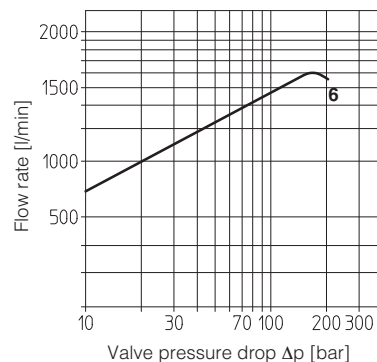
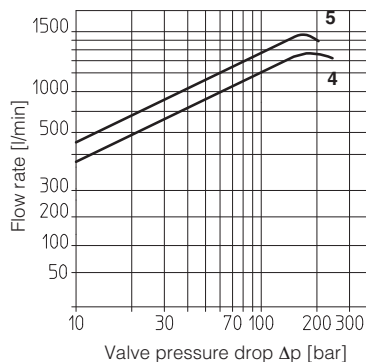
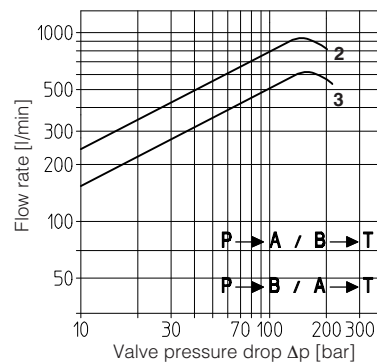
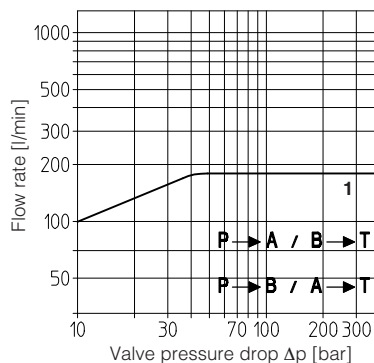
- 4 = spool L5, S5, D5

DPZO-4:

- 5 = spool L5, S5, D5

DPZO-6:

- 6 = spool L5, S5, D5

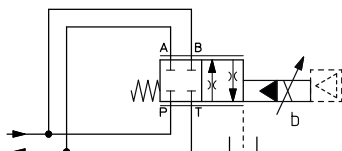


### 16.3 Operation as throttle valve

Single solenoid valves (\*51) can be  
used as simple throttle valves:

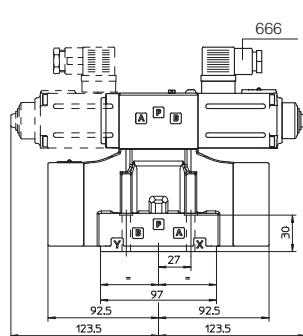
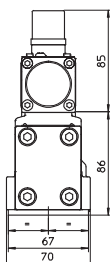
Pmax = 250 bar

For this application, the use of valve -T,  
-TE or -TES (see tab. F172 and F175) is  
advisable (consult our technical office)



DPZO-*	151-L5	251-L5	351-L5	451-L5	651-L5
Max flow [l/min]	320	850	1300	1400	2000
Δp [bar]	30	30	30	30	30



**DPZO-A(\*)-1** (dotted line = double solenoid version)**DPZO-A-1****ISO 4401: 2005****Mounting surface: 4401-05-05-0-05** (see table P005)

Fastening bolts:

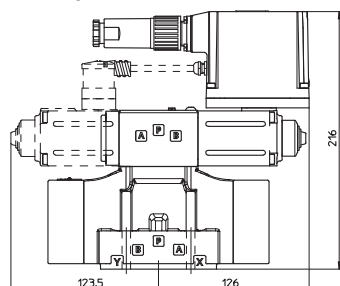
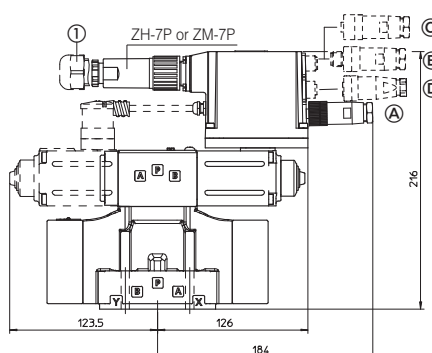
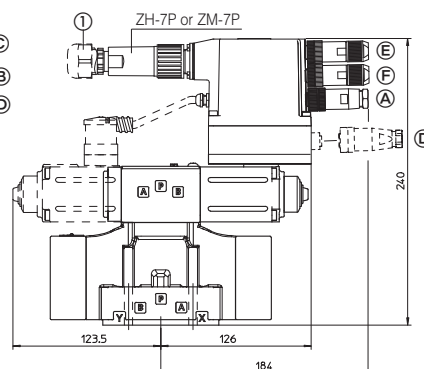
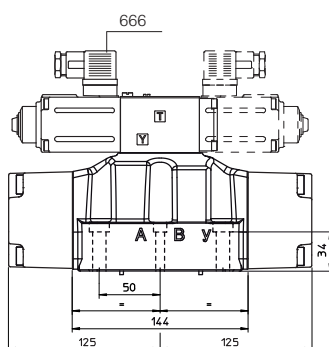
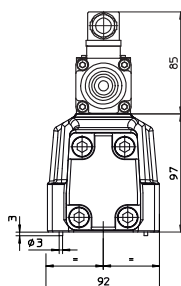
4 socket head screws M6x40 class 12.9

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 [kg]**

	A	AE, AES, AEG, AEZ	AES-EH
DPZO-*-15*	7,7	8,1	8,2
DPZO-*-17*	8,6	9	9,1

**DPZO-AE-1****DPZO-AES-1****DPZO-AES-EH-1****DPZO-A(\*)-2** (dotted line = double solenoid version)**DPZO-A-2****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

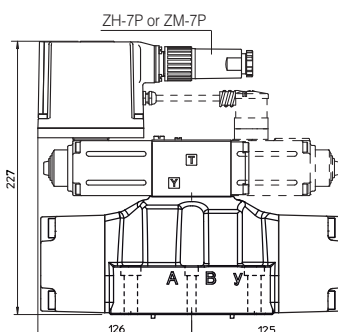
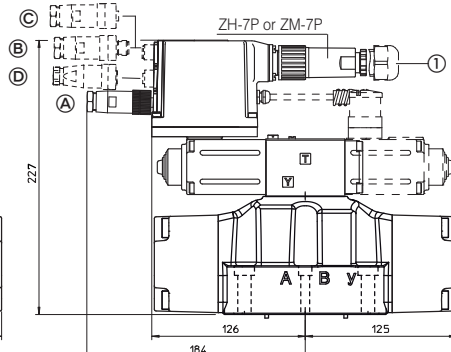
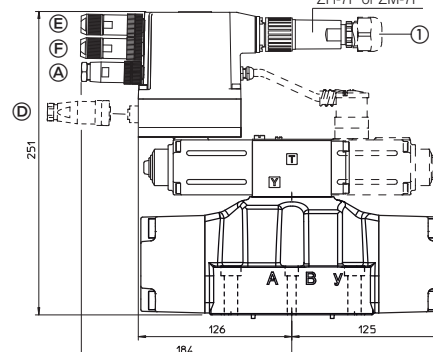
2 socket head screws M6x45 class 12.9

Tightening torque = 15 Nm

Seals: 4 OR 130; 3 OR 109/70

Diameter of ports A, B, P, T:  $\varnothing = 20$  mm;Diameter of ports X, Y:  $\varnothing = 7$  mm;**Mass [kg]**

	A	AE, AES, AEG, AEZ	AES-EH
DPZO-*-25*	11,9	12,3	12,4
DPZO-*-27*	12,8	13,2	13,3

**DPZO-AE-2****DPZO-AES-2****DPZO-AES-EH-2**

- Ⓐ -PS communication interface, ZH-5P connector
- Ⓑ -BP communication interface, ZH-5P/BP connector
- Ⓒ -BC communication interface, ZH-5P connector
- Ⓓ -Option /W pressure transducer interface, ZH-5PM connector
- Ⓔ -EH communication interface (input), ZM-4PM/EH connector
- Ⓕ -EH communication interface (output), ZM-4PM/EH connector

① dotted line = 12 pin connector ZH-12P for -AES option /Z, /W

**NOTE:** The overall height is increased by 40 mm for /G option (0,9 kg).

For option /B the proportional solenoid and the electronics (in case of execution -AE and -AES) are at side of port B of the main stage.

**DPZO-A(\*)-3** (dotted line = double solenoid version)

ISO 4401: 2005

Mounting surface: 4401-08-08-0-05 (see table P005)

Fastening bolts:

6 socket head screws M12x50 class 12.9

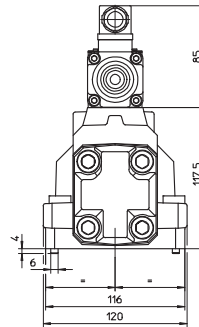
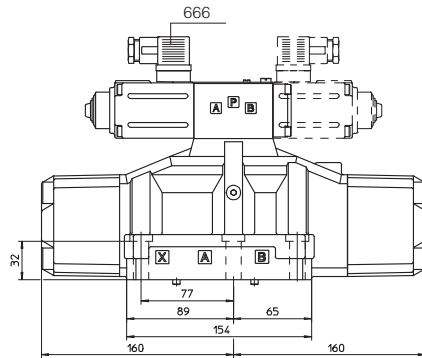
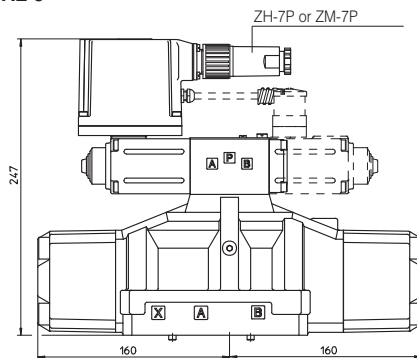
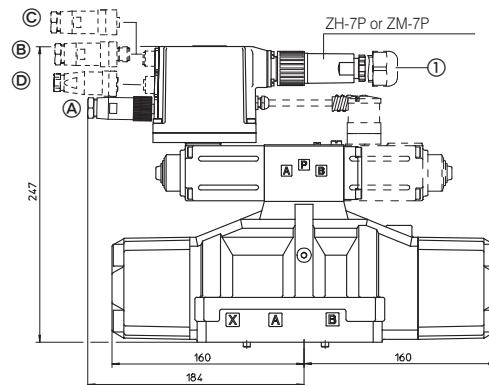
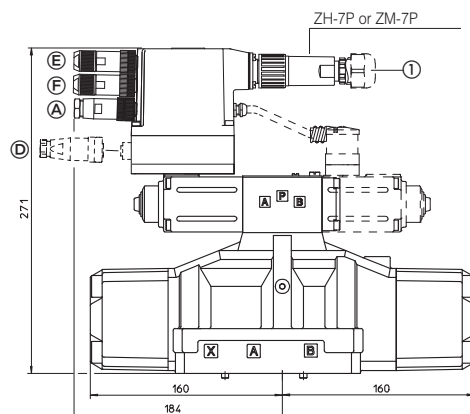
Tightening torque = 125 Nm

Seals: 4 OR 4112; 3 OR 3056

Diameter of ports A, B, P, T:  $\varnothing = 24$  mm;Diameter of ports X, Y, L:  $\varnothing = 7$  mm;

Mass [kg]

	A	AE, AES, AEG, AEZ	AES-EH
DPZO-*-35*	17,1	17,5	17,6
DPZO-*-37*	18	18,4	18,5

**DPZO-A-3****DPZO-AE-3****DPZO-AES-3****DPZO-AES-EH-3**

- (A) -PS communication interface, ZH-5P connector
- (B) -BP communication interface, ZH-5P/BP connector
- (C) -BC communication interface, ZH-5P connector
- (D) -Option /W pressure transducer interface, ZH-5PM connector
- (E) -EH communication interface (input), ZM-4PM/EH connector
- (F) -EH communication interface (output), ZM-4PM/EH connector

① dotted line = 12 pin connector ZH-12P for -AES option /Z, /W

**NOTE:** The overall height is increased by 40 mm for /G option (0,9 kg).

For option /B the proportional solenoid and the electronics (in case of execution -AE and -AES) are at side of port B of the main stage.



**DPZO-A(\*)-4** (dotted line = double solenoid version)

ISO 4401: 2005

Mounting surface: 4401-08-08-0-05 (see table P005)

Fastening bolts:

6 socket head screws M12x60 class 12.9

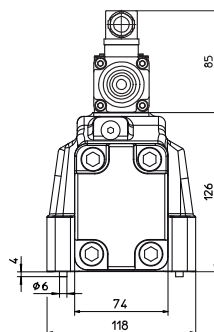
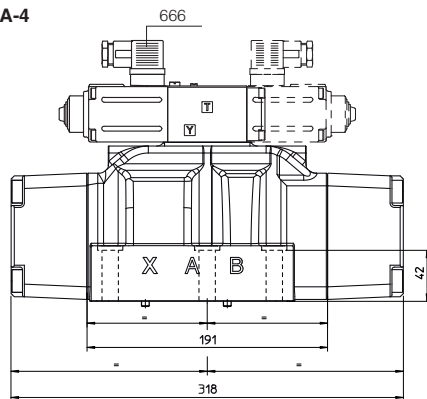
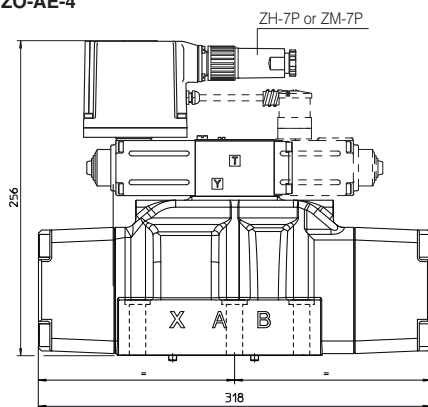
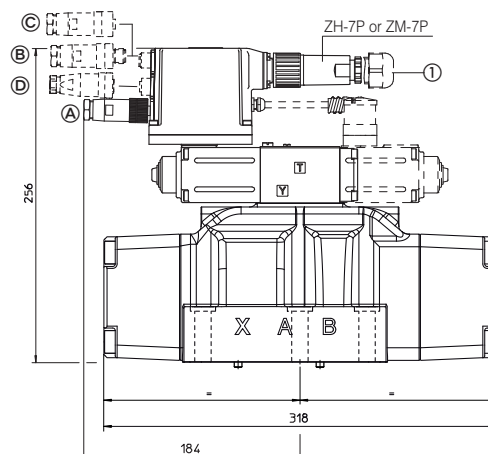
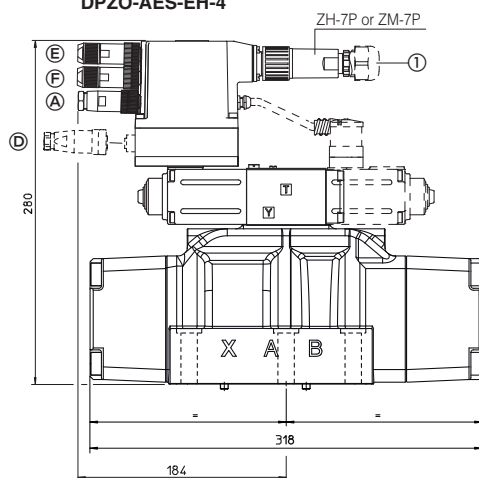
Tightening torque = 125 Nm

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;

Mass [kg]

	A	AE, AES, AEG, AEZ	AES-EH
DPZO-*-35*	17,1	18	18,1
DPZO-*-37*	18	18,9	19

**DPZO-A-4****DPZO-AE-4****DPZO-AES-4****DPZO-AES-EH-4**

- (A) -PS communication interface, ZH-5P connector
- (B) -BP communication interface, ZH-5P/BP connector
- (C) -BC communication interface, ZH-5P connector
- (D) -Option /W pressure transducer interface, ZH-5PM connector
- (E) -EH communication interface (input), ZM-4PM/EH connector
- (F) -EH communication interface (output), ZM-4PM/EH connector

① dotted line = 12 pin connector ZH-12P for -AES option /Z, /W

**NOTE:** The overall height is increased by 40 mm for /G option (0,9 kg).

For option /B the proportional solenoid and the electronics (in case of execution -AE and -AES) are at side of port B of the main stage.

**DPZO-A(\*)-6** (dotted line = double solenoid version)

ISO 4401: 2005

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

Fastening bolts:

6 socket head screws M20x90 class 12.9

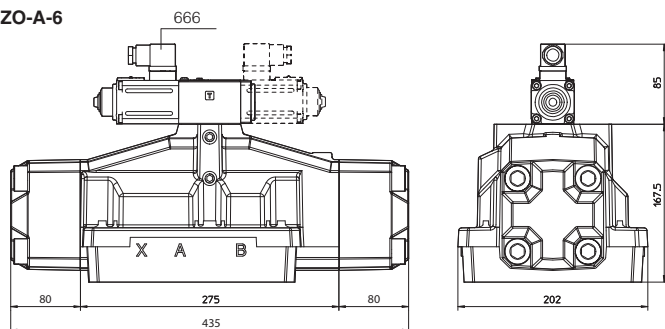
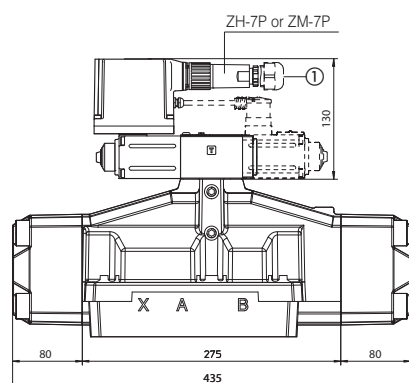
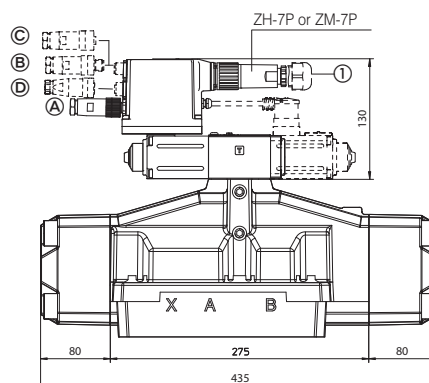
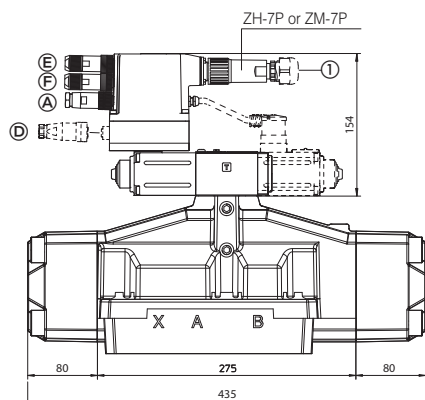
Tightening torque = 600 Nm

Diameter of ports A, B, P, T:  $\varnothing = 34$  mm;Diameter of ports X, Y:  $\varnothing = 7$  mm;

Seals: 4 OR 144, 3 OR 3056

Mass [kg]

	A	AE, AES, AEG, AEZ	AES-EH
DPZO-*-65*	42,1	42,5	42,6
DPZO-*-67*	42,7	43,1	43,2

**DPZO-A-6****DPZO-AE-6****DPZO-AES-6****DPZO-AES-EH-6**

- Ⓐ -PS communication interface, ZH-5P connector
- Ⓑ -BP communication interface, ZH-5P/BP connector
- Ⓒ -BC communication interface, ZH-5P connector
- Ⓓ -Option /W pressure transducer interface, ZH-5PM connector
- Ⓔ -EH communication interface (input), ZM-4PM/EH connector
- Ⓕ -EH communication interface (output), ZM-4PM/EH connector

① dotted line = 12 pin connector ZH-12P for -AES option /Z, /W

**NOTE:** The overall height is increased by 40 mm for /G option (0,9 kg).

For option /B the proportional solenoid and the electronics (in case of execution -AE and -AES) are at side of port B of the main stage.