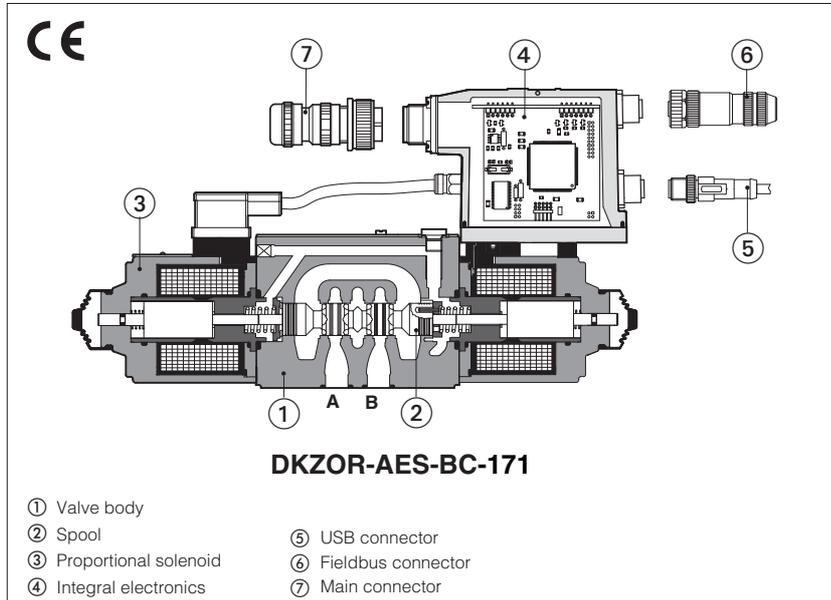


Proportional directional valves

digital, direct operated, open loop, with **positive spool overlap**



DHZO-A, DHZO-AEB, DHZO-AES
DKZOR-A, DKZOR-AEB, DKZOR-AES
Direct operated digital proportional valves without position transducer and with positive spool overlap, for open loop directional controls and not compensated flow regulations.

- Executions:
- **A** without integral driver, to be coupled with separated drivers, see section 2.
 - **AEB** with basic integral digital electronic driver, analog reference signals and USB port for software functional parameters setting.
 - **AES** with full integral digital electronic driver and fieldbus interface for functional parameters setting, reference signals and real-time diagnostics.

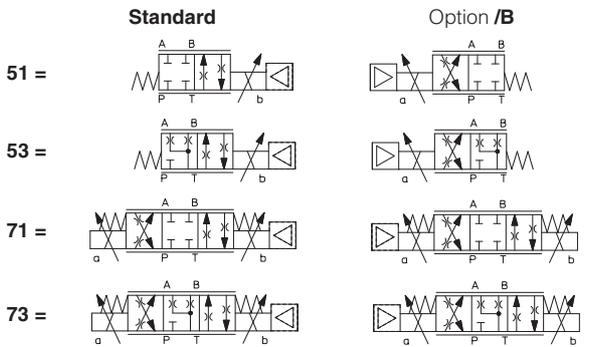
The integral digital electronic driver performs the valve's hydraulic regulation according to the reference signal and assures valve-to-valve interchangeability thanks to the factory presetting

Size: **06** and **10**
Max flow: up to **75** and **160 l/min**
Max pressure: **350 bar** (DHZO)
315 bar (DKZOR)

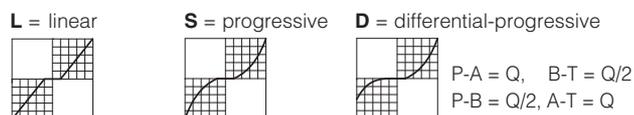
1 MODEL CODE for STANDARD SPOOLS

DHZO	-	A	ES	-	BP	-	0	71	-	L	5	/	*	/	*	/	*
<p>DHZO = size 06 DKZOR = size 10</p>		<p>A = open loop</p>		<p>- = omit for execution with separated driver see section 2</p>		<p>EB = basic integral driver ES = full integral driver</p>		<p>Fieldbus interfaces - USB port always present (1): NP = Not present BC = CANopen BP = PROFIBUS DP EH = EtherCAT</p>		<p>Valve size - ISO 4401: 0 = 06 1 = 10</p>		<p>Seals material, see sect. 5, 6: - = NBR PE = FKM BT = HNBR</p>		<p>Series number</p>		<p>Coil voltage only for A - see sect. 10: - = standard coil for 24V_{DC} Atos drivers 6 = optional coil for 12V_{DC} Atos drivers 18 = optional coil for low current drivers</p>	

Configuration (2):



Spool type - regulating characteristics:



Hydraulic options - see sect. 9:

B = solenoid and integral electronics at side of port A (3)
Y = external drain

Hand lever options, only for **A** - see sect. 10:

MO = horizontal hand lever
MV = vertical hand lever
BMO = horizontal hand lever installed at side of port A
BMV = vertical hand lever installed at side of port A

Electronic options, only for **AEB, AES** - see sect. 11:

C = current feedback 4÷20 mA for remote transducer, only in combination with option **W**
I = current reference input 4÷20 mA (omit for standard voltage reference input ±10 V)
Q = enable signal
Z = double power supply, enable, fault and monitor signals - 12 pin connector
W = Power limitation function - 12 pin connector

Spool size:	14 (L)	1 (L)	2 (S)	3 (L,S,D)	5 (L,S,D)
DHZO =	1	4,5	8	18	28
DKZOR =	-	-	-	45	75
Nominal flow (l/min) at Δp 10bar P-T					

(1) Omit for **A** execution; **AEB** available only in version **NP**; **AES** available only in version **BC, BP, EH**

(2) Hydraulic symbols are represented with integral digital driver

(3) In standard configuration the solenoid (config. 51 and 53) and integral electronics (AEB, AES) are at side of port B

2 ELECTRONIC DRIVERS

Valve model	A							AEB	AES
Drivers model	E-MI-AC-01F	E-BM-AC	E-ME-AC	E-RP-AC	E-MI-AS-IR	E-BM-AS-PS	E-BM-AES	E-RI-AEB	E-RI-AES
Type	Analog				Digital				
Format	plug-in to solenoid	DIN 43700 UNDECAL	EUROCARD	sealed and rugged box	plug-in to solenoid	DIN-rail panel		Integral to valve	
Data sheet	G010	G025	G035	G100	G020	G030	GS050	GS115	

Note: For main and communication connector see sections 13 14

3 GENERAL NOTES

DHZO-A* and DKZOR-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.

4 FIELDBUS - only for AES

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	150 years, see technical table P007					
Ambient temperature range	A: standard = -20°C ÷ +70°C,			/BT option = -40°C ÷ +60°C		
	AEB, AES: standard = -20°C ÷ +60°C,			/BT option = -40°C ÷ +60°C		
Storage temperature range	A: standard = -20°C ÷ +80°C,			/BT option = -40°C ÷ +70°C		
	AEB, AES: standard = -20°C ÷ +70°C,			/BT option = -40°C ÷ +70°C		
Coil code	DHZO			DKZOR		
	standard	option /6	option /18	standard	option /6	option /18
Coil resistance R at 20°C	3 ÷ 3,3 Ω	2 ÷ 2,2 Ω	13 ÷ 13,4 Ω	3,8 ÷ 4,1 Ω	2,2 ÷ 2,4 Ω	12 ÷ 12,5 Ω
Max. solenoid current	2,2 A	2,75 A	1 A	2,6 A	3,25 A	1,2 A
Max. power	A = 30W		AEB, AES = 50W	A = 35W		AEB, AES = 50W
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 connectors					
Tropicalization	Tropical coating on electronics PCB					
Duty factor	Continuous rating (ED=100%)					
EMC, climate and mechanical load	See technical table G004					
Communication interface	USB Atos ASCII coding		CANopen EN50325-4 + DS408	PROFIBUS DP EN50170-2/IEC61158	EtherCAT IEC 61158	
Communication physical layer	not insulated USB 2.0 + USB OTG		optical insulated CAN ISO11898	optical insulated RS485	Fast Ethernet, insulated 100 Base TX	

Valve model	DHZO					DKZOR	
Pressure limits [bar]	ports P, A, B = 350; T = 210 (250 with external drain /Y); Y = 10					ports P, A, B = 315; T = 210 (250 with external drain /Y); Y = 10	
Spool type	L14	L1	S2	L3,S3,D3	L5,S5,D5	L3,S3,D3	L5,S5,D5
Nominal flow [(1)] [l/min]							
Δp= 10 bar	1	4,5	8	18	28	45	75
Δp P-T Δp= 30 bar	1,7	8	14	30	50	80	130
max Δp= 70 bar	2,6	12	21	45	75	120	170
permissible flow [(2)]	4	18	30	50	80	130	180
Response time [ms] (0-100% step signal) [(3)]	≤30					≤40	
Leakage [cm³/min]	<30 (at p = 100 bar); <135 (at p = 350 bar)					<80 (at p = 100 bar); <600 (at p = 315 bar)	
Hysteresis	≤ 5 [% of max regulation]						
Repeatability	± 1 [% of max regulation]						

Notes: above performance data refer to valves coupled with Atos electronic drivers, see section 2

(1) for different Δp, the max flow is in accordance to the diagrams in section 7.2 (2) see detailed diagrams in section 7.3

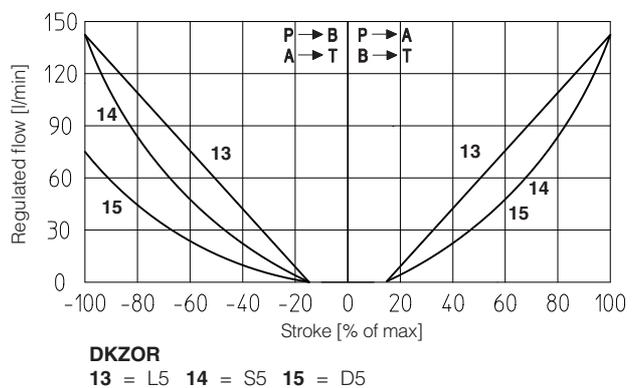
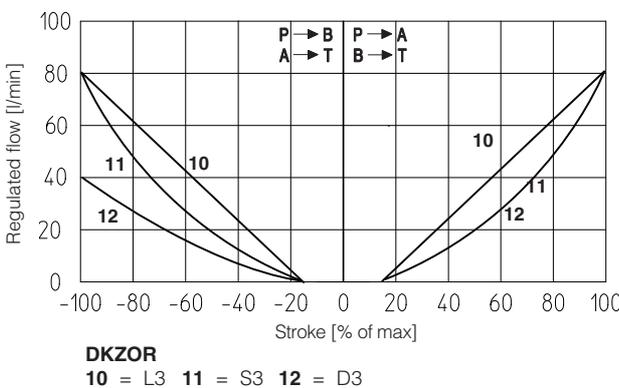
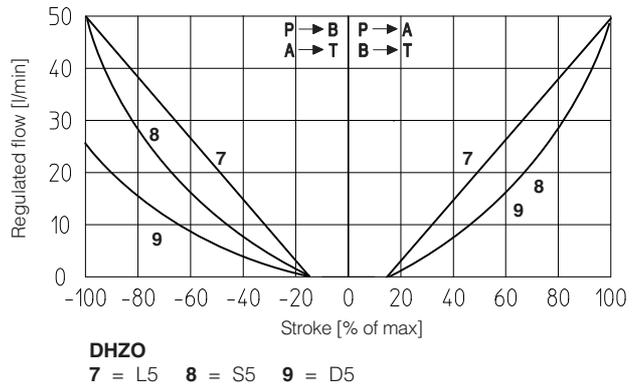
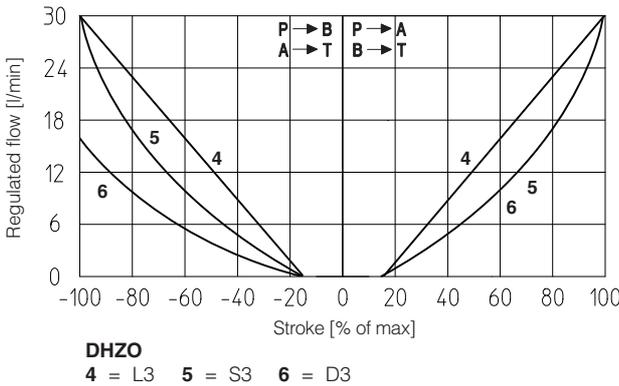
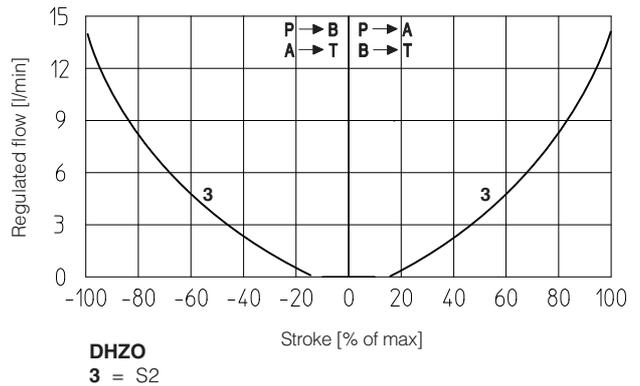
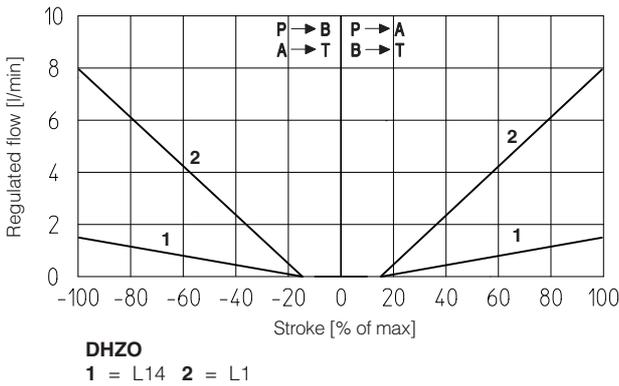
(3) see detailed diagrams in section 7.4

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 FKM seals (/PE option) = -20°C ÷ +80°C HNBR seals (/BT option) = -40°C ÷ +60°C, with HFC hydraulic fluids = -40°C ÷ +50°C		
Recommended viscosity	20 ÷ 100 mm ² /s - max allowed range 15 ÷ 380 mm ² /s		
Fluid contamination class	ISO 4406 class 20/18/15 NAS 1638 class 9, in line filters of 10 µm (β10 ≥75 recommended)		
Hydraulic fluid	Suitable seals type	Classification	Ref. Standard
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 DIAGRAMS - based on mineral oil ISO VG 46 at 50 °C

7.1 Regulation diagrams - values measure at Δp 30 bar P-T



Note: Hydraulic configuration vs. reference signal for configurations 71 and 73 (standard and option /B)

Reference signal $\left. \begin{matrix} 0 \div +10 \text{ V} \\ 12 \div 20 \text{ mA} \end{matrix} \right\} P \rightarrow A / B \rightarrow T$ Reference signal $\left. \begin{matrix} 0 \div -10 \text{ V} \\ 12 \div 4 \text{ mA} \end{matrix} \right\} P \rightarrow B / A \rightarrow T$

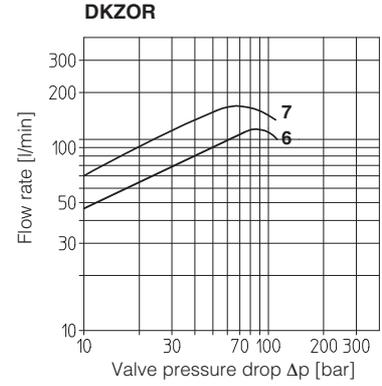
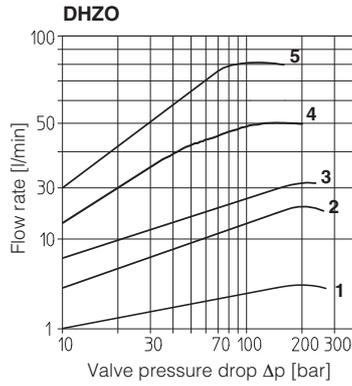
7.2 Flow /Δp diagrams
stated at 100% of valve stroke

DHZO

- 1 = spool L14
- 2 = spool L1
- 3 = spool S2
- 4 = spool L3, S3, D3
- 5 = spool L5, S5, D5

DKZOR

- 6 = spool S3, L3, D3
- 7 = spool S5, L5, D5



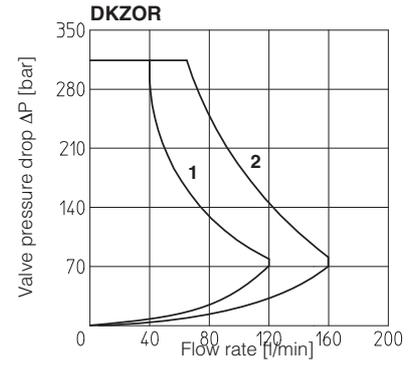
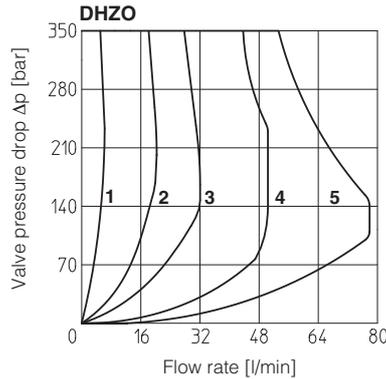
7.3 Operating limits

DHZO

- 1 = spool L14
- 2 = spool L1
- 3 = spool S2
- 4 = spool L3, S3, D3
- 5 = spool L5, S5, D5

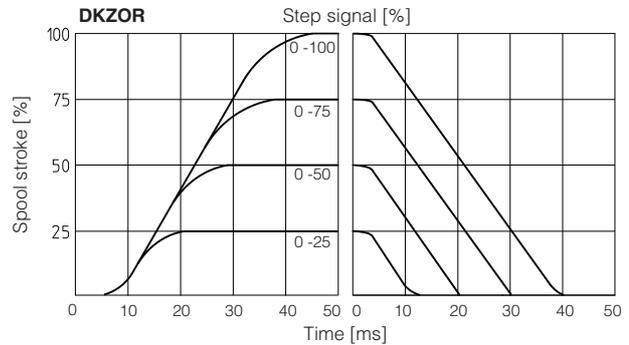
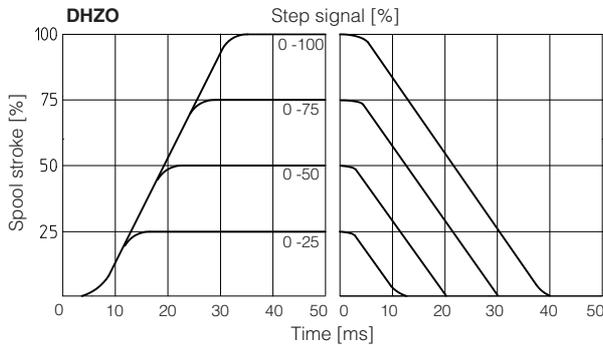
DKZOR

- 6 = spool S3, L3, D3
- 7 = spool S5, L5, D5



7.4 Response time

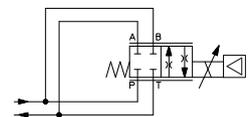
The response times in below diagrams are measured at different steps of the reference input signal. They have to be considered as average values. For the valves with digital electronics the dynamics performances can be optimized by setting the internal software parameters.



7.5 Operation as throttle valve

Single solenoid valves configuration
51 and 53 can be used as simple
throttle valves:
Pmax = 250 bar (option /Y advisable)

Max flow Δp= 30bar [l/min]	SPOOL TYPE				
	L14	L1	S2	L3 S3	L5 S5
DHZO	4	16	28	60	100
DKZOR				130	170



8 PROGRAMMING TOOLS - see tech 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.

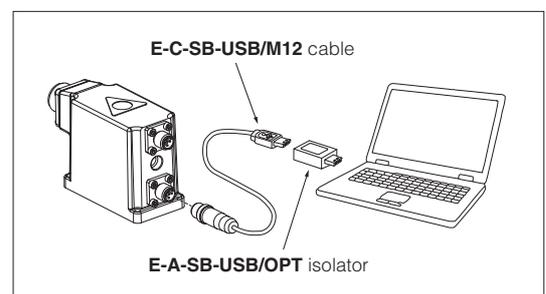
The software is available in different versions according to the driver's options:

- 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



9 HYDRAULIC OPTIONS

9.1 Option /B

DHZO-05 and DKZOR-15: solenoid and integral electronics at side of port A of the main stage.

DHZO-07 and DKZOR-17: integral electronics at side of port A of the main stage.

9.2 Option /Y

External drain advisable when the valve is used in double flow path, see section 7.5. Option /Y is mandatory if the pressure in port T exceeds 210 bar.

10 OPTIONS for -A

10.1 Coil voltage

Option /6 optional coil to be used with Atos drivers with power supply 12 VDC

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

10.2 Hand lever

This option is available only for DHZO-A with spool type S3, S5, D3, D5, L3, L5.

It allows to operate the valve in absence of electrical power supply. For detailed description of DHZO-A with hand lever option see tech. table E138

Option /MO horizontal hand lever

Option /MV vertical hand lever

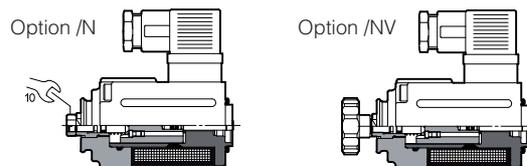
Option /BMO horizontal hand lever installed at side of port A

Option /BMV vertical hand lever installed at side of port A

The following supplementary options allow to operate the valve in absence of electrical power supply by means of a micrometric screw replacing the standard solenoid manual override, see tech. table TK150

Option /N manual micrometric adjustment

Option /NV as /N plus handwheel and graduated scale



11 ELECTRONIC OPTIONS for AEB and AES

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 time lag is required in series to each driver power supply. Apply at least a 10000 μ F/40 V capacitance to single phase rectifiers or a 4700 μ F/40 V capacitance to three phase rectifiers

Reference input signal - analog differential input with ± 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)

Note: a minimum booting time of 500 ms has to be 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.

11.1 Option /I

It provides 4 \div 20 mA current reference signal, instead of the standard ± 10 V.

Input signal can be reconfigured via software selecting between voltage and current, within a maximum range of ± 10 V or ± 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.

11.2 Option /Q

To enable the driver, supply 24 VDC on pin C referred to pin B: Enable input signal allows to enable/disable the current supply to the solenoid, without removing the electrical power supply to the driver; it is used to maintain active the communication and the other driver functions when the valve has to be disabled. This condition does not comply with European Norms EN13849-1 (ex EN954-1).

11.3 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: Enable input signal allows to enable/disable the current supply to the solenoid, without removing the electrical power supply to the driver; it is used to maintain active the communication and the other driver functions when the valve has to be disabled. This condition does not comply with European Norms EN13849-1 (ex EN954-1).

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 24 VDC (pin 11 referred to pin 2): Fault status is not affected by the Enable input signal

Power supply for driver's logics and communication

Separate power supply (pin 9,10) allow to cut solenoid power supply (pin 1,2) while maintaining active diagnostics, USB and fieldbus communication. A safety fuse is required in series to each driver power supply: 500 mA fast fuse.

11.4 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 input INPUT+ and a pressure transducer, 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 \times 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. GS115

11.5 Option /C - only in combination with option /W

Option /C is available to connect pressure transducer with 4 \div 20 mA current output signal, instead of the standard 0 \div 10V.

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

11.6 Possible combined options: /IQ, /IZ, /IW, /ICW and /CWI

12 ELECTRONIC CONNECTIONS

12.1 Main connector signals - 7 pin - standard and /Q options - AEB and AES (A1)

PIN	Standard	/Q	TECHNICAL SPECIFICATIONS	NOTES
A	V+		Power supply 24 Vdc Rectified and filtered: $V_{RMS} = 20 \div 32 V_{MAX}$ (ripple max 10 % V_{PP})	Input - power supply
B	V0		Power supply 0 Vdc	Gnd - power supply
C	AGND		Analog ground	Gnd - analog signal
		ENABLE	Enable (24 Vdc) or disable (0 Vdc) the driver, referred to V0	Input - on/off signal
D	INPUT+		Reference input signal: $\pm 10 V_{dc} / \pm 20 mA$ maximum range Defaults are $\pm 10 V_{dc}$ for standard and $4 \div 20 mA$ for /I option	Input - analog signal Software selectable
E	INPUT-		Negative reference input signal for INPUT+	Input - analog signal
F	MONITOR referred to: AGND V0		Monitor output signal: $\pm 5 V_{dc}$ maximum range Default is $\pm 5 V_{dc}$ (1V = 1A)	Output - analog signal Software selectable
G	EARTH		Internally connected to driver housing	

12.2 Main connector signals - 12 pin - /Z and /W options - AEB and AES (A2)

PIN	/Z	/W	TECHNICAL SPECIFICATIONS	NOTES
1	V+		Power supply 24 Vdc Rectified and filtered: $V_{RMS} = 20 \div 32 V_{MAX}$ (ripple max 10 % V_{PP})	Input - power supply
2	V0		Power supply 0 Vdc	Gnd - power supply
3	ENABLE		Enable (24 Vdc) or disable (0 Vdc) the driver, referred to V0	Input - on/off signal
4	INPUT+		Reference input signal: $\pm 10 V_{dc} / \pm 20 mA$ maximum range Defaults are $\pm 10 V_{dc}$ for standard and $4 \div 20 mA$ for /I option	Input - analog signal Software selectable
5	INPUT-		Negative reference input signal for INPUT+	Input - analog signal
6	MONITOR		Monitor output signal: $\pm 5 V_{dc}$ maximum range, referred to VL0 Default is $\pm 5 V_{dc}$ (1V = 1A)	Output - analog signal
7	NC		Do not connect	
8	NC		Do not connect	
		MONITOR2	2nd monitor output signal: $\pm 5 V_{dc}$ maximum range, default is $0 \div 5 V_{dc}$	Output - analog signal
9	VL+		Power supply 24 Vdc for driver's logic and communication	Input - power supply
10	VL0		Power supply 0 Vdc for driver's logic and communication	Gnd - power supply
11	FAULT		Fault (0 Vdc) or normal working (24 Vdc), referred to V0	Output - on/off signal
PE	EARTH		Internally connected to driver housing	

12.3 Communication connectors - AEB (B) and AES (B) - (C)

(B) USB connector - M12 - 5 pin always present		
PIN	SIGNAL	TECHNICAL SPECIFICATION (1)
1	+5V_USB	Power supply
2	ID	Identification
3	GND_USB	Signal zero data line
4	D-	Data line -
5	D+	Data line +

(C1) BC fieldbus execution, connector - M12 - 5 pin (2)		
PIN	SIGNAL	TECHNICAL SPECIFICATION (1)
1	CAN_SHLD	Shield
2	NC	do not connect
3	CAN_GND	Signal zero data line
4	CAN_H	Bus line (high)
5	CAN_L	Bus line (low)

(C2) BP fieldbus execution, connector - M12 - 5 pin (2)		
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	

(C3) (C4) EH fieldbus execution, connector - M12 - 4 pin (2)		
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) only for AES execution

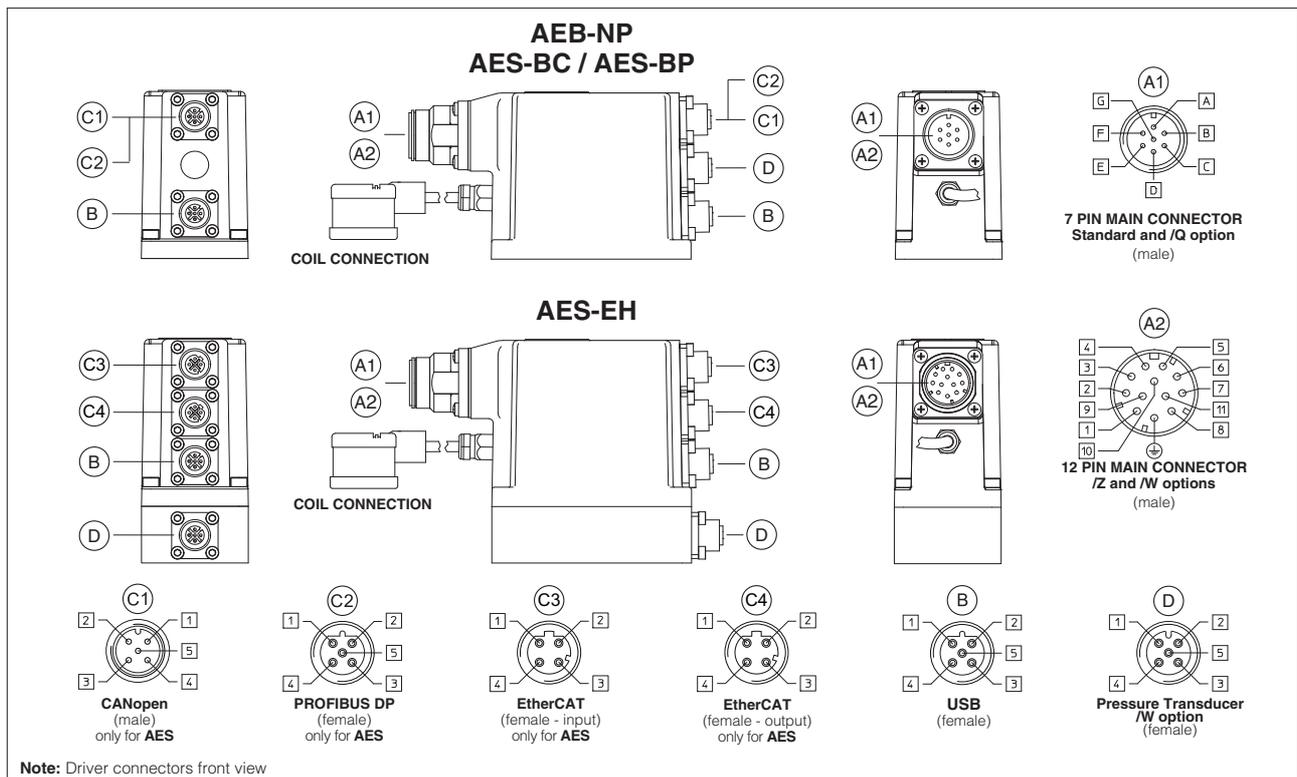
12.4 Pressure transducer connector - M12 - 5 pin - only for /W option (D)

PIN	SIGNAL	TECHNICAL SPECIFICATION	Voltage	Current
1	VF +24V	Power supply +24Vdc	Connect	Connect
2	TR	Signal transducer maximum range $\pm 10 V_{dc} / \pm 20 mA$, software selectable Defaults are $0 \div 10 V_{dc}$ for standard and $4 \div 20 mA$ for /C option	Connect	Connect
3	AGND	Common GND for transducer power and signals	Connect	/
4	NC	Not Connect	/	/
5	NC	Not Connect	/	/

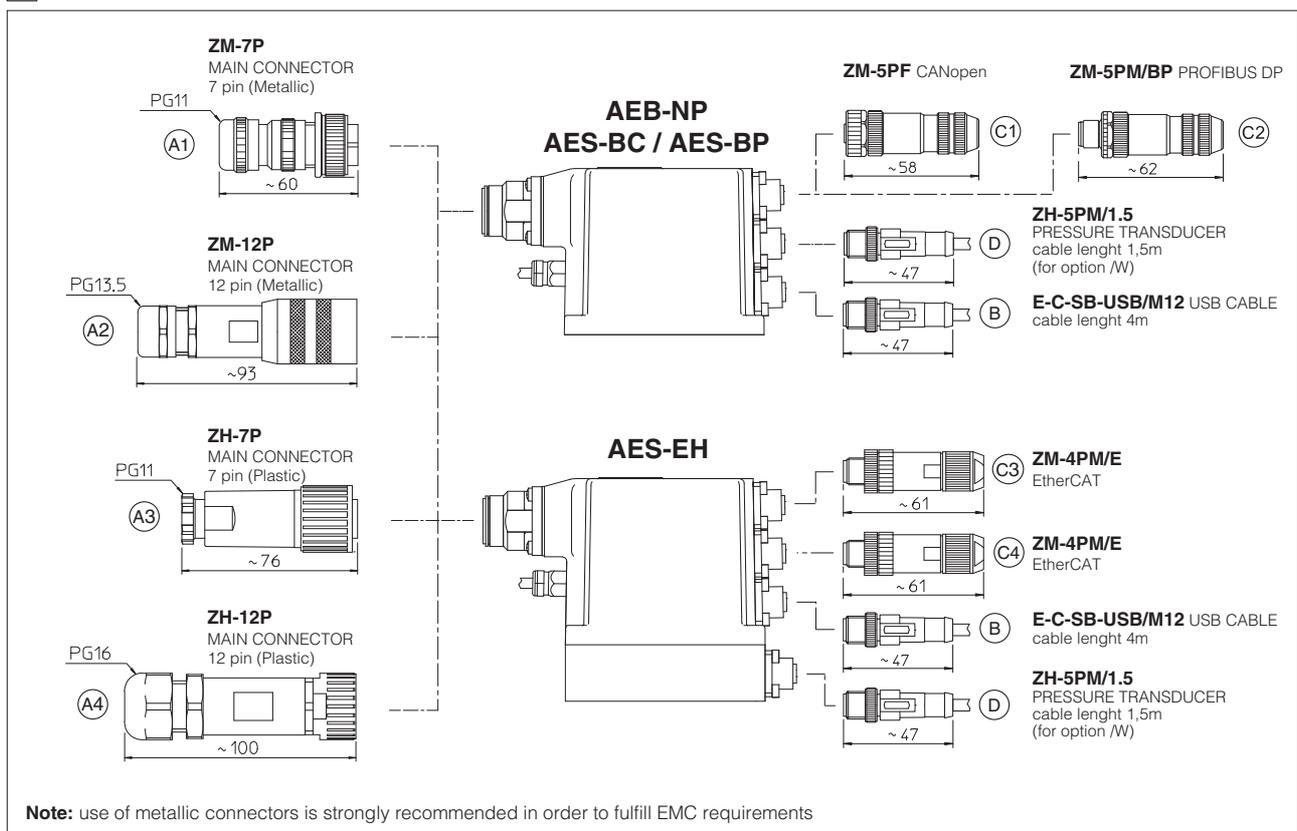
12.5 Solenoid connection - only for A

PIN	SIGNAL	TECHNICAL SPECIFICATION	Connector code 666
1	COIL	Power supply	
2	COIL	Power supply	
3	GND	Ground	

12.6 Connections layout - only for AEB and AES



13 CONNECTORS



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

VALVE VERSION	A (1)	AEB, AES std and /Q	AEB, AES /Z and /W	AEB, AES /W	BC - CANopen	BP - PROFIBUS DP	EH - EtherCAT
CONNECTOR CODE	666	ZM-7P (A1)	ZM-12P (A2)	ZH-5PM/1.5 (D)	ZM-5PF (C1)	ZM-5PM/BP (C2)	ZM-4PM/E (C3)
		ZH-7P (A3)	ZH-12P (A4)				ZM-4PM/E (C4)
PROTECTION DEGREE	IP67	IP67					
DATA SHEET	K500	GS115, K500					

(1) Connector supplied with the valve

only for AES

15 INSTALLATION DIMENSIONS FOR DHZO [mm]

ISO 4401: 2005

Mounting surface: 4401-03-02-0-05 (see table P005)
(for /Y version, surface 4401-03-03-0-05 without X port)

Fastening bolts: 4 socket head screws M5x50 class 12.9

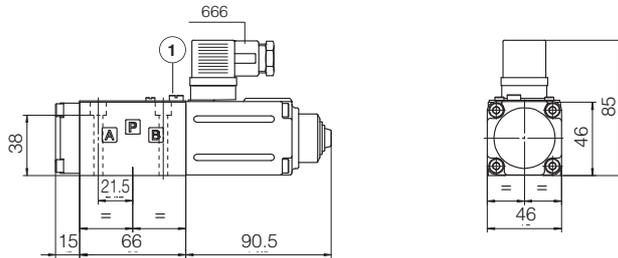
Tightening torque = 8 Nm

Seals: 4 OR 108; 1 OR 2025

Diameter of ports A, B, P, T: \varnothing 7,5 mm (max)

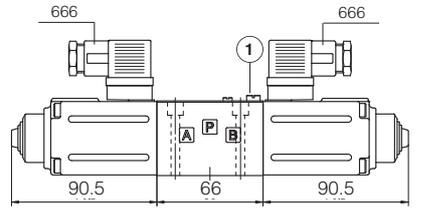
Diameter of port Y: \varnothing = 3,2 mm (only for /Y option)

DHZO-A-05



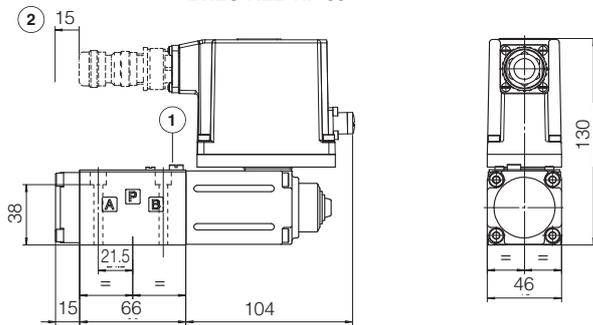
Mass: 1,9 kg

DHZO-A-07



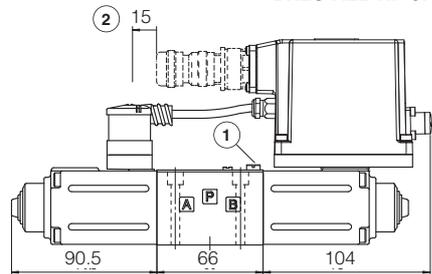
Mass: 2,6 kg

DHZO-AEB-NP-05



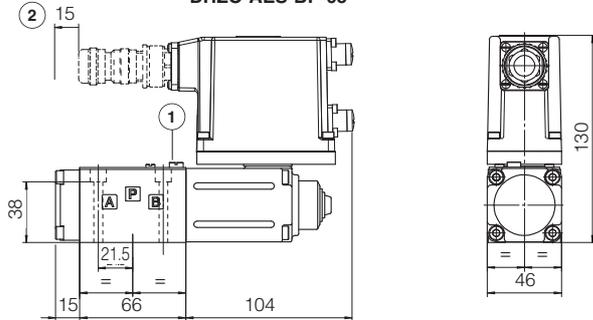
Mass: 2,3 kg

DHZO-AEB-NP-07



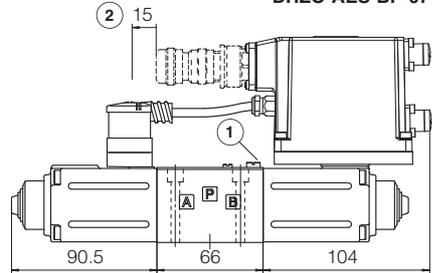
Mass: 3,1 kg

DHZO-AES-BC-05
DHZO-AES-BP-05



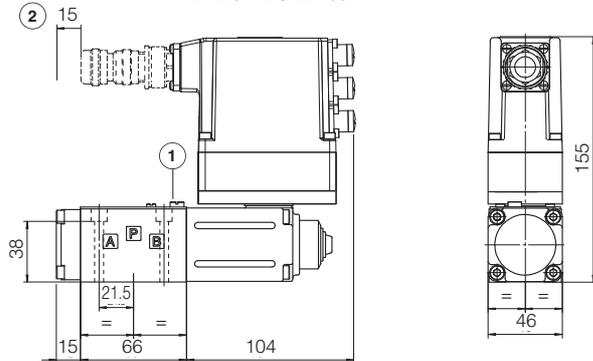
Mass: 2,3 kg

DHZO-AES-BC-07
DHZO-AES-BP-07



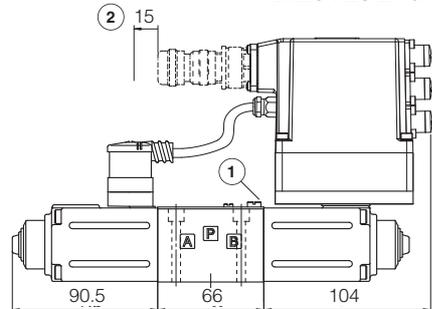
Mass: 3,1 kg

DHZO-AES-EH-05



Mass: 2,4 kg

DHZO-AES-EH-07



Mass: 3,2 kg

① = Screw for air bleeding: at the first valve commissioning the air eventually trapped inside the solenoid must be bled-off through the screw ①

② = Space to remove the 7 or 12 pin main connector. For main and communication connectors see section 13, 14

16 INSTALLATION DIMENSIONS FOR DKZOR [mm]

ISO 4401: 2005

Mounting surface: 4401-05-04-0-05 (see table P005)
 (for Y version, surface 4401-05-05-0-05 without X port)

Fastening bolts: 4 socket head screws M6x40 class 12.9

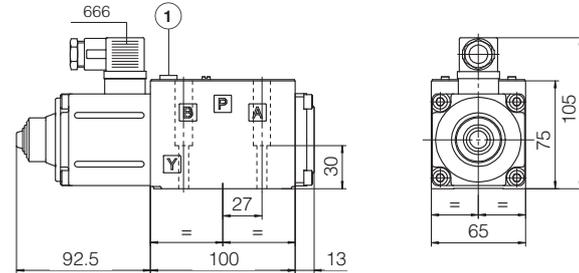
Tightening torque = 15 Nm

Seals: 5 OR 2050; 1 OR 108

Diameter of ports A, B, P, T: \varnothing 11,2 mm (max)

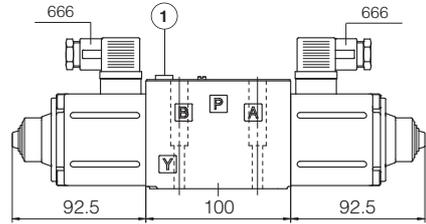
Diameter of port Y: \varnothing = 5 mm (only for Y option)

DKZOR-A-15



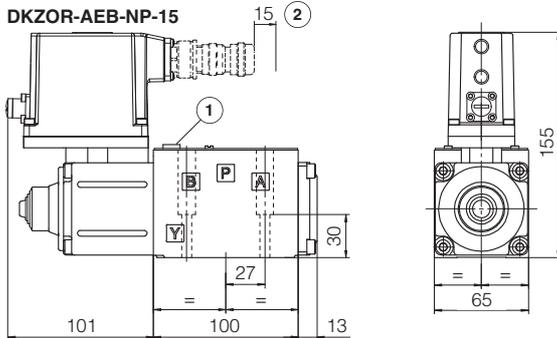
Mass: 3,8 kg

DKZOR-A-17



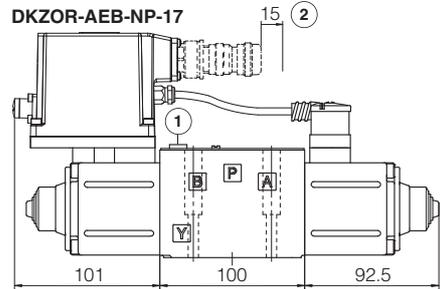
Mass: 4,5 kg

DKZOR-AEB-NP-15



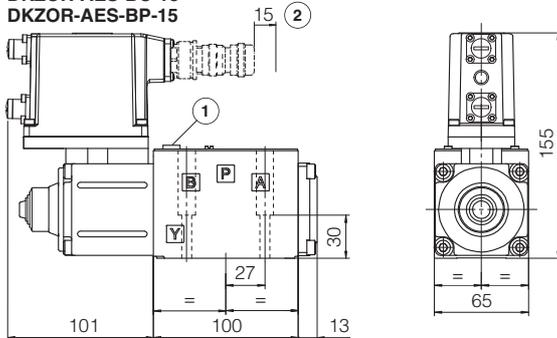
Mass: 4,3 kg

DKZOR-AEB-NP-17



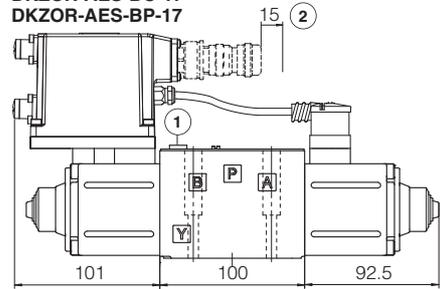
Mass: 5,0 kg

DKZOR-AES-BC-15
DKZOR-AES-BP-15



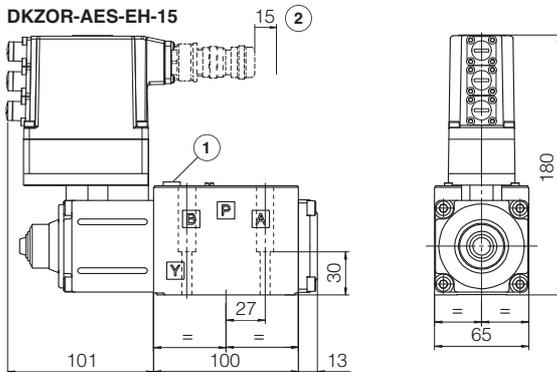
Mass: 4,3 kg

DKZOR-AES-BC-17
DKZOR-AES-BP-17



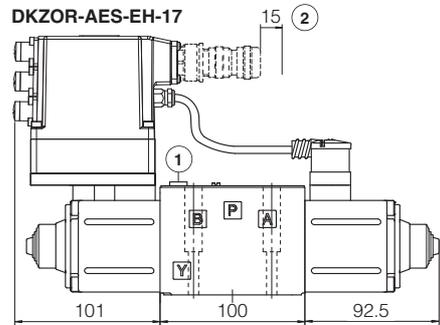
Mass: 5,0 kg

DKZOR-AES-EH-15



Mass: 4,4 kg

DKZOR-AES-EH-17



Mass: 5,1 kg

① = Screw for air bleeding: at the first valve commissioning the air eventually trapped inside the solenoid must be bled-off through the screw ①

② = Space to remove the 7 or 12 pin main connector. For main and communication connectors see section 13, 14