Servoproportional directional valves
direct operated, with position transducer and zero spool overlap

1 Valve body
2 Spool
3 Proportional solenoid
4 Position transducer
5 Integral electronics
6 USB connector
7 Fieldbus connectors
8 Main connector

DKZOR-TES-BC-170
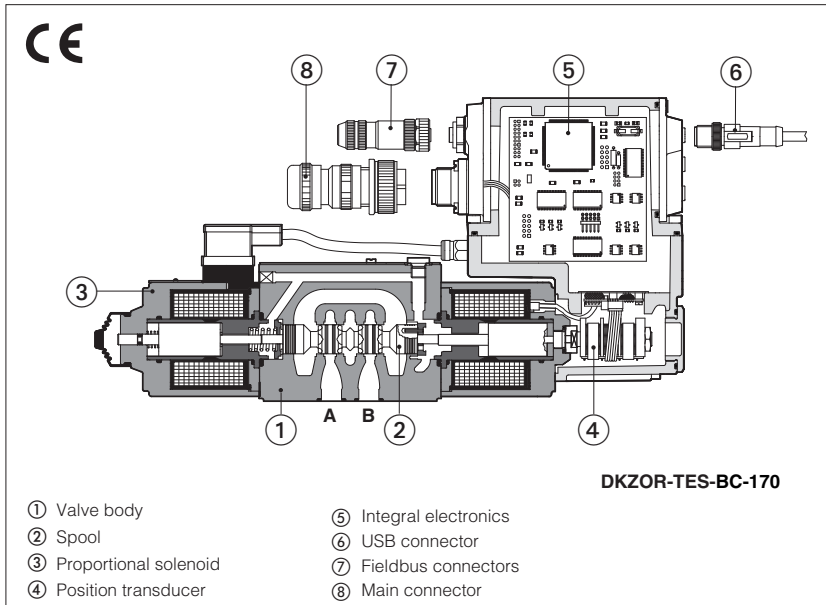
DHZO-T*; DKZOR-T*

Servoproportional valves with position transducer and zero spool overlap for position closed loop controls; the double solenoid construction involves larger flows and central safety rest position.

Digital TEZ version integrates the closed loop axis control functions, while -T, -TE and -TES versions can be used in combination with remote Z-ME-KZ digital axis controller (see table G340).

These valves are also specifically designed to implement alternated Pressure (Force) /Flow controls - options /S* coupled with any zero overlap spool.

The 4-way spool ②, sliding into a 5-chambers body ①, is directly operated by the proportional solenoid ③ and it is controlled in closed loop position by means of the LVDT transducer feedback ④.

The electronic driver supplies the servoproportional valve with proper current to align valve regulation to the reference signal, the integral execution ⑤ has rugged construction and grants factory presetting for valve-to-valve interchangeability.

Size: **06** and **10**
Max flow: up to **75** and **170 l/min**
Max pressure: **350 bar** (DHZO)
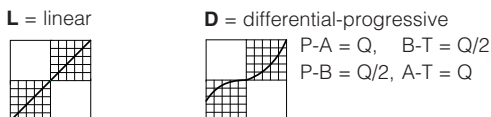**315 bar** (DKZOR)

---

1 | **MODEL CODE for STANDARD SPOOLS**

| **DHZO** | - | **TES** | - | **NP** | - | **0** | **70** | - | **L** | **5** | / | * | / | * | / | * |

DHZO = size 06
DKZOR = size 10

T = without integral electronics
TE = with integral analog electronics
TES = with integral digital electronics
TEZ = as TES plus digital axis controller (see table F230)

Fieldbus interfaces for TES and TEZ:
USB port always present
NP= Not present   **BP** = PROFIBUS DP
BC= CANopen   **EH** = EtherCAT

Valve size ISO 4401
0 = 06   **1** = 10

Configuration:

	Standard	Option **/B**
70 =		

Spool type -regulating characteristics:

L = linear

D = differential-progressive
P-A = Q, B-T = Q/2
P-B = Q/2, A-T = Q

Seals material,
see sections 5, 6:
- = NBR
PE = FKM
BT = HNBR (only for TES and TEZ)

Series number

Hydraulic options, see section 3:
B=solenoid, integral electronics and position transducer at side of port A
Y=external drain

Electronic options, see sections 9, 11:
F =fault signal
I =current reference input and monitor (4÷20 mA)
Q =enable signal
Z = **for TE execution**
    enable, fault and monitor signal (12 pin connector)
Z = **for TES execution**
    double power supply, enable, fault and monitor signals (12 pin connector)

Options for TES and TEZ executions
SP, SF, SL = additional closed loop pressure/force control, see section 11 and table G212
C = current feedback for pressure transducer(s) for options /SP, /SF, /SL

Spool size		**3** (L)	**5** (L,D)
DHZO	=	17	28
DKZOR	=	45	75

Nominal flow (l/min) at Δp 10bar P-T

2 HYDRAULIC OPTIONS

2.1 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 7.1

2.2 Option /Y

Option /Y is mandatory if the pressure in port T exceeds 210 bar.

3 GENERAL NOTES

DHZO-T* and DKZOR-T* 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).
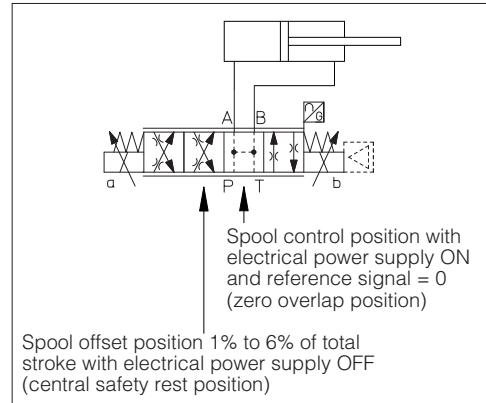
3.1 Central safety rest position of configuration 70

In absence of electric power supply (+24 VDC), the valve spool is moved by the springs force to the **central safety rest position** characterized by a small offset of about 1% to 6% of the total stroke in P-B / A-T configuration.
This is specifically designed to avoid that in case of accidental interruption of the electrical power supply to the valve, the actuator moves towards an undefined direction (due to the tolerances of the zero overlap spool), with potential risk of damages or personnel injury.
Thanks to the **central safety rest position** the actuator movement is suddenly stopped and it is recovered at very low speed towards the direction corresponding to the P-B/ A-T connection.
The spool moves to the closed loop control position (zero overlap) when the valve is fed with power supply +24 VDC and reference input = 0V (or 12 mA for option /I) is applied to the driver.

Spool control position with electrical power supply ON and reference signal = 0 (zero overlap position)

Spool offset position 1% to 6% of total stroke with electrical power supply OFF (central safety rest position)

4 MAIN CHARACTERISTICS

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	300 years, see technical table P007
Ambient temperature range	-T execution = -20°C ÷ +70°C
	-TE and -TES executions = -20°C ÷ +60°C
	/BT option only for -TES and -TEZ executions = -40°C ÷ +60°C
Storage temperature range	Standard execution = -20°C ÷ +70°C
	/BT option only for -TES and -TEZ executions = -40°C ÷ +70°C
Coil resistance R at 20°C	DHZO = 3 ÷ 3,3 Ω DKZOR = 3,8 ÷ 4,1 Ω
Max. solenoid current	DHZO = 2,6 A DKZOR = 3 A
Max. power	-T execution = 35 Watt -TE, -TES and -TEZ executions = 50 Watt
Insulation class	H (180°) Due to the occuring surface temperatures of the solenoid coils, the European standards ISO 13732-1 and EN982 must be taken into account
Protection degree to DIN EN60529	-T execution = IP65 -TE execution = IP67 -TES and -TEZ executions = IP66/67
Duty factor	Continuous rating (ED=100%)
EMC, climate and mechanical load	See technical table G004

Valve model	DHZO-T			DKZOR-T		
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	**L3**	**L5**	**D5**	**L3**	**L5**	**D5**
Nominal flow [l/min] **(1)**						
Δp= 10 bar	17	28	28	45	75	75
Δp= 30 bar	30	50	50	80	130	130
Δp= 70 bar	45	75	75	120	170	170
Response time [ms] (0-100% step signal) **(2)**	< 15			< 20		
Leakage [cm³]	<500 (at p = 100 bar); <1500 (at p = 350 bar)			<800 (at p = 100 bar); <2500 (at p = 315 bar)		
Hysteresis [%]	≤ 0,2%					
Repeatability	± 0,1%					
Thermal drift	zero point displacement < 1% at ΔT = 40°C					

Notes: • above performance data refer to valves coupled with Atos electronic drivers, see section 6.
  (1) for different Δp, the max flow is in accordance to the diagrams in section 7.2
  (2) see detailed diagrams in section 7.4

5 SEALS AND HYDRAULIC FLUID   for other fluids not included in above table, consult our technical office

Seals, recommended fluid temperature	NBR seals = -20°C ÷ +60°C, with HFC hydraulic fluids = -20°C ÷ +50°C FKM seals = -20°C ÷ +80°C HNBR seals = -40°C ÷ +60°C, with HFC hydraulic fluids = -40°C ÷ +50°C		
Recommended viscosity	20÷100 mm²/s - max allowed range 15 ÷ 380 mm²/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	

Note: For other fluids not included in above table, consult our technical office
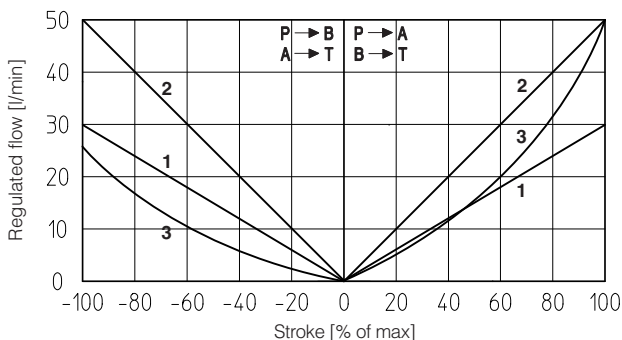
6 ELECTRONIC DRIVERS

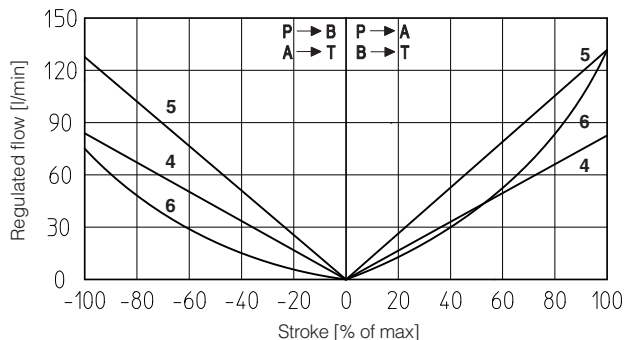| Valve model	**-T**	**-TE**	**-TES**	**-TES / SP, SL, SF**
Drivers model	E-ME-T	E-RI-TE	E-RI-TES	E-RI-TES /S*
Type	Analog		Digital	
Format	Eurocard	Integral to valve		
Data sheet	G140	G200	G210	G212

Note: For main and communication connector see sections 14 , 15

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

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

DHZO
1 = L3   **2** = L5   **3** = D5

DKZOR
4 = L3   **5** = L5   **6** = D5

Note:

Hydraulic configuration vs. reference signal for configurations 70 (standard and option /B)

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

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

DHZO
1 = spool L3,
2 = spool L5, D5

DKZOR
3 = spool L3
4 = spool L5, D5
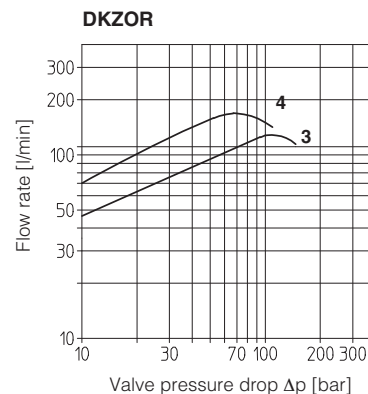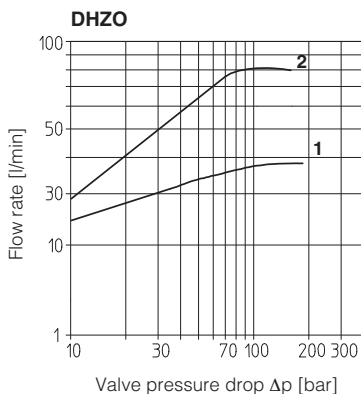
7.3 Operating limits

DHZO
1 = spool L3
2 = spool L5, D5

DKZOR
3 = spool L3
4 = spool L5, D5

DHZO

Valve pressure drop Δp [bar] vs Flow rate [l/min]

DKZOR

Valve pressure drop ΔP [bar] vs Flow rate [l/min]
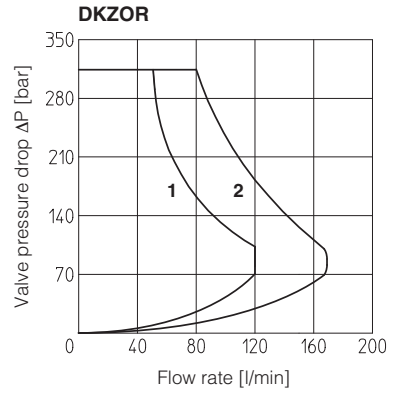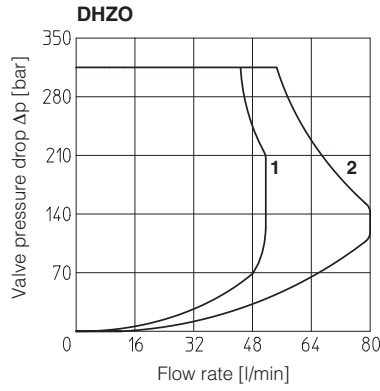
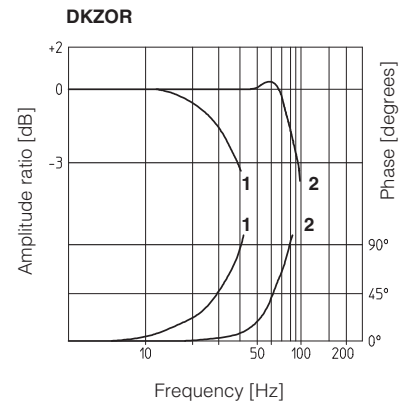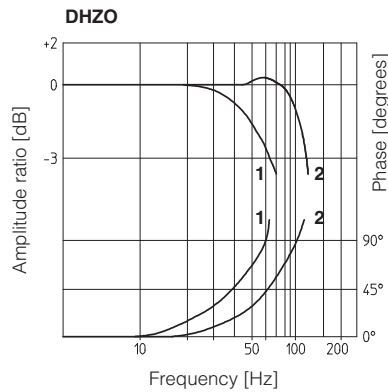### 7.4 Response time

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.

DHZO

Step signal [%]
0 -100
0 -75
0 -50
0 -25

Spool stroke [%] vs Time [ms]

DKZOR

Step signal [%]
0 -100
0 -75
0 -50
0 -25

Spool stroke [%] vs Time [ms]
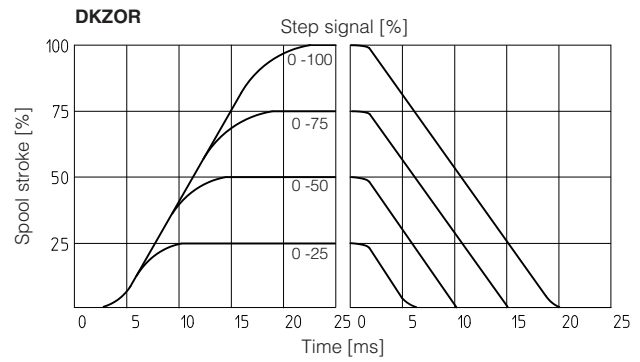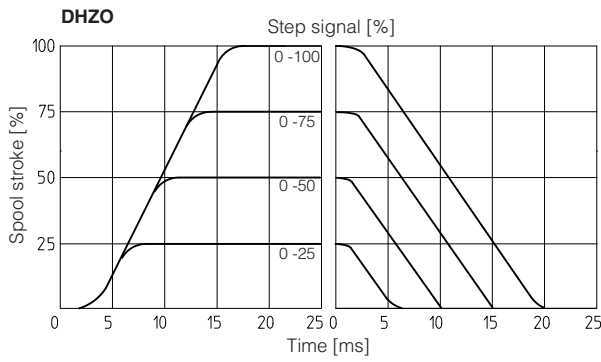
7.5 Bode diagrams

1 = 10% ⟷ 90% nominal stroke
2 = 50% ± 5% nominal stroke

DHZO

Amplitude ratio [dB] / Phase [degrees] vs Frequency [Hz]

DKZOR

Amplitude ratio [dB] / Phase [degrees] vs Frequency [Hz]

8 | CONNECTIONS FOR -T EXECUTION

SOLENOID POWER SUPPLY CONNECTOR		
PIN	Signal description	**666**
1	SUPPLY	
2	SUPPLY	
3	GND	

POSITION TRANSDUCER CONNECTOR (pilot and main stage)		
PIN	Signal description	**345**
1	OUTPUT SIGNAL	
2	SUPPLY -15 V$_{DC}$	
3	SUPPLY +15 V$_{DC}$	
4	GND	

666   345

A P B
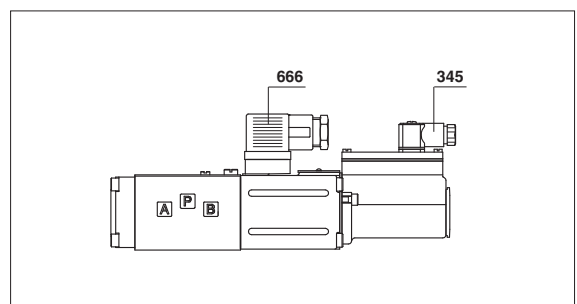
9 ANALOG INTEGRAL DRIVERS -TE - OPTIONS

Standard driver execution provides on the 7 pin main connector:

Power supply - 24V$_{DC}$ 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 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 ±10 V$_{DC}$ 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 ±10 V$_{DC}$ nominal range

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

9.1 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 V$_{DC}$, normal working corresponds to 24 V$_{DC}$.

9.2 Option /I

It provides the 4÷20 mA current reference and monitor signals instead of the standard ±10 V$_{DC}$

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.

9.3 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 V$_{DC}$ on the enable input signal.
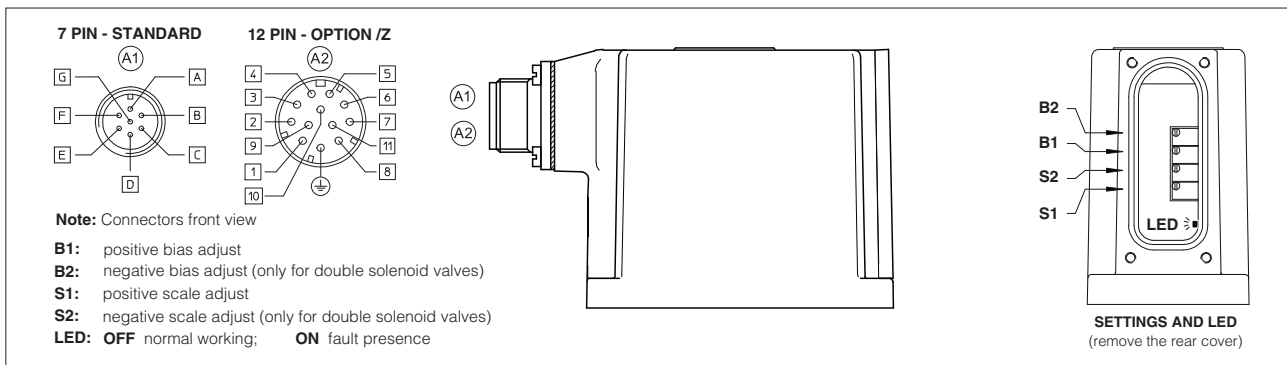
9.4 Option /Z (12 pin connector)

This option includes **/F** and **/Q** features, plus the Monitor output signal.
When the driver is disabled (0 V$_{DC}$ on Enable signal) Fault output is forced to 0 V$_{DC}$.

I signals, the logic state "0" produces an output voltage signal ≤ 1 Vdc while the logic state "1" produces an output voltage signal ≥ 22 V$_{DC}$.

9.5 Possible combined options: /FI and /IZ

10 ANALOG INTEGRAL DRIVERS -TE - ELECTRONIC CONNECTIONS

7 PIN - STANDARD (A1)

12 PIN - OPTION /Z (A2)

Note: Connectors front view

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)
LED: OFF normal working; **ON** fault presence

SETTINGS AND LED
(remove the rear cover)

10.1 MAIN CONNECTOR - 7 pin (A1)

PIN	SIGNAL	TECHNICAL SPECIFICATIONS		NOTES
A	V+	Power supply 24 V$_{DC}$ for solenoid power stage and driver logic		Input - power supply
B	V0	Power supply 0 V$_{DC}$ for solenoid power stage and driver logic		Gnd - power supply
C	AGND	Ground - signal zero for MONITOR signal		Gnd - analog signal
	ENABLE	Enable (24 V$_{DC}$) or disable (0 V$_{DC}$) the driver (for /Q option) with /Q option ENABLE signal replaces AGND on pin C; MONITOR signal is reffered to pin B		Input - on/off signal
D	INPUT+	Reference analog differential input: ±10 V$_{DC}$ maximum range (4 ÷ 20 mA for /I option)		
		For single solenoid valves the reference input is 0 ÷ +10 V$_{DC}$ (4 ÷ 20 mA for /I option)		Input - analog signal
E	INPUT -	For double solenoid valves the reference input is ±10 V$_{DC}$ (4 ÷ 20 mA for /I option)		
F	MONITOR	Monitor analog output: ±10 V$_{DC}$ maximum range (4 ÷ 20 mA for /I option)		Output - analog signal
	FAULT	Fault (0 V$_{DC}$) or normal working (for /F option) with /F option FAULT signal replaces MONITOR on pin F		Output - on/off signal
G	EARTH	Internally connected to the driver housing		

10.2 MAIN CONNECTOR - 12 pin (/Z option) (A2)

PIN	SIGNAL option /Z	TECHNICAL SPECIFICATIONS		NOTES
1	V+	Power supply 24 V$_{DC}$ for solenoid power stage and driver logic		Input - power supply
2	V0	Power supply 0 V$_{DC}$ for solenoid power stage and driver logic		Gnd - power supply
3	ENABLE	Enable (24 V$_{DC}$) or disable (0 V$_{DC}$) the driver		Input - on/off signal
4	INPUT+	Reference analog differential input: ±10 V$_{DC}$ maximum range (4 ÷ 20 mA for /I option)		
		For single solenoid valves the reference input is 0 ÷ +10 V$_{DC}$ (4 ÷ 20 mA for /I option)		Input - analog signal
5	INPUT -	For double solenoid valves the reference input is ±10 V$_{DC}$ (4 ÷ 20 mA for /I option)		
6	MONITOR	Monitor analog output: ±10 V$_{DC}$ maximum range (4 ÷ 20 mA for /I option)		Output - analog signal
7	AGND	Ground - signal zero for MONITOR signal		Gnd - analog signal
8	R_ENABLE	Repeat Enable - output repetition of Enable input		Output - on/off signal
9	NC	do not connect		Output - on/off signal
10	NC	do not connect		Output - on/off signal
11	FAULT	Fault (0 V$_{DC}$) or normal working (24 V$_{DC}$)		Output - on/off signal
PE	EARTH	Internally connected to the driver housing		

● a minimum time of 26ms to 120ms have be considered between the driver energizing with the 24 V$_{DC}$ power supply and when the valve is ready to operate. During this time the current to the valve coils is switched to zero.

Standard driver execution provides on the 7 pin main connector:

Power supply - 24 VDC 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 ±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 ±10 VDC nominal range

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

11.1 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

11.2 Option /I

It provides 4÷20 mA current reference and monitor signals, instead of the standard ±10 V.

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.

11.3 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.

11.4 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 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 24 VDC. (pin 11 referred to pin 2): Fault status is not affected by the Enable input signal

11.5 Options /SP, /SF and /SL (see table G212)

/S options add the closed loop control of pressure (/SP) or force (/SF and /SL) to the basic functions of proportional directional valves flow regulation. A dedicated algorithm alternates pressure (force) depending on the actual hydraulic system conditions.

A dedicated connector is available for the additional transducers that are required to be interfaced to the valve's driver (1 pressure transducer for /SP, 2 pressure transducers for /SF or 1 load cell for /SL).
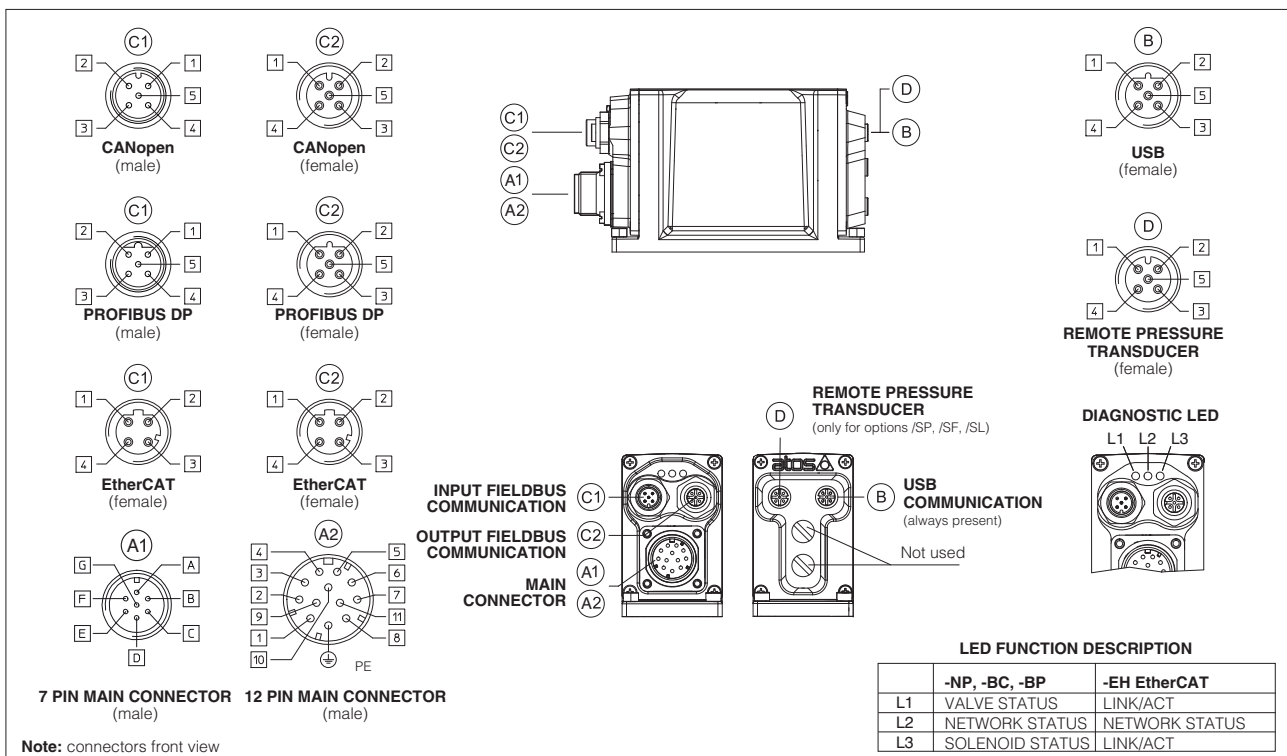
Main 12 pin connector is the same as /Z option one plus two analog signals specific for the pressure (force) control: pin 7 for reference signal and pin 8 for monitor.

11.6 Options /C

Options /CSP, /CSF and /CSL are available to connect pressure (force) transducers with 4 ÷ 20mA current output signal.

11.7 Possible combined options: /ISP, /ISF, /ISL, /CSP, /CSF, /CSL, /CISP, /CISF, /CISL, /FI, /IQ and /IZ.

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12 DIGITAL INTEGRAL DRIVERS -TES - ELECTRONIC CONNECTIONS AND LEDS

CANopen (male)

CANopen (female)

USB (female)

PROFIBUS DP (male)

PROFIBUS DP (female)

REMOTE PRESSURE TRANSDUCER (female)

EtherCAT (female)

EtherCAT (female)

REMOTE PRESSURE TRANSDUCER
(only for options /SP, /SF, /SL)

DIAGNOSTIC LED
L1 L2 L3

INPUT FIELDBUS COMMUNICATION — C1

OUTPUT FIELDBUS COMMUNICATION — C2

MAIN CONNECTOR — A1 A2

USB COMMUNICATION (always present)

Not used

7 PIN MAIN CONNECTOR (male)

12 PIN MAIN CONNECTOR (male)

Note: connectors front view

LED FUNCTION DESCRIPTION

	-NP, -BC, -BP	-EH EtherCAT
L1	VALVE STATUS	LINK/ACT
L2	NETWORK STATUS	NETWORK STATUS
L3	SOLENOID STATUS	LINK/ACT

12.1 Main connector - 7 pin (standard, /F and /Q options) Ⓐ1

PIN	SIGNAL	TECHNICAL SPECIFICATIONS	NOTES	
A	V+	Power supply 24 VDC for solenoid, driver's logic and communication	Input	- power supply
B	V0	Power supply 0 VDC for solenoid, driver's logic and communication	Gnd	- power supply
C	AGND	Ground - signal zero for MONITOR signal (applying 24 VDC to AGND electronics will damaged)	Gnd	- analog signal
C	ENABLE	Enable (24 VDC) or disable (0 VDC) the driver (for /Q option)	Input	- on/off signal
D	INPUT+	Reference analog input, differential: ±10 VDC / ±20 mA, maximum range software selectable	Input	- analog signal
E	INPUT -			
F	MONITOR	Monitor analog output: ±10 VDC / ±20 mA, maximum range software selectable, referred to AGND for Standard and /F option or to V0 for /Q option	Output	- analog signal
F	FAULT	Driver status: Fault (0 VDC) or normal working (24 VDC) (for /F option)	Output	- on/off signal
G	EARTH	Internally connected to driver housing		

12.2 MAIN CONNECTOR - 12 pin (/Z option) Ⓐ2

PIN	SIGNAL	TECHNICAL SPECIFICATIONS	NOTES	
1	V+	Power supply 24 VDC for solenoid	Input	- power supply
2	V0	Power supply 0 VDC for solenoid	Gnd	- power supply
3	ENABLE	Enable (24 VDC) or disable (0 VDC) the controller	Input	- on/off signal
4	INPUT+	Reference analog input, differential: ±10 VDC / ±20 mA, maximum range software selectable	Input	- analog signal
5	INPUT-			
6	MONITOR	Monitor analog output: ±10 VDC / ±20 mA, maximum range software selectable, referred to VL0	Output	- analog signal
7	NC	do not connect		
8	NC	do not connect		
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	Driver status: Fault (0 VDC) or normal working (24 VDC)	Output	- on/off signal
PE	EARTH	Internally connected to driver housing		

Note: A minimum time of 300 to 500 ms 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.

12.3 REMOTE PRESSURE TRANSDUCER CONNECTOR - M12 - 5 pin Ⓓ

PIN	SIGNAL	TECHNICAL SPECIFICATION	Single transducer (1)	Double transducer (1)
1	VF +24V	Power supply +24VDC	Connect	Connect
2	TR1	1st signal transducer: ±10 VDC / ±20 mA, maximum range software selectable	Connect	Connect
3	AGND	Common GND for transducer power and signals	Connect	Connect
4	TR2	2nd signal transducer: ±10 VDC / ±20 mA, maximum range software selectable	/	Connect
5	NC	Not connect	/	/

Note (1) single/double pressure transducer configuration and analog input range are software selectable

12.4 COMMUNICATION CONNECTORS Ⓑ - Ⓒ

Ⓑ 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 +

Ⓒ1 Ⓒ2 -BC fieldbus execution, connector - M12 - 5 pin

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)

Ⓒ1 Ⓒ2 -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	

Note (1) shield connection on connector's housing is recommended

Ⓒ1 Ⓒ2 -EH fieldbus execution, connector - M12 - 4 pin

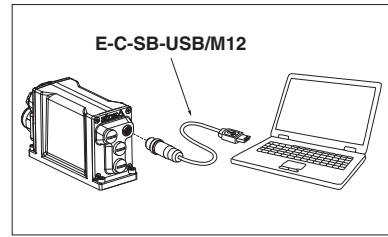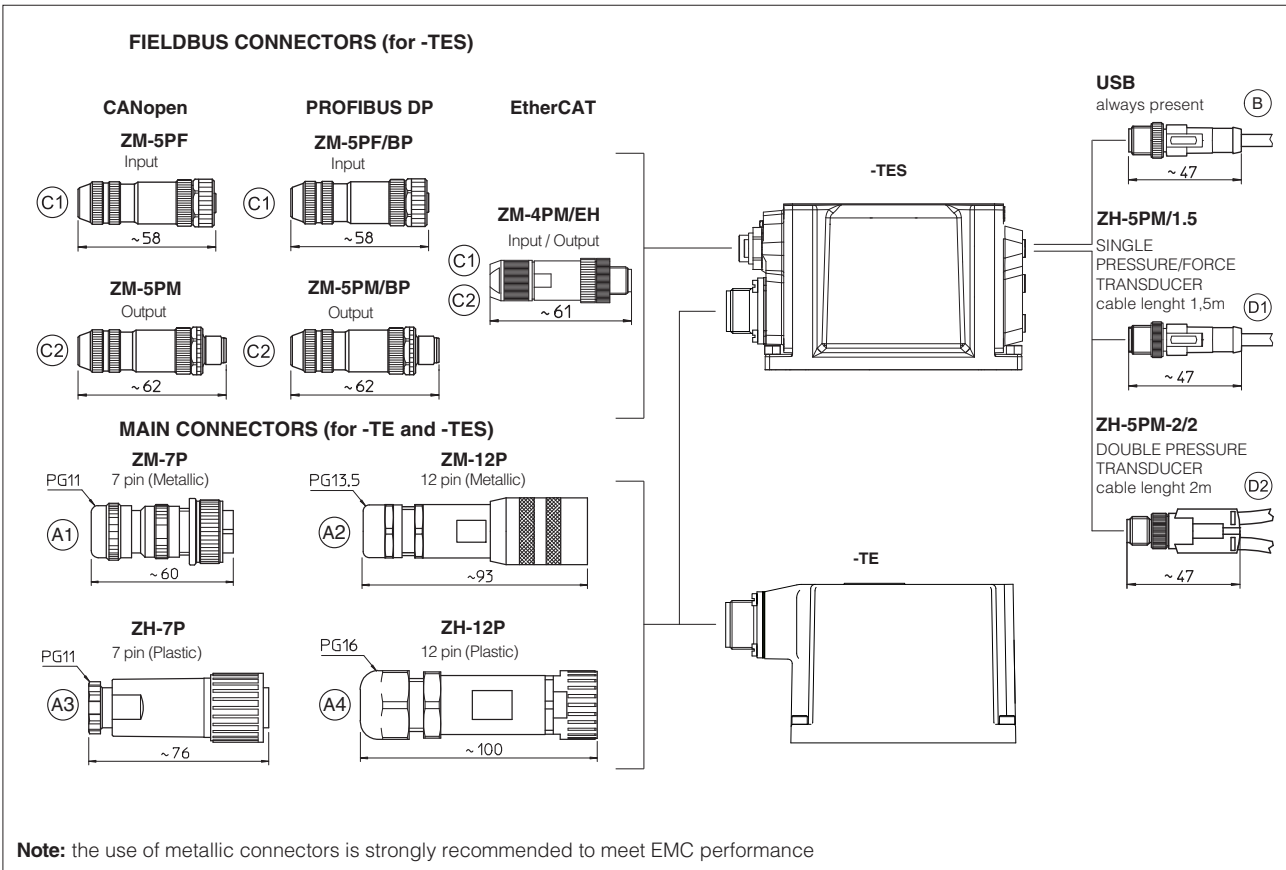| PIN	SIGNAL	TECHNICAL SPECIFICATION (1)
1	TX+	Transmitter
2	RX+	Receiver
3	TX-	Transmitter
4	RX-	Receiver
Housing	SHIELD	

Valve's functional parameters and configurations, can be easily set and optimized using Atos E-SW programming software connected via USB communication port to the digital driver. E-SW software is available in different versions according to the driver's fieldbus interface: -NP (not present) E-SW-PS, -BC (CANopen) E-SW-BC, -BP (PROFIBUS DP) E-SW-BP and -EH (EtherCAT) E-SW-EH.

For fieldbus versions, E-SW software permits valve's parameterization through USB communication port also if the driver is connected to the central machine unit via fieldbus.

USB connection

E-C-SB-USB/M12

14 CONNECTORS

FIELDBUS CONNECTORS (for -TES)

CANopen

ZM-5PF
Input
C1
~58

ZM-5PM
Output
C2
~62

PROFIBUS DP

ZM-5PF/BP
Input
C1
~58

ZM-5PM/BP
Output
C2
~62

EtherCAT

ZM-4PM/EH
Input / Output
C1
C2
~61

-TES

USB
always present B
~47

ZH-5PM/1.5
SINGLE PRESSURE/FORCE TRANSDUCER
cable lenght 1,5m D1
~47

ZH-5PM-2/2
DOUBLE PRESSURE TRANSDUCER
cable lenght 2m D2
~47

MAIN CONNECTORS (for -TE and -TES)

ZM-7P
7 pin (Metallic)
PG11
A1
~60

ZM-12P
12 pin (Metallic)
PG13,5
A2
~93

ZH-7P
7 pin (Plastic)
PG11
A3
~76

ZH-12P
12 pin (Plastic)
PG16
A4
~100

-TE

Note: the use of metallic connectors is strongly recommended to meet EMC performance

15 MODEL CODES OF MAIN CONNECTORS AND COMMUNICATION CONNECTORS (to be ordered separately)

VALVE VERSION	-T		-TE, -TES	-TE /Z -TES /Z	CANopen (-BC)	PROFIBUS DP (-BP)	EtherCat (-EH)	/SP, /SL, /SF
	Power supply	Transducer						
CONNECTOR CODE	666	345	ZM-7P A1	ZM-12P A2	ZM-5PF C1	ZM-5PF/BP C1	ZM-4PM/EH C1	ZH-5PM/1.5 **(1)** D1
			ZH-7P A3	ZH-12P A4	ZM-5PM C2	ZM-5PM/BP C2	ZM-4PM/EH C2	ZH-5PM-2/2 **(2)** D2
PROTECTION DEGREE	IP65	IP67	IP67					
DATA SHEET	K500		G200, G210, G212, K500					

☐ connectors supplied with the valve   **(1)** only for /SP or /SL options   **(2)** only for /SF option

DHZO-T*

ISO 4401: 2000
Mounting surface: 4401-03-02-0-05 (see table P005)
(for /Y surface 4401-03-03-0-05 without X port)

Fastening bolts: 4 socket head screws M5x50 class 12.9
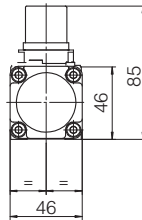Tightening torque = 8 Nm
Seals: 4 OR 108; 1 OR 2025
Diameter of ports A, B, P, T: Ø 7,5 mm (max)
Diameter of port Y: Ø = 3,2 mm (only for /Y option)

DHZO-T-05
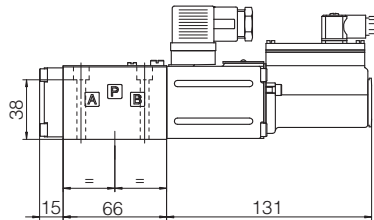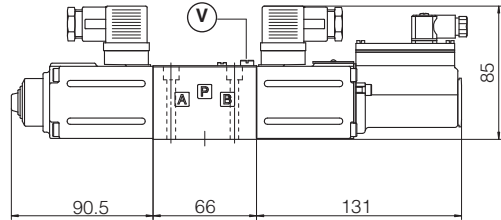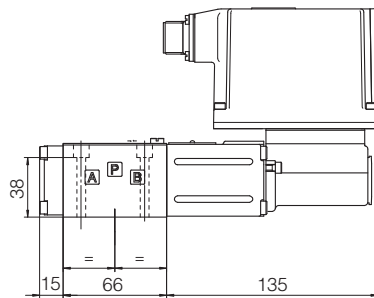
DHZO-T-07

Mass: 1,9 kg

Mass: 2,6 kg

DHZO-TE-05
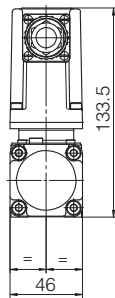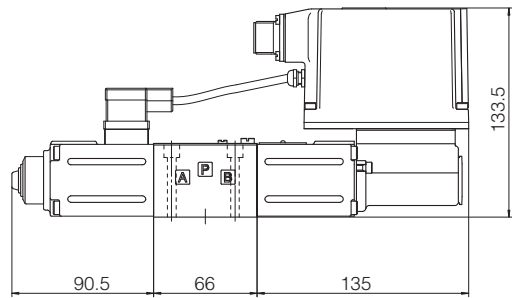
DHZO-TE-07

Mass: 2,3 kg

Mass: 3,1 kg

DHZO-TES-*-05
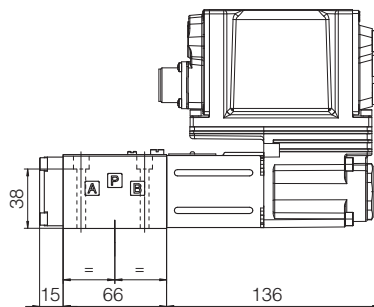
DHZO-TES-*-07

Mass: 2,3 kg
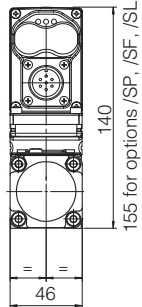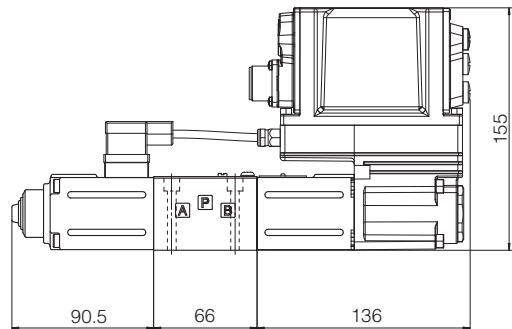
Mass: 3,1 kg

Note: for option /B the solenoid, the position transducer and the integral electronics are at side of port A

for main and communication connectors see section 14, 15

Ⓥ = Air bleed off

DKZOR-T*

ISO 4401: 2000
Mounting surface: 4401-05-04-0-05 (see table P005)
(for /Y 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
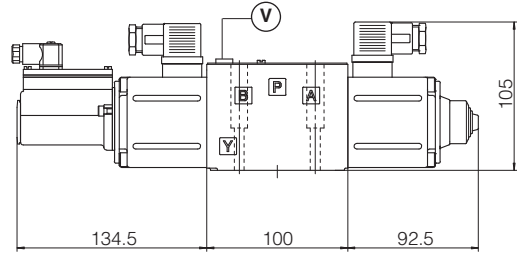Diameter of ports A, B, P, T: Ø 11,2 mm (max)
Diameter of port Y: Ø = 5 mm (only for /Y option)

DKZOR-T-15
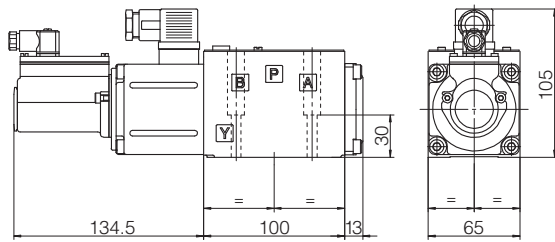
Mass: 3,8 kg
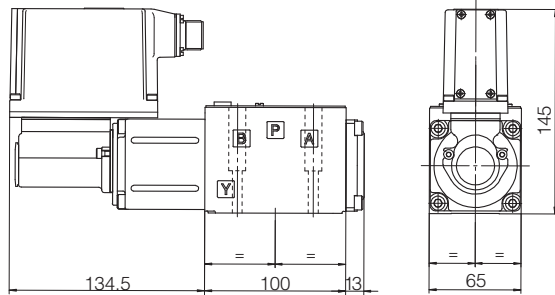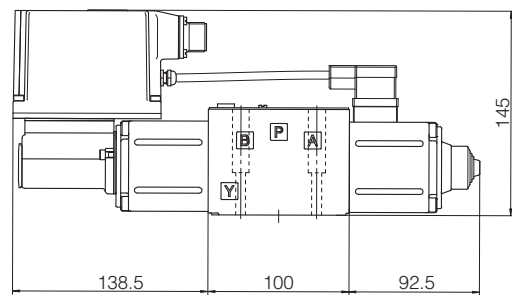
DKZOR-T-17

Mass: 4,5 kg

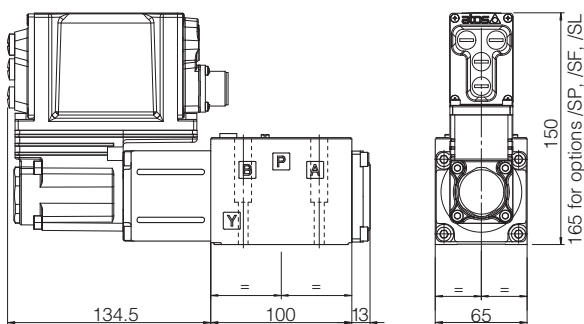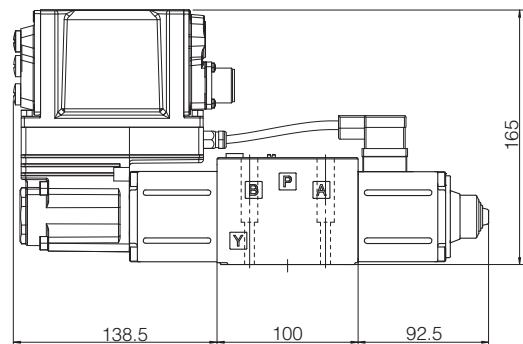**DKZOR-TE-15**

Mass: 4,3 kg

DKZOR-TE-17

Mass: 5,0 kg

DKZOR-TES-*-15

Mass: 4,3 kg

DKZOR-TES-*-17

Mass: 5,0 kg

Note: for option /B the solenoid, the position transducer and the integral electronics are at side of port A

for main and communication connectors see section 14, 15

Ⓥ = Air bleed off