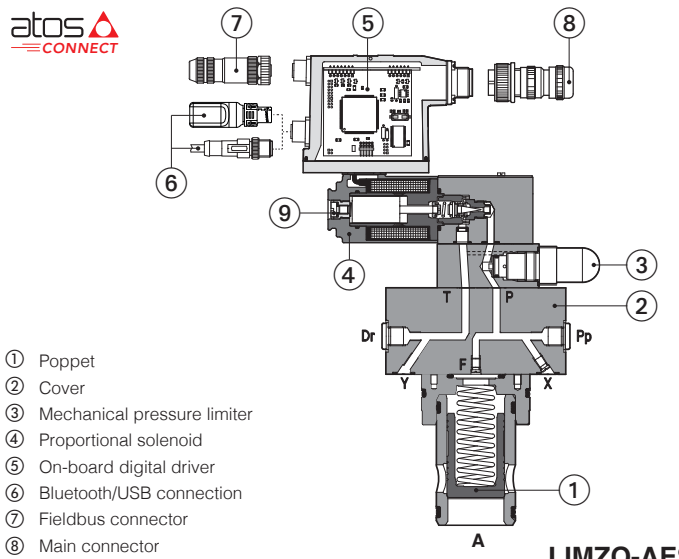
Digital proportional pressure cartridges

piloted, without transducer - compensator, relief, reducing functions



① Poppet
② Cover
③ Mechanical pressure limiter
④ Proportional solenoid
⑤ On-board digital driver
⑥ Bluetooth/USB connection
⑦ Fieldbus connector
⑧ Main connector
⑨ Screw for air blending

LIMZO-AES-BC-4

LICZO, LIMZO, LIRZO

2-way digital proportional cartridges respectively performing: pressure compensator, relief and reducing open loop functions.

A to be coupled with off-board driver.

AEB basic execution, with on-board digital driver, with analog reference signal or IO-Link interface for digital reference signals, valve settings, and real-time diagnostics.

AES full execution, with on-board digital driver which includes also fieldbus interfaces for digital reference signals, valve settings, and real-time diagnostics.

For **AEB** and **AES**, Bluetooth/USB connection is always present for valve settings via mobile App and Atos PC software

Size: **16** ÷ **80** - ISO 7368
Max flow: up to **4500 l/min**
Max pressure: **350 bar**

1 MODEL CODE

LIMZO	- AES -	BC	- 4 /	315 /	* /	* /	*	* /	*

LIMZO
Proportional pressure cartridges, piloted
LICZO = pressure compensator
LIMZO = pressure relief
LIRZO = pressure reducing

A = off-board driver, see section 5
AEB = basic on-board digital driver
AES = full on-board digital driver

IO-Link interface, only for AEB, see section 9 :
NP = Not present **IL** = IO-Link

Fieldbus interfaces, only for AES, see section 10 :
BC = CANopen **EH** = EtherCAT
BP = PROFIBUS DP

Valve size ISO 7368:
1 = 16
2 = 25
3 = 32
4 = 40
5 = 50 (not for LIRZO)
6 = 63 (only for LIMZO)
8 = 80 (only for LIMZO)

Max regulated pressure:
50 = 50 bar
100 = 100 bar
210 = 210 bar
315 = 315 bar
350 = 350 bar

Hydraulic options (1):
P =with on-board mechanical pressure limiter (standard for size 1, 2 and 3)

Electronic options, only for **AEB-NP** and **AES (1)**:
I = current reference input 4 ÷ 20 mA
Q = enable signal
Z = double power supply, enable, fault and monitor signals - 12 pin connector

Bluetooth option, only for **AEB** and **AES (1)**, see section 8 :
T = Bluetooth adapter supplied with the valve

Coil voltage, only for **A** - see section 19 :
- = standard coil for 24VDC Atos drivers
6 = optional coil for 12VDC Atos drivers
18 = optional coil for low current drivers

Series number

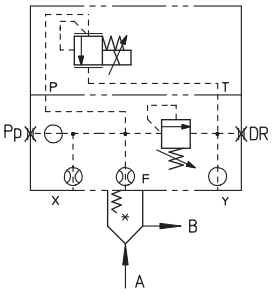
Seals material, see section 14 :
- = NBR
PE = FKM
BT = NBR low temp.

(1) For possible combined options, see section 18

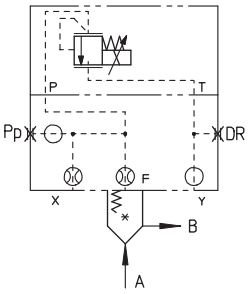
2 HYDRAULIC SYMBOLS

LICZO

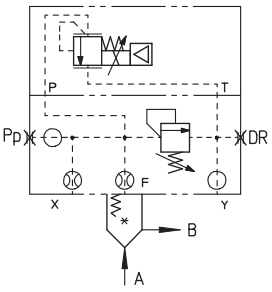
LICZO-A-1÷3
LICZO-A-4÷5 /P



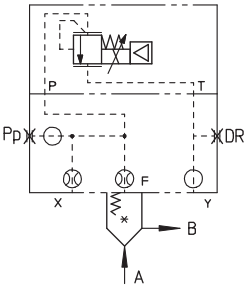
LICZO-A-4
LICZO-A-5



LICZO-AEB(AES)-1÷3
LICZO-AEB(AES)-4÷5 /P

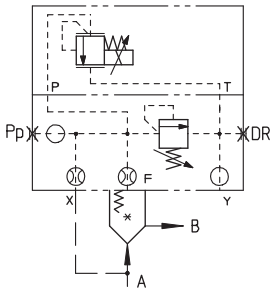


LICZO-AEB(AES)-4÷5

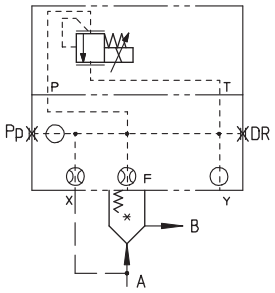


LIMZO

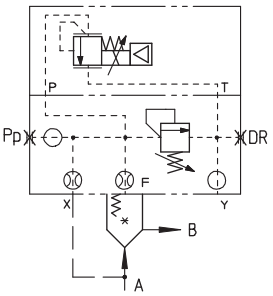
LIMZO-A-1÷3
LIMZO-A-4÷8 /P



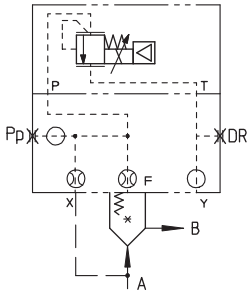
LIMZO-A-4÷8



LIMZO-AEB(AES)-1÷3
LIMZO-AEB(AES)-4÷8 /P

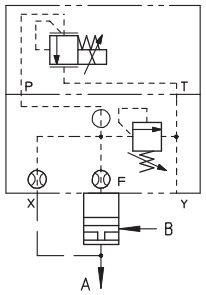


LIMZO-AEB(AES)-4÷8

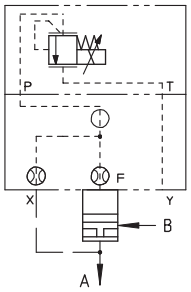


LIRZO

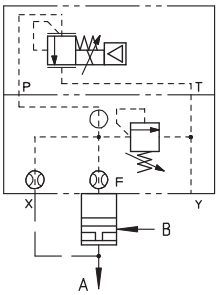
LIRZO-A-1÷3
LIRZO-A-4 /P



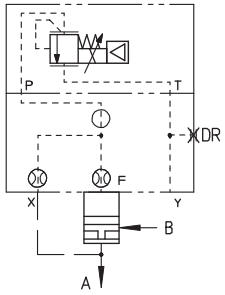
LIRZO-A-4



LIRZO-AEB(AES)-1÷3
LIRZO-AEB(AES)-4 /P



LIRZO-AEB(AES)-4



3 MODEL CODE OF CARTRIDGES

SC LI	-	32	31	2	*	/	*

Cartridge according to ISO 7368

Cartridge size ISO 7368:
16; **25**; **32**; **40**; **50**; **63**; **80**

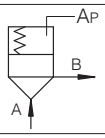
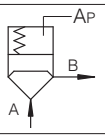
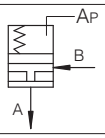
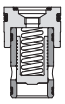
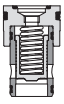
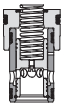
Type of poppet:
31 = for LIMZO and LICZO
36 = for LICZO
37 = for LIRZO

Series number

Spring cracking pressure:
2 = 1,5 bar for poppet 31
3 = 3 bar for poppet 31 and 36
4 = 4 bar only for poppet 37
6 = 6 bar for poppet 31 and 36
7 = 7 bar for poppet 37 (only for size 16, 25, 32, 40)

Seals material, see section 14 :
- = NBR
PE = FKM
BT = NBR low temp.

4 TYPE OF POPPET

Type of poppet	**31**	**36**	**37**
Functional sketch (Hydraulic symbol)			
Typical section			
Area ratio A: AP	**1:1**	**1:1**	**1:1**

5 OFF-BOARD ELECTRONIC DRIVERS - only for **A**

Drivers model	E-MI-AC-01F		E-MI-AS-IR		E-BM-AS-PS		E-BM-AES
Type	Analog		Digital				
Voltage supply (VDC)	12	24	12	24	12	24	24
Valve coil option	/6	std	/6	std	/6	std	std
Format	plug-in to solenoid				DIN-rail panel		
Tech table	G010		G020		G030		GS050

6 GENERAL NOTES

Atos digital proportionals valves are CE marked according to the applicable directives (e.g. Immunity and Emission EMC Directive).
Installation, wirings and start-up procedures must be performed according to the general prescriptions shown in tech table **FS900** and in the user manuals included in the E-SW-SETUP programming software.

7 VALVE SETTINGS AND PROGRAMMING TOOLS - see tech. table **GS500**

7.1 Atos CONNECT mobile App

Free downloadable App for smartphones and tablets which allows quick access to valve main functional parameters and basic diagnostic information via Bluetooth, thus avoiding physical cable connection and significantly reducing commissioning time.
Atos CONNECT supports Atos digital valve drivers equipped with E-A-BTH adapter or with built-in Bluetooth. It does not support valves with p/Q control or axis controls.

Download on the App Store

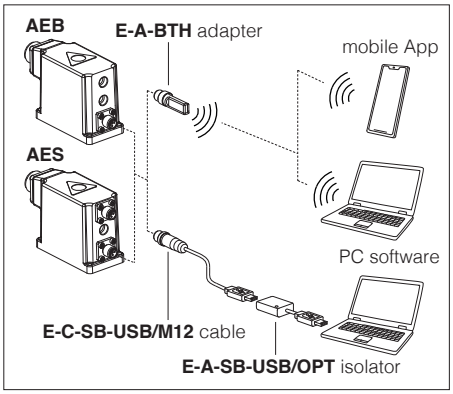
GET IT ON Google Play

7.2 E-SW-SETUP PC software

Free downloadable software for PC allows to set all valve functional parameters and to access complete diagnostic information of digital valve drivers via Bluetooth/USB service port.
Atos E-SW-SETUP PC software supports all Atos digital valve drivers and it is available at www.atos.com in MyAtos area.

WARNING: drivers USB port is not isolated! For E-C-SB-USB/M12 cable, the use of E-A-SB-USB/OPT isolator adapter is highly recommended for PC protection

Bluetooth or USB connection



8 BLUETOOTH OPTION - see tech. table **GS500**

T option adds Bluetooth® connectivity to Atos valve drivers thanks to E-A-BTH adapter, which can be left permanently installed on-board, to allow the Bluetooth connection with the valve drivers at any time. E-A-BTH adapter can also be purchased separately and used to connect with any supported Atos digital product.
Bluetooth connection to the valve can be protected against unauthorised access by setting a personal password. The adapter leds visually indicates the status of valve driver and Bluetooth connection.

WARNING: for the list of countries where the Bluetooth adapter has been approved, see tech. table **GS500**
T option is not available for the Indian market, so the Bluetooth adapter must be ordered separately.

9 IO-LINK - only for **AEB**, see tech. table **GS520**

IO-Link allows low cost digital communication between the valve and machine central unit. The valve is directly connected to a port of an IO-Link master (point-to-point connection) via low-cost unshielded cables for digital reference, diagnostic and settings. The IO-Link master works as a hub exchanging this information with the machine central unit via fieldbus.

10 FIELDBUS - only for **AES**, see tech. table **GS510**

Fieldbus allows valve direct communication with machine control unit for digital reference, valve diagnostics and settings. These execution allow to operate the valves through fieldbus or analog signals available on the main connector.

11 GENERAL CHARACTERISTICS

Assembly position	Any position
Subplate surface finishing to ISO 4401	Acceptable roughness index: Ra ≤ 0,8, recommended Ra 0,4 – Flatness ratio 0,01/100
MTTFd valves according to EN ISO 13849	75 years, for further details see technical table P007
Ambient temperature range	**A:** **Standard** = -20°C ÷ +70°C **/PE** option = -20°C ÷ +70°C **/BT** option = -40°C ÷ +60°C **AEB, AES:** **Standard** = -20°C ÷ +60°C **/PE** option = -20°C ÷ +60°C **/BT** option = -40°C ÷ +60°C
Storage temperature range	**A:** **Standard** = -20°C ÷ +80°C **/PE** option = -20°C ÷ +80°C **/BT** option = -40°C ÷ +70°C **AEB, AES:** **Standard** = -20°C ÷ +70°C **/PE** option = -20°C ÷ +70°C **/BT** option = -40°C ÷ +70°C
Surface protection	Zinc coating with black passivation, galvanic treatment (driver housing for AEB and AES)
Corrosion resistance	Salt spray test (EN ISO 9227) > 200 h
Vibration resistance	See technical table G004 (for AEB and AES)
Compliance	CE according to EMC directive 2014/30/EU (Immunity: EN 61000-6-2; Emission: EN 61000-6-3) RoHS Directive 2011/65/EU as last update by 2015/863/EU REACH Regulation (EC) n°1907/2006

12 HYDRAULIC CHARACTERISTICS - based on mineral oil ISO VG 46 at 50 °C

Valve model		LICZO					LIMZO							LIRZO			
valve size		1	2	3	4	5	1	2	3	4	5	6	8	1	2	3	4
Max flow	[l/min]	200	400	750	1000	2000	200	400	750	1000	2000	3000	4500	160	300	550	800
Min regulated pres. at port A	[bar]	9	8,5	8	13	15	7	7	7	10,5	12	12	**(2)**	7			
Min regulated pres. at port A for /350	[bar]	11	10	10	13	16	10	10	9	12	13	13	16	12			
Max regulated pres. at port A	[bar]	50; 100; 210; 315; 350					50; 100; 210; 315; 350							50; 100; 210; 315; 350			
Response time 0-100% step signal (depending on installation) **(1)**	[ms]	100 ÷ 400					100 ÷ 450							100 ÷ 350			
Hysteresis	[% of the regulated max flow]	≤ 2					≤ 1,5							≤ 2			
Linearity	[% of the regulated max flow]	≤ 3					≤ 3							≤ 3			
Repeatability	[% of the regulated max flow]	≤ 2					≤ 2							≤ 2			

Note: above performance data refer to valves coupled with Atos electronic drivers, see section 5

(1) Average response time value; the pressure variation in consequence of a modification of the reference input signal to the valve is affected by the stiffness of the hydraulic circuit: greater is the stiffness of the circuit, faster is the dynamic response.

(2) Consult our technical office.

13 ELECTRICAL CHARACTERISTICS

Power supplies	Nominal : +24 VDC Rectified and filtered : VRMS = 20 ÷ 32 VMAX (ripple max 10 % VPP)			
Max power consumption	**A** = 30 W **AEB**, **AES** = 50 W			
Coil voltage code	standard		option /6	option /18
Max. solenoid current	2,6 A		3,25 A	1,5 A
Coil resistance R at 20°C	3 ÷ 3,3 Ω		2 ÷ 2,2 Ω	13 ÷ 13,4 Ω
Analog input signals	Voltage: range ±10 VDC (24 VMAX tolerant) Input impedance: Ri > 50 kΩ Current: range ±20 mA Input impedance: Ri = 500 Ω			
Monitor output	Output range: voltage ±5 VDC @ max 5 mA			
Enable input	Range: 0 ÷ 9 VDC (OFF state), 15 ÷ 24 VDC (ON state), 9 ÷ 15 VDC (not accepted); Input impedance: Ri > 87 kΩ			
Fault output	Output range : 0 ÷ 24 VDC (ON state ≅ VL+ [logic power supply] ; OFF state ≅ 0 V) @ max 50 mA; external negative voltage not allowed (e.g. due to inductive loads)			
Alarms	Solenoid not connected/short circuit, cable break with current reference signal, over/under temperature, current control monitoring, power supplies level			
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	**A** = IP65; **AEB**, **AES** = IP66 / IP67 with mating connectors			
Duty factor	Continuous rating (ED=100%)			
Tropicalization	Tropical coating on electronics PCB			
Additional characteristics	Short circuit protection of solenoid's current supply; current control by P.I.D. with rapid solenoid switching; protection against reverse polarity of power supply			
Communication interface	USB Atos ASCII coding	IO-Link Interface and System Specification 1.1.3	CANopen EN50325-4 + DS408	PROFIBUS DP EN50170-2/IEC61158	EtherCAT IEC 61158
Communication physical layer	not insulated USB 2.0 + USB OTG	SDCI class port B	optical insulated CAN ISO11898	optical insulated RS485	Fast Ethernet, insulated 100 Base TX
Recommended wiring cable	LiYCY shielded cables, see section 24				

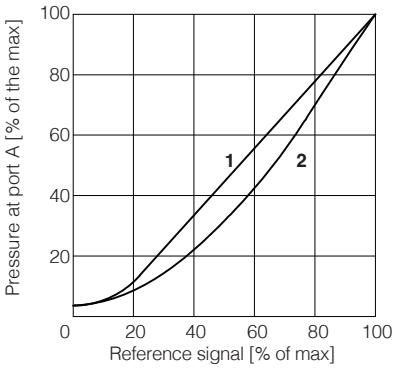
Note: a maximum time of 500 ms (depending on communication type) has to be considered between the driver energizing with the 24 VDC power supply and when the valve is ready to operate. During this time the current to the valve coils is switched to zero.

14 SEALS AND HYDRAULIC FLUIDS - for other fluids not included in below table, consult our technical office

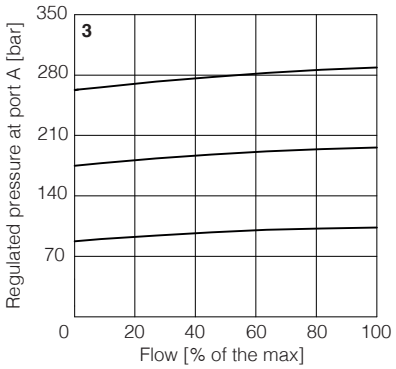
Seals, recommended fluid temperature	NBR seals (standard) = -20°C ÷ +60°C (+80°C for **A**), with HFC hydraulic fluids = -20°C ÷ +50°C FKM seals (/PE option) = -20°C ÷ +80°C NBR low temp. seals (/BT option) = -40°C ÷ +60°C, with HFC hydraulic fluids = -20°C ÷ +50°C			
Recommended viscosity	20 ÷ 100 mm²/s - max allowed range 15 ÷ 380 mm²/s			
Max fluid contamination level — normal operation	ISO4406 class 18/16/13 NAS1638 class 7		see also filter section at www.atos.com or KTF catalog	
Max fluid contamination level — longer life	ISO4406 class 16/14/11 NAS1638 class 5			
Hydraulic fluid	**Suitable seals type**	**Classification**	**Ref. Standard**	
Mineral oils	NBR, FKM, NBR low temp.	HL, HLP, HLPD, HVLP, HVLPD	DIN 51524	
Flame resistant without water	FKM	HFDU, HFDR	ISO 12922	
Flame resistant with water	NBR, NBR low temp.	HFC		

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

1 Regulation diagrams LIMZO
2 Regulation diagrams LICZO



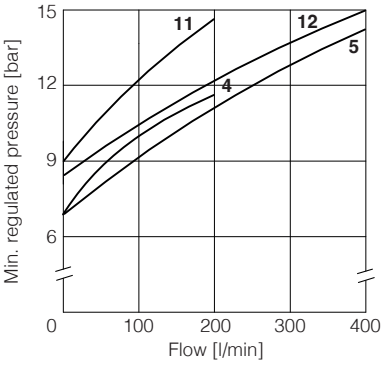
3 Pressure/flow diagrams LICZO, LIMZO

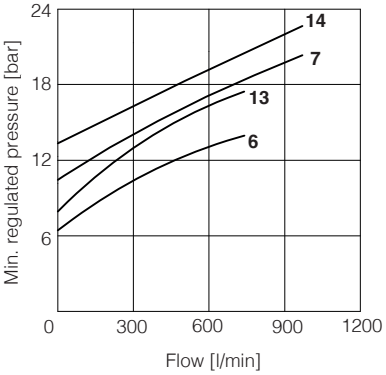


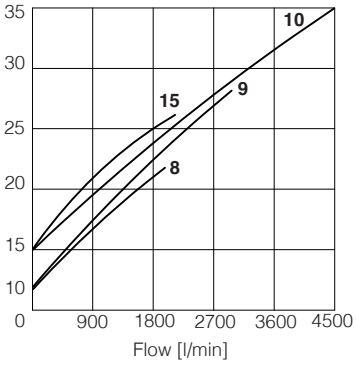
4-14 Min. pressure/flow diagrams
with zero reference signal

4 = LIMZO-*-1
5 = LIMZO-*-2
6 = LIMZO-*-3
7 = LIMZO-*-4
8 = LIMZO-*-5
9 = LIMZO-*-6
10 = LIMZO-*-8

11 = LICZO-*-1
12 = LICZO-*-2
13 = LICZO-*-3
14 = LICZO-*-4
15 = LICZO-*-5





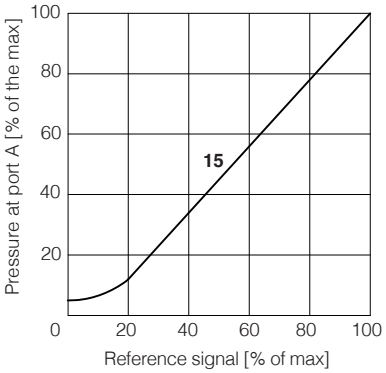


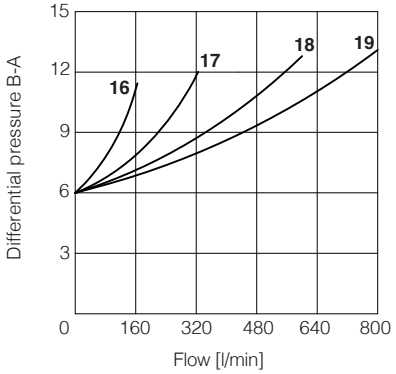
Regulation diagrams LIRZO

15 = LIRZO-A

16-19 Min. pressure/flow diagrams
with reference signal "null"

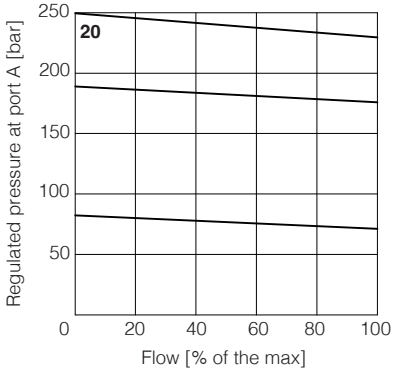
16 = LIRZO-*-1
17 = LIRZO-*-2
18 = LIRZO-*-3
19 = LIRZO-*-4





Pressure/flow diagrams

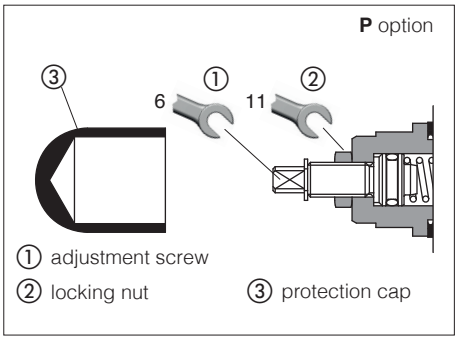
20 = LIRZO-A



16 HYDRAULIC OPTIONS

P = This option (standard for size 1, 2 and 3) provides a mechanical pressure limiter acting as protection against overpressure. For safety reasons the factory setting of the mechanical pressure limiter is fully unloaded (min pressure).
At the first commissioning it must be set at a value lightly higher than the max pressure regulated with the proportional control.
For the pressure setting of the mechanical pressure limiter, proceed according to following steps:

- apply the max reference input signal to the valve's driver. The system pressure will not increase until the mechanical pressure limiter remains unloaded
- turn clockwise the adjustment screw ① until the system pressure will increase up to a stable value corresponding to the pressure setpoint at max reference input signal
- turn clockwise the adjustment screw ① of additional 1 or 2 turns to ensure that the mechanical pressure limiter remains closed during the proportional valve working



17 ELECTRONIC OPTIONS - only for **AEB-NP** and **AES**

I = This option provides 4 ÷ 20 mA current reference, instead of the standard 0 ÷ 10 VDC.
Input signal can be reconfigured via software selecting between voltage and current, within a maximum range of ±10 VDC 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.

Q = This option permits to inhibit the valve function without removing the power supply to the driver. Upon disable command the current to the solenoid is zeroed and the valve's spool moves to rest position.
The option /Q is suggested for all cases where the valve has to be frequently inhibited during the machine cycle – see 21.5 for signal specifications.

Z = This option provides, on the 12 pin main connector, the following additional features:
Fault output signal - see 21.6
Enable input signal - see above option /Q
Power supply for driver's logics and communication - see 21.2

18 POSSIBLE COMBINED OPTIONS

Hydraulic options: all combination possible
Electronic options: /IQ, /IZ

Note: **/T** Bluetooth adapter option can be combined with all other options

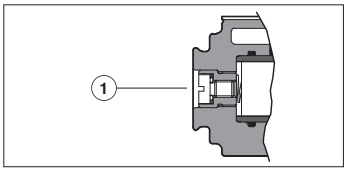
19 COIL VOLTAGE OPTIONS - only for **A**

6 = Optional coil to be used with Atos drivers with power supply 12 VDC.

18 = Optional coil to be used with electronic drivers not supplied by Atos.

20 AIR BLEEDING

At the first valve commissioning the air eventually trapped inside the solenoid must be bled-off through the screw ① located at the rear side of the solenoid housing.
The presence of air may cause pressure instability and vibrations.



21 POWER SUPPLY AND SIGNALS SPECIFICATIONS - only for **AEB-NP** and **AES**

Generic electrical output signals of the valve (e.g. fault or 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, ISO 4413).

For **AEB-IL** signals see section 22

21.1 Power supply (V+ and V0)

The power supply must be appropriately stabilized or rectified and filtered: apply at least a 10000 µF/40 V capacitance to single phase rectifiers or a 4700 µF/40 V capacitance to three phase rectifiers. In case of separate power supply see 21.2.

⚠ A safety fuse is required in series to each power supply: 2,5 A time lag fuse.

21.2 Power supply for driver's logic and communication (VL+ and VL0) - only for **/Z** option

The power supply for driver's logic and communication must be appropriately stabilized or rectified and filtered: apply at least a 10000 µF/40 V capacitance to single phase rectifiers or a 4700 µF/40 V capacitance to three phase rectifiers.
The separate power supply for driver's logic on pin 9 and 10, allow to remove solenoid power supply from pin 1 and 2 maintaining active the diagnostics, USB and fieldbus communications.

⚠ A safety fuse is required in series to each driver's logic and communication power supply: 500 mA fast fuse.

21.3 Reference input signal (INPUT+)

The driver controls in closed loop the current to the valve proportionally to the external reference input signal.
Reference input signal is factory preset according to selected valve code, defaults are 0 ÷ 10 VDC for standard and 4 ÷ 20 mA for /I option.
Input signal can be reconfigured via software selecting between voltage and current, within a maximum range of ±10 VDC or ± 20 mA.
Drivers with fieldbus interface (BC, BP, EH) can be software set to receive reference signal directly from the machine control unit (fieldbus reference). Analog reference input signal can be used as on-off commands with input range 0 ÷ 24VDC.

21.4 Monitor output signal (MONITOR)

The driver generates an analog output signal (MONITOR) proportional to the actual coil current of the valve; the monitor output signal can be software set to show other signals available in the driver (e.g. analog reference, fieldbus reference).
Monitor output signal is factory preset according to selected valve code, default settings is 0 ÷ 5 VDC (1V = 1A).
Output signal can be reconfigured via software, within a maximum range of ±5 VDC.

21.5 Enable input signal (ENABLE) - not for standard

To enable the driver, supply a 24 VDC on pin 3 (pin C): 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 active the communication and the other driver functions when the valve must be disabled for safety reasons. This condition **does not comply** with norms IEC 61508 and ISO 13849.
Enable input signal can be used as generic digital input by software selection.

21.6 Fault output signal (FAULT) - only for **/Z** option

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

22 IO-LINK SIGNALS SPECIFICATIONS - only for **AEB-IL**

22.1 Power supply for IO-Link communication (L+ and L-)

The IO-Link master provides dedicated 24 VDC power supply for IO-Link communication.
Maximum power consumption: 2 W
Internal electrical isolation of power L+, L- from P24, N24

22.2 Power supply for driver's logic and valve regulation (P24 and N24)

The IO-Link master provides dedicated 24 VDC power supply for valve regulation, logics and diagnostics.
Maximum power consumption: 50 W
Internal electrical isolation of power P24, N24 from L+, L-

22.3 IO-Link data line (C/Q)

C/Q signal is used to establish communication between IO-Link master and valve.

23 ELECTRONIC CONNECTIONS

23.1 Main connector signals - 7 pin (A1) Standard and /Q option - for AEB-NP and AES

PIN	Standard	/Q	TECHNICAL SPECIFICATIONS	NOTES
A	**V+**		Power supply 24 VDC	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: ±10 VDC / ±20 mA maximum range Defaults are 0 ÷ 10 VDC for standard and 4 ÷ 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: ±5 VDC maximum range Default is 0 ÷ 5 VDC (1V = 1A)	Output - analog signal **Software selectable**
G	**EARTH**		Internally connected to driver housing	

23.2 Main connector signals - 12 pin (A2) /Z option - for AEB-NP and AES

PIN	/Z	TECHNICAL SPECIFICATIONS	NOTES
1	**V+**	Power supply 24 VDC	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 VL0	Input - on/off signal
4	**INPUT+**	Reference input signal: ±10 VDC / ±20 mA maximum range Defaults are 0 ÷ 10 VDC for standard and 4 ÷ 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: ±5 VDC maximum range, referred to VL0 Default is 0 ÷ 5 VDC (1V = 1A)	Output - analog signal **Software selectable**
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**	Fault (0 VDC) or normal working (24 VDC), referred to VL0	Output - on/off signal
PE	**EARTH**	Internally connected to driver housing	

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

23.3 IO-Link connector signals - M12 - 5 pin - Coding A, port class B (A) only for AEB-IL

PIN	SIGNAL	TECHNICAL SPECIFICATIONS	NOTES
1	**L+**	Power supply 24 VDC for IO-Link communication	Input - power supply
2	**P24**	Power supply 24 VDC for valve regulation, logics and diagnostics	Input - power supply
3	**L-**	Power supply 0 VDC for IO-Link communication	Gnd - power supply
4	**C/Q**	IO-Link data line	Input / Output - signal
5	**N24**	Power supply 0 VDC for valve regulation, logics and diagnostics	Gnd - power supply

Note: L+, L- and P24, N24 are electrically isolated

23.4 Communication connectors - for 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)

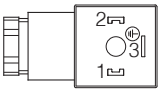
(C2) BP fieldbus execution, connector - M12 - 5 pin (2)		
PIN	**SIGNAL**	**TECHNICAL SPECIFICATION (1)**
1	**+5V**	Termination supply signal
2	**LINE-A**	Bus line (high)
3	**DGND**	Data line and termination signal zero
4	**LINE-B**	Bus line (low)
5	**SHIELD**	

(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**	

(1) Shield connection on connector's housing is recommended

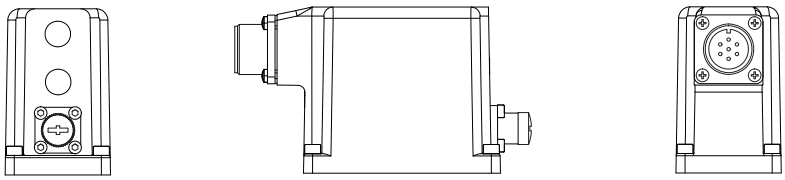
(2) Only for **AES** execution

23.5 Solenoid connection - only for A

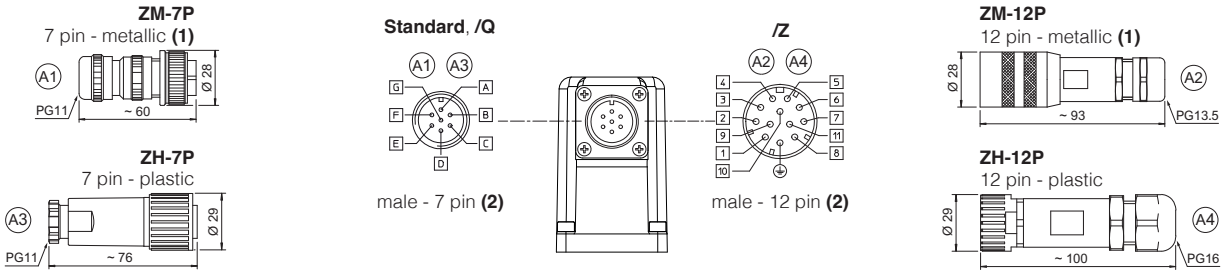
PIN	SIGNAL	TECHNICAL SPECIFICATION	Connector code 666
1	**COIL**	Power supply	
2	**COIL**	Power supply	
3	**GND**	Ground	

23.6 AEB-NP connections layout

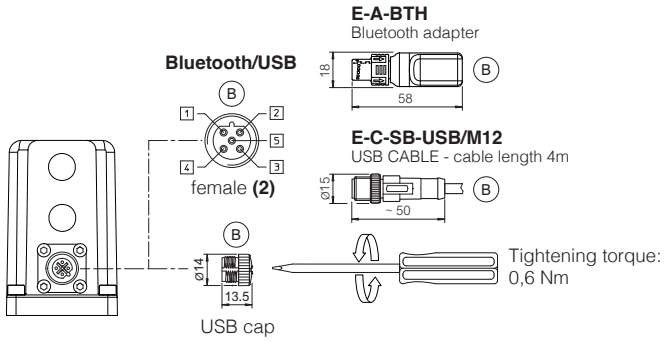
DRIVER OVERVIEW



MAIN CONNECTORS



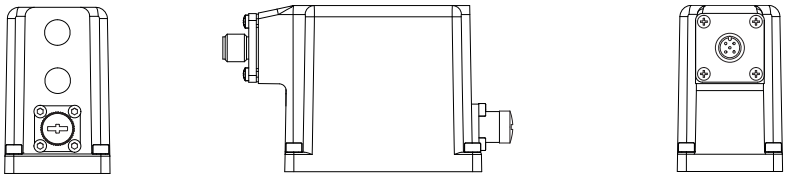
BLUETOOTH ADAPTER AND USB CONNECTOR



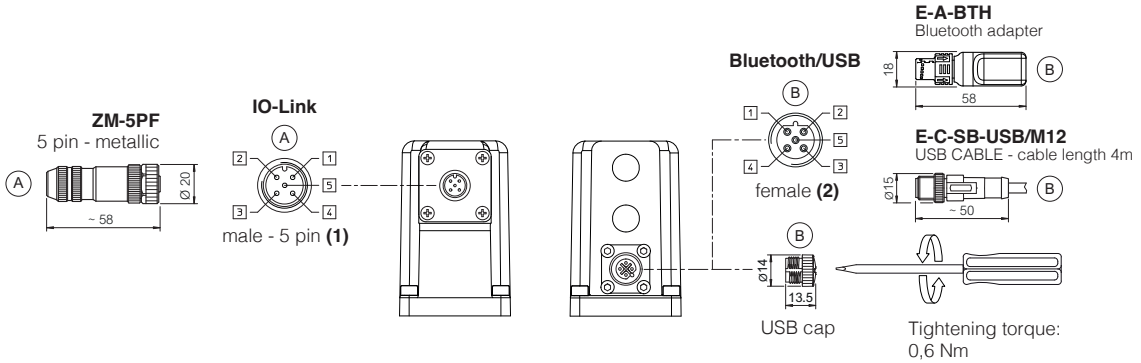
(1) Use of metallic connectors is strongly recommended in order to fulfill EMC requirements **(2)** Pin layout always referred to driver's view

23.7 AEB-IL connections layout

DRIVER OVERVIEW



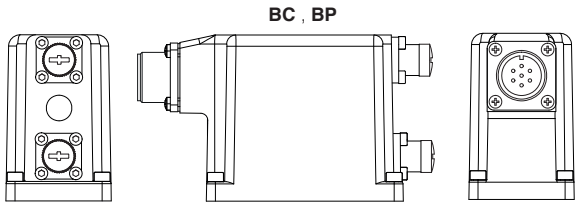
IO-Link CONNECTOR - BLUETOOTH ADAPTER AND USB CONNECTOR

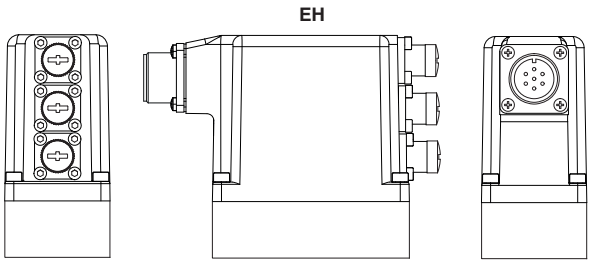


(1) Use of metallic connectors is strongly recommended in order to fulfill EMC requirements **(2)** Pin layout always referred to driver's view

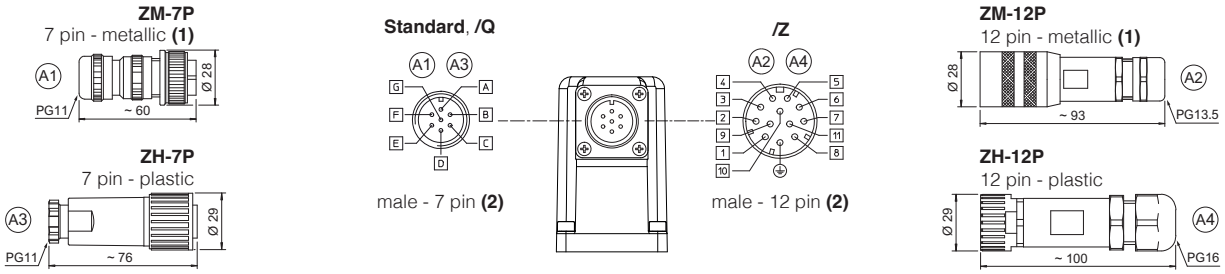
23.8 AES connections layout

DRIVER OVERVIEW

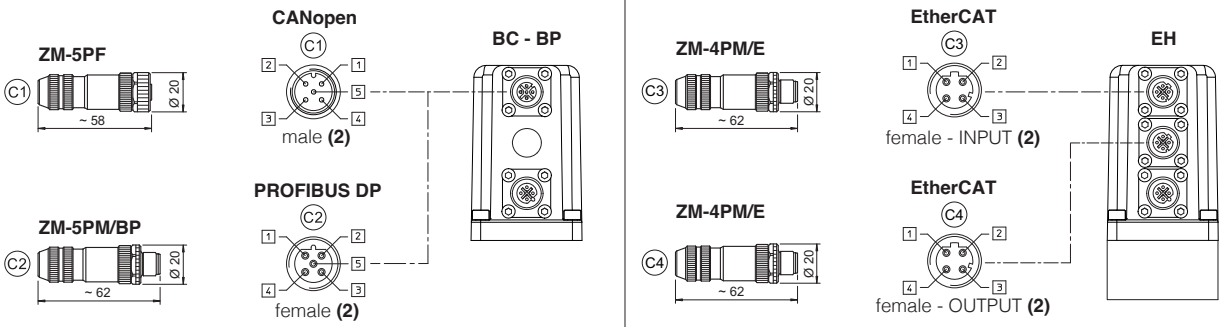




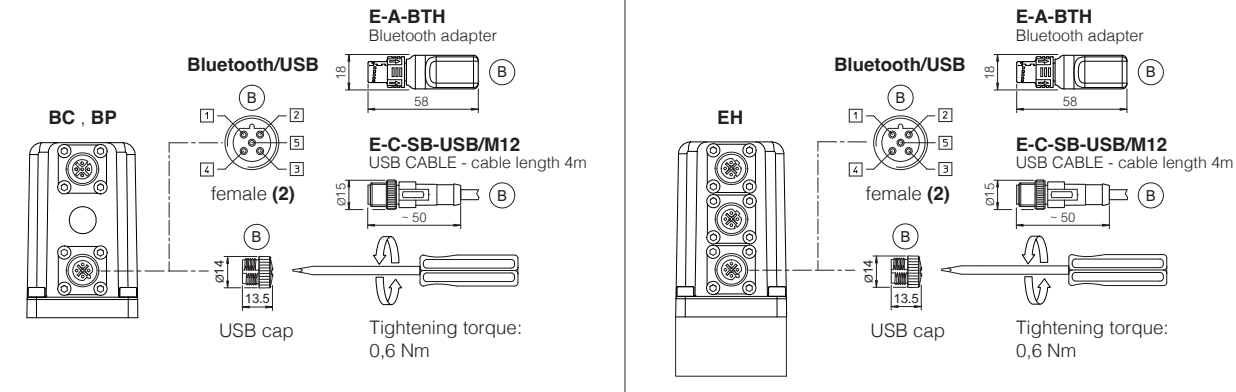
MAIN CONNECTORS



FIELDBUS CONNECTORS



BLUETOOTH ADAPTER AND USB CONNECTOR



(1) Use of metallic connectors is strongly recommended in order to fulfill EMC requirements **(2)** Pin layout always referred to driver's view

24 CONNECTORS CHARACTERISTICS - to be ordered separately

24.1 Main connectors - 7 pin - for **AEB-NP** and **AES**

CONNECTOR TYPE	POWER SUPPLY AND SIGNALS	POWER SUPPLY AND SIGNALS
CODE	(A1) **ZM-7P**	(A3) **ZH-7P**
Type	7pin female straight circular	7pin female straight circular
Standard	According to MIL-C-5015	According to MIL-C-5015
Material	Metallic	Plastic reinforced with fiber glass
Cable gland	PG11	PG11
Recommended cable	LiYCY 7 x 0,75 mm² max 20 m (logic and power supply) or LiYCY 7 x 1 mm² max 40 m (logic and power supply)	LiYCY 7 x 0,75 mm² max 20 m (logic and power supply) or LiYCY 7 x 1 mm² max 40 m (logic and power supply)
Conductor size	up to 1 mm² - available for 7 wires	up to 1 mm² - available for 7 wires
Connection type	to solder	to solder
Protection (EN 60529)	IP 67	IP 67

24.2 Main connectors - 12 pin - for **AEB-NP** and **AES**

CONNECTOR TYPE	POWER SUPPLY AND SIGNALS	POWER SUPPLY AND SIGNALS
CODE	(A2) **ZM-12P**	(A4) **ZH-12P**
Type	12pin female straight circular	12pin female straight circular
Standard	DIN 43651	DIN 43651
Material	Metallic	Plastic reinforced with fiber glass
Cable gland	PG13,5	PG16
Recommended cable	LiYCY 12 x 0,75 mm² max 20 m (logic and power supply)	LiYCY 10 x 0,14mm² max 40 m (logic) LiYY 3 x 1mm² max 40 m (power supply)
Conductor size	0,5 mm² to 1,5 mm² - available for 12 wires	0,14 mm² to 0,5 mm² - available for 9 wires 0,5 mm² to 1,5 mm² - available for 3 wires
Connection type	to crimp	to crimp
Protection (EN 60529)	IP 67	IP 67

24.3 IO-Link connector - only for **AEB-IL**

CONNECTOR TYPE	IL IO-Link
CODE	(A) **ZM-5PF**
Type	5pin female straight circular
Standard	M12 coding A – IEC 61076-2-101
Material	Metallic
Cable gland	Pressure nut - cable diameter 6÷8 mm
Recommended cable	5 x 0,75 mm² max 20 m
Connection type	screw terminal
Protection (EN 60529)	IP 67

24.4 Fieldbus communication connectors - only for **AES**

CONNECTOR TYPE	BC CANopen (1)		BP PROFIBUS DP (1)		EH EtherCAT (2)
CODE	(C1) **ZM-5PF**	(C2) **ZM-5PM**	(C1) **ZM-5PF/BP**	(C2) **ZM-5PM/BP**	(C1) (C2) **ZM-4PM/E**
Type	5 pin female straight circular	5 pin male straight circular	5 pin female straight circular	5 pin male straight circular	4 pin male straight circular
Standard	M12 coding A – IEC 61076-2-101		M12 coding B – IEC 61076-2-101		M12 coding D – IEC 61076-2-101
Material	Metallic		Metallic		Metallic
Cable gland	Pressure nut - cable diameter 6÷8 mm		Pressure nut - cable diameter 6÷8 mm		Pressure nut - cable diameter 4÷8 mm
Cable	CANbus Standard (DR 303-1)		PROFIBUS DP Standard		Ethernet standard CAT-5
Connection type	screw terminal		screw terminal		terminal block
Protection (EN 60529)	IP67		IP 67		IP 67

(1) E-TRM-** terminators can be ordered separately - see tech table **GS500**

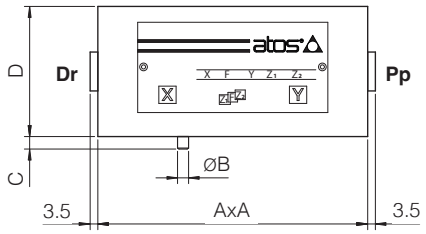
(2) Internally terminated

25 FASTENING BOLTS AND SEALS

Type	Size	Fastening bolts	Seals
LIMZO **LICZO** **LIRZO**	**1** = 16	4 socket head screws M8x45 class 12.9 Tightening torque = 35 Nm	2 OR 108
	2 = 25	4 socket head screws M12x45 class 12.9 Tightening torque = 125 Nm	2 OR 108
	3 = 32	4 socket head screws M16x55 class 12.9 Tightening torque = 300 Nm	2 OR 2043
	4 = 40	4 socket head screws M20x70 class 12.9 Tightening torque = 600 Nm	2 OR 3043
LIMZO **LICZO**	**5** = 50	4 socket head screws M20x80 class 12.9 Tightening torque = 600 Nm	2 OR 3043
LIMZO	**6** = 63	4 socket head screws M30x90 class 12.9 Tightening torque = 2100 Nm	2 OR 3050
	8 = 80	8 socket head screws M24x90 class 12.9 Tightening torque = 1000 Nm	2 OR 4075

26 COVERS DIMENSIONS [mm]

Size	AxA	øB	C	D	Port Pp - Dr
1 = 16	65x80	3	4	40	-
2 = 25	85x85	5	6	40	-
3 = 32	100x100	5	6	50	-
4 = 40	125x125	5	6	60	G 1/4"
5 = 50	140x140	6	4	70	G 1/4"
6 = 63	180x180	6	4	80	G 3/8"
8 = 80	ø250	8	6	80	G 3/8"

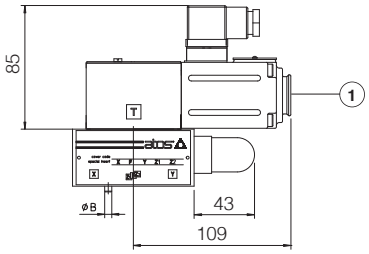


Notes:
size 1 cover is not squared but rectangular, dimensions 65x80
size 8 cover is not squared but circular, dimension ø250

27 INSTALLATION DIMENSIONS [mm]

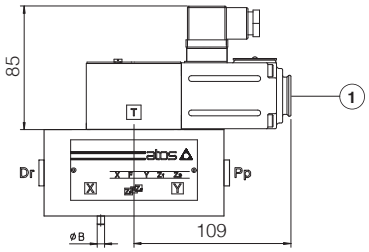
A version for off-board driver

LICZO-A-1 LIMZO-A-1 LIRZO-A-1
LICZO-A-2 LIMZO-A-2 LIRZO-A-2
LICZO-A-3 LIMZO-A-3 LIRZO-A-3

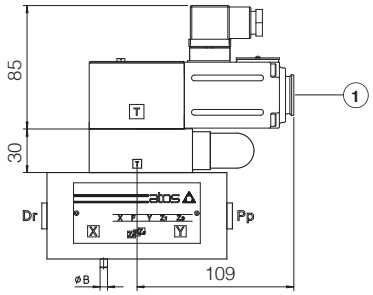


Mass [kg]			
LICZO, LIMZO, LIRZO			Cartridge
Size	Standard	Option /P	SC LI
1 = 16	3,3	-	0,2
2 = 25	4,0	-	0,5
3 = 32	5,3	-	0,9
4 = 40	10,7	11,7	1,7
5 = 50	14,2	15,2	2,9
6 = 63	23,7	24,7	6,7
8 = 80	32,3	33,3	13,1

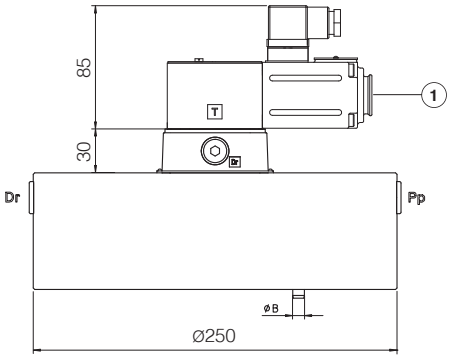
LICZO-A-4 LIMZO-A-4 LIRZO-A-4
LICZO-A-5 LIMZO-A-5
LIMZO-A-6



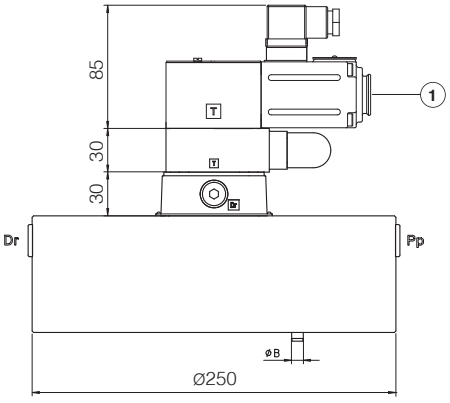
LICZO-A-4/P LIMZO-A-4/P LIRZO-A-4/P
LICZO-A-5/P LIMZO-A-5/P
LIMZO-A-6/P



LIMZO-A-8



LIMZO-A-8/P



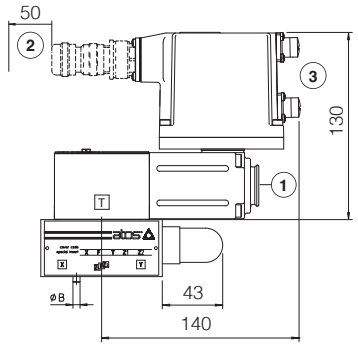
(1) = Air bleeding, see section 20

Note: for mounting surface and cavity dimensions, see tech. table P006

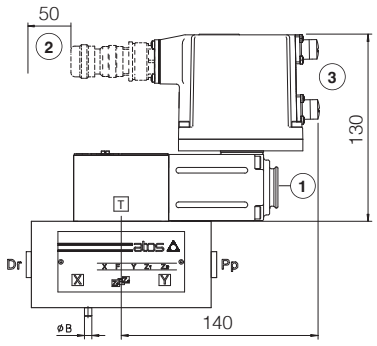
AEB and **AES** version for on-board driver

Mass [kg]			
LICZO, LIMZO, LIRZO			Cartridge
Size	Standard	Option /P	SC LI
1 = 16	4,0	-	0,2
2 = 25	4,5	-	0,5
3 = 32	5,8	-	0,9
4 = 40	11,2	12,2	1,7
5 = 50	14,7	15,7	2,9
6 = 63	24,2	25,2	6,7
8 = 80	32,8	33,8	13,1

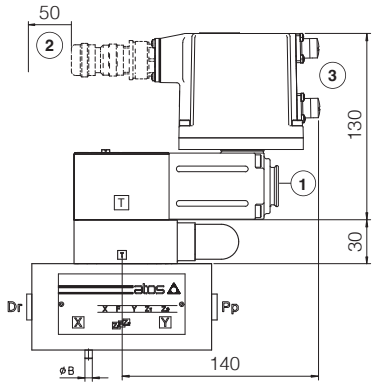
LICZO-AE*-1 LIMZO-AE*-1 LIRZO-AE*-1
LICZO-AE*-2 LIMZO-AE*-2 LIRZO-AE*-2
LICZO-AE*-3 LIMZO-AE*-3 LIRZO-AE*-3



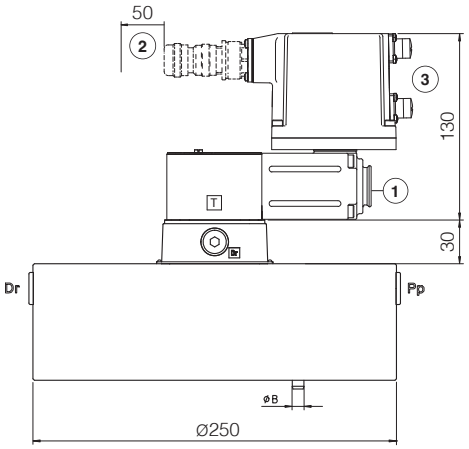
LICZO-AE*-4 LIMZO-AE*-4 LIRZO-AE*-4
LICZO-AE*-5 LIMZO-AE*-5
LIMZO-AE*-6



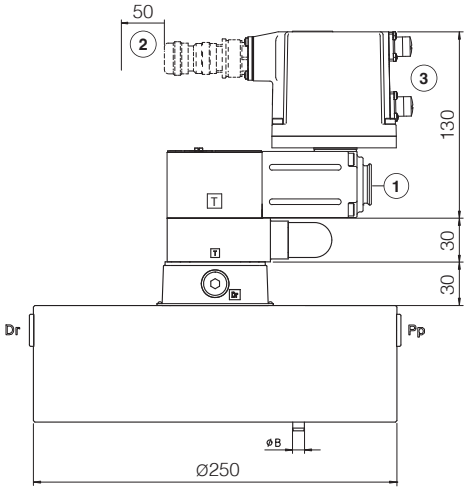
LICZO-AE*-4/P LIMZO-AE*-4/P LIRZO-AE*-4/P
LICZO-AE*-5/P LIMZO-AE*-5/P
LIMZO-AE*-6/P



LIMZO-AE*-8



LIMZO-AE*-8/P



(1) = Air bleeding, see section 20

(2) = Space required for connection cable and for connector removal

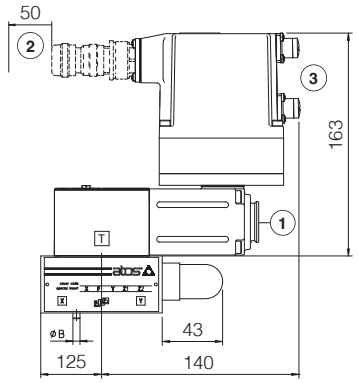
(3) = The dimensions of connectors and Bluetooth adapter must be considered, see section 23.6, 23.7 and 23.8

Note: for mounting surface and cavity dimensions, see tech. table P006

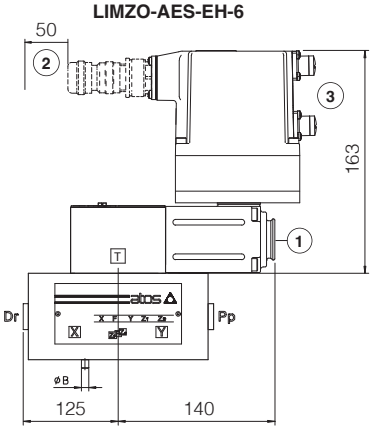
AES-EH version for on-board driver

Mass [kg]			
	LICZO, LIMZO, LIRZO		Cartridge
Size	Standard	Option /P	SC LI
1 = 16	4,1	-	0,2
2 = 25	4,6	-	0,5
3 = 32	5,9	-	0,9
4 = 40	11,3	12,3	1,7
5 = 50	14,8	15,8	2,9
6 = 63	24,3	25,3	6,7
8 = 80	32,9	33,9	13,1

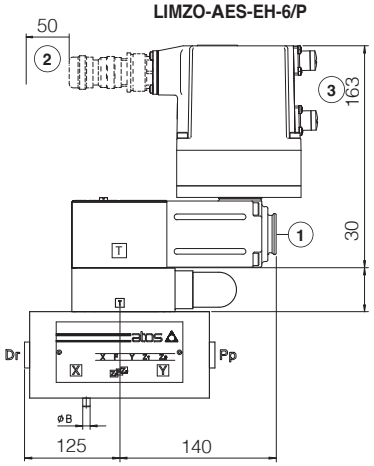
LICZO-AES-EH-1 LIMZO-AES-EH-1 LIRZO-AES-EH-1
LICZO-AES-EH-2 LIMZO-AES-EH-2 LIRZO-AES-EH-2
LICZO-AES-EH-3 LIMZO-AES-EH-3 LIRZO-AES-EH-3



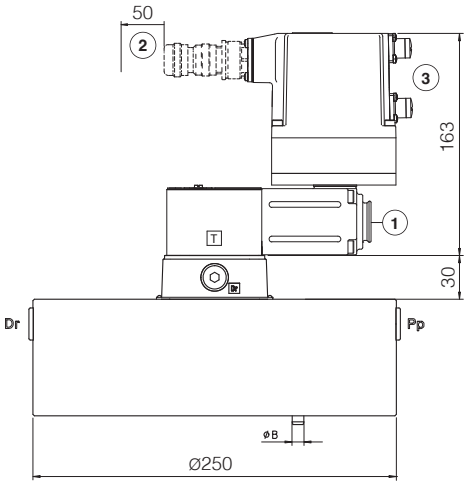
LICZO-AES-EH-4 LIMZO-AES-EH-4 LIRZO-AES-EH-4
LICZO-AES-EH-5 LIMZO-AES-EH-5
LIMZO-AES-EH-6



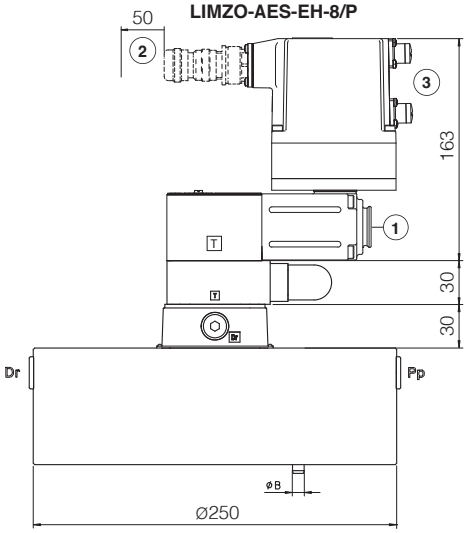
LICZO-AES-EH-4/P LIMZO-AES-EH-4/P LIRZO-AES-EH-4/P
LICZO-AES-EH-5/P LIMZO-AES-EH-5/P
LIMZO-AES-EH-6/P



LIMZO-AES-EH-8



LIMZO-AES-EH-8/P



(1) = Air bleeding, see section 20
(2) = Space required for connection cable and for connector removal
(3) = The dimensions of connectors and Bluetooth adapter must be considered, see section 23.6, 23.7 and 23.8

Note: for mounting surface and cavity dimensions, see tech. table P006

28 RELATED DOCUMENTATION

FS001	Basics for digital electrohydraulics	**K800**	Electric and electronic connectors
FS900	Operating and maintenance information for proportional valves	**P006**	Mounting surfaces and cavities for cartridge valves
G010	E-MI-AC analog driver	**QB220**	Quickstart for AEB valves commissioning
G020	E-MI-AS-IR digital driver	**QF220**	Quickstart for AES valves commissioning
G030	E-BM-AS digital driver	**E-MAN-MI-AS**	E-MI-AS-IR user manual (off-board)
GS050	E-BM-AES digital driver	**E-MAN-BM-AS**	E-BM-AS user manual (off-board)
GS500	Programming tools	**E-MAN-BM-AES**	E-BM-AES user manual (off-board)
GS510	Fieldbus	**E-MAN-RI-AEB**	AEB user manual
GS520	IO-Link interface	**E-MAN-RI-AES**	AES user manual