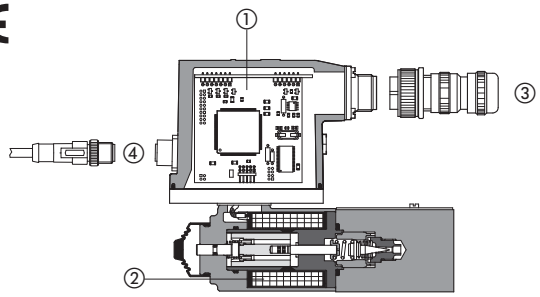
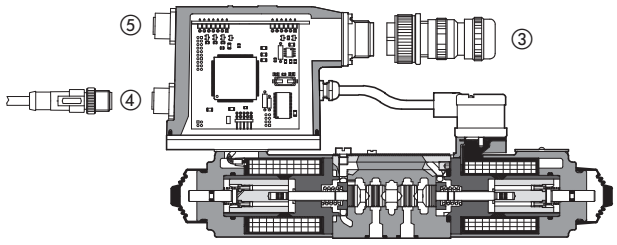
# Digital electronic AEB/AES drivers

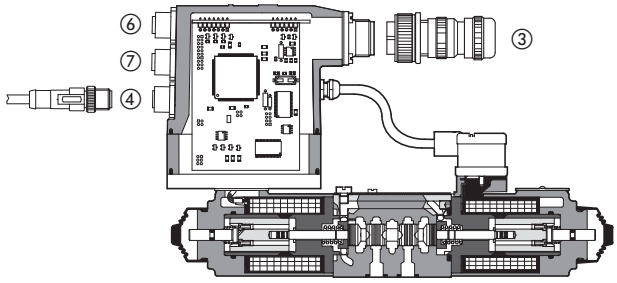
integral-to-valve format, for proportional valves without transducer



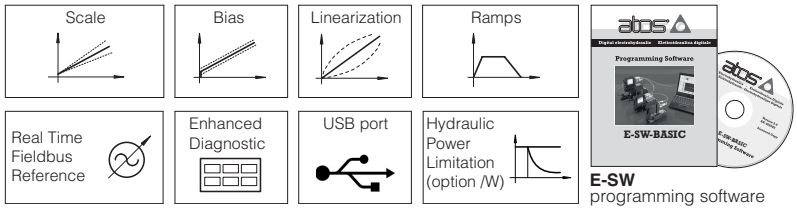
RZMO-AEB- **NP** Not Present



DHZO-AES- **BC** CANopen
**BP** PROFIBUS DP



DHZO-AES- **EH** EtherCAT




**E-SW**
programming software

Connector ③ and cable ④ included, to be ordered separately

## AEB, AES

Digital drivers ① supply and control the current to the solenoid of Atos proportional valves without transducer, according to the electronic reference input signal. The solenoid ② proportionally transforms the current into a force, acting on the valve spool or poppet, against a reacting spring, thus providing the valve's hydraulic regulation.
AEB basic execution is equipped with USB port for programming.
AES full execution is equipped with fieldbus communication in addition to USB port for programming.
Atos PC software allows to customize the driver configuration to the specific application requirements.

**Electrical Features:**

- Functional factory preset parameters for best performances
- 7 pin main connector ③ for power supply, analog input reference and monitor signals
- 5 pin USB connector ④ always present
- 5 pin CANopen or PROFIBUS DP communication connector ⑤ - only for AES
- 4 pin EtherCAT communication connectors ⑥ and ⑦ (input - output) - only for AES
- /Q option 7 pin main connector for enable signal
- /Z option 12 pin main connector for additional double power supply, enable and fault signals
- /W option 5 pin connector for external pressure transducer
- Electrical protection against reverse polarity of power supply
- Operating temperature -40° ÷ +60°
- IP66 / IP67 protection degree
- Rugged construction
- CE mark according to EMC directive

**Software Features:**

- Intuitive graphic interface
- Setting of valve's functional parameters: bias, scale, ramps, dither, PID gains
- Linearization function for hydraulic regulation
- /W option software selectable max power limitation function (see 6.7)
- Complete diagnostics of driver status
- Internal oscilloscope function
- In field firmware update through USB port

**Fieldbus Features** - only for **AES:**

- Valve direct communication with machine control unit for digital reference, diagnostics and settings
- Fieldbus execution allow to operate the valves via fieldbus or via analog signals available on the main connector

## 1 VALVES RANGE

| Valves model | Pressure | | | | Directional | | Cartridge | Flow |
|---|---|---|---|---|---|---|---|---|
| | **RZMO** | **RZGO** | **AGMZO** | **AGRCZO** | **DHZO DKZOR** | **DPZO** | **LICZO LIMZO LIRZO** | **QVHZO QVKZOR** |
| Data sheet | FS007 FS065 | FS015 FS070 | FS035 | FS050 | FS160 | FS170 | FS300 | FS410 |
| Driver model | **AEB / AES** | | | | | | | |

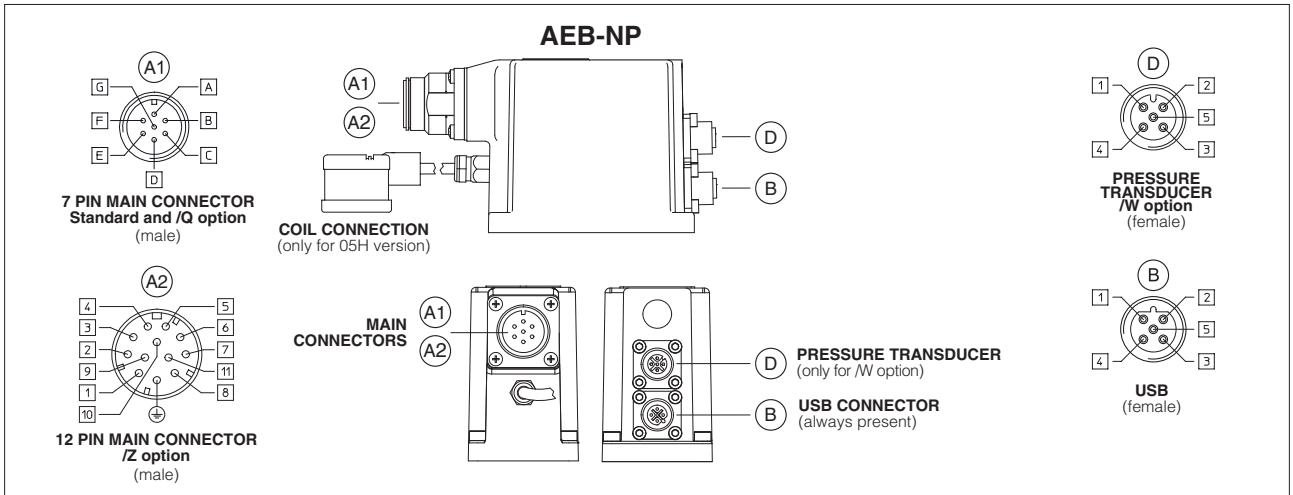
## 2 MAIN CHARACTERISTICS

| | | | | |
|---|---|---|---|---|
| Power supply<br>(see 4.1, 4.4) | Nominal : +24 VDC<br>Rectified and filtered : VRMS = 20 ÷ 32 VMAX (ripple max 10 % VPP) | | | |
| Max power consumption | 50 W | | | |
| Reference input (see 4.2) | Voltage: maximum range ±10 VDC Input impedance: Ri > 50 kΩ<br>Current: maximum range ±20 mA Input impedance: Ri = 500 Ω | | | |
| Monitor output (see 4.3) | Voltage: maximum range ± 5 VDC @ max 5 mA | | | |
| Enable input (see 4.5) | Range : 0 ÷ 9 VDC (OFF state), 15 ÷ 24 VDC (ON state), 9 ÷ 15 VDC (not accepted); Input impedance: Ri > 87kΩ | | | |
| Fault output (see 4.6) | Output range : 0 ÷ 24 VDC (ON state ≅ VL+ [logic power supply] ; OFF state ≅ 0 V) @ max 50 mA | | | |
| Pressure transducer (only /W option) | Power supply: +24VDC @ max 100 mA<br>Pressure input: voltage, maximum range ±10 VDC Input impedance, Ri > 50 Ω<br>current, maximum range ±20 mA Input impedance, Ri = 500 Ω | | | |
| Alarms | Solenoid not connected/short circuit, cable break with current reference signal, over/under temperature, current control monitoring, power supplies level, pressure transducer failure (/W option) | | | |
| Format | Sealed box on the valve; IP66 / IP67 protection degree with mating connectors | | | |
| Tropicalization | Tropical coating on electronics PCB | | | |
| Operating temperature | -40 ÷ +60 °C (storage -40 ÷ +70 °C) | | | |
| Mass | Approx. 480 g (approx. 610 g for -EH execution) | | | |
| Additional characteristics | Short circuit protection of solenoid current supply; current control by P.I.D. with rapid solenoid switching; protection against reverse polarity of power supply | | | |
| Electromagnetic compatibility (EMC) | According to Directive 2004/108/CE (Immunity: EN 61000-6-2; Emission: EN 61000-6-3) | | | |
| Communication interface | USB<br>Atos ASCII coding | CANopen - only for AES<br>EN50325-4 + DS408 | PROFIBUS DP - only for AES<br>EN50170-2/IEC61158 | EtherCAT - only for AES<br>IEC61158 |
| Communication physical layer | not insulated<br>USB 2.0 + USB OTG | optical insulated<br>CAN ISO11898 | optical insulated<br>RS485 | Fast Ethernet<br>100 Base TX |
| Recommended wiring cable (see 8) | LiYCY shielded cables | | | |

**Note:** a minimum booting time of 500 ms has 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

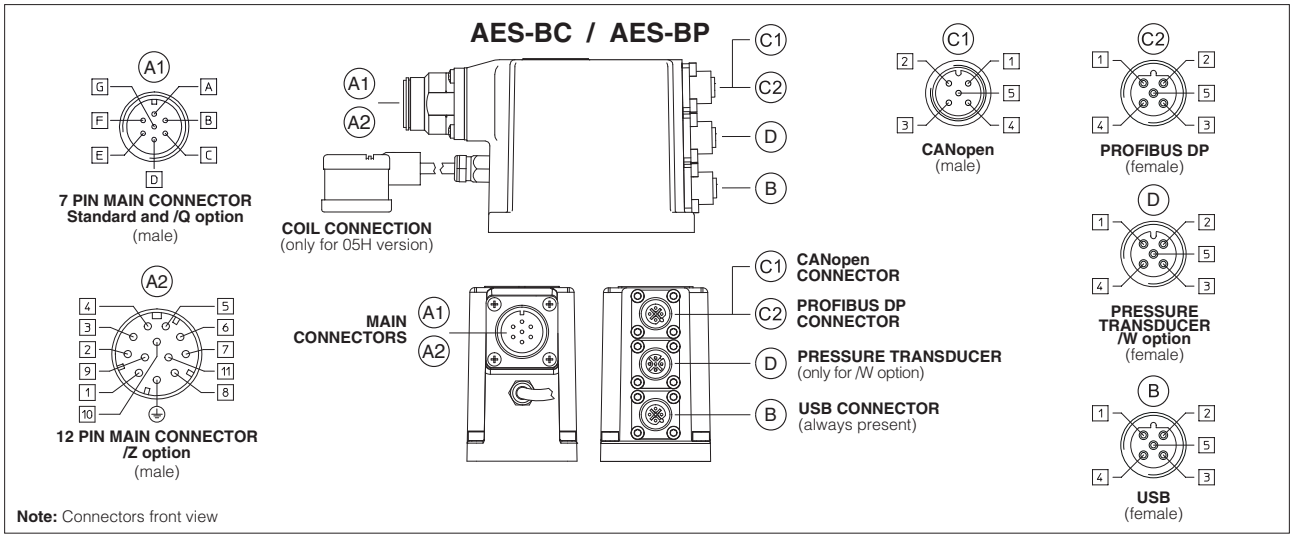
## 3 CONNECTIONS

### 3.1 AEB



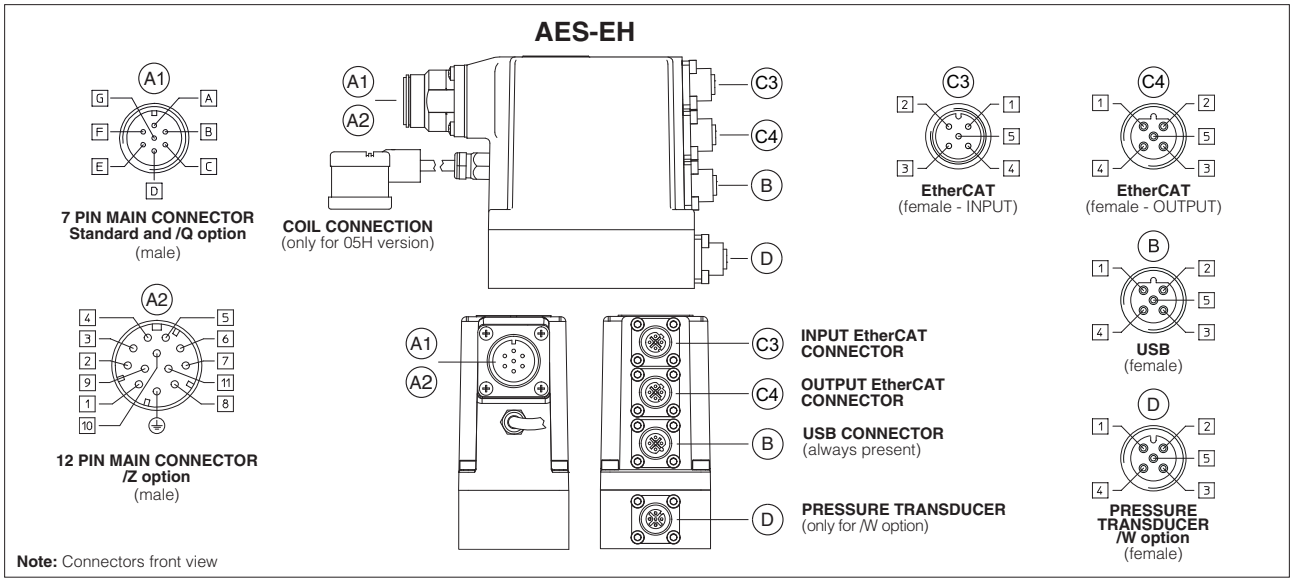

**Note:** Connectors front view

### 3.2 AES - CANopen BC and PROFIBUS BP




**Note:** Connectors front view

### 3.3 AES - EtherCAT




**Note:** Connectors front view

### 3.4 Main connector signals - 7 pin - **standard** and **/Q** options (A1) - see 8.1

| PIN | Standard | /Q | TECHNICAL SPECIFICATIONS | NOTES |
|---|---|---|---|---|
| A | **V+** | | Power supply 24 VDC (see 4.1) | Input - power supply |
| B | **V0** | | Power supply 0 VDC (see 4.1) | Gnd - power supply |
| C | **AGND** | | Analog ground | Gnd - analog signal |
| | | **ENABLE** | Enable (24 VDC) or disable (0 VDC) the driver, referred to V0 (see 4.5) | Input - on/off signal |
| D | **INPUT+** | | Reference input signal: ±10 VDC / ±20 mA maximum range (see 4.2) | 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 (see 4.3) | Output - analog signal **Software selectable** |
| G | **EARTH** | | Internally connected to driver housing | |

### 3.5 Main connector signals - 12 pin - **/Z** and **/W** options (A2) - see 8.2

| PIN | /Z | /W | TECHNICAL SPECIFICATIONS | NOTES |
|---|---|---|---|---|
| 1 | **V+** | | Power supply 24 VDC (see 4.1) | Input - power supply |
| 2 | **V0** | | Power supply 0 VDC (see 4.1) | Gnd - power supply |
| 3 | **ENABLE** | | Enable (24 VDC) or disable (0 VDC) the driver, referred to V0 (see 4.5) | Input - on/off signal |
| 4 | **INPUT+** | | Reference input signal: ±10 VDC / ±20 mA maximum range (see 4.2) | 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 (see 4.3) | Output - analog signal **Software selectable** |
| 7 | **NC** | | Do not connect | |
| 8 | **NC** | | Do not connect | |
| | | **MONITOR2** | 2nd monitor output signal: ±5 VDC maximum range, referred to VL0 (see 4.3) | Output - analog signal **Software selectable** |
| 9 | **VL+** | | Power supply 24 VDC for driver's logic and communication (see 4.4) | Input - power supply |
| 10 | **VL0** | | Power supply 0 VDC for driver's logic and communication (see 4.4) | Gnd - power supply |
| 11 | **FAULT** | | Fault (0 VDC) or normal working (24 VDC), referred to V0 (see 4.6) | Output - on/off signal |
| PE | **EARTH** | | Internally connected to driver housing | |

### 3.6 Communication connectors (B) - (C) - see 8.3

| (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

**3.7 Pressure transducer connector - M12 - 5 pin** - only for **/W** option (D) - see 8.4

| PIN | SIGNAL | TECHNICAL SPECIFICATION | Voltage | Current |
|---|---|---|---|---|
| 1 | **VF +24V** | Power supply +24VDC | Connect | Connect |
| 2 | **TR** | Signal transducer ±10 VDC / ±20 mA maximum range, software selectable - see 4.7 | Connect | Connect |
| 3 | **AGND** | Common GND for transducer power and signals | Connect | / |
| 4 | **NC** | Not Connect | / | / |
| 5 | **NC** | Not Connect | / | / |

## 4 SIGNALS SPECIFICATIONS

Atos proportional valves are CE marked according to the applicable directives (e.g. Immunity/Emission EMC Directive).
Installation, wirings and start-up procedures must be performed according to the general prescriptions shown in tech table **F003** and in the user manuals included in the E-SW programming software.
The electrical signals of the driver (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).

**4.1 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.
A safety fuse is required in series to each driver power supply: 2,5 A fuse time lag.

**4.2 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 ±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.

**4.3 Monitor output signals (MONITOR and MONITOR2)** - only for **/Z** and **/W** options

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 ±5 VDC (1V = 1A).
Output signal can be reconfigured via software, within a maximum range of ±5 VDC.

*Option /W*
The driver generates a second analog output signal (MONITOR2) proportional to the actual system pressure.
The output maximum range is ±5 VDC; default setting is 0 ÷ 5 VDC

**4.4 Power supply for driver's logic and communication (VL+ and VL0)** - only for **/Z** and **/W** options

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

**4.5 Enable input signal (ENABLE)** - only for **/Q**, **/Z** and **/W** options

To enable the driver, supply 24 VDC on pin 3 (pin C) referred to pin 2 (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 active the communication and the other driver functions when the valve must be disabled for safety reasons. This condition does not comply with European Norms EN13849-1 (ex EN954-1).

**4.6 Fault output signal (FAULT)** - only for **/Z** and **/W** options

Fault output signal indicates fault conditions of the driver (solenoid short circuits/not connected, reference signal cable broken for 4 ÷ 20 mA 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.

**4.7 Remote Pressure Transducer Input signal (TR)** - only for **/W** option

Analog pressure transducers can be directly connected to the driver.
Analog input signal is factory preset according to selected valve code, defaults are 0 ÷ 10 VDC for standard and 4 ÷ 20 mA for /C option.
Input signal can be reconfigured via software selecting between voltage and current, within a maximum range of ±10 VDC or ±20 mA.
Note: transducer feedback can be read as a digital information through fieldbus communication - software selectable.

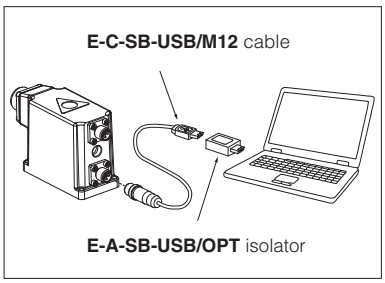
## 5 PROGRAMMING TOOLS - see tech table **GS500**

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) | | |

**USB connection**




**WARNING: drivers USB port is not isolated!**
The use of isolator adapter is highly recommended for PC protection (see table **GS500**)

Free programming software, web download:

**E-SW-BASIC** web download = software can be downloaded upon web registration at www.download.atos.com ; service and DVD not included
Upon web registration user receive via email the Activation Code (software free license) and login data to access Atos Download Area

DVD programming software, to be ordered separately:

**E-SW-*** DVD first supply = software has to be activated via web registration at www.download.atos.com ; 1 year service included
Upon web registration user receive via email the Activation Code (software license) and login data to access Atos Download Area

**E-SW-*-N** DVD next supplies = only for supplies after the first; service not included, web registration not allowed
Software has to be activated with Activation Code received upon first supply web registration

**Atos Download Area:** direct access to latest releases of E-SW software, manuals, USB drivers and fieldbus configuration files at www.download.atos.com

**USB Adapters, Cables and Terminators, can be ordered separately**

## 6 MAIN SOFTWARE PARAMETER SETTINGS

The following is a brief description of the main settings and features of digital drivers.
For a detailed descriptions of available settings, wirings and installation procedures, please refer to the user manual included in the E-SW programming software:

**E-MAN-RI-AEB** - user manual for **AEB** basic execution

**E-MAN-RI-AES** - user manual for **AES** full execution

### 6.1 Scale

Scale function allows to set the maximum current supplied to the solenoid, corresponding to the max valve regulation, at maximum reference signal value.
This regulation allows to adapt the maximum current supplied from the driver to the specific nominal current of the proportional valves to which the driver is coupled; it is also useful to reduce the maximum valve regulation in front of maximum reference signal.
Two different Scale regulations are available for double solenoid valves: ScaleA for positive reference signal and ScaleB for negative reference signal.

### 6.2 Bias and Threshold

Proportional valves may be provided with a dead band in the hydraulic regulation corresponding to their switch-off status.
This dead band discontinuity in the valve's regulation can be compensated by activating the Bias function, which adds a fixed preset Bias value to the reference signal (analog or fieldbus external input).
The Bias function is activated when the reference signal overcomes the Threshold value, preset into the driver.
The Bias setting allows to calibrate the Bias current to the specific proportional valve to which the driver is coupled.
The Threshold setting is useful to avoid undesired valve regulation at zero reference signal when electric noise is present on the analog input signal: smaller threshold reduces the reference signal dead band, greater values are less affected by electric noise presence.
If fieldbus reference signal is active (see 4.2), threshold should be set to zero.
Two different Bias regulations are available for double solenoid valves: positive reference signals activate BiasA and negative reference signals activate BiasB.
Refer to the programming manuals for a detailed description of other software selectable Bias functions.

### 6.3 Offset

Proportional valves may be provided with zero overlapping in the hydraulic regulation corresponding to zero reference input signal (valve's central spool position).
The Offset function allows to calibrate the Offset current, required to obtain valve's spool central position, to the specific hydraulic system setup (e.g. valve applied to cylinder with differential areas).

### 6.4 Ramps

The ramp generator allows to convert sudden change of electronic reference signal into smooth time-dependent increasing/decreasing of the current supplied to the solenoid.
Different ramp mode can be set:
- single ramp for any reference variation
- two ramps for increasing and for decreasing reference variations
- four ramps for positive/negative signal values and increasing/decreasing reference variations

Ramp generator is useful for application where smooth hydraulic actuation is necessary to avoid machine vibration and shocks.
If the proportional valve is driven by a closed loop controller, the ramps can lead to unstable behaviour, for these applications ramp function can be software disabled (default setting).

### 6.5 Linearization - E-SW level 2 functionality

Linearization function allows to set the relation between the reference input signal and the controlled valve's regulation.
Linearization is useful for applications where it is required to linearize the valve's regulation in a defined working condition.

### 6.6 Variable Dither

The dither is the frequency modulation of the current supplied to the solenoid. To reduce the hysteresis should be selected a lower value of frequency, despite a lower regulation stability, because a small vibration in the valve regulating parts considerably reduces static friction effects.
To improve the regulation stability, should be selected a high value of frequency, despite a higher hysteresis. This solution in some application can lead to vibration and noise. Normally, the right setting is a compromise and depends on system setup.
AEB and AES drivers allow to realize a variable dither frequency that linearly depends on the demanded current: variable dither frequency allows an higher degree to optimize the valve hysteresis.

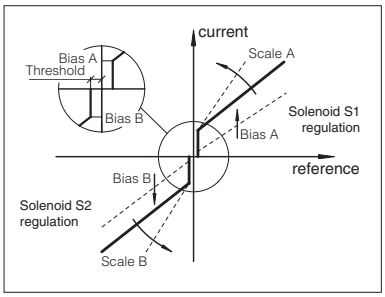
### 6.7 Hydraulic Power Limitation - only for **/W** option

Digital AES drivers with /W option electronically perform hydraulic power limitation on:
- direct and pilot operated flow control valves
- direct and pilot operated directional control valves + mechanical pressure compensator
- variable displacement pumps with proportional flow regulator (e.g. PVPC-*-LQZ, tech table **A170**)

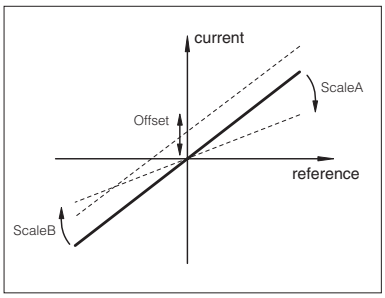
The driver receives the flow reference signal by the analog external input INPUT+ (see 4.2) and a pressure transducer, installed in the hydraulic system, has to be connected to the driver's analog input TR (see 4.7).
When the actual requested hydraulic power **p**x**Q** (TR x INPUT+) reaches the max power limit (p1xQ1), 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:

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

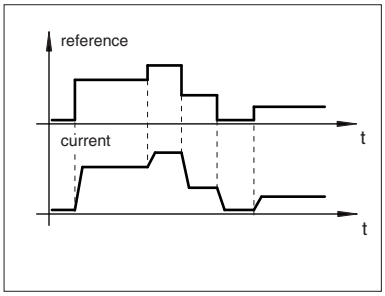
**6.1, 6.2 - Scale, Bias & Threshold**



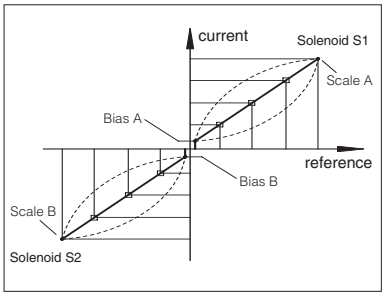

**6.3 - Offset**



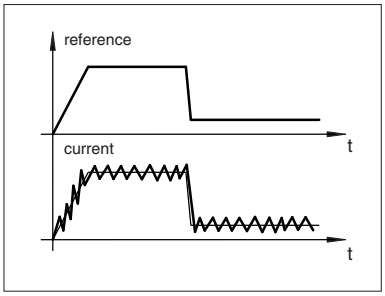

**6.4 - Ramps**



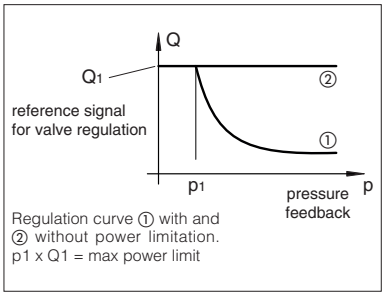

**6.5 - Linearization**




**6.6 - Variable Dither**

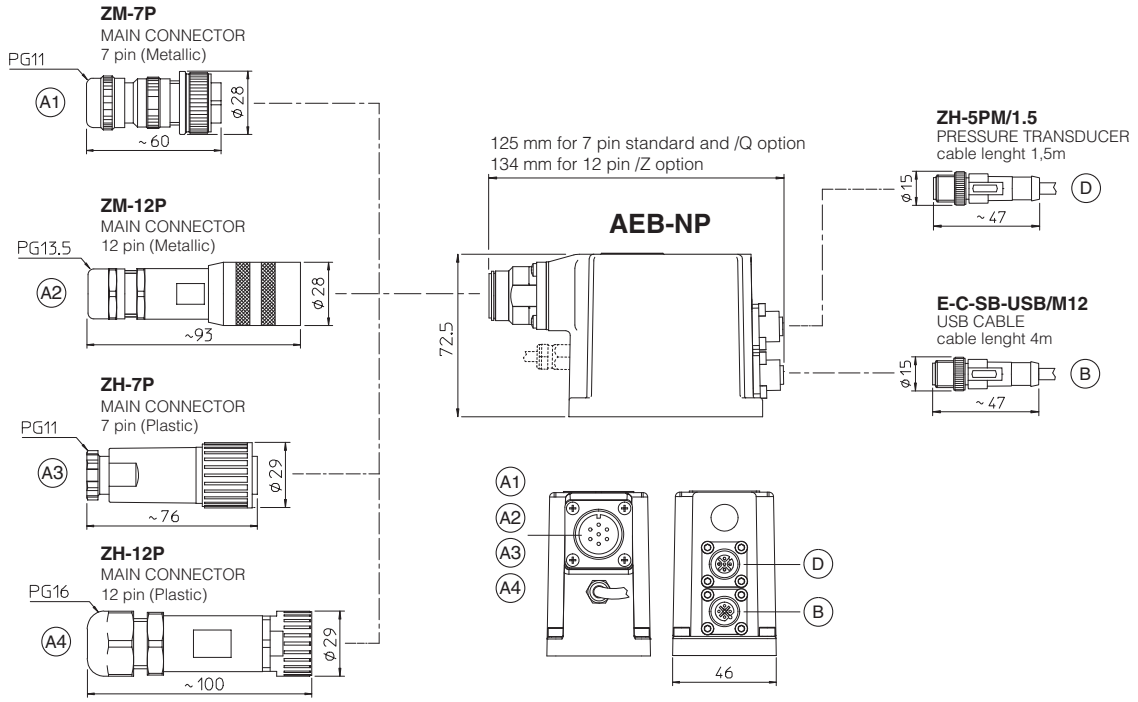



**6.7 - Hydraulic Power Limitation**



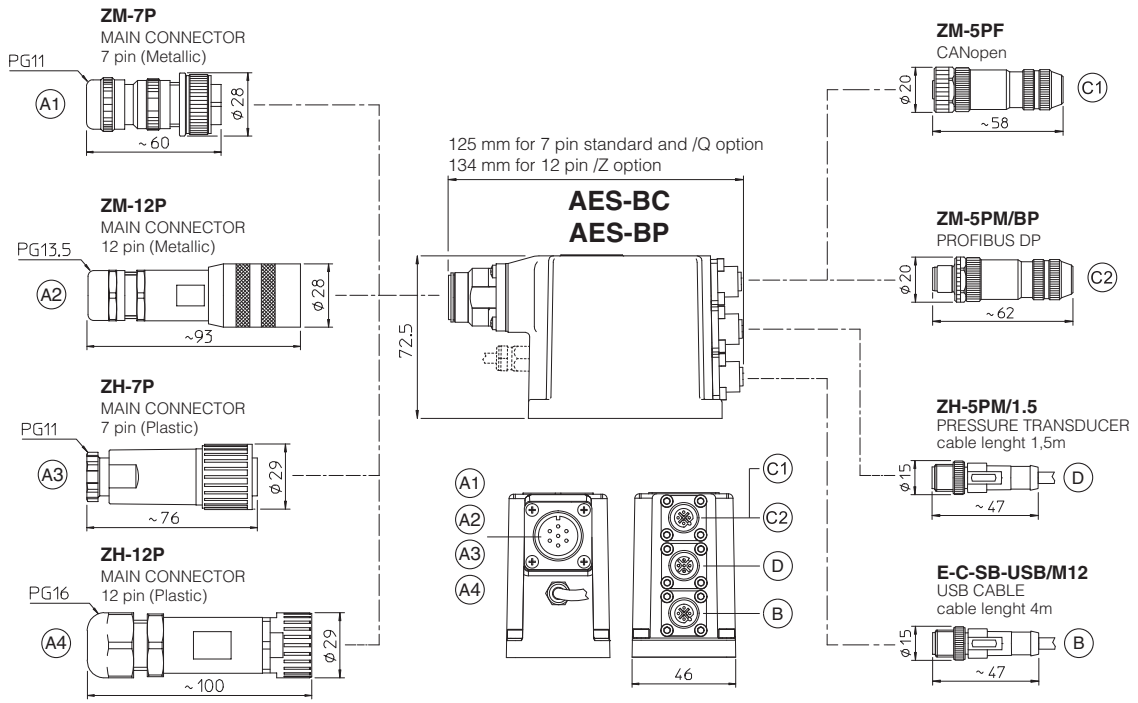
## 7 OVERALL DIMENSIONS [mm]

### 7.1 AEB



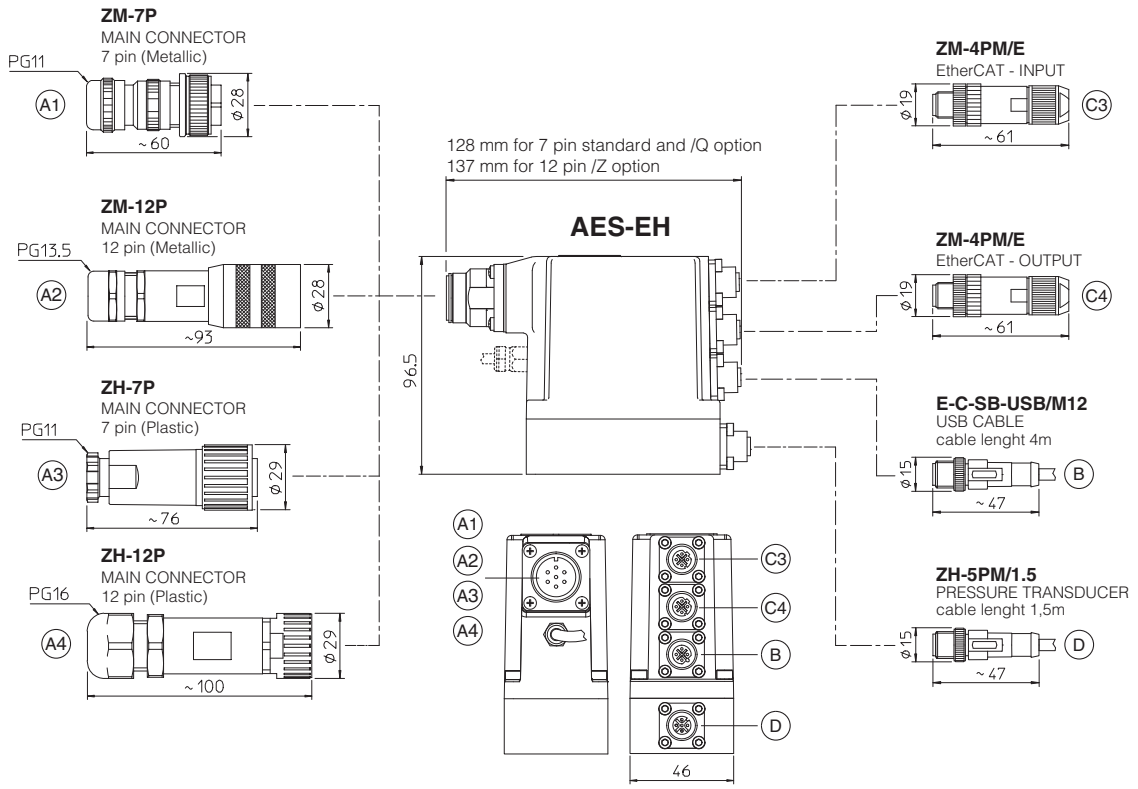

**Note:** use of metallic connectors is strongly recommended in order to fulfill EMC requirements

### 7.2 AES - **CANopen BC** and **PROFIBUS BP**




**Note:** use of metallic connectors is strongly recommended in order to fulfill EMC requirements

### 7.3 AES - EtherCAT EH




**Note:** use of metallic connectors is strongly recommended in order to fulfill EMC requirements

## 8 CONNECTORS CHARACTERISTICS - to be ordered separately

### 8.1 Main connectors - 7 pin

| CONNECTOR TYPE | POWER SUPPLY | POWER SUPPLY |
|---|---|---|
| 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)<br>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)<br>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 |

### 8.2 Main connectors - 12 pin

| CONNECTOR TYPE | POWER SUPPLY | POWER SUPPLY |
|---|---|---|
| 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)<br>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<br>0,5 mm² to 1,5 mm² - available for 3 wires |
| Connection type | to crimp | to crimp |
| Protection (EN 60529) | IP 67 | IP 67 |

**8.3 Fieldbus communication connectors** - only for **AES** execution

| CONNECTOR TYPE | **BC CANopen** (1) | **BP PROFIBUS DP** (1) | **EH EtherCAT** (2) |
|---|---|---|---|
| **CODE** | (C1) **ZM-5PF** | (C2) **ZM-5PM/BP** | (C3) (C4) **ZM-4PM/E** |
| Type | 5 pin female straight circular | 5 pin male straight circular | 4 pin male straight circular |
| Standard | M12 coding A – IEC 60947-5-2 | M12 coding B – IEC 60947-5-2 | 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 |

**Notes: (1)** E-TRM-** terminators can be ordered separately - see tech table **GS500** **(2)** Internally terminated

**8.4 Pressure transducer connector** - only for **/W** option

| CONNECTOR TYPE | **TRANSDUCER** |
|---|---|
| **CODE** | (D) **ZH-5PM/1.5** |
| Type | 5 pin male straight circular |
| Standard | M12 coding A – IEC 60947-5-2 |
| Material | Plastic |
| Cable gland | Connector moulded on cables 1,5 m lenght |
| Cable | 3 x 0,25 $mm^2$ |
| Connection type | molded cable |
| Protection (EN 60529) | IP 67 |

## 9 MODEL CODE FOR SPARE PARTS

Integral drivers are available as spare parts only for Atos authorized service centers.

**E-RI** - **AE** **S** - **NP** - **01H** / ***** ***** / *****

Integral electronic driver **(1)**

**AE** = for proportional valves without transducer

**B** = basic
**S** = full

**Fieldbus interface** - USB port always present **(2):**
**NP** = Not Present
**BC** = CANopen
**BP** = PROFIBUS DP
**EH** = EtherCAT - not for Ex-proof execution

**01H** = for single solenoid proportional valves
**05H** = for double solenoid proportional valves

**Options:**
**Q** = enable signal
**Z** = adds double power supply, enable and fault signals
**W** = power limitation function

Series number

Set code **(3)**

**(1)** for Ex-proof execution, please contact Atos technical department
**(2) AEB** available only in version **NP**; **AES** available only in version **BC**, **BP**, **EH**
**(3)** set code identifies the corrispondence between the integral driver and the relevant valve; it is assigned by Atos when the driver is ordered as spare part