Integral electronic drivers type **E-RI-AES**
digital, for proportional valves without transducer

Power supply connector metallic or plastic, see section [10]

Communication plastic connector see section [11]

DHZO-AES--071-***

RZMO-AES--010**
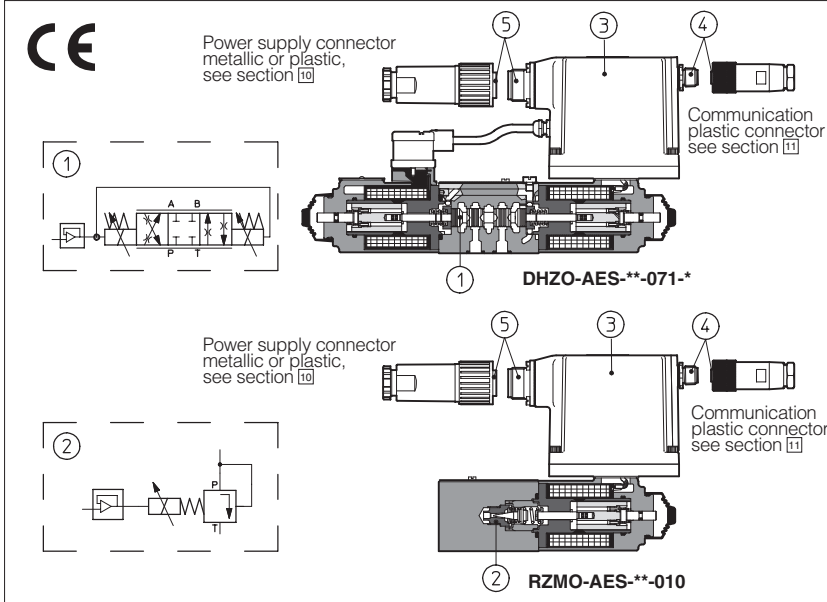
These digital drivers are integral to Atos proportional valves without pressure or position transducer, and they control the current to the solenoid, regulating the spool position ①, the flow or the pressure ② according to the electronic reference signal.
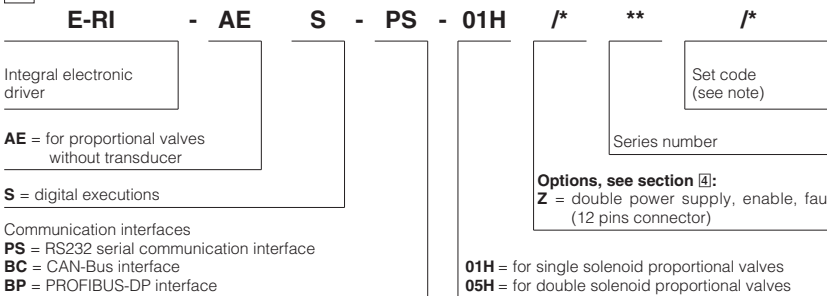
Features
- Integral digital electronics ③, factory preset
- Software setting of the main functional parameters as bias, scale, ramps, by means of the relevant programming devices KIT-E-SW-*, see section [8]
- Possibility to optimize the application performances modifying via software the internal parameters as the regulation characteristic of the valve (linearization)
- Standard execution with 7 pins power supply connector, see section [2]
- 12 pins power supply connector for safety option /Z, see section [3].

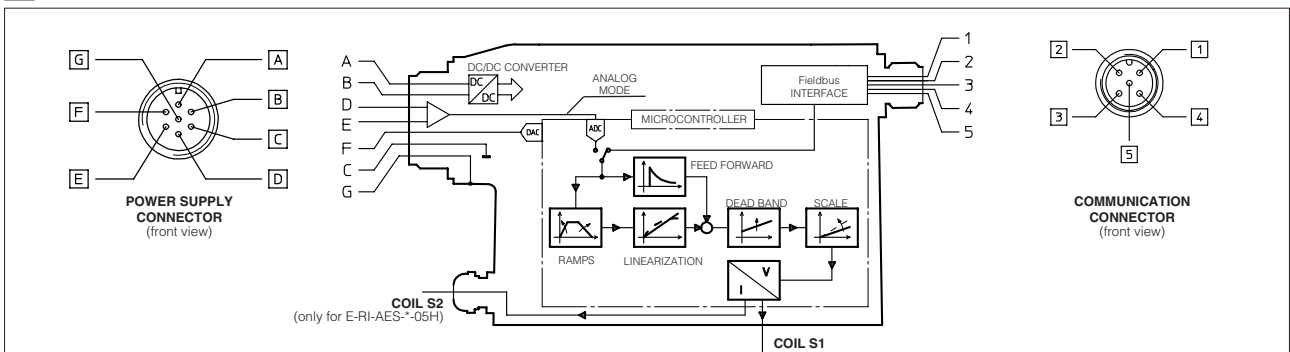Following communication interfaces ④ are available:
- -PS, RS232 serial communication interface. The valve reference signal is provided with analogue commands via the 7 (or 12) pins connector ⑤
- -BC, CANbus interface
- -BP, PROFIBUS-DP interface

In the -BC and -BP interfaces the valve reference signal is provided via fielbus; during start up or maintenance, the valves can be operated with analogue signals via the 7 (or 12) pins connector ⑤.
- IP67 protection degree.
- 3,3A maximum current to the coils.
- CE marking grants the conformity to the EMC Directive (Electromagnetic Compatibility).

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[1] MODEL CODE: PROPORTIONAL VALVES WITH INTEGRAL DIGITAL DRIVERS TYPE E-RI-AES

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

Integral electronic driver

AE = for proportional valves without transducer

S = digital executions

Communication interfaces
PS = RS232 serial communication interface
BC = CAN-Bus interface
BP = PROFIBUS-DP interface

Set code (see note)

Series number

Options, see section [4]:
Z = double power supply, enable, fault (12 pins connector)

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

Note: the set code identifies the corrispondance between the digital integral driver and the relevant valve.

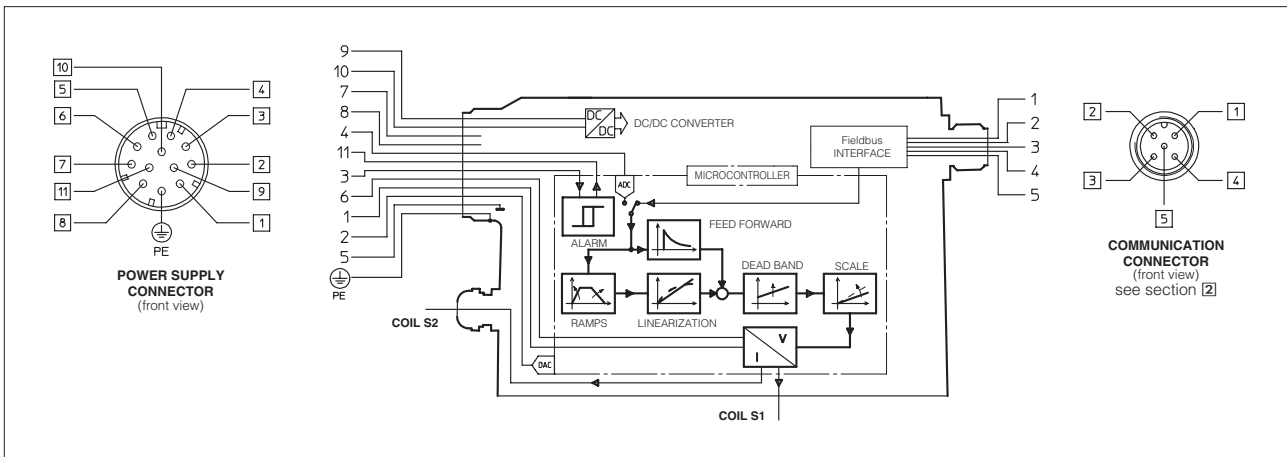**[2] ELECTRONIC AND WIRING BLOCK DIAGRAM FOR -AES (7 PINS CONNECTOR)**

POWER SUPPLY CONNECTOR (front view)

DC/DC CONVERTER
ANALOG MODE
Fieldbus INTERFACE
MICROCONTROLLER
FEED FORWARD
DEAD BAND
SCALE
RAMPS
LINEARIZATION
COIL S2 (only for E-RI-AES-*-05H)
COIL S1

COMMUNICATION CONNECTOR (front view)

Note: with -BC and -BP options, the connections D-E-F can be used to operate the valve with analogue signals during start-up or maintenance

	POWER SUPPLY CONNECTOR			COMMUNICATION CONNECTOR		
PIN	SIGNAL DESCRIPTION	TECHNICAL SPECIFICATION	Communication options	–PS (RS232) Male connector	–BC (CAN-Bus) Male connector	–BP (PROFIBUS-DP) Female connector (reverse key)
A	Power supply 24 V_{DC}	Stabilized: +24V_{DC}	1	NC Not connected	CAN_SHLD Shield	+5V Termination voltage
B	Power supply zero	Filtered and rectified: V_{rms} = 21 ÷ 33 (ripple max 2 V_{pp})				
C	Signal zero	Reference 0 V_{DC}	2	NC Not connected	NC Not connected	LINE -A Bus-line (high signal)
D	Input +	0 ÷ 10V_{DC} (for single solenoid valve)	3	RS_GND Signal zero data line	CAN_GND Signal zero data line	DGND - Signal zero data line - Termination voltage
E	Input -	± 10V_{DC} (for double solenoid valve)				
F	Monitor (driving current)	0 ÷ 5 V (for single solenoid valve) ± 5 V (for double solenoid valve) 1 V = 1A	4	RS_RX Valves receiving data line	CAN_H Bus-line (high signal)	LINE-B Bus-line (low signal)
G	Earth	Connect only when the power supply doesn't conform to VDE 0551 (CEI 14/6	5	RS_TX Valves transmitting data line	CAN_L Bus-line (low signal)	SHIELD Shield

3 | **ELECTRONIC AND WIRING BLOCK DIAGRAM FOR -AES/Z (12 PINS CONNECTOR)**

POWER SUPPLY
CONNECTOR
(front view)

COIL S2

DC/DC CONVERTER

Fieldbus
INTERFACE

MICROCONTROLLER

FEED FORWARD

ALARM

DEAD BAND   SCALE

RAMPS   LINEARIZATION

COIL S1

COMMUNICATION
CONNECTOR
(front view)
see section **2**

PIN	SIGNAL DESCRIPTION	TECHNICAL SPECIFICATION	
		POWER SUPPLY CONNECTOR (OPTION /Z)	
1	Power supply 24 V_{DC} (power stage)	Stabilized:	+24 V_{DC}
2	Power supply 0 V_{DC} (power stage)	Filtered and rectified:	Vrms 21-33 (ripple max 2 Vpp)
3	Enable	Enabling input - normal working 24 V_{DC}	
4	Input signal +	0 ÷ 10 V_{DC} (for single solenoid valve)	
		± 10 V_{DC} (for double solenoid valve)	
5	Signal zero	Reference 0 V_{DC}	
6	Monitor (driving current)	± 5 V_{DC} referred to pin 5 1V = 1A	
7	NC	Not connected	
8	NC	Not connected	
9	Power supply 24 V_{DC} (logic stage)	Stabilized:	+24 V_{DC}
10	Power supply 0 V_{DC} (logic stage)	Filtered and rectified:	Vrms 21-33 (ripple max 2 Vpp)
11	Fault	Alarm = 0 V_{DC} Normal working = +24 V_{DC}	
PE	Earth	Connect only when the power supply doesn't conform to VDE 0551 (CEI 14/6)	

4 | **OPTIONS**

4.1 Option /Z (12 pins connector)

Safety option, specifically introduced for -BC and -BP communication interfaces, provides two separated electric power supplies for the digital electronic circuits and for the solenoid power supply stage. The Enable and Fault signals are also available.

- Double power supply - Pin 1, 2 / 9, 10
The double power supply allows to interrupt the valve functioning by cutting the solenoid power supply (pins 1 and 2) e.g. for emergency, as provided by the European Norms EN954-1 for components with safety class 2, but keeping energized the digital electronic circuits (pins 9 and 10), thus avoiding fault conditions of the machine fieldbus controller.
Pins 2 and 10 (zero Volt) are connected together inside the electronics.

- Enable signal - Pin 3
Safety function providing the possibility to enable or disable the valve functioning without cutting the power supply. This is particularly useful when the valve functioning has to be disabled regularly during the machine cycle. Removing the enable command, it is possible to inhibit the valve driver, with the consequent interruption of the valve operations. The driver is active with an enabling signal +9 to +24V_{DC}.

- Fault signal - Pin 11
Safety function providing an output signal which switches to zero in case of alarm conditions as electronic overcurrent and overtemperature. In this condition the valve functioning is disabled.

5 | MAIN CHARACTERISTICS OF DIGITAL INTEGRAL ELECTRONIC DRIVERS

Driver section	
Format	Sealed box on the valve - Protection: IP67 DIN 40050 - Insulation: VDE0110
Electromagnetic compatibility (EMC)	Emission: EN 50081-2 - Immunity: EN 50082-2
Max power consumption	50 W
Current supplied to solenoid	Imax= 3.3 A square wave PWM type
Analog input signal impedance	Voltage signal Ri > 50K
Operating temperature	-20°C ÷ +60°C (storage –20°C ÷ +70°C)
Alarm messages	Electronic overcurrent and overtemperature

Communication options	RS232 interface (option -PS)	CAN-Bus interface (option -BC)	Profibus-DP interface (option -BP)
Serial input format	RS232C serial connection	Industrial field-bus with optical insulation type CAN-Bus ISO 11898	Industrial field-bus with optical type PROFIBUS - DP European fieldbus standard EN 50170 part 2
Communication Protocol	Atos protocol with ASCII coding	CANopen EN50325-4 Device Profile DS408	PROFIBUS - DP EN50170-2 IEC61158
Programming interface - see section 8	Software interface (see tab. G500)	Master CAN-Bus device	Master PROFIBUS device

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.
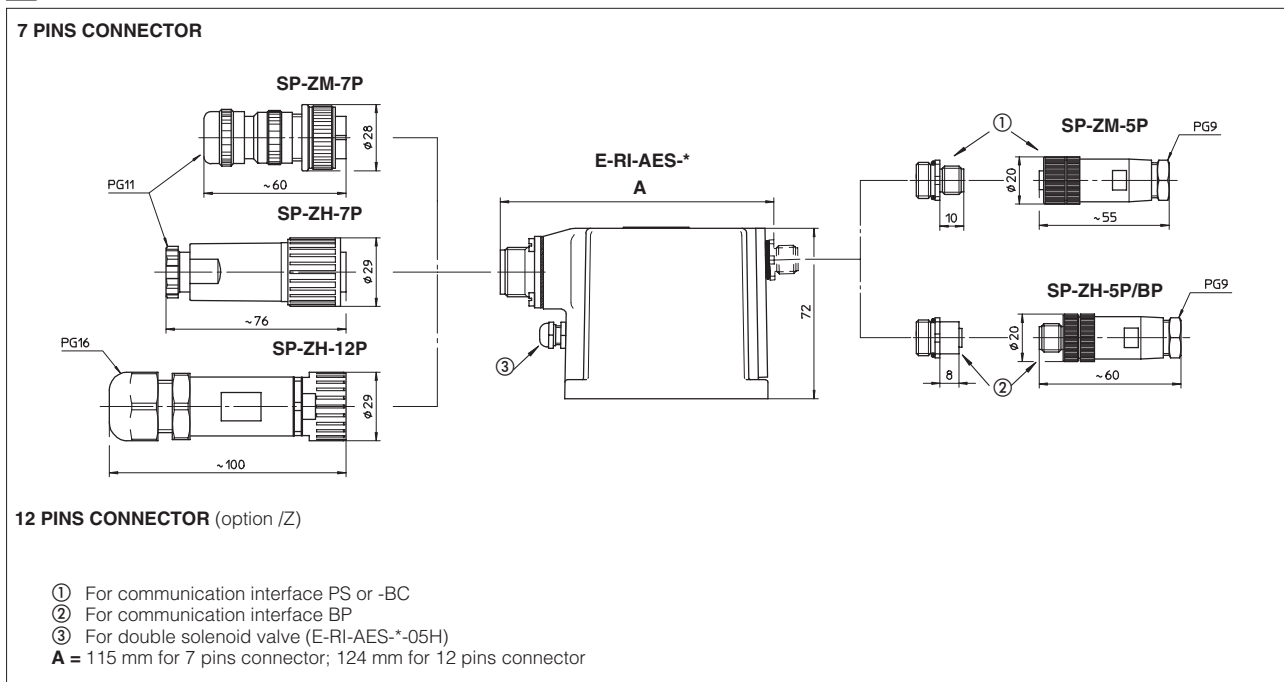
6 | AVAILABLE SETTINGS

SCALE AND BIAS   UP AND DOWN RAMPS   LINEARIZATION
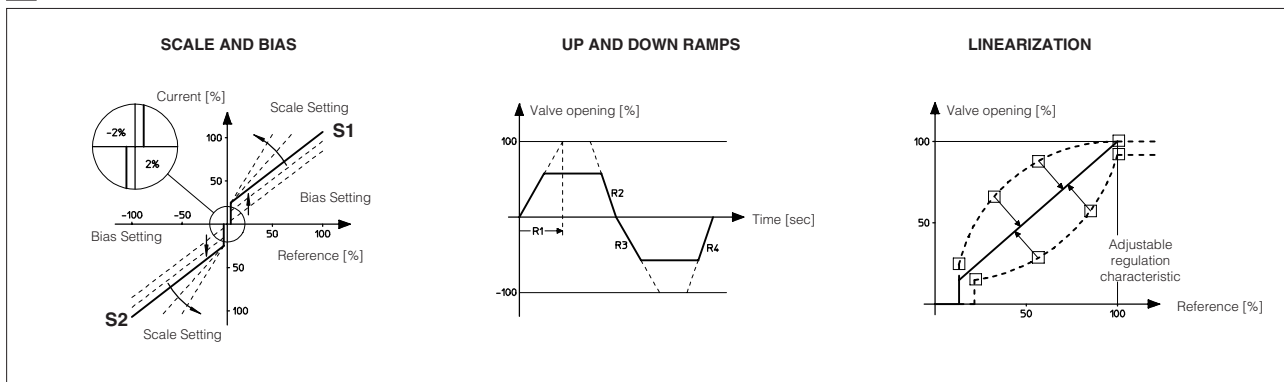
In addition to the above settings, other software regulations are available:
- Customized configuration of the reference signal, instead of standard ± 10V
- Internal static generation of the reference signal. This function is particularly useful during start-up or maintenance
- Dither frequency
- Alarm setting of the high/low limits of the electronics temperature

7 | DIMENSIONS OF THE ELECTRONIC DRIVER AND CONNECTORS [mm]

7 PINS CONNECTOR

12 PINS CONNECTOR (option /Z)

① For communication interface PS or -BC
② For communication interface BP
③ For double solenoid valve (E-RI-AES-*-05H)
A = 115 mm for 7 pins connector; 124 mm for 12 pins connector

8 PROGRAMMING DEVICES

The functional parameters of the digital valves, as the bias, scale, ramp and linearization of the regulation characteristic, can be easily set and optimized with graphic interface by using the following software programming devices suitable for standard PC:
KIT-E-SW-PS for electronics with RS232 interface (option **-PS**)
KIT-E-SW-BC for electronics with CANbus interface (option **-BC**)
KIT-E-SW-BP for electronics with PROFIBUS-DP interface (option **-BP**)
see tab. G500 for complete information about the programming device kits and for the PC minimum requirements.
Only for the -BC and -BP communication options, the functional parameters can be alternatively set via fieldbus through the machine control unit, using the standard communication protocols implemented by Atos.
The protocol operating instructions to be implemented in the standard protocols (DS301V4.02, DSP408 for CANbus and DPVO for PROFIBUS-DP) are described in the user manuals MAN-S-BC (for -BC option) and MAN-S-BP (for -BP option) supplied with the relevant programming device kits.
The above programming devices have to be ordered separately.

9 FIELDBUS FEATURES

9.1 CANbus - CANopen features implemented in Atos protocol

Protocol	CANopen version DS301 V4.02
Network error ctrl	Node Guarding
Boot up process	Minimum boot-up
Node ID, Baudrate	setting via LSS (Layer Setting Services) and via SDO
Number of RPDO	Two Receive PDOs (not mappable)
Number of TPDO	Two Transmit PDOs (not mappable)
Number of SDO	One Receive SDO and one Transmit SDO
Device Profile	DSP408 Device Profile Fluid Power Technology
Configuration	Physical Layer: ISO11898 (transmission rates from 10 Kbit/s to 1 Mbit/s)
	Data Link Layer: Based on CAN standard frame with 11-bit identifier (CAN 2.0A)
Info (file)	EDS file (Electronic Device Data Sheet) enclosed in a CD-ROM (Kit-E-SW-BC) with the proper manual

9.2 Profibus DP features implemented in Atos protocol

Protocol	Profibus version DPV0
Error control	SAP 60
Boot up proces	SAP 61, SAP 62
Node ID	SAP 55 or dip-switches hardware
Cyclic and Acyclic communication	PPO Telegrams: Type 3 for real-time and parameter communication (string management is realized with an Atos algorithm, see Kit-MAN-S-BP)
Device profile	PROFIBUS Profile: Fluid Power Technology
Configuration	Physical Layer: (lev.1 - EN50170 part. 2) rates from 9,6 Kbit/s to 12 Mbit/s, up to 126 stations (with repeaters)
	Data Link Layer: (lev.2 - EN50170 part3/4)
Info (file)	GSD file (Electronic Device Data Sheet) enclosed in a CD-ROM (Kit-E-SW-BP) with the proper manual

10 CHARACTERISTICS OF POWER SUPPLY CONNECTORS (to be ordered separately)

CONNECTOR TYPE	POWER SUPPLY CONNECTOR		
CODE	**SP-ZH-7P**	**SP-ZM-7P**	**SP-ZH-12P**
TYPE	Female straight circular socket plug 7 pins		Female straight circular socket plug 11 pins + PE
MATERIAL	Plastic reinforced with fiber glass	Aluminium alloy with cadmiun plating	Plastic reinforced with fiber glass
CABLE GLAND	PG11		PG16
CABLE	LiYCY 7x 0.75 mm² max 20m 7 x 1 mm² max 40m		LiCY 10 x 0,14 mm² (signal) LiYY 3 x 1 mm² (alimentation)
CONNECTION TYPE	to solder		to crimp
STANDARD	DIN 43563-BF6-3-PG11	Secondo MIL-C-5015 G	DIN 43563
PROTECTION (DIN 40050)	IP 67	IP 66	IP 65

11 CHARACTERISTICS OF COMMUNICATION CONNECTORS (to be ordered separately)

CONNECTOR TYPE	RS232 CONNECTOR (-PS) or CAN-Bus (-BC)	PROFIBUS CONNECTOR (-BP)
CODE	**SP-ZH-5P**	**SP-ZH-5P/BP**
TYPE	Female straight circular socket plug 5 pins	Male straight circular socket plug 5 pins
MATERIAL	Plastic	Plastic
CABLE GLAND	PG9	PG9
CABLE	for BC: CANBus Standard (301 DSP) for PS: LiYCY 5 x 0,25 shielded	PROFIBUS Standard
CONNECTION TYPE	screw terminal	screw terminal
STANDARD	M12 – IEC 60947-5-2	M12 – IEC 60947-5-2
PROTECTION (DIN 40050)	IP 67	IP 67