Integral electronic drivers type **E-RI-TE, E-RI-LE**
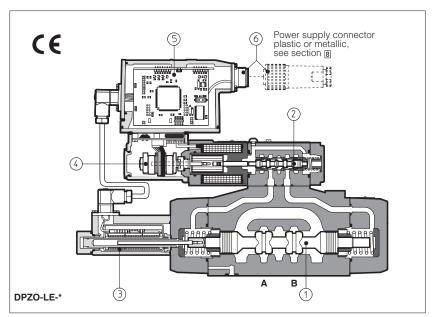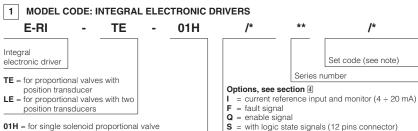
analog, for proportional valves with one or two position transducers

Power supply connector plastic or metallic, see section ⑧

DPZO-LE-*

E-RI-* drivers are integral to the Atos proportional valves and they control in closed loop the spool position ① and ② according to the electronic reference signal.

They are available in two different executions:

  -TE for proportional valves with position transducer

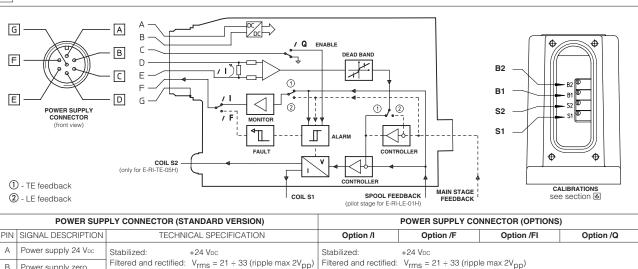 -LE for proportional valves with two position transducers ③, ④

Features:

• integral electronic ⑤, factory preset
• potentiometer adjustment of the hydraulic zero, bias and scale
• 7 pins connector ⑥ arranged to receive the electric power supply, the reference signal (input) and to supply the monitor of the main stage transducer (output)
• 12 pins connector for option /S with enable, transducer monitor plus logic state signals of the valve's spool position, and for option /Z with enable signal, fault signal, transducer monitor.
• IP67 protection degree
• 3,3A maximum current to the coils
• rapid solenoid excitation and switching off
• CE marking grants the conformity to the EMC Directive (Electro-magnetic Compatibility)
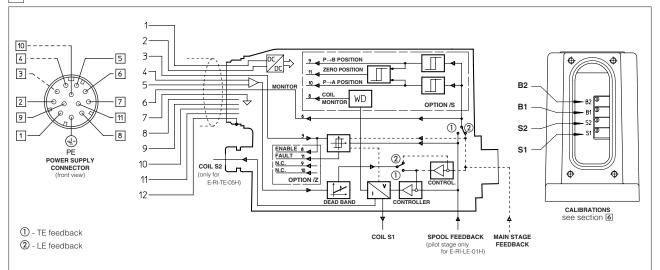
Applications:

Integrated solution for closed loop valves.

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1   MODEL CODE: INTEGRAL ELECTRONIC DRIVERS

E-RI - TE - 01H /* ** /*

| Integral electronic driver | | | | Set code (see note) |

TE = for proportional valves with position transducer
LE = for proportional valves with two position transducers

01H = for single solenoid proportional valve
05H = for double solenoid proportional valve (only for -TE)

Series number

Options, see section ④
I = current reference input and monitor (4 ÷ 20 mA)
F = fault signal
Q = enable signal
S = with logic state signals (12 pins connector)
Z = with enable, fault and monitor (12 pins connector)

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

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2   ELECTRONIC AND WIRING BLOCK DIAGRAM FOR -TE AND -LE (7 PINS CONNECTOR)

POWER SUPPLY CONNECTOR (front view)

① - TE feedback
② - LE feedback

COIL S2 (only for E-RI-TE-05H)
COIL S1
SPOOL FEEDBACK (pilot stage for E-RI-LE-01H)
MAIN STAGE FEEDBACK

CALIBRATIONS see section ⑥

	POWER SUPPLY CONNECTOR (STANDARD VERSION)		POWER SUPPLY CONNECTOR (OPTIONS)			
PIN	SIGNAL DESCRIPTION	TECHNICAL SPECIFICATION	**Option /I**	**Option /F**	**Option /FI**	**Option /Q**
A	Power supply 24 V$_{DC}$	Stabilized: +24 V$_{DC}$ Filtered and rectified: V$_{rms}$ = 21 ÷ 33 (ripple max 2V$_{pp}$)	Stabilized: +24 V$_{DC}$ Filtered and rectified: V$_{rms}$ = 21 ÷ 33 (ripple max 2V$_{pp}$)			
B	Power supply zero					
C	Signal zero	Reference 0 V$_{DC}$	Reference 0 V$_{DC}$			Enabling input std. working + 24 V$_{DC}$
D	Input signal +	0 ÷ 10 V$_{DC}$ or ± 10 V$_{DC}$ (see valve technical table)	4 ÷ 20 mA	0 ÷ 10 V$_{DC}$ or ± 10 V$_{DC}$ (see valve tech. table)	4 ÷ 20 mA	0 ÷ 10 V$_{DC}$ or ± 10 V$_{DC}$ (see valve tech. table)
E	Input signal -					
F	Monitor	0 ÷ 10 V or ± 10 V (see valve technical table) 1 V = 10% of spool position	4 ÷ 20 mA = 0 ÷ 100% referred to pin C	Fault signal Alarm= 0 V$_{DC}$ Normal working= + 24 V$_{DC}$		0÷10 V$_{DC}$ or ± 10 V$_{DC}$ 1 V = 10% of spool pos.
G	Earth	Connect only when the power supply is not conform to VDE 0551 (CEI 14/6)	Earth			

3 ELECTRONIC AND WIRING BLOCK DIAGRAM FOR -TE/S, -LE/S, -TE/Z, -LE/Z (12 PINS CONNECTOR)

POWER SUPPLY CONNECTOR (front view)

① - TE feedback
② - LE feedback

COIL S2 (only for E-RI-TE-05H)

COIL S1
SPOOL FEEDBACK (pilot stage only for E-RI-LE-01H)
MAIN STAGE FEEDBACK

CALIBRATIONS see section 6

PIN	SIGNAL DESCRIPTION	TECHNICAL SPECIFICATIONS POWER SUPPLY CONNECTOR (OPTIONS /*Z)	
		Option /Z	Option /IZ
1	Power supply 24 V_{DC}	Stabilized: +24 V_{DC}	
2	Power supply zero	Filtered and rectified: V_{rms} 21-33 (ripple max 2 V_{pp})	
3	Enable	Enabling input normal working 24 V_{DC}	
4	Input +	± 10 V_{DC} or 0 ÷10 V_{DC} (see valve technical table)	4 ÷ 20 mA
5	Input -		
6	Monitor	± 10 V_{DC} referred to pin 7	4 ÷ 20 mA
7	Signal zero	Reference 0 V_{DC}	
8	Repeat enable	Output enable active	
9	NC	Not connected	
10	NC	Not connected	
11	Fault	Alarm = 0 V_{DC} Correct functioning = +24 V_{DC}	
PE	Earth	Connect only when the power supply is not conform to VDE 0551 (CEI 16/6)	

PIN	SIGNAL DESCRIPTION	TECHNICAL SPECIFICATIONS POWER SUPPLY CONNECTOR (OPTIONS /*S)	
		Option /S	Option /IS
1	Power supply 24 V_{DC}	Stabilized: +24 V_{DC}	
2	Power supply zero	Filtered and rectified: V_{rms} 21-33 (ripple max 2 V_{pp})	
3	Enable	Enabling input normal working 24 V_{DC}	
4	Input +	± 10 V_{DC} or 0 ÷10 V_{DC} (see valve technical table)	4 ÷ 20 mA
5	Input -		
6	Monitor	± 10 V_{DC} referred to pin 10	4 ÷ 20 mA
7	Signal zero	Reference 0 V_{DC}	
8	Coils disabled	Current zero (see 4.4)	
9	P → B position	P → B regulation (see 4.4)	
10	P → A position	P → A regulation (see 4.4)	
11	Zero position	Zero regulation (see 4.4)	
PE	Earth	Connect only when the power supply is not conform to VDE 0551 (CEI 16/6)	

4 OPTIONS

4.1 Option /I It provides the 4÷20 mA current reference signal and the current feedback signals instead of the standard 0÷10 V (±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. In case of breakage of the reference signal cable, the valve functioning is disabled.

4.2 Option /F Safety option providing an output signal which switches to zero in case of interruption of the transducer feedback cable. In this condition the valve functioning is disabled.

4.3 Option /Q Safety option providing the possibility to enable or disable the valve functioning without cutting the power supply.

4.4 Option /S - State logic signals

Option available only for direct operated double solenoid valves with positive overlap.
For other valve models please contact our technical office.
By means of four ON/OFF output signals this option provides a real time control on the valve's spool position and coils energizing.

P → B position: indicates an hydraulic regulation from spool positive overlap to P → B max opening.

P → A position: indicates an hydraulic regulation from spool positive overlap to P → A max opening.

Zero position: indicates no hydraulic regulation; the spool is in the "central position window" (between +5% and -5% of zero mechanical position).

Coils disabled: indicates when the coils current is zero.

HYDRAULIC REGULATION

For all signals, the logic state "0" produces an output voltage signal ≤ 1 V_{dc} while the logic state "1" produces an output voltage signal ≥ V_{supply} – 2 V ≅ 22 V.
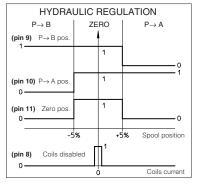Maximum current available on each pin is 50mA. This option is useful to improve the overall machine safety.

4.5 Option /Z - 12 pins connector
Option providing the same characteristics of **/F** and **/Q** plus the monitor signal 0 ÷ 10 V (or ±10 V) of the spool position.

4.6 Combined options
- **option /FI** Option providing the combined characteristics of **/F** (fault signal) and **/I** (current signal)
- **option /IS** Option providing the combined characteristics of **/I** (current signal) and **/S** (state logic signal)
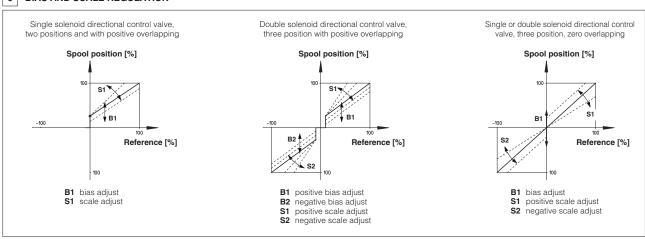- **option /IZ** Option providing the combined characteristics of **/I** (current signal) and **/Z** (fault, enable and monitor signals)
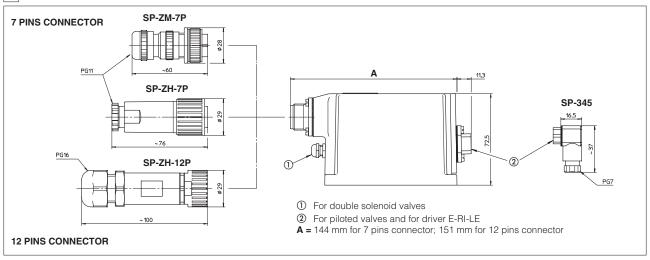
5 | MAIN CHARACTERISTICS OF INTEGRAL ELECTRONIC DRIVERS

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 solenoids	Imax= 3.3 A square wave PWM type
Input signal impedance	Voltage signal Ri > 50 kΩ (option /I Ri = 316 Ω)
Operating temperature	-20 °C ÷ +60 °C (storage –20 °C ÷ +70 °C)
Features	Position control by PID action - Rapid solenoid excitation and switching off - Output to solenoids protected against accidental short circuits - Feedback cable break produces an inhibition of the driver, zeroing the current and creating a fail safe position in the valve
Notes	For installation and set-up refer to the table "Installation of proportional valves ZO(R)-TE" enclosed to the product

6 | BIAS AND SCALE REGULATION

Single solenoid directional control valve, two positions and with positive overlapping

B1 bias adjust
S1 scale adjust

Double solenoid directional control valve, three position with positive overlapping

B1 positive bias adjust
B2 negative bias adjust
S1 positive scale adjust
S2 negative scale adjust

Single or double solenoid directional control valve, three position, zero overlapping

B1 bias adjust
S1 positive scale adjust
S2 negative scale adjust

7 | DIMENSIONS OF ELECTRONIC DRIVER AND CONNECTORS [mm]

7 PINS CONNECTOR

SP-ZM-7P

SP-ZH-7P

SP-ZH-12P

12 PINS CONNECTOR

SP-345

① For double solenoid valves
② For piloted valves and for driver E-RI-LE
A = 144 mm for 7 pins connector; 151 mm for 12 pins connector

Note: female plug connectors can be supplied separately on request

8 | 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 cadmium plating	Plastic reinforced with fiber glass
CABLE GLAND	PG11		PG16
CABLE	LiYCY 7 x 0.75 mm² max 20 m		LiCY 10 x 0,14 mm² (signal)
	7 x 1 mm² max 40 m		LiYY 3 x 1 mm² (power)
CONNECTION TYPE	to solder		to crimp
STANDARD	DIN 43563-BF6-3-PG11	According to MIL-C-5015 G	DIN 43563
PROTECTION ACCORDING TO DIN 40050	IP 67	IP 66	IP 65