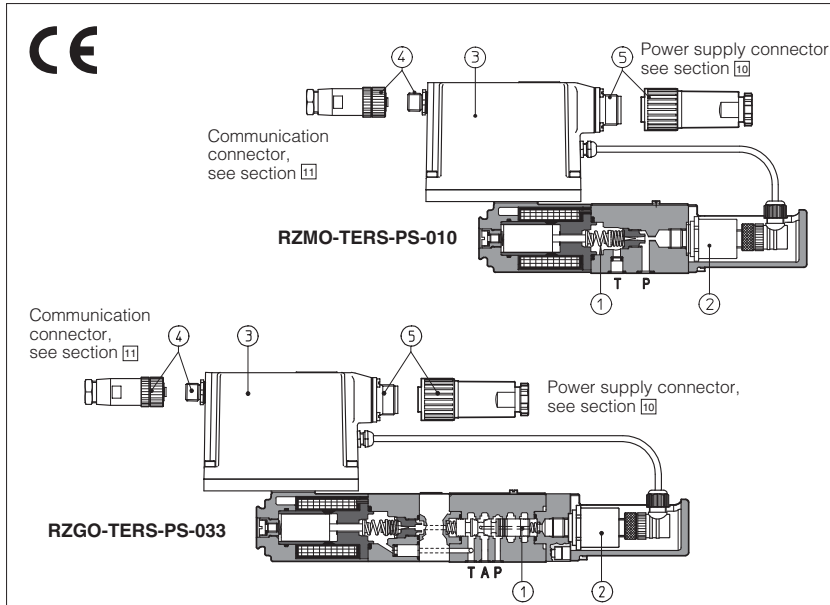


Integral electronic drivers type E-RI-TERS, E-RI-AERS

digital, for proportional valves with integral or remote pressure transducer



These digital drivers are integral to Atos proportional valves and they control in closed loop the regulated pressure (1) according to the electronic reference signal.

They are available in two different executions:

- -TERS with integral pressure transducer (2) plus digital electronics (3) preset in closed loop, featuring improved static and dynamic performances.
- -AERS as -TERS but without integral pressure transducer (predisposed for connection of remote pressure transducer).

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 dynamic response (P.I.D.) and the regulation characteristic of the valve (linearization)
- Standard execution with 7 pin power supply connector, see section 2
- 12 pin power supply connector for safety options /Z, see section 3.

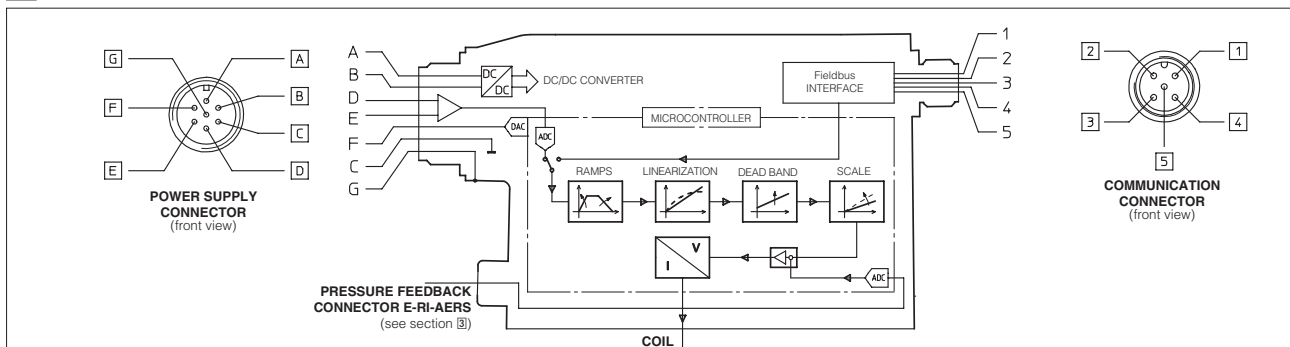
Following communication interfaces (4) are available:

- -PS, RS232 serial communication interface. The valve reference signal is provided with analogue commands via the 7 (or 12) pin connector (5).
 - -BC, CANbus interface
 - -BP, PROFIBUS-DP interface
- In the -BC and -BP interfaces the valve reference signal is provided via fieldbus; during start up or maintenance, the valves can be operated with analogue signals via the 7 (or 12) pin connector (5).
- IP67 protection degree.
 - 3,3A maximum current to the coils.
 - CE marking grants the conformity to the EMC Directive (Electromagnetic Compatibility).

1 MODEL CODE						
E-RI	- TER	S	- PS	- 01H	/*	** / *
Integral electronic driver				Set code		
TER = with integral pressure transducer				Series number		
AER = with remote pressure transducer				Options, see section 4:		
S = digital electronic				C = remote pressure transducer with current feedback 4÷20 mA (only for AERS execution)		
PS = RS232 serial				I = current reference input and Monitor (4÷20 mA) - only for TERS-PS execution		
BC = CAN-Bus				Z = double power supply, enable, fault (12 pin connector)		
BP = PROFIBUS-DP				01H = for single solenoid proportional valves		

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

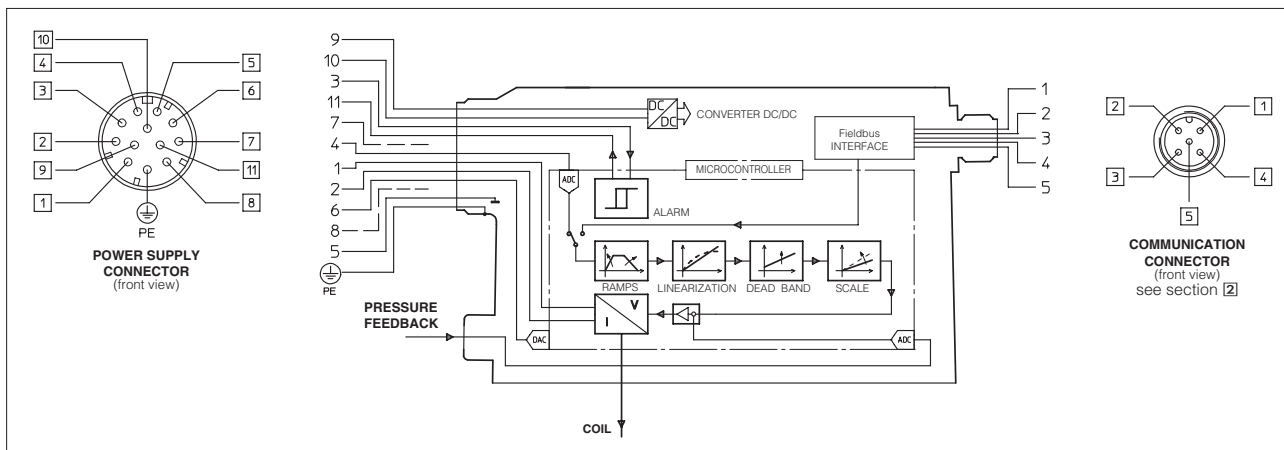
2 ELECTRONIC AND WIRING BLOCK DIAGRAM - TERS AND AERS (7 PIN CONNECTOR)



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}	Pin number Signal description	1	CAN_SHLD	+5V	
B	Power supply zero	Filtered and rectified: V _{ripple} = 21 ÷ 33 (ripple max 2 V _{pp})		2	Shield	Termination voltage	
C	Signal zero	Reference 0 V _{DC}		3	NC	LINE-A	
D	Input signal +	0 ÷ 10 V _{DC}		4	Not Connected	Not Connected	Bus line (high)
E	Input signal -	0 ÷ 10 V referred to pin C (signal 0 V _{DC})		5	RS_GND	CAN_GND	DGND Signal zero data line / termination voltage
F	Monitor	1V - 10% of the regulated pressure		1	Signal zero data line	Signal zero data line	
G	Earth	Connect only when the power supply don't conform to VDE 0551 (CEI 14/6)		2	Valves receiving data line	CAN_H	LINE-B
			3	RS_TX	CAN_L	SHIELD	
			4	Valves transmitting data line	Bus line (low)	Shield	

3 ELECTRONIC AND WIRING BLOCK DIAGRAM -TERS/Z AND -AERS/Z (12 PIN CONNECTOR)



POWER SUPPLY CONNECTOR (12 PIN)

PIN	SIGNAL DESCRIPTION	TECHNICAL SPECIFICATION
1	Power supply 24 Vdc (power stage)	Stabilized: +24 Vdc
2	Power supply 0 Vdc (power stage)	Filtered and rectified: Vrms 21-33 (ripple max 2 Vpp)
3	Enable	Enabling input normal working 24 Vdc
4	Input signal	0÷10 Vdc
5	Signal zero	Reference signal 0 Vdc
6	Monitor (regulated pressure)	0 ÷ 10 V referred to pin 5 1V = 10% of the regulated pressure
7	NC	Not connected
8	NC	Not connected
9	Power supply 24 Vdc (logic stage)	Stabilized: +24 Vdc
10	Power supply 0 Vdc (logic stage)	Filtered and rectified: Vrms 21-33 (ripple max 2 Vpp)
11	Fault	Alarm = 0 Vdc Correct functioning = +24 Vdc
PE	Earth	Connect only when the power supply is not conform to VDE 0551 (CEI 14/6)

4 OPTIONS

4.1 Option /Z (12 pin 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 (pin 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 (pin 9 and 10), thus avoiding fault conditions of the machine fieldbus controller. Pin 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 +24Vdc.

- Fault signal - Pin 11

Safety function 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.

4.2 Option /C - only for -AERS execution

The valve electronics is set to receive the 4÷20 mA feedback signal from the remote pressure transducer, instead of the standard 0÷10 V. For the pressure transducer connector wiring see section 4.4.

4.3 Option /I (current reference signal) - only for -PS execution

The digital drivers type -TERS can be supplied, with 4÷20 mA current reference signal and feedback signal, instead of the standard 0÷10 V.

POWER SUPPLY CONNECTOR		
PIN	SIGNAL DESCRIPTION	-TERS/I, -AERS/I
A	Power supply 24 Vdc	Stabilized: +24Vdc
B	Power supply zero	Filtered and rectified: Vrms = 21 ÷ 33 (ripple max 2Vpp)
C	Signal zero	Reference 0 Vdc
D	Input signal +	4 ÷ 20 mA
E	Input signal -	
F	Monitor regulated pressure	4 ÷ 20 mA referred to pin C (signal 0 Vdc) 4 ÷ 20 mA = 0÷100% of regulated pressure
G	Earth	Connect only when the power supply is not conform to VDE 0551 (CEI 14/6)

4.4 Pressure transducer connector (-AERS)

The pressure transducer and the 4 pin connector type **SP-ZH-4P-M8/5** have to be ordered separately. See section 10 for the 4 pin connector and tab. G460 for the pressure transducer.

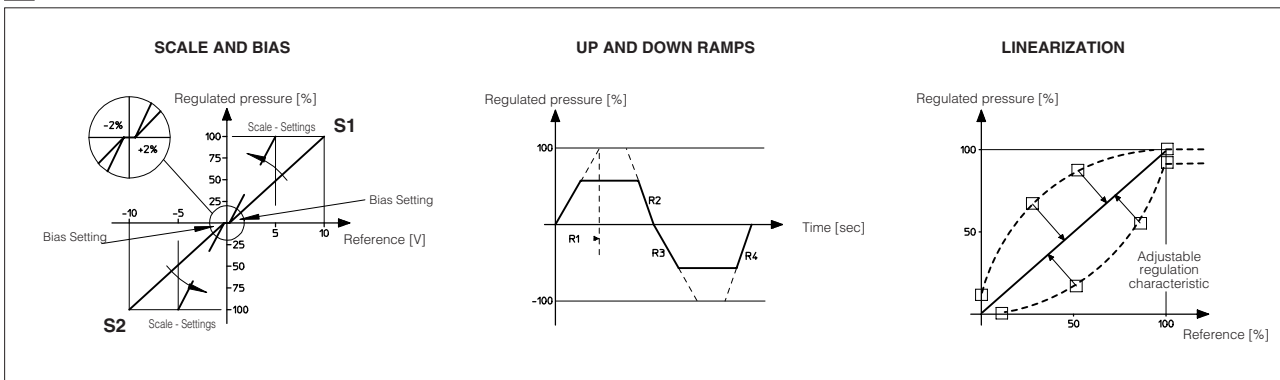
PIN	standard version	option /C (Ri = 316 Ω)	CONNECTOR (front view)
1	Pressure - real value	Pressure signal	
2	Common zero for power supply and signal	Reserved (do not connect)	
3	Transducer power supply +24 Vdc	Power supply	
4	Reserved (do not connect)	Reserved (do not connect)	

5 MAIN CHARACTERISTICS OF DIGITAL INTEGRAL ELECTRONIC DRIVERS

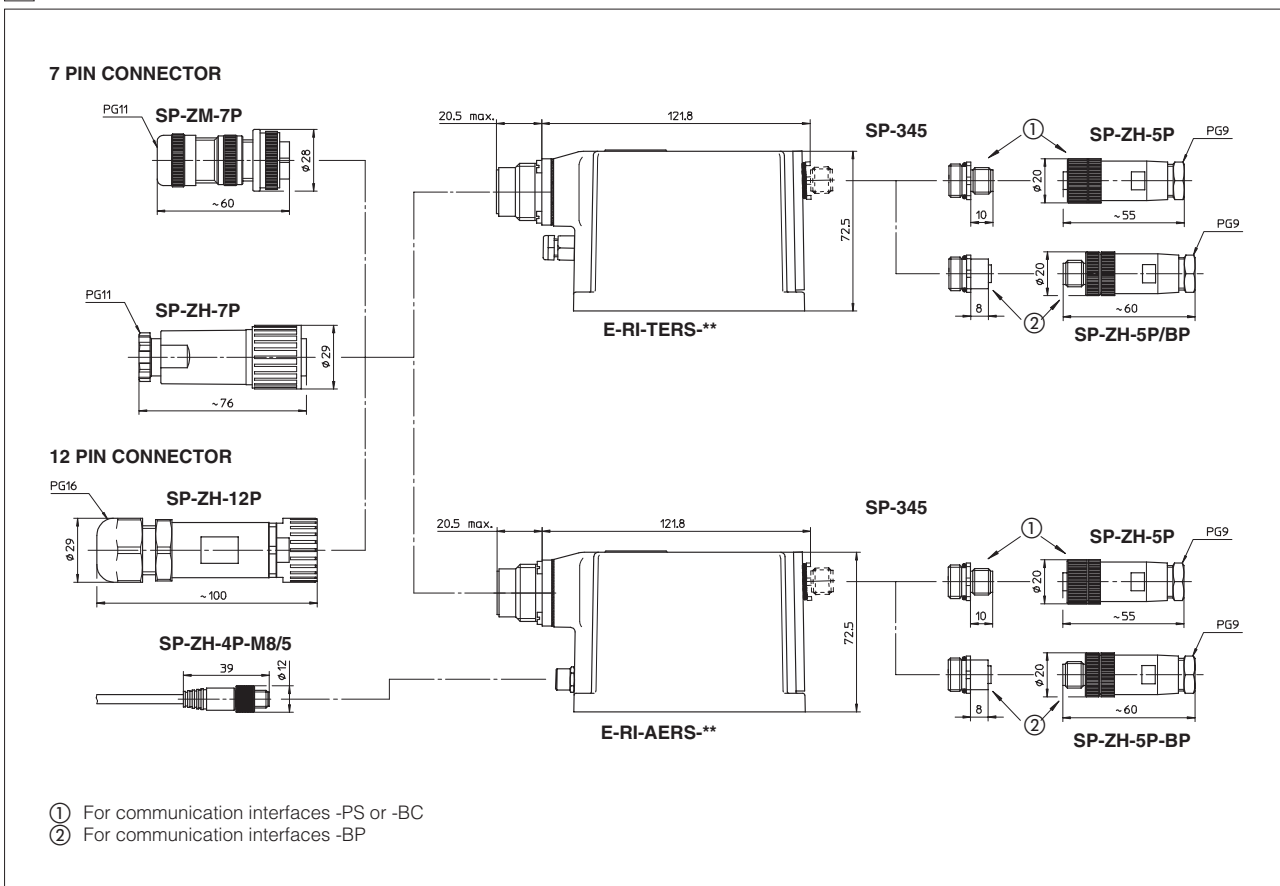
Driver section			
Format	Sealed box on the valve - Protection: IP67 DIN 40050 - Insulation: VDE0110		
Electromagnetic compatibility (EMC)	Emission: EN 50081-2 - Immunity: EN 50082-2		
Max power consumption	50 W		
Current supplied to solenoid	I _{max} = 3.3 A square wave PWM type		
Analog input signal impedance	Voltage signal R _i > 50KΩ (option / I R _i = 316 Ω)		
Operating temperature	-20°C ÷ +50°C (storage -20°C ÷ +70°C)		
Alarm messages	Electronic overcurrent and overtemperature		
Features	Pressure control by P.I.D. - 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 to the solenoid		
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 7	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



7 DIMENSIONS OF ELECTRONIC DRIVER AND CONNECTORS [mm]



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-PS-TERS only for -TERS-PS electronics - simplified version of KIT-E-SW-PS with only bias and scale settings

KIT-E-SW-PS-TERS/U as KIT-E-SW-PS-TERS with serial to USB interface

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 protocol 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	Four Receive PDOs (mappable parameters, default as indicated in DSP408)
Number of TPDO	Four Transmit PDOs (mappable parameters, default as indicated in DSP408)
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 KIT-E-SW-BC or DVD-E-MAN-BC (both in DVD format)

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 KIT-E-SW-BP or DVD-E-MAN-BP (both in DVD format)

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

CONNECTOR TYPE	POWER SUPPLY CONNECTOR		
	SP-ZH-7P	SP-ZM-7P	SP-ZH-12P
CODE			
Type	Female straight circular socket plug 7 pin		Female straight circular socket plug 12 pin
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 mm ² max 20m 7 x 1 mm ² max 40m		LiCY 10 x 0,14 mm ² (signal) LiYY 3 x 1 mm ² (alimantation)
Connection type	to solder		to crimp
Standard	DIN 43563-BF6-3-PG11	Secondo MIL-C-5015 G	DIN 43651
Protection (DIN 40050)	IP 67	IP 66	IP 65

11 CHARACTERISTICS OF COMMUNICATION AND OF PRESSURE TRANSDUCER CONNECTORS (to be ordered separately)

CONNECTOR TYPE	RS232 CONNECTOR (-PS) or CAN-Bus (-BC)	PROFIBUS CONNECTOR (-BP)	TRANSDUCER PRESSURE CONNECTION
CODE	SP-ZH-5P	SP-ZH-5P/BP	SP-ZH-4P-M8/5 (1)
Type	Female straight circular socket plug 5 pin	Male straight circular socket plug 5 pin	Male straight circular socket plug 4 pin
Material	Plastic	Plastic	Plastic
Cable gland	PG9	PG9	PG7
Cable	for -BC: CANBus Standard (301 DSP) for -PS: LiYCY 5x0,25 shielded	PROFIBUS Standard	4x0,25 mm ²
Connection type	screw terminal	screw terminal	to solder
Standard	M12 - IEC 60947-5-2	M12 - IEC 60947-5-2	M8 - IEC 60947-5-2
Protection (DIN 40050)	IP 67	IP 67	IP 67

(1) Connector moulded on cable with 5 mt lenght