



- ▶ N.4/8 (8/16 single-ended) analogue inputs, N.1/4 digital inputs (*)
- ▶ 2.4 GHz Zig-Bee radio to receive measurements from radio sensors and other R-Log modules
- ▶ Auto-recognition of connected sensors (*)
- ▶ Extremely low power consumption and integrated batteries (*)
- ▶ N.50/99 measurements condensing channels for sensor acquisition and derived quantities (*)
- ▶ Internal library for calculating derived quantities and mathematical calculations
- ▶ 8 MB Flash Memory
- ▶ Digital outputs to implement external devices with programmable logics or events (*)
- ▶ Sensors acquisition rate from 1 second to 12 hours
- ▶ Statistic elaboration rate from 1 second to 12 hours
- ▶ Connection to the PC via RS232 (USB/Ethernet with external accessories)
- ▶ Display and keyboard

** Depending on the models. See the chapter Models.*



R-Log is a line of compact data loggers for environmental monitoring which can receive measurements via radio from other R-Log units in order to create a wireless measurement points network. Small and flexible, but also powerful and reliable, R-Log is used in multi-measurement (different parameters) and multi-point (different measurement points) applications. Suitable for portable indoor applications, but also fixed for continuous monitoring. R-Log can be connected to a wide range of LSI LASTEM's sensor (see LSI LASTEM's sensors catalogues).



▶ *R-Log is used in indoor applications where medium-long term monitoring is required using an easily transportable and installable system. Typically each R-Log module is mounted on a tripod together with a series of sensors. Applications where R-Log is typically used are HVAC tests of buildings, where the user wants to run a campaign to measure thermal quantities on various points simultaneously with a duration from a few hours to several days.*

▶ **Inputs for analog and digital sensors**

Mini-DIN inputs (ELR510.1)

- N.4 analog inputs
- N.1 digital input (Pulse/Frequency)

This model is able to auto-recognize the connected LSI LASTEM sensors.



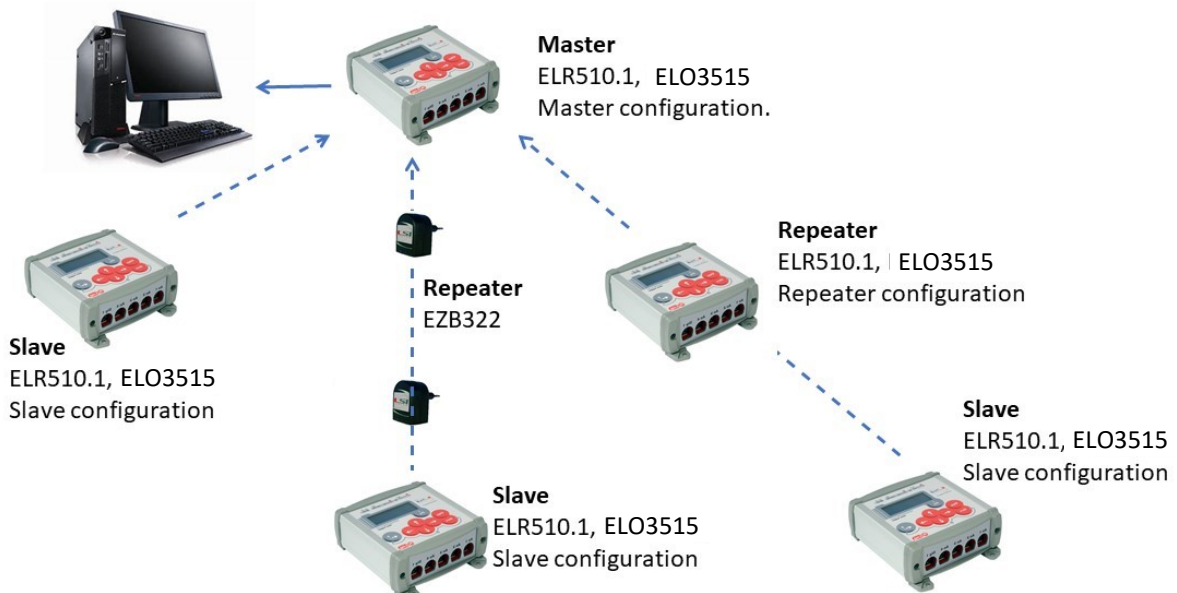
Terminal input (ELO3515)

- N.8 differential analog inputs (N.16 single-ended)
- N.4 digital inputs (Pulse/Frequency)



▶ **Radio network**

R-Log, when configured as Master, receives measurements via radio from the configured Slave and Repeater units. In this case R-Log Master stores all the measurements of the network. It is sufficient to connect only the Master unit to a PC, in order to download all the data. The radio used is ZigBee type at 2,4 GHz (Tx 10 mW), this type of radio uses a free frequency everywhere. The distance covered is 300 m (line-of-sight).



▶ Sensors acquisition rate

Acquisition rate is programmable for each input (from 1 second to 12 hours).

- ELR510.1: manages channels from analog inputs and 8 derived quantities in 1 second.
- ELO3515: manages 12 channels from analog sensors and 8 derived quantities in 1 second.

To limit energy consumption from sensors requiring power supply, it is possible to set an advanced power supply from the acquisition event (warm-up) that is interrupted immediately after the acquisition itself.

▶ Data elaboration

The raw measured values can be stored directly as instantaneous values, or be stored as statistical processing (n.1 base from 1 second to 12 hours):

- Average/Minimum/Maximum/Standard Deviation
- Wind elaborations
- Totals

▶ Derived and calculated quantities

Internal library of derived environmental quantities. These calculations use acquired quantities, constant values and other calculated quantities. The library also includes mathematical functions (see Derived Quantities table).

- ELR510.1: manages up to 50 channels between acquired, derived and calculated quantities.
- ELO3515: manages up to 99 channels between acquired, derived and calculated quantities.

▶ Data memory

Internal memory (8 MB) allows to store data typically for several weeks. The registration structure is circular. In ELR510.1 model with Mini-DIN inputs the data are stored in "surveys" with progressive numbering and date/time start/end.

▶ Data communication devices

It is possible to transfer data to a PC via RS232, USB (with adapter included), or via Ethernet through an external converter (see Accessories).

▶ Data communication protocols

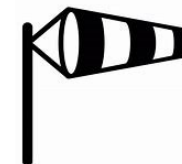
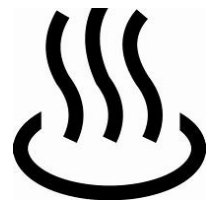
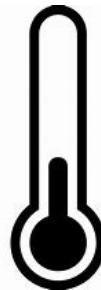
R-Log uses a proprietary binary type protocol to transmit data using LSI LASTEM communication programs: 3DOM and CommNET.

▶ Measurements

R-Log units can be connected to a wide range of sensors for environmental quantities, as:

- Air temperature and Relative Humidity
- Black globe temperature
- Wet temperature
- Surface and materials temperatures
- Air speed
- Light
- Pollutance (indoor air quality)
- Thermal flow and Radiant asymmetry
- Meteorological quantities

LSI LASTEM supplies a wide range of compatible sensors (see the LSI LASTEM's catalogues). Having terminal inputs, using ELO3515 model, it is possible to use third-parties sensors



▶ Switched power supply outputs

ELO3515 N.7 electrical outputs
Independent to supply external sensors and devices that can be activated with configurable logics depending on the data acquired. These outputs become relay outputs with a special external module (MG3023).

▶ Peripherals

R-Log is equipped with the following peripherals:

- N.1 RS232 DCE port
- N.1 ZigBee radio (2.4 GHz)

▶ Display

R-Log is equipped with a back-lit LCD display (4x20 chrs) (see Models). The following information are listed:

- Real-time measurements list
- Dignostic

▶ Power supply

R-Log runs at 10...14 Vcc and can charge, through battery charger (BSC015) the internal rechargeable lithium battery (see Models).

▶ Modbus RTU and TCP output from R-Log network

In stand-alone installations, it is possible to obtain Modbus (RTU or TCP) output of the quantities measured by the R-Log network through an E-log module connected via RS232 to the R-Log Master module. The same E-Log has up to 7 electrical outputs to trigger external devices according to programmable events. These outputs become relay outputs with the external module (MG3023).

▶ Built-in Temperature sensor

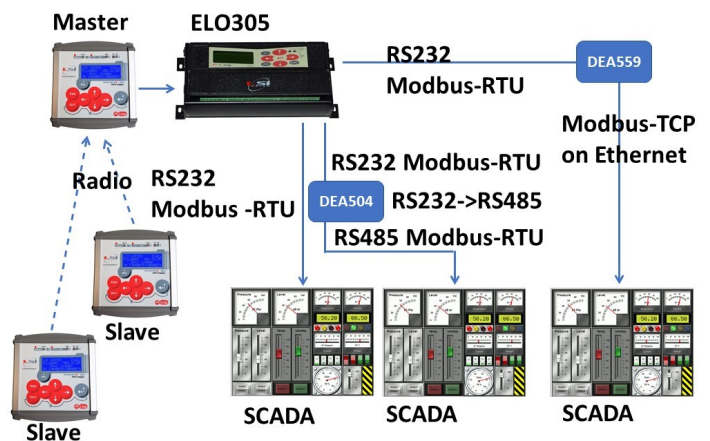
Built-in Temperature sensor (accuracy 0,5°C).

▶ Data Logger configuration

The configuration is carried out by means of the 3DOM program on PC. The configuration file is sent to the instrument via RS232, USB, RS485 or Ethernet with external optional devices.

▶ Clock synchronization

The internal clock (accuracy 30 seconds/month) is updated through the keyboard or through the 3DOM configuration program.



► **Software**

Master
ELR510.1, ELO3515
Master configuration.



Ethernet
(DEA553)

3-DOM software
(Manual downloads)

BSZ306 CommNET
(Automatic downloads)

BSZ411 X-Panel

BSZ310 InfoFLUX

SQL GIDAS modules:
BSZ311, BSZ313-
315-317, BSZ422,
BSZ420

The data acquired by R-Log Master are downloaded to a PC using two types of programs:

- 3DOM: in manual mode saves the data in TXT text format, or in SQL-Gidas format.
- CommNET: in automatic mode saves data in TXT text format, or in SQL-Gidas format. This program allows also data communication via modem GPRS.

Once the data is saved in SQL-Gidas format, they can be managed with all the LSI-LASTEM applications that use this type of database (see Software catalog). Through the X-Panel program it is possible to view the data in dynamic form in real-time.

► **Installation**

In portable applications, R-Log (ELR510.1) is mounted on a BVA304 tripod through a stand where also the probes can be fixed (see Accessories). The model ELO3515 through DIN connection, can be fixed inside ELF boxes (see Accessories). Depending on the ELF's models, the enclosure can also accommodate power systems, communication devices and batteries.



R-Log (ELR510.1) tripod mounting using a stand.





IP66 enclosure for fix monitoring applications.



IP66 enclosure for portable monitoring applications.

Models R-Log

Code	ELR510.1	ELO3515
		
Description	R-Log data logger. N.5 inputs by Mini-Din connector. 2.4 GHz radio programmable as MASTER, SLAVE, REPEATER mode	R-Log data logger. N.12 inputs by terminal block. 2.4 GHz radio programmable as MASTER, SLAVE, REPEATER mode
Inputs type	Mini-DIN	Terminal block
Analog inputs	N.4 differential	N.8 differential (N.16 single ended)
Digital inputs	N.1 (on/off or frequency/counter)	N.4 (on/off or frequency/counter) <ul style="list-style-type: none"> • N.2 input for sensors with optoelectronics (freq. max 10 kHz) • N.2 Frequency input (freq. max 5 kHz) • N.4 Logic state input ON/OFF (they acquire signals 0...3 Vdc)
N° channels	N.50	N.99
Sensor's auto-recognition	YES	NO
Switched power supply outputs	NO	YES (qt.7)
Back-lit display	YES	NO
Threaded slot for tripod fixing	YES	NO
Internal battery	2Ah rechargeable (4,. V)Lithium	NO
Plug for power battery charger	YES	YES
Included accessories	RS232/USB adapter, RS232 cable.	RS232/USB adapter, RS232 cable, DIN-bar mounting
Dimensions	140 x 120 x 50 mm	242 x 108 x 80 mm
Weight	500 g	720 g

Technical features R-Log

Analog inputs		Range	Resolution	Accuracy (@ 25°C)	
	Voltage	-300...1200 mV	40 µV	±160 µV	
		±78 mV	3 µV	±30 µV	
		±39 mV	1.5 µV	±15 µV	
	Pt100	-50...70°C	0.003°C	±0.1°C	
		-50...600°C	0.011°C	±0.3°C	
		0...6000 Ω	0, Ω	±1.5 Ω	
	Resistance	80...140 Ω	0.0013 Ω	±0.02 Ω	
		80...320 Ω	0.005 Ω	±0.05 Ω	
		0...6000 Ω	0.19 Ω	±1.5 Ω	
	Thermo-couples	E-IPTS 68 -200...1000°C	< 0.1 °C	±0.6 °C	
		J-IPTS 68 -50...600°C	< 0.1 °C	±0.6 °C	
		J – DIN -50...600°C	< 0.1 °C	±0.6 °C	
		K-IPTS 68 -150...1350°C	< 0.1 °C	±0.5 °C	
		S-IPTS 68 0...1600°C	0.22 °C	±2.0 °C	
		T-IPTS 68 -200...200°C	< 0.1 °C	±0.5 °C	
	Inputs number	See models			
	ESD protection	±8 kV contact discharge IEC 1000-4-2 ±1.2 kV air-gap discharge IEC 1000-4-2			
	Channel to Channel crosstalk	-93 dB			
Max input signal	1.2 V				
EMC filter	On all inputs				
Temperature error (@-10...30°C)	300...1200 mV < ±0.01% FS, ±39 mV < ±0.01% FS ±78 mV < ±0,01% FS				
Digital inputs	Inputs number	See models			
	Mode	See models			
	Max input frequency	5 kHz			
	Accuracy	3 Hz @ 5 kHz			
	Protection	Transient voltage suppressor 600 W, <10 µs			
Switched power supply outputs (see models)	Outputs number	See models			
	Max total current	On a single output: 0.7 A On all outputs: 1.2 A			
	Protections	Thermal and over current (> 0.15 A)			

Power supply	Power supply	10 ... 14 Vdc
	Power consumption	<ul style="list-style-type: none"> Standby: < 4 mW During measurements: 115 mW (136 mW display On)
	Radio consumption	TX ON: 180 mA, RX ON: 30 mA
	Protections	Transient voltage suppressor: 600 W, t >10 µs; Polarity inversion
Battery (see models)	Type	2 A (4,2 V) Lithio rechargeable (See models)
	Recharging time	About 8 hrs
	Battery duration	Standby: 9 months, Radio Off: 48 hrs, Radio On: 24 hrs
Radio	Tipo	ZigBee
	Frequency	ISM 2.4 GHz direct sequence channels
	Power	10 mW (+10 dBm)
RS232 ports	Number	1
	Speed	1200...115200 bps
	Type	DE-9 pin/male/DTE
Others	Watch	Accuratezza: 30 s/m (@ 25°C)
	Display	LCD 4 x 20 car
	Keyboard	N.8 keys
	Processor	RISC 8 bit, clock 16 MHz
	ADC converter	18 bit resolution (rounded to 16 bit)
	Sample duration	(rejection 50/60 Hz): 80 ms@rejection 50 Hz
	Data memory	8 Mb
	Environmental limits	-20...60 °C, 15...100 % RH (without condensation water)
	Protection rate	IP 40
	Weight	See models
	Dimensions	See models