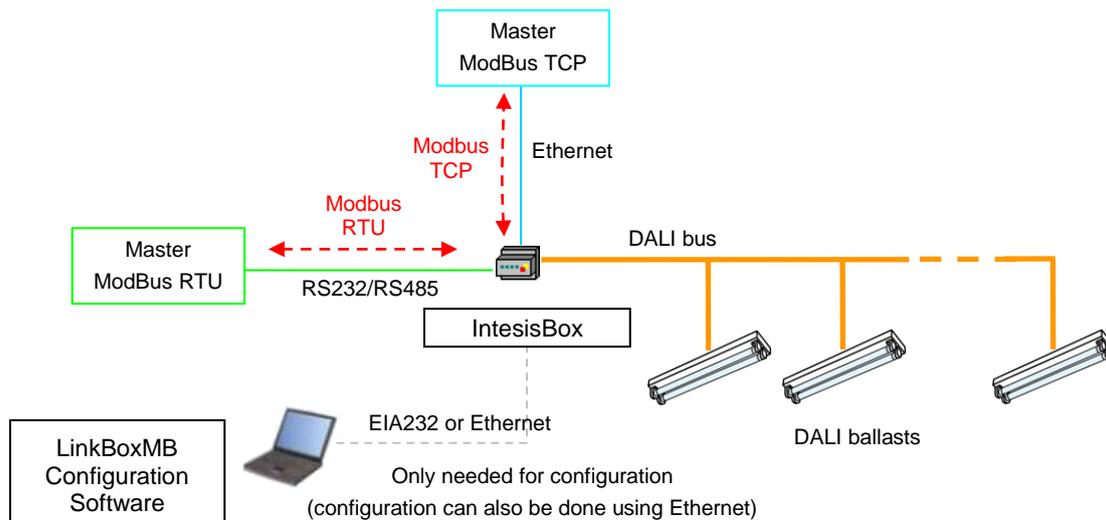# IntesisBox®

Modbus Server - DALI

Gateway for integration of DALI ballasts into Modbus based control systems

IntesisBox is a DALI master device, monitoring and controlling DALI ballasts connected to a DALI bus (up to 64 ballasts can be integrated within a single channel). IntesisBox also supplies the necessary power for the DALI Bus.

Modbus master devices connected to IntesisBox can read IntesisBox's internal datapoints by means of standard Modbus communication. Modbus interface of IntesisBox supports Modbus TCP or Modbus RTU (RS232 or RS485), software configurable, and acts as a Modbus slave device. DALI ballasts can be monitored and controlled from Modbus using standard Modbus register types.

IntesisBox Modbus Server series are configured using LinkBoxMB, a software tool for Windows™ which is supplied along with the purchase of IntesisBox with no additional cost.

URL	http://www.intesis.com
email	info@intesis.com
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Modbus interface of IntesisBox

Functions supported

- Modbus functions 03 and 04 (*Read Holding Registers* and *Read Input Registers*) can be used to read Modbus registers.
- Modbus functions 06 and 16 (*Single Multiple Holding Registers* and *Write Multiple Holding Registers*) can be used to write Modbus registers.
- If *poll records* are used to read or write more than one register, it is necessary that the range of addresses requested contains valid addresses; if not the corresponding Modbus error code will be returned.
- Modbus error codes are fully supported; they will be sent whenever a non valid Modbus action or address is required.

Data Formats

The Modbus registers are of 2 bytes (16 bits), its content is expressed always in MSB..LSB.

Modbus RTU

- Baud rate can be selected from 1200, 2400, 4800, 9600, 19200, 38400 and 57600.
- Modbus slave number can be configured. Physical connection (RS232 or RS485) can also be selected.
- Only the lines RX, TX and GND of the RS232 connector are used (TX/RX+ and TX/RX- for RS485).

Modbus TCP

- The TCP port to use can be configured (by default 502 is used).
- The IP address, subnet mask and default router address to use by IntesisBox can be also configured.

Address Map

The Modbus address map is fix, every point in the IntesisBox is assigned to a pre-defined Modbus register address.

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Existing Modbus registers for each ballast (1..64)

Point name	Register	Description
Dali ErrorCom	Read	Communication error
Dali Sts	Read	Byte value representing the status of the ballast • b0-Ballast Ok • b1-Lamp Fail • b2-Lamp Power On • b4-Fade Running • b5-Reset State • b3-Ballast Limit Error • b6-Missing Short Address • b7-No Power Command After Power Up
Dali PwrLvl	Read	Actual power level on the ballast, periodically read by IntesisBox (0…100%)
Dali PwrSet	Write	Point allowing to set the power level control of the ballast (0…100%)
Dali Cmd	Write	Point allowing to send DALI commands to the applying ballast (enumeration-based): • Off, • 100% • Step Up • Step Down • Go To Scene X • Store Current Level as Scene X • Remove Scene X • Set Fade Rate • Set Fade Time • Configure Min Level • Configure Max Level • Configure Power-on Level • Configure System failure Level

Existing Modbus registers for each group (1..16) and broadcast/all ballasts too

Object name	Object type	Description
Dali PwrSet	Write	Point allowing to set the power level control of the group (0…100%)
Dali Cmd	Write	Point allowing to send DALI command to the applying group (enumeration-based): • Off, • 100% • Step Up • Step Down • Go To Scene X • Store Current Level as Scene X • Remove Scene X • Set Fade Rate • Set Fade Time • Configure Min Level • Configure Max Level • Configure Power-on Level • Configure System failure Level

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DALI interface of IntesisBox

DALI Interface	
DALI Bus	Supplies power to the DALI bus (+15V +/-2%) Max current drain is 150mA. Opto-isolated from the rest of ports of IntesisBox.
Number of ballasts	1 channel / 64 ballasts
Parameters that can be configured in each ballasts using LinkBoxMB	All of those defined in the DALI standard • Short Address • Min Level • Max Level • Power-on Level • System failure Level • Fade rate • Fade time • Group 0..15 membership • Scene 0..15 preset value
Other	The software LinkBoxMB is used to configure the IntesisBox and also to do the task of addressing, commissioning and configuration of the DALI ballast.

Configuration tool

| LinkBoxMB	• Visual engineering tool, easy of use, for gateway's configuration and supervision compatible with Microsoft Windows operating systems, supplied with the gateway free of charge. • Multi-window tool allowing to supervise simultaneously the communication activity with both protocols (systems), real time values for all the signals allowing to modify any value (very useful for test purposes), console window showing debug and working status messages, and configuration windows to configure all the gateway's parameters and signals. • Signals configuration in plain text files (tab separated) for easy and quick configuration using Microsoft Excel (very useful in projects with a lot of points). • Allows configuring the gateway's parameters and signals while in off-line (not connected to the gateway). • Connection to the gateway for download the configuration and supervision by using serial COM port of the PC (serial cable supplied with the gateway). • Allows configuring all the external protocols available for IntesisBox® Modbus Server series. • Upgrades for this software tool available free of charge whenever a new protocol is added to the IntesisBox® Modbus Server series. • Multi-project tool allowing having in the engineer's PC the configuration for all the sites with different IntesisBox® Modbus Server series gateways. • Multi-language tool, all the language-dependent strings are in a plain text file (tab separated) for easy modification or addition of new languages. • A list of system commands is available to send to the gateway for debugging and adjust purposes (Reset, Date/time consultation/adjust, Firmware version request…).

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Mechanical & Electrical characteristics

Enclosure	Plastic, type PC (UL 94 V-0). Dimensions: 159mm 105mm x 58mm.
Color	Light Grey / RAL 7035.
Supply Voltage	24 Vdc 250 mA (2-pole plug-in terminal block)
Mounting	Wall. DIN rail EN60715 TH35.
DALI bus power source	15Vdc +/-2% 150mA. (DALI bus is powered from IntesisBox)
DALI port	1 x DALI electrically isolated (2-pole plug-in terminal block).
Ethernet port (Modbus IP, device config)	1 x Ethernet 10BT RJ45.
Modbus RTU ports	1 x Serial RS232 (DB9 male DTE). 1 x Serial RS485 (Plug-in screw terminal block, 2 poles).
LED indicators	1 x Power indicator. 2 x DALI activity (Tx, Rx). 2 x Ethernet link & activity (LNK, ACT). 2 x Modbus RTU port activity (Tx, Rx). 1 x DALI bus power 1 x DALI test[1]
Push buttons	1 x DALI test[1]
Console port	EIA232. DB9 female connector (DCE).
Configuration	Via Ethernet or serial console port.[2]
Firmware	Allows upgrades via console port.
Operational temperature	0°C to +60°C
Operational humidity	25-90% at 50ºC, non condensing
Protection	IP20 (IEC60529).
RoHS conformity	Compliant with RoHS directive (2002/95/CE).
Certifications	CE

[1]   DALI test push-button and LED are meant to perform a quick test of your DALI line and connected ballasts.
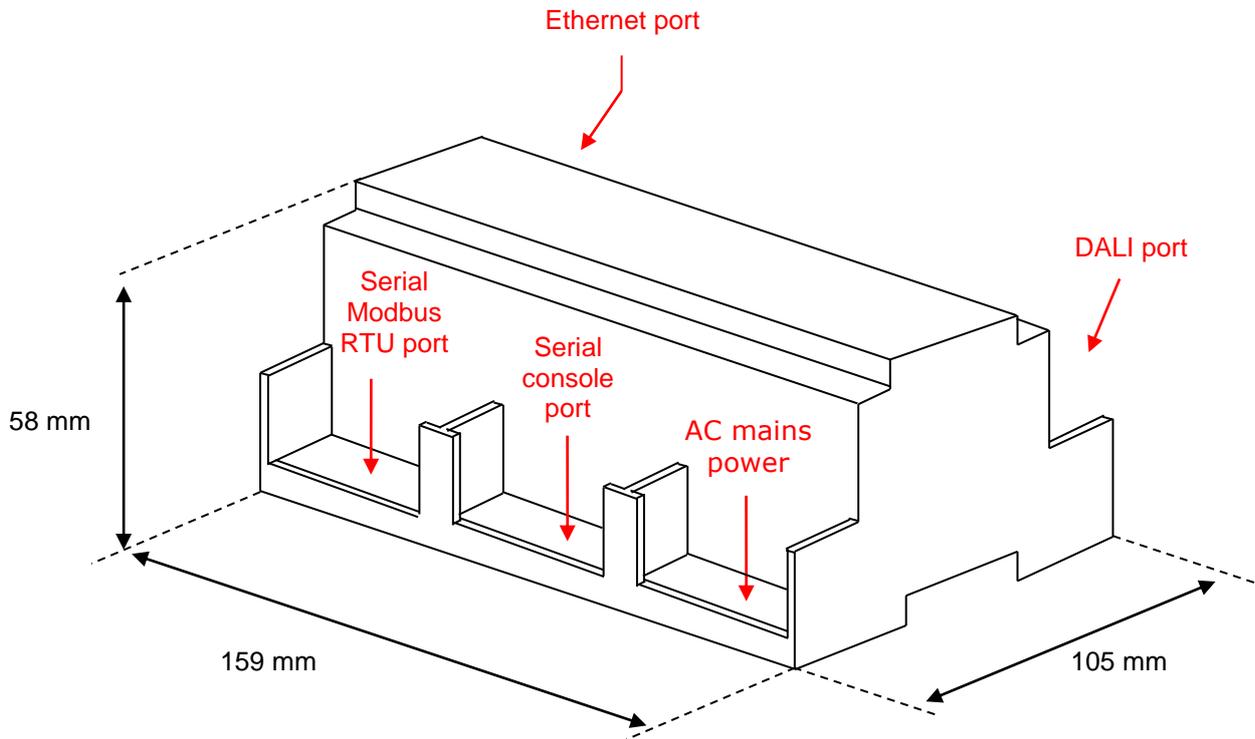
[2]   Standard cable DB9 male-DB9 female 1,8 meters long is supplied with the device for connection to a PC COM port for configuring and monitoring the device using the serial port (Ethernet is also possible). The configuration software, compatible with Windows® operating systems, is also supplied.

Connections
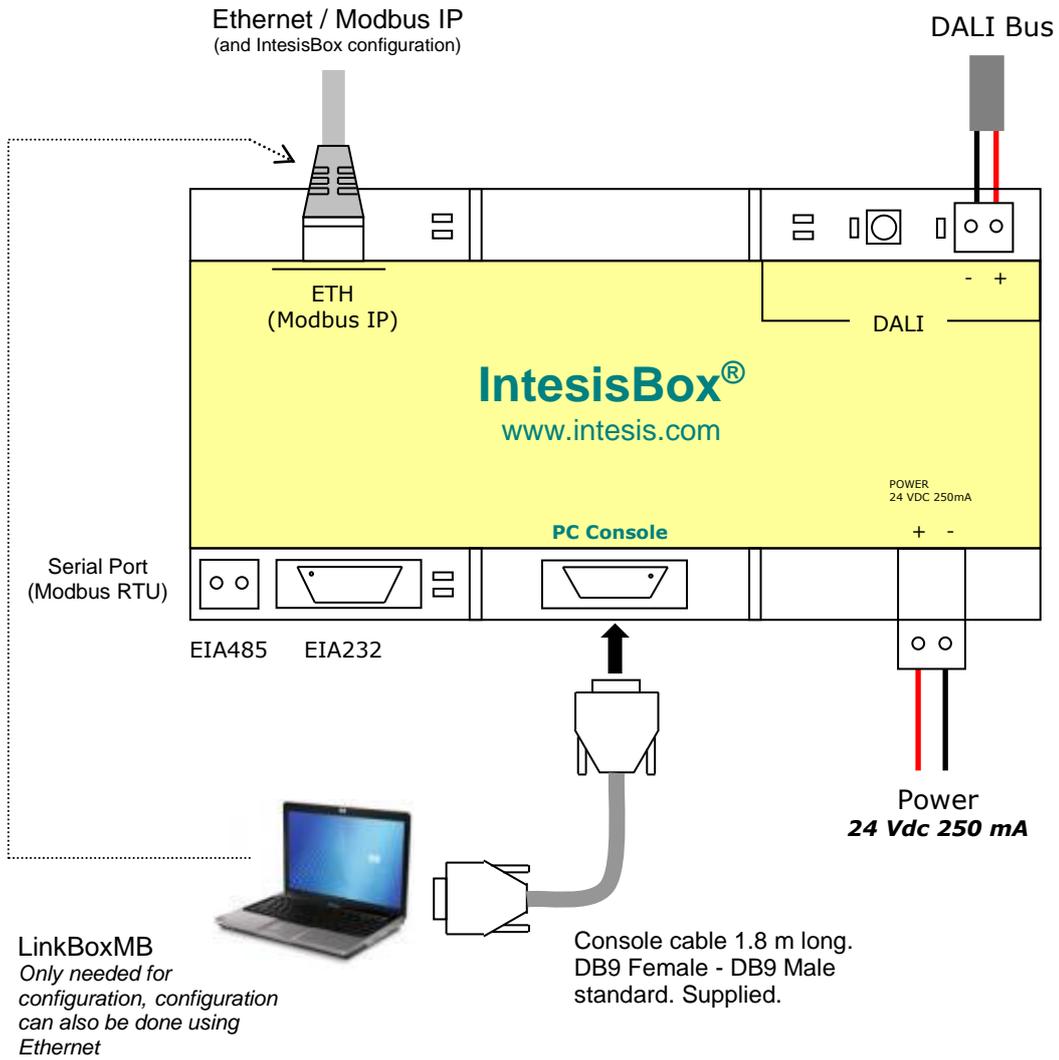
Dimensions

External dimensions

Free space recommended in the install location of the device, with spacing enough for external connections.

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